

**Florida  
Power**  
CORPORATION

July 25, 1985  
3F0785-31

Director of Nuclear Reactor Regulation  
Attention: Mr. John F. Stolz, Chief  
Operating Reactors Branch #4  
Division of Licensing  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Subject: Crystal River Unit 3  
Docket No. 50-302  
Operating License No. DPR-72  
Appendix R/Fire Protection Evaluations

Dear Sir:

Attached are three evaluations of fire protection features at Crystal River Unit 3 (CR-3). These have been prepared using the guidance provided in draft Generic Letter 85-01, and guidance obtained through discussions with fire protection reviewers D. Kubicki and S. West. Notes on each evaluation are provided below.

- I. Evaluation of Fire Barrier Deviations - Section 3.1.2, "Previously Accepted Fire Area Boundaries", of draft Generic Letter 85-01 states in part:

"If a fire area boundary was described as a rated barrier in the 1977 Fire Hazards Analysis, and was evaluated and accepted in a published SER, the fire area boundary need not be reviewed as part of the re-analysis for compliance with Section III.G of Appendix R."

Our attached evaluation is based on the previous acceptance of the fire area boundaries separating the A and B 480 V switchgear rooms from the cable spreading room. Additional barriers are evaluated where the protection afforded is equivalent or better, and the hazard is comparable to the previously accepted areas. The previous acceptance was based on a 1977 Fire Hazards Analysis (FHA) and walkdowns conducted by NRC inspectors.

Fire loading values in the current FHA are higher for these areas than those in the 1977 FHA. The current FHA is a conservative analysis which assumes cable tray fill of at least 50% for all trays and uses actual tray fill if greater than 50%. The 1977 FHA used actual fill which in most cases was, and still is, less than 50%.

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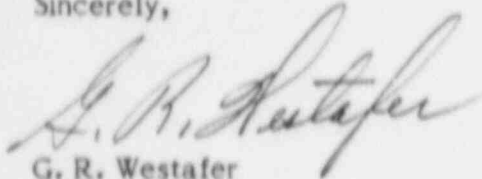
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2. Evaluation of Emergency Lights - Appendix R III.J provides a very general requirement regarding the placement of emergency lights. This evaluation is provided to describe Florida Power Corporation's position on emergency lighting and its specific application at CR-3.
3. Evaluation of Protection Against Spurious Actuation of Automatic Fire Suppression Systems - The Fire Protection Safety Evaluation Report for CR-3 dated July 27, 1979 required that drip shields be provided for safety related motor control centers in areas where automatic sprinklers were installed. Those shields have not been installed and are not planned based on the attached evaluation.

We request that these evaluations be forwarded to the appropriate NRC staff for review, evaluation and concurrence.

Should you have any questions or require further information, please contact this office.

Sincerely,



G. R. Westafer  
Manager, Nuclear Operations  
Licensing and Fuel Management

SCP/feb

Attachments

ATTACHMENT 1  
July 25, 1985

EVALUATION OF FIRE  
BARRIER DEVIATIONS

## SUMMARY OF FIRE BARRIER DEVIATIONS

Appendix R, Section III.G.2.a requires separation of cables and equipment of redundant safe shutdown systems by a fire barrier having a 3 hour rating. Elevation 124' of the Control Complex does not meet this criteria due to the construction of the ceiling, which separates this elevation from the Cable Spreading Room. The ceiling is constructed of steel plate on protected and unprotected structural steel with a 1 hour fire resistant material on the top of the steel. Penetrations through the ceiling are sealed above the steel.

This construction results in a one-directional fire barrier from the top down. The Cable Spreading Room meets the criteria of Appendix R, Section III.G.2.c (separation by detection, automatic suppression, and 1 hour fire barrier); therefore, a deviation for only fire areas on the 124' elevation is requested. The fire areas affected are:

- CC-124-111 CRD and Communication Equipment Room
- CC-124-112 EFIC Room 'A'
- CC-124-113 EFIC Room 'C'
- CC-124-114 EFIC Room 'D'
- CC-124-115 EFIC Room 'B'
- CC-124-116 480V ES Switchgear Bus Room 3B
- CC-124-117 480V ES Switchgear Bus Room 3A

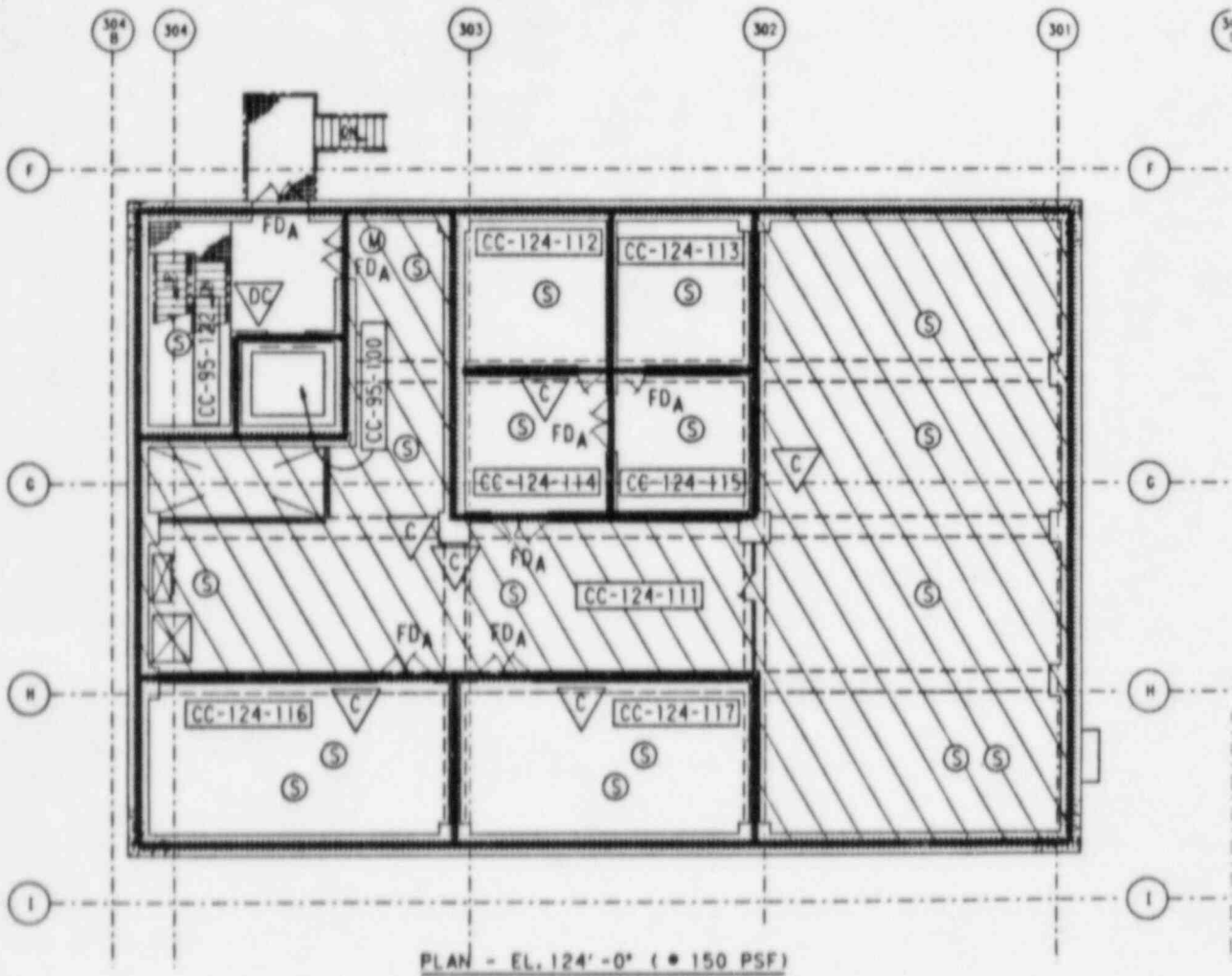
The following sections present the specific deviation requests, the detailed technical bases for the deviations and the conclusions.

Figure 1 presents the layout of these fire areas.



FIGURE 1

FIRE AREA LAYOUT



FIRE ZONE/AREA IDENTIFIER



FIRE ZONE BOUNDARY



FIRE AREA BOUNDARY

FDA

UL CLASS 'A' 3HR FIRE DOOR

FDB

UL CLASS 'B' 1.5HR FIRE DOOR

FDC

UL CLASS 'C' .75HR FIRE DOOR

FDB

UL CLASS 'A' EQUIVALENT FIRE DOOR

FDB 1.5I

UL CLASS 'B' EQUIVALENT FIRE DOOR



TRAYS WITH LINEAR THERMAL DETECTORS



CO<sub>2</sub> EXT.



DRY CHEMICAL (A-B-C) EXT.



WATER EXT.



HOSE STATION



IONIZATION DETECTOR (SMOKE)



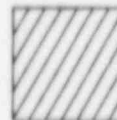
HEAT DETECTOR



IONIZATION DETECTOR BEING INSTALLED FOR APPENDIX R



MANUAL PULL STATION



SPRINKLER



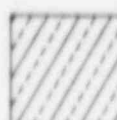
DELUGE



HALON



CARDOX



FIXED SPRAY

## FIRE AREA CC-124-111

### CRD and Communication Equipment Room

#### DEVIATION PROPOSED

Appendix R, Section III.G.2.a requires separation of cables and equipment of redundant safe shutdown systems by a fire barrier having a 3 hour rating. Fire Area CC-124-111 in the Control Complex does not meet this criteria due to the construction of the ceiling, which separates this elevation from the cable spreading room. The ceiling is constructed of steel plate on protected and unprotected structural steel with a 1 hour fire resistant material on the top of the steel. Penetrations through the ceiling are sealed above the steel.

A deviation from the above requirement is proposed due to the difficulty in protecting the underside of the steel because of excessive interference by cable trays, conduits, and equipment.

This ceiling was previously accepted as a fire area barrier for adjacent fire areas CC-124-116 and CC-124-117 under the guidance of Appendix A of Branch Technical Position 9.5.1. (Safety Evaluation by the Office of Nuclear Reactor Regulation Supporting Amendment No. 23 to License No. DPR-72, Docket No. 50-302, dated July 27, 1979)

#### TECHNICAL BASES FOR DEVIATION

##### Combustible Material

##### Quantity

Cable (Note 1)

8994 lbs.

Fire loading - 24,310 BTU/sq ft

Maximum permissible fire loading - 38,000 BTU/sq ft (Note 2)

Heat Rate - C/875°F

Maximum Severity Fire - 18 minutes

Note 1: The quantity of cable insulation called out above is based on 50% fill for all cable trays that are filled with cable up to 50% full by volume. For cable trays that are more than 50% full, the actual percentage fill has been used. This is extremely conservative, since very few trays are filled to greater than 50% and the actual plant average tray fill is significantly lower.

Note 2: The maximum permissible fire loading is based on an evenly distributed loading of combustible materials and is based upon the limitation of the steel ceiling construction.

## FIRE AREA CC-124-111 (continued)

### Design Basis Fire

The maximum severity fire is based upon the 'E' curve of the NFPA Handbook (15th edition) which corresponds to the standards of ASTM E-119 and NFPA-251. Since the only combustible is IEEE-383 type cable, which through fire tests has shown to have properties that limit the ability to sustain a fire, the design basis fire is postulated to be a slow burning fire (equivalent to a 'C' curve fire) that reaches a maximum temperature of 875°F. This is less than the 1100°F critical temperature of structural steel.

The design basis fire is conservatively based on the simultaneous total combustion of all combustibles in the area.

### Fire Protection Equipment

Full area wet pipe sprinkler coverage will be provided. Additional fire protection equipment in the zone consists of 3 portable CO<sub>2</sub> fire extinguishers. Portable fire extinguishers are also located in adjacent areas CC-124-114, CC-124-116, CC-124-117 and CC-124-122. In addition, ionization smoke detectors located within the area provide an early warning alarm in the control room.

### Construction

All walls and the floor are concrete with a 3 hour fire rating. The ceiling is steel plate on protected and unprotected structural steel with a 1 hour directional fire barrier from the top down. Class A fire doors access areas CC-124-114, CC-124-116, CC-124-117, and CC-95-122. Ventilation duct with 3 hour rated fire dampers communicates with areas CC-108-107, CC-134-118, CC-124-114, CC-124-115, CC-124-116, and CC-124-117. Ventilation ducts with 1 -1/2 hour dampers and ducts with 3 hour dampers communicates with area CC-134-118A (Cable Spreading Room ) through the 1 hour directional barrier (ceiling). Electrical and mechanical penetrations in the walls and floor of this fire area are provided with a 3 hour fire rated penetration seal.

FIRE AREA CC-124-111 (continued)

Safe Shutdown Equipment

Safe shutdown components listed below that are underlined will be protected in a 1 hour fire rated enclosure/wrap.

AIR HANDLING SYSTEM:	Train 0 - Ductwork
Reactor Building Fans	<u>Train 1 - Remote shutdown circuits to AHF-1A</u>
	<u>Train 2 - Remote shutdown circuits to AHF-1B</u>
Diesel Generator Room Fans	Train 1 - Normal and Remote shutdown circuits to AHF-22A
	Train 2 - <u>Remote shutdown circuit to AHF-22C; Normal circuits to AHF-22D</u>
EFIC Room HVAC	Train 1 - Circuits to fan AHF-54A; Valves and Circuits to valves CHV-108, CHV-113
	<u>Train 2 - Circuits to fan AHF-54B; Circuits to valves CHV-90, CHV-97, CHV-100, CHV-101</u>
Control Complex HVAC	Train 1 - Circuits to AHF-20A
	Train 2 - Circuits to AHF-20B
DECAY HEAT CLOSED CYCLE COOLING SYSTEM:	<u>Train 1 - Remote shutdown circuits to pump DCP-1A</u>
	<u>Train 2 - Remote shutdown circuits to pump DCP-1B</u>
DECAY HEAT SYSTEM:	
DH Removal	<u>Train 1 - Remote shutdown circuits to pump DHP-1A</u>
	<u>Train 2 - Remote shutdown circuits to pump DHP-1B</u>
RC Outlet Isolation	<u>Train 1 - Remote shutdown circuits for valve DHV-3</u>
	<u>Train 2 - Remote shutdown circuits for valve DHV-4</u>

FIRE AREA CC-124-111 (continued)

EMERGENCY FEEDWATER SYSTEM:

EF Flow Paths

Train 1 - Remote shutdown and normal circuits for EFIC Control, pump EFP-1; Normal circuits to valves EFV-57, EFV-58; Remote shutdown circuits to valves EFV-14, EFV-33, EFV-57, EFV-58

Train 2 - Remote shutdown circuits for EFIC Control; Remote shutdown circuits to ASV-5, EFV-11, EFV-32, MSV-55, MSV-56; Normal circuits to valves EFV-11, EFV-32, EFV-55

Main FW Isolation

Train 1 - Normal circuits to FWV-14 FWV-15

Train 3 - Normal circuits to valves FWV-29, FWV-30, FWV-33, FWV-36

MAIN STEAM SYSTEM:  
MSIV's

Train 1 - Circuits to valves MSV-411-SV2, MSV-412-SV2, MSV-413-SV2, MSV-414-SV2

Steam Generator Press.

Train 2 - Circuits to instruments MS-107-PT, MS-108-PT, MS-111-PT, MS-112-PT

ELECTRICAL DISTRIBUTION SYSTEM:

Train 1 - Remote shutdown circuits to 4kV Breakers 3205, 3209, 3221, to 480V Breaker 3311, to EGDG-1A, RS Isolation Relay, 4kV Differential Meter; Normal circuits to 4kV UV, Breaker 3209, EGDG-1A

Train 2 - Remote shutdown circuits to 4KV Breakers 3206, 3210, 3220, to 480V Breaker 3310, to EGDG-1B, RS Isolation Relay, 4kV Differential Meter; Normal circuits to EGDG-1B

MAKE-UP AND PURIFICATION SYSTEM:  
Make up Charging Paths

Train 1 - Remote shutdown circuits to pumps MUP-1A, MUP-2A, MUP-4A; to valves MUV-27, MUV-73; Normal circuits to MUP-1A, MUP-4A, MUP-5A, MUV-27, MUV-73



FIRE AREA CC-124-111 (continued)

	Train 2 - Remote shutdown circuits to pumps <u>MUP-1C, MUP-3C, MUP-4C</u> , to valves <u>MUV-25, MUV-58</u> ; Normal circuits to <u>MUP-TC, MUP-5C, MUV-58</u>
Swing Pump	Train 1&2 - Remote shutdown circuits to pumps <u>MUP-2B, MUP-3B, MUP-4B</u> ; Normal circuits to <u>MUP-5B</u>
	Train 1 - Normal circuits to <u>MUP-1B, MUV-3</u> ; Remote shutdown circuits to <u>pump MUP-TB</u>
	Train 2 - Normal circuits to <u>MUP-1B, MUV-3</u> ; Remote shutdown circuits to <u>pump MUP-TB, MUV-23</u>
Letdown Isolation	Train 1 - Remote shutdown circuits to valves <u>MUV-40, MUV-41</u> ; Normal circuits to valves <u>MUV-40, MUV-41</u>
	Train 2 - Remote shutdown circuit to <u>MUV-49</u> ; Normal circuit to <u>MUV-49</u>
REACTOR COOLANT SYSTEM: RC Instrumentation	Train 1 - Remote shutdown circuits to instruments <u>RC-1-LT1, RC-2-TE1, RC-4A-TE1, RC-5A-TE2</u>
	Train 2 - Remote shutdown circuits to instruments <u>RC-1-LT3, RC-2-TE2, RC-4B-TE4, RC-5B-TE4</u>
RC Drain Tank Isolation	Train 1 - Remote shutdown and normal circuits to <u>RCV-10</u>
	Train 2 - Remote shutdown circuits to <u>RCV-11</u>
NUCLEAR SERVICE SEAWATER SYSTEM: Nuc. Service SW Pumps	Train 1 - Remote shutdown circuits to <u>pump RWP-2A</u>
	Train 2 - Remote shutdown circuits to <u>pump RWP-2B</u>

FIRE AREA CC-124-111 (continued)

DH Service SW Pumps

Train 1 - Remote shutdown circuits to RWP-3A

Train 2 - Remote shutdown circuits to RWP-3B

SECONDARY PLANT INSTRUMENTATION  
SYSTEM:

Steam Generator Level

Train 2 - Circuits to instruments  
SP-18-DPT, SP-19-DPT,  
SP-22-DPT, SP-23-DPT,  
SP-26-DPT, SP-27-DPT,  
SP-31-DPT, SPS-30-DPT

CST Level Indication

Train 2 - Circuits to instrument  
CD-99-DPT

NUCLEAR SERVICE CLOSED CYCLE  
COOLING WATER SYSTEM:  
SW Pumps

Train 1 - Remote shutdown circuits to  
pump SWP-1A

Train 2 - Remote shutdown circuits to  
pump SWP-1B

RB Fan Cooling

Train 1 - Remote shutdown circuits to  
valves SWV-353A, SWV-354A;  
Normal circuit to SWV-353A

Train 2 - Remote shutdown circuits to  
valves SWV-353B, SWV-354B

Train 3 - Circuits to valves SWV-39,  
SWV-45

Safety Related Equipment Not Required for Safe Shutdown

ELECTRICAL DISTRIBUTION SYSTEM:

Train A - Trays 153, 212, 215, 216, 260,  
261, 262, 263, 264, 631, 633  
for control power; circuits in  
conduit

Train B - Trays 120, 154, 206, 217, 265,  
266, 267, 268, 640, 643 for  
control power; circuits in  
conduit

Train C - Tray 623 for control power

Train AB- Circuits in conduit

CORE FLOOD SYSTEM:

Train AB- Circuits in conduit

### FIRE AREA CC-124-111 (continued)

MAIN STEAM SYSTEM:	Train AB-	Circuits in conduit
MAKE-UP AND PURIFICATION SYSTEM:	Train B -	Circuits in conduit
	Train AB-	Circuits in conduit
NUCLEAR SERVICE CLOSED CYCLE COOLING WATER SYSTEM:	Train A -	Circuits in conduit
	Train B -	Circuits in conduit
EMERGENCY FEEDWATER SYSTEM:	Train A -	Circuits in conduit
AIR HANDLING SYSTEM:	Train A -	Circuits in conduit
	Train B -	Circuits in conduit
	Train AB-	Circuits in conduit; heat exchangers AHHE-6D; AHHE-6E, AHHE-6F
SERVICE AIR SYSTEM:	Train AB-	Piping
FIRE SERVICE WATER SYSTEM:	Train AB-	Piping

### Consequences of Design Basis Fire

The ionization detectors will detect the products of combustion from an incipient fire and alert the control room for prompt response by the fire brigade. The available fire protection equipment is adequate to extinguish a design basis fire in this area.

Train 2 components of the Air Handling System (all functions) will be protected and available for safe shutdown with the exception of diesel generator room fan AHF-22D. This fan (for Diesel Generator Room Fans) may be lost as a result of design bases fire, however, fan AHF-22C will be available for Train 2.

For the Air Handling System (Control Complex HVAC), loss of fans AHF-20A (Train 1) and AHF-20B (Train 2) may occur as a result of a design basis fire. This is acceptable because the remaining components in both trains will be available to cool the Main Control Room and the dedicated HVAC system may be used to cool the other Control Complex areas.

Both trains are available for safe shutdown for the Decay Heat Closed Cycle Cooling and Decay Heat Systems. The valves should be operated manually if required.



### FIRE AREA CC-124-111 (continued)

Train 2 of the Emergency Feedwater System (EF Flow Paths) is being relied upon for a fire in this area. Power circuits to valve EFV-55 will be lost; however, this will only prevent the normally open valve from closing. Control of emergency feedwater flow can be accomplished through EFV-11 and EFV-32.

Train 2 for the Emergency Feedwater System (Main FW Isolation) is also completely functional. Trains 1 and 3 may be disabled as a result of a fire. Train 2 of the Main Steam System (MSIV's) will be functional for safe shutdown. Train 1 may be lost as a result of a fire. Train 2 circuits for Steam Generator Pressure Instrumentation will be protected and therefore will be available for safe shutdown.

Train 2 of the Electrical Distribution System is protected and functional for safe shutdown. Train 1 may be disabled as a result of a design basis fire.

Train 2 of the Makeup and Purification System (Charging Paths) will be available for safe shutdown. MUP-5C could be disabled as a result of a design basis fire, however, MUP-4C is functional as a backup gear oil pump. Train 1 components MUP-5A, MUP-4A, MUV-27 and MUV-73 may be lost as a result of a design basis fire.

Both Trains of the Swing Pump are functional. There is an unprotected circuit for MUP-1B which is not needed for a fire in this area. MUP-5B may be lost as a result of a fire, however, MUP-4B is available as a back up gear oil pump. For Train 2, the charging path is via MUV-3, 4 and 25 since MUV-23 and MUV-27 may be lost for a fire in this area.

Train 1 Makeup and Purification (Letdown Isolation) is functional for a fire in this area. The unprotected circuits to MUV-40 and MUV-41 have a fuse installed in the circuit such that control of the valves will be maintained in the event of fire induced damage. Should the 'A' diesel be lost in conjunction with a loss of offsite power, cross-tieing of the 480V Busses will be required.

Both trains of RC Instrumentation are available because all of the circuits in the area are remote shutdown circuits that are not required for a fire in this area. Train 2 of the Reactor Coolant System (RC Drain Tank Isolation) is completely functional.

Both trains are also available for the Nuclear Service Seawater System and Secondary Plant Instrumentation.

The low combustible loading, fire detection, high personnel traffic, full area automatic suppression, and construction of the walls preclude the design basis fire from propagating to other fire areas.

FIRE AREA CC-124-111 (continued)

CONCLUSION

The design basis fire will not affect the capability to achieve and maintain cold shutdown. Administrative limits must be put in place to restrict the amount and type of transient combustibles in the area. The total combustible loading must not exceed 38,000 BTU's/sq. ft.

Thus, Impell believes upgrading the fire resistance rating of the ceiling is not warranted, and would not enhance the level of safety afforded to the public.

## FIRE AREA CC-124-112

### EFIC Room "A"

#### DEVIATION PROPOSED

Appendix R, Section III.G.2.a requires separation of cables and equipment of redundant safe shutdown systems by a fire barrier having a 3 hour fire rating. Fire Area CC-124-112 in the Control Complex does not meet this criteria due to the construction of the ceiling, which separates this elevation from the cable spreading room. The ceiling is constructed of steel plate on protected and unprotected structural steel with a 1 hour fire resistant material on the top of the steel. Penetrations through the ceiling are sealed above the steel.

A deviation from the above requirement is proposed due to the difficulty in protecting the underside of the steel because of excessive interference by cable trays, conduits, and equipment.

This ceiling was previously accepted as a fire area barrier for fire areas CC-124-116 and CC-124-117 under the guidance of Appendix A of Branch Technical Position 9.5.1 (Safety Evaluation by the Office of Nuclear Reactor Regulation Supporting Amendment No. 23 to License No. DPR-72, Docket No. 50-302, dated July 27, 1979).

#### TECHNICAL BASES FOR DEVIATION

<u>Combustible Material</u>	<u>Quantity</u>
Cable (Note 1)	77 lbs

Fire loading - 3687 BTU/sq. ft.

Maximum permissible fire loading - 38,000 BTU/sq ft (Note 2)

Heat Rate - C/500°F

Maximum Severity Fire - 2 minutes

Note 1: The quantity of cable insulation called out above is based on 50% fill for all cable trays that are filled with cable up to 50% full by volume. For cable trays that are more than 50% full, the actual percentage fill has been used. This is extremely conservative, since very few trays are filled to greater than 50% and the actual plant average tray fill is significantly lower.

Note 2: The maximum permissible fire loading is based on an evenly distributed loading of combustible materials and is based upon the limitation of the steel ceiling construction.

## FIRE AREA CC-124-112 (continued)

### Design Basis Fire

The maximum severity fire is based upon the 'E' curve of the NFPA Handbook (15th edition) which corresponds to the standards of ASTM E-119 and NFPA-251. Since the only combustible is IEEE-383 type cable, which through fire tests has shown to have properties that limit the ability to sustain a fire, the design basis fire is postulated to be a slow burning fire (equivalent to a 'C' fire ) that reaches a maximum temperature of 500°F. This is less than the 1100°F critical temperature of structural steel.

The design basis fire is conservatively based on the simultaneous total combustion of all combustibles in the area.

### Fire Protection Equipment

There is no fire fighting equipment in this area. Portable fire extinguishers are available in adjacent area CC-124-114 and nearby area CC-124-111. In addition, an ionization smoke detector located within the area provides an early warning alarm in the control room.

### Construction

The north and west walls and the floor are concrete with a 3 hour fire rating. The south and east walls are gypsum board walls with a 3 hour fire rating. The ceiling is steel plate on protected and unprotected structural steel with a 1 hour directional fire barrier from the top down. A Class A fire door in the south wall accesses area CC-124-114. Electrical and mechanical penetrations in the walls and floor of this fire area are provided with a 3 hour fire rated penetration seal. Ventilation ducts with 3 hour fire dampers communicate with fire areas CC-124-114 and CC-124-113.

### Safe Shutdown Equipment

#### EMERGENCY FEEDWATER SYSTEM:

EF Flow Paths

Train 1 - Circuits for EFIC Control;  
Circuits for EFIC  
Instrumentation; Circuits to  
valves EFV-57, EFV-58

Train 2 - Circuits for EFIC  
Instrumentation

#### MAIN STEAM SYSTEM:

Steam Gen. Press.

Train 1 - Circuits to instruments  
MS-106-PT, MS-110-PT

#### ELECTRICAL DISTRIBUTION SYSTEM:

Train 1 - VBDP-8; Circuits to "A"  
Inverter and VBDP-8; Circuits  
to RS Isolation Relay

## FIRE AREA CC-124-112 (continued)

### SECONDARY PLANT INSTRUMENTATION:

Steam Gen. Level

Train 1 - Circuits to instruments  
SP-17-DPT, SP-21-DPT,  
SP-25-DPT, SP-29-DPT

CST Level

Train 1 - Circuits to instrument  
CD-98-DPT

### Safety Related Equipment Not Required for Safe Shutdown

CORE FLOOD SYSTEM:

Train AB- Circuits in conduit

MAIN STEAM SYSTEM:

Train AB- Circuits in conduit

ELECTRICAL DISTRIBUTION SYSTEM:

Train A - Tray 638 for control power

### Consequences of Design Basis Fire

The ionization detectors will detect the products of combustion from an incipient fire and alert the control room for prompt response by the fire brigade. The available fire fighting equipment is adequate to extinguish the design basis fire.

The low combustible loading, fire detection, and construction of the walls preclude the design basis fire from propagating to other fire areas.

Loss of Train 1 of the safe shutdown systems listed above may occur as a result of a design basis fire in this area. Train 2 circuits for EFIC instrumentation may also be lost for the Emergency Feedwater System; however, the circuits that are redundant to Train 1 are in conduit that is protected by a 3 hour rated fire enclosure/wrap. Therefore, Train 2 of all the above shutdown systems will be available for a fire in this area.

### CONCLUSION

A design basis fire will not affect the capability to achieve and maintain cold shutdown. Administrative limits must be put in place to restrict the amount and type of transient combustibles in the area. The total combustible loading must not exceed 38,000 BTU's/sq. ft.

Thus, Impell believes upgrading the fire resistance rating of the ceiling is not warranted, and would not enhance the level of safety afforded to the public.



## FIRE AREA CC-124-113

### EFIC Room "C"

#### DEVIATION PROPOSED

Appendix R, Section III.G.2.a requires separation of cables and equipment of redundant safe shutdown systems by a fire barrier having a 3 hour fire rating. Fire Area CC-124-113 in the Control Complex does not meet this criteria due to the construction of the ceiling, which separates this elevation from the cable spreading room. The ceiling is constructed of steel plate on protected and unprotected structural steel with a 1 hour fire resistant material on the top of the steel. Penetrations through the ceiling are sealed above the steel.

A deviation from the above requirement is proposed due to the difficulty in protecting the underside of the steel because of excessive interference by cable trays, conduits, and equipment.

This ceiling was previously accepted as a fire area barrier for fire areas CC-124-116 and CC-124-117 under the guidance of Appendix A of Branch Technical Position 9.5.1 (Safety Evaluation by the Office of Nuclear Reactor Regulation Supporting Amendment No. 23 to License No. DPR-72, Docket No. 50-302, dated July 27, 1979).

#### TECHNICAL BASES FOR DEVIATION

##### Combustible Material

##### Quantity

Negligible

N/A

Fire loading - Negligible

Maximum permissible fire loading - 38,000 BTU/sq ft (Note 1)

Heat Rate - N/A

Note 1: The maximum permissible fire loading is based on an evenly distributed loading of combustible materials and is based on the construction limitations of the ceiling.

##### Design Basis Fire

Since there are no permanent combustibles, a design basis fire would involve only transient combustibles. A significant fire is not considered credible.

## FIRE AREA CC-124-113 (continued)

### Fire Protection Equipment

There is no fire fighting equipment in the area. Portable fire extinguishers are available in adjacent area CC-124-114 and CC-124-111. In addition, an ionization smoke detector located within the area provides an early warning alarm in the control room.

### Construction

The north and east walls and the floor are concrete with a 3 hour fire rating. The south and west walls are gypsum board walls with a 3 hour rating. The ceiling is steel plate on protected and unprotected structural steel with a 1 hour directional fire barrier from the top down. A Class A fire door in the south wall accesses area CC-124-115. Electrical and mechanical penetrations in the walls and floor of this fire area are provided with a 3 hour fire rated penetration seal. Ventilation ducts with 3 hour fire dampers communicate with fire areas CC-124-112 and CC-124-115.

### Safe Shutdown Equipment

#### AIR HANDLING SYSTEM:

EFIC Room HVAC	Train 2 -	Circuits to valves CHV-100, CHV-101, CHV-90, CHV-97
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#### EMERGENCY FEEDWATER SYSTEM:

EF Flow Path	Train 1 -	Circuits for EFIC Instrumentation
	Train 2 -	Circuits to valves EFV-11, EFV-32; Circuits for EFIC Instrumentation; Circuits for EFIC Control

#### MAIN STEAM SYSTEM:

Steam Gen. Pressure	Train 2 -	Circuits to instruments MS-108-PT, MS-112-PT
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ELECTRICAL DISTRIBUTION SYSTEM:	Train 1 -	Circuits to "C" Inverter and VBDP-9
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#### SECONDARY PLANT INSTRUMENTATION:

Steam Gen. Pressure	Train 2 -	Circuits to instruments SP-19-DPT, SP-23-DPT, SP-27-DPT, SP-31-DPT
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## FIRE AREA CC-124-113 (continued)

### Safety Related Equipment Not Required for Safe Shutdown

CORE FLOOD SYSTEM:                      Train AB-    Circuits in conduit

MAIN STEAM SYSTEM:                      Train AB-    Circuits in conduit

### Consequences of Design Basis Fire

The ionization detector is expected to detect the products of combustion from an incipient fire and alert the control room for prompt response by the fire brigade. The available fire fighting equipment is adequate to extinguish the design basis fire.

Loss of all safe shutdown circuits listed above may occur as a result of a design basis fire in this area. With the exception of the Emergency Feedwater System, only one train of the above safe shutdown systems is in the fire area thus, the redundant train would be available for safe shutdown. The Emergency Feedwater System contains Train 1 and Train 2 circuits for EFIC instrumentation. All of these circuits terminate in the EFIC cabinets located in this fire area. Loss of these circuits is acceptable because at least two of the remaining EFIC channels of a four channel system would be available for operation of the EFIC system, thus, enabling safe shutdown.

The minimal combustible loading, fire detection, and construction of the walls preclude the possibility of a design basis fire propagating to other fire areas.

### CONCLUSION

A design basis fire will not affect the capability to achieve and maintain cold shutdown. Administrative limits must be put in place to restrict the amount and type of transient combustibles in the area. The total combustible loading must not exceed 38,000 BTU's/sq. ft.

Thus, Impell believes upgrading the fire resistance rating of the ceiling is not warranted, and would not enhance the level of safety afforded to the public.



## FIRE AREA CC-124-114

### EFIC Room "D"

#### DEVIATION PROPOSED

Appendix R, Section III.G.2.a requires separation of cables and equipment of redundant safe shutdown systems by a fire barrier having a 3 hour fire rating. Fire Area CC-124-114 in the Control Complex does not meet this criteria due to the construction of the ceiling, which separates this elevation from the cable spreading room. The ceiling is constructed of steel plate on protected and unprotected structural steel with a 1 hour fire resistant material on the top of the steel. Penetrations through the ceiling are sealed above the steel.

A deviation from the above requirement is proposed due to the difficulty in protecting the underside of the steel because of excessive interference by cable trays, conduits, and equipment.

This ceiling was previously accepted as a fire area barrier for fire areas CC-124-116 and CC-124-117 under the guidance of Appendix A of Branch Technical Position 9.5.1 (Safety Evaluation by the Office of Nuclear Reactor Regulation Supporting Amendment No. 23 to License No. DPR-72, Docket No. 50-302, dated July 27, 1979).

#### TECHNICAL BASES FOR DEVIATION

<u>Combustible Material</u>	<u>Quantity</u>
Negligible	N/A
Fire loading - Negligible	
Maximum permissible fire loading - 38,000 BTU/sq ft (Note 1)	
Heat Rate - N/A	

Note 1: The maximum permissible fire loading is based on an evenly distributed loading of combustible materials and is based on the construction limitations of the steel ceiling.

#### Design Basis Fire

Since there are no permanent combustibles, a design basis fire would involve only transient combustibles. A significant fire is not considered credible.

## FIRE AREA CC-124-114 (continued)

### Fire Protection Equipment

The only fire fighting equipment in the area is 1 portable CO<sub>2</sub> fire extinguisher. Other portable fire extinguishers are available in adjacent area CC-124-111. In addition, an ionization smoke detector located within the area provides an early warning alarm in the control room.

### Construction

The south and west walls and the floor are concrete with a 3 hour fire rating. The north and east walls are gypsum board walls with a 3 hour fire rating. The ceiling is steel plate on protected and unprotected structural steel with a one hour directional fire barrier from the top down. Class A fire doors in the north, south and east walls access areas CC-124-112, CC-124-111, and CC-124-115, respectively. Ventilation duct with 3 hour fire dampers communicates with areas CC-108-105, CC-124-111, and CC-134-118. Electrical and mechanical penetrations in the walls and floor of this fire area are provided with a 3 hour fire rated penetration seal.

### Safe Shutdown Equipment

Components listed below that are underlined will be protected in a 3 hour fire rated enclosure or wrap.

AIR HANDLING SYSTEM:	Train 0 - Ductwork
EFIC Room HVAC	Train 2 - Circuits to fan AHF-54B; Circuits to valves CHV-90, CHV-97, CHV-100, CHV-101
EMERGENCY FEEDWATER SYSTEM:	
EF Flow Paths	Train 1 - Circuits for EFIC Control; <u>Circuits for EFIC</u> <u>Instrumentation</u> ; Circuits to valves EFV-14, EFV-33
	Train 2 - <u>Circuits for EFIC</u> <u>Instrumentation</u>
MAIN STEAM SYSTEM:	
Steam Gen. Pressure	Train 1 - Circuits to instruments MS-109-PT, MS-113-PT
ELECTRICAL DISTRIBUTION SYSTEM:	Train 2 - Circuits to "D" Inverter and VBDP-11
SECONDARY PLANT INSTRUMENTATION:	
Steam Gen. Pressure	Train 1 - Circuits to instruments SP-20-DPT, SP-24-DPT, SP-28-DPT, SP-32-DPT

## FIRE AREA CC-124-114 (continued)

### Safety Related Equipment Not Required for Safe Shutdown

None.

### Consequences of Design Basis Fire

With the exception of redundant circuits for EFIC instrumentation, loss of the above listed safe shutdown components may occur as a result of a design basis fire. Redundant circuits to EFIC instrumentation are protected in a 3 hour rated fire enclosure/wrap thereby ensuring operation of the EFIC system. Redundant trains of the remaining safe shutdown systems are available for safe shutdown.

The minimal fire loading, fire detection, and construction of the walls preclude the possibility of a design basis fire propagating to other fire areas.

### CONCLUSION

A design basis fire in this area will not affect the capability to achieve and maintain cold shutdown. Administrative limits must be put in place to restrict the amount and type of transient combustibles in the area. The total combustible loading must not exceed 38,000 BTU's/sq. ft.

Thus, Impell believes upgrading the fire resistance rating of the ceiling is not warranted, and would not enhance the level of safety afforded to the public.

## FIRE AREA CC-124-115

### EFIC Room "B"

#### DEVIATION PROPOSED

Appendix R, Section III.G.2.a requires separation of cables and equipment of redundant safe shutdown systems by a fire barrier having a 3 hour fire rating. Fire Area CC-124-115 in the Control Complex does not meet this criteria due to the construction of the ceiling, which separates this elevation from the cable spreading room. The ceiling is constructed of steel plate on protected and unprotected structural steel with a 1 hour fire resistant material on the top of the steel. Penetrations through the ceiling are sealed above the steel.

A deviation from the above requirement is proposed due to the difficulty in protecting the underside of the steel because of excessive interference by cable trays, conduits, and equipment.

This ceiling was previously accepted as a fire area barrier for fire areas CC-124-116 and CC-124-117 under the guidance of Appendix A of Branch Technical Position 9.5.1 (Safety Evaluation by the Office of Nuclear Reactor Regulation Supporting Amendment No. 23 to License No. DPR-72, Docket No. 50-302, dated July 27, 1979).

#### TECHNICAL BASES FOR DEVIATION

<u>Combustible Material</u>	<u>Quantity</u>
Cable (Note 1)	103 lbs

Fire loading - 5207 BTU/sq. ft.

Maximum permissible fire loading - 38,000 BTU/sq ft (Note 2)

Heat Rate - C/550°

Maximum Severity Fire - 4 minutes

Note 1: The quantity of cable insulation called out above is based on 50% fill for all cable trays that are filled with cable up to 50% full by volume. For cable trays that are more than 50% full, the actual percentage fill has been used. This is extremely conservative, since very few trays are filled to greater than 50% and the actual plant average tray fill is significantly lower.

Note 2: The maximum permissible fire loading is based on an evenly distributed loading of combustible materials and is based upon the limitation of the steel ceiling construction.

## FIRE AREA CC-124-115 (continued)

### Design Basis Fire

The maximum severity fire is based upon the 'E' curve of the NFPA Handbook (15th edition) which corresponds to the standards of ASTM E-119 and NFPA-251. Since the only combustible is IEEE-383 type cable, which through fire tests has shown to have properties that limit the ability to sustain a fire, the design basis fire is postulated to be a slow burning fire (equivalent to a 'C' curve fire) that reaches a maximum temperature of 550°F. This is less than the 1100°F critical temperature of structural steel.

The design basis fire is conservatively based on the simultaneous total combustion of all combustibles in the area.

### Fire Protection Equipment

There is no fire fighting equipment in the area. Portable fire extinguishers are available in adjacent areas CC-124-114 and CC-124-111. In addition, an ionization smoke detector located within the area provides an early warning alarm in the control room.

### Construction

The south and east walls and the floor are concrete with a 3 hour fire rating. The north and west walls are gypsum board walls with a 3 hour fire rating. The ceiling is steel plate on protected and unprotected structural steel with a 1 hour directional fire barrier from the top down. Class A fire doors in the north and west walls access areas CC-124-113 and CC-124-114, respectively. Ventilation duct with 3 hour fire dampers communicates with areas CC-124-111, CS-124-114 and CS-124-113. Electrical and mechanical penetrations in the walls and floor of this fire area are provided with a 3 hour fire rated penetration seal.

### Safe Shutdown Equipment

Components listed below that are underlined will be protected in a 3 hour fire rated enclosure or wrap.

#### AIR HANDLING SYSTEM:

Diesel Generator Rm Fans	Train 2 -	Circuits to fan AHF-22C
EFIC Room HVAC	Train 2 -	Circuits to fan AHF-54B; Circuits to valves CHV-90, CHV-97, CHV-100, CHV-101

#### EMERGENCY FEEDWATER SYSTEM:

EF Flow Paths	Train 1 -	Circuits for EFIC Instrumentation
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FIRE AREA CC-124-115 (continued)

	Train 2 -	Circuits for EFIC Control; Circuits for EFIC Instrumentation; Circuits to valves ASV-5, EFV-11, EFV-32, EFV-55, EFV-56, MSV-55, MSV-56
Main FW Isolation	Train 1 -	Circuits to valves FWV-14, FWV-15
	Train 3 -	Circuits to valves FWV-29, FWV-30, FWV-33, FWV-36
MAIN STEAM SYSTEM: MSIV's	Train 2 -	Circuits to valves MSV-411-SV1, MSV-412-SV1, MSV-413-SV1, MSV-414-SV1
Steam Gen. Pressure	Train 2 -	Circuits to instruments MS-107-PT, MS-108-PT, MS-111-PT, MS-112-PT
ELECTRICAL DISTRIBUTION SYSTEM:	Train 2 -	VBDP-10; Circuits to "B" Inverter and VBDP-10, 4kV UV, 4kV Breaker 3210, EGDG-1B, RS Isolation Relay
MAKE-UP AND PURIFICATION SYSTEM:		
Makeup Charging Paths	Train 2 -	Circuits to pump MUP-4C; Circuits to valves MUV-25, MUV-58
SECONDARY PLANT INSTRUMENTATION:		
Steam Gen. Pressure	Train 2 -	Circuits to instruments SP-18-DPT, SP-19-DPT, SP-22-DPT, SP-23-DPT, SP-26-DPT, SP-27-DPT, SP-31-DPT, SP-30-DPT
CST Level Indicator	Train 2 -	Circuits to instrument CD-99-DPT
NUCLEAR SERVICE CYCLE CLOSED COOLING WATER SYSTEM:		
RB Fan Cooling	Train 2 -	Circuits to valves SWV-37, SWV-43, SWV-353B, SWV-354B

Safety Related Equipment Not Required for Safe Shutdown

ELECTRICAL DISTRIBUTION SYSTEM:	Train B -	Trays 647, 648 for Control Power
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## FIRE AREA CC-124-115 (continued)

### Consequences of Design Basis Fire

With the exception to circuits for EFV-11 and EFV-32, loss of the above listed safe shutdown components may occur as a result of a design basis fire in this area. The Emergency Feedwater System (EF Flow Paths) has Train 1 and Train 2 circuits for the EFIC system. All of these circuits either terminate in or are associated with EFIC Cabinet "B", which is in the fire area. Loss of these circuits is acceptable because at least two channels of the EFIC system are still operable for a fire in this area. Train 1 is completely functional for suction from the condensate storage tank.

Train 1 and Train 3 of the Emergency Feedwater System (Main FW Isolation) may be lost as a result of a fire in this area. Train 2 is functional, however, for main feedwater isolation.

For the remaining safe shutdown systems listed above, Train 1 is operable for safe shutdown.

The low fire loading, available fire detection, and the construction of the walls preclude the possibility of a design basis fire propagating to other fire areas.

### CONCLUSION

A design basis fire will not affect the capability to achieve and maintain cold shutdown. Administrative limits must be put in place to restrict the amount and type of transient combustibles in the area. The total combustible loading must not exceed 38,000 BTU's/sq. ft.

Thus, Impell believes upgrading the fire resistance rating of the ceiling is not warranted, and would not enhance the level of safety afforded to the public.

## FIRE AREA CC-124-116

### 480V ES Switchgear Bus Room 3B

#### DEVIATION PROPOSED

Appendix R, Section III.G.2.a requires separation of cables and equipment of redundant safe shutdown systems by a fire barrier having a 3 hour fire rating. Fire Area CC-124-116 in the Control Complex does not meet this criteria due to the construction of the ceiling, which separates this elevation from the cable spreading room. The ceiling is constructed of steel plate on protected and unprotected structural steel with a 1 hour fire resistant material on the top of the steel. Penetrations through the ceiling are sealed above the steel.

A deviation from the above requirement is proposed due to the difficulty in protecting the underside of the steel because of excessive interference by cable trays, conduits, and equipment.

This ceiling was previously accepted as a fire area barrier under the guidance of Appendix A of Branch Technical Position 9.5.1 (Safety Evaluation by the Office of Nuclear Reactor Regulation Supporting Amendment No. 23 to License No. DPR-72, Docket No. 50-302, dated July 27, 1979 SER Section 5.12.6). Since the previous acceptance, no new cable trays have been added in this area and the addition of cable to the existing trays has been minimal.

#### TECHNICAL BASES FOR DEVIATION

##### Combustible Material

##### Quantity

Cable (Note 1)

1682 lbs.

Fire loading - 33,744 BTU/sq ft

Maximum permissible fire loading - 38,000 BTU/sq ft (Note 2)

Heat Rate - C/1030°F

Maximum Severity Fire - 25 minutes

Note 1: The quantity of cable insulation called out above is based on 50% fill for all cable trays that are filled with cable up to 50% full by volume. For cable trays that are more than 50% full, the actual percentage fill has been used. This is extremely conservative, since very few trays are filled to greater than 50% and the actual plant average tray fill is significantly lower.

Note 2: The maximum permissible fire loading is based on an evenly distributed loading of combustible materials and is based upon the limitation of the steel ceiling construction.



## FIRE AREA CC-124-116 (continued)

### Design Basis Fire

The maximum severity fire is based upon the 'E' curve of the NFPA Handbook (15th edition) which corresponds to the standards of ASTM E-119 and NFPA-251. Since the only combustible is IEEE-383 type cable, which through fire tests has shown to have properties that limit the ability to sustain a fire, the design basis fire is postulated to be a slow burning fire (equivalent to a 'C' curve fire) that reaches a maximum temperature of 1030°F. This is less than the 1100°F critical temperature of structural steel.

The design basis fire is conservatively based on the simultaneous total combustion of all combustibles in the area.

### Fire Protection Equipment

Fire fighting equipment in the area consists of 1 portable CO<sub>2</sub> fire extinguisher. Portable fire extinguishers are also available in adjacent areas CC-124-111 and CC-124-117. In addition, ionization smoke detectors are located within the area provide an early warning alarm in the control room.

### Construction

All four walls and the floor are concrete with a 3 hour fire rating. The ceiling is steel plate on protected and unprotected structural steel with a 1 hour rated directional fire barrier from the top down. A Class A fire door in the north wall accesses area CC-124-111. Ventilation duct with 3 hour fire dampers communicates with area CC-124-111. Electrical and mechanical penetrations in the walls and floor of this fire area are provided with a 3 hour fire rated penetration seal.

### Safe Shutdown Equipment

Components listed below that are underlined will be protected in a 3 hour fire rated enclosure/wrap.

#### AIR HANDLING SYSTEM:

Diesel Gen. Room Fans	Train 2 -	Circuits to fan AHF-22D
EFIC Room HVAC	Train 2 -	Circuits to CHHE-1B
Control Complex HVAC	Train 2 -	Circuits to fans AHF-20B, AHF-19B
	Train 0 -	Ductwork

#### DECAY HEAT CLOSED CYCLE COOLING SYSTEM:

Train 2 -	Circuits to pump DCP-1B
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#### DECAY HEAT SYSTEM.

RC Outlet Isolation	Train 2 -	Circuits to valve DHV-4
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FIRE AREA CC-124-116 (continued)

EMERGENCY FEEDWATER SYSTEM:

EF Flow Paths

Train 1 - Circuits to valves EFV-14,  
EFV-33

Train 2 - Circuits to valves ASV-5,  
EFV-11, EFV-32, EFV-55,  
EFV-56, MSV-55, MSV-56

Main FW Isolation

Train 1 - Circuits to valve FWV-14

Train 3 - Circuits to valves FWV-29,  
FWV-33

MAIN STEAM SYSTEM:

Stm. Gen. Pres.

Train 2 - Circuits to instruments  
MS-107-PT, MS-108-PT,  
MS-111-PT, MS-112-PT

ELECTRICAL DISTRIBUTION SYSTEM:

Train 2 - 480V ES Switchgear 3B;  
Distribution Panel DPDP-5B;  
Circuits to 4kV Breakers 3206,  
3220; Circuits to 480V Breaker  
3310; Circuits to Distribution  
Panels DPDP-5B, DPDP-6B;  
Circuits to ES MCC 3B1, 3B2,  
3B3; Circuits to 480V UV

MAKE-UP AND PURIFICATION SYSTEM:

Make-up Charging Paths

Train 2 - Circuits to Pumps MUP-3B,  
MU-3C, MUP-5C

Letdown Isolation

Train 2 - Circuits to MUV-49

SECONDARY PLANT INSTRUMENTATION:

Steam Gen. Level

Train 2 - Circuits to instruments  
SP-18-DPT, SP-19-DPT,  
SP-22-DPT, SP-23-DPT,  
SP-26-DPT, SP-27-DPT,  
SP-30-DPT, SP-31-DPT

CST Level Ind.

Train 2 - Circuits to instrument  
CD-99-DPT

## FIRE AREA CC-124-116 (continued)

### Safety Related Equipment Not Required for Safe Shutdown

ELECTRICAL DISTRIBUTION SYSTEM:	Train B -	Trays 124, 148, 149 for control power; circuits in conduit
	Train AB-	Circuits in conduit
MAIN STEAM SYSTEM:	Train AB-	Circuits in conduit
CORE FLOOD SYSTEM:	Train AB-	Circuits in conduit
SERVICE AIR SYSTEM:	Train AB-	Circuits in conduit

### Consequences of Design Basis Fire

The ionization detectors will detect the products of combustion from an incipient fire and alert the control room for prompt response by the fire brigade. The available fire fighting equipment is adequate to extinguish the design basis fire.

The low combustible loading, fire detection, and construction of the walls preclude the design basis fire from propagating to other fire areas.

Loss of the above listed safe shutdown components may occur as a result of a design basis fire in this area with the exception of circuits to EFV-11, EFV-32, MS-108-PT, MS-112-PT, SP-19-dPT, SP-23-dPT, SP-27-dPT, AND SP-31-dPT. These circuits will be protected in a 3 hour rated fire enclosure/wrap.

With the exception of the Emergency Feedwater System, Train 1 of the above safe shutdown systems will be available for safe shutdown.

For the Emergency Feedwater System (EF Flow Paths), Train 2 components may be lost as a result of a design basis fire. Circuits to valves EFV-11 and EFV-32 are protected to enable the operator to shutdown Train 2 if required. For Train 1, power circuits to EFV-14 and EFV-33 may be lost. This will remove the capability to close these normally open valves. Emergency feedwater flow will be controlled through valves EFV-57 and EFV-58, therefore Train 1 is available for safe shutdown.

Train 2 of the Emergency Feedwater System (Main FW Isolation) is also available.

FIRE AREA CC-124-116 (continued)

CONCLUSION

A design basis fire will not affect the capability to achieve and maintain cold shutdown. Administrative limits must be put in place to restrict the amount and type of transient combustibles in the area. The total combustible loading must not exceed 38,000 BTU's/sq. ft.

Thus, Impell believes upgrading the fire resistance rating of the ceiling is not warranted, and would not enhance the level of safety afforded to the public.

## FIRE AREA CC-124-117

### 480V ES Switchgear Bus Room 3A

#### DEVIATION PROPOSED

Appendix R, Section III.G.2.a requires separation of cables and equipment of redundant safe shutdown systems by a fire barrier having a 3 hour fire rating. Fire Area CC-124-117 in the Control Complex does not meet this criteria due to the construction of the ceiling, which separates this elevation from the cable spreading room. The ceiling is constructed of steel plate on protected and unprotected structural steel with a 1 hour fire resistant material on the top of the steel. Penetrations through the ceiling are sealed above the steel.

A deviation from the above requirement is proposed due to the difficulty in protecting the underside of the steel because of excessive interference by cable trays, conduits, and equipment.

This ceiling was previously accepted as a fire area barrier under the guidance of Appendix A of Branch Technical Position 9.5.1 (Safety Evaluation by the Office of Nuclear Reactor Regulation Supporting Amendment No. 23 to License No. DPR-72, Docket No. 50-302, dated July 27, 1979 SER Section 5.12.6). Since the previous acceptance, no new cable trays have been added in this area and the addition of cable to the existing trays has been minimal.

#### TECHNICAL BASES FOR DEVIATION

##### Combustible Material

##### Quantity

Cable (Note 1)

2214 lbs.

Fire loading - 37,517 BTU/sq ft

Maximum permissible fire loading - 38,000 BTU/sq ft (Note 2)

Heat Rate - C/1100°F

Maximum Severity Fire - 28 minutes

Note 1: The quantity of cable insulation called out above is based on 50% fill for all cable trays that are filled with cable up to 50% full by volume. For cable trays that are more than 50% full, the actual percentage fill has been used. This is extremely conservative, since very few trays are filled to greater than 50% and the actual plant average tray fill is significantly lower.

Note 2: The maximum permissible fire loading is based on an evenly distributed loading of combustible materials and is based upon the limitation of the steel ceiling construction.

## FIRE AREA CC-124-117 (continued)

### Design Basis Fire

The maximum severity fire is based upon the 'E' curve of the NFPA Handbook (15th edition) which corresponds to the standards of ASTM E-119 and NFPA-251. Since the only combustible is IEEE-383 type cable, which through fire tests has shown to have properties that limit the ability to sustain a fire, the design basis fire is postulated to be a slow burning fire (equivalent to a 'C' curve fire) that reaches a maximum temperature of 1100°F.

The design basis fire is conservatively based on the simultaneous total combustion of all combustibles in the area.

### Fire Protection Equipment

Fire fighting equipment in the area consists of 1 portable CO<sub>2</sub> fire extinguisher. Portable extinguishers are also available in adjacent areas CC-124-111 and CC-124-116. In addition, ionization smoke detectors are located within the area provide an early warning alarm in the control room.

### Construction

All four walls and the floor are concrete with a 3 hour fire rating. The ceiling is steel plate on protected and unprotected structural steel with a 1 hour rated directional fire barrier from the top down.

A Class A fire door in the north wall accesses area CC-124-111. Ventilation duct with 3 hour fire dampers communicates with area CC-124-111. Electrical and mechanical penetrations in the walls and floor of this fire area are provided with a 3 hour fire rated penetration seal.

### Safe Shutdown Equipment

Components listed below that are underlined will be protected in a 3 hour fire rated enclosure/wrap.

#### AIR HANDLING SYSTEM:

Reactor Bldg. Fans	Train 1 -	Circuits to fans AHF-1A
Diesel Gen. Room Fans	Train 1 -	Circuits to fan AHF-22A
EFIC Room HVAC	Train 1 -	Circuits for fan AHF-54A; <u>Circuits to pump CHP-1A;</u> <u>Circuits to CHHE-1A; Circuits</u> to valves CHV-108, CHV-113
Control Complex HVAC	Train 1 -	Circuits to fans AHF-17A, AHF-19A, AHF-20A



FIRE AREA CC-124-117 (continued)

	Train 0 - Ductwork
DECAY HEAT CLOSED CYCLE COOLING:	Train 1 - Circuits to pump DCP-1A
EMERGENCY FEEDWATER SYSTEM:	
EF Flow Paths	Train 1 - Circuits to pump EFP-1; Circuits to valves EFV-57, EFV-58
	Train 2 - Circuits to valves EFV-11, EFV-32
Main FW Isolation	Train 1 - <u>Circuits to FWV-15</u>
	Train 3 - Circuits to valves <u>FWV-30</u> , FWV-36
ELECTRICAL DISTRIBUTION SYSTEM:	Train 1 - 480V Switchgear 3A; Distribution Panel DPDP-5A; Circuits to 480V UV; Circuits to Breaker Cont. Power, 480V UV; Circuits to 4kV Breakers 3205, 3209, 3221; Circuits to 480V Breaker 3311; Circuits to distribution Panels DPDP-5A, DPDP-6A; Circuits to ES MCC 3A1, 3A2, 3A3, 3AB; Circuits to EGDG-1A
MAKE-UP AND PURIFICATION SYSTEM:	
Charging Paths	Train 1 - Circuits to pumps MUP-2A, MUP-3A, MUP-3B, MUP-4A, <u>MUP-5A</u> ; Circuits to valve <u>MUV-73</u>
Letdown Isolation	Train 1 - Circuits to valves MUV-40, MUV-41
NUCLEAR SERVICE CLOSED CYCLE COOLING WATER SYSTEM:	
RB Fan Cooling	Train 1 - <u>Circuits to valve SWV-353A</u>

Safety Related Equipment Not Required for Safe Shutdown

ELECTRICAL DISTRIBUTION SYSTEM:	Train A - Trays 116, 118, 145, 146, 147, 562 for control power; circuits in conduit
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### FIRE AREA CC-124-117 (continued)

Train B - Circuits in conduit

Train AB- Circuits in conduit

#### Consequences of Design Basis Fire

The ionization detectors will detect the products of combustion from an incipient fire and alert the control room for prompt response by the fire brigade. The available fire fighting equipment is adequate to extinguish the design basis fire.

The low combustible loading, fire detection, and construction of the walls preclude the design basis fire from propagating to other fire areas.

With the exception of the Emergency Feedwater System, Train 2 of the above safet shutdown systems will be available for safe shutdown.

For the Emergency Feedwater System (EF Flow Paths), Train 1 components may be lost as a result of a design basis fire. For Train 2, power circuits to EFV-11 and EFV-32 may be lost. This will remove the capability to close the normally open valves. Emergency Feedwater flow will be controlled through valves EFV-55 and EFV-56, therefore Train 2 is available for safe shutdown.

Train 2 of the Emergency Feedwater System (Main FW Isolation) is also available.

#### CONCLUSION

A design basis fire will not affect the capability to achieve and maintain cold shutdown. Administrative limits must be put in place to restrict the amount and type of transient combustibles in the area. The total combustible loading must not exceed 38,000 BTU's/sq. ft.

Thus, Impell believes upgrading the fire resistance rating of the ceiling is not warranted, and would not enhance the level of safety afforded to the public.



ATTACHMENT 2  
July 25, 1985

APPENDIX R  
EMERGENCY LIGHTING EVALUATION

## EMERGENCY LIGHTING

### REQUIREMENT (10 CFR 50, Appendix R, Section III.J.)

"Emergency lighting units with at least an 8-hour battery power supply shall be provided in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto."

### GUIDANCE (Generic Letter 85-01, Section 4.1)

The level of illumination provided by emergency lighting in access routes to and in areas where shutdown functions must be performed is a level that is sufficient to enable an operator to reach that area and perform the shutdown functions. At the remote shutdown panels the illumination levels should be sufficient for control panel operators.

### EVALUATION

#### A. EMERGENCY BATTERY PACK LIGHTING

Procedures for shutdown in the event of a fire have been reviewed to determine what operations must be performed outside the main control room. These operations have been categorized as follows:

- 1) Required Operations,
- 2) Verification Operations,
- 3) Remedial Operations

Required operations are those actions which must be taken to initiate or maintain shutdown operations according to the Appendix R design. Emergency 8-hour battery pack lights have been installed to provide access to, egress from and lighting in areas where required operations will be performed.

Verification operations are actions taken as a matter of good practice, and include items such as independent verification of control rod insertion or turbine trip. These actions are not considered vital since the components necessary to achieve these functions are protected from the effects of fire. Emergency 8-hour battery pack lights are not provided for these operations by design. However, many of these operations are performed in areas where battery pack lighting is provided for required operations, or alternate lighting provisions are available.

Remedial operations are those actions which may be taken to mitigate the effects of spurious operations. Spurious operations have been identified and evaluated; however, since their occurrence is highly unlikely, emergency 8-hour battery pack lighting has not been provided by design. Alternate lighting provisions are available for remedial operations.

## B. ADDITIONAL EMERGENCY LIGHTING

In addition to emergency 8-hour battery pack lights, areas throughout the Reactor, Auxiliary, Intermediate and Turbine Buildings are provided with normal plant lighting fixtures which are automatically supplied power from the emergency diesel generators in the event of loss of normal sources. These lights will be available to provide access/egress and operational lighting for verification and remedial operations.

## C. DEDICATED HAND HELD LIGHTS

Three storage locations are provided for dedicated hand held lights (flashlights). The storage locations are:

- 1) Near the Remote Shutdown Panel - Control Complex El. 108'
- 2) Near the elevator - Auxiliary Building El. 95'
- 3) Near the Condensate Demineralizers - Turbine Building El. 119'

These lights are not to be used for any purpose except supplemental lighting in the event of a fire. These lights are included in the periodic preventative maintenance program under Preventative Maintenance Procedure PM-110, Miscellaneous Plant Batteries.

## CONCLUSION

The number and placement of 8-hour battery emergency lighting units is sufficient to provide access to, egress from, and illumination for operations, outside the main control room which are necessary for safe shutdown. Additional diesel backed emergency lights and hand held lights will provide illumination for verification and remedial operations which will be performed as a matter of good practice. This design meets or exceeds the requirements of 10 CFR 50, Appendix R, Section III.J., and provides a dependable emergency lighting system.

ATTACHMENT 3  
July 25, 1985

PROTECTION AGAINST  
SPURIOUS ACTUATION OF  
AUTOMATIC FIRE SUPPRESSION SYSTEMS

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**REQUIREMENTS**

10 CFR 50, Appendix A. General Design Criterion 3

"Firefighting systems shall be designed to assure that their rupture or inadvertant operation does not significantly impair the safety capability of (structures, systems or components important to safety)."

Branch Technical Position APCSB 9.5-1, 1976, Appendix A

"Failure or inadvertant operation of the fire suppression system should not incapacitate safety related systems or components."

Operating License # DPR-72, Amendment 23, July 27, 1979, Safety Evaluation Report, Section 4.3.1.7

"Fixed fire suppression systems have not been installed where their operation or failure could cause unacceptable damage to safety related equipment."

"The licensee will provide drip protection for safety-related motor control centers in areas where automatic sprinkler systems are installed."

**EVALUATION**

Since the time that the Crystal River Unit 3 "Appendix A" Safety Evaluation Report was issued, the automatic fire suppression systems have been completely re-designed in order to comply with the separation requirements of 10 CFR 50, Appendix R. Compliance with the requirements listed above has been accomplished by the following methods.

1. The sprinkler system is seismically supported to preclude its falling down on equipment below.
2. It is a closed head system so that a fire will initiate a head opening only where the fire is located, or spurious operation will only occur at a single head.
3. Sprinkler head guards are placed on exposed heads in high traffic areas to protect them from accidental mechanical damage or actuation.
4. Conduits entering vertically into MCC's will have the space between the cable and the conduit plugged with a water-tight material.
- i. Water flow alarms and isolation valves are located in each major sprinkler branch line to provide the ability to quickly identify and isolate spurious sprinkler operation.

6. Safe shutdown power circuits originate from MCC's located on different fire area/building elevations so that any one fire or inadvertent sprinkler operation for that fire area/elevation would not affect both shutdown trains.

In summation, applicable regulations and requirements have been considered and where applicable incorporated into the design, installation, and testing of the present wet-pipe sprinkler system.

### CONCLUSION

The Crystal River Unit 3 fire protection design has located redundant safe shutdown components such that a single fire (and related suppression activities) will not impair the ability to safely shut down. Inadvertant actuation of a fire suppression system, alone, (without a fire) will also not impair the ability to safely shut down. This separation philosophy combined with the design features of the automatic fire suppression systems provide assurance that inadvertant actuation of a fire suppression system is highly unlikely and will not cause unacceptable damage to systems or components important to safety.