

UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D. C. 20555

JUN 4 1981

Docket No. 50-341

APPLICANT: Detroit Edison Company

FACILITY: Fermi 2

SUBJECT: SUMMARY OF MAY 27, 1981 OL REVIEW MEETING REGARDING THE FERMI 2 FIRE PROTECTION REVIEW

The purpose of the meeting was to hear applicant's plans for revision to fire protection features to meet current staff requirements, as requested in Request No. 021.32. One of the major modifications is provision of alternate shutdown capability for a fire in the control room, cable spreading room or relay room. Enclosure 1 is a list of attendees.

Enclosure 2 is a copy of slides showing existing and proposed alternate shutdown capability for a fire in the control room. The proposed system would provide a means for hot shutdown from outside the control room, if only one control panel is destroyed by fire.

Enclosure 3 provides a draft response for Request 021.32.

Applicant has completed its identification of interaction areas, where redundant, cables (Division I and II) in cable trays or conduits are less than 20 feet apart Drawings showing these locations will be submitted, together with response to Request 021.32, and a revised and updated Fire Hazards Analysis during the week of June 1, 1981. Procedures for bringing the plant to a cold shutdown after a fire were requested to be completed and available at the plant 3 months prior to fuel loading.

At the conclusions of the meeting staff so ted that:

(1) The CO2 systems should be replaced with less toxic and more effective systems for fire fighting, e.g. halon with a manual water system as backup. Applicant stated that, because of its relay room under the cable spreading room, it preferred not to use water. However it will consider a dry pipe system as a backup.

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(2) A fire in the control room external to the panels must be considered, e.g. due to a spill of a flamable fluid. Applicant stated it will run a test to demonstrate that its panels will protect the wiring and switches inside of the panel from such a fire. Staff will consider test plans and test results in its evaluation.

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L. L. Kintner, Project Manager Licensing Branch No. 1 Division of Licensing

Enclosure: As stated

cc: See next page

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ENCLOSURE 1

List of Attendees for May 27, 1981 Meeting, NRC-Detroit Edison Company

NRC

Detroit Edison

L. L. Kintner Jerry L. Mauck Victor Benaroya A. Saeed Raj Anand C. Woodhead R. L. Ferguson Faust Rosa

Edison Electric Inst.

J. E. Evans

Larry E. Schuerman William F. Colbert William Fahrner Evalds Lusis Lawrence F. Wooden Terence M. McKelvey Richard C. Anderson Rick L. Shaw John W. Honkala

Gage-Babcock & Assoc.

J. Behn

ENCLOSURE 2







POOR ORIGINAL

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 the 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 CO₂ hose reels are provided outside the relay room and switchgear room in addition to the water hose stations.

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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:

DRAFT

021.32 Response (Add. sional 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 Elergency 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 values.

The HPCI and RCIC systems containment isolation values have cross divisional circuits for he diverse containment isolation function. The cross-system values 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, cont.ol, 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 varicus 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.

Table 021.32-1

SYSTEMS REQUIRED FOR SHUTDOWN

Systems Required for Hot and Cold Shutdown

	C11	Concrol 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	EECW
	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
	E5]	RCIC (Div. I)
	B21	Safety Relief Valves (Div. I)

- E41 HPCI (Div. II)
- Ell RHR, Contairment Cooling Mode

Systems Required Only for Cold Shutdown

E11	RHR, Shu	utdown Cox	oling 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 11
Valves:	
B2103-F022A -F022C -F028A -F028C B2104-F013A -F013B -F013C -F013D -F013E	B2103-F022B -F022D -F028B -F028D
-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 -P619	H1100-P611
Racks:	
H2100-P084 -P086	H2100-P085 -P087

Table 021.32-2 (Continued)

Ell-RHR System

Division I

Division II

Pumps:

E1102-C002A	E1102-C002B
-C002C	-C002D

Valves:

E1150-F003A			E1150-F003E	3		
-F004A			-F004E	3		
-F004C			-F004I)		
-F006A			-F006I	3		
-F006C			-F006I)		
-F007A			-F007E	3		
			-F008	(Cold	Shutdown	System)
-F009	(Cold Shutdown	System)				
-F011A			-F011E	3		
-F015A	(Cold Shutdown	System)	-F015E	(Cold	Shutdown	System)
-F016A			-F016E	1		
-F017A	(Cold Shutdown	System)	-F017E	(Cold	Shutdown	System)
		-1	-F023			
-F024A			-F024F			
-F026A			-F026F			
-F027A			-F027F			
-F028A			-F028F			
-F047A			-F047F	1000		
-F047A			-F048F			
-10404			-F049	1000		
-50693			-F0495			
-10004			-10401	1.1		
-FIGAN			-F1045			
-r 104A			-11041			
PEOE						
-1001			- 2609	(Cold	Shutdown	Suction
			-6004	land	Shutuown	System
Testamonte.						
instruments:						
Packe .						
RACKS:						
H2100-P018		`	H2100-P021			
-2030			-P081			
-2082			-P083			
-1002			-P488			
			1400			
Relay Panels:						
H1100-P601		1.2.2	H1100-P602			
-P617			-PE12			
-P822			-P618			
-P823			-P820			

-P821

Table 021.32-2 (Continued)

	Division I	Division II
Pumps		
	E1151-C001A -C001C	E1151-C001B -C001D
Fan Mk	otors:	
	E1156-C001A -C001C	E1156-C001B -C001D
Valves	5:	

E1150-F603A	E1150-F603B
-F604A	-F604B
-F605A	-F605B

Instrumentation:

H1100-P807	H1100-P810
-P809	

E41 - HPCI System

Pumps:

E4101-C002	
-C003	
-C004	
-C005	

Valves:

E4150-F002

E4150-F001

-F003 -F004 -F006 -F007 -F008 -F012 -F021 -F022 -F021 -F022 -F041 -F042 -F059

Table 021.32-2 (Continued)

E41 - HPCI System (Continued)

Division I

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

Division II

Control Operating Panel:

H1100-P602

F5I - RCIC SYSTEM

DIVISION I

Pumps

.

E5101C002 E5101C003 E5101C004

Valve

E5150 F001

E5150 F008 F010 F012 F013 F019 F022 F029 F029 F031 F045 F046 F059 F062 F084

Instrumentation

	TE TOO NO21 D
	E5100 N021 B
	NUZZ B
	NU23 B
	E5100 N025 B
	N025 D
	N026 B
	N026 D
	N027 B
	N027 D
-the	
ICKS	
	H21-P081
	H21-P083
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	H11-P618
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	acks

DIVISION II

Valves

E5150 F007

H11-P601

P44 - EECW SYSTEM

DIVISION I

Pumps

P4400C001A

Valves

P4400	F	601A
	F	602A
	F	603A

Instruments

244	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

Relay Cabinets

H1100P808 P857 P891

P45 - EESW SYSTEM

Pumps

P4500C002 A

Relay Cabinets

H1100 P808 P857 P868 P891

R1400S002 B

R14 - 4160V Swgr Buses R1400S001 B R1400S001 C R1400S002 A H2100P448 H2100P475 H1100P817

P868

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DIVISION II

P4400C001B

P4400 F 601B

F 602B F 603B

Pumps

Pumps

P4500C002 B

H1100 P817 P870

R1400S002 D

R1400S001 E Rx Bldg. R1400S001 F Rx Bldg.

RHR Complex

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 Fower 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	
		. 1

Distribution Cabinets (cont.)	
DIVISION I	DIVISION II
R3200S061 A R3200S061 B	R3200S064 A R3200S064 B
DC Notor Control Centers	
R3200S015	R3200S016
R30 - Emergency Diesel Generators	
Generators	
R3C00S001 R3000S002	R3000S003 R3000S004
Control Panels	
R3000S005 R3000S006	R3000S007 R3000S008
EDG Fuel Transfer Pumps	
R3000C001 R3000C002 R3000C003 R3000C004	R3000C009 R3000C010 R3000C011 R3000C012
EDG Serv. Water Pumps	
R3000C005 R3000C006	R3000C007 R3000C008
T41 - CONTROL CENTER HVAC & ES	SENTIAL FAN COIL UNITS
Fans & Heating Coils	Fans
T4100B007 T4100C031 T4100B007 A T4100B007 C	T4100B006 T4100C030 T4100B007 B T4100B007 D
Pumps	Pumps
T4100C041	T4100C042
Compressors	Compressors
T4100B009	T4100B008
Fan Coil Units	
T4100B002 (Div. I Swgr) T4100B003 (Div. I Swgr) T4100B018 (Div. I RHR)	T4100B004 (1 T4100B005 (1 T4100B019 (1

T4100B021 (CS & RCIC)

T4100B028 (Div. I AC Equpt Rm)

T4100B004 (Div. II Swgr) T4100B005 (Div. II Swgr) T4100B019 (Div. II RHR) T4100B022 (HPCI) T4100B027 (Div. II AC Equpt.Rm)

Fan Coil Uni	ts (cont.)			
DIVISION I		DIVISION II		
T4100B034 (E	ECW Div. I)	T4100B035 (E	ECW Div. II)	
Instrumentat	ion			
Racks				
H11P809 P888		H1100P817 P889		
Relay Panels				
H2100P285 A H2100P296 A P296 C P296 E P521 P527 P528		H2100P285 B H2100P296 B P296 D P296 F P520 P527 A P529		
<u>T50 - 04 - 5</u>	Suppression Pool Temperature Monitoring		제도 상황 전	
Instrumentat	tion			
T/C Terminal	L Box	T/C Terminal Box		
H2100P584 M		H2100P584 L		
Relay Cabine	et			
H1100P898 A P914		H1100P898 B P915		
Racks				
H2100P501 A		H2100P501 B		
X41-03 - RHI	R Complex HVAC			
Fans		Fans		
X4103C001 C002	EDG 11	X4103C005 C006	EDG 13	
C003 C004	EDG 12	C008	EDG 14	
C009 C010	EDG 11 Swtch. Gr.	C013 C014	EDG 13 Swtch. Gr	
C011 C014	EDG 12 Swtch. Gr.	C015 C016	EDG 14 Swtch. Gr	
Motor Opera	ted Dampers			
X4103 F103 F104 F106 F108 F109	EDG 11 Swtch. Gr.	X4103 F127 F128 F130 F132 F133	EDG 13 Swtch. Gr	

motor upera	ited Dampers (cont.)	
F110 EDC	5 11 Rm.	F134 EDG 13 Rm.
F115		F139
F116 EDC	G 12 Swtch. Gr.	F140 EDG 14 Swtch. Gr.
F118		F142
F120		F144
F121		F145 .
F122 ED0	5 12 Rm.	F146 EDG 14 Rm.
X4103 - RHF	Complex HVAC(cont.)	
X4103F149		A4103F153 FTC 13 Pm
X4103F150	EDG II KM.	X4103F154
F151	ETV: 12 Dm	F155 FIX 14 Rm.
F152	EDG 12 rdl.	F156 120 11 14
F157	Dist T Dump Pm	, F164 Div. II Pump Rm.
F159	DIV. I Fund Idn.	F166
F161		F168
F162		F169
Instrumenta	ation	
Relay Panel	Ls	

H2100P350 P351 H2160P352 P353

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TABLE 021.32-3 INTERACTION AREAS LESS THAN 20 FEET

		Automatic	
Area	Detection	Suppression	Correction Action
AB, Elev. 551' and 562'	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. 2 trays
AB Elev. 613' Relay room	Ionization	C02	Provide one hoour barrier around Div. 1 tray interaction
AB Elev. 613' Cable Tunnel	Ionization	C02	Provide one hour barrier around Div. 2 and swing bus trays
AB Elev 613 Relay Room Stairwell at H-17	None	None	Analyze failure of both divisional instrument trays or provide suppression, detection, and 1 hour barrier
RB Elev. 613' near F-11	Ionization	Sprinklers	Provide one hour barrier Div l Tray
RB Elev. 613' near C-11	Ionization	None	Provide one hour barrier and suppression or justify failure of swing bus and Div. 2 tray
AB Elev. 630' Cable Spreading Room	Ionization g	co2	Provide one hour barrier on both divisional Trays in zone
AB Elev. 671' South Cable Tray Area	Ionization	C02	Provide one hour barrier around Div. 1 trays in NE corner of room
AB Elev. 643' DC-MCC Area	Ionization	CO2	Provide one hour barrier around Div. I trays
AB Elev. 659'	Ionization	None	Provide one hour barrier around Div. I trays and suppression, or analyze loss of both divisional trays

R. C. Anderson /dk 5-22-81

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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 function. 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.

TABLE 021.32-5

EXISTING SHUTDOWN PANEL (DIVI) EQUIPMENT LIST

ITI	EM P.I.S. NO.	SERVICE	DIV.	CONTROL DEVICE
N	JCLEAR BOILER	SYSTEM		
20	B21-R605A	Reactor Level Indicator	I	Beckman V5A
21	821-R005A	Reactor Pressure I Indicator	I	Foxboro 6400C
22	B21-F013D	Manual Relief Valve	I	BLPB
23	B21-F013H	Manual Relief Valve	1	BLPB
RE	CIRCULATION S	SYSTEM		
24	B31-F023A	Recirc Pump Suction Valve	I	BLPB
MI	SCELLANEOUS			
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	11	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	ype SBM Mode. 0AA50
32		Transfer Switch Logic Power For 64C BRKR Cont	I	Type SBM Mode: 10AA50

EXISTING SHUTDOWN PANEL (DIVI) EQUIPMENT LIST

			and the second	
ITE	M P.I.S. NO.	SERVICE	DIV.	CONTROL DEVICE
RC	IC SYSTEM			
1	E51-C002	Trip throttle valve	1	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	1	BLPB
5	E50-R613	Flow indicator	I	Beckman V5A
RH	IR SYSTIM			
6	E11-C001A	RHR Service Water Pump	I	CMC SW
7	E11-C001C	RHR Service Water Pump	1	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	E11009	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

1.

PROPOSED DIVIT SHUTDOWN PANEL EQUIPMENT LIST

DESCRIPTION .	LEGEND ENGRAVING	MAKE
2-POSITION KEYLOCK SWITCH	TRANSFER DIVISION IL POWER - AC	ELECTROSURH
2 - POSITICN REYLOCK SWITCH	TRANSFER. DIVISION J POWER - DC	ELECTROSWIN
2 - POSITION KEYLOOK SWITCH	BYPASS STALLEAL DETECTION ISOLATION SIONAL	ELECTROSUITCH
BACK LIGHTED PB	HPCI JUITIATE	MASTER SPECIALITIES
M/A CONTROL STATION	HPCI FLOW	QE -MAC
PRESSURE INDICATOR	DRYWELL PRESSURE	ANALCEIC
TEMPERATURE INDICATOR	SUPRESSION POOL WATER TEMPERATURE	WESTCU
FLOW INDICATOR	HPIC HEADER FLOW	HAYS REPVENC
LEVEL INDICATOR	REACTOR LEVEL	WESTON
PRESSURE INDICATOR	REACTOR PRESSURE	ANALOER

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