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Public Service
Company of Colorado
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R.O. WILLIAMS, JR.
VICE PRESIDENT
NUCLEAR OPERATIONS

June 13, 1988
Fort St. Vrain
Unit No. 1
P-88200

Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Docket No. 50-267

SUBJECT: Fire Protection Program Plan, Request for Additional Information

REFERENCE: 1) NRC Letter dated April 29, 1988, Heitner to Williams (G-88144)

Dear Gentlemen:

Reference 1 requested that Public Service Company of Colorado (PSC) provide the NRC with additional information on Fort St. Vrain's Fire Protection Program Plan (FPPP). Attached is PSC's response to all six items that were requested.

If you have any questions or comments, please contact Mr. M.H. Holmes at (303) 480-6960.

Very truly yours,

R.O. Williams, Jr.
Vice President
Nuclear Operations

ROW/BD:jw

Attachment

A006 Drawings to: Docket Files
1/1

Attachment

cc: Regional Administrator, Region IV
ATTN: Mr. T.F. Westerman, Chief
Projects Section B

Mr. R.E. Farrell
Senior Resident Inspector
Fort St. Vrain

PSC RESPONSE TO
FIRE PROTECTION PROGRAM PLAN REVIEW
REQUEST FOR ADDITIONAL INFORMATION

NRC Request 1:

During the 1983 Appendix R audit, a concern was raised concerning the routing of the power feed for the electric fire pump through the area containing the diesel fire pump. During the site visit of April 4-6, 1988 it was demonstrated that a redundant feed from the ACM had been added, however, it appeared that the electrical control circuit for the electric fire pump still ran through the diesel room. Please provide conduit routing diagrams and a description which demonstrates the separation of all necessary power and control cables for the electric pump from the room containing the diesel fire pump.

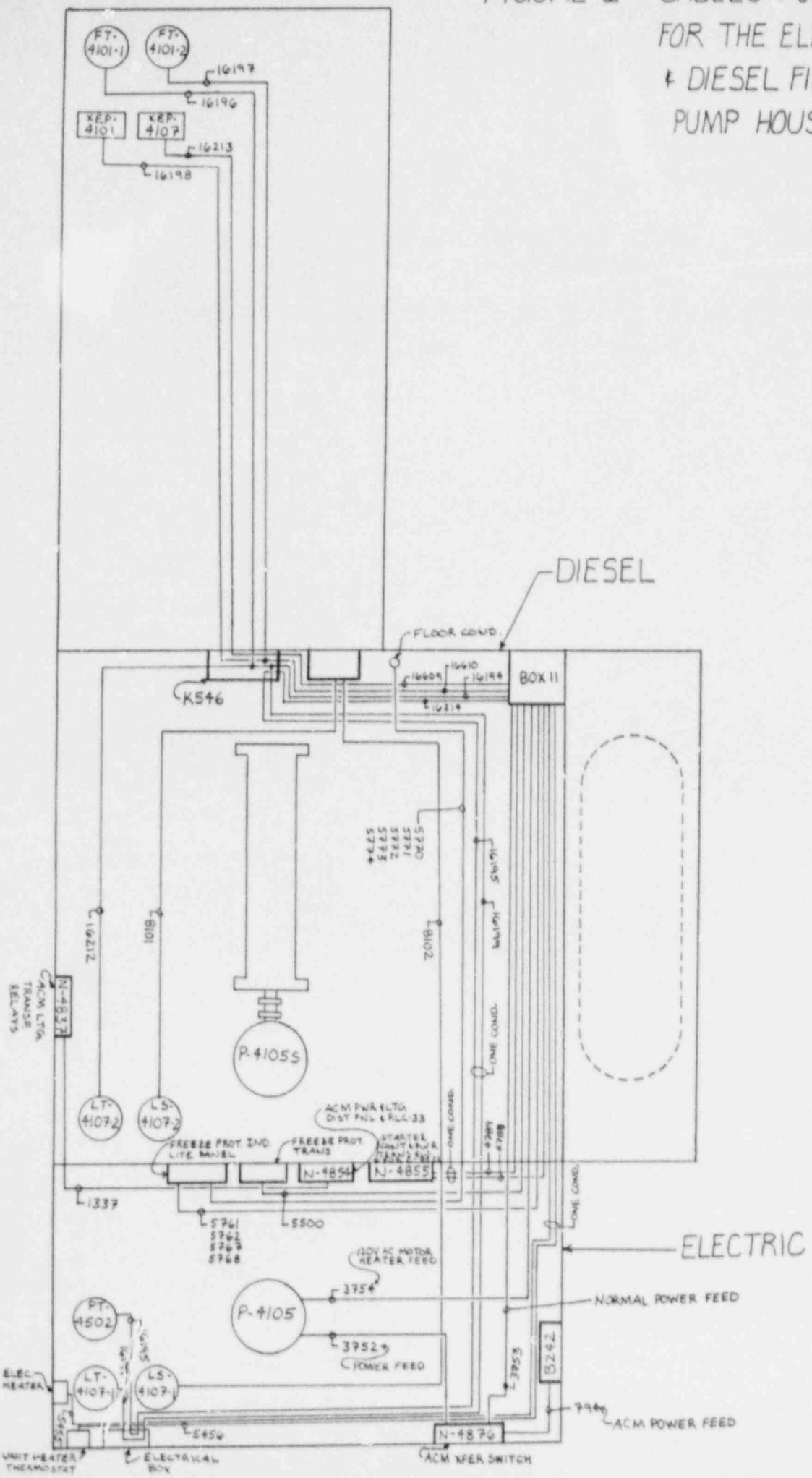
PSC Response 1:

Figure 1 shows the cable and conduit routing for the diesel and electric fire water pump rooms. The control cable (cable 3754) of concern which runs through the diesel room is the 120V AC motor heater feed cable. The motor heater is used to keep condensation out of the motor and is not required for the pump to operate. All control circuitry for the motor driven pump are located outside of the fire water pump house. The normal power cable for the electric fire water pump does run through the diesel pump side, however the electric pump can still be operated following a fire in the diesel fire water pump room using ACM power. The ACM power cable (cable 794) for the electric fire water pump runs from the ACM 480V switchgear (N-4868, compt.C2) directly to the electric fire water pump room, via underground ducts. This cable does not go through the diesel side of the fire water pump house. When the pump is powered by ACM power (manually) the control and power cables used during normal power operation are not needed and are not a factor in the pump's operation.

The following cables (within the fire water pump house) are required for either normal power or ACM power, for the electric fire water pump to operate:

CABLE	FUNCTION
794	ACM POWER FEED
3752	POWER FEED FROM ACM TRANSFER SWITCH
3753	NORMAL POWER FEED

FIGURE 1: CABLES & CONDUIT FOR THE ELECTRIC & DIESEL FIRE WTR. PUMP HOUSE



NRC Request 2:

Provide drawings and any other necessary documentation which demonstrates that detectors throughout the plant are located in compliance with NFPA 72A and 72E. This information should also address the adequate spacing of detectors when ionization and beam detectors are used in the same area.

PSC Response 2:

PSC is reviewing the potential derating of specific fire detectors by the fire detector manufacturer after we requested him to certify the fire detection spacing per the guidelines of NFPA 72E. PSC design Specification 45-S-16 (attached) specified that area-wide detection per our original commitment contained in Vol. 3 of the Appendix R reports, be provided for the Reactor and Turbine Buildings. If it is determined that additional fire detectors are required, PSC will institute a fire watch on the deficient areas and will provide the NRC with a schedule for the installation of the remaining fire detectors. We are attempting to resolve this question expeditiously with the manufacturer's representative and anticipate submitting our response, including drawings and any other necessary documentation, by July 28, 1988.

NRC Request 3:

Provide justification for the use of non-IEEE 383 cables in the plant. This response should address items such as the location of this cable, combustible loadings in these areas, and why this cable does not impact plant safety.

PSC Response 3:

Public Service Company of Colorado is presently evaluating the locations outside of the Congested Cable Areas and Three Room Control Complex where significant concentration of cables exist. A significant concentration is defined as being the equivalent loading of 3.5 standard 30" wide, fully loaded cable trays within a 20 ft. radius. Where this concentration is determined to exist, PSC will evaluate the impact on plant safety. If unacceptable conditions exist, PSC will take appropriate corrective measures. It is anticipated that we will submit this information by August 12, 1988.

In conjunction with this submittal, PSC is attaching the Underwriters Laboratories (UL) VW-1 flame test requirements. The FPPP Fire Hazards Analysis (Section FP.3) uses a conservative value for the heat liberated by a fire of cable jacket and does not take credit for any IEEE 383-1974 cables which may exist.

The following paragraphs provide background information on previous communications between PSC and the NRC concerning fire protection of cables:

- When cables were originally procured for the construction of FSV Nuclear Generating Station, IEEE 383-1974 had not yet been released.

- Cables installed during FSV construction were required to comply with the UL vertical flame test (VW-1) requirements. Reference 1, which was dated December 21, 1970 (during FSV construction), states that "Cable insulation is flame-retardant as defined by the Underwriters Laboratories vertical flame test."

- From inspections conducted by Mr. T.F. Westerman of the NRC on November 18-21, 1975 and on December 15-19, 1975 it was discovered that Public Service Company of Colorado could not produce test reports of the performance of UL VW-1 for all cable types installed (See Reference 2). This was corrected as discussed in PSC's response (See Reference 3) which stated that results of the Vertical Flame Test performed on samples of FSV cables were available on site. In addition, this violation was closed out by an NRC Internal Memo dated January 9, 1976.

- Following the electrical cable fire at TVA's Brown's Ferry nuclear generating station in 1975, the NRC took measures to assure that cables supplying power to redundant components in the essential shutdown trains were routed in separate trays, conduits, or wireways so that an electrical cable fire would not damage cables supplying both essential shutdown trains. In areas where separation of redundant essential cables could not be achieved due to physical layout of the plant, such as entry into the control room panels, the NRC stipulated measures to assure rapid detection and suppression of fires, as well as use of flame retardant coating to prevent the propagation of fire along cables.

- PSC re-routed a substantial number of cables, installed fire detection and suppression systems in the congested cable areas (CCAs), and applied flame retardant material to cables in the CCAs in response to NRC requirements.

- In addition to these measures, PSC installed the Alternate Cooling Method (ACM) system at FSV to enable plant cooldown using PCRV liner cooling in the event a fire in one of the CCAs were to damage redundant essential cables. The NRC approved the measures implemented by PSC to address fires in the CCAs (See Reference 4). In fact, when the NRC required PSC to evaluate FSV compliance with the guidelines of BTP 9.5-1 Appendix A, the NRC excluded the CCAs from this comparison (See Reference 5).

- PSC has not subjected many of the electrical cable types used at FSV to IEEE 383-1974 flame test requirements since much of the cable was installed prior to 1974. This cable was subjected to UL VW-1 flame qualifications, however, flame retardant materials have been applied to those locations necessary to prevent the spread of a cable fire from cables or cable trays serving essential equipment in one loop shutdown train to cables or cable trays serving essential equipment in the alternate loop shutdown train. The paragraphs below discusses the requirements applied to FSV electrical cables to accomplish this objective.

- It was not considered necessary to cover the full length of all non-IEEE 383-1974 cables with flame retardant coating, since essential cables in either train would survive fires in cables of the alternate train provided flame retardant was properly applied to strategic ("crossover") locations.

- In the cover letter attached to Amendment 14 to the FSV Operating License (See Reference 6) the NRC makes the statement "We have concluded that the overall program of electrical cable corrective action represents an acceptable approach for correcting the deficiencies." This program of electrical cable corrective actions included the five categories of nonconformance (Category 1 to Category 5) of electrical cables and their fire protection which can be seen in Amendment 14 (Reference 6) to the FSV Operating License.

REFERENCES FOR PSC RESPONSE 3:

1. PSC Letter dated December 21, 1970, R.F. Walker to Dr. Peter A. Morris (AEC); Subject: Amendment 17 of FSAR to AEC.

2. NRC Letter, dated January 9, 1976 (G-76004), G.L. Madsen to C.K. Millen; Subject: Inspection conducted by Mr. T.F. Westerman, period November 18-21 and December 15-19, 1975.

3. PSC Letter dated January 29, 1976 (P-76032), C.K. Millen to E. Morris (NRC), Subject: Response to G-76004.

4. NRC Letter dated October 28, 1977 (G-77076), Richard P. Denise to J.K. Fuller; Subject: "Amendment No. 18 to DPR-34." (Page 4-4)

5. NRC Letter dated September 22, 1978 (G-78096), Themis P. Speis to J.K. Fuller; Subject: "FORT ST. VRAIN FIRE PROTECTION AND FIRE HAZARDS ANALYSIS."

6. NRC Letter, dated June 18, 1976 (G-76046), Richard P. Denise to Richard F. Walker; Subject: Response to PSC's proposed action on electrical cables not installed in accordance with FSAR criteria. (Amendment 14)

NRC Request 4:

Submit drawings which illustrate the installed configurations of fire dampers inside barriers. Also provide a description of the several types of dampers used in the plant and information which demonstrates that these dampers are rated equivalent to the barrier.

PSC Response 4:

To assure that all appropriate dampers have been reviewed for this request, the fire dampers as listed in the Fire Protection Operability Requirements (FPOR) will be used as a guide. These dampers can be found in the Fire Protection Program Plan (FPPP) on table FPOR-15-1, Issue 2 (Attachment AA).

1) The Building 10 dampers were installed per PSC CN-1461. The location of the dampers in the building can be seen on PSC drawings M-435 (Attachment 1A) and M-436 (Attachment 1B). The design of these dampers can be found in the CN file and in Division 15800 (B) of Specification 75-J-2 (Attachment 1C). Barriers are 3-Hour rated. Dampers are 3-Hour rated.

2) The Diesel Generator Room dampers were installed by PSC CN-2016 (Attachment 2A). Barriers are 3-Hour rated. Dampers are 3-Hour rated.

3) The damper installed at the Electric Fire Pump Room was done by PSC CN-2645 (portion of CN attached as Attachment 3A). Also included is the manufacturer's product sheet (Attachment 3B), which was part of the purchase order for the damper. Barriers are 3-Hour rated. Damper is 3-Hour rated.

4) The details of the fire dampers in the Auxiliary Boiler Room are shown on PSC drawing M-103-2 (Attachment 4A). Manufacturer's drawings for these dampers are also included (Attachments 4B and 4C). Barriers are 2-Hour rated. Dampers are 3-Hour rated.

5) The fire dampers of the Turbine Lube Oil Reservoir Room and the Turbine Lube Oil Storage Room have little original design information available on them. PSC is in the process of obtaining additional data for these dampers. PSC will assure that these dampers are 3-Hour rated. Barriers are 3-Hour rated.

6) The dampers discussed for the Control Room, the Auxiliary Electric Room, and the 480 Volt Switchgear Room (3RCC) are for the Halon System and are used to seal the 3RCC and prevent leakage. The design and construction requirements of these dampers are given in PSC Specifications 75-V-1 (Attachment 6A) and 75-V-2 (Attachment 6B). Barriers are 3-Hour rated. Dampers are not fire rated. This has been

addressed in the Appendix R Evaluation. An exemption for not fire rating the dampers was granted under the Appendix R Safety Evaluation Report issued to PSC in G-88171 dated May 10, 1988. No further action is required.

NRC Request 5:

During the April 4-6, 1988 site visit, the Appendix A comparison portion of the program plan was discussed with licensee representatives. The concern raised by the NRC was that a number of sections within this comparison use words such as "the intent of this guideline has been met", however, no explanation is presented of why the guideline is not strictly met. For sections where full compliance does not exist, provide, within the comparison, an explanation of the deviation and adequate justification for the deviation. Where justification is contained in lengthy analyses, reference to these documents would be satisfactory.

PSC Response 5:

Fort St. Vrain's comparison to Appendix A of BTP 9.5-1, Rev. 1 (FPPP Section FP.5.2) has been re-written and a draft copy of this comparison is attached. All of the FPPP Sections being revised, including Section FP.5.2, will be submitted to the NRC by July 22, 1988. The wording, "The intent of this guideline has been met" has been revised to, "This guideline has been met with the following exception(s):" or other appropriate wording. The comparison then justifies any exception(s) taken.

NRC Request 6:

It could not be determined during the April 4-6, 1988 visit whether or not the recently installed emergency lighting system provides adequate illumination for safe shutdown manual operator actions and for access and egress to areas where these manual actions take place. It is understood that this lighting system will be evaluated by the licensee during an upcoming drill. Although no action is necessary at this time, the issue of the adequacy of the emergency lighting system will remain an open item pending the performance of this evaluation.

PSC Response 6:

Fort St. Vrain will be performing a special T-Test on the emergency lighting system prior to the scheduled August 5, 1988 fire protection drill. When the emergency lighting system has been satisfactorily tested, PSC will submit documentation to close this open item.

ATTACHMENTS

FOR

PSC RESPONSE 2

PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

FORM 344-22-4082

SPECIFICATION COVER SHEET

NO. 45-S-16

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SPECIFICATION FOR	PLANT ITEM NO'S.
Fort St. Vrain Nuclear Generating Station 10CFR50, Appendix R, Fire Detection System	45

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NON-CONTROLLED COPY
VERIFY ISSUE STATUS WITH DOCUMENT CENTER PRIOR TO USE
FORM 372-22-3567

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ATTACHMENTS

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Price Schedule
Figures 1 through 8

ISSUE SUMMARY

ISSUE	PREPARED BY	ENGRG. REVIEW	Q.A. REVIEW	APPROVED BY	DATE	PASIS FOR REVISION
A	TENERA	KBB	TL	JBG by [illegible]	3/24/88	CN-2003 Initial Issue

REV. A

SPECIFICATION FOR
FIRE DETECTION SYSTEM
EQUIPMENT AND SERVICES FOR
FORT ST. VRAIN

1.0 GENERAL

1.1 Scope of Work

Contractor shall provide the necessary fire detectors, control panel, and services including specific detector location drawings, wiring/interconnection diagrams, installation supervision, acceptance testing, training, and documentation for a fire detection system for the Fort St. Vrain nuclear power station as specified herein.

1.2 Codes and Standards

The fire detection system shall meet the applicable requirements of the following National Fire Protection Association (NFPA) standards:

NFPA 72D-1979	Standard for the Installation, Maintenance, and Use of Proprietary Protective Signaling Systems
NFPA 72E-1984	Standard on Automatic Fire Detectors

Wiring shall be Class A as defined in NFPA 72D. In addition, all components shall be listed by Underwriters Laboratory (UL) or Factory Mutual (FM).

1.3 Purchaser Supplied Items

The purchaser will supply the following items for the fire detection system:

a. Installation of detectors and control panel;

b. Interconnecting cable and conduit and their installation;

c. Uninterruptible 120 Vac, single phase, 60 Hz power for the control panel;

d. Reproducible set of required plant arrangement drawings.

1.4 Schedule

Contractor shall commence work on or about July 1, 1985 and shall submit the detector location drawing mark-ups as each drawing is completed so installation can proceed on an area-by-area basis. All detector location drawings shall be completed within thirty (30) days of job authorization. Fire detector hardware shall be available on-site to support this installation schedule. The control panel shall be available on-site within sixty (60) days. System wiring diagrams shall be submitted within fifteen (15) days of the final detector location drawing submittal. All other documentation shall be submitted within ninety (90) days. Training shall be scheduled with the Purchaser, but shall be conducted no later than thirty (30) days after final acceptance.

2.0 DETAILED SPECIFICATIONS

2.1 Detectors

Contractor shall provide the necessary smoke detectors to cover the cross-hatched areas of Figures 1 through 8. Contractor shall base his bid on the following numbers and types of smoke detectors:

Figure Number	Area	Quantity of Linear Beams	Quantity of Photoelectronic
1	Open	8	None
	Machine Shop	None	2 Master/3 Slave
	Office	None	1 Master/3 Slave
	Water Treatment	None	1 Master/3 Slave
2	Open	4	None
3	Open	2	None
4	Open	6	None
	North/South of Fuel Storage Facility	None	2
5	Open	None	1 Master/2 Slave
6	Open	8	
	Office	None	2 Master/6 Slave
7	Columns 5-7	None	2 Master/4 Slave
	Columns 2-5	5	None
8	Open	6	None
	North/South of Equipment Rooms	None	3

All detectors shall be compatible with the control panel supplied under Section 2.4 and shall be configured in accordance with the manufacturer's instructions. All detectors except slaves shall be addressable. See Section 2.4 for further discussion of control requirements. All detectors shall be capable of operating over a temperature range of 60°F to 105°F with a relative humidity of 90%.

Linear beam detectors shall be Gamewell A2400 type or agreed upon equal. Photoelectronic detectors shall be Gamewell R7 type or agreed upon equal.

2.2 Location Drawings

Contractor shall determine by field inspection the specific placement of all detectors to comply with Section 1.2 of this Specification and the manufacturer's requirements. Contractor shall utilize the plant arrangement (PA) drawings provided by Purchaser to document the type and location of each detector. Location information shall be in sufficient detail so that installation can proceed without further information. Contractor shall also provide recommended mounting details for each detector type provided. (Note: Figures 1 through 8 reference the appropriate PA drawing.)

2.3 Wiring/Interconnection Diagrams

Contractor shall provide a complete set of wiring/interconnection diagrams showing all detectors wired to the control panel in a Class A loop. The wiring/interconnection diagrams shall clearly show all terminal connections for all devices, and shall identify the input terminals for Purchaser supplied power and the outputs for remote annunciation. The system wiring shall minimize the number of cable runs required back to the control panel. Contractor shall provide a recommendation on the size and type (shielded, etc.) of interconnection cable for the system and any size limitations.

2.4 Control Panel

Contractor shall provide a control panel compatible with the detectors provided. The control panel shall be of heavy duty steel construction suitable for wall mounting. The control panel shall be capable of operating over a temperature range of 60°F to 105°F with a relative humidity of 90%.

The control panel shall contain: all necessary microprocessor based controls to address, bypass, and annunciate trouble or alarm conditions for each addressable detector; an operating console; power supplies; and output relay(s) with unpowered contacts rated at 2A/24 Vdc for remote annunciation. Zone label wording for each detector address will be provided later by Purchaser.

The control panel shall be Gamewell type Flex 500A or agreed upon equal.

2.5 Installation Supervision

The Contractor shall supply the services of an Installation Engineer/Supervisor to assure installation of the detection equipment and the detection system as designed, in a manner to meet the installation requirements of Section 1.2 of this Specification. In addition, the Installation Engineer/Supervisor will be responsible for the acceptance of the work, subject to the approval of the Purchaser or his designated representatives. The Installation Engineer/Supervisor performance will also be subject to the limitations and agreements established by the Purchaser's installation contract, general conditions, and labor agreements.

The minimum time of work performance for the Installation Engineer/Supervisor shall be as follows:

1. That full period necessary to establish acceptable detailed location of the photoelectronic area smoke detectors, the linear beam smoke detector light transmitters, and light receivers;

2. That period necessary for instruction of installation personnel in acceptable tolerances, work practices, installation methods, testing procedures, precautionary methods for the protection of the equipment, and methods for assurance of an acceptable system;

3. Periodic inspections as the work progresses, not less than three times a work week;

4. For the duration of the adjustment, startup and acceptance of the system;

5. That time necessary to document acceptance testing;

6. Repeat acceptance testing on a standard day rate basis as requested by the Purchaser.

2.6 Acceptance Test Procedure

The Contractor shall prepare an Acceptance Test Procedure for final system acceptance test.

The Acceptance Test Procedure shall be documented by Smoke Detector Element, Control Panel, and/or conditions to be tested, tests to be performed on interconnecting wiring, and acceptance criteria. This documentation shall provide a sign-off sheet with a sign-off point for each element of inspection and shall require the signature of the Installation Engineer/Supervisor for both acceptance and rejection. Rejections requiring rework shall be signed by the installation contractor's representative as acknowledgement of work to be performed and rescheduled for additional testing and/or acceptance.

The special tools, filters, instrumentation, and equipment and similar items necessary for final adjustment and acceptance shall be listed in the procedure for assurance that the contractor will have them available at the point of test.

The Acceptance Test Procedure shall be in sufficient detail to assure that the installation is fully functional and conforms to the requirements of Section 1.2 of this specification. Final acceptance of the system will be made by the Purchaser's designated representative.

2.7 Training

The vendor shall supply a maintenance/training manual in reproducible form and 15 copies. This manual shall cover all vendor supplied items and shall include, but shall not be limited to, the following:

1. A tabulation of the equipment and submittals supplied under the contract, the contract numbers, and the quantity supplied;
2. Catalog sheets/cut sheets for each item which delineate methods of assembly and parts lists;
3. Test Procedures;
4. Special tooling and instrumentation required for testing and/or maintenance;
5. Vendor address and person to be contacted for assistance or parts replacement;

6. Periodic operating/maintenance procedures and schedules for assurance that the smoke detection system remains operable;

7. Wiring diagrams;

8. Interconnection diagrams.

A manufacturer trained instructor shall be made available at no additional cost to train the Purchaser's personnel in the day-to-day operation of the smoke detection system and its components, as well as maintenance procedures on a one-time basis. A lesson plan in outline form must be appended to the Training/Maintenance Manual for both day-to-day operation and for maintenance training.

2.8 Documentation

Design documentation shall be prepared which establishes both physical layout and specific design of the installed system. As a minimum, the following documentation must be supplied:

1. Physical equipment layouts prepared on mylar reproducibles provided by the Purchaser. These mylars as provided will be direct copies of drawings PA 2, 6, 8, 9, 10, 18, 19, and 23. The title, number, and change blocks will have been removed for placement of the vendor's titles, numbers, and issue records. Upon completion and Purchaser approval, double mat 5 mil mylar reproducibles shall be forwarded to the Purchaser for their records. The title blocks, revision, and number blocks shall be coordinated with and meet the requirements of the Purchaser.

2. Composite wiring/interconnection diagrams will be prepared on the same size and format of (1) above. Final issue will also be as prescribed in (1) above.

3. Manufacturer's drawings, maintenance cut sheets, wiring diagrams, logic diagrams, panel drawings, installation drawings must be transferred to mylar reproducible forms for final forwarding to the Purchaser.

4. Training/Maintenance Manuals are to be prepared and submitted as described under the Training/Maintenance section.

5. Manufacturer's installation and operating manuals for each system component shall be provided in multiple quantities and reproducible form.

6. Acceptance Test Procedures shall follow the detailed description contained in the section called Acceptance Test Procedure.

TRANSMITTAL SCHEDULE

Document Category	Specification Reference	Type Copy	Quantity Initial	Quantity Final	Days From Order For Approval	Days From Order Approval	Days From Order Final
1.1/1.2/1.4	Wiring/Interconnection	Repro	3		35	40	45
		Mylar		1			90
1.3/1.5	Equipment Layouts	Repro	3		21	25	30
		Mylar		1			90
1.1/1.2/1.3 1.4/1.5	MFG's Drawings	Repro	3		30	35	45
		Mylar		1			90
2.3/2.4	MFG's Manuals	Xerox Printed	3	15	21	25	30 90
2.1/2.2	Training/Maintenance	Xerox Printed	3	15	30	35	45 90
3.1	Acceptance Test	Xerox Printed	3	15	70	80	90 120

REV. A

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DEFINITIONS - DOCUMENT CATEGORY

1.0 Drawings

1.1 Wiring Diagrams - Prepared to show the internal wiring, terminal points, and external interface information for electrical equipment.

1.2 Interconnection Diagrams - Prepared to show the wiring required between the items of equipment.

1.3 Outline Dimensions - Drawings which show external envelops, size and location of openings for electrical cable or conduit, method of mounting.

1.4 Control Diagrams - Electrical control logic drawings which show the electrical paths for development of the control sequence.

1.5 Equipment Layouts - Drawings which show the location of elements of the system necessary to enable the system to perform its prescribed function.

2.0 Manuals

2.1 Maintenance - Written instructions for periodic testing, and to assemble, disassemble, program and maintain the equipment and/or system in a fully functional condition.

2.2 Training - Details of components and/or systems in a manner to fully describe their function and operation complete with lesson plans to establish methods and development of operational or maintenance knowledge.

2.3 Operating - Specific instructions and precautions to be used in placing the equipment in a fully operating condition.

2.4 Installation - Complete instructions including drawings necessary to place the equipment and/or system in a fully functional condition.

3.0 Procedures

3.1 Acceptance Test Procedure. This document is to establish the acceptance test methods and criteria for acceptance.

FIRE DETECTION SYSTEM
EQUIPMENT AND SERVICES FOR
FORT ST. VRAIN

PRICE SCHEDULE

Base Bid Price $_____

This price contains _____ man days of Installation Engineer/Supervisor time.

This price also contains _____ man days of Training Instructor time.

Unit Prices (for modification of Base Bid Price)	Deletion	Addition
Addressable Photoelectronic Smoke Detector (Master)	_____	_____
Photoelectronic Smoke Detector (Slave)	_____	_____
Linear Beam Smoke Detector Elements		
Transmitter	_____	_____
Receiver (Addressable)	_____	_____
Services		
Installation Engineer/Supervisor Standard (8) eight-hour day.	_____	_____
Overtime hour (each)		_____
Training Instructor Standard (8) eight-hour day	_____	_____
Overtime hour (each)		_____

Recommended Spare Parts
(Contractor to list)

Part Description	Part Number	Quantity Recommended	Unit Price

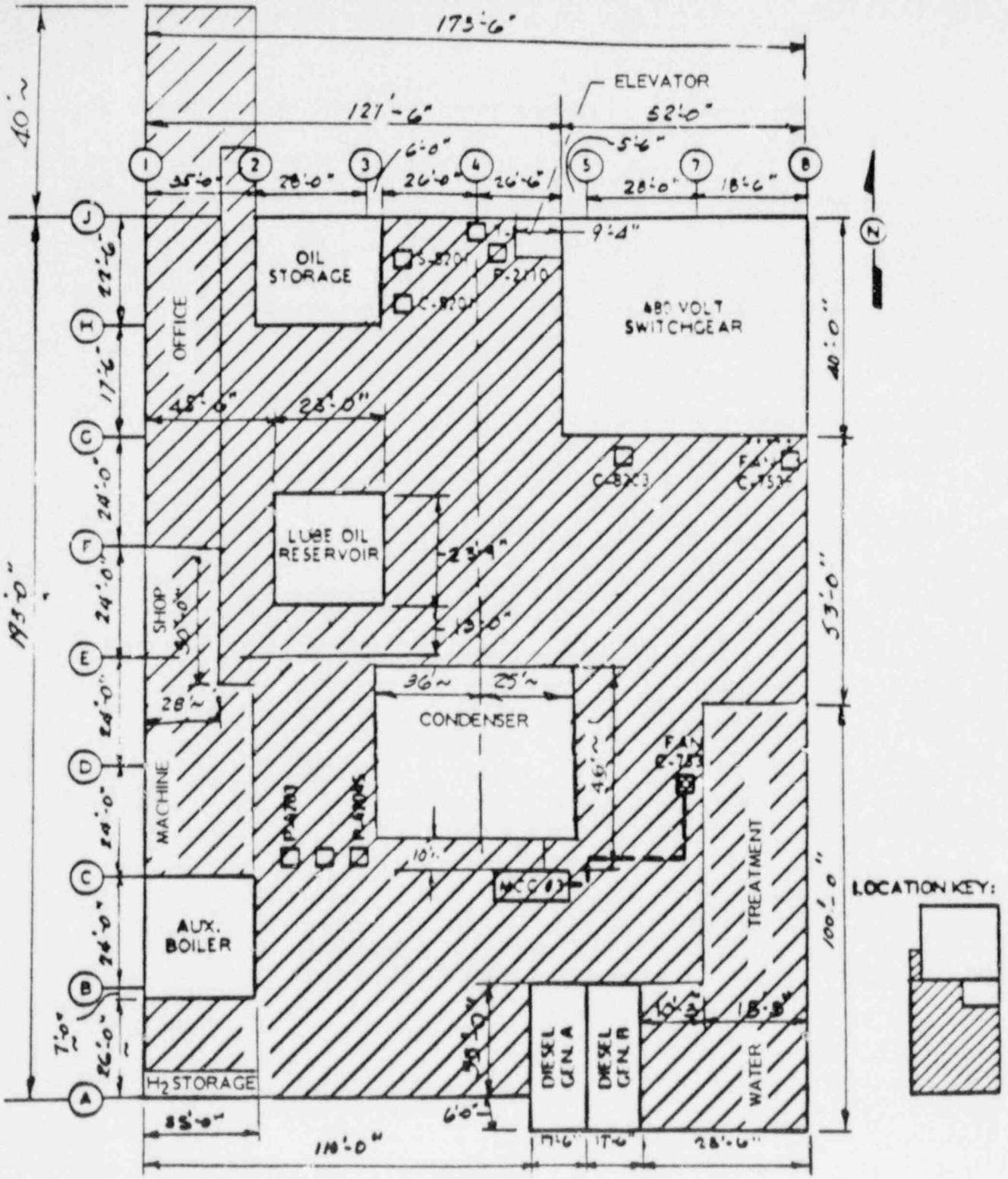


FIGURE 1

TURBINE BUILDING - GRADE FLOOR - CEILING ABOVE EL. 4791'-0"
PROPOSED FIRE DETECTION SYSTEM COVERAGE

REF. PA-19

DC-85-33

REV. A

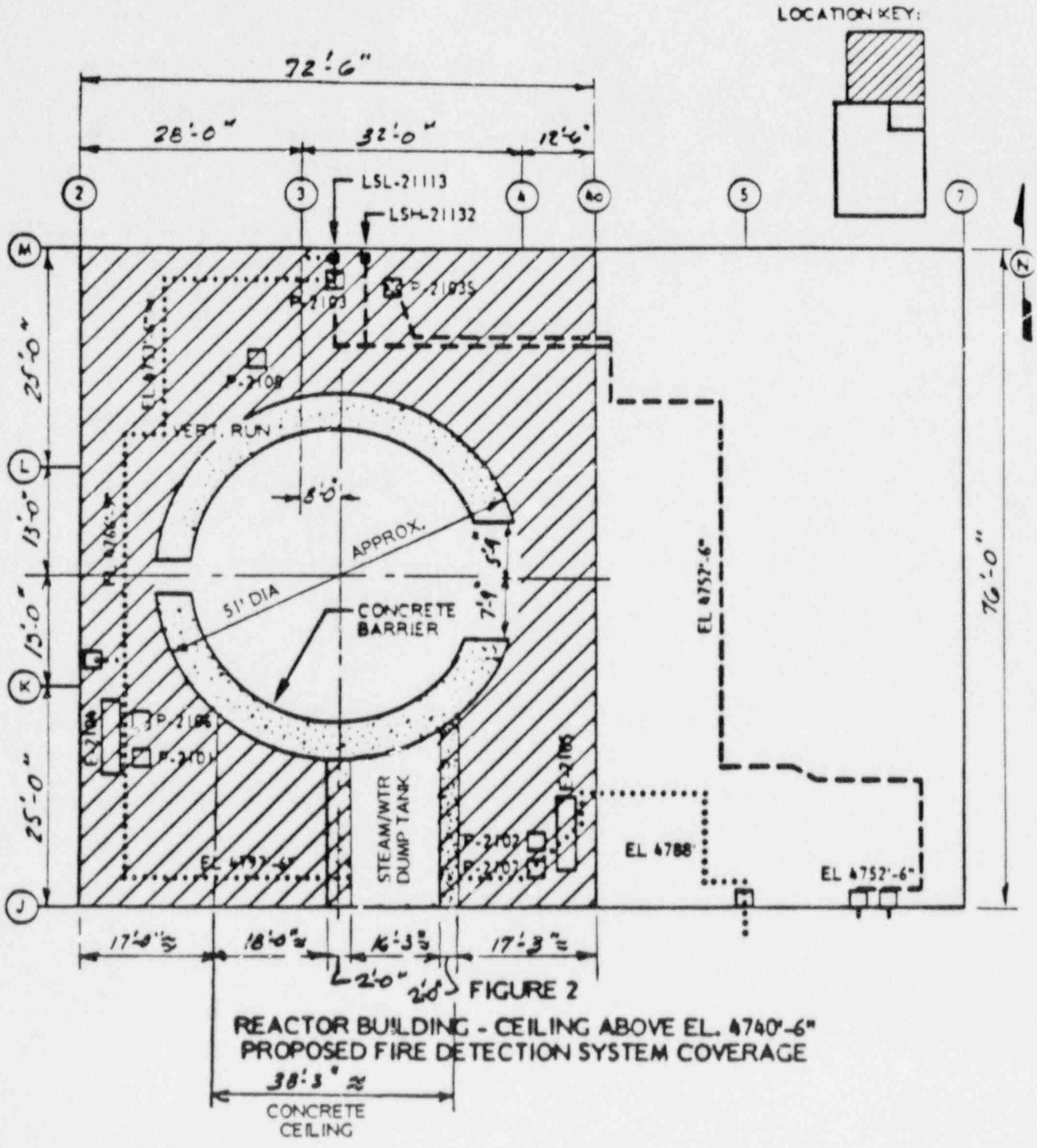


FIGURE 2

REACTOR BUILDING - CEILING ABOVE EL. 4740'-6"
PROPOSED FIRE DETECTION SYSTEM COVERAGE

DC-85-33

REF. PA-10

REV. A

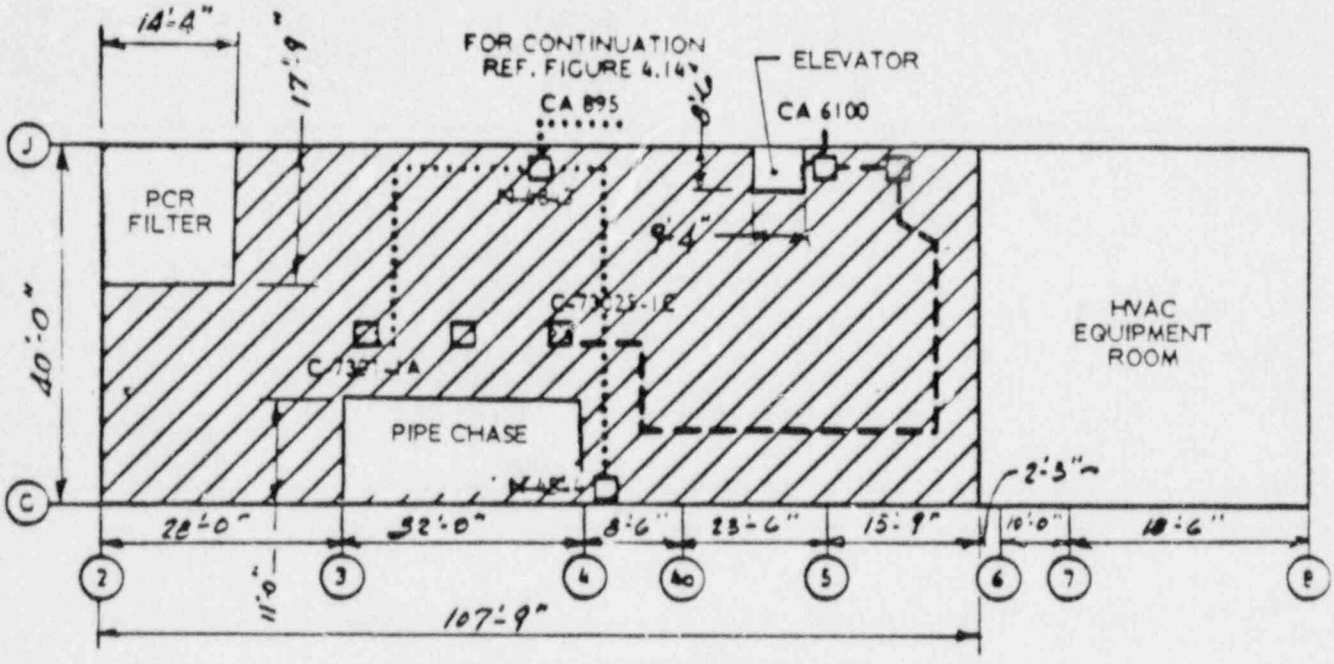
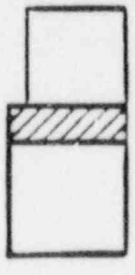


FIGURE 3

ACCESS CONTROL BAY - CEILING ABOVE EL. 4846'-6"
PROPOSED FIRE DETECTION SYSTEM COVERAGE

LOCATION KEY:



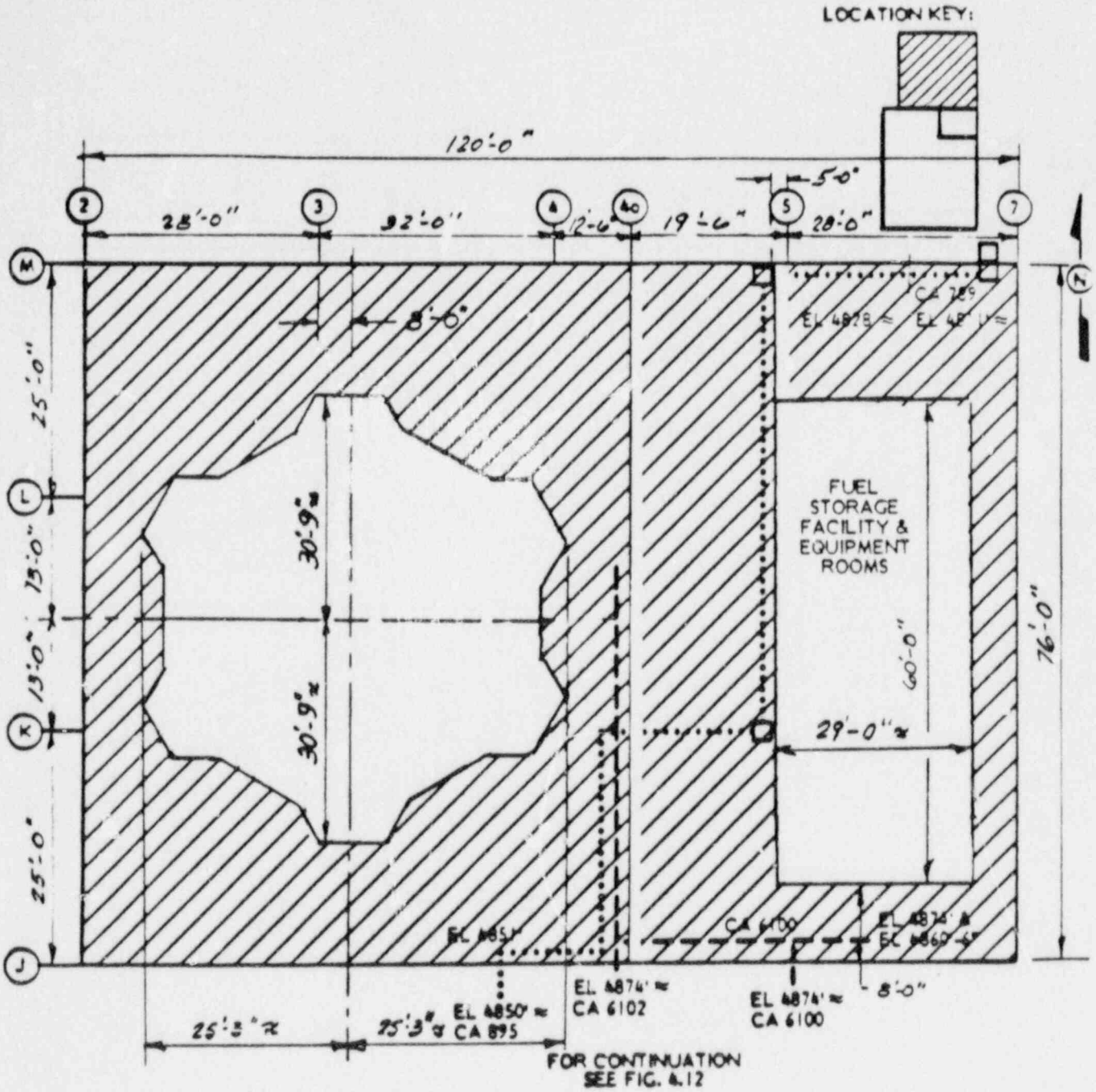


FIGURE 4

REACTOR BUILDING - CEILING ABOVE EL. 4864'
PROPOSED FIRE DETECTION SYSTEM COVERAGE

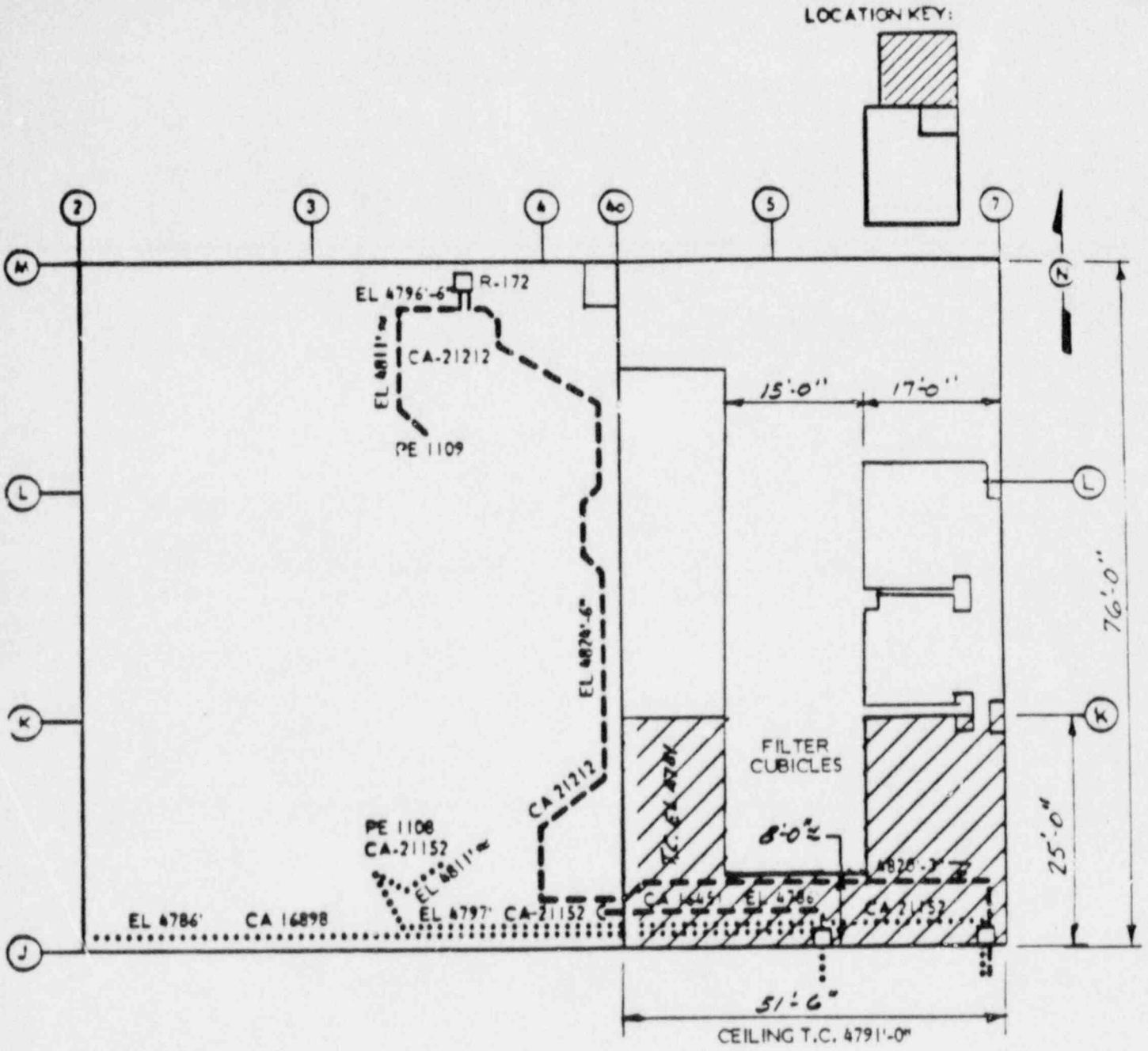


FIGURE 5

REACTOR BUILDING - CEILING ABOVE EL. 4781'
PROPOSED FIRE DETECTION SYSTEM COVERAGE

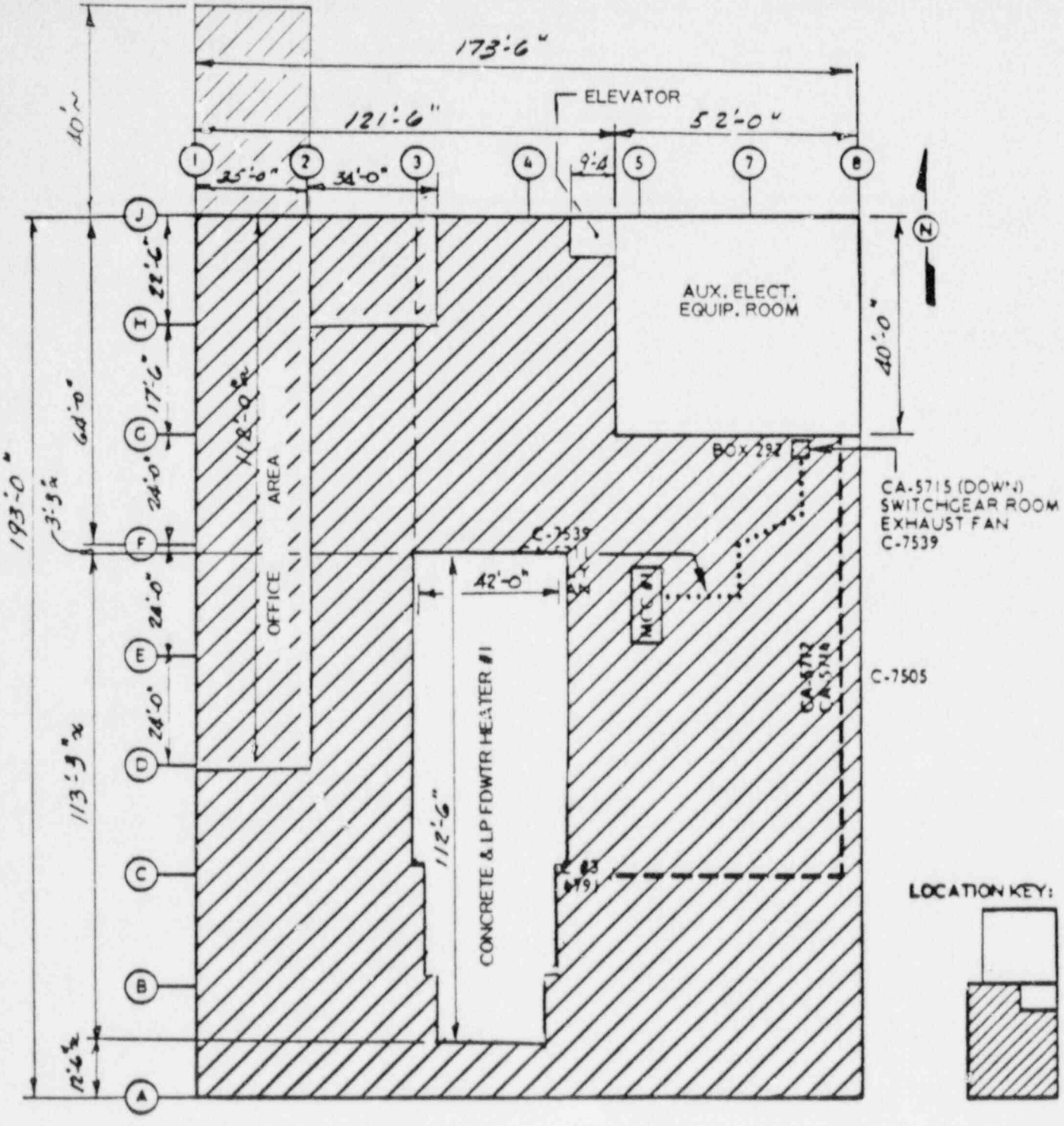


FIGURE 6

TURBINE BUILDING - MEZZANINE FLOOR - CEILING ABOVE EL. 4811'-0"
PROPOSED FIRE DETECTION SYSTEM COVERAGE

DC-85-33

REF PA-18

REV. A

Pg 19 of 35

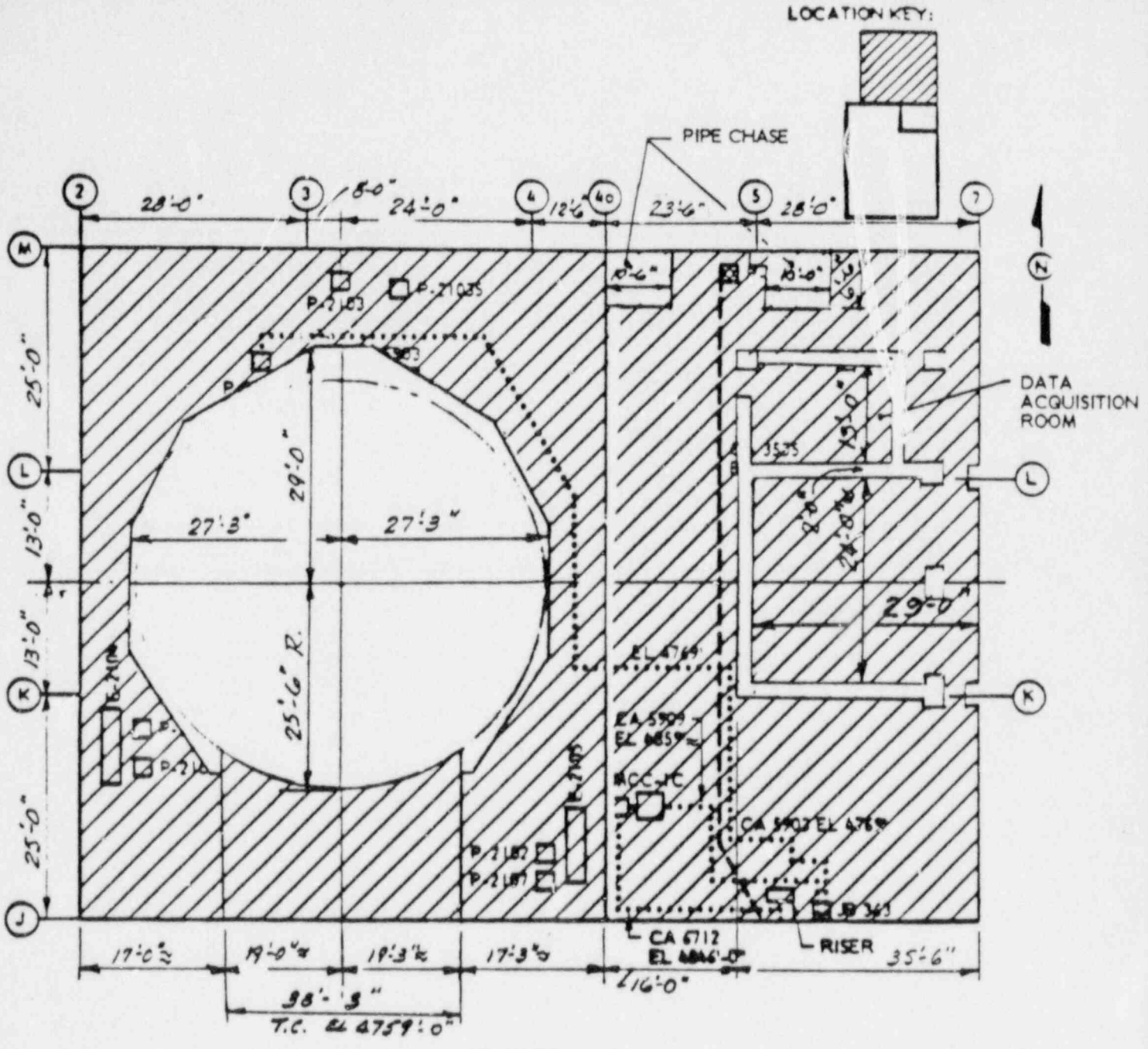


FIGURE 7

REACTOR BUILDING - CEILING ABOVE EL. 4756'-0"
PROPOSED FIRE DETECTION SYSTEM COVERAGE

DC-85-33

REF PA-9

REV. A

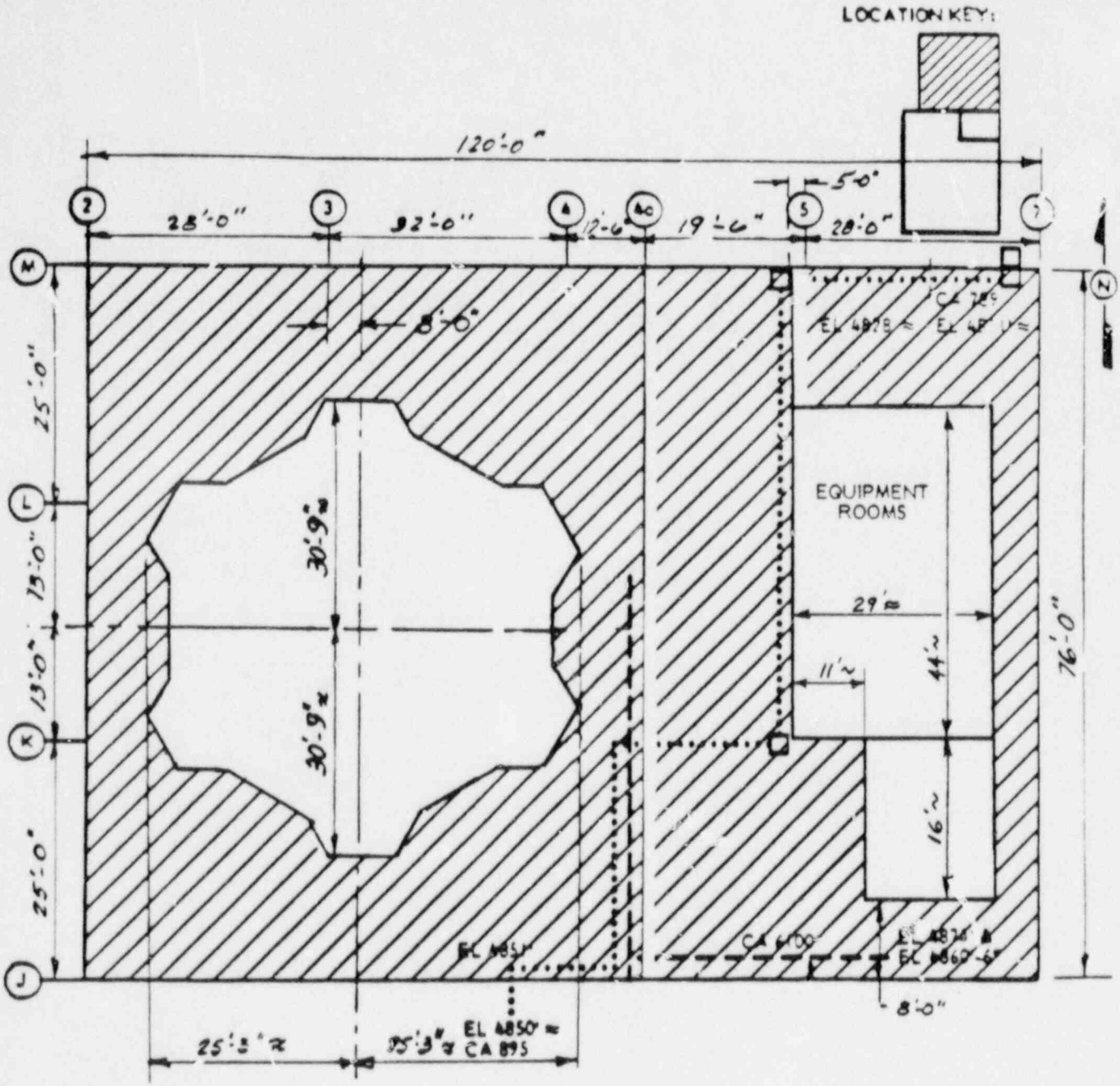


FIGURE 8

REACTOR BUILDING - CEILING ABOVE EL. 4815'
PROPOSED FIRE DETECTION SYSTEM COVERAGE

ATTACHMENTS

FOR

PSC RESPONSE 3

WIRE MARKED "VW-1"

INSPECTOR

Style 3239 and other styles (this test is to be waived on "Teflon" (FEP, TFE or PTFE) wires without outer coverings) which are intended for use in radio and television receivers must be tested and comply with the Flame Tests described on Pages 31 and 95B-E. If the material does not comply with the specified requirements, it shall not be labeled.

All other general styles may be marked "VW-1" and shall be subjected to the Flame Tests described on Pages 31 and 95B-95E. Any style not complying with these requirements must have the "VW-1" marking obliterated, but may still be labelled.

The VW-1 (Vertical Wire) Flame Test described in Pages 95B-E shall be conducted on insulated singles and/or complete cable in accordance with the following table:

Tag Marked †	Test Conducted on	Abbreviations † that may be used with Optional Surface Printing
"VW-1"	Finished wire or cable	"VW-1"
"VW-1 insulated singles only"	Insulated singles only	"VW-1S"
"VW-1 insulated singles and complete cable"	Insulated singles and finished cable, each tested separately @	"VW-1SC"

@ - Jacketed AWM used within a finished cable is to be considered as insulated single conductor unless marked "VW-1S" or "VW-1SC".

† - Surface Printing Optional.

WIRE NOT MARKED "VW-1"

Any style that is not tag or surface marked "VW-1" and that does not include the VW-1 Flame Test on the Style page shall not be considered as "VW-1" wire.

CASUALTY AND CHEMICAL HAZARDS DEPARTMENT

+ - The VW-1 (Vertical Wire) Flame Test described on Pages 95B-E shall be conducted quarterly as described above.

VW-1 (Vertical Wire) Flame Test

A VERTICAL SPECIMEN OF THE FINISHED WIRE OR CABLE SHALL FLAME NO LONGER THAN ONE MIN FOLLOWING FIVE 15 s APPLICATIONS OF THE FLAME, THE PERIOD BETWEEN APPLICATIONS BEING 15 s. THE SPECIMEN SHALL NOT CONVEY FLAME DURING, BETWEEN, OR AFTER THE FIVE APPLICATIONS OF FLAME.

This test is to be conducted in a 3-sided enclosure that is 12 in wide (305 mm), 14 in deep (355 mm), and 24 in high (610 mm). The top and front are to be open. The specimen is to be secured with its longitudinal axis vertical in the center of the enclosure (see Figure 1). The faces of flat cable are to be parallel to the front and rear of the enclosure. A flat, horizontal layer of untreated surgical cotton is to be placed on the floor of the enclosure and centered under the specimen. The upper surface of the cotton is to be no more tha 9-1/2 in (241 mm) below point B, which is the point at which the tip of the blue inner cone of the test flame will touch the specimen (this is shown in Figure 1.)

A Tirrill gas burner with or without a gas pilot light attached is to supply the flame. The barrel of the burner is to extend four in (102 mm) above the air inlets, and its inside diameter is to be 3/8 in (9.5 mm). While the barrel is vertical, the overall height of the flame is to be adjusted to five in (127 mm). The blue inner cone is to be 1-1/2 in high (38 mm) and the temperature at its tip is to be 836° C (1500°F) or higher. Without disturbing the adjustments for the height of the flame, the valve supplying gas to the burner flame and the separate valve supplying gas to any pilot flame are to be closed.

A wedge to which the base of the burner can be secured is to be provided for tilting the barrel twenty degrees from the vertical while the longitudinal axis of the barrel remains in a vertical plane. The burner is to be secured to the wedge and the assembly is to be placed in an adjustable support jig. The jig is to be adjusted laterally (see Figure 1) to place the longitudinal axis of the barrel in the same vertical plane as the longitudinal axis of the specimen. The plane is to be parallel to the sides of the enclosure. The jig is also to be adjusted toward the rear or front of the enclosure (see Figure 1) to position the point A, which is the intersection of the longitudinal axis of the barrel with the plane of the tip of the barrel, 1 1/2 inches (38 mm) from the point.

B at which the extended longitudinal axis of the barrel meets the outer surface of the specimen. Point B is the point at which the tip of the blue inner cone will touch the center of the front of the specimen. The specimen is to be adjusted vertically to prevent point B from being any closer than three inches (76 millimeters) to the lower end of the specimen.

In the absence of a gas pilot light on the burner, the support for the burner and wedge is to be arranged to enable the burner to be quickly removed from and precisely returned to the position described in the preceding paragraph.

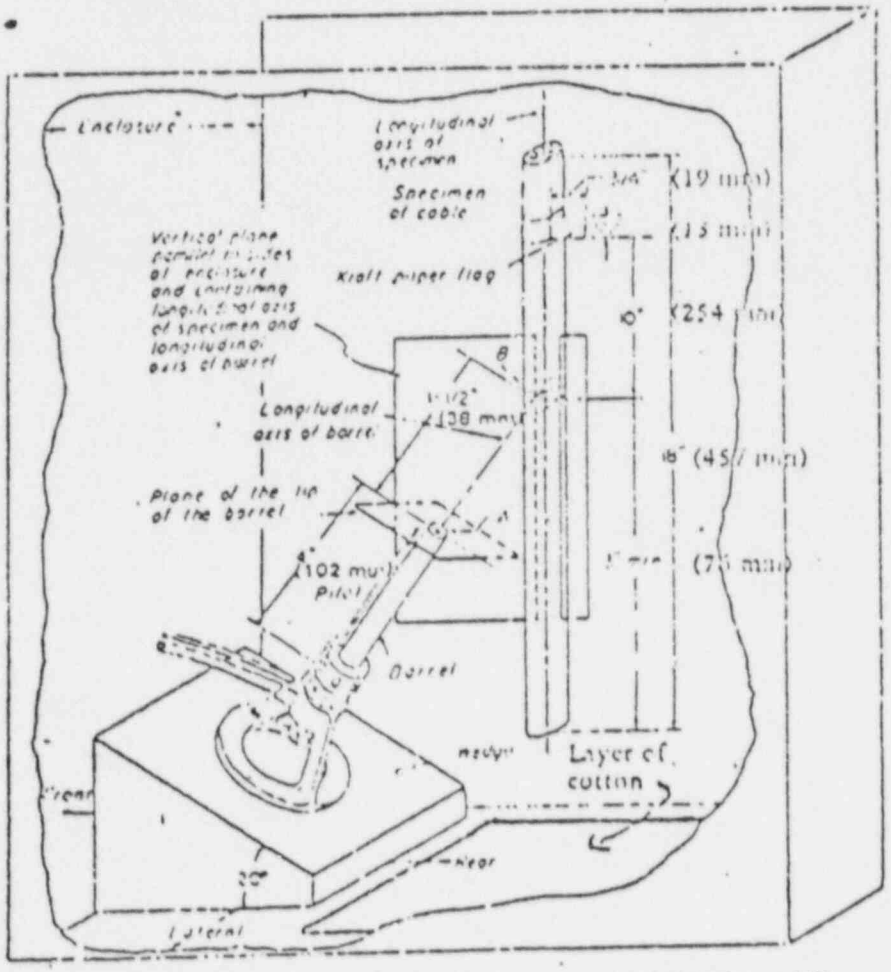


FIG. 1. — ESSENTIAL DIMENSIONS OF APPARATUS AND SPECIMEN FOR VERTICAL FLAME TEST

Proportions exaggerated for clarity of detail

A half-inch-wide (12.7 millimeter) strip of unreinforced 5-mil-thick (approximately 0.1 millimeter) 60-pound kraft paper† that is gummed on one side is to be used to make an indicator flag. The gumming is to be moistened just sufficiently to permit adhesion. With the gum toward the specimen, the strip is to be wrapped around the specimen once with its lower edge ten inches (254 millimeters) above B, the point at which the blue inner cone will touch the specimen. The ends of the strip are to be pasted together evenly and trimmed to provide a flag which projects 3/4 inch (19 millimeters) from the specimen toward the rear of the enclosure (see Figure 1). In the case of a flat cable, the flag is to project from the center of the rear broad face of the cable and the flame is to be applied to the front broad face.

If the burner has a gas pilot light, the valve supplying gas to the pilot is to be opened and the pilot lit. If the burner does not have a gas pilot light, it is to be supported as indicated above in a position away from the specimen and then lit. This operation and the remainder of the test are to be conducted under a forced-draft hood operating to provide adequate ventilation but avoiding drafts which affect the flame.

If the burner has a gas pilot light, the valve supplying gas to the burner is to be opened to apply the flame to the specimen automatically. This valve is to be held open for 15 seconds, closed for 15 seconds, opened for 15 seconds, etc., for a total of five 15-second applications of flame to the specimen with 15 seconds between applications. If the burner does not have a gas pilot light, the burner is to be moved into position to apply the flame to the specimen, kept there for 15 seconds, removed for 15 seconds, etc., for a total of five 15-second applications with 15 seconds between applications.

In any case, the flame is not to be reapplied until any flaming caused by the previous application ceases of its own accord, even though the time interval between applications may exceed 15 seconds. (This paragraph effective January 1, 1973).

Counting from the instant of the last removal of the burner flame, the duration of any flaming of the specimen is to be noted and recorded. Note also is to be taken and recorded of whether any flaming or glowing particles or flaming drops fall from the specimen.

†Five hundred 25x36-inch ungummed sheets (635x914 millimeters) have a mass of 60 pounds (27.2 kilograms mass).

If more than 25 percent of the indicator flag is burned or charred (soot that can be removed with a cloth or the fingers and brown scorching are to be ignored) after * any of the five applications of flame or if flaming or glowing particles or flaming drops fall from the specimen and ignite the cotton at any time during the test (flameless charring of the cotton is to be ignored), the wire or cable of which the specimen is representative is to be judged to have conveyed flame. Any wire or cable from which a specimen continues to flame longer than 60 seconds * after * any application of the flame is not acceptable. (Note: Underlined parts of this paragraph effective January 1, 1973).

ATTACHMENTS

FOR

PSC RESPONSE 4

ATTACHMENT AA

TABLE: FPOR-15-1

REQUIRED FIRE DAMPERS

BUILDING 10:

FDV-45321-1	FDV-45324-1	FDV-45327-1	FDV-45330-1	FDV-45333-1
FDV-45321-2	FDV-45324-2	FDV-45327-2	FDV-45330-2	FDV-45333-2
FDV-45322-1	FDV-45325-1	FDV-45328-1	FDV-45331-1	FDV-45341
FDV-45322-2	FDV-45325-2	FDV-45328-2	FDV-45331-2	FDV-45342
FDV-45323-1	FDV-45326-1	FDV-45329-1	FDV-45332-1	FDV-45343
FDV-45323-2	FDV-45326-2	FDV-45329-2	FDV-45332-2	FDV-45344

DIESEL GENERATOR ROOMS

FDV-75378 FDV-75379

FIRE WATER PUMP HOUSE

FDV-45403

AUXILIARY BOILER ROOM

FDV-75371 FDV-75372
FDV-75373 FDV-75374
FDV-75375

TURBINE LUBE OIL RESEVOIR ROOM

FDV-75369 FDV-75370

TURBINE LUBE OIL STORAGE ROOM

FDV-75367 FDV-75368

CONTROL ROOM/ELECTRIC EQUIPMENT ROOM

DV-75298 DV-75326
DV-75299 DV-75327
DV-75300 DV-75328
DV-75323 DV-75329
DV-75324 DV-75330
DV-75325 DV-75363

480 VOLT ROOM

DV-75331 DV-75364
DV-75332 DV-75365
DV-75334

OVERSIZE DOCUMENT PAGE PULLED

SEE APERTURE CARDS

NUMBER OF OVERSIZE PAGES FILMED ON APERTURE CARDS 2

APERTURE CARD/HARD COPY AVAILABLE FROM RECORD SERVICES BRANCH
FTS 492-8989

ATTACHMENT 1C

the traps at not less than a 1/32" per foot slope. Traps will also be installed for each 25 feet of hot gas line vertical rise or as shown on the drawings. All elbows used in the hot gas sides of the refrigeration piping system shall be of the long radius type except as allowed per Engineer's approval. All piping connections shall be of the swaged brazed type. Valves will be installed in all refrigeration lines at the rooftop condensing units for isolation at this point. Hot gas lines shall be insulated as approved by the Engineer in the field. G

C. Wiring

All wiring of refrigeration equipment to be done per Division 16 of these specifications.

D. Contractor guarantees that all equipment furnished and installed will fulfill all requirements and conditions as set forth in this specification.

15800 AIR DISTRIBUTION

A. General

Contractor will furnish and install all necessary round and rectangular ductwork, volume dampers, exhaust fan, flexible duct, fire dampers, access doors, duct connectors, hangers and all associated mounting hardware as called out on the mechanical drawings and in this specification. (Dimensions of hangers and mounting hardware as given are subject to change by Company after seismic verifications). Construction and installation to comply with Uniform Mechanical Code 1979 Edition. Contractor will balance all air flows as shown on the drawings ±10%.

B. Fire Dampers

Fire dampers shall be 3 hour fire rated and of the 100% free flow open area type(except that in the battery room and under the computer floor parallel

DIVISION 15
MECHANICAL

blade or type B open area dampers may be used) with sleeves long enough to allow attachment of duct on each side of sleeve and be in compliance with Uniform Mechanical Code 1979 Edition. Closure control links will be capable of 165 degrees F thermal, 120 VAC solenoid electrical, and push button manual release. Links to be McCabe model E-5752 BS or equivalent. Damper and link construction and installation shall comply with Uniform Building Code 1979 Edition, Uniform Mechanical Code 1979 Edition, and UL requirements.

If required to maintain the fire ratings and provide adequate Halon retention two sets of fire dampers may be used at appropriate locations. This will be approved by the Engineer as needed for type, size and location of these dampers. Actuation of Halon retention damper shall be per McCabe link (as decribed above) and installation sketches shall be submitted for Engineer approval before installation. 3 hour rated damper (not Halon seal damper) actuation shall only be per a 160 degree F fusible link (U.L. listed).

All Dampers shall have a U.L. sticker attached stating fire rating and shall also be inspected after installation to verify that the fire barrier integrity has been maintained. McCabe closure control links shall be functionally tested to verify proper operation. Inspection and testing shall be covered by the Contractor's QA program and shall be documented.

C. Access Doors

Access doors shall be provided for inspection and resetting of fire dampers as necessary or as shown on the mechanical drawings. Access doors for round supply duct shall be United Sheet Metal type AR-W or equivalent. All access doors shall conform to Uniform Mechanical Code 1979 Edition.

D. Dimensions of Ducts

PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

CHANGE NOTICE

Form (8) 372 30 3380

ISSUE STATUS	
APPROVED	8-8-85
COMPLETE	

CN. NO 2016
PAGE 1
DATE JULY 11, 1985
BY F. TRUJILLO
JO # / ACCT. # MAINT.

DESCRIPTION

DESCRIPTION RELOCATE FIRE DAMPERS IN HVAC SUPPLY DUCTS IN STANDBY DIESEL GENERATOR ROOMS MODIFICATION REQUIRED PER APPENDIX R EVALUATION.

ATTACHMENT 2A

CN GENERATED IN RESPONSE TO (COMMITMENT, JOB NO., DCAR, I & E BULLETIN, ETC.) NRC COMMITMENT LOG No. 1131

SYST. NO 75

EQUIP. NO [redacted]

SPEC. NO

SAFETY EVALUATION: SEE DETAILED SAFETY EVALUATION

SAFETY RELATED X NONSAFETY RELATED X MODIFICATION DOCUMENT CHANGE ONLY

REMARKS CN TO BE REVIEWED AS SAFETY RELATED BECAUSE OF FIRE PROTECTION

PAGE SCHEDULE (Number CN Cover Pages Sequentially: 1, 2, 3, etc.)

1 CHANGE NOTICE COVER SHEET
2 SAFETY EVALUATION
3 ENVIROMENTAL EVALUATION
4 COORDINATION SHEET

APPROVALS

NUCLEAR ENGINEERING 7. 7[illegible] 7-31-85

PROD. [signature] 8/6/85

QA PMassmann for T. Prenger per tele con 8/8/85

CWP's 85-646 85-647

FT. ST. VRAIN NON-CONTROLLED COPY VERIFY ISSUE STATUS PRIOR TO USE

PORC REVIEW: REQUIRED IF CHANGE IS SAFETY RELATED OR HAS POTENTIAL FOR CREATING AN UNREVIEWED ENVIRONMENTAL QUESTION
YES NO
SAFETY SIGNIFICANT
UNREVIEWED SAFETY QUESTION
UNREVIEWED ENVIRONMENTAL QUESTION — SIGNATURE — DATE

NFSC REVIEW: REQUIRED ONLY IF PORC DETERMINES CHANGE TO BE EITHER SAFETY SIGNIFICANT, AN UNREVIEWED SAFETY QUESTION OR AN UNREVIEWED ENVIRONMENTAL QUESTION
YES NO
UNREVIEWED SAFETY QUESTION
UNREVIEWED ENVIRONMENTAL QUESTION — SIGNATURE — DATE

NRC REVIEW: * REQUIRED ONLY IF NFSC CONCURS THAT THE CHANGE IS AN UNREVIEWED SAFETY QUESTION OR AN UNREVIEWED ENVIRONMENTAL QUESTION
NRC REVIEW — SIGNATURE DATE

* NRC REVIEW REQUIRED PRIOR TO IMPLEMENTATION

CLOSE OUT (To Be Completed By NED)

DOCUMENT REVISION COMPLETED — SIGNATURE — DATE

CHANGE NOTICE CANCELLED — SIGNATURE — DATE

Public Service™

FORT ST. VRAIN NUCLEAR GENERATING STATION

PUBLIC SERVICE COMPANY OF COLORADO

SAFETY EVALUATION

(CN) TCR SCR PC TR NO. 2016

CATEGORY

TYPE:

- [X] CN OVERALL
- [ ] CN SUBMITTAL #
- [ ] SETPOINT CHANGE REPORT
- [ ] TEST REQUEST
- [ ] TEMPORARY CONFIGURATION REPORT
- [ ] PROCEDURE CHANGE (FSAR)
- [ ] OTHER

CLASSIFICATION: ARE THE SYSTEM(S) EQUIPMENT OR STRUCTURES INVOLVED, OR DOES THE ACTIVITY AFFECT:

CLASS I	[ ] YES	[X] NO	ENGINEERED SAFEGUARD	[ ] YES	[X] NO
SAFE SHUTDOWN	[ ] YES	[X] NO	PLANT PROTECTIVE SYSTEM	[ ] YES	[X] NO
SAFETY RELATED	[ ] YES	[X] NO	SECURITY SYSTEM	[ ] YES	[X] NO

REMARKS CN REVIEWED AS SAFETY RELATED BECAUSE OF FIRE PROTECTION SYSTEM

EVALUATION

Use Additional Sheets If Required

1. DOES THIS ACTIVITY AFFECT STRUCTURES, SYSTEMS, COMPONENTS, EQUIPMENT, TESTS, EXPERIMENTS OR PROCEDURES DESCRIBED IN THE FSAR OR TECH SPECS? [X] YES [ ] NO

   LIST THE APPLICABLE SECTIONS REVIEWED: FIRE DAMPERS IN THE VENTILATION SYSTEM TO THE STANDBY DIESEL GENERATOR ROOMS IS MENTIONED IN SECTION 9.12.3 OF THE FSAR

2. DOES THE ACTIVITY REQUIRE THAT CHANGE(S) BE MADE TO THE FSAR OR TECH SPEC? [ ] YES [X] NO

   LIST SECTIONS TO BE CHANGED AND THE CHANGES TO BE MADE

3. DETERMINE WHETHER OR NOT THE ACTIVITY INVOLVED IS AN UNREVIEWED SAFETY QUESTION UTILIZING THE FOLLOWING GUIDELINES:

   (A) HAS THE PROBABILITY OF OCCURRENCE OR THE CONSEQUENCES OF AN ACCIDENT OR MALFUNCTION OF EQUIPMENT IMPORTANT TO SAFETY PREVIOUSLY EVALUATED IN THE FSAR BEEN INCREASED?

   [ ] YES [X] NO STATE BASIS: PER THE APPENDIX R EVALUATION PERFORMED, IT WAS DETERMINED THE EXISTING FIRE DAMPERS SHOULD BE RELOCATED TO THE WALL PENETRATION. THE HVAC SYSTEM IS NOT REQUIRED TO FUNCTION IN ORDER FOR THE DIESEL GENERATORS TO FULFILL THEIR SAFETY FUNCTIONS.

   (B) HAS THE POSSIBILITY OF AN ACCIDENT OR MALFUNCTION OF A DIFFERENT TYPE THAN ANY EVALUATED PREVIOUSLY IN THE FSAR BEEN CREATED? [ ] YES [X] NO STATE BASIS: THE ACCIDENT EVALUATED WOULD SHUT OFF AIR FLOW TO THE ROOMS IN THE EVENT OF A FIRE. THE SAME FUNCTION WILL BE PERFORMED FOLLOWING THIS MODIFICATION.

   (C) HAS THE MARGIN OF SAFETY, AS DEFINED IN THE BASIS FOR ANY TECHNICAL SPECIFICATION OR IN THE FSAR BEEN REDUCED?

   [ ] YES [X] NO STATE BASIS: IT HAS BEEN INCREASED BY THIS RELOCATION. THE DAMPERS IN THE DUCTS WILL BE AT THE POINT OF PENETRATION OF THE FIRE BARRIER.

DOES THE ACTIVITY APPEAR TO INVOLVE AN UNREVIEWED SAFETY QUESTION [ ] YES [X] NO

BE SAFETY SIGNIFICANT [ ] YES [X] NO

BY T. Tomlinson (SIGNATURE) 7/22/85 (DATE) APPROVED (SIGNATURE) 7-20-85 (DATE)

CONCUR K. Mangan 7/25/85

Form (C) 372-02-3382

Public Service™

FORT ST. VRAIN NUCLEAR GENERATING STATION

PUBLIC SERVICE COMPANY OF COLORADO

ENVIRONMENTAL EVALUATION

(CN) / OTHER
NO. 2016
PAGE 3

CATEGORY

TYPE: [X] CN Overall [ ] CN Submittal Other

Are all measurable nonradiological effects of this activity confined to the on-site areas previously disturbed during site preparation, plant construction or previous plant operation? [X] Yes [ ] No

State basis THIS IS A MODIFICATION TO AN EXISTING PIECE OF EQUIPMENT

Is the activity required to achieve compliance with Federal, State or local environmental regulations? [ ] Yes [X] No

Applicable Regulations

NOTE: If either answer is Yes, the activity does not involve an unreviewed environmental question. Sign and date the form. If both answers are No, the activity has the potential for creating an unreviewed environmental question. Complete the remainder of this evaluation form.

EVALUATION (Use additional sheets if required)

1. Is the activity identified in the final environmental statement (FES) Or Supplementary Environmental Documents (See Q-3)? [ ] Yes [ ] No

Identify documents and document sections reviewed

2. Determine whether or not the activity involved is an unreviewed environmental question using the following guidelines. (If the answer to any of the following questions is Yes, then this activity involves an unreviewed environmental question.)

(A) Will this activity result in a significant increase in any adverse environmental impact previously evaluated in the FES? [ ] Yes [ ] No State basis:

(B) Will this activity result in a significant change in the types, or a significant increase in the amounts of effluents, or a significant increase in the authorized power level? [ ] Yes [ ] No

State basis:

(C) Does this activity involve an environmental matter not previously reviewed and evaluated in the FES? [ ] Yes [ ] No State basis:

Does the activity involve an unreviewed environmental question? [ ] Yes [ ] No

By F. Tyill (SIGNATURE) 7/22/85 (DATE) Approved (SIGNATURE) (DATE)

CONCUR D. Mangan 7/25/85

FORM [illegible] 372-24-4310 (Q-3)

Public Service

FORT ST. VRAIN NUCLEAR GENERATING STATION
PUBLIC SERVICE COMPANY OF COLORADO

CN 2016
BY F. Trujillo

COORDINATION SHEET FOR CHANGE NOTICE DESIGN OUTPUT PACKAGES

CN Coordinator F. TRUJILLO Date 7-22-85

Overall Design Verification By J. H. Wambach Date 7/25/85
(Safety related CNs only)

Internal Design Interface Reviews			Engrg. Complete	Engrg. Not Complete	Engrg. Not Required
By F. B. Bud	Date 7/25/85	Elec.	☐	☐	☒
By K. Durack	Date 7/25/85	Mech.	☒	☐	☐
By E. Gunnerson	Date 7-25-85	Struc.	☐	☐	☒
By G. R. Johns	Date 7-26-85	Licen.			

Approved F. Tilson Effective 7-29-85

PAGE SCHEDULE

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B5	G4		45
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	G6		47
	G7		48
	G8		49

INSTRUCTIONS

Add New Pages	Substitute Page(s) / for Page(s)

Form (B) 344 24 4097

DESIGN BACKGROUND INFORMATION

FORM 344-22-4052

FORT ST. VRAIN
CHANGE NOTICE NO. 2016

(ENG-2)

Public Service™

FORT ST. VRAIN NUCLEAR GENERATING STATION

PUBLIC SERVICE COMPANY OF COLORADO

CN 2016
BY F. Tyell
PAGE B1

DESIGN INPUT REQUIREMENTS

☐ ELECTRICAL
☒ MECHANICAL
☐ STRUCTURAL
☐ SAFETY RELATED
☒ NON-SAFETY RELATED

Per Report No. 4 of the Fort St. Vrain Appendix R Evaluation, Section 4.3, PSC is to relocate fire dampers to the wall in each of the two Diesel Generator rooms. The damper in the East Room is DV-75315 (formerly V-75419) and in the West Room DV-75316 (formerly V-75420). Per the requirements of the Appendix R Evaluation, a "...fire-rated damper is required to maintain the overall fire barrier rating." It is also required that the damper "...be automatic and cabled/listed by FM, UL, or other certified fire testing agency." As the fire barrier rating of the wall enclosing the Standby Diesel Generator Rooms has been established in Section 3.12.3 of Report No. 4 as 3-hour, the dampers shall be of the same rating.

1-J-9

NFPA 90A - 1983 ED.

UBC (UMC-79)

Prepared By F. Tyell (SIGNATURE) 7/22/85 (DATE) Approved By K Durd (SIGNATURE) 7/25/85 (DATE)

Form (A) 344-22-4060 IENG-2

PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

SAFETY RELATED DESIGN ANALYSIS - SHEET 1

CN 2016

BY F. Tills

PAGE B2

Form 344 22 4063

☐ ELECTRICAL
☒ MECHANICAL
☐ STRUCTURAL

I. SEISMIC ANALYSIS

NO ANALYSIS REQUIRED, NOT SUBJECT TO SEISMIC CRITERIA

II. STRESS ANALYSIS

NO ANALYSIS REQUIRED, NOT SUBJECT TO STRESS CRITERIA

III. PIPING/HANGER ANALYSIS

NO ANALYSIS REQUIRED, NOT SUBJECT TO HANGER OR PIPING CRITERIA

IV. HYDRAULIC/PNEUMATIC ANALYSIS

NO ANALYSIS REQUIRED, NOT SUBJECT TO HYD/PNE. CRITERIA

V. THERMAL ANALYSIS

NO DETAILED ANALYSIS REQUIRED. FUSIBLE LINK PROVIDED WITH DAMPERS IS RATED AT 160°F AS DETAILED IN SPEC 1-J-9

VI. NUCLEAR ANALYSIS

NO ANALYSIS REQUIRED, NOT SUBJECT TO NUCLEAR CRITERIA

VII. FIRE PROTECTION ANALYSIS

THE DAMPERS ARE BEING RELOCATED PER PSC's COMMITMENT IN REPORT NO. 4 OF FSU's APPENDIX R EVALUATION. THE DAMPERS TO BE INSTALLED ARE UL LISTED AND RATED FOR 3 HOURS. THEY WILL BE INSTALLED AT THE WALL PENETRATION IN EACH ROOM AS RECOMMENDED IN NFPA 90A

VIII. ENVIRONMENTAL ANALYSIS

NO ANALYSIS REQUIRED, NOT SUBJECT TO ENVIROMENTAL CRITERIA

IX. COMPATIBILITY OF MATERIALS, EQUIPMENT, AND PROCESSES

AS STATED ABOVE THE DAMPERS ARE OF A CONSTRUCTION AND OPERATION APPROVED BY U.L. THE SLEEVES INSTALLED AS PART OF THIS MODIFICATION ARE OF A GAGE (16 GAGE) RECOMMENDED BY THE UNIFORM BUILDING CODE STD. 43-7 (SECTION 43.702(b)

PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION
SAFETY RELATED DESIGN ANALYSIS - SHEET 3

CN 2016
BY F. Tydlack
PAGE B4

Form 344-22-4069

X. ACCESSIBILITY FOR IN-SERVICE INSPECTION, MAINTENANCE, AND REPAIR

AN INSPECTION DOOR SHALL BE ADDED TO THE DUCTWORK BY THIS CN TO ALLOW INSPECTION AND/OR RESETTING IF NECASSARY.

XI. SEPARATION AND SEGREGATION ANALYSIS

NO ANALYSIS REQUIRED, NOT SUBJECT TO SEPARATION AND SEGREGATION CRITERIA.

XII. ELECTRICAL ANALYSIS

NO ANALYSIS REQUIRED. NO ELECTRICAL INVOLVEMENT.

XIII. ACCIDENT ANALYSIS

THE WORST CASE ACCIDENT WOULD BE THE FAILURE OF THE DAMPER TO CLOSE. AS THESE DAMPERS ARE IN SUPPLY DUCTS ANY FIRE OUTSIDE OF THE ROOM, THE SMOKE AND HEAT WOULD BE CARRIED INTO THE ROOM BY THE AIR FLOW. AS A DETECTION AND SUPPRESSION SYSTEM EXISTS IN THE ROOMS, APPROPRIATE ALARMS WOULD SOUND AND THE FIRE EXTINGUISHED. IF THE FIRE WERE TO OCCUR INSIDE THE ROOM THE ABOVE REF. CO_2 SYSTEM WOULD DETECT AND SUPPRESS THE FIRE. AS RESERVE STORAGE IS PROVIDED ON THE CO_2, ANY LEAKAGE UP THE DUCT COULD BE ALLOWED FOR.

PREPARED BY F. Tydlack 7/22/85
DATE

(ENG 2)

- ☐ ELECTRICAL
- ☒ MECHANICAL
- ☐ STRUCTURAL
- ☐ SAFETY RELATED
- ☒ NON-SAFETY RELATED

The supply duct which feeds to the East Room is 12" X 12", and the duct to the West Room is 6" X 12". The existing dampers in these ducts are 24" X 6". Each duct is sized for 500 CFM. This CN shall install FM/UL listed, 3-hour rated, fire dampers at the point where the duct penetrates the wall of each room. This CN shall also instruct the contractor to install inspection doors in the duct in the area of the new dampers. In addition, if the penetration is disturbed during modification, a frame around the duct shall be fabricated and the penetration shall be caulked or filled with an approved fire stop material as necessary.

PREPARED BY F. Tyll (SIGNATURE) 7/22/85 (DATE)

PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

CN 2016

BY J Wambach

PAGE B6

CHECK LIST OF DESIGN VERIFICATION QUESTIONS FOR DESIGN REVIEW METHOD

Form 344-22-4095

YES	NO	N/A		
X			1.	Were the inputs correctly selected and incorporated into design?
X			2.	Are assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent re-verifications when the detailed design activities are completed?
X			3.	Are the appropriate quality and quality assurance requirements specified?
X			4.	Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified and are their requirements for design met?
X			5.	Have applicable construction and operating experience been considered?
X			6.	Have the design interface requirements been satisfied?
X			7.	Was an appropriate design method used?
X			8.	Is the output reasonable compared to inputs?
X			9.	Are the specified parts, equipment, and processes suitable for the required application?
X			10.	Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?
X			11.	Have adequate maintenance features and requirements been specified?
X			12.	Are accessibility and other design provisions adequate for performance of needed maintenance and repair?
X			13.	Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?
		X	14.	Has the design properly considered radiation exposure to the public and plant personnel?
X			15.	Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?
X			16.	Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?
X			17.	Are adequate handling, storage, cleaning and shipping requirements specified?
X			18.	Are adequate identification requirements specified?
X			19.	Are requirements for record preparation review, approval, retention, etc., adequately specified?

NOTE: If the answer to any question is no, provide additional information and resolution b[illegible]

RESOLUTION OF DESIGN DEFICIENCIES
UNCOVERED DURING THE DESIGN VERIFICATION PROCESS

No deficiencies found.

J. D. Wambach 7/25/85

PROCUREMENT INSTALLATION AND TEST REQUIREMENTS

FORM 344-22-4051

Performed	Controlled	Reerc	Chrg	Order / Code
				MAINT.

FORT ST. VRAIN
CHANGE NOTICE NO. 2016

(ENG-2)

PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION

CN 2016
BY [illegible]
PAGE G1

INSTALLATION SEQUENCING CONSIDERATIONS

Form 344-22-4096

I. System No.(s) 75

II. Date Prepared JULY 22, 1985

III. PRECAUTIONS / PREREQUISITES: (Identify known conditions described in other CN/CN Reissues that must be completed prior to the implementation of this CN being evaluated.)

NONE

IV. REMARKS: (Identify other information useful to determining sequencing of this CN with other work planned or in progress.)

NRC COMMITTMENT TO HAVE ALL WORK COMPLETED BY SEPT. 15, 1985

V. CN's which were reviewed

N/A

Public Service

FORT ST. VRAIN NUCLEAR GENERATING STATION

PUBLIC SERVICE COMPANY OF COLORADO

CONSTRUCTION DRAWINGS, SKETCHES & BILL OF MATERIAL

CN 2016
BY F.J.G.
PAGE G2

DRAWING or SKETCH NO.	TITLE or DESCRIPTION	DRAWING SIZE	CN PAGE NO.
B/M	BILL OF MATERIAL CN2016 SK-M1 & M2		G3
"	"		G3.1
CN2016SK-M1	LOCATION DWG. - PLAN	8½x11	G4
CN 2016 SK-M2	TYPICAL INSTALLATION - SECTION	"	G5
-	INSTALLATION INSTRUCTIONS		G6
-	FIRE AND SMOKE DAMPERS - SMACNA		G7
	"		G8
-	DUCT ACCESS DOORS - SMACNA		G9
-	INSTALLATION INSTRUCTIONS - DAMPERS		G10
	"		G11

Form 344 54 4055

PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION
BILL OF MATERIAL

Performed	Controlled	Resrc	Chrg	Order / Code
				MAINT.

TABLES OF CODES

SOURCE CODES
- C — Contractor
- D — Denver Engineering
- E — Electrical Shop
- F — Field Engineering Office
- M — Maintenance Shop
- P — PSC stock (show stock code and storeroom numbers)
- R — Results Engineering
- S — PSC Sub Shops
- O — Other

VENDOR CODES
- Q — From Qualified Vendor
- V — From Vendor

TRACEABILITY CODES
- 1 — Material Traceability — P.O. no. and heat identification no. shall be marked on each item and/or when not practical to be maintained via sketches or other documents
- 2 — P.O. Traceability — P.O. no. maintained via appropriate traceability documents
- 3 — No traceability is required

DOCUMENTATION CODES
- A — Test Report of Actual Chemical Analysis and Physical Tests required
- B — Certificate of Conformance to the indicated specification required
- C — Other — as specified
- D — None

SPARE PARTS CODES
- E — Existing Spare Parts List applicable
- SP — New/Revised Spare Parts List required
- NR — Spare Parts not required

FLUID SYSTEM CLEANNESS GRADES (see STD-3)
- G-1 — Pure Gas
- G-2 — Unfiltered Gas
- I-1 — Condensed Inorganic
- I-2 — Closed Treated Water
- I-3 — Open Treated Water
- I-4 — Makeup Water
- O-1 — Organic Liquid
- N — Not Applicable (non fluid, drains, etc.)

PROTECTION LEVELS (STD-1)
- A — Humidity/Temp. Controlled Storage
- B — Indoor Heated Storage
- C — Indoor Unheated Storage
- D — Outdoor Storage
- N — Not Quality Related
- W — Special Requirements

FOREIGN PRINT CODES
- OM — Operations and Maintenance Manual required
- D — Drawings required
- VP — Vendor Procedures required
- PL — Parts List required
- C — Combination of O & M / Drawing / Vendor Proc. / P.L. required
- NR — Foreign Prints not required

Item No	Drawing or Sketch Mark No	Quantity	Unit of Measure	DESCRIPTION	SPEC. NO. / TAG NO.	Source Code	Vendor Code	STOCK CODE NO	Storeroom No	PURCHASE REQ. NO. / PURCHASE ORDER NO.	CODES (see tables above) Traceability	Doc.	Spare Parts	Fluid Grade	Protect Level	Foreign Prints
1		1	EA	DAMPER, FIRE, CURTAIN TYPE, SPRING LOADED W/FUSIBLE LINK (160°F) 12"X12" W/16 GAGE SLEEVE, 18" LONG UL LISTED W/STICKER (HORZ. DUCT RUN), 3 HR RATED	1-J-9 FDV-7537B	I	V			Y6037 N-6344	2	B	NR	N	C	NR
2		1	EA	DAMPER, FIRE, CURTAIN TYPE, SPRING LOADED W/FUSIBLE LINK (160°F) 6"H X 12"V W/16 GAGE SLEEVE, 18" LONG UL LISTED W/TH STICKER (HORZ DUCT RUN), 3 HR. RATED	1-J-9 FDV-7537A	D	V			Y6037 N-6344	2	B	NR	N	C	NR

Bill of Material for CN Drawings / Sketches / Page Numbers CN 2016 SKM1 & M2

CN 2016 BY [illegible] PAGE G3

(ENG. 2)

NUCLEAR ENGINEERING DIVISION

Public Service™

FORT ST. VRAIN NUCLEAR GENERATING STATION
PUBLIC SERVICE COMPANY OF COLORADO

BILL OF MATERIAL

Performed	Controlled	Rosrc	Chrg	Order / Code
				MAINT.

Item No	Drawing or Sketch Mark No	Quantity	Unit of Measure	DESCRIPTION	SPEC. NO. / TAG NO.	Source Code	Vendor Code	STOCK CODE NO.	Storeroom No	PURCHASE REQ. NO. / PURCHASE ORDER NO.	CODES (See tables on sheet 1) Traceability	Doc	Spare Parts	Fluid Grade	Protect Level	Foreign Prints
3		50	EA	SCREW, SHEET METAL, PAN HEAD, No. 10		C	V				3	D	NR	N	N	NR
4		50	ft.²	SHEET METAL, GALVANIZED, 14 GAGE		C	V				3	D	NR	N	N	NR
5		4	TUBES	GROUT, SEALANT, DOW CORNING FIRE STOP 2000, UL LISTED, (AVAILABLE FROM SMALL & CO. DENVER ATTN: DON)		C	V				2	B	NR	N	N	NR

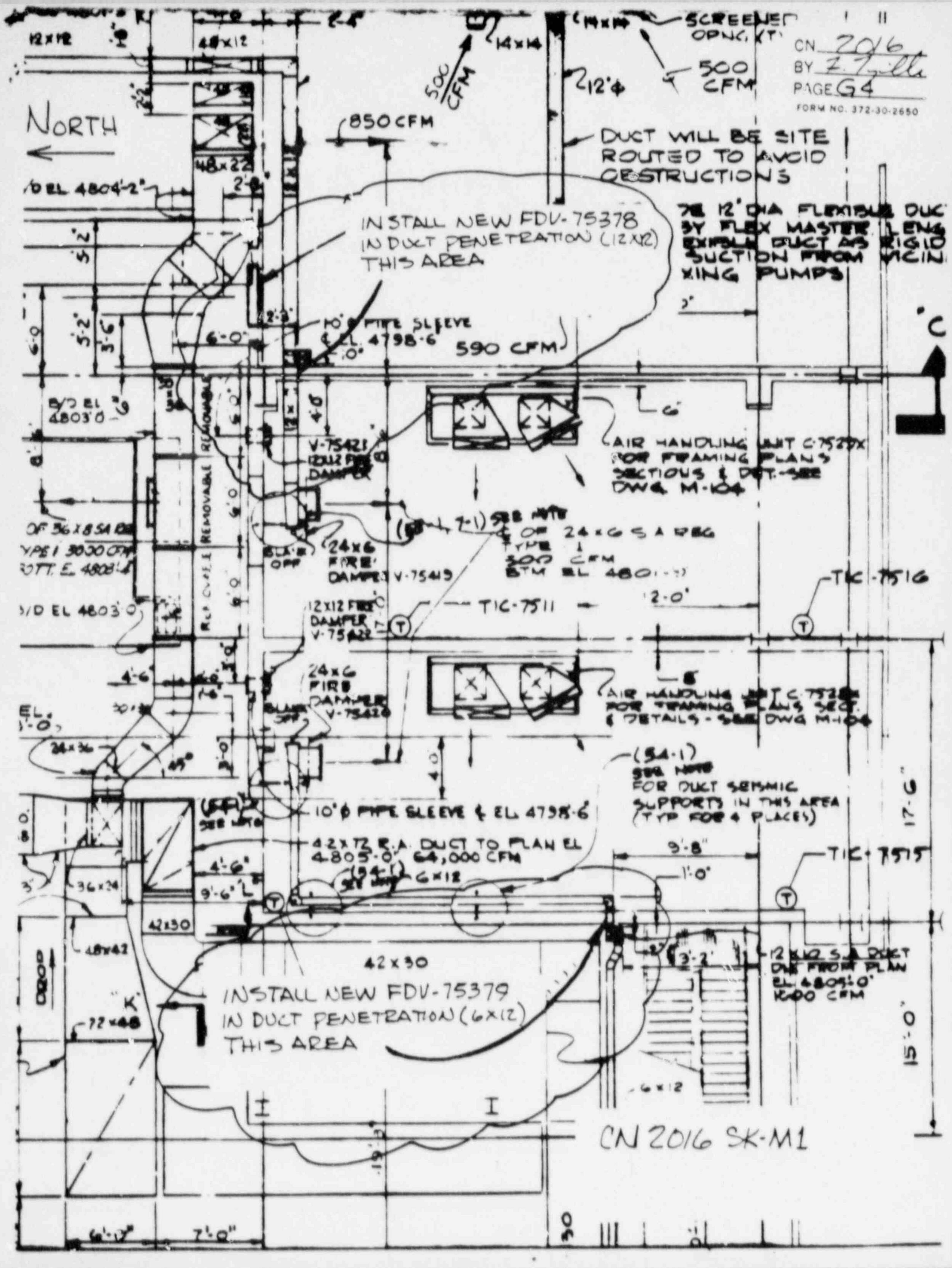
Form (A) 344-54-4056

Bill of Material for CN Drawings / Sketches / Page Numbers CN 2016 SK M1 & M2

(ENG. 2)

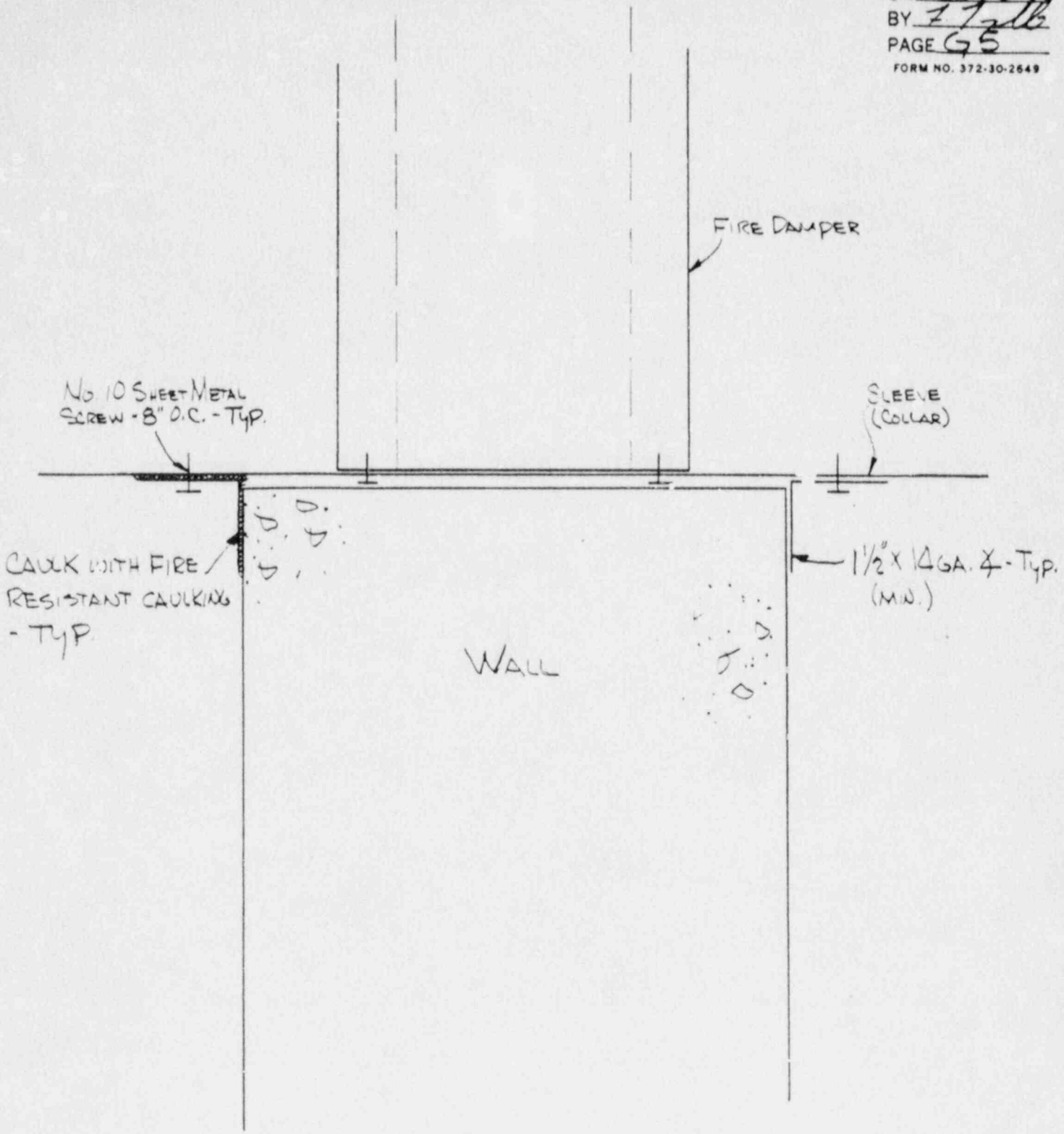
NUCLEAR ENGINEERING DIVISION

CN 2016
BY
PAGE G3.1



CN 2016
PAGE G4
FORM NO. 372-30-2650
NORTH
850 CFM
500 CFM
SCREENED OPNG.
DUCT WILL BE SITE ROUTED TO AVOID OBSTRUCTIONS
INSTALL NEW FDV-75378 IN DUCT PENETRATION (12X12) THIS AREA
590 CFM
10"Ø PIPE SLEEVE
AIR HANDLING UNIT
REMOVABLE
24x6 FIRE DAMPER
TIC-7511
TIC-7516
TIC-7515
10"Ø PIPE SLEEVE ℄ EL. 4798-6
FOR DUCT SEISMIC SUPPORTS IN THIS AREA (TYP FOR 4 PLACES)
42X72 R.A. DUCT TO PLAN EL 4805-0", 64,000 CFM
42x30
INSTALL NEW FDV-75379 IN DUCT PENETRATION (6X12) THIS AREA
CN 2016 SK-M1

CN 2016
BY 7 7/26
PAGE G5
FORM NO. 372-30-2649



TYPICAL INSTALLATION
SECTION

CN 2016 SK-M2

PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

INSTALLATION INSTRUCTIONS

CN 2016

BY F. Tylls

PAGE G6

Form 344-22-4136

SUGGESTED SEQUENCE	ACTIVITY DESCRIPTION
1	THIS CN IS TO INSTALL TWO (2) FIRE DAMPERS AT WALL PENETRATIONS TO THE STANDBY DIESEL GENERATOR ROOM. SEE CN 2016 SK M1 FOR LOCATION OF PROPOSED DAMPERS.
2	THE EXISTING DUCTWORK INTO THESE ROOMS WILL REQUIRE REMOVAL AND POSSIBLE MODIFICATION. ALL REWORK OF THE CN SHALL BE DONE TO ASHRAE AND SMACNA STANDARDS.
3	ALTHOUGH NOT DETAILED BY A DWG. IN THIS PACKAGE, INSPECTION PANELS SHALL BE INSTALLED IN THE DUCT WORK CLOSE ENOUGH TO THE FIRE DAMPERS TO ALLOW FOR INSPECTION AND RESETTING IF REQUIRED. SEE PAGES G8 AND G9 FOR DETAILS OF PANELS.
4	CONSTRUCTOR SHALL REVIEW EXCERPTS FROM SMACNA STDS. (G7, G8, G9) FOR GENERAL INSTRUCTIONS INSTALLATION OF FIRE DAMPERS.
5	CONSTRUCTOR SHALL ALSO REVIEW INSTALLATION INSTRUCTIONS PROVIDED BY DAMPER MFG. (G10 & G11)
6	INSTRUCTION 4 & 5 WILL GUIDE CONSTRUCTOR ON TYPE OF CONNECTIONS AND JOINTS TO USE IN THE FABRICATION AND MODIFICATION OF THE DUCT WORK & INSTALLATION OF DAMPERS
7	ALL NEW CONNECTIONS AND JOINTS SHALL BE LEAK TIGHT AND SEALED USING THE FIRE RESISTANT CAULK PROVIDED ON B/M
8	AN APPROPRIATE FIRE WATCH SHALL BE POSTED FOR THE PERIOD OF TIME WHEN A COMPLETE OPENING (NO DUCT OR DAMPER) EXISTS IN THE PENETRATION.
9	THE NEW DAMPER TAG NUMBER SHALL BE STAMPED ONTO A S.S. TAG AND ATTACHED TO THE INSPECTION PANEL AT EACH LOCATION.
10	QA DEPT. SHALL VERIFY THAT THE INSTALLED DAMPER IS OF A THREE HOUR RATING AND THAT A U.L. STAMP IS ATTACHED TO EACH DAMPER
11	QA DEPT SHALL PERFORM A VISUAL INSPECTION OF THE COMPLETED INSTALLATION. AS NO LEAK TYPE TEST SHALL BE PERFORMED, THE INSPECTION SHALL BE IN REGARD TO WORKMANSHIP, AND APPEARANCE.

(ENG-2)

FIRE AND SMOKE DAMPERS

For designers, primary references for the function and use of fire or smoke dampers are

1. NFPA Life Safety Code, NFPA Standard 101
2. NFPA Standard 90A, 90B
3. NFPA Standard 80, Fire Doors and Windows
4. ASHRAE Guide and Data Book
5. Building Codes and Mechanical Codes
6. ASHRAE Journal and ASHRAE Transactions

Secondary references relating to the testing or installation of such dampers are:

1. U.L. Standard 555 — Fire Dampers
2. U.L. Building Materials Directory — includes lists of rated fire dampers and fire doors
3. U.L. Fire Resistance Index — includes ratings of walls, partitions, floor and ceiling assemblies and alternative ducted ceiling outlet protection methods.
4. Fire Damper Guide, 1970 (out of print) — SMACNA
5. Fire Protection for Ceiling Outlets — SMACNA
6. Blade Type Fire Damper Manufacturing Program Single Blade (SB) and Multiblade (MB) series for horizontal and vertical installations — SMACNA
7. ASTM Standard Tests
8. NFPA Standard Tests
9. SMACNA manuals on Duct Construction of various types

Fire and smoke protection planning involves concepts of early warning, suppression, evacuation, safe refuge zones, monitoring and communications systems, etc. Modern implementation concepts involve use of hvac system operations to supply fresh air for life support, pressurization of corridors and exit routes to control smoke spreading, exhausting of products of combustion and shut down of some systems or portions of systems.

The basic function of a fire damper has been identified with the concept of avoiding reducing the fire rating of a structural barrier because of a duct penetration or air passage opening. In some cases the damper has a purpose of interrupting air flow or heat transmission within a duct. Derived from these concepts is the idea that the damper must stay in the wall even if ducts and/or ceilings on either side of the wall fall down.

Thus, so called "breakaway" connections are placed between the duct sleeve containing the damper and the duct continuations, and furthermore, retaining angles are attached to the sleeve or damper frame (but not the wall).

Tests of many damper and sleeve assemblies at U.L. and study of warpage and potential interference with damper operation have led to the conclusion that fire damper sleeves may be the same gage as the duct unless otherwise dictated by the approval conditions issued with damper ratings.

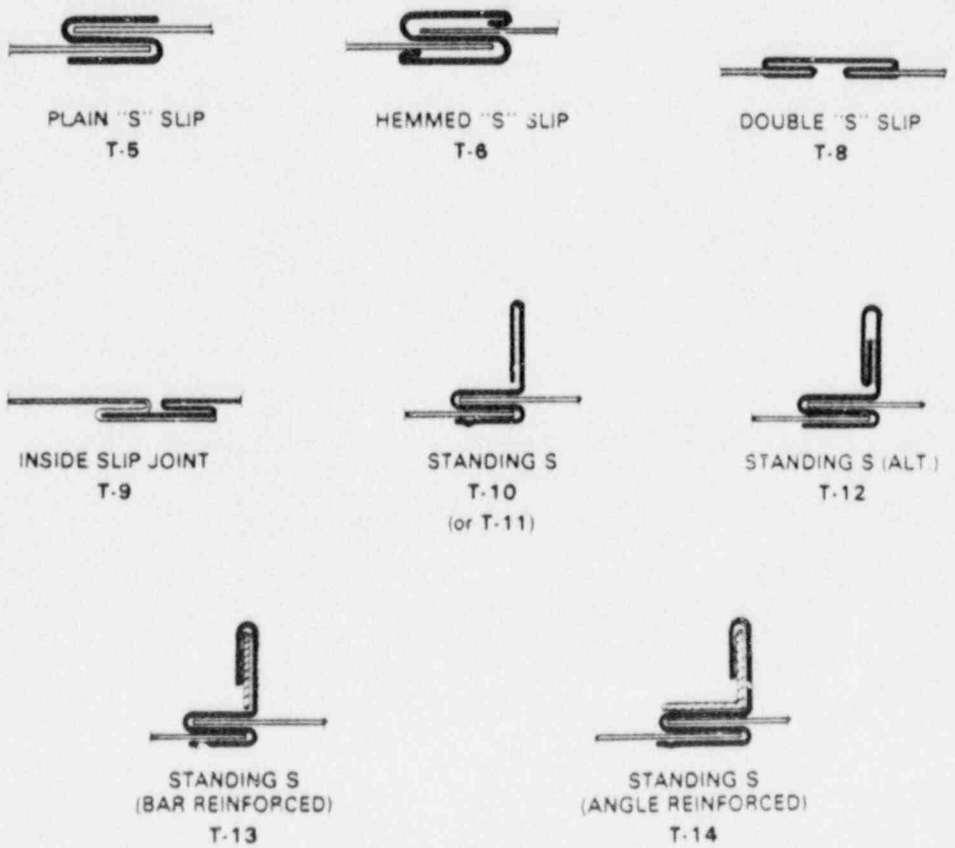
The following items deserve special attention. Local code documents and specific installation instructions issued with a rated damper must be followed.

1. Fire or smoke dampers are to be installed only in locations shown on the contract drawings. NFPA standard 90 has consistently required the requirement that the designers show all required dampers on the drawings. Only designers are in possession of sufficient information on barrier locations, occupancy assignments, protection planning and rating and identification of compartments and structural components . . . to coordinate all requirements. Literary designations in specifications do not suffice. See symbol list in this manual.
2. Sleeve length shall not be greater than wall thickness plus retaining angle dimensions plus 6".
3. Designers should designate frames and blades to be out of the air stream if such models are desired.
4. Framing for openings is normally provided by the wall or partition contractor. The air handling contractor may furnish locations and dimensions.
5. In some installations the opening between the wall and sleeve requires filler material of flexible consistency. Clearance between the sleeves and the open-

ing is provided for expansion under fire condition. Packing should not unduly restrict expansion. See NFPA 90A, when this is invoked.

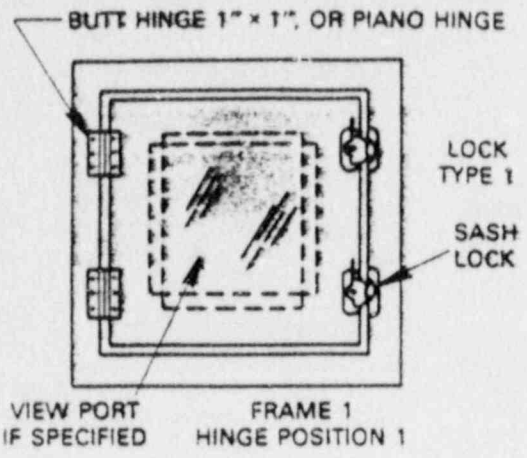
6. The following duct-to-fire damper-sleeve connection alternatives are recommended: (To permit breakaway do not use screws, rivets, bolts, etc. Seal if required for leakage class.) Fig. 2-13.
7. Always consult installation instructions of the damper manufacturer.
8. Vertical air flow damper installations are similar with spring loading of damper added.
9. Power operated dampers are available.
10. Fire dampers have ratings specified in hours, commonly 1-1/2 hours. Fire doors are rated for 1/3, 1/2, 3/4, 1, 1-1/2 and 3 hour tests and E, D, C, B or A wall opening classification, per NFPA standard 80. Door or damper rating may not, by code provision, will not necessarily match wall or partition ratings. Fusible links are normally 160° to 165° minimum, but 50°F above system operating temperature encountered. Follow applicable specifications. See U.L. Standard 33. Other type links are available.
11. Access should be provided in ducts in usable location adjacent fire dampers. Vision panels in such doors may be beneficial for inspection of links and controls in certain applications. See Fig. 2-14.

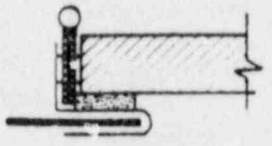
CN 2016
BY F.T.H
PAGE G 8
FORM NO. 372-30-2650

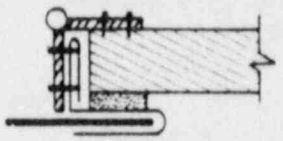


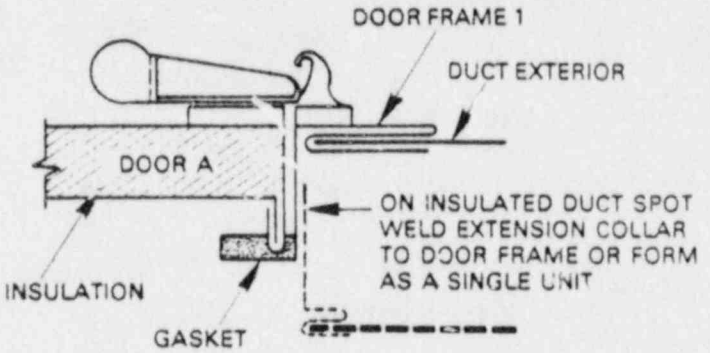
FIRE DAMPER SLEEVE CONNECTIONS FIG 2-13

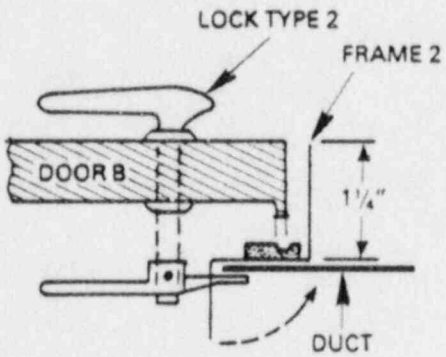
CN 2016
BY F. Tyll
PAGE G9
FORM NO. 372-30-2650

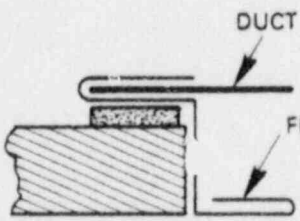


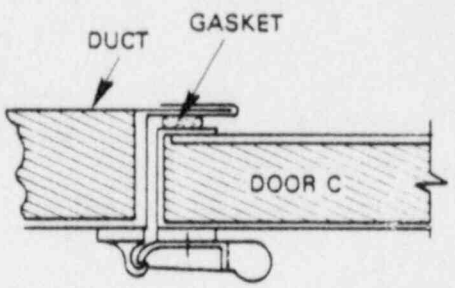


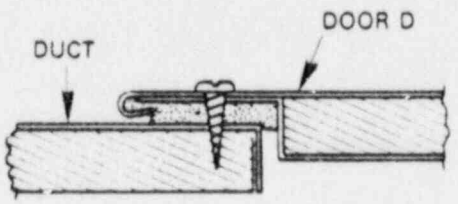








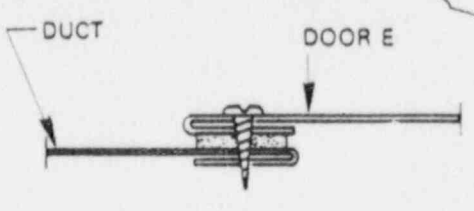




OTHER ARRANGEMENTS THAT SATISFY FUNCTIONAL REQUIREMENTS ARE ACCEPTABLE.

INSPECTION PANELS PER THIS CN (TYP. FOR TWO)

MAX DIM	NO. HINGES	NO. HANDLES	GAGE		
			DOOR	BACK	FRAME
12 × 12	2	1	26	26	24
16 × 20	2	2	24	26	22
24 × 24	3	2	22	26	22
DOOR "E"	THIS ACCESS PANEL MAY BE DUCT GAGE WITH SCREWS AT 8" MAXIMUM SPACING.				



DUCT ACCESS DOORS

FIG. 2-14

CN 2016
BY F. Tyler
PAGE G10

SUBMITTAL DATA

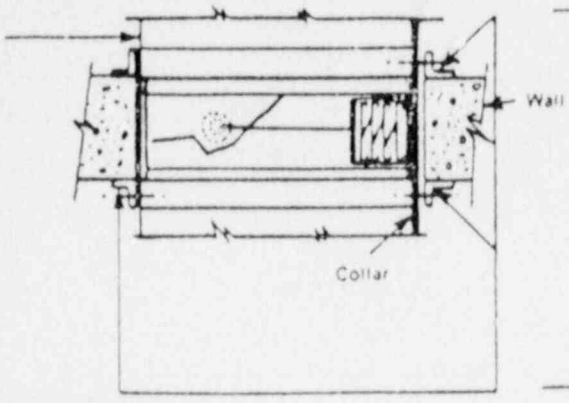
Installation Instructions — FIRE DAMPERS

Horizontal & Vertical

FOR FIRE DAMPERS LISTED BY UNDERWRITERS LABORATORIES INC.

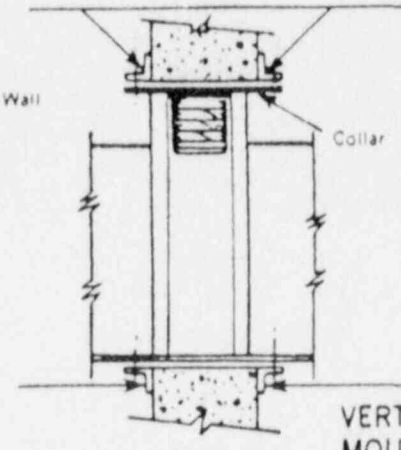
U.L. Classified

See notes 2 and 3 for joint detail.

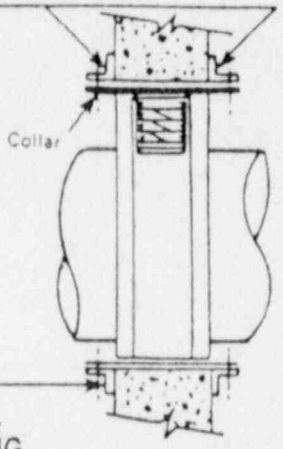


HORIZONTAL MOUNTING

TYPE 'A'



TYPE 'B'



VERTICAL MOUNTING

TYPE 'C'

Dampers secured to collar with 1/4" dia. nuts and bolts, welding or, No. 10 sheet metal screws or 3/16" steel pop rivets, 8" on center.

See notes 2 and 3 for joint detail.

Angles shall be a minimum of 1-1/2" x 14 ga. Fasten to collar only, with 1/4" dia. nuts and bolts or welding 8" on center. Or, No. 10 sheet metal screws 8" on center or 3/16" steel pop rivets. (See Note 4 for clearance and overlap)

LOOK FOR THIS LABEL

UNDERWRITERS' LABORATORIES INC.
CLASSIFIED
FIRE DAMPERS
FIRE RESISTANCE RATINGS 1½ HR. OR
NO

NOTES:

1. Collars shall be of the same or heavier gauge as the duct to which it is attached. Gauges shall conform to SMACNA or ASHRAE duct standards.

2. When the following duct-collar connections are used, the minimum gauge of the collar shall be 16 gauge on dampers not exceeding 36"W x 24"H and 14 gauge on larger curtain-type dampers:
   1) Angle reinforced standing seam.
   2) Angle reinforced packet lock.
   3) Companion angles.
   4) Metal fasteners shall be spaced a minimum of approximately 16" on center.

3. The following duct-collar connections may be used on all systems:
   1) Inside slip
   2) Plain 'S' slip
   3) Hemmed 'S' slip
   4) Bar slip
   5) Alternate slip (Standing slip)
   6) Reinforced bar slip (Cleat)
   7) Angle slip
   8) Double 'S' slip
   9) Cup slip
   10) Drive slip
   11) Pocket lock

4. Fire dampers shall have a clearance of 1/8" per foot on height and width, and angles shall increase in size, proportionately, so that there will be a minimum of 1" of overlap on the partition.

5. On Type 'C' installations the wall collar must be 18 gauge or heavier.

6. Maximum single damper of multiple damper assembly shall be 40" x 40" in vertical mountings, 42"H x 36"H in horizontal mountings.

7. In multiple damper assemblies, units shall be fastened Together.

8. As with all joints, contractor must seal collar, in field, after installation.

CN 2016
BY F. Tylutki
PAGE G11

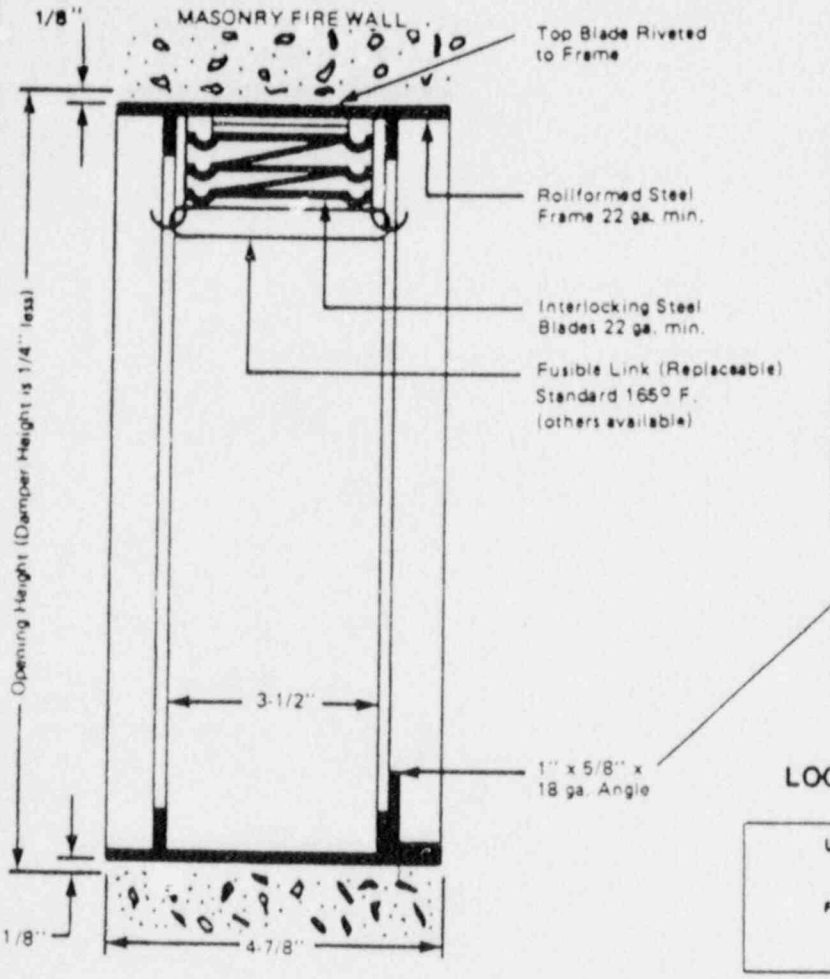
SUBMITTAL DATA

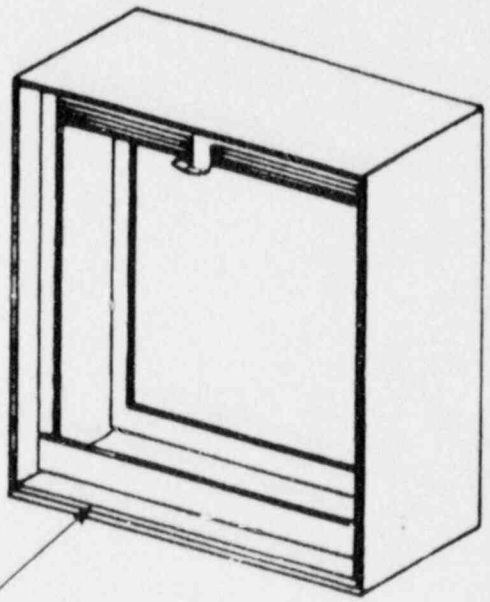
Model FD-K

FIRE DAMPERS

Horizontal & Vertical

U.L. Classified for 3-Hours





LOOK FOR THIS LABEL

UNDERWRITERS' LABORATORIES INC.
CLASSIFIED
FIRE DAMPERS
FIRE RESISTANCE RATINGS 3 HR (A)

SINGLE SECTION SIZE AVAILABILITY		
	VERTICAL	HORIZONTAL
	WIDTH X HEIGHT	WIDTH X HEIGHT
MINIMUM	4" x 4"	4" x 4"
MAXIMUM SECTION	24" x 24" or 36" x 16"	48" x 48"

Materials: Standard construction is galvanized steel. Stainless steel is optional.

The fire damper is available in models similar to Type B and Type C fire dampers for installation in higher velocity systems.

DOCUMENT UPDATE INFORMATION

FORM 344-22-4050

				MAINT.
Performed	Controlled	Resrc	Chrg	Order / Code

FORT ST. VRAIN
CHANGE NOTICE NO. 2016

(ENG-2)

Public Service™

FORT ST. VRAIN NUCLEAR GENERATING STATION

PUBLIC SERVICE COMPANY OF COLORADO

DOCUMENT UPDATE LIST

PERFORMED	CONTROLLED	RESRC	CHRG	ORDER / OCDE
				MAINT.

ENTER COMPLETE DOCUMENT NUMBER	ENTER ALL CN PAGE NUMBER(S) WHERE DOCUMENT IS LOCATED. DO NOT ENTER PAGE REVISION LETTER.	LIST ALL NEW AND EXISTING DOCUMENTS TO BE ADDED, REVISED OR CANCELLED. ONCE LISTED, A DOCUMENT SHALL NOT BE DELETED FROM THIS FORM.	IF NEW CONTROLLED DOCUMENT ENTER $	LIST CN ISSUES WHICH EITHER ADD TO, MODIFY OR CANCEL THE DOCUMENT	DOCUMENT REVISION AND DATE		Initials
DOCUMENT NUMBER	CN PAGE NUMBER(S)	TITLE OR DESCRIPTION	$	ADD CN REISSUE LETTER/NUMBER Ø = INITIAL ISSUE	REV LTR	REVISION DATE	DCT
IL 6-7	42, 43	INST. LIST		Ø			
PI 75-5	44, 45	P&I DIAGRAM		Ø			
M-109	46	HVAC - PLAN VIEW		Ø			
B-243	47, 48	DIESEL GEN RM - DETAILS		Ø			
PI-51	49	CO_2 SYS P&I		Ø			
01-J-09-0077	–	DAMPERS - FOREIGN PRINT	$	Ø			

Form (A) 344-22 4/84

NUCLEAR ENGINEERING DIVISION

(ENG 2)

CN 2016

BY [illegible]

PAGE 41

Public Service™

FORT ST. VRAIN NUCLEAR GENERATING STATION
PUBLIC SERVICE COMPANY OF COLORADO

ADDITION TO INSTRUMENT LIST
(Including Control Valves)
IL-6-7

CN 2016
BY F. Tull
PAGE 42

*****NUMBER IN PARENTHESES INDICATES MAXIMUM NUMBER OF CHARACTERS THAT CAN BE ENTERED*****

TAG NO. (17) FDV-75378 TYPE: INST ☐ CTVA ☒

SAFETY RELATED: YES ☐ NO ☒ SPEC (12) 1-J-9 DATA SHEET (8) —

DESCRIPTION (60) FIRE DAMPER - EAST STD By DIESEL GEN 2M

(60)

PI DWG 1 (8) 75-S (PI DWG SHEET NUMBER IF APPLICABLE) ZONE 1 (3) B, 2

PI DWG 2 (8) (PI DWG SHEET NUMBER IF APPLICABLE) ZONE 2 (3)

LOCATION DWG (30) M-109 LOCATION (ELEV & COORD) (10) 4749; B,5

SCHEMATIC DWG (12) — CONNECTION DWG (12) —

INSTALLATION DWG (12) — ELEC PLAN VIEW (30) —

POWER SUPPLY (12) — CABLE (8) — BUS/LOOP (4) — FUSE (12) —

PIPE CLASS (5) — SERVICE (30) HVAC

SIZE (8) 12X12 RATING (6) 3 HOUR MATERIAL (8) —

VALVE TYPE (10) CURTAIN OPERATOR (20) FUSIBLE LINK 160°F

MANUFACTURER (20) AIR CONTROL PROD. MODEL (20) FD-K

REF DOCUMENTS (59)

COMMENTS (36) APPENDIX R MODIFICATION, QA CLASSIFICATION = F

Public Service™

FORT ST. VRAIN NUCLEAR GENERATING STATION
PUBLIC SERVICE COMPANY OF COLORADO

ADDITION TO INSTRUMENT LIST
(Including Control Valves)
IL-6-7

CN 2916
BY F. Tyler
PAGE 43

*****NUMBER IN PARENTHESES INDICATES MAXIMUM NUMBER OF CHARACTERS THAT CAN BE ENTERED*****

TAG NO. (17) FDV-75379 TYPE: INST ☐ CTVA ☒

SAFETY RELATED: YES ☐ NO ☒ SPEC (12) 1-S-9 DATA SHEET (8) —

DESCRIPTION (60) FIRE DAMPER - WEST STD. BY DIESEL GEN. RM

(60)

PI DWG 1 (8) 75-5 (PI DWG SHEET NUMBER IF APPLICABLE) ZONE 1 (3) B, 2

PI DWG 2 (8) (PI DWG SHEET NUMBER IF APPLICABLE) ZONE 2 (3)

LOCATION DWG (30) M-109 LOCATION (ELEV & COORD) (30) 4749; B, 5

SCHEMATIC DWG (12) — CONNECTION DWG (12) —

INSTALLATION DWG (12) — ELEC PLAN VIEW (30) —

POWER SUPPLY (12) — CABLE (8) — BUS / LOOP (4) — FUSE (12) —

PIPE CLASS (5) — SERVICE (30) HVAC

SIZE (8) 6X12 RATING (6) 3 HOUR MATERIAL (8) —

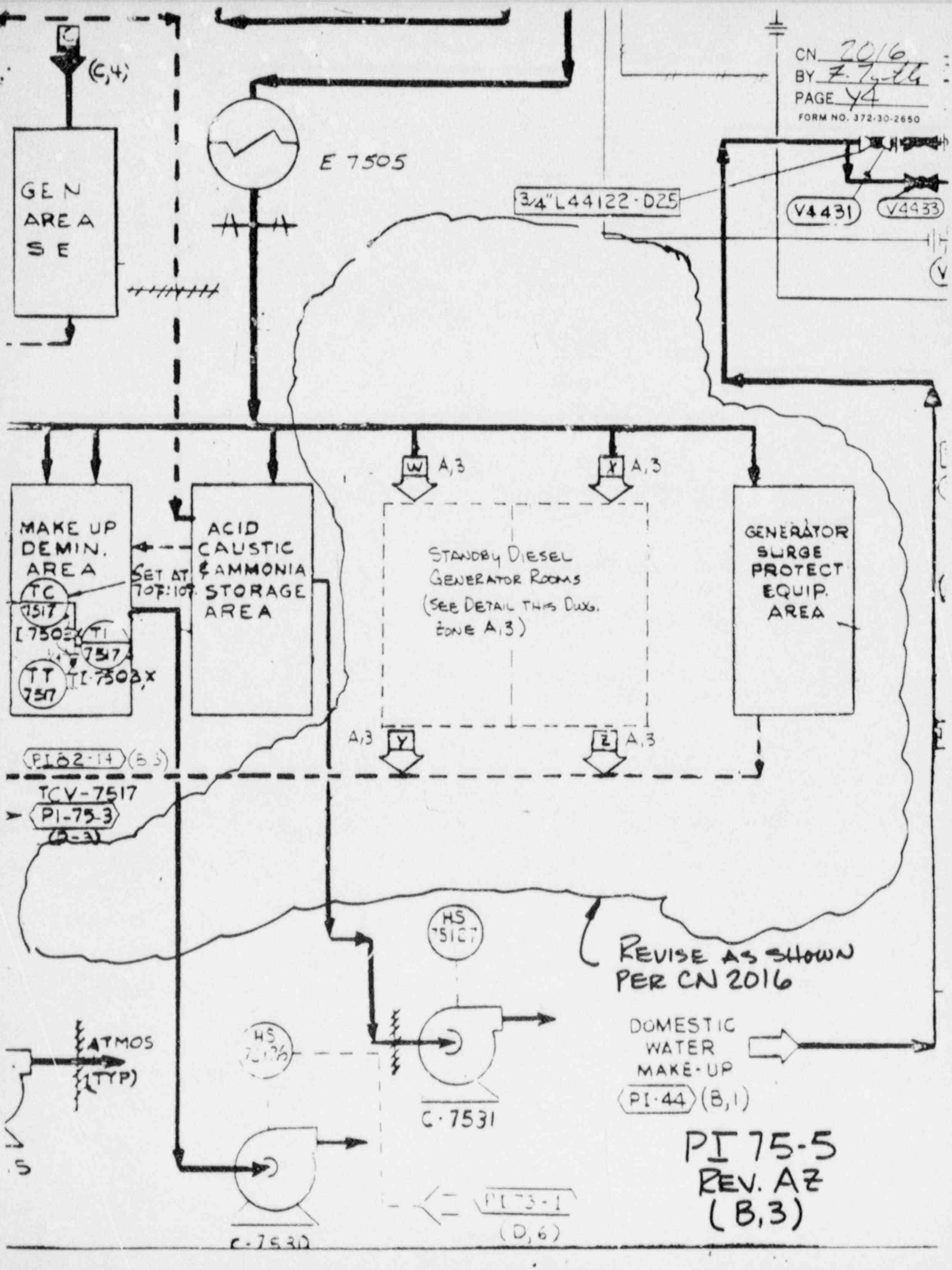
VALVE TYPE (10) CURTAIN OPERATOR (20) FUSIBLE LINK 160°F

MANUFACTURER (20) AIR CONTROL PROD MODEL (20) FD-K

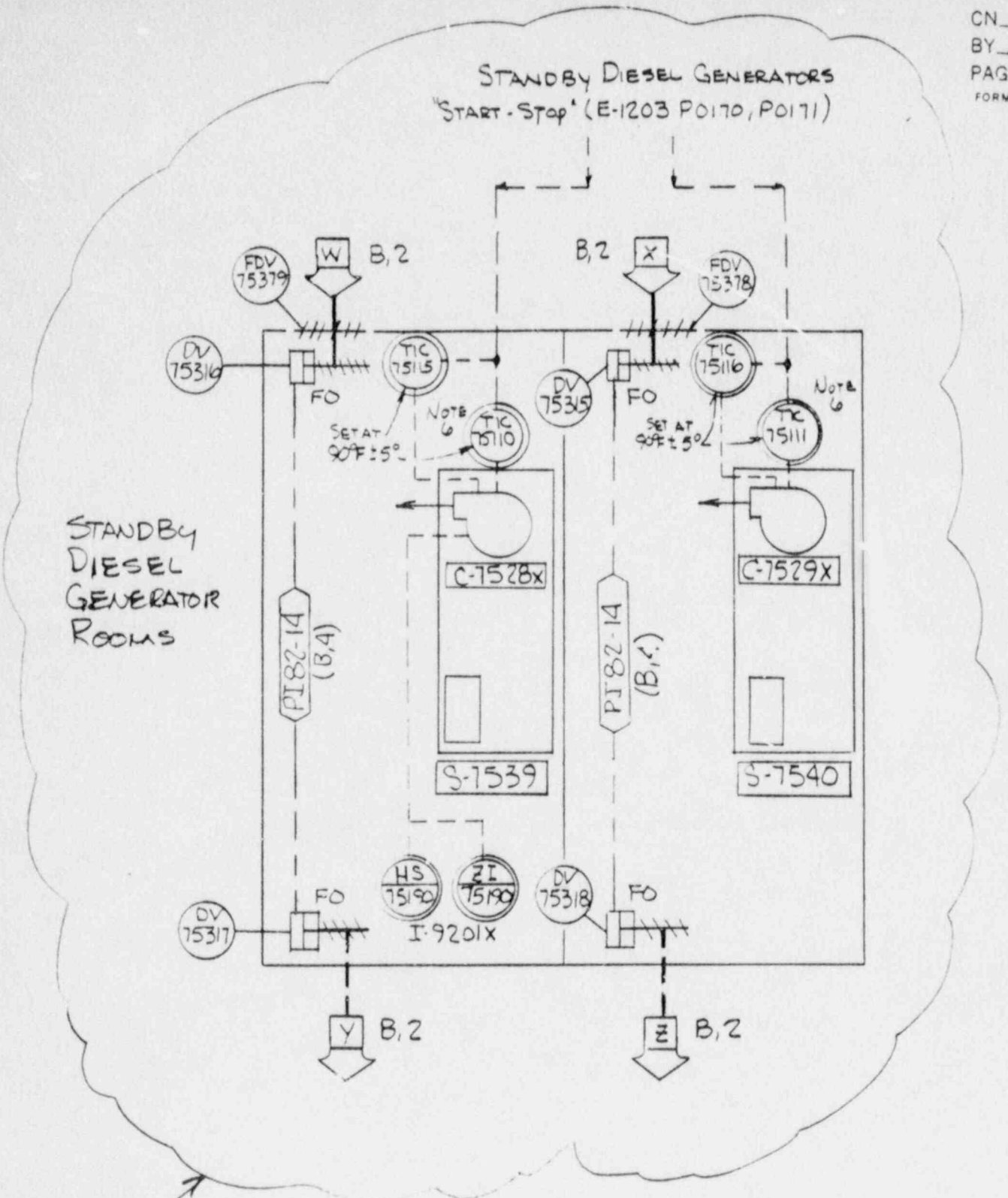
REF DOCUMENTS (59)

COMMENTS (36) APPENDIX R MODIFICATION, QA CLASSIFICATION = F

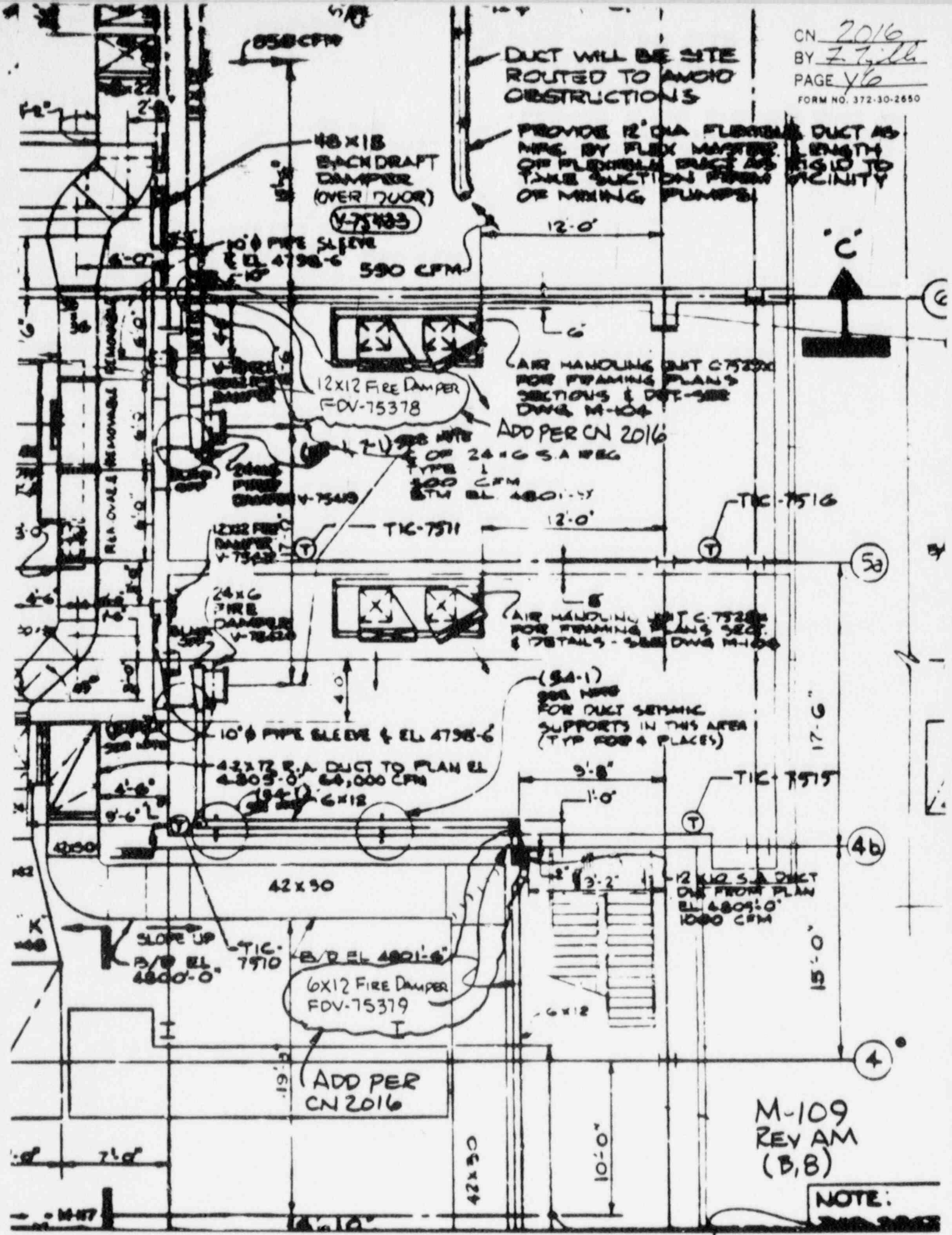
CN 2016
BY Z. 7-76
PAGE Y4
FORM NO. 372-30-2650



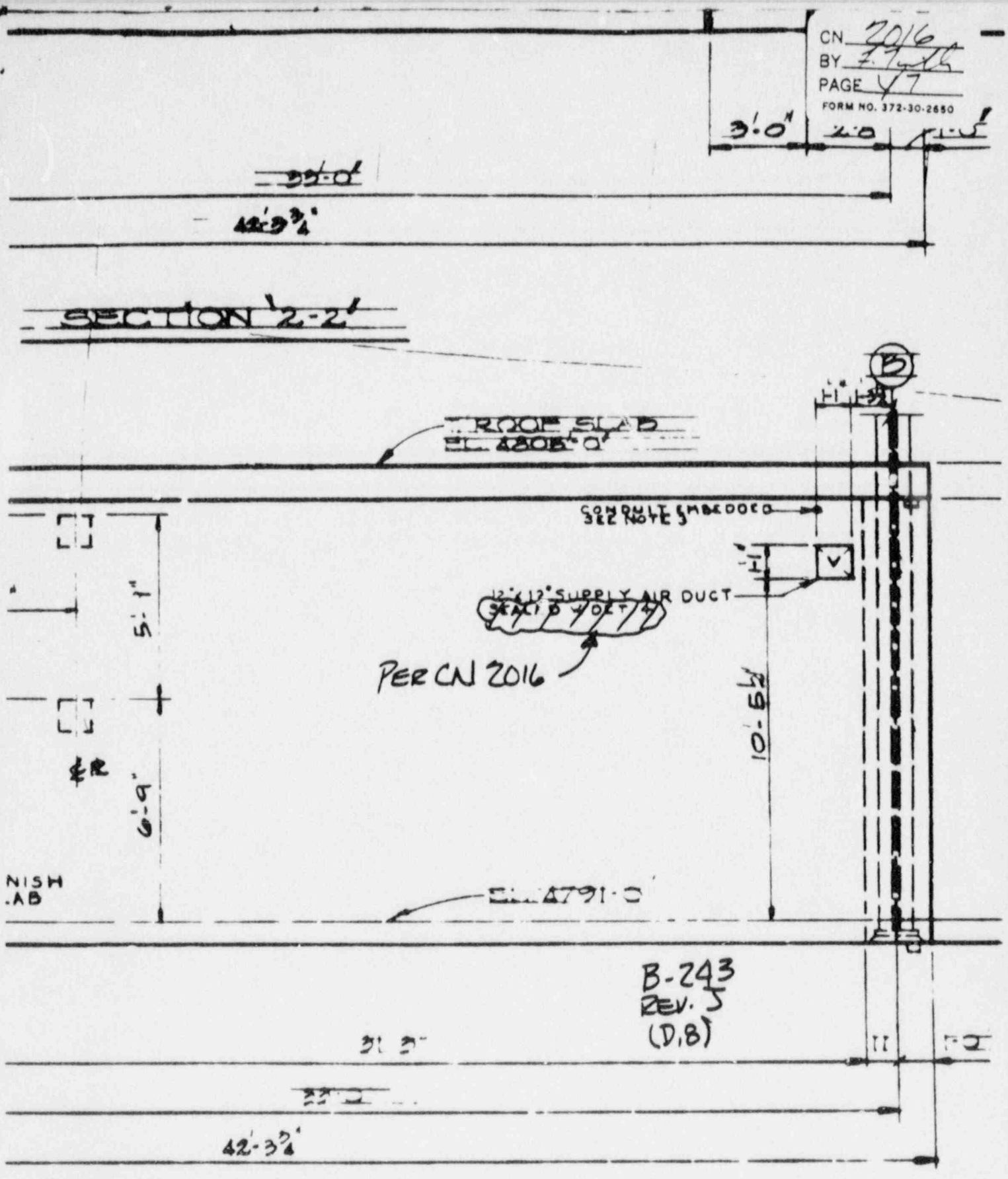
CN 2016
BY [illegible]
PAGE 45
FORM NO. 372-30-2650



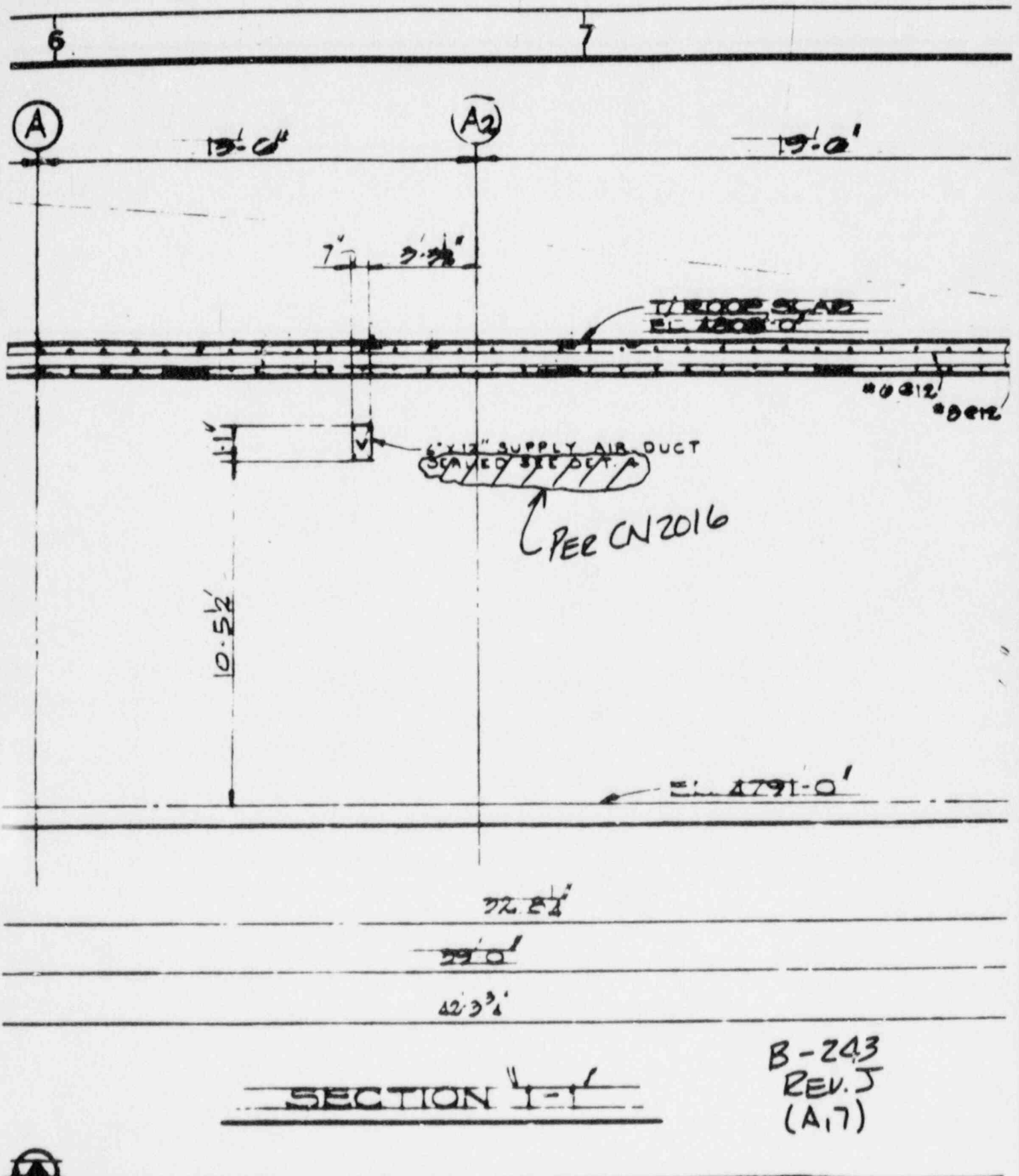
INSERT AT ZONE A,3 OF PI 75-5
PER CN 2016


CN 2016
BY F. T. Ch.
PAGE Y6
FORM NO. 372-30-2650
DUCT WILL BE SITE ROUTED TO AVOID OBSTRUCTIONS
PROVIDE 12" DIA FLEXIBLE DUCT AS MFG. BY FLEX MASTER LENGTH OF FLEXIBLE DUCT AS REQ'D TO TAKE SUCTION FROM VICINITY OF MIXING PUMPS
48 x 18 BACK DRAFT DAMPER (OVER DOOR)
V-75483
10" ϕ PIPE SLEEVE @ EL. 4798'-6"
590 CFM
12'-0"
"C"
AIR HANDLING UNIT C-75200 FOR FRAMING PLANS SECTIONS & DET. SEE DWG M-104
12x12 FIRE DAMPER FDV-75378
ADD PER CN 2016
24x6 FIRE DAMPER V-75419
TIC-7511
TIC-7516
24x6 FIRE DAMPER V-75420
(SA-1) SEE NOTE FOR DUCT SEISMIC SUPPORTS IN THIS AREA (TYP FOR 4 PLACES)
10" ϕ PIPE SLEEVE @ EL. 4798'-6"
42x72 R.A. DUCT TO PLAN EL 4805'-0" 64,000 CFM
6x18
9'-8"
1'-0"
TIC-7515
42x30
SLOPE UP B/D EL 4800'-0"
TIC-7510
B/D EL 4801'-6"
6x12 FIRE DAMPER FDV-75379
12 x 10 S.A. DUCT DWN FROM PLAN EL 4809'-0" 1000 CFM
ADD PER CN 2016
M-109
REV AM
(B,B)
NOTE:

CN 2016
BY
PAGE 47
FORM NO. 372-30-2650



CN 2016
BY [illegible]
PAGE 48
FORM NO. 372-30-2650



SECTION 1-1

B-243
REV. J
(A,7)

CN 2016
BY F. Light
PAGE V9
FORM NO. 372-30-2650

5

K-9201
EY GENERATOR 1A

T-4504X
CO_2 SYSTEM
STORAGE TANK
CAPACITY: 4 TONS
OPERATING PRESSURE: 300 PSIG
OPERATING TEMP: 0°F

K-9202
STANDBY GENERATOR 1B

E-4501X
CO_2 VAPORIZER
RATING: 4000 LB/HR
C-4501X
CO_2 SYSTEM REFRIGERATION COMPRESSOR
RATING: 1½ HP

REVISE TO READ PER CN 2016

FSV-7580-1
(DV-75317)
PI 82-14
(B,4)

FSV-7580-2
(DV-75318)
PI 82-14
(B,4)

DV-7542Y
PI-75-5
(A-3)

DV-7542Z
PI-75-5
(A-2)

PI 51
REV AF
(D,5)

NDBY GENERATOR ROOM

STANDBY GENERATOR ROOM

SEL- 1B

SET AT 225°F (TYP)

BS 0037

BA 0039

BA 0040

DIESEL

1D

ALARM HORN

BS 0038

1½"x1"

K-9201

K-9202

NERATOR

GENERATOR

¾" L-5118-D31B

CO_2 NOZ

(BY VEND

1" L-5113-D31B

¾" L-5118-D31B

1½"x1"

AIR CONTROL PRODUCTS, INC.

4049 SOUTH HOWICK STREET • SALT LAKE CITY, UTAH 84107
801-263-8333 • TELEX 453-071

August 15, 1985

Public Service Commission
of Colorado
2420 West 26th Avenue
Suite 100D
Denver, Colorado 80211

Attn: Felix Trujillo

Dear Sirs:

Per your request attached please find Submittal Data Sheets D-S10B and D-S21A. These sheets will show you installation for a 3 Hour type fire damper per U.L. Our Quality Assurance Program meets the U.L. Spec Sheets to the smallest detail.

Please refer to these submittal sheets when identifying the products and/or installation.

I hope this information is helpful. If you need any further help, please call.

Thank you,

AIR CONTROL PRODUCTS, INC.

Steven R. Haws
Damper Sales Manager

SH/tfb

attachments

cc: Rocky Mountain Aircold

CALVIN WHEELER

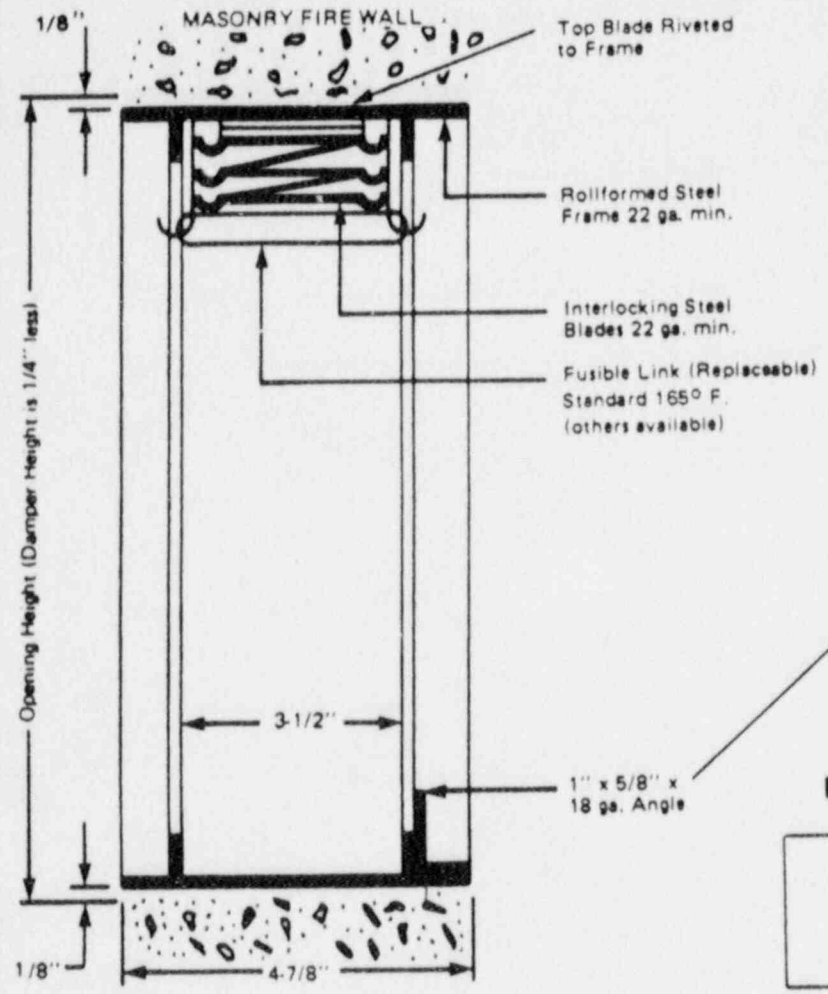
SUBMITTAL DATA

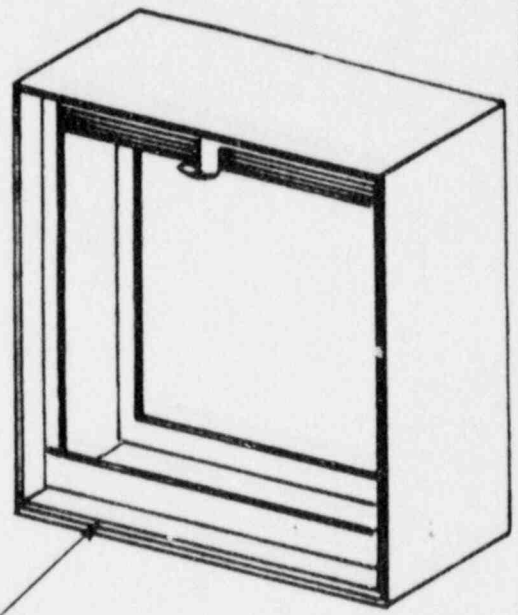
Model FD-K

FIRE DAMPERS

Horizontal & Vertical

U.L. Classified for 3-Hours





LOOK FOR THIS LABEL

UNDERWRITERS' LABORATORIES INC.
CLASSIFIED
FIRE DAMPERS
FIRE RESISTANCE RATINGS 3 HR (A)

SINGLE SECTION SIZE AVAILABILITY		
	VERTICAL	HORIZONTAL
	WIDTH X HEIGHT	WIDTH X HEIGHT
MINIMUM	4" x 4"	4" x 4"
MAXIMUM SECTION	24" x 24" or 36" x 16"	48" x 48"

Materials: Standard construction is galvanized steel
Stainless steel is optional.

The fire damper is available in models similar to Type B and Type C fire dampers for installation in higher velocity systems.

SUBMITTAL DATA

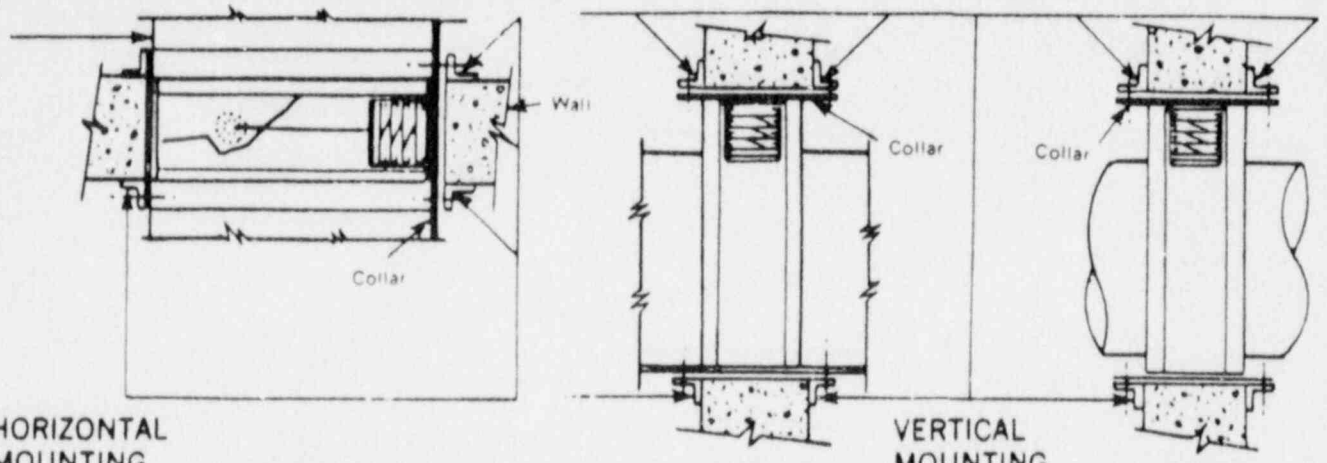
Model FD-A, FD-B & FD-C & FD-D
Installation Instructions FIRE DAMPERS

Horizontal & Vertical

FOR FIRE DAMPERS LISTED BY UNDERWRITERS LABORATORIES INC.

U.L. Classified

See notes 2 and 3 for joint detail.



HORIZONTAL MOUNTING

TYPE 'A'

TYPE 'B'

VERTICAL MOUNTING

TYPE 'C'

Dampers secured to collar with 1/4" dia. nuts and bolts, welding or, No. 10 sheet metal screws or 3/16" steel pop rivets, 8" on center.

See notes 2 and 3 for joint detail.

LOOK FOR THIS LABEL

UNDERWRITERS' LABORATORIES INC.
CLASSIFIED
FIRE DAMPERS
FIRE RESISTANCE RATINGS 1½ HR. (B)
NO

Angles shall be a minimum of 1-1/2" x 14 ga. Fasten to collar only, with 1/4" dia. nuts and bolts or welding 8" on center. Or, No. 10 sheet metal screws 8" on center or 3/16" steel pop rivets. (See Note 4 for clearance and overlap)

NOTES:

1. Collars shall be of the same or heavier gauge as the duct to which it is attached. Gauges shall conform to SMACNA or ASHRAE duct standards.

2. When the following duct-collar connections are used, the minimum gauge of the collar shall be 16 gauge on dampers not exceeding 36"W x 24"H and 14 gauge on larger curtain-type dampers:
   1) Angle reinforced standing seam.
   2) Angle reinforced packet lock.
   3) Companion angles.
   4) Metal fasteners shall be spaced a minimum of approximately 16" on center.

3. The following duct-collar connections may be used on all systems:
   1) Inside slip
   2) Plain 'S' slip
   3) Hemmed 'S' slip
   4) Bar slip
   5) Alternate slip (Standing slip)
   6) Reinforced bar slip (Cleat)
   7) Angle slip
   8) Double 'S' slip
   9) Cup slip
   10) Drive slip
   11) Pocket lock

4. Fire dampers shall have a clearance of 1/8" per foot on height and width, and angles shall increase in size, proportionately, so that there will be a minimum of 1" of overlap on the partition.

5. On Type 'C' installations the wall collar must be 18 gauge or heavier.

6. Maximum single damper of multiple damper assembly shall be 40" x 40" in vertical mountings, 42"H x 36"H in horizontal mountings.

7. In multiple damper assemblies, units shall be fastened Together.

8. As with all joints, contractor must seal collar, in field, after installation.

SEE INSTRUCTIONS ON BACK OF PINK AND YELLOW COPIES

QUALITY RELATED PURCHASE REQUISITION

INTERNAL CONTROL NUMBER ONLY: Y6037 — DO NOT TRANSMIT TO SELLER

SELLER NO: 74926

SELLER NAME & ADDRESS:
ROCKY MOUNTAIN AIR COLD CO. 480-1156
P O BOX 19099
DENVER CO

MIKE
Scot

PURCHASE ORDER: CONF. N-6344 (ASSIGNED BY PURCHASING)

DATE WRITTEN: 7-15-85

PUBLIC SERVICE COMPANY OF COLORADO
OR SUBSIDIARY COMPANY

STOREROOM: 686 | DATE WANTED: 8-1-85

SHIP TO: ATTN: F. TRUJILLO
STOREKEEPER, FORT ST.VRAIN: PLATTEVILLE, COLORADO 80651

SHIPPING POINT (INCLUDE CITY, STATE): SALT LAKE, UTAH
1. ☐ SP/FA
2. ☐ COLLECT

SHIP VIA: OVERNITE EXPRESS

TOTAL EST WEIGHT:

ITEM NUMBER OR STORES CODE NO.	QUANTITY	DESCRIPTION OF MATERIAL OR SERVICES	ESTIMATED UNIT PRICE	ACTUAL UNIT PRICE	AMOUNT
		THE FOLLOWING DOCUMENTATION REQUIREMENTS PERTAIN TO THE ITEMS ON THIS PURCHASE ORDER:			
		MANUFACTURER TO SUPPLY LETTER OF CONFORMANCE TO UNDERWRITERS LABORATORIES. CERTIFICATE MUST ACCOMPANY MATERIAL. MATERIAL TO BE 3-HOUR RATED. MANUFACTURER TO INCLUDE INSTALLATION INSTRUCTIONS FOR PURCHASED MATERIAL ON THIS ORDER.			
1	1 EA	DAMPER, FIRE, CURTAIN TYPE, SPRING LOADED W/ FISIBLE LINK (160°F), 12" X 12" SQ W/16 GA. SLEEVE, 18" LONG	72.50		72.50
2	1 EA	DAMPER, FIRE, CURTAIN TYPE, SPRING LOADED W/FUSIBLE LINK (160°F) 6" HORIZ. X 12" VERTICAL W/16 GA. SLEEVE 18" LONG.	52.50		52.50
		BOTH DAMPERS TO BE MOUNTED IN HORIZONTAL 500 CFM DUCT			
		PACKAGING, SHIPPING, RECEIVING, STORAGE, AND HANDLING REQUIREMENTS INCLUDED IN ENCLOSURE N-100 APPLY TO ITEMS ON THIS ORDER AND ARE CONSIDERED ADEQUATE TO ENSURE PROTECTION TO THE ANSI N45.2.2 LEVEL C.			
		STOREKEEPER: TAG FOR CN-2016			
		~~[illegible]~~			

SEE ATTACHED SHEET FOR QUALITY AND DOCUMENTATION REQUIREMENTS.

QUALIFIED SOURCE REQUIRED: ☐ MANUFACTURER ☐ SUPPLIER ☐ SERVICES

SPEC. NO. ________ EQUIP. NO. ________

QA REVIEW ________

QUOTATION SOURCE:

TOTAL ☐ ACTUAL ☒ ESTIMATE: 125.00

ACCOUNTS TO BE CHARGED
INDICATE ITEM NUMBER FROM ABOVE WHEN MORE THAN ONE ACCOUNT NUMBER IS USED.

CORRESPONDING ITEM NUMBER AND/OR %	PERFORMED	CONTROLLED	RESRCE	CHRG D	ORDER/CODE	MCS REPORT DESCRIPTION (ONE LINE PER ACCOUNT)
100%	4740	4512	22	24		

PURPOSE FOR WHICH MATERIAL WILL BE USED: CN-2016

LOCATION OF USE: FORT ST. VRAIN

APPROVED CAPITAL BUDGET ITEM? ☐ YES ☐ NO

ORIGINATOR'S NAME (TYPE OR PRINT): L. ARAGON

TELEPHONE NO: 571-8556

APPROVAL SIGNATURE:
DATE:

EXECUTIVE APPROVAL SIGNATURE:
DATE:

ACCOUNT APPROVAL | PURCHASING APPROVAL | BUYER | TRAFFIC

FORM (A) 278-54-2842

NOTE: PURCHASE REQUISITIONS MUST NOT BE MADE UNLESS IT HAS BEEN DETERMINED THAT SUPPLIES WANTED ARE NOT IN STOCK AT WAREHOUSE. THIS REQUISITION MUST BE SIGNED BY THE PERSON AUTHORIZED IN ACCORDANCE WITH GI-170

Public Service®

FORT ST. VRAIN NUCLEAR GENERATING STATION

PUBLIC SERVICE COMPANY OF COLORADO

CHANGE NOTICE

ISSUE STATUS	
APPROVED	8.4.87

CN. NO. 2645
PAGE 1
DATE 5-11-87
BY HICKS
JO # / ACCT. # 25-97016-1

DESCRIPTION

DESCRIPTION: PROVIDE A 3 HOUR FIRE DOOR & FIRE DAMPER FOR THE ELECTRIC MOTOR DRIVEN FIRE WATER PUMP ROOM & 3 HOUR FIRE BARRIER FOR ACM CONDUIT

ATTACHMENT 3A

CN GENERATED IN RESPONSE TO (COMMITMENT JOB NO., DCAR, I & E BULLETIN, ETC.): FIRE PROTECTION PROGRAM

SYST. NO.: 45 48

EQUIP. NO.: DOOR D142

SPEC. NO.:

PSC 1 CAT

SAFETY EVALUATION: SEE DETAILED SAFETY EVALUATION

- [X] SAFETY RELATED
- [X] MODIFICATION
- [ ] ENHANCED QUALITY
- [ ] NONSAFETY RELATED
- [ ] DOCUMENT CHANGE ONLY

REMARKS: THE CN IS SAFETY RELATED BECAUSE OF MINOR MODIFICATION TO SAFETY RELATED WALL

PAGE SCHEDULE (Number CN Cover Pages Sequentially: 1, 2, 3, etc.)

1 2 3 4, 4.1

APPROVALS

	SIGNATURE	DATE
NUCLEAR ENGINEERING	R. Gunderson R. Gunderson	7-27-87 7-17-87
PROD	7/28/87	7/[illegible]/87
QA		8.4.87

FT. ST. VRAIN NON-CONTROLLED COPY VERIFY ISSUE STATUS PRIOR TO USE

PORC REVIEW: REQUIRED IF CHANGE IS SAFETY RELATED OR HAS POTENTIAL FOR CREATING AN UNREVIEWED ENVIRONMENTAL QUESTION.

YES	NO		
[ ]	[ ]	SAFETY SIGNIFICANT	
[ ]	[ ]	UNREVIEWED SAFETY QUESTION	
[ ]	[ ]	UNREVIEWED ENVIRONMENTAL QUESTION	(SIGNATURE) (MTG NO.) (DATE)

NFSC REVIEW: REQUIRED ONLY IF PORC DETERMINES CHANGE TO BE EITHER SAFETY SIGNIFICANT, AN UNREVIEWED SAFETY QUESTION OR AN UNREVIEWED ENVIRONMENTAL QUESTION.

YES	NO		
[ ]	[ ]	UNREVIEWED SAFETY QUESTION	
[ ]	[ ]	UNREVIEWED ENVIRONMENTAL QUESTION	(SIGNATURE) (MTG NO.) (DATE)

NRC REVIEW: * REQUIRED ONLY IF NFSC CONCURS THAT THE CHANGE IS AN UNREVIEWED SAFETY QUESTION OR AN UNREVIEWED ENVIRONMENTAL QUESTION.

NRC REVIEW COMPLETED (NED SIGNATURE) (DATE) (REFERENCE)

* NRC REVIEW REQUIRED PRIOR TO IMPLEMENTATION

CLOSE OUT (To Be Completed By NED)

DOCUMENT REVISION COMPLETED (SIGNATURE) (DATE)

CHANGE NOTICE CANCELLED (SIGNATURE) (DATE)

Form (E) 344-30-3380

Public Service™

FORT ST. VRAIN NUCLEAR GENERATING STATION

PUBLIC SERVICE COMPANY OF COLORADO

CN XXXXXXXXXXXXXXX
NO. 2645
PAGE 2

SAFETY EVALUATION

CATEGORY

TYPE:

[X] CN OVERALL [ ] CN SUBMITTAL [ ] SETPOINT CHANGE REPORT [ ] TEST REQUEST
[ ] TEMPORARY CONFIGURATION REPORT [ ] PROCEDURE CHANGE (FSAR) [ ] OTHER

CLASSIFICATION: ARE THE SYSTEM(S) EQUIPMENT OR STRUCTURES INVOLVED, OR DOES THE ACTIVITY AFFECT:

CLASS I	[X] YES	[ ] NO	ENGINEERED SAFEGUARD	[ ] YES	[X] NO
SAFE SHUTDOWN	[X] YES	[ ] NO	PLANT PROTECTIVE SYSTEM	[ ] YES	[X] NO
SAFETY RELATED	[X] YES	[ ] NO	SECURITY SYSTEM	[ ] YES	[X] NO

REMARKS

EVALUATION — Use Additional Sheets If Required

1. DOES THIS ACTIVITY AFFECT STRUCTURES, SYSTEMS, COMPONENTS, EQUIPMENT, TESTS, EXPERIMENTS OR PROCEDURES DESCRIBED IN THE FSAR OR TECH SPECS? [X] YES [ ] NO

LIST THE APPLICABLE SECTIONS REVIEWED:
FSAR Sections: 9.12, 1.4.4, Tables 1.4-1 and 1.4-2, 9.12.3.3

Tech Specs: LCO 4.2.6, SR. 5.2.10
LCO 4.10.4 SR 5.10.4

FPPP: 6.5, 6.4,6.1, 10.2

2. DOES THE ACTIVITY REQUIRE THAT CHANGE(S) BE MADE TO THE FSAR OR TECH SPEC? [ ] YES [X] NO

LIST SECTIONS TO BE CHANGED AND THE CHANGES TO BE MADE:
FPPP Section 10.2 should be changed to reflect the three hour rated damper and fire door on the electrical Fire Water Pump Room.

3. DETERMINE WHETHER OR NOT THE ACTIVITY INVOLVED IS AN UNREVIEWED SAFETY QUESTION UTILIZING THE FOLLOWING GUIDELINES:

(A) HAS THE PROBABILITY OF OCCURRENCE OR THE CONSEQUENCES OF AN ACCIDENT OR MALFUNCTION OF EQUIPMENT IMPORTANT TO SAFETY PREVIOUSLY EVALUATED IN THE FSAR BEEN INCREASED?

[ ] YES [X] NO STATE BASIS: The replacement of an unrated door with a three hour fire rated door and damper, better protects the Electric Fire Water Pump during a fire and provides separation between the two Fire Water Pumps, if the fire occurs in the Electric Fire Water Pump Room. The ACM conduits will be better protected from an exterior fire by the 5" concrete placed around them. The changes do not effect the seismic design. The probability of an occurrence or consequences of an accident or malfunction of equipment important to safety has decreased by this change.

(B) HAS THE POSSIBILITY OF AN ACCIDENT OR MALFUNCTION OF A DIFFERENT TYPE THAN ANY EVALUATED PREVIOUSLY IN THE FSAR BEEN CREATED? [ ] YES [X] NO STATE BASIS: This CN is the result of PSC lette P-87167. This change does not affect operation of the Fire Water System, per se, but adds additional protection and three hour fire barrier separation between the two Fire Protection Shutdown/Cooldown trains. No new accident conditions have been created.

(C) HAS THE MARGIN OF SAFETY, AS DEFINED IN THE BASIS FOR ANY TECHNICAL SPECIFICATION OR IN THE FSAR BEEN REDUCED?

[ ] YES [X] NO STATE BASIS: The overall margin of safety for the plant has increased due to this CN. The three hour fire rated door, damper, and concrete around the ACM power cables better protects and separates the two Fire Protection Shutdown/Cooldown trains Fire Water Pumps. The fire damper should be surveillanced per Tech Spec 5.10.4, and procedure changes made to reflect the need to reset the fire damper after a fire to ensure adequate ventilation for the Electric Fire Water Pump.

DOES THE ACTIVITY APPEAR TO INVOLVE AN UNREVIEWED SAFETY QUESTION [ ] YES [X] NO
BE SAFETY SIGNIFICANT [ ] YES [XX] NO

BY Robert A Spence (SIGNATURE) 7-17-87 (DATE) APPROVED (SIGNATURE) 7-17-87 (DATE)

Public Service®

FORT ST. VRAIN NUCLEAR GENERATING STATION

PUBLIC SERVICE COMPANY OF COLORADO

ENVIRONMENTAL EVALUATION

CN / ~~OTHER~~ 2645
NO.
PAGE 3

CATEGORY

TYPE: [X] CN Overall [ ] CN Submittal Other _____

Are all measurable nonradiological effects of this activity confined to the on-site areas previously disturbed during site preparation, plant construction or previous plant operation? [X] Yes [ ] No

State basis The construction work to accomplish this CN is confined to the site area previously disturbed during site construction. The completed modification will minimize the effects of a fire in the Electric Fire Water Pump room on the environment by helping to contain combustion products within the building.

Is the activity required to achieve compliance with Federal, State or local environmental regulations? [ ] Yes [X] No

Applicable Regulations _____

NOTE: If either answer is Yes, the activity does not involve an unreviewed environmental question. Sign and date the form. If both answers are No, the activity has the potential for creating an unreviewed environmental question. Complete the remainder of this evaluation form.

EVALUATION (Use additional sheets if required)

1. Is the activity identified in the final environmental statement (FES) Or Supplementary Environmental Documents (See Q-3)? [ ] Yes [ ] No

Identify documents and document sections reviewed _____

2. Determine whether or not the activity involved is an unreviewed environmental question using the following guidelines. (If the answer to any of the following questions is Yes, then this activity involves an unreviewed environmental question.)

(A) Will this activity result in a significant increase in any adverse environmental impact previously evaluated in the FES? [ ] Yes [ ] No State basis _____

(B) Will this activity result in a significant change in the types, or a significant increase in the amounts of effluents, or a significant increase in the authorized power level? [ ] Yes [ ] No

State basis _____

(C) Does this activity involve an environmental matter not previously reviewed and evaluated in the FES? [ ] Yes [ ] No State basis _____

Does the activity involve an unreviewed environmental question? [ ] Yes [X] No

By Robert A Spence (SIGNATURE) 7/17/87 (DATE) Approved R K Wong (SIGNATURE) 7-17-87 (DATE)

DESIGN BACKGROUND INFORMATION

FORM (A) 344-22-4052

FORT ST. VRAIN
CHANGE NOTICE NO. 2645

Public Service®

FORT ST. VRAIN NUCLEAR GENERATING STATION

PUBLIC SERVICE COMPANY OF COLORADO

DESIGN INPUT REQUIREMENTS

CN 2645
BY HICKS
PAGE B1

- ☐ ELECTRICAL
- ☐ MECHANICAL
- ☒ STRUCTURAL
- ☒ SAFETY RELATED
- ☐ NON-SAFETY RELATED

REPLACE EXIST DOOR D142 WITH AN "A" LABELED DOOR TO PROVIDE A 3 HOUR FIRE BARRIER FOR THE ELECTRIC MOTOR DRIVEN FIRE PUMP. THE PUMP IS LOCATED IN THE SOUTH EAST CORNER OF THE MAIN COOLING TOWER THE PUMP IS ENCLOSED IN CONCRETE WALLS, ROOF AND FLOOR (MIN THICKNESS 8" EA). THERE IS A 24" DIA PIPE SLEEVE THAT PENETRATES THE ROOF THIS OPENING WILL NOT BE PROTECTED WITH A 3 HR FIRE BARRIER PER THE FIRE ENGINEER'S ~~RECOMMENDATIONS~~ INSTRUCTION

REPLACE EXISTING DOOR D142 WITH AN "A" LABELED DOOR
A FIRE DAMPER WILL BE INSTALLED ABOVE DOOR D142 TO PROVIDE A 3 HOUR FIRE BARRIER FOR THE LOUVERED OPENING.
A 3 HOUR CONCRETE FIRE BARRIER WILL ALSO BE INSTALLED AROUND AN ACM CONDUIT OUTSIDE THE EAST WALL OF THE ELECTRIC FIREWATER PUMP (P4501) ROOM

REFERENCE
FIRE PROTECTION PROGRAM PLAN
UNDERWRITERS LABORATORY 63 (1976)
NFPA 80 1986
FIRE PROTECTION HANDBOOK (14TH EDITION)
A.C.I 318 - 83
ACI 301 - 84

Prepared By Ed Hicks 6-4-87
SIGNATURE DATE

Approved By R. Granerson 6-12-87
SIGNATURE DATE

Form (C) 344-22-4060

Public Service™

FORT ST. VRAIN NUCLEAR GENERATING STATION

PUBLIC SERVICE COMPANY OF COLORADO

DESIGN INPUT REQUIREMENTS

CN 2645
BY SCHMALZ
PAGE B1.1

- ☐ ELECTRICAL
- ☒ MECHANICAL
- ☐ STRUCTURAL
- ☒ SAFETY RELATED
- ☐ NON-SAFETY RELATED

The installation of the fire door and fire damper assembly meets the applicable requirements of NFPA 90A (for the fire damper) and UL requirements for the fire door. The duct assembly extension does not affect the rating of the assembly of the fire damper.

G. Schmalz
F.P.E.
7/9/87.

Prepared By _____ SIGNATURE _____ DATE

Approved By F. Tilson SIGNATURE 7-16-87 DATE

Form 1B 344-22-4060

Public Service®

FORT ST. VRAIN NUCLEAR GENERATING STATION
PUBLIC SERVICE COMPANY OF COLORADO
DESIGN ANALYSIS

CN 2645
BY HICKS
PAGE B2

- ☐ ELECTRICAL
- ☐ MECHANICAL
- ☒ STRUCTURAL
- ☒ SAFETY RELATED
- ☐ NON-SAFETY RELATED

THE CONCRETE HATCH* LOCATED IN THE ROOF OF THE ELECTRIC FIRE WATER PUMP ROOM IS 6" THICK. THE NFPA WILL ALLOW A FIRE RATING OF 3 HR FOR CONC THAT IS A MIN OF 5 1/2" THICK. SEE ATTACHED SH B3. THE FIRE RATING OF A 12" CONCRETE WALL EXCEED A 3 HR FIRE RATING SEE ATTACHED SH B4

THE EXISTING HARDWARE THAT WILL BE REUSED IS UL APPROVED & THE NEW DOOR WILL BE FABRICATED TO ACCEPT THE HARDWARE.

THE LIGHTWEIGHT CONCRETE PLACED AROUND THE ACM CONDUIT WILL HAVE A MIN THICKNESS OF 5" WHICH WILL PROTECT THE CONDUIT FOR A 3 HR FIRE. SEE PAGE B4 SEE PAGE B8 FOR CONC MIX FOR EXPANDED SHELL AGGREGATES

* CN 2616 WILL INSTALL CERAFIBER INSULATION TO THE HATCH FOR ADDITIONAL FIRE PROTECTION

PER PAGE B4 THE MAX THICKNESS OF CONC. USING EXPANDED SHELL AGGREGATE IS 4" FOR A 3HR FIRE RATING

PREPARED BY Ed Hicks 6-4-87
SIGNATURE DATE

Form (D) 344-22-4062

Public Service®

FORT ST. VRAIN NUCLEAR GENERATING STATION

PUBLIC SERVICE COMPANY OF COLORADO

SAFETY RELATED DESIGN ANALYSIS - SHEET 1

CN 2645
BY HICKS
PAGE 85

☐ ELECTRICAL
☐ MECHANICAL
☒ STRUCTURAL

I. SEISMIC ANALYSIS

A SMALL SECTION OF THE CONC DOOR OPENING WILL BE REMOVED (1/8") EA. SIDE. THIS IS AN INSIGNICANT AMOUNT & WILL NOT AFFECT THE EXISTING SEISMIC ANALYSIS OF THE WALL

BY INSPECTION THE ANCHORAGE OF THE NEW DOOR FRAME TO THE CONC BY EXPANSION BOLTS IS SUFFICIENT FOR SEISMIC LOAD & THE DRILLING OF THE EXPANSION ANCHOR HOLES WILL NOT REDUCE THE DESIGN CAPACITY OF THE WALL

II. STRESS ANALYSIS

BY INSPECTION THE ~~YIELD~~ ALLOWABLE STRENGTH OF THE CONC. & REINF STEEL WILL NOT BE EXCEEDED

III. PIPING/HANGER ANALYSIS

THERE ARE NO NEW PIPES OR HANGERS

IV. HYDRAULIC/PNEUMATIC ANALYSIS

NO HYDRAULIC OR PNEUMATIC WORK

V. THERMAL ANALYSIS

THERMAL EFFECTS ARE INSIGNIFICANT FOR THIS CN

VI. NUCLEAR ANALYSIS

THE RADIATION EXPOSURE WILL NOT CHANGE BECAUSE THE DOOR & TRANSOM SHALL BE UPGRADED FOR FIRE PROTECTION & SHALL REPLACE THE EXIST DOOR & FRAME ON A LIKE FOR LIKE BASIS

VII. FIRE PROTECTION ANALYSIS

EXIST DOOR 142 IS NOT FIRE RATED. THIS CN WILL REPLACE DOOR 142 WITH A NEW 3 HR FIRE RATED DOOR & FRAME & DAMPER
THE ACM CONDUIT WILL HAVE A 3 HOUR FIRE BARRIER PLACED AROUND THE CONDUITS

VIII. ENVIRONMENTAL ANALYSIS

~~THERE IS NO CHANGE ON THE PLANT ENVIRONMENT DUE TO THIS MODIFICATION.~~
PROVIDING A 3 HR FIRE BARRIER FOR THE ELECTRIC FIRE WATER PUMP ROOM WOULD MAINTAIN A MILD INTERNAL ENVIRONMENT AND ENSURES OPERABILITY OF THE PUMP DURING AN EXTERNAL FIRE

IX. COMPATIBILITY OF MATERIALS, EQUIPMENT, AND PROCESSES

ALL THE NEW MATERIAL WILL BE COMPATIBLE WITH OTHER MATERIAL EQUIPMENT & PROCESS

X. ACCESSIBILITY FOR IN-SERVICE INSPECTION, MAINTENANCE, AND REPAIR

ACCESSIBILITY WILL BE MAINTAINED FOR MAINT & REPAIR. EM

XI. SEPARATION AND SEGREGATION ANALYSIS

SINCE THIS PROJECT WILL REPLACE AN EXIST H.M. DOOR WITH A NEW HOLLOW METAL DOOR, THERE IS NO CHANGE IN THE MISSILE PROTECTION, HENCE SEPARATION & SEGREGATION IS NOT A PROBLEM

XII. ELECTRICAL ANALYSIS

THE ENCASEMENT OF THIS CONDUIT & ASSOCIATED CABLES HAS NO IMPACT ON THEIR FUNCTION. THE PLACEMENT OF A FIBERGLAS BOX OVER THE EXPOSED CONDUCTORS & FILLED WITH CERAFIBER ELIMINATES ANY POSSIBLE CONTACT WITH THE CONCRETE THERE FORE THE CONCRETE WILL NOT EFFECT THE ELECTRICAL CHARACTERISTICS OF THE CONDUCTORS

XIII. ACCIDENT ANALYSIS

NO NEW ACCIDENT MODE IS ANTICIPATED

XIV. SECURITY ANALYSIS

A LOCKABLE MORTISE LOCKSET WILL BE USED TO CONTROL ENTRY

Prepared by ED HICKS 5-25-87
DATE

Public Service™

FORT ST. VRAIN NUCLEAR GENERATING STATION

PUBLIC SERVICE COMPANY OF COLORADO

CHECK LIST OF DESIGN VERIFICATION QUESTIONS FOR DESIGN REVIEW METHOD

CN 2645
BY HICKS
PAGE B9

STRUCTURAL

YES	NO	N/A		
☐	☐	☒	1.	Were the inputs correctly selected and incorporated into design?
☐	☐	☒	2.	Are assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent re-verifications when the detailed design activities are completed?
☐	☐	☒	3.	Are the appropriate quality and quality assurance requirements specified?
☒	☐	☐	4.	Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified and are their requirements for design met?
☒	☐	☐	5.	Have applicable construction and operating experience been considered?
☒	☐	☐	6.	Have the design interface requirements been satisfied?
☐	☐	☒	7.	Was an appropriate design method used?
☐	☐	☒	8.	Is the output reasonable compared to inputs?
☒	☐	☐	9.	Are the specified parts, equipment, and processes suitable for the required application?
☒	☐	☐	10.	Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?
☐	☐	☒	11.	Have adequate maintenance features and requirements been specified?
☒	☐	☐	12.	Are accessibility and other design provisions adequate for performance of needed maintenance and repair?
☒	☐	☐	13.	Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?
☐	☐	☒	14.	Has the design properly considered radiation exposure to the public and plant personnel?
☐	☐	☒	15.	Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?
☐	☐	☒	16.	Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?
☐	☐	☒	17.	Are adequate handling, storage, cleaning and shipping requirements specified?
☐	☐	☒	18.	Are adequate identification requirements specified?
☐	☐	☒	19.	Are requirements for record preparation review, approval, retention, etc., adequately specified?

NOTE: If the answer to any question is no, provide additional information and resolution below.

RESOLUTION OF DESIGN DEFICIENCIES
UNCOVERED DURING THE DESIGN VERIFICATION PROCESS

NO DEFIOECIES FOUND IN FIRE RATING EVALUATION.

[signature]
7-14-87

Form (A) 344-22-4095

Public Service™

FORT ST. VRAIN NUCLEAR GENERATING STATION

PUBLIC SERVICE COMPANY OF COLORADO

CHECK LIST OF DESIGN VERIFICATION QUESTIONS FOR DESIGN REVIEW METHOD

CN 2645
BY HICKS
PAGE B 10

MECHANICAL ONLY

YES	NO	N/A		
X			1.	Were the inputs correctly selected and incorporated into design?
X			2.	Are assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent re-verifications when the detailed design activities are completed?
X			3.	Are the appropriate quality and quality assurance requirements specified?
X			4.	Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified and are their requirements for design met?
X			5.	Have applicable construction and operating experience been considered?
X			6.	Have the design interface requirements been satisfied?
X			7.	Was an appropriate design method used?
X			8.	Is the output reasonable compared to inputs?
X			9.	Are the specified parts, equipment, and processes suitable for the required application?
X			10.	Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?
		X	11.	Have adequate maintenance features and requirements been specified?
X			12.	Are accessibility and other design provisions adequate for performance of needed maintenance and repair?
X			13.	Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?
		X	14.	Has the design properly considered radiation exposure to the public and plant personnel?
X			15.	Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?
		X	16.	Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?
X			17.	Are adequate handling, storage, cleaning and shipping requirements specified?
X			18.	Are adequate identification requirements specified?
X			19.	Are requirements for record preparation review, approval, retention, etc., adequately specified?

NOTE: If the answer to any question is no, provide additional information and resolution below.

RESOLUTION OF DESIGN DEFICIENCIES
UNCOVERED DURING THE DESIGN VERIFICATION PROCESS

ALL OPEN ISSUES FOUND ON INITIAL REVIEW OF THIS REISSUE HAVE BEEN INCORPORATED OR CLOSED OUT.

1/16/87

CN 2645
BY HICKS
PAGE B11
FORM NO. 372-30-2650

7/17/87

I HAVE REVIEWED THE DESIGN MODIFICATIONS CONTAINED IN CN 2645 AND FOUND THEM TO MEET THE APPLICABLE NFPA CODE GUIDELINES AND CORRECTLY IMPLEMENT THE COMMITMENTS PREVIOUSLY MADE TO THE NRC IN PSC LTR. OF 5/15/87.

G. Schmalz
Fire Protection Engr.

PROCUREMENT INSTALLATION AND TEST REQUIREMENTS

FORM (A) 344-22-4051

	4749		01	J25970 16
Performed	Controlled	Reserc	Chrg	Order / Code

FORT ST. VRAIN

CHANGE NOTICE NO. 2643

Public Service

FORT ST. VRAIN NUCLEAR GENERATING STATION

PUBLIC SERVICE COMPANY OF COLORADO

CN 2645
BY RH Lockhart
PAGE G4.1

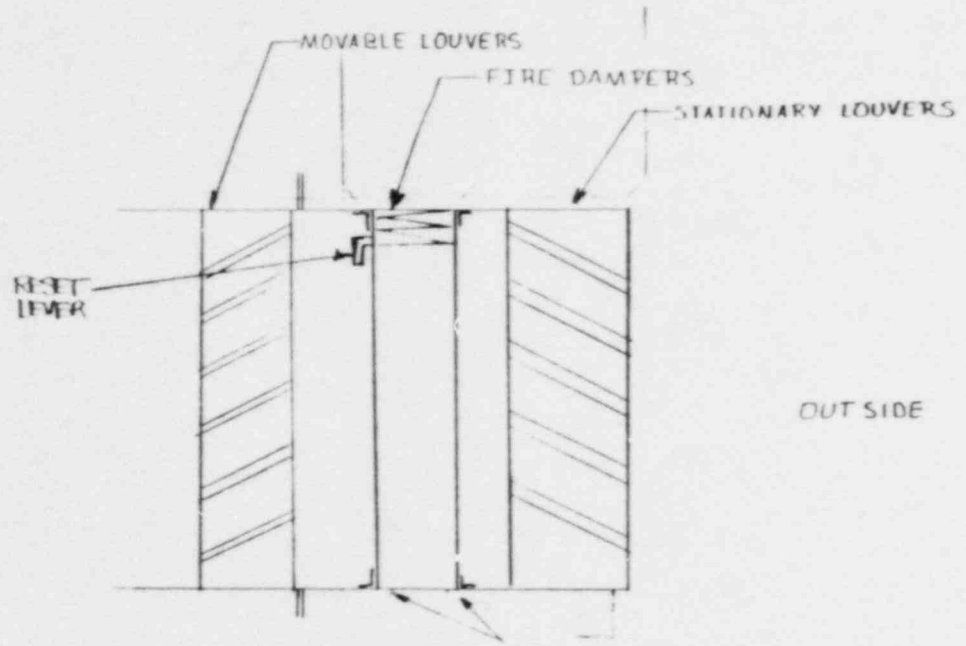
INSTALLATION INFORMATION

SUGGESTED SEQUENCE	ACTIVITY DESCRIPTION
	Remove duct assembly from above the door, leaving the operator for the movable louver. Remove the movable louvers. Install New Fire damper in the louvers location. (See Page G 16). Install Duct in its original location after the new door frame is installed. Fill with grout the open areas around the re-installed duct. Install an additional 5" length of duct on the duct assembly Re-install the movable louvers in the duct extension. Note: Fire Damper must be Free Floating. Do not attach to duct or angle iron. NOTE: A FIRE WATCH SHALL BE CONTINUOUSLY POST AT THE DOOR TO ELECTRIC MOTOR DRIVEN FIRE PUMP ROOM WHILE THE ABOVE INSTALLATION TAKES PLACE AND SHALL NOT BE REMOVED UNTIL INSTALLATION IS COMPLETE. See note on page G10 for required QA verification step.

Form (D) 344-22-4136

CN 2645
BY [illegible]
PAGE 6 / 10
FORM NO. 372-30-2650

SK 2645-7



ELEVATION
(LOOKING SOUTH

NOTE: A 1/8" CLEARANCE BETWEEN DAMPER/ASSEMBLY MOUNTING MUST EXIST. THIS CLEARANCE MUST BE MAINTAINED FOR SAFE DURING INSTALLATION & [illegible]

DOCUMENT UPDATE INFORMATION

FORM (A) 344 - 22 - 4050

Performed	Controlled	R-src	Chrg	Order / Code
	4749		01	J?597016

FORT ST. VRAIN

CHANGE NOTICE NO. 2645

Public Service™

FORT ST. VRAIN NUCLEAR GENERATING STATION

PUBLIC SERVICE COMPANY OF COLORADO

ADDITION TO INSTRUMENT LIST
(Including Control Valves)
IL-6-7

CN 2645

BY SCHMALZ

PAGE Y6

*****NUMBER IN PARENTHESES INDICATES MAXIMUM NUMBER OF CHARACTERS THAT CAN BE ENTERED.*****

TAG NO. (17) FDV-45403 SYSTEM (2) 45 TYPE: INST ☐ CTVA ☐

*SAFETY RELATED: YES ☐ NO ☒

QA CLASS (5) _____ SPEC (12) _____ DATA SHEET (8) _____

DESCRIPTION (60) Fire Damper For Elec Fire Water Pump Room.

(60) _____

PI DWG 1 (8) _____ (PI DWG SHEET NUMBER IF APPLICABLE _____) ZONE 1 (3) _____

PI DWG 2 (8) _____ (PI DWG SHEET NUMBER IF APPLICABLE _____) ZONE 2 (3) _____

LOCATION DWG (30) _____ LOCATION (ELEV & COORD) (10) _____

SCHEMATIC DWG (12) _____ CONNECTION DWG (13) _____

INSTALLATION DWG (12) _____ ELEC PLAN VIEW (30) _____

POWER SUPPLY (12) _____ CABLE (5) _____ BUS/LOOP (4) _____

LOAD (5) _____ VOLTAGE (6) _____

PIPE CLASS (5) _____ SERVICE (30) _____

SIZE (8) 2'x3' RATING (6) 3 hr MATERIAL (8) Galvanized

(NOTE: IF SIZE, RATING, OR MATERIAL ARE TOO LONG, PUT THEM UNDER COMMENTS)

VALVE TYPE (10) _____ OPERATOR (20) _____

MANUFACTURER (20) Ruskin MODEL (20) 11-IBD23 683

REF DOCUMENTS (59) _____

COMMENTS (59) _____

ADDITIONAL COMMENTS (16 LINES of 69 characters each).

(69) _____

(69) _____

(69) _____

(69) _____

(69) _____

* IF THE COMPONENT IS SAFETY RELATED, AN SRB UPDATE FORM MUST ALSO BE FILLED OUT.

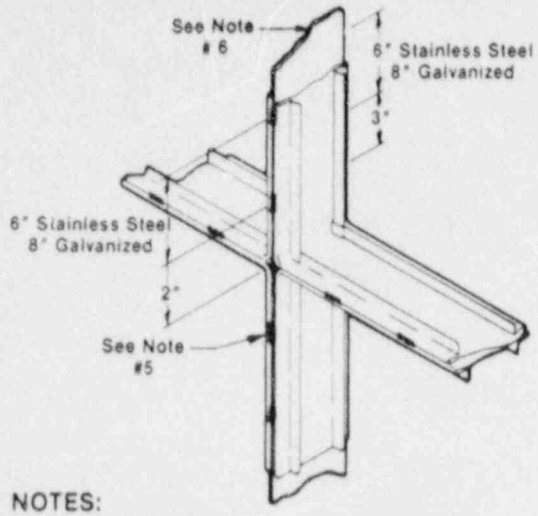
Form (D) 344 22 4320

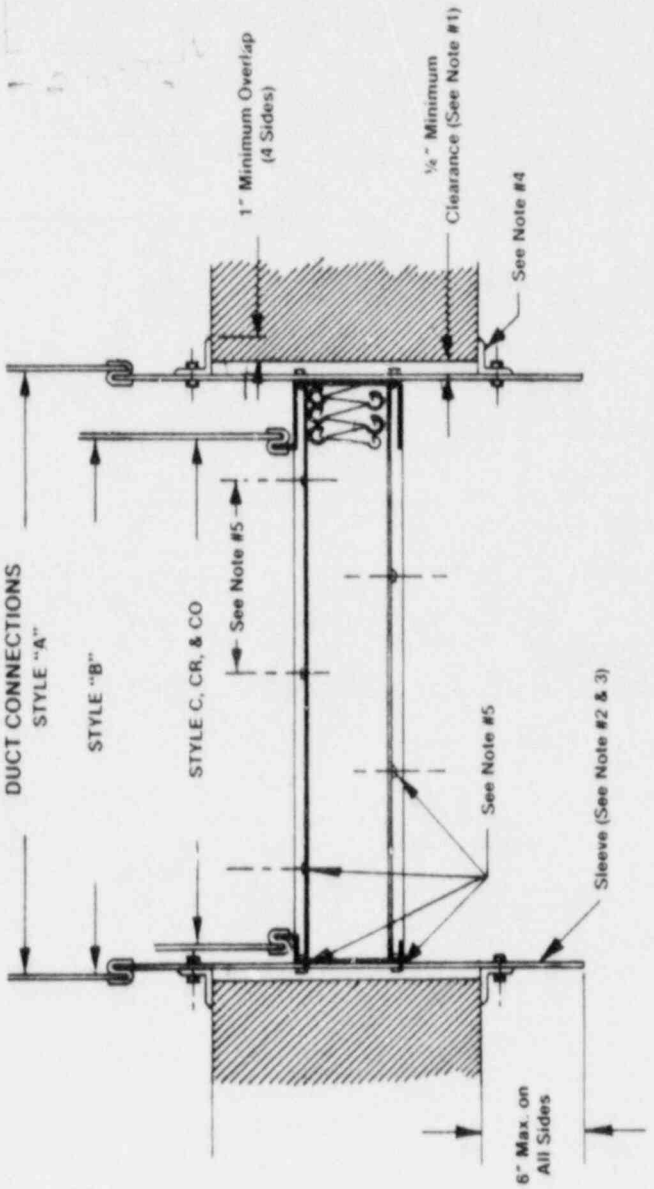
RUSKIN

II-IBD23 683
Replaces
II-IBD23 182
& II-IBD23SS 182

INSTALLATION INSTRUCTIONS — VERTICAL 3-HOUR U.L. CLASSIFIED GALVANIZED OR STAINLESS STEEL CURTAIN TYPE IBD FIRE DAMPERS SINGLE OR MULTI SECTION

ATTACHMENT 3B





NOTES:

1.) Opening in floor shall be a minimum 1/8" per foot larger than overall size of damper and sleeve assembly for galvanized steel dampers and a minimum 3/16" per foot for stainless steel dampers. Maximum opening not to exceed 1/8" per foot plus one inch for galvanized steel dampers and 3/16" per foot plus one inch for stainless steel dampers. Opening shall not be less than 1/4" larger for any size damper and sleeve assembly.

2.) Sleeve gage shall be at least equal to the gage of the duct as defined by the appropriate SMACNA duct construction standard and described in NFPA 90A when one or more of the following duct-sleeve connections are used (plain "S" slip, hemmed "S" slip, standing "S" slip, reinforced standing "S" slip, inside slip joint, and double "S" slip.)

3.) If any other duct-sleeve connections are used, sleeve shall be minimum of 18 gage for dampers up to 36"W x 24"H and 14 gage if damper width exceeds 36" or height exceeds 24".

4.) Mounting angles shall be a minimum of 1½" x 1½" x 14 gage and bolted with ¼" - 20 bolt, welded, or screwed with No. 10 screws to sleeve at a maximum spacing of 6" for stainless steel and 8" for galvanized with a minimum of two connections in each side, top, and bottom (see illustration). Mounting angles shall overlap wall a minimum of one inch.

5.) When multiple damper assemblies are joined or fastening damper to sleeve dampers shall be fastened with 1/4 - 20 bolts, no. 10 screws, or 1/2" lg. welds staggered intermittently and spaced 8" maximum c-c for galvanized and 6" maximum c-c for stainless steel.

6.) The steel plate mullion shall be sandwiched between ends of dampers with frames welded at top and bottom with 1/2" long fillet welds staggered intermittently spaced 6" on center for stainless, 8" c-c galvanized. The mullion plate between the sides of the dampers shall be a 14 gage x 4½" wide steel plate of same material as damper. Length shall be equal to length (perpendicular to blade) of two or more adjoining dampers. Mullions are not required for assemblies consisting of two dampers attached end-to-end or up to three dampers attached side-to-side.

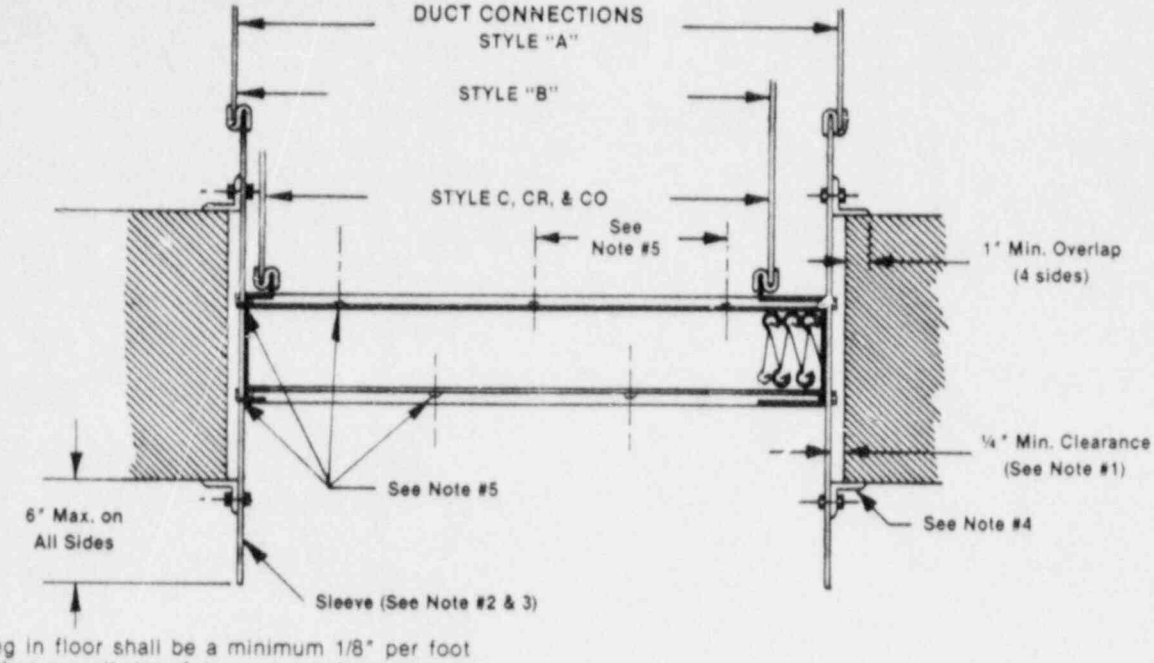
INSTALLATION INSTRUCTIONS COMPLY WITH UNDERWRITERS LABS. SAFETY STANDARDS 555

RUSKIN Mfg. Co. **P. O. Box 129** **Grandview, Mo. 64030**

RUSKIN

II-IBD23 683
Replaces
II-IBD23 1079

INSTALLATION INSTRUCTIONS — HORIZONTAL 3-HOUR U.L. CLASSIFIED GALVANIZED OR STAINLESS STEEL CURTAIN TYPE IBD FIRE DAMPERS SINGLE OR MULTI SECTION



NOTES:

1.) Opening in floor shall be a minimum 1/8" per foot larger than overall size of damper and sleeve assembly for galvanized steel dampers and a minimum 3/16" per foot for stainless steel dampers. Maximum opening not to exceed 1/8" per foot plus one inch for galvanized steel dampers and 3/16" per foot plus one inch for stainless steel dampers. Opening shall not be less than 1/4" larger for any size damper and sleeve assembly.

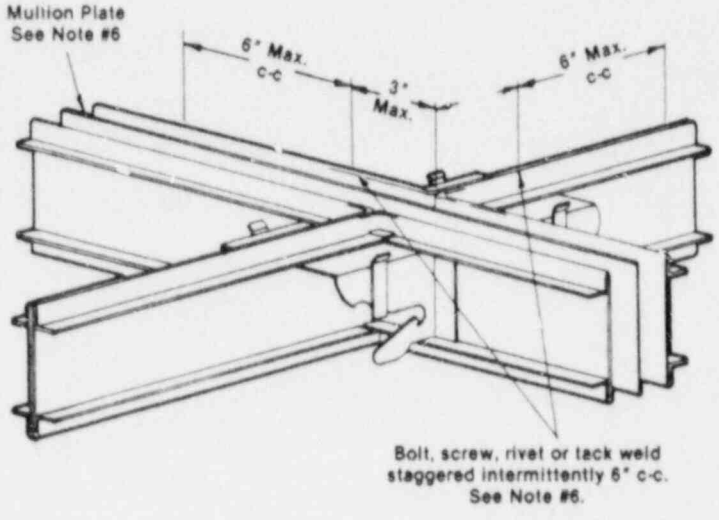
2.) Sleeve gage shall be at least equal to the gage of the duct as defined by the appropriate SMACNA duct construction standard and described in NFPA 90A when one or more of the following duct-sleeve connections are used (plain "S" slip, hemmed "S" slip, standing "S" slip, reinforced standing "S" slip, inside slip joint, and double "S" slip.)

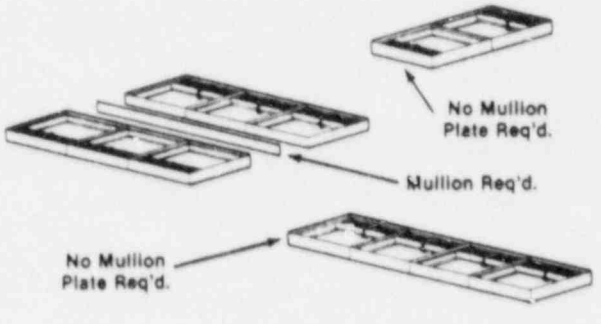
3.) If any other duct-sleeve connections are used, sleeve shall be minimum of 18 gage for dampers up to 36"W x 24"H or 14 gage if damper width exceeds 36" or height exceeds 24".

4.) Mounting angles shall be a minimum of 1½" x 1½" x 14 gage and bolted with ¼"-20 bolt, welded, or screwed with No. 10 screws to sleeve at a maximum spacing of 6" for stainless steel and galvanized, with a minimum of two connections in each side, top, and bottom (see illustration). Mounting angles shall overlap wall a minimum of one inch.

5.) When multiple damper assemblies are joined or fastening damper to sleeve, dampers shall be fastened with 1/4 - 20 bolts or welded with 1/2" lg. welds staggered intermittently and spaced 6" maximum c-c.

6.) The steel plate mullion shall be sandwiched between ends of dampers with frames welded at top and bottom with 1/2" long fillet welds staggered intermittently spaced 6" on center. The mullion plate between the dampers shall be a 14 gage x 4½" wide steel plate of same material as damper. Length shall be equal to width (parallel to blade) of two or more adjoining dampers. Mullions are not required for assemblies consisting of two dampers attached end-to-end or up to three dampers attached side-to-side (see example).





RUSKIN Mfg. Co. **P. O. Box 129** **Grandview, Mo. 64030**

Form (C) 276 - 54 - 4181

MATERIAL REQUEST / PURCHASE REQUISITION

YA 3695

Seller No.	Seller Name and Address	Purchase Order Number	Page
56680	LONG & ASSOCIATES		1 of 1
	1795 W. YALE AVENUE	☐ CONFIRMING	Procurement Classification
	DENVER, CO. 80110	Date Requested 6-11-87	☐ "Q" (N-Order) ☒ "CQ" (N-Order) ☐ "NS" ☐ "CI"

Strm. No.	Date Wanted	SHIPPING POINT (Include City & State)	Ship Via	Total Est. Weight
686		FOB ☐ SP/FA ☐ COLL. ☐ DEST.		

DESCRIPTION	Materials Mgmt. Code Number	Quantity Requested	Actual Unit Price	Actual Total Price
DAMPER, FIRE		1 EA	77.00	77.00
3-HOUR RATED (UL LISTED), RUSKIN IBD 23				
VERTICAL MOUNT, A FRAME GALVANIZED				
ANSI N45.2.2 LEVEL C.				

SEE ATTACHED SHEET FOR QUALITY AND DOCUMENTATION REQUIREMENTS

Spec. No. _____ Equip. No. _____

QUALIFIED SOURCE REQUIRED ☐ Manufacturer ☐ Supplier ☐ Services

QA Review _____

TOTAL ☒ Actual ☐ Estimated $ 77.00

SCHEDULED DELIVERY MO.	DAY	YR	ACTUAL DELIVERY MO.	DAY	YR	Quoted by and Date	Phone Number
						Tom 6/11	922-6660

APPROVED BUDGET ITEM ☐ Yes ☐ No

ORIGINATED MO.	DAY	YR	ORIGINATOR NAME AND PHONE NO.	SECTION Oper 1	Mech 2	Resit 3	Elec 4	Other 7	SSR NUMBER
06	11	87	L.ARAGON/Schmalz 480-6937	☐	☐	☐	☐	☐	

Date Processed

INSTRUMENT CODE	ACCOUNT NUMBER PERFORMED	CONTROLLED	RES	CHRG	EQUIPMENT UNIT CODE ORDER / CODE

By Initial

Plant Name And Unit No. **FORT ST. VRAIN**

Equipment Description

Eqpt. Mfg. | Model | Ser. No. | Size

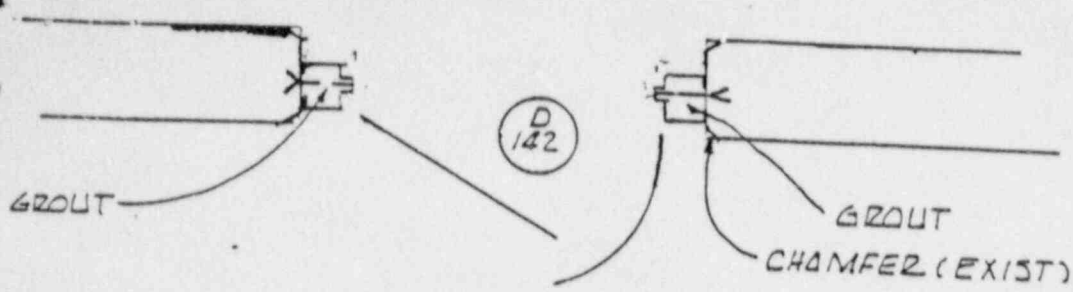
☐ SPECIAL JOB REQUIREMENT ☐ STOCK ☐ AUTO. REORDER ☐ NON - STOCK

APPROVALS SUPERVISOR	PLANT MANAGER	DIVISION MANAGER	VICE PRESIDENT	Acct. Approval	PURCHASING Approval	PURCHASING Buyer	Traffic

WHITE – Buyer BUFF – QA/QC YELLOW – Stores Dept. GREEN – Scheduling BLUE – Originator

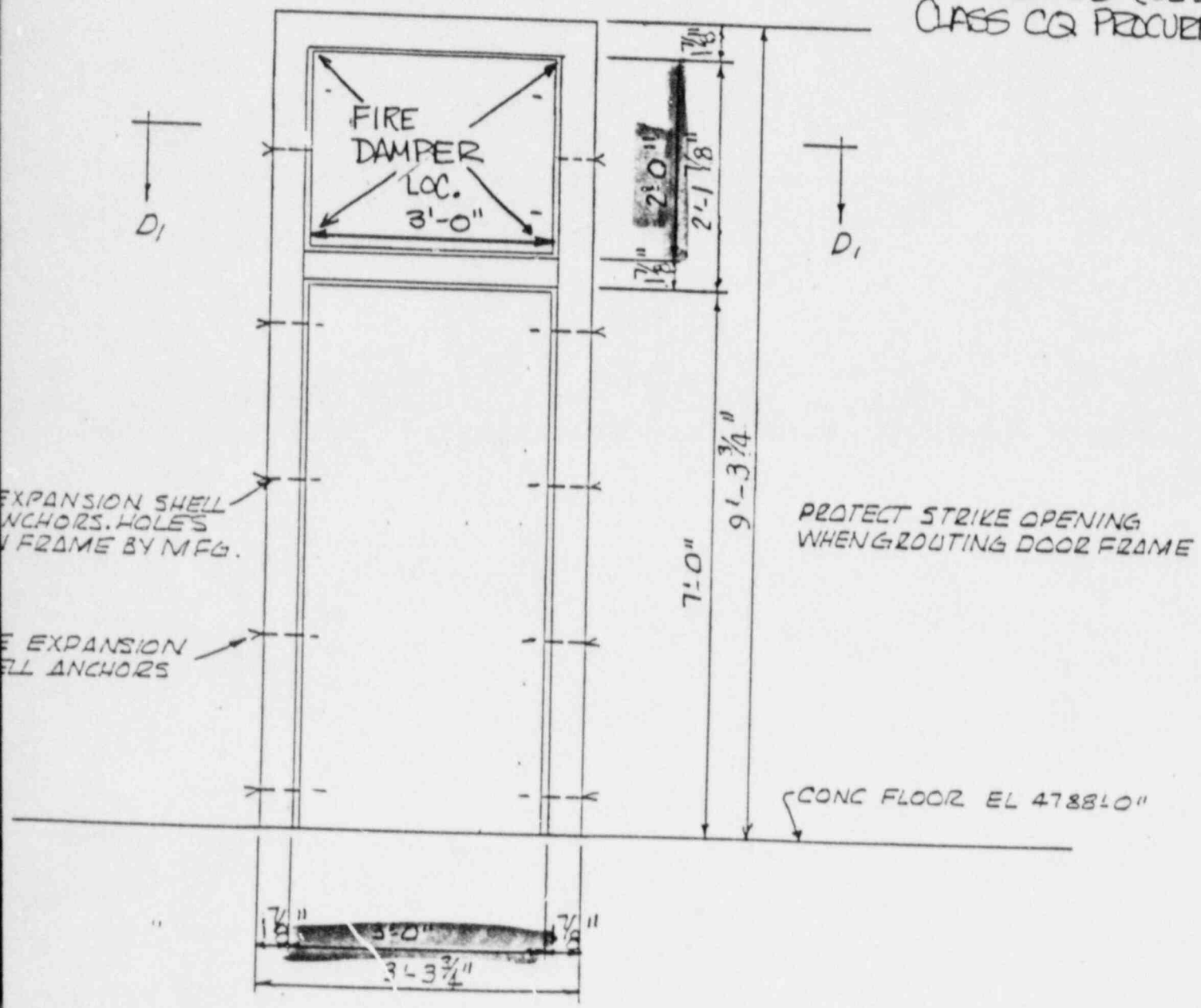
QA / QC COPY

CN 2675
BY HICKS
PAGE
FORM NO. 372-30-2650



PLAN

FIRE DAMPER
3 HR. RATED (UL LISTED)
CLASS CQ PROCUREMENT



ELEVATION

DOOR & FRAME DETAILS

OVERSIZE DOCUMENT PAGE PULLED

SEE APERTURE CARDS

NUMBER OF OVERSIZE PAGES FILMED ON APERTURE CARDS 1

APERTURE CARD/HARD COPY AVAILABLE FROM RECORD SERVICES BRANCH
FTS 492-8989

ATTACHMENT 4B

VENDOR DOCUMENT APPROVAL	PUBLIC SERVICE COMPANY OF COLORADO		FORT ST. VRAIN
F.P. / O & M NO. 79-V-03-0001		P.O. NO.	TAG NO. (S)

Rev. Ltr.	Rev. Date	CN Issues And CN Reissues Incorp.	Prepared By	Reviewed By	Approved By
A	5-7-82	PER CN-1398	[illegible]	R.D.N.	PAC

FORM (A) 372-30-2647

FT. ST. VRAIN
NON-CONTROLLED
COPY
VERIFY ISSUE STATUS
PRIOR TO USE

Rev A

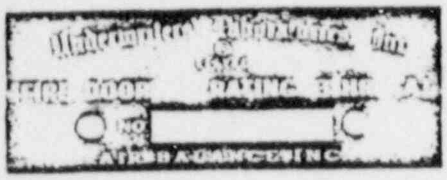
Vertical Model 319-P — Single Unit

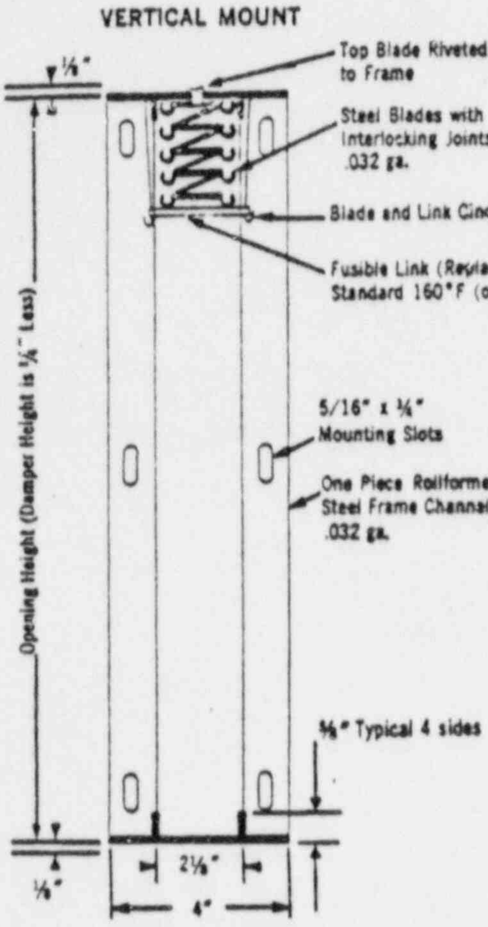
Fire/Seal® Fire Doors

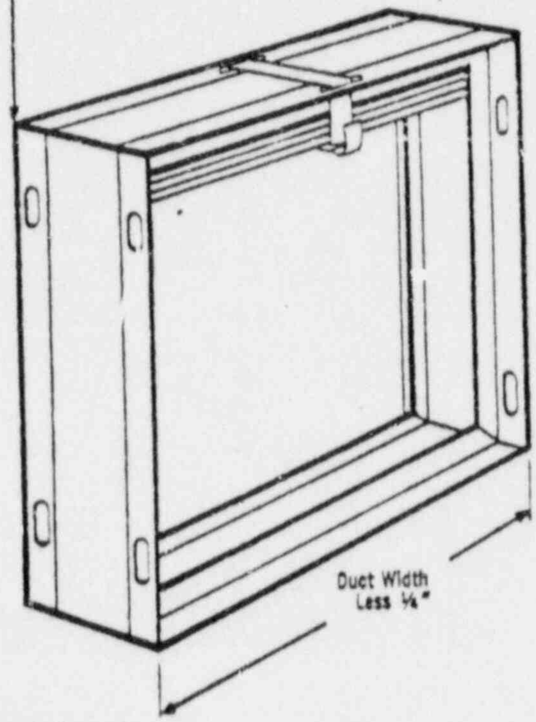
UL Rated for Use in Class A Openings

75-V-3-1

FDV-75371
FDV-75372
FDV-75373







For vertical applications only.

The 319P Fire Door is rated by Underwriters' Laboratories for installation in ducts passing through Class A openings. It can also be installed as a fire damper where upgrading of the fire damper rating is desirable. A double unit, 319W is available for Class A openings where codes require a fire door on both sides of the wall. See submittal sheet on 319W.

The fire door is available in models similar to Type B and Type C fire dampers for installation in higher velocity systems.

All materials are as tested by Underwriters' Laboratories.

Maximum Wall Opening (using multiple single sections): 48" x 48"

Maximum Single Section Size: 24" x 24" or 36" x 16"

Minimum Size: 4" x 4" Opening Dimensions

See attached sheet for schedule of models and sizes

GENERAL ATOMIC COMPANY | PROJECT 90 FORT ST. VRAIN

air balance INCORPORATED • 3100 W. Grand Avenue, Chicago, Ill.
Mfg. Plants: New York City, Chicago, Philadelphia and Los Angeles

BY: [signature] 5/3/78

REVIEWED BY:

G.A. P.O. NO. 5-9642 | EQUIP. NO. FDV 75371, 372, 373

PROJECT
LOCATION
ARCHITECT
ENGINEER
CONTRACTOR
P.O. NUMBER
DATE

F.P. NO. 75-V-3-1 | SUPERSEDES PREV. ISSUE DATED:

FCN-GA-1385

☐ 1. NOT APPROVED, REVISE AND RESUBMIT
☒ 2. APPROVED
☐ COMMENTS AS NOTED
☐ SUBMIT CERTIFIED TRANSPARENCY
☐ FINAL. NO FURTHER REQUIREMENTS
☐ 3. RESUBMIT BETTER QUALITY DIAZO MASTER

COMPUTER CODE 10

THIS ACTION DOES NOT RELIEVE THE SELLER OF ...

Rev. A.

ATTACHMENT 4C

VENDOR DOCUMENT APPROVAL	PUBLIC SERVICE COMPANY OF COLORADO		FORT ST. VRAIN		
F.P. / O & M NO. 75-V-03-0002		P.O. NO.	TAG NO. (S)		
Rev. Ltr.	Rev. Date	CN Issues And CN Reissues Incorp.	Prepared By	Reviewed By	Approved By
A	5-7-82	PER CN-1598	XQA	RDN	RHG

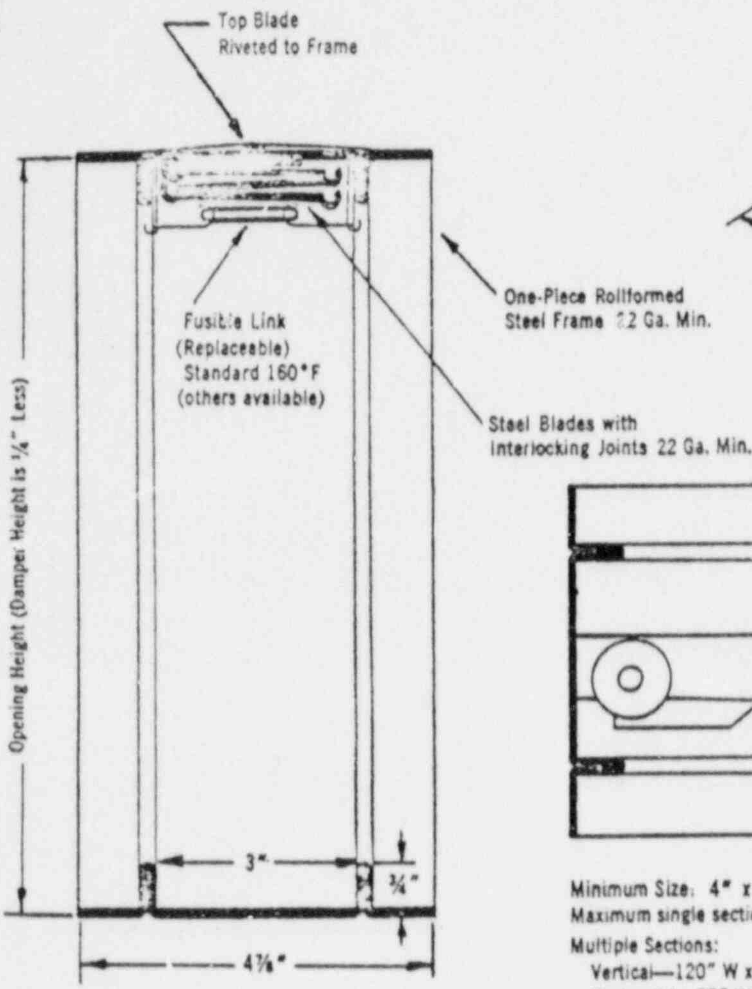
FORM (A) 372-30-2647

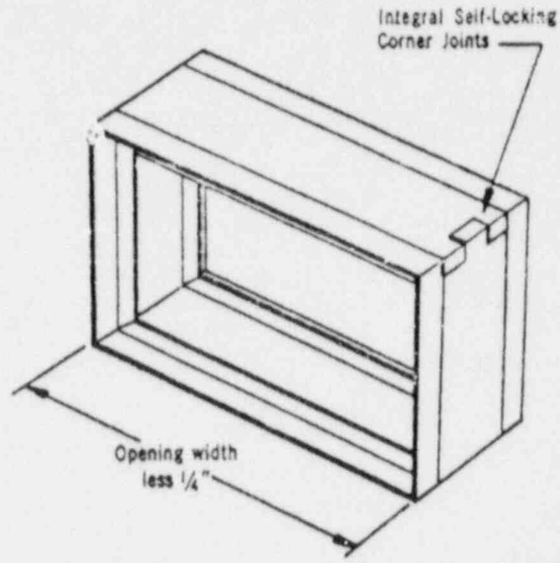
Fire/Seal® Fire Damper

Horiz. & Vert., Model 119 Type AL U.L. Labelled

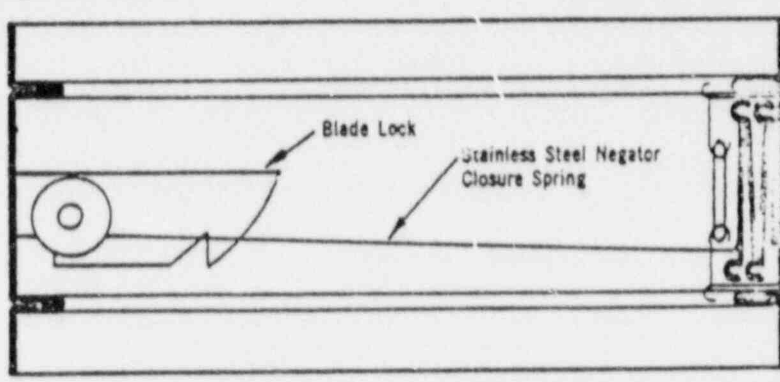
75-V-3-2

UNDERWRITERS' LABORATORIES INC.
CLASSIFIED
FIRE DAMPERS
FIRE RESISTANCE RATING [1½ HR]
NO.
SEE U.L. CLASSIFIED BUILDING MATERIALS INDEX
air balance inc. CHICAGO ILLINOIS





HORIZONTAL MOUNT



Minimum Size: 4" x 4"
Maximum single section size: 60" X 60" Vertical 48" X 48" Horizontal
Multiple Sections:
Vertical—120" W x 80" H in 40" x 40" Max. Sections.
Horizontal—97" W x 42" H in 36" W x 42" H Max Sections.
Materials: Standard construction is galvanized steel — stainless steel is optional.
Underwriters Laboratories labelled for use in 2-hour fire partitions in sizes no larger than maximums stated above.

See attached sheet for schedule of models and sizes.

GENERAL ATOMIC COMPANY
PROJECT 90 FORT ST. VRAIN UNIT 1
VENDOR DRAWING APPROVAL

air balance inc.
3100 W. Grand Avenue, Chicago, Illinois 60622

BY:	DATE: 5-3-78
REVIEWED BY	
GA P.O. NO.	EQUIP. NO.

PROJECT
LOCATION
ARCHITECT
ENGINEER
CONTRACTOR
P.O. NUMBER
DATE

F.P. NO. 75-V-3-2
SUPERSEDES PREV. ISSUE DATED:
FCN-GA-4335

☐ 1. NOT APPROVED. REVISE AND RESUBMIT
☒ 2. APPROVED
☐ COMMENTS AS NOTED
☐ SUBMIT CERTIFIED TRANSPARENCY
☒ FINAL. NO FURTHER REQUIREMENTS
☐ 3. RESUBMIT BETTER QUALITY REPRO MASTER

COMPUTER CODE 10

THIS APPROVAL DOES NOT RELIEVE THE CONTRACTOR OF ANY OBLIGATIONS UNDER THE

Rev A

ATTACHMENT 6A

SPECIFICATION 75-V-1

ISOLATION DAMPERS

FORT ST. VRAIN - UNIT 1
GENERAL ATOMIC, INC.
PUBLIC SERVICE COMPANY OF COLORADO

FEBRUARY 13, 1976

ISOLATION DAMPERS

FORT ST. VRAIN - UNIT 1
PROJECT 90-330 MWe HTGR
GENERAL ATOMIC COMPANY

TABLE OF CONTENTS

TABLE OF CONTENTS, Cont.

SPECIFICATION FOR ISOLATION DAMPERS

DIVISION 1 - GENERAL REQUIREMENTS

101. BUYER: GENERAL ATOMIC COMPANY

102. NAME OF PROJECT: FORT ST. VRAIN - UNIT 1
PROJECT 90-330 MWe HTGR

103. OWNER: PUBLIC SERVICE COMPANY OF COLORADO

104. LOCATION OF PROJECT

Project Site: The Project Site is located in Weld County, Colorado about four miles northwest of Platteville, Colorado, just south of the confluence of the St. Vrain Creek and the South Platte River.

Site Elevation: Grade at the plant will be approximately 4,790 feet above mean sea level.

105. DELIVERY FACILITIES

See Shipping Information on Purchase Order #589806 transmitted under separate cover.

106. TRANSPORTATION FACILITIES

The east side of the station property is adjacent to U. S. Highway 52. An access road capable of supporting H20 Highway loading will extend from the highway to the station. All equipment shall be delivered by truck to the station.

107. SCOPE OF WORK

Contractor shall design, develop, manufacture, test, furnish and deliver f.o.b. to the above station Safety-Related Isolation Dampers with operators and accessories as called for in the Damper List and specified herein.

108. WORK BY OTHERS

108.1 The following related work will be performed by others:

a. Unloading and erection of dampers.

b. Furnishing and installation of all air piping and accumulators external to damper operator.

c. Furnishing and installation of all concrete pads, matching flanges, anchor bolts and grouting as may be required.

d. Furnishing and installation of all conduit, controls, and wiring external to the damper assemblies.

109. SCHEDULE

Dampers shall be delivered to the site as soon as possible but not later than April 19, 1976.

110. DEFINITIONS

110.1 The term safety-related is used in this Specification to designate systems, subsystems or pieces of equipment that comprise systems that are required to accomplish the safe shutdown of the nuclear power plant or that are required to operate following a postulated accident.

110.2 Wherever the term "Job Specification" appears in Sargent & Lundy's Standard Specifications or Forms, it shall be construed to mean "Project Specification".

110.3 All reference to American Society for Testing and Materials (ASTM) Standard Specifications, other similar standard publications, and applicable supplements are to the latest issue of each as of the date of this contract.

110.4 Whenever the words, "Purchaser" and "Contractor" appear in the Specification Documents, they shall be construed to mean "Buyer" and "Seller", respectively.

111. SPECIFIED PRODUCTS AND SUBSTITUTIONS

Mention of materials or components by name as products of certain manufacturers in this Specification is made to insure that the proper quality and/or type is provided. Products of other manufacturers will be acceptable if Seller furnishes proof to the Consulting Engineers that the proposed substitute products are equal to or better than the specified products in quality, performance, design and suitability for the intended use.

112. CODES AND STANDARDS

112.1 IEEE-344-1975, Recommended Practices for Seismic Qualification of Class IE Electric Equipment for Nuclear Power Generating Stations, February, 1975.

112.2 IEEE-323-1974, Qualifying Class IE Equipment for Nuclear Power Generating Stations.

113. ORIGIN OF COMPONENTS

The WORK shall not include any components manufactured outside the U.S.A. unless specifically agreed upon in writing by the Buyer or the Consulting Engineers. If foreign manufactured components are included in the WORK without prior approval, Seller shall, upon notice in writing, replace them at his own expense including installation, and he shall be liable to the Buyer for any damage to the Owner's plant and any losses due to any delay caused the Buyer by such replacement.

114. QUALITY ASSURANCE AND CONTROL

114.1 Quality Program

a. The Seller shall have a Quality Assurance Program consistent, as appropriate, with the requirements of 10CFR50, App. B, that will assure that the equipment furnished will meet the requirements of this Specification. (A Quality Assurance Program in accordance with ANSI-N45.2 will satisfy the requirements of 10CFR50 Appendix B.) The Seller shall submit a detailed summary of his Quality Assurance Program to permit an evaluation of controls imposed on his production sequences. The Seller shall impose his Quality Assurance program on all subvendors as may be appropriate.

b. All material and services specified herein shall be considered safety related will require the necessary documentation.

114.2 Inspection Program

a. The Seller's inspection program shall allow for the necessary personnel and procedures to inspect, test, and document this manufacturing process. Product inspections and examinations required by applicable codes, specification and schedules shall employ the proper method and techniques to meet the specified acceptance standards.

114.3 Vendor Procurement Control

a. The Seller shall ensure that the requirements of this Specification and all other related documents are a part of any order purchased from his subvendor. Copies of purchase documents which invoke the requirements of this Specification are required to be at the location where any work, fabrication or processes are being performed.

114.4 Source Inspection

a. The Owner/Buyer shall have free access to the Seller's plant at all times to witness or verify, or to observe any processes, procedures, inspections or tests required by this Specification. These representatives shall have the right to any information regarding engineering, procurement, scheduling and production. The Seller shall provide whatever personnel, facilities, test equipment, tools, or instruments are necessary to facilitate any inspection or survey. The purpose of these inspections/surveys is to assure that nonconforming material/equipment is not shipped to the job site. These inspection/surveys do not relieve the Seller of his obligation to conduct an adequate inspection of his own, nor does it relieve the Seller of his obligation regarding nonconforming material/equipment missed by such inspections. Any nonconformances dispositioned "Use As Is" or "Repair" shall be submitted to the Owner/Buyer for final acceptance.

114.5 Shop Tests

a. The Owner or his representative shall at his discretion witness all testing required by this Specification. The Seller shall notify Buyer at

least 5 working days in advance of Shop Testing. The Seller shall request approval for any deviations or limitations he intends to make in conducting the required tests.

b. Inspection or audit by the Owner or his representative in no way relieves the Seller of his responsibility to provide equipment/material totally in compliance with this Specification.

114.6 Documentation

a. At time of final shipment, all documentation required by the applicable codes and standards, and that specifically required by this Specification shall be available for review by the Purchaser/Owner.

b. Final site acceptance of the equipment shall be contingent upon the receipt, at the site, of all required documentation.

c. All documentation shall be clear, legible, and suitable quality for microfilming and/or storage for the life of the plant.

114.7 Preventative Maintenance

a. The Seller shall submit his procedures for preventative maintenance planned during manufacture/fabrication with recommended maintenance for all material/equipment in storage at the site. The procedures shall include:

a1. Frequency of inspection/maintenance.

a2. Types of preservation - coatings, desiccants, etc.

a3. Type of inspections such as:

a3.1 Visual.

a3.2 Equipment rotation.

a3.3 Environmental protection.

a3.4 Insulation checks.

a3.5 Startup cautions.

114.8 Control Procedures

The detailed control procedures that must be submitted for review shall be in accordance with Article 205.

115. SPARE PARTS

115.1 After award and one (1) month prior to shipment of equipment, Seller shall submit a Recommended Spare Parts Quotation. The Recommended Spare Parts Quotation shall:

a. Be submitted in ten (10) copies to the Buyer, and three (3) copies to Sargent & Lundy.

b. Be inclusive for and applicable to all equipment components, auxiliaries, accessories and materials being furnished under the Contract.

c. Include for each recommended spare part the unit price, quantity, description, catalog number drawing reference(s), etc., to completely identify the item and the equipment component for which it is recommended.

115.2 The quotation shall be based upon furnishing the parts f.o.b. Ft. St. Vrain Nuclear Power Station. Seller shall indicate the point of shipment and the amount included for freight charges.

116. PACKAGING, SHIPPING, STORAGE, ETC.

116.1 The Contractor shall adequately prepare and package all of the equipment for shipment and for storage in an unheated warehouse at the project site. Flanges, openings and nozzles shall be adequately sealed and protected during shipment to prevent corrosion, entrance of foreign matter and possible damage from rough handling during transit. All exposed machined surfaces shall be protected with a suitable antirust compound before shipment.

116.2 All items shall be clearly identified both on the equipment and on the exterior of the packaging with a securely fastened weatherproof tag labeled with Purchaser's purchase order number 589806 and FCN No. 554, equipment item number and service, and this Specification Number 75-V-1.

116.3 Each damper shall be shipped to the station in one section. Each shall be packaged in suitably reinforced crates or containers to allow vertical lifting on end without damage due to twist or other deflection. Lifting hooks shall be provided on container ends. Each crate shall be protected from weather during transit.

ISOLATION DAMPERS
FORT ST. VRAIN - UNIT 1
PROJECT 90-330 MWe HTGR

DIVISION 2 - SUPPLEMENTS, STANDARDS AND DRAWINGS

201. SUPPLEMENTS
The following are attached hereto and form a part hereof:

201.1 Buyer's Terms and Conditions of Purchase (Included with Purchase Order No. 589806 transmitted under separate cover.)

201.2 Shipping Information (Included with Purchase Order No. 589806 transmitted under separate cover.)

201.3 Equal portunity Compliance (Form 566; Rev. 2/68).

201.4 List (dated 2-13-76).

202. STANDARDS (CONSULTING ENGINEERS')
The following are attached hereto and form a part hereof:

202.1 Form 1790-E - Standard Specification for Prime Coat Painting.

203. DRAWINGS (CONSULTING ENGINEERS')

203.1 M-103 Three-Room Control omplex Isolation Damper Details (dated 2-13-76).

203.2 M-103-1 Three-Room Control Complex Isolation Damper Details (dated 2-13-76).

204. DRAWINGS AND DATA (SELLER'S)

204.1 Within one week after receipt of this procurement Specification 75-V-1, Seller shall submit to the Consulting Engineers, Buyer, and Owner for review, drawings and data as follows and in accordance with Article 205.

a. Drawings showing the general arrangement and principal dimensions of the dampers including cross-sections through the equipment.

b. Drawings of mechanical components of damper operator.

c. Loading diagrams and foundation and anchor bolt requirements for dampers.

d. Seller shall submit shop detail drawings of all pieces of equipment including damper position switches, and operators.

e. Other detail drawings as the Consulting Engineers may require.

204.2 Separate drawings as specified in Article 204.1 above shall be prepared for each damper which reflect the actual design and arrangement of equipment for this project. Seller's standard drawings will not be acceptable.

204.3 Drawings and data shall be submitted in quantity and in the form as specified in Article 205. Distribution of correspondence, drawings and data shall be made in accordance with Article 204.11.

204.4 It is intended that the Consulting Engineers will review all drawings and data submitted by the Seller, therefore, reference to the terms "approve, approved, approval, etc.", in Standard Specifications included herewith shall be construed to mean "review" or "reviewed".

204.5 Upon completion of final review, all general arrangement drawings, shall be corrected and resubmitted per Article 204.3.

204.6 Seller shall furnish the Buyer with twenty-five (25) and transmitted to Sargent & Lundy for distribution, bound sets of complete instruction books for the erection, operation, testing, lubrication, and maintenance, of the equipment. These books shall completely describe the equipment, in word and with design drawings; they shall also provide maintenance and operating instructions for each specific item (generalized information will not be acceptable) and they shall include such drawings, list, etc., as may be necessary to give Purchasers complete information for the ordering of spare parts and dismantling of equipment. Books shall include complete descriptions and ratings of all accessory electrical equipment, if any, and schematic and wiring drawings of any factory wiring. Instruction books shall have complete testing instructions including operating and calibration instructions for all test equipment. Books shall be issued with shipment of equipment.

204.7 All submittals of drawings and data shall include the Owner, Contractor, Project, Equipment and Specification Number identifying information.

204.8 Engineering details shall be completed one week after receipt of this specification, regardless of shipping date.

204.9 With the proposal, Seller shall submit to the Consulting Engineers, for review, a complete list of suppliers showing the respective equipment and/or service each is furnishing to Seller to form a part of the equipment package.

204.10 All materials shall be fully identified on the drawings with reference to recognized Codes, Standards and Specification, i.e., ASTM, ASME, ANSI, etc.

204.11 Distribution of Correspondence, Drawings and Data

The distribution of all correspondence, drawings and data shall be made in accordance with the following:

a. Owner:

J. H. Reader, Resident Engineer
Fort St. Vrain Nuclear Generating Station
Public Service Company of Colorado
P. O. Box 361
Platteville, Colorado 80651

Three (3) copies of all correspondence plus the requirements or Article 205.

b. Buyer:

General Atomic Company
J. M. Waage, Project Manager
Fort St. Vrain Plant
P. O. Box 426
Platteville, Colorado 80651

Attention: P. Krane

Three (3) copies of all correspondence plus the requirements of Article 205.

c. Owner's Fire Protection Consultant:

Proto-Power Management Corp.
P. O. Box 494
Mystic, Connecticut 06355

Attention: R. A. Schaufler
Principal Engineer

One (1) copy of all correspondence plus the requirements of Article 205.

d. Consulting Engineers:

W. G. Hegener
Project Director
Sargent & Lundy
55 E. Monroe Street
Chicago, Illinois 60603

Attention: Mr. D. L. Leone
Project Manager

Four (4) copies of all correspondence plus the requirements of Article 205.

205. SUMMARY OF REQUIRED DATA FROM SELLER

	Seller's Data	Review Copies* and Resubmittal Copies**					Final Copies	
		Owner	Buyer	PPMC≠	Sargent & Lundy		Sargent & Lundy	
		Prints	Prints	Prints	Prints	Sepias	Prints	Sepias
205.1	Proposal prices and proposal data (Ref. PD-1 through PD-7).....	3	3	1	6	-	-	-
205.2	Outline dimensions, including electrical components and cross-sectional drawings with complete parts list (Ref. Art. 204.b).....	3	3	1	11	1	3	1
205.3	Shop detail drawings (Ref. Art. 204.1d).....	-	-	-	-	-	3	1
205.4	Seller's catalog literature including vendored components.....	3	3	1	6	-	-	-
205.5	Certified factory test performance reports (Ref. Art. 307.2).....	-	-	-	-	-	10	-
205.6	Material Specifications (Ref. Art. 307.1g).....	3	3	1	3	-	1	-
205.7	Fabrication procedures..	3	3	1	1	-	1	-
205.8	Welding procedures (Ref. Art. 307.1g).....	3	3	1	1	-	1	-
205.9	NDE procedures.....	3	3	1	1	-	1	-
205.10	Quality assurance program.....	1	3	1	1	-	1	-
205.11	Installation, operation and Maintenance Manuals (Ref. Art. 204.6).....	-	-	-	-	-	25	-
205.12	Recommended Spare Parts (Ref. Art. 114).....	-		-	-	-	3	-
205.13	Recommended Tools (Ref. Art. 301.3).....	-	-	-	-	-	3	-
205.14	Seismic Qualification Documentation (Ref. Art. 302.3).....	-	-	-	-	-	10	-

*To be submitted one week after receipt of this Specification with proposal.
**To be resubmitted one week after receipt of drawings and Art. 302.3 data returned with comments.
≠PPMC = Proto-Power Management Corp.

ISOLATION DAMPERS

FORT ST. VRAIN - UNIT 1
PROJECT 90-330 MWe HTGR

DIVISION 3 - TECHNICAL REQUIREMENTS

301. GENERAL EQUIPMENT REQUIREMENTS

301.1 General:

a. Each isolation damper shall be furnished as a factory assembled unit complete with damper body, connection flanges, shaft, blades or discs, seals, air or operator(s).

b. The isolation dampers will be used to contain Halon 1301 within the three-room control complex. The dampers will in all cases be mounted in the ducts external to the structural pressure boundary as shown on Consulting Engineers Drawings referenced in Article 203.

301.2 Service Life:

a. All component material supplied under this Specification shall be capable of a service life of 40 years.

b. All component materials used in the dampers shall be compatible with the radiation exposures and environmental conditions set forth in the Damper List and specified hereinafter. This shall include all metal components, seals, gaskets, lubricants and coatings, such as paints, operators, capacitors, insulation, etc. Contractor shall list in the proposal all teflon materials used in the construction of equipment. All component material used in the dampers shall be compatible with the ambient conditions of 65°F to 120°F dry bulb temperature and 10% to 90% relative humidity unless otherwise listed on the Damper List.

All component material used in operators and accessories shall be compatible with ambient conditions of 65°F to 120°F dry bulb temperature and 10% to 90% relative humidity unless otherwise listed on Damper List.

301.3 Tools: Any special tools required to adjust or dismantle the damper and operator shall be furnished by Contractor. Tools shall be new and of first-class quality. Tools shall be shipped to the job in a suitable separate container, clearly marked with the name of the equipment for which the tools are intended.

301.4 Tagging and Identification: Each unit, and detached components (if any), shall be provided with a metal tag bearing the damper number and location, or service identification shown in the Damper List. Tag shall also include the design flow rate, and all other factors related to the design performance of the unit. The tag, in each case, shall be

securely attached so as to insure against its accidentally coming loose. Seller's drawings and data submitted shall also bear the identification marking for each unit and component.

302. SEISMIC REQUIREMENTS

302.1 All requirements of this Article 302 shall apply to all dampers and components furnished under this Specification.

302.2 Each damper assembly shall be seismically qualified as follows:

a. Seismic Design:

a1. Equipment shall be designed to withstand a horizontal loading of 0.198g. in conjunction with a vertical loading of 0.160g. within a range of 1 to 33 Hertz. When designing for this loading, the seismic and operating load stress shall be combined without any increase in the normal allowable stresses.

a2. The equipment shall also be capable of withstanding a horizontal loading of 0.396g. in conjunction with a vertical loading of 0.32g. within a range of 1 to 33 Hertz. For this loading condition it is necessary that the equipment be capable of withstanding the above forces without loss of function. This is to say that the equipment shall withstand the above forces and still be able to operate.

b. All the electrical equipment such as the solenoids and position switches for the dampers shall in addition be qualified in compliance with IEEE-344 Recommended Practices for Seismic Qualification of Class IE Equipment for Nuclear Power Generating Stations, (Feb., 1975).

302.3 Documentation
One week prior to shipment, seismic qualification documentation shall be submitted to the Buyer/Owner.

303. DESIGN AND CONSTRUCTION

303.1 Materials:

a. Frames shall be ASTM A-36 minimum.

b. Blades shall be ASTM A-36 minimum.

c. Shafts shall be Stainless Steel, Type 304, ASTM A-276.

d. Linkages shall be ASTM A-575.

e. Pins shall be ASTM A-36.

f. Blade seals shall be silicon rubber, rated for a minimum 400° F.

g. Seller shall obtain a certificate of compliance for all materials.

303.2 Dampers shall be designed to be "bubble tight" at 8 in. W.G. differential pressure when in the closed position. The arrangement of blade shafts shall be in accordance with the damper mounting specified in Subarticle 301.1b.

303.3 Dampers shall in general conform to PAPCo bubble tight construction; however, the following minimum requirements shall be met:

a. Flange to flange dimensions of frame shall contain blades when open; however, this dimension shall be not less than 12 in.

b. Damper dimensions reference inside of frame to inside frame dimensions.

c. Flange width shall be 2 in.

d. Frame thickness shall be not less than ' in.

e. Shafts shall be through type, solid, not less than 1 in. diameter.

f. Bearings shall be PAPCo "Nu-Con" design. Materials shall be selected for pressures and environmental conditions specified.

g. Linkages shall be outside of the damper frame and shall be not less than 1 in. diameter with 1/2 in. diameter connecting rods and locked to blade shafts by 3/8 in. set screws.

h. Damper design shall incorporate integral rigid mounting bracket for the operator and specified accessories.

i. Dampers shall be designed for radiation resistance and seismic conditions specified elsewhere within this specification.

j. Flanges shall be provided with accurately positioned bolt holes, not less than 7/16 in. diameter for 3/8 in. bolts, located on approximately 4 in. centers, approximately 3/4 in. in from the outside flange dimension.

304. OPERATORS

304.1 General

a. Seller shall provide each isolation damper with a pneumatic operator in accordance with two position operation, and failure mode as indicated on the Damper List, and as hereinafter specified.

b. Each operator shall be designed or selected for not less than 200% of the design operating torque or force required by the driven equipment. It shall be Seller's responsibility to determine the required torque for each application taking into account design features of the driven equipment, design flow range, design operating pressures, and flow stream pressure drop.

c. A single or double actuator shall be furnished for each damper in accordance with Seller's design.

d. Damper operators and accessories shall be factory mounted wherever possible; however, if operators require field mounting for shipping or any other reason, mounting and correct adjustment of dampers shall be supervised by the Seller.

e. The designation of acceptable operator manufacturer and model numbers in no way relieves the Seller of the responsibility of supplying operators that are fully qualified for the specified environments, radiation and seismic criteria.

304.2 Pneumatic Operators

a. Operators for each isolation damper shall be as manufactured by Contromatics.

b. Air will be supplied by Buyer at 80 psi minimum and will be instrument quality at 40°F dew point.

c. Operators shall have spring return with adjustable speed control.

d. Dampers shall fail closed (by spring) in 5 s. +/- 0.5 s.

e. Operator torque shall be based on PAPCo "bubble tight" damper design at 8 in. W.G. differential pressure (minimum) when closed and dynamic differential pressure from flow and damper characteristics/sizes per the Damper List.

f. Each operator shall have a handwheel for manual opening of damper with operating force limited to 75 lb.

g. Each operator shall have an integrally mounted three-way solenoid valve (Model HT-8320A175) with high temperature (Class H) coil for operation on 120 V ac as manufactured by ASCO. Solenoid shall be qualified in accordance with IEEE-323-1974 (Reference Article 111.2).

h. Isolation signal will de-energize operator solenoid in failure mode (i.e., loss of electric signal shall close damper).

305. POSITION SWITCHES

Position switches shall be furnished for each damper to detect damper open and closed position. Switches shall be factory mounted. Switches shall be NAMCo with DP DT contacts.

306. PAINTING

306.1 Before shipment, all parts of the damper assemblies shall be thoroughly cleaned of all mill scale, rust, grease, and other foreign matter.

306.2 Exterior unfinished surfaces of dampers shall be given one "shop coat" of a flat filler which will serve as a suitable base for enamel. Filler shall be applied in ample quantity and shall be well "rubbed-in" so that coated surfaces will have a smooth, even finish and will require no further attention before being painted. Contractor's standard filler may be used for this purpose. Use of lead based prime coat paint is specifically forbidden.

306.3 Exterior unfinished steel surfaces shall receive a "shop coat" of manufacturer's standard brand of paint suitable for the service intended. This factory finish shall consist of a paint or coating system as follows, with the finish color ANSI #61 Gray.

	Coat	Dry Film Thickness
a.	Shop prime coat.....	2.0 mils
b.	Shop intermediate coat.....	1.5 mils
c.	Shop enamel finish coat.....	1.5 mils
d.	Total System Thickness.....	5.0 mils

307. TESTING

307.1 Factory Testing

The following tests shall be conducted at the factory prior to delivery to the station in the same order as they are listed below:

a. Cycling and Closure Time Test

a1. Each isolation damper shall be cycled opened and closed at fastest closure speed no less than 10 times. Dampers shall be inspected for damaged blade seals, deflected shafts or cracked welds.

a2. During the cycling test the closure times shall be checked and be 5 s. +/- 0.5 s. for every cycle.

b. Leakage Test
Each isolation damper assembly shall be factory leak tested to demonstrate bubble tightness at 8.0 in. W.G. differential pressure after closure test specified in Subarticle 307.1a.

307.2 Full and complete reports of above tests shall be submitted to Buyer and Consulting Engineers prior to shipment (Reference Article 205.5).

307.3 Field Testing

a. When the equipment is put into service, Buyer will perform tests to determine whether or not it will meet Seller's guarantees. Seller's representative must be present to witness and assist in the testing of the equipment as requested by the Buyer.

b. Acceptance of the equipment by Buyer on the basis of the above tests will not relieve Seller from responsibility for the operation of the equipment in service, as set forth in the Contract.

SARGENT AND LUNDY, ENGINEERS
CHICAGO, ILLINOIS

FORT ST. VRAIN, HVAC ISOLATION DAMPERS FOR THREE-ROOM CONTROL COMPLEX
JOB NO. 3614-16
DATE 02/13/76

DAMPER LIST
(SEQUENCED BY EQUIPMENT NUMBERS)

1. REVISION	DV-75323	DV-75324	DV-75325	DV-75327	DV-75328
2. EQUIPMENT NUMBER	V75442	V75443	V75444	V75446	V75447
3. DRAWING NUMBER	M-XXXX	M-XXXX	M-XXXX	M-XXXX	M-XXXX
4. SYSTEM	CONTROL ROOM HVAC	CONTROL ROOM HVAC	CONTROL ROOM HVAC	CONTROL ROOM HVAC	ELEC. EQUIP. HVAC
5. SPECIFICATION NO.	75-V-1	75-V-1	75-V-1	75-V-1	75-V-1
6. FURNISHED WITH EQUIPMENT	NO	NO	NO	NO	NO
7. TYPE OF DAMPER	PARALLEL	PARALLEL	PARALLEL	PARALLEL	PARALLEL
8. FUNCTION	ISOLATION	ISOLATION	ISOLATION	ISOLATION	ISOLATION
9. LEAKAGE DESIGN	L1 (SEE NOTE 9)	L1 (SEE NOTE 9)	L1 (SEE NOTE 9)	L1 (SEE NOTE 9)	L1 (SEE NOTE 9)
10. SIZE, INCHES	24.25(W) X 12.25(H)	24.25(W) X 12.25(H)	21.25(W) X 12.25(H)	28.25(W) X 24.(H)	28.25(W) X 20.(H
11. AIR QUANTITY, CFM	3800.	3800.	3800.	11860.	9300.
12. NOMINAL AIR VELOCITY, FPM	1900.	1900.	1900.	2541.	2391.
13. MAX. DESIGN TEMP., F	SEE STD SPEC	SEE STD SPEC	SEE STD SPEC	SEE STD SPEC	SEE STD SPEC
14. MAX. DESIGN PRESS., PSIG	SEE STD SPEC	SEE STD SPEC	SEE STD SPEC	SEE STD SPEC	SEE STD SPEC
15. DIRECTION OF AIR FLOW	VERT. DOWN	VERT. DOWN	VERT. DOWN	VERT. UP	VERT. UP
16. BLADE SHAFT POSITION	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL
17. FIRE CLASSIFICATION	NONE	NONE	NONE	NONE	NONE
18. RADIATION RESISTANCE, RADS	E3	E3	E3	E3	E3
19. SEISMIC CLASSIFICATION	SEISMIC	SEISMIC	SEISMIC	SEISMIC	SEISMIC
20. TYPE OF OPERATOR	PNEUMATIC (SPRING RETURN)	PNEUMATIC (SPRING RETURN)	PNEUMATIC (SPRING RETURN)	PNEUMATIC (SPRING RETURN)	PNEUMATIC (SPRING RETURN)
21. DAMPER FAILURE MODE	FAIL CLOSED	FAIL CLOSED	FAIL CLOSED	FAIL CLOSED	FAIL CLOSED
22. OPERATOR POWER SERVICE	80 PSI	80 PSI	80 PSI	80 PSI	80 PSI
23. TORQUE, IN-LBS					
24. LIMIT SWITCHES REQ'D	YES	YES	YES	YES	YES

SARGENT AND LUNDY, ENGINEERS
CHICAGO, ILLINOIS

FORT ST. VRAIN, HVAC ISOLATION DAMPERS FOR THREE-ROOM CONTROL COMPLEX
JOB NO. 3614-16
DATE 02/13/76

DAMPER LIST
(SEQUENCED BY EQUIPMENT NUMBERS)

1. REVISION	DV-75329	DV-75326	DV-75330	DV-75332	DV-75333
2. EQUIPMENT NUMBER	V75448	V75445	V75449	V75451	V75452
3. DRAWING NUMBER	M-XXXX	M-XXXX	M-XXXX	M-XXXX	M-XXXX
4. SYSTEM	ELEC. EQUIP. HVAC	MISC VENTILATION	MISC VENTILATION	MISC VENTILATION	MISC VENTILATION
5. SPECIFICATION NO.	75-V-1	75-V-1	75-V-1	75-V-1	75-V-1
6. FURNISHED WITH EQUIPMENT	NO	NO	NO	NO	NO
7. TYPE OF DAMPER	PARALLEL	PARALLEL	PARALLEL	PARALLEL	PARALLEL
8. FUNCTION	ISOLATION	ISOLATION	ISOLATION	ISOLATION	ISOLATION
9. LEAKAGE DESIGN	L1 (SEE NOTE 9)	L1 (SEE NOTE 9)	L1 (SEE NOTE 9)	L1 (SEE NOTE 9)	L1 (SEE NOTE 9)
10. SIZE, INCHES	28.25(W) X 22.(H)	22.(W) X 6.(H)	6.(W) X 8.(H)	11.(W) X 7.(H)	11.(W) X 7.(H)
11. AIR QUANTITY, CFM	9300.	760.	300.	250.	250.
12. NOMINAL AIR VELOCITY, FPM	2174.	829.	900.	468.	468.
13. MAX. DESIGN TEMP., F	SEE STD SPEC	SEE STD SPEC	SEE STD SPEC	SEE STD SPEC	SEE STD SPEC
14. MAX. DESIGN PRESS., PSIG	SEE STD SPEC	SEE STD SPEC	SEE STD SPEC	SEE STD SPEC	SEE STD SPEC
15. DIRECTION OF AIR FLOW	VERT. DOWN	VERT. DOWN	VERT. UP	HORIZONTAL	HORIZONTAL
16. BLADE SHAFT POSITION	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL
17. FIRE CLASSIFICATION	NONE	NONE	NONE	NONE	NONE
18. RADIATION RESISTANCE, RADS	E3	E3	E3	E3	E3
19. SEISMIC CLASSIFICATION	SEISMIC	SEISMIC	SEISMIC	SEISMIC	SEISMIC
20. TYPE OF OPERATOR	PNEUMATIC (SPRING RETURN)	PNEUMATIC (SPRING RETURN)	PNEUMATIC (SPRING RETURN)	PNEUMATIC (SPRING RETURN)	PNEUMATIC (SPRING RETURN)
21. DAMPER FAILURE MODE	FAIL CLOSED	FAIL CLOSED	FAIL CLOSED	FAIL CLOSED	FAIL CLOSED
22. OPERATOR POWER SERVICE	80 PSI	80 PSI	80 PSI	80 PSI	80 PSI
23. TORQUE, IN-LBS					
24. LIMIT SWITCHES REQ'D	YES	YES	YES	YES	YES

SARGENT AND LUNDY, ENGINEERS
CHICAGO, ILLINOIS

FORT ST. VRAIN, HVAC ISOLATION DAMPERS FOR THREE-ROOM CONTROL COMPLEX
JOB NO. 3614-16
DATE 02/13/76

DAMPER LIST
(SEQUENCED BY EQUIPMENT NUMBERS)

1.	REVISION	DV-75331	DV-75334
2.	EQUIPMENT NUMBER	V75450	V75453
3.	DRAWING NUMBER	M-XXXX	M-XXXX
4.	SYSTEM	SW'GR HEAT REMOVAL	SW'GR HEAT REMOVAL
5.	SPECIFICATION NO.	75-V-1	75-V-1
6.	FURNISHED WITH EQUIPMENT	NO	NO
7.	TYPE OF DAMPER	PARALLEL	PARALLEL
8.	FUNCTION	ISOLATION	ISOLATION
9.	LEAKAGE DESIGN	L1 (SEE NOTE 9)	L1 (SEE NOTE 9)
10.	SIZE, INCHES	31.(W) X 15.(H)	24.(W) X 24.(H)
11.	AIR QUANTITY, CFM	11000.	11000.
12.	NOMINAL AIR VELOCITY, FPM	3400.	2750.
13.	MAX. DESIGN TEMP., F	SEE STD SPEC	SEE STD SPEC
14.	MAX. DESIGN PRESS., PSIG	SEE STD SPEC	SEE STD SPEC
15.	DIRECTION OF AIR FLOW	HORIZONTAL	HORIZONTAL
16.	BLADE SHAFT POSITION	HORIZONTAL	HORIZONTAL
17.	FIRE CLASSIFICATION	NONE	NONE
18.	RADIATION RESISTANCE, RADS	E3	E3
19.	SEISMIC CLASSIFICATION	SEISMIC	SEISMIC
20.	TYPE OF OPERATOR	PNEUMATIC (SPRING RETURN)	PNEUMATIC (SPRING RETURN)
21.	DAMPER FAILURE MODE	FAIL CLOSED	FAIL CLOSED
22.	OPERATOR POWER SERVICE	80 PSI	80 PSI
23.	TORQUE, IN-LBS		
24.	LIMIT SWITCHES REQ'D	YES	YES

SARGENT AND LUNDY, ENGINEERS
CHICAGO, ILLINOIS

FORT ST. VRAIN, HVAC ISOLATION DAMPERS FOR THREE-ROOM CONTROL COMPLEX
JOB NO. 3614-16
DATE 02/13/76

DAMPER LIST, SUPPLEMENT TO SPECIFICATION 75-V-1

THIS DAMPER LIST IDENTIFIES ALL THE PHYSICAL FEATURES FOR ALL THE HVAC SYSTEMS DAMPERS EXCEPT FOR THE CHECK TYPE. CHECK DAMPER SPECIFICATIONS ARE PRESENTED IN THE PROJECT SPECIFICATIONS.

IN ADDITION TO DEFINEMENT OF THE CODES IN THE LIST, THE FOLLOWING ITEMS ARE FURTHER CLARIFIED:

1 A LETTER ON THIS LINE INDICATES THAT A CHANGE HAS BEEN MADE TO THIS SPECIFIC DAMPER SINCE THE PREVIOUS ISSUE OF THE LIST. ALL PREVIOUS REVISIONS ARE CLEARED, AND THE MOST RECENT REVISION IS INDICATED WITH THE REVISION DATE IN THE TITLE BOX.

5 DAMPERS ARE TO BE PURCHASED UNDER THIS SPECIFICATION NUMBER, AND FURNISHED TO THE HVAC CONTRACTOR (IDENTIFIED BY SPECIFICATION 1-J-09) FOR INSTALLATION.

6 IF YES, THEN OPERATOR ONLY REQUIRED.
IF NO, THEN BOTH THE DAMPER AND OPERATOR REQUIRED UNDER ITEM 5.

SPECIAL LEAKAGE REQUIREMENTS ARE AS FOLLOWS:

CODE	MAXIMUM LEAKAGE
L1	0. SCFM AT 8.00 INCHES WATER DIFFERENTIAL PRESSURE

10 FOR RECTANGULAR DAMPERS 'W' IS THE LENGTH PARALLEL TO THE BLADE AXIS.

12 NOMINAL VELOCITY IS BASED ON THE INSIDE DAMPER FRAME DIMENSIONS, AND DOES NOT ACCOUNT FOR INTERNAL OBSTRUCTIONS.

13 WHENEVER 'SEE STD SPEC' IS INDICATED IT REFERS TO THE PROJECT SPECIFICATION 75-V-1.

14 WHENEVER 'SEE STD SPEC' IS INDICATED IT REFERS TO THE PROJECT SPECIFICATION 75-V-1.

17 FIRE CLASSIFICATIONS PER UNDERWRITERS' LABORATORIES STANDARD 555.

18 E_6 MEANS 1 X 10 RAISED TO THE 6TH POWER, E8 MEANS 1 X 10 TO THE 8TH POWER, ETC.

23 APPLICABLE FOR THOSE DAMPERS PURCHASED WITHOUT AN OPERATOR BY OTHER THAN THE CONTROL CONTRACTOR.

24 LIMIT SWITCHES SHALL MEAN POSITION SWITCHES.

3. UNIT PRICES

3.1 The following are unit prices by which the Seller agrees to furnish additional Isolation Dampers (without operators) and accessories as specified, furnished and delivered f.o.b. Fort St. Vrain Nuclear Power Station:

0.25	0.5	1

Name of Seller:

(Insert all prices in these columns)

Damper Area (ft^2)							
1.5	2	2.5	3	3.5	4	4.5	5

Name of Seller: _____

UNIT PRICES, Cont.	(Insert all prices in these columns)	
	Add	Delete
3.2 The following are unit prices by which the Seller agrees to add or delete operators and accessories after award, furnished and delivered f.o.b. Fort St. Vrain Nuclear Power Station:		
a. Pneumatic Operators, Spring Return, 2 Position Without Pilot Positioner: (Contractor to insert Manufacturer and Model No. of each operator supplied below).....		
b. Solenoid Valves (each).....		
c. Position Switches (each).....		
4. PER DIEM cost (including travel, board and room) of the services of Contractor's competent service engineer for field checkout, adjustment and repair of Isolation Dampers during plant preoperational tests as requested by Purchaser.....($/day)	$	
5. ESCALATION		
5.1 A firm price will be considered more favorably in the analysis of prices. Is the above price firm? (Answer Yes or No).....	_____	
5.2 If Seller cannot quote a firm price, he shall list <u>in detail</u> in his proposal the exact terms of his escalation clause. The Escalation Clause shall be based on a published Index or a stated percent of the base price. (Indicate percent or index).....	_____	
5.3 Maximum number of months that escalation clause will remain in effect if Buyer delays shipment.....	_____	
6. CONFORMITY WITH SPECIFICATION DOCUMENTS Seller hereby certifies that he agrees to all provisions of the Specification Documents unless exceptions are specifically and clearly listed in the proposal and identified as <u>Exceptions</u>. Seller's printed terms and conditions are <u>not</u> considered specific exceptions. Any exceptions which Seller has taken are listed on Page.....	_____	

Name of Seller:_____

	(Insert all prices in this column)
7. SELLER hereby agrees that his printed General Conditions, conditions of sale or similar material, do not form part of this Proposal.....	

_____
Signature of Seller

_____
Date of Proposal

PROPOSAL DATA FOR
ISOLATION DAMPERS
FORT ST. VRAIN - UNIT 1
PROJECT 90-330 MWe HTGR
BUYER: GENERAL ATOMIC, INC.
OWNER: PUBLIC SERVICE COMPANY OF COLORADO

Spec. No. 75-V-1
Issue: Purchase, 02-13-76

Name of Seller: _____

		(Insert all data in these columns)		
		Required Schedule	Seller's Earliest Schedule	
1.	CERTIFIED DRAWINGS Time required after receipt of this procurement specification (75-V-1) before certified drawings as called for in the Specification will be submitted for review:			
1.1	General arrangement and principal dimensions of the equipment.....(weeks)	1		
1.2	Piping details and dimensions for external connections.....(weeks)	1		
1.3	Outline dimensions and mounting details of control and electrical equipment.(weeks)	1		
2.	POINTS OF SHIPMENT.....			
3.	SCHEDULE	Delivery Required	Earliest Delivery Seller Can Meet	
3.1	Isolation Dampers.....	As Soon As Possible		
4.	DOCUMENTATION Time required after receipt of this procurement specification before documents as called for in the Specification will be submitted for review.			
4.1	Quality Control Procedures.....(weeks)	1		
4.2	Quality Control Test Reports.....(weeks)	See Article 113		
4.3	Seismic Qualification Documentation.(weeks)	See Article 302		
5.	DAMPER PHYSICAL DATA (Assembly)	Multileaf	Multileaf	Multileaf
5.1	Guaranteed Typical Construction Data (Seller to Supply data for typical isolation dampers):			
a.	Damper size (in. diameter or in. height x in. length).....	6W x 8H	24W x 12H	28W x 20H
a1.	Shipping weight.....(lb)			
a2.	Operating weight.....(lb)			

Name of Seller:_____

DAMPER PHYSICAL DATA, Cont.	(Insert all data in these columns)		
	Multileaf	Multileaf	Multileaf
b. Body Material:			
b1. Type.....			
b2. ASTM Designation.....			
b3. Thickness.....(in)			
c. Blade Material:			
c1. Type.....			
c2. ASTM Designation.....			
c3. Thickness..... .....(in)			
d. Shaft Material:			
d1. Type.....			
d2. ASTM Designation.....			
d3. Diameter.....(in)			
e. Bearings:			
e1. Type.....			
e2. Manufacturer.....			
e3. Model No.			
e4. Type of Lubrication.....			
e5. Designation of Manufacturer's recommended lubricant.....			
e6. Manufacturer's recommended frequency of relubrication.....(mo.)			
e7. Radiation resistance.....(rads)			
f. Blade Seals:			
f1. Type.....			

Name of Seller:

DAMPER PHYSICAL DATA, Cont.	(Insert all data in these columns)		
	Multileaf	Multileaf	Multileaf
f2. Manufacturer's designation.....			
f3. Contractor's designation (if applicable)			
f4. Contractor's estimated life based on design conditions.....(yrs)			
f5. Radiation resistance.....(rads)			
g. Flanges:			
g1. Type.....			
g2. ASTM Designation.....			
g3. Thickness.....(in)			
g4. Width.....(in)			
g5. Method of attachment to damper body.....			
g6. Number of bolt holes.....			
g7. Size of bolt holes.....			
h. Shaft Seals:			
h1. Type.....			
h2. Manufacturer's designation.....			
h3. Does seal employ organic materials (Answer yes or no).....			
h4. Describe seal material.....			
h5. Radiation resistance.....(rads)			
i. Damper Operators - Air			
i1. Manufacturer.....			
i2. Model.....			

Name of Seller:_____

DAMPER PHYSICAL DATA, Cont.	(Insert all data in these columns)
i3. Type .....(Verify Spring Return)	
i4. Maximum torque required to move largest damper driven by operator @ 8 in W.G. S.P. and 4000 ft/min air velocity....(ft-lb)	
i5. Air pressure to actuate.....(psig)	
i6. Maximum spring torque developed by operator.....(ft-lb)	
i7. Total number of operators of this size proposed.....	
i8. Radiation Resistance.....(rads)	

Seller to Supply Data for each Operator of Different Size and Manufacture					

Name of Seller:_____

DAMPER PHYSICAL DATA, Cont.	(Insert all data in this column)
j. Damper Position Switches:	
j1. Manufacturer.....	
j2. Type.....	
j3. Voltage rating.....(V)	
j4. Inductive current @ 120 Vac.....(A)	
j5. Power consumption.....(watts)	
j6. Contact separation.....(in)	
j7. Number of switches.....	
j8. Number of N.O. and N.C. independent contacts.....	
j9. Radiation resistance.....(rads)	
k. Solenoid Valves:	
k1. Manufacturer.....	
k2. Type.....	
k3. Voltage rating.....(VAC)	
k4. Coil class.....	
k5. Body rating.....(psi)	
k6. Orifice size.....(in)	
k7. Power consumption.....(VA)	
k8. Radiation resistance.....(rads)	

Proposal Data for
Isolation Dampers, Cont.
Fort St. Vrain - Unit 1
Project 90-330 MWe HTGR

Name of Seller: _____

6. PERFORMANCE DATA	(Insert all data in these columns)								
6.1 Damper No(s).....	V-75442 V-75443 V-75444	V-75446	V-75447	V-75448	V-75445	V-75449	V-75451 V-75452	V-75450	V-75453
6.2 Damper Dimensions (W x H).....(in x in)	DV-75323 DV-75324 DV-75325	DV-75327	DV-75328	DV-75329	DV-75326	DV-75330	DV-75332 DV-75333	DV-75331	DV-75334
6.3 Leakage @ 8 in H_2O differential.....(cfm)									
6.4 Closing time.....(sec)									
6.5 Opening time.....(sec)									
6.6 Velocity through free area.....(fpm)									
6.7 Pressure drop across fully opened damper at design flow at 0.060 lb/ft^3 density..(in H_2O)									
6.8 Natural frequency of the damper assembly..(Hertz)									

Name of Seller:_____

		(Insert all data in this column)
7.	SEISMIC DESIGN	
7.1	Will each damper assembly meet the Seismic Design Specification, yes or no.....	
7.2	Method employed to determine the static forces that the equipment will withstand. (Calculation, Test, or Report Attached).	
7.3	State the maximum horizontal and vertical force that the equipment will withstand with no loss of function.	
a.	Horizontal.....(g)	
b.	Vertical.....(g)	

8. Contractor shall list here or attach hereto on page(s) _____ any additions or deletions required to Specification 75-V-1, Article 113.

9. SPECIAL PROPOSAL REQUIREMENTS
In addition to the complete Proposal Prices and Proposal Data Forms, Seller shall furnish the following with his bid:

9.1 Seller shall attach to his proposal general arrangement drawings of the damper assemblies showing components and overall dimensions. The drawings shall also include body thickness, flange size and thickness, number and size of bolt holes and flange to flange dimension as specified in Article 204.

9.2 List of materials with Teflon:

9.3 Quality Assurance Program with Quality Control procedures as specified in Articles 113 and 205.

9.4 Shop Test procedures.

9.5 Catalog information on the dampers and all accessories.

_____
Signature of Seller

_____
Date of Proposal

SARGENT & LUNDY
ENGINEERS
CHICAGO

NUCLEAR SAFETY RELATED
Project: 3614-16

Spec. No. 75-V-1
Issue: Purchase, 02-13-76

SPECIFICATION FOR

ISOLATION DAMPERS

FORT ST. VRAIN - UNIT 1
PROJECT 90-330 MWe HTGR

PROFESSIONAL ENGINEERS CERTIFICATION

I certify that this Specification was prepared under my supervision and that I am a registered professional engineer under the laws of the State of Colorado.

Certified by: _____ Date: February 13, 1976

Seal

STANDARD SPECIFICATION FOR PRIME COAT PAINTING (Form 1790-E)

1. GENERAL
   A. Prime coat painting shall conform to the requirements of this Standard Specification, the Job Specification, and the Design Drawings. In the event of variance between this Standard Specification and the Job Specification or Design Drawings, the Job Specification and Design Drawings shall take precedence.
   B. Where the term "design drawings" is used, it shall mean "Consulting Engineer's Design Drawings".
   C. Where the terms "as indicated" or "indicated" are used, they shall mean "as specified in the Job Specification and as shown or called for on the design drawings".
   D. All references to the following publications are to the latest issue of each; such references will be made in accordance with the abbreviations indicated:
      a. Steel Structures Painting Council (SSPC) Standard Specifications.
      b. National Woodwork Manufacturers Association (NWMA) Standards.
      c. American Wood-Preservers Association (AWPA) Manual of Recommended Practice.
2. SCOPE
   A. This Specification covers requirements for the following:
      a. Surface preparation and shop prime coat, field touch-up and field prime coat painting of ferrous metals (structural steel, miscellaneous steel, etc.).
      b. Field touch-up for galvanizing.
      c. Field painting for concealed surfaces.
      d. Painting for aluminum contact surfaces.
      e. Fire retardant painting of temporary wood members.
      f. Preservative treatment of permanent wood members.
   B. Contractor shall furnish all materials, labor and equipment to perform the indicated work. The extent of the WORK shall be as specified in the Job Specification.
   C. Finish field painting will be by others unless specifically included in the Job Specification.
3. INTENT
   A. Ferrous Metals: The intent of requirements herein specified for prime coat painting of ferrous metals is that:
      a. All ferrous metal surfaces, except galvanized surfaces (unless otherwise indicated), shall have at least one (1) acceptable complete coat of paint at the time the WORK is completed ready for finish field painting, except as hereinafter specified for grating. This requirement shall apply to ferrous metal installed by any and all trades included in the WORK.
      b. This one (1) complete coat shall consist of either an original shop prime coat, with subsequent field touch-up, or of a full prime coat applied in the field.

c. Grating shall receive one (1) shop prime coat of paint and one (1) shop finish coat of paint.

B. Aluminum Contact Surfaces: The intent of requirements herein specified for painting protection of aluminum contact surfaces is that either the aluminum surfaces, or the surfaces in contact with the aluminum, shall have two (2) acceptable complete coats of paint at the time that the aluminum is installed.

4. INSPECTION

A. All work covered by this Specification will be subject to inspection by Purchaser and the Consulting Engineers, and any work found not in accordance with the Specification shall be redone to the satisfaction of Purchaser and the Consulting Engineers.

B. Purchaser or the Consulting Engineers may make random spot checks of materials, equipment, etc., which have been painted, by removing small swatches of paint to bare metal with acetone and examining the surface with a 10 power magnifying glass to observe the absence or presence of rust under the prime coat. The presence of rust or rust stains under such swatches shall be sufficient cause for rejecting the work, and Contractor shall reprepare and recoat the work in the field at his own expense.

5. GENERAL REQUIREMENTS

A. General:

a. Paint shall be as made by the manufacturers hereinafter specified, and shall be delivered to the place of use in unbroken containers bearing manufacturer's brand name and number.

b. Paint identification numbers are paint manufacturers' numbers and shall be used in ordering paint.

c. Paint shall not be mixed or stored in contaminated containers. All paint shall be thoroughly mixed before using and shall be applied in strict accordance with manufacturer's instructions, as approved.

B. Protection and Clean-Up for Field Work: Contractor shall furnish the necessary drop cloths or other protection required to fully protect all surfaces from paint dropping, mist and all other conditions due to execution of field prime coat and field touch-up painting work by Contractor.

6. SURFACE PREPARATION (CLEANING)

A. Immediately prior to and throughout the painting process, material to be painted shall receive the following surface preparation which shall consist of the following methods as required and/or as specified in the Job Specification:

a. Method 1: Solvent Cleaning
b. Method 2: Hand Cleaning
c. Method 3: Power Tool Cleaning
d. Method 4: Commercial Blast Cleaning
e. Method 5: Blast Cleaning to "White" Metal

B. Method 1 - Solvent Cleaning:

a. Solvent cleaning shall be used primarily to remove oil or grease, and shall conform to the applicable requirements of SSPC Surface Preparation Specification No. 1, "Solvent Cleaning".

b. Solvent cleaning shall also include removal of soil, cement spatter, drawing compounds, salts and other foreign matter as set forth in the foregoing SSPC Specification.

C. Method 2 - Hand Cleaning:
   a. Hand cleaning shall be used primarily to remove loose mill scale, loose rust, and loose paint, and also all slag, weld splatter and alkaline scale from welded surfaces, by the use of hand brushing, hand sanding, hand scraping, hand chipping, or other hand impact tools, and shall conform to the applicable requirements of SSPC Surface Preparation Specification No. 2, "Hand Cleaning".
   b. Oil, grease or salts shall first be removed by Solvent Cleaning as hereinbefore specified.

D. Method 3 - Power Tool Cleaning:
   a. Power tool cleaning shall be used primarily to remove loose mill scale, loose rust, and loose paint, and also all slag, weld spatter and alkaline scale from welded surfaces, by the use of power wire brushes, power impact tools, power grinders, power sanders, or a combination of these methods, and shall conform to the applicable requirements of SSPC Surface Preparation Specification No. 3, "Power Tool Cleaning".
   b. Power tool cleaning shall be used as required to supplement Method No. 2, "Hand Cleaning", and/or shall be used where specified or directed.
   c. Oil, grease or salts shall first be removed by Solvent Cleaning as hereinbefore specified.

E. Method 4 - Commercial Blast Cleaning:
   a. Commercial blast cleaning shall be used to remove mill scale, rust, rust-scale, paint or foreign matter by the use of abrasives propelled through nozzles or by centrifugal wheels, and shall conform to the applicable requirements of SSPC Surface Preparation Specification No. 6, "Commercial Blast Cleaning".
   b. Heavy deposits of oil or grease shall first be removed by Solvent Cleaning as hereinbefore specified.
   c. Excessive rust-scale shall be removed by Hand Cleaning or Power Tool Cleaning, as hereinbefore specified, prior to blast cleaning.

F. Method 5 - Blast Cleaning to "White" Metal:
   a. Blast cleaning to "White" metal shall be used for the same purpose as Method 4, and shall conform to the applicable requirements of SSPC Surface Preparation Specification No. 5, "Blast Cleaning to 'White' Metal". "White" metal is defined to mean a surface of a gray white, uniform metallic color, slightly roughened to form suitable anchor pattern for coatings.
   b. The depth of anchor pattern shall be as specified in the Job Specification.
   c. Heavy deposits of oil or grease shall first be removed by Solvent Cleaning as hereinbefore specified.
   d. Excessive rust-scale shall be removed by Hand and/or Power Tool Cleaning, as hereinbefore specified, prior to blast cleaning.

G. Metal Patching [illegible] necessary to patch or fill scratches or gouges in equipment, tanks, etc., a metal putty shall be used. The type of metal putty shall be submitted for approval before [illegible] putty shall be applied in strict accordance with manufacturer's directions, as approved, and shall be level and smooth after application.

H. Preparation of Galvanized Surfaces: Where galvanized surfaces are specified to be painted, the following surface preparation requirements shall apply:

a. Galvanizing Pretreated for Painting:

(1) Where the galvanized surface has been specified to be shop pretreated for painting, the surface shall be prepared by Method 1 - Solvent Cleaning.

(2) If a question arises as to whether specific galvanized surfaces have been shop pretreated, the decision of Purchaser and/or the Consulting Engineers shall govern.

b. Galvanizing Not Pretreated for Painting:

(1) Surface shall first be prepared by Method 1 - Solvent Cleaning.

(2) Following the solvent cleaning, the surfaces shall receive one (1) washcoat pretreatment in accordance with the applicable requirements of SSPC Pretreatment Specification No. 3, "Basic Zinc Chromate-Vinyl Butyral Washcoat".

(3) Washcoats shall be applied by spraying or brushing to a minimum dry film thickness of 0.3 to 0.5 mils.

7. APPLICATION OF PAINT

A. Application of paint shall conform to the applicable requirements of SSPC Paint Application Specification No. 1, "Shop, Field and Maintenance Painting", and to the requirements hereinafter specified.

B. Time Restrictions: The prime coat (or wash primer if specified for surfaces prepared by Methods 4 and/or 5) shall be applied within the following time limitations after completion of specified surface preparation:

a. Within 24 hours for surfaces prepared by Methods 1, 2 and 3.

b. Within 8 hours for surfaces prepared by Methods 4 and 5.

c. If the prime coat is not applied within the specified period, the surface shall be reprepared.

C. Temperature Restrictions:

a. Paint shall not be applied when the surrounding air temperature is below 40 F, nor when the temperature is expected to drop to 32 F before the paint has dried.

b. Paint shall not be applied to steel which is more than five (5) degrees F below the surrounding air temperature, or which is at a temperature less than 35 F.

c. Paint shall not be applied to steel which is at a temperature of over 125 F unless the paint is specifically formulated for application at the proposed temperature. When steel is painted in hot weather, precautions shall be taken to insure that the specified dry mil thickness of paint is obtained.

D. Moisture and Humidity Restrictions:

a. Paint shall not be applied in rain, snow, fog, or mist, or when the relative humidity is such as to cause condensation on metal surfaces due to variation in metal temperatures and surrourding air temperatures. Table 90-1 shall be used as the guide for this relative humidity restriction.

b. All surfaces shall be perfectly dry before and while being painted.

E. Method of Application:

a. Application of the paint shall primarily be made with proper size and grade of brushes, except where spray equipment or rollers can be used to advantage.

b. Spray equipment if used, shall be accurately and fully controlled at all times so as to prevent damage to adjacent surfaces.

F. Two Coat Work: Where two (2) shop or field prime coats of paint are specified (except as herein specified for grating), the following shall apply:

a. The second coat of paint (or the first, if approved or if requested) shall be tinted, as approved or as requested, to insure ease of checking that a second coat is applied.

b. The second coat shall not be applied until the first coat has been completed, checked and approved. If the second coat is applied before approval of the undercoat, it will be assumed that such undercoat has not been applied, and at the option of Purchaser or the Consulting Engineers such undercoat shall be reapplied or the entire coating shall be removed and this area repainted from the beginning.

c. Drying Time: Sufficient time for drying shall be allowed between coats.

TABLE 90-1

Per Cent Relative Humidity Above Which Moisture will Condense On Metal Surfaces Not Insulated

Metal Surface Temp.	Surrounding Air Temperature F												
	40	45	50	55	60	65	70	75	80	85	90	95	100
35 F	60	33	11										
40 F		69	39	20	8								
45 F			69	45	27	14							
50 F				71	49	32	20	11					
55 F					73	53	38	26	17	9			
60 F						75	56	41	30	21	14	9	
65 F							78	59	45	34	25	18	13
70 F								79	61	48	37	29	22
75 F									80	64	50	40	32
80 F										81	66	53	43
85 F											81	68	55
90 F												82	69
95 F													83

8. MINIMUM THICKNESS OF PAINT

A. Each prime coat of paint shall be applied so as to result in a minimum dry paint thickness of 2 mils, unless otherwise indicated.

B. Inspection of paint thickness will be made by Purchaser of the Consulting Engineers, and shall be based on measuring average wet film thickness, using a Nordson Wet Film Gage, #WFG-100, as made by the Nordson Corp., Amherst, Ohio, or an Interchemical direct reading wet film thickness gauge, #GG-6280, as made by Gardner Laboratory, Inc., Bethesda, Maryland. Gauges shall be furnished by Contractor. For the Nordson gage, not less than two (2) applications of the gage will be

made in each area to be tested to determine an average wet film thickness; for the Interchemical gauge, nor less than two (2) rolls of the gauge, in opposite directions, will be made for each test.

C. The paint manufacturers shall accordingly be required by Contractor to furnish the Consulting Engineers and the Contractor with wet film thickness required, for each class of paint and method of application, to obtain the specified dry film thickness. These wet film thicknesses shall be based on applying the paint directly from the original containers, with no thinners added.

D. If Contractor intends to use thinners he shall inform the Consulting Engineers and the paint manufacturer of his intended method of application. The paint manufacturer shall then re-evaluate the paint and furnish the Consulting Engineers and the Contractor with the new wet film mil thicknesses required.

E. Dry film thickness may also be inspected by Purchaser or the Consulting Engineers for verification of paint thickness, and the dry thickness will be tested using an Elcometer gauge or a Nordson Micro gauge. Gauges shall be furnished by Contractor.

F. If the required minimum dry thickness is not attained, as determined by either the wet-film inspection of the dry-film inspection, additional coats shall be applied to produce the specified thickness.

9 PAINT

The brand of paint shall be as made by The Detroit Graphite Company or by E. I. du Pont de Nemours & Co., Inc. Manufacturers' paint numbers and the corresponding use of these paints shall be as specified in Table 90-2.

TABLE 90-2
Paint Designations

Use	Color	Detroit Graphite Number	du Pont Number
(1) Shop coat (except grating) (2) Field prime coat (except grating) (3) Field touch-up (except grating) (4) First coat of two-coat shop or field prime coat painting (except grating)	Brown	501	67-746
(5) Second coat of two-coat shop or field prime coat painting (except grating).....	Black	30	515
(6) Grating: (a) Shop prime coat.....	Brown (Dipping Primer)	501-A	67-733
(b) Shop finish coat: i. Indoor use.....	Black (Dipping Enamel)	90800	655-1627
ii. Outdoor use.....		90801	83-005
(7) Field painting for concealed surfaces of ferrous metals.....	Black	30	515
(8) Field or shop painting for aluminum contact surfaces: (a) For ferrous metals, one coat in addition to prime coat.....	Black	30	515
(b) For aluminum, if painted in place of painting other materials: i. First coat.....	Brown	501	67-746
ii. Second coat.....	Black	30	515
(c) For concrete, masonry or wood: i. First coat.....	White	#600 CEM-GARD primer	675 Primer, 50-50 mix with 710 oil
ii. Second coat.....	Dark Gray	#103 CEM-GARD	687

10. SHOP PAINTING

A. Surfaces to be shop painted, after completion of surface preparation as hereinbefore specified, and surfaces to be left unpainted, shall be as specified in Table 90-3.

B. Machine-finished surfaces shall be protected against corrosion by a suitable antirust coating.

TABLE 90-3

Extent of Shop Painting

Surface	Paint Requirements
(1) Surfaces in contact after shop assembly...	No Paint
(2) Surfaces in contact for field erection....	No Paint
(3) Contact surfaces under washers of high strength bolts.....	No Paint
(4) All joints to be field welded.....	3" wide strips to be left unpainted on each side of joints.
(5) Surfaces inaccessible after shop assembly (other than contact surfaces), or inaccessible after field erection	2 coats of paint of different colors, as follows: 1st (prime) coat 2nd coat
(6) All other surfaces (unless otherwise indicated)	1 (prime) coat of paint

11. FIELD PRIME COAT PAINTING
    A. Field prime coat painting shall consist of one (1) complete coat of paint applied to all bare structural steel or other ferrous metal surfaces, after such surfaces have been properly cleaned as hereinbefore specified.
    B. Provided further that two-coat work shall conform to the same requirements as for shop two-coat work.
12. FIELD TOUCH-UP PAINTING
    A. Field touch-up painting shall consist of one (1) coat of paint applied to the following surfaces after they have been properly cleaned as hereinbefore specified.
        a. Surfaces where the shop coat of paint has been marred, scratched or otherwise damaged, due to shipping, handling, erection, installation, weathering, etc.
        b. Heads of field bolts and nuts, and adjacent surfaces left unpainted in the shop.
        c. Surfaces of field welds, and adjacent surfaces left unpainted in the shop.
        d. Surfaces of any ferrous fasteners not otherwise protected.
    B. Exposed fabrication, erection or shipping marks shall be cleaned off and the areas touch-up painted to match the adjacent surfaces.
    C. Provided further that field touch-up painting shall consist of two coats for any of the above surfaces which have received two coats either in the shop or in the field prime coat painting; such two-coat touch-up shall conform to the same requirements as for shop two-coat work.
    D. For surfaces where blast cleaning and a wash primer are specified, touch-up painting shall include blast cleaning and application of the wash primer before the touch-up coat, or coats, are applied.
    E. Dry film thickness of touch-up painting shall be not less than 2 mils.
    F. Touch-up painting shall overlap the prime coat by not less than 1" all around to insure continuity of coating.

13. FIELD TOUCH-UP FOR GALVANIZING
    A. The following shall be touched-up with one (1) coat of zinc-rich paint:
        a. Areas of galvanized surfaces (of siding, etc., furnished and/or installed by Contractor) which have been marred due to handling, shipping, erection, weathering, etc.
        b. Field welds made on hot-dipped galvanized surfaces.
    B. Material: Galvanox zinc-rich paint as made by Subox, Inc. Paint coverage shall be at the rate of not more than 350 sq. ft. per gallon, and shall result in a coating containing not less than one (1) oz. of zinc metal per sq. ft. of surface.
    C. Touch-up galvanizing shall overlap the original coating by not less than 1" all around to insure continuity of coating.
14. FIELD PAINTING FOR CONCEALED SURFACES
    A. Concealed surfaces painting shall consist of one (1) field coat of paint applied to the following surfaces of structural steel or other ferrous metals (except for galvanized metals), IN ADDITION TO shop and/or field prime coats:
        a. All surfaces in contact with siding, roofs, walls, ceiling, etc., or which will be made inaccessible by the erection of these items.
        b. All surfaces made inaccessible by masonry, concrete, etc., except that this requirement shall not apply where the surfaces are embedded in, or fully encased in, these materials.
        c. All surfaces made inaccessible by other materials.
    B. Concealed surfaces painting shall not be done until all required prime coat and touch-up painting of the surface has been completed.
    C. Concealed surfaces paints shall be as hereinbefore specified in Table 90-2.
    D. Dry film thickness for concealed surfaces painting shall be not less than 2 mils.
15. PAINTING FOR ALUMINUM CONTACT SURFACES
    A. Aluminum contact surfaces painting shall be provided as follows:
        a. Ferrous Metals:
            (1) To prevent galvanic action where aluminum surfaces will be in contact with ferrous metals (other than galvanized), the contact surfaces of the ferrous metal shall receive one (1) field coat of paint IN ADDITION TO shop and/or field prime coats.
            (2) Where one (1) field coat of paint is already required by concealed surfaces painting it shall serve as the foregoing specified field coat.
        b. Non-Ferrous Metals:
            (1) Where aluminum will be in contact with copper, lead or other non-ferrous metals not compatible with aluminum, the contact surfaces of these metals shall receive two (2) coats of paint.
            (2) Non-ferrous metals compatible with aluminum, such as stainless steel, zinc, white bronze, etc., will not require painting.
        c. Concrete and Masonry:
            (1) Where aluminum surfaces will be embedded in concrete or masonry, the aluminum surfaces shall receive two (2) field coats of paint.

(2) Where aluminum surfaces will be in contact with concrete or masonry, the contact surfaces of these materials shall receive two (2) field coats of paint.

d. Wood:

(1) Where aluminum surfaces will be in contact with untreated wood (other than wood in the interiors of buildings), the wood shall receive two (2) coats of paint.

(2) Where aluminum surfaces will be in contact with treated wood the preservative mateial shall be of a type that is compatible with aluminum. The following types may be used:

(a) Pentachlorophenol solutions
(b) Wolman salts
(c) Creosote
(d) Zinc, naphthenate

B. Where desirable, where required, or where requested, contact surfaces of aluminum may be painted with two (2) coats of paint in place of painting contact surfaces of the foregoing specified materials.

C. Paints for aluminum contact surfaces shall be as hereinbefore specified in Table 90-2.

D. Dry film thickness for aluminum contact surfaces painting shall be not less than 2 mils for each coat.

16. FIRE RETARDANT PAINTING OF TEMPORARY WOOD MEMBERS

A. Temporary wood members required to be protected with fire retardant paint shall receive two (2) coats of Albi #107 (Exterior type, oil base, flat finish) Intumescent paint as made by Albi Manufacturing Co., Inc.

B. Coverage of paint shall be at the rate of 200 sq. ft. per gallon for each coat, to produce a flamespread rating of 15 (Incombustible Classification).

C. First coat color shall be white. Second coat color shall be Fiesta Brown.

D. Paint shall be applied in strict accordance with manufacturer's instructions, as approved.

17. PRESERVATIVE TREATMENT OF PERMANENT WOOD MEMBERS

A. Water-Repellent Type, Cold Drip Method:

a. Preservative: Water-repellent preservative conforming to NWMA Standards M-1 and M-2 for preservative oils containing water-repellent components.

b. Treatment:

(1) Open tank, cold dip method, and conform to the applicable requirements of the NWMA nonpressure treating practice for architectural woodwork.

(2) All machine work on lumber shall be completed before dipping.

(3) Treatment shall consist of complete immersion in the solution for a period of three (3) minutes.

(4) Products requiring assembly with glue shall be glued up prior to treatment.

c. Drying: All items treated with preservative shall dry a minimum of seventy-two (72) hours before application of any finish treatment.

d. Stamp or Certificate:

(1) A stamp or brand shall be provided on all treated material to certify compliance with the foregoing requirements.

(2) Where a stamp or brand is impractical, a notorized certificate from the treater will be accepted.

e. Field Touch-Up: All surfaces of treated material which are exposed by cutting operations subsequent to the initial preservative treatment shall be treated by redipping or copiously brushing such cut surfaces with the same preservative used for the original treatment.

B. Water-Repellent Type, Pressure Method:
   a. Preservative: Water-borne preservative conforming to the applicable requirements of AWPA Standard P5.
   b. Pressure Treatment: Conform to the applicable requirements of AWPA Standards C1, C2 and/or other applicable AWPA Standards. Minimum retention of the preservatives shall conform to the values specified in the above Standards; these values may vary from 0.30 to 0.75 lb. per cubic foot depending on the exact preservative used.
   c. Drying: Same as for Cold Dip Method.
   d. Stamp or Certificate: Same as for Cold Dip Method.
   e. Field Touch-Up: Same as for Cold Dip Method.

C. Creosote Type, Pressure Method:
   a. Preservative: Creosote oil conforming to applicable requirements of AWPA Standard P1.
   b. Pressure Treatment: Conform to applicable requirements of AWPA Standard C1, using full cell process to produce minimum retention of 8.0 lb. of creosote per cubic foot (unless otherwise indicated in the Job Specification).
   c. Field Touch-Up: Same as for Cold Dip Method.

Revision Note: This Form 1790-E, dated 11-15-63, supersedes Form 1790-D. Specification changed from Specification for Painting to Specification for Prime Coat Painting (only), and completely rewritten.

ATTACHMENT 6B

SARGENT & LUNDY
ENGINEERS
CHICAGO

Project: 3614-16

Spec. No. 75-V-2
Issue: Revised for Purchase Order, 10-06-76

PURGE DAMPERS
FORT ST. VRAIN - UNIT 1
PROJECT 90 - 330 MWe HTGR
GENERAL ATOMIC, INC.

APPROVAL PAGE

NUCLEAR SAFETY RELATED ITEMS ARE PART OF THIS SPECIFICATION

	Issue		Prepared by	Date	Reviewed by	Date	Approved by	Date
	Purpose	Date						
A	Purchase	04-27-76	W K Brown	04-27-76	R. Dhalji	04-27-76	C W Peterson	04-27-76
	Addendum 1	05-03-76	W K Brown	05-03-76	R. Dhalji	05-03-76	D. L Leone	05-03-76
B	Revised for Purchase Order per FCN-554	10-06-76	W K Brown	10-06-76	W H Miller Jr	10-06-76	D. L Leone	10-06-76

NUCLEAR SAFETY RELATED
Project: 3614-16

SARGENT & LUNDY
ENGINEERS
CHICAGO

Spec. No. 75-V-2
Issue: Revised for Purchase Order, 10-06-76

PURGE DAMPERS
FORT ST. VRAIN - UNIT 1
PROJECT 90 - 330 MWe HTGR

ISSUE SUMMARY

Purpose of Issue	Date	Pages Affected
Com - Spec. 75-V-1 issued for Buyer's Comments	04-23-76	All
Purchase - Spec. 75-V-2 issued for purchase	04-27-76	All
Addendum 1 - Spec 75-V-2	05-03-76	2-1 (Section)
Revised for Purchase Order per FCN-SL-554	10-06-76	All

Spec. No. 75-V-2
Issue: Revised for Purchase Order, 10-06-76

PROPOSAL PRICES FOR PURGE DAMPERS FORT ST. VRAIN - UNIT 1 PROJECT 90 - 330 MWe HTGR

BUYER: GENERAL ATOMIC, INC.
OWNER: PUBLIC SERVICE COMPANY OF COLORADO

Name of Seller: American Warming & Ventilating Co.

		(Insert all prices in this column)
1.	TOTAL PRICE for all Purge Dampers, complete with operators and accessories as specified, furnished and delivered f.o.b. Factory.....	$ 20,397.00
1.1	Number of Dampers included in Total Price.....	Seven
2.	The breakdown of the above total (under 1) price includes the following items:	
2.1	Equipment (including freight).....	$
2.2	The cost (not included under 2.1) included in the Total Price for seismic qualification and documentation for equipment as specified in Article 302 of the Specification.....	$ 500.00
2.3	The cost (not included under 2.1) included in the Total Price for preparing and submitting Quality Control documentation as specified in Article 113 of the Specification.....	$ 150.00
2.4	Total Freight included in above equipment costs (2.1).....	$ Frt. Prepaid & Added

Proposal Prices for
Purge Dampers, Cont.
Fort St. Vrain - Unit 1
Project 90 - 330 MWe HTGR

75-V-2
Revised for Purchase Order,
10-06-76

Name of Seller: American Warming & Ventilating Co.

3. UNIT PRICES	(Insert all prices in these columns) Damper Area (ft^2)									
	0.5	1.0	2.0	4	5	6	7	8	9	10
3.1 The following are unit prices by which the Seller agrees to furnish additional Purge Dampers (without operators) and accessories as specified, furnished and delivered f.o.b. Fort St. Vrain Nuclear Power Station:	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Name of Seller: American Warming & Ventilating Co.

UNIT PRICES, Cont.	(Insert all prices in these columns)	
	Add	Deduct
3.2 The following are unit prices by which the Seller agrees to add or delete operators and accessories after award, furnished and delivered f.o.b. Fort St. Vrain Nuclear Power Station:	NA	NA
a. Pneumatic Operators, Spring Return, 2 Position Without Pilot Positioner: (Contractor to insert Manufacturer and Model No. of each operator supplied below).....	NA	NA
b. Solenoid Valves (each).....	NA	NA
c. Position Switches (each).....	NA	NA
d. Pilot Positioner.....	NA	NA
4. PER DIEM cost (including travel, board and room) of the services of Contractor's competent service engineer for field checkout, adjustment and repair of Purge Dampers during plant preoperational tests as requested by Purchaser....($/day)	$ 200.00	
5. ESCALATION		
5.1 A firm price will be considered more favorably in the analysis of prices. Is the above price firm? (Answer Yes or No).....	Yes	
5.2 If Seller cannot quote a firm price, he shall list in detail in his proposal the exact terms of his escalation clause. The Escalation Clause shall be based on a published Index or a stated percent of the base price. (Indicate percent or index).....	None	
5.3 Maximum number of months that escalation clause will remain in effect if Buyer delays shipment....	None	
6. CONFORMITY WITH SPECIFICATION DOCUMENTS Seller hereby certifies that he agrees to all provisions of the Specification Documents unless exceptions are specifically and clearly listed in the proposal and identified as Exceptions. Seller's printed terms and conditions are not considered specific exceptions. Any exceptions which Seller has taken are listed on Page.....	None	

Name of Seller: American Warming & Ventilating Co.

	(Insert all prices in this column)
7. SELLER hereby agrees that his printed General Conditions, Conditions of Sales or similar material, do not form part of this proposal.....	Yes

American Warming & Ventilating Co.
c/o Air Filter & Equipment Corp.

Signature of Seller

10-06-76
Date of Bid

Spec. No. 75-V-2
Issue: Revised for Purchase Order 10-06-76

PROPOSAL DATA FOR PURGE DAMPERS FORT ST. VRAIN - UNIT 1 PROJECT 90-330 MWe HTGR BUYER: GENERAL ATOMIC, INC. OWNER: PUBLIC SERVICE COMPANY OF COLORADO

Name of Seller: American Warming & Ventilating Co.

		(Insert all data in these columns)		
1.	CERTIFIED DRAWINGS Time required after receipt of this procurement specification (75-V-2) before certified drawings as called for in the Specification will be submitted for review:	Required Schedule	Seller's Earliest Schedule	
1.1	General arrangement and principal dimensions of the equipment.....(weeks)	May 6, 1976	4 Weeks	
1.2	Piping details and dimensions for external connections.....(weeks)	May 6, 1976	4 Weeks	
1.3	Outline dimensions and mounting details of control and electrical equipment.....(weeks)	May 6, 1976	4 Weeks	
2.	POINTS OF SHIPMENT.....	Waldron, Ohio		
3.	SCHEDULE	Delivery Required	Earliest Delivery Seller Can Meet	
3.1	Isolation Dampers.....	As Soon As Possible	6-30-76	
4.	DOCUMENTATION Time required after receipt of this procurement specification before documents as called for in the Specification will be submitted for review.		6 Weeks	
4.1	Quality Control Procedures.....(weeks)	May 6, 1976	4 Weeks	
4.2	Quality Control Test Reports.....(weeks)	See Article 113	3 Weeks	
4.3	Seismic Qualification Documentation..(weeks)	See Article 302	6 Weeks	
5.	DAMPER PHYSICAL DATA (Assembly)	Multileaf	Multileaf	Multileaf
5.1	Guaranteed Typical Construction Data (Seller to Supply data for typical isolation dampers):			
a.	Damper size (in. diameter or in. height x in. length).....	60Wx24H	54Wx24H	36Wx24H
a1.	Shipping weight.....(lb)	410	350	300
a2.	Operating weight.....(lb)	380	330	270

Name of Seller: American Warming & Ventilating Co.

DAMPER PHYSICAL DATA (Assembly), Cont.	(Insert all data in these columns)		
	75402,03, 04&07 Multileaf	75482 Multileaf	75483&84 Multileaf
b. Body Material:			
b1. Type.....	Galv. Steel	→	→
b2. ASTM Designation.....	A-526	→	→
b3. Thickness.....(in)	10 Ga.	→	→
c. Blade Material:			
c1. Type.....	Galv. Steel	→	→
c2. ASTM Designation.....	A-527	→	→
c3. Thickness.....(in)	14 Ga.	→	→
d. Shaft Material:			
d1. Type.....	C.R. Steel	→	→
d2. ASTM Designation..... AISI	1008/1018	→	→
d3. Diameter.....(in)	1-1/4"	1"	1"
e. Bearings:			
e1. Type.....	Oil Impregnated Bronze		
e2. Manufacturer.....	Boston Gear	→	→
e3. Model No.	FB2024-10	FB1620-6	→
e4. Type of lubrications.....	Oil	Oil	Oil
e5. Designation of manufacturer's recommended lubricant.....	NA	NA	NA
e6. Manufacturer's recommended frequency of relubrication.....(mo.)	NA	NA	NA
e7. Radiation resistance.....(rads)	$1x10^6$	$1x10^6$	$1x10^6$

Name of Seller: American Warming & Ventilating Co.

DAMPER PHYSICAL DATA (Assembly), Cont.	(Insert all data in these columns)		
	75402,03, 04&07 Multileaf	75482 Multileaf	75483&84 Multileaf
f. Blade and Jamb Seals:	9343 Neoprene Sponge		
f1. Type.....	EPT Wedge on Jambs		
f2. Manufacturer's designation.....	NA	NA	NA
f3. Contractor's designation (if applicable)..	NA	NA	NA
f4. Contractor's estimated life based on design conditions.....(yrs)	10	10	10
f5. Radiation resistance.....(rads)	$1x10^5$	$1x10^5$	$1x10^5$
g. Flanges:			
g1. Type.....	Galv. Steel →		
g2. ASTM Designation.....	A-526 →		
g3. Thickness.....(in)	10 Ga. →		
g4. Width.....(in)	2-1/2 →		
g5. Method of attachment to damper body.....	Weld →		
g6. Number of bolt holes.....	40	28	24
g7. Size of bolt holes.....	7/16	7/16	7/16
h. Damper Operators - Air			
h1. Manufacturer.....	Masoneilan	NA	NA
h2. Model.....	Reverse Acting 18L	NA	NA
h3. Type.....(Verify Spring Return)	Yes	NA	NA
h4. Maximum torque required to move largest damper driven by operator at 5 in. W.G. S.P. and design air velocity.....(ft-lb)	400	NA	NA

Name of Seller: American Warming & Ventilating Co.

DAMPER PHYSICAL DATA (Assembly), Cont.	(Insert all data in these columns)		
	75402,03, 04&07 Multileaf	75482 Multileaf	75483&84 Multileaf
h5. Air pressure to actuate.....(psig)	3-15	NA	NA
h6. Maximum spring torque developed by operator.....(ft-lb)	433	NA	NA
h7. Total number of operators of this size proposed.....	Seven	NA	NA
h8. Radiation resistance.....(rads)	$1x10^6$	NA	NA
h9. Pilot positioner Model No.	7400	NA	NA
i. Damper Position Switches:			
i1. Manufacturer.....	NAMCO		
i2. Type.....	EA740-20100		
i3. Voltage rating.....(V)	120		
i4. Inductive current at 120 V ac.....(A)	20 Amps at .75 PF		
i5. Power consumption..... ..(W)	NA		
i6. Contact separation.....(in)	1/8 Per Contact		
i7. Number of switches.....	Two/Panel		
i8. Number of N.O. and N.C. independent contacts.....	One		
i9. Radiation resistance.....(rads)	$1x10^8$		
j. Solenoid Valves:			
j1. Manufacturer.....	ASCO		
j2. Type.....	HT-8320A175		

Name of Seller: American Warming & Ventilating Co.

DAMPER PHYSICAL DATA (Assembly), Cont.	(Insert all data in this column)
j3. Voltage rating.....(V ac)	120
j4. Coil class.....	H
j5. Body rating.....(psi)	500
j6. Orifice size.....(in)	3/32
j7. Power consumption.....(VA)	10.5
j8. Radiation resistance.....(rads)	4×10^5

Proposal Data for
Purge Dampers, Cont.
Fort St. Vrain - Unit 1
Project 90-330 MWe HTGR

Name of Seller: American Warming & Ventilating Co.

6. PERFORMANCE DATA	(Insert all data in these columns)						
6.1 Damper No(s).....	V-75402	V-75403	V-75404	V-75407	V-75482	V-75483	V-75484
	DV-75298	DV-75299	DV-75300	DV-75303	DV-75363	DV-75364	DV-75365
6.2 Damper Dimensions (W x H).....(in x in)	60 x 24	60 x 24	60 x 24	60 x 24	54 x 24	36 x 24	36 x 24
6.3 Leakage at 5 in. H_2O differential.....(cfm)	60	60	60	60	-	-	-
6.4 Leakage at 2 in. H_2O differential.....(cfm)	-	-	-	-	55	35	35
6.5 Closing time max.....(sec)	10 →						
6.6 Opening time max.....(sec)	10 →						
6.7 Velocity through free area.....(fpm)	2120	2120	2120	2120	2356	1833	1833
6.8 Pressure drop across fully opened damper at design flow at 0.060 lb/ft^3 density.....(in H_2O)	.5	.5	.5	.5	.5	.5	.5
6.9 Natural frequency of the damper assembly.....(Hertz)	21.2	21.2	21.2	21.2	18	44	44

Name of Seller: American Warming & Ventilating Co.

	(Insert all data in this column)
7. SEISMIC DESIGN	
7.1 Will each damper assembly meet the Seismic Design Specification, yes or no.....	Yes
7.2 Method employed to determine the static forces that the equipment will withstand. (Calculation, Test, or Report Attached).....	Calculation
7.3 State the maximum horizontal and vertical force that the equipment will withstand with no loss of function:	
a. Horizontal.....(g)	1.0
b. Vertical.....(g)	1.0

8. Contractor shall list here or attach hereto on page(s) NONE any additions or deletions required to Specification 75-V-2, Article 113.

9. SPECIAL PROPOSAL REQUIREMENTS
In addition to the complete Proposal Prices and Proposal Data Forms, Seller shall furnish the following with his bid:

9.1 Seller shall attach to his proposal general arrangement drawings of the damper assemblies showing components and overall dimensions. The drawings shall also include body thickness, flange size and thickness, number and size of bolt holes and flange to flange dimensions as specified in Article 204. Proposal shall be submitted by May 6, 1976.

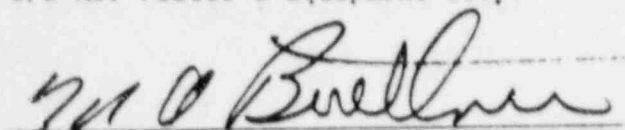
9.2 List of materials with Teflon: NONE

9.3 Quality Assurance Program with Quality Control Procedures as specified in in Articles 113 and 205.

9.4 Shop Test procedures.

9.5 Catalog information on the dampers and all accessories.

American Warming & Ventilating Co.
c/o Air Filter & Equipment Corp.



Signature of Seller

10-6-76
Date of Proposal

NUCLEAR SAFETY RELATED
Project: 3614-16

SARGENT & LUNDY
ENGINEERS
CHICAGO

Spec. No. 75-V-2
Issue: Revised for Purchase Order, 10-06-76

SPECIFICATION FOR

PURGE DAMPERS

FORT ST. VRAIN - UNIT 1
PROJECT 90 - 330 MWe HTGR

PROFESSIONAL ENGINEERS CERTIFICATION

I certify that this Specification was prepared under my supervision and that I am a registered professional engineer under the laws of the State of Colorado.

Certified by: [signature] Date: April 27, 1976

REGISTRATION NO: 7810

Seal

Revision: Revised for Purchase Order Certified By: [signature] Date 10/6/76

PURGE DAMPERS
FORT ST. VRAIN - UNIT 1
PROJECT 90-330 MWe HTGR
GENERAL ATOMIC COMPANY

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SPECIFICATION FOR PURGE DAMPERS

DIVISION 1 - GENERAL REQUIREMENTS

101. BUYER: GENERAL ATOMIC COMPANY.

102. NAME OF PROJECT: FORT ST. VRAIN - UNIT 1
PROJECT 90-330 MWe HTGR

103. OWNER: PUBLIC SERVICE COMPANY OF COLORADO.

104. LOCATION OF PROJECT

Project Site: The Project Site is located in Weld County, Colorado about four miles northwest of Platteville, Colorado, just south of the confluence of the St. Vrain Creek and the South Platte River.

Site Elevation: Grade at the plant will be approximately 4,790 feet above mean sea level.

105. DELIVERY FACILITIES

See Shipping Information on Purchase Order #598896 transmitted under separate cover.

106. TRANSPORTATION FACILITIES

The east side of the station property is adjacent to U. S. Highway 52. An access road capable of supporting H20 Highway loading will extend from the highway to the station. All equipment shall be delivered by truck to the station.

107. SCOPE OF WORK

Contractor shall design, develop, manufacture, test, furnish and deliver f.o.b. to the above station Safety-Related Purge Dampers with operators and accessories as called for in the Damper List and specified herein.

108. WORK BY OTHERS

108.1 The following related work will be performed by others:

a. Unloading and erection of dampers.

b. Furnishing and installation of all air piping external to damper assemblies.

c. Furnishing and installation of all concrete pads, matching flanges, anchor bolts and grouting as may be required.

d. Furnishing and installation of all conduit, controls, and wiring external to the damper assemblies.

e. Buyer will conduct a damper cycling test in the field after installation as a part of system testing.

109. SCHEDULE

Dampers shall be delivered to the site as soon as possible but not later than June 24, 1976.

110. DEFINITIONS

110.1 The term safety-related is used in this Specification to designate systems, subsystems or pieces of equipment that comprise systems that are required to accomplish the safe shutdown of the nuclear power plant or that are required to operate following a postulated accident.

110.2 Wherever the term "Job Specification" appears in Sargent & Lundy's Standard Specifications or Forms, it shall be construed to mean "Project Specification".

110.3 All reference to American Society for Testing and Materials (ASTM) Standard Specifications, other similar standard publications, and applicable supplements are to the latest issue of each as of the date of this contract.

110.4 Whenever the words, "Purchaser" and "Contractor" appear in the Specification Documents, they shall be construed to mean "Buyer" and "Seller", respectively.

111. SPECIFIED PRODUCTS AND SUBSTITUTIONS

Mention of materials or components by name as products of certain manufacturers in this Specification is made to insure that the proper quality and/or type is provided. Products of other manufacturers will be acceptable if Seller furnishes proof to the Consulting Engineers that the proposed substitute products are equal to or better than the specified products in quality, performance, design and suitability for the intended use.

112. ORIGIN OF COMPONENTS

The WORK shall not include any components manufactured outside the U.S.A. unless specifically agreed upon in writing by the Buyer or the Consulting Engineers. If foreign manufactured components are included in the WORK without prior approval, Seller shall, upon notice in writing, replace them at his own expense including installation, and he shall be liable to the Buyer for any damage to the Owner's plant and any losses due to any delay caused the Buyer by such replacement.

113. QUALITY ASSURANCE AND CONTROL

113.1 Quality Program

a. The Seller shall have a Quality Assurance Program consistent, as appropriate, with the requirements of 10CFR50, App. B, that will assure that

the equipment furnished will meet the requirements of this Specification. (A Quality Assurance Program in accordance with ANSI-N45.2 will satisfy the requirements of 10CFR50 Appendix B.) The Seller shall submit a detailed summary of his Quality Assurance Program to permit an evaluation of controls imposed on his production sequences. The Seller shall impose his Quality Assurance program on all subvendors as may be appropriate.

b. All material and services specified herein shall be considered safety related and will require the necessary documentation.

113.2 Inspection Program

a. The Seller's inspection program shall allow for the necessary personnel and procedures to inspect, test, and document this manufacturing process. Product inspections and examinations required by applicable codes, specification and schedules shall employ the proper method and techniques to meet the specified acceptance standards.

113.3 Vendor Procurement Control

a. The Seller shall ensure that the requirements of this Specification and all other related documents are a part of any order purchased from his subvendor. Copies of purchase documents which invoke the requirements of this Specification are required to be at the location where any work, fabrication or processes are being performed.

113.4 Source Inspection

a. The Owner/Buyer shall have free access to the Seller's plant at all times to witness or verify, or to observe any processes, procedures, inspections or tests required by this Specification. These representatives shall have the right to any information regarding engineering, procurement, scheduling and production. The Seller shall provide whatever personnel, facilities, test equipment, tools, or instruments are necessary to facilitate any inspection or survey. The purpose of these inspections/surveys is to assure that nonconforming material/equipment is not shipped to the job site. These inspection/surveys do not relieve the Seller of his obligation to conduct an adequate inspection of his own, nor does it relieve the Seller of his obligation regarding nonconforming material/equipment missed by such inspections. Any nonconformances dispositioned "Use As Is" or "Repair" shall be submitted to the Owner/Buyer for final acceptance.

113.5 Shop Tests

a. The Owner or his representative shall at his discretion witness all testing required by this Specification. The Seller shall notify Buyer at least 5 working days in advance of Shop Testing, if specified. The Seller shall request approval for any deviations or limitations he intends to make in conducting the required tests.

b. Inspection or audit by the Owner or his representative in no way relieves the Seller of his responsibility to provide equipment/material totally in compliance with this Specification.

113.6 Documentation

a. At time of final shipment, all documentation required by the applicable codes and standards, and that specifically required by this Specification shall be available for review by the Purchaser/Owner.

b. Final site acceptance of the equipment shall be contingent upon the receipt, at the site, of all required documentation.

c. All documentation shall be clear, legible, and suitable quality for microfilming and/or storage for the life of the plant.

113.7 Preventative Maintenance

a. The Seller shall submit his procedures for preventative maintenance planned during manufacture/fabrication with recommended maintenance for all material/equipment in storage at the site. The procedures shall include:

a1. Frequency of inspection/maintenance.

a2. Types of preservation - coatings, desiccants, etc.

a3. Type of inspections such as:

a3.1 Visual.

a3.2 Equipment rotation.

a3.3 Environmental protection.

a3.4 Insulation checks.

a3.5 Startup cautions.

113.8 Control Procedures

The detailed control procedures that must be submitted for review shall be in accordance with Article 205.

114. SPARE PARTS

114.1 After award and one (1) month prior to shipment of equipment, Seller shall submit a Recommended Spare Parts Quotation. The Recommended Spare Parts Quotation shall:

a. Be submitted in ten (10) copies to the Buyer, and three (3) copies to Sargent & Lundy.

b. Be inclusive for and applicable to all equipment components, auxiliaries, accessories and materials being furnished under the Contract.

c. Include for each recommended spare part the unit price, quantity, description, catalog number drawing reference(s), etc., to completely identify the item and the equipment component for which it is recommended.

114.2 The quotation shall be based upon furnishing the parts f.o.b. Ft. St. Vrain Nuclear Power Station. Seller shall indicate the point of shipment and the amount included for freight charges.

115. PACKAGING, SHIPPING, STORAGE, ETC.

115.1 The Contractor shall adequately prepare and package all of the equipment for shipment and for storage in an unheated warehouse at the project site. Flanges, openings and nozzles shall be adequately sealed and protected during shipment to prevent corrosion, entrance of foreign matter and possible damage from rough handling during transit. All exposed machined surfaces shall be protected with a suitable antirust compound before shipment.

115.2 All items shall be clearly identified both on the equipment and on the exterior of the packaging with a securely fastened weatherproof tag labeled with Purchaser's purchase order number 598896 and FCN No. 554, equipment item number and service, and this Specification Number 75-V-2.

115.3 Each damper shall be shipped to the station in one section. Each shall be packaged in suitably reinforced crates or containers to allow vertical lifting on end without damage due to twist or other deflection. Lifting hooks shall be provided on container ends. Each crate shall be protected from weather during transit.

PURGE DAMPERS
FORT ST. VRAIN - UNIT 1
PROJECT 90-330 MWe HTGR

DIVISION 2 - SUPPLEMENTS, STANDARDS AND DRAWINGS

201. SUPPLEMENTS
The following are attached hereto and form a part hereof:

201.1 Buyer's Terms and Conditions of Purchase (Included with Purchase Order No. 598896 transmitted under separate cover.)

201.2 Shipping Information (Included with Purchase Order No. 598896 transmitted under separate cover.)

201.3 Equal Opportunity Compliance (Form 566; Rev. 2/68).

201.4 Damper List (dated 4-27-76).

202. STANDARDS (CONSULTING ENGINEERS')
The following are attached hereto and form a part hereof:

202.1 Form 322 - Standard Specification for HVAC Dampers.

202.2 Form 1790-E - Standard Specification for Prime Coat Painting.

203. DRAWINGS (CONSULTING ENGINEERS')

203.1 M-112 Turbine Plant HVAC System Plans & Sections

203.2 M-109 Turbine Plant HVAC System Plans

203.3 M-103-3 Control Room Complex Purge Damper Arrangement (Rev. B, 5-3-76)

204. DRAWINGS AND DATA (SELLER'S)

204.1 By May 6, 1976, Seller shall submit to the Consulting Engineers, Buyer, and Owner for review, drawings and data as follows and in accordance with Article 205.

a. Drawings showing the general arrangement and principal dimensions of the dampers including cross-sections through the equipment.

b. Drawings of mechanical components of damper operator including the solenoid valve(s) and limit switches.

c. Loading diagrams and foundation and anchor bolt requirements for dampers.

d. Seller shall submit shop detail drawings of all pieces of equipment including damper position switches and operators. These drawings shall indicate electrical and pneumatic connections.

e. Other detail drawings as the Consulting Engineers may require.

204.2 Separate drawings as specified in Article 204.1 above shall be prepared for each damper which reflect the actual design and arrangement of equipment for this project. Seller's standard drawings will not be acceptable.

204.3 Drawings and data shall be submitted in quantity and in the form as specified in Article 205. Distribution of correspondence, drawings and data shall be made in accordance with Article 204.11.

204.4 It is intended that the Consulting Engineers will review all drawings and data submitted by the Seller, therefore, reference to the terms "approve, approved, approval, etc.", in Standard Specifications included herewith shall be construed to mean "review" or "reviewed".

204.5 Upon completion of final review, all general arrangement drawings, shall be corrected and resubmitted per Article 204.3.

204.6 Seller shall furnish the Buyer with twenty-five (25) and transmitted to Sargent & Lundy for distribution, bound sets of complete instruction books for the erection, operation, testing, lubrication, and maintenance, of the equipment. These books shall completely describe the equipment, in word and with design drawings; they shall also provide maintenance and operating instructions for each specific item (generalized information will not be acceptable) and they shall include such drawings, list, etc., as may be necessary to give Purchasers complete information for the ordering of spare parts and dismantling of equipment. Books shall include complete descriptions and ratings of all accessory electrical equipment, if any, and schematic and wiring drawings of any factory wiring. Instruction books shall have complete testing instructions including operating and calibration instructions for all test equipment. Books shall be issued with shipment of equipment.

204.7 All submittals of drawings and data shall include the Owner, Contractor, Project, Equipment and Specification Number identifying information.

204.8 Engineering details shall be completed one week after receipt of this specification, regardless of shipping date.

204.9 With the proposal, Seller shall submit to the Consulting Engineers, for review, a complete list of suppliers showing the respective equipment and/or service each is furnishing to Seller to form a part of the equipment package.

204.10 All materials shall be fully identified on the drawings with reference to recognized Codes, Standards and Specification i.e., ASTM, ASME, ANSI, etc.

204.11 Distribution of Correspondence, Drawings and Data

The distribution of all correspondence, drawings and data shall be made in accordance with the following:

a. Owner:

J. H. Reader, Resident Engineer
Fort St. Vrain Nuclear Generating Station
Public Service Company of Colorado
P. O. Box 361
Platteville, Colorado 80651

Three (3) copies of all correspondence plus the requirements of Article 205.

b. Buyer:

General Atomic Company
J. M. Waage, Project Manager
Fort St. Vrain Plant
P. O. Box 426
Platteville, Colorado 80651

Attention: P. Krane

Three (3) copies of all correspondence plus the requirements of Article 205.

c. Owner's Fire Protection Consultant:

Proto-Power Management Corp.
P. O. Box 494
Mystic, Connecticut 06355

Attention: R. A. Schaufler
Principal Engineer

One (1) copy of all correspondence plus the requirements of Article 205.

d. Consulting Engineers:

W. G. Hegener
Project Director
Sargent & Lundy
55 E. Monroe Street
Chicago, Illinois 60603

Attention: Mr. D. L. Leone
Project Manager

Four (4) copies of all correspondence plus the requirements of Article 205.

205. SUMMARY OF REQUIRED DATA FROM SELLER

	Seller's Data	Review Copies* and Resubmittal Copies**					Final Copies	
		Owner	Buyer	PPMC≠	Sargent & Lundy		Sargent & Lundy	
		Prints	Prints	Prints	Prints	Sepias	Prints	Sepias
205.1	Proposal prices and proposal data (Ref. PD-1 through PD-7)..	3	3	1	6	-	-	-
205.2	Outline dimensions, including electrical components and cross-sectional drawings with complete parts list (Ref. Art. 204.b).....	3	3	1	11	1	3	1
205.3	Shop detail drawings (Ref. Art. 204.1d)..	-	-	-	-	-	3	1
205.4	Seller's catalog literature including vendored components.....	3	3	1	6	-	-	-
205.5	Certified leakage test documentation. (Ref. Art. 307.2)...	-	-	-	-	-	10	-
205.6	Material Specifications (Ref. Art. 307.1g).....	3	3	1	3	-	1	-
205.7	Final Inspection Reports including visual weld inspection report.	-	-	-	-	-	10	-
205.8	Welding procedures (Ref. Art. 307.1g)	3	3	1	1	-	1	-
205.9	NDE procedures....	3	3	1	1	-	1	-
205.10	Quality assurance program.....	1	3	1	1	-	1	-

*To be submitted one week after receipt of this Specification with proposal.
**To be resubmitted one week after receipt of drawings and Art. 302.3 data returned with comments.
≠PPMC = Proto-Power Management Corp.

Seller's Data		Review Copies* and Resubmittal Copies**					Final Copies	
		Owner	Buyer	PPMC≠	Sargent & Lundy		Sargent & Lundy	
		Prints	Prints	Prints	Prints	Sepias	Prints	Sepias
205.11	Installation, operation and Maintenance Manuals (Ref. Art. 204.6).....	-	-	-	-	-	25	-
205.12	Recommended Spare Parts (Ref. Art. 114)	-	-	-	-	-	3	-
205.13	Recommended Tools (Ref. Art. 301.3).....	-	-	-	-	-	3	-
205.14	Seismic Qualification Documentation (Ref. Art. 302.3).....	-	-	-	-	-	10	-

*To be submitted one week after receipt of this Specification with proposal.
**To be resubmitted one week after receipt of drawings and Art. 302.3 data returned with comments.
≠PPMC - Proto-Power Management Corp.

PURGE DAMPERS
FORT ST. VRAIN - UNIT 1
PROJECT 90-330 MWe HTGR

DIVISION 3 - TECHNICAL REQUIREMENTS

301. GENERAL EQUIPMENT REQUIREMENTS

301.1 General:

a. Each purge damper shall be furnished as a factory assembled unit complete with damper body, connection flanges, shaft, blades or discs, seals, air or operator(s), except for dampers V-75402, V-75403, V-75404 and V-75407 which shall be arranged as indicated on M-103-3.

b. The purge dampers will be used to direct outdoor purge air through the three-room control complex. The dampers will in all cases be mounted in the ducts as shown on Consulting Engineers Drawings referenced in Article 203.

301.2 Service Life:

a. All component material supplied under this Specification shall be capable of a service life of 40 years.

b. All component materials used in the dampers shall be compatible with the radiation exposures and environmental conditions set forth in the Damper List and specified hereinafter. This shall include all metal components, seals, gaskets, lubricants and coatings, such as paints, operators, capacitors, insulation, etc. Contractor shall list in the proposal all teflon materials used in the construction of equipment. All component material used in the dampers shall be compatible with the ambient conditions of 65°F to 120°F dry bulb temperature and 10% to 90% relative humidity unless otherwise listed on the Damper List.

All component material used in operators and accessories shall be compatible with ambient conditions of 65°F to 120°F dry bulb temperature and 10% to 90% relative humidity unless otherwise listed on Damper List.

301.3 Tools: Any special tools required to adjust or dismantle the damper and operator shall be furnished by Contractor. Tools shall be new and of first-class quality. Tools shall be shipped to the job in a suitable separate container, clearly marked with the name of the equipment for which the tools are intended.

301.4 Tagging and Identification: Each unit, and detached components (if any), shall be provided with a metal tag bearing the damper number and location, or service identification shown in the Damper List. Tag

shall also include the design flow rate, and all other factors related to the design performance of the unit. The tag, in each case, shall be securely attached so as to insure against its accidentally coming loose. Seller's drawings and data submitted shall also bear the identification marking for each unit and component.

302. SEISMIC REQUIREMENTS

302.1 All requirements of this Article 302 shall apply to all dampers and components furnished under this Specification.

302.2 Each damper assembly shall be seismically qualified as follows:

a. Seismic Design:

a1. Equipment shall be designed to withstand a horizontal loading of 0.210g in conjunction with a vertical loading of 0.160g within a range of 1 to 33 Hertz. When designing for this loading, the seismic and operating load stress shall be combined without any increase in the normal allowable stresses.

a2. The equipment shall also be capable of withstanding a horizontal loading of 0.420g in conjunction with a vertical loading of 0.32g within a range of 1 to 33 Hertz. For this loading condition it is necessary that the equipment be capable of withstanding the above forces without loss of function. This is to say that the equipment shall withstand the above forces and still be able to operate.

302.3 Documentation
One week prior to shipment, seismic qualification documentation shall be submitted to the Buyer/Owner.

303. DESIGN AND CONSTRUCTION

303.1 General:

a. Dampers shall be designed in accordance with Form 322, Standard Specification for HVAC Dampers.

b. All damper components shall be designed using an allowable stress not exceeding 2/3 (two thirds) of the material yield stress.

c. Corrections to Form 322: Shaft lengths up to 60 inches may be used in lieu of 54-inch, as specified in Form 322.

d. Blade seals shall be manufacturer's standard design, rated for a minimum of 120°F.

e. Seller shall obtain a supplier's letter of conformance for all materials including weld filler material.

f. Damper design shall incorporate integral rigid mounting bracket for the operator and specified accessories.

g. Flanges shall be provided with accurately positioned bolt holes, not less than 7/16 in. diameter for 3/8 in. bolts, located on approximately 4 in. centers, approximately 3/4 in. in from the outside flange dimension.

304. OPERATORS

304.1 General

a. Seller shall provide each purge damper with a pneumatic operator in accordance with isolation, or modulating operation, and failure mode as indicated on the Damper List, and as hereinafter specified.

b. Each operator shall be designed or selected for not less than 125% of the design operating torque or force required by the driven equipment. It shall be Seller's responsibility to determine the required torque for each application taking into account design features of the driven equipment, design flow range, design operating pressures, and flow stream pressure drop.

c. A single actuator shall be furnished for each damper in accordance with Seller's design.

d. Damper operators and accessories shall be factory mounted wherever possible; however, if operators require field mounting for shipping or any other reason, mounting and correct adjustment of dampers shall be supervised by the Seller.

e. The designation of acceptable operator manufacturer and model numbers in no way relieves the Seller of the responsibility of supplying operators that are fully qualified for the specified environments, radiation and seismic criteria.

304.2 Pneumatic Operators

a. Operators for each purge damper shall be as manufactured by Masoneilan, Model 18L, reverse acting, with steel yoke and with Model 7402-802 pilot positioner for modulating dampers or equivalent.

b. Air will be supplied by Buyer at 20 psi minimum and will be instrument quality at 40°F dew point.

c. Operators shall have spring return.

d. Operator torque shall be determined by Seller based on tight shutoff damper design, per Form 322, when closed and dynamic differential pressure from flow and damper characteristics/sizes per the Damper List.

e. Each damper shall have integrally mounted three-way solenoid valve(s) (Model HT-8320A175) with high temperature (Class H) soil for operation on 120 V ac as manufactured by ASCO, as noted on the Damper List.

305. POSITION SWITCHES

Position switches shall be furnished for each damper to detect damper open and closed position. Switches shall be factory mounted. Switches shall be NAMCo Model EA170 with two normally open and two normally closed contacts. Switches shall be designed for industrial/ nuclear service.

306. PAINTING

306.1 All shop welds on galvanized material shall be coated in accordance with S&L Form 1790, Article 13.

306.2 All nongalvanized or nonstainless steel parts of the damper assemblies shall be thoroughly cleaned of all mill scale, rust, grease, and other foreign matter.

306.3 Exterior unfinished surfaces of dampers shall be given one "shop coat" of a flat filler which will serve as a suitable base for enamel. Galvanized material is considered finished. Filler shall be applied in ample quantity and shall be well "rubbed-in" so that coated surfaces will have a smooth, even finish and will require no further attention before being painted. Contractor's standard filler may be used for this purpose. Use of lead based prime coat paint is specifically forbidden.

306.4 Exterior unfinished steel surfaces shall receive a "shop coat" of manufacturer's standard brand of paint suitable for the service intended. This factory finish shall consist of a paint or coating system as follows, with the finish color ANSI #61 Gray.

	Coat	Dry Film Thickness
a.	Shop prime coat.....	2.0 mils
b.	Shop intermediate coat.....	1.5 mils
c.	Shop enamel finish coat.....	1.5 mils
d.	Total System Thickness.....	5.0 mils

307. TESTING

307.1 Factory Testing

The following tests shall be conducted at the factory prior to delivery to the station in the same order as they are listed below:

a. Seller shall perform standard final assembly operating test.

b. Leakage Test

Purge damper leakage shall be qualified by objective evidence based upon AMCA-500 leak test on 48" x 48" damper.

307.2 Documentation shall be submitted to Buyer and Consulting Engineers prior to shipment (Reference Article 205.5).

307.3 Field Testing

a. When the equipment is put into service, Buyer will perform tests to determine whether or not it will meet Seller's guarantees. Seller's representative must be present to witness and assist in the testing of the equipment as requested by the Buyer.

b. Acceptance of the equipment by Buyer on the basis of the above tests will not relieve Seller from responsibility for the operation of the equipment in service, as set forth in the Contract.

SARGENT AND LUNDY. ENGINEERS
CHICAGO, ILLINOIS

FORT ST. VRAIN, FCN-FSV-SL-589, CONTROL ROOM
JOB NO. 3619-16
DATE 10/06/76

DAMPER LIST, SUPPLEMENT TO SPECIFICATION 75-V-2

THIS DAMPER LIST IDENTIFIES ALL THE PHYSICAL FEATURES FOR ALL THE HVAC SYSTEMS DAMPERS EXCEPT FOR THE CHECK TYPE. CHECK DAMPER SPECIFICATIONS ARE PRESENTED IN THE PROJECT SPECIFICATIONS. SPECIFIC DETAILS ARE PRESENTED IN THE FOLLOWING* SARGENT & LUNDY STANDARD SPECIFICATIONS:

FORM 321 HVAC DUCTWORK ACCESSORIES
FORM 322 HVAC DAMPERS

IN ADDITION TO DEFINEMENT OF THE CODES IN THE LIST, THE FOLLOWING ITEMS ARE FURTHER CLARIFIED:

1 A LETTER ON THIS LINE INDICATES THAT A CHANGE HAS BEEN MADE TO THIS SPECIFIC DAMPER SINCE THE PREVIOUS ISSUE OF THE LIST. ALL PREVIOUS REVISIONS ARE CLEARED, AND THE MOST RECENT REVISION IS INDICATED WITH THE REVISION DATE IN THE TITLE BOX.

2 REFER TO S & L STANDARD MF-270.10-1 FOR AN EXPLANATION OF THE EQUIPMENT NUMBER.

5 DAMPERS ARE TO BE PURCHASED UNDER THIS SPECIFICATION NUMBER, AND FURNISHED TO THE HVAC CONTRACTOR (IDENTIFIED BY SPECIFICATION 1-39) FOR INSTALLATION.

6 IF YES, THEN OPERATOR ONLY REQUIRED.
IF NO, THEN BOTH THE DAMPER AND OPERATOR REQUIRED UNDER ITEM 5.

9 LEAKAGE REQUIREMENTS SHALL BE AS STATED IN FORM 322 UNLESS NOTED OTHERWISE IN THIS LIST.

10 FOR RECTANGULAR DAMPERS "W" IS THE LENGTH PARALLEL TO THE BLADE AXIS.

12 NOMINAL VELOCITY IS BASED ON THE INSIDE DAMPER FRAME DIMENSIONS, AND DOES NOT ACCOUNT FOR INTERNAL OBSTRUCTIONS.

13 WHENEVER "SEE STD SPEC" IS INDICATED IT REFERS TO THE MAXIMUM DESIGN TEMPERATURE (AIR SIDE OR AMBIENT, WHICHEVER IS GREATER) STATED IN FORMS 321 & 322.

14 WHENEVER "SEE STD SPEC" IS INDICATED IT REFERS TO THE MAXIMUM DESIGN AMBIENT PRESSURE (NOT DIFFERENTIAL) STATED IN FORMS 321 AND 322.

17 FIRE CLASSIFICATIONS PER UNDERWRITERS' LABORATORIES STANDARD 555.

18 E6 MEANS 1 X 10 RAISED TO THE 6TH POWER, E8 MEANS 1 X 10 TO THE 8TH POWER, ETC.

19 SEISMIC: REFERS TO SEISMIC QUALIFICATION AS DEFINED IN THE PROJECT SPECIFICATION 75-V-2.

20 THE SPECIAL OPERATOR FOR FIRE DAMPERS REFERS TO THE EXTERNAL FUSIBLE LINK CONTROL AS SPECIFIED IN FORM 321.

23 APPLICABLE FOR THOSE DAMPERS PURCHASED WITHOUT AN OPERATOR BY OTHER THAN THE CONTROL CONTRACTOR.

SARGENT AND LUNDY. ENGINEERS
CHICAGO. ILLINOIS

FORT ST. VRAIN. FCN-FSV-SL-589. CONTROL ROOM
JOB NO. 3619-16
DATE 10/06/76

DAMPER LIST
(SEQUENCED BY EQUIPMENT NUMBERS)

1. REVISION	DV-75298	DV-75299	DV-75300	DV-75303	DV-75363
2. EQUIPMENT NUMBER	V75402	V75403	V75404	V75407	V75482
3. DRAWING NUMBER	M-112	M-112	M-112	M-112	M-112
4. SYSTEM	CONTROL ROOM HVAC	CONTROL ROOM HVAC	CONTROL ROOM HVAC	CONTROL ROOM HVAC	CONTROL ROOM HVAC
5. SPECIFICATION NO.	75-V-2	75-V-2	75-V-2	75-V-2	75-V-2
6. FURNISHED WITH EQUIPMENT	NO	NO	NO	NO	NO
7. TYPE OF DAMPER	PARALLEL	OPPOSED	OPPOSED	OPPOSED	OPPOSED
8. FUNCTION	ISOLATION	MODULATION	MODULATION	MODULATION	MODULATION
9. LEAKAGE DESIGN	TIGHT SHUTOFF	TIGHT SHUTOFF	TIGHT SHUTOFF	TIGHT SHUTOFF	TIGHT SHUTOFF
10. SIZE, INCHES	60.(W) X 29.(H)	60.(W) X 29.(H)	60.(W) X 29.(H)	60.(W) X 29.(H)	59.(W) X 29.(H)
11. AIR QUANTITY, CFM	21200.	21200.	21200.	21200.	21200.
12. NOMINAL AIR VELOCITY, FPM	2120.	2120.	2120.	2120.	2356.
13. MAX. DESIGN TEMP., F	SEE STD SPEC	SEE STD SPEC	SEE STD SPEC	SEE STD SPEC	SEE STD SPEC
14. MAX. DESIGN PRESS., PSIG	SEE STD SPEC	SEE STD SPEC	SEE STD SPEC	SEE STD SPEC	SEE STD SPEC
15. DIRECTION OF AIR FLOW	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	VERT. UP
16. BLADE SHAFT POSITION	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL
17. FIRE CLASSIFICATION	NONE	NONE	NONE	NONE	NONE
18. RADIATION RESISTANCE, RADS	E3	E3	E3	E3	E3
19. SEISMIC CLASSIFICATION	SEISMIC	SEISMIC	SEISMIC	SEISMIC	SEISMIC
20. TYPE OF OPERATOR	PNEUMATIC (SPRING RETURN)	PNEUMATIC (SPRING RETURN)	PNEUMATIC (SPRING RETURN)	PNEUMATIC (SPRING RETURN)	PNEUMATIC (SPRING RETURN)
21. DAMPER FAILURE MODE	FAIL OPEN	FAIL OPEN	FAIL CLOSED	FAIL CLOSED	FAIL OPEN
22. OPERATOR POWER SERVICE	20 PSI	20 PSI	20 PSI	20 PSI	20 PSI
23. TORQUE, IN-LBS					
24. LIMIT SWITCHES REQ'D	YES	YES	YES	YES	YES
25. NO. OF SOLENOIDS REQ'D	1	1	1	1	2

SARGENT AND LUNDY, ENGINEERS
CHICAGO, ILLINOIS

FORT ST. VRAIN, FCN-FSV-SL-589, CONTROL ADD
JOB NO. 3619-16
DATE 10/06/76

DAMPER LIST
(SEQUENCED BY EQUIPMENT NUMBERS)

1. REVISION	DV-7536A	DV-7536S
2. EQUIPMENT NUMBER	V75483	V75489
3. DRAWING NUMBER	M-109	M-109
4. SYSTEM	480V SWGR RM	480V SWGR RM
5. SPECIFICATION NO.	7S-V-Z	7S-V-Z
6. FURNISHED WITH EQUIPMENT	NO	NO
7. TYPE OF DAMPER	PARALLEL	PARALLEL
8. FUNCTION	ISOLATION	ISOLATION
9. LEAKAGE DESIGN	TIGHT SHUTOFF	TIGHT SHUTOFF
10. SIZE, INCHES	36.(W) X 24.(H)	36.(W) X 24.(H)
11. AIR QUANTITY, CFM	11000.	11000.
12. NOMINAL AIR VELOCITY, FPM	1833.	1833.
13. MAX. DESIGN TEMP., F	SEE STD SPEC	SEE STD SPEC
14. MAX. DESIGN PRESS., PSIG	SEE STD SPEC	SEE STD SPEC
15. DIRECTION OF AIR FLOW	HORIZONTAL	HORIZONTAL
16. BLADE SHAFT POSITION	HORIZONTAL	HORIZONTAL
17. FIRE CLASSIFICATION	NONE	NONE
18. RADIATION RESISTANCE, RADS	E3	E3
19. SEISMIC CLASSIFICATION	SEISMIC	SEISMIC
20. TYPE OF OPERATOR	PNEUMATIC (SPRING RETURN)	PNEUMATIC (SPRING RETURN)
21. DAMPER FAILURE MODE	FAIL CLOSED	FAIL OPEN
22. OPERATOR POWER SERVICE	20 PSI	20 PSI
23. TORQUE, IN-LBS		
24. LIMIT SWITCHES REQ'D	YES	YES
25. NO. OF SOLENOIDS REQ'D	1	1

SARGENT & LUNDY
ENGINEERS
CHICAGO

STANDARD SPECIFICATION FOR HVAC DAMPERS (Form 322)

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STANDARD SPECIFICATION FOR HVAC DAMPERS (Form 322)

1. GENERAL

1.1 Conformance: Control dampers and accessories shall conform to the requirements of this Standard Specification and shall satisfy all conditions and requirements set forth in the Project Specification.

1.2 Conflict: In the event of variance between the general requirements delineated in this Standard Specification and the particular requirements set forth in the Project Specification, the Project Specification shall take precedence.

1.3 References: The following references are applicable to the design, manufacture and testing of the equipment included in this Specification and shall form a part of this Specification to the extent specified herein. All references to the following publications are to the latest issue of each, together with the latest additions and/or amendments thereto, as of the date of Contract, unless otherwise indicated; references to the sponsoring agencies will be made in accordance with the abbreviations indicated:

AMCA..... Air Mocing and Conditioning Association

ANSI..... American National Standard Institute

ASTM..... American Society for Testing and Materials

1.4 Trade Standards: The design of all dampers shall be tested in accordance with the requirements of AMCA Standard 500, Test Method for Louvers, Dampers and Shutters in an AMCA approved facility.

1.5 Responsibility: All dampers, except as noted otherwise, shall be furnished by the HVAC Control Subcontractor, or Contractor, and shall be installed by the HVAC Contractor, as defined in the Project Specification. The HVAC Control Subcontractor, or Contractor, shall be responsible for the design, testing and operation of the dampers as herein specified, and shall be responsible for all control interconnections, except that electric wiring 120 volts and greater will be installed by Others.

1.6 Substitutions: Mention of materials by name or as products of certain manufacturers in this Standard Specification or in the Project Specification is made to insure that the proper quality and/or type is provided. Substitutions for said items will be permitted only if approval is granted in writing by the Consulting Engineers. Substitutions must be submitted with the proposal.

1.7 Torque Data: Contractor shall submit torque data for all dampers which are driven with a power operator with his proposal.

1.8 Design Stress: The stress of all components, regardless of minimum material thicknesses specified herein, shall be designed not to exceed 10% of their yield strength under all operating conditions.

2. NUCLEAR PLANT APPLICATION QUALIFICATION

In nuclear plant applications, control dampers are employed in safety-related or essential (Seismic Category I) HVAC systems. Whenever a duct system is identified as Seismic Category I in the Project Specification and/or the Damper List, the control dampers employed therein shall be designed and constructed to meet the applicable seismic and quality assurance and control requirements for safety related equipment as specified in the Project Specification. All design and quality control documentation shall be provided as outlined in the Project Specification.

3. CAPACITY, TYPE AND SIZES

3.1 The type, size, design airflow quantity, and other design features for each damper shall be as tabulated in the Damper List (attached as a supplement to the Project Specification) and as herein specified.

3.2 The Consulting Engineers will be responsible for the correctness of the Damper List; however, the Contractor or Subcontractor shall notify the Consulting Engineers of any conflicts. The Contractor shall be responsible for furnishing all dampers in accordance with Damper List after it is released for construction.

3.3 The Contractor or Subcontractor shall be responsible for furnishing a hydraulic, pneumatic or electric motor operator for each damper as indicated on the Damper List. Operators shall conform to the requirements as specified in Form 340 Standard Specification for HVAC System Controls, or in the Project Specification.

4. BUTTERFLY DAMPERS FOR DUST ELIMINATION SYSTEMS

4.1 General Requirements:

4.1.1 Dampers shall be of the butterfly type consisting of circular or elliptical damper blade, mounted on a shaft within a formed and/or machined flanged frame.

4.1.2 Damper design and construction shall meet the minimum requirements as hereinafter specified, and shall be designed for operation in an airstream of 7000 fpm when the damper is in full open position and a shutoff differential pressure of not less than 15 in. H_2O.

4.1.3 Dampers will be utilized in a dust elimination system handling coal dust, and therefore, the design shall not employ blade stops or other similar projections which would cause a build-up of dust and prevent tight shutoff.

4.2 Construction:

4.2.1 Frames: Damper frames shall be rolled channel or angle frame with through-bolt holes for erection between flanged sections of connecting ductwork. Frame dimensions and material thickness shall be not less than the following:

Damper Diameter, inches	Minimum Size of Frame, inches		
	Flanges	Housing	Frame Width Flange to Flange
11 and less	1-1/4 x 1-1/4 x 1/8	1/8	9
12 to 24	1-1/2 x 1-1/2 x 1/8	1/8	9
25 to 48	2 x 2 x 3/16	1/4	12
49 to 71	2-1/2 x 2-1/2 x 1/4	5/16	12
72 and larger	3 x 3 x 3/8	3/8	12

If damper design employs an elliptical blade, inside diameter of frame shall be machined for close fit of blade, or outside diameter of blade machined for close fit.

4.2.2 Blades: Damper blades shall be single thickness type of circular or elliptical configuration, fabricated from hot-rolled steel. Blades shall be either bolted and tack welded or welded to the shaft and shall be reinforced as may be required to prevent undue deflection and vibration. Blades shall be centered on the shaft. Minimum blade thickness shall be suitable for the flow and pressure, but not less than the following:

Damper Diameter, inches	Minimum Blade Thickness, inches
24 and less	1/8
25 to 48	1/4
49 to 71	3/8
72 and larger	1/2

4.2.3 Shafts: Blade shafts shall be fabricated from solid, cold-rolled steel. Shaft shall extend sufficient distance for attachment of operating linkage or operator. Shaft packing shall be double gland seal with adjustment to be provided just external of the frame for minimizing air leakage.

Shaft diameters shall be suitable for the flow and pressure, but not less than the following.

Damper Diameter, inches	Minimum Shaft Diameter, inches
11 and less	3/4
13 to 24	1
25 to 48	1-1/2
49 to 72	2
73 to 96	2-1/2

4.2.4 Bearings: Shaft shall be supported on sealed ball bearings which can be relubricated, enclosed in a cast iron housing mounted external to the damper housing. Bearing design shall be based on both indoor and outdoor exposure with ambient conditions ranging from -20°F to 122°F.

4.2.5 Linkage: Damper linkage shall be designed for factory mounting of the operator on the damper frame. Linkage shall have toggle lock design to prevent backlash and vibration, unless the operator design is such that backlash is inherently controlled. Linkage, as may be required, shall be of heavy bar stock, which will transmit the design loads without deflecting more than 1/360 between pivot points. Linkage shall be welded to the shaft and pivot points connected with not less than 1/2-inch diameter shoulder bolts and lock nuts. Limit switches shall be furnished when specified in the Damper List in accordance with Article 9.

4.2.6 Seals: Blade seals shall be designed to limit leakage to a maximum of 90 cfm per foot of blade outside perimeter at the design differential pressure of 15 in. H_2O. Blade seals shall be either of a metal-to-metal type seat, or shall utilize a closed cell synthetic material attached to the blade. Seal design shall consider the effects of air velocity to prevent detachment and shall require minimum maintenance. The use of blade stops attached to inside diameter of the damper housing will not be permitted.

4.2.7 Operators: Damper operators shall be mounted by the damper manufacturer. Operators shall be designed for not less than 200% of the required operating torque. Operators shall be hydraulic, pneumatic or electric, as indicated on the Damper List, or in the Project Specifications. Pneumatic operators shall have cushions at both ends to reduce shock.

4.2.8 Coatings: All parts shall be cleaned of mill scale and rust, and then sand blasted to white metal or chemically steam cleaned. All parts, not otherwise protected, shall receive one prime coat and one finish coat of epoxy. Total dry film thickness shall be not less than 4 mils. Alternately, the dampers may be zinc or cadmium plated.

5. BUTTERFLY DAMPERS FOR HVAC SYSTEMS

5.1 General Requirements:

5.1.1 Dampers shall be of the butterfly type consisting of a circular or elliptical damper blade, mounted on a shaft within a formed and/or machined, flanged frame.

5.1.2 Damper design and construction shall meet the minimum requirements as hereinafter specified and shall be designed for the turbulent airflow conditions when mounted approximately one (1) duct diameter downstream of a vaneaxial fan. Minimum design velocity shall be 6000 fpm and the minimum design shutoff differential pressure shall be 10 in. H_2O.

5.1.3 Dampers will be used in HVAC systems conveying filtered, air conditioned, or ventilation air. Blade stops may be considered in the design for perfecting the blade seal.

5.2 Construction:

5.2.1 Frames: Same as Article 4.2.1.

5.2.2 Blades: Same as Article 4.2.2, except that blades do not necessarily have to be centered on the shaft.

5.2.3 Shafts: Same as Article 4.2.3.

5.2.4 Bearings: Same as Article 4.2.4, except that the minimum operating ambient will be 55°F.

5.2.5 Linkage: Same as Article 4.2.5.

5.2.6 Seals: Blade seals shall be designed to limit leakage to a maximum of 30 cfm plus 10 cfm per foot of blade perimeter at 10 in. H_2O differential pressure when tested in accordance with AMCA Standard 500 at an approved facility. Blade seals shall be either of a metal-to-metal type seat, or shall utilize a closed cell synthetic material attached to the blade or blade stop. Seal design shall consider the effects of air velocity to preclude detachment and shall require minimum maintenance.

5.2.7 Operators: Same as Article 4.2.7.

5.2.8 Coatings: Same as Article 4.2.8.

5.2.9 Radiation: On nuclear plants, all materials of construction shall, in addition, be designed to withstand the total integrated radiation dose as specified in the Damper List.

6. GENERAL PURPOSE MULTILEAF DAMPERS

6.1 General Requirements:

6.1.1 Dampers shall be of the parallel or opposed blade type arrangement as indicated in the Damper List.

6.1.2 Parallel blade dampers will be used, in general, for all shutoff duty.

6.1.3 Opposed blade dampers will be used, in general, for all flow modulation duty. If a modulating damper also serves for shutoff duty, it will be opposed blade.

6.2 Construction:

6.2.1 Frame: Damper frames shall be not less than 12-gauge, galvanized steel formed into a channel having not less than a 6-inch web and not less than 2-1/2-inch flanges. Damper frames shall be electric arc welded. Mounting holes shall be not less than 7/16-inch diameters for 3/8-inch diameter bolts located on not less than 8-inch centers.

6.2.2 Blades: Damper blades shall be double-skin airfoil type. Width of blades shall be not greater than 10 inches and not less than 6 inches. Blades up to 42 inches in length (width of damper) shall be fabricated from not less than 16-gauge galvanized steel. Blades greater than 42 inches in length shall be fabricated from not less than 14-gauge galvanized steel. Maximum blade length for a single panel shall be 56 inches. Each blade shall be of two-piece, galvanized steel, formed into an airfoil shape with one side rolled over at the edges and bolted to the center shaft.

6.2.3 Shafts: Blade shafts for damper widths up to 42 inches shall be not less than 3/4 inch diameter cold finished bar. Above 42-inch damper widths, the shaft shall be not less than 1-inch diameter bar. The shafts shall extend the entire length of the blade plus the distance beyond the blade through the frame to the linkage at the exterior side of the damper. The blades shall be through-bolted to the shaft using not less than 1/4-inch diameter bolts and locking fasteners, or tack welded, as required, to prevent the bolts from coming loose.

6.2.4 Linkage: The damper linkage shall be outside the airstream and not less than 1/4-inch x 1-1/4-inch flat, cold finished bar, fixed at hinged points with not less than 1/4-inch diameter shoulder bolts and lock nuts. Linkage shall be tight, vibration free and shall permit no independent action of an individual blade. Linkage hinges of shoulder bolts with lock nuts shall be press-fitted to assure free integral blade action. Dampers with blades 48 inches and longer shall have linkage on each side of the damper. Linkage attached to damper shafts shall be welded. Limit switches, as may be required, shall be furnished as specified in the Damper List in accordance with Article 9.

6.2.5 Bearings:

a. Bearings for all dampers, except as noted below or in the Project Specification, shall be sintered bronze type, pressfitted into the frame and shall have wall thickness of not less than 0.0625-inch.

b. Bearings for dampers located inside the primary containment (system identification code VP) on nuclear power plants shall have sealed ball bearings which can be relubricated, enclosed in a cast iron housing and set on a channel mount which is welded to the damper frame. A packing gland, serviceable without damper removal, shall be installed at each shaft clearance hole in the frame. Lubrication for the bearings shall be either Aero-Schell #5 or Chevron-BRB #2.

6.2.6 Seals: Blade and jamb seals are not required.

6.2.7 Multiple Sections: Dampers larger than 56 inches wide or 72 inches high shall be made up of multiple sections. Design shall be based on through-shaft, jack shaft, or an individual operator for each section, based on operator design by the HVAC Control Contractor or Subcontractor.

6.2.8 Coatings: All factory welds on galvanized material shall be cleaned and coated with a zinc rich paint developing no less than 1 oz^{Zn}/ft^2 of coated surface. Paint shall be Galvanox as made by Subox, Inc. or agreed upon equally.

7. TIGHT-SHUTOFF MULTILEAF DAMPERS

7.1 General Requirements:

7.1.1 Dampers shall be of the parallel or opposed blade type.

7.1.2 Only those dampers which are specifically noted as tight-shutoff in the Damper List shall have blade and jamb seals as hereinafter specified.

7.2 Construction:

7.2.1 Construction shall conform to all requirements for general purpose multileaf dampers, Article 6, except for blade and jamb seals.

7.2.2 Seals: Blade and jamb seals shall be a synthetic closed cell material applied to the blade edges or jambs, respectively. Method of attachment shall be capable of withstanding air velocities up to 6000 fpm.

7.2.3 Leakage: The damper design shall be based on a maximum leakage of 220 scfm at 10 inch H_2O differential pressure for a 48-in x 48-in damper, when tested, in accordance with AMCA Standard 500 at an approved facility.

8. BACKDRAFT DAMPERS

8.1 General Requirements:

8.1.1 Dampers shall be of the gravity actuated type.

8.1.2 Dampers shall be designed to operate for up to 1/2 in. H_2O differential pressure in the direction of flow, and a nominal backpressure up to 1 inch H_2O differential pressure closing the damper. In general, back draft dampers will be installed in plates, thereby simulating orifice type flow. Therefore, the dampers shall be designed such that the inlet pressure loss, internal damper loss, and exit loss are all considered part of the total damper static differential pressure. The design shall be based on the dampers starting to open at 1/8 in H_2O and be full open at 3/8 in H_2O differential pressure.

8.2 Construction:

8.2.1 Frame: Damper frames shall be not less than 14-gauge, galvanized steel formed into a channel having not less [illegible] 3-inch web and 1-1/2 flange.

8.2.2 Blades: Dampers up to 24 x 24 inches [illegible] have a single blade. Dampers larger than 24 x 24 inches sh[illegible] multiple blade. Blades shall be not less than 16-gauge with [illegible]backs and blade stiffeners. Damper blades shall be counterbalanced with field adjustable external counterweight for operating differential pressure range (midpoint pressure) of 1/8 to 1/2-inch W. G. Blade stops shall be positioned on the frame.

8.2.3 Shafts: Blade shafts shall be not less than 1/2 inch diameter, finished bar extending the full damper width and extending outside the frame on each side. Blades shall be through-bolted and/or tack welded to the shafts.

8.2.4 Linkage: Multiple blade dampers shall have blades linked together for operation in unison. Linkage shall be not less than 1/4 x 1 in, flat, cold finished bar, but of sufficient strength to avoid deflection greater than 1/360 of the span. Linkage shall be connected with 1/4 inch diameter shoulder bolts and self-locking nuts. Bolts shall be press-fitted to eliminate slack.

8.2.5 Bearings: Bearings shall be sintered bronze type, press-fitted into the frame and shall have a wall thickness of not less than 0.0625-inch.

8.2.6 Seals: Blades shall be strips of closed cell synthetic material to minimize backflow leakage when the damper is closed.

9. LIMIT SWITCHES

9.1 General: Damper limit switches shall be furnished and installed to indicate both the open and closed position of dampers where indicated in the Damper List or in the Project Specification. Switches shall be the following.

9.2 Operating Description:
Contacts operate as lever is moved clockwise or counter-clockwise. When lever is released, contacts return to original position.

9.3 Acceptable Manufacturers:
Spring Return-Lever Action Switch, National Acme Manufacturing Company Model SL-2C-B2 with one N.O. and one N.C. contact and with operating lever type as required, or agreed upon equal.

10. PAINTING
Motors and other electrical apparatus shall be painted in accordance with the Manufacturer's standard practice suitable for the specified conditions unless otherwise specified.

11. TAGGING AND IDENTIFICATION
Each damper and each operator and detached components (if any) shall be provided with a stainless steel metal tag bearing the equipment number, design flow rate, torque rating, and all other factors related to the design performance of the unit. The tag, in each case, shall be securely attached so as to insure against its accidentally coming loose. Contractor's drawings and data submitted shall also bear the identification marking for each unit and component.

12. SHOP TESTS

12.1 The leakage of all tight closing dampers, constructed to meet the requirements of Article 7, shall be selectively certified by a shop test in accordance with AMCA Standard 500, in an approved facility as indicated by the Consulting Engineers in the Project Specification.

12.2 Contractor shall conduct tests or submit objective evidence certifying the seismic design of all dampers so designated as outlined in the Project Specification.

12.3 Each damper shall be shop tested for torque rating in the static condition. The same dampers tested for leakage shall be tested for dynamic torque ratings simulating the specified flow and pressure condition.

12.4 Contractor shall perform and submit test results to the Consulting Engineers for review all other shop tests as may be called for in the Project Specification.

13. PROTECTION FOR SHIPMENT

13.1 It shall be Contractor's/Subcontractor's responsibility to insure that all dampers are properly packaged and crated to insure protection against damage during shipping and site storage and weather effects during storage. The HVAC Contractor shall receive and inspect all dampers and notify the damper supplier in writing within one week of any damages, etc.

13.2 Dampers which are damaged during transit or storage shall be repaired or replaced at Contractor's/Subcontractor's expense.

13.3 In general, large dampers shall be individually packaged and crated to protect damper blades and linkages from becoming misaligned or bent. Smaller dampers may be crated together consistent with convenient handling. Each crate shall be identified with the damper numbers.

14. PERFORMANCE TESTS

14.1 Shop Tests: The Contractor or Subcontractor shall perform leak tests and submit certified test results to the Consulting Engineers for those dampers as designated in the Project Specification.

14.2 System Startup: It shall be the Contractor's or Subcontractor's responsibility to conduct a functional test on each damper to assure its proper operation prior to system startup with airflow. Full travel of the dampers, and operation of limit switches shall be ascertained as a part of this checkout.

15. CONTRACTORS DRAWINGS AND DATA

15.1 Contractors shop drawings shall be submitted to the Consulting Engineers in accordance with the Project Specification and the following:

15.1.1 One typical drawing for each single section damper of each different type which is not Safety Category I.

15.1.2 One drawing for each multiple section damper.

15.1.3 One drawing for each Safety Category I damper.

15.2 Contractor shall submit all torque ratings, seismic calculations, Quality Assurance/Quality Control documentation and all other data as specified in accordance with the Project Specification.

STANDARD SPECIFICATION FOR PRIME COAT PAINTING (Form 1790-E)

1. GENERAL
   A. Prime coat painting shall conform to the requirements of this Standard Specification, the Job Specification, and the Design Drawings. In the event of variance between this Standard Specification and the Job Specification or Design Drawings, the Job Specification and Design Drawings shall take precedence.
   B. Where the term "design drawings" is used, it shall mean "Consulting Engineers' Design Drawings".
   C. Where the terms "as indicated" or "indicated" are used, they shall mean "as specified in the Job Specification and as shown or called for on the design drawings".
   D. All references to the following publications are to the latest issue of each; such references will be made in accordance with the abbreviations indicated:
      a. Steel Structures Painting Council (SSPC) Standard Specifications.
      b. National Woodwork Manufacturers Association (NWMA) Standards.
      c. American Wood-Preservers Association (AWPA) Manual of Recommended Practice.
2. SCOPE
   A. This Specification covers requirements for the following:
      a. Surface preparation and shop prime coat, field touch-up and field prime coat painting of ferrous metals (structural steel, miscellaneous steel, etc.).
      b. Field touch-up for galvanizing.
      c. Field painting for concealed surfaces.
      d. Painting for aluminum contact surfaces.
      e. Fire retardant painting of temporary wood members.
      f. Preservative treatment of permanent wood members.
   B. Contractor shall furnish all materials, labor and equipment to perform the indicated work. The extent of the WORK shall be as specified in the Job Specification.
   C. Finish field painting will be by others unless specifically included in the Job Specification.
3. INTENT
   A. Ferrous Metals: The intent of requirements herein specified for prime coat painting of ferrous metals is that:
      a. All ferrous metal surfaces, except galvanized surfaces (unless otherwise indicated), shall have at least one (1) acceptable complete coat of paint at the time the WORK is completed ready for finish field painting, except as hereinafter specified for grating. This requirement shall apply to ferrous metal installed by any and all trades included in the WORK.
      b. This one (1) complete coat shall consist of either an original shop prime coat, with subsequent field touch-up, or of a full prime coat applied in the field.

c. Grating shall receive one (1) shop prime coat of paint and one (1) shop finish coat of paint.

B. Aluminum Contact Surfaces: The intent of requirements herein specified for painting protection of aluminum contact surfaces is that either the aluminum surfaces, or the surfaces in contact with the aluminum, shall have two (2) acceptable complete coats of paint at the time that the aluminum is installed.

4. INSPECTION

A. All work covered by this Specification will be subject to inspection by Purchaser and the Consulting Engineers, and any work found not in accordance with the Specification shall be redone to the satisfaction of Purchaser and the Consulting Engineers.

B. Purchaser or the Consulting Engineers may make random spot checks of materials, equipment, etc., which have been painted, by removing small swatches of paint to bare metal with acetone and examining the surface with a 10 power magnifying glass to observe the absence or presence of rust under the prime coat. The presence of rust or rust stains under such swatches shall be sufficient cause for rejecting the work, and Contractor shall reprepare and recoat the work in the field at his own expense.

5. GENERAL REQUIREMENTS

A. General:

a. Paint shall be as made by the manufacturers hereinafter specified, and shall be delivered to the place of use in unbroken containers bearing manufacturer's brand name and number.

b. Paint identification numbers are paint manufacturers' numbers and shall be used in ordering paint.

c. Paint shall not be mixed or stored in contaminated containers. All paint shall be thoroughly mixed before using and shall be applied in strict accordance with manufacturer's instructions, as approved.

B. Protection and Clean-Up for Field Work: Contractor shall furnish the necessary drop cloths or other protection required to fully protect all surfaces from paint dropping, mist and all other conditions due to execution of field prime coat and field touch-up painting work by Contractor.

6. SURFACE PREPARATION (CLEANING)

A. Immediately prior to and throughout the painting process, material to be painted shall receive the following surface preparation which shall consist of the following methods as required and/or as specified in the Job Specification:

a. Method 1: Solvent Cleaning
b. Method 2: Hand Cleaning
c. Method 3: Power Tool Cleaning
d. Method 4: Commercial Blast Cleaning
e. Method 5: Blast Cleaning to "White" Metal

B. Method 1 - Solvent Cleaning:

a. Solvent cleaning shall be used primarily to remove oil or grease, and shall conform to the applicable requirements of SSPC Surface Preparation Specification No. 1, "Solvent Cleaning".

b. Solvent cleaning shall also include removal of soil, cement spatter, drawing compounds, salts and other foreign matter as set forth in the foregoing SSPC Specification.

C. Method 2 - Hand Cleaning:
   a. Hand cleaning shall be used primarily to remove loose mill scale, loose rust, and loose paint, and also all slag, weld splatter and alkaline scale from welded surfaces, by the use of hand brushing, hand sanding, hand scraping, hand chipping, or other hand impact tools, and shall conform to the applicable requirements of SSPC Surface Preparation Specification No. 2, "Hand Cleaning".
   b. Oil, grease or salts shall first be removed by Solvent Cleaning as hereinbefore specified.

D. Method 3 - Power Tool Cleaning:
   a. Power tool cleaning shall be used primarily to remove loose mill scale, loose rust, and loose paint, and also all slag, weld spatter and alkaline scale from welded surfaces, by the use of power wire brushes, power impact tools, power grinders, power sanders, or a combination of these methods, and shall conform to the applicable requirements of SSPC Surface Preparation Specification No. 3, "Power Tool Cleaning".
   b. Power tool cleaning shall be used as required to supplement Method No. 2, "Hand Cleaning", and/or shall be used where specified or directed.
   c. Oil, grease or salts shall first be removed by Solvent Cleaning as hereinbefore specified.

E. Method 4 - Commercial Blast Cleaning:
   a. Commercial blast cleaning shall be used to remove mill scale, rust, rust-scale, paint or foreign matter by the use of abrasives propelled through nozzles or by centrifugal wheels, and shall conform to the applicable requirements of SSPC Surface Preparation Specification No. 6, "Commercial Blast Cleaning".
   b. Heavy deposits of oil or grease shall first be removed by Solvent Cleaning as hereinbefore specified.
   c. Excessive rust-scale shall be removed by Hand Cleaning or Power Tool Cleaning, as hereinbefore specified, prior to blast cleaning.

F. Method 5 - Blast Cleaning to "White" Metal:
   a. Blast cleaning to "White" metal shall be used for the same purpose as Method 4, and shall conform to the applicable requirements of SSPC Surface Preparation Specification No. 5, "Blast Cleaning to 'White' Metal". "White" metal is defined to mean a surface with a gray white, uniform metallic color, slightly roughened to form a suitable anchor pattern for coatings.
   b. The depth of anchor pattern shall be as specified in the Job Specification.
   c. Heavy deposits of oil or grease shall first be removed by Solvent Cleaning as hereinbefore specified.
   d. Excessive rust-scale shall be removed by Hand and/or Power Tool Cleaning, as hereinbefore specified, prior to blast cleaning.

G. Metal Patching: If it is found necessary to patch or fill scratches or gouges in equipment metal housings, etc., a metal putty shall be used. The type and make of metal putty shall be submitted for approval before being used. Metal putty shall be applied in strict accordance with manufacturer's directions, as approved, and shall be level and smooth after application.

H. Preparation of Galvanized Surfaces: Where galvanized surfaces are specified to be painted, the following surface preparation requirements shall apply:
   a. Galvanizing Pretreated for Painting:
      (1) Where the galvanized surface has been specified to be shop pretreated for painting, the surface shall be prepared by Method 1 - Solvent Cleaning.
      (2) If a question arises as to whether specific galvanized surfaces have been shop pretreated, the decision of Purchaser and/or the Consulting Engineers shall govern.
   b. Galvanizing Not Pretreated for Painting:
      (1) Surface shall first be prepared by Method 1 - Solvent Cleaning.
      (2) Following the solvent cleaning, the surfaces shall receive one (1) washcoat pretreatment in accordance with the applicable requirements of SSPC Pretreatment Specification No. 3, "Basic Zinc Chromate-Vinyl Butyral Washcoat".
      (3) Washcoats shall be applied by spraying or brushing to a minimum dry film thickness of 0.3 to 0.5 mils.

7. APPLICATION OF PAINT
   A. Application of paint shall conform to the applicable requirements of SSPC Paint Application Specification No. 1, "Shop, Field and Maintenance Painting", and to the requirements hereinafter specified.
   B. Time Restrictions: The prime coat (or wash primer if specified for surfaces prepared by Methods 4 and/or 5) shall be applied within the following time limitations after completion of specified surface preparation:
      a. Within 24 hours for surfaces prepared by Methods 1, 2 and 3.
      b. Within 8 hours for surfaces prepared by Methods 4 and 5.
      c. If the prime coat is not applied within the specified period, the surface shall be reprepared.
   C. Temperature Restrictions:
      a. Paint shall not be applied when the surrounding air temperature is below 40 F, nor when the temperature is expected to drop to 32 F before the paint has dried.
      b. Paint shall not be applied to steel which is more than five (5) degrees F below the surrounding air temperature, or which is at a temperature less than 35 F.
      c. Paint shall not be applied to steel which is at a temperature of over 125 F unless the paint is specifically formulated for application at the proposed temperature. When steel is painted in hot weather, precautions shall be taken to insure that the specified dry mil thickness of paint is obtained.
   D. Moisture and Humidity Restrictions:
      a. Paint shall not be applied in rain, snow, fog, or mist, or when the relative humidity is such as to cause condensation on metal surfaces due to variation in metal temperatures and surrounding air temperatures. Table 90-1 shall be used as the guide for this relative humidity restriction.
      b. All surfaces shall be perfectly dry before and while being painted.
   E. Method of Application:
      a. Application of the paint shall primarily be made with proper size and grade of brushes, except where spray equipment or rollers can be used to advantage.

b. Spray equipment if used, shall be accurately and fully controlled at all times so as to prevent damage to adjacent surfaces.

F. Two Coat Work: Where two (2) shop or field prime coats of paint are specified (except as herein specified for grating), the following shall apply:

a. The second coat of paint (or the first, if approved or if requested) shall be tinted, as approved or as requested, to insure ease of checking that a second coat is applied.

b. The second coat shall not be applied until the first coat has been completed, checked and approved. If the second coat is applied before approval of the undercoat, it will be assumed that such undercoat has not been applied, and at the option of Purchaser or the Consulting Engineers such undercoat shall be reapplied or the entire coating shall be removed and this area repainted from the beginning.

c. Drying Time: Sufficient time for drying shall be allowed between coats.

TABLE 90-1

Per Cent Relative Humidity Above Which Moisture will Condense On Metal Surfaces Not Insulated

Metal Surface Temp.	Surrounding Air Temperature F												
	40	45	50	55	60	65	70	75	80	85	90	95	100
35 F	60	33	11										
40 F		69	39	20	8								
45 F			69	45	27	14							
50 F				71	49	32	20	11					
55 F					73	53	38	26	17	9			
60 F						75	56	41	30	21	14	9	
65 F							78	59	45	34	25	18	13
70 F								79	61	48	37	29	22
75 F									80	64	50	40	32
80 F										81	66	53	43
85 F											81	68	55
90 F												82	69
95 F													83

8. MINIMUM THICKNESS OF PAINT

A. Each prime coat of paint shall be applied so as to result in a minimum dry paint thickness of 2 mils, unless otherwise indicated.

B. Inspection of paint thickness will be made by Purchaser of the Consulting Engineers, and shall be based on measuring average wet film thickness, using a Nordson Wet Film Gage, #WFG-100, as made by the Nordson Corp., Amherst, Ohio, or an Interchemical direct reading wet film thickness gauge, #GG-6280, as made by Gardner Laboratory, Inc., Bethesda, Maryland. Gauges shall be furnished by Contractor. For the Nordson gage, not less than two (2) applications of the gage will be

made in each area to be tested to determine an average wet film thickness; for the Interchemical gauge, nor less than two (2) rolls of the gauge, in opposite directions, will be made for each test.

C. The paint manufacturers shall accordingly be required by Contractor to furnish the Consulting Engineers and the Contractor with wet film thickness required, for each class of paint and method of application, to obtain the specified dry film thickness. These wet film thicknesses shall be based on applying the paint directly from the original containers, with no thinners added.

D. If Contractor intends to use thinners he shall inform the Consulting Engineers and the paint manufacturer of his intended method of application. The paint manufacturer shall then re-evaluate the paint and furnish the Consulting Engineers and the Contractor with the new wet film mil thicknesses required.

E. Dry film thickness may also be inspected by Purchaser or the Consulting Engineers for verification of paint thickness, and the dry thickness will be tested using an Elcometer gauge or a Nordson Micro gauge. Gauges shall be furnished by Contractor.

F. If the required minimum dry thickness is not attained, as determined by either the wet-film inspection of the dry-film inspection, additional coats shall be applied to produce the specified thickness.

9. PAINT

The brand of paint shall be as made by The Detroit Graphite Company or by E. I. du Pont de Nemours & Co., Inc. Manufacturers' paint numbers and the corresponding use of these paints shall be as specified in Table 90-2.

TABLE 90-2
Paint Designations

Use	Color	Detroit Graphite Number	du Pont Number
(1) Shop coat (except grating) (2) Field prime coat (except grating) (3) Field touch-up (except grating) (4) First coat of two-coat shop or field prime coat painting (except grating)	Brown	501	67-746
(5) Second coat of two-coat shop or field prime coat painting (except grating).....	Black	30	515
(6) Grating:			
(a) Shop prime coat.....	Brown (Dipping Primer)	501-A	67-733
(b) Shop finish coat:			
i. Indoor use.....	Black (Dipping Enamel)	90800	655-1627
ii. Outdoor use.....		90801	83-005
(7) Field painting for concealed surfaces of ferrous metals.....	Black	30	515
(8) Field or shop painting for aluminum contact surfaces:			
(a) For ferrous metals, one coat in addition to prime coat.....	Black	30	515
(b) For aluminum, if painted in place of painting other materials:			
i. First coat.....	Brown	501	67-746
ii. Second coat.....	Black	30	515
(c) For concrete, masonry or wood:			
i. First coat.....	White	#600 CEM-GARD primer	675 Primer, 50-50 mix with 710 oil
ii. Second coat.....	Dark Gray	#103 CEM-GARD	687

10. SHOP PAINTING

A. Surfaces to be shop painted, after completion of surface preparation as hereinbefore specified, and surfaces to be left unpainted, shall be as specified in Table 90-3.

B. Machine-finished surfaces shall be protected against corrosion by a suitable antirust coating.

TABLE 90-3

Extent of Shop Painting

Surface	Paint Requirements
(1) Surfaces in contact after shop assembly...	No Paint
(2) Surfaces in contact for field erection....	No Paint
(3) Contact surfaces under washers of high strength bolts.....	No Paint
(4) All joints to be field welded.....	3" wide strips to be left unpainted on each side of joints.
(5) Surfaces inaccessible after shop assembly (other than contact surfaces), or inaccessible after field erection	2 coats of paint of different colors, as follows: 1st (prime) coat 2nd coat
(6) All other surfaces (unless otherwise indicated)	1 (prime) coat of paint

11. FIELD PRIME COAT PAINTING
    A. Field prime coat painting shall consist of one (1) complete coat of paint applied to all bare structural steel or other ferrous metal surfaces, after such surfaces have been properly cleaned as hereinbefore specified.
    B. Provided further that two-coat work shall conform to the same requirements as for shop two-coat work.
12. FIELD TOUCH-UP PAINTING
    A. Field touch-up painting shall consist of one (1) coat of paint applied to the following surfaces after they have been properly cleaned as hereinbefore specified.
        a. Surfaces where the shop coat of paint has been marred, scratched or otherwise damaged, due to shipping, handling, erection, installation, weathering, etc.
        b. Heads of field bolts and nuts, and adjacent surfaces left unpainted in the shop.
        c. Surfaces of field welds, and adjacent surfaces left unpainted in the shop.
        d. Surfaces of any ferrous fasteners not otherwise protected.
    B. Exposed fabrication, erection or shipping marks shall be cleaned off and the areas touch-up painted to match the adjacent surfaces.
    C. Provided further that field touch-up painting shall consist of two coats for any of the above surfaces which have received two coats either in the shop or in the field prime coat painting; such two-coat touch-up shall conform to the same requirements as for shop two-coat work.
    D. For surfaces where blast cleaning and a wash primer are specified, touch-up painting shall include blast cleaning and application of the wash primer before the touch-up coat, or coats, are applied.
    E. Dry film thickness of touch-up painting shall be not less than 2 mils.
    F. Touch-up painting shall overlap the prime coat by not less than 1" all around to insure continuity of coating.

13. FIELD TOUCH-UP FOR GALVANIZING
    A. The following shall be touched-up with one (1) coat of zinc-rich paint:
        a. Areas of galvanized surfaces (of siding, etc., furnished and/or installed by Contractor) which have been marred due to handling, shipping, erection, weathering, etc.
        b. Field welds made on hot-dipped galvanized surfaces.
    B. Material: Galvanox zinc-rich paint as made by Subox, Inc. Paint coverage shall be at the rate of not more than 350 sq. ft. per gallon, and shall result in a coating containing not less than one (1) oz. of zinc metal per sq. ft. of surface.
    C. Touch-up galvanizing shall overlap the original coating by not less than 1" all around to insure continuity of coating.
14. FIELD PAINTING FOR CONCEALED SURFACES
    A. Concealed surfaces painting shall consist of one (1) field coat of paint applied to the following surfaces of structural steel or other ferrous metals (except for galvanized metals), IN ADDITION TO shop and/or field prime coats:
        a. All surfaces in contact with siding, roofs, walls, ceiling, etc., or which will be made inaccessible by the erection of these items.
        b. All surfaces made inaccessible by masonry, concrete, etc., except that this requirement shall not apply where the surfaces are embedded in, or fully encased in, these materials.
        c. All surfaces made inaccessible by other materials.
    B. Concealed surfaces painting shall not be done until all required prime coat and touch-up painting of the surface has been completed.
    C. Concealed surfaces paints shall be as hereinbefore specified in Table 90-2.
    D. Dry film thickness for concealed surfaces painting shall be not less than 2 mils.
15. PAINTING FOR ALUMINUM CONTACT SURFACES
    A. Aluminum contact surfaces painting shall be provided as follows:
        a. Ferrous Metals:
            (1) To prevent galvanic action where aluminum surfaces will be in contact with ferrous metals (other than galvanized), the contact surfaces of the ferrous metal shall receive one (1) field coat of paint IN ADDITION TO shop and/or field prime coats.
            (2) Where one (1) field coat of paint is already required by concealed surfaces painting it shall serve as the foregoing specified field coat.
        b. Non-Ferrous Metals:
            (1) Where aluminum will be in contact with copper, lead or other non-ferrous metals not compatible with aluminum, the contact surfaces of these metals shall receive two (2) coats of paint.
            (2) Non-ferrous metals compatible with aluminum, such as stainless steel, zinc, white bronze, etc., will not require painting.
        c. Concrete and Masonry:
            (1) Where aluminum surfaces will be embedded in concrete or masonry, the aluminum surfaces shall receive two (2) field coats of paint.

(2) Where aluminum surfaces will be in contact with concrete or masonry, the contact surfaces of these materials shall receive two (2) field coats of paint.

d. Wood:

(1) Where aluminum surfaces will be in contact with untreated wood (other than wood in the interiors of buildings), the wood shall receive two (2) coats of paint.

(2) Where aluminum surfaces will be in contact with treated wood the preservative mateial shall be of a type that is compatible with aluminum. The following types may be used:

(a) Pentachlorophenol solutions
(b) Wolman salts
(c) Creosote
(d) Zinc, naphthenate

B. Where desirable, where required, or where requested, contact surfaces of aluminum may be painted with two (2) coats of paint in place of painting contact surfaces of the foregoing specified materials.

C. Paints for aluminum contact surfaces shall be as hereinbefore specified in Table 90-2.

D. Dry film thickness for aluminum contact surfaces painting shall be not less than 2 mils for each coat.

16. FIRE RETARDANT PAINTING OF TEMPORARY WOOD MEMBERS

A. Temporary wood members required to be protected with fire retardant paint shall receive two (2) coats of Albi #107 (Exterior type, oil base, flat finish) Intumescent paint as made by Albi Manufacturing Co., Inc.

B. Coverage of paint shall be at the rate of 200 sq. ft. per gallon for each coat, to produce a flamespread rating of 15 (Incombustible Classification).

C. First coat color shall be white. Second coat color shall be Fiesta Brown.

D. Paint shall be applied in strict accordance with manufacturer's instructions, as approved.

17. PRESERVATIVE TREATMENT OF PERMANENT WOOD MEMBERS

A. Water-Repellent Type, Cold Drip Method:

a. Preservative: Water-repellent preservative conforming to NWMA Standards M-1 and M-2 for preservative oils containing water-repellent components.

b. Treatment:

(1) Open tank, cold dip method, and conform to the applicable requirements of the NWMA nonpressure treating practice for architectural woodwork.

(2) All machine work on lumber shall be completed before dipping.

(3) Treatment shall consist of complete immersion in the solution for a period of three (3) minutes.

(4) Products requiring assembly with glue shall be glued up prior to treatment.

c. Drying: All items treated with preservative shall dry a minimum of seventy-two (72) hours before application of any finish treatment.

d. Stamp or Certificate:

(1) A stamp or brand shall be provided on all treated material to certify compliance with the foregoing requirements.

(2) Where a stamp or brand is impractical, a notorized certificate from the treater will be accepted.

e. Field Touch-Up: All surfaces of treated material which are exposed by cutting operations subsequent to the initial preservative treatment shall be treated by redipping or copiously brushing such cut surfaces with the same preservative used for the original treatment.

B. Water-Repellent Type, Pressure Method:
   a. Preservative: Water-borne preservative conforming to the applicable requirements of AWPA Standard P5.
   b. Pressure Treatment: Conform to the applicable requirements of AWPA Standards C1, C2 and/or other applicable AWPA Standards. Minimum retention of the preservatives shall conform to the values specified in the above Standards; these values may vary from 0.30 to 0.75 lb. per cubic foot depending on the exact preservative used.
   c. Drying: Same as for Cold Dip Method.
   d. Stamp or Certificate: Same as for Cold Dip Method.
   e. Field Touch-Up: Same as for Cold Dip Method.

C. Creosote Type, Pressure Method:
   a. Preservative: Creosote oil conforming to applicable requirements of AWPA Standard P1.
   b. Pressure Treatment: Conform to applicable requirements of AWPA Standard C1, using full cell process to produce minimum retention of 8.0 lb. of creosote per cubic foot (unless otherwise indicated in the Job Specification).
   c. Field Touch-Up: Same as for Cold Dip Method.

Revision Note: This Form 1790-E, dated 11-15-63, supersedes Form 1790-D. Specification changed from Specification for Painting to Specification for Prime Coat Painting (only), and completely rewritten.

ATTACHMENTS

FOR

PSC RESPONSE 5

FP.5.2. FSV COMPARISON TO APPENDIX A TO BTP 9.5-1, REV. 1

APPENDIX A TO BTP 9.5-1, REV. 1

"A. Overall Requirements of Nuclear Plant Fire Protection Program

1. Personnel - Responsibility for the overall fire protection program should be assigned to a designated person in the upper level of management. This person should retain ultimate responsibility even though formulation and assurance of program implementation is delegated. Such delegation of authority should be to staff personnel prepared by training and experience in fire protection and nuclear plant safety to provide a balanced approach in directing the fire protection programs for nuclear power plants. The qualification requirements for the fire protection engineer or consultant who will assist in the design and selection of equipment, inspect and test the completed physical aspects of the system, develop the fire protection program, and assist in the fire-fighting training for the operating plant should be stated. Subsequently, the FSAR should discuss the training and the updating provisions such as fire drills provided for maintaining the competence of the station fire-fighting and operating crew, including personnel responsible for maintaining and inspecting the fire protection equipment.

The fire protection staff should be responsible for:

(a) coordination of building layout and systems design with fire area requirements, including consideration of potential hazards associated with postulated design basis fires,

(b) design and maintenance of fire detection, suppression and extinguishing systems,

(c) fire prevention activities,

(d) training and manual fire-fighting activities of plant personnel and the fire brigade.

(NOTE: NFPA 6 - Recommendations for Organization of Industrial Fire Loss Prevention, contains useful guidance for organization and operation of the entire fire loss prevention program.)"

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met as discussed in Section FP.1.3.

FSV procedures specify fire-fighting training and activities of plant personnel and the Fire Brigade. These procedures also cover fire prevention activities which are supplemented by FSV administrative controls. FSV staff members are presently responsible for organization and operation of the station fire protection programs, including inspection and maintenance of fire protection systems, development of fire-fighting procedures, and training of the Fire Brigade.

Station maintenance procedures and surveillance requirements procedures specify instructions for maintaining and inspecting fire-fighting equipment. Section FP.1.4.2. specifies the training and drill requirements for the station's fire-fighting team. The Manager, Nuclear Engineering, is responsible for fire protection system design modifications, including specification, installation, and initial testing of fire protection equipment.

Outside fire protection engineers, qualified to be full Members of the Society of Fire Protection Engineers, were used as consultants in the preparation of the Appendix R Evaluation and the Fire Hazards Analysis (Section FP.3.)

PSC has a permanent Fire Protection Engineer on staff who meets the qualifications noted in Section FP.1.3.

The Nuclear Sciences Training Supervisor is responsible to provide and maintain a training program for the Fire Brigade.

APPENDIX A TO BTP 9.5-1, REV. 1

> "A.2. Design Bases - The overall fire protection program should be based upon evaluation of potential fire hazards throughout the plant and the effect of postulated design basis fires relative to maintaining ability to perform safe shutdown functions and minimize radioactive releases to the environment."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

The overall fire protection program evaluation at FSV has been completed and was based on an evaluation of plant-wide fire hazards and their effect on shutdown equipment. The fire protection evaluation and the responses to specific BTP 9.5-1, Appendix A positions contained in this FPPP are based on the detailed fire hazards analysis presented in Section FP.3.

APPENDIX A TO BTP 9.5-1, REV. 1

"A.3. Backup - Total reliance should not be placed on a single automatic fire suppression system. Appropriate backup fire suppression capability should be provided."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

The Fire Hazards Analyses (Section FP.3) describes both the primary and backup fire suppression systems provided to protect each fire area.

The hose stations and portable hand-held fire extinguishers provide backup protection to fixed automatic fire suppression systems used to protect specific hazards and have specific operability and testing requirements listed in Section FP.6.1.

Portable hand-held fire extinguishers provide a backup to the hose stations.

APPENDIX A TO BTP 9.5-1, REV. 1

"A.4. Single Failure Criterion - A single failure in the fire suppression system should not impair both the primary and backup fire suppression capability. For example, redundant fire water pumps with independent power supplies and controls should be provided. Postulated fires or fire protection system failures need not be considered concurrent with other plant accidents or the most severe natural phenomena.

The effects of lightning strikes should be included in the overall plant fire protection program."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

Redundant features have been incorporated into the system design to ensure that a single failure will not impair both primary and backup fire suppression capability.

Two types of failures have been considered. First, redundant pumps, water sources, supply headers, and equipment have been provided to account for single equipment failures and, secondly, a single failure will not impair both the primary and backup methods of fire suppression.

Water for fire protection is stored in two large storage ponds with two independent supply lines to three circulating water makeup pumps, each rated at greater than 100 percent fire water system requirements. These pumps supply makeup water to the fire water pump pits and cooling tower basin through two independent headers. Two redundant fire pumps, each rated at 100 percent system capacity, discharge independently into the underground fire main loop. One pump is motor driven, and the other is diesel engine driven. The underground loop and the system of distribution headers entering and running throughout the buildings provide a multiple source of fire water to the individual fire water systems.

Fire protection distribution piping is sectionalized with gate valves to allow isolation of piping while maintaining at least one flow path to each fire area.

All water spray deluge systems are equipped with backup manual actuators on the deluge valves to permit manual operation of the deluge system on failure or damage to the actuating (release) system.

It is assumed that a fire will be extinguished within one hour, such that the fire water system will be available when needed within 1-1/2 hours after an IOFC for Fire Protection Shutdown/Cooldown functions.

The automatic actuated CO2 flooding system, installed in each Standby Diesel Generator Room, is activated by either one of the two fixed thermal detectors provided in each room. These CO2 systems can be manually operated from outside the rooms in the event of a failure in the automatic actuation system.

The Halon gas fire suppression systems are automatically operated and have a backup reserve gas supply. If the automatic feature fails, then manual actuation can be initiated. Should the primary gas supply not be available or fail, then the reserve gas supply can be used. No type of failure in the primary (Halon) fire suppression system will affect the availability of the station wide backup fire protection systems/equipment.

Hose stations and portable fire extinguishers are available to provide backup fire suppression capability in all equipment areas of the station. In some locations hose stations serve as the primary means of fire suppression and portable fire extinguishers serve as a backup.

Lightning protection is provided by the station's grounding system. The grounding system is electrically connected to Building 10, the Reactor and Turbine Buildings' structure, metal roof, and metal clad siding.

APPENDIX A TO BTP 9.5-1, REV. 1

"A.5. Fire Suppression Systems - Failure or inadvertent operation of the fire suppression system should not incapacitate safety related systems or components. Fire suppression systems that are pressurized during normal plant operation should meet the guidelines specified in APCSB Branch Technical Position 3-1, 'Protection Against Postulated Piping Failures in Fluid Systems Outside Containment.'"

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

The fire suppression systems are a moderate energy fluid system as defined by BTP ASB 3-1. Although this document was not in force when the FSV fire suppression systems were being designed, its general requirements are considered met, based on the following:

a) The station fire water piping was inspected to determine the effects of postulated piping failure on the operability of safety-related equipment. The results of this inspection revealed that such piping failures will not impair the operability of safety-related equipment. (See FSAR Appendix I)

b) System piping is primarily 2-1/2 inches and larger and is welded steel construction with flanged valves and special fittings.

c) Supply lines to the individual water suppression systems and hose water standpipes have been installed to the intent of the appropriate NFPA standards.

Furthermore, an inspection of the firewater system piping showed that no failure or crack in any moderate energy line will impair both the primary and backup fire suppression systems.

Floor drains/open grating are provided in all areas protected by sprinkler systems and deluge systems.

APPENDIX A TO BTP 9.5-1, REV. 1

"A.6. Fuel Storage Areas - Schedule for implementation of modifications, if any, will be established on a case-by-case basis."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

No conformance is required at this time; this topic governs future modifications.

APPENDIX A TO BTP 9.5-1, REV. 1

"A.7. Fuel Loading - Schedule for implementation of modifications, if any, will be established on a case-by-case basis."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

No conformance is required at this time; this topic governs future modifications.

APPENDIX A TO BTP 9.5-1, REV. 1

"A.8. Multiple-Reactor Sites - On multiple-reactor sites where there are operating reactors and construction of remaining units is being completed, the fire protection program should provide continuing evaluation and include additional fire barriers, fire protection capability, and administrative controls necessary to protect the operating units from construction fire hazards. The superintendent of the operating plant should have the lead responsibility for site fire protection."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This is not applicable; FSV is a one reactor site.

APPENDIX A TO BTP 9.5-1, REV. 1

"A.9. Simultaneous Fires - Simultaneous fires in more than one reactor need not be postulated, where separation requirements are met. A fire involving more than one reactor unit need not be postulated except for facilities shared between units."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This is not applicable; FSV is a one reactor site.

APPENDIX A TO BTP 9.5-1, REV. 1

"B. Administrative Procedures, Controls, and Fire Brigade

1. Administrative procedures consistent with the need for maintaining the performance of the fire protection system and personnel in nuclear power plant should be provided.

Guidance is contained in the following publications:

NFPA 4 - Organization for Fire Services

NFPA 4A - Organization for Fire Department

NFPA 6 - Industrial fire Loss Prevention

NFPA 7 - Management of Fire Emergencies

NFPA 8 - Management Responsibility for Effects of Fire on Operations

NPFA 27 - Private Fire Brigades"

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

FSV Administrative procedures, maintenance procedures, and Fire Protection Operability Requirements (FPOR) (FP.6.1) are provided to maintain the performance of fire protection systems and personnel. Responsibilities are delineated in applicable administrative procedures. The Shift Supervisor has the overall responsibility and authority in any plant emergency. The Shift Supervisor is supported by other members of the station's staff having designated fire protection and firefighting responsibilities described by administrative procedures.

APPENDIX A TO BTP 9.5-1, REV. 1

"B.2. Storage of Combustible Materials - Effective administrative measures should be implemented to prohibit bulk storage of combustible materials inside or adjacent to safety related buildings or systems during operation or maintenance periods. Regulatory Guide 1.39, 'Housekeeping Requirements for Water-Cooled Nuclear Power Plants,' provides guidance on housekeeping, including the disposal of combustible materials."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

FSV administrative procedures implement effective measures to control the use of combustibles within the station, and to minimize the fire hazard presented by their use. Bulk storage of combustible materials is prohibited. FSV procedures include applicable guidance given in Regulatory Guide 1.39 (Rev. 0) regarding housekeeping.

APPENDIX A TO BTP 9.5-1, REV. 1

"B.3. Reviews - Normal and abnormal conditions or other anticipated operations such as modifications (e.g., breaking fire stops, impairment of fire detection and suppression systems) and refueling activities should be reviewed by appropriate levels of management and appropriate special actions and procedures such as fire watches or temporary fire barriers implemented to assure adequate fire protection and reactor safety. In particular:

(a) Work involving ignition sources such as welding and flame cutting should be done under closely controlled conditions. Procedures governing such work should be reviewed and approved by persons trained and experienced in fire protection. Persons performing and directly assisting in such work should be trained and equipped to prevent and combat fires. If this is not possible, a person qualified in fire protection should directly monitor the work and function as a fire watch.

(b) Leak testing and similar procedures such as air flow determination, should use one of the commercially available aerosol techniques. Open flames or combustion generated smoke should not be permitted.

(c) Use of combustible material, e.g., HEPA and charcoal filters, dry ion exchange resins or other combustible supplies, in safety related areas should be controlled. Use of wood inside buildings containing safety related systems or equipment should be permitted only when suitable non combustible substitutes are not available. If wood must be used, only fire retardant treated wood (scaffolding, lay down blocks) should be permitted. Such materials should be allowed into safety related areas only when they are to be used immediately. Their possible and probable use should be considered in the fire hazard analysis to determine the adequacy of the installed fire protection systems."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

Anticipated operations, such as modifications and refueling, are reviewed to assure that adequate fire protection and reactor safety is continuously maintained. FSV administrative procedures establish work practices and review levels for the control of ignition sources and combustibles used during maintenance activities. These procedures and the FPORs specify appropriate measures that must be taken when work is being performed on the fire detection and suppression systems.

The use of open flames or combustion-generated smoke for leak testing or other air flow determination is specifically addressed by FSV administrative procedures. These procedures specify that only nonflammable agents are to be used for leak testing.

The use of combustible material in safety-related areas is controlled by FSV administrative procedures. The handling of specific combustibles such as charcoal and HEPA filters and lubricants are included in the appropriate administrative procedure. When wood is used during periods of maintenance in areas containing safety-related equipment, it is fire resistant treated. Its use is limited to situations when a suitable non-combustible material is not available.

Persons performing and/or directly assisting in work involving ignition sources are trained and equipped to prevent and suppress fires.

APPENDIX A TO BTP 9.5-1, REV. 1

"B.4. (Public Fire Departments) - Nuclear power plants are frequently located in remote areas, at some distance from public fire departments. Also, first response fire departments are often volunteer. Public fire department response should be considered in the overall fire protection program. However, the plant should be designed to be self-sufficient with respect to firefighting activities and rely on the public response only for supplemental or backup capability."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

FSV fire protection systems and the Fire Brigade are normally self-sufficient with respect to all firefighting activities inside the protected area where all Fire Protection Shutdown/Cooldown and ACM equipment is located. Supplemental back up support will be provided by the Platteville Fire Protection District.

For fires outside the protected area support will be provided by the nearest public volunteer fire department which is located in Platteville, Colorado, approximately 5 miles from the station.

APPENDIX A TO BTP 9.5-1, REV. 1

"B.5. (Organization, Training and Equipping) - The need for good organization, training and equipping of Fire Brigades at nuclear power plant sites requires effective measures be implemented to assure proper discharge of these functions. The guidance in Regulatory Guide 1.101, "Emergency Planning for Nuclear Power Plants", should be followed as applicable.

(a) Successful fire fighting requires testing and maintenance of the fire protection equipment, emergency lighting and communication, as well as practice as brigades for the people who must utilize the equipment. A test plan that lists the individuals and their responsibilities in connection with routine tests and inspections of the fire detection and protection systems should be developed. The test plan should contain the types, frequency and detailed procedures for testing. Procedures should also contain instructions on maintaining fire protection during those periods when the fire protection system is impaired or during periods of plant maintenance, e.g., fire watches or temporary hose connections to water systems.

(b) Basic training is a necessary element in effective fire fighting operation. In order for a Fire Brigade to operate effectively, it must operate as a team. All members must know what their individual duties are. They must be familiar with the layout of the plant and equipment location and operation in order to permit effective fire-fighting operations during times when a particular area is filled with smoke or is insufficiently lighted. Such training can only be accomplished by conducting drills several times a year (at least quarterly) so that all members of the Fire Brigade have had the opportunity to train as a team, testing itself in the major areas of the plant. The drills should include the simulated use of equipment in each area and should be pre-planned and post critiqued to establish the training objective of the drills and determine how well these objectives have been met. These drills should periodically (at least annually) include local fire department participation where possible. Such drills also permit supervising personnel to evaluate the effectiveness of communications within the Fire Brigade and with the on scene fire team leader, the reactor operator in the Control Room, and the offsite command post.

(c) To have proper coverage during all phases of operation, members of each shift crew should be trained in fire protection. Training of the plant Fire Brigade should be coordinated with the local fire department so that responsibilities and duties are delineated in advance. This coordination should be part of the training course and implemented into the training of the local fire department staff. Local fire departments should be educated in the operational precautions when fighting fires on nuclear power plant sites. Local fire departments should be made aware of the need for radioactive protection of personnel and the special hazards associated with a nuclear power plant site.

(d) NFPA 27, 'Private Fire Brigade' should be followed in organization, training, and fire drills. This standard also is applicable for the inspection and maintenance of fire fighting equipment. Among the standards referenced in this document, the following should be utilized: NFPA 194, 'Standard for Screw Threads and Gaskets for Fire Hose Couplings,' NFPA 196, 'Standard for Fire Hose,' NFPA 197, 'Training Standard on Initial Fire Attacks,' NPFA 601, 'Recommended Manual of Instructions and Duties for the Plant Watchman on Guard.' NFPA booklets and pamphlets listed on page 27-11 of Volume 8, 1971-72 are also applicable for good training references. In addition, courses in fire prevention and fire suppression which are recognized and/or sponsored by the fire protection industry should be utilized."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

FSV administrative procedures, training procedures, the FPPP, Fire Suppression and Prevention Manual and training lesson plans establish the firefighting organization, techniques, personnel responsibilities, and readiness requirements for firefighting equipment and training and qualification of the Fire Brigade personnel.

Periodic testing and inspection of the station fire protection equipment and emergency lighting are specified in the FPOR's and administrative procedures. The FPOR's contain types, frequency, and detailed procedures for testing. The FPOR's provide for maintaining fire protection when the fire protection system is impaired.

FSV employees receive basic initial training on fire extinguishing systems and equipment as applicable to their positions. Designated Fire Brigade members in each shift crew receiv 'ditional training appropriate to their assigned responsibilities.

The organization, training, and qualification of members of the Fire Brigade is provided in accordance with the FSV training and administrative procedures.

The inspection and maintenance of firefighting equipment is performed in accordance with FSV maintenance procedures and surveillance requirements.

See the following sections for NFPA code compliance:

NFPA 27	FP.5.5.15
NFPA 194	FP.5.5.28
NFPA 196	FP.5.5.29
NFPA 197	FP.5.5.30
NFPA 601	FP.5.5.33

APPENDIX A TO BTP 9.5-1, REV. 1

"C. Quality Assurance Program

Quality Assurance (QA) programs of applicants and contractors should be developed and implemented to assure that the requirements for design, procurement, installation, and testing and administrative controls for the fire protection program for safety related areas as defined in this Branch Position are satisfied. The program should be under the management control of the QA organization. The QA program criteria that apply to the fire protection program should include the following criterion:

1. Design Control and Procurement Document Control

   Measures should be established to assure that all design-related guidelines of the Branch Technical Position are included in design and procurement documents and that deviations therefrom are controlled.

2. Instructions, Procedures and Drawings - Inspections, tests, administrative controls, fire drills and training which govern the fire protection program should be prescribed by documented instructions, procedures or drawings and should be accomplished in accordance with these documents.

3. Control of Purchased Material, Equipment and Services - Measures ~~should~~ be established to assure that purchased material, equipment and services conform to the procurement documents.

4. Inspection - A program for independent inspection activities affecting fire protection ~~should~~ be established and executed by, or for, the organization performing the activity to verify conformance with documented installation drawings and test procedures for accomplishing the activities.

5. Test and Test Control - A test program should be established and implemented to assure that testing is performed and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. The tests should be performed in accordance with written test procedures and test results are properly evaluated and acted on.

6. Inspection, Test and Operating Status - Measures should be established to provide for the identification of items which have satisfactorily passed required tests and inspections.

7. Nonconforming Items - Measures should be established to control items which do not conform to specified requirements to prevent inadvertent use or installation.

8. Corrective Action - Measures should be established to assure that conditions adverse to fire protection, such as failures, malfunctions, deficiencies, deviations, defective components, uncontrolled combustible material, and nonconformance, are promptly identified, reported and corrected.

9. Records - Records should be prepared and maintained to furnish evidence that the criteria enumerated above are being met for activities affecting the fire protection program.

10. Audits - Audits should be conducted and documented to verify compliance with the fire protection program, including design and procurement documents; instructions; procedures and drawings; and inspection and test activities."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

Section FP.1.7 and Administrative Procedure Q-2 describe the FSV QA program as applied to fire protection.

APPENDIX A TO BTP 9.5-1, REV. 1

"D. General Guidelines for Plant Protection

1. Building Design

(a) (Plant Layouts) - Plant layouts should be arranged to:

(1) Isolate safety related systems from unacceptable fire hazards, and

(2) Alternatives:

(a) Redundant safety related systems that are subject to damage from a single fire hazard should be protected by a combination of fire retardant coatings and fire detection and suppression systems, or (b) a separate system to perform the safety function should be provided."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

FSV uses safety-related systems for safe shutdown following an earthquake, tornado, or EQ event. Following a fire, the Fire Protection Shutdown/Cooldown models are used to shutdown. Sections FP.5.3 and FP.5.4.2 provide the details of separation for redundant shutdown equipment and discusses exemptions submitted to the NRC for areas where strict separation criteria are not met. These exceptions have been approved by the NRC (See Section FP.5.6.8.).

APPENDIX A TO BTP 9.5-1, REV. 1

"D.1.(b) (Fire Hazards Analysis) - In order to accomplish (1)(a) above, safety related systems and fire hazards should be identified throughout the plant. Therefore, a detailed fire hazard analysis should be made. The fire hazards analysis should be reviewed and updated as necessary. Additional fire hazards analysis should be done after any plant modification."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

A detailed Fire Hazards Analysis was conducted on a facility-wide basis at FSV. The latest revision to the fire hazards analysis is included in FSV FPPP, Section FP.3.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.1.(c) (Sharing of Cable Spreading Rooms) - Alternative guidance for constructed plants is shown in Section F.3 'Cable Spreading Room.'"

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline is not applicable to FSV; see the FSV response for Appendix A, paragraph F.3.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.1.(d) (Interior Construction and Finishes) - Interior wall and structural components, thermal insulation materials and radiation shielding materials and sound-proofing should be noncombustible. Interior finishes should be non-combustible or listed by a nationally recognized testing laboratory, such as Factory Mutual or Underwriters' Laboratory, Inc. for flame spread, smoke and fuel contribution of 25 or less in its use configuration (ASTM E-84 lest), 'Surface Burning Characteristics of Building Materials.'"

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

Combustible Paint	Area of Combustible (Note 1)
Turbine Building	
Floor Tile	approx. 3000 square ft.
Wood Paneling	approx. 100 square ft.
Control Room	
Floor Tile	approx. 2600 square ft.
Carpeting	approx. 2500 square ft.
Rubber Bumper For Paneled Wall	approx. 200 linear ft.
Aux. Elec. Equipt	
Floor Tile	approx. 2000 square ft.
Reactor Building	
Floor Tile	approx. 600 square ft.

FSV compliance is discussed in Section FP.2.7.3. All future painting and floor coverings will comply with these guidelines.

NOTE 1: The amount of paint is an insignificant contribution to the combustible loading for any particular fire area.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.1.(e) (Metal Deck Roof Construction) - Metal deck roof construction should be noncombustible (See the building materials directory of the Underwriters Laboratory, Inc.) or listed as Class I by Factory Mutual System Approval Guide.

Where combustible material is used in metal deck roofing design, acceptable alternatives are (i) replace combustibles with noncombustible materials. (ii) provide an automatic sprinkler system. (iii) provide the ability to cover the roof exterior and interior with adequate water volume and pressure."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

Reactor/Turbine Building Roof

The 4 foot width of insulation around the entire roof perimeter was not mechanically fastened to the steel deck. In place of mechanical fastener an approved adhesive was used to bond the vapor barrier and insulation. (Ref. 1)

Reactor Building Roof

The flood coat of asbestos fibered emulsion was not applied. Since the flood coat was not applied the roof does not meet the requirements of FM or UL Construction 1, Class A roof covering.

This exception has been evaluated by Reference 1 and found to be acceptable.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.1.(f) (Suspended Ceilings) - Suspended ceilings and their supports should be of noncombustible construction. Concealed spaces should be devoid of combustibles.

Adequate fire detection and suppression systems should be provided where full implementation is not practicable."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

Suspended ceilings have noncombustible tile, supports, and fasteners. Except for minor quantities of computer terminal cables, the concealed ceiling and floor spaces are essentially devoid of combustibles.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.1.(g) (Inside Transformers) - High voltage - high amperage transformers installed inside buildings containing safety related systems should be of the dry type or insulated and cooled with non-combustible liquid.

Safety related systems that are exposed to flammable oil filled transformers should be protected from the effects of a fire by:

(i) replacing with dry transformers or transformers that are insulated and cooled with non-combustible liquid; or

(ii) enclosing the transformer with a three-hour fire barrier and installing automatic water spray protection."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exception:

All transformers within the plant building are either dry type or the Askeral (fire retardant oil) filled type. The Askeral-filled transformers are not a fire loading concern due to the inability to attain the elevated temperatures required to burn askeral.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.1.(h) (Outside Transformer) - Buildings containing safety related systems, having openings in exterior walls closer than 50 feet to flammable oil filled transformers should be protected from the effects of a fire by:

(i) closing of the opening to have fire resistance equal to three hours,

(ii) constructing a three-hour fire barrier between the transformers and the openings; or

(iii) closing the opening and providing the capability to maintain a water curtain in case of a fire."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

Building 10 is within 50 feet of two separate locations having outside transformers. Building 10 walls are fire rated, and the walls have protected openings. The outside transformers have fire protection in the form of water deluge systems. Backup fire protection is in the form of two separate exterior hose houses. Finally, transformer oil and firewater would drain away from Building 10 walls.

A louvered ventilation system supply air opening in the Turbine Building south wall is approximately 30 feet from the oil-cooled Reserve Auxiliary Transformer. The transformer is protected with an automatic water deluge system. The 4160V switchgear cabinet (nonsafety related) separates the transformer from the Turbine Building, providing a substantial fire barrier.

The two Standby Diesel Generator Rooms are located inside the Turbine Building, 20 feet away and one level below the wall opening. All other safety-related equipment items are at least 75 feet from the wall opening. The Standby Diesel Generator Rooms are constructed of reinforced concrete walls and roof having a fire rating of at least 3 hours. In addition, automatic total flooding CO2 systems are installed in the Diesel Generator Rooms. Diesel fuel oil supply lines and the generator output cables are routed underground.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.1.(i) (Floor Drains) - Floor drains, sized to remove expected fire fighting water flow should be provided in those areas where fixed water fire suppression systems are installed. Drains should also be provided in other areas where hand hose lines may be used if such fire fighting water could cause unacceptable damage to equipment in the area. Equipment should be installed on pedestals, or curbs should be provided as required to contain water and direct it to floor drains. (See NFPA 92M 'Waterproofing and Draining of Floors.') Drains in areas containing combustible liquids should have provisions for preventing the spread of the fire throughout the drain system. Water drainage from areas which may contain radioactivity should be sampled and analyzed before discharge to the environment.

In operating plants or plants under construction if accumulation of water from the operation of new fire suppression systems does not create unacceptable consequences, drains need not be installed."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

Drains in the Turbine Lube Oil Rooms are plugged to preclude environmental oil contamination.

Use of fixed water supression in the Auxiliary Electric Room and the 480 Volt Switchgear Room falls under the second paragraph of this guideline. Firefighting procedures concerning the manual initiation of fixed systems and hand hoses assures no unacceptable consequences.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.1.(j) (Separation of Safe Shutdown Equipment) - Floors, walls and ceilings enclosing separate fire areas should have minimum fire rating of three hours. Penetrations in these fire barriers, including conduits and piping, should be sealed or closed to provide a fire resistance rating at least equal to that of the fire barrier itself. Door openings should be protected with equivalent rated doors, frames and hardware that have been tested and approved by a nationally recognized laboratory. Such doors should be normally closed and locked or alarmed with alarm and annunciation in the control room. Penetrations for ventilation system should be protected by a standard 'fire door damper' where required. (Refer to NFPA 80, 'Fire Doors and Windows').

The fire hazard in each area should be evaluated to determine barrier requirements. If barrier fire resistance cannot be made adequate, fire detection and suppression should be provided, such as:

(i) water curtain in case of fire,

(ii) flame retardant coatings,

(iii) additional fire barriers."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

The Fire Hazards Analysis (Section FP.3) lists each fire area and describes the compliance with 10CFR50 Appendix R regarding separation of Fire Protection Shutdown/Cooldown equipment. Table 2.8-1 lists all of the fire areas and the minimum fire ratings of floors, walls, ceilings, penetrations, fire doors, and dampers. Table 2.8-1 also identifies if the construction of that fire area complies with 10CFR50 Appendix R or has been granted an exemption.

The separation and protection of redundant Fire Protection Shutdown/Cooldown equipment at FSV and Appendix R exemption requests are described in Section FP.5.4.2. FSV compliance with NFPA 80 (1974) is described in FP.5.5.26.

These exemption requests were approved by the NRC in Section FP.5.6.8.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.2. Control of Combustibles

(a). Safety related systems should be isolated or separated from combustible materials. When this is not possible because of the nature of the safety system or the combustible material, special protection should be provided to prevent a fire from defeating any safety system function. Such protection may involve a combination of automatic fire suppression, and construction capable of withstanding and containing a fire that consumes all combustibles present. Examples of such combustible materials that may not be separable from the remainder of its system are:

(1) Emergency diesel generator fuel oil day tanks.

(2) Turbine-generator oil and hydraulic control fluid systems.

(3) Reactor coolant pump lube oil system."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the exception of items c, d and f listed below.

Within Building 10, safety-related systems are separated from station-wide combustible materials by fire rated construction. The safety-related systems within Building 10 are composed of cables and electrical equipment. These are minimal in terms of quantity of combustibles and associated fire hazard and are protected by an automatic fire suppression system throughout the area. Further, these redundant safety systems are also separated from each other by fire rated barriers.

Other FSV areas where combustible materials are located near safety-related equipment are identified as follows:

a. Standby Diesel Generator Fuel Oil Day Tank

b. Charcoal Filters in Reactor Building and Control Room Ventilation System

c. Hydraulic Oil Operated Steam Valves (no fixed suppression provided)

d. Hydraulic Power Units (no fixed suppression provided)

e. Turbine Lube Oil Storage Rooms

f. Diesel Driven Fire Water Pump Diesel Oil Day Tank (no fixed suppression provided)

g. Turbine Driven Boiler Pump Lube Oil Systems

Rated fire barriers or automatic suppression and detection systems are provided for the protection of these areas.

PSC has determined that existing supression and detection methods for the Hydraulic Oil Operated Steam Valves is adequate, and has been demonstrated effective during the fire of October 2-3, 1987. Furthermore, modifications have been made to shield hot surfaces from possible oil leaks (Ref. 3).

The turbine generator electro-hydraulic power and control unit uses "Fyrequel", a phosphate ester type fire-resistant hydraulic fluid. Because of its fire resistant characteristic, this unit is protected by local hose water stations and CO2 hole reel station. No additional protection is considered necessary.

The Diesel Driven Fire Water Pump Diesel Day Tank has no automatic suppression but a fire in this area can be extinguished using outside fire hydrants. Furthermore, the fire pumps are not in the normal shutdown train.

The FSV circulators do not have a lube oil system.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.2.(b) (Bulk Gas Storage) - Bulk gas storage (either compressed or cryogenic) should not be permitted inside structures housing safety-related equipment. Storage of flammable gas such as hydrogen, should be located outdoors or in separate detached buildings so that a fire or explosion will not adversely affect any safety related systems or equipment. (Refer to NFPA 50A. 'Gaseous Hydrogen Systems.')

Care should be taken to locate high-pressure gas storage containers with the long axis parallel to building walls. This will minimize the possibility of wall penetration in the event of a container failure. Use of compressed gases (especially flammable and fuel gases) inside buildings should be controlled. (Refer to NFPA 6, 'Industrial Fire Loss Prevention.')"

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exception:

Bulk gas storage for hydrogen, which is used in the turbine-generator, does not meet this guideline and is in the process of being relocated outside the Turbine Building. It will comply with the applicable requirements of NFPA 50A (1978). FSV compliance with NFPA 50A (1978) is described in Section FP.5.5.18.

Bulk gas storage is maintained for hydrogen, nitrogen, helium and carbon dioxide outside the plant buildings. Nitrogen gas is stored in the Reactor Building (level 11). Helium and nitrogen gas are stored throughout the plant. The long axis of the helium storage bottles in the Helium Storage Building is parallel to the Reactor Building walls.

There are six liquid nitrogen tanks in the Reactor Building which supply liquid nitrogen to the four Moisture Monitors and the Low Temperature Adsorbers. The Liquid Nitrogen Storage Tank has a 1280 gal. volume; the Liquid Nitrogen Surge Tank has a 200 gal. volume; and the four moisture Monitor Nitrogen Supply Tanks have a 66 gal. volume each.

FSV compliance with NFPA 6 (1974) is described in Section FP.5.5.3.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.2.(c) (Control of Combustibles) - The use of plastic materials should be minimized. In particular, halogenated plastics such as polyvinyl chloride (PVC) and neoprene should be used only when substitute non-combustible materials are not available. All plastic materials, including flame and fire retardant materials, will burn with an intensity and BTU production in a range similar to that of ordinary hydrocarbons. When burning, they produce heavy smoke that obscures visibility and can plug air filters, especially charcoal and HEPA. The halogenated plastics also release free chlorine and hydrogen chloride when burning which are toxic to humans and corrosive to equipment."

FSV CONFIRMANCE WITH GUIDELINES

This guideline has been met.

The use of plastic materials was limited to items which were available only in plastic (e.g., cables, wiring, computer parts, circuit cards, etc). PVC piping is installed on level 5 and 6 of the Turbine Building. These materials were incorporated into the fire hazards analysis fire loading estimates. Additionally, a minimal amount of vinyl film vapor seal material is used to cover fiberglass insulation on some of the Turbine and Reactor Building HVAC ducts. Contribution to fire loading by PVC is estimated to be less than 114 BTU/SQ.FT.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.2.(d) (Storage of Combustible Liquids) - Storage of flammable liquids should as a minimum, comply with the requirements of NFPA 30, 'Flammable and Combustible Liquids Code.'"

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exception:

FSV compliance with NFPA 30 (1973) and exceptions taken are described in Section FP.5.5.16.

The following is a list of the major flammable and combustible liquids which are stored at FSV:

Type	Quantity	Location	Fire Protection
Fuel Oil			
Fuel Oil Storage Tanks	Two tanks 20,000 gals. each	Underground	None required
Diesel Fuel Oil Storage Tank	One tank 10,000 gals.	Underground	None required
Emergency Diesel Generator Day Tanks*	Two tanks 550 gals. each	Turbine Bldg. inside 3-hour rated construction	Automatic Flooding CO2
Fire Pump Day Tank	One tank 850 gals.	Fire Pump House	Fire-Rated Enclosure Separate from the Diesel Driven Fire Water Pump
Lubricating Oil			
Turbine L.O. Reservoir	One tank 4,700 gals.	Turbine Bldg. L.O. Reservoir Room inside 3-hour rated construction	Automatic Water Deluge

* The Emergency Diesel Generator Day Tanks will be upgraded to meet NFPA 30 by fire rating its supports.

Type	Quantity	Location	Fire Protection
Turbine L.O. Storage	One tank 16,000 gals.	Turbine Bldg. L.O. Storage Room inside 3-hour rated construction	Automatic Water Deluge
Boiler Feed Pump Turbine L.O. Storage Tanks	Two tanks 1,000 gals. each	Turbine Bldg. BFP Units	Wet Pipe Sprinkler
Hydraulic Oil			
Hydraulic Power Units	Two units 500 gals.	Reactor Bldg. 4740'-6"	Wet Pipe Sprinkler
He Circulator Turntable Oil Reservoir	One tank 1,250 gals.	Reactor Bldg. 4712'-6"	Wet Pipe Sprinkler
Electro Hydraulic Control Unit*	One Tank 750 gals.	Turbine Bldg. 4791'	Fire Detectors CO_2 Hose Stations
Generator Seal Hydrogen Detraining Unit	Approx. 250 gals.	Turbine Bldg. 4749'	Wet Pipe Sprinkler

*The turbine generator electro-hydraulic power and control unit uses "Fyrequel", a phosphate ester type fire-resistant hydraulic fluid. Because of its fire resistant characteristic, this unit is protected by local hose water stations and a CO_2 hose reel station. No additional protection is considered necessary.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.3. Electric Cable Construction, Cable Trays, and Cable Penetrations

(a) (Cable Trays) - Only noncombustible materials should be used for cable tray construction."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

All electrical cable trays are constructed of steel.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.3.(b) (Cable Spreading Room) - See Section F.3 for fire protection guidelines for cable spreading rooms."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met by alternative means.

FSV does not have a separate cable spreading room, except those FSV equivalents as described in Section "F.3". The congested cable area along the "G" wall and the "J" wall of the Turbine and Reactor Buildings are protected by a closed head, automatically activated water spray system, smoke detectors, fire retardant cable coatings, and metal cable tray coverings. This combination of fire protection features was reviewed and approved by the NRC, as noted in Section FP.5.6.8.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.3.(c) (Cable Tray Protection) - Automatic water sprinkler systems should be provided for cable trays outside the cable spreading room. Cables should be designed to allow wetting down with deluge water without electrical faulting. Manual hose stations and portable hand extinguishers should be provided as backup. Safety related equipment in the vicinity of such cable trays, that does not itself require water fire protection, but is subject to unacceptable damage if wetted by sprinkler water discharge, should be protected from sprinkler system operation or malfunction.

When safety related cables do not satisfy the provisions of Regulatory Guide 1.75, all exposed cables should be covered with an approved fire retardant coating and a fixed automatic water fire suppression system should be provided."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

Cable trays have been considered in the fire hazard analysis and, in areas outside of the congested cable area, are not sufficient in number or have a sufficiently low fire loading to justify the absence of an automatic water sprinkler protection over the trays. The cables installed are able to be wetted down via a fire hose without electrical faulting.

There is a possibility that some safety-related equipment will receive some water damage due to the automatic sprinkler system at the G and J walls. This automatic sprinkler system was installed due to an NRC requirement stating "To assure that a fire at the G and J walls will not result in the loss of normal cooling systems and the ACM, the existing manually activated sprinkler systems in these areas shall be converted to an automatic ("pre-action" or "wet pipe") sprinkler system that complies with the guidelines contained in NFPA 13." This requirement is detailed in Reference 2. During initial installation of the fixed suppression system, selected electrical equipment was equipped with spray shields to minimize exposure to water.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.3.(d) (Cable and Cable Tray Penetrations) - Cable and cable tray penetration of fire barriers (vertical and horizontal) should be sealed to give protection at least equivalent to that fire barrier. The design of fire barriers for horizontal and vertical cable trays should, as a minimum, meet the requirements of ASTM E-119, 'Fire Test of Building Construction and Materials,' including the hose stream test.

Where installed penetration seals are deficient with respect to fire resistance, these seals may be protected by covering both sides with an approved fire retardant material. The adequacy of using such material should be demonstrated by suitable testing."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

The cable and cable tray penetrations in the 3-hour fire rated barriers are specified to be:

1. U.L. listed design tested to ASTM E-119 (Revision at time of testing) fire test method.

2. Dow Corning silicone foam or equal.

3. Installed by an approved applicator.

Documentation is available for all seals required to comply with ASTM E-119, except for certain seals which were exempted by the NRC as noted in Section FP 5.6.7.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.3.(e) (Fire Breaks) - Fire breaks should be provided as deemed necessary by the fire hazards analysis. Flame or flame retardant coatings may be used as a fire break for grouped electrical cables to limit spread of fire in cable ventings. (Possible cable derating owing to use of such coating materials must be considered during design.)"

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

Fire breaks (as deemed necessary in Section FP.3 Fire Hazards Analysis) have been reviewed for compliance with ASTM E-119 (Revision at time of testing) guidelines.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.3.(f) (Electric Cable) - Electric cable constructions should, as a minimum, pass the current IEEE No. 383 flame test. (This does not imply that cables passing this test will not require additional fire protection.)

For cable installation in operating plants and plants under construction that do not meet the IEEE 383 flame test requirements, all cables must be covered with an approved flame retardant coating and properly derated."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

PSC has not subjected the type of electrical cable used at FSV to the IEEE 383 flame test requirements. As a result of other concerns, a flame retardant coating of Flamemastic 71A or asbestos cloth has been applied in congested cable areas. This fire protection measure, which retards the spread of fire between electric cables serving redundant safety-related equipment and prevents the loss of redundant circuits due to an exposure fire, has been reviewed and accepted by the NRC for full plant operation, as noted in Section FP.5.6.1. Cables have been purchased since the original cable audit to IEEE 383 (1974) or U.L. Standard VW-1, as shown in the cable specification 93-I-170. Cables purchased and installed before the cable audit have an exemption from the NRC, as noted in Section FP.5.6.1. These cables were tested by various labs (Wyle, G.A.) and were proven to be acceptable to the NRC.

PSC is negotiating an exemption that all cables pass the IEEE 383(1974) flame test or be covered with an approved flame retardent in the non-congested cable areas. Reference 4 submitted PSC's position and is under evaluation by the NRC. Once this issue is resolved the FPPP will be revised in the next update to provide the results of this negotiation and any exemptions granted.

The installed cable in Building 10 meets IEEE 383. Plans are in process for the installation of instrumentation racks in Building 10. The wiring for these racks, although not required to meet IEEE 383, will (per the FSAR, Revision 2, Section 8.2.7.3) be "fire retardant" as defined by the U.L. VW-1 Vertical Flame Test or will meet IEEE 383.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.3.(g) (Corrosive Gases From Cables) - To the extent practical cable construction that does not give off corrosive gases while burning should be used. Applicable to new cable installations."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met for new cable installations.

New cables are specified to be IEEE 383 (1974) or U.L. VW-1.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.3.(h) (Cable Tray Uses) - Cable trays, raceways, conduit, trenches or culverts should be used only for cables. Miscellaneous storage should not be permitted nor should piping for flammable or combustible liquids or gases be installed in these areas.

Installed equipment in cable tunnels or culverts, need not be removed if they present no hazard to the cable runs as determined by the fire hazards analysis."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

All FSV cables are installed in either cable trays, raceways, or conduits used exclusively for cables and contain no materials other than fire retardant coatings.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.3.(i) (Smoke Venting) - The design of cable tunnels, culverts and spreading room should provide for automatic or manual smoke venting as required to facilitate manual fire fighting capability."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

FSV has no cable tunnels or culverts within the plant. Smoke venting is provided in the cable spreading rooms (Auxiliary Electrical Equipment Room and the 480V Switchgear Room), per Section FP.2.6.2.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.3.(j) (Control Room Wiring) - Cables in the control room should be kept to the minimum necessary for operation of the control room. All cables entering the control room should terminate there. Cables should not be installed in floor trenches or culverts in the control room. Existing cabling installed in concealed floor and ceiling spaces should be protected with an automatic total flooding halon system."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

The fire protection provisions in this area of FSV have been reviewed, upgraded, and accepted by the NRC in SER Amendments 14 and 18 (Sections FP.5.6.1 and FP.5.6.2).

APPENDIX A TO BTP 9.5-1, REV. 1

"D.4. Ventilation

(a) The products of combustion that need to be removed from a specific fire area should be evaluated to determine how they will be controlled. Smoke and corrosive gases should generally be automatically discharged directly outside to a safe location. Smoke and gases containing radioactive materials should be monitored in the fire area to determine if release to the environment is within the permissible limits of the plant Technical Specifications

The products of combustion which need to be removed should be evaluated to determine how they will be controlled."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

The ventilation system for each building containing safety-related equipment and the products of combustion that need to be removed during a fire was evaluated to ensure that the combustion products will be safely removed. The present ventilation system design in each building is considered adequate for removing the products of combustion anticipated during a fire. Redundant area and reactor building ventilation exhaust radiation monitoring systems provide assurance that Technical Specification requirements are met and compliance 10CFR20 limits are monitored.

APPENDIX A TO BTP 9.5-1, REV.1

"D.4.(b) Any ventilation system designed to exhaust smoke or corrosive gases should be evaluated to ensure that inadvertent operation or single failures will not violate the controlled areas of the plant design. This requirement includes containment functions for protection or the public and maintaining habitability for operations personnel."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

The Reactor Building Ventilation System has provisions for monitoring airborne radioactivity and the capability to filter the discharged air through HEPA and charcoal bed filters to ensure that releases to the environment are within the permissible limits of the plant Technical Specifications. During a fire, the area can also be monitored by portable equipment to determine if radioactive material is present.

Ionization smoke detectors are installed in the Building 10 ventilation system as well as throughout Building 10. This system will shut off the ventilation system in the event of a fire/smoke signature. Hence, the fresh air intakes will not draw in combustion contaminated air.

Section FP.2.6.3 discusses the Appendix R evaluation of HVAC equipment.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.4.(c) The power supply and controls for mechanical ventilation systems should be run outside the fire area served by the system."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has not been met.

The original "open space" HVAC design and the large fire areas employed at FSV negate the routing of HVAC controls per the guidelines of this BTP 9.5-1 position. The FSV Appendix R analysis demonstrates the availability of HVAC for shutdown/cooldown required actions.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.4.(d) Fire suppression systems should be installed to protect charcoal filters in accordance with Regulatory Guide 1.52, 'Design Testing and Maintenance Criteria for Atmospheric Cleanup Air Filtration.'"

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exception:

The Reactor Plant Exhaust Filters are protected by fixed water spray systems that are automatically actuated by a thermal detection system. These systems meet the requirements of Regulatory Guide 1.52 (Rev. 2).

The criteria of Regulatory Guide 1.52 (Rev. 2) states that charcoal filter units which are considered "Engineered Safety Features" (Engineered Safeguards) be protected by a water spray system of some design. It also states that access and occupancy of the Control Room under accident conditions and for the duration of the accident shall not expose personnel to radiation in excess of 5 rems to the whole body. In regard to the Control Room HVAC system charcoal filters (F-7503 and F-7504), neither of which are listed as Engineered Safeguards in the FSAR, no water spray systems are provided. The highest whole body dose that control room operators could receive as the result of accident conditions is about 2.9 Rem from a permanent loss of forced circulation accident, which could result from a major fire in a congested cable area. This 180 day dose is discussed in FSAR Section D.1.1.3, and is based on the occupancy factor provided in Section 6.4 of NRC's Standard Review Plan. A primary coolant leak rate of 6 lbs/sec out of the PCRV results in the maximum activity concentration in the Reactor Building and an integrated whole body dose to the control room operators of approximately 1.0 Rem (FSAR Section 11.2.2.6). It has also been shown through actual test that acceptable room ambient temperatures can be maintained during a prolonged (12 hour) ventilation system shutdown. Furthermore, a breathing air hose line system is available in the Control Room as a backup.

PSC considers the present system design adequate.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.4.(e) The fresh air supply intakes to areas containing safety related equipment or systems should be located remote from the exhaust air outlets and smoke vents of other fire areas to minimize the possibility of contaminating the intake air with the products of combustion."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

Sufficient separation is provided between supply air intakes and exhaust air outlets to minimize the possibility of contaminating the intake air with products of combustion.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.4.(f) Stairwells should be designed to minimize smoke infiltration during a fire. Staircases should serve as escape routes and access routes for fire fighting. Fire exit routes should be clearly marked. Stairwells, elevators and chutes should be enclosed in masonry towers with minimum fire rating of three hours and automatic fire doors at least equal to the enclosure construction, at each opening into the building. Elevators should not be used during fire emergencies. Where stairwells or elevators cannot be enclosed in three-hour fire rated barrier with equivalent fire doors, escape and access routes should be established by pre-fire plans and practiced in drills by operating and Fire Brigade personnel."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

Enclosed stairways (stairwells) were not provided in the original FSV design concept. Open stairways are a part of the open floor grating design to enhance ventilation. They were not designed to minimize smoke infiltration between floor levels.

The present stairwells are acceptable since multiple sets of stairs are provided in each building, serving as both fire escape and access routes. These escape and access routes are established by the pre-fire plans and are practiced in drills by the Fire Brigade. Equipment Operators, Auxiliary Tenders, Health Physics Technicians, and selected security personnel are members of the Fire Brigade. Also, stairway locations are provided in GET. Elevators are only used for transporting equipment in the event of a fire emergency. Where the direction of exit is not apparent, appropriate signs have been added at the stairways to identify floor elevations (levels) and fire exit direction. A sign has not been provided for Level 5 in the

Reactor Building; however, egress from the Reactor Building Level 5 is specifically covered in GET.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.4.(g) Smoke and heat vents may be useful in specific areas such as cables spreading rooms and diesel fuel oil storage areas and switchgear rooms. When natural convection ventilation is used, a minimum ratio of 1 sq. foot of venting area per 200 sq. feet of floor area should be provided. If forced-convection ventilation is used, 300 CFM should be provided for every 200 sq. feet of floor area. See NFPA No. 204 for additional guidance on smoke control."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

FSV compliance with NFPA 204 (1968) is described in Section FP.5.5.31.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.4.(h) Self-contained breathing apparatus, using full face positive pressure masks, approved by NIOSH (National Institute for Occupational Safety and Health-approval formerly given by the U.S. Bureau of Mines) should be provided for Fire Brigade, damage control, and Control Room personnel. Control Room personnel may be furnished breathing air by a manifold system piped from a storage reservoir if practical. Service or operating life should be a minimum of one-half hour for the self-contained units. At least two extra air bottles should be located on-site for each self-contained breathing unit. In addition, an on-site 6-hour supply of reserve air should be provided and arranged to permit quick and complete replenishment of exhausted supply air bottles as they are returned. If compressors are used as a source of breathing air, only units approved for breathing air should be used. Special care must be taken to locate the compressor in areas free of dust and contaminants."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

Sixteen (16) self-contained breathing apparatus are provided at FSV for use by the Fire Brigade and Control Room personnel. Each breathing apparatus is provided with a full face positive pressure mask approved by National Institute Occupational Safety and Health (NIOSH). Each breathing apparatus is provided with one in-service air cylinder and one spare air cylinder. The service (or operating) life of each cylinder is expected to be one-half hour, providing a 16-hour ready supply of portable (self-contained) breathing air at the station.

A breathing air compressor system provides an unlimited supply of cylinder recharging air. The system includes two redundant compressor trains designed and approved for breathing air service. The air receivers are equipped to quickly recharge the spent air cylinders used with the self-contained air breathing apparatus.

APPENDIX A TO BTP 9.5-1, REV. 1

> "D.4.(i) Where total flooding gas extinguishing systems are used, area intake and exhaust ventilation dampers should close upon initiation of gas flow to maintain necessary gas concentration. (See NFPA 12, 'Carbon Dioxide Systems,' and 12A, 'Halon 1301 Systems.')"

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

Total flooding CO_2 gas extinguishing systems are provided in the two Emergency Diesel Generator Rooms. Pneumatically operated supply air and return air ventilation dampers will automatically close upon signal from the CO_2 control system.

Total flooding Halon gas extinguishing systems are provided in Building 10 and the Three Room Control Complex. Supply air and return air ventilation dampers will automatically close upon a signal from the Halon fire suppression system.

FSV compliance with NFPA 12 (1980) and NFPA 12A (1977) is described in Sections FP.5.5.7 and FP.5.5.8.

APPENDIX A TO BTP 9.5-1, REV. 1

"D.5. Lighting and Communications - Lighting and two way voice communication are vital to safe shutdown and emergency response in the event of fire. Suitable fixed and portable emergency lighting and communication devices should be provided to satisfy the following requirements:

(a) Fixed emergency lighting should consist of sealed beam units with individual 8-hour minimum battery power supplies.

(b) Suitable sealed beam battery powered portable hand lights should be provided for emergency use.

(c) Fixed emergency communication should use voice powered head sets at pre-selected stations.

(d) Fixed repeaters installed to permit use of portable radio communication units should be protected from exposure fire damage."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

(a) An emergency lighting system consisting of 8-hour battery-powered lighting units and ACM-fed hardwired lights is provided. (See Section FP.2.5.2) An exemption from Section III.J of Appendix R has been requested and granted (see Section FP.5.6.4).

(b) Yard lighting is provided by the Security Lighting System. These lights are fed by the ACM (backup feed), in the event of a loss of outside power. The switchover to ACM must be done manually within 30 minutes. In addition the operations personnel will carry flashlights to access the ACM Switchgear and provide backup to lighting per the NRC SER (See Section FP.5.6.8) and Appendix R Compliance Report 4, Section 2.

(c,d) During a fire situation, the Fire Brigade leader will ensure adequate communications exist at the assembly area. Normally, communications will be maintained by portable radio transceivers. In the event that these transceivers become inoperative during a fire situation, emergency communications will be provided by the station's GAI-tronics (AC-powered) public address system.

Locations where manual shutdown/cooldown actions are required may be local "dead spots" for portable radio communications. The operator, if required to communicate, with the Control Room, will relocate to establish

necessary communications.

APPENDIX A TO BTP 9.5-1, REV. 1

"E. Fire Detection and Suppression

1. Fire Detection

(a) Fire detection systems should as a minimum comply with NFPA 72D, 'Standard for the Installation, Maintenance and Use of Proprietary Protective Signaling Systems.' Deviations from the requirements of NFPA 72D should be identified and justified.

(b) Fire detection system should give audible and visual alarm and annunciation in the control room. Local audible alarms should also sound at the location of the fire.

(c) Fire alarms should be distinctive and unique. They should not be capable of being confused with any other plant system alarms.

(d) Fire detection and actuation systems should be connected to the plant emergency power supply. Deviations from the requirements of NFPA 72D should be identified and justifed."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

The fire detection system installed as part of the Three Room Control Complex Fire Protection Improvement Program complies with the intent of NFPA 72A (1979), "Standard for Local Protective Signaling Systems." This system meets the requirements specified in Attachment No. 3 of PSC letter P-75024, dated December 15, 1975, and has been approved by the NRC, as noted in FP.5.6.4.

The detection system installed in Building 10, as well as the portions of the Reactor and Turbine Buildings that will be upgraded for Appendix R, are designed and installed in accordance with NFPA Codes 72D (1979) and 72E (1984). FSV compliance with these codes is discussed in Sections FP.5.5.23 and FP.5.5.24.

APPENDIX A TO BTP 9.5-1, REV. 1

"E.2. Fire Protection Water Supply Systems

(a) (Underground Fire Main Loop) - An underground yard fire main loop should be installed to furnish anticipated fire water requirements. NFPA 24 - Standard for Outside Protection - gives necessary guidance for such installation. It references other design codes and standards developed by such organizations as the American National Standards Institute (ANSI) and the American Water Works Association (AWWA). Lined steel or cast iron pipe should be used to reduce internal tuberculation. Such tuberculation deposits in an unlined pipe over a period of years can significantly reduce water flow through the combination of increased friction and reduced pipe diameter. Means for treating and flushing the systems should be provided. Approved visually-indicating sectional control valves, such as Post Indicator Valves, should be provided to isolate portions of the main for maintenance or repair without shutting off the entire system. The fire main system piping should be separate from service or sanitary water system piping. For operating plants, fire main system piping that can be isolated from service or sanitary water system piping is acceptable."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

The underground fire main loop meets the intent of NFPA No. 24, (1977). FSV compliance with this code is discussed in Section FP.5.5.14.

The underground fire main is flushed periodically through appropriate fire hydrants and indoor hose stations. This maintenance and surveillance testing provide for verification that system flow rate requirements are maintained.

Approved post indicator type valves are provided in the yard main and in supply headers to the buildings to allow for isolating portions of the piping system during maintenance and repair periods without shutting off the entire system. These valve locations are shown on Figures 2.2-1 and 2.2-2.

The fire water system piping is normally separated from all other piping systems by dual isolation valves and a telltale drain or by blind flange. Opening these valves provides fire water as emergency backup to portions of the service water and reactor plant cooling water systems serving certain essential equipment in the turbine plant and reactor plant, respectively. In an emergency, the fire water system serves as the third source to the feedwater system as a

water supply to the steam generators and the helium circulator water turbine drives.

APPENDIX A TO BTP 9.5-1, REV. 1

"E.2.(b) (Common Fire Main for Multi-Unit Site) - A common yard fire main loop may serve multi-unit nuclear power plant sites, if cross-connected between units. Sectional control valves should permit maintaining independence of the individual loop around each unit. For such installations, common water supplies may also be utilized. The water supply should be sized for the largest single expected flow. For multiple reactor sites with widely separated plants (approaching 1 mile or more), separate yard fire main loops should be used. Sectionalized systems are acceptable."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

Not applicable since FSV is a one reactor site.

APPENDIX A TO BTP 9.5-1, REV. 1

"E.2.(c) (Pumps) - If pumps are required to meet system pressure or flow requirements, a sufficient number of pumps should be provided so that 100 percent capacity will be available with one pump inactive (e.g., three 50 percent pumps or two 100 percent pumps). The connection to the yard fire main loop from each fire pump should be widely separated, preferably located on opposite sides of the plant. Each pump should have its own driver with independent power supplies and control. At least one pump (if not powered from the emergency diesels) should be driven by non-electrical means, preferably diesel engine. Pumps and drivers should be located in rooms separated from the remaining pumps and equipment by a minimum three-hour fire wall. Alarms indicating pump running, driver availability, or failure to start should be provided in the control room.

Details of the fire pump installation should as a minimum conform to NFPA 20, 'Standard for the Installation of Centrifugal Fire Pumps.'"

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

FSV does not completely conform to NFPA 20 (1978) for the fire pumps. The exceptions to NFPA 20 (1978) are discussed in Section FP.5.5.13.

Two redundant 100 percent capacity fire pumps are provided. Each pump has its own driver with independent power supplies and controls. One pump is electric motor driven; the other pump is diesel engine driven. Alarm annunciation is provided in the Control Room for each pump. Alarms are available for the electric motor driven pump to indicate an auto start and breaker trip. Alarms available for the diesel engine driven pump are a running alarm and trouble alarm. The trouble alarm consists of loss of battery A or B, failure to start.

Each pump and its driver is located in a separate room separated by a minimum 3-hour fire rated concrete wall. The electric motor driven pump room is entirely three hour rated (dampers, door, and penetrations). A separate discharge header from each pump connects to the yard fire main loop. The two connection points are bounded by valves for maximum system flexibility during normal system operation and periods of system maintenance.

Power cables for the electric pump do run through the diesel pump side, however the electric pump can still be operated using ACM power. Control cables that run between the two rooms have been evaluated and their failure would not adversely affect operation of the motor drive fire pump. The ACM power cable (cable 794) for N-4501 runs from the ACM 480V switchgear (N-4868, compt.C2) directly to the electric fire water pump room, via underground duct. This cable does not go through the diesel side of the fire water pump house. When the pump is powered by ACM power the control and power cables used during normal power operation are not needed and are not a factor in the pump's operation.

APPENDIX A TO BTP 9.5-1, REV. 1

"E.2.(d) (Redundant Water Sources) - Two separate reliable water supplies should be provided. If tanks are used, two 100 percent (minimum of 300,000 gallons each) system capacity tanks should be installed. They should be so interconnected that pumps can take suction from either or both. However, a leak in one tank or its piping should not cause both tanks to drain. The main plant fire water supply capacity should be capable of refilling either tank in a minimum of eight hours.

Common tanks are permitted for fire and sanitary or service water storage. When this is done, however, minimum fire water storage requirements should be dedicated by means of a vertical standpipe for other water services."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

Fire water is supplied from two storage ponds.

APPENDIX A TO BTP 9.5-1, REV. 1

"E.2.(e) (Flow Rate) - The fire water supply (total capacity and flow rate) should be calculated on the basis of the largest expected flow rate for a period of two hours, but not less than 300,000 gallons. This flow rate should be based (conservatively) on 1,000 gpm for manual hose streams plus the greater of:

(1) all sprinkler heads opened and flowing in the largest designed fire area; or

(2) the largest open head deluge system(s) operating."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

The fire water system design flow rate is 1500 gpm at 125 psig TDH.

The largest wet pipe sprinkler system flow rate is 562 gpm at 85 psig for simultaneous use of two adjacent spray water zones at the Reactor Building "J" wall. The fire water system is capable of maintaining the required pressure and flow to these spray water zones with the system supplying an additional 938 gpm to hose stations.

The largest open head deluge system demand is 7t gpm at 75 psig to the main power transformer and unit auxiliary transformer. The tripping system for these two independent deluge systems are interlocked to actuate both systems in the event of a fire at either one. The fire water system is capable of maintaining the required pressure and flow to these common deluge systems with the system supplying an additional 740 gpm to hose stations. Water available to hose water stations is considered more than adequate to meet any demand, since the available flow represents the use of 12 inside hose stations at their maximum rated flow of 60 gpm each.

The fire water supply is in excess of 20 million gallons.

APPENDIX A TO BTP 9.5-1, REV. 1

"E.2.(f) (Lakes) - Lakes or fresh water ponds of sufficient size may qualify as sole source of water for fire protection, but require at least two intakes to the pump supply. When a common water supply is permitted for fire protection and the ultimate heat sink, the following conditions should also be satisfied:

(1) The additional fire protection water requirements are designed into the total storage capacity; and

(2) Failure of the fire protection system should not degrade the function of the ultimate heat sink."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

The fire water pumps draw water from two pump pits located beside the main cooling tower basin. The water levels in the pump pits are automatically maintained by two makeup water lines. The circulating water makeup system is designed to account for at least 1500 gpm for fire water use in addition to cooling tower makeup. The fire water pump pits can be isolated from the cooling water basin and kept full during periods of tower maintenance. Failure of the fire protection system will not degrade circulating water makeup to the cooling tower basin.

APPENDIX A TO BTP 9.5-1, REV. 1

"E.2.(g) (Yard Hydrant System) - Outside manual hose installation should be sufficient to reach any location with an effective hose stream. To accomplish this hydrants should be installed approximately every 250 feet on the yard main system. The material to each hydrant from the yard main should be controlled by a visually indicating or key operated (curb) valve. A hose house, equipped with hose and combination nozzle, and other auxiliary equipment recommended in NFPA 24, 'Outside Protection', should be provided as needed but at least every 1,000 feet.

Threads compatible with those used by local fire departments should be provided on all hydrants, hose couplings and standpipe risers."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

Fire hydrants located in the yard area tie into the underground yard main. The hydrants are spaced no more than 250 feet on the yard main system. Underground fire water isolation valves in the yard header are provided with post indication. A hose house is provided for each hydrant. Hose houses meet the intent of NFPA 24 (1977). The hydrant houses are equipped with solid stream nozzles (play pipes) and "All Fog" nozzles. The yard hydrant hoses will reach equipment or building areas where safety-related or Fire Equipment is located.

Threads on hydrant and hose couplings are National Standard threads and are compatible with the local fire department.

The hydrant system does not provide coverage for trailers located on the east side of the protected area. Fire coverage for these trailers is provided by the local fire department. This is considered acceptable since loss of these trailers will not affect operability of plant equipment. The potential for combustion products to be deposited in other areas is considered in the respective area pre-fire plans which suitably address protection for these affected areas.

APPENDIX A TO BTP 9.5-1, REV. 1

"E.3. Water Sprinklers and Hose Standpipe Systems

(a) Each automatic sprinkler system and manual hose station standpipe should have an independent connection to the plant underground water main. Headers fed from each end are permitted inside buildings to supply multiple sprinkler and standpipe systems. When provided, such headers are considered an extension of the yard main system. The header arrangement should be such that no single failure can impair both the primary and backup fire protection systems.

Each sprinkler and standpipe system should be equipped with an OS&Y (outside screw and yoke) gate valve, or other approved shut off valve, and water flow alarm. Safety related equipment that does not itself require sprinkler water fire protection, but is subject to unacceptable damage if wetted by sprinkler water discharge should be protected by water shields or baffles."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

The station's indoor hose standpipes, water sprinklers, and deluge systems are supplied from an indoor fire header loop in both the Reactor Building and Turbine Building.

Each automatic sprinkler and deluge system and each hose standpipe is connected independently to the indoor headers except the three sprinkler systems located on elevation 4740'-6" in the Reactor Building, except the "G" & "J" wall sprinklers, switchgear room and 480V transformer deluge systems which are equipped with approved ball valves. These three sprinkler systems are supplied from two of the four hose standpipes. In this case, however, hose stations on this elevation supplied from the two remaining standpipes would be used (are within reach) to backup the sprinkler systems. The fire header and hose standpipes are arranged and valved so that no single failure can impair both the primary and backup fire protection system.

Each sprinkler, deluge, and standpipe supply line is equipped with an OS&Y (outside screw and yoke) type gate valve or ball valves approved for use by NRC. (See Section FP.5.6.4) Each sprinkler system, deluge supply, and hose standpipe is equipped with a flow alarm that annunciates in the Control Room.

No wet pipe sprinkler system is installed such that its accidental operation could impair safety-related equipment areas.

APPENDIX A TO BTP 9.5-1, REV. 1

"E.3.(b) (Electrically Supervised Valves) - All valves in the fire water systems should be electrically supervised. The electrical supervision signal should indicate in the control room and other appropriate command locations in the plant. (See NFPA 26 'Supervision of Valves.')

When electrical supervision of the fire protection valves is not practicable, an adequate management supervision program should be provided. Such a program should include locking valves open with strict key control; tamper proof seals; and periodic, visual check of all valves."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

All fire water system valves are either electrically supervised or under periodic visual surveillance.

APPENDIX A TO BTP 9.5-1, REV. 1

"E.3.(c) (Water Sprinklers) - Automatic sprinkler systems should as a minimum conform to requirements of appropriate standards such as NFPA 13, 'Standard for the Installation of Sprinkler Systems,' and NFPA 15, 'Standard for Water Spray Fixed Systems.'"

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

The design, installation, and testing of the wet pipe sprinkler systems and the deluge water spray systems at FSV are in accordance with portions of NPFA 13 (1976) and NFPA 15 (1973), as documented in FP.5.5.9 and FP.5.5.12.

The acceptability of the G and J wall sprinkler configuration by the NRC is documented in Section FP.5.6.8.

APPENDIX A TO BTP 9.5-1, REV. 1

"E.3.(d) (Interior Hose Stations) - Interior manual hose installation should be able to reach any location with at least one effective hose stream. To accomplish this, standpipes with hose connections equipped with a maximum of 75 feet of 1 1/2 inch woven jacket lined fire hose and suitable nozzles should be provided in all buildings, including containment, on all floors and should be spaced at not more than 100 foot intervals. Individual standpipes should be of at least 4 inch diameter for multiple hose connections. These systems should follow the requirements of NFPA 14 for sizing, spacing and pipe support requirements (NELPIA).

Hose stations should be located outside entrances to normally unoccupied areas and inside normally occupied areas. Standpipes serving hose stations in areas housing safety related equipment should have shut off valves and pressure reducing devices (if applicable) outside the area."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

1. Hose stations are spaced up to 115 feet apart.

2. Individual standpipes are 2-1/2 inch diameter for multiple hose connections and 1-1/2 inch diameter for single hose connections as specified by NFPA 14 (1978) for Class II systems. FSV compliance with NFPA 14 (1978) is described in Section FP.5.5.11.

3. A hose station is not provided on Elevation 4921' in the Access Control Bay.

4. Hose connections are equipped with approximately 100 feet of fire hose.

5. Hoses are as provided in NFPA 196 (1974) as described in Section FP.5.5.29.

APPENDIX A TO BTP 9.5-1, REV. 1

"E.3.(e) (Hose Nozzles) - The proper type of hose nozzles to be supplied to each area should be based on the fire hazard analysis. The usual combination spray/straight-stream nozzle may cause unacceptable mechanical damage (for example, the delicate electronic equipment in the Control Room) and be unsuitable. Electrically safe nozzles should be provided at locations where electrical equipment or cabling is located."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

"All Fog" (electrically safe) nozzles are used throughout the station. This type of hose nozzle is satisfactory for use in all areas of the station, based on the kinds of fire possible, the nature of the equipment located in each area, and the type of combustibles present as determined by the Fire Hazards Analysis.

APPENDIX A TO BTP 9.5-1, REV. 1

"E.3.(f) (Foam Suppression Systems) - Certain fires such as those involving flammable liquids respond well to foam suppression. Consideration should be given to use of any of the available foams for such specialized protection application. These include the more common chemical and nonchemical low expansion foams, high expansion foam and the relatively new aqueous film forming foam (AFFF)."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

Not applicable since FSV does not use foam suppression systems.

APPENDIX A TO BTP 9.5-1, REV. 1

"E.4. Halon Suppression Systems - The use of Halon fire extinguishing agents should as a minimum comply with the requirements of NFPA 12A and 12B, "Halogenated Fire Extinguishing Agent Systems - Halon 1301 and Halon 1211." Only UL or FM approved agents should be used.

In addition to the guidelines of NFPA 12A and 12B, preventative maintenance and testing of the systems including check weighing of the Halon cylinders should be done at least quarterly.

Particular consideration should also be given to:

(a) minimum required Halon concentration and soak time;

(b) toxicity of Halon;

(c) toxicity and corrosive characteristics of thermal decomposition products of Halon."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exception:

The Building 10 Halon fire extinguishing systems were designed per the requirements of NFPA 12A (1977) with exceptions listed in Section FP.5.5.8. Station procedures specify the Halon systems' preventive maintenance and testing (See Section FP.6.1). The Halon containers are spherical and come equipped with a pressure gauge to monitor the Halon contents. As part of the surveillance for Halon systems, the Halon bottles will be weighed or inspected by other acceptable means to ensure sufficient inventory.

A full-flooding Halon 1301 system is provided in the Three Room Control Complex in accordance with these requirements and has been reviewed and accepted by the NRC, as noted in FP.5.6.4 and FP.2.3.1.

APPENDIX A TO BTP 9.5-1, REV. 1

"E.5. Carbon Dioxide Suppression Systems - The use of carbon dioxide extinguishing systems should as a minimum comply with the requirements of NFPA 12, 'Carbon Dioxide Extinguishing Systems.'

Particular consideration should also be given to:

(a) minimum required carbon dioxide concentration and soak time;

(b) toxicity of carbon dioxide;

(c) possibility of secondary thermal shock (cooling) damage;

(d) offsetting requirements for venting during carbon dioxide injection to prevent overpressurization versus sealing to prevent loss of agent;

(e) design requirements from overpressurization; and

(f) possibility and probability of carbon dioxide systems being out-of-service because of personnel safety consideration. Carbon dioxide systems are disarmed whenever people are present in an area so protected. Areas entered frequently (even though duration time for any visit is short) have often been found with CO2 systems shut off."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

Total-flooding Carbon Dioxide Suppression Systems are employed in the Standby Diesel Generator Rooms.

The design, installation, and testing of these systems meet the applicable requirements of NFPA 12 (1980). FSV compliance with NFPA 12 (1980) is described in Section FP.5.5.7.

APPENDIX A TO BTP 9.5-1, REV. 1

"E.6. Portable Fire Extinguishers - Fire extinguishers should be provided in accordance with guidelines of NFPA 10 and 10A, 'Portable Fire Extinguishers, Installation, Maintenance and Use.' Dry chemical extinguishers should be installed with due consideration given to cleanup problems after use and possible adverse effects on equipment installed in the area."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

Portable fire extinguishers are provided at specific locations throughout the station. The extinguishers used at FSV meet the intent of NFPA 10 (1981) (including Appendix A) and are approved by Underwriters Laboratories. Portable carbon dioxide, Halon 1211, and dry chemical type extinguishers are used.

APPENDIX A TO BTP 9.5-1, REV. 1

"F. Guidelines for Specific Plant Areas

1. Primary and Secondary Containment

(a) (Normal Operation) - Fire protection requirements for the primary and secondary containment areas should be provided on the basis of specific identified hazards. For example:

- o Lubricating oil or hydraulic fluid system for the primary coolant pumps;
- o Cable tray arrangements and cable penetrations;
- o Charcoal filters.

Fire suppression systems should be provided based on the fire hazards analysis.

Fixed fire suppression capability should be provided for hazards that could jeopardize safe plant shutdown. Automatic sprinklers are preferred. An acceptable alternate is automatic gas (Halon or carbon dioxide) for hazards identified as requiring fixed suppression protection.

An enclosure may be required to confine the agent if a gas system is used. Such enclosures should not adversely affect safe shutdown, or other operating equipment in containment.

Automatic fire suppression capability need not be provided in the primary containment atmospheres that are inerted during normal operation. However, special fire protection requirements during refueling and maintenance operations should be satisfied as provided below."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

APPENDIX A TO BTP 9.5-1, REV. 1

"F.1.(b) (Refueling and Maintenance) - Refueling and maintenance operations in containment may introduce additional hazards such as contamination control materials, decontamination supplies, wood planking temporary wiring, welding and flame cutting (with portable compressed fuel gas supply). Possible fires would not necessarily be in the vicinity of fixed detection and suppression systems.

Management procedures and controls necessary to assure adequate fire protection are discussed in (BTP 9.5-1, Appendix A) Section 3a.

In addition, manual fire fighting capability should be permanently installed in containment. Standpipes with hose stations, and portable fire extinguishers, should be installed at strategic locations throughout containment for any required manual fire fighting operations. Equivalent protection from portable systems should be provided if it is impractical to install standpipes with hose stations.

Adequate self-contained breathing apparatus should be provided near the containment entrances for fire fighting and damage control personnel. These units should be independent of any breathing apparatus or air supply systems provided for general plant activities.'

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

Standpipes with hose stations, portable CO2, and dry chemical extinguishers are provided in the Reactor Building on all levels to provide for manual fire suppression.

Four (4) Scott Air Packs and ten (10) spare air cylinders are provided at the Reactor Building entrance (elevation 4829') for fire

fighting personnel.

APPENDIX A TO BTP 9.5-1, REV. 1

"F.2. Control Room

The Control Room is essential to safe reactor operation. It must be protected against disabling fire damage and should be separate from other areas of the plant by floors, walls and roofs having minimum fire resistance ratings of three hours.

Control Room cabinets and consoles are subject to damage from two distinct fire hazards:

(a) Fire originating within a cabinet or console; and

(b) Exposure fire involving combustibles in the general room area.

Manual fire fighting capability should be provided for both hazards. Hose stations and portable water and Halon extinguishers should be located in the control room to eliminate the need for operators to leave the control room. An additional hose piping shut off valve and pressure reducing devices should be installed outside the control room. (As an alternative), hose stations adjacent to the control room with portable extinguishers in the control room are acceptable.

Nozzles that are compatible with the hazards and equipment in the control room should be provided for the manual hose station. The nozzles chosen should satisfy actual fire fighting needs, satisfy electrical safety and minimize physical damage to electrical equipment from hose stream impingement.

Fire detection in the control room cabinets, and consoles should be provided by smoke and heat detectors in each fire area. Alarm and annunciation should be provided in the control room. Fire alarms in other parts of the plant should also be alarmed and annunciated in the control room.

Breathing apparatus for control room operators should be readily available. Control room floors, ceilings, supporting structures, and walls, including penetrations and doors, should be designed to a minimum fire rating of three hours. All penetration seals should be air tight.

Manually operated ventilation systems are acceptable.

Cables should not be located in concealed floor and ceiling spaces. All cables that enter the Control Room should terminate in the Control Room. That is, no cabling should be simply routed through the Control Room from one area to another. If such concealed spaces are used, however, they should have fixed automatic total flooding halon protection."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

The Control Room is separated from other plant areas by 1-1/2 hour fire rated construction (limited by the door construction) as described in the Fire Hazards Analysis, Section FP.3.8.

Manual fire fighting capability in the form of nearby hose reel stations and Halon 1211 portable extinguishers is available for fighting fires in the Control Room. These manual hose stations are equipped with "All Fog" nozzles as described in Section FP.5.2.E.3.(e).

Ionization fire detectors that alarm in the Control Room and a manual room flooding Halon 1301 fire suppression system are installed for the protection of the Control Room cabinets, consoles, and the general room area. Fire alarms in other parts of the plant alarm and annunciate in the Control Room as described in Section FP.2.1.

Breathing apparatus are located in the Control Room for the Control Room operators.

The Control Room ventilation system is controlled from the Control Room (See Section FP.2.6.3).

Cables that enter the Control Room terminate there.

The Control Room configuration has been reviewed and accepted by the NRC in SER amendments 14 and 18. (See Sections FP.5.6.1 and FP.5.6.2)

APPENDIX A TO BTP 9.5-1, REV. 1

"F.3. Cable Spreading Room

"(a) The preferred acceptable methods are:

(1) Automatic water system such as closed head sprinklers, open head deluge, or open directional spray nozzles. Deluge and open spray systems should have provisions for manual operation at a remote station; however, there should also be provisions to preclude inadvertent operation. Location of sprinkler heads or spray nozzles should consider cable tray sizing and arrangements to assure adequate water coverage. Cables should be designed to allow wetting down with deluge water without electrical faulting. Open head deluge and open directional spray systems should be zoned so that a single failure will not deprive the entire area of automatic fire suppression capability. The use of foam is acceptable, provided it is of a type capable of being delivered by a sprinkler or deluge system, such as an Aqueous Film Forming Foam (AFFF).

(2) Manual hoses and portable extinguishers should be provided as backup.

(3) Each cable spreading room of each unit should have divisional cable separation, and be separated from the other and the rest of the plant by a minimum three-hour rated fire wall. (Refer to NFPA 251 or ASTM E-119 for fire test resistance rating.)

(4) At least two remote and separate entrances are provided to the room for access by fire brigade personnel; and

(5) Aisle separation provided between tray stacks should be at least three feet wide and eight feet high.

(b) For cable spreading rooms that do not provide divisional cable separation of a (3), in addition to meeting a (1), (2), (4), and (5) above, the following should also be provided:

(1) Divisional cable separation should meet the guidelines of Regulatory Guide 1.75, 'Physical Independence of Electric Systems.'

(2) All cabling should be covered with a suitable fire retardant coating.

(3) As an alternate to a.(1) above, automatically initiated gas systems (Halon or CO2) may be used for primary fire suppression, provided a fixed water system is used as a backup.

(4) Plants that cannot meet the guidelines of Regulatory Guide 1.75, in addition to meeting a (1), (2), (4), and (5) above, an auxiliary shutdown system with all cabling independent of the cable spreading room should be provided.

For multiple-reactor unit sites, cable spreading rooms should not be shared between reactors. Each cable spreading room of each unit should have divisional cable separation as stated above and be separated from the other and the rest of the plant by a wall with a minimum fire rating of three hours. (See NFPA 251, 'Fire Tests, Building Construction and Materials', or ASTM E-119, 'Fire Test of Building Construction and Materials', or fire test resistance rating.)

The ventilation system to the cable spreading room should be designed to isolate the area upon actuation of any gas extinguishing system in the area. In addition, smoke venting of the cable spreading room may be desirable. Such smoke venting systems should be controlled automatically by the fire detection or suppression system as appropriate. Capability for remote manual control should also be provided."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met by alternative means.

The FSV equivalents of cable spreading areas are located in the Auxiliary Electric Equipment Room, the 480 Volt Switchgear Room, and along the Reactor Building "J" wall and Turbine Building "G" wall. There are two entrances for each room. These rooms are protected by an automatically operated halon system. Backup provided by manual fixed water suppression system. The congested cable areas of the "G" and "J" walls are protected by automatically actuated water spray systems, as discussed in FP.2.2.4.

The Auxiliary Electric Equipment Room has floor penetration seals which provide a measure of smoke and fire protection. The entire Three Room Control Complex is considered to be one Fire Area for the use of the Alternate Cooling Method. The fire protection provisions in these areas have been reviewed, upgraded, and approved by the NRC in the review of the congested cable area. (See Section FP.5.6.2) The Alternate Cooling Method is depended upon for a fire in these areas. The ACM is separated from this room by 3-hour fire barriers as described in Section FP.4.4.

APPENDIX A TO BTP 9.5-1, REV. 1

"F.4. Plant Computer Room - Safety related computers should be separated from other areas of the plant by barriers having a minimum three-hour fire resistant rating. Automatic fire detection should be provided to alarm and annunciate in the control room and alarm locally. Manual hose stations and portable water and Halon fire extinguishers should be provided."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline is not applicable to FSV since the computers are not safety-related. The area where the computers are located in Building 10 is protected by an automatic Halon system and fire detection alarms.

APPENDIX A TO BTP 9.5-1, REV. 1

"F.5. Switchgear Rooms - Switchgear rooms should be separated from the remainder of the plant by minimum three-hour rated fire barriers to the extent practicable. Automatic fire detection should alarm and annunciate in the control room and alarm locally. Fire hose stations and portable extinguishers should be readily available.

Acceptable protection for cables that pass through the switchgear room is automatic water or gas agent suppression. Such automatic suppression must consider preventing unacceptable damage to electrical equipment and possible necessary containment of agent following discharge."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

Fire protection provisions in the 480 Volt Switchgear Room consist of fire rated construction as described in the Fire Hazards Analysis (FP.3.), fire detection, automatic total-flooding Halon 1301, and a backup open head deluge system that is manually actuated.

Portable fire extinguishers and hose reel stations are provided for the protection of the 480 Volt Switchgear Room.

The Three Room Control Complex is considered one fire area for the use of the ACM described in Section FP.4.4, and has been reviewed and accepted by the NRC in SER Amendments 14 and 18 (Sections FP.5.6.1 and FP.5.6.2).

APPENDIX A TO BTP 9.5-1, REV. 1

"F.6. Remote Safety Related Panels - The general area housing remote safety related panels should be provided with automatic fire detectors that alarm locally and alarm and annunciate in the Control Room. Combustible materials should be controlled and limited to those required for operation. Portable extinguishers and manual hose stations should be provided."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exception:

The area wide detectors alarm in the Control Room but not locally. Indication in the Control Room will identify what "area" within the plant has alarmed. (See Section FP.2.1) Combustibles are controlled by Procedure P-8. Portable extinguishers and manual hose stations are provided.

APPENDIX A TO BTP 9.5-1, REV. 1

"F.7. Station Battery Rooms - Battery rooms should be protected against fire and explosions. Battery rooms should be separated from each other and other areas of the plant by barriers having a minimum fire rating of three-hours inclusive of all penetrations and openings. (See NFPA 69 'Standard on Explosion Prevention Sytems.') Ventilation systems in the battery rooms should be capable of maintaining the hydrogen concentration well below 2 vol. percent hydrogen concentration. Standpipe and hose and portable extinguishers should be provided.

Alternatives:

(a) Provide a total fire rated barrier enclosure of the battery room complex that exceeds the fire load contained in the room.

(b) Reduce the fire load to be within the fire barrier capability of 1-1/2 hours.

or

(c) Provide a remote manual actuated sprinkler system in each room and provide the 1-1/2 hour fire barrier separation."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has not been met.

The single battery room located within Building 10 is separated from adjoining areas by a 2-hour fire rated enclosure which includes its entrance door assembly. (NOTE: Within a small portion of one of the fire rated wall assemblies unprotected structural steel exists. The acceptability of this design has been justified in an exemption request from Appendix R to 10 CFR Part 50). The battery room is provided with a fire detection system and a total-flooding halon gas fire suppression system and alternate fire protection in the form of extinguishers and nearby hose stations. The battery room has an approximate volume of 1000 cubic feet ventilated by a mechanical exhaust system. The exhaust intake duct is at the ceiling level and, is one foot square. The extraction duct has a 170 cfm fan. The fan and wiring are suitable for hydrogen gas ventilation. NFPA 50A (1978) describes adequate ventilation for hydrogen gas systems representing less than 3000 cubic feet, as being a one foot square opening to the outside. Since the installed exhaust duct has an exhaust fan with a driving force of 100 cfm, the battery room ventilation system would promptly remove hydrogen gas liberated from the batteries such that minimal accumulation would occur and would be kept well below 2 percent. This ventilation is also ensured because hydrogen gas is 1/15 the weight of air and, therefore, has a high buoyancy driving force.

The Battery Rooms 1A and 1B (approximately 1,350 cubic feet each) in the 480 Volt Switchgear Room are each fitted with a supply air duct and extraction duct feeding a 250 cfm fan. For Room 1A the extraction duct exhausts 175 cfm plus 75 cfm from the computer battery room. The exhaust duct opening in each Battery Room is approximately 0.3 sq. ft. The 250 cfm fans provide adequate ventilation to prevent the build-up of evolved hydrogen and maintain battery temperature. There are no fire detectors installed in these battery rooms and the battery room doors are not fire rated.

The Three Room Control Complex is considered one fire area for the use of the ACM described in Section FP.4.4 and has been reviewed and accepted by the NRC in SER Amendments 14 and 18 (Section FP.5.6.1 and FP.5.6.2).

APPENDIX A TO BTP 9.5-1, REV. 1

"F.8. Turbine Lubrication and Control Oil Storage Use Areas

A blank fire wall having a minimum resistance rating of three hours should separate all areas containing safety related systems and equipment from the turbine oil system. When a blank wall is not present, open head deluge protection should be provided for the turbine oil hazards and automatic open head water curtain protection should be provided for wall openings."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

The turbine lubricating oil storage tanks, are located in a separate fire area within the Turbine Building. This area is constructed of concrete and concrete blocks, providing a minimum fire rating of 2 hours, and is protected by an open head deluge system.

The turbine oil reservoir is also located in a separate fire area within the Turbine Building. This room is constructed of concrete and concrete blocks, providing a minimum fire rating of 2 hours, and is protected by an open head deluge system.

The 2-hour fire rating is due to block and concrete thicknesses being marginally less than the thicknesses required for a 3-hour fire rating. This design in conjunction with the existing sprinkler protection provides adequate protection.

The turbine oil reservoir for the two steam driven boiler feed pumps are located on the boiler feed pump base plates set in pits in the Turbine Building floor, elevation 4791'. The two boiler feed pump areas are protected by wet pipe sprinkler systems.

APPENDIX A TO BTP 9.5-1, REV. 1

"F.9. Diesel Generator Areas

Diesel generators should be separated from each other and other areas of the plant by fire barriers having a minimum fire resistance rating of three hours.

When day tanks cannot be separated from the diesel-generator, one of the following should be provided for the diesel generator area:

(a) Automatic open head deluge or open head spray nozzle system(s);

(b) Automatic closed head sprinklers;

(c) Automatic AFFF that is delivered by a sprinkler deluge or spray system;

(d) Automatic gas system (Halon or CO2) may be used in lieu of foam or sprinklers to combat diesel generator and/or lubricating oil fires."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

The two Standby Diesel Generators are separated from each other, and the remainder of the station by reinforced concrete walls and ceiling having a 3-hour fire rating. Unrated HVAC duct fire dampers are the subject of an exemption request showing their adequacy. The Fire Hazards Analysis provides a detailed description of the fire area boundaries and penetrations through the fire barriers.

Each Standby Diesel Generator Room is protected by a fixed, automatically actuated CO2 flooding system.

A 550-gallon capacity diesel oil day tank is included in each Standby Diesel Generator Room. The room CO2 system provides for their protection.

APPENDIX A TO BTP 9.5-1, REV. 1

"F.10. Diesel Fuel Oil Storage Areas - Diesel fuel oil tanks with a capacity greater than 1,100 gallons should not be located inside the buildings containing safety related equipment. They should be located at least 50 feet from any building containing safety related equipment, or if located within 50 feet, they should be housed in a separate building with construction having a minimum fire resistance rating of three hours. Buried tanks are considered as meeting the three hour fire resistance requirements. See NFPA 30 'Flammable and Combustible Liquids Code', for additional guidance.

When located in a separate building, the tank should be protected by an automatic fire suppression system such as AFFF or sprinklers.

In operating plants where tanks are located directly above or below the diesel generators and cannot reasonably be moved, separating floors and main structural members should, as a minimum, have fire resistance rating of three hours. Floors should be liquid tight to prevent leaking of possible oil spills from one level to another. Drains should be provided to remove possible oil spills and fire fighting water to a safe location.

One of the following acceptable methods of fire protection should also be provided:

(a) Automatic open head deluge or open head spray nozzle system(s)

(b) Automatic closed head sprinklers; or

(c) Automatic AFFF that is delivered by a sprinkler system or spray system."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

One 10,000-gallon underground Diesel Fuel Oil Tank stores diesel oil for the two (2) Standby Diesel Generators. Piping between the tank and the two Standby Diesel Generator Rooms are routed underground.

FSV compliance with NFPA 30 (1973) is described in Section FP.5.5.16.

APPENDIX A TO BTP 9.5-1, REV. 1

"F.11. Safety Related Pumps

Pump houses and rooms housing safety related pumps should be protected by automatic sprinkler protection unless a fire hazards analysis can demonstrate that a fire will not endanger other safety related equipment required for safe plant shutdown. Early warning fire detection should be installed with alarm and annunciation locally and in the Control Room. Local hose stations and portable extinguishers should also be provided."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

Exceptions are noted in Section FP.5.4.2, which were approved by the NRC SER in Section FP.5.6.8. These exceptions include the ACM, Reactor Plant Cooling Water Pumps and the Reactor Building Exhaust Fans.

APPENDIX A TO BTP 9.5-1, REV. 1

"F.12. New Fuel Area

Hand portable extinguishers should be located within this area. Also, local hose stations should be located outside but within hose reach of this area. Automatic fire detection should alarm and annunciate in the control room and alarm locally. Combustibles should be limited to a minimum in the new fuel area. The storage area should be provided with a drainage system to preclude accumulation of water.

The storage configuration of new fuel should always be so maintained as to preclude criticality for any water density that might occur during fire water application."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exception:

The New Fuel Storage Building is located in a dedicated concrete enclosed structure, independent of other buildings containing safety-related equipment. The New Fuel Storage Building does not contain any automatic fire detection. A portable CO2 extinguisher is located inside the building and two fire hydrants are located outside the building. New fuel is stored in closed steel containers. These steel containers, the concrete building construction and the absence of combustibles and ignition sources provides adequate protection from fire. This building does not require fire detection. Any water used in this building will drain past building doors to the yard outside, precluding the accumulation of water inside the building.

Prior to refueling, new fuel is moved from the New Fuel Storage Building to the nine independent vertical steel lined storage wells located in the concrete refueling floor of the Reactor Building. These wells are also used to store spent fuel during the decay period. This facility is completely enclosed in concrete except for the nine well covers on the refueling floor, elevation 4881'-8". Portable CO2 and dry chemical extinguishers and two hose stations are provided on the refueling floor. General area fire detection is provided by an ionization detector in the return air ventilation duct which alarms and annunciates in the Control Room.

The fuel storage wells are gas and water tight, normally maintained under a sub-atmospheric helium gas atmosphere except during refueling. A decontaminating drain, having a capped closure, is provided for each well outside the storage facility.

The storage wells are designed to prevent nuclear criticality even when all storage spaces are filled with maximum reactivity fuel and completely flooded with water (See FSAR Section 9.1.2.3).

APPENDIX A TO BTP 9.5-1, REV. 1

"F.13. Spent Fuel Pool Area

Protection for the spent fuel pool area should be provided by local hose stations and portable extinguishers. Automatic fire detection should be provided to alarm and annunciate in the control room and to alarm locally."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

Spent fuel is stored in the steel lined concrete storage wells located in the floor of the Reactor Building at elevation 4881'-8". Portable fire extinguishers and hose reel stations are provided at this location. Fire detection is provided by a ionization detector located in the HVAC return air ventelation duct that alarms and

annunciates in the Control Room. The fuel storage wells are gas and water tight, normally maintained under a sub-atmospheric helium gas atmosphere.

APPENDIX A TO BTP 9.5-1, REV. 1

"F.14. Radwaste Building

The radwaste building should be separated from other areas of the plant by fire barriers having at least three-hour ratings. Automatic sprinklers should be used in all areas where combustible materials are located. Automatic fire detection should be provided to annunciate and alarm in the control room and alarm locally. During a fire, the ventilation systems in these areas should be capable of being isolated. Water should drain to liquid radwaste building sumps.

Acceptable alternative fire protection is automatic fire detection to alarm and annunciate in the control room, in addition to manual hose stations and portable extinguishers consisting of hand held and large wheeled units."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exceptions:

FSV does not generate substantial quantities of solid or liquid wastes during normal operation. Radioactive liquid waste is collected, monitored, and discharged directly from the station. Solid wastes (laboratory waste, etc.) are packaged in drums and shipped off-site for suitable storage. Packaging and drumming of these solid wastes is carried out in the radioactive storage area of the Reactor Building, elevation 4777' and the Radioactive Waste Compacting Building. These areas generally contain several drums and one or two unsealed drums of waste material. The Reactor Building area, although not entirely enclosed, is separated from other areas containing safety-related equipment by partial concrete barriers. The Radioactive Waste Compacting Building is a totally enclosed Building.

Fire detection, portable fire extinguishers and hose reel stations are provided for the protection of the Reactor Building area. The Radioactive Waste Compacting Building has a wet pipe sprinkler system and portable dry chemical extinguishers.

The Reactor Building area is ventilated by the Reactor Building Ventilation System. Isolating this area is not possible due to the building and ventilation system design criteria. The Radioactive Waste Compacting Building ventilation system cannot be isolated.

APPENDIX A TO BTP 9.5-1, REV. 1

"F.15. Decontamination Areas

The decontamination areas should be protected by automatic sprinklers if flammable liquids are stored. Automatic fire detection should be provided to annunciate and alarm in the Control Room and alarm locally. The ventilation system should be capable of being isolated. Local hose stations and hand portable extinguishers should be provided as backup to the sprinkler system."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

No decontamination areas store flammable liquids. Small quantities of flammable liquids are used on occasion for decontamination. These flammable liquids are stored in accordance with Reg. Guide 1.39. Therefore, automatic fire detection systems are not required and the ventilation systems are not required to be isolated.

Manual hose stations and portable fire extinguishers are provided near the areas where decontamination is performed.

APPENDIX A TO BTP 9.5-1, REV. 1

"F.16. Safety Related Water Tanks

Storage tanks that supply water for safe shutdown should be protected from the effects of fire. Local hose stations and portable extinguishers should be provided. Portable extinguishers should be located in nearby hose houses. Combustible materials should not be stored next to outdoor tanks. A minimum of 50 feet of separation should be provided between outdoor tanks and combustible materials where feasible."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

Manual hose stations have been provided near the Condensate Storage Tanks.

APPENDIX A TO BTP 9.5-1, REV. 1

"F.17. Cooling Towers

Cooling towers should be of non-combustible construction or so located that a fire will not adversely affect any safety related systems or equipment. Cooling towers should be of non-combustible construction when the basins are used for the ultimate heat sink or for the fire protection water supply.

Cooling towers of combustible construction, so located that a fire in them could adversely affect safety related systems or equipment should be protected with an open head deluge system installation with hydrants and hose houses strategically located."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exception:

The Main Cooling Tower and Service Water Cooling Tower are constructed of combustible material. This exception is acceptable due to redundancy, a fire in either cooling tower will not impair the operation of safety-related equipment or systems to perform all required functions. Furthermore, during plant operation these towers are continuously wetted down as a normal function. A spray water system is provided on each tower to keep the wood parts wet (primarily to prevent shrinkage) during plant shutdown periods.

The Service Water Cooling Tower is within reach of two yard hydrants. The Main Cooling Tower is within reach of six yard hydrants. Each hydrant is provided with a hose house.

APPENDIX A TO BTP 9.5-1, REV. 1

"F.18. Miscellaneous Areas

Miscellaneous areas such as records storage areas, shops, warehouses, and auxiliary boiler rooms should be so located that a fire or effects of a fire, including smoke, will not adversely affect any safety related systems or equipment. Fuel oil tanks for auxiliary boilers should be buried or provided with dikes to contain the entire tank contents."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

Significant physical separation exists between most outlying support buildings and safety-related equipment even though the building may be located close to the Turbine or Reactor Building. Where this isn't the case, automatic fire protection is provided.

Ventilation systems are separated from outside fire hazards.

APPENDIX A TO BTP 9.5-1, REV. 1

"G. Special Protection Guidelines

1. Welding and Cutting, Acetylene - Oxygen Fuel Gas Systems - This equipment is used in various areas throughout the plant. Storage locations should be chosen to permit fire protection by automatic sprinkler system. Local hose stations and portable equipment should be provided as backup. The requirements of NFPA 51 and 51B are applicable to these hazards. A permit system should be required to utilize this equipment. (Also refer to 2f herein.)"

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met with the following exception:

All requirements are being met except the storage location for acetylene-oxygen which is not protected by an automatic sprinkler system.

Portable welding and flame cutting equipment that uses acetylene-oxygen fuel is stored in a designated storage area in the Turbine Building, elevation 4791' outside the Maintenance Shop. Spare acetylene and oxygen cylinders are stored in an outdoor storage area north of the Helium Storage Building. Spare hydrogen bottles are also stored outside; this is allowed in accordance with NFPA 51 since there is greater than 20 feet of separation between the two storage areas.

Local hose stations and portable hand-held extinguishers are available near the storage area. An automatic sprinkler system at the acetylene-oxygen storage area is not considered necessary due to the small quantity of fuel stored and the distance from safety-related equipment. Fire detection is provided for the acetylene-oxygen storage area outside the Maintenance Shop. These detectors alarm and annunciate in the Control Room and alarm locally.

A work permit system requires supervisory level review and sign-off prior to the use of welding and flame cutting equipment.

APPENDIX A TO BTP 9.5-1, REV. 1

"G.2. Storage Areas for Dry Ion Exchange Resins

Dry ion exchange resins should not be stored near essential safety related systems. Dry unused resins should be protected by automatic wet pipe sprinkler installations. Detection by smoke and heat detectors should alarm and annunciate in the control room and alarm locally. Local hose stations and portable extinguishers should provide backup for these areas. Storage areas of dry resin should have curbs and drains. (Refer to NFPA 92M, 'Waterproofing and Draining of Floors.')"

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

Ion exchange resins are stored in the south end of the Turbine Building, elevation 4811'. This material is procured and stored in a wet condition. Since this resin is not stored dry, automatic fire detector and a wet pipe sprinkler system is not required. Local hose stations and portable extinguishers are available in the area and suitable floor drains are provided.

APPENDIX A TO BTP 9.5-1, REV. 1

"G.3. Hazardous Chemicals

Hazardous chemicals should be stored and protected in accordance with the recommendations of NFPA 49, "Hazardous Chemicals Data." Chemicals storage areas should be well ventilated and protected against flooding conditions since some chemicals may react with water to produce ignition."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

The bulk of the hazardous chemicals at FSV are located in the Condensate Treatment Room on grade level (elevation 4791') in the southeast corner of the Turbine Building. The hazardous chemicals consist of sulfuric acid, sodium sulfite, sodium hydroxide, ammonium hydroxide and hydrazine; these chemicals are used for make-up and condensate water treatment.

FSV compliance with NFPA 49 (1975) is described in Section FP.5.5.17.

APPENDIX A TO BTP 9.5-1, REV. 1

"G.4. Materials Containing Radioactivity

Materials that collect and contain radioactivity such as spent ion exchange resins, charcoal filters, and HEPA filters should be stored in closed metal tanks or containers that are located in areas free from ignition sources or combustibles. These materials should be protected from exposure to fires in adjacent areas as well. Consideration should be given to requirements for removal of isotopic decay heat from entrained radioactive materials."

FSV CONFORMANCE WITH APPENDIX A GUIDANCE

This guideline has been met.

Radioactive filters, resin cartridges and other solid wastes are collected in the designated Radioactive Compacting and Storage Area in the Reactor Building, elevation 4771' and contained in suitable metal containers. When the containers become full, they are sealed for shipment offsite. There are normally one or two unsealed and some sealed containers located in the room. The full containers are staged for shipment in trailers or the compacter building. The room is continuously ventilated to remove isotopic decay heat.

REFERENCES FOR SECTION FP.5.2.

1. Engineering Evaluation, "FSV Turbine & Reactor Roof Evaluation," EE-45-0008, Rev. A, March 3, 1987.

2. NRC letter dated June 4, 1987 (G-84176), Wagner to Lee.

3. PSC letter dated March 10, 1988 (P-88087), Warembourg to Doc. Desk; Subject: "Emergency Response capabilities: Reg. Guide 1.97."

4. PSC letter date June 13, 1988 (P-88200), Williams to Calvo; Subject: "Fire Protection Program Plan, Request for Additional Information."