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June 29, 1981
EF2 - 53,899

Mr. L. ntner
Divis Project Management
Office of Nuclear Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Kintner:

Reference: Enrico Fermi Atomic Power Plant, Unit 2
NRC Docket No. 50-341

Subject: Response to Q. 021.32

Enclosed please find Detroit Edison's response to Question 021.32.

Sincerely,

W Colbert/EL

W. F. Colbert
Technical Director
Enrico Fermi 2

B001
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Aperture D.st
SEND DRAWINGS to:
PM

WFC/EL:jl

Enclosure

cc: B. Little

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021.32 RESPONSE

Detroit Edison has provided many design features on Fermi 2 to assure that it meets the requirements of BTP 9.5-1, Appendix A, and that the reactor can be shut down in the event of a fire. The electrical design of the plant was developed in 1970 to meet 3-feet horizontal, 5-feet vertical separation criteria, in response to PSAR Question 6.8.1. Conduit separation criteria was developed with the same criteria as [illegible] cable trays. Instrument cable trays are totally enclosed. Other cable trays have covers in areas where additional protection is required. The electrical cable insulation is a fire retardant as established by fire tests using propane burners and typical tray installation. The cable, trays, and conduits are color coded to assure that the installation follows the intended divisional routing. The routing of the cable is performed by a computer program based on the separation criteria.

No power cables are allowed in the critical control areas of the control center control room, cable spreading room, or relay room. A verification program has been conducted as an additional assurance that the electrical design was installed to the above criteria.

The control room and relay room panels are designed to prevent an internal fire from spreading out of the cabinets. A steel barrier with no penetrations allowed is provided between divisional cabinets. The fire hazards analysis of this plant was conducted by an independent consultant in accordance with Appendix A to BTP 9.5-1. Automatic water or gaseous suppression systems were provided in fire areas that contained both safety related divisions. Where the fire hazard analysis indicated, the walls, ceilings and floors were designed to provide rated fire barriers and seals. Manual water hose reels are provided to cover all areas of the plant as backup to automatic suppression. Manual CO_2 hose reels are provided outside the relay room and switchgear room in addition to the water hose stations.

The above features show that the Fermi 2 design meets the criteria of Appendix A to BTP 9.5-1, and thereby provides assurance that the plant can be shut down due to a postulated fire.

The review requested in the question poses new requirements beyond that required of Appendix A to BTP 9.5-1. The following responses are provided to the subsection part of 021.32:

021.32 Response (Additional Information)

1. A list of systems required to shut down the plant was developed. The systems identified are the minimum necessary to achieve shutdown, with the following assumptions:

   a. There are no single failures outside of the effects from the single fire.

   b. A loss of offsite power occurs and the Emergency Diesel Generators start and successfully restore the onsite electrical system.

   c. For hot shutdown systems, any operator action is from the main control room. For cold shutdown systems, however, some local operations or repair is allowed if such operation or repair can be readily accomplished.

   d. No additional transients, accidents or release of radioactivity is assumed.

The systems for shutting down the reactor are identified in Table 021.32-1 of this response. The systems are categorized according to hot shutdown only systems, cold shutdown systems, and both hot and cold shutdown systems. The systems are all redundant; both divisions are included when the divisional reference is not marked. The HPCI system (Division II) is redundant to the RCIC system and Division I safety-relief valves.

The HPCI and RCIC systems containment isolation valves have cross divisional circuits for the diverse containment isolation function. The cross-system valves remain open. In the fire scenario, there is no need to assure the isolation function as transients other than the fire are not imposed.

From the shutdown system list, the Table 021.32-2 was developed that identifies the minimum number of valves, equipment, and instrumentation necessary to use the shutdown system. In addition to the valves that must operate, valves are also listed that must be maintained in one position in order to assure system integrity or functionability. Instruments and controls were included when automatic initiation was required or where inadvertent operation would cause a system trip. The RPV level and pressure and suppression pool temperature were included as the basic operating instrumentation.

The cable routings of the basic shutdown systems were identified, using Edison's computerized cable routing program. The computer was utilized to identify all of the cable trays and conduits that contain circuits for the shutdown system equipment of Table 021.32-2. The identified cable trays were marked on "field verified" cable tray layout drawings to physically identify the tray location. Edison routes instrumentation, control, and power cables in separate trays that are differentiated by the tray classification. The conduit routings were added to the cable tray drawings to form the complete composite.

The layout drawings were marked with the various fire barriers identified in the fire hazards analysis of FSAR Appendix 9B.

The layout drawings were reviewed for the possibility of divisional interaction where there was less than 20 feet separation between divisions. These areas were marked by cross-hatching on the drawings and a summary list of problem areas is provided in table 021.32-3. This table includes the areas, suppression, detection, and corrective action necessary to achieve compliance with Appendix R to 10 CFR 50.

2. In addition to the review of divisional interaction of shutdown systems, the Fermi 2 review has considered the potential of Class 1E or BOP circuits that could become associated with one of the shutdown systems of Table 021.32-1. The types of associated circuits considered are as follows:

A. BOP circuits unisolated and fed from Class 1E circuits.

For systems not designed by the NSSS supplier, Detroit Edison Design Instruction No. 112 established the isolation requirements for BOP and Class 1E circuits. Edison design practices are to impose a fuse or other isolation device at any BOP - Class 1E interface. For circuit designs developed by the NSSS supplier, General Electric, it is allowed to feed certain BOP cables from the Class 1E control.

Edison's installation criteria for such circuits address this situation by maintaining control over the routing of such circuits. The BOP cables routed within a Class 1E division raceway must remain in that division or in BOP raceway but cannot enter the opposite division Class 1E raceways.

B. Unisolated Class 1E circuits on common power supplies.

Branch 1E circuits that feed into motor control centers are provided with fuse protection. It is Edison's position that the isolating devices constitute sufficient protection such that these feeds do not have to be considered as associated circuits.

Within a system, various Class 1E control circuits are provided between the cabinets and racks, ultimately fed from the system power supply. The computerized cable routing program used to establish the cable tray and conduit routing of shutdown systems included all of the Class 1E cables of a fire essential system between racks and cabinets. The review identified any cable tray or conduit interaction that did not meet the separation of Section III.G.2 of Appendix R to 10 CFR 50. Therefore, the original review includes all associated circuits of this type.

C. Any auxiliary systems necessary for successful operation of a shutdown division.

The systems established in Table 021.32-1 are all safety related and divisional by design. There are no BOP support or auxiliary systems that must function to maintain the shutdown system operation. The routing of the cables for these systems in Table 021.32-1 are included in the computerized cable routing program. The review identified any area meeting the separation criteria of Section III 6.2 of Appendix R to 10 CFR 50.

D. Cables to valves in a shutdown system that could spuriously operate and jeopardize the shutdown system.

The cable tray and conduit identification program included as input data, valves whose spurious operation could affect the shutdown system. The valves are not required to function but must remain in a certain position for a pressure boundary or other reason. By including these valves in the program, any of these cables that do not meet Section III.G.2 to Appendix R to 10 CFR 50 are identified. Valves that perform a high pressure to low pressure boundary are reviewed as part of Section 5 to this resonse.

E. Control cables of the opposite division from the shutdown system that it controls.

Certain systems requiring redundant sensor or logic functions, have both divisional control circuits. These systems will, therefore, have some control cables in a division opposite to the system which it is controlling. Depending upon the function, these circuits are associated with the shutdown system. A review has been conducted and certain associated circuit interactions have been identified in Table 021.32-4.

3. The information regarding any corrective actions from the associated circuit review is included in Table o21.32.4.

Table 021.32-1

SYSTEMS REQUIRED FOR SHUTDOWN

Systems Required for Hot and Cold Shutdown

C11	Control Rod Drive - Manual Scram Circuits Only
B21	Main Steam Isolation Valves (manual closure only)
T50-04	Suppression Pool Temperature Monitoring
B21	Reactor Vessel Pressure Instrumentation
T41	Control Center HVAC
T41	ESF Fan Coil Units, for Areas Servicing Shutdown Systems
P44	EBCW
P45	EESW
R30-01	Emergency Diesel Generators and Auxiliaries
X41-03	EDG and EDG Switchgear Room HVAC
R32	ESF DC System
R30, R14, R16	ESF AC Distribution System, for Shutdown System Equipment
E11-51	RHRSW System
E11-56	RHR Cooling Towers

Systems Required Only for Hot Shutdown

E51	RCIC (Div. I)
B21	Safety Relief Valves (Div. I)
E41	HPCI (Div. II)
E11	RHR, Containment Cooling Mode

Systems Required Only for Cold Shutdown

E11	RHR, Shutdown Cooling Mode
B31	Recirc. (Inboard Isolation Valves Only)

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Table 021.32-2

Equipment, Valve and Instrument List

Unless otherwise noted, all entries to this list are used for hot shutdown or hot and cold shutdown.

B21 - Nuclear Boiler System

Division I	Division II
Valves:	
B2103-F022A	B2103-F022B
-F022C	-F022D
-F028A	-F028B
-F028C	-F028D
B2104-F013A	
-F013B	
-F013C	
-F013D	
-F013E	
-F013F	

B31 - Recirculation

Valves:	
B3105-F031A	B3105-F031B
Instrumentation:	
B3100-P401A	B3100-P401B
Racks:	
H2100-P006	H2100-P022

C11 - Reactor Protection System (Manual Scram Circuit)

Relay Cabinets:	
H1100-P609	H1100-P611
-P619	
Racks:	
H2100-P084	H2100-P085
-P086	-P087

Table 021.32-2 (Continued)

E11-RHR System

Division I	Division II
Pumps:	
E1102-C002A	E1102-C002B
-C002C	-C002D
Valves:	
E1150-F003A	E1150-F003B
-F004A	-F004B
-F004C	-F004D
-F006A	-F006B
-F006C	-F006D
-F007A	-F007B
	-F008 (Cold Shutdown System)
-F009 (Cold Shutdown System)	
-F011A	-F011B
-F015A (Cold Shutdown System)	-F015B (Cold Shutdown System)
-F016A	-F016B
-F017A (Cold Shutdown System)	-F017B (Cold Shutdown System)
	-F023
-F024A	-F024B
-F026A	-F026B
-F027A	-F027B
-F028A	-F028B
-F047A	-F047B
-F048A	-F048B
	-F049
-F068A	-F048B
	-F073
-F104A	-F104B
-F606	
-F607	
	-F608 (Cold Shutdown System)
Instruments:	
Racks:	
H2100-P018	H2100-P021
-P080	-P081
-P082	-P083
	-P488
Relay Panels:	
H1100-P601	H1100-P602
-P617	-P612
-P822	-P618
-P823	-P820
	-P821

Table 021.32-2 (Continued)

E1151 - RHRSW System and E1156 - RHR Cooling Towers

	Division I	Division II
Pumps:		
	E1151-C001A -C001C	E1151-C001B -C001D
Fan Motors:		
	F1156-C001A -C001C	E1156-C001B -C001D
Valves:		
	E1150-F603A -F604A -F605A	F1150-F603B -F604B -F605B
Instrumentation:		
	H1100-P807 -P809	H1100-P810

E41 - HPCJ System

Pumps:		
		E4101-C002 -C003 -C004 -C005
Valves:		
		E4150-F001
	E4150-F002	
		-F003 -F004 -F006 -F007 -F008 -F012 -F021 -F022 -F041 -F042 -F059

Table 021.32-2 (Continued)

E41 - HPCI System (Continued)

Division I	Division II
Instrumentation:	
E4100-N028A	E4101-N028B
-N029A	-N029B
-N030A	-N030B
	-N062B
	-N062D
Instrument Racks:	
H2100-P080	H2100-P083
-P082	-P081
	-P014
Relay Panels:	
H1100-P617	H1100-P620
Control Operating Panel:	
	H1100-P602

E5I - RCIC SYSTEM

DIVISION I	DIVISION II
Pumps	
E5I01C002	
E5I01C003	
E5I01C004	
Valve	**Valves**
E5I50 F001	E5I50 F007
E5I50 F008	
F010	
F012	
F013	
F019	
F022	
F029	
F031	
F045	
F046	
F059	
F062	
F084	
Instrumentation	
E5I00 N011	
E5I00 N021 A	E5I00 N021 B
N022 A	N022 B
N023 A	N023 B
E5I00 N025 A	E5I00 N025 B
N025 C	N025 D
N026 A	N026 B
N026 C	N026 D
N027 A	N027 B
N027 C	N027 D
Instrument Racks	
H21-P080	H21-P081
H21-P082	H21-P083
H21-P017	
Relay Panels	
H11-P614	H11-P618
H11-P617	
H11-P621	
COP	
H11-P601	

P44 - EECW SYSTEM

DIVISION I	DIVISION II
Pumps	**Pumps**
P4400C001A	P4400C001B
Valves	
P4400 F 601A	P4400 F 601B
F 602A	F 602B
F 603A	F 603B
Instruments	
P44 N 403A	P44 N 403B
N 404A	N 404B
N 405A	N 405B
N 406A	N 406B
N 409A	N 409B
N 413A	N 413B
N 431A	N 431B
N 432A	N 432B
N 433A	N 433B
Racks	
H2100P447	H2100P448
	H2100P475
Relay Cabinets	
H1100P808	H1100P817
P857	P868
P891	

P45 - EESW SYSTEM

Pumps	**Pumps**	
P4500C002 A	P4500C002 B	
Relay Cabinets		
H1100 P808	H1100 P817	
P857	P870	
P868		
P891		
R14 - 4160V Swgr Buses		
R1400S001 B	R1400S001 E	Rx Bldg.
R1400S001 C	R1400S001 F	
R1400S002 A	R1400S002 C	RHR Complex
R1400S002 B	R1400S002 D	

DIVISION I	DIVISION II	
4160 - 480 V Transformers		
R1400S022 A R1400S023 A	R1400S020 A R1400S020 B	Rx Bldg.
R1400S036 A R14005037 A	R1400S038 A R14005039 A	RHR Complex
480 V Voltage Regulators		
	R1400S020 B R1400A021 B	Rx Bldg.
	R1400S038 B R1400S039 B	RHR Complex
480 V Swgr Buses		
R1400S022 R1400S023	R1400S020 R1400S021	Rx Bldg.
R1400S036 R1400S037	R1400S038 R1400S039	RHR Complex
R16 - 480 V Motor Control Centers		
R1600S002 A R1600S002 B R1600S003 A R1600S003 B R1600S003 D	R1600S004 B R1600S005 A R1600S005 D R1600S005 C	Rx Bldg.
R1600S016 A R1600S017 A	R1600S018 A R1600S019 A	RHR Complex
R31 - 120 V AC Power Supplies (MPV's)		
R3101S001	R3101S002	
R32 - DC System		
Batteries		
R3200S003	R3200S004	
Chargers		
R3200S020 A R3200S020 B	R3200S021 A R3200S021 B	
Distribution Cabinets		
R3200S026 R3200S062 R3200S063	R3200S027 R3200S065 R3200S066	

Distribution Cabinets (cont.)

DIVISION I	DIVISION II
R3200S061 A	R3200S064 A
R3200S061 B	R3200S064 B

DC Motor Control Centers

R3200S015	R3200S016

R30 - Emergency Diesel Generators

Generators

R3000S001	R3000S003
R3000S002	R3000S004

Control Panels

R3000S005	R3000S007
R3000S006	R3000S008

EDG Fuel Transfer Pumps

R3000C001	R3000C009
R3000C002	R3000C010
R3000C003	R3000C011
R3000C004	R3000C012

EDG Serv. Water Pumps

R3000C005	R3000C007
R3000C006	R3000C008

T41 - CONTROL CENTER HVAC & ESSENTIAL FAN COIL UNITS

Fans & Heating Coils	Fans
T4100B007	T4100B006
T4100C031	T4100C030
T4100B007 A	T4100B007 B
T4100B007 C	T4100B007 D

Pumps	Pumps
T4100C041	T4100C042

Compressors	Compressors
T4100B009	T4100B008

Fan Coil Units

T4100B002 (Div. I Swgr)	T4100B004 (Div. II Swgr)
T4100B003 (Div. I Swgr)	T4100B005 (Div. II Swgr)
T4100B018 (Div. I RHR)	T4100B019 (Div. II RHR)
T4100B021 (CS & RCIC)	T4100B022 (HPCI)
T4100B028 (Div. I AC Equpt Rm)	T4100B027 (Div. II AC Equpt.Rm)

Fan Coil Units (cont.)

DIVISION I	DIVISION II
T4100B034 (EECW Div. I)	T4100B035 (EECW Div. II)
Instrumentation	
Racks	
H11P809	H1100P817
P888	P889
Relay Panels	
H2100P285 A	H2100P285 B
H2100P296 A	H2100P296 B
P296 C	P296 D
P296 E	P296 F
P521	P520
P527	P527 A
P528	P529

T50 - 04 - Suppression Pool Temperature Monitoring

Instrumentation	
T/C Terminal Box	**T/C Terminal Box**
H2100P584 M	H2100P584 L
Relay Cabinet	
H1100P898 A	H1100P898 B
P914	P915
Racks	
H2100P501 A	H2100P501 B

X11-03 - RHR Complex HVAC

Fans		Fans	
X4103C001	EDG 11	X4103C005	EDG 13
C002		C006	
C003	EDG 12	C007	EDG 14
C004		C008	
C009	EDG 11 Swtch. Gr.	C013	EDG 13 Swtch. Gr.
C010		C014	
C011	EDG 12 Swtch. Gr.	C015	EDG 14 Swtch. Gr.
C014		C016	
Motor Operated Dampers			
X4103 F103		X4103 F127	
F104		F128	
F106	EDG 11 Swtch. Gr.	F130	EDG 13 Swtch. Gr.
F108		F132	
F109		F133	

Motor Operated Dampers (cont.)

F110	EDG 11 Rm.	F134	EDG 13 Rm.
F115		F139	
F116	EDG 12 Swtch. Gr.	F140	EDG 14 Swtch. Gr.
F118		F142	
F120		F144	
F121		F145	
F122	EDG 12 Rm.	F146	EDG 14 Rm.

X4103 - RHR Complex HVAC (cont.)

X4103F149	EDG 11 Rm.	X4103F153	EDG 13 Rm.
X4103F150		X4103F154	
F151	EDG 12 Rm.	F155	EDG 14 Rm.
F152		F156	
F157	Div. I Pump Rm.	F164	Div. II Pump Rm.
F159		F166	
F161		F168	
F162		F169	

Instrumentation

Relay Panels

H2100P350	H2100P352
P351	P353

TABLE 021.32-3 INTERACTION AREAS LESS THAN 20 FEET

Area	Detection	Suppression	Corrective Action
AB, Elev. 551'	Ionization	Sprinklers	Provide 1-hr barrier wall or barrier for Div. 2
AB, Elev. 583 North End, South End and Elev. 603'-6"	Ionization	Sprinklers	Provide one hour barrier around Div. trays
RB, Elev. 583'6" West side outside containment	Ionization	None	None-valves are for cold shutdown. See note 1
AB, Elev. 613' Relay room	Ionization	Halon	Provide one hour barrier around Div. 1 tray interactions. Bypass switches required to bypass leak detection trip -- see note 2
AB, Elev. 613' Cable Tunnel	Ionization	Halon	Provide one hour barrier around both divisions in tunnel
AB, Elev. 613' Relay Room Stairwell at H-17	None	None	Provide ionization detection in stairwell. Provide a 3 hour barrier around cable trays identified as interacting.
RB, Elev. 613' near F-11	Ionization	Sprinklers	Provide one hour barrier Div. 1 Tray
RB, Elev. 613' near C-11	Ionization	None	Analysis indicates these circuits are control circuits for cold shutdown valves. No suppression or protection required -- see note 3

Area	Detection	Suppression	Corrective Action
AB, Elev. 630' Cable Spreading Room	Ionization	Halon	Provide one hour barrier on both divisional trays in zone
AB Elev. 631' South Cable Tray Area	Ionization	Halon	Provide one hour barrier around Div. 1 trays in NE corner of room
AB Elev. 643' DC-MCC Area	Ionization	Halon	Provide one hour barrier around Div. I trays and between MCCs.
AB, Elev. 659'	Ionization	SPRINKLERS	Provide one hour barrier around Div. I trays
AB, Elev. 677' Control Center Ventilation Equipment Room	Ionization	None	Provide 3 hour barrier around divisional tray interaction

Conduit Interactions

Area	Detection	Automatic Suppression	Corrective Action
AB, 677' 6" Control Center Ventilation	Ionization	None	Provide a 3 hour barrier on Div. I
RB 684'6" Ventilation Syste-	Ionization	Sprinklers	1 hour barrier Division I
AB 659'6"	Ionization	Sprinklers	Re-route Div. 2
643'6" Emergency Lighting	Ionization	Sprinklers	Re-route Div. 1 to maintain 10 ft. separation
R.B. 641'6"	Ionization	Sprinklers	1 hr. for Div. 2 barrier
AB 613'6"	Ionization	Halon	1 hour barrier Div. 1
AB 630'6"	Ionization	Halon/ Manual sprinklers	1 hour barrier on both divisions
AB 631	Ionization	Halon	1 hour barrier on Div. 1
RB 583'6"	Ionization	Sprinklers	1 hour barrier
AB 583'6"	Ionization	Sprinklers	1 hour barrier on Div. 2
RB 540'	Ionization	Sprinklers	1 hour barrier on Div. 1

TABLE 021.32-4

Associated Crt Review - HPCI

1. Div. I - HPCI Circuits	Corrective Action Required
a. Power & control to HPCI vac. Bkr isolation valve E4150-F075	None - Valve E41-F075 is normally open - HPCI can still operate without the vac. Bkr line, no effect if valve closes.
b. Div. I Power Supply to HPCI isolation valves and trip logic	None - Loss of power supply to the isolation valves inacceptable as Div.II valves could provide isolation. The HPCI trip protection is provided in Div. II Trip ckts.
c. Div. I trip circuit cable between H11-P617 and H21-P080, H11-P617, H11-P602, H21-P082	Faulting of these cables will only cause loss of the Div. I trip circuits, HPCI turbine can still function. Loss of the Div. I power supply is acceptable (see Item b). Spurious pickup of interposing trip relay k45 can cause loss of the HPCI. Corrective action will be to remove these circuits and reroute.
d. Control cable to Drain isolation valve E4150-F028	None - F028 is normally closed duting HPCI operation, redundant valve E41-F029 provides isolation.
e. Control cable to HPCI condenser drain valve E4150-F025	None - Valve F025 is normally closed during HPCI operation, redundant valve F026 provides isolation.
f. Instrument cable from H21-P080 to sensor at H21-P016 and H21-P074	None - Shorting of these cables will not pick up false actuation if the Analog trip units. Cables are also shielded.

2. Div. II - RCIC Circuits	Corrective Action Required
a. Power & control cables to RCIC vacuum breaker valve isolation valve E5150-F084	None - Valve F084 is normally open - RCIC can still operate without the vacuum breaker lineif valve inadvertently closes.
b. Div. II Power Supply to RCIC isolation valves and trip logic	None - Loss of power supply to isolation valves is acceptable as the Div. I valves provide isolation RCIC trip protection is provided by Div. II trip circuits.
c. Div. II trip circuit control cables between H11-F618 and H21-P081, H11-P614, H21-P081, H11-P601, H21-P083, and E51-F045 valve.	None - Faulting of these cables will cause loss of the Div. II trip function, RCIC can still operate. Loss of the Div. II power supply sill also only cause loss of the trip circuit. Spurious pickup of interposing relays K33 or K34 can cause loss of the RCIC turbine. Corrective action will be to remove those circuits and reroute.
d. Control cables to RCIC condenser drain valve E5150-F005	None - Valve F005 is normally closed during RCIC operation, redundant valve F004 provides isolation.
e. Control cable to RCIC steam line drain valve E5150-F026	None - Valve F026 is normally closed during RCIC operation, redundant valve F025 provides isolation.
f. Instrument calbe from H21-F081 to racks H21-P037, H21-P028	None - Shorting of these cables will not pick up false actuation of the analog trip units. Cables are also shielded.

R. C. Anderson
/dk
6-26-81

TABLE 02132-3 NOTES

Note 1 - Reactor Building elevation 583'-6" west side outside containment.

This zone contains valves E11 F019A, E11 F015 B and E11 F008. These valves are shutdown cooling valves and are not needed until the reactor is put into cold shutdown. Damage to these valves can be overcome as the valves can be operated manually. Inadvertent operation of valves E11 F015 A or B was discussed in Critique Item #1-g above. If valve E11 F008 should inadvertently open, the valve inside containment E11 F009 would provide isolation. No further protection is required.

Note 2 - Auxiliary Building 613'-6" Relay Room. Evaluation of relay room panels.

The relay room analysis indicates there are two sets of panels used for shutdown that have both divisions separated by less than 20 feet. The panels are H11 P609 and P611, the Reactor Protection System panels, and panel P614, the HPCI, RCIC steam line leak detection panel.

The RPS cabinets are included as shutdown equipment because the reactor must be scramed to shutdown. Loss of the RPS cabinets would cause a scram as the RPS circuit integrity must be intact to keep the control rods out. In addition, the RPS MG sets can be tripped that will de-energize the scram circuits and cause a scram.

The steam leak detection cabinets are used for isolation of the HPCI and RCIC steam lines in the event of a steam line break. This cabinet includes trip contacts in both the HPCI and RCIC systems.

If the circuits in this cabinet open circuit, there would be no affect on the HPCI or RCIC control circuits (which are located in other divisional relay cabinets). If the circuits in H11 P614 are grounded, the circuit fusing would de-energize the leak detection circuits; however, the HPCI and RCIC turbine control circuits would not be affected. A hot short in certain circuits in H11 P614 could inadvertently pick up the trip relay. To correct for this potential problem, a bypass switch will be added at the relay cabinets (H11 P618 for RCIC, H11 P617 for RCIC) to isolate the steam leak detection trip contacts. The leak detection is not needed in a fire scenario.

a. Note 3 - Reactor Building, elevation 613'-6"
Southwest corner coordinates B - C and 11.

The interaction tray identified as the foreign division in this area is also known as the swing bus. This tray contains control cables to valves which are used for shutdown cooling only. The following valves are included:

E11 F010 (RHR Cross tie)

E1150 F015 A, B (RHR injection)

E1150 F017 A, B (RHR injection)

B3105 - F031 A, B (Recirc Line Discharge Valves)

Relay Control for B3105 - F031 A, B

The RHR cross tie valve E1150 F010 is normally open and is not used for the reactor shutdown. If it should close, there would be no affect on the shutdown using the RHR system. The RHR injection valves are not used until shutdown cooling for cold shutdown is required. If both injection valves inadvertently opened while the reactor was at pressure, the swing check valves E1150 F050 A or B would prevent back flow. If the valves failed to open when called upon for cold shutdown, the valves can be manually opened.

The Recirculation Pump discharge valves are open and are closed when the RHR system is put into shutdown cooling. There is no problem if these valves inadvertently closed as there is no flow in the Recirculation System once the reactor is scramed. If the valves cannot be closed, the Recirculation System inboard valves B3105 F023 A, B can be closed and accomplish the same objective. The inboard valves are not powered by the swing bus.

This analysis indicates that the swing bus circuits can be damaged in a fire without preventing hot or cold reactor shutdown.

2. The review of the electrical circuits will include those circuits associated with shutdown circuits. The routing will be identified for associated circuits and this routing included in the fire zone review of Section 1 to this response.

   Edison will identify a circuit as associated with a divisional shutdown circuit under the following conditions:

   a. Common power source (to the first isolation device)

   b. Common cable tray or conduit

   c. Cables for equipment whose spurious operation will adversely affect the shutdown system.

   Edison will consider appropriate isolating devices; such as, fusing, as defined in IEEE 384-1977, as a termination of an associated circuit. Edison will also consider, for circuits that are not electrically common but are termed associated because of common cable tray or conduit, that the associated circuit definition is terminated at the first rated fire stop or rated penetration seal when the circuit otherwise falls out of the criteria of associated circuit.

3. For areas of Section 2, where circuits associated with one shutdown division are within the same fire zone as the redundant shutdown division, corrective action will be considered. Where corrective action is required, we will adopt one of the methods identified in 3 (a), (b) or (c) of Question 021.32.

4. Fermi 2 will be using a method of remote shutdown from the control room if a control room panel fire causes the need to evacuate the control room. The design basis for such a fire is that the control room panel fire would be extinguished before damage could occur to more than one panel. The smoke from such a fire could cause the evacuation of the operating personnel after a limited amount of operation is performed. To address such a scenario, Fermi 2 will have two divisional remote shutdown panels.

   Table 021.32-1 lists the systems necessary for shutdown and vital support to achieve hot and cold shutdown from the control room. Table 021.32-5 lists the instrumentation and manual equipment control provided on the remote shutdown panels. Because the control panel fire will leave one of the two redundant divisions intact, credit is taken for the automatic operation of equipment in the functional division. The division I remote shutdown panel is provided to meet GDC 19 and is provided with equipment to achieve hot and cold shutdown. Although cold shutdown can be achieved from this panel, the control room habitability would be re-established before the need to go to cold shutdown. The division II remote shutdown panel will include instruments and controls necessary to perform the manual operating functions to achieve hot shutdown.

   Fermi 2 is providing remote shutdown capability to bypass any control room operating panel. The cable entry to the control room panels is bottom fed from the cable spreading room.

5. A. The valves outlined in Table 21.32-6 outlines are the motor operated divisional valves for the high pressure, low pressure interfaces on the RHR system.

B. The cold shutdown power and control cables for the above mentioned valves were included in the overall analysis as referenced in Table 021.32-2.

C. Conduit and cable tray interactions are shown on the enclosed drawings.

D. Check valves are provided to mitigate the possibility of an intersystem LOCA for all pressure interfaces with the exception of the recirculation system suction line (E11-F608, F009, F008). Valves E11-F009 and E11-F608 are located inside primary containment and E11-F008 is outside containment. Therefore, based on the cable and conduit analysis interactions and our inerted containment status, the potential for damage to both the inboard and outboard valves from a single fire source is considered to be resolved.

TABLE 021.32-5

EXISTING SHUTDOWN PANEL (DIV I)

EQUIPMENT LIST

ITEM	P.I.S. NO.	SERVICE	DIV.	CONTROL DEVICE
	RCIC SYSTEM			
1	E51-C002	Trip throttle valve	I	BLPB
2	E51-C002	Trip throttle valve position	I	BLDS
3	-	Manual initiation of RCIC (Bypass low Reactor Water level)	I	Round PB
4	E51-F045	Steam to turbine	I	BLPB
5	E50-R613	Flow indicator	I	Beckman V5A
	RHR SYSTEM			
6	E11-C001A	RHR Service Water Pump	I	CMC Sw
7	E11-C001C	RHR Service Water Pump	I	CMC Sw
8	E11-C002A	RHR Pump	I	CMC Sw
9	E11-F024A	Containment Spray M.O.V.	I	BLPB
10	E11-F028A	Containment Spray M.O.V.	I	BLPB
11	E11-F048A	Hx Shell Side Bypass M.O.V.	I	BLPB
12	E11-F068A	Cont. Cooling Hx Discharge M.O.V.	I	BLPB
13	E11-F008	RHR Suction Cooling (OUTER)	II	BLPB
14	E11-F009	RHR Suction Cooling (INBD)	I	BLPB
15	E11-F006A	Shutdown Cooling M.O.V.	I	BLPB
16	E11-F015A	RHR Injection M.O.V.	I	BLPB
17	E11-F004A	RHR Pump Suction M.O.V.	I	BLPB
18	E11-F017A	RHR Outboard M.O.V.	I	BLPB
19	E11-R604A	RHR Flow Indicator	I	Beckman V5A

BLPB - Back Lighted Push Button
BLDS - Back Lighted Display

TABLE 021.32-5

EXISTING SHUTDOWN PANEL (DIV I) EQUIPMENT LIST

ITEM	P.I.S. NO.	SERVICE	DIV.	CONTROL DEVICE
	NUCLEAR BOILER SYSTEM			
20	B21-R605A	Reactor Level Indicator	I	Beckman V5A
21	B21-R005A	Reactor Pressure I Indicator	I	Foxboro 6400C
22	B21-F013D	Manual Relief Valve	I	BLPB
23	B21-F013H	Manual Relief Valve	I	BLPB
	RECIRCULATION SYSTEM			
24	B31-F023A	Recirc Pump Suction Valve	I	BLPB
	MISCELLANEOUS			
25	E1156C001-A	Mech. Draft Cooling Tower Fan A	I	CMC Sw
26	E1156C001-C	Mech. Draft Cooling Tower Fan C	I	CMC Sw
27	C11-C001A	CRD Pump	I	CMC Sw
28		HPCI Manual Trip	II	Selector Sw Cutler Hammer
29		Drywell Press Indicator	I	Foxboro 6400HC
30		Suppression Pool Water Temp. Indicator Off Temp Element T50N405A	I	Weston 1316
31		Transfer Switch Logic Power For 64B BRKR Cont	I	Type SBM Model 10AA50
32		Transfer Switch Logic Power For 64C BRKR Cont	I	Type SBM Model 10AA50

TABLE 021.32-5

EXISTING SHUTDOWN PANEL (DIV I)

EQUIPMENT LIST

ITEM	P.I.S. NO.	SERVICE	DIV.	CONTROL DEVICE
	RCIC SYSTEM			
1	E51-C002	Trip throttle valve	I	BLPB
2	E51-C002	Trip throttle valve position	I	BLDS
3	-	Manual initiation of RCIC (Bypass low Reactor Water level)	I	Round PB
4	E51-F045	Steam to turbine	I	BLPB
5	E50-R613	Flow indicator	I	Beckman V5A
	RHR SYSTEM			
6	E11-C001A	RHR Service Water Pump	I	CMC Sw
7	E11-C001C	RHR Service Water Pump	I	CMC Sw
8	E11-C002A	RHR Pump	I	CMC Sw
9	E11-F024A	Containment Spray M.O.V.	I	BLPB
10	E11-F028A	Containment Spray M.O.V.	I	BLPB
11	E11-F048A	Hx Shell Side Bypass M.O.V.	I	BLPB
12	E11-F068A	Cont. Cooling Hx Discharge M.O.V.	I	BLPB
13	E11-F008	RHR Suction Cooling (OUTER)	II	BLPB
14	E11-F009	RHR Suction Cooling (INBD)	I	BLPB
15	E11-F006A	Shutdown Cooling M.O.V.	I	BLPB
16	E11-F015A	RHR Injection M.O.V.	I	BLPB
17	E11-F004A	RHR Pump Suction M.O.V.	I	BLPB
18	E11-F017A	RHR Outboard M.O.V.	I	BLPB
19	E11-R604A	RHR Flow Indicator	I	Beckman V5A

BLPB - Back Lighted Push Button
BLDS - Back Lighted Display

TABLE 21.32-6

LIST OF PRESSURE ISOLATION VALVES

SYSTEM	P&ID	VALVE NUMBERS	TYPE	SIZE IN.	FUNCTION
PHR	6M721-2083	E11-F015A, B	Gate	24	Discharge to Recirc. System
	6M721-2084	-F050A, B	Check	24	Discharge to Recirc. System
		-F023	Globe	6	Discharge to Head Spray
		-F022	Gate	6	Discharge to Head Spray
		-F008	Gate	20	Suction from Recirc. System
		-F009	Gate	20	Suction from Recirc. System
		-F608	Gate	20	Suction from Recirc. System

PROPOSED DIV II SHUTDOWN PANEL
EQUIPMENT LIST

DESCRIPTION	LEGEND ENGRAVING	MAKE
2-POSITION KEYLOCK SWITCH	TRANSFER DIVISION II POWER - AC	ELECTROSWITCH
2-POSITION KEYLOCK SWITCH	TRANSFER DIVISION II POWER - DC	ELECTROSWITCH
2-POSITION KEYLOCK SWITCH	BYPASS STH LEAK DETECTION ISOLATION SIGNAL	ELECTROSWITCH
BACK LIGHTED PB	HPCI INITIATE	MASTER SPECIALTIES
M/A CONTROL STATION	HPCI FLOW	GE-MAC
PRESSURE INDICATOR	DRYWELL PRESSURE	ANALOG
TEMPERATURE INDICATOR	SUPRESSION POOL WATER TEMPERATURE	WESTON
FLOW INDICATOR	HPIC HEADER FLOW	HAYS REPUBLIC
LEVEL INDICATOR	REACTOR LEVEL	WESTON
PRESSURE INDICATOR	REACTOR PRESSURE	ANALOG

TABLE 21.32-6

LIST OF PRESSURE ISOLATION VALVES

SYSTEM	P&ID	VALVE NUMBERS	TYPE	SIZE IN.	FUNCTION
RHR	6M721-2083	E11-F015A, B	Gate	24	Discharge to Recirc. System
	6M721-2084	-F050A, B	Check	24	Discharge to Recirc. System
		-F023	Globe	6	Discharge to Head Spray
		-F022	Gate	6	Discharge to Head Spray
		-F008	Gate	20	Suction from Recirc. System
		-F009	Gate	20	Suction from Recirc. System
		-F608	Gate	20	Suction from Recirc. System