



Duquesne Light

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December 16, 1983

Director of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Attn: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
Division of Licensing
Washington, DC 20555

Reference: Beaver Valley Power Station
Docket No. 50-334, License No. DPR-66
Appendix R - Additional Exemption Requests
Based on Generic Letter 83-33

Gentlemen:

Based on our review of Generic Letter 83-33, "NRC Positions on Certain Requirements of Appendix R to 10 CFR 50", which provided specific interpretations for certain requirements of the Fire Protection Rule, we have determined that additional exemptions will be necessary to be consistent with the staff interpretations and to remain within conformance of the Rule for these particular issues.

Numerous correspondence, telephone conversations, and meetings between the Staff reviewers and Duquesne Light Company had taken place and resulted in, what we believed to be, a mutual understanding and clarification of the requirements of Appendix R. Our final SER for Appendix R, documented on January 5, 1983, concluded that the proposed Beaver Valley Power Station Unit I design meets the requirements of Appendix R to 10 CFR 50 items III.G.3 and III.L with respect to safe shutdown in the event of a fire in the areas identified in our submittal, provided our proposed modifications are implemented according to the committed schedule dates. Our previously identified exemption requests, documented in our Appendix R Submittal Report of June 30, 1982 and supplemented by additional information provided by our letters of October 22, October 28, December 10, and December 21, 1982, were all granted and documented in your letter of March 14, 1983.

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Duquesne Light Company hereby requests additional exemptions, from certain provisions of Section III.G of Appendix R to 10 CFR 50, pursuant to 10 CFR 50.12, based on the interpretations of certain requirements provided in Generic Letter 83-33. In summary, the eleven (11) fire areas for which exemptions are being requested are broken down into five (5) separate categories:

- 1) Section III.G sets forth the requirement for fire protection for safe shutdown capability on the basis of "fire areas", defined in Generic Letter 83-33 as that portion of a building or plant that is separated from other areas by boundary fire barriers (walls, floors, and ceilings with any openings or penetrations protected with seals or closures having a fire resistance rating equal to that required of the barrier).

Certain configurations that do not meet the strict definition of fire areas have been determined and exemptions from the provisions of III.G.2 are requested for the following areas:

- Control Room HVAC Equipment Room (CR-2), Elev. 713'
(See Attachment II)
- Emergency Switchgear Rooms (ES-1 & 2), Elev. 713'
(See Attachment III)
- Process Instrument Room (CR-4), Elev. 713'
(See Attachment IV)
- Communications Equipment & Relay Panel Room (CR-3), Elev. 713'
(See Attachment V)
- Normal Switchgear Room (NS-1), Elev. 713'
(See Attachment VI)
- Cable Spreading Room (CS-1), Elev. 725'6"
(See Attachment XI)

- 2) Section III.G.3 requires suppression and detection for the original area under consideration for which alternative or dedicated shutdown capability has been provided. Exemptions from the provisions of III.G.3 are requested for the following areas:

- Primary Auxiliary Building (PA-1A), Elev. 768
(See Attachment I)

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- Control Room HVAC Equipment Room (CR-2), Elev. 713
(See Attachment II)
 - Emergency Switchgear Rooms (ES-1 & 2), Elev. 713
(See Attachment III)
 - Process Instrument Room (CR-4), Elev. 713
(See Attachment IV)
 - Communications Equipment & Relay Panel Room (CR-3), Elev. 713
(See Attachment V)
 - Normal Switchgear Room (NS-1), Elev. 713
(See Attachment VI)
 - Carbon Dioxide Storage/PG Pump Room (CO-2)
(See Attachment VIII)
- 3) Section III.G.2 (a) requires structural steel forming a part of or supporting fire barriers shall be protected to provide fire resistance equivalent to that required of the barrier. An exemption from the provisions of III.G.2 (a) is requested for the following area:
- Service Building, Elevation 713 area below the Cable Spreading Room
(Structural Steel)
(See Attachment VII)
- 4) Section III.G.3 requires suppression and detection be installed "in the area, room or zone under consideration" in addition to providing alternative or dedicated shutdown capability.
- To satisfy this requirement, the Staff's interpretation is that suppression and detection needs to be installed "throughout" the fire area. An exemption from III.G.3 is requested for the following area:
- Pipe Tunnel (Sub-area QP-1), Elev. 735
(See Attachment IX)
- 5) Section III.G.2 (d) requires 20 foot separation of cables of redundant trains inside containment area. An exemption from the provisions of III.G.2 (d) is requested for the following area:
- Reactor Containment (RC-1), Elev. 738,
Source Range Cable Routing
(See Attachment X)

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The technical justification and fire hazards analysis for each fire area supporting our exemption requests are provided in Attachments I through XI of this letter which provides reasonable assurance that at least one safe shutdown division is free of fire damage given a postulated fire in any one fire area. Each exemption is predicated upon an equivalent level of protection to that required by Appendix R based on the information and considerations provided for each fire area.

The bases for these additional exemption requests are:

- 1) that the existing plant configurations of these fire areas provide equivalent protection to the public health and safety to that which would be provided by the specific requirements of Appendix R as interpreted by the Staff; and
- 2) that, therefore, any plant modifications necessary to comply with the specific requirements of Appendix R, as interpreted by the Staff, would not enhance the overall facility fire protection safety, and
- 3) that the modifications previously made to the facility for conforming to B.T.P. 9.5-1 have already been implemented and the existing configuration(s) found acceptable by the NRC under that review effort.

DLC believes that the existing configurations given the fire loadings of the areas, the degree of protection already inherent in the present design, and the previously committed to modifications documented in our SER provide protection equivalent to that which would be achieved by conformance to the specific requirements and interpretations of Section III.G of Appendix R to 10 CFR 50.

In addition to the exemption requests, we are presently evaluating the status of our fire doors and open trenches. We have determined that some fire door openings do not have an approved UL label affixed to the door or frame which would denote the proper fire rating. For some of the unlabeled fire doors, documentation from the manufacturer is available due to the oversized dimensions of the doors. We are making arrangements to have a qualified individual from UL make a site visit to conduct an inspection and test program of all unlabeled doors and frames to determine their acceptability. Our objective is to have all fire doors properly labeled or have adequate documentation to verify satisfactory fire rating of the openings. This information will be made available at the time the NRC I & E Review Team conducts their Appendix R site inspection tour to aide in their review process.

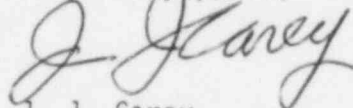
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In our final SER dated January 5, 1983, page 8, Section C - "Repairs" noted that the licensee would have repair procedures for utilizing support cradles under the main steam lines for the proposed water-solid operation outlined in our October 28, 1982 letter describing our cold shutdown methodology. We have re-evaluated the presently existing supports and determined that they are acceptable as is. No additional support cradles will be necessary. The calculations and supporting documentation will be available to the NRC I&E Review Team during the Appendix R site inspection visit.

In regards to your letter of November 22, 1983, pertaining to the fee requirements of 10 CFR 170 relative to our previous alternate safe shutdown exemption per 10 CFR 50 and subsequent approval by your letter of January 5, 1983, we have forwarded the payment due under separate cover. In accordance with the policy set forth in your letter, all additional exemptions pursuant to 10 CFR 50.12 are exempt from fees. Therefore, no payment is necessary for the additional exemptions requested within this letter.

Please contact my staff if additional information or clarification is necessary.

Very truly yours,

A handwritten signature in cursive script, appearing to read "J. J. Carey".

J. J. Carey
Vice President, Nuclear

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Enclosures

cc: Mr. W. M. Troskoski, Resident Inspector
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Beaver Valley Power Station
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U. S. Nuclear Regulatory Commission
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Washington, DC 20555

Director, Safety Evaluation & Control
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U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Attn: Dr. Thomas E. Murley, Regional Director
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King of Prussia, PA 19406

U. S. Nuclear Regulatory Commission
Division of Licensing
Attn: D. G. Eisenhut, Director
Washington, DC 20555

U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Attn: S. J. Chilk, Secretary of the Commission
Washington, DC 20555

Mr. Peter Tam, Project Manager
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Phillips Building
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Mail Stop 438

EXEMPTION

I. PRIMARY AUXILIARY BUILDING (PA-1A) EL. 768'7"

(See attached Figures 11.7-1 and 11.7-2)

A. Discussion

Even though this fire area does not contain safe shutdown cables/equipment, the ventilation exhaust fans (VS-F-7A and -7B, and VS-F-4A and 4B) located in this fire area are for the Charging Pump Cubicles located three floors below at elevation 722 in the Primary Auxiliary Building (PAB). The use of portable ventilation fans as a means of providing an alternate method for essential air flow to the Charging Pump Cubicles to ensure continued operation of the pumps was approved in your SER for BVPS-1 dated 1/5/83 and an exemption was granted per your letter of 3/14/83. However, since Appendix R requires fixed suppression and detection for the original area under consideration (in this case the PAB 768 floor level), we request an additional exemption from III.G.3 for the PAB elevation 768 floor level because this area does not have fixed suppression or detection.

This exemption is predicated on equivalent level of protection to that required based on the information and considerations provided within this section.

B. Boundaries

The construction of this area constitutes a 3-hour rated fire barrier between the fuel building (FB-1), the pipe tunnel (PT-1) and the lower floor elevations of the Primary Auxiliary Building (PAB).

1. Walls (Ref. Drawing 11700-RC-24M)

Reinforced Concrete:

- a. North 1ft,6in. which is the outside wall
- b. South 1ft,6in. which parallels the fuel building (FB-1) and a portion makes up the outside wall
- c. East 1ft,6in. which is the outside wall
- d. West 2ft,0in. which parallels the pipe tunnel (PT-1) and a portion makes up the outside wall.

2. Ceiling (Ref. Drawing 11700-RC-24Q)

Structural Steel with 1 1/2 inches corrugated steel decking

3. Floor (Ref. Drawing 11700-RC-24M)

2ft,0in. reinforced concrete

4. Room Volume

231,480 cu.ft.

All penetrations to adjacent fire areas have been sealed for a 3-hour rating which constitutes a 3-hour fire rated boundary for this fire zone.

C. Ventilation

Figure 11.7-3 details the primary auxiliary building ventilation for this elevation. This zone of PA-1A is not designed with any dedicated supply or exhaust ventilation.

D. Redundant Safe Shutdown Cables/Equipment in the 768'7" level of PA-1A

As identified in our circuit analysis report (Figure 11.7-4), there are no redundant safe shutdown cables/equipment in this fire area.

Additional equipment located on this floor level:

1. Charcoal Filter Banks (VS-FL-23, -24, and -25, and GW-FL-1A, -1B; -4A, and -4B; Figure 11.7-1). The existence of the associated filter bank heat detectors that alarm in the control room, in conjunction with the spatial separation from other equipment in the area and the available fire suppression feature within the area provides adequate assurance of early detection, containment of the fire and extinguishment.
2. The Primary Grade Water Vacuum Pump (PG-C-1, Figure 11.7-1) is equipped with an 8-gal oil reservoir. The rupture and subsequent ignition of the oil in this reservoir is not a significant threat to any safe shutdown equipment due to location and quantity of oil.
3. The Main Exhaust Filter Banks (MF-1 and MF-2; Fig. 11.7-1) contain charcoal filters enclosed within metal containers for each bank, which is provided with a water deluge suppression system, and therefore is not considered as an exposure hazard for this area.

E. Fire Protection Existing

1. Fire Detection Systems

Heat detectors with control room alarm are provided in MF-1 and -2 only.

2. Fire Extinguishing Systems Existing

- a) Interior standpipe hose rack stations are provided as the primary fire suppressions system with portable fire extinguishers in the area (Carbon Dioxide and Dry Chemical) as backup protection.
- b) An automatic/manual water spray deluge suppression system is provided for MF-1 and 2. (Ref. Figures 11.7-5 and 11.7-1.)

3. Propagation Retardants

All cables installed at BVPS-1 were fabricated to pass the vertical cable tray flame test with an oil and burlap flame source which was the accepted industry standard during the construction of BV-1 and is comparable to IEEE-383 tests.

F. Fire Hazard Analysis

1. Type/Quantity of Combustibles in this Area

- a) Cable insulation is negligible as all cable on this elevation is enclosed in conduit.
- b) 8 gallons of lube oil for the primary grade water vacuum pump.
- c) 4,000 lb. of charcoal housed in the charcoal filter banks.
- d) Charcoal contained within the Main Filter Banks MF-1 & 2 is contained and adequately protected, therefore it is not considered an exposure hazard in this area.

2. Heat Release Potential

Cable-negligible

Charcoal - contained within the charcoal filter banks
(VS-FL-23, 24 & 25, and GW-FL-1A, 1B, 4A & 4B)
(4000 lbs.)

- a) Heat Load = 14,000 Btu
- b) Area = 10,000 ft²
- c) Heat Release Potential = 560 Btu/ft²

Lube Oil - (8 gallons)

- a) Heat Load = 1.24×10^6 Btu
- b) Area = 10,000 ft²
- c) Heat Release Potential = 125 Btu/ft²

Total Heat Release Potential = 685 Btu/ft²

Based on the total heat release potential, the required fire rating for this area is negligible (less than 1 hour).

G. Justification of Area Acceptability

1. The existing construction provides fire barriers in excess of the required ratings determined by the fire loading for the area.
2. Manual suppression equipment is immediately available in the area.
3. Strict plant control of hazardous quantities of transient combustibles.
4. The fire rated construction of the area would obviate the potential for a fire in this area spreading to adjacent fire areas.

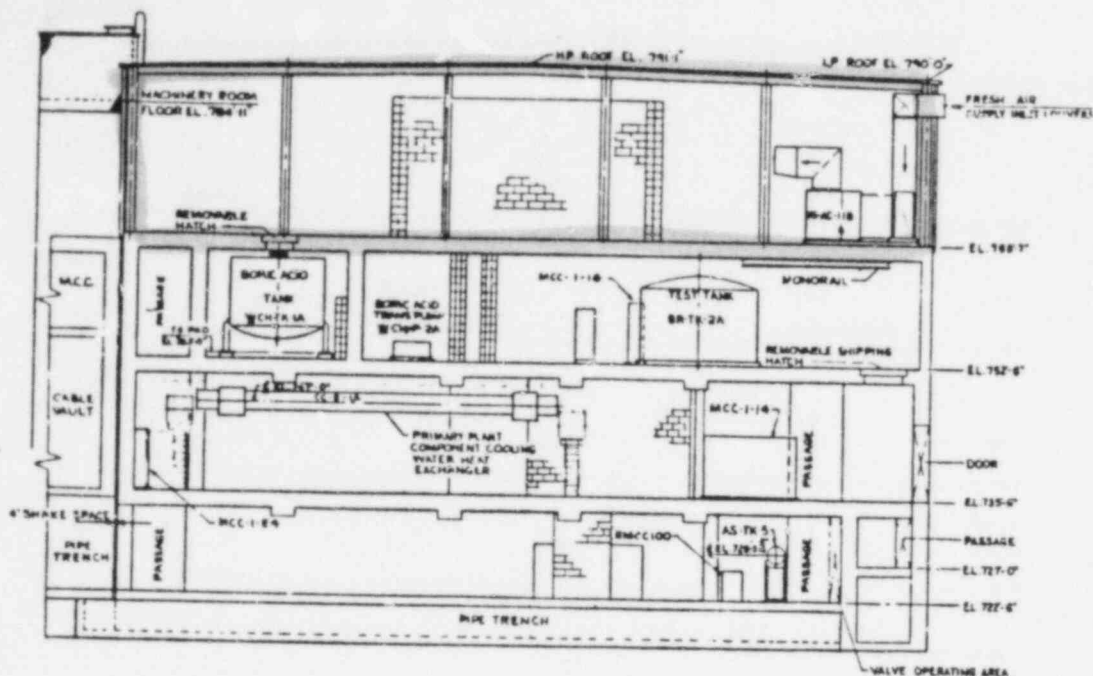
5. The normal fans (VS-F-7A,-7B) and the emergency fans (VS-F-4A,-4B) associated with the charging pump cubicle ventilation system had previously been assumed lost for this area. To ensure continued charging pump operation, a portable gasoline driven emergency exhaust fan will be provided as part of the fire brigade inventory and will be utilized to provide cubicle ventilation to ensure continued long term operation. This method was approved and an exemption was granted per your letter of 3/14/83.

This alternate shutdown capability method would bring plant design for this area into conformance with Appendix R, except for fixed suppression and detection for the original area under consideration (PAB, Elev. 768 floor level).

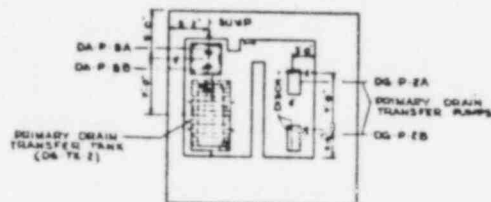
This exemption request is predicated upon an equivalent level of protection to that required based on the above considerations.



- FIGURE 11.7-1
AUXILIARY BUILDING
BEAVER VALLEY POWER STATION-UNIT 1
FIRE HAZARDS ANALYSIS

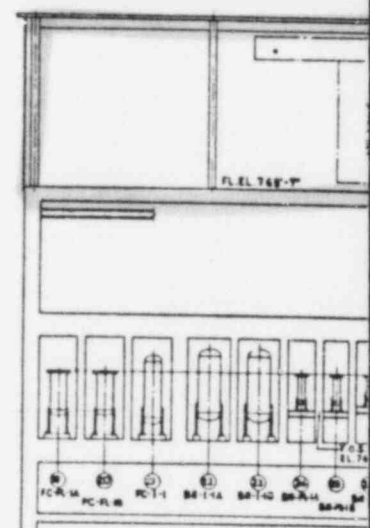


3-3
3.4-19*20

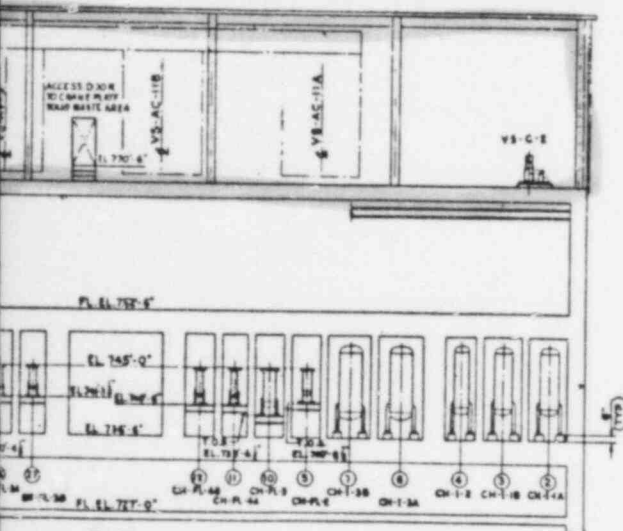


PLAN EL. 794.0

0 5 10 15 20 25 30
SCALE- FEET








3
C
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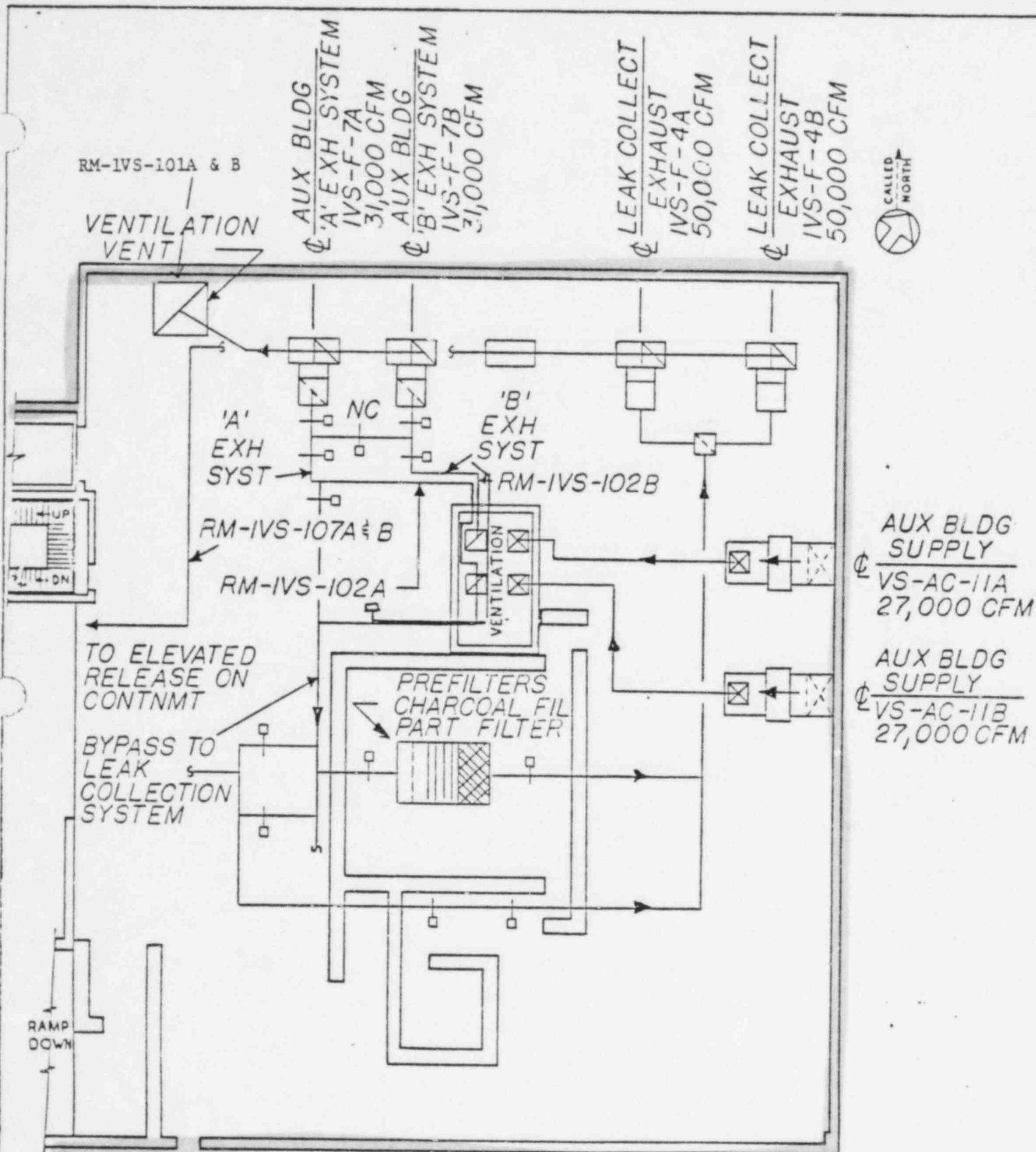


PRC
APERTURE
CARD

REVISÉ 3/1/82

 FIRE AREA
 FIRE ZONE
 FIRE BARRIER
 SUB-AREA
 FIRE DOOR RATINGS, (HOURS)
 REINFORCED CONCRETE
 CONCRETE BLOCK WALL
 INSULATED METAL SIDING

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AUXILIARY BLDG VENTILATION ARRANGEMENT
EL 768'-7"

FIGURE 11.7-3

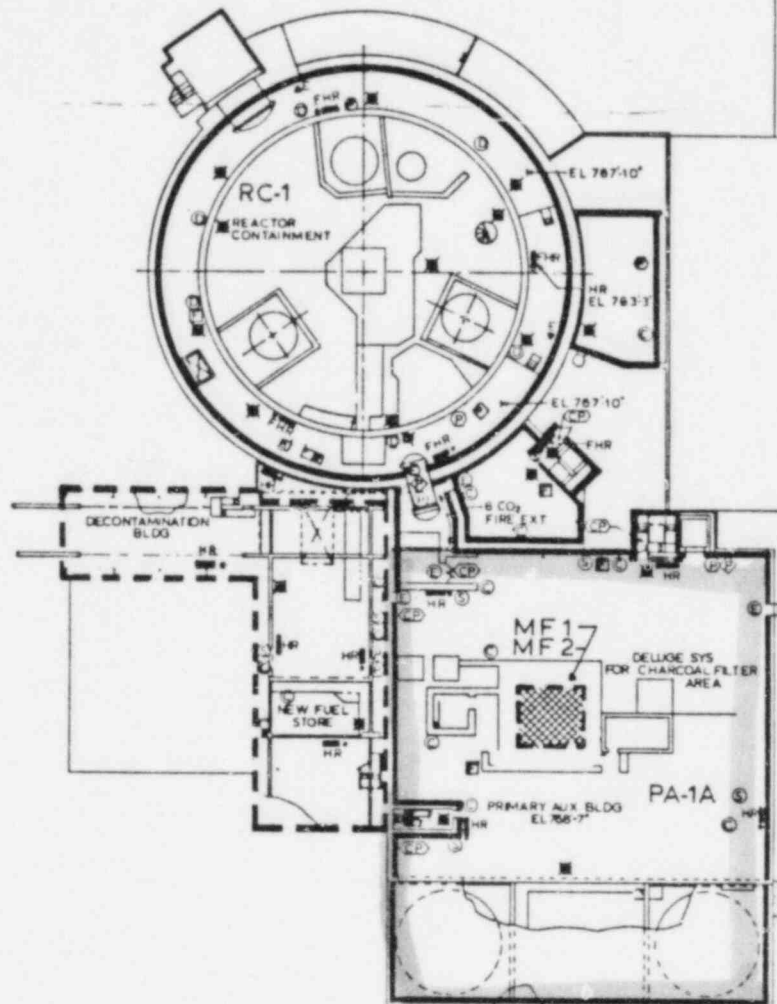
ISSUE 2

FIGURE 11.7-4
AUX BUILDING EL 1
FIRE AREA PA-1A

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
POWER	NOTE 1	NONE	NO	NO	NO	CHAPTER 6 SECT 6.5	YES
CONTROL AND INSTRUMENT	NOTE 1	NONE	NO	NO	NO	CHAPTER 6 SECT 6.5	YES

NOTE FOR FIRE AREA PA-1A:

1. BECAUSE OF THE COMPLEXITY AND DISPERSED LAYOUT OF ALL THE EQUIPMENT ASSOCIATED WITH THE CHARGING PUMP CUBICLE VENTILATION SYSTEM (NORMAL FANS VS-F-7A, -7B; EMERGENCY FANS VS-F-4A, -4B), ALL OF THE ASSOCIATED POWER AND CONTROL CABLES WERE NOT TRACED. THIS SYSTEM FUNCTION HAS BEEN ASSUMED LOST FOR THE FOLLOWING AREAS: CS-1, NS-1, CR-4, CV-1, CV-2, AND PA-1A, -1C, AND -1E. THE FUNCTION IS REPLACED BY THE MODIFICATION DESCRIBED IN CHAPTER 6 SECTION 6.5.



PLAN EL 767'-10" & EL 766'-7"

0 5 10 15 20
 SCALE-FEET

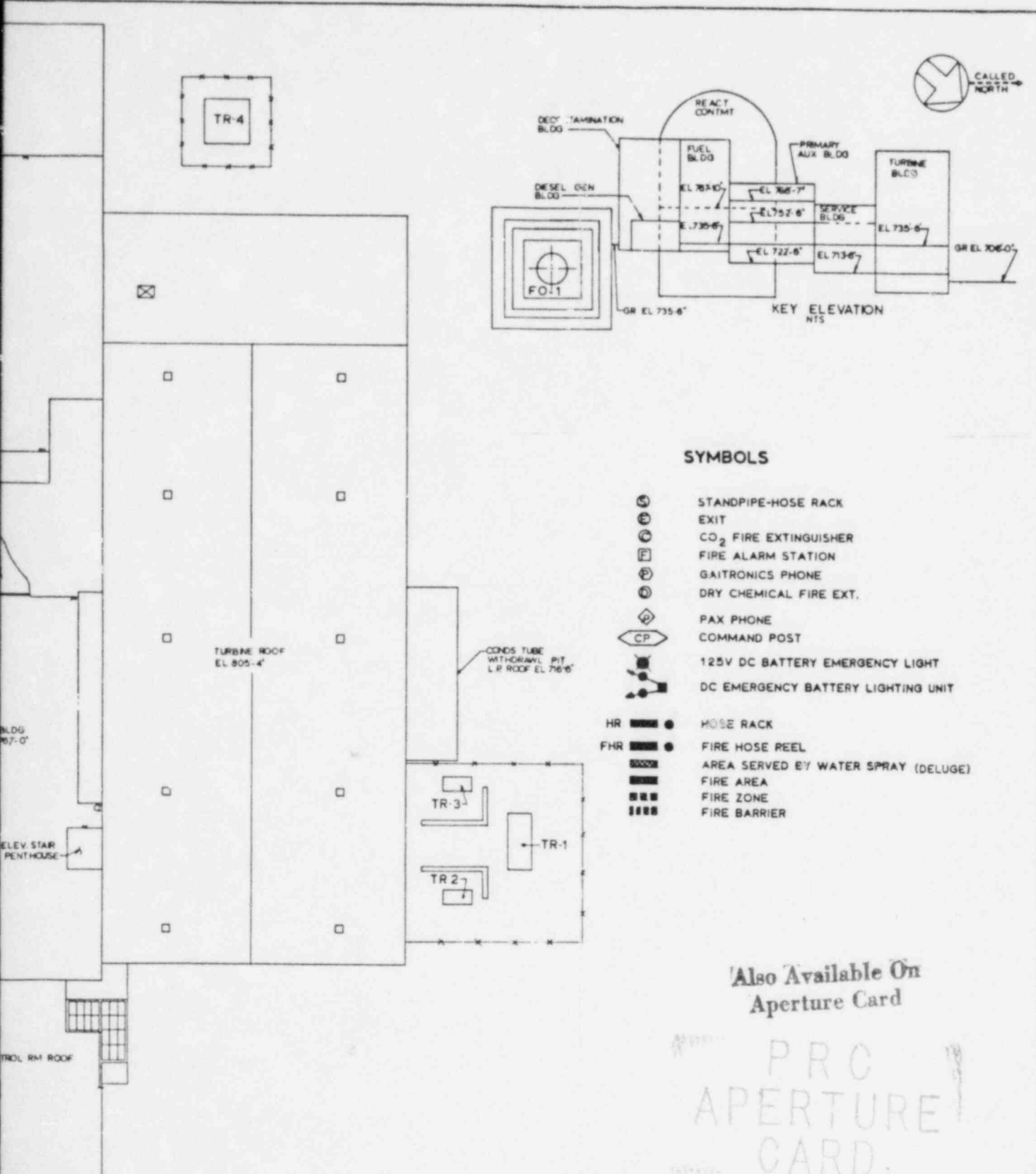


FIGURE 11.7-5

ARRGT-PERSONNEL ACCESS
BETWEEN BUILDINGS ELEV. 767'-10"

BEAVER VALLEY POWER STATION-UNIT 1
FIRE HAZARDS ANALYSIS

REVISED 3/1/82

8312280506-02

EXEMPTION

II. Control Room. HVAC Equipment Room (CR-2) EL.713'

(See attached Figures 11.8-1 and 11.8-2)

A. Discussion

This area contains the HVAC equipment and controls for the control room areas (CR-1 through CR-4) and isolation valves for the control room "pressure envelope". The emergency outside air pressurization fans and charcoal filter bank units are also located in this area.

The potential for a fire in this area to render equipment located in this area inoperable was previously identified in our Appendix R Fire Protection Review submittal report.

Our proposal was to:

- 1) remove the B Train on #2 Diesel Generator control circuit and wiring out of this area in order to meet the required separation criteria for redundant safety related circuits, and
- 2) provide a method to ventilate the areas lost by virtue of a fire in this area (CR-2), by use of portable ventilation units as part of the fire brigade equipment inventory.

These were approved and documented in your SER for BVPS #1 dated January 5, 1983, and your letter dated March 14, 1983, respectively. However, since Appendix R requires fixed suppression and detection for the original area under consideration (in this case the CR-2 area), we request an exemption from III.G.3 for CR-2 because this area does not have fixed suppression.

Section III.G of Appendix R sets forth the requirement for fire protection for safe shutdown capability on the basis of fire areas. A fire area is defined as that portion of a building or plant that is separated from other areas by boundary fire barrier (walls, floors and ceilings with any openings or penetrations protected with seals or closures having a fire resistance rating equal to that required of the barrier). For boundary fire barriers, using walls, floors, ceilings, dampers, doors, etc. existing prior to Appendix R, the rating required of a boundary fire barrier is based on the guidance in Appendix A to BTP ASB 9.5-1, i.e., the rating of the barrier or boundary must exceed with margin the fire loading in the area and need not necessarily be a 3-hour rated boundary unless the fire loading warrants such a boundary. Pursuant to the Staff's interpretation of fire areas, the fire rating of such boundaries must be three hours or an exemption must be requested. Therefore, an exemption from III.G.2 is required for this area (CR-2) because of an existing fire door which has a fire rating of 1 1/2 hours. (See Figure 11.8-2).

B. Boundaries

The construction of this area constitutes a 3-hour rated fire barrier between the process instrument room, relay room, and the primary auxiliary building, with the exception of the single fire door described below.

1. Walls (Ref. Drawing 11700-RC-8A,-8B)

Reinforced Concrete:

- a. North 1ft.0in. which parallels the relay room (CR-3)
- b. South 2ft.0in. which parallels the Primary Auxiliary Building (PA-1)
- c. East 2ft.0in. which is next to an unexcavated area
- d. West 1ft.0in. which parallels the Process Instrument Room (CR-4)

2. Ceiling (Ref. Drawings 11700-RC-8C,8F)
2 ft.0 in. reinforced concrete

3. Floor (Ref. Drawing 11700-RC-8H)
Minimum 3 ft. reinforced concrete

4. Room Volume
32,780 cu.ft.

5. Fire Doors
The double door entrance to this area from CR-4 is a 3 hour fire-rated door. The single side door near the Relay Room (CR-3) is a 1 1/2 hour fire-rated door. (See Figure 11.8-2). The single door is a solid (no glass), hollow metal, 4 ft. x 8 ft. sized door, which was originally installed to achieve the required fire barrier rating based on the fire loading in the room.

All penetrations to the adjacent fire areas have been sealed for a 3-hour rating.

C. Ventilation

This area is serviced by the same ventilation air conditioning system as the Control Room areas CR-1, CR-3 and CR-4. The system is detailed on Figure 11.8-3. Duct penetrations are provided with 3 hour fire rated dampers between fire areas as detailed on Figure 11.8-5.

D. Redundant Safe Shutdown Cables/Equipment Located in CR-2

Both sets of DC power cabling associated with the field flashing of the emergency diesel generators are routed through this area (CR-2).

E. Fire Protection Existing or Committed

1. Fire Detection Systems

Early Warning Detection System consists of area ionization coverage with control room and local alarm. Heat detection with control room alarm is provided for the charcoal filter bank unit.

2. Fire Extinguishing Systems

Portable extinguishers are available within the room and directly outside the area, as indicated on Figure 11.8-2. A standpipe hose rack station is located in stairwell (S-4) and could be used for water suppression. A 150-lb wheeled dry chemical extinguisher also exists in stairwell (S-4) on this floor level (Elev. 713). No automatic suppression system is installed in this area (CR-2).

3. Propagation Retardants

All cables installed at Beaver Valley Power Station-Unit 1 were fabricated to pass the vertical cable tray flame test with an oil and burlap flame source which was the acceptable industry standard during the construction of BV-1 and is comparable to IEEE-383 tests.

F. Fire Hazard Analysis

1. Type/Quantity of Combustibles in the CR-2 area

- | | | | |
|----|------------------|-----|-----------|
| a. | Cable Insulation | --- | 5,025 lbs |
| b. | Lube Oil | --- | 10 gal. |
| c. | Charcoal | --- | 100 lbs |

2. Heat Release Potential

- | | | | |
|----|------------------------|---|-------------------------|
| a. | Cable | | |
| | Heat Load | = | 5.527×10^7 Btu |
| | Area | = | 1,490 Sq.ft. |
| | Heat Release Potential | = | 37,060 Btu/sq.ft. |
| b. | Lube Oil | | |
| | Heat Load | = | 1.55×10^6 Btu |
| | Area | = | 1,490 Sq.ft. |
| | Heat Release Potential | = | 1,040 Btu/sq.ft. |
| c. | Charcoal | | |
| | Heat Load | = | 1.40×10^6 Btu |
| | Area | = | 1,490 Sq.ft. |
| | Heat Release Potential | = | 940 Btu/sq.ft. |

The total heat release potential = 39,040 Btu/sq.ft. Based on the heat release potential, the required fire rating for this area is less than one hour.

G. Justification of Area Acceptability

1. The existing construction provides fire barriers in excess of the required ratings determined by the fire loading for this area.
2. Three (3) hour fire rated dampers are installed in all ducts penetrating the fire barriers of this area.
3. The CR-2 area is provided with floor and equipment drains that will prevent equipment damage from standing water due to fire hose use. The drain header is provided with a deep seal running trap, eliminating the potential of fire propagation through the drain system.
4. Hazardous quantities of transient combustibles would not be expected in this area for the following reasons:
 - a) The area is not adjacent to or near any major plant traffic route.
 - b) Storage of transient combustibles in this area is prohibited by plant administrative procedures.
 - c) Maintenance and operations activities in this area do not involve the use of large quantities of combustible materials.
 - d) The accessibility to this area is restricted due to the security system card-key access into the switchgear area.
5. The installed early warning smoke detection system would promptly detect incipient fire conditions in this area and the separation of redundant trains will maintain integrity of the cables and equipment. The fire brigade personnel, responding from the Control Room area two floors above the CR-2 area, will respond to extinguish the fire via the southeast stairwell. The brigade should be capable of reaching this area within minutes after an alarm is received in the Control Room.
6. The circuit analysis presented in (Figure 11.8-4) has identified the potential loss of function of the field flashing circuits of both emergency diesel generators. These circuits are routed through the area in conduit, running at least 10 ft above the floor elevation.

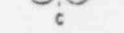

These circuits will be modified as described in Section 6.10 of our original Appendix R submittal report, which would reroute the B train or #2 DG Control Circuit and wiring out of this area, thereby meeting the required separation criteria for redundant trains. This will obviate the potential loss of function and bring the plant design for this area into compliance with Appendix R, except for fixed suppression in the original area under consideration (CR-2).

7. In the event of a fire in this area, loss of ventilation to the Control Room, Process Instrument Rack Room, and Relay Room will be covered by providing ventilation via portable gasoline-driven exhaust fans, when necessary, and included as part of the fire brigade inventory. This method of providing portable ventilation to these areas was previously approved in your letter of March 14, 1983.

This exemption request is predicated upon an equivalent level of protection to that required based on the above considerations and modifications.

Also Available On
Aperture Card

SYMBOLS

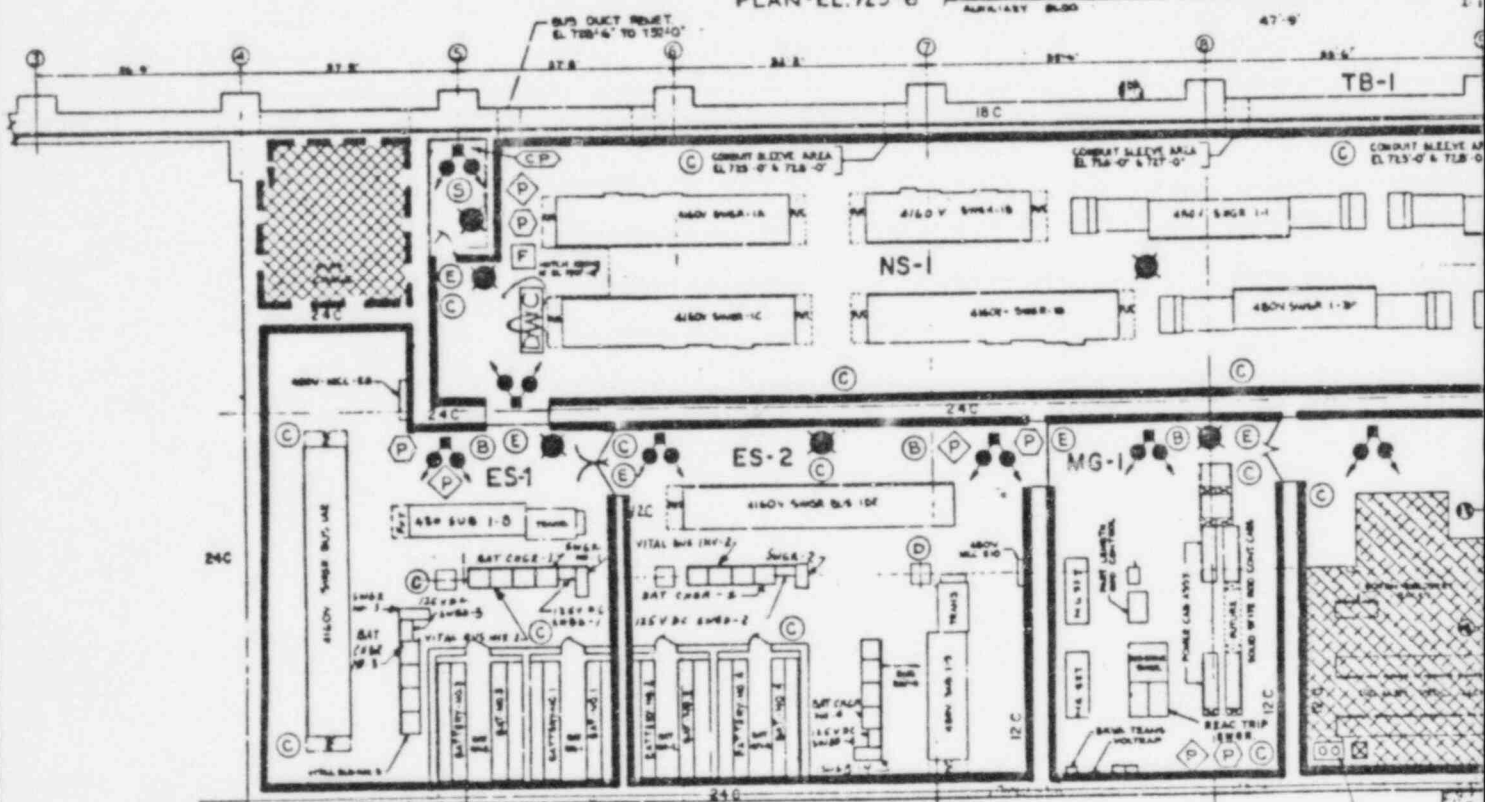
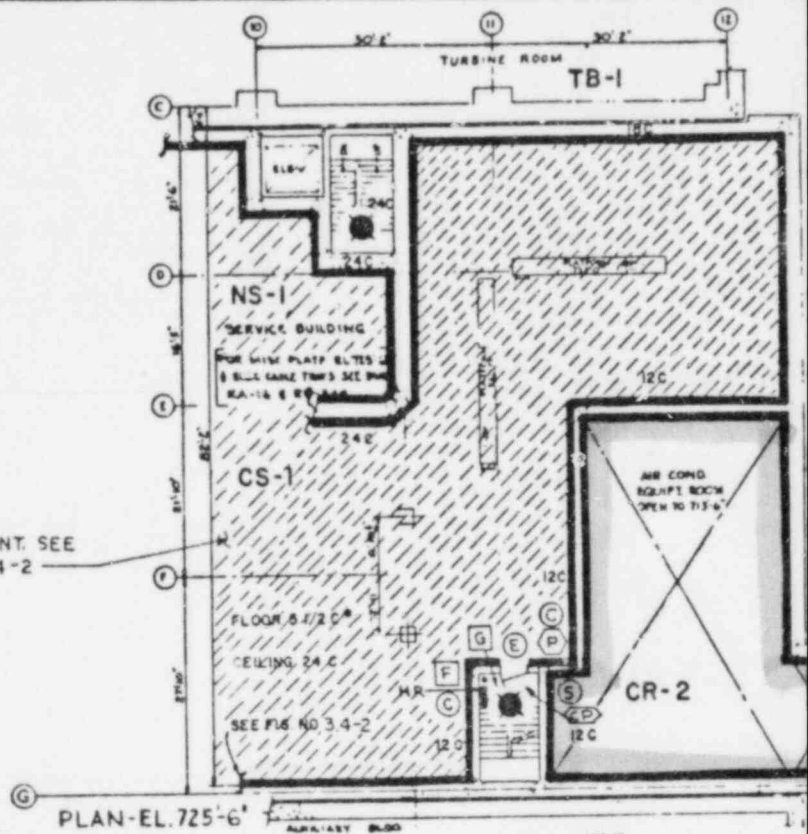
	DC EMERGENCY BATTERY LIGHTING UNIT
	125V DC BATTERY EMERGENCY LIGHT
	PAX PHONE
	DRY CHEMICAL FIRE EXT.
	FIRE EXT. CO -20LBS (APPROX LOCATION)
	EXIT SIGNS
	FIRE ALARM STATION
	FIRE ALARM BELL (APPROX LOCATION)
	GAITRONICS PHONE
	H ₂ O FIRE EXT.
	STANDPIPE-HOSE RACK
	FIRE AREA
	FIRE ZONE
	FIRE BARRIER
	SUB-AREA
	FIRE DOOR RATINGS, (HOURS)
	REINFORCED CONCRETE
	CONCRETE BLOCK WALL
	INSULATED METAL SIDING

P.R.C.
APERTURE
CARD

FIGURE 11.8-1
CONTROL ROOM
BEAVER VALLEY POWER STATION-UNIT 1
FIRE HAZARDS ANALYSIS

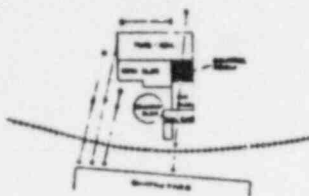
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PRC
APERTURE
CARD

0 5 10 15 20 25 30
SCALE- FEET



KEY PLAN



Also Available On
Aperture Card

SYMBOLS

- AREA SERVED BY CO₂ SYSTEM
- AREA SERVED BY WATER SPRAY (DEL'G)
- AREA SERVED BY HALON SYSTEM
- HALON ACTUATION PULL BOX
- PAX PHONE
- HOSE RACK
- DRY CHEMICAL WHEEL UNIT
- COMMAND POST
- H₂O FIRE EXT.
- STANDPIPE-HOSE RACK
- GAITRONICS PHONE
- CO₂ CONTROL/ALARM PANEL
- FIRE ALARM STATION
- EXIT SIGNS
- DRY CHEMICAL FIRE EXT.
- PORT FIRE EXT. CO₂-20LBS
- FIRE ALARM BELL (APPROX LOCATION)
- FIRE AREA
- FIRE ZONE
- FIRE BARRIER
- SUB-AREA
- FIRE DOOR RATINGS, (HOURS)
- REINFORCED CONCRETE
- CONCRETE BLOCK WALL
- CONCRETE BLOCK WALL
- INSULATED METAL SIDING
- 125V DC BATTERY EMERGENCY LIGHT
- DC EMERGENCY BATTERY LIGHTING UNIT
- FLOOR SYSTEM IS 5 1/8" CONCRETE (INC 1 1/4" CORRUGATED METAL DECKING)

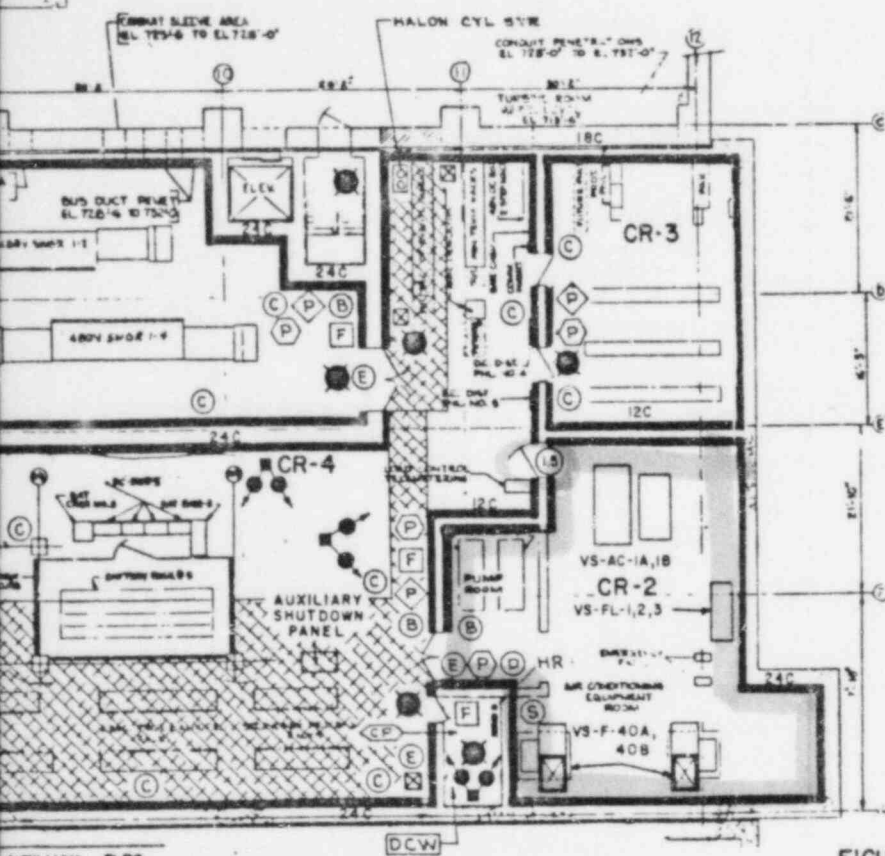


FIGURE 11.8-2
CONTROL ROOM, SWITCHGEAR
AND CABLE SPREADING AREA
BEAVER VALLEY POWER STATION - UNIT 1
FIRE HAZARDS ANALYSIS

REVISED 3/1/82

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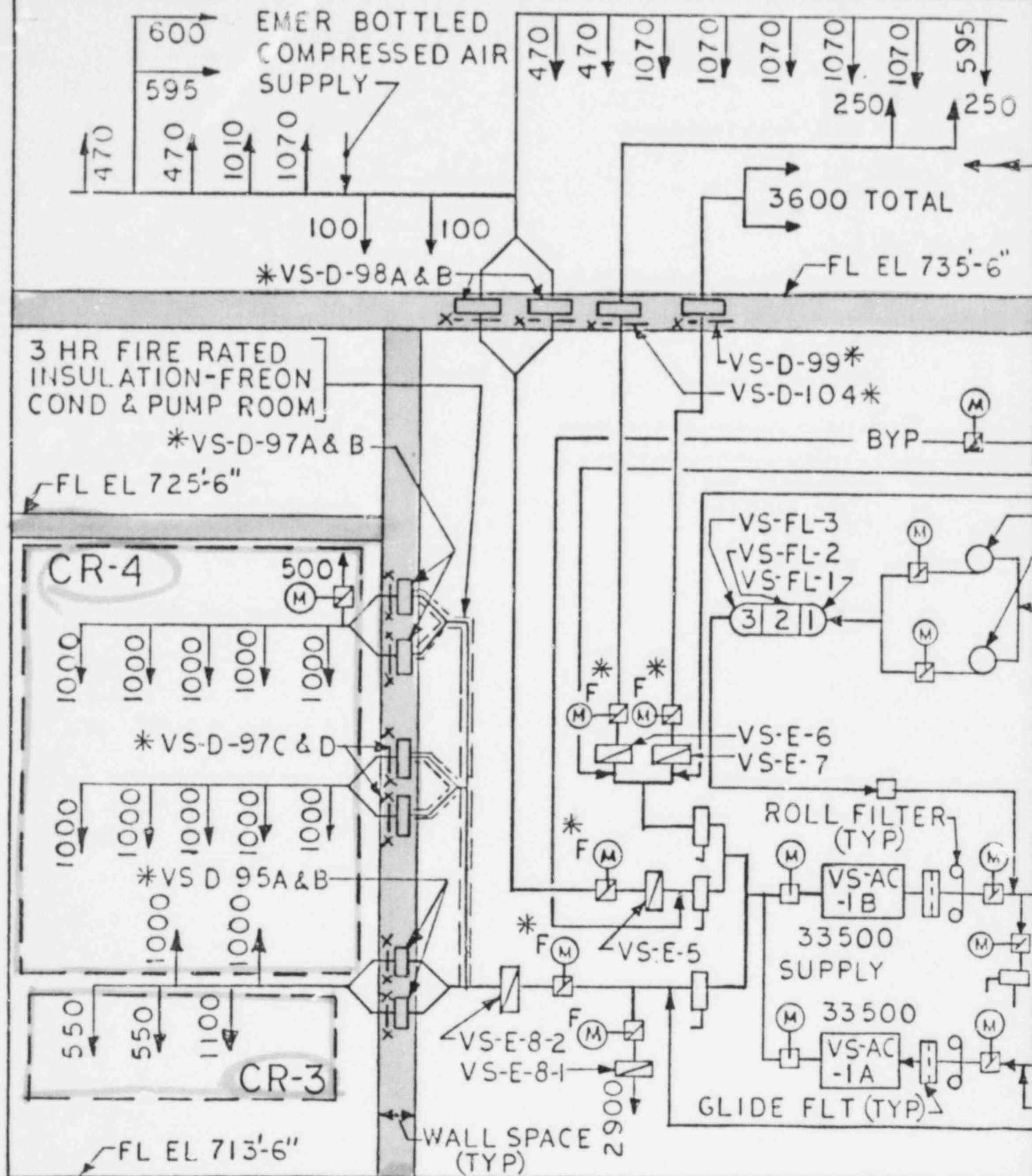
Figure 11.8-4
AIR CONDITIONING ROOM
FIRE AREA CR-2

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION		APPENDIX "R" COMPLIANCE	REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT			
POWER	EE-EG-1 (FIELD) EMERGENCY GENERATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.7	N/A
	EE-EG-2 (FEED) EMERGENCY GENERATOR	EE-EG-1 (FEED)	YES	N/A	YES	-	NO
	EE-EG-2 (FIELD) EMERGENCY GENERATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.7	N/A
	MCC-1-E8 MOTOR CONTROL CENTER	MCC-1-E9	YES	N/A	YES	-	NO
	WR-P-1B RWGR WATER PUMP	WR-P-1A	YES	YES	YES	-	NO
CONTROL AND INSTRUMENT	EE-EG-2 (ENG) EMERGENCY GENERATOR	EE-EG-1 (ENG)	YES	YES	YES	-	NO
	EE-EG-2 (TR-PP) EMERGENCY GENERATOR	EE-EG-1 (TR-PP)	YES	YES	YES	-	NO
	EE-EG-2 (V-REG) EMERGENCY GENERATOR	EE-EG-1 (V-REG)	N/A	YES	YES	-	NO
	FCV-CH122 CHARGING FLOW CONTROL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW113C DIESEL GENERATOR HEAT EXCHANGER 1B INLET VALVE	MOV-RW113A	YES	YES	YES	-	NO

NOTES FOR FIRE AREA CR-2:

1. THIS DISTRIBUTION SYSTEM IS NOT LOST DUE TO A FIRE IN THIS AREA, ONLY SUB-FEEDS INCLUDED TO PROVE COORDINATION.

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION		APPENDIX "R" COMPLIANCE	REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT			
CONTROL AND INSTRUMENT (CONT'D)	MOV-RW113D DIESEL GENERATOR HEAT EXCHANGER 1B INLET VALVE	MOV-RW113B	YES	YES	YES	-	NO
	PNL-VB-1 VITAL BUS PANEL	NOTE 1	N/A	N/A	YES	-	NO
	PNL-VB-2 VITAL BUS PANEL	NOTE 1	N/A	N/A	YES	-	NO
	PNL-VB-3 VITAL BUS PANEL	NOTE 1	N/A	N/A	YES	-	NO
	PNL-VB-4 VITAL BUS PANEL	NOTE 1	N/A	N/A	YES	-	NO
	VS-F-16B EMERGENCY SWITCHGEAR EXHAUST FAN	VS-F-16A	YES	YES	YES	-	NO
	VS-F-22B DIESEL GENERATOR BUILDING EXHAUST FAN	VS-F-22A	YES	YES	YES	-	NO



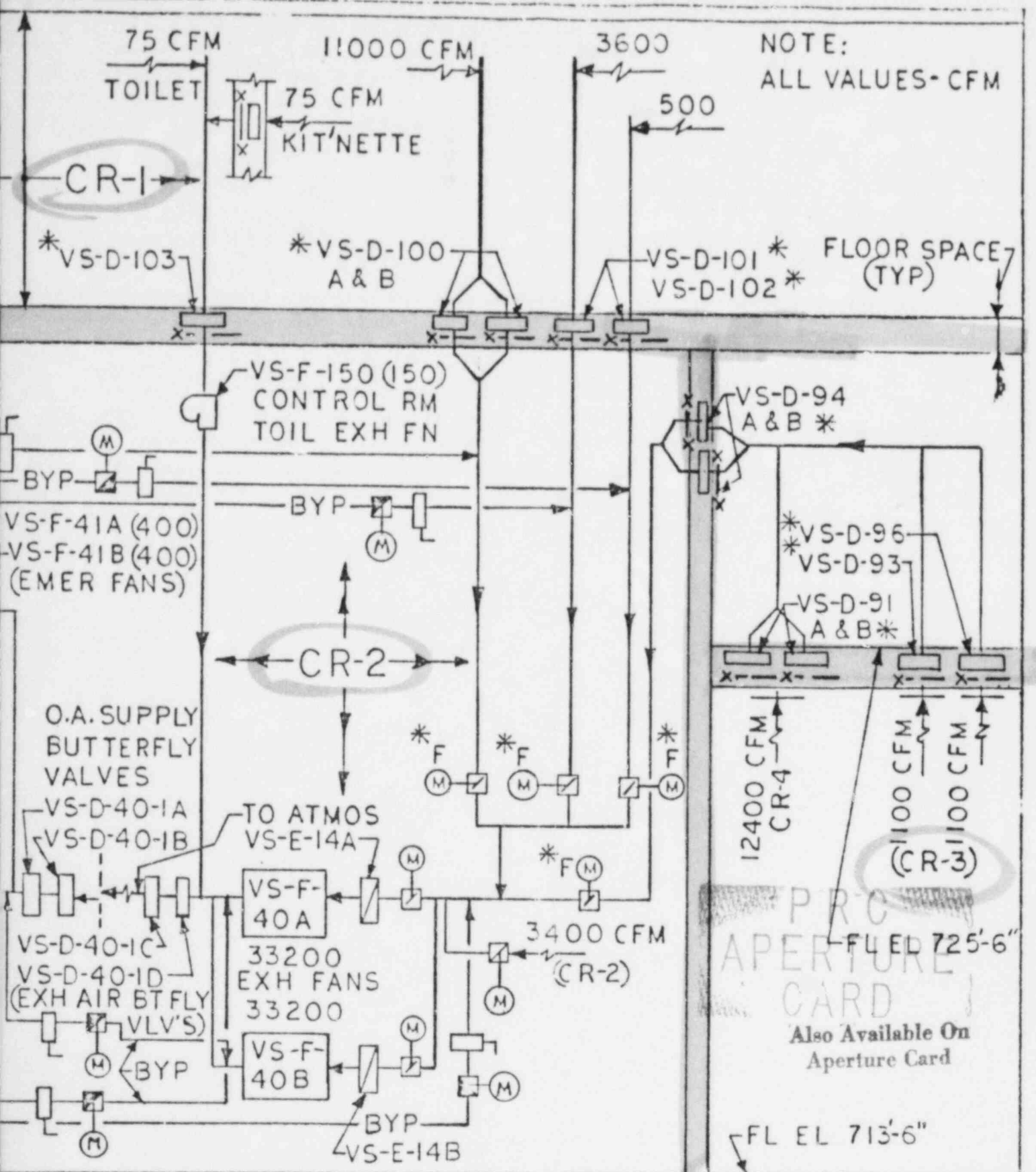
LEGEND:

- ELEC HEAT COIL
- FIRE DMP-THRU WALL
- FIRE DMP-THRU FLR

*=3 HR FIRE RATED DAMPERS

- VOLUME DMP
- MOT OPER DMP
- MOT OPER FIRE DMP

REVISED 1-10-83



VENTILATION-FIRE AREAS CR-1,2,3,&4
PHYSICAL LAYOUT-SERVICE BLDG

8812280506-05

FIGURE 11. B-5

EXEMPTION

III. Emergency Switchgear Rooms (ES-1 & -2) EL.713'

(See attached Figure 11.9-1)

A. Discussion

The West Emergency Switchgear Room (ES-1) contains the safety-related 4KV switchgear and 480V substations and associated cabling for the AE (Orange) Train. The East Emergency Switchgear Room (ES-2) contains the safety-related 4KV Switchgear and 480V substations and associated cabling for the DF (purple) Train. The rooms and redundant trains are adequately separated by a 3 hour-rated fire barrier to prevent a design basis fire from spreading between rooms.

The potential for a fire in either of these areas (ES-1 or 2) to render the loss of vital instrumentation redundant power supplies (120 volt AC Vital Bus 1,2,3 and 4) was previously identified in our Appendix R Fire Protection Review submittal report. Our proposal to provide an alternate capability via a Backup Indication Panel (BIP) was approved and documented in your SER for BVPS #1 dated January 5, 1983. However, since Appendix R requires fixed suppression and detection for the original area under consideration (in this case ES-1&2), we request an exemption from III.G.3 for these areas because they do not have fixed suppression.

Section III.G of Appendix R sets forth the requirement for fire protection for safe shutdown capability on the basis of fire areas. A fire area is defined as that portion of a building or plant that is separated from other areas by boundary fire barriers (walls, floors and ceilings with any openings or penetrations protected with seals or closures having a fire resistance rating equal to that required of the barrier). For boundary fire barriers, using walls, floors, ceilings, dampers, doors, etc. existing prior to Appendix R, the rating required of a boundary fire barrier is based on the guidance in Appendix A to BTP ASB 9.5-1, i.e., the rating of the barrier or boundary must exceed with margin the fire loading in the area and need not necessarily be a 3-hour rated boundary unless the fire loading warrants such a boundary. Pursuant to the Staff's interpretation of fire areas, the fire rating of such boundaries must be three hours or an exemption must be requested. Therefore, an exemption from III.G.2 is required for these areas (ES-1&2) because the ceiling slab which is the floor of the Cable Spreading Room (CS-1) constitutes a minimum 1 1/2 hour fire rated barrier (See Exemption Request for CS-1 area, ATTACHMENT XI), and the Emergency Switchgear Rooms (ES-1&2) are provided with 1 1/2 hour fire rated dampers at the CS-1 perimeter penetration.

B. Boundaries

The construction of these areas constitutes a 3-hour rated fire barrier between the East and West Emergency Switchgear Rooms. For adjacent areas, the boundary fire barriers are 3-hour rated fire barriers with the exception of the ceiling slab and fire dampers described below.

1. Walls (Ref. Drawing, 11700-RC-8A,8B)

Reinforced Concrete:

	<u>ES-1</u>	<u>ES-2</u>	<u>Adjacent Walls</u>
a. North	2ft.0in.	2ft.0in.	parallels the Normal Swgr. Room, in addition ES-1 parallels the MS pipe chase.
b. South	2ft.0in.	2ft.0in.	parallels the unexcavated area.
c. East	1ft.0in.	1ft.0in.	ES-1 parallels ES-2 which parallels Rod Drive MG Room (MG-1)
d. West	2ft.0in.	1ft.0in.	ES-1 parallels Pipe Tunnel partially and ES-2 parallels ES-1

2. Ceiling (Ref. Drawing 11700-RC-8C,8F)

Reinforced concrete (5 1/2" max., 4" min.) on 1 1/2 inches corrugated metal decking constitutes a minimum 1 1/2-hour fire rated barrier per the fire resistance/concrete thickness curve. (See Exemption Request for CS-1 area, ATTACHMENT XI).

3. Floor (Ref. Drawing 11700-RC-8G)
Minimum 3ft.6in. reinforced concrete

4. Room Volume

<u>ES-1</u>	<u>ES-2</u>
29,220 cu.ft.	28,200 cu.ft.

All penetrations to the adjacent fire areas have been sealed for a 3-hour rating which constitutes a 3-hour boundary for this fire zone.

C. Ventilation

The emergency switchgear rooms and battery rooms ventilation system includes two 100 percent redundant exhaust fans powered from the emergency buses. The fans exhaust the rooms through a common exhaust duct discharging to outdoor atmosphere. Each Emergency Switchgear Room exhaust register is provided with a 1 1/2 fire rated damper at the Cable Spreading Room (CS-1) perimeter penetration.

D. Redundant Safe Shutdown Cables/Equipment Located in ES-1 & ES-2.

Redundant safety-related 4KV switchgear and 480V substations are located in each of these separate areas and supply power to Class 1E circuits required for safe shutdown. The circuit analysis has indicated the potential loss of safe shutdown instrumentation redundant power supplies via the 120 VAC Vital Bus 1,2,3 and 4 if either ES-1 or -2 areas are lost due to a fire per the criteria of Appendix R.

E. Fire Protection Existing

1. Fire Detection Existing

Early warning detection system consists of area ionization coverage with local and control room alarm.

2. Fire Extinguishing Systems

No fixed fire suppression is available in either ES-1 or -2. Portable carbon dioxide fire extinguishers are located in each area with additional dry chemical extinguishers available in nearby adjacent areas. A 150-lb wheeled dry chemical extinguisher is located in the adjacent Normal Switchgear (NS-1) room.

3. Standpipe Hose Rack Station

Standpipe hose rack stations are available at both stairwell entrances on this level of the building.

4. Propagation Retardants

All cables installed at Beaver Valley Power Station Unit 1 were fabricated to pass the vertical cable tray flame test with an oil and burlap flame source which was the accepted industry standard during the construction of BV-1 and is comparable to IEEE-383 tests.

F. Fire Hazard Analysis

1. Type/Quality of Combustibles in the ES-1 & ES-2 Area.

	<u>ES-1</u>	<u>ES-2</u>
Cable Insulation	5,920 lbs	5,665 lbs.

2. Heat Release Potential

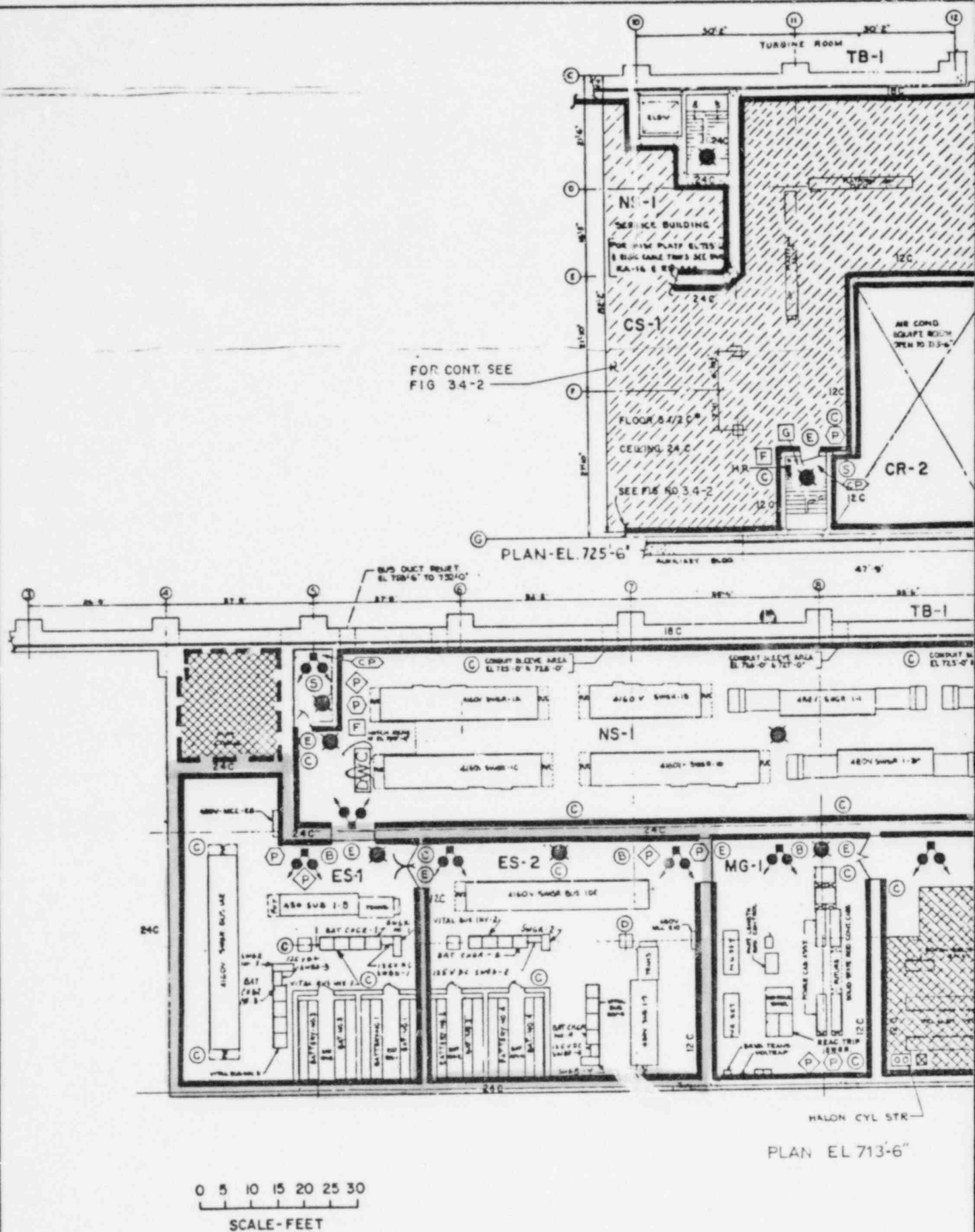
<u>ES-1</u>		<u>ES-2</u>
6.51x10 ⁷ Btu	Heat Load	6.23x10 ⁷ Btu
2,435 sq.ft.	Area	2,350 sq.ft.
31,660 Btu/sq.ft.	Heat Release Potential	26,380 Btu/sq.ft.

Based on the heat release potential, the required fire rating for each of these areas is less than 1/2 hour.

G. Justification of Area Acceptability

1. The existing construction provides fire barriers in excess of the required ratings determined by the fire loading for these areas.
2. Hazardous quantities of transient combustibles would not be expected in this area for the following reasons:
 - a) The area is not adjacent to or near any major plant traffic route.
 - b) Storage of transient combustibles in this area is prohibited by plant administrative procedures.
 - c) Maintenance and operations activities in this area do not involve the use of large quantities of combustible materials.
 - d) The accessibility to the switchgear areas is restricted due to the security system card-key access.
3. The installed early warning smoke detection system would promptly detect incipient fire conditions in this area and the separation of redundant trains will maintain integrity of the cables and equipment. The fire brigade personnel, responding from the control room area two floors above the switchgear area, will respond to extinguish the fire via the southeast stairwell. The brigade should be capable of reaching this area within minutes after an alarm is received in the Control Room.
4. The circuit analysis presented in (Figures 11.9-2,-3) has indicated the potential loss of safe shutdown instrumentation redundant power supplies (120 VAC Vital Busses) if either ES-1 or ES-2 is lost in its entirety in accordance with the layout separation criteria of Appendix R. This potential loss of function was addressed in a previously approved exemption and describes a plant modification to provide a backup indication panel replacing this lost function. This was approved in your letter of January 5, 1983. This alternate shutdown capability modification would bring plant design for this area into conformance with Appendix R, except for fixed suppression in the original area under consideration (ES-1 and -2).

This exemption request is predicated upon an equivalent level of protection to that required based on the above considerations.





PRO
APERTURE
CARD

Also Available On
Aperture Card

SYMBOLS

- AREA SERVED BY CO₂ SYSTEM
- AREA SERVED BY WATER SPRAY (DEL G)
- AREA SERVED BY HALON SYSTEM
- HALON ACTUATION PULL BOX
- PAX PHONE
- HOSE RACK
- DRY CHEMICAL WHEEL UNIT
- COMMAND POST
- H₂O FIRE EXT.
- STANDPIPE-HOSE RACK
- GAITRONICS PHONE
- CO₂ CONTROL/ALARM PANEL
- FIRE ALARM STATION
- EXIT SIGNS
- DRY CHEMICAL FIRE EXT.
- PORT FIRE EXT. CO₂-20LBS
- ALARM BELL (APPROX LOCATION)
- FIRE ZONE
- FIRE BARRIER
- SUB-AREA
- FIRE DOOR RATINGS, (HOURS)
- REINFORCED CONCRETE
- CONCRETE BLOCK WALL
- INSULATED METAL SIDING
- 125V DC BATTERY EMERGENCY LIGHT
- DC EMERGENCY BATTERY LIGHTING UNIT
- FLOOR SYSTEM IS 5 1/4" CONCRETE (INC 1 1/4" CORRUGATED METAL DECKING)

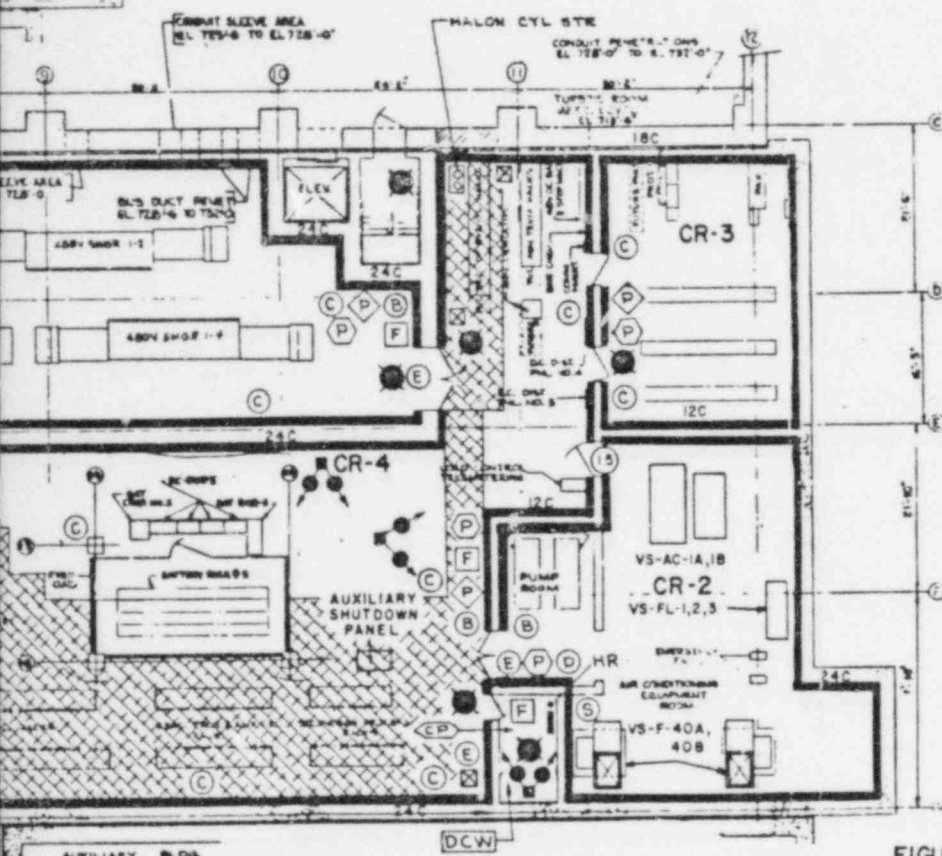


FIGURE 11.9-1
CONTROL ROOM, SWITCHGEAR
AND CABLE SPREADING AREA
BEAVER VALLEY POWER STATION - UNIT I
FIRE HAZARDS ANALYSIS

REVISED 3/1/82

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FIGURE 11.9-2
EMERGENCY SWITCHGEAR - ORANGE
FIRE AREA ES-1

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
POWER	CH-P-1A CHARGING PUMP	CH-P-1B	YES	YES	YES	-	NO
	CH-P-1C CHARGING PUMP	CH-P-1B	YES	YES	YES	-	NO
	DC-SWBD-1 DC SWITCHBOARD	DC-SWBD-2, 4	YES	N/A	YES	-	NO
	DC-SWBD-3 DC SWITCHBOARD	DC-SWBD-2, 4	YES	N/A	YES	-	NO
	EE-EG-1 (FEED) EMERGENCY GENERATOR	EE-EG-2 (FEED)	YES	YES	YES	-	NO
	EE-EG-1 (FIELD) EMERGENCY GENERATOR	EE-EG-2 (FIELD)	YES	YES	YES	-	NO
	EE-EG-1 (GND-SW) EMERGENCY GENERATOR	EE-EG-2 (GND-SW)	YES	YES	YES	-	NO
	FW-P-3A AUX FEED WATER PUMP	FW-P-3B	YES	YES	YES	-	NO
	MCC-1-E1 MOTOR CONTROL CENTER	MCC-1-E2	YES	N/A	YES	-	NO
	MCC-1-E3 MOTOR CONTROL CENTER	MCC-1-E4	YES	N/A	YES	-	NO
	MCC-1-E5 MOTOR CONTROL CENTER	MCC-1-E6	YES	N/A	YES	-	NO
	MCC-1-E7 MOTOR CONTROL CENTER	MCC-1-E8	YES	N/A	YES	-	NO

NOTES FOR FIRE AREA ES-1:

1. CABLE IN AREA FOR CONTROL OF NORMAL AUX LUBE OIL PUMP, ASSOCIATED CABLE WITH SUITABLE CIRCUIT PROTECTION IS PROVIDED.
2. THESE PANELS SERVE AS INSTRUMENTATION POWER SUPPLIES.

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION		APPENDIX "R" COMPLIANCE	REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT			
POWER (CONT'D)	MCC-1-E9 MOTOR CONTROL CENTER	MCC-1-E10	YES	YES	YES	-	NO
	MCC-1-E11 MOTOR CONTROL CENTER	MCC-1-E12	YES	N/A	YES	-	NO
	PNL-VB-1 VITAL BUS	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11 NOTE 2	N/A
	PNL-VB-3 VITAL BUS	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11 NOTE 2	N/A
	PNL-VB-4 VITAL BUS PANEL	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11 NOTE 2	N/A
	PZR-HTR-A PRESSURIZER HEATER	PZR-HTR-B	YES	YES	YES	-	NO
	PZR-HTR-D PRESSURIZER HEATER	PZR-HTR-E	YES	YES	YES	-	NO
	RH-P-1A RESIDUAL HEAT REMOVAL PUMP	RH-P-1B	YES	YES	YES	-	NO
	VS-F-1A CONTAINMENT RECIRC. FAN	VS-F-1B	YES	YES	YES	-	NO
	VS-F-1C CONTAINMENT RECIRC. FAN	VS-F-1B	YES	YES	YES	-	NO
	VS-F-16A EMERGENCY SWITCHGEAR EXHAUST FAN	VS-F-16B	YES	YES	YES	-	NO
	VS-F-55A EMERGENCY SWITCHGEAR SUPPLY FAN	VS-F-55B	YES	YES	YES	-	NO

FIGURE 11.9-2
EMERGENCY SWITCHGEAR - ORANGE
FIRE AREA ES-1

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
POWER (CONT'D)	WR-P-1A RIVER WATER PUMP	WR-P-1B	YES	YES	YES	-	NO
	WR-P-1C RIVER WATER PUMP	WR-P-1B	YES	YES	YES	-	NO
	WR-P-9A AUX. RIVER WATER PUMP	WR-P-9B	YES	YES	YES	-	NO
CONTROL AND INSTRUMENT	CH-P-1B CHARGING PUMP	NOTE 1	YES	YES	YES	-	NO
	CH-P-2A BORIC ACID TRANSFER PUMP	CH-P-2B	YES	YES	YES	-	NO
	EE-EG-1 (ENG) EMERGENCY GENERATOR	EE-EG-2 (ENG)	YES	YES	YES	-	NO
	EE-EG-1 (PROT) EMERGENCY GENERATOR	EE-EG-2 (PROT)	YES	YES	YES	-	NO
	EE-EG-1 (TR-PP) EMERGENCY GENERATOR	EE-EG-2 (TR-PP)	YES	YES	YES	-	NO
	EE-EG-1 (V-REG) EMERGENCY GENERATOR	EE-EG-2 (V-REG)	YES	YES	YES	-	NO
	MOV-CH-115B REFUELING WATER STORAGE TANK CHARGING PUMP ISOL VALVE	MOV-CH115D	YES	YES	YES	-	NO
	MOV-FW151B STM GEN AUX FEED PUMP ISOL VALVE	MOV-FW151A	YES	YES	YES	-	NO

FIGURE 11.9-2
EMERGENCY SWITCHGEAR - ORANGE
FIRE AREA ES-1

CABLE FAILURE TYPE	EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	MOV-FW151D STM GEN AUX FEED PUMP ISOL VALVE	MOV-FW151C	YES	YES	YES	-	NO
	MOV-FW151F STM GEN AUX FEED PUMP ISOL VALVE	MOV-FW151E	YES	YES	YES	-	NO
	MOV-RW102A1 RIVER WATER PUMP 1A DISCHARGE ISOLATION VALVE	MOV-RW102B1	YES	YES	YES	-	NO
	MOV-RW102A2 RIVER WATER PUMP 1A DISCHARGE ISOLATION VALVE	MOV-RW102B2	YES	YES	YES	-	NO
	MOV-RW102C2 WR-P-1C DISCHARGE ISOLATION A HEADER	MOV-RW102B1, B2	YES	YES	YES	-	NO
	TV-CH200 A, B, C LETDOWN ORIFICE ISOLATION VALVES	NONE	N/A	N/A	YES	CHAPTER 7&8	YES
	TV-MS105A AUX FEED PUMP STEAM SUPPLY ISOL VALVE	TV-MS105B	YES	YES	YES	-	NO
	VS-F-22A DIESEL GENERAL BUILDING EXHAUST FAN	VS-F-22B	YES	YES	YES	-	NO

CIRCUIT ANALYSIS SHEET

FIGURE 11.9-3
EMERGENCY SWITCHGEAR-PURPLE
FIRE AREA ES-2

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
POWER	CH-P-1B CHARGING PUMP	CH-P-1A	YES	YES	YES	-	NO
	CH-P-1C CHARGING PUMP	CH-P-1A	YES	YES	YES	-	NO
	DC-SWBD-1 DC SWITCHBOARD	NOTE 1	YES	N/A	YES	-	NO
	DC-SWBD-2 DC SWITCHBOARD	DC-SWBD-1,3	YES	N/A	YES	-	NO
	DC-SWBD-3 DC SWITCHBOARD	NOTE 1	YES	N/A	YES	-	NO
	DC-SWBD-4 DC SWITCHBOARD	DC-SWBD-1,3	NO	N/A	YES	-	NO
	EE-EG-2 (FEED) EMERGENCY GENERATOR	EE-EG-1 (FEED)	YES	N/A	YES	-	NO
	EE-EG-2 (FIELD) EMERGENCY GENERATOR	EE-EG-1 (FIELD)	YES	N/A	YES	-	NO
	EE-EG-2 (GND-SW) EMERGENCY GENERATOR	EE-EG-1 (GND-SW)	YES	N/A	YES	-	NO
	FW-P-3B AUX FEED WATER PUMP	FW-P-3A	YES	YES	YES	-	NO
	MCC-1-E2 MOTOR CONTROL CENTER	MCC-1-E1,3,5,7 9,11	YES	N/A	YES	-	NO
	MCC-1-E10 MOTOR CONTROL CENTER	MCC-1-E1,3,5,7 9,11	YES	N/A	YES	-	NO

NOTES FOR FIRE AREA ES-2:

1. THIS DISTRIBUTION SYSTEM IS NOT LOST DUE TO A FIRE IN THIS AREA, ONLY SUBFEEDS INCLUDED TO PROVE COORDINATION.
2. THE ONLY CABLE IN THIS AREA IS AN ASSOCIATED CABLE TO THE MOTOR HEATER WHICH IS PROTECTED BY A COORDINATED CIRCUIT BREAKER FROM A NON-1E POWER SOURCE.
3. THESE PANELS SERVE AS INSTRUMENTATION POWER SUPPLIES.

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
POWER (CONT'D)	MCC-1-E12 MOTOR CONTROL CENTER	MCC-1-E1,3,5,7 9,11	YES	N/A	YES	-	NO
	MCC-1-E4 MOTOR CONTROL CENTER	MCC-1-E1,3,5,7 9,11	YES	N/A	YES	-	NO
	MCC-1-E6 MOTOR CONTROL CENTER	MCC-1-E1,3,5,7 9,11	YES	N/A	YES	-	NO
	MCC-1-E8 MOTOR CONTROL CENTER	MCC-1-E1,3,5,7 9,11	YES	N/A	YES	-	NO
	PNL-VB-1 VITAL BUS	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11 NOTE 3	N/A
	PNL-VB-2 VITAL BUS	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11 NOTE 3	N/A
	PNL-VB-3 VITAL BUS	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11 NOTE 3	N/A
	PNL-VB-4 VITAL BUS	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11 NOTE 3	N/A
	PZR-HTR-B PRESSURIZER HEATER	PZR-HTR-A	YES	YES	YES	-	NO
	PZR-HTR-E PRESSURIZER HEATER	PZR-HTR-D	YES	YES	YES	-	NO
	RH-P-1B RESIDUAL HEAT REMOVAL PUMP	RH-P-1B	YES	YES	YES	-	NO
	VS-F-1B CONTAINMENT RECIRC. FAN	VS-F-1A	YES	YES	YES	-	NO
	VS-F-1C CONTAINMENT RECIRC. FAN	VS-F-1A	YES	YES	YES	-	NO

FIGURE 11.9-3
EMERGENCY SWITCHGEAR-PURPLE
FIRE AREA ES-2

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
POWER (CONT'D)	VS-F-55B EMERGENCY SWITCHGEAR SUPPLY FAN	VS-F-55A	YES	YES	YES	-	NO
	WR-P-1B RIVER WATER PUMP	WR-P-1A	YES	NO	YES	CHAPTER 7	YES
	WR-P-1C RIVER WATER PUMP	WR-P-1A	YES	NO	YES	CHAPTER 7	YES
	WR-P-9B AUX. RIVER WATER PUMP	WR-P-9A	YES	YES	YES	-	NO
CONTROL AND INSTRUMENT	CH-P-2B BORIC ACID TRANSFER PUMP	CH-P-2A	YES	YES	YES	-	NO
	EE-EG-2 (ENG) EMERGENCY GENERATOR	EE-EG-1 (ENG)	YES	YES	YES	-	NO
	EE-EG-2 (PROT) EMERGENCY GENERATOR	EE-EG-1 (PROT)	YES	YES	YES	-	NO
	EE-EG-2 (TR-PP) EMERGENCY GENERATOR	EE-EG-1 (TR-PP)	YES	YES	YES	-	NO
	EE-EG-2 (V-REG) EMERGENCY GENERATOR	EE-EG-1 (V-REG)	YES	YES	YES	-	NO
	LT-FW487 STEAM GENERATOR WR LEVEL TRANSMITTER	LT-FW477,497	YES	YES	YES	-	NO
	MOV-CH115D REFUELING WATER STORAGE TANK CHARGING PUMP ISOLATION VALVE	MOV-CH115B	YES	YES	YES	-	NO
	MOV-CH310 RCS CHARGING ISOLATION	NONE	NO	NO	YES	CHAPTER 7	N/A

CIRCUIT ANALYSIS SHEET

CABLE FAILURE TYPE	EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	MOV-FW151A STM GEN AUX FEED PMP ISOLATION VALVE	MOV-FW151B	YES	YES	YES	-	NO
	MOV-FW151C STM GEN AUX FEED PUMP ISOLATION VALVE	MOV-FW151D	YES	YES	YES	-	NO
	MOV-FW151E STM GEN AUX FEED PUMP ISOLATION VALVE	MOV-FW151F	YES	YES	YES	-	NO
	MOV-RW102B1 RIVER WATER PUMP 1B DISCHARGE VALVE	MOV-RW102A1	YES	YES	YES	-	NO
	MOV-RW102B2 RIVER WATER PUMP 1B DISCHARGE VALVE	MOV-RW102A2	YES	YES	YES	-	NO
	MOV-RW102C1 RIVER WATER PUMP 1C DISCHARGE VALVE	MOV-RW102A2	YES	YES	YES	-	NO
	TV-MS105B TURBINE DRIVEN AUX FEED PUMP STEAM SUPPLY ISOLATION VALVE	TV-MS105A	YES	YES	YES	-	NO
	VS-F-16B EMERGENCY SWITCHGEAR EXHAUST FAN	VS-F-16A	YES	YES	YES	-	NO
	VS-F-22B DIESEL GENERATOR BUILDING EXHAUST FAN	VS-F-22A	YES	YES	YES	-	NO
	WR-P-1A RIVER WATER PUMP	NOTE 2	YES	YES	YES	-	NO

CIRCUIT ANALYSIS SHEET

EXEMPTION

IV. Process Instrument Room (CR-4) EL. 713'

(See Attached Figures 11.10-1 and 11.10-2)

A. Discussion

This area is located in the basement of the Service Building (El.713), one floor below the Cable Spreading Room (CS-1) and two floors below the Control Room (CR-1). The room houses the Emergency Shutdown Panel, installed during original construction of the plant for hot shutdown capability if the control room had to be evacuated in the event of habitability problems. The loss of this shutdown panel does not affect the ability to achieve safe shutdown. The reactor protection and Engineered Safeguards Features System logic cabinets and Solid State Protection System racks are also located in this area.

The components located in this area required for safe shutdown are the Class 1E control and instrument cabling associated with:

- Emergency Diesel Generators control and protection relay circuits
- Auxiliary Feedwater control and associated instrumentation circuits
- Steam Generator Pressure process instrumentation circuits
- Pressurizer Pressure and level process instrumentation circuits
- Reactor Coolant hot and cold leg temperature process instrumentation circuits
- Emergency Diesel Generator Heat Exchanger River Water Isolation Valves SIS signal circuit (opens the associated cooling water valve on D.G. auto-start)

The potential for a fire in this area to render all the above cabling and equipment inoperable was previously identified in our Appendix R Fire Protection Review submittal report. Our proposal to make modifications and provide alternate/dedicated shutdown capability external to this area, thereby eliminating the possibility of a fire in CR-4 from jeopardizing the plant's ability to achieve safe shutdown, was approved and documented in your SER for BVPS Unit 1 dated January 5, 1983. However, since Appendix R requires fixed suppression and detection for the original area under consideration (in this case CR-4), we request an exemption from III.G.3 for the Process Instrument Room (CR-4) because this area does not have fixed suppression.

Section III.G of Appendix R sets forth the requirement for fire protection for safe shutdown capability on the basis of fire areas. A fire area is defined as that portion of a building or plant that is separated from other areas by boundary fire barriers (walls, floors and ceilings with any openings or penetrations protected with seals or closures having a fire resistance rating equal to that required of the barrier). For boundary fire barriers, using walls, floors, ceilings, dampers, doors, etc. existing prior to Appendix R, the rating required of a boundary fire barrier is based on the guidance in Appendix A to NTP ASB 9.5-1, i.e., the rating of the barrier or boundary must exceed with margin the fire loading in the area and need not necessarily be a 3-hour rated boundary unless the fire loading warrants such a boundary. Pursuant to the Staff's interpretation of fire areas, the fire rating of such boundaries must be three hours or an exemption must be requested. Therefore, an exemption from III.G.2 is required for this area because of the three (3) existing fire doors which have a fire rating of 1 1/2 hours (See Figure 11.10-2), and the ceiling slab, which is the floor of the Cable Spreading Room (CS-1) constitutes a minimum 1 1/2 hour fire rated barrier (See Exemption Request for CS-1 area, ATTACHMENT XI).

B. Boundaries

The construction of this area constitutes a 3-hour rated fire barrier with the exception of the ceiling slab and the 1 1/2 hour fire rated doors leading to the Relay Room (CR-3) and A/C Equipment Room (CR-2) described below.

1. Walls (Ref. Drawing 11700-RC-8A,-8B)

a. North

The north wall faces the Normal Switchgear Room (NS-1) and the Turbine Building (TB-1) and is divided into two sections of different thicknesses.

- 1) 2ft.0in. reinforced concrete at that section which parallels NS-1.
- 2) 1ft.6in. reinforced concrete at that section which parallels TB-1.

b. South

The south wall faces the Primary Auxiliary Building (PAB).

2ft.0in. reinforced concrete at the section which parallels the PAB.

c. East

The east wall faces the Control Room A/C Equipment Room (CR-2) and Relay Room (CR-3).

1ft.0in. reinforced concrete parallels the Relay Room (CR-3) and the A/C Equipment Room (CR-2).

d. West

The west wall faces the Motor Generator Room (MG-1) and the Normal Switchgear Room (NS-1) and is divided into two sections of different thicknesses.

1) 1ft.0in. reinforced concrete at the MG-1 section.

2) 2ft.0in reinforced concrete at the NS-1.

2. Ceiling (Ref. Drawing 11700-RC-7G)

Reinforced concrete (5 1/2" max., 4" min.) on 1 1/2 inches corrugated metal decking constitutes a minimum 1 1/2-hour fire rated barrier per the fire resistance/concrete thickness curve. (See Exemption Request for CS-1 area, ATTACHMENT XI).

3. Floor (Ref. Drawing 11700-RC-8G)

Minimum 3ft.6in. reinforced concrete.

4. Room Volume

65,880 cu.ft.

5. Fire Doors

3 hour fire-rated doors are provided to adjacent areas NS-1 (Normal Switchgear Room), MG-1 (Motor Generator Room) and the double door entrance to CR-2 (Control Room A/C Equipment Room). 1 1/2 hour fire-rated doors are provided to CR-3 (Relay Room) and the northwest entrance door to CR-2 room. See Figure 11.10-2.

All penetrations to adjacent fire areas have been sealed for a 3-hour rating.

C. Ventilation

This area is serviced by the same air conditioning system as the Control Room areas CR-1, CR-2 and CR-3. The system is detailed on Figure 11.10-3. Duct penetrations are provided with 3 hour fire rated dampers between fire areas as detailed on Figure 11.10-5.

D. Redundant Safe Shutdown Cables/Equipment Located in CR-4

Both Class 1E and non-Class 1E equipment and cable exist within this area. The major equipment located in this area consists of the primary and secondary process racks, reactor protection racks, and emergency auxiliary shutdown panel. A battery rack exists within area CR-4. Separate ventilation and enclosure was not provided as it was determined that a maximum of only 0.25% hydrogen concentration would result with minimum outdoor air supplied and 10 times the maximum calculated hydrogen being generated during battery charging.

E. Fire Protection Existing

1. Fire Detection Systems

Detection consists of area coverage by ionization type detectors provided with an alarmed display in the control room fire detection panel. This fire detection panel is powered from the normal system with automatic transfer to station emergency power on loss of primary power source. Activation of any ionization detector will cause all fire alarms throughout the plant to sound. Detectors are also located in the subfloor area for the actuation of the Halon 1301 system.

2. Fire Extinguishing Systems

A fixed suppression system is available in the subfloor cable trench area in the false floor which is an automatic total flooding Halon 1301 system. No suppression system exists within the CR-4 room area.

Portable extinguishers are available within the room and directly outside the area, as indicated on Figure 11.10-2. A standpipe hose rack station is located in stairwell (S-4) and could be used for water suppression. A 150-lb wheeled dry chemical extinguisher also exists in the stairwell (S-4) on this floor level (Elev.713).

3. Propagation Retardants

All cables installed at Beaver Valley Power Station Unit 1 were fabricated to pass the vertical cable tray flame test with an oil and burlap flame source which was the accepted industry standard during the construction of BV-1 and is comparable to IEEE-383 tests.

F. Fire Hazard Analysis

1. Type/Quantity of Combustibles in CR-4 area.

Cable Insulation - 24,060 lbs.

2. Heat Release Potential

Heat Load	= 2.65×10^8 Btu.
Area	=5,490 sq.ft.
Heat Release Potential	=50,200 Btu/sq.ft.

Based on the heat release potential, the required fire rating for this area is less than one hour.

G. Justification of Area Acceptability

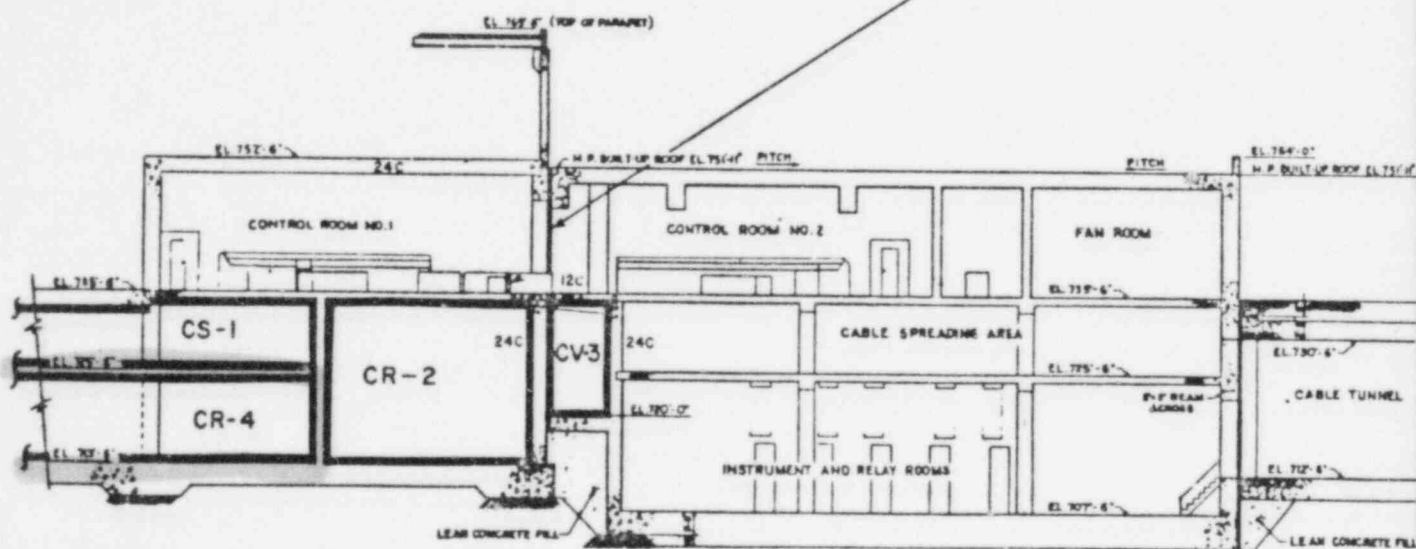
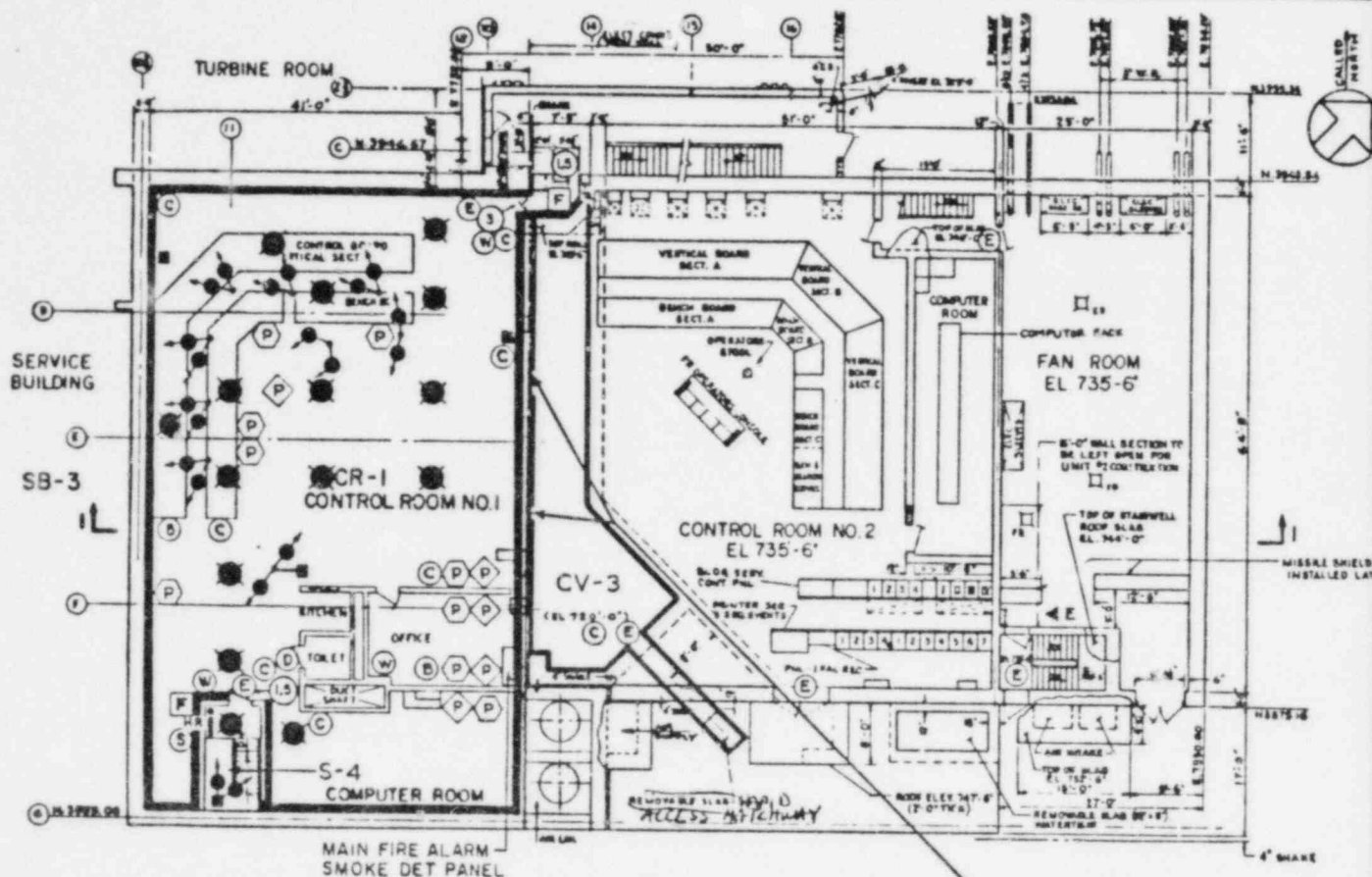
1. The existing construction provides fire barriers in excess of the required ratings determined by the fire loading for this area.
2. The control room air conditioning ductwork penetrations between this area and CR-2, CR-3 and CS-1 are provided with 3 hour fire rated dampers in the associated wall or floor penetrations.
3. The circuit analysis presented in Figure 11.10-4 has identified the following redundant functions which could potentially be lost, assuming the layout separation of Appendix R:
 - Emergency Diesel Generators control and protection relay circuits
 - Auxiliary Feedwater control and associated instrumentation circuits
 - Steam Generator Pressure process instrumentation circuits
 - Pressurizer Pressure and level process instrumentation
 - Reactor Coolant hot and cold leg temperature process instrumentation circuits
 - Emergency Diesel Generator Heat Exchanger River Water Isolation Valves SIS signal circuit (opens the associated cooling water valve on D. G. auto-start)

These circuits will be modified as described in Section 6.10 of our original Appendix R submittal report. River Water Supply Valve MOV-RW113D will be provided with isolation in its control circuit for a safety injection interlock. Additionally the plant modification to provide a backup indication panel (BIP) replacing the lost parameters associated with the reactor coolant system will be installed per Section 6.11 of the Report. To resolve the concern with the loss of Auxiliary Feedwater capability, a new pump and associated instrumentation will be installed as described in Section 6.2 of our original Appendix R Report.

These modifications will obviate the potential loss of functions in this area and bring the plant design for this area into conformance with Appendix R, except for fixed suppression in the original area under consideration (CR-4).

4. Loss of ventilation to the Control Room (CR-1), Process Instrument Room (CR-4), and Relay Room (CR-3) will be covered by providing ventilation via portable gasoline-driven exhaust fans, when necessary, and included as part of the fire brigade inventory. This method of providing portable ventilation to these areas was previously approved in your letter of March 14, 1983.
5. Hazardous quantities of transient combustibles would not be expected in this area for the following reasons:
 - a) The area is not adjacent to or near any major plant traffic route.
 - b) Storage of transient combustibles in this area is prohibited by plant administrative procedures.
 - c) Maintenance and operations activities in this area do not involve the use of large quantities of combustible materials.
 - d) The accessibility to the switchgear area is restricted due to the security system card-key access.
6. The installed early warning smoke detection system would promptly detect incipient fire conditions in this area until the fire brigade personnel, responding from the control room area two floors above the CR-4 area, respond to extinguish the fire via the southeast stairwell. The brigade should be capable of reaching this area within minutes after an alarm is received in the Control Room.

This exemption request is predicated upon an equivalent level of protection to that required based on the above considerations and modifications.



Also Available On
Aperture Card

SYMBOLS

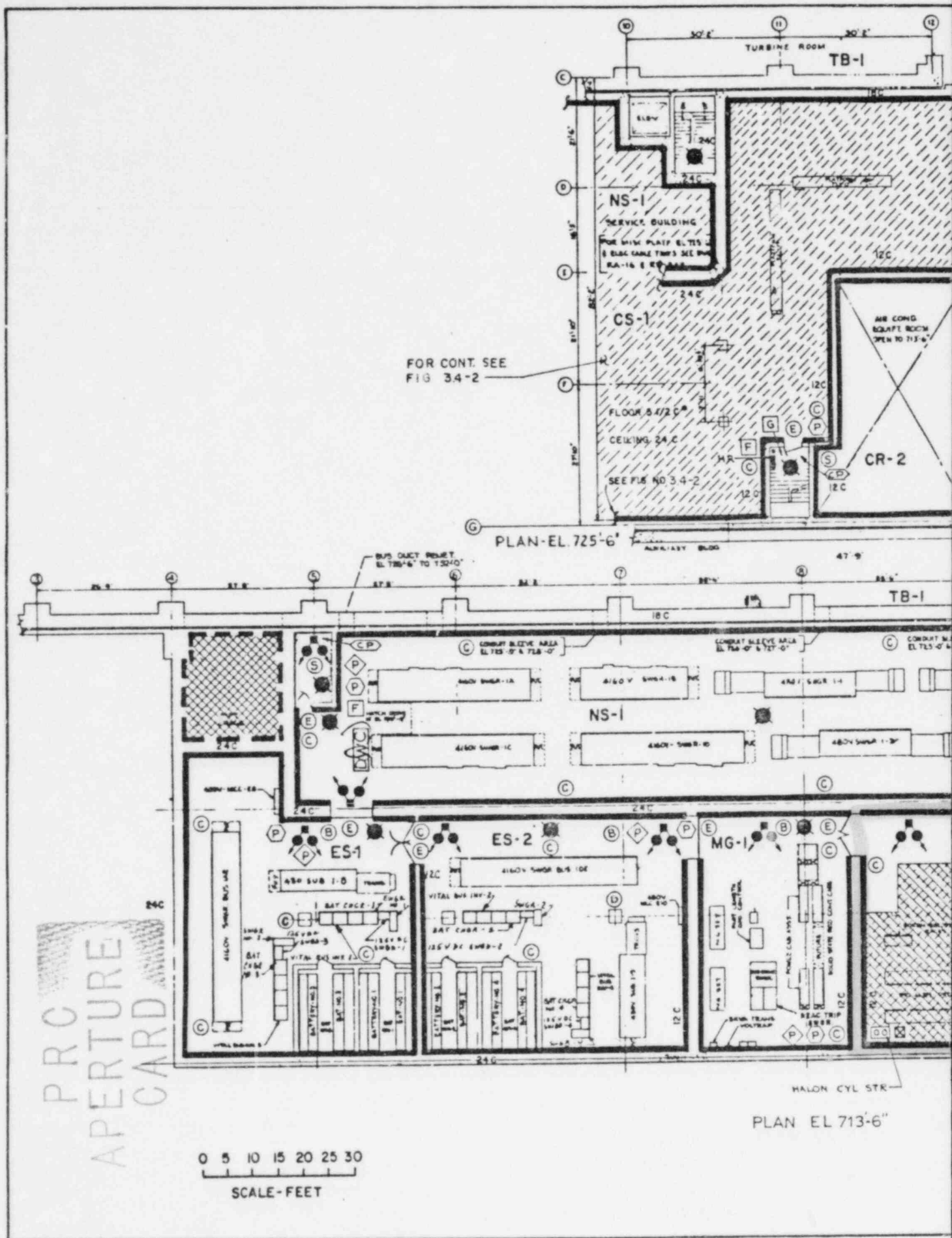
	DC EMERGENCY BATTERY LIGHTING UNIT
	125V DC BATTERY EMERGENCY LIGHT
	PAX PHONE
	DRY CHEMICAL FIRE EXT.
	FIRE EXT. CO -20LBS (APPROX. LOCATION)
	EXIT SIGNS
	FIRE ALARM STATION
	FIRE ALARM BELL (APPROX. LOCATION)
	GAITHRONICS PHONE
	H ₂ O FIRE EXT.
	STANDPIPE-HOSE RACK
	FIRE AREA
	FIRE ZONE
	FIRE BARRIER
	SUB AREA
	FIRE DOOR RATINGS. (HOURS)
	REINFORCED CONCRETE
	CONCRETE BLOCK WALL
	INSULATED METAL SIDING

PRC
APERTURE
CARD

FIGURE 11.10-1
CONTROL ROOM
BEAVER VALLEY POWER STATION-UNIT 1
FIRE HAZARDS ANALYSIS

REVISED 3/1/82

8312280506-07





Also Available On
Aperture Card

SYMBOLS

- AREA SERVED BY CO₂ SYSTEM
 - AREA SERVED BY WATER SPRAY (DEL'G)
 - AREA SERVED BY HALON SYSTEM
 - HALON ACTUATION PULL BOX
 - PAX PHONE
 - HOSE RACK
 - DRY CHEMICAL WHEEL UNIT
 - COMMAND POST
 - H₂O FIRE EXT.
 - STANDPIPE-HOSE RACK
 - GAITRONICS PHONE
 - CO₂ CONTROL/ALARM PANEL
 - FIRE ALARM STATION
 - EXIT SIGNS
 - DRY CHEMICAL FIRE EXT.
 - PORT. FIRE EXT. CO₂-20LBS
 - FIRE ALARM BELL (APPROX LOCATION)
 - FIRE AREA
 - FIRE ZONE
 - FIRE BARRIER
 - SUB-AREA
 - FIRE DOOR RATINGS, (HOURS)
 - REINFORCED CONCRETE
 - CONCRETE BLOCK WALL
 - INSULATED METAL SIDING
 - 125V DC BATTERY EMERGENCY LIGHT
 - DC EMERGENCY BATTERY LIGHTING UNIT
- * FLOOR SYSTEM IS 5 1/4" CONCRETE
(INC 1 1/4" CORRUGATED METAL DECKING)

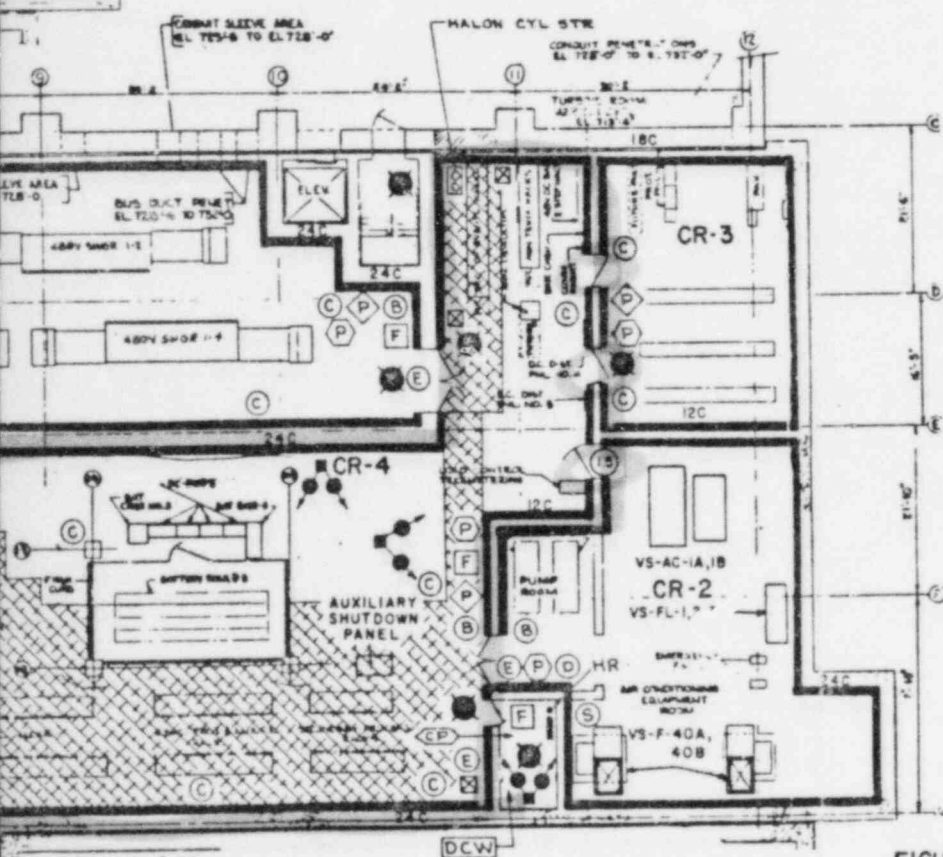


FIGURE 11,10-2
CONTROL ROOM, SWITCHGEAR
AND CABLE SPREADING AREA
BEAVER VALLEY POWER STATION - UNIT 1
FIRE HAZARDS ANALYSIS

REVISED 3/1/82

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FIGURE 11.10-4
INSTRUMENT ROOM
FIRE AREA CR-4

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION		APPENDIX "R" COMPLIANCE	REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT			
POWER							
	DC-SWBD-3 DC SWITCHBOARD	NOTE 1	N/A	N/A	YES	-	NO
	DC-SWBD-4 DC SWITCHBOARD	NOTE 1	N/A	N/A	YES	-	NO
	EE-EG-2 (FEED) EMERGENCY GENERATOR	EE-EG-1 (FEED)	YES	N/A	YES	-	NO
	MCC-1-E2 MOTOR CONTROL CENTER	MCC-1-E1	YES	N/A	YES	-	NO
	MCC-1-E8 MOTOR CONTROL CENTER	MCC-1-E9	YES	N/A	YES	-	NO
	PNL-VB-1 VITAL BUS PANEL	NOTE 1	N/A	N/A	YES	-	NO
	PNL-VB-2 VITAL BUS PANEL	NOTE 1	N/A	N/A	YES	-	NO
	PNL-VB-3 VITAL BUS PANEL	NOTE 1	N/A	N/A	YES	-	NO
	PNL-VB-4 VITAL BUS PANEL	NOTE 1	N/A	N/A	YES	-	NO
	WR-P-1B RIVER WATER PUMP	WR-P-1A NOTE 2	YES	NO	YES	CHAPTER 7	YES

NOTES FOR FIRE AREA CR-4:

1. THIS DISTRIBUTION SYSTEM IS NOT LOST DUE TO A FIRE IN THIS AREA, ONLY SUB-FEEDS INCLUDED TO PROVE COORDINATION.
2. THERE ARE NO POWER CABLES FOR WR-P-1A IN THE CR-4 AREA. THIS DEVIATES FROM THE INFORMATION IN THE FIRE STUDY REPORTS, BUT WAS SHOWN TO BE CORRECT BY PLANT INSPECTION.

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
POWER (CONT'D)	WR-P-1C RIVER WATER PUMP	WR-P-1A NOTE 2	YES	NO	YES	CHAPTER 7	YES
	WR-P-9A ALT RIVER WATER PUMP	WR-P-1A NOTE 2	YES	NO	YES	CHAPTER 7	YES
	WR-P-9B ALT RIVER WATER PUMP	WR-P-1A NOTE 2	YES	NO	YES	CHAPTER 7	YES
CONTROL AND INSTRUMENT	CH-P-1A CHARGING PUMP	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	CH-P-1B CHARGING PUMP	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	CH-P-1C CHARGING PUMP	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	CH-P-2A BORIC ACID TRANSFER PUMP	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	CH-P-2B BORIC ACID TRANSFER PUMP	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	EE-EG-1 (ENG) EMERGENCY GENERATOR	N/A	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	EE-EG-1 (PROT) EMERGENCY GENERATOR	N/A	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	EE-EG-2 (ENG) EMERGENCY GENERATOR	N/A	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	EE-EG-2 (PROT) EMERGENCY GENERATOR	N/A	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	FCV-CH122 CHARGING FLOW CONTROL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A

FIGURE 11.10-4
INSTRUMENT ROOM
PIPE AREA CR-4

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	FW-P-3A AUX FEED WATER PUMP	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A
	FW-P-3B AUX FEED WATER PUMP	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A
	LCV-CH460A&B PRESSURIZER LEVEL CONTROL VALVES	NONE	N/A	N/A	YES	CHAPTER 7&8	YES
	LT-FW474,84,94 STEAM GENERATOR 1A, 1B, AND 1C NR LEVEL TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	LT-FW475,85,95 STEAM GENERATOR 1A, 1B, AND 1C NR LEVEL TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	LT-FW476,86,96 STEAM GENERATOR 1A, 1B, AND 1C NR LEVEL TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	LT-FW477 STEAM GENERATOR A WR LEVEL TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	LT-FW487 STEAM GENERATOR B WR LEVEL TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	LT-FW497 STEAM GENERATOR C WR LEVEL TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	LT-RC459 PRESSURIZER LEVEL TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	LT-RC460 PRESSURIZER LEVEL TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	MOV-CH115B REFUELING WATER STORAGE TANK CHARGING PUMP ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-CH115D REFUELING WATER STORAGE TANK CHARGING PUMP ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-CH289 REGENERATIVE HEAT EXCHANGER CHARGING LINE ISOLATION VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-CH310 REGENERATIVE HEAT EXCHANGER CHARGING LINE DISCHARGE ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-CH378 REACTOR COOLANT PUMP SEAL WATER RETURN VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-CH381 REACTOR COOLANT PUMP SEAL WATER RETURN VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-FW151A STM GEN AUX FEED PUMP ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	NO
	MOV-FW151B STM GEN AUX FEED PUMP ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	NO

FIGURE 14.10-4
INSTRUMENT ROOM
FIRE AREA CR-4

CABLE FAILURE TYPE	EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION		APPENDIX "R" COMPLIANCE	REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT			
CONTROL AND INSTRUMENT (CONT'D)	MOV-FW151C STM GEN AUX FEED PUMP ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	NO
	MOV-FW151D STM GEN AUX FEED PUMP ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	NO
	MOV-FW151E STM GEN AUX FEED PUMP ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	NO
	MOV-FW151F STM GEN AUX FEED PUMP ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	NO
	MOV-RW103A RECIRCULATION SPRAY HEAT EXCHANGER SUPPLY ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW103B RECIRCULATION SPRAY HEAT EXCHANGER SUPPLY ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW106A REACTOR PLANT COMPONENT COOLING WATER HEAT EXCHANGER SERIES ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW106B REACTOR PLANT COMPONENT COOLING WATER HEAT EXCHANGER SERIES ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW113A DIESEL GENERATOR HEAT EXCHANGER 1B INLET ISOL VALVE	N/A	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION		APPENDIX "R" COMPLIANCE	REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT			
CONTROL AND INSTRUMENT (CONT'D)	MOV-RW113B DIESEL GENERATOR HEAT EXCHANGER 1A INLET ISOL VALVE	N/A	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	MOV-RW113C DIESEL GENERATOR HEAT EXCHANGER 1B INLET ISOL VALVE	N/A	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	MOV-RW113D DIESEL GENERATOR HEAT EXCHANGER 1A INLET ISOL VALVE	N/A	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	MOV-RW114A PRIMARY COMPONENT COOLING WATER HEAT EXCHANGER SERIES ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW114B PRIMARY COMPONENT COOLING WATER HEAT EXCHANGER SERIES ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW117 CONTAINMENT RECIRCULATION AIR COOLER SUPPLY ISOL VALVES	MOV-RW116	YES	YES	YES	-	NO
	MOV-S1867A BIT TANK INLET ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-S1867B BIT TANK INLET ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-S1867C BIT TANK OUTLET ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-S1867D BIT TANK OUTLET ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A

FIGURE 11.10-4
INSTRUMENT ROOM
FIRE AREA CR-4

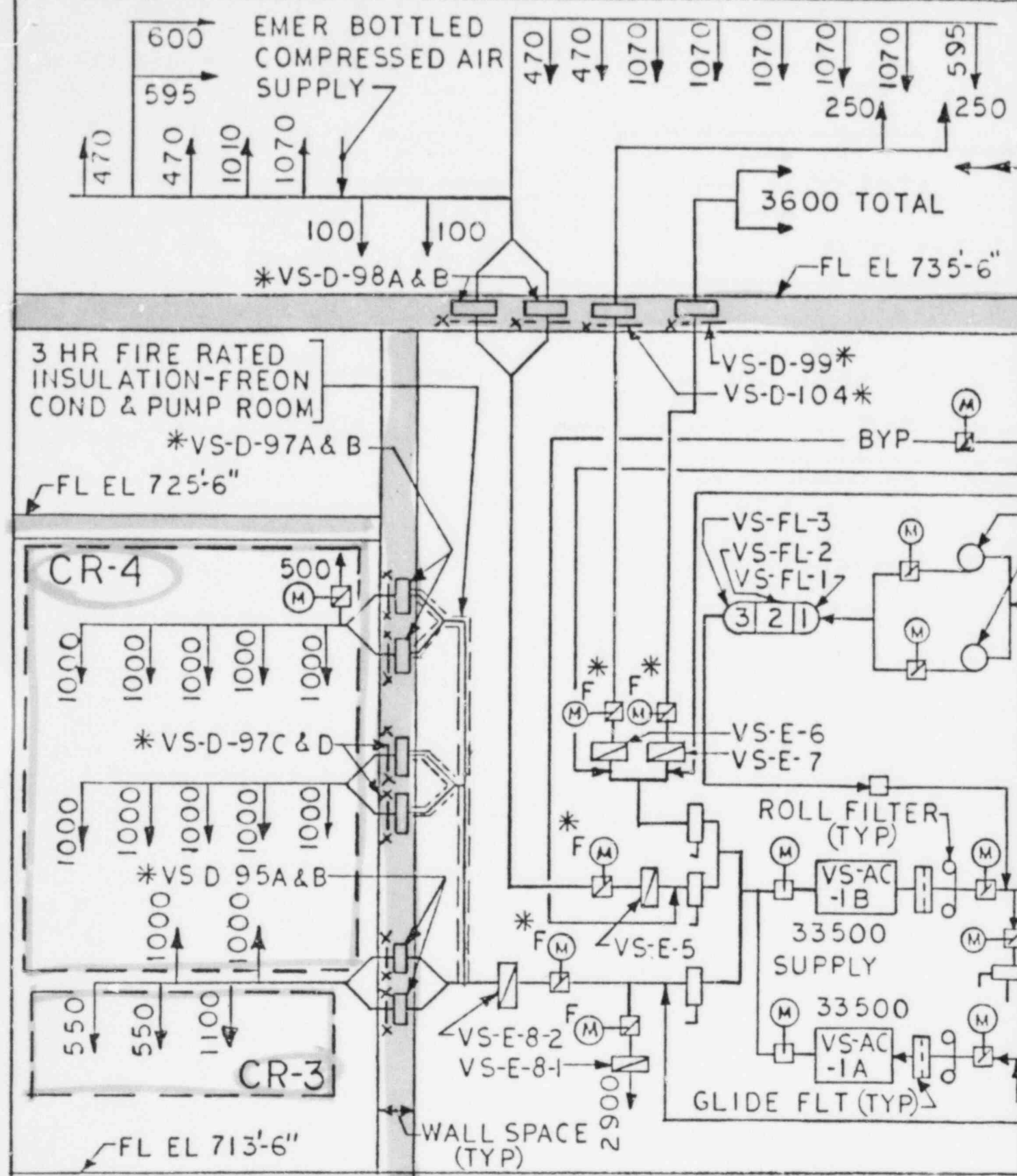
TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	PCV-MS101A STM GEN 1A ATMOSPHERIC STEAM DUMP PRESSURE CONTROL VALVE	SV-MS101A	N/A	N/A	YES	-	NO
	PCV-MS101B&C STM GEN 1B&1C ATMOSPHERIC STEAM DUMP PRESSURE CONTROL VALVE	SV-MS101B&C	N/A	N/A	YES	-	NO
	PCV-RC455C PRESSURIZER POWER RELIEF VALVE	NONE	N/A	N/A	YES	CHAPTER 7 & 8	YES
	PCV-RC455D & 456 PRESSURIZER POWER RELIEF VALVES	NONE	N/A	N/A	YES	CHAPTER 7 & 8	YES
	PT-MS474,84,94 STEAM GENERATOR 1A, 1B, AND 1C PRESSURE TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PT-MS475,85,95 STEAM GENERATOR 1A, 1B, AND 1C PRESSURE TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PT-MS476,86,96 STEAM GENERATOR 1A, 1B, AND 1C PRESSURE TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PT-RC402 PRESSURE TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PT-RC403 PRESSURE TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PT-RC444 PRESSURIZER PRESSURE TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	PT-RC455 PRESSURIZER PRESSURE TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PT-RC456 PRESSURIZER PRESSURE TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PT-RC457 and LT-461 PRESSURIZER PRESSURE AND LEVEL TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PZR-HTR-A PRESSURIZER HEATER	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	PZR-HTR-B PRESSURIZER HEATER	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	PZR-HTR-D PRESSURIZER HEATER	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	PZR-HTR-E PRESSURIZER HEATER	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	RH-P-1A RESIDUAL HEAT REMOVAL PUMP	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	RH-P-1B RESIDUAL HEAT REMOVAL PUMP	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	TRB & TI-RC410 REACTOR COOLANT COLD LEG NO. 1 TEMP RESISTANT BULB AND INDICATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	TRB & TI-RC413 REACTOR COOLANT HOT LEG NO. 1 TEMP RESISTANT BULB AND INDICATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A

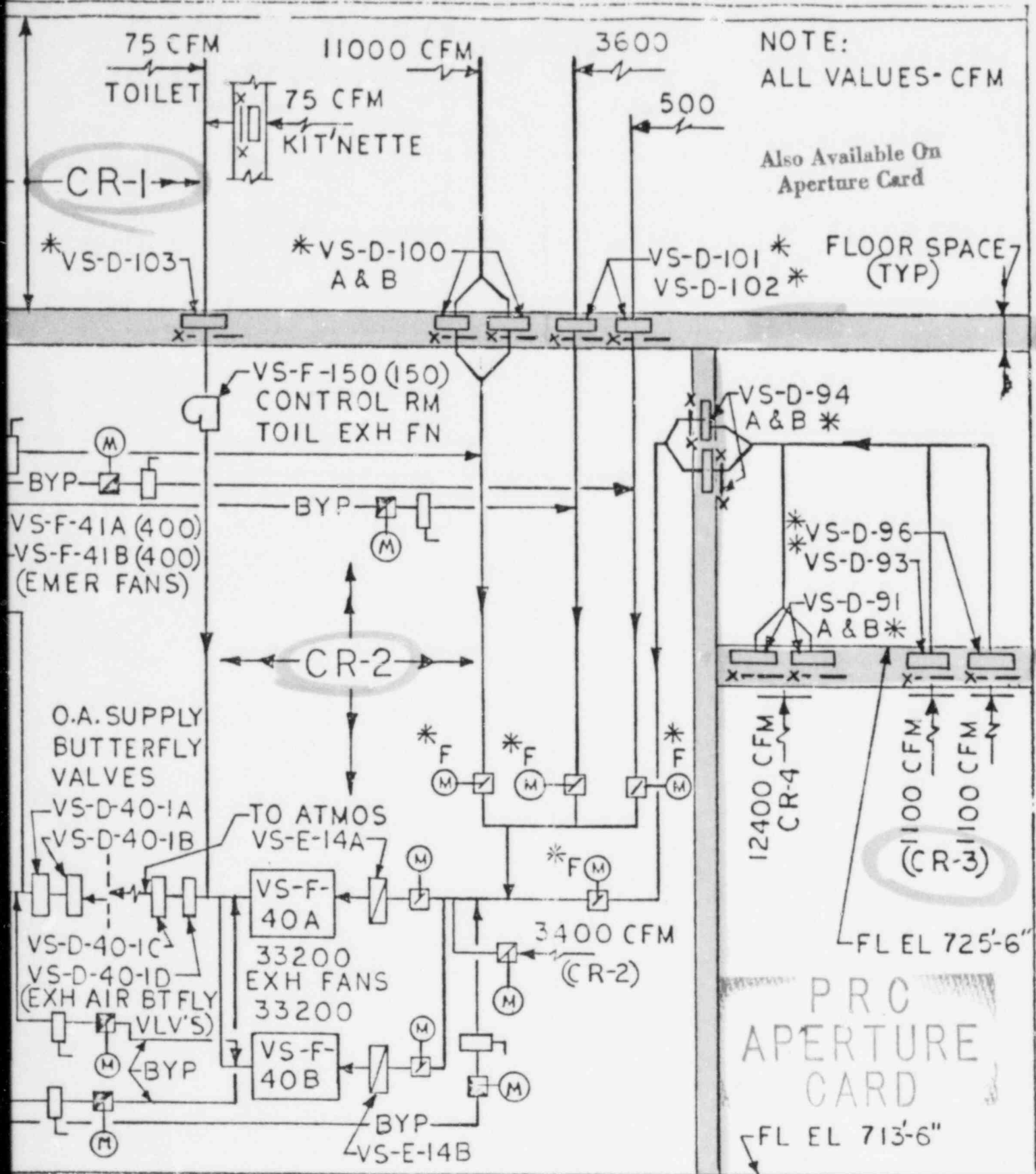
FIGURE 11.10-4
INSTRUMENT ROOM
FIRE AREA CR-4

TYPE	CABLE FAILURE EQUIPMENT LOSS	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	TRB & TI-RC420 REACTOR COOLANT COLD LEG NO. 2 TEMP RESISTANT BULB AND INDICATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	TRB & TI-RC423 REACTOR COOLANT HOT LEG NO. 2 TEMP RESISTANT BULB AND INDICATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	TRB & TI-RC430 REACTOR COOLANT COLD LEG NO. 3 TEMP RESISTANT BULB AND INDICATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	TRB & TI-RC433 REACTOR COOLANT HOT LEG NO. 3 TEMP RESISTANT BULB AND INDICATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	TV-CC110D&E3 CONTAINMENT RECIRCULATION AIR COOLER ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	TV-CC110E2&F2 CONTAINMENT RECIRCULATION AIR COOLER ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	TV-CC110F1 CONTAINMENT RECIRCULATION AIR COOLER ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	TV-CH200A,B,C REGENERATIVE HEAT EXCHANGER DISCHARGE ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7&8	YES
	TV-CH204 LETDOWN LINE ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION		APPENDIX "R" COMPLIANCE	REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT			
CONTROL AND INSTRUMENT (CONT'D)	TV-MS105A AUX FEED PUMP STEAM SUPPLY ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A
	TV-MS105B AUX FEED PUMP STEAM SUPPLY ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A
	VS-F-1A CONTAINMENT RECIRC FANS	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	VS-F-1B CONTAINMENT RECIRC FANS	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	VS-F-1C CONTAINMENT RECIRC FANS	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	VS-F-16B EMERGENCY SWITCHGEAR EXHAUST FAN	VS-F-16A	YES	YES	YES	-	NO
	WR-P-1A RIVER WATER PUMP	NONE	N/A	N/A	YES	CHAPTER 7	N/A



- | | | | |
|---------|--------------------|---------------------------|-------------------|
| LEGEND: | | *=3 HR FIRE RATED DAMPERS | |
| | ELEC HEAT COIL | | VOLUME DMP |
| | FIRE DMP-THRU WALL | | MOT OPER DMP |
| | FIRE DMP-THRU FLR | | MOT OPER FIRE DMP |



VENTILATION-FIRE AREAS CR-1,2,3,&4
PHYSICAL LAYOUT-SERVICE BLDG

FIGURE 11.10-5

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EXEMPTION

V. Communication Equipment & Relay Panel Room (CR-3) EL.713'

(See attached Figure 11.11-1)

A. Discussion

This area is located in the basement of the Service Building (Elev. 713), one floor below the Cable Spreading Room (CS-1) and two floors below the Control Room (CR-1). Equipment located in this area is mainly relay and communication panels. The primary components located in this area required for safe shutdown are the diesel generator protection panels. The circuit analysis presented in our original Appendix R submittal report had identified several circuits associated with the control and protection of both emergency diesel generators which could result in the coincident loss of function of both diesel generators if the loss of this area were postulated.

The potential for a fire in this area to render both emergency diesel generators inoperable was previously identified in our Appendix R Fire Protection Review submittal report. Our proposal to make modifications and provide alternate/dedicated shutdown capability external to this area, to eliminate the possibility of a fire in CR-3 from jeopardizing the plant's ability to achieve safe shutdown, was approved and documented in your SER for BVPS Unit 1 dated January 5, 1983. However, since Appendix R requires fixed suppression and detection for the original area under consideration (in this case CR-3), we request an exemption from III.G.3 for the Communications Equipment and Relay Panel Room (CR-3) because this area does not have fixed suppression.

Section III.G of Appendix R sets forth the requirement for fire protection for safe shutdown capability on the basis of fire areas. A fire area is defined as that portion of a building or plant that is separated from other areas by boundary fire barriers (walls, floors and ceilings with any openings or penetrations protected with seals or closures having a fire resistance rating equal to that required of the barrier). For boundary fire barriers, using walls, floors, ceilings, dampers, doors, etc. existing prior to Appendix R, the rating required of a boundary fire barrier is based on the guidance in Appendix A to BTP ASB 9.5-1, i.e., the rating of the barrier or boundary must exceed with margin the fire loading in the area and need not necessarily be a 3-hour rated boundary unless the fire loading warrants such a boundary. Pursuant to the Staff's interpretation of fire areas, the fire rating of such boundaries must be three hours or an exemption must be requested.

Therefore, an exemption from III.G.2 is required for this area (CR-3) because of the two (2) existing fire doors which have a fire rating of 1 1/2 hours (See Figure 11.11-1), and the ceiling slab which is the floor of the Cable Spreading Room (CS-1) constitutes a minimum 1 1/2 hour fire rated barrier (See Exemption Request for CS-1 area, ATTACHMENT XI).

B. Boundaries

The construction of this area constitutes a 3-hour rated fire barrier with the exception of the ceiling slab and the 1 1/2 hour fire rated doors leading to the Process Instrument Rack Room (CR-4) described below.

1. Walls (Ref. Drawing 11700-RC-8A,-8B)

Reinforced Concrete:

- a. North 1ft.6in. parallels the Turbine Building (TB-1)
- b. South 1ft.0in. parallels the A/C Equipment Room (CR-2)
- c. East 2ft.0in. below grade
- d. West 1ft.0in. parallels the Process Instrument Rack Room (CR-4)

2. Ceiling. (Ref. Drawing 11700-RC-7G)

Reinforced concrete (5 1/2" max., 4" min.) on 1 1/2 inches corrugated metal decking constitutes a minimum 1 1/2-hour fire rated barrier per the fire resistance/concrete thickness curve. (See Exemption Request for CS-1 area, ATTACHMENT XI).

3. Floor (Ref. Drawing 11700-RC-8H)

Minimum 3ft. reinforced concrete.

4. Room Volume

10,980 cu.ft.

5. Fire Doors

Both doors located between the Process Instrument Room (CR-4) & Communications Equipment and Relay Panel Room (CR-3) are 1 1/2 hour fire-rated doors. (See Figure 11.11-1). They are solid (no glass), hollow metal, 4 ft 8 ft sized doors, which were originally installed to achieve the required fire barrier rating based on the fire loading in the room.

All penetrations to adjacent fire areas have been sealed for a 3-hour rating.

C. Ventilation

This area is serviced by the same air conditioning system as the Control Room Areas CR-1, CR-2 and CR-4. The system is detailed on Figure 11.11-2. Duct penetrations are provided with 3 hour fire rated dampers between fire areas as detailed on Figure 11.11-4.

D. Redundant Safe Shutdown Cables/Equipment Located in CR-3

Control and instrumentation cable associated with the emergency diesel generators.

E. Fire Protection Existing

1. Fire Detection Systems

Early warning detection system consists of area coverage by ionization type detectors provided with an alarmed display in the control room fire detection panel. The fire detection panel is powered from the normal system with automatic transfer to station emergency power on loss of primary power source. Activation of any ionization detector will cause all fire alarms throughout the plant to sound.

The air conditioning system for this area has branch supply and return ducts that individually service CR-3. Redundant smoke detectors exists in the returns to present the possibility of any smoke spreading to the other zones.

2. Fire Extinguishing Systems

Portable extinguishers are available within the room and directly outside the area, as indicated on Figure 11.11-1. A standpipe hose rack station is located in stairwell (S-4) and could be used for water suppression. A 150-lb wheeled dry chemical extinguisher also exists in the stairwell (S-4) on this floor level (Elev. 713).

3. Propagation Retardants

All cables installed at Beaver Valley Power Station Unit 1 were fabricated to pass the vertical cable tray flame test with an oil and burlap flame source which was the accepted industry standard during the construction of BV-1 and is comparable to IEEE-383 tests.

F. Fire Hazard Analysis

1. Type/Quantity of Combustibles in the CR-3 area

Cable Insulation - 4,750 lbs.

2. Heat Release Potential

Cable

Heat Load = 5.22×10^7 Btu

Area = 915 sq. ft.

Heat Release Potential = 58,550 Btu/sq.ft.

Based on the heat release potential, the required fire rating for this area is less than 1 hour.

G. Justification of Area Acceptability

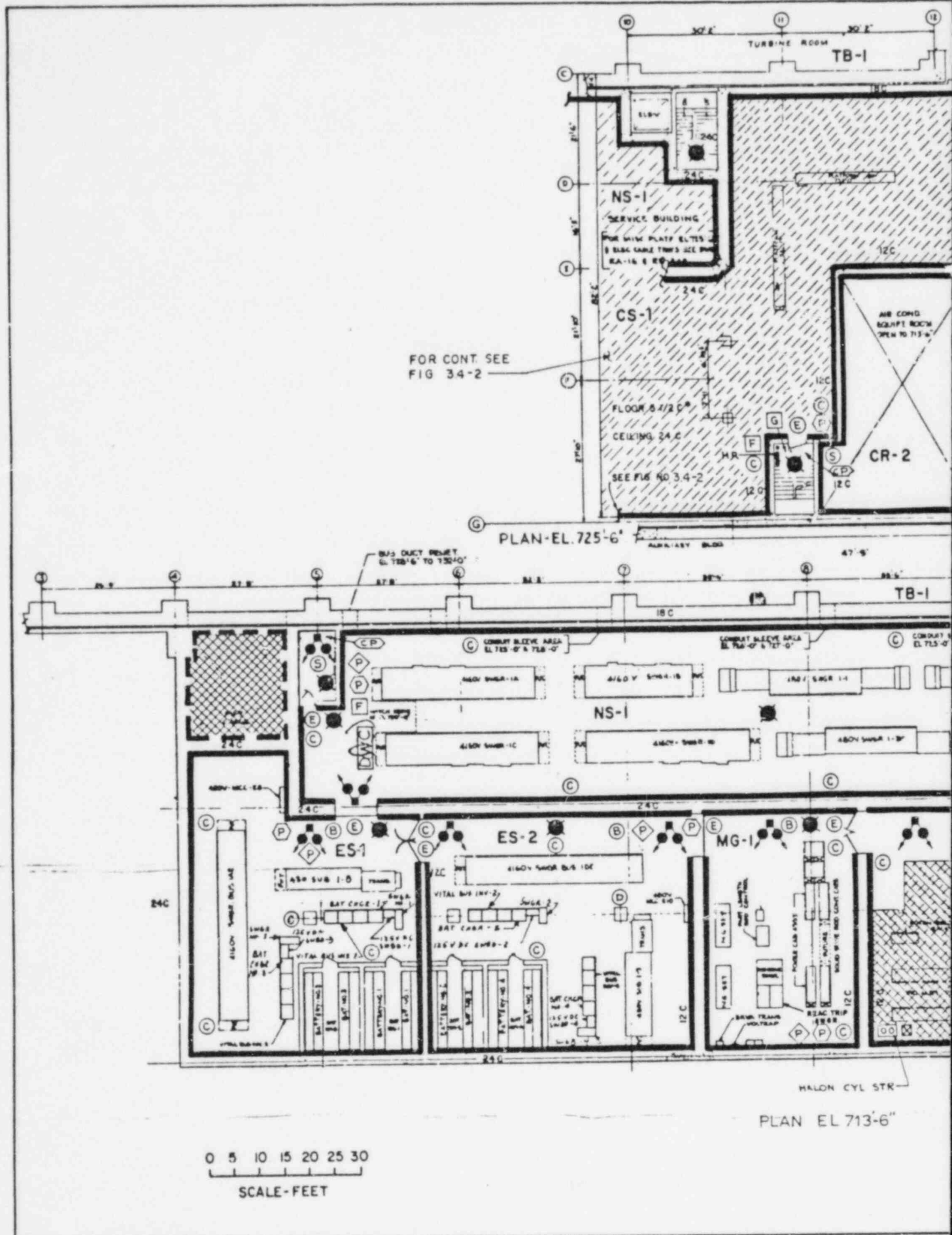
- 1) The existing construction provides fire barriers in excess of the required ratings determined by the fire loading for this area.
- 2) The control room air conditioning ductwork penetrations between this area and CR-2, CR-4 and CS-1 are provided with 3-hour fire rated dampers in the associated wall or floor penetrations.
- 3) The circuit analysis presented in Figure 11.11-3 has indicated the potential loss of function of both diesel generators as various control and protection circuits for both emergency diesels are routed through this area.

The plant modifications described in Section 6.10 of our original Appendix R submittal report, which would reroute the B train or #2 DG control circuit and wiring thereby meeting the required separation criteria for redundant trains. This will obviate the potential loss of redundant functions and bring the plant design for this area into conformance with Appendix R except for fixed suppression in the original area under consideration (CR-3).

4. Hazardous quantities of transient combustibles would not be expected in this area for the following reasons:
 - a) The area is not adjacent to or near any major plant traffic route.
 - b. Storage of transient combustibles in this area is prohibited by plant administrative procedures.
 - c) Maintenance and operations activities in this area do not involve the use of large quantities of combustible materials.
 - d) The accessibility to this area is restricted due to the security system card-key access into the switchgear area.

5. The installed early warning smoke detection system would promptly detect incipient fire conditions in this area until the fire brigade personnel, responding from the control room area two floors above the CR-3 area, respond to extinguish the fire via the southeast stairwell.. The brigade should be capable of reaching this area within minutes after an alarm is received in the Control Room.

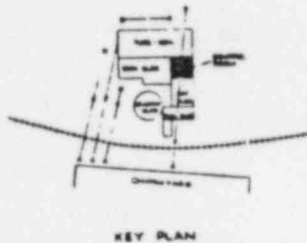
This exemption request is predicated upon an equivalent level of protection to that required based on the above considerations and modifications.





PRC APERTURE CARD

Also Available On
Aperture Card



KEY PLAN

SYMBOLS

- AREA SERVED BY CO₂ SYSTEM
 - AREA SERVED BY WATER SPRAY (DEL G)
 - AREA SERVED BY HALON SYSTEM
 - HALON ACTUATION PULL BOX
 - PAX PHONE
 - HOSE RACK
 - DRY CHEMICAL WHEEL UNIT
 - COMMAND POST
 - H₂O FIRE EXT.
 - STANDPIPE-HOSE RACK
 - GAITRONICS PHONE
 - CO₂ CONTROL/ALARM PANEL
 - FIRE ALARM STATION
 - EXIT SIGNS
 - DRY CHEMICAL FIRE EXT.
 - PORT FIRE EXT. CO₂-20LBS
 - FIRE ALARM BELL (APPROX LOCATION)
 - FIRE AREA
 - FIRE ZONE
 - FIRE BARRIER
 - SUB AREA
 - FIRE DOOR RATINGS, (HOURS)
 - REINFORCED CONCRETE
 - CONCRETE BLOCK WALL
 - INSULATED METAL SIDING
 - 125V DC BATTERY EMERGENCY LIGHT
 - DC EMERGENCY BATTERY LIGHTING UNIT
- * FLOOR SYSTEM IS 5 1/2" CONCRETE
(INC 1 1/4" CORRUGATED METAL DECKING)

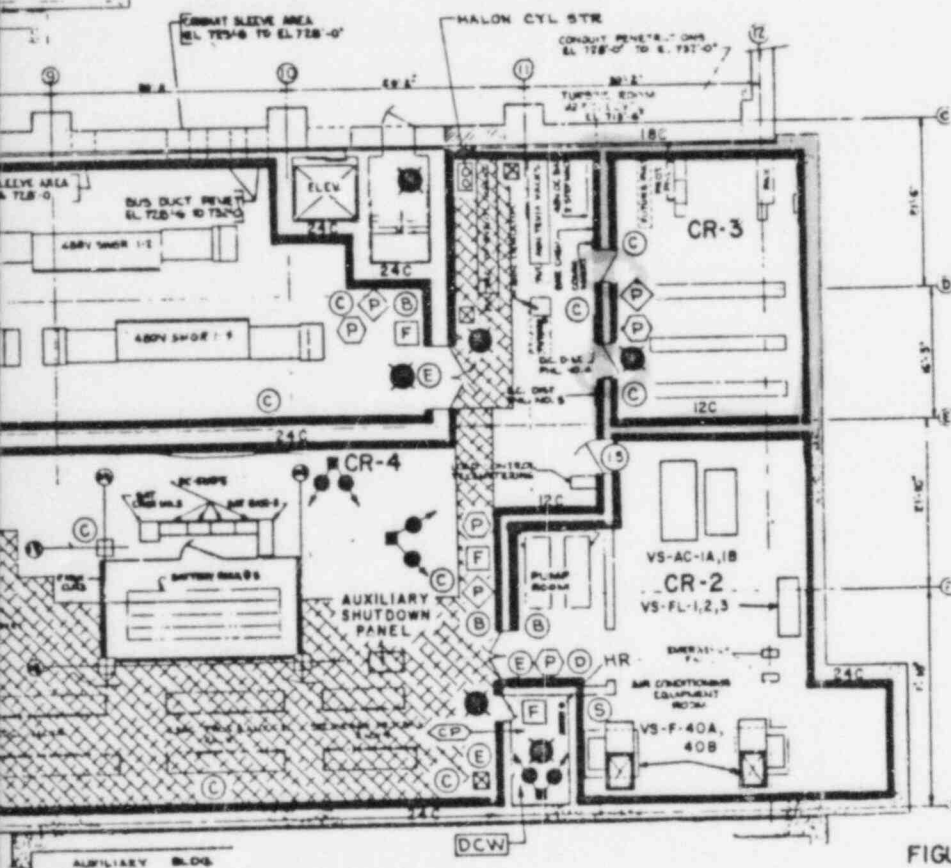


FIGURE 11.11-1
CONTROL ROOM, SWITCHGEAR
AND CABLE SPREADING AREA
BEAVER VALLEY POWER STATION-UNIT I
FIRE HAZARDS ANALYSIS

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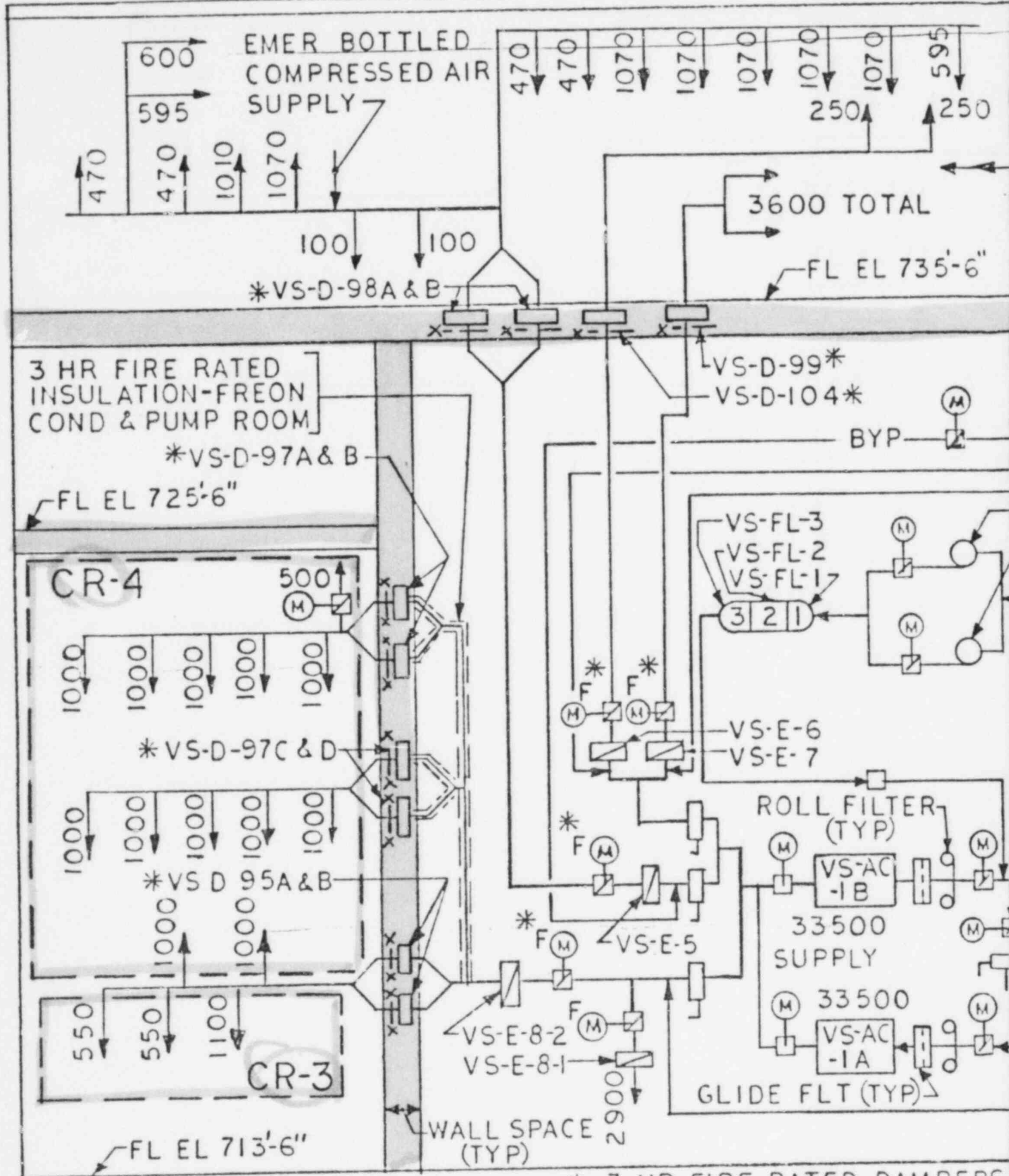
FIGURE 11.11-3
RELAY ROOM
FIRE AREA CR-3

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION		APPENDIX "R" COMPLIANCE	REMARKS OR REFERENCE	SPURIOUS OPERATION
			POWER	CABLES AVAILABLE CONTROL AND INSTRUMENT			
POWER	DC-SWBD-3 DC SWITCHBOARD	NOTE 1	N/A	N/A	YES	-	NO
	DC-SWBD-4 DC SWITCHBOARD	NOTE 1	N/A	N/A	YES	-	NO
	MCC-1-E2 MOTOR CONTROL CENTER	MCC-1-E1	YES	N/A	YES	-	NO
	PNL-VB-1 VITAL BUS PANEL	NOTE 1	N/A	N/A	YES	-	NO
	PNL-VB-2 VITAL BUS PANEL	NOTE 1	N/A	N/A	YES	-	NO
	PNL-VB-3 VITAL BUS PANEL	NOTE 1	N/A	N/A	YES	-	NO
	WR-P-1A RIVER WATER PUMP	WR-P-1B	YES	YES	YES	-	NO
	WR-P-1C RIVER WATER PUMP	WR-P-1B	YES	YES	YES	-	NO
	WR-P-9A AUX RIVER WATER PUMP	WR-P-1B	YES	YES	YES	-	NO
	WR-P-9B AUX RIVER WATER PUMP	WR-P-1B	YES	YES	YES	-	NO
CONTROL AND INSTRUMENT	EE-EG-1 (ENG) EMERGENCY GENERATOR	N/A	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A

NOTES FOR FIRE AREA CR-3:

1. THIS DISTRIBUTION SYSTEM IS NOT LOST DUE TO A FIRE IN THIS AREA, ONLY SUB-FEEDS INCLUDED TO PROVE COORDINATION.

CABLE FAILURE TYPE	EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	EE-EG-1 (PROT) EMERGENCY GENERATOR	N/A	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	EE-EG-1 (V-REG) EMERGENCY GENERATOR	EE-EG-2 (V-REG)	N/A	YES	YES	-	NO
	EE-EG-2 (ENG) EMERGENCY GENERATOR	N/A	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	EE-EG-2 (PROT) EMERGENCY GENERATOR	N/A	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	MOV-RW113A DIESEL GENERATOR HEAT EXCHANGER 1A INLET VALVE	MOV-RW113C,D	YES	YES	YES	-	NO
	MOV-RW113B DIESEL GENERATOR HEAT EXCHANGER 1A INLET VALVE	MOV-RW113C,D	YES	YES	YES	-	NO
	PNL-VB-4 VITAL BUS PANEL	NOTE 1	N/A	N/A	YES	-	NO
	PT-RC402 PRESSURIZER PRESSURE TRANSMITTER	PT-RC444, 445, 446	N/A	YES	YES	-	NO
	PT-RC403 PRESSURIZER PRESSURE TRANSMITTER	PT-RC444, 445, 446	N/A	YES	YES	-	NO
	TV-CH200A,B,C REGENATIVE HEAT EXCHANGER DISCHARGE VALVES	NONE	N/A	N/A	YES	CHAPTER 7&8	YES

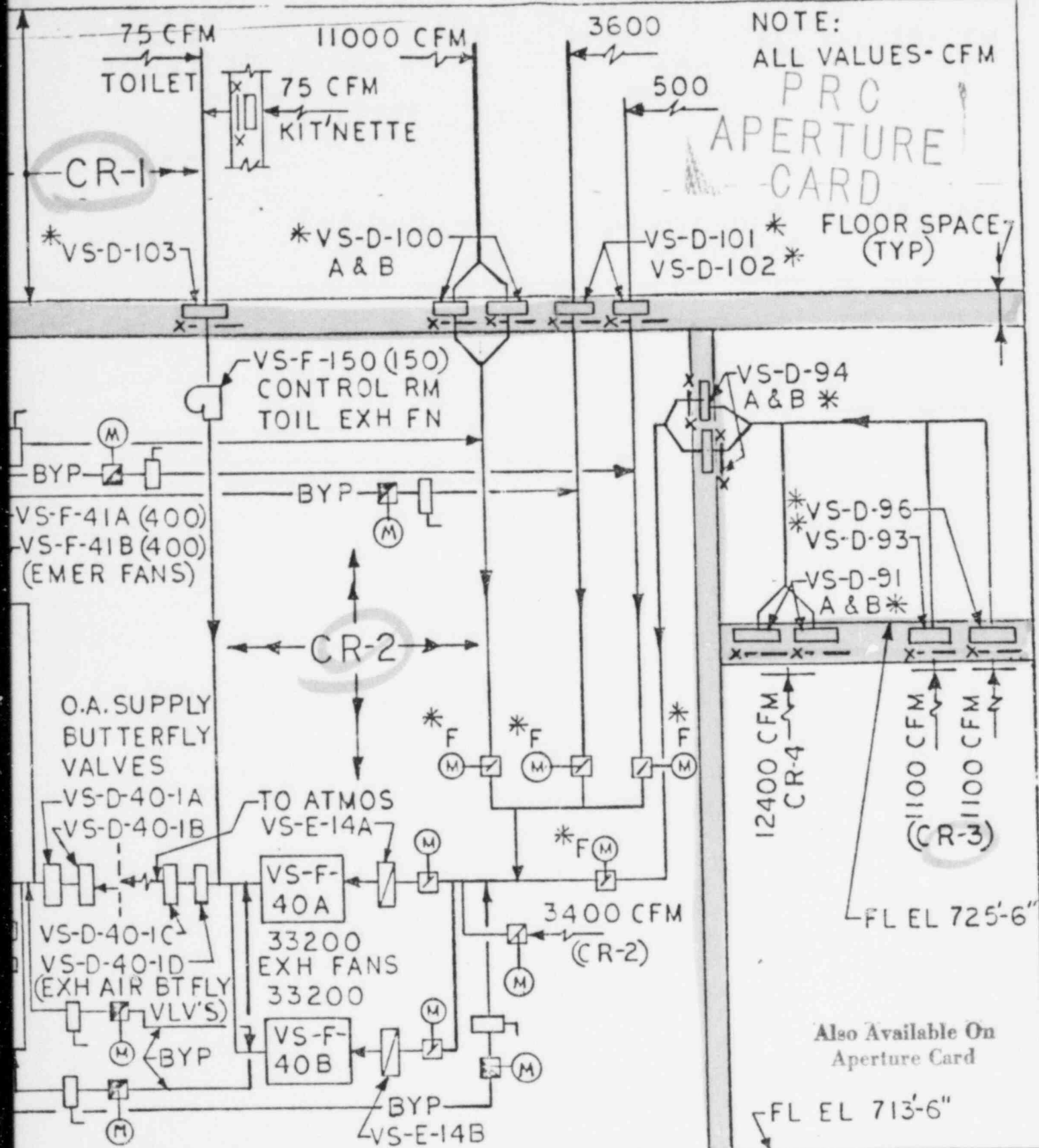


LEGEND:

- ELEC HEAT COIL
- FIRE DMP-THRU WALL
- FIRE DMP-THRU FLR

*=3 HR FIRE RATED DAMPERS

- VOLUME DMP
- MOT OPER DMP
- MOT OPER FIRE DMP



VENTILATION-FIRE AREAS CR-1,2,3,&4
PHYSICAL LAYOUT-SERVICE BLDG

FIGURE 11.11-4

EXEMPTION

VI. Normal Switchgear Room (NS-1) EL. 713'

(See attached Figure 11.12-1)

A. Discussion

This area is located in the basement of the Service Building (Elev. 713). The area contains non-safety related 4160 Volt Switchgear and 480 Volt substations, and associated cabling for the equipment. The fire area is adequately separated by a 3 hour-rated barrier to prevent a design basis fire from spreading to adjacent areas.

The circuit analysis presented in our original Appendix R submittal report had identified several circuits associated with the control and protection of both emergency diesel generators which could potentially result in the coincidental loss of function of both diesel generators given a loss of this area due to a postulated fire. This was previously identified and our proposal to make modifications to reroute the #2 DG control circuitry from this area (Section 6.10 of our Appendix R submittal report), to eliminate the possibility of a fire in NS-1 area from jeopardizing the plant's ability to achieve safe shutdown, was approved and documented in your SER for BVPS Unit 1 dated January 5, 1983. However, since Appendix R requires fixed suppression and detection for the original area under consideration (in this case NS-1), we request an exemption from III.G.3 for the Normal Switchgear Room (NS-1) because this area does not have fixed suppression.

Section III.G of Appendix R sets forth the requirement for the fire protection for safe shutdown capability on the basis of fire areas. A fire area is defined as that portion of a building or plant that is separated from other areas by boundary fire barriers (walls, floors and ceilings with any openings or penetrations protected with seals or closures having a fire resistance rating equal to that required of the barrier). For boundary fire barriers, using walls, floors, ceilings, dampers, doors, etc. existing prior to Appendix R, the rating required of a boundary fire barrier is based on the guidance in Appendix A to BTP ASB 9.5-1, i.e., the rating of the barrier or boundary must exceed with margin the fire loading in the area and need not necessarily be a 3-hour rated boundary unless the fire loading warrants such a boundary. Pursuant to the Staff's interpretation of fire areas, the fire rating of such boundaries must be three hours or an exemption must be requested. Therefore, an exemption from III.G.2 is required for this area because of the existing 1 1/2 hour fire rated dampers at the Cable Spreading Room (CS-1) perimeter penetration.

B. Boundaries

The construction of this area constitutes a 3-hour rated barrier between the Normal Switchgear Room and the Emergency Switchgear Rooms, the Process Instrument Room and the Rod Drive MG Room.

1. Walls (Ref. Drawing 11700-RC-8A, -8B)

Reinforced Concrete:

- a. North 1ft.6in. which parallels the Turbine Building
- b. South 2ft.0in. which parallels the Emergency Switchgear Rooms (ES-1 & -2), Rod Drive MG Room (MG-1), Process Instrument Room (CR-4) and Cable Spreading Room (CS-1).
- c. East 2ft.0in. which parallels the Process Instrument Room (CR-4) and Cable Spreading Room (CS-1).
- d. West

The west wall faces the Main Steam and feedwater pipe chase and part of the West Emergency Switchgear Room (ES-1) and Cable Spreading Room (CS-1) and is divided into two sections of different thicknesses.

- 1) 1ft.0in. reinforced concrete at the pipe chase
- 2) 2ft.0in. reinforced concrete at ES-1.

2. Ceiling (Ref. Drawing 11700-RC-8C, 8D)

2ft.0in. reinforced concrete

3. Floor (Ref. Drawing 11700-RC-8F)

Minimum 4ft.0in. reinforced concrete

4. Room Volume

130,570 cu.ft.

All penetrations to adjacent fire areas have been sealed for a 3-hour rating which constitutes a 3-hour fire rated boundary for this fire zone.

C. Ventilation

The ventilation supply and exhaust system for this area has branch ducts servicing ES-1, ES-2, MG-1 and CS-1. All areas are exhausted to an outdoor discharge. All branch ducts are provided with at least a 1 1/2 hour fire damper at the CS-1 perimeter penetration. Venting of any of the areas could be accomplished by resetting the respective fire dampers, all of which are accessible from CS-1. The power and controls for this ventilation system are outside the CS-1 area.

D. Redundant Safe Shutdown Cables/Equipment Located in NS-1.

Various control and protection circuits for both emergency diesels are routed through this area.

E. Fire Protection Existing

1. Fire Detection Systems

The Early warning detection system consists of area ionization coverage with local and control room alarm.

2. Fire Extinguishing Systems

Portable Carbon Dioxide fire extinguishers are located throughout the NS-1 area, with additional portable extinguishers available in adjacent areas. A 150-lb wheeled dry chemical extinguisher is located in this area. Water coverage could be achieved for this area by the standpipe hose rack stations in the stairwells using available hose lengths.

3. Propagation Retardants

All cables installed at Beaver Valley Power Station Unit 1 were fabricated to pass the vertical cable tray flame test with an oil and burlap flame source which was the accepted industry standard during the construction of BV-1 and is comparable to IEEE-383 tests.

F. Fire Hazard Analysis

1. Type/Quantity of Combustibles in the NS-1 area.

Cable Insulation = 31,385 lbs.

2. Heat Release Potential

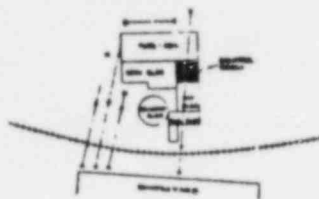
Cable Heat Load	=3.45 x 10 ⁸ Btu
Area	=5,935 sq.ft.
Heat Release Potential	=58,680 Btu/sq.ft.

Based on the heat release potential, the required fire rating for this area is less than one hour.

G. Justification of Area Acceptability

1. The existing construction provides fire barriers in excess of the required ratings determined by the fire loading.
2. The circuit analysis of Figure 11.12-2 has indicated the potential loss of function of both emergency diesel generators as various control and protection circuits for both emergency diesels are routed through this area. The plant modification described in Section 6.10 of our original Appendix R submittal report, which would reroute the B train or #2 DG control circuit and wiring from this area, thereby meeting the required separation for redundant trains. This will obviate this potential loss of function and bring the plant design for this area into conformance with Appendix R criteria, except for fixed suppression in the original area under consideration (NS-1).
3. Hazardous quantities of transient combustibles would not be expected in this area for the following reasons:
 - a) The area is not adjacent to or near any major plant traffic route.
 - b) Storage of transient combustibles in this area is prohibited by plant administrative procedures.
 - c) Maintenance and operations activities in this area do not involve the use of large quantities of combustible materials.
 - d) The accessibility to the switchgear area is restricted due to the security system card-key access.
4. The installed early warning smoke detection system would promptly detect incipient fire conditions in this area and the separation of redundant trains will maintain integrity of the cables and equipment until the fire brigade personnel, responding from the control room area two floors above, respond to extinguish the fire via the southeast stairwell. The brigade should be capable of reaching this area within minutes after an alarm is received in the Control Room.

This exemption request is predicated upon an equivalent level of protection to that required based on the above considerations and modifications.



KEY PLAN



PRC
APERTURE
CARD

Also Available On
Aperture Card

SYMBOLS

- AREA SERVED BY CO₂ SYSTEM
- AREA SERVED BY WATER SPRAY (DEL'G)
- AREA SERVED BY HALON SYSTEM
- HALON ACTUATION PULL BOX
- PAX PHONE
- HOSE RACK
- DRY CHEMICAL WHEEL UNIT
- COMMAND POST
- H₂O FIRE EXT.
- STANDPIPE-HOSE RACK
- GAITRONICS PHONE
- CO₂ CONTROL/ALARM PANEL
- FIRE ALARM STATION
- EXIT SIGNS
- DRY CHEMICAL FIRE EXT.
- PORT FIRE EXT. CO₂-20LBS
- FIRE ALARM BELL (APPROX. LOCATION)
- FIRE AREA
- FIRE ZONE
- FIRE BARRIER
- SUB-AREA
- FIRE DOOR RATINGS, (HOURS)
- REINFORCED CONCRETE
- CONCRETE BLOCK WALL
- INSULATED METAL SIDING
- 125V DC BATTERY EMERGENCY LIGHT
- DC EMERGENCY BATTERY LIGHTING UNIT
- FLOOR SYSTEM IS 5 1/2" CONCRETE (INC 1 1/4" CORRUGATED METAL DECKING)

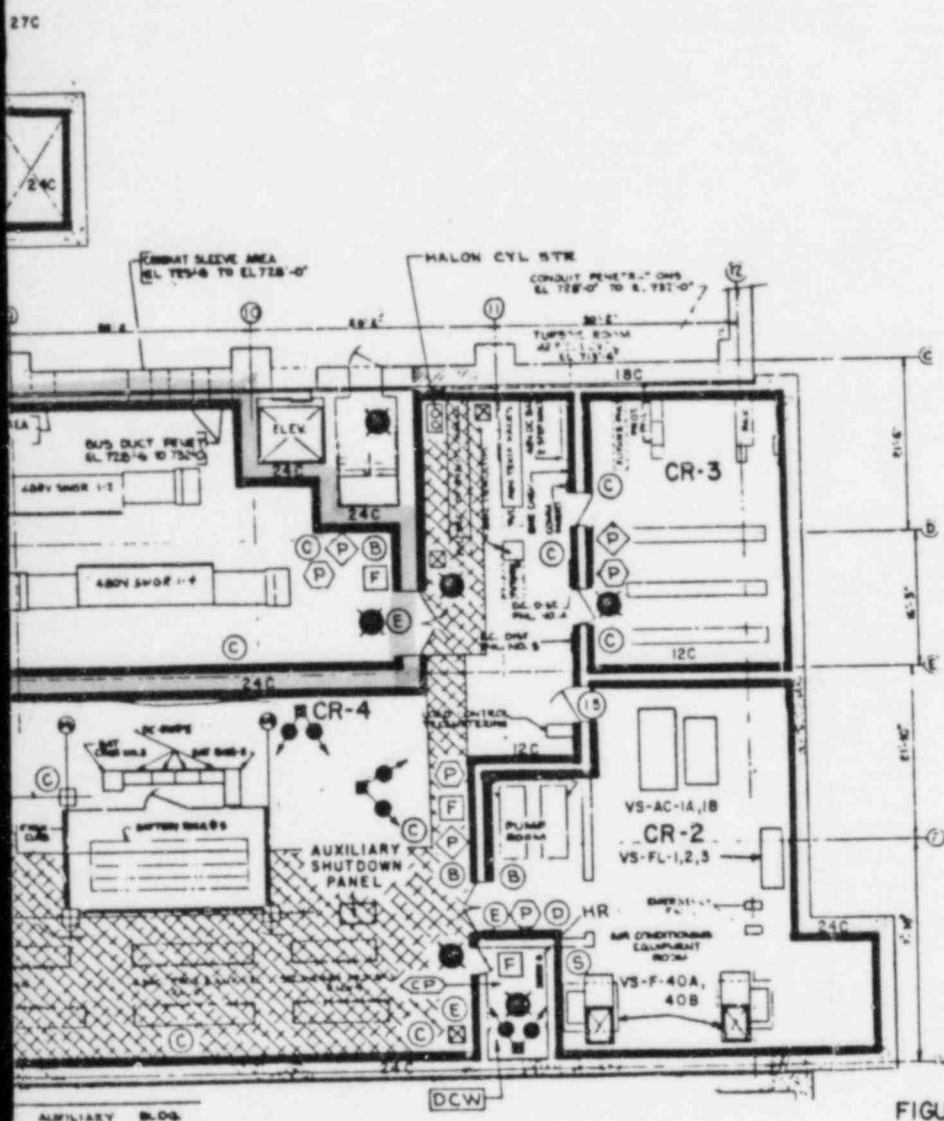


FIGURE 11.12-1
CONTROL ROOM, SWITCHGEAR
AND CABLE SPREADING AREA
BEAVER VALLEY POWER STATION - UNIT 1
FIRE HAZARDS ANALYSIS

REVISED 3/1/82

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FIGURE 11.12-2
NORMAL SWITCHGEAR ROOM
FIRE AREA NS-1

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
POWER	EE-EG-1 (FEED) EMERGENCY GENERATOR	EE-EG-2 (FEED)	YES	N/A	YES	-	NO
	MCC-1-E1 MOTOR CONTROL CENTER	MCC-1-E2	YES	N/A	YES	-	NO
	MCC-1-E7 MOTOR CONTROL CENTER	MCC-1-E8	YES	N/A	YES	-	NO
	PNL-VB-2 VITAL BUS	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11 NOTE 3	N/A
	PNL-VB-3 VITAL BUS	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11 NOTE 3	N/A
	WR-P-1A RIVER WATER PUMP	WR-P-1B	YES	YES	YES	-	NO
	WR-P-9A AUX RIVER WATER PUMP	WR-P-1B	YES	YES	YES	-	NO
CONTROL AND INSTRUMENT	WR-P-9B AUX RIVER WATER PUMP	WR-P-1B	YES	YES	YES	-	NO
	CH-P-1B CHARGING PUMP	CH-P-1A	YES	YES	YES	-	NO
	CH-P-2B BORIC ACID TRANSFER PUMP	CH-P-2A	YES	YES	YES	-	NO

NOTES FOR FIRE AREA NS-1:

1. THIS DISTRIBUTION SYSTEM IS NOT LOST DUE TO A FIRE IN THIS AREA, ONLY SUBFEEDS INCLUDED TO PROVE COORDINATION OF PROTECTIVE DEVICES.
2. FW-P-2 IS THE TURBINE DRIVEN AUXILIARY FEED PUMP.
3. THESE PANELS SERVE AS INSTRUMENTATION POWER SUPPLIES.

CABLE FAILURE TYPE	EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES POWER	AVAILABLE CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	DC-SWBD-3 DC SWITCHBOARD	NOTE 1	YES	YES	YES	-	NO
	DC-SWBD-4 DC SWITCHBOARD	NOTE 2	YES	YES	YES	-	NO
	EE-EG-1 (ENG) EMERGENCY GENERATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	EE-EG-1 (PROT) EMERGENCY GENERATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	EE-EG-1 (V-REG) EMERGENCY GENERATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	EE-EG-2 (ENG) EMERGENCY GENERATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	EE-EG-2 (PROT) EMERGENCY GENERATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	EE-EG-2 (V-REG) EMERGENCY GENERATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	FW-P-3A FOK FEED WATER PUMP	FW-P-2 NOTE 2	NO	YES	YES	-	NO
	FW-P-3B FOK FEED WATER PUMP	FW-P-2 NOTE 2	NO	YES	YES	-	NO
	MOV-CH115B REFUELING WATER STORAGE TANK CHARGING PUMP ISOLATION VALVE	MOV-RW-115D	YES	YES	YES	-	NO
	MOV-CH289 CHARGING LINE CONTAINMENT ISOLATION VALVE	NONE	N/A	N/A	NO	CHAPTER 7	N/A

FIGURE 11.12-2
NORMAL SWITCHGEAR ROOM
FIRE AREA NS-1

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION		APPENDIX "R" COMPLIANCE	REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT			
CONTROL AND INSTRUMENT (CONT'D)	MOV-FW151A STM GEN AUX FEED PUMP ISOLATION VALVE	MOV-FW151B	YES	YES	YES	-	NO
	MOV-FW151C STM GEN AUX FEED PUMP ISOLATION VALVE	MOV-FW151D	YES	YES	YES	-	NO
	MOV-FW151E STM GEN AUX FEED PUMP ISOLATION VALVE	MOV-FW151F	YES	YES	YES	-	NO
	MOV-RW103A RIVER WATER SUPPLY ISOL TO RECIRC SPRAY HEAT EXCHANGER	MOV-RW103B	YES	YES	YES	-	NO
	MOV-CH289 CHARGING CONTAINMENT ISOLATION VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW114A PRIMARY COMPONENT COOLING HEAT EXCHANGER INLET VALVE	MOV-RW114B	YES	NO	YES	CHAPTER 7	YES
	MOV-RW114B PRIMARY COMPONENT COOLING HEAT EXCHANGER INLET VALVE	MOV-RW114A	YES	NO	YES	CHAPTER 7	YES
	PNL-VB-1 VITAL BUS PANEL	PNL-VB-2, 4	YES	YES	YES	-	NO
	PZR-HTR-A PRESSURIZER HEATER	PZR-HTR-E	YES	YES	YES	-	NO
	PZR-HTR-B PRESSURIZER HEATER	PZR-HTR-E	YES	YES	YES	-	NO

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION		APPENDIX "R" COMPLIANCE	REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT			
CONTROL AND INSTRUMENT (CONT'D)	PZR-HTR-D PRESSURIZER HEATER	PZR-HTR-E	YES	YES	YES	-	NO
	RH-P-1A RESIDUAL HEAT REMOVAL PUMP	NONE	N/A	N/A	NO	CHAPTER 7	N/A
	RH-P-1B RESIDUAL HEAT REMOVAL PUMP	NONE	N/A	N/A	NO	CHAPTER 7	N/A
	VS-F-1C CONTAINMENT RECIRC. FAN	VS-F-1A, 1B	YES	YES	YES	-	NO
	VS-F-16A EMERGENCY SWITCHGEAR EXHAUST FAN	VS-F-16B	YES	YES	YES	-	NO
	VS-F-55A EMERGENCY SWITCHGEAR SUPPLY FAN	VS-F-55B	YES	YES	YES	-	NO
	WR-P-1B RIVER WATER PUMP	WR-P-1A	YES	YES	YES	-	NO

CIRCUIT ANALYSIS SHEET

EXEMPTION

VII. (Structural Steel) Service Bldg. EL. 713' area below the Cable Spreading Room (CS-1)

Fire Areas:

ES-1 West Emergency Switchgear Room
ES-2 East Emergency Switchgear Room
MG-1 Control Rod Drive Motor Generator Room
CR-3 Communications Equipment and Relay Panel Room
CR-4 Process Instrument and Rod Position Room
(See Attached Figures 11.13-1 and 2)

A. Discussion

The structural steel located in the above fire areas, which helps to support the above floor area cable spreading room (CS-1), is denoted in Figure 11.13-1. Located in these areas are various safe shutdown cabling as discussed in Section D below.

An exemption is requested from III.G.2a which requires that structural steel forming a part of or supporting fire barriers separating redundant trains to have a fire rating equivalent to the fire resistance of the barrier. A fire hazards analysis has been performed and documented within this request for exemption which justifies the acceptability of the present plant design based on equivalent level of protection, and shows the maximum temperature the steel will reach during a fire in these areas and it's ability to carry the required loads.

B. Boundaries

The construction of all of the above listed areas constitutes a 3-hour rated fire barrier between each of the adjacent fire areas with the exception of the ceiling slab described below.

1. Walls (Ref. Drawing 11700-RC-8A, -8B)

Reinforced Concrete:

a. North

The north wall faces the 4KV Normal Switchgear Room (NS-1), the pipe chase, and the turbine building and is divided into two sections of different thicknesses.

- (1) 2ft.0in reinforced concrete at the pipe chase and NS-1.
- (2) 1ft.6in. reinforced concrete at the turbine building.

b. South

The south wall faces an unexcavated area, Primary Auxiliary building (PAB) and the A/C Equipment Room (CR-2) and is divided into two sections of different thicknesses.

- (1) 2ft.0in. reinforced concrete at that section which parallels the unexcavated area and the PAB.
- (2) 1ft.0in. reinforced concrete at that section which parallels CR-2.

c. East

The east wall faces the Cable Tunnel (CV-3) and the A/C Equipment Room (CR-2) and is divided into two sections of different thicknesses.

- (1) 2ft.0in. reinforced concrete at that section which parallels CV-3.
- (2) 1ft.0in. reinforced concrete at that section which parallels CR-2.

d. West

2ft.0in. parallels an unexcavated area and the normal switchgear room (NS-1).

- e. Intermediate walls running north-south between areas ES-1 and ES-2, ES-2 and MG-1, MG-1 and CR-4, and CR-4 and CR-3 are all 1ft.0in. reinforced concrete with qualified 3-hour fire rated penetration seals, as required, which constitutes a 3-hour fire barrier between these rooms.

2. Ceiling (Ref. Drawing 11700-RC-7G)

Reinforced concrete (5 1/2" max., 4" min.) on 1 1/2 inches corrugated metal decking constitutes a minimum 1 1/2-hour fire rated barrier per the fire resistance/concrete thickness curve (Figure 11.13-3)*. See Figure 11.13-6 for details of ceiling slab. (See Exemption Request for CS-1 area, ATTACHMENT XI)

3. Floor (Ref. Drawing 11700-RC-8G, -8H)

Minimum 3 ft. reinforced concrete

4. Room Volumes

ES-1	29,220 cu.ft.
ES-2	28,220 cu.ft.
MG-1	17,160 cu.ft.
CR-4	65,880 cu.ft.
CR-3	10,980 cu.ft.

* Reference. NFPA Fire Protection Handbook; 15th edition, 1983. Figure 5-8R.

C. Ventilation

1. The ventilation supply and exhaust system for ES-1, ES-2 & MG-1 are the same. All areas are exhausted to an outdoor discharge. Venting of any of the areas could be accomplished by resetting the respective fire dampers, all of which are accessible from the Cable Spreading Room (CS-1). The power and controls for this ventilation system are outside the CS-1 area.
2. The air conditioning system is the same for CR-3 and CR-4 as that for CR-1 and CR-2. The system is detailed on Figure 11.13-4.

D. Redundant Safe Shutdown Equipment

ES-1 and ES-2 house redundant safety-related 4KV switchgear and 480V substations and supply power to Class 1E circuits required for safe shutdown.

MG-1 houses both class 1E and non-class 1E equipment and cable. The two rod drive motor generator sets and switchgear supply power to the CRDM's and are located in this area. These power supplies are not required for safe shutdown.

CR-4 consists of the primary and secondary process racks, reactor protection racks and the emergency auxiliary shutdown panel located in CR-4 area.

CR-3 contains the safe shutdown diesel generator protection panels and the relay and communication panels.

E. Fire Protection Existing

1. Fire Detection Systems

Early warning detection system consists of area coverage within each applicable fire area by ionization type detectors provided with local alarm and control room alarm display in the fire detection panel. CR-4 additionally has ionization detectors located in the sub-flooring which alarm locally and in the control room and activates the Halon Suppression System in the event of a cable fire in the subfloor area. (Figure 11.13-5)

2. Fire Extinguishing Systems

a. Portable Carbon Dioxide extinguishers presently exist within all areas, with additional portable Carbon Dioxide extinguishers available in adjacent and nearby areas. Additionally, portable 150-lb. wheeled dry chemical extinguisher units are available in the adjacent area (NS-1) and at the S-4 stairwell entrance. Standpipe hose racks stations are available at both stairwell entrances on this elevation.

b. Halon 1301 Suppression System installed in the subfloor cable area of CR-4. (Figure 11.13-5)

3. Propagation Retardants

All cables installed at Beaver Valley Power Station Unit 1 were fabricated to pass the vertical cable tray flame test with an oil and burlap flame source which was the accepted industry standard during the construction of BV-1 and is comparable to IEEE-383 tests.

F. Fire Hazard Analysis

1. Type/Quantity of combustibles in these areas are all for cable insulation as noted.

<u>Fire Area</u>	<u>Cable Insulation</u>
ES-1	5,920 lbs.
ES-2	5,665 lbs.
MG-1	5,575 lbs.
CR-4	24,060 lbs.
CR-3	4,750 lbs.

2. Heat Release Potential from Cable Insulation

<u>Fire Area</u>	(Btu) <u>Heat Load</u>	(Sq.ft) <u>Area</u>	(Btu/sq.ft.) <u>Heat Release Potential</u>
ES-1	6.51×10^7	2,435	31,660
ES-2	6.23×10^7	2,350	26,380
MG-1	6.13×10^7	1,430	48,420
CR-4	2.65×10^8	5,490	50,200
CR-3	5.22×10^7	915	58,550

Based on the heat release potentials, the required fire ratings for each of the areas is less than one hour.

G. Justification of Area Acceptability

1. The fire loading for each of the areas that contain structural steel was determined to be as noted below. In all cases, the existing walls, floors, ceilings and doors exceed this rating.

<u>Fire Area</u>	<u>Fire Loading</u>	<u>Barrier Required</u>
ES-1	24 min.	Determined from
ES-2	20 min.	the STANDARD TIME-
MG-1	36 min.	TEMPERATURE CURVE
CR-4	38 min.	
CR-3	44 min.	

All the areas noted contain structural steel members supporting the floor above (CS-1). Because of hangers and cable tray supports attached to various beams, the stresses vary. Except at the perimeter walls, all supporting beams are Compact I sections. A reserve capacity exists and varies from 24% to 78% (Min. To Max.) under working stress conditions.

<u>Fire Area</u>	<u>Minimum Reserve Capacity</u>
ES-1	52%
ES-2	51%
MG-1	24%
CR-4	49%
CR-3	40%

It is recognized that a rise in temperature reduces the yield stress in steel and that at 1100°F the yield stress may drop to 60% of the value at room temperature. The most highly stressed beam still has not reached the yield point per our calculations. (See Attachment 1)

Because steel has a high thermal conductivity, it can transfer heat away from a localized heat source rather quickly. Heat will be transferred to cooler regions through the grid of steel beams supporting the entire CS-1 floor area. A cushion of time can be anticipated in such large areas of heat dissipation.

2. A margin of safety is provided by the vertical concrete columns that support the horizontal steel beams and the floor-to-ceiling solid 12 inches reinforced concrete walls separating areas ES-1, ES-2, MG-1, CR-4 and CR-3. In the event the horizontal ceiling beams start to weaken, the floor load would be distributed onto the partition concrete walls and the vertical concrete columns in the area.
3. Three hour fire rated doors are installed between each of these areas except CR-3/CR-4 which are 1 1/2 hour fire rated doors, and all penetrations are sealed with a qualified 3-hour fire rated material.
4. Hazardous quantities of transient combustibles would not be expected in this area for the following reasons:
 - a) The area is not adjacent to or near any major plant traffic route.
 - b) Storage of transient combustibles in this area is prohibited by plant administrative procedures.
 - c) Maintenance and operations activities in this area do not involve the use of large quantities of combustible materials.
 - d) The accessibility to the switchgear area is restricted due to the security system card-key access.

5. The installed early warning smoke detection system would promptly detect incipient fire conditions in this area and the separation of redundant trains will maintain integrity of the cables and equipment until the fire brigade personnel, responding from the control room area two floors above this switchgear area, respond to extinguish the fire via the southeast stairwell. The brigade should be capable of reaching this area within minutes after an alarm is received in the Control Room.

This exemption request is predicated upon an equivalent level of protection to that required based on the above considerations and modifications.

LOCATION SERVICE BUILDINGSUBJECT STEEL FRAMING AT E1.725'-6"

COMPILED

BY: S. Bose Date 8/9/83

REFERENCES/DESIGN BASIS

Stone & Webster Engr. Corp. (SWEC) calculations #11700-S-5 and #13387.13-S-59 are used to determine the stress levels for the most highly stressed beams shown in the Stress Summary. The latter calculations are based on a g value of 1.176 for SSE loading.

The applicable stress F equals σ_{xx} for vertical stress, including dead and live load only. To neglect seismic stress, the g-factor is divided into the final SWEC result, as applicable.

Yield stress of A36 steel is $F = 36 \text{ Ksi}$. Allowable stress per AISC

Sec. 1.5.1.4.3 is $F = .75F = .75 \times 36 = 27 \text{ Ksi}$

Reserve capacity = $1 - F / F$

Postulated yield stress at $1100^\circ \text{F} = .6F = .6 \times 36 = 21.6 \text{ Ksi}$

STRESS SUMMARY

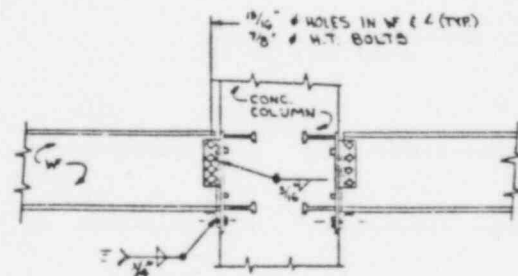
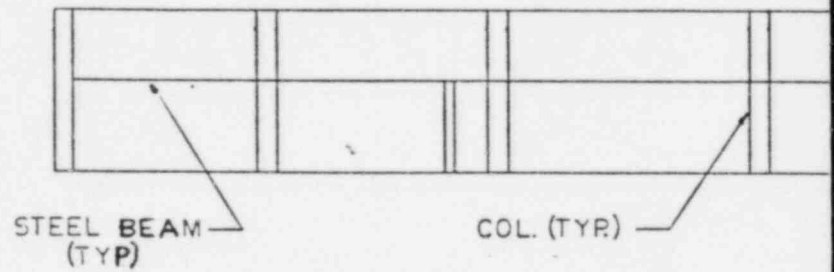
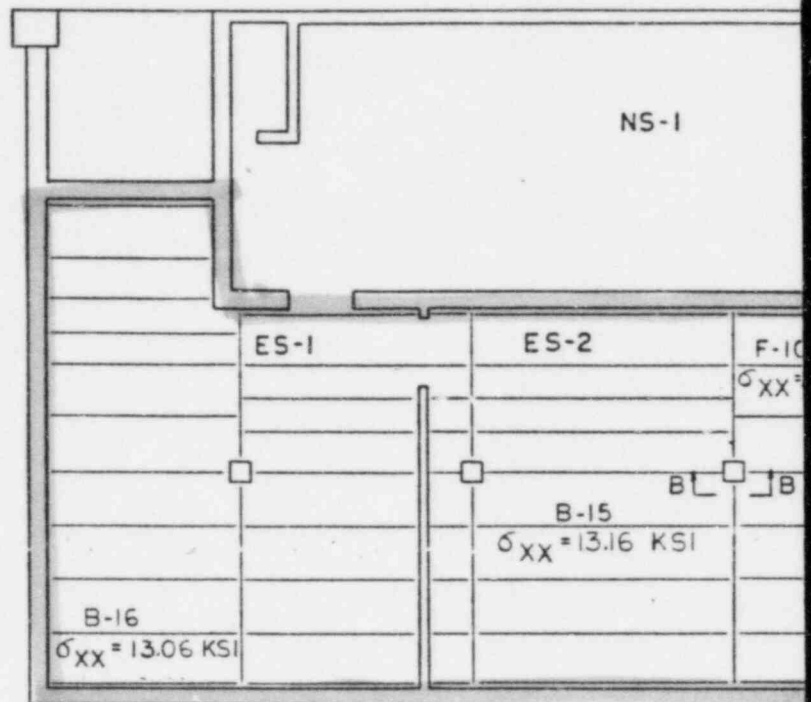
FIRE AREA	MOST HIGHLY STRESSED BEAM PER SWEC CALCS.	MAX. BENDING STRESS σ_{xx} (KSI)	RESERVE CAPACITY
ES-1	B-16. #13387.13-S-59	15.36/1.176 = 13.06	1-13.06/27=52%
ES-2	B-15. #13387.13-S-59	15.48/1.176 = 13.16	1-13.16/27=51%
MG-1	F-10. #11700-S-5	-(no g-value used-20.43	1-20.43/27=24%
CR-4	B-12. #13387.13-S-59	16.04/1.176 = 13.64	1-13.64/27=49%
CR-3	B-3. #13387.13-S-59	19.00/1.176 = 16.16	1-16.16/27=40%

CONCLUSIONS

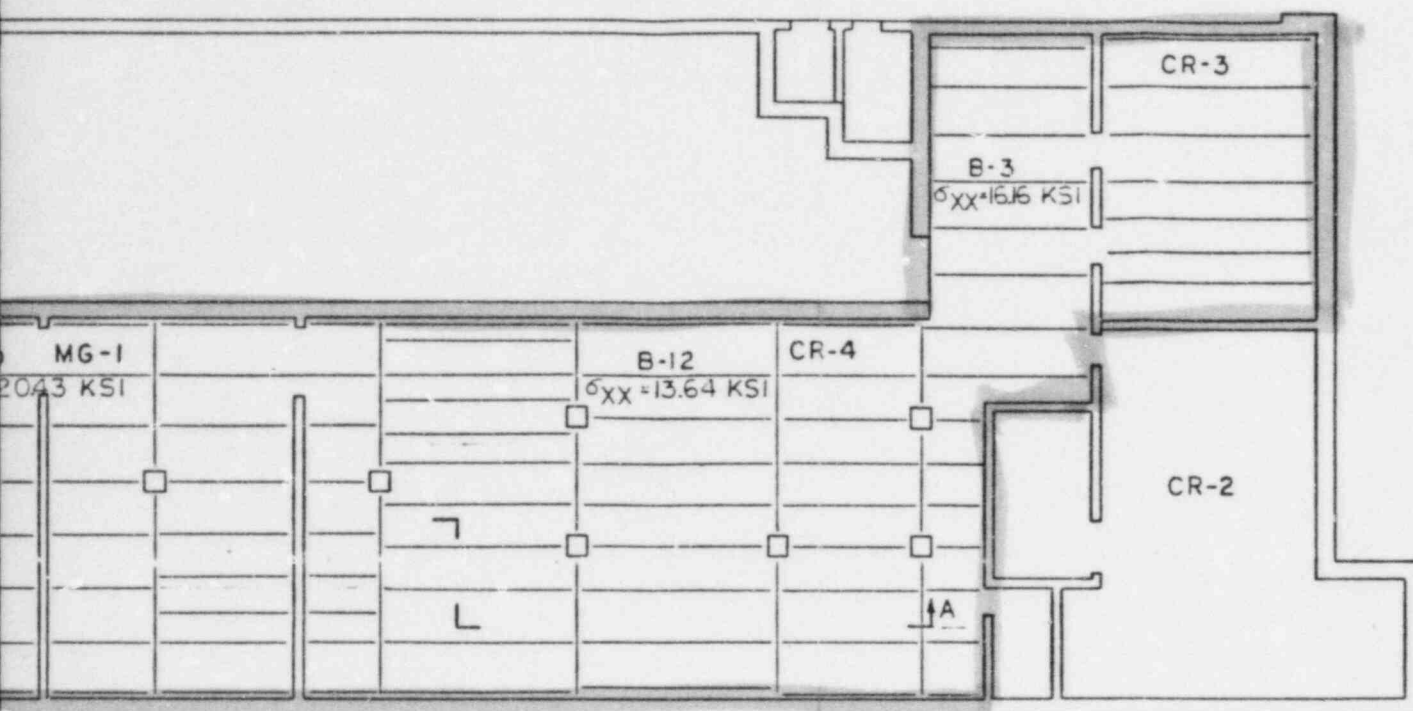
1. All beams have a reserve capacity.
2. The maximum beam stress (σ_{xx} - highest value 20.43) is lower than 21.6 Ksi, the postulated yield stress at 1100°F .

ATTACHMENT 1

A ↑

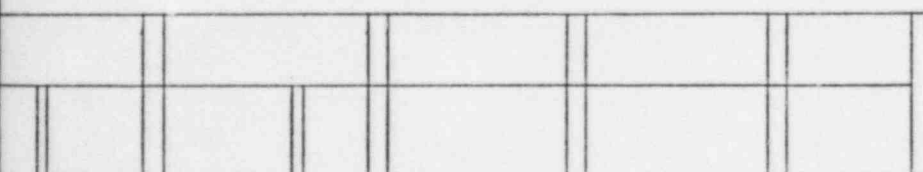


B-B
TYP CONNECTION
WF TO COLUMN



PLAN EL. 713'-6"

Also Available On
Aperture Card



CS-1 FLOOR
EL. 725'-6"

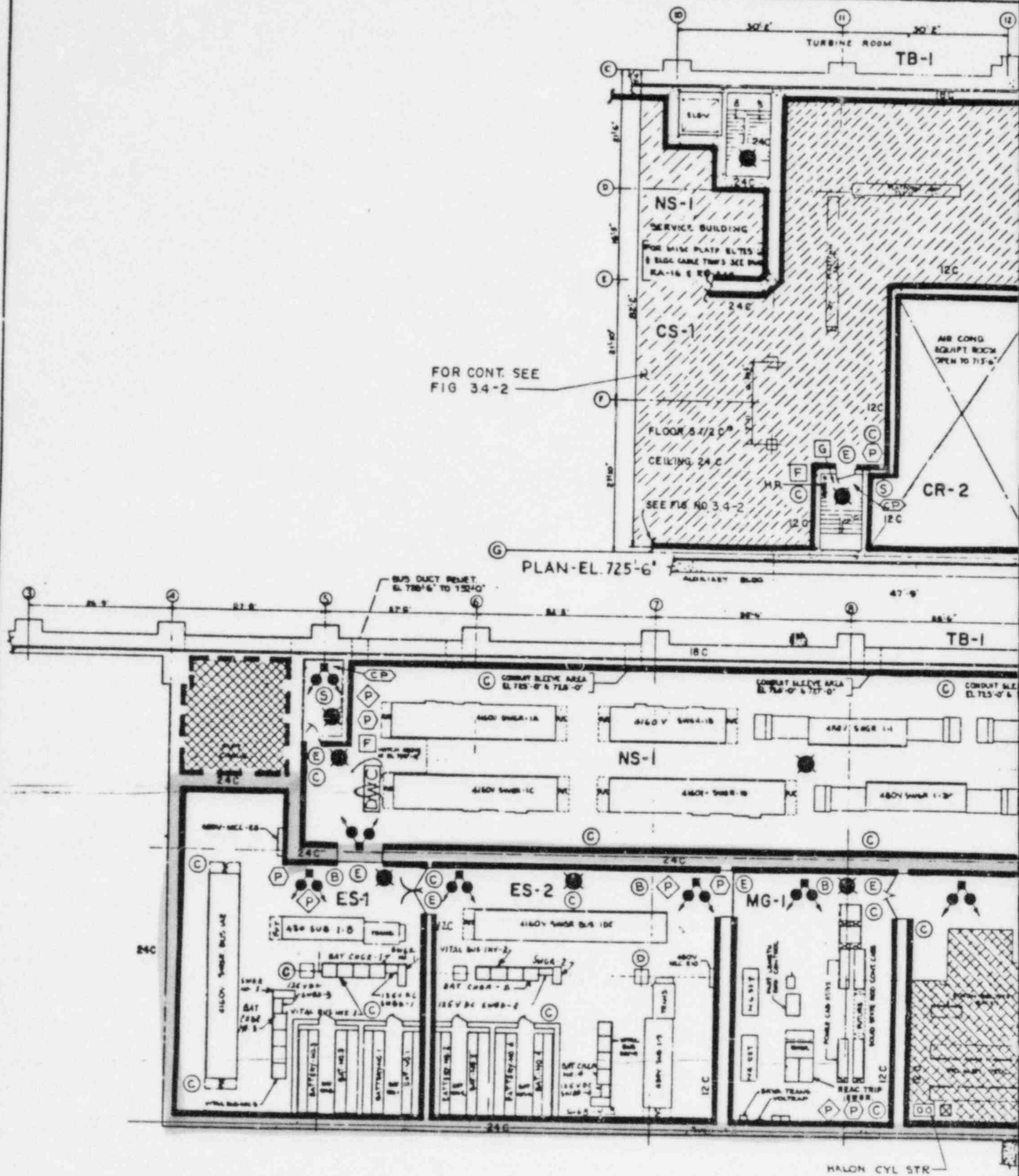
EL 713'-6"

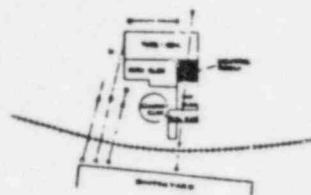
A-A

PRC
APERTURE
CARD

FIGURE 11.13-1

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KEY PLAN



PRO
APERTURE
CARD

Also Available On
Aperture Card

SYMBOLS

- AREA SERVED BY CO₂ SYSTEM
 - AREA SERVED BY WATER SPRAY (DEL.G.)
 - AREA SERVED BY HALON SYSTEM
 - HALON ACTUATION PULL BOX
 - PAX PHONE
 - HOSE RACK
 - DRY CHEM CAL WHEEL UNIT
 - COMMAND POST
 - H₂O FIRE EXT.
 - STANDPIPE-HOSE RACK
 - GAITRONICS PHONE
 - CO₂ CONTROL/ALARM PANEL
 - FIRE ALARM STATION
 - EXIT SIGNS
 - DRY CHEMICAL FIRE EXT.
 - PORT.FIRE EXT. CO₂-20LBS
 - FIRE ALARM BELL (APPROX LOCATION)
 - FIRE AREA
 - FIRE ZONE
 - FIRE BARRIER
 - SUB-AREA
 - FIRE DOOR RATINGS, (HOURS)
 - REINFORCED CONCRETE
 - CONCRETE BLOCK WALL
 - INSULATED METAL SIDING
 - 125V DC BATTERY EMERGENCY LIGHT
 - DC EMERGENCY BATTERY LIGHTING UNIT
- * FLOOR SYSTEM IS 5 1/4" CONCRETE
(INC 1 1/4" CORRUGATED METAL DECKING)

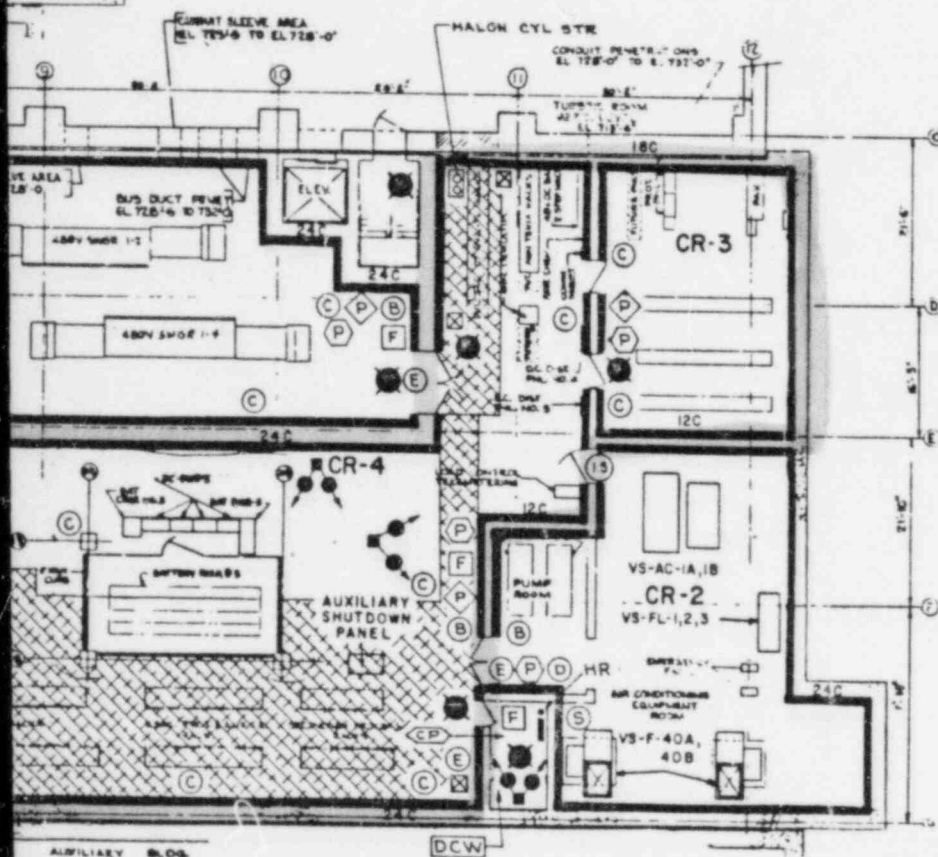


FIGURE 11.13-2
CONTROL ROOM, SWITCHGEAR
AND CABLE SPREADING AREA
BEAVER VALLEY POWER STATION - UNIT 1
FIRE HAZARDS ANALYSIS

REVISED 3/1/82

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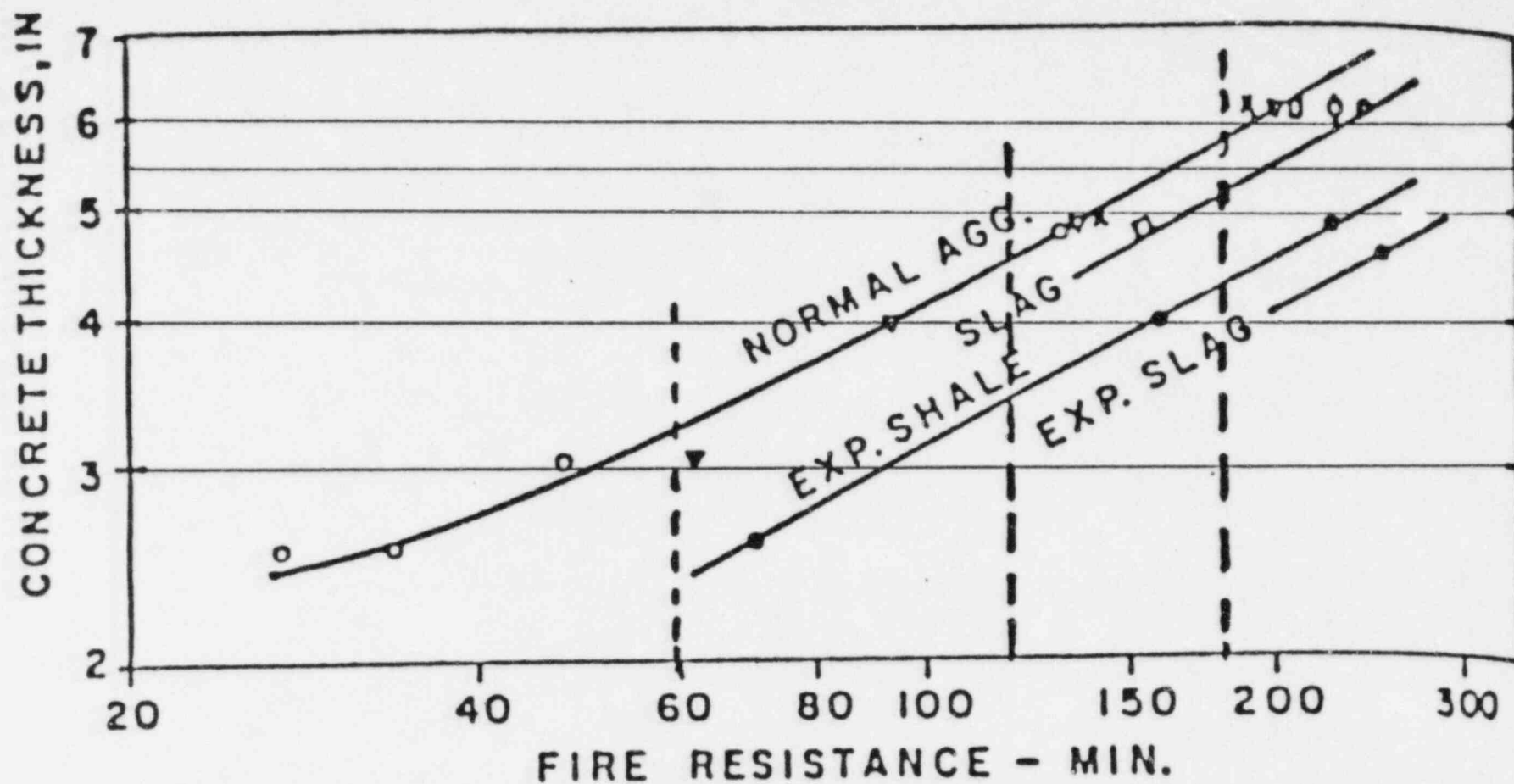
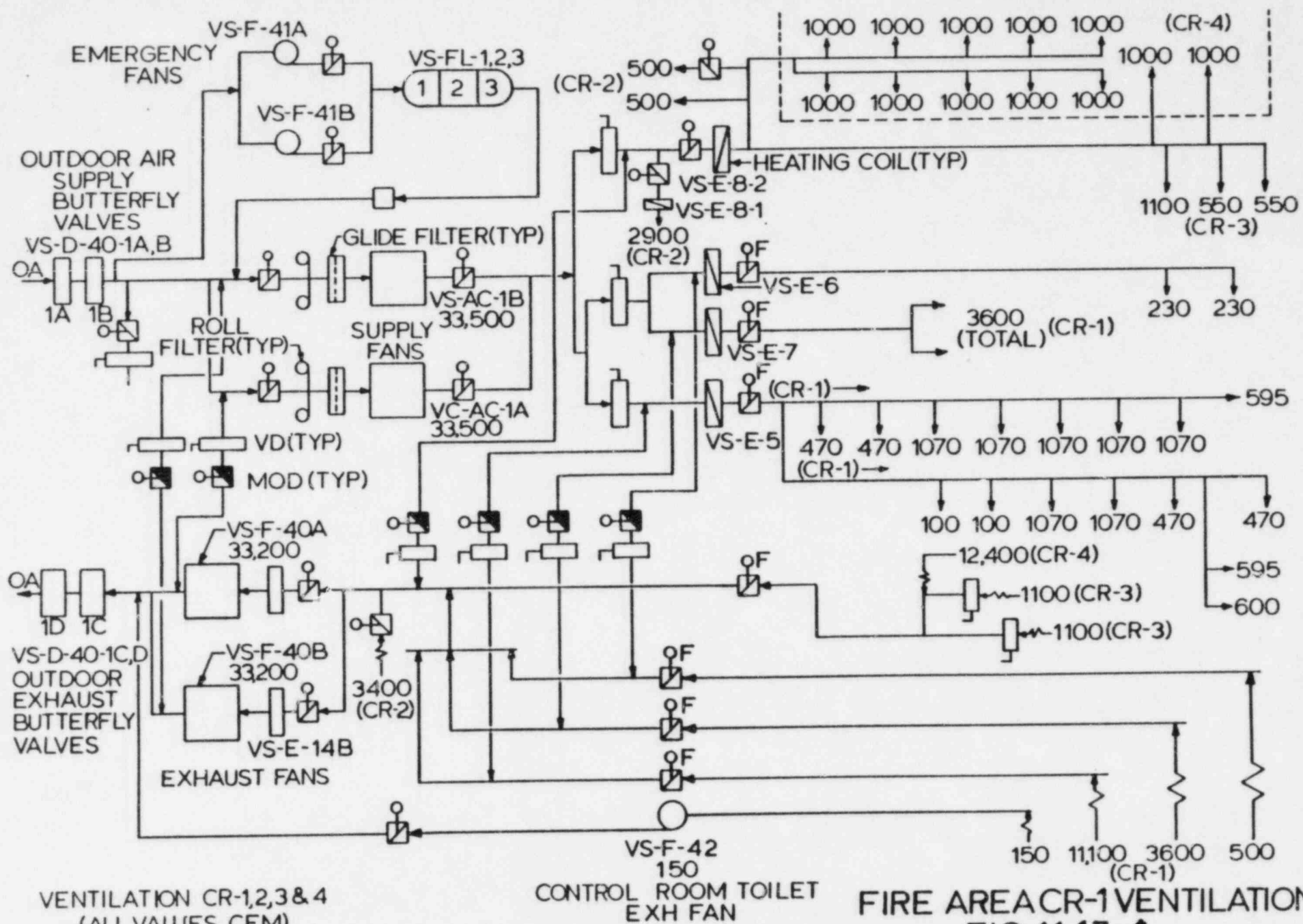
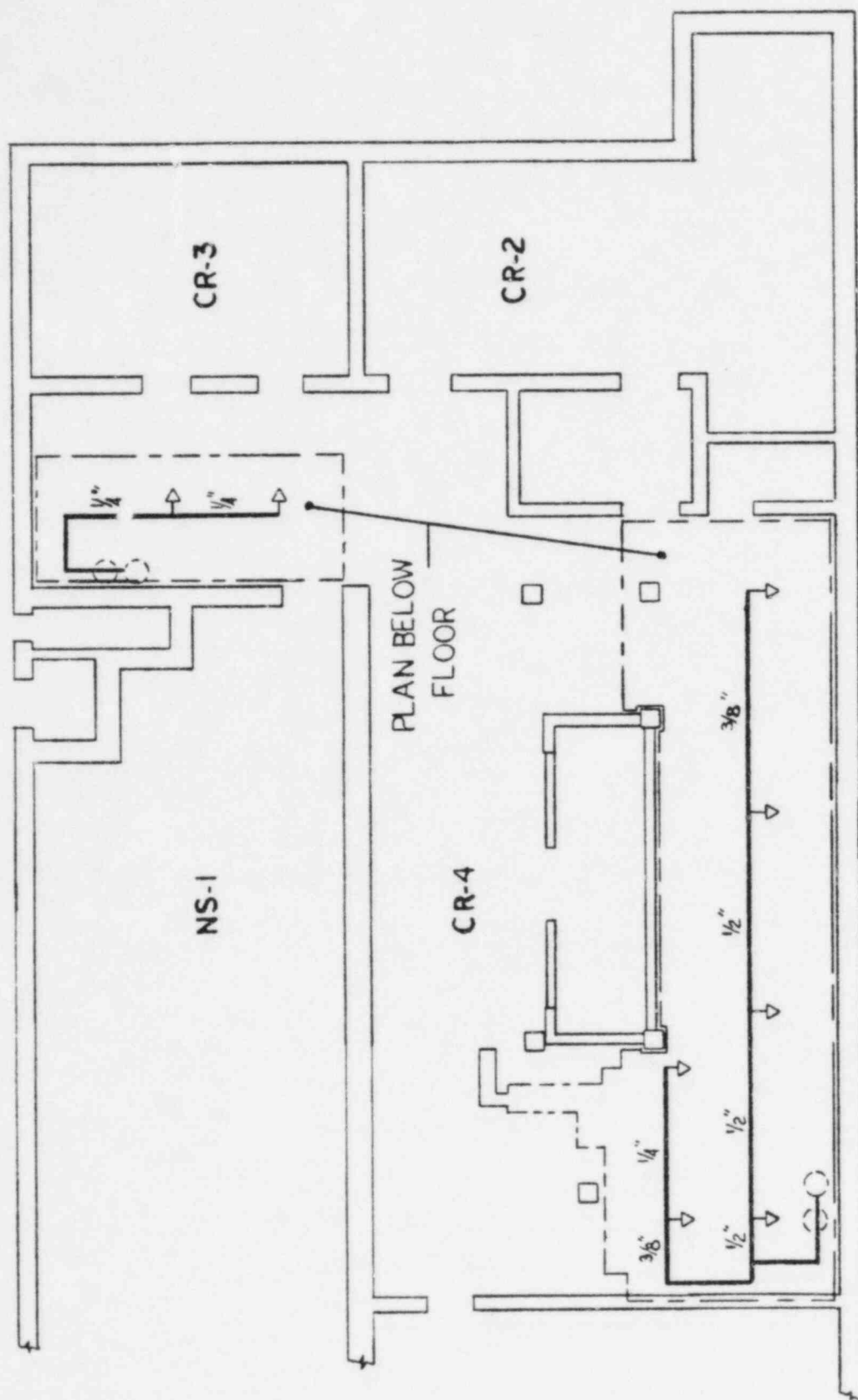


Fig. 5-8R. Relationship of slab thickness and type of aggregate to fire endurance.





▽ - 4 PORT RADIAL NOZZLE

○ - HALON CYL.

CR-4 HALON SYSTEM
SIMPLIFIED 11700-RB-116E

FIGURE 11.13-5

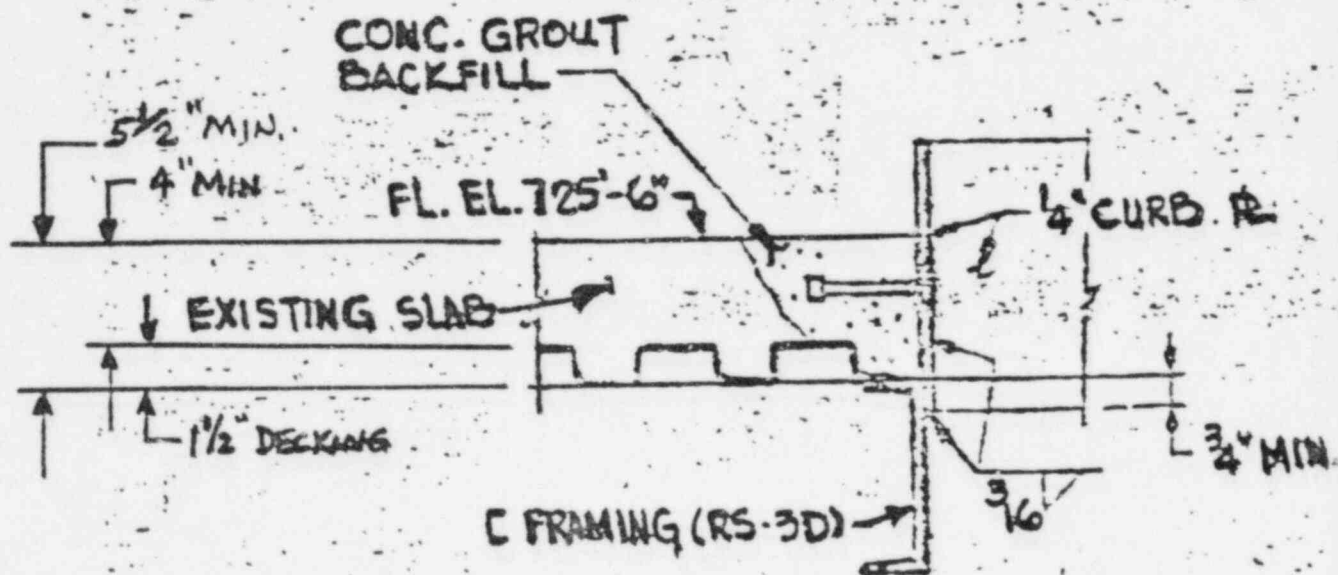
PLAN - EL. 725'-6"

SLAB THICKNESS $5\frac{1}{2}"$ OVERALL UNLESS NOTED
LIVE LOAD 40 P.S.F.

MAIN REINF. TO BE #4 @ 12" T. & B. IN N-S
DIRECTION. CONT. CUT & BEND AS REQ'D. (TYP. FOR $5\frac{1}{2}"$ SLAB)

SECONDARY REINF. AT RIGHT ANGLE TO
MAIN REINF. SHALL BE #4 @ 18" T. & B.
CONT. CUT & BEND AS REQ'D (TYP. FOR $5\frac{1}{2}"$ SLAB)
SLAB SHALL HAVE MONOLITHIC FLOOR FINISH.

* FLOOR SYSTEM IS $5\frac{1}{2}"$ CONCRETE
(INC. $1\frac{1}{2}"$ CORRUGATED METAL DECKING)



CABLE SPREADING AREA FLOOR
(CS-1) FIGURE 11.13-6

EXEMPTIONVIII. CARBON DIOXIDE STORAGE/PG PUMP ROOM (CO-2)

(Figures 11.14-1, -2, -3)

A. Discussion

This area is a two level structure located adjacent to the emergency diesel generator buildings. The lower level of this structure (below grade) contains various support equipment (transfer pumps, tank heaters, and valve stations) associated with the boron recovery yard tankage. The only components in this area required for safe shutdown are the four (4) motor-operated, river water supply valves (MOV-RW-113A, -B, -C, -D) for emergency diesel generators (EE-EG-1;-2). The upper level (grade elevation) contains the 10 ton refrigerated carbon dioxide storage tank unit.

The potential for a fire in this area to render all four river water supply valves inoperable was previously identified in our Appendix R Fire Protection Review submittal report. Our proposal to physically remove and relocate one of the valves to another fire zone (diesel generator #2 Room (DG-2)), thereby eliminated the possibility of coincidental loss of cooling water to both diesels in the event of a fire in this area (CO-2), was approved and documented in your SER for BVPS Unit I dated January 5, 1983. However, since Appendix R requires fixed suppression and detection for the original area under consideration (in this case the CO-2 area), we request an exemption from III.G.3 for the Carbon Dioxide Storage/PG Pump Room because this area does not have fixed suppression or detection.

This exemption is predicated on equivalent level of protection to that required based on the information and considerations provided within this section.

B. Boundaries

The construction of this area constitutes a 3-hour rated fire barrier between the Diesel Generator Building (DG) and the outside.

1. Walls (Ref. Drawing 11700-RC-40A;-B,)

Reinforced Concrete:

a. Lower Level (El. 721'6")

(1) North	1ft.0in. parallels unexcavated area
(2) South	1ft.0in. parallels unexcavated area and concrete stairway
(3) East	1ft.0in. parallels unexcavated area
(4) West	2ft.0in. parallels unexcavated area

b. Upper Level (El.735'6")

- | | |
|-----------|---------------------------------|
| (1) North | 2ft.0in. parallels outside area |
| (2) South | 2ft.0in. parallels outside area |
| (3) East | 2ft.0in. parallels outside area |
| (4) West | 2ft.0in. parallels DG-2 |

2. Ceiling (Ref. Drawing 11700-RC-40C)

Since the intermediate floor slab is penetrated by openings, resulting in both levels being considered as one fire area, there will be no evaluation of the lower level ceiling. The upper ceiling is 2ft.0in. reinforced concrete.

3. Floor (Ref. Drawing 11700-RC-40C)

For reasons stated in previous paragraph, only the lower level floor will be evaluated. This floor is a minimum 2ft.0in. reinforced concrete.

4. Room Volume

upper level	3,048 cu.ft.
lower level	<u>2,996 cu.ft.</u>
TOTAL	6,044 cu.ft.

All penetrations to the adjacent fire area have been sealed for a 3-hour rating which constitutes a 3-hour boundary for this fire zone.

C. Ventilation

A 1,780 cfm wall-mounted propeller exhaust fan [1VS-F-44] shown in Figure 11.14-4 may be run manually, or automatically when the room temperature rises above the setting of a room thermostat. When the fan starts, the intake and exhaust dampers [1VS-D-44-2] and [1VS-D-44-1] will open. In winter, space temperature is maintained by electrical unit heaters installed in each space.

D. Redundant Safe Shutdown Cables/Equipment in the CO-2 area

The structure is considered a vital area because it contains the river water supply valves (MOV-RW-113A,B,C and D) for the emergency diesel generators.

E. Fire Protection Existing

1. Fire Detection System

There are no automatic or manual fire detection systems within the CO-2 area.

2. Fire Extinguishing Systems

There are no automatic suppression systems within the CO-2 area.

3. Propagation Retardants

All cables installed at BVPS-1 were fabricated to pass the vertical cable tray flame test with an oil and burlap flame source which was the accepted industry standard during the construction and is comparable to IEEE-383 tests.

F. Fire Hazard Analysis

1. Type/Quantity of Combustibles in This Area

- a) Cable insulation is negligible as all cable is enclosed in conduit.
- b) One gallon of lube oil associated with the primary grade water transfer pump motors.

2. Heat Release Potential

Cable-Negligible
Lube Oil - (1 gallon)

- a) Heat Load = 1.55×10^5 Btu
- b) Area = 214 sq. ft.
- c) Heat Release Potential = 724 Btu/sq.ft. (negligible)

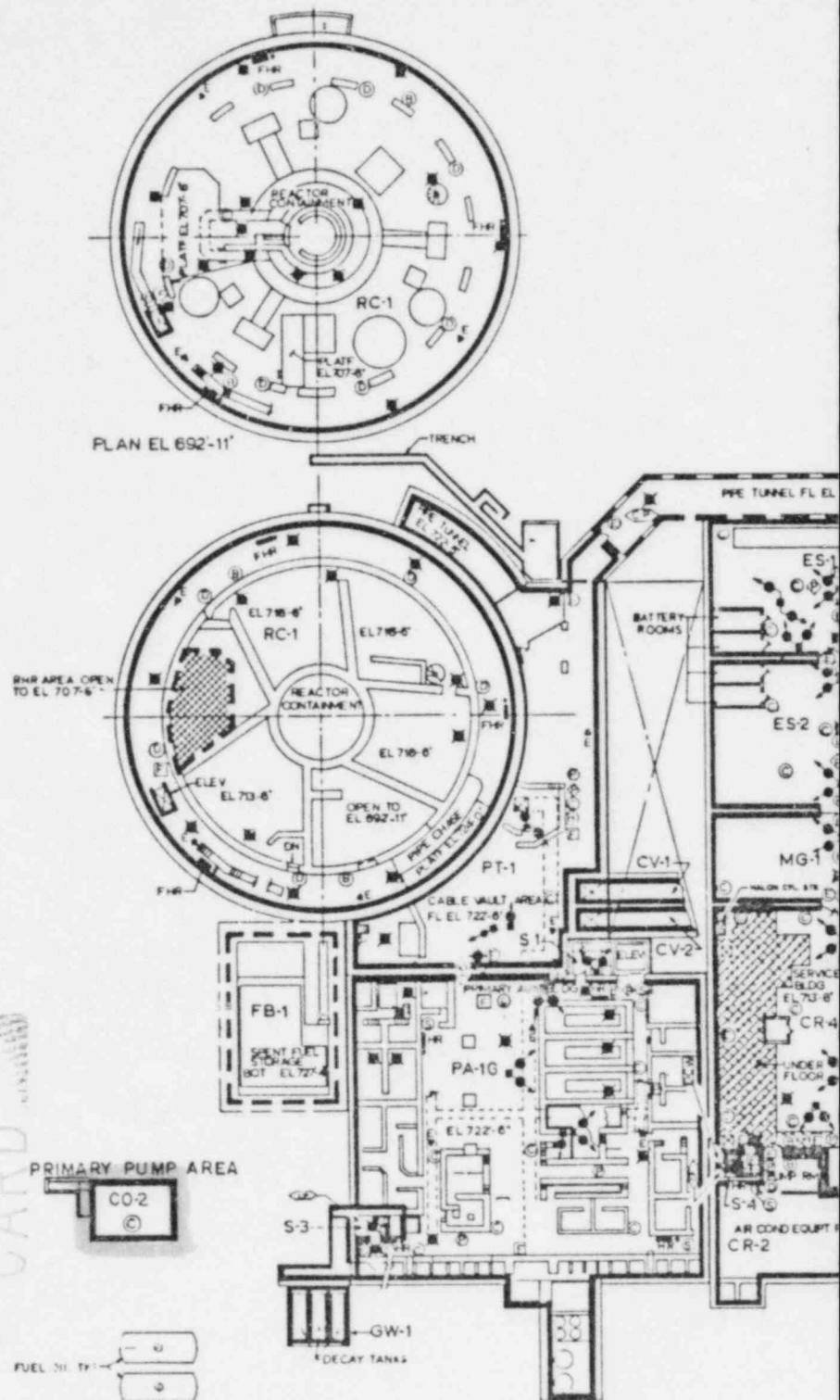
Based on the heat release potential, the required fire rating for this area is negligible (less than 1 hour).

G. Justification of Area Acceptability

- 1. The existing construction provides fire barriers in excess of the required ratings determined by the fire loading.
- 2. The circuit analysis (Figures 11.14-5) has indicated the potential exists for an area fire to render all four motor operated valves (MOV-RW113A,-B,-C,-D) inoperable. These valves supply river water to the two diesel generator cooling system heat exchangers. The plant modification described in Section 6.9 of our original Appendix R submittal report will relocate motor operated valve MOV-RW113D into the diesel generator building (DG-2) as shown on Figure 11.14-6. This will eliminate the possibility of coincident loss of cooling water to both emergency diesel generators and bring the plant design for this area into conformance with Appendix R criteria.
- 3. Hazardous quantities of transient combustibles would not be expected in this area for the following reasons:
 - a) The area is not adjacent to or near any major plant traffic route.
 - b) Storage of transient combustibles in the area is prohibited by plant administrative procedures.
 - c) Maintenance and operations activities in this area do not involve the use of large quantities of combustible materials.

- d) The accessibility to this area is restricted due to the security system card-key access.

This exemption request is predicated upon an equivalent level of protection to that required based on the above considerations and modifications.

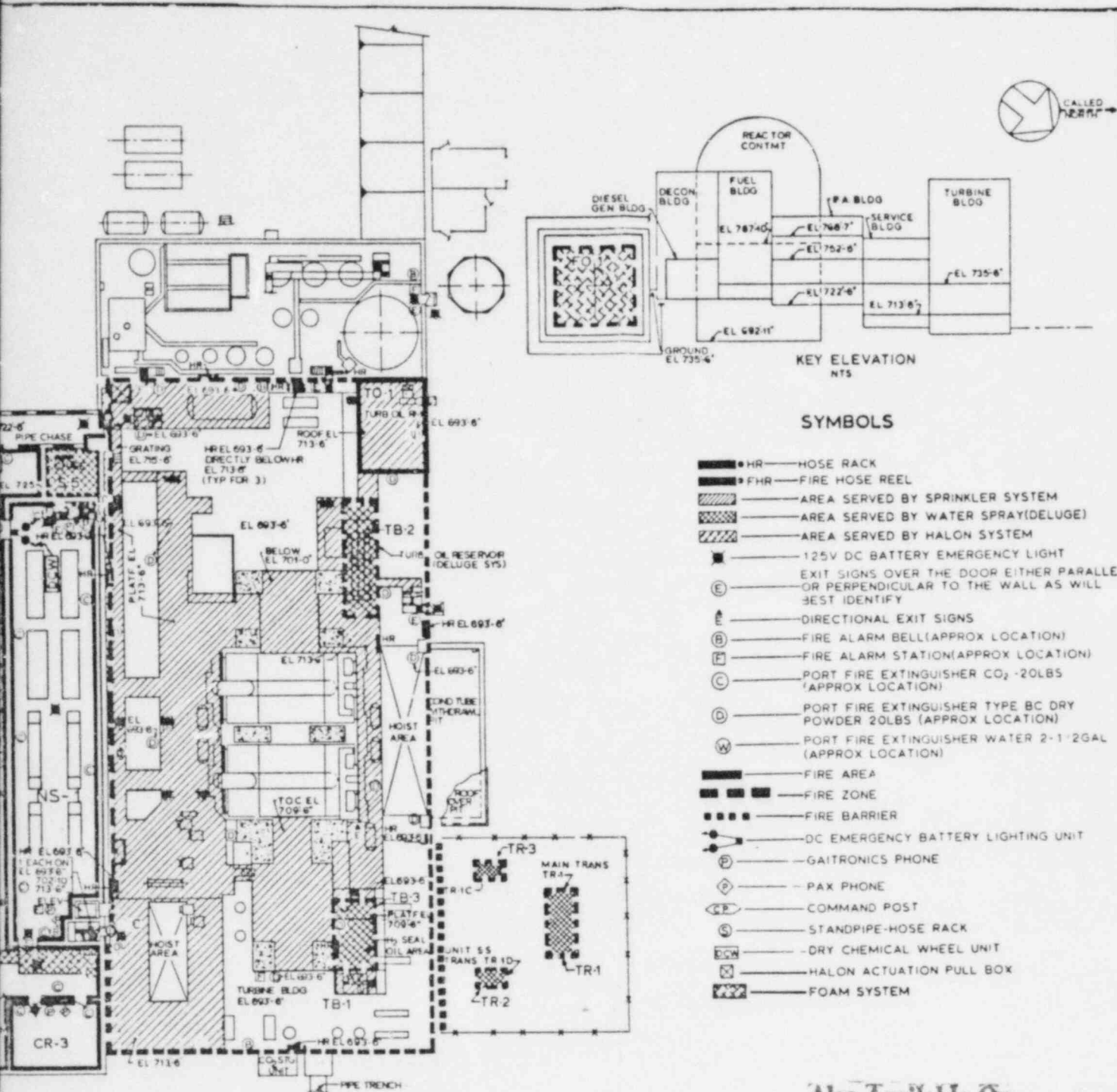


NOTES

- EXIT SIGNS SHALL BE PROVIDED AT ALL EXIT DOORS AND DIRECTIONAL SIGNS PLACED AT OTHER POINTS IN THE BUILDING IN SUCH A MANNER AS TO CLEARLY DENOTE THE EXIT WAYS.
- ALL SIGNS SHALL HAVE RED LETTERS AND CONFORM TO COMMONWEALTH OF PENNSYLVANIA BUILDING REGULATIONS & OSHA STANDARDS. 6 MIN HIGH LETTERS. SIGNS WILL BE ILLUMINATED BY NORMAL AND EMERGENCY LIGHTING.

0 5 10 15 20

SCALE-Feet



Also Available On
Aperture Card

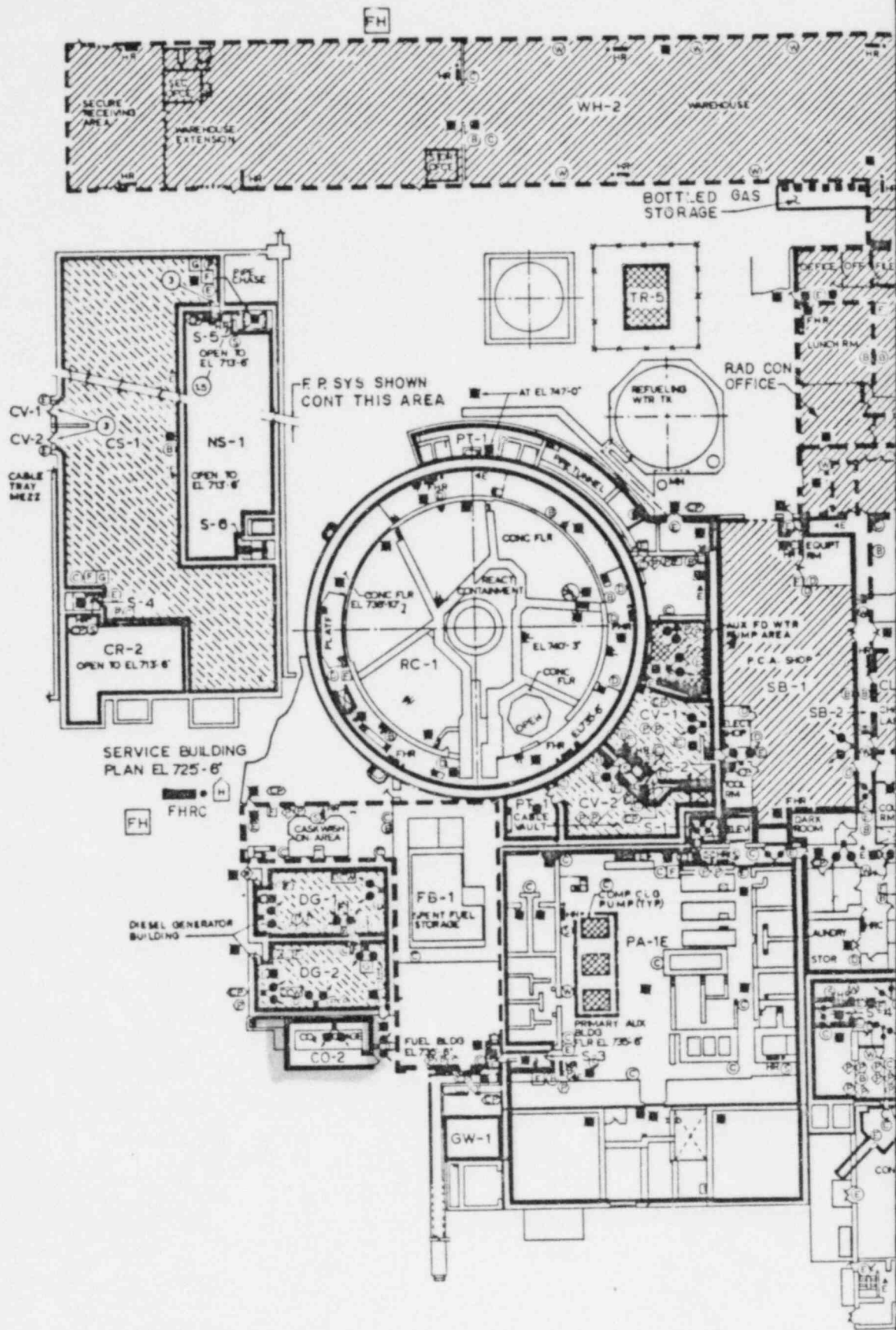
FIGURE 11.14-1

ARRGT-PERSONNEL ACCESS BETWEEN
BUILDINGS ELEVATION 713'-6"

BEAVER VALLEY POWER STATION-UNIT 1
FIRE HAZARDS ANALYSIS

REVISED 3/1/82

8312280506-15



0 5 10 15 20
 SCALE-Feet

PLAN EL 735'-6"

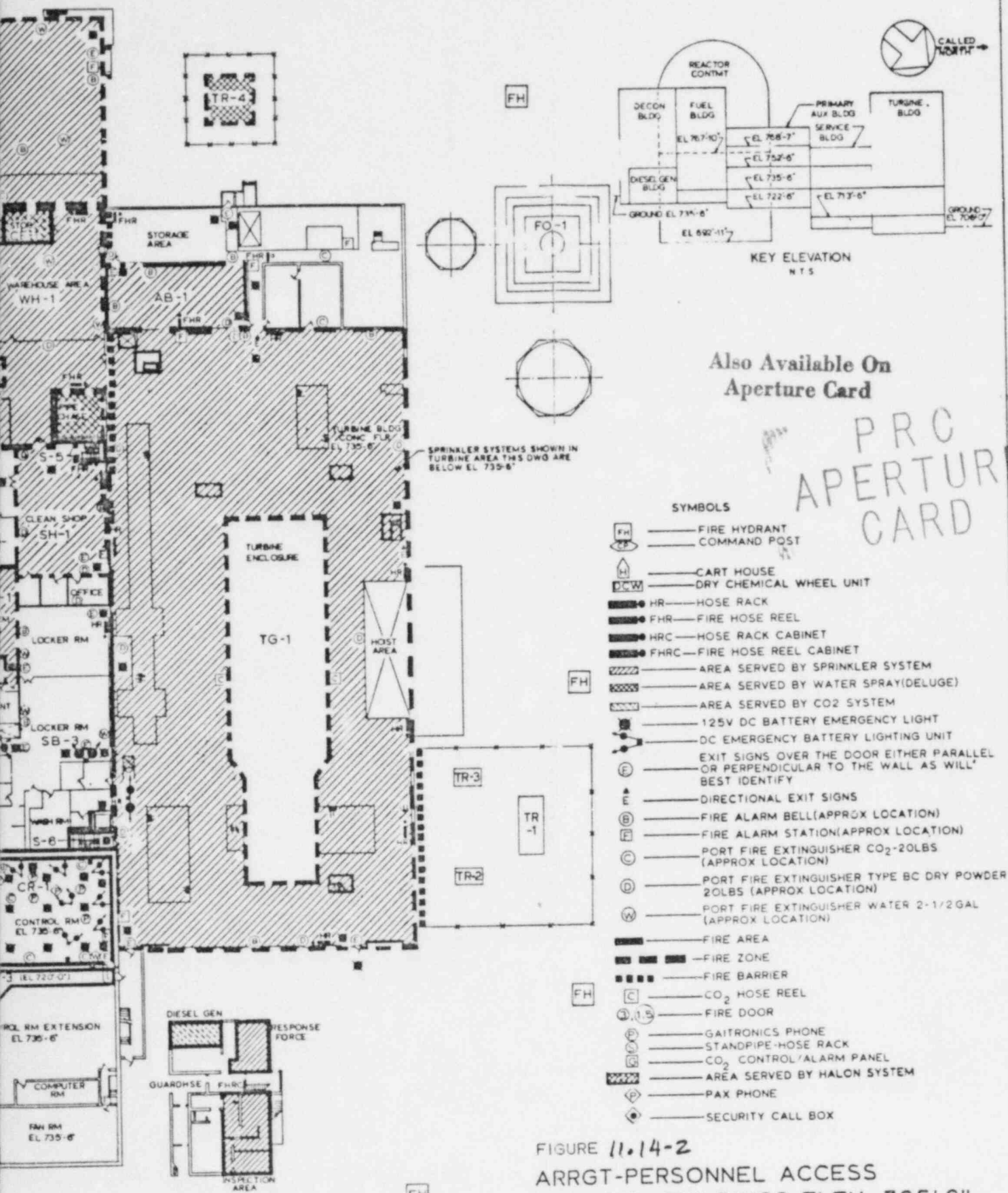


FIGURE 11.14-2

ARRGT-PERSONNEL ACCESS
BETWEEN BUILDINGS ELEV. 735'-6"

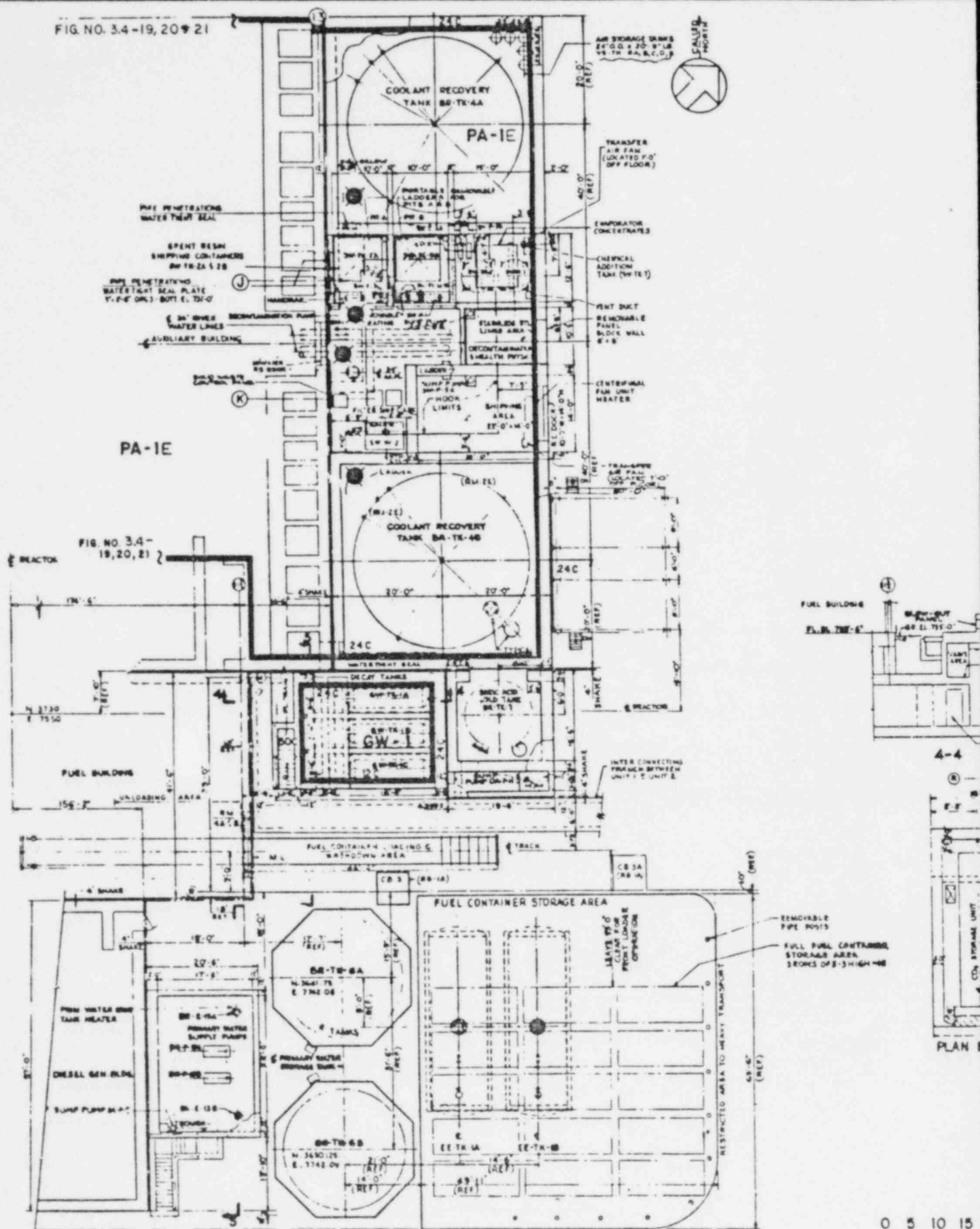
BEAVER VALLEY POWER STATION-UNIT 1

FIRE HAZARDS ANALYSIS

REVISED 3/1/82

8312280506-16

FIG. NO. 3.4-19, 20, 21



Also Available On
Aperture Card

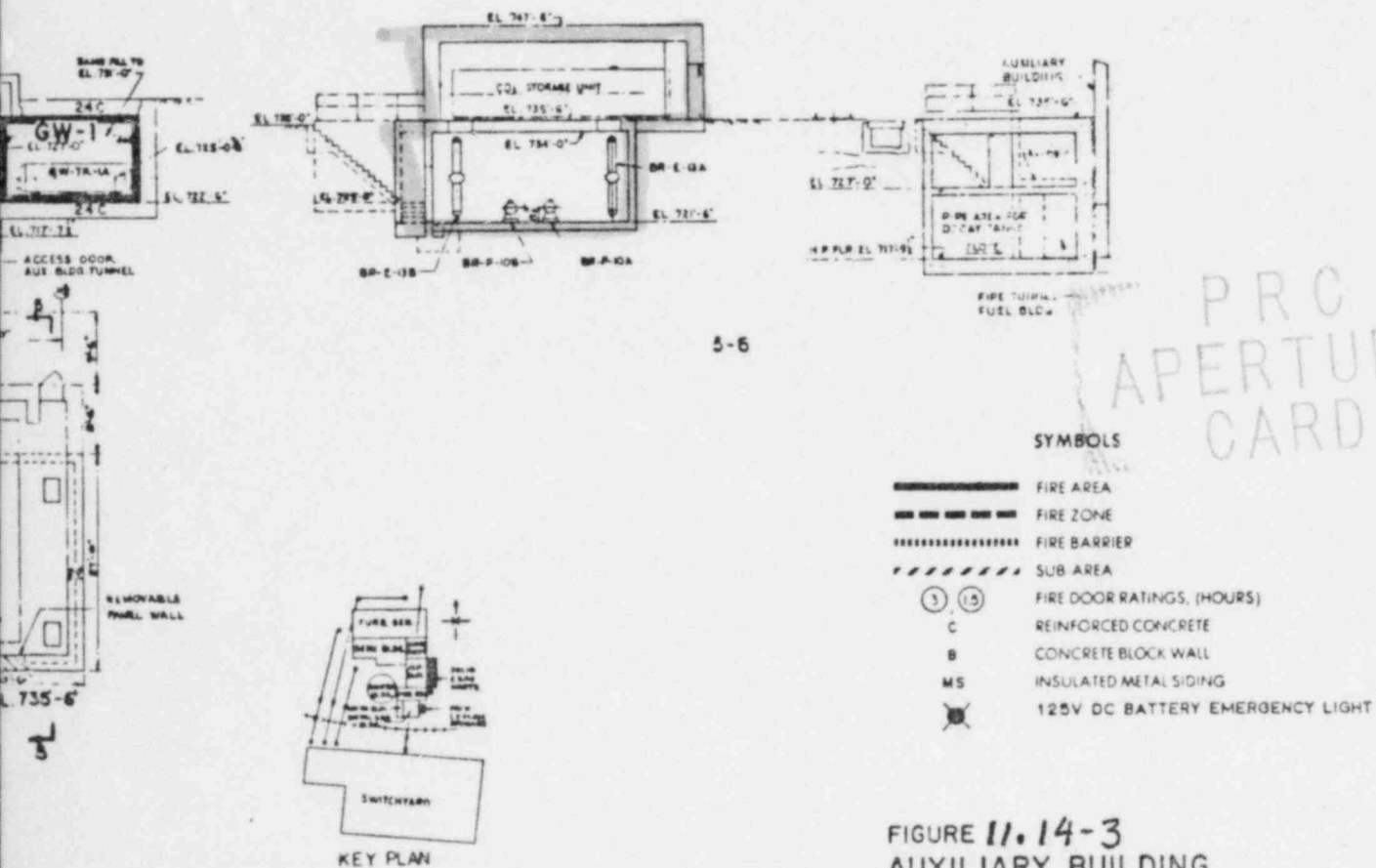


FIGURE 11.14-3
AUXILIARY BUILDING
SOLID WASTE AREA
BEAVER VALLEY POWER STATION-UNIT 1
FIRE HAZARDS ANALYSIS

REVISED 3/1/82

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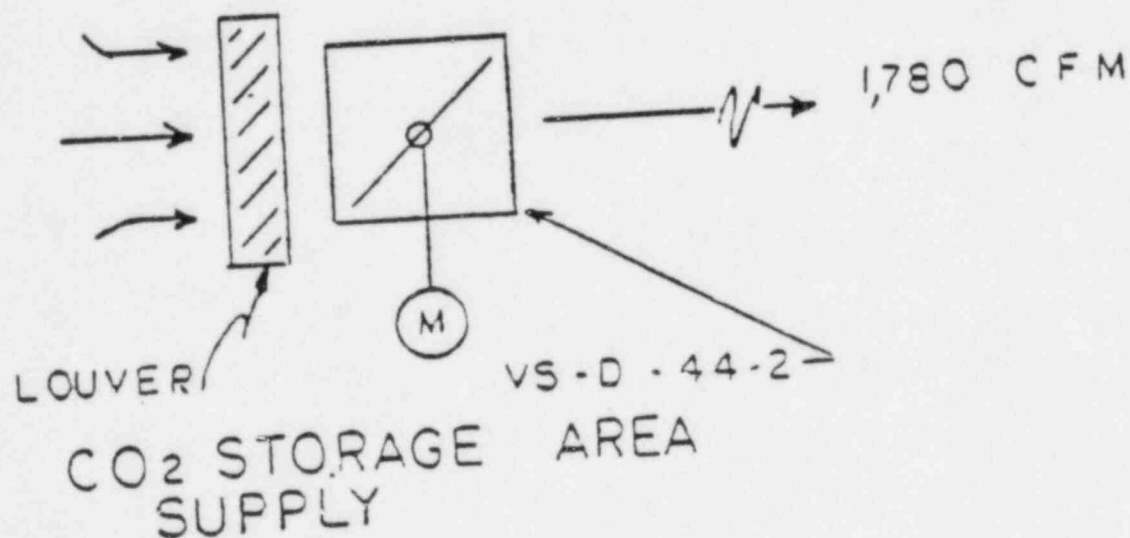
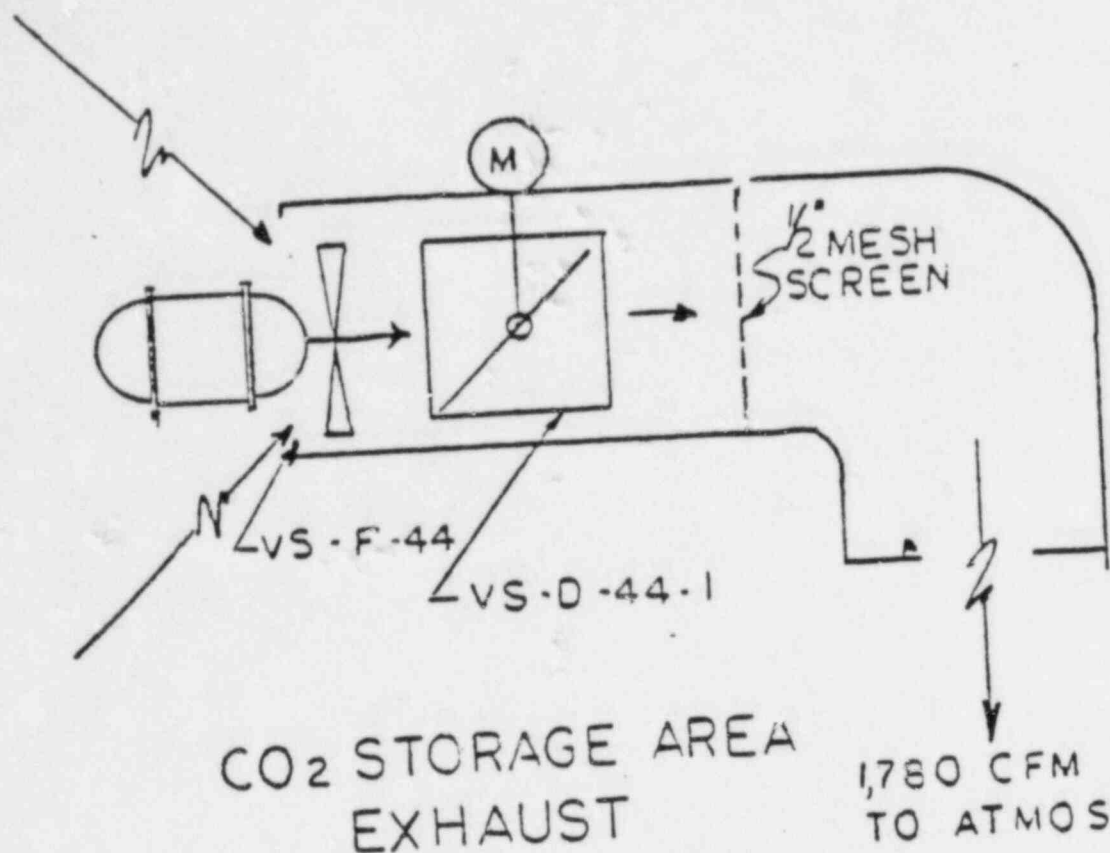
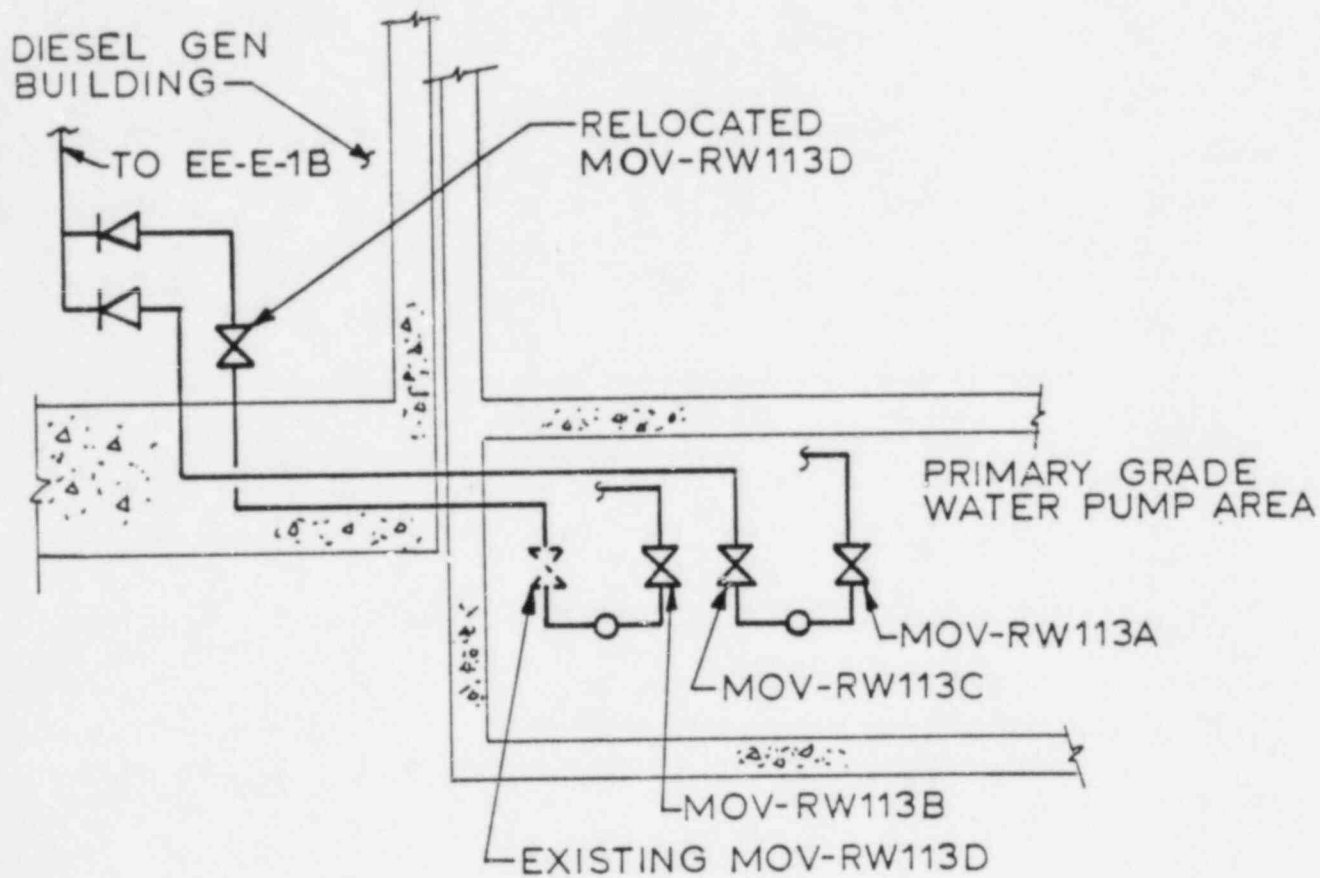


FIGURE 11.14-4 CO₂ STORAGE AREA VENTILATION SYSTEM

CO2 STORAGE AND PG PUMP ROOM
FIRE AREA CO-2

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
POWER	MOV-RW113A DIESEL GENERATOR HEAT EXCHANGER 1A INLET VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.9	N/A
	MOV-RW113B DIESEL GENERATOR HEAT EXCHANGER 1A INLET VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.9	N/A
	MOV-RW113C DIESEL GENERATOR HEAT EXCHANGER 1B INLET VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.9	N/A
	MOV-RW113D DIESEL GENERATOR HEAT EXCHANGER 1B INLET VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.9	N/A



SCHEMATIC OF
RELOCATED MOV-RW113D

FIGURE 11.14-6
BEAVER VALLEY POWER
STATION UNIT 1
APPENDIX R REVIEW

REVISED 3/18/82

EXEMPTIONIX. PIPE TUNNEL (SUBAREA QP-1), EL 735 ft.

(See Attached Figures 11.15-1, -2, -3 and Figure 11.15-5)

A. Discussion

This area which houses the Motor-driven and the Steam-driven Auxiliary Feedwater Pumps [FW-P-3A, 3B and FW-P-2] and the Quench Spray Pumps [QS-P-1A; -1B] is a subarea of the Pipe Tunnel (PT-1), otherwise known as Subarea QP-1. The potential for a fire in this area to render all auxiliary feedwater capability inoperable due to the existing plant geometry was previously identified in our Appendix R Fire Protection Review Submittal report. Our proposal to install an additional auxiliary feedwater pump (dedicated shutdown system) which would be located in a separate fire area in the Turbine Building and be independent of existing onsite and offsite power sources (Reference Section 6.2 of our Appendix R Report), was approved and documented in your SER for BVPS Unit #1 dated January 5, 1983. In addition, the Pipe Tunnel (PT-1) elevation 722 area was previously evaluated and an exemption was granted based on equivalent level of protection to that required by Appendix R, Section III.G and documented in your letter of March 14, 1983. However, after receiving further clarification from the staff on the position of suppression and detection in a fire area vs. fire zone and the need for coverage "throughout" the fire area, we request an exemption from III.G.3 for this subarea QP-1 because it does not have suppression and detection coverage "throughout" the fire area, nor is this subarea separated by boundary fire barriers.

This exemption is predicated on equivalent level of protection to that required based on a fire hazards analysis and the information provided in this section.

B. Boundaries

1. Walls (Ref. Dwg. 11700-RC-21A)

Reinforced Concrete:

- a. North
2-ft 0-in reinforced concrete which parallels the Service Building.
- b. South
4-ft 6-in reinforced concrete which is the Reactor Containment wall.
- c. East
2-ft 0-in reinforced concrete which parallels the West Cable Vault (CV-1)
- d. West
2-ft 0-in reinforced concrete which parallels the outside of the building, west yard.

2. Ceiling

2-ft 0-in. reinforced concrete

3. Floor

2-ft 0-in. reinforced concrete

4. Room Volume

$\approx 1500 \text{ ft}^3$

All penetrations leading to adjacent fire areas are sealed for a 3-hour fire rating.

C. Ventilation

Air is recirculated throughout the pipe tunnel (PT-1) area by VS-AC-9 which has a capacity of 10,200 CFM. This area is maintained at a negative pressure by means of the supplemental leak collection system.

D. Redundant Safe Shutdown Cables/Equipment

The circuit analysis has indicated the potential loss of all three of the Auxiliary Feedwater pumps given a fire in this area.

Other major equipment located in the area are the Quench Spray Pumps [QS-P-1A, -1B], which are not required for safe shutdown.

E. Fire Protection Existing

1. Fire Detection Systems

Early warning ionization smoke detectors and preaction thermal heat detectors, which alarm locally and in the control room in the event of a fire, are located in the room housing the Auxiliary Feedwater Pumps.

The actuation of any one smoke or heat detector in the auxiliary feedwater pump area provides a fire alarm on the fire protection control panel in the control room. Waterflow, detector, and master deluge valve supervision is provided with a circuit trouble alarm in the control room.

Detectors are also installed in the return main of the ventilation system servicing this area with annunciation in the control room.

2. Fire Extinguishing System

The auxiliary feedwater pump area is provided with an automatic preaction sprinkler spray system using closed heads. Smoke and heat detector systems are installed in the same area as the sprinklers. Actuation of any heat detector, as from a fire, opens a deluge valve which permits fire main water to flow into the sprinkler piping system and to be discharged from only the affected sprinklers.

A 4-in curb is installed around each auxiliary feed pump to contain an oil spill or water from the sprinkler spray system. Each curbed area is provided with a drain. The three drain lines form a single header below the floor of the auxiliary feed pump area and pass through a deep loop seal. The arrangement and elevation of this piping prevents an oil leak or fire from spreading from one feed pump to another through the drain system. The combined drain header enters an oil interceptor to remove oil from the water and prevent the transfer of oil-contaminated water to the tunnel sump. The water leaving the oil interceptor will enter the auxiliary feedwater area drain tank. The contents of this tank are continuously monitored for high radiation. A high radiation condition provides indication and alarm in the control room and automatically diverts the auxiliary feedwater area drain tank discharge from the yard oil separator to the tunnel sump. This prevents transferring potentially radioactive water from the auxiliary feedwater area drainage system.

3. Hose Station/Extinguishers

Portable fire extinguisher units are located throughout the area. The nearest standpipe fire hose station is located less than 50 feet away in the cable vault stairwell (S-2) located on Elevation 735.

4. Propagation Retardants

All cables installed at Beaver Valley Power Station Unit I were fabricated to pass the vertical cable tray flame test with an oil and burlap flame source which was the accepted industry standard during the construction of BV-1 and is comparable to IEEE-383 tests.

F. Fire Hazards Analysis

1. Type/Quality of Combustibles

Cable Insulation	=	3360 lbs.
Lube Oil	=	90 Gallons

2. Heat Release Potential

Heat Load	=	5.1×10^7 Btu
Area	=	1430 ft ²
Heat Release Potential	=	3.57×10^4 Btu/ft ²

Based on the heat release potential in the area, the required fire rating for this area is less than 1/2 hour.

G. Justification of Area Acceptability

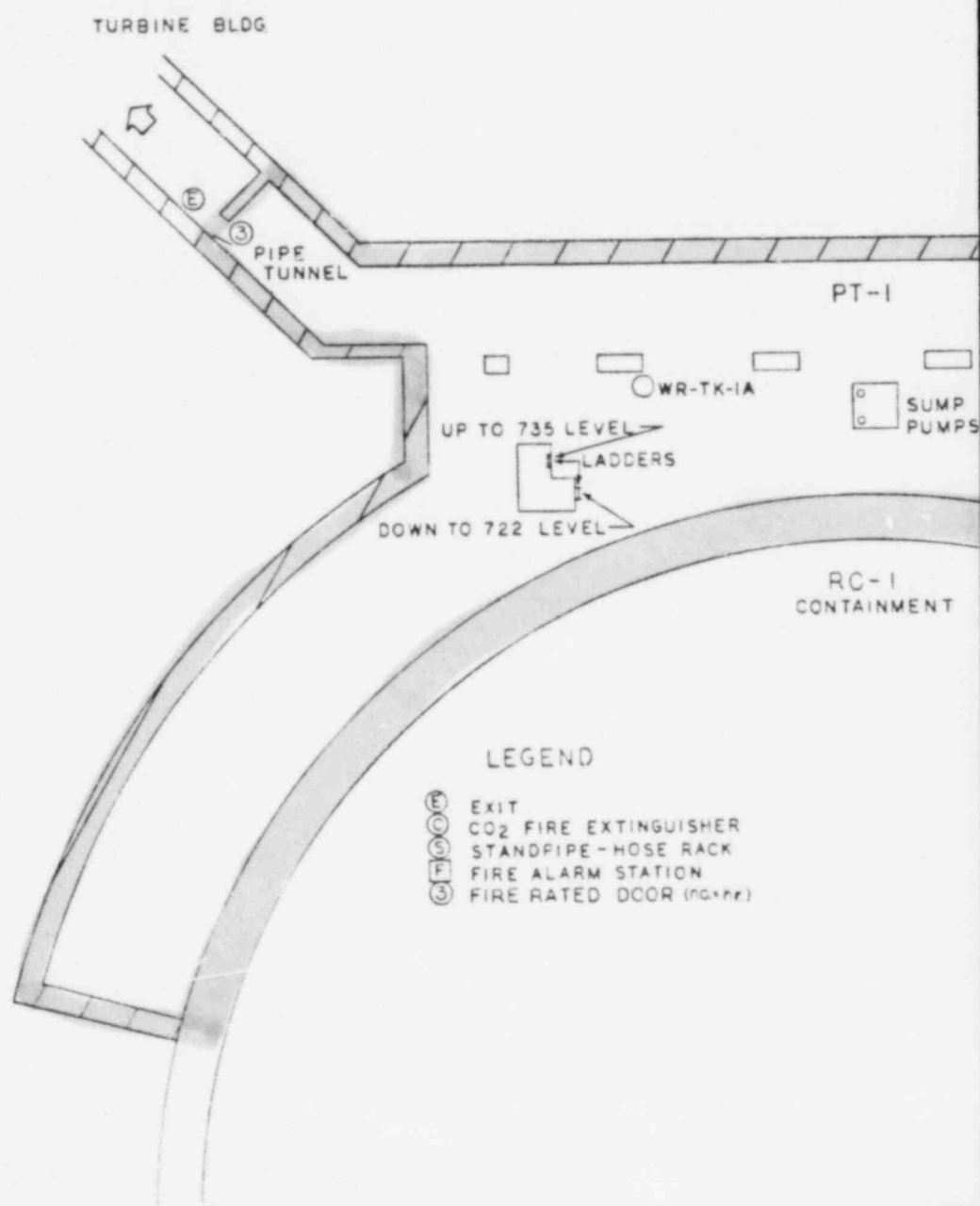
1. The circuit analysis (Figure 11.15-4) of our original Appendix R Report submittal previously identified the potential loss of this area and the loss of safe shutdown equipment (auxiliary feedwater capability) due to the existing configuration not in compliance with the separation criteria of Section III.G. As a result, our proposal to install a new Auxiliary Feedwater Pump, separate from this fire area and independent of existing onsite and offsite power sources, was approved and documented in your SER dated January 5, 1983. This dedicated shutdown equipment modification would bring plant design for this area under consideration into conformance with Section III.G of Appendix R.
2. The existing fire suppression and detection systems provided in the area of coverage for the Auxiliary Feedwater Pumps would promptly detect and extinguish the fire in its incipient stage, thereby eliminating the potential for propagation or spread of the fire.
3. The curbing and drain system provided around each Auxiliary Feedwater Pump, previously discussed in Section E.2 of this exemption request, would prevent the possibility of an oil fire in the area from spreading.
4. A fire in the Auxiliary Feedwater Pump area would be prevented from spreading to the Cable Vault (CV-1) room by virtue of a 3 hour fire-rated boundary between these fire areas. The door between the rooms is a 3-hour fire-rated door and all penetrations have been sealed with a 3-hour rating.
5. The motor-driven Quench Spray Pumps, located in the area adjacent to the Auxiliary Feedwater Pumps, are not required for safe shutdown. The only fire condition that might develop in this area is an electric motor insulation-type fire which would simply smolder, be short lived, and not likely to propagate or spread to other areas.
6. Hazardous quantities of transient combustibles would not be expected in this area for the following reasons:
 - a) The area is not adjacent to or near any major plant traffic route.
 - b) Storage of transient combustibles in this area is prohibited by plant administrative procedures.
 - c) Maintenance and operations activities in this area during plant operations do not involve the use of large quantities of combustible material.
 - d) The accessibility to the area is restricted by existing security capability.

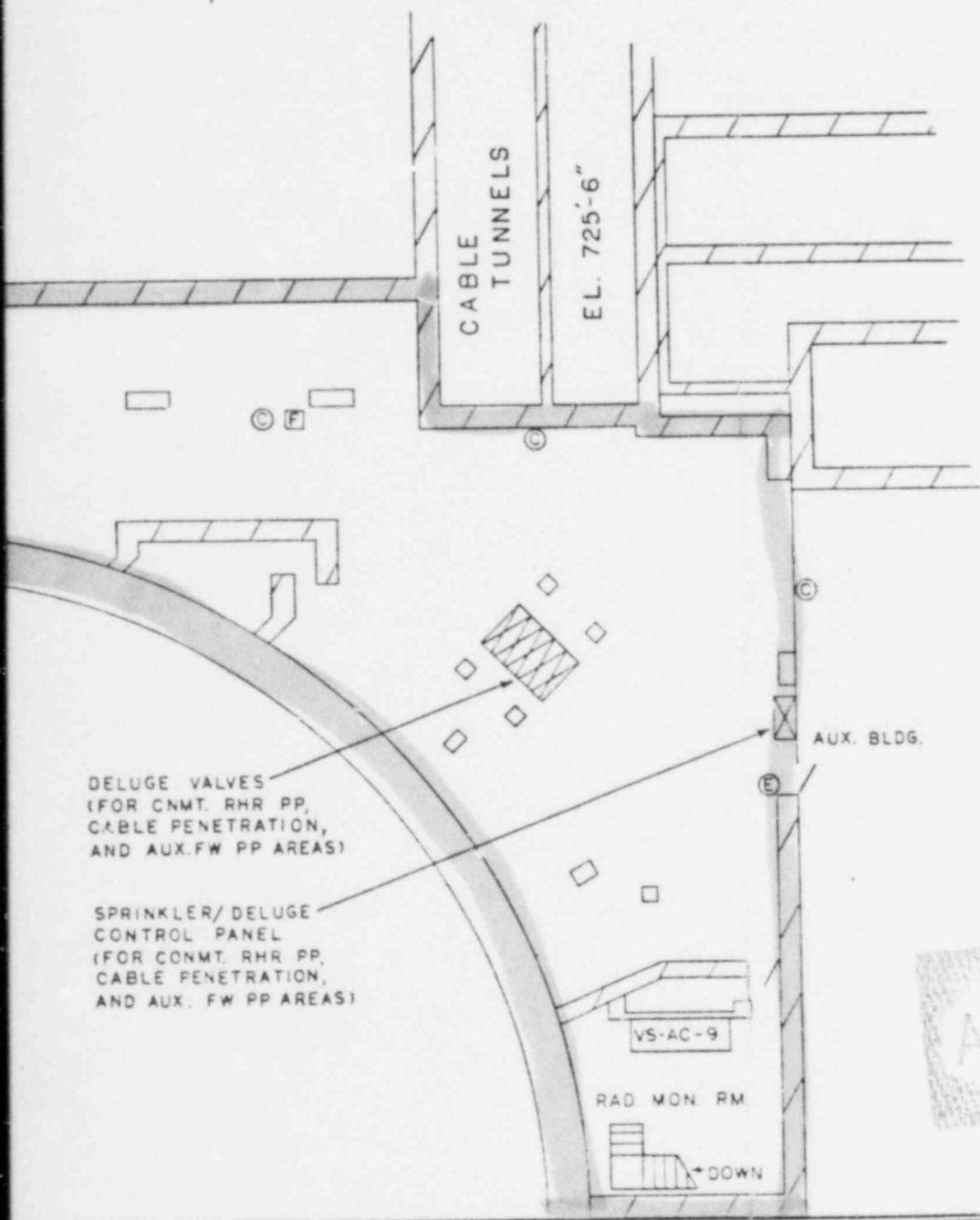
7. The Pipe Tunnel (PT-1) area is serviced by a ventilation system with detectors located in the return main which would provide remote alarm indication in the control room in the event of a fire in this area and aide response time of the fire brigade.
8. A possibility of a fire in this subarea (QP-1) spreading are described below:
 - a) To the west of this area exists a non-fire rated door which leads to the lower elevation (Elev. 722) of the Pipe Tunnel (PT-1) area. This area was previously evaluated in our original Appendix R Report submittal and subsequently an exemption was granted and documented in your letter of March 14, 1983.
 - b) To the west is the Safeguards Area Ventilation Equipment Room (size $\approx 10'$ x $15'$) which houses ventilation unit VS-AC-7. This unit recirculates filtered and conditioned air for the safeguards pipe tunnel area. An exit door leading directly to the outside of the building is to the west of the room. At the northwest corner of the room, a ladder going to an open hatchway exists which leads to the floor directly above, Elev. 751 of the Pipe Tunnel (PT-1).

In the unlikely event the fire were to spread up the hatchway to the floor Elev. 751 above, the only equipment located in this room is a ventilation fan unit (VS-AC-6) and a self-contained charcoal filter unit [HY-FL-1,-2] for the Hydrogen Recombiner Units located in the adjacent room. No equipment or cables required for safe shutdown are located in these areas. Based on the above, the possibility of a fire spreading to adjacent areas via the non-rated door to Elevation 722 below QP-1 and via the open hatchway to the floor above to Elev. 751 is negligible based on the low fire loading in these areas, existing plant layout and construction of the areas, the administrative control of combustibles in the area, and the equivalent level of protection to that required by Section III.G.

9. The provision for detection and suppression "throughout" this fire area would not significantly increase the level of fire safety presently afforded by the existing partial coverage in the Auxiliary Feedwater Pump area. Additional suppression and detection systems throughout this area would not enhance the level of protection for this fire area under consideration with respect to Appendix K safe shutdown capability criteria.

This exemption request is predicated upon an equivalent level of protection to that required based on the above considerations.



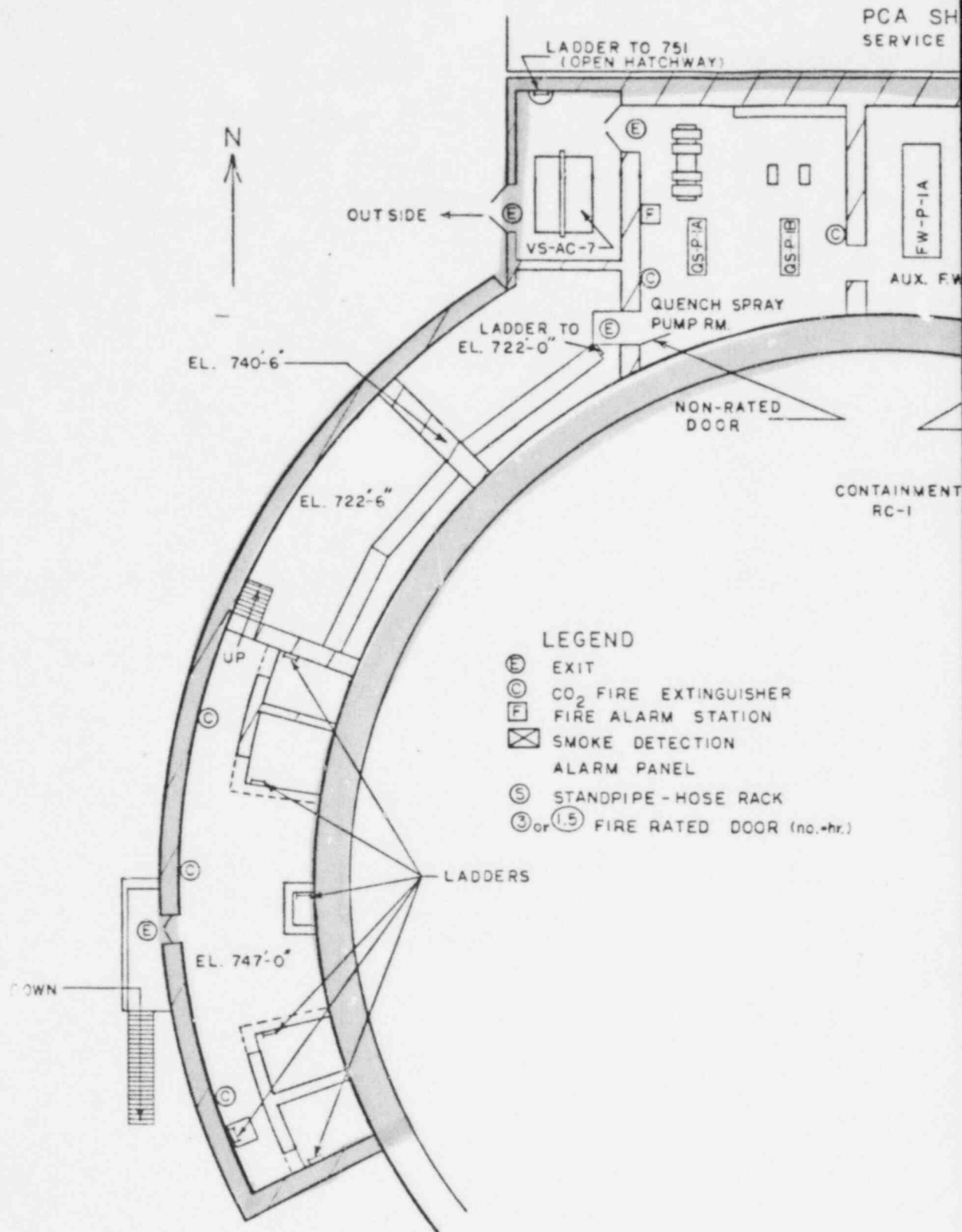


Also Available On
Aperture Card

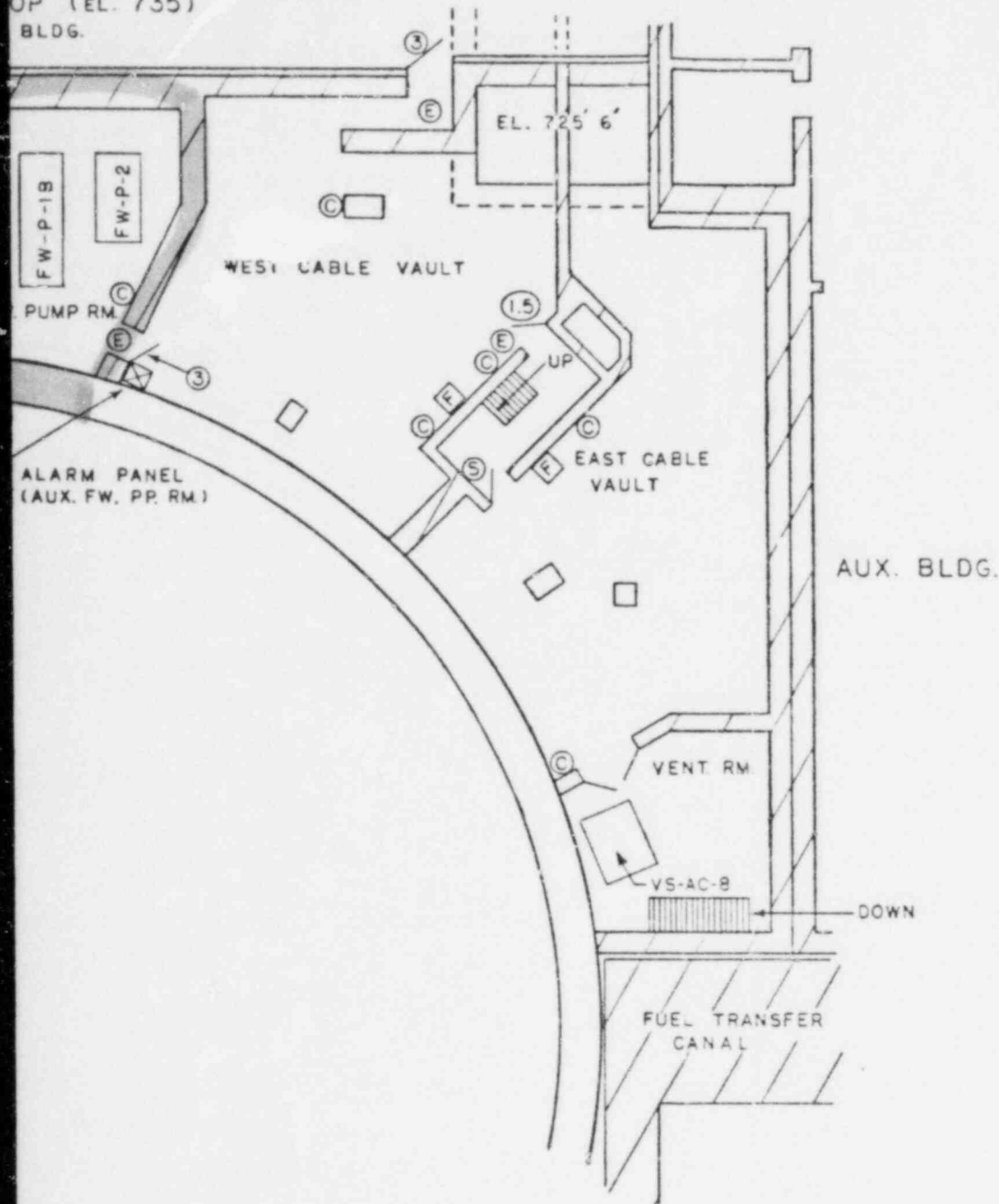
PRC
APERTURE
CARD

DUQUESNE LIGHT COMPANY				PIPE TUNNEL	
ENGINEERING & CONSTRUCTION DIVISION				PITTSBURGH, PA.	
SCALE	DATE 9-3-53	ARCH. APP.	EL. 722-6'		
NONE	DRAWN JWS	ELEC. APP.	APP. COMPLETE WHEN INITIALED HERE		
CHECKED		MECH. APP.	O.F. NO.		
INSPECTED		STRUCT. APP.	E.O. NO.		
			A No. FIGURE 11.5-1		

8312280506-18



OP (EL. 735)
BLDG.



Also Available On
Aperture Card

PRO
APERTURE
CARD

8312280506-19

DUQUESNE LIGHT COMPANY				PIPE TUNNEL	
ENGINEERING & CONSTRUCTION DIVISION				PITTSBURGH, PA.	
SCALE	DATE 9-2-93	ARCH. APP.	EL 735'-6" APP. COMPLETE WHEN INITIALED HERE OF ENO E. ONO A NO. FIGURE 11.15-2		
NONE	DRAWN JWS	ELECT. APP. ✓			
	CHECKED	MECH. APP.			
	INSPECTED	STRUCT. APP.			

TRIM LINE

SERVICE

N

LADDER TO 735-6'
(OPEN HATCHWAY)

MAIN STEAM
EL. 7

VS-AC-6

HYDROGEN
RECOMBINERS

HY-FL-1

RC-1
CONTAINMENT

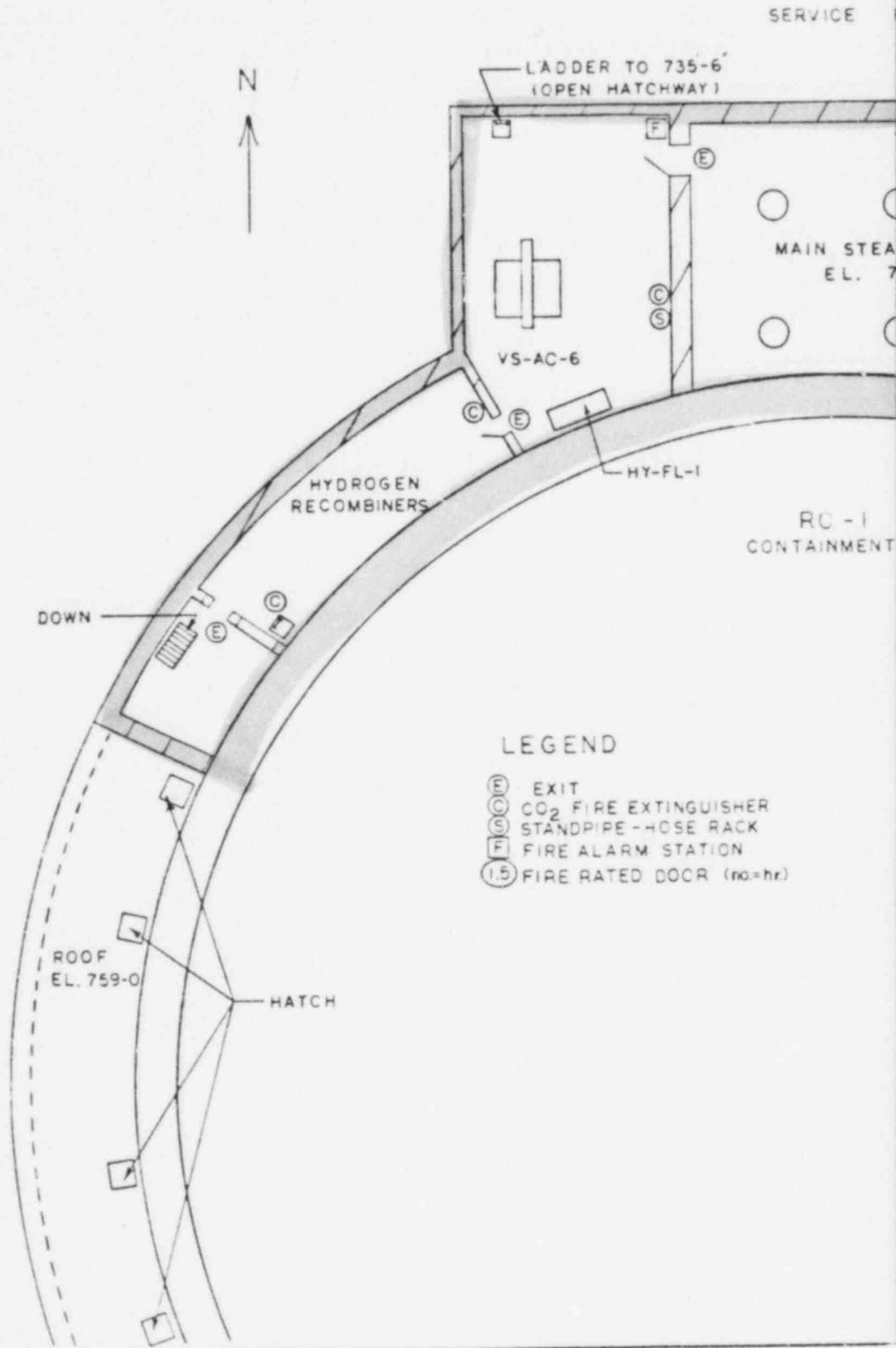
DOWN

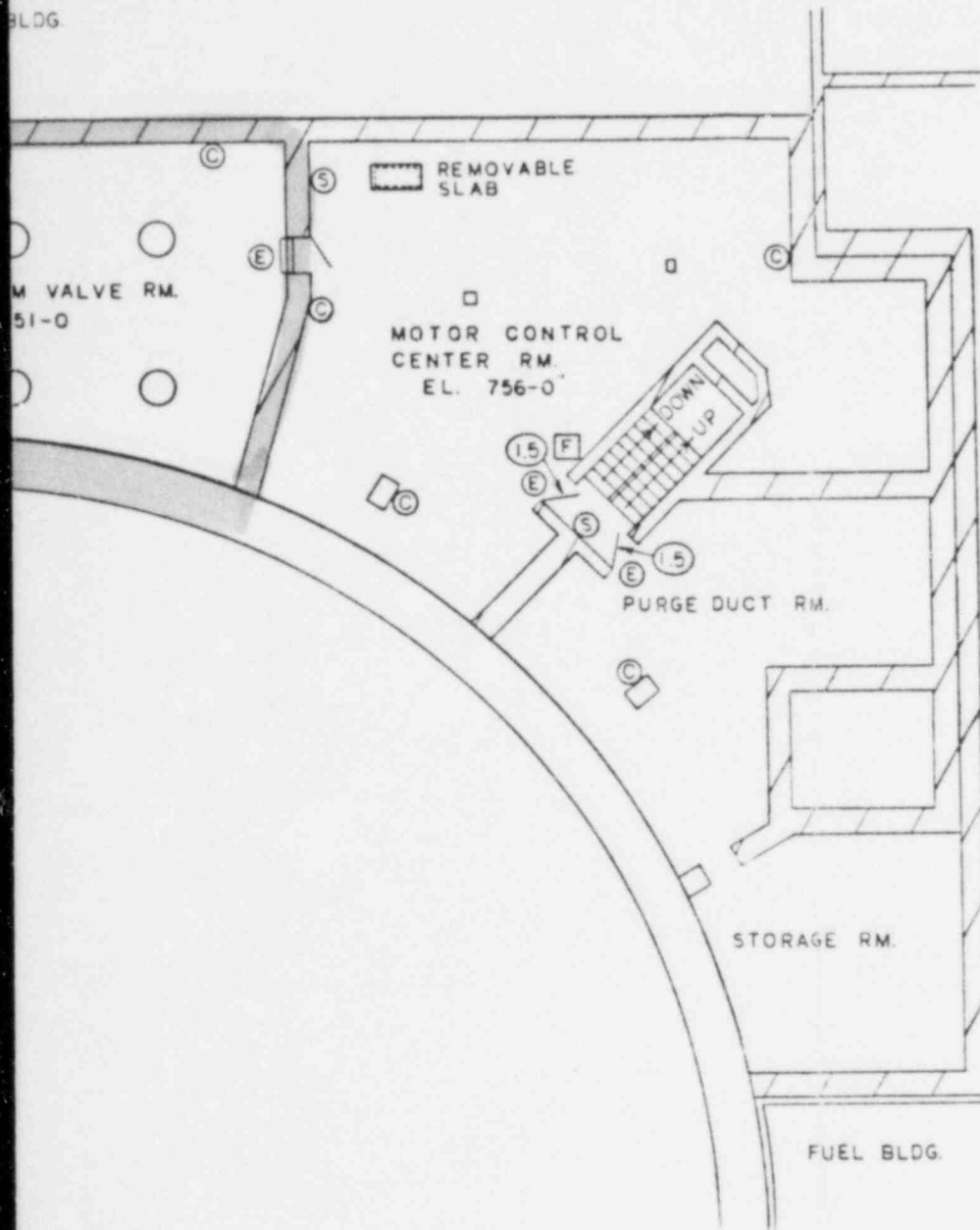
LEGEND

- (E) EXIT
- (C) CO₂ FIRE EXTINGUISHER
- (S) STANDPIPE-HOSE RACK
- (F) FIRE ALARM STATION
- (1.5) FIRE RATED DOOR (no.=hr.)

ROOF
EL. 759-0

HATCH





Also Available On
Aperture Card

AUX. BLDG.

PRC
APERTURE
CARD

8312280506-20

DUQUESNE LIGHT COMPANY				PIPE TUNNEL	
ENGINEERING & CONSTRUCTION DIVISION				PITTSBURGH, PA.	
SCALE	DATE 9-7-63	ARCH. APP.			
NONE	DRAWN JNS	ELECT. APP.			
CHECKED		MECH. APP.			
INSPECTED		STRUCT. APP.			
APP. COMPLETE WHEN INITIALED HERE			OF ENO.	A	NO. FIGURE 11.15-3
			E.O. NO.		

Figure 11.15-4
PIPE TUNNEL
FIRE AREA PT-1

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
POWER	CH-P-1B CHARGING PUMP	CH-P-1A	YES	YES	YES	-	NO
	FW-P-3A AUX FEEDWATER PUMP	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A
	FW-P-3B AUX FEED WATER PUMP	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A
	MCC-1-E12 MOTOR CONTROL CENTER	MCC-1-E5, 11	YES	N/A	YES	-	NO
	MCC-1-E6 MOTOR CONTROL CENTER	MCC-1-E5, 11	YES	N/A	YES	-	NO
	MOV-CH289 CHARGING LINE CONTAIN- MENT ISOLATION	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-CH381 RCS CHARGING ISOLATION	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-FW151A STM GEN AUX FEED PUMP ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A
	MOV-FW151B STM GEN AUX FEED PUMP ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A
	MOV-FW151C STM GEN AUX FEED PUMP ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A
	MOV-FW151D STM GEN AUX FEED PUMP ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A

NOTES FOR FIRE AREA PT-1:

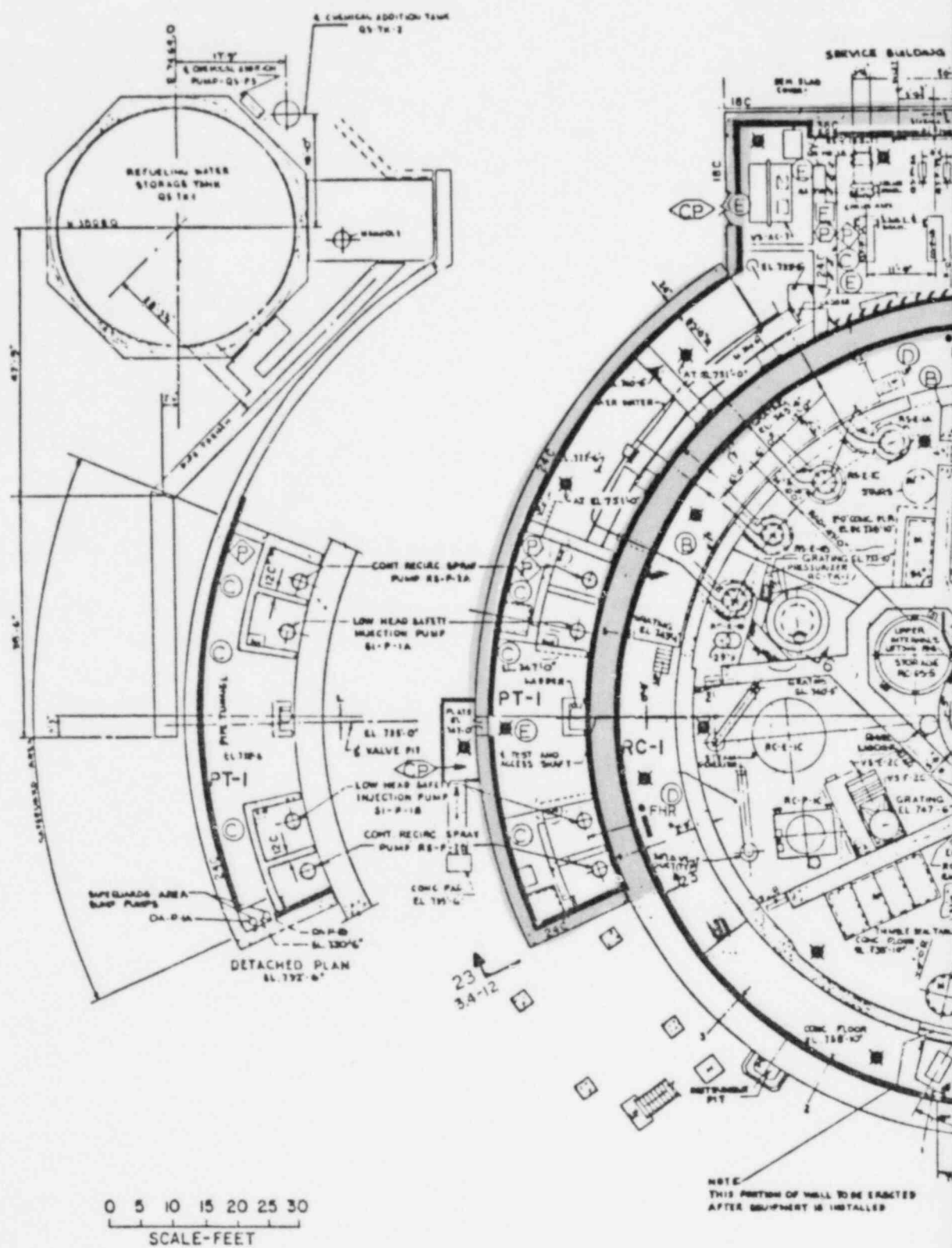
1. THIS FUNCTION IS NOT REQUIRED FOR SHUTDOWN ONLY TO ENSURE CIRCUIT BREAKER COORDINATION.
2. A DERIVED VALUE OF t_{ave} WILL BE USED TO DETERMINE STEAM PRESSURE DURING HOT/COLD SHUTDOWN.

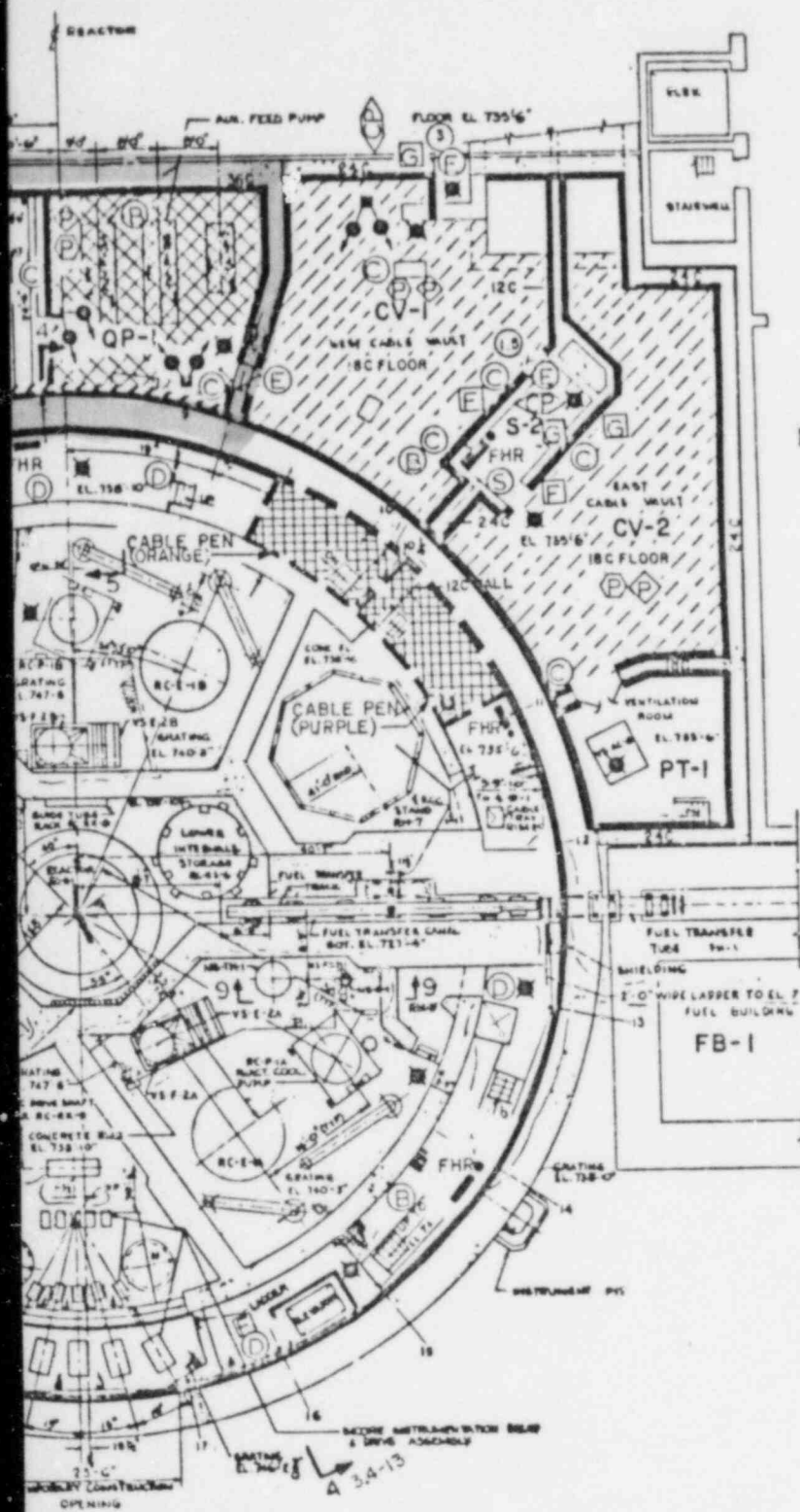
TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION		APPENDIX "R" COMPLIANCE	REMARKS OR REFERENCE	SERIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT			
POWER (CONT'D)	MOV-FW151E SIM GEN AUX FEED PUMP ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A
	MOV-FW151F SIM GEN AUX FEED PUMP ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A
	MOV-S1867C BIT TANK ISO VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-S1867D BIT TANK ISO VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	PZR-1TR-B PRESSURIZER HEATER	PZR-HTR-A	YES	NO	YES	-	NO
	RH-P-1B RESIDUAL HEAT REMOVAL PUMP	RH-P-1A	YES	NO	YES	-	NO
	VS-F-16B EMERGENCY SWITCHGEAR EXHAUST FAN	VS-F-16A	YES	YES	YES	-	NO
CONTROL AND INSTRUMENT	LT-FW477 STEAM GENERATOR A WR LEVEL TRANSMITTER	LT-FW474, 75, 76	N/A	YES	YES	-	NO
	LT-FW487 STEAM GENERATOR B WR LEVEL TRANSMITTER	LT-FW484, 85, 86	N/A	YES	YES	-	NO
	LT-FW497 STEAM GENERATOR C WR LEVEL TRANSMITTER	LT-FW495, 95, 96	N/A	YES	YES	-	NO

FIGURE 11.15-4
PIPE TUNNEL
FIRE AREA PT-1

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	PCV-MS101A STM GEN 1A ATMOSPHERIC STEAM DUMP PRESS CONTROL VALVE	SV-MS101A	N/A	N/A	YES	-	NO
	PCV-MS101B&C STM GEN 1B&C ATMO- SPHERIC STEAM DUMP PRESS CONTROL VALVE	SV-MS101B&C	N/A	N/A	YES	-	NO
	PNL-VB-1 VITAL BUS PANEL	NOTE 1	N/A	N/A	YES	-	NO
	PT-MS474,84,94 STM GEN 1A, 1B, AND 1C STEAM DISCHARGE PRESSURE TRANSMITTERS	RC-T1410 COLD RC-T1420 HOT NOTE 2	N/A	YES	YES	CHAPTER 7	YES
	PT-MS475,85,95 STM GEN 1A, 1B, AND 1C STEAM DISCHARGE PRESSURE TRANSMITTERS	RC-T1430 COLD RC-T1423 HOT NOTE 2	N/A	YES	YES	CHAPTER 7	YES
	PT-MS476,86,96 STM GEN 1A, 1B, AND 1C STEAM DISCHARGE PRESSURE TRANSMITTERS	RC-T1430 COLD RC-T1433 HOT NOTE 2	N/A	YES	YES	CHAPTER 7	YES
	TV-CC110F2&F2 CONTAINMENT RECIRCUL- ATION AIR COOLER ISOL VALVE	NONE	NO	NO	NO	CHAPTER 11 SECT 11.4	N/A
	TV-CC110F1 CONTAINMENT RECIRCUL- ATION AIR COOLER ISOL VALVE	NONE	NO	NO	NO	CHAPTER 11 SECT 11.4	N/A

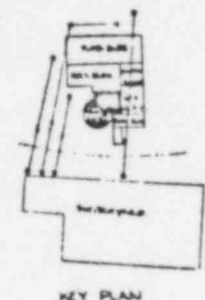
TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	TV-CH204 LET'DOWN LINE ISOLATION VALVE	NONE	N/A	NO	YES	CHAPTER 7	N/A
	TV-MS105A TURBINE DRIVEN AUX FEED PUMP STM SUPPLY VALVE	NONE	NO	NO	NO	CHAPTER 6 SECT 6.2	N/A
	TV-MS105B TURBINE DRIVEN AUX FEED PUMP STM SUPPLY VALVE	NONE	NO	NO	NO	CHAPTER 6 SECT 6.2	N/A
	WR-P-1C RIVER WATER PUMP	WR-P-1A	YES	YES	YES	-	N/A





SYMBOLS

- AREA SERVED BY CO₂ SYSTEM
- AREA SERVED BY WATER SPRAY (DELUGE)
- FIRE ALARM STATION (APPROX. LOCATION)
- FIRE HOSE REEL
- STANDPIPE-HOSE RACK
- FIRE AREA
- FIRE ZONE
- FIRE BARRIER
- SUB AREA
- FIRE DOOR RATINGS, (HOURS)
- REINFORCED CONCRETE
- CONCRETE BLOCK WALL
- INSULATED METAL SIDING
- CO₂ FIRE EXTINGUISHER
- FIRE ALARM BELL (APPROX. LOCATION)
- DRY CHEMICAL FIRE EXT.
- EXIT
- CO₂ CONTROL/ALARM PANEL
- GAIOTRONICS PHONE
- PAX PHONE
- COMMAND POST
- 125V DC EMERGENCY LIGHT
- DC EMERGENCY BATTERY LIGHTING UNIT



KEY PLAN

PRO
APERTURE
CARD

Also Available On
Aperture Card

FIGURE 11.15-5
REACTOR CONTAINMENT, PIPE
TUNNEL AND CABLE VAULT
BEAVER VALLEY POWER STATION-UNIT 1
FIRE HAZARDS ANALYSIS

REVISED 3/1/82

8312280506-2/

EXEMPTION

X. REACTOR CONTAINMENT (RC-1), EL. 738'
(Source Range Cable Routing)
(See Attached Figures 11.16-1,-2)

A. Discussion

The Nuclear Instrumentation System at Beaver Valley uses information from three separate types of instrumentation channels to provide protection levels. Each range of instrumentation (source, intermediate and power) provides some form of overpower reactor trip protection deemed necessary during operation.

One type of neutron detector, with solid-state electronic circuitry, is used to monitor the leakage neutron flux from the reactor during core loading, shutdown, and startup, as well as during subsequent refueling. The system provides control room indication and recording of signals via two independent source range channels from the reactor containment through separate penetrations and into separate preamplifiers, one located in the East Cable Vault (CV-2) and one located in the West Cable Vault (CV-1).

A source range instrument drawer for process monitoring capability outside the control room will be provided with capability to tie into the pre-amplifier located in the East Cable Vault (CV-2) within one hour following its required use. This will provide alternate safe shutdown capability outside the control room for source range indication as noted in your letter of January 5, 1983.

The cabling for the redundant source range detector signals are in separate conduits. However, because of its existing plant geometry inside containment, the routing does not meet the 20 foot separation criteria of Appendix R, item III G.2(d). The cable penetration area inside containment, where the redundant trains are within ≈ 2 feet (min.) of each other, is protected by a fixed suppression and detection system due to the heavy cable loading in this area. Given the protection of the conduit and the limited quantity of installed or transient combustibles in the area of the routing, this layout is considered equivalent protection to that required by Appendix R.

The Reactor Containment (RC-1) was previously evaluated and an exemption was granted based on equivalent level of protection to that required by Appendix R and documented in your letter of March 14, 1983. However, it did not specifically address the source range cable routing inside containment.

This exemption is predicated on equivalent level of protection to that required based on a fire hazards analysis and the information provided in this section.

B. Boundaries

The boundaries of the Reactor Containment (RC-1), El. 738'10" is depicted on Figure 11.16-1. The containment structure perimeter consists of a 10-ft concrete mat, with 4-ft 6-in thick reinforced concrete walls to the dome transition that is a minimum thickness of 2-ft 6-in of reinforced concrete. A continuous steel liner is provided on the entire interior for assuring leak tightness of the structure. This structural design constitutes a 3-hour rated fire barrier. The interior of the containment is considered as one fire area. The interior structural details will afford a degree of passive fire protection due to their size and placement.

The total volume of the reactor containment is 1.8×10^6 ft³.

C. Ventilation

The containment ventilation system, depicted on Figure 11.16-3, normally operates in a recirculation mode with the containment recirculation coils serviced with chilled water acting as the heat sink. The plant river water system acts as an emergency backup heat sink available under a loss of power condition.

D. Redundant Safe Shutdown Cables/Equipment Located in RC-1

The cabling and physical equipment that is potentially lost in the event of an exposure fire in RC-1 was previously documented in our Appendix R Submittal Report, Section 11.2. An exemption for RC-1 area was granted and documented in your letter of March 14, 1983 to DLC.

The cabling involved for the source range monitoring indication is not required for safe shutdown, but this capability outside the control room was required and documented in your letter of January 5, 1983 to DLC.

E. Fire Protection Existing in Source Range Conduit Path

1. Fire Detection Systems

- a. The Cable Penetration Area (El. 735') is designed with four photoelectric and four ionization smoke detectors, with Control Room annunciation.

2. Fire Extinguishing Systems Existing

- a. Cable Penetration Area-Open head deluge system
- b. Standpipe system at all elevations

Additional design information is available in our Appendix R Submittal, Chapter 3, Section 3.4.1.

3. Hose Stations/Extinguishers

Portable dry chemical fire extinguisher units are located throughout the area. Standpipe fire hose stations are located near columns 8, 11 & 14 for coverage of the source range cabling route. (Reference Figure 11.16-1).

4. Propagation Retardants

All cables installed at Beaver Valley Power Station Unit 1 were fabricated to pass the vertical cable tray flame test with an oil and burlap flame source which was the accepted industry standard during the construction of BV-1 and is comparable to IEEE-383 tests.

F. Fire Hazards Analysis

1. Type/Quantity of Combustibles in the RC-1 Source Range Cable Routing Area

- a) Cable Penetration Area
Cable Insulation/455 lbs.
- b) Source Range Cable Route (from penetration area back to detector wells of reactor vessel).
Cable Insulation/negligible (in Conduit)

2. Heat Release Potential

- a) Cable Penetration Area
Heat Load: 5.005×10^6 Btu
Area: 170 ft^2
Heat Release Potential: $30,820 \text{ Btu/ft}^2$
- b) Source Range Cable Route
Negligible (In Conduit)

Based on the heat release potential in the area, the required fire loading for this area is less than one hour.

G. Justification of Area Acceptability

This exemption request is predicated upon an equivalent level of protection to that required by Appendix R when the following points are considered:

- 1. Hazardous quantities of transient combustibles would not be expected in the Reactor Containment (RC-1) area for the following reasons:
 - a) The containment structure is considered an exclusion area while at power, and strictly controlled. During an outage the plant's security force controls personnel access and material control for the containment area.
 - b) Storage of transient combustibles in this area is prohibited by plant administrative procedures.

c) Solvents typically used at the plant do not have a flash point below their boiling point (inhibited solvents). This substantially mitigates the fire hazard potential of transient combustibles throughout the plant.

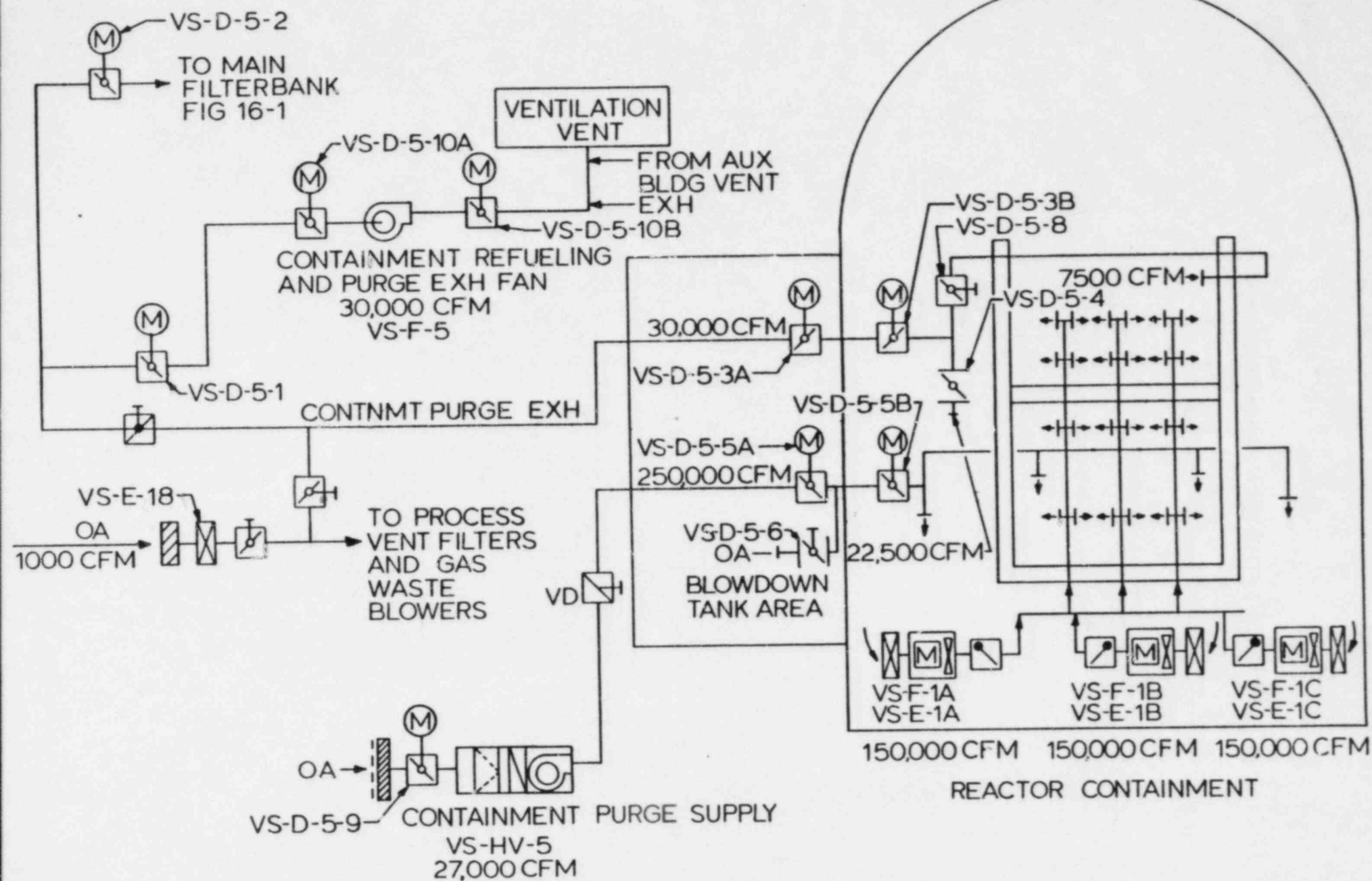
2. The principal fire hazard in RC-1, the reactor coolant pump lubricating oil, has been eliminated by the installation of an oil collection system.
3. The cable penetration area inside containment is protected by installed water suppression and detection systems, which would promptly detect and extinguish the fire in its incipient stage, thereby eliminating the potential for propagation or spread of the fire.

A Photograph of the Cable Penetration area in containment has been included to better illustrate the typical layout condition. (Figure 11.16-4)

4. All containment trays are of a covered design which will afford a significant level of fire propagation protection from an electrically induced cable fire.
5. All cables installed at Beaver Valley Power Station Unit 1 were fabricated to pass the vertical cable tray flame test with an oil and burlap flame source which was the accepted industry standard during the construction of BV-1 and is comparable to IEEE-383 tests.
6. Redundant cable penetrations enter the containment from the East and West Cable Vaults (CV-1 and CV-2) which are separated by a 3 hour fire-rated barrier (see Figure 11.16-1). This fire barrier, considered in conjunction with the flame-resistant, fire-retardant properties of the cable insulation and the suppression and detection systems within the areas, provides the required assurance that a cable fire associated with one train will not affect the redundant train on the opposite side of the barrier, thereby assuring separation between cable vaults.
7. All Source Range cabling inside containment has been run inside conduit which will afford a significant level of fire propagation protection from an electrically induced cable fire.

This exemption request is predicated upon an equivalent level of protection to that required based on the above considerations.





FIRE AREA RC-1 VENTILATION
FIG 11.16-3

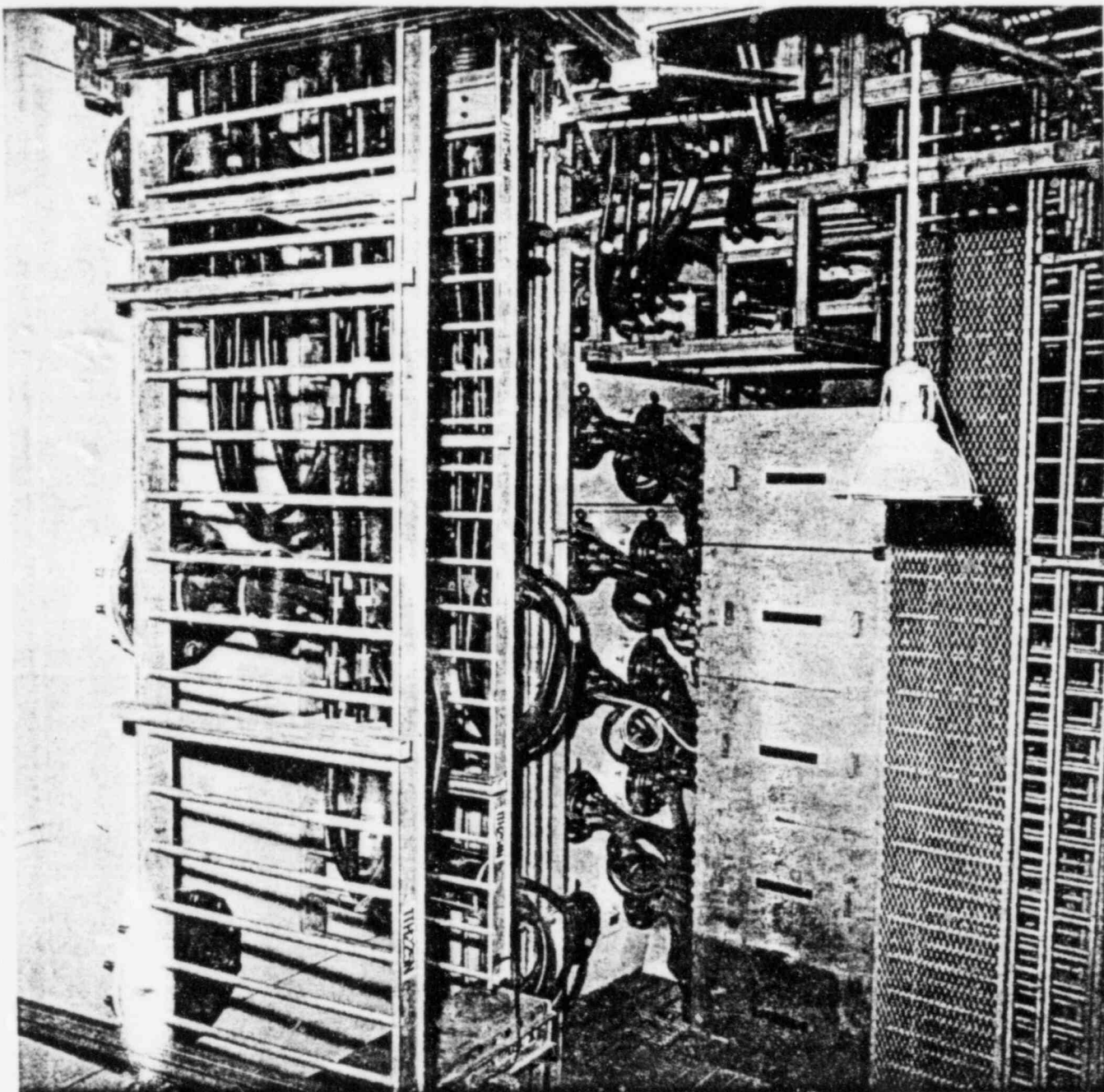


FIG 11.16-4

CABLE PENETRATIONS
LOOKING AT CONTAINMENT SIDE OF CABLE PENETRATIONS

738'6" REACTOR CONTAINMENT
BEAVER VALLEY POWER STATION UNIT NO. 1
RADIATION ZONE COLOR = BLUE

EXEMPTION

XI. Cable Spreading Room (CS-1) EL. 725'6"
(See Attached Figures 11.17-1 and 11.17-2)

A. Discussion

This area is located on the 725'6" elevation of the Service Building, one floor below the Control Room (CR-1) and one floor above the Communication Room (CR-3), the Process Instrument Room (CR-4), Motor Generator Room (MG-1), and the Emergency Switchgear Rooms (ES-1 and ES-2). The Cable Spreading area contains safety related redundant instrument, control, and power cables that are required for attaining safe shutdown. The area also contains nonsafety related instrument, control, and power cable.

The following redundant functions which could potentially be lost given a fire in this area and predicated upon the layout separation requirements of Appendix R:

- a. Containment Ventilation
- b. Emergency Diesel Generator Control and Protection Circuits.
- c. Emergency Diesel Generator Field Flashing
- d. Emergency Switchgear Ventilation

The circuits associated with a, b, and c above will be modified as described in Section 6.10 of our original Appendix R submittal report. A brief summary of each is noted below:

- 1. One containment recirculation fan power cable will be rerouted out of this area via a previously installed 3-hour fire rated electrical ductline. (See Section G of this attachment)
- 2. The control circuit will be modified to maintain the auto-start function by using interposing relays from a separately protected power supply.
- 3. One train of the field flashing leads will be rerouted out of this area (CS-1).
- 4. The Emergency Switchgear ventilation will be supplemented by auxiliary portable ventilation being provided under the modification described in Section 6.6 of our original Appendix R submittal report and approved via your letter dated March 14, 1983.

These modifications will obviate the potential loss of functions in this area and bring the plant design for this area into conformance with Appendix R, except for the 3 hour rated fire barrier boundary requirement of a fire area as interpreted by Generic Letter 83-33. The intent of the requirement to provide reasonable assurance that at least one safe shutdown division is free of fire damage after a postulated fire in this area (CS-1) is met by virtue of the modifications previously committed to and identified in our SER, and the rerouting of one train of redundant power and control cables required for safe shutdown in a separate 3 hour barrier envelope described in Section G of this exemption request.

The potential for a fire in this area to render all of the above cabling and equipment inoperable was previously identified in our Appendix R Fire Protection Review submittal report. Our proposal to make modifications to the #2 Diesel Generator control circuits and wiring and provide portable ventilation capability for key areas, thereby eliminating the possibility of a fire in CS-1 from jeopardizing the plant's ability to achieve safe shutdown, was approved and documented in your SER for BVPS Unit 1 dated January 5, 1983. However, since Appendix R requires the separation of redundant trains under consideration within the "fire zone boundaries" and the separation between fire zones to comply with 3-hour fire barrier, we request an exemption from III.G.2 for the Cable Spreading Room (CS-1) because this area does not have a 3-hour barrier envelope.

This exemption is predicated on equivalent level of protection to that required based on the information and considerations provided within this section.

B. Boundaries

The boundaries and wall construction of the Cable Spreading Room (CS-1) are depicted on Figures 11.17-1 and 11.17-2. The fire loading for the area was determined to be less than 1 1/2 hours. The existing walls, floor slab, ceiling, doors, etc. exceed with margin the fire loading of the area. The floor slab is 5 1/2" of reinforced concrete on 1 1/2" of corrugated metal decking (Ref. Figure 11.17-3), which constitutes a barrier of slightly greater than 1 1/2-hours, in accordance with the NFPA handbook.

1. Walls (Ref. Drawing 11700-RC-8A,-8B) Reinforced Concrete

a. North

The north wall faces the Normal Switchgear Room (NS-1), the Turbine Building (TB-1) and the Main Steam Pipe Chase and is divided into two sections of different thicknesses.

- 1) 2ft.0in. reinforced concrete at the sections which parallel NS-1 and the Pipe Chase.

- 2) 1ft.6in. reinforced concrete at the section which parallels TB-1.

b. South

The south wall faces the HVAC Equipment Room (CR-2), the Primary Auxiliary Building (PAB), Cable Vaults (CV-1 and CV-2) and is divided into two sections of different thicknesses.

- 1) 2ft.0in reinforced concrete at the sections which parallel PAB, CV-1, CV-2.
- 2) 1ft.0in. reinforced concrete at the section which parallels CR-2.

c. East

The east wall faces the HVAC Equipment Room (CR-2) and the Cable Tunnel (CV-3) and is divided into two sections of different thicknesses.

- 1) 2ft.3in. reinforced concrete at the section which parallels CV-3.
- 2) 1ft.0in. reinforced concrete at the section which parallels CR-2.

d. West

The west wall faces the Pipe Tunnel (PT-1).

2ft.0in. reinforced concrete at the section which parallels PT-1.

2. Ceiling (Ref. Drawing 11700-RC-8C,8F)

2ft.0in. reinforced concrete

3. Floor (Ref. Drawing 11700-RC-7G)

5 1/2" reinforced concrete on 1 1/2" corrugated metal decking. (See Figure 11.17-3)

4. Room Volume

121,250 cu. ft.

5. Fire Doors

The Cable Spreading area has four entrances. (Ref. Figure 11.17-1). The doors entering the East and West Cable Vaults (CV-1&2) are both 3 hour fire-rated doors. The West entrance door from the Normal Switchgear Room (NS-1) is a 3 hour fire-rated door. The East stairwell door is a 1 1/2 hour fire-rated door, which is consistent with all stairwell doors in the plant. This stairwell door in conjunction with the adjacent 1 1/2 hour fire rated stairwell doors on the upper and lower floors in the Service Building would prevent a fire from spreading to other fire areas by virtue of the 3 hour boundary fire barrier.

All penetrations to adjacent fire areas have been sealed with cellular concrete or silicone foam to achieve a fire rating equivalent to the barrier.

C. Ventilation

The ventilation supply and exhaust system for this area has branch ducts servicing ES-1, ES-2, MG-1 and NS-1. All areas are exhausted to an outdoor discharge. All branch ducts are provided with at least a 1 1/2-hour fire damper at the CS-1 perimeter penetration. Venting of any of the remaining areas could be accomplished by resetting the respective fire dampers, all of which are accessible from this area. The power and controls for this ventilation system are outside of the cable spreading area. (Ref. Figure 11.17-4 and 11.17-5).

D. Redundant Safe Shutdown Cables/Equipment Located in CS-1

Both Class 1E and non-Class 1E cable exist within this area. The only major equipment located in this area are the emergency powered redundant supply and exhaust fans for the Emergency Switchgear and Battery Rooms. Loss of ventilation to the Emergency Switchgear Rooms (ES-1 and -2) was previously evaluated and covered by providing portable ventilation fans which was approved in your letter of March 14, 1983.

E. Fire Protection Existing

1. Fire Detection Systems

Detection consists of area coverage by ionization type detectors provided with an alarmed display in the Control Room fire detection panel. This fire detection panel is powered from the normal system with automatic transfer to station emergency power on loss of primary power source. Activation of any ionization detector will cause all fire alarms throughout the plant to sound. A heat detection system is also located in the area for the auto actuation of the total flooding CO₂ system.

2. Fire Extinguishing System

The primary fire suppression system in CS-1 is an automatic or manual, double shot, total flooding, CO₂ system. This is in accordance with the fire insurance carrier recommendations originally established for the area.

The design of the total flooding CO₂ system conforms to the requirements of NFPA No. 12. The initial shot is actuated by a temperature detection system or can be actuated manually. The second shot is manual. Lockout switches as well as CO₂ pre-discharge alarm are provided for personnel protection. An alarmed FIRE display is provided in the control room. An alarmed TROUBLE light is provided in the control room for the area in case of loss of the electrical integrity in detector and release circuits or upon lockout of the system. An alarmed display for CO₂ DISCHARGE also exists in the control room for low level in the storage tank, high or low pressure in the storage tank, and compressor electric motor trip. These alarms enable the control room to be aware of the CO₂ system status and availability at all times, and provide required protection for inadvertent operation or rupture of the system. Mechanical pressure release devices activated by CO₂ pressure are provided to close dampers and doors to prevent escape of CO₂ from the fire area. The respective fans associated with this area are also automatically shut down on discharge of CO₂.

Fire hose racks installed at both stairwell entrances provide water coverage in the event of a deep-seated, localized, cable fire in the area. Portable CO₂ and dry chemical extinguishers are also available from nearby areas. (Ref. Figure 11.17-1 and 11.17-2).

3. Propagation Retardants

All cables installed at Beaver Valley Power Station Unit 1 were fabricated to pass the vertical cable tray flame test with an oil and burlap flame source which was the accepted industry standard during the construction of BV-1 and is comparable to IEEE-383 tests.

F. Fire Hazard Analysis

1. Type/Quantity of combustibles in CS-1 area.

Cable Insulation - 115,300 lbs.

2. Heat Release Potential

Heat Load	= 1.27×10^9 Btu
Area	=12,125 sq.ft.
Heat Release Potential	=104,600 Btu/sq.ft.

Based on the heat release potential, the required fire rating for this area is less than 1 1/2 hours.

G. Cables Rerouted in 3-Hour Barrier Envelope
(Ref. Figure 11.17-7)

Because of cable tray congestion in CS-1 area, a modification was made as part of the Appendix A to BTP ASB 9.5-1 review effort to ensure that the Station could be shutdown if a fire results in the total loss of the Cable Spreading Room (CS-1). The modification provided protection of one train of equipment required for safe shutdown by encasing certain redundant (purple) control and power cables through a 3-hour fire rated barrier (Ductline 997) located in CS-1. The rerouting of 18 control and 7 power cables to the Auxiliary Shutdown Panel was accomplished in 1981 during our second refueling outage. For details of the modification and the listing of cables rerouted through the ductline, see Figures 11.17-7 & 8.

H. Justification of Area Acceptability

1. The existing construction provides fire barriers in excess of the required ratings determined by the fire loading for this area.
2. The Control Room air conditioning ductwork penetrations for CS-1 area are provided with 3-hour fire rated dampers in the associated wall or floor penetrations (Ref. Figure 11.17-4 and 11.7-5), thereby providing a 3-hour boundary fire barrier between the CS-1 area and the vital Control Room ventilation system fire areas CR-1, CR-2, CR-3 and CR-4.
3. The circuit analysis presented in Figure 11.17-6 has identified the following redundant functions which could potentially be lost predicated upon the layout separation requirements of Appendix R:
 - a. Containment Ventilation
 - b. Emergency Diesel Generator Control and Protection Circuits
 - c. Emergency Diesel Generator Field Flashing

d. Emergency Switchgear Ventilation

The circuits associated with a,b and c above will be modified as described in Section 6.10 of our original Appendix R submittal report. A brief summary of each is noted below:

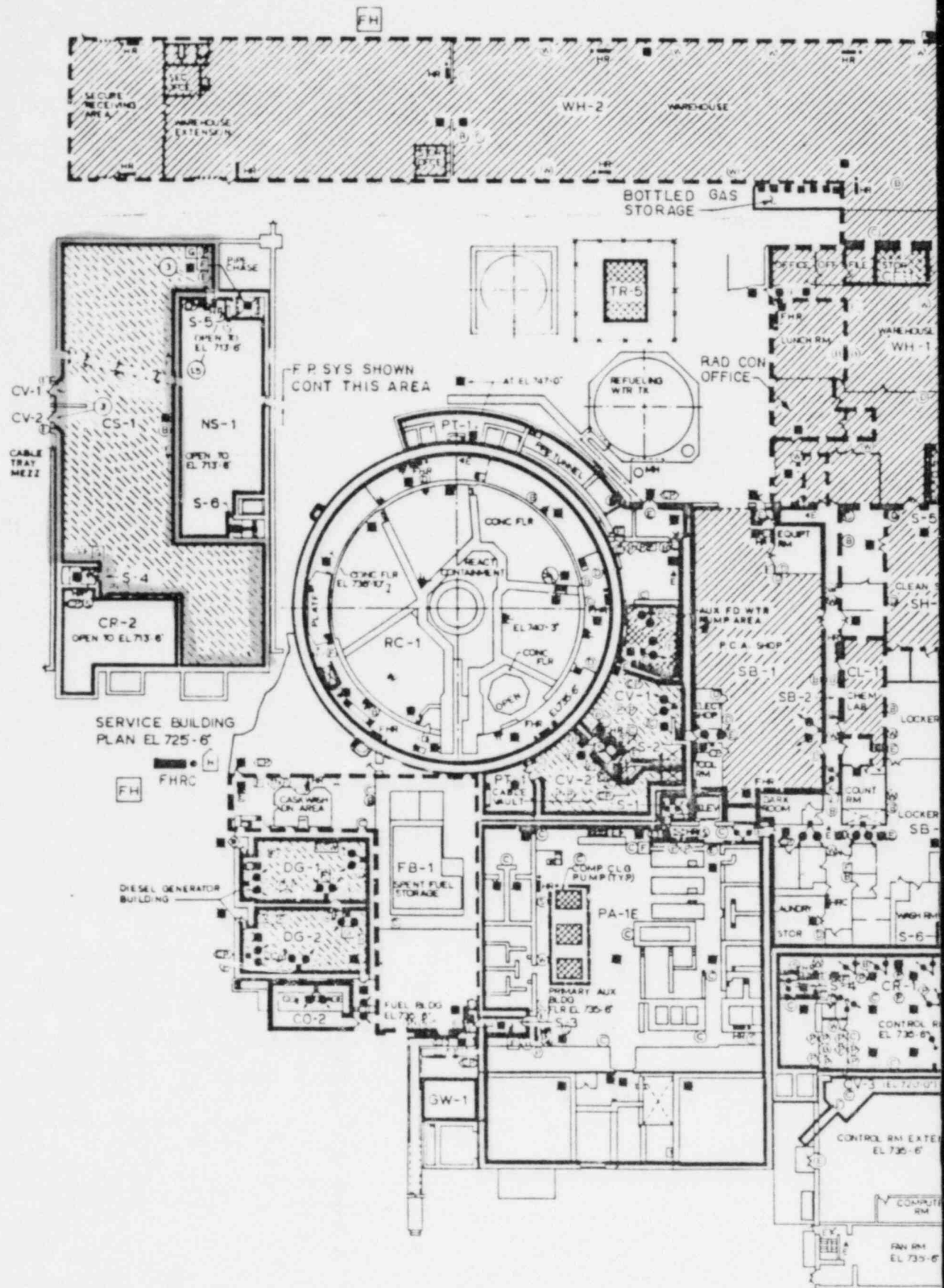
1. One containment recirculation fan power cable will be rerouted out of this area via a previously installed 3-hour fire rated electrical ductline.
2. The control circuit will be modified to maintain the auto-start function by using interposing relays from a separately protected power supply.
3. One train of the field flashing leads will be rerouted out of this area (CS-1).
4. The Emergency Switchgear ventilation will be supplemented by auxiliary portable ventilation being provided under the modification described in Section 6.6 of our original Appendix R submittal report and approved via your letter dated March 14, 1983.

These modifications will obviate the potential loss of functions in this area and bring the plant design for this area into conformance with Appendix R, except for the 1 1/2 hour-fire barrier floor and the 1 1/2 hour fire rated dampers in the area under consideration (CS-1).

4. Loss of ventilation to the Emergency Switchgear Rooms (ES-1 & ES-2) as a result of a fire in CS-1 will be covered by providing ventilation via portable gasoline-driven exhaust fans, when necessary, and included as part of the fire brigade inventory. This method of providing portable ventilation to these affected areas was previously approved in your letter of March 14, 1983.
5. Hazardous quantities of transient combustibles would not be expected in this area for the following reasons:
 - a) The area is not adjacent to or near any major plant traffic route.
 - b) Storage of transient combustibles in this area is prohibited by plant administrative procedures.
 - c) Maintenance and operations activities in this area do not involve the use of large quantities of combustible materials.
 - d) The accessibility to the Cable Spreading Room (CS-1) area is restricted due to the security system card-key access.

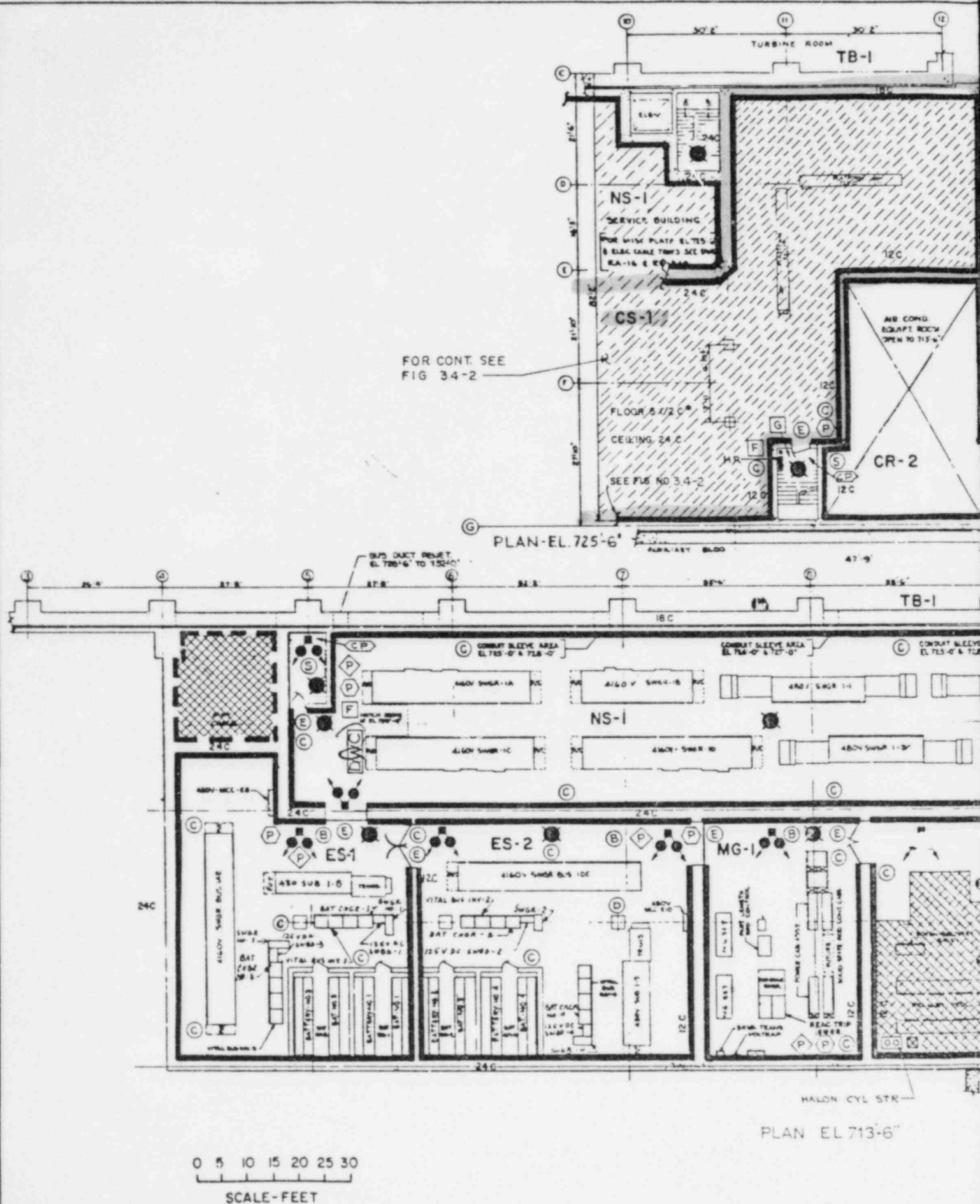
6. The installed early warning smoke detection system would promptly detect incipient fire conditions in this area until the fire brigade personnel, responding from the Control Room area one floor above the CS-1 area, respond to extinguish the fire via the southeast stairwell. The brigade should be capable of reaching this area within minutes after an alarm is received in the Control Room.

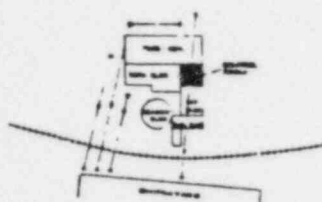
This exemption request is predicated upon an equivalent level of protection to that required based on the above considerations and modifications.



0 5 10 15 20
SCALE-Feet

PLAN EL 735'-6"





KEY PLAN



PRC APERTURE CARD

Also Available On
Aperture Card

SYMBOLS

- AREA SERVED BY CO₂ SYSTEM
- AREA SERVED BY WATER SPRAY (DEL'G)
- AREA SERVED BY HALON SYSTEM
- HALON ACTUATION PULL BOX
- PAX PHONE
- HOSE RACK
- DRY CHEM CAL WHEEL UNIT
- COMMAND POST
- H₂O FIRE EXT.
- STANDPIPE-HOSE RACK
- GAITRONICS PHONE
- CO₂ CONTROL/ALARM PANEL
- FIRE ALARM STATION
- EXIT SIGNS
- DRY CHEMICAL FIRE EXT.
- PORT. FIRE EXT. CO₂-20LBS
- FIRE ALARM BELL (APPROX. LOCATION)
- FIRE AREA
- FIRE ZONE
- FIRE BARRIER
- SUB-AREA
- FIRE DOOR RATINGS (HOURS)
- REINFORCED CONCRETE
- CONCRETE BLOCK WALL
- INSULATED METAL S/DING
- 125V DC BATTERY EMERGENCY LIGHT
- DC EMERGENCY BATTERY LIGHTING UNIT

* FLOOR SYSTEM IS 5 1/4" CONCRETE
(INC 1 1/4" CORRUGATED METAL DECKING)

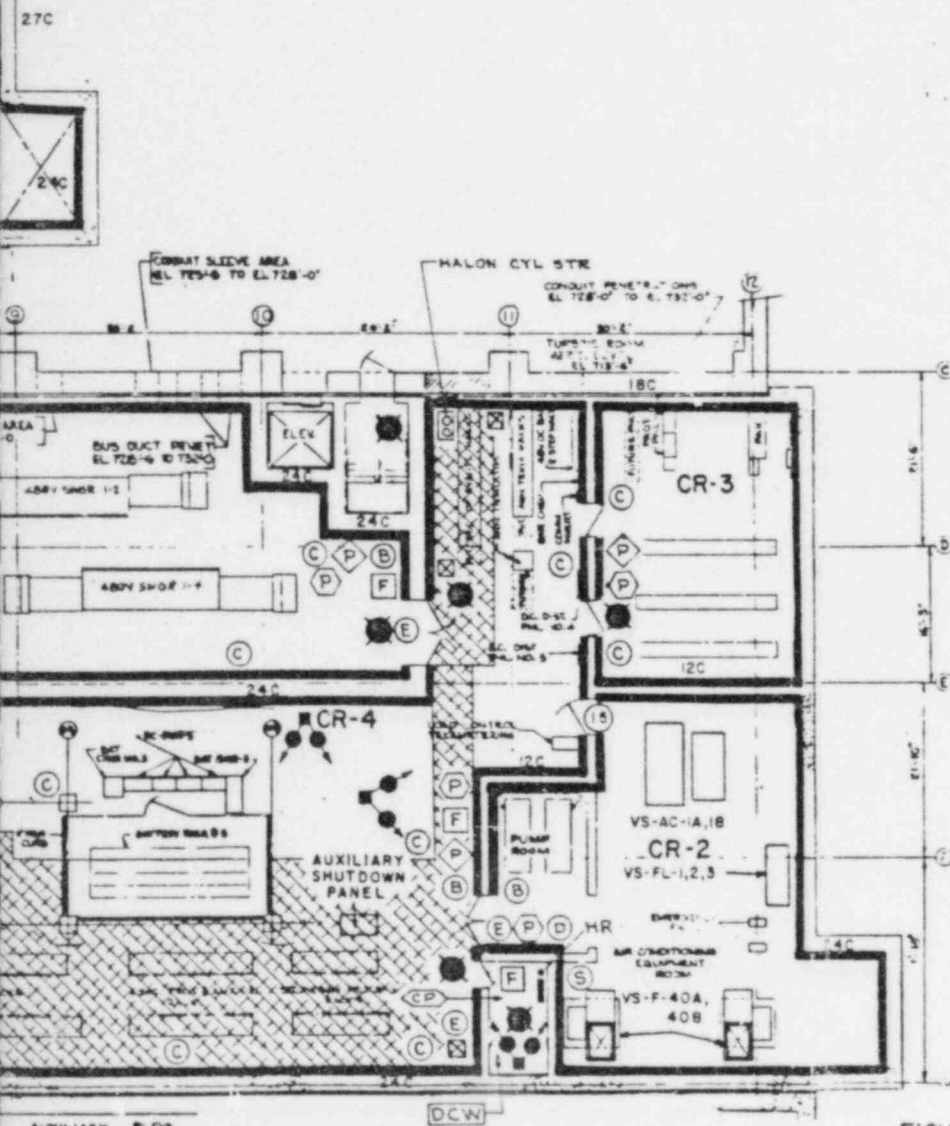


FIGURE 11.17-2
CONTROL ROOM, SWITCHGEAR
AND CABLE SPREADING AREA
BEAVER VALLEY POWER STATION - UNIT 1
FIRE HAZARDS ANALYSIS

REVISED 3/1/82

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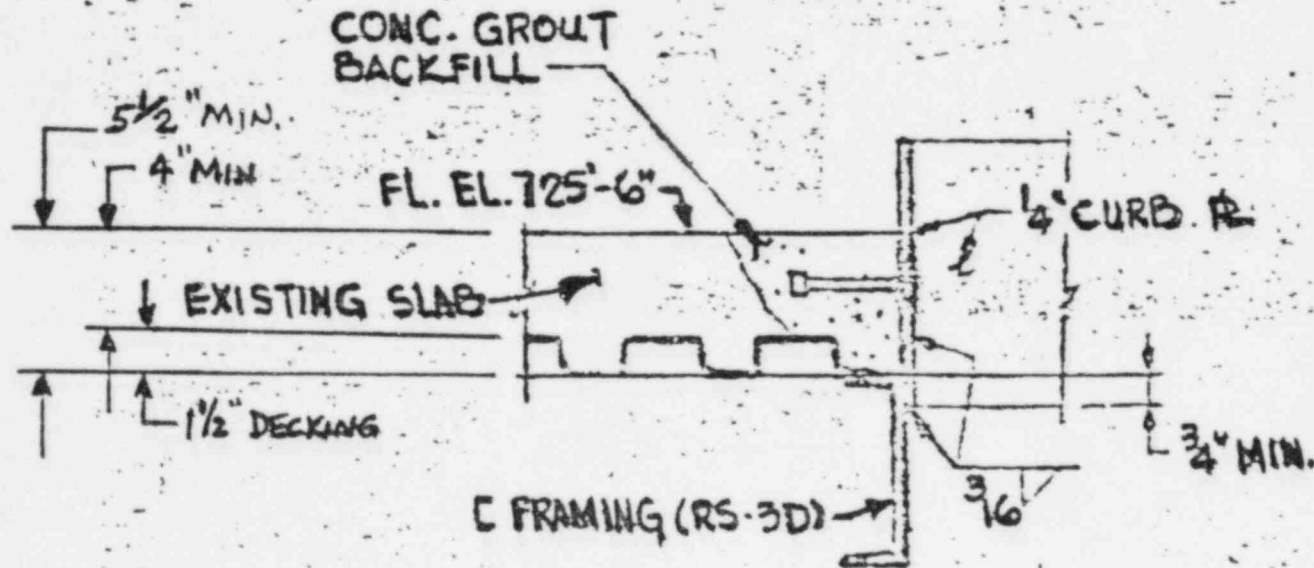
PLAN - EL. 725'-6"

SLAB THICKNESS $5\frac{1}{2}"$ OVERALL UNLESS NOTED
LIVE LOAD 40 P.S.F.

MAIN REINF. TO BE #4 @ 12" T. & B. IN N-S
DIRECTION. CONT. CUT & BEND AS REQ'D. (TYP. FOR $5\frac{1}{2}"$ SLAB)

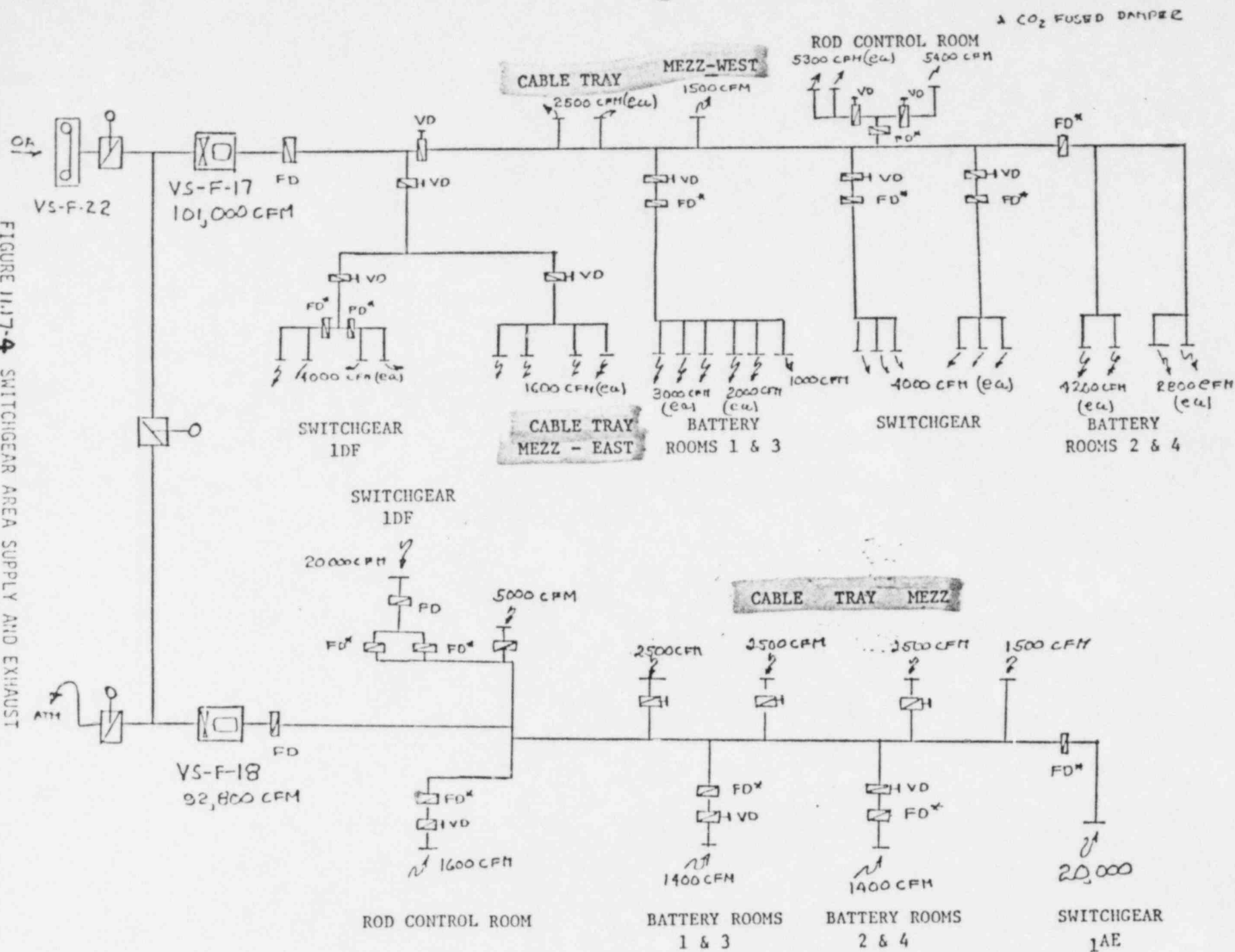
SECONDARY REINF. AT RIGHT ANGLE TO
MAIN REINF. SHALL BE #4 @ 18" T. & B.
CONT. CUT & BEND AS REQ'D (TYP. FOR $5\frac{1}{2}"$ SLAB)
SLAB SHALL HAVE MONOLITHIC FLOOR FINISH.

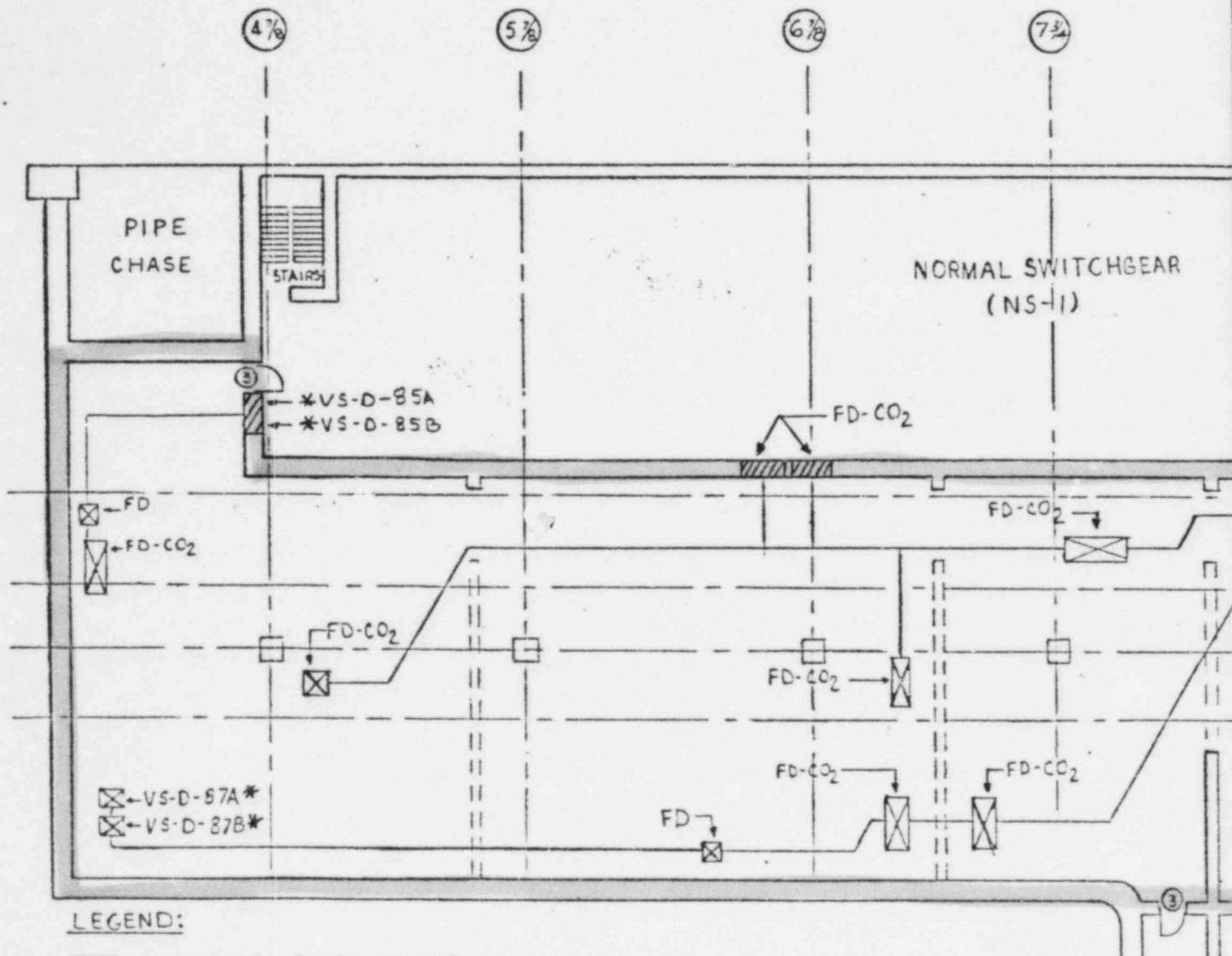
* FLOOR SYSTEM IS $5\frac{1}{2}"$ CONCRETE
(INC. $1\frac{1}{2}"$ CORRUGATED METAL DECKING)



CABLE SPREADING AREA FLOOR
(CS-1) FIGURE 11.17-3

FIGURE 11.17-4 SWITCHGEAR AREA SUPPLY AND EXHAUST





LEGEND:

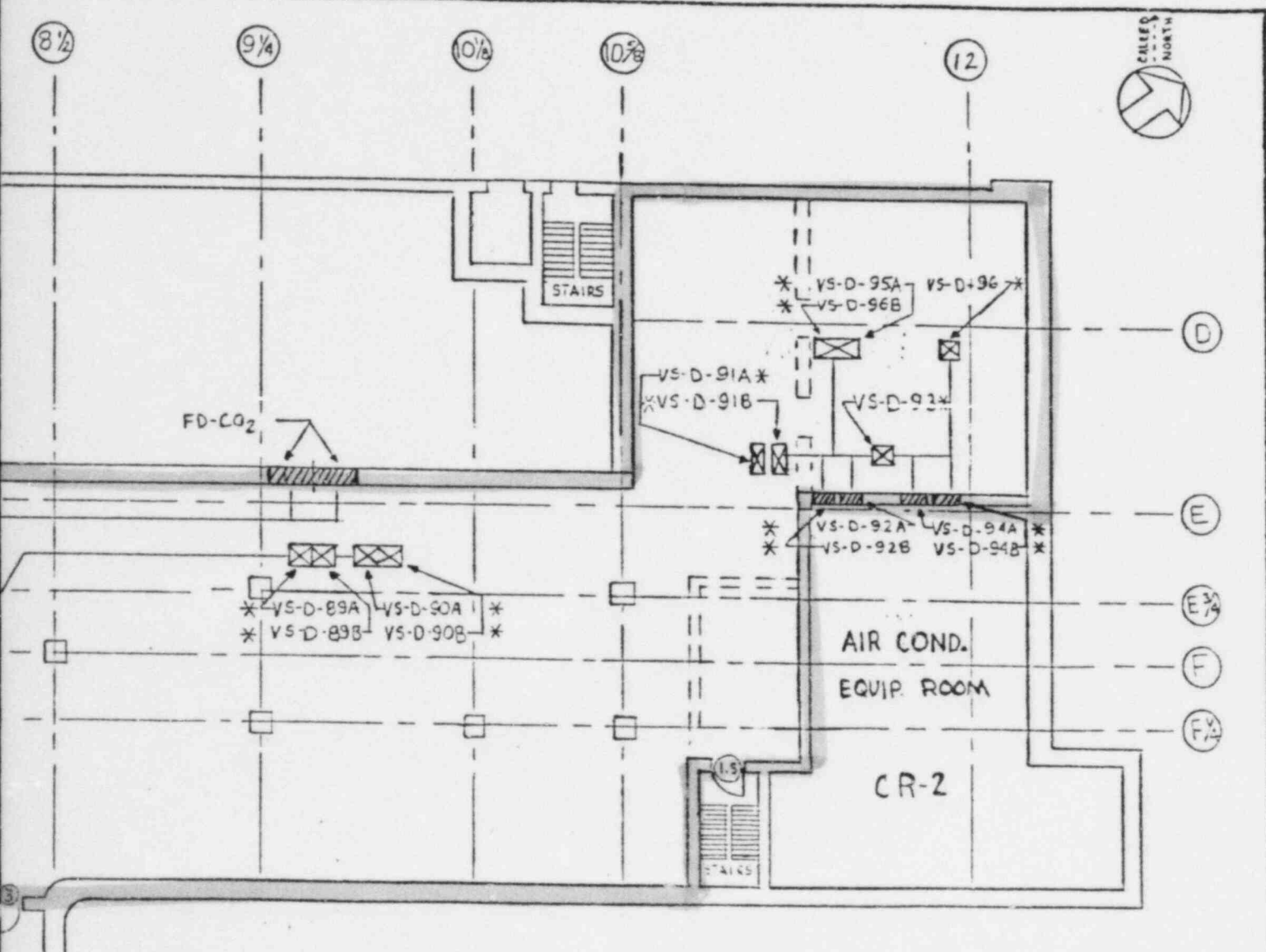
☒ FIRE DMP - THRU FLOOR

▨ FIRE DMP - THRU WALL

* 3 HR. RATED DMP

(ALL OTHER DMP RATED 1 1/2 HRS)

PRC APERTURE CARD



CABLE SPREADING ROOM (CS-1)

FIGURE 11.17-5

Also Available On
Aperture Card

Figure 11.17-6
CABLE SPREADING AREA
FIRE AREA CS-1

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
POWER	CH-P-1A CHARGING PUMP	CH-P-1B	YES	NO	YES	CHAPTER 7	YES
	CH-P-1C CHARGING PUMP	CH-P-1B	YES	NO	YES	CHAPTER 7	YES
	DC-SWBD-1 DC SWITCHBOARD	NOTE 1	N/A	N/A	YES	-	NO
	DC-SWBD-2 DC SWITCHBOARD	NOTE 1	N/A	N/A	YES	-	NO
	DC-SWBD-3 DC SWITCHBOARD	NOTE 1	N/A	N/A	YES	-	NO
	DC-SWBD-4 DC SWITCHBOARD	NOTE 1	N/A	N/A	YES	-	NO
	EE-EG-1 (FEED) EMERGENCY GENERATOR	EE-EG-2 (FEED)	YES	NO	YES	-	NO
	EE-EG-1 (FIELD) EMERGENCY GENERATOR	NONE	N/A	N/A	NO	CHAPTER 5 SECT 6.7	N/A
	EE-EG-2 (FIELD) EMERGENCY GENERATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.7	N/A
	FW-P-3A AUXILIARY FEED PUMP	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A
	FW-P-3B AUXILIARY FEED PUMP	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A

NOTES FOR FIRE AREA CS-1:

1. THIS DISTRIBUTION SYSTEM IS NOT LOST DUE TO A FIRE IN THIS AREA, ONLY SUB-FEEDS INCLUDED TO PROVE COORDINATION.
2. THIS FUNCTION IS NOT REQUIRED FOR SHUTDOWN, ONLY TO ENSURE CIRCUIT BREAKER COORDINATION.
3. THERE ARE POWER CABLES FOR WR-P-1A IN THE CS-1 AREA. THIS DEVIATES FROM THE INFORMATION IN THE FIRE STUDY REPORTS, BUT WAS SHOWN TO BE CORRECT BY PLANT INSPECTION.

FIGURE 11.17-6
CABLE SPREADING AREA
FIRE AREA CS-1

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
POWER (CONT'D)	MCC-1-E1 MOTOR CONTROL CENTER	MCC-1-E2	YES	N/A	YES	-	NO
	MCC-1-E3 MOTOR CONTROL CENTER	NOTE 2	N/A	N/A	YES	-	N/A
	MCC-1-E4 MOTOR CONTROL CENTER	NOTE 2	N/A	N/A	YES	-	N/A
	MCC-1-E5 MOTOR CONTROL CENTER	NOTE 2	N/A	N/A	YES	-	N/A
	MCC-1-E7 MOTOR CONTROL CENTER	MCC-1-E8	YES	N/A	YES	-	NO
	MCC-1-E11 MOTOR CONTROL CENTER	NOTE 2	N/A	N/A	YES	-	N/A
	PNL-VB-1 VITAL BUS PANEL	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PNL-VB-2 VITAL BUS PANEL	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PNL-VB-3 VITAL BUS PANEL	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PNL-VB-4 VITAL BUS PANEL	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PZR-HTR-A PRESSURIZER HEATER	PZR-HTR-B	YES	NO	YES	CHAPTER 7	YES
	PZR-HTR-D PRESSURIZER HEATER	PZR-HTR-B	YES	NO	YES	CHAPTER 7	YES
	PZR-HTR-E PRESSURIZER HEATER	PZR-HTR-B	YES	NO	YES	CHAPTER 7	YES
	RH-P-1A RESIDUAL HEAT REMOVAL PUMP	RH-P-1B	YES	NO	YES	CHAPTER 7	YES

CIRCUIT ANALYSIS SHEET

FIGURE 11.17-6
CABLE SPREADING AREA
FIRE AREA CS-1

CABLE FAILURE TYPE	EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
POWER (CONT'D)	VS-F-1A CONTAINMENT RECIRC. FAN	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	VS-F-1B CONTAINMENT RECIRC. FAN	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	VS-F-1C CONTAINMENT RECIRC. FAN	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	VS-F-16A EMER. SWITCHGEAR FAN	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.6	N/A
	VS-F-16B EMER. SWITCHGEAR FAN	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.6	N/A
	VS-F-55A EMER. SWITCHGEAR FAN	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.6	N/A
	VS-F-55B EMER. SWITCHGEAR FAN	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.6	N/A
CONTROL AND INSTRUMENT	WR-P-1A - NOTE 3 RIVER WATER PUMP	WR-P-1B	YES	NO	YES	CHAPTER 7	N/A
	CH-P-1B CHARGING PUMP	CH-P-1B	YES	NO	YES	CHAPTER 7	YES
	CH-P-2A BORIC ACID TRANSFER PUMP	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	CH-P-2B BORIC ACID TRANSFER PUMP	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	EE-EG-1 (ENG) EMERGENCY GENERATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	EE-EG-1 (PROT) EMERGENCY GENERATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A

FIGURE 11.17-6
CABLE SPREADING AREA
FIRE AREA CS-1

CIRCUIT ANALYSIS SHEET

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	EE-EG-1 (TR-PP) EMERGENCY GENERATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	EE-EG-1 (VREG) EMERGENCY GENERATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	EE-EG-2 (ENG) EMERGENCY GENERATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	EE-EG-2 (PROT) EMERGENCY GENERATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	EE-EG-2 (TR-PP) EMERGENCY GENERATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	EE-EG-2 (VREG) EMERGENCY GENERATOR	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	FCV-CH122 CHARGING FLOW CONTROL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	LCV-CH460A & B PRESSURIZER LEVEL CONTROL VALVES	NONE	N/A	N/A	YES	CHAPTER 7&8	YES
	LT-FW474, 84, 94 STEAM GENERATOR 1A, 1B, AND 1C NR LEVEL TRANSMITTERS	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	LT-FW475, 85, 95 STEAM GENERATOR 1A, 1B, AND 1C NR LEVEL TRANSMITTERS	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	LT-FW476, 86, 96 STEAM GENERATOR 1A, 1B, AND 1C NR LEVEL TRANSMITTERS	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A

FIGURE 11.17-6
CABLE SPREADING AREA
FIRE AREA CS-1

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	LT-FW477 STEAM GENERATOR 1A WR LEVEL TRANSMITTERS	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	LT-FW487 STEAM GENERATORS LEVEL TRANSMITTERS	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	LT-FW497 STEAM GENERATOR 1C WR LEVEL TRANSMITTERS	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	LT-RC459 PRESSURIZER LEVEL TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	LT-RC460 PRESSURIZER LEVEL TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	MCC-1-E2 MOTOR CONTROL CENTER	NOTE 2	N/A	N/A	YES	-	N/A
	MCC-1-E6 MOTOR CONTROL CENTER	NOTE 2	N/A	N/A	YES	-	N/A
	MCC-1-E10 MOTOR CONTROL CENTER	NOTE 2	N/A	N/A	YES	-	N/A
	MCC-1-E12 MOTOR CONTROL CENTER	NOTE 2	N/A	N/A	YES	-	N/A
	MOV-CH115B REFUELING WATER STORAGE TANK CHARGING PUMP ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A

CIRCUIT ANALYSIS SHEET

FIGURE 11.17-6
CABLE SPREADING AREA
FIRE AREA CS-1

CIRCUIT ANALYSIS SHEET

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION		APPENDIX "R" COMPLIANCE	REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT			
CONTROL AND INSTRUMENT (CONT'D)	MOV-CH115D REFUELING WATER STORAGE TANK CHARGING PUMP ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-CH289 REGENATIVE HEAT EXCHANGER CHARGING LINE ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-CH310 REGENATIVE HEAT EXCHANGER CHARGING LINE ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-CH378 REACTOR COOLANT PUMP SEAL WATER RETURN VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-CH381 REACTOR COOLANT PUMP SEAL WATER RETURN VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-FW151A STM GEN AUX FEED PUMP ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A
	MOV-FW151B STM GEN AUX FEED PUMP ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A
	MOV-FW151C STM GEN AUX FEED PUMP ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A

FIGURE 11.17-6
CABLE SPREADING AREA
FIRE AREA CS-1

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	MOV-FW151D STM GEN AUX FEED PUMP ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A
	MOV-FW151E STM GEN AUX FEED PUMP ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A
	MOV-FW151F STM GEN AUX FEED PUMP ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A
	MOV-RC535 PRESSURIZER RELIEF BLOCK VALVE	NONE	N/A	N/A	YES	CHAPTER 7	NO
	MOV-RC536 PRESSURIZER RELIEF BLOCK VALVE	NONE	N/A	N/A	YES	CHAPTER 7	NO
	MOV-RC537 PRESSURIZER RELIEF BLOCK VALVE	NONE	N/A	N/A	YES	CHAPTER 7	NO
	MOV-RW102A1 RIVER WATER PUMP 1A DISCHARGE VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW102A2 RIVER WATER PUMP 1A DISCHARGE VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW102B1 RIVER WATER PUMP 1B DISCHARGE VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A

CIRCUIT ANALYSIS SHEET

FIGURE 11.17-6
CABLE SPREADING AREA
FIRE AREA CS-1

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION		APPENDIX "R" COMPLIANCE	REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT			
CONTROL AND INSTRUMENT (CONT'D)	MOV-RW102B2 RIVER WATER PUMP 1B DISCHARGE VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW102C1 RIVER WATER PUMP 1C DISCHARGE VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW102C2 RIVER WATER PUMP 1C DISCHARGE VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW103A RIVER WATER SUPPLY ISOL VALVE CONT RECIRC	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW103B RIVER WATER SUPPLY ISOL VALVE CONT RECIRC	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW106A PRIMARY COMPONENT COOLING WATER HEAT EXCHANGER INLET VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW106B PRIMARY COMPONENT COOLING WATER HEAT EXCHANGER INLET VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW113A DIESEL GENERATOR HEAT EXCHANGER 1B INLET ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	MOV-RW113B DIESEL GENERATOR HEAT EXCHANGER 1A INLET ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A

CIRCUIT ANALYSIS SHEET

FIGURE 11.17-6
CABLE SPREADING AREA
FIRE AREA CS-1

CABLE FAILURE TYPE	EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	MOV-RW113C DIESEL GENERATOR HEAT EXCHANGER 1B INLET ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	MOV-RW113D DIESEL GENERATOR HEAT EXCHANGER 1A INLET ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.10	N/A
	MOV-RW114A PRIMARY COMPONENT COOLING WATER SERIES ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW114B PRIMARY COMPONENT COOLING WATER SERIES ISOL VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW116 RIVER WATER SUPPLY VALVE CONT AIR COOLERS	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-RW117 RIVER WATER SUPPLY VALVE CONT AIR COOLERS	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-S1867A BIT TANK INLET ISOLATION VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-S1867B BIT TANK INLET ISOLATION VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	MOV-S1867C BIT TANK OUTLET ISOLATION VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	MOV-S1867D BIT TANK OUTLET ISOLATION VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	PCV-MS101A STM GEN 1A ATMOSPHERIC STEAM DUMP PRESSURE CONTROL VALVE	SV-MS101A	N/A	N/A	YES	-	N/A
	PCV-MS101B&C STM GEN 1B&1C ATMOSPHERIC STEAM DUMP PRESSURE CONTROL VALVE	SV-MS101B SV-MS101C	N/A	N/A	YES	-	N/A
	PCV-RC455C PRESSURIZER POWER RELIEF VALVES	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	PCV-RC455D & 456 PRESSURIZER POWER RELIEF VALVES	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	PT-MS474, 84, 94 STEAM GENERATOR 1A, 1B, AND 1C PRESSURE TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PT-MS475, 85, 95 STEAM GENERATOR 1A, 1B, AND 1C PRESSURE TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PT-MS476, 86, 96 STEAM GENERATOR 1A, 1B, AND 1C PRESSURE TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PT-RC402 PRESSURE TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A

FIGURE 11.17-6
CABLE SPREADING AREA
FIRE AREA CS-1

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	PT-RC403 PRESSURE TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PT-RC444 PRESSURIZER PRESSURE TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PT-RC455 PRESSURIZER PRESSURE TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PT-RC456 PRESSURIZER PRESSURE TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PT-RC457 & LT-461 PRESSURIZER PRESSURE AND LEVEL TRANSMITTER	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	PZR-HTR-B PRESSURIZER HEATER	PZR-HTR-B	YES	NO	YES	CHAPTER 7	YES
	RH-P-1B RESIDUAL HEAT REMOVAL PUMP	RH-P-1B	YES	NO	YES	CHAPTER 7	YES
	TRB & TI-RC410 REACTOR COOLANT COLD LEG NO 1 TEMP RESISTANT BULB AND INDICATION	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	TRB & TI-RC413 REACTOR COOLANT HOT LEG NO 1 TEMP RESISTANT BULB AND INDICATION	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	TRB & TI-RC420 REACTOR COOLANT COLD LEG NO 2 TEMP RESISTANT BULB AND INDICATION	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A

CIRCUIT ANALYSIS SHEET

FIGURE 11.17-6
CABLE SPREADING AREA
FIRE AREA CS-1

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	TRB & TI-RC423 REACTOR COOLANT HOT LEG NO 2 TEMP RESISTANT BULB AND INDICATION	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	TRB & TI-RC430 REACTOR COOLANT COLD LEG NO 3 TEMP RESISTANT BULB AND INDICATION	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	TRB & TI-RC433 REACTOR COOLANT HOT LEG NO. 3 TEMP RESISTANT BULB AND INDICATION	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.11	N/A
	TV-CC110A CONTAINMENT RECIRCULATION AIR COOLER ISOLATION VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	TV-CC110B CONTAINMENT RECIRCULATION AIR COOLER ISOLATION VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	TV-CC110C CONTAINMENT RECIRCULATION AIR COOLER ISOLATION VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	TV-CC110D & E3 CONTAINMENT RECIRCULATION AIR COOLER ISOLATION VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A

CIRCUIT ANALYSIS SHEET

FIGURE 11.17-6
CABLE SPREADING AREA
FIRE AREA CS-1

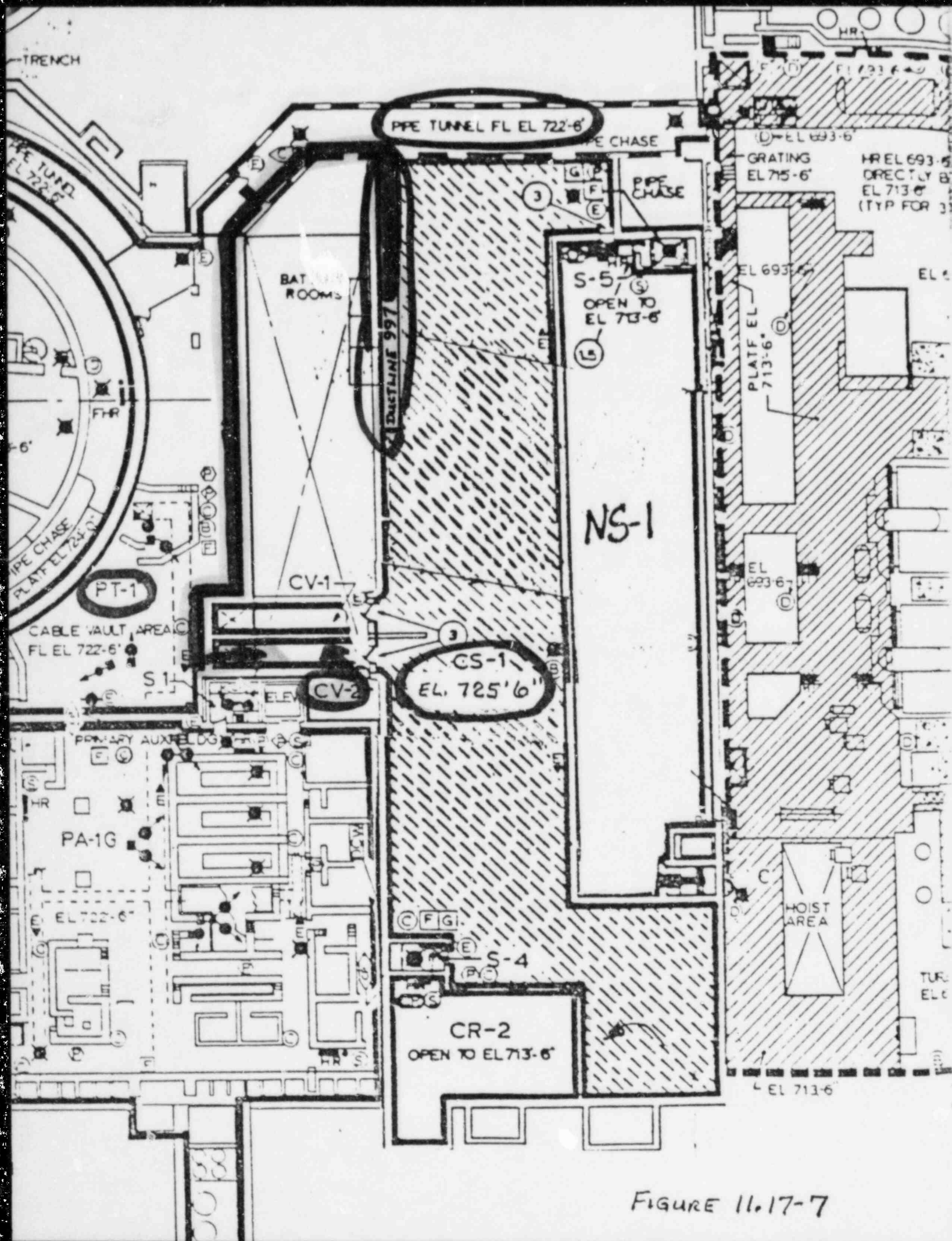
CABLE FAILURE TYPE	EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	TV-CC110E2&F2 CONTAINMENT RECIRCULATION AIR COOLER ISOLATION VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	TV-CC110F1 CONTAINMENT RECIRCULATION AIR COOLER ISOLATION VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	TV-CH200A, B, C REGENATIVE HEAT EXCHANGER DISCHARGE ISOLATION VALVES	NONE	N/A	N/A	YES	CHAPTER 7&8	YES
	TV-CH204 LETDOWN LINE ISOLATION VALVE	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	TV-MS105A AUX FEED PUMP STEAM SUPPLY ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A
	TV-MS105B AUX FEED PUMP STEAM SUPPLY ISOL VALVE	NONE	N/A	N/A	NO	CHAPTER 6 SECT 6.2	N/A
	VS-F-22A DIESEL GENERATOR BUILDING EXHAUST FAN	NONE	N/A	N/A	YES	CHAPTER 7	N/A
	VS-F-22B DIESEL GENERATOR BUILDING EXHAUST FAN	NONE	N/A	N/A	YES	CHAPTER 7	N/A

CIRCUIT ANALYSIS SHEET

FIGURE 11.17-6
CABLE SPREADING AREA
FIRE AREA CS-1

TYPE	CABLE FAILURE EQUIPMENT LOST	EQUIPMENT	REDUNDANT FUNCTION			REMARKS OR REFERENCE	SPURIOUS OPERATION
			CABLES AVAILABLE POWER	CONTROL AND INSTRUMENT	APPENDIX "R" COMPLIANCE		
CONTROL AND INSTRUMENT (CONT'D)	WR-P-1B RIVER WATER PUMP	WR-P-1A	YES	NO	YES	CHAPTER 7	YES
	WR-P-1C RIVER WATER PUMP	WR-P-1B	YES	NO	YES	CHAPTER 7	YES
	WR-P-9A AUX RIVER WATER PUMP	WR-P-1B	YES	NO	YES	CHAPTER 7	YES
	WR-P-9B AUX RIVER WATER PUMP	WR-P-1B	YES	NO	YES	CHAPTER 7	YES

CIRCUIT ANALYSIS SHEET



REROUTED CABLES

CONTROL CABLES	DESCRIPTION		
	FROM	TO	FUNCTION
1CCPBPC303	4VVS-1DF	PNL-Shutdown	Component Cooling Pump - 1B
1CHBBPC006	PNL-Relay 34	PNL-Shutdown	Charging Pump - 2B
1CHSPBC301	4KVS-1DF	PNL-Shutdown	Charging Pump - 1B
1EGPBNC458	4KVS-1DF	PNL-Shutdown	Read Voltage for 4KVS-1DF
1FWEAPC009	PNL-Relay 32	MCC-1-E6	Motor Operated Valve-FW151A
1FWEAPC014	PNL-Relay 32	PNL-Shutdown	Motor Operated Valve-FW151A
1FWEBPC302	4KVS-1DF	PNL-Shutdown	Feedwater Pump - 3B
1FWEBPC615	PNL-Relay 32	PNL-Shutdown	Shutdown Transfer Switch MOV-FW151A, C, E
1FWEBPC616	DC-SWBD-2	PNL-Relay 32	DC-Switchboard - 2
1FWEBPK616	DC-SWBD-2	DC2-BKR-Box	DC-Switchboard - 2
1FWEPC009	PNL-Relay 32	MCC-1-E6	Motor Operated Valve-FW-151C
1FWEPC014	PNL-Relay 32	PNL-Shutdown	Motor Operated Valve-FW-151C
1FWEPC009	PNL-Relay 32	MCC-1-E6	Motor Operated Valve-FW-151E
1FWEPC014	PNL-Relay 32	PNL-Shutdown	Motor Operated Valve-FW-151E
1FWSBNX035	PNL-Shutdown	TB-718	Level Transmitter-FW487
1RCBPBC205	PNL-Relay 34	PNL-Shutdown	Pressurizer Heater-B Bank
1RHSBPC302	4KVS-1DF	PNL-Shutdown	Residual Heat Removal Pump - 1B
1SWSBPC301	4KVS-1DF	PNL-Shutdown	River Water Pump - 1B

POWER CABLES	DESCRIPTION		
	FROM	TO	FUNCTION
1CCPBPH301	4KVS-1DF	SPL2	Component Cooling Pump - 1B
1CHSBPH301	4KVS-1DF	SPL3	Charging Pump - 1B
1EHSBPL211	480VUS-1-9	MCC-1-E6	Motor Control Center - E6
1EHSBPL226	480VUS-1-9	MCC-1-E12	Motor Control Center - E12
1FWEBPH301	4KVS-1DF	FW-P-3B	Feedwater Pump - 3B
1RCBPPL205	480VUS-1-9	PNL-PR-HTR	Pressurizer Heater - B Bank
1RHSBPH302	4KVS-1DF	SPL1	Residual Heat Removal Pump - 1B

Figure 11.17-8