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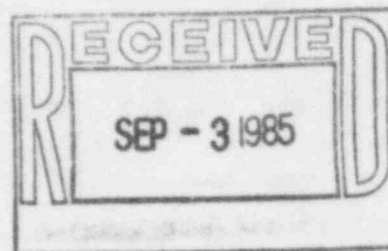
August 30, 1985  
Fort St. Vrain  
Unit No. 1  
P-85301

Public Service  
Company of Colorado  
P.O. Box 840  
Denver, CO 80201-0840

OSCAR R. LEE  
VICE PRESIDENT

Regional Administrator  
Region IV  
U. S. Nuclear Regulatory Commission  
611 Ryan Plaza Drive, Suite 1000  
Arlington, Texas 76011

Attn: Mr. E. H. Johnson



Docket No. 50-267

SUBJECT: 10CFR50, Appendix R Fire  
Protection Evaluation

- REFERENCES:
- 1) PSC Letter, Lee to Johnson,  
dated August 17, 1984  
(P-84281)
  - 2) PSC Letter, Lee to Johnson,  
dated November 16, 1984  
(P-84493), Report No. 1
  - 3) PSC Letter, Lee to Johnson,  
dated December 17, 1984  
(P-84526), Report No. 2
  - 4) PSC Letter, Lee to Johnson,  
dated January 17, 1985  
(P-85010), Report No. 3
  - 5) PSC Letter, Lee to Johnson,  
dated February 4, 1985  
(P-85048)
  - 6) NRC Meeting Summary, from  
Wagner, dated February 8, 1985  
(G-85048)
  - 7) PSC Letter, Lee to Johnson,  
dated April 1, 1985  
(P-85113), Report No. 4
  - 8) PSC Letter, Lee to Johnson,  
dated May 31, 1985  
(P-85187), Report No. 5
  - 9) NRC Letter, Hunter to Lee,  
dated August 2, 1985  
(G-85314)

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Dear Mr. Johnson:

This letter is intended to provide the necessary information to resolve staff questions or concerns identified in the review of Report Numbers 1 through 4 for the Fort St. Vrain Appendix R Evaluation and Report No. 5 for the Branch Technical Position 9.5-1, Appendix A Evaluation of Building 10. Also included is the response to Reference 9. In addition, there are 20 copies of page changes for Reports 1 through 5 which incorporate information related to the following resolutions, and to correct errors that have been identified. Please arrange to have the revised pages inserted into the 20 reports forwarded by each of those referenced letters.

1. Access Control Bay Fire Detection - Mr. Dennis Kubicki indicated that page 3-8 of Report Number 4 was not clear as to whether fire detection will be provided at elevation 4846'-6" of the Access Control Bay. Section 4.5 (Page 4-3) of Report No. 4 notes that fire detection will be provided in the Reactor Plant Exhaust Fan Room at elevation 4846'-6" of the Access Control Bay. A revised page 3-8 has been prepared and is attached to clarify that fire detection will be provided at this location.
2. Building 10 Structural Steel - Mr. Kubicki indicated that he had a concern relative to unprotected structural steel in Building 10 areas that did not have automatic fire suppression system coverage. All of these areas were identified and analyzed with respect to fire loading and building design features. We generally concluded that none of the structural steel in question required fire proofing because of the very low fire loading in place. This issue is discussed in detail on new Report No. 5 pages 3-15 through 3-17, which are attached.
3. Reactor Building Exhaust Fans - Mr. Kubicki requested information to demonstrate that a recirculation fan and chiller unit will provide adequate cooling within the Reactor Building in lieu of a Reactor Building exhaust fan. It should be noted that the recirculation fan and chiller units are the normal means for removing heat from the Reactor Building. The exhaust only mode of ventilation would rely on outside air entering the Reactor Building through the ventilation intake to provide mixing with room air; hotter air from the Reactor Building would be exhausted through the exhaust fans. A recirculation fan, with chiller unit, is approximately the same air flow capacity as a Reactor Building exhaust fan, but with the capability to supply cooler air than outside air through use of the

chiller unit. Accordingly, a recirculation fan and chiller unit provides greater cooling capacity than a Reactor Building exhaust fan. A page change to Page 3-13 of Report No. 4, is attached.

4. Hand-Held Lights - Mr. Kubicki indicated that he had a concern relative to the use of portable hand-held lights for access to outbuildings. The use that is proposed is similar to situations at other plants where exemptions were granted for the use of portable hand-held lights to traverse open yard areas (reference Oconee and McGuire Nuclear Stations). The basis for the exemption was that the portable hand-held lights were a backup to the yard lights, which were subject to loss or interruption for a loss of offsite power, and that the portable hand-held lights were adequate to ensure safe operator access when traversing the open yard area and would only be used for such.

For Fort St. Vrain, hand-held lights will be provided in the Control Room for operator use in traversing the open yard area from the Turbine Building to the outbuildings required to energize the ACM Diesel Generator (DG) backed emergency lighting systems when required for certain fires in the Turbine or Reactor Buildings. Access routes from the Control Room to an outside door will be provided with battery backed emergency lights with a minimum of 90-minutes capacity, which is more than enough time to start the ACM DG and energize the ACM DG-backed emergency lighting systems. The hand-held portable lights will be used as a backup to the yard security lighting to ensure safe operator access to the outbuildings required to activate the ACM DG-backed emergency lighting systems, which include the yard security lighting. The use of portable hand-held lights would only be required in the event of a loss of offsite power at night, when the yard security lighting would be unavailable until the ACM DG was started and connected as a backup to the security system per existing procedures. Outbuildings requiring operator action to accomplish the lighting system transfer will have battery backed emergency lights in accordance with proposed modification 4.4.c of Report No. 4. Once the yard security lighting is restored, adequate lighting is available for safe operator access to other outbuildings where manual operator actions may be required. The yard security lighting system would not be affected by a fire in the Turbine or Reactor Buildings. Based on the above, we feel use of portable hand-held lights in a limited application as a backup for a specific condition (i.e., a fire, necessitating use of the ACM DG-backed emergency

lighting system, concurrent with a loss of offsite power at night) is justified and is adequate to ensure safe operator access to the necessary outbuildings to restore yard security lighting for subsequent operator actions that may be required.

5. Building 10 Compliance with Appendix R - The Report No. 5 Fire Hazards Analysis has been revised to incorporate details on fire protection shutdown components in each Building 10 fire area, and the basis for compliance with Appendix R. Page changes for this revision are attached.

We understand that the above information should resolve any remaining concerns or questions from Mr. Kubicki relative to the fire protection review of the Fort St. Vrain evaluations and exemption requests submitted in Reports 1 through 5. Since design of modifications is proceeding, and Public Service is moving ahead with implementation of the modifications as plant activities and operational status permit, we would appreciate completion of the NRC staff review and issuance of an SER for these modifications and exemption requests in the near future.

If you have any questions, please contact Mr. M. H. Holmes at (303) 571-8409.

Very truly yours,

*O. R. Lee / by Don Marumbury*  
O. R. Lee, Vice President  
Electric Production

ORL/FT:pa

REPORT NO. 1  
PAGE CHANGES

TABLE 2.3-1  
PROCESS MONITORING INSTRUMENTATION  
FORCED CIRCULATION COOLING

<u>Function</u>	<u>Inst. No.</u>	<u>Range</u>	<u>Ref.</u>	<u>Power Supply</u>
B.1 Nuclear Inst.			SD-93-11-1, FSAR Fig.	
Wide Range:	NI-1133-11/	Approximately 10-6-10 <sup>3</sup> % Rx Power	7.3-22, IC-11-1.	Inst. Bus 1A
B.2 Nuclear Inst.			SD-93-11-1, FSAR Fig.	
Wide Range:	NI-1134-11/	Approximately 10-6-10 <sup>3</sup> % Rx Power	7.3-22, IC-11-1.	Inst. Bus 1B
F.1 Core Heat Removal				
Circulator 1A Helium Flow	PDI-1157-2	-0.05-0.50 psid	SD-93-11-2, IC-11-3	Inst. Bus 3
F.2 Core Heat Removal				
Circulator 1C Helium Flow	PDI-1158-2	-0.05-0.50 psid	SD-93-11-2, IC-11-3.	Inst. Bus 3
G.1 S/G Feedwater Flow				
G.1.1 Loop 1 FW	FR-2205	0-400,000 lbs./hr.	PI-22-1	Inst. Bus 1A
G.1.2 Loop 2 FW	FR-2206	0-400,000 lbs./hr.	PI-22-6	Inst. Bus 1B
G.2 S/G Exit Temp				
G.2.1 Loop 1 Temp	TI-22121 (or TR-22121, Pen 1)	0-1200°F	PI-22-2	Inst. Bus 1A
G.2.2 Loop 2 Temp	TI-22122 (or TR-22121, Pen 2)	0-1200°F	PI-22-7	Inst. Bus 1B



TABLE 2.3-1  
PROCESS MONITORING INSTRUMENTATION  
FORCED CIRCULATION COOLING  
(Continued)

<u>Function</u>	<u>Inst. No.</u>	<u>Range</u>	<u>Ref.</u>	<u>Power Supply</u>	
H.1 RCS Integrity			SD-93-11-2		
Primary Coolant Press.	PI-1108 <sup>2/</sup>	0-1000 psia	IC-11-2 (Sht. 1)	Inst. Bus 1A	
Circ. Inlet Coolant Temp	TI-1187 <sup>2/</sup> (TE-1173 Input)	100-1000°F	IC-11-3	Inst. Bus 3	
H.2 RCS Integrity			SD-93-11-2		
Primary Coolant Press.	PI-1109 <sup>2/</sup>	0-1000 psia	IC-11-2 (Sht. 2)	Inst. Bus 1B	
Circ. Inlet Coolant Temp	TI-1187 <sup>2/</sup> (TE-1177 Input)	100-1000°F	IC-11-3	Inst. Bus 3	

<sup>1/</sup> Not required for fire protection shutdown. See discussion in Report No. 4, Section 2.17 and Appendix C.

<sup>2/</sup> Not required for fire protection shutdown. See discussion in Exemption Request 3.10 and Table 3.10-1, Item 4 of Report No. 4.

TABLE 3.1  
(continued)

F.P. Shutdown Train A

F.P. Shutdown Train B

Valves - Manual Only (Continued):

Table 2.1-6 Sht 11	V-461522
	V-46342
	V-46346
2.1-6 Sht 11	V-461643
6.3-1 (Rpt.3)	V-32102
	V-21754
	V-46251
	V-46349
	V-461633

Valves - Manual Only (Continued):

Table 6.3-1 (Rpt.3)	V-46349
	V-461633
	V-92114
	V-92117

Instrumentation:

Process Monitoring

PDI-1157-2  
FR-2205  
TI-22121 or TR 22121 Pen 1

Instrumentation:

Process Monitoring

PDI-1158-2  
FR-2206  
TI-22122 or TR-22121 Pen 2



REPORT NO. 2  
PAGE CHANGES

TABLE 2.3-1  
INSTRUMENTATION CIRCUITS

Fire Protection Shutdown Train	Function Required	Indicator	Supporting Instruments	Instrument Location	Cable Number <sup>(7)</sup>	From/To	Instrument Power Supply	Hot Shorts Evaluation	Power Supply Coord. Evaluation	Schematic Diagram	Other Document References
A	Monitor Circulator C-2101 Helium Flow	PDI-1157-2	PDI-1157-2 PDM-1157-2 PDT-1157-2 PDE-1157-2	I-05 (Note 4) I-05 (Note 4) Local (C3X1) Local	(---) 21315 21320 Local	I-05/PDT I-05/C3X1 Local	120Vac Interr. Bus 3 at I-05	Other PDT's or common 120Vac supply are local at C3X1		IC-11-3	E-1328 E-1332 E-1333 E-1334 93-I-15-74

TABLE 2.3-1  
INSTRUMENTATION CIRCUITS

Fire Protection Shutdown Train	Function Required	Indicator	Supporting Instruments	Instrument Location	Cable Number <sup>(7)</sup>	From/To	Instrument Power Supply	Hot Shorts Evaluation	Power Supply Coord. Evaluation	Schematic Diagram	Other Document References
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TABLE 2.3-1  
INSTRUMENTATION CIRCUITS

NOTES:

- (1) Instruments required to provide circuit continuity.
- (2) Cables numbers represent cables whose potential to cause hot shorts must be verified.
- (3) Panels listed require further verification of power supply coordination.
- (4) These components are located in the CCA, and thus are not of concern for fires in non-CCA locations.
- (5) Note that I-34, are located in the CCA.
- (6) It must be verified that a power supply to this instrument be present to maintain circuit continuity.
- (7) Cable numbers in parentheses ( ) are located in the CCA only.

TABLE 2.3-2  
POWER SUPPLY COORDINATION

Instrument	Power Supply	Power Supply Input Fuse-F/ Circuit Breaker-CB	Power Supply Output Fuse-F/ Circuit Breaker-CB	Other Devices on Output	Power Supply Feeder Bus	Feeder Bus Protection Fuse-F/ Circuit Breaker-CB	Other Devices on Feeder Bus	Drawings/Comments
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TABLE 2.3-2  
POWER SUPPLY COORDINATION

Instrument	Power Supply	Power Supply Input Fuse-F/Circuit Breaker-CB	Power Supply Output Fuse-F/Circuit Breaker-CB	Other Devices on Output	Power Supply Feeder Bus	Feeder Bus Protection Fuse-F/Circuit Breaker-CB	Other Devices on Feeder Bus	Drawings/Comments
<u>TI-22121</u>								
TT-22121	120 Vac Bus 1 @ I-35B	None	None	See E-1522 Each device is separately fused.	120 Vac Bus 1 Dist. Panel 1A Drawing E-1102 (Cable in CCA)	30 A-CB & Two 15 A-F	See E-1102	E-1203, pg. 1888 E-1510 E-1522 E-1102
<u>TI-22122</u>								
TT-22122	120 Vac Bus 2 @ I-36B	None	None	See E-1523 Each device is separately fused.	120 Vac Bus 2 Dist. Panel 1B Drawing E-1103 (Cable in CCA)	30 A-CB & Two 15 A-F	See E-1103	E-1203, pg. 1887 E-1510 E-1523 E-1103



TABLE 2.3-2  
POWER SUPPLY COORDINATION

Instrument	Power Supply	Power Supply Input Fuse-F/ Circuit Breaker-CB	Power Supply Output Fuse-F/ Circuit Breaker-CB	Other Devices on Output	Power Supply Feeder Bus	Feeder Bus Protection Fuse-F/ Circuit Breaker-CB	Other Devices on Feeder Bus	Drawings/Comments
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TABLE 2.3-2  
POWER SUPPLY COORDINATION

Instrument	Power Supply	Power Supply Input Fuse-F/ Circuit Breaker-CB	Power Supply Output Fuse-F/ Circuit Breaker-CB	Other Devices on Output	Power Supply Feeder Bus	Feeder Bus Protection Fuse-F/ Circuit Breaker-CB	Other Devices on Feeder Bus	Drawings/Comments
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TABLE 4.1-1  
FORCED CIRCULATION COOLDOWN  
REQUIRED ELECTRICAL EQUIPMENT  
OUTSIDE CCA

F.P. Shutdown Train "A"		F.P. Shutdown Train "B"	
<hr/>			
<u>4160V AC Switch Gear</u>			
ACM Bus	N-4866		
Load Test Bus	N-4869		
HVAC Bus	N-9257		
Switch Gear Bus 2	N-9210		
Switch Gear Bus 1	N-9206		
 <u>480V Switch Gear</u>			
ACM 480 V Switch Gear	N-4868		
 <u>4160-480V Transformers</u>			
ACM Bus Transformer	N-4867		
Load Center Switchgear Transformer 1			
 <u>Motor Control Centers</u>			
Reactor Plant MCC-1C	N-9229C	Reactor Plant MCC-3	N-9231
ACM MCC	N-4870	Turbine Building MCC-3	N-9208
 <u>Inverters</u>			
Inverter/Static Transfer Switch 1A	N-9289	Inverter/Static Transfer Switch 1B	N-9290

TABLE 4.1-1  
FORCED CIRCULATION COOLDOWN  
REQUIRED ELECTRICAL EQUIPMENT  
OUTSIDE CCA

F.P. Shutdown Train "A"		F.P. Shutdown Train "B"	
<u>Control Panels - Instrument Racks</u>			
ACM Diesel Generator	N-4866	Diesel Generator IB	I-9202X
Reactor Plant Equipment Rack ID	I-93123	HVAC Instrument Cabinet Reactor Plant Air Conditioning	I-7301X
Turbine Building Equipment Rack IE	I-9355	Turbine Building Equipment Rack ID	I-9354
<u>Battery Banks</u>			
		Diesel Fire Pump Battery 1 or 2	
ACM DG Batteries	N-4887		
<u>Battery Chargers</u>			
ACM DG Battery Charger	(At D.G.)		
<u>Instruments</u>			
Bearing Water Surge Tank Level	LT-21135 LSL-2137	Bearing Water Surge Tank Level	LT-21136 LSL-2138
Turbine Water Drain Tank Level	LSL-21113	Turbine Water Drain Tank Level	LSL-21113
Emergency Bearing Water Filter Differential Pressure	PDIS-21393		

TABLE 4.1-1  
FORCED CIRCULATION COOLDOWN  
REQUIRED ELECTRICAL EQUIPMENT  
OUTSIDE CCA

F.P. Shutdown Train "A"		F.P. Shutdown Train "B"	
Feedwater Flow Loop 1 Steam Generator	FT-2207 TE-2205	Feedwater Flow Loop 2 Steam Generator	FT-2208 TE-2206
Circulator 1A, C2101, Flow, Low Range Exit Temperature Monitor Loop 1 Steam Generator	PDT-1157-2 TE-22121	Circulator 1C, C2103, Flow, Low Range Exit Temperature Monitor Loop 2 Steam Generator	PDT-1158-2 TE-22122
		Service Water Return Sump Level	LS-4208-2

TABLE 4.1-2  
FORCED CIRCULATION COOLDOWN CABLES OUTSIDE CCA  
(CONTINUED)

FP Shutdown - Train A	FP Shutdown - Train B
<u>120 Vac and 125 Vdc Power Cables</u>	<u>120 Vac and 125 Vdc Power Cables</u>
143	144
145	146
1157	1027
	1158



TABLE 4.1-2  
FORCED CIRCULATION COOLDOWN CABLES OUTSIDE CCA  
(CONTINUED)

FP Shutdown - Train A	FP Shutdown - Train B
<u>Instrumentation Cables</u>	<u>Instrumentation Cables</u>
16164	6607
16169	16156
16898	16157
17395	16161
18030	16451
21315	17354
21320	17924
	21265
	21270

REPORT NO. 4  
PAGE CHANGES

The Turbine Building is considered to be a single fire area containing plant arrangements wherein redundant safe shutdown components are within close proximity to each other. These interactions do not currently conform to the requirements contained in Section III.G.2 to Appendix R; however, PSC proposes to re-route cables, and other modifications such that either conformance to Section III.G.2 or an equivalent level of fire protection results (see Exemption Request 3.11). Hose stations and fire extinguishers are available throughout the Turbine Building. Emergency lighting will be provided (see Exemption Request 3.8) in the Turbine Building and will assure adequate illumination for personnel egress and access to essential equipment.

PSC proposes to install a fire detection system at elev. 4846'-6" of the access control bay of the Turbine Building and area coverage of the grade and mezzanine elevations of the Turbine Building fire area, except for the turbine generator operating floor. The fire detection system will conform to NFPA 72D and 72E.

### 3.3.3 Evaluation

This area does not comply with Section III.G.2 because of the plant arrangements, wherein redundant divisions of cables/equipment are not separated by 20 feet free of intervening combustibles, and automatic fire suppression and fire detection systems are not provided throughout the fire area. The major fire hazards are protected against by fire rated enclosures or by a fire suppression system or both. The balance of the intervening combustibles are dispersed throughout the Turbine Building and do not present a significant fire threat. Selected cables/equipment of redundant divisions will be re-routed to improve separation. The lack of an automatic fire suppression system on an area-wide basis and the adequacy of the resulting separation following re-routes are addressed in Exemption Request 3.11. PSC proposes to install a fire detection system throughout the area of the first two levels of the Turbine Building and at elevation 4846'-6" of the Access Control Bay, but not on the third level (turbine generator floor) of the Turbine Building. Section 4.0 includes figures depicting the locations to be provided coverage with fire detection devices.

Automatic fire detection in accordance with NFPA Standards 72D and 72E will be provided throughout this floor level of the access control bay. Finally, emergency lighting will be provided for the Turbine Building areas, to include the access control bay, as described in Exemption Request 3.8.

### 3.5.3 Evaluation

This area does not comply with Section III.G.2 because the reactor plant exhaust fans and circuits are not separated by 20 feet free of intervening combustibles. Automatic fire suppression and fire detection systems are not provided throughout the fire area. PSC proposes to re-route the cables and transfer switches to the A-train fan and provide a fire detection system throughout the 4846'-6" elevation of the access control bay. The A-train cables will be located greater than 35 feet from B-train cables, except where the A-train cables approach the fan units, where the separation will approach 20 feet. Automatic fire suppression will not significantly enhance the fire protection safety of the area due to the low fire loading, which is equivalent to approximately 16 minutes. The intervening cables between the fans are in conduit. Charcoal filters are contained in the metal filter housing and provided with water spray protection. This further reduces the fire load.

A fire which occurs in this area will be small and rapidly detected by the proposed fire detection system. The re-routing of the A-train fan cables, the physical separation of the fans, and the enclosure of the fans by the metal duct will prevent damage until the fire brigade arrives and extinguishes the fire.

Even if all reactor plant exhaust fans were damaged by a fire, alternative cooling for the Reactor Building is available through a chiller unit and recirculation fan. The chiller, fan, associated cables and supporting chilled water system cables and components are located in the Reactor Building, the Water Chiller Building or routed in underground duct banks. Required components in the Reactor Building (using fan S-7320S) are located greater than 45 feet from elev. 4846'-6" of the Access Control Bay, and separated by the steel wall. The chiller units are the normal method of heat removal from the Reactor Building. One chiller unit has approximately the same air flow capacity as a single Reactor Building exhaust fan, with the capacity to supply 60°F air that enters the unit at 105°F.

Refer to Exemption Request 3.8 for further details and criteria (2.27, 3.8).

- (b) Three-Room Complex - The present DC-powered emergency lighting system within the Three-Room Complex will be modified so that all power feeds remain inside the CCA. With this change, the lighting system will not be affected by a fire outside of the Three-Room Complex.
- (c) Out-Buildings - Eight-hour battery pack lights will be installed in the following out-buildings:
  - Circulating Water Pump Pit
  - 4kV switchgear enclosure (Bus 1, 2, and 3)
  - 4kV switchgear enclosures (HVAC)
  - ACM 4kV switchgear
  - Turbine evaporative cooling building
- (d) Access to Out-Buildings - Portable hand-held lights will be made available to provide lighting for access to out-buildings. In addition, access routes from the Control Room to an outside door will be provided with battery pack lights with a minimum of ninety minutes capacity, which is more than enough time to start the ACM diesel generator (DG) and energize the ACM DG-backed emergency lighting systems.

#### 4.5 FIRE DETECTION

The following fire detection system upgrades will be made:

- (a) Reactor Building Fire Area - Complete fire detection coverage below elevation 4881' and at 4756' will be provided. Other elevations will have spot or partial coverage in areas of cable concentration or where required due to location of fire protection safe shutdown components or cabling.
- (b) Turbine Building Fire Area - Area-wide fire detection coverage will be provided at the grade and mezzanine levels of the Turbine Building. (3.3)
- (c) Turbine Building Access Control Bay - Fire detection coverage will be provided in the Reactor Plant Exhaust Fan room at elevation 4846'-6". (3.5)

Figures 1 through 7 depict the locations to be provided coverage with fire detection devices.

REPORT NO. 5  
PAGE CHANGES



## FIRE HAZARDS ANALYSIS

Building:	Ten
Room (Fire Area):	Training Office Rooms (T-1)
Elevation:	4835'-6"
Safety Related:	No
Construction	
North Wall:	12" reinforced concrete
East Wall:	12" reinforced concrete
South Wall:	12" reinforced concrete
West Wall:	12" reinforced concrete
Ceiling:	Noncombustible suspended ceiling under a concrete roof
Floor:	Resilient tile on concrete
Drainage:	None
Ventilation:	Yes - Mechanical HVAC
Fire Detection:	Yes - Ionization throughout the area
Fire Protection:	No automatic fire suppression; two ABC dry chemical extinguishers provided
Emergency Lighting:	Yes - However, not in the form of sealed beam, 8-hour battery pack units. The normal lighting system will be connected to the ACM diesel, and the emergency lighting system is backed up by the battery IC and a diesel generator. No manual actions are required within Building 10 for post-fire shutdown. Therefore, 8-hour battery pack lights are not required.
Required Fire Protection Shutdown Components in Fire Area:	None
Area (sq. ft.):	1,092
Fire Hazard (BTU/sq. ft.):	58,400
Fire Hazard Classification:	Low
Compliance With Appendix R (Sect. III.G) and Separation Criteria:	Complies because there are no fire protection shutdown components in the fire area, and 8-hour battery pack lights are not required.

## FIRE HAZARDS ANALYSIS

Building:	Ten
Room (Fire Area):	Computer Services Office (T-2)
Elevation:	4824'-0"
Safety Related:	No
Construction	
North Wall:	8" concrete block
East Wall:	12" reinforced concrete
South Wall:	12" reinforced concrete
West Wall:	8" concrete block
Ceiling:	Noncombustible suspended ceiling under concrete on metal pan
Floor:	Resilient tile on concrete
Drainage:	None
Ventilation:	Yes - Mechanical HVAC
Fire Detection:	Yes - Ionization throughout the area
Fire Protection:	No automatic fire suppression; Halon 1211 fire extinguishers provided
Emergency Lighting:	No - No manual actions are required within Building 10 for post-fire shutdown. Therefore, 8-hour battery pack lights are not required.
Required Fire Protection Shutdown Components in Fire Area:	None
Area (sq. ft.):	644
Fire Hazard (BTU/sq. ft.):	58,400
Fire Hazard Classification:	Low
Compliance With Appendix R (Sect. III.G) and Separation Criteria:	Complies because there are no fire protection shutdown components in the fire area, and 8-hour battery pack lights are not required.

## FIRE HAZARDS ANALYSIS

Building: Ten  
Room (Fire Area): Electrical Equipment Room (T-2)  
Elevation: 4824'-0"  
Safety Related: No

### Construction

North Wall: 12" reinforced concrete  
East Wall: 12" reinforced concrete  
South Wall: 8" concrete block  
West Wall: 12" reinforced concrete  
Ceiling: 12" concrete over metal pan  
Floor: Concrete  
Drainage: No  
Ventilation: Yes - Mechanical HVAC

Fire Detection: Yes - Ionization throughout the area

Fire Protection: Yes - Halon Suppression System  
CO<sub>2</sub> fire extinguisher provided

Emergency Lighting: Yes - However, not in the form of sealed beam, 8-hour battery pack units. The normal lighting system will be connected to the ACM diesel, and the emergency lighting system is backed up by the battery IC and a diesel generator. No manual actions are required within Building 10 for post-fire shutdown. Therefore, 8-hour battery pack lights are not required.

Required Fire Protection  
Shutdown Components  
in Fire Area:

None

Area (sq. ft.): 385

Fire Hazard (BTU/sq. ft.): 58,400

Fire Hazard Classification: Low

Compliance With  
Appendix R (Sect. III.G)  
and Separation Criteria:

Complies because there are no fire protection shutdown components in the fire area, and 8-hour battery pack lights are not required.

## FIRE HAZARDS ANALYSIS

Building:	Ten
Room (Fire Area):	Computer Room North (T-2)
Elevation:	4811'-0"
Safety Related:	No
Construction	
North Wall:	12" reinforced concrete
East Wall:	12" reinforced concrete
South Wall:	8" concrete block
West Wall:	12" reinforced concrete
Ceiling:	Concrete on metal pan
Floor:	12" raised noncombustible computer room floor
Drainage:	1 Condensate drain
Ventilation:	No - Mechanical HVAC internal recirculation
Fire Detection:	Yes - Ionization above and below floor throughout the area
Fire Protection:	Yes - Halon Suppression System, 1211 fire extinguishers provided
Emergency Lighting:	Yes - However, not in the form of sealed beam, 8-hour battery pack units. The normal lighting system will be connected to the ACM diesel, and the emergency lighting system is backed up by the battery IC and a diesel generator. No manual actions are required within Building 10 for post-fire shutdown. Therefore, 8-hour battery pack lights are not required.
Required Fire Protection Shutdown Components in Fire Area:	None
Area (sq. ft.):	532
Fire Hazard (BTU/sq. ft.):	58,400
Fire Hazard Classification:	Low
Compliance With Appendix R (Sect. III.G) and Separation Criteria:	Complies because there are no fire protection shutdown components in the fire area, and 8-hour battery pack lights are not required.

## FIRE HAZARDS ANALYSIS

Building:	Ten
Room (Fire Area):	Computer Room South (T-2)
Elevation:	4811'-0"
Safety Related:	No
Construction	
North Wall:	8" concrete block
East Wall:	12" reinforced concrete
South Wall:	12" reinforced concrete
West Wall:	12" reinforced concrete
Ceiling:	Concrete on metal pan
Floor:	12" raised, noncombustible computer room floor on concrete
Drainage:	1 Condensate drain
Ventilation:	No - Mechanical HVAC internal recirculation
Fire Detection:	Yes - Ionization above and below floor throughout the area
Fire Protection:	Yes - Halon Suppression System, one 1211 fire extinguisher provided
Emergency Lighting:	Yes - However, not in the form of sealed beam, 8-hour battery pack units. The normal lighting system will be connected to the ACM diesel, and the emergency lighting system is backed up by the battery IC and a diesel generator. No manual actions are required within Building 10 for post-fire shutdown. Therefore, 8-hour battery pack lights are not required.
Required Fire Protection Shutdown Components in Fire Area:	None
Area (sq. ft.):	532
Fire Hazard (BTU/sq. ft.):	58,400
Fire Hazard Classification:	Low
Compliance With Appendix R (Sect. III.G) and Separation Criteria:	Complies because there are no fire protection shutdown components in the fire area, and 8-hour battery pack lights are not required.

## FIRE HAZARDS ANALYSIS

Building:	Ten
Room (Fire Area):	Inverter I-B (T-3)
Elevation:	4791'-0" 4800'-6"
Safety Related:	Yes
Construction	
North Wall:	8" concrete block
East Wall:	12" reinforced concrete
South Wall:	12" reinforced concrete
West Wall:	12" reinforced concrete
Ceiling:	Concrete on metal pan
Floor:	Concrete
Drainage:	No
Ventilation:	Yes - Mechanical HVAC
Fire Detection:	Yes - Ionization throughout the area
Fire Protection:	Yes - Halon Suppression System, 1211 fire extinguishers provided
Emergency Lighting:	Yes - However, not in the form of sealed beam, 8-hour battery pack units. The normal lighting system will be connected to the ACM diesel, and the emergency lighting system is backed up by the battery IC and a diesel generator. No manual actions are required within Building 10 for post-fire shutdown. Therefore, 8-hour battery pack lights are not required.
Required Fire Protection Shutdown Components in Fire Area:	F.P. Shutdown Train A: Cables 143 and 1157 for instrument/control power A. F.P. Shutdown Train B: Inverter IB; Distribution Panel IB-1; Cables 144, 146, and 1158 for instrument/control power B.
Area (sq. ft.):	504
Fire Hazard (BTU/sq. ft.):	Negligible
Fire Hazard Classification:	Low; Transient fire only
Compliance With Appendix R (Sect. III.G) and Separation Criteria:	Complies. Train A cables 143 and 1157 are wrapped in a 1-hour fire rated barrier, and there is automatic fire suppression coverage. Exemption Number 3.4 justifies existence of unprotected structural steel (see page 3-10 of Report No. 4).



## FIRE HAZARDS ANALYSIS

Building:	Ten
Room (Fire Area):	Mezzanine I-C (T-3)
Elevation:	4800'-6"
Safety Related:	Yes
Construction	
North Wall:	12" reinforced concrete
East Wall:	12" reinforced concrete
South Wall:	None
West Wall:	12" reinforced concrete
Ceiling:	Concrete on metal pan
Floor:	Concrete
Drainage:	No
Ventilation:	Yes - Mechanical HVAC
Fire Detection:	Yes - Ionization throughout the area
Fire Protection:	Yes - Halon Suppression System, 1211 fire extinguishers provided
Emergency Lighting:	Yes - However, not in the form of sealed beam, 8-hour battery pack units. The normal lighting system will be connected to the ACM diesel, and the emergency lighting system is backed up by the battery IC and a diesel generator. No manual actions are required within Building 10 for post-fire shutdown. Therefore, 8-hour battery pack lights are not required.
Required Fire Protection Shutdown Components in Fire Area:	F.P. Shutdown Train A: Cables 143 and 1157 for instrument/control power A. F.P. Shutdown Train B: Inverter 1B; Distribution Panel 1B-1; Cables 144, 146, and 1158 for instrument/control power B.
Area (sq. ft.):	672
Fire Hazard (BTU/sq. ft.):	Negligible
Fire Hazard Classification:	Low; Transient fire only
Compliance With Appendix R (Sect. III.G) and Separation Criteria:	Complies. Train A cables 143 and 1157 are wrapped in a 1-hour fire rated barrier, and there is automatic fire suppression coverage. Exemption Number 3.4 justifies existence of unprotected structural steel (see page 3-10 of Report No. 4).

## FIRE HAZARDS ANALYSIS

Building:	Ten
Room (Fire Area):	Battery Room I-C (T-4)
Elevation:	4791'-0"
Safety Related:	Yes
Construction	
North Wall:	8" concrete block
East Wall:	12" reinforced concrete
South Wall:	8" concrete block
West Wall:	8" concrete block
Ceiling:	Concrete on metal pan
Floor:	Concrete
Drainage:	No
Ventilation:	Yes - Mechanical Ventilation
Fire Detection:	Yes - Ionization throughout the area
Fire Protection:	Yes - Halon Suppression System
Emergency Lighting:	No - No manual actions are required within Building 10 for post-fire shutdown. Therefore, 8-hour battery pack lights are not required.
Required Fire Protection Shutdown Components in Fire Area:	F.P. Shutdown Train A: None F.P. Shutdown Train B: None
Area (sq. ft.):	120
Fire Hazard (BTU/sq. ft.):	75,000
Fire Hazard Classification:	Low
Compliance With Appendix R (Sect. III.G) and Separation Criteria:	Complies because there are no fire protection shutdown components in the fire area, and 8-hour battery pack lights are not required.

## FIRE HAZARDS ANALYSIS

Building: Ten

Room (Fire Area): Inverter I-A (T-5)

Elevation: 4791'-0"

Safety Related: Yes

Construction

North Wall:	12" reinforced concrete
East Wall:	12" reinforced concrete
South Wall:	8" concrete block
West Wall:	12" reinforced concrete
Ceiling:	Concrete on metal pan
Floor:	Concrete
Drainage:	No
Ventilation:	Yes - Mechanical HVAC

Fire Detection: Yes - Ionization throughout the area

Fire Protection: Yes - Halon Suppression System, 1211 fire extinguishers provided

Emergency Lighting: Yes - However, not in the form of sealed beam, 8-hour battery pack units. The normal lighting system will be connected to the ACM diesel, and the emergency lighting system is backed up by the battery IC and a diesel generator. No manual actions are required within Building 10 for post-fire shutdown. Therefore, 8-hour battery pack lights are not required.

Required Fire Protection Shutdown Components in Fire Area: F.P. Shutdown Train A: Inverter A; Cables 143, 145 and 1157 for instrument/control power A; Distribution Panel 1A-1  
F.P. Shutdown Train B: None

Area (sq. ft.): 472

Fire Hazard (BTU/sq. ft.): Negligible

Fire Hazard Classification: Low; Transient fire only

Compliance With Appendix R (Sect. III.G) and Separation Criteria: Only one fire protection shutdown train is located within fire area T-5, which is enclosed by a 3-hour fire rated barrier. Exemption Number 3.4 justifies the existence of unprotected structural steel in a portion of the 3-hour fire rated barrier. On this basis, this fire area complies with Appendix R.

## FIRE HAZARDS ANALYSIS

Building:	Ten
Room (Fire Area):	Walkover Structure (T-6)
Elevation:	4791'-0" 4811' 4829'
Safety Related:	Yes
Construction	
North Wall:	Heavy metal plate tack welded
East Wall:	12" reinforced concrete
South Wall:	Heavy metal plate tack welded
West Wall:	12" reinforced concrete
Ceiling:	Concrete on metal pan
Floor:	Concrete
Drainage:	No
Ventilation:	No - Mechanical HVAC is provided for the fire alarm panel room on el. 4829'
Fire Detection:	Yes - Ionization throughout the area
Fire Protection:	No automatic fire suppression or fire extinguishers provided
Emergency Lighting:	Yes - However, not in the form of sealed beam, 8-hour battery pack units. The normal lighting system will be connected to the ACM diesel, and the emergency lighting system is backed up by the battery IC and a diesel generator. No manual actions are required within Building 10 for post-fire shutdown. Therefore, 8-hour battery pack lights are not required.
Required Fire Protection Shutdown Components in Fire Area:	<p>F.P. Shutdown Train A: Cables 143 and 1157 for instrument/control power A.</p> <p>F.P. Shutdown Train B: Cables 144 and 1158 for instrument/control power B.</p>
Area (sq. ft.):	198
Fire Hazard (BTU/sq. ft.):	Negligible
Fire Hazard Classification:	Low; Transient fire only
Compliance With Appendix R (Sect. III.G) and Separation Criteria:	Cables 143 and 1157 are wrapped in a 1-hour fire rated barrier and considered part of fire area T-5. The 1-hour fire area boundary is considered sufficient because of the negligible fire load. Additionally, fire detection system coverage is provided. On this basis, and in accordance with the guidelines of Generic Letter 85-01, this fire area is judged to be in compliance with Appendix R.

### 3.4 STRUCTURAL STEEL

#### 3.4.1 General

During a Telecon on July 26, 1985, with Mr. Dennis Kubicki of the NRC, several questions were raised for resolution. One of these dealt with the adequacy of unprotected structural steel in Building 10 fire areas that do not have automatic fire suppression system coverage.

Building 10 is composed of six(6) separate fire areas. Each fire area comprises one or more rooms. Those that have automatic fire suppression include the following:

<u>ROOM</u>	<u>FIRE AREA</u>
Inverter Room I-A	T-5
Inverter Room I-B	T-3
Mezzanine I-C	T-3
Battery Room I-C	T-4
Computer Room North	T-2
Computer Room South	T-2
Electrical Equipment Room	T-2

The balance of Building 10 does not have automatic fire suppression coverage and this includes; the training/office rooms in fire area T-1, the walkover structure (T-6), and the computer services office in fire area T-2. Hence, only these three specific areas need to be specifically evaluated for the acceptability of unprotected structural steel, based on Exemption Request 3.4.

#### 3.4.2 Evaluation

The fire load (see section 2.0) for fire areas T-1 and T-2 was determined to be less than 45 minutes (low) and, for the walkover structure (T-6), it was 15 minutes or less. In none of these areas were there any concentrated fire loads or fire hazardous equipment located adjacent to structural steel members. Finally, the type of fire expected would only include ordinary combustibles, office materials, and/or a transient fire load.

The training/office room (fire area T-1) has 3-hour fire rated reinforced concrete walls, floor, and ceiling. There is no unprotected steel in this fire area except for the concealed ceiling space. The walkover structure (fire area T-6) has three levels, each with unprotected steel. Also, the north and-south walls are unprotected steel with metal siding. The computer services office (fire area T-2) has walls composed of either reinforced concrete or 8-inch concrete block. The floor is tile over concrete. There is unprotected steel in the ceiling.

The training/office room (T-1) has unprotected structural steel in the ceiling space, but the non-combustible, mineral tile, suspended ceiling shields this from the room space. Also, the training office room does not have any safety related cables/equipment. There are no concentrated fire loads, fire hazardous equipment or storage, and this room has a low fire load. Therefore, no concern exists for structural steel in this fire area.

Regarding the walkover structure (T-6), there is essentially a negligible fire load and only a transient fire would pose the single largest hazard. All floor levels are open to each other and, hence, the walkover structure volume serves as a "heat sink". The structural members are substantial in size and assuming no fire suppression efforts, an unmitigated fire would only raise the steel's temperature by a marginal amount due to the low fire load, and would not cause structural failure.

The computer services office (T-2) also has a low fire load with no special fire hazards. Since the floor has a 3 hour fire rating, then the safety related equipment below is protected. With the low fire load, a fire would not damage or weaken the ceiling steel supports above the computer services office. Since no fire protection shutdown equipment is located therein, fire protection shutdown is not threatened.

#### 3.4.3 Conclusion Regarding Unprotected Structural Steel

For areas where unprotected structural steel exists coupled with a lack of automatic fire suppression system, it has been determined to be an acceptable condition based upon the following:



1. low and/or transient fire loads;
2. absence of concentrated fire loads;
3. absence of fire hazardous equipment; and
4. absence of fire protection shutdown equipment in all areas except for the walkover structure.

Therefore, because of the above, it is not necessary to provide the unprotected structural steel with either automatic fire suppression system coverage or fire rated barriers.