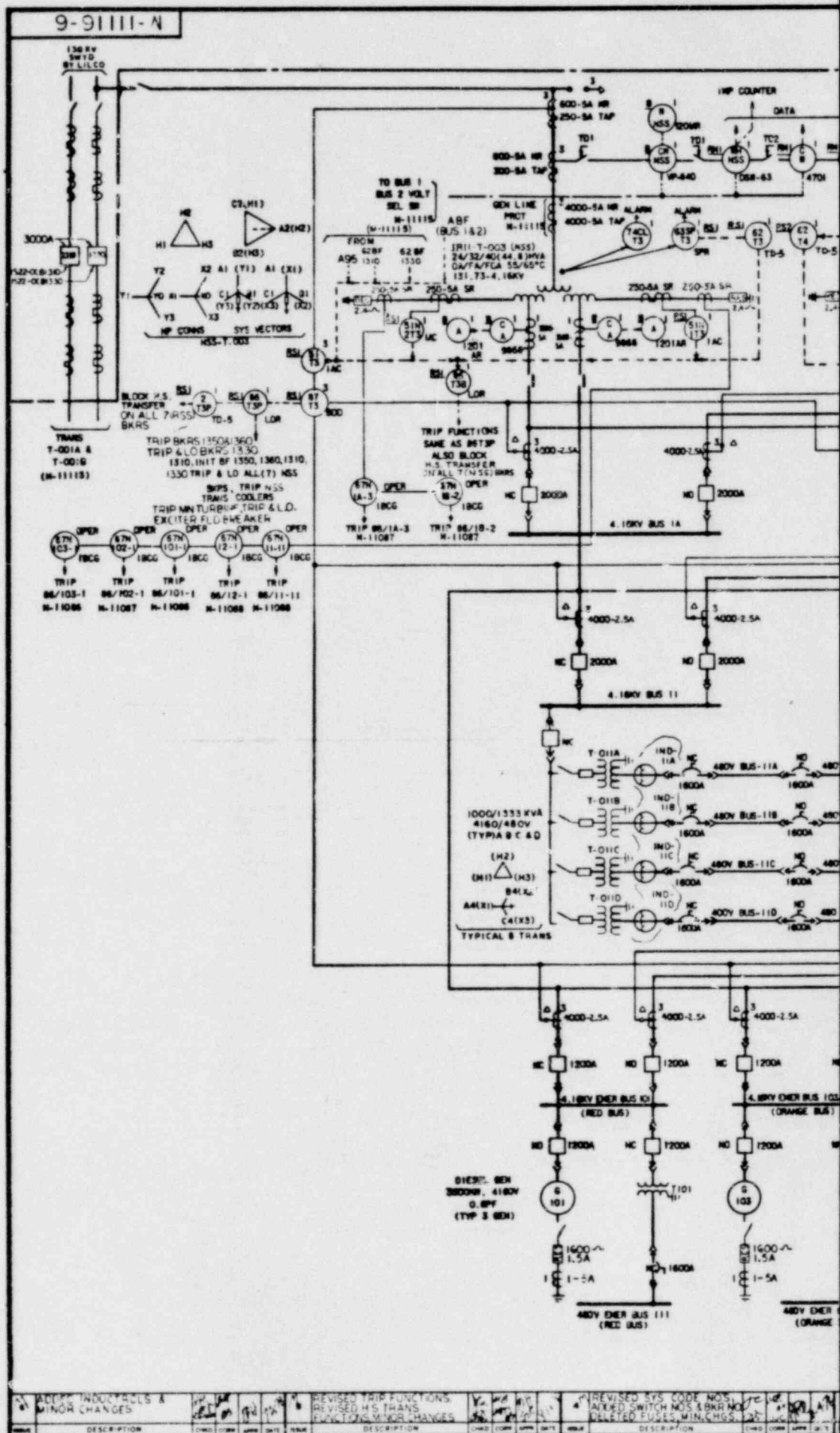
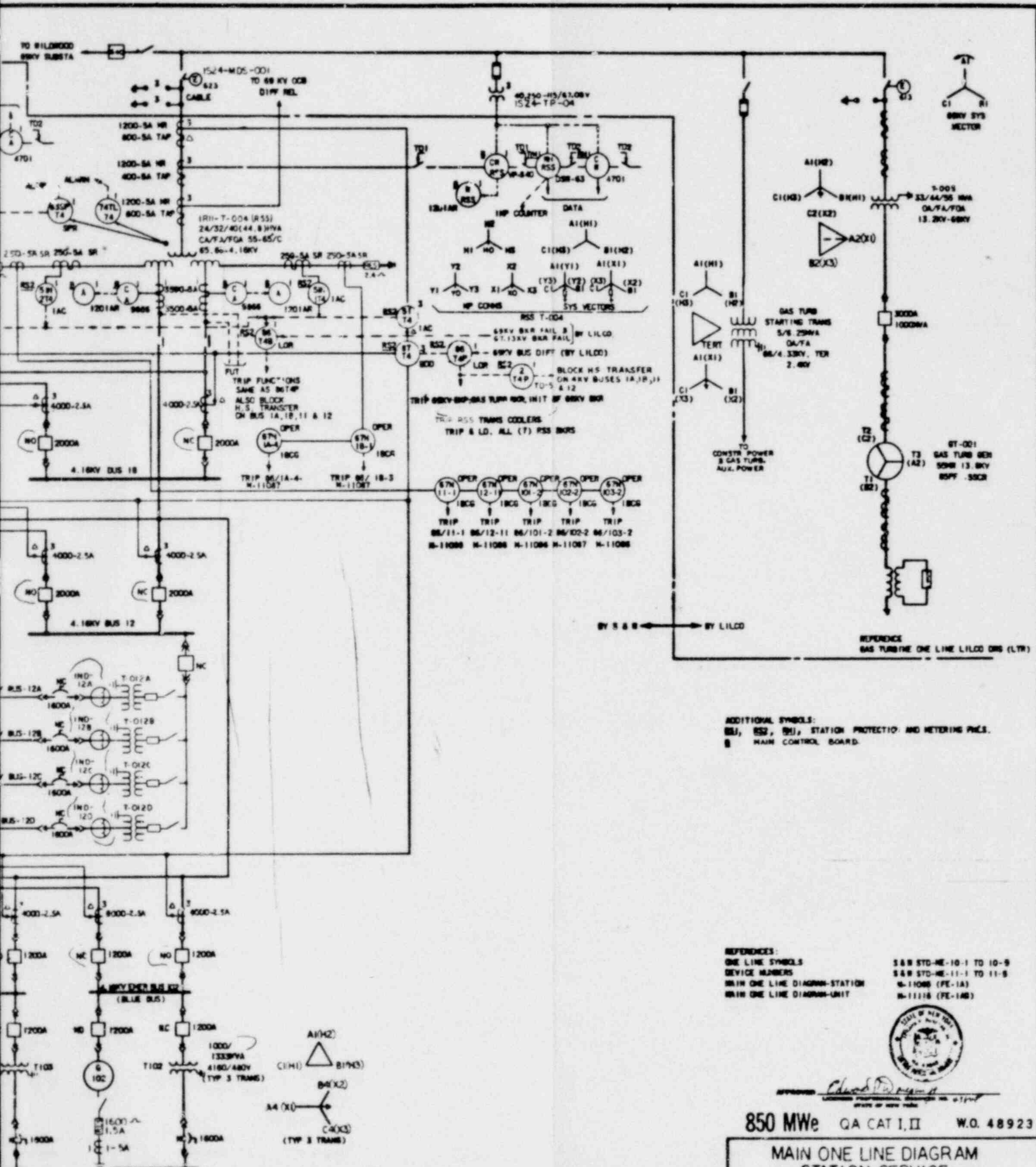

9-91111-N
138 KV SWYD BY G.E.CO
TRANS T-001A & T-001B (M-11113)
TRIP BKRS 1350A/360 TRIP & LO BKRS 1330 1310, INIT BF 1350, 1360, 1310, 1330 TRIP & LO ALL (7) NSS BKRS, TRIP NSS TRANS COOLERS TRIP MN TURBINE TRIP & L.O. EXCITER FLD BREAKER
BLOCK H.S. TRANSFER ON ALL 7 NSS BKRS
TRIP FUNCTIONS SAME AS 86T3P ALSO BLOCK H.S. TRANSFER ON ALL 7 (N.S.S.) BKRS
TRIP 86/1A-3 M-11087
TRIP 86/1B-2 M-11087
TRIP 86/103-1 M-11086
TRIP 86/102-1 M-11087
TRIP 86/101-1 M-11086
TRIP 86/12-1 M-11088
TRIP 86/11-11 M-11088
4.16KV BUS 1A
4.16KV BUS 1I
1000/1333 KVA 4160/480V (TYP)A B C & D
TYPICAL 8 TRANS
480V BUS-11A
480V BUS-11B
480V BUS-11C
480V BUS-11D
4.16KV EMER BUS 101 (RED BUS)
4.16KV EMER BUS 103 (ORANGE BUS)
DIESEL GEN 3500KW, 4160V 0.8PF (TYP 3 GEN)
480V EMER BUS 111 (RED BUS)
480V EMER (ORANGE
ADDED INDICATORS & MINOR CHANGES
REVISED TRIP FUNCTIONS REVISED H.S. TRANS FUNCTIONS MINOR CHANGES
REVISED SYS CODE NOS. ADDED SWITCH NOS & BKR NOS DELETED FUSES, MIN. CHGS.

8105210470



ADDITIONAL SYMBOLS:
RSJ, RS2, RHJ, STATION PROTECTION AND METERING PNLS.
B MAIN CONTROL BOARD.

REFERENCES:

ONE LINE SYMBOLS	S&W STD-ME-10-1 TO 10-9
DEVICE NUMBERS	S&W STD-ME-11-1 TO 11-6
MAIN ONE LINE DIAGRAM-STATION	M-11086 (FE-1A)
MAIN ONE LINE DIAGRAM-UNIT	M-11116 (FE-1AB)

APPROVED

850 MWe QA CAT I, II W.O. 48923

MAIN ONE LINE DIAGRAM STATION SERVICE

SHOREHAM NUCLEAR POWER STATION UNIT 1

LONG ISLAND LIGHTING COMPANY

STONE & WEBSTER ENGINEERING CORPORATION BOSTON, MASS.

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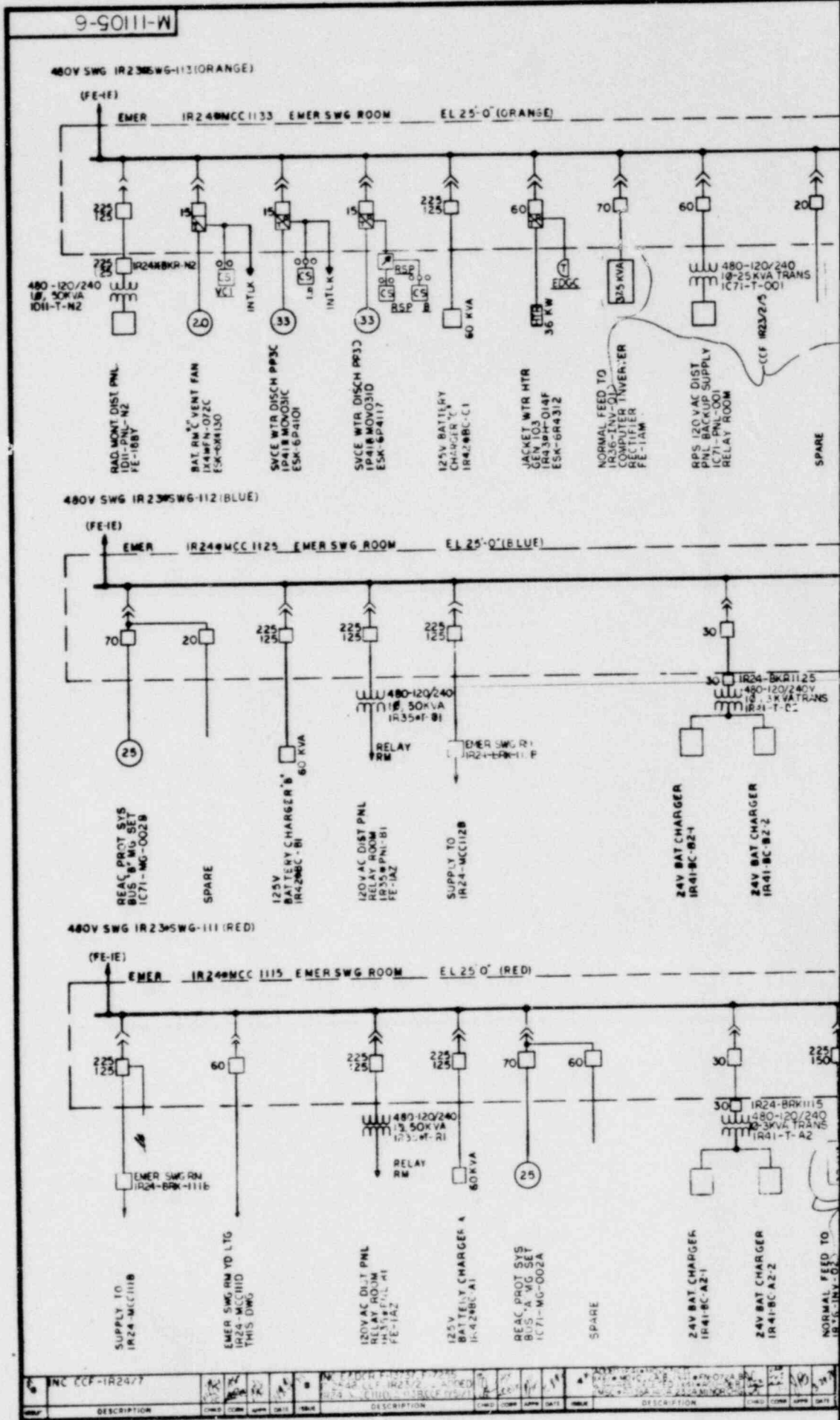
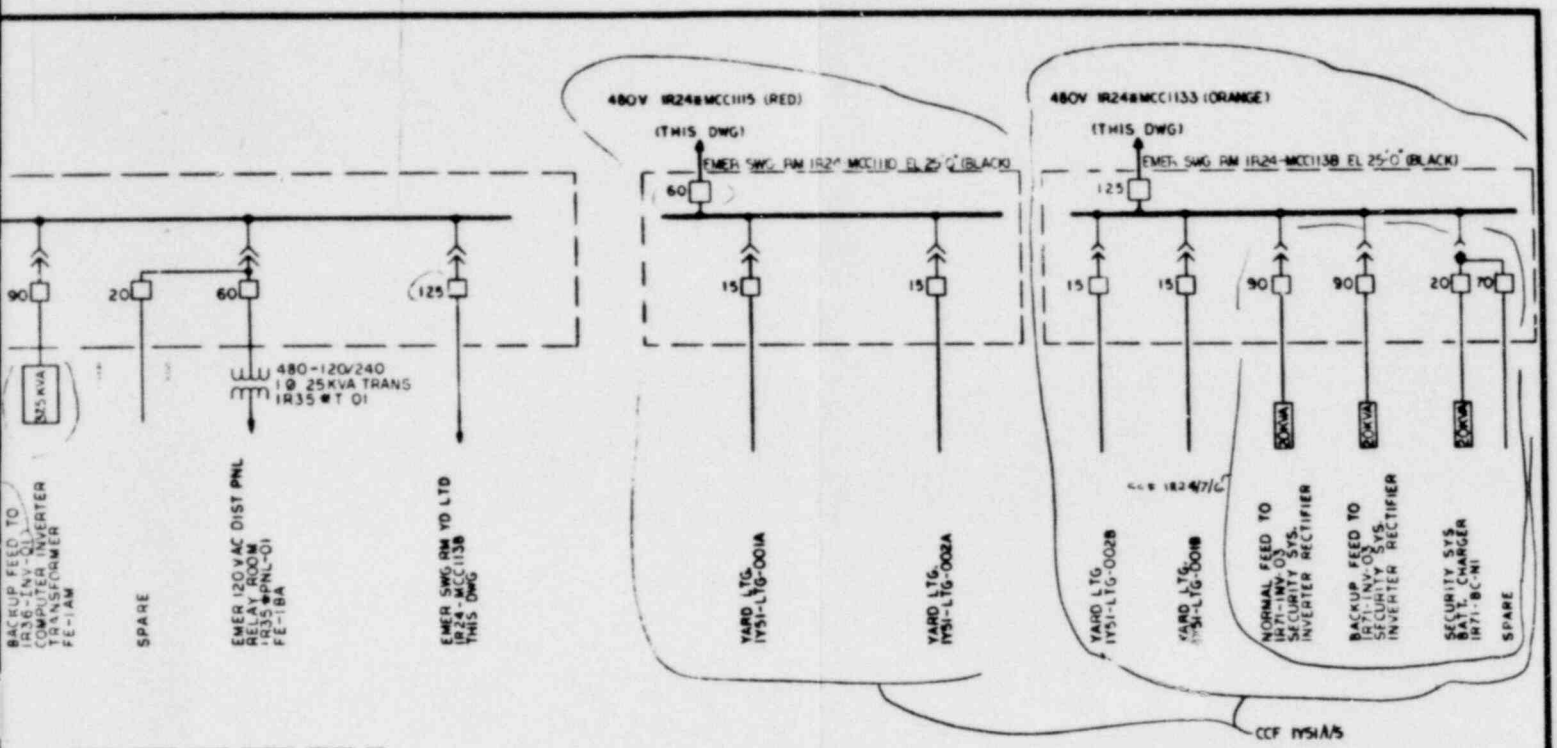
ORIGINAL ISSUE

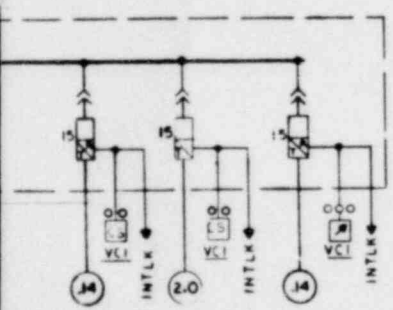
10 LILCO DRAWING NUMBER M-11116-6

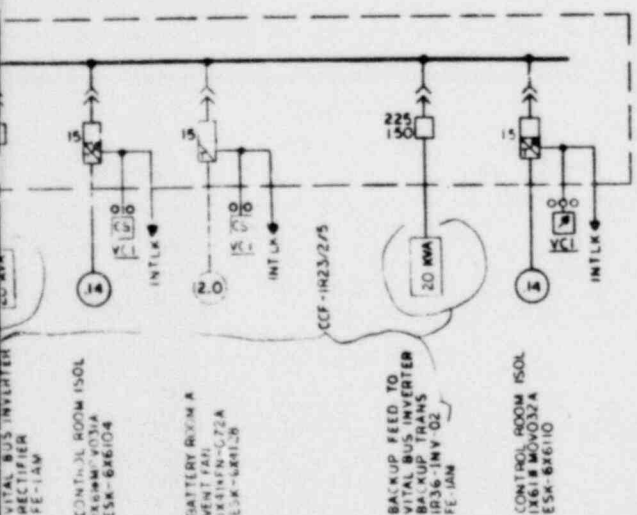
S&W DWG. No. 11600.02-FE-1AC-6

9-90111-M


480V SWG IR23[illegible]SWG-113 (ORANGE)
(FE-1E)
EMER
IR24[illegible]MCC 1133 EMER SWG ROOM
EL 25'-0" (ORANGE)
480-120/240 1Ø, 50KVA 1D11-T-N2
IR24[illegible]KP-N2
INTLK
INTLK
BSP
BSP
60 KVA
36 KW
325 KVA
480-120/240 1Ø-25 KVA TRANS 1C71-T-001
RAD MONT DIST PNL 1D11-PNL-N2 FE-1BBY
BAT RM "C" VENT FAN 1X4[illegible]FN-072C ESK-6R4130
SVCE WTR DISCH PP3C 1P41[illegible]MOV031C ESK-6P4101
SVCE WTR DISCH PP3J 1P41[illegible]MOV031D ESK-6P4117
125V BATTERY CHARGER "A" IR42[illegible]BC-C1
JACKET WTR HTR (EN 103) IR43[illegible]-014F ESK-6R4312
NORMAL FEED TO IR36-INV-012 COMPUTER INVERTER RECTIFIER FE-1AM
RPS 120VAC DIST PNL BACKUP SUPPLY 1C71-PNL-001 RELAY ROOM
CCF IR23/24/5
SPARE
480V SWG IR23[illegible]SWG-112 (BLUE)
(FE-1E)
EMER
IR24[illegible]MCC 1125 EMER SWG ROOM
EL 25'-0" (BLUE)
480-120/240 1Ø, 50KVA IR35[illegible]-B1
RELAY RM
EMER SWG RM IR24-[illegible]-111P
IR24-BKR11 25
480-120/240V 1Ø, 3KVA TRANS IR41-T-[illegible]
60 KVA
REAC PROT SYS BUS "B" MG SET 1C71-MG-002B
SPARE
125V BATTERY CHARGER "B" IR42[illegible]BC-B1
120VAC DIST PNL RELAY ROOM IR35[illegible]PNL-B1 FE-1AZ
SUPPLY TO IR24-MCC1128
24V BAT CHARGER IR41-BC-B2-1
24V BAT CHARGER IR41-BC-B2-2
480V SWG IR23[illegible]SWG-111 (RED)
(FE-1E)
EMER
IR24[illegible]MCC 1115 EMER SWG ROOM
EL 25'-0" (RED)
480-120/240 1Ø, 50KVA IR35[illegible]-R1
RELAY RM
60KVA
EMER SWG RM IR24-BRK-111b
IR24-BRK1115
480-120/240 1Ø-3KVA TRANS IR41-T-A2
SUPPLY TO IR24 MCC1118
EMER SWG RM YD LTG 1H24-MCC1110 THIS DWG
120VAC DIST PNL RELAY ROOM IR35[illegible]PNL-A1 FE-1AZ
125V BATTERY CHARGER [illegible] IR42[illegible]BC-A1
REAC PROT SYS BUS "A" MG SET 1C71-MG-002A
SPARE
24V BAT CHARGER IR41-BC-A2-1
24V BAT CHARGER IR41-BC-A2-2
NORMAL FEED TO IR36-INV-012
INC CCF-IR2477
DESCRIPTION
DESCRIPTION
DESCRIPTION







NOTES
1. GENERAL NOTES & REFERENCES M-11092 (FE-1M)

NUCLEAR SAFETY RELATED
QA CAT I, II

APPROVED

850 MWe

W.O. 48923

ONE LINE DIAGRAM-EMER SWGR RM 480V MCC 1115,1125,1133,1110,1138

SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

LILCO DRAWING NUMBER M-11105-5

S&W DWG. No. 11600.02-FE-1W-6

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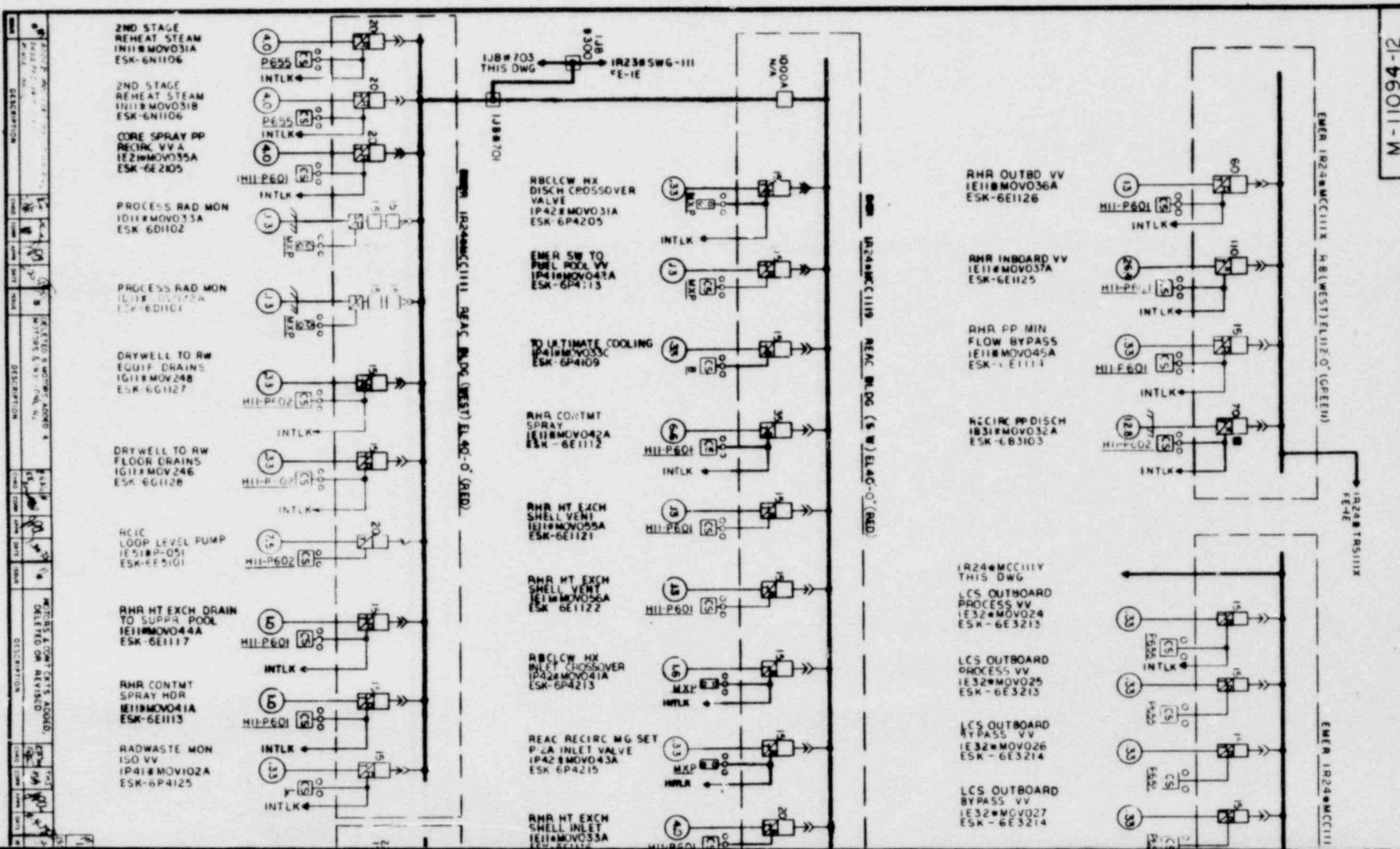
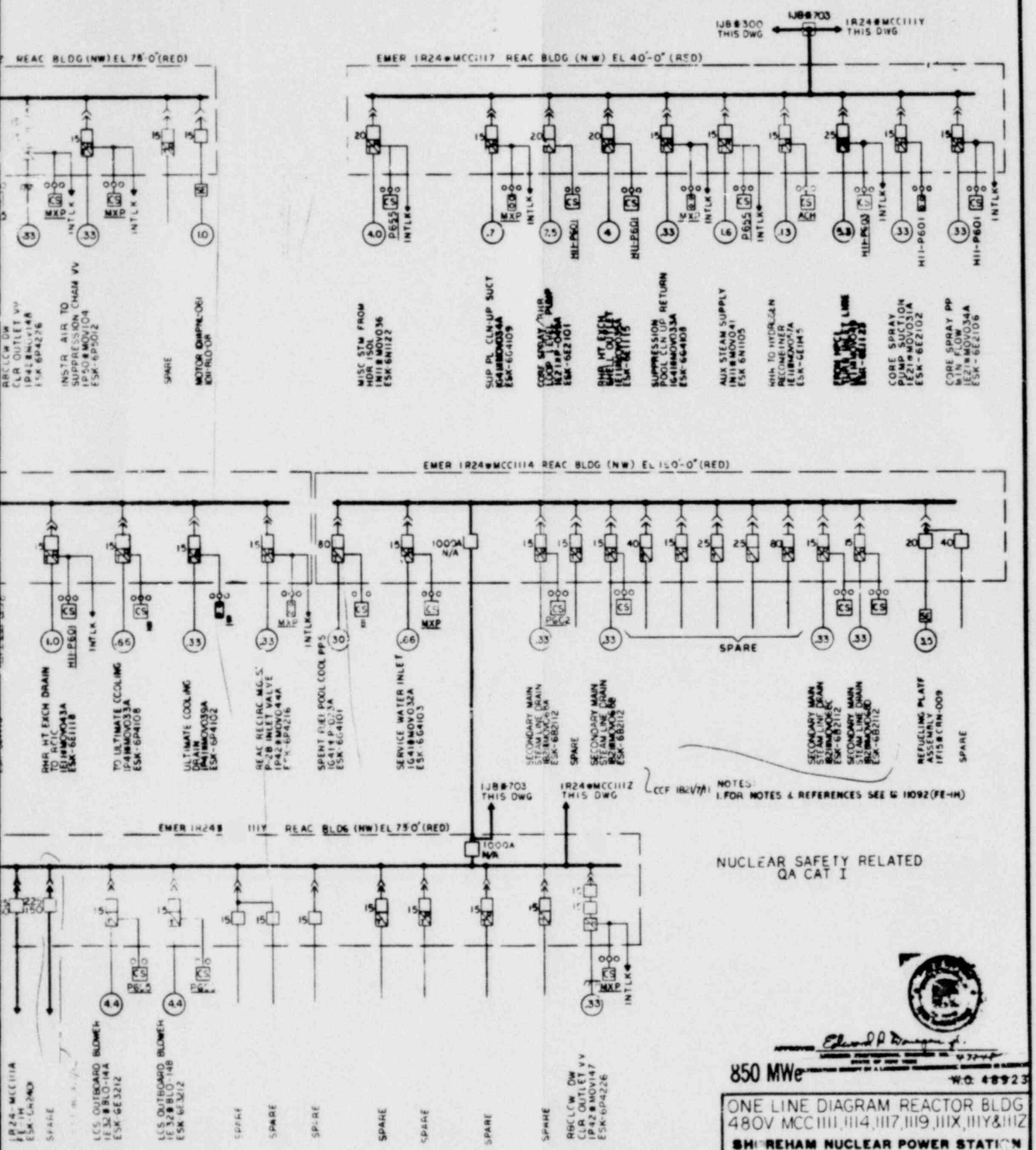
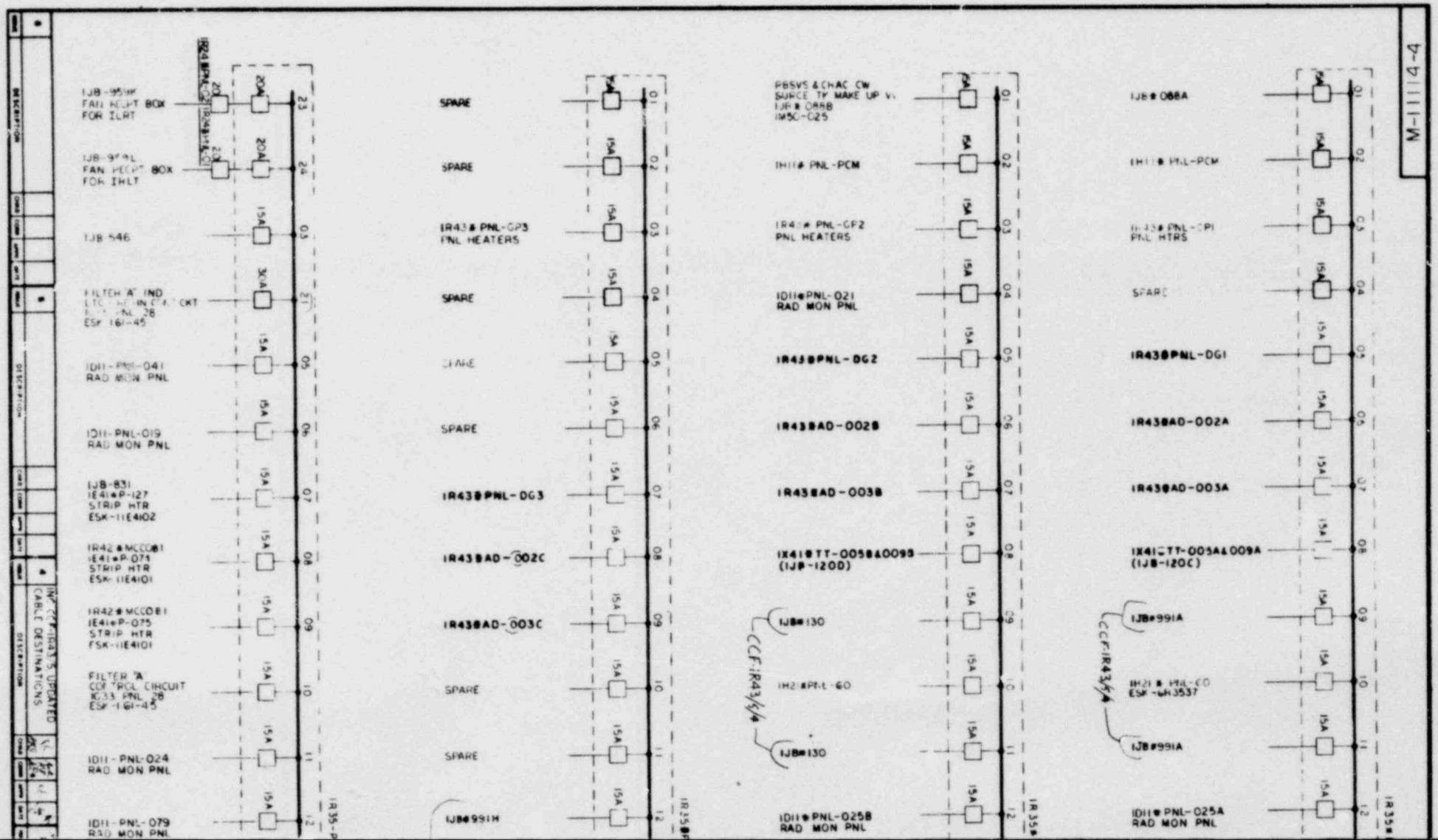
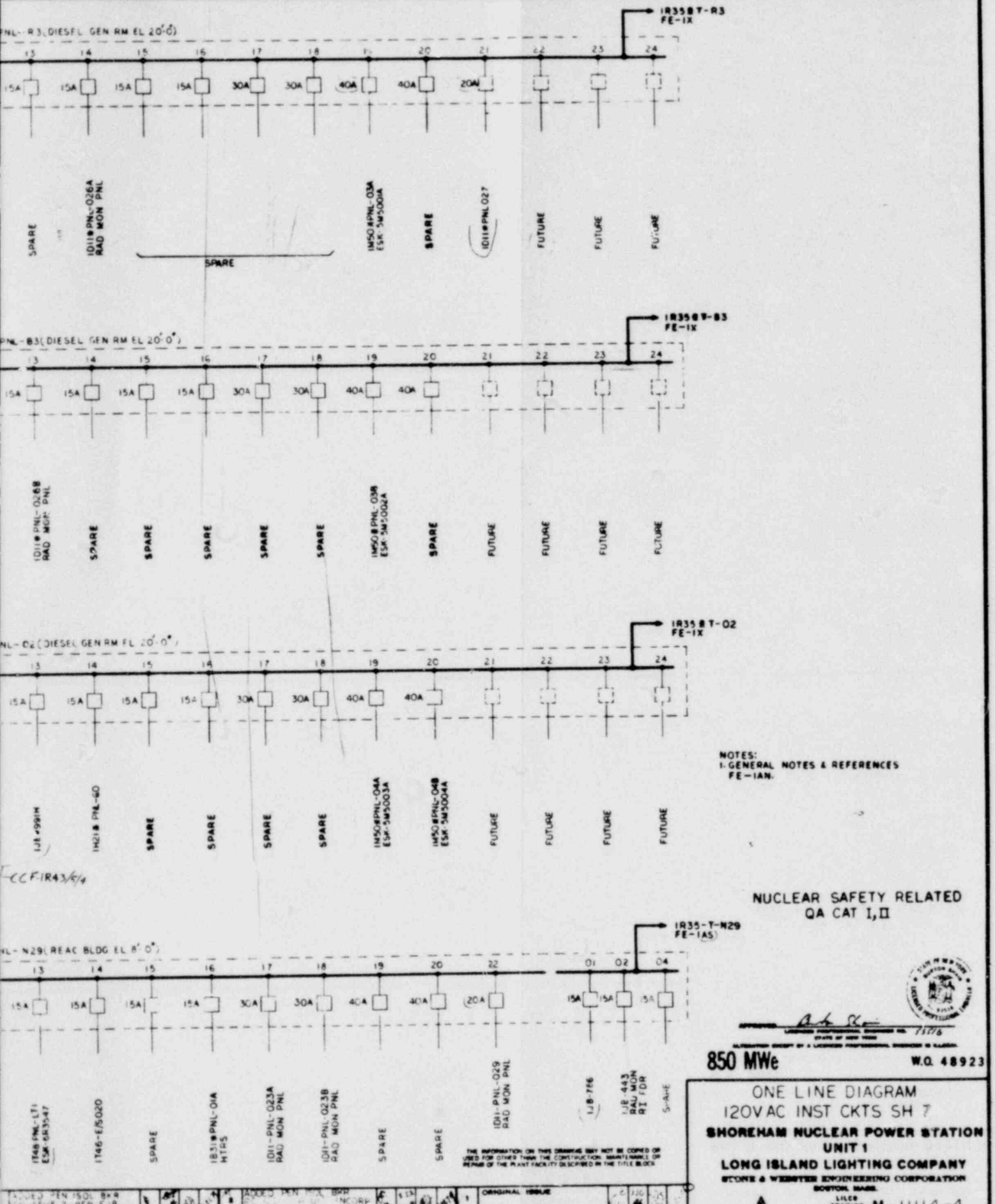
NO.	DESCRIPTION	CHKD	CONN	APPD	DATE
1	ORIGINAL ISSUE				


M-11094-12
EMER 1R24●MCC111X R.B.(WEST) EL112'-0" (GREEN)
1R24●TRS111X
FE-1E
RHR OUTBD VV
1E11●MOV036A
ESK-6E1126
RHR INBOARD VV
1E11●MOV037A
ESK-6E1125
RHR PP MIN
FLOW BYPASS
1E11●MOV045A
RECIRC PP DISCH
1B31●MOV032A
ESK-6B3103
H11-P601
H11-F601
INTLK
CS
EMER 1R24●MCC111
1R24●MCC111Y
THIS DWG
LCS OUTBOARD
PROCESS VV
1E32●MOV024
ESK-6E3213
LCS OUTBOARD
PROCESS VV
1E32●MOV025
ESK-6E3213
LCS OUTBOARD
BYPASS VV
1E32●MOV026
ESK-6E3214
LCS OUTBOARD
BYPASS VV
1E32●MOV027
ESK-6E3214
1R24●MCC1119 REAC BLDG (S.W.) EL40'-0" (RED)
1000A
N/A
1JB
#300
1R23●SWG-111
FE-1E
1JB●703
THIS DWG
1JB●701
RBCLCW HX
DISCH CROSSOVER
VALVE
1P42●MOV031A
ESK-6P4205
EMER SW TO
FUEL POOL VV
1P41●MOV043A
ESK-6P4113
TO ULTIMATE COOLING
1P41●MOV033C
ESK-6P4109
RHR CONTMT
SPRAY
1E11●MOV042A
ESK-6E1112
RHR HT EXCH
SHELL VENT
1E11●MOV055A
ESK-6E1121
RHR HT EXCH
SHELL VENT
1E11●MOV056A
ESK 6E1122
RBCLCW HX
INLET CROSSOVER
1P42●MOV041A
ESK-6P4213
REAC RECIRC MG SET
P-2A INLET VALVE
1P42●MOV043A
ESK 6P4215
RHR HT EXCH
SHELL INLET
1E11●MOV033A
MXP
1R24●MCC1111 REAC BLDG (WEST) EL 40'-0" (RED)
2ND STAGE
REHEAT STEAM
1N11●MOV031A
ESK-6N1106
2ND STAGE
REHEAT STEAM
1N11●MOV031B
ESK-6N1106
CORE SPRAY PP
RECIRC VV A
1E21●MOV035A
ESK-6E2105
PROCESS RAD MON
1D11●MOV033A
ESK 6D1102
PROCESS RAD MON
ESK-6D1101
DRYWELL TO RW
EQUIP DRAINS
1G11●MOV248
ESK-6G1127
DRYWELL TO RW
FLOOR DRAINS
1G11●MOV246
ESK-6G1128
RCIC
LOOP LEVEL PUMP
1E51●P-051
ESK-6E5101
RHR HT EXCH DRAIN
TO SUPPR POOL
1E11●MOV044A
ESK-6E1117
RHR CONTMT
SPRAY HDR
1E11●MOV041A
ESK-6E1113
RADWASTE MON
ISO VV
1P41●MOV102A
ESK-6P4125
P655
H11-P601
H11-P602
DELETED 6 MOTORS ADDED 4 MOTORS
MOTORS & CONT CKTS ADDED, DELETED OR REVISED
DESCRIPTION
ISSUE
CHKD
APPR
DATE


1JB8703
1JB8300 THIS DWG
1R24*MCC111Y THIS DWG
EMER 1R24*MCC1117 REAC BLDG (NW) EL 40'-0" (RSD)
REAC BLDG (NW) EL 78'-0" (RED)
EMER 1R24*MCC1114 REAC BLDG (NW) EL 150'-0" (RED)
SPARE
1JB8703 THIS DWG
1R24*MCC111Z THIS DWG
CCF 1R24/7
NOTES:
1. FOR NOTES & REFERENCES SEE E 11092 (FE-1M)
EMER 1R24B 111Y REAC BLDG (NW) EL 75'-0" (RED)
NUCLEAR SAFETY RELATED
QA CAT I
850 MWe
W.O. 48923
ONE LINE DIAGRAM REACTOR BLDG
480V MCC 1111, 1114, 1117, 1119, 111X, 111Y & 111Z
SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.
10
LILCO DRAWING NUMBER M-11094-12
S&W DWG. No. 11600:02-FE-1K-12


M-11114-4
IJB-955W FAN RECPT BOX FOR ILRT
IJB-956L FAN RECPT BOX FOR IHLT
IJB 546
FILTER 'A' IND CONTROL CKT PNL 28 ESK 161-45
IDII-PNL-041 RAD MON PNL
IDII-PNL-019 RAD MON PNL
IJB-831 IE41*P-127 STRIP HTR ESK-11E4102
IR42*MCC081 IE41*P-079 STRIP HTR ESK-11E4101
IR42*MCC081 IE41*P-075 STRIP HTR FSK-11E4101
FILTER 'A' CONTROL CIRCUIT XG33 PNL 28 ESK-161-45
IDII-PNL-024 RAD MON PNL
IDII-PNL-079 RAD MON PNL
SPARE
SPARE
IR43* PNL-GP3 PNL HEATERS
SPARE
SPARE
IR43BPNL-DG3
IR43BAD-002C
IR43BAD-003C
SPARE
SPARE
IJB*991H
PBSVS & CHAC CW SURGE TK MAKE UP V's IJB*088B IM5C-025
IHII* PNL-PCM
IR43* PNL-GP2 PNL HEATERS
IDII*PNL-021 RAD MON PNL
IR43BPNL-DG2
IR43BAD-002B
IR43BAD-003B
IX41*TT-005B&009B (IJB-120D)
IJB*130
IH21*PNL-GO
IJB*130
IDII*PNL-025B RAD MON PNL
IJB*088A
IHII* PNL-PCM
IR43* PNL-GP1 PNL HTRS
SPARE
IR43BPNL-DG1
IR43BAD-002A
IR43BAD-003A
IX41*TT-005A&009A (IJB-120C)
IJB*991A
IH21* PNL-GO ESK-6M3537
IJB*991A
IDII*PNL-025A RAD MON PNL
CCF IR43/4/4
CCF IR43/4/4
CABLE DESTINATIONS



NOTES:
1. GENERAL NOTES & REFERENCES FE-1AN.

CCF IR43/6/4

NUCLEAR SAFETY RELATED
QA CAT I, II

850 MWe

W.O. 48923

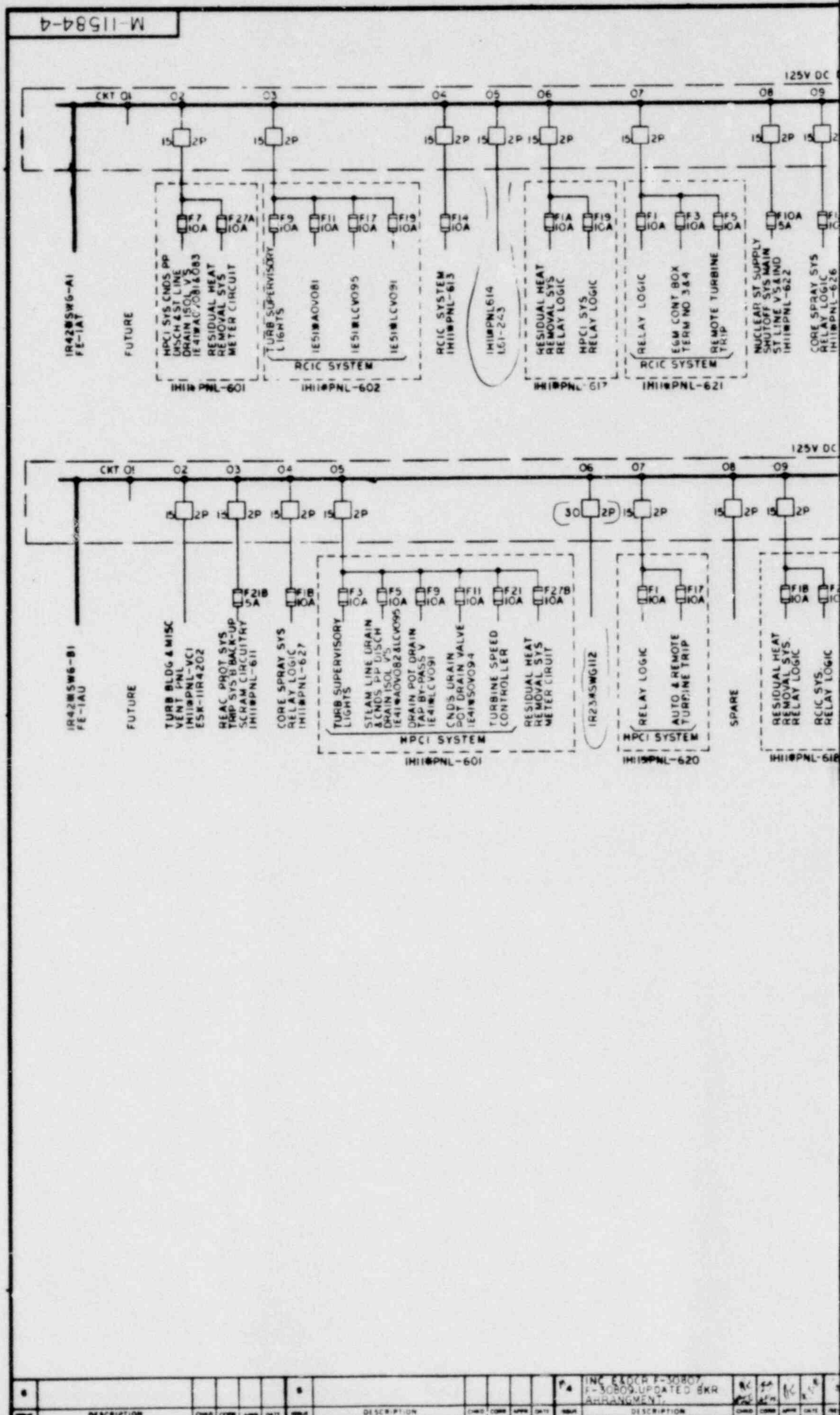
ONE LINE DIAGRAM
120VAC INST CKTS SH 7

SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

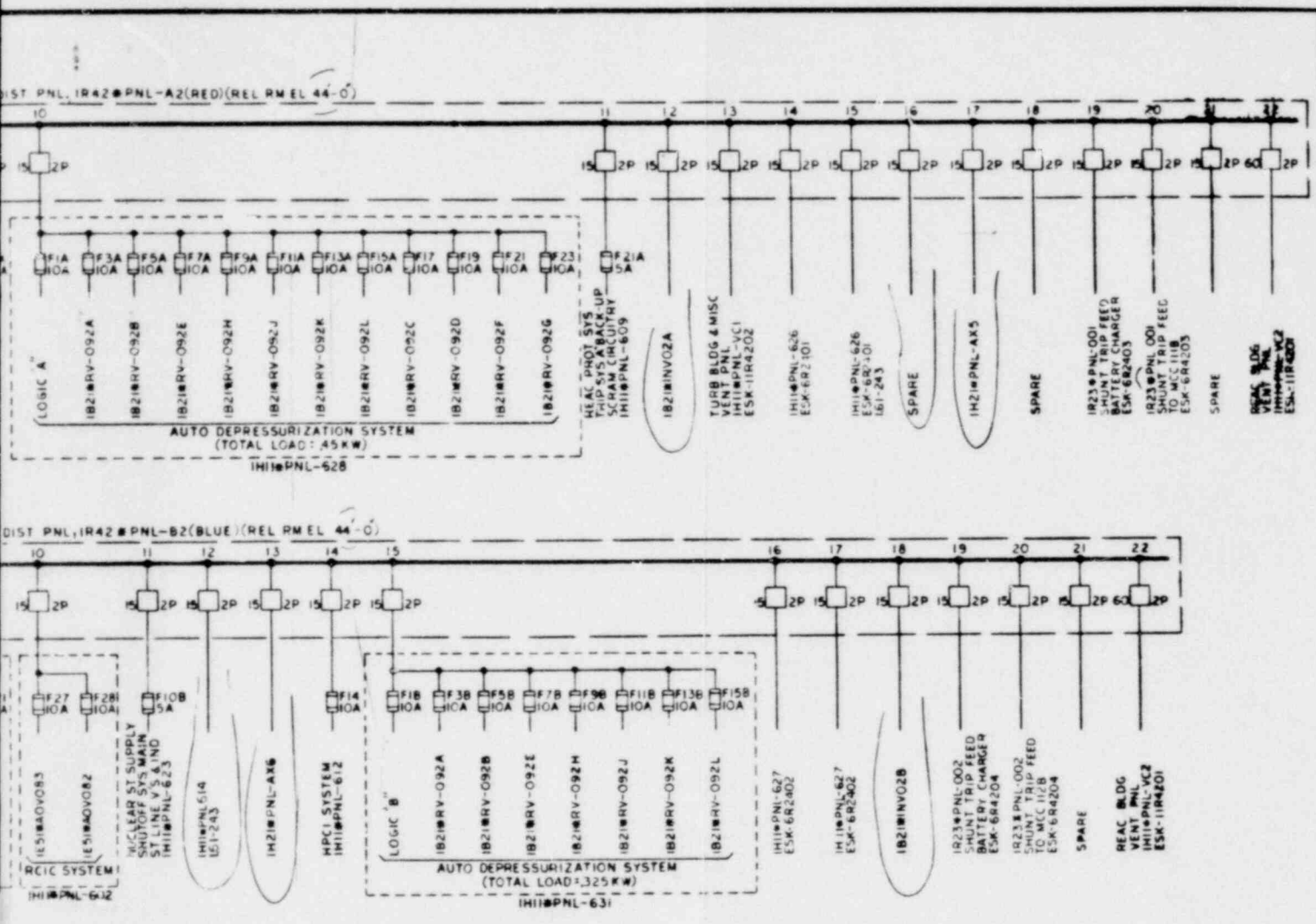
FILED DRAWING NUMBER M-11114-4

S & W DWG. No. 11600.02-FE-188-4

NO.	DESCRIPTION	CHKD	CONN	APPD	DATE
1	ORIGINAL ISSUE				



M-11584-4
125V DC
CKT 01
FUTURE
1R42@SW6-A1
FE-1AT
HPCI SYS CNDS PP DISCH & ST LINE DRAIN ISOL V'S
RESIDUAL HEAT REMOVAL SYS METER CIRCUIT
1H11@PNL-601
TURB SUPERVISORY LIGHTS
1E51@AOV081
1E51@LCV095
1E51@LCV091
RCIC SYSTEM
1H11@PNL-602
RCIC SYSTEM
1H11@PNL-613
1H11@PNL614
LS1-243
RESIDUAL HEAT REMOVAL SYS RELAY LOGIC
HPCI SYS RELAY LOGIC
1H11@PNL-617
RELAY LOGIC
E&M CONT BOX TERM NO 3&4
REMOTE TURBINE TRIP
RCIC SYSTEM
1H11@PNL-621
NUCLEAR ST SUPPLY SHUTOFF SYS MAIN ST LINE V'S & IND
1H11@PNL-622
CORE SPRAY SYS RELAY LOGIC
1H11@PNL-626
1R42@SW6-B1
FE-1AU
FUTURE
TURB BLDG & MISC VENT PNL
1H11@PNL-VC1
ESK-11R4202
REAC PROT SYS TRIP SYS B BACK-UP SCRAM CIRCUITRY
1H11@PNL-611
CORE SPRAY SYS RELAY LOGIC
1H11@PNL-627
TURB SUPERVISORY LIGHTS
STEAM LINE DRAIN & CNDS PP DISCH DRAIN ISOL V'S
DRAIN POT DRAIN TAP BY-PASS V
CNDS DRAIN POT DRAIN VALVE
TURBINE SPEED CONTROLLER
RESIDUAL HEAT REMOVAL SYS METER CIRCUIT
HPCI SYSTEM
1H11@PNL-601
1R2345WG112
RELAY LOGIC
AUTO & REMOTE TURBINE TRIP
HPCI SYSTEM
1H11@PNL-620
SPARE
RESIDUAL HEAT REMOVAL SYS RELAY LOGIC
RCIC SYS RELAY LOGIC
1H11@PNL-618
INC E&DCR F-30807
F-30809 UPDATED BKR ARRANGMENT
DESCRIPTION



NOTES:
1. GENERAL NOTES & REFERENCES FE-1M.

NUCLEAR SAFETY RELATED
QA CAT. I

APPROVED _____
LICENSED PROFESSIONAL ENGINEER
STATE OF NEW YORK

ALTERATION EXCEPT BY A LICENSED PROFESSIONAL ENGINEER IS ILLEGAL

850 MWe W.O. 48923

ONE LINE DIAGRAM
125V DC DISTRIBUTION BUS "A" & "B"

SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

LILCO DRAWING NUMBER M-11584-4

S & W DWG. No. 1160002-FE-1AY-4

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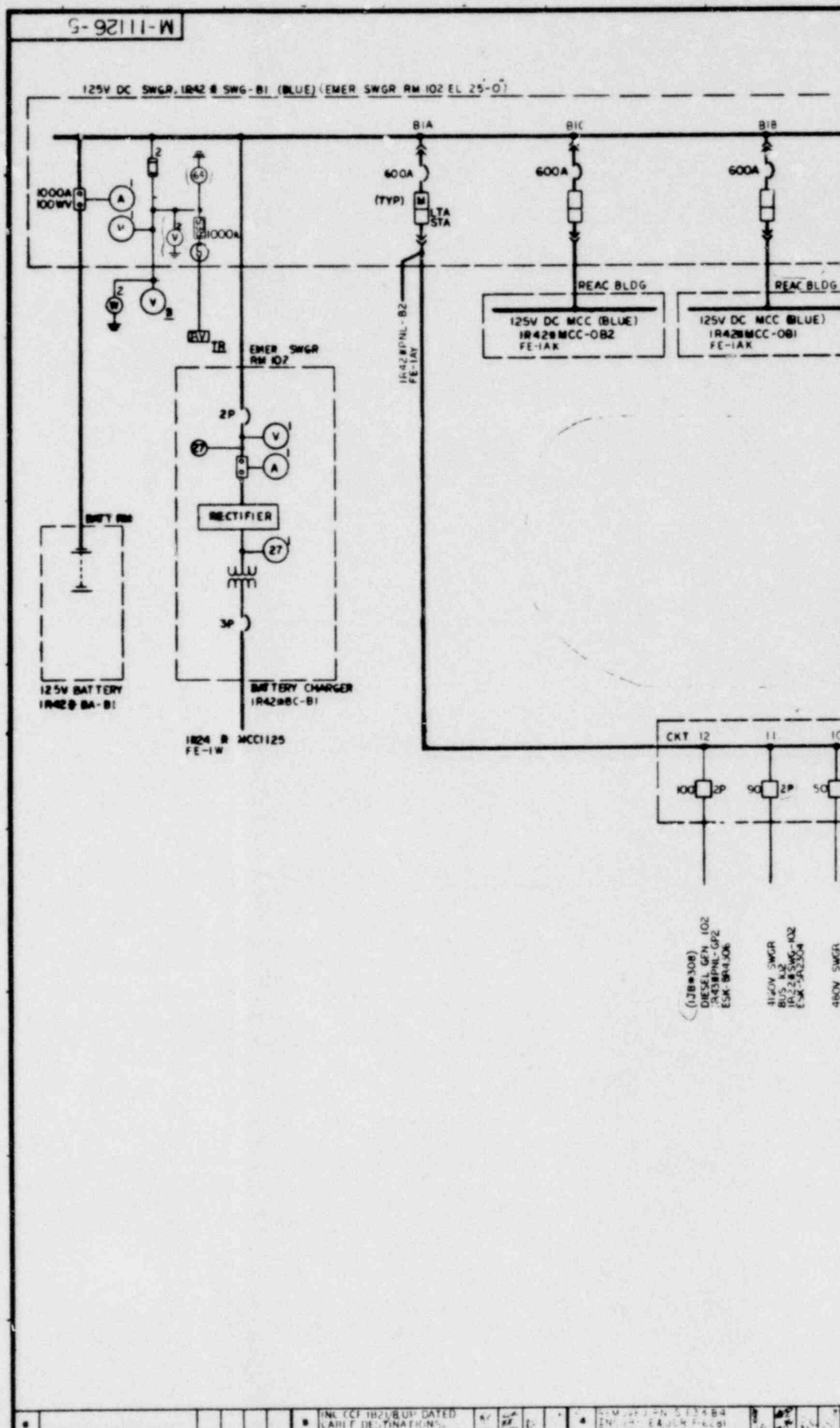
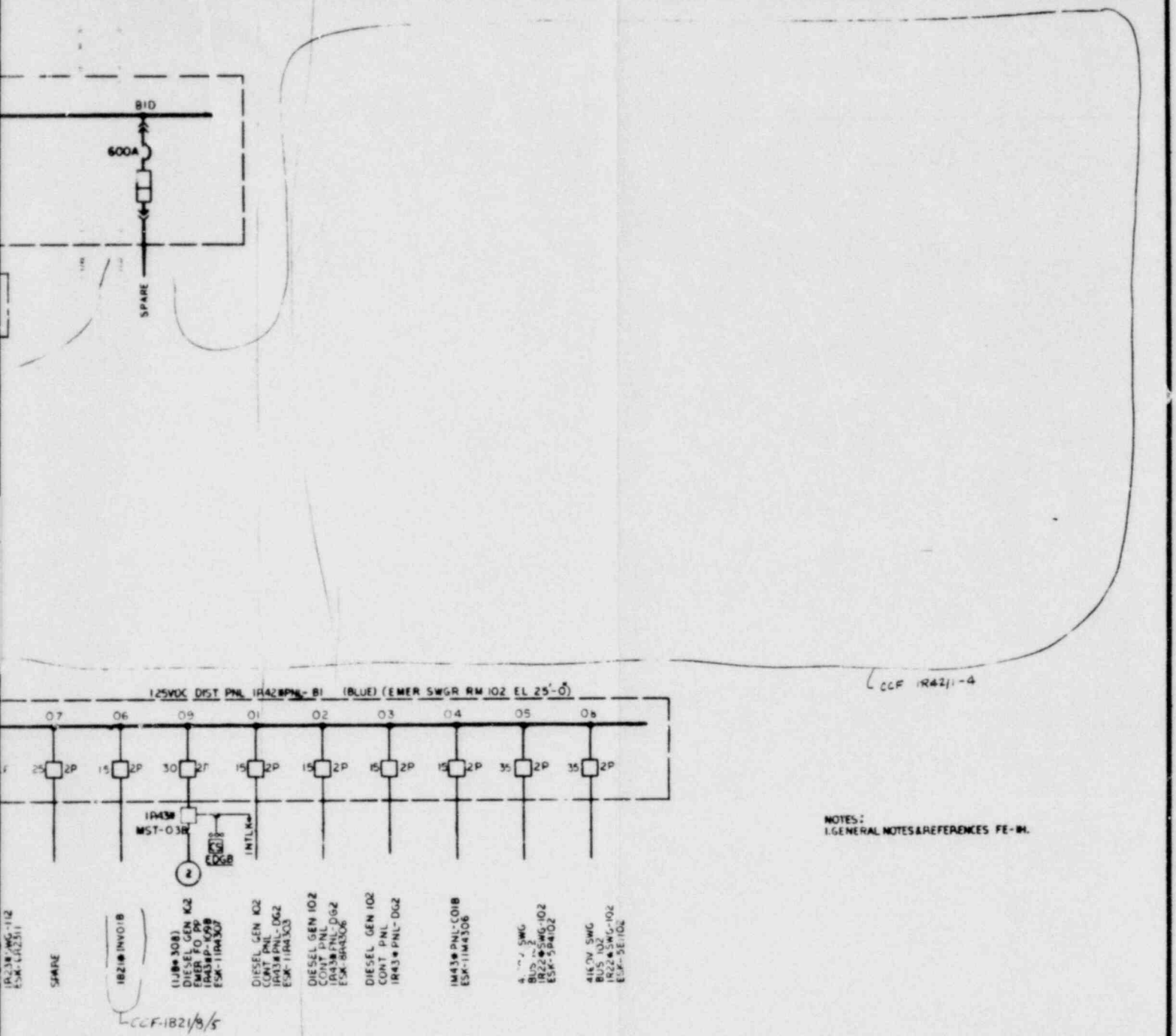
NO.	DESCRIPTION	CHKD	CORR	APPR	DATE
3	ADDED & REVISED CKTS				
2	REVISED CKTS				
1	ORIGINAL ISSUE				



M-11126-5
125V DC SWGR. 1R42 # SWG-B1 (BLUE) (EMER SWGR RM 102 EL 25'-0")
B1A
B1C
B1B
600A
(TYP)
LTA
STA
1000A
100WV
1000A
TR
EMER SWGR
RM 102
2P
27
RECTIFIER
3P
BATT RM
125V BATTERY
1R42 # BA-B1
BATTERY CHARGER
1R42#BC-B1
1R24 R MCC1125
FE-1W
REAC BLDG
125V DC MCC (BLUE)
1R42#MCC-0B2
FE-1AK
125V DC MCC (BLUE)
1R42#MCC-0B1
FE-1AK
1R42#PNL-B2
FE-1AY
CKT 12
11
10
100
2P
90
2P
50
(1J8#308)
DIESEL GEN 102
1R43#PNL-GP2
ESK-8R4306
4160V SWGR
BUS 102
1R22#SWG-102
ESK-5R2304
480V SWGR
INC ECF 1821/B UPDATED CABLE DESTINATIONS
DESCRIPTION



CCF-1821/8/5

CCF 1R42/1-4

NOTES:
1. GENERAL NOTES & REFERENCES FE-1H.

NUCLEAR SAFETY RELATED
Q.A. CAT I

APPROVED _____
LICENSED PROFESSIONAL ENGINEER NO. _____
STATE OF NEW YORK

ALTERATION EXCEPT BY A LICENSED PROFESSIONAL ENGINEER IS ILLEGAL

850 MWe

W.O. 48923

ONE LINE DIAGRAM 125V DC DISTRIBUTION BUS "B"

SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

LILCO DRAWING NUMBER M-11126-5

S & W DWG. No. 11600.02-FE-1AU-5

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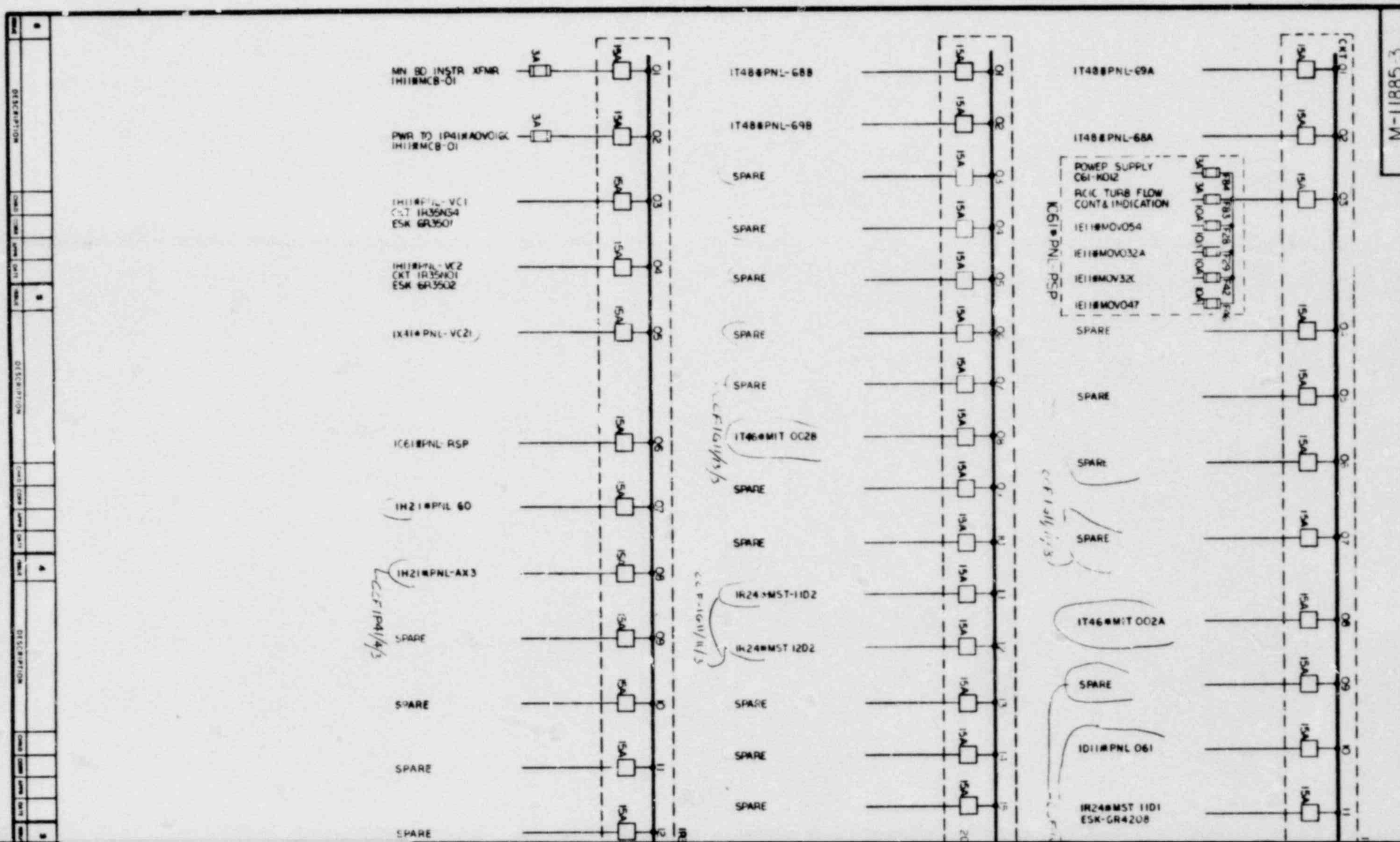
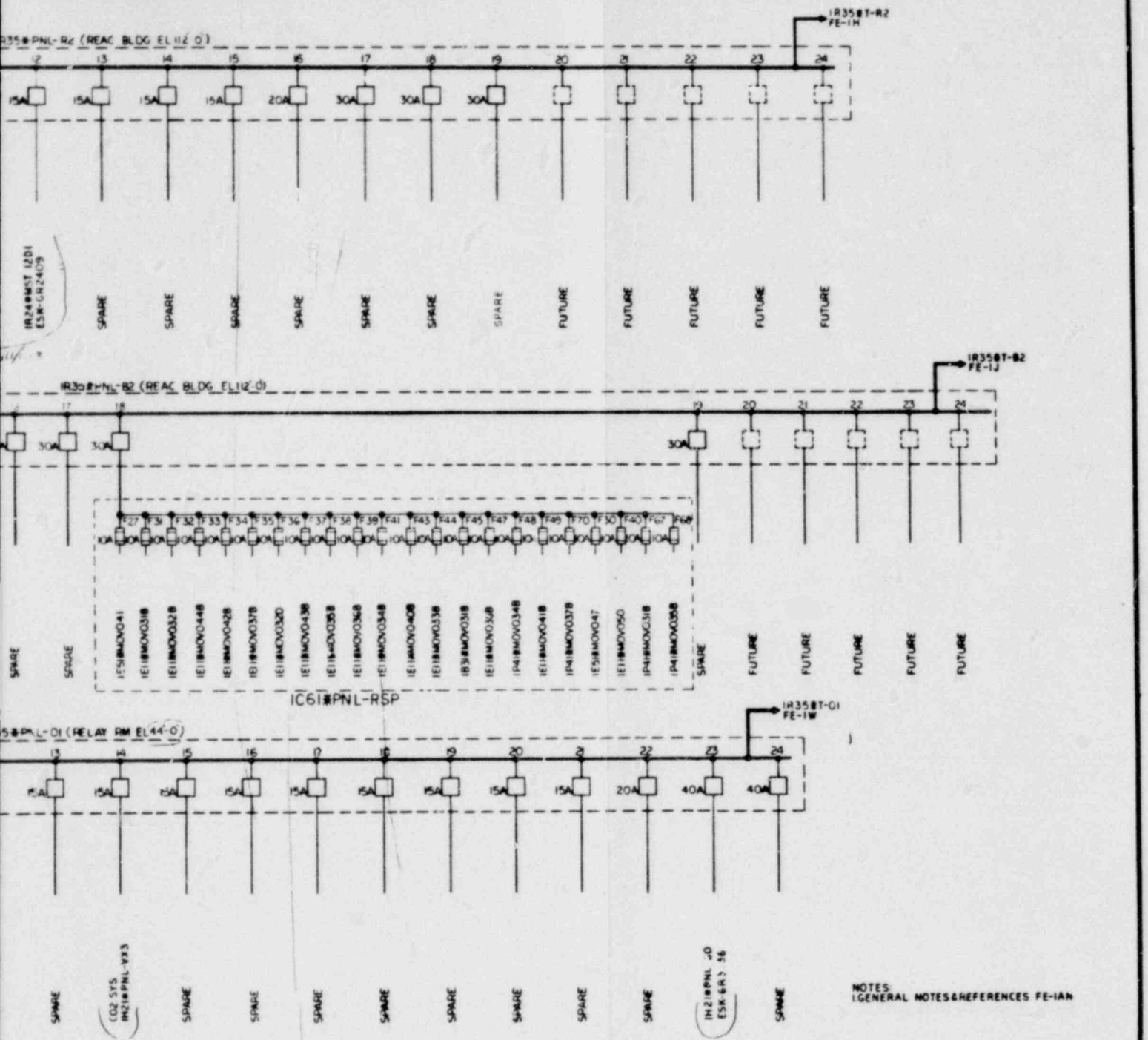
ISSUE	DESCRIPTION	CHKD	CORR	APPR	DATE
3	REVISED & ADDED CKTs & MIN CHGS	JC	[illegible]	[illegible]	[illegible]
2	MOVED 1R42BPNL-B1 & B4, ADDED TRIP RATINGS, REARRANGED & ADDED CKT NOS., MINOR CHANGES	[illegible]	[illegible]	[illegible]	[illegible]
1	ORIGINAL ISSUE	[illegible]	[illegible]	[illegible]	[illegible]


M-11885-3
CKT 01
1T48#PNL-69A
1T48#PNL-68A
POWER SUPPLY C61-K012
RCIC TURB FLOW CONT & INDICATION
1E11#MOV054
1E11#MOV032A
1E11#MOV32X
1E11#MOV047
1C61#PNL-PSP
SPARE
SPARE
SPARE
SPARE
1T46#MIT 002A
SPARE
1D11#PNL 061
1R24#MST 11D1
ESK-GR4208
1T48#PNL-68B
1T48#PNL-69B
SPARE
SPARE
SPARE
SPARE
SPARE
1T46#MIT 002B
SPARE
SPARE
1R24#MST-11D2
1R24#MST 12D2
SPARE
SPARE
SPARE
MN BD INSTR XFMR
1H11#MCB-01
PWR TO 1P41#AOV016C
1H11#MCB-01
1H11#PNL-VC1
CKT 1R35N54
ESK 6R3501
1H11#PNL-VC2
CKT 1R35N01
ESK 6R3502
1X41#PNL-VC21
1C61#PNL-RSP
1H21#PNL 60
1H21#PNL-AX3
SPARE
SPARE
SPARE
SPARE
15A
3A
10A
DESCRIPTION



NOTES:
1. GENERAL NOTES & REFERENCES FE-1AN

NUCLEAR SAFETY RELATED
QA CAT I

850 MWe

W.O. 48923

ONE LINE DIAGRAM
120V AC INST CKTS SH6

SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

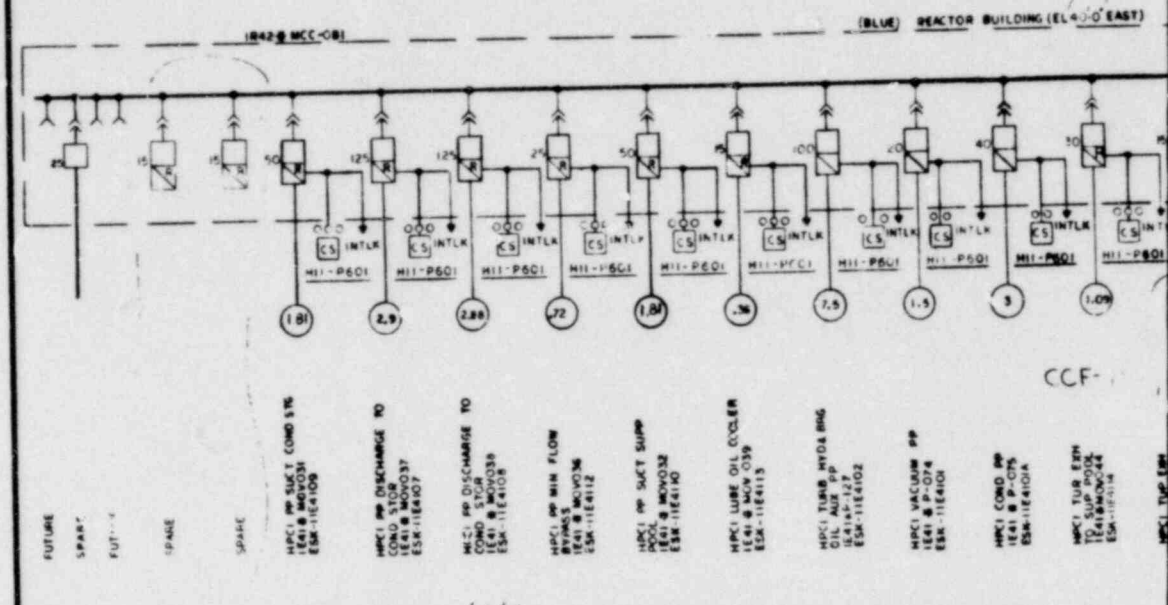
FILED DRAWING NUMBER M-11885-3

S & W DWG. No. 11600.02 FE-18A-3

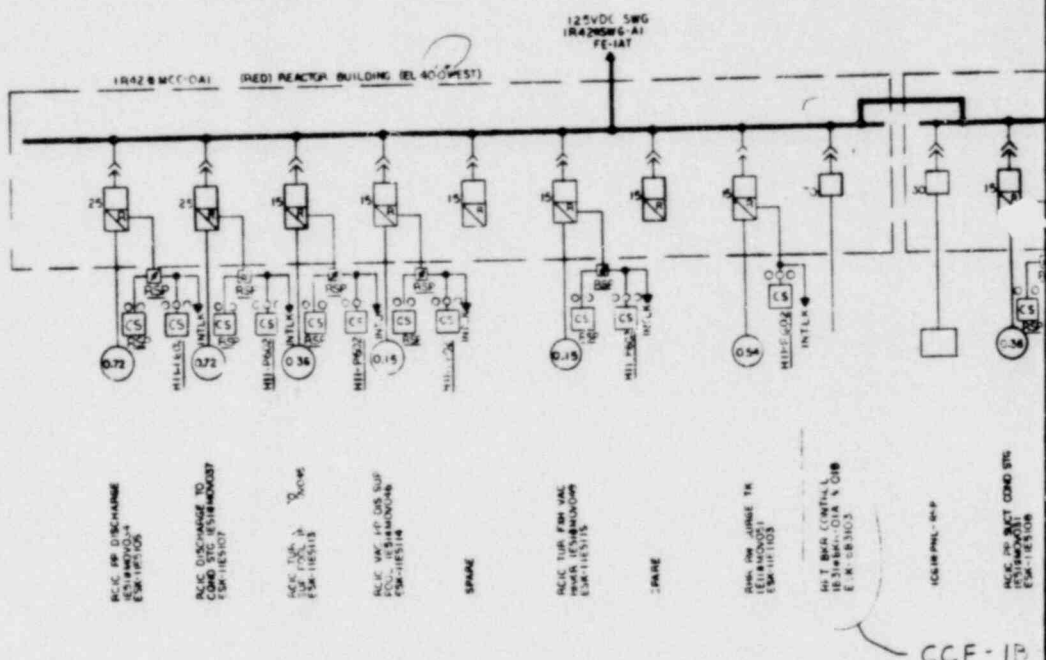
THE INFORMATION ON THIS DRAWING MAY NOT BE COPIED OR USED FOR OTHER THAN THE CONSTRUCTION, MAINTENANCE OR REPAIR OF THE PLANT FACILITY DESCRIBED IN THE TITLE BLOCK.

DESCRIPTION	CHKD	CORR	APPR	DATE	ISSUE
REV. TO AGREE WITH MFG. PANEL BOARD LAYOUT & MINOR CHGS.					1
ORIGINAL ISSUE					

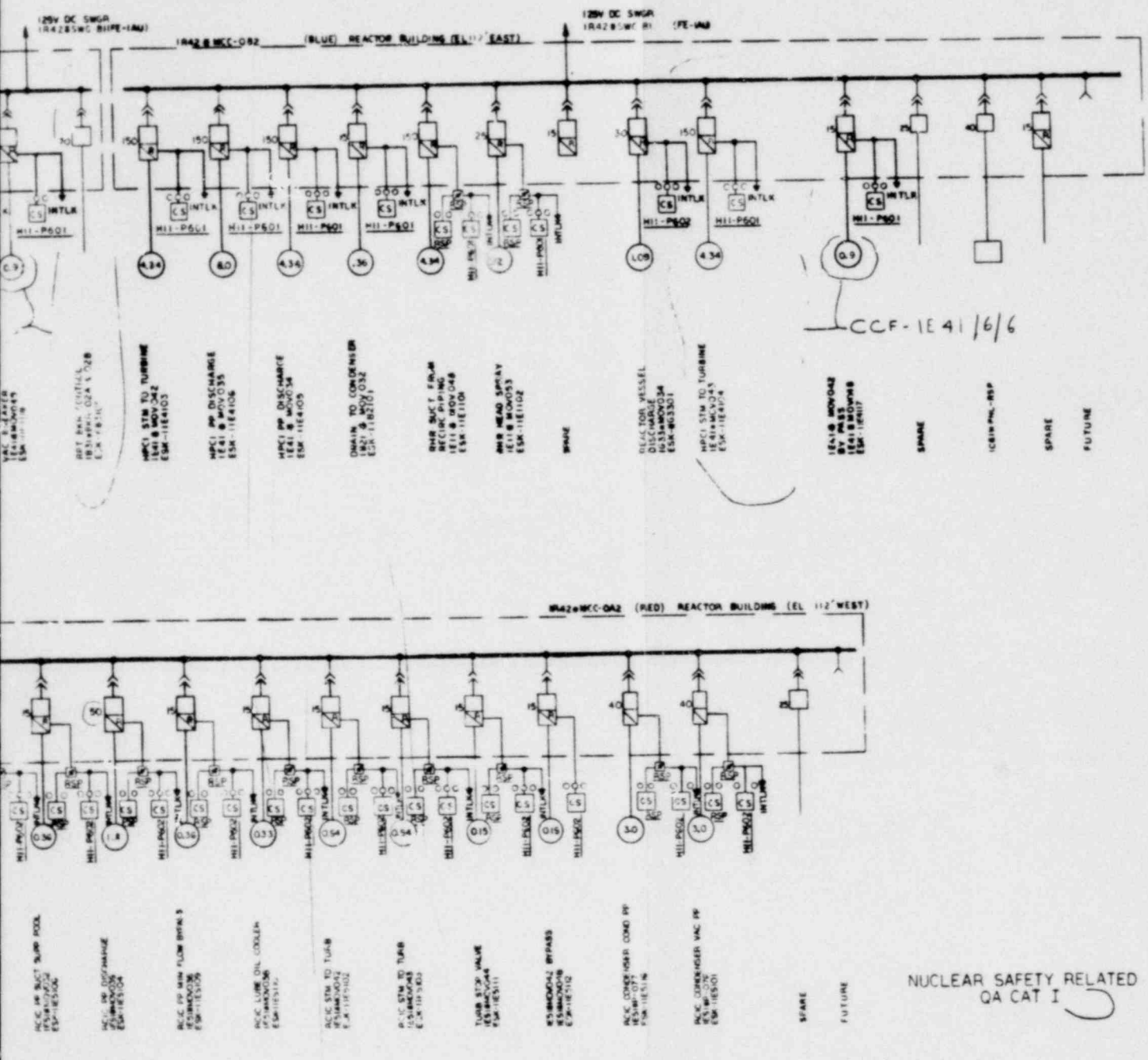
M-11118-7



CCF-1[illegible]4.1/1/6



NO	DESCRIPTION	CHKD	CORR	APPR	DATE	ISSUE	DESCRIPTION	CHKD	CORR	APPR	DATE
	INCORP CCF [illegible]						CHG PRIM SIZES [illegible] MINOR CHGS	UJC			
						4	[illegible]				



NUCLEAR SAFETY RELATED
QA CAT I

NOTES:
FOR GENERAL NOTES & REFERENCES
SEE M-11C92 (E-1H)

850 MWe

W.O. 48923

ONE LINE DIAGRAM
125VDC MCC 0A1,0A2,CB1,0B2
SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

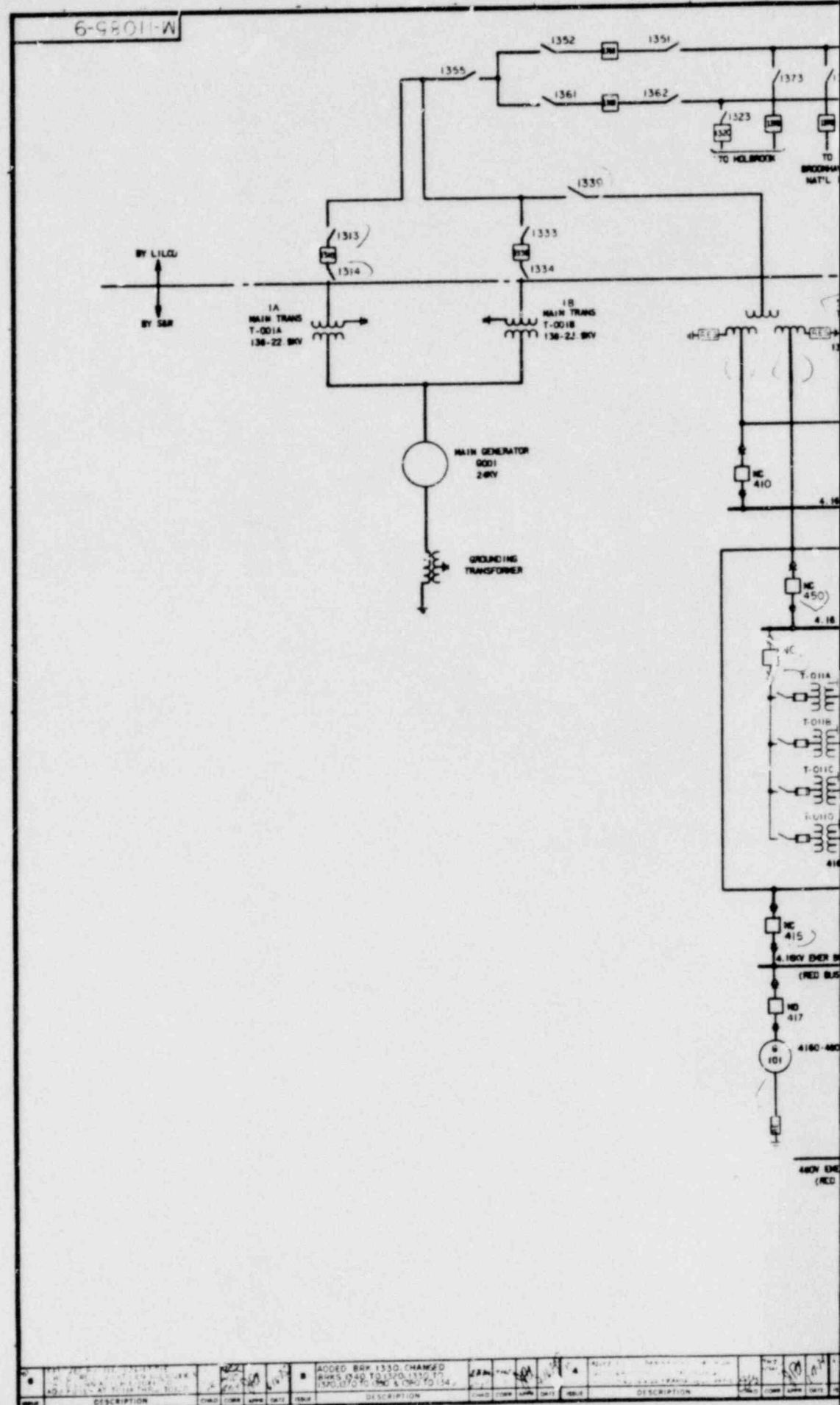
10

LILCO DRAWING NUMBER M-11118-7

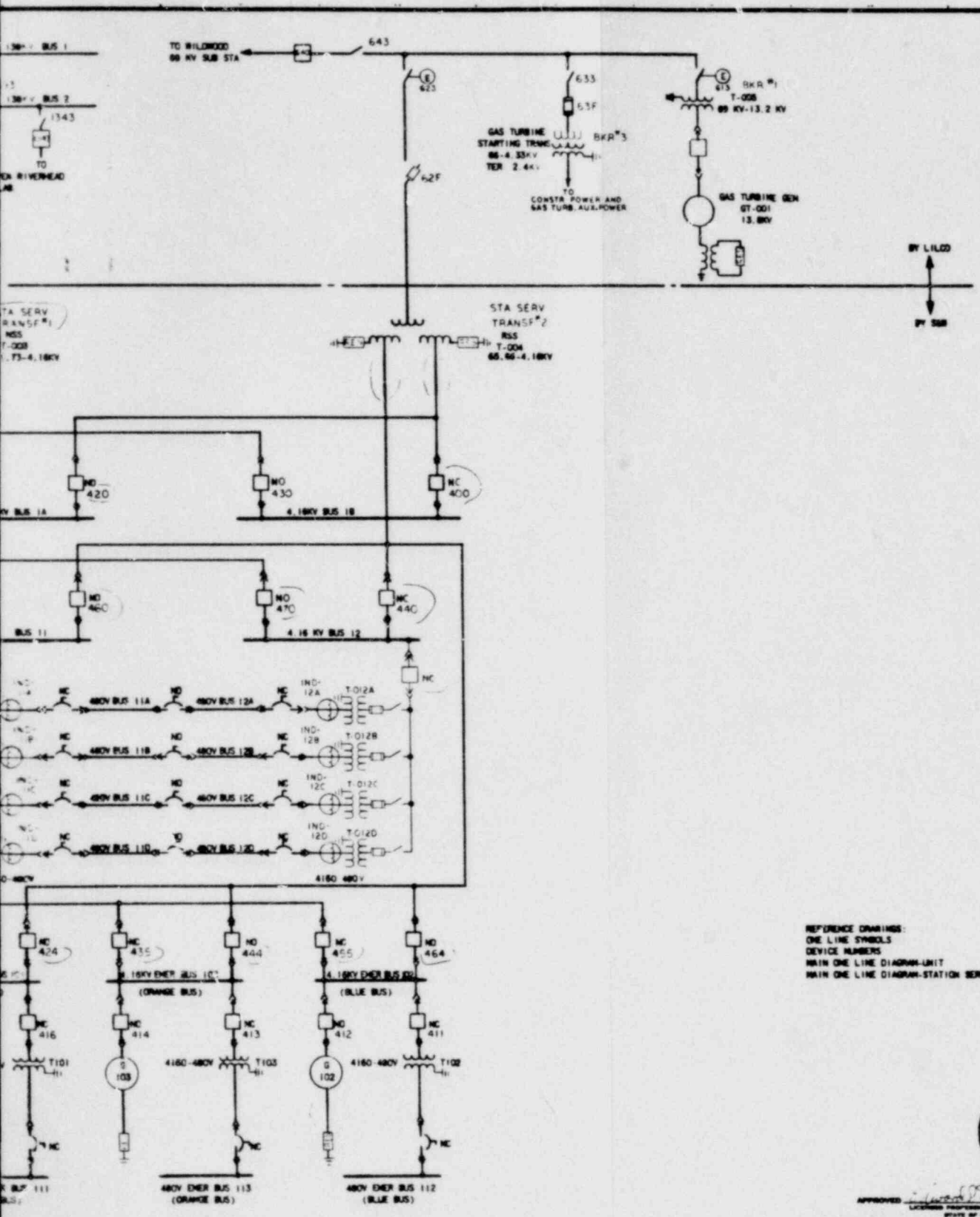
S&W DWG. No. 11600Q2-FE-1AX-7

THE INFORMATION ON THIS DRAWING MAY NOT BE COPIED OR USED FOR OTHER THAN THE CONSTRUCTION, MAINTENANCE OR REPAIR OF THE PLANT FACILITY DESCRIBED IN THE TITLE BLOCK

DESCRIPTION	CHKD	COMM	APPR	DATE	ISSUE	DESCRIPTION	CHKD	COMM	APPR	DATE	ISSUE	DESCRIPTION	CHKD	COMM	APPR	DATE
ADDED EQUIP NO. & ESK NO. REVISED MOTOR NO. SEPARATED W/CCB1 & MCC 082					B						A1	ORIGINAL ISSUE				



NO.	DESCRIPTION	CHKD	CORR	APPR	DATE
B	ADDED BRK 1330. CHANGED BUSES 1340 TO 1350, 1370 TO 1400, 1310 TO 1340 & 1360 TO 1314.				
A					



REFERENCE DRAWINGS:

ONE LINE SYMBOLS	S & W STD-ME-10-1 TO 10-9
DEVICE NUMBERS	S & W STD-ME-11-1 TO 11-4
MAIN ONE LINE DIAGRAM-UNIT	M-11115 (FE-13B)
MAIN ONE LINE DIAGRAM-STATION SERVICE	M-11116 (FE-1AC)

APPROVED _____
LICENSED PROFESSIONAL ENGINEER NO. 47547
(STATE OF NEW YORK)

850 MWe QA CAT I, II W.O. 48923

MAIN ONE LINE DIAGRAM- KEY

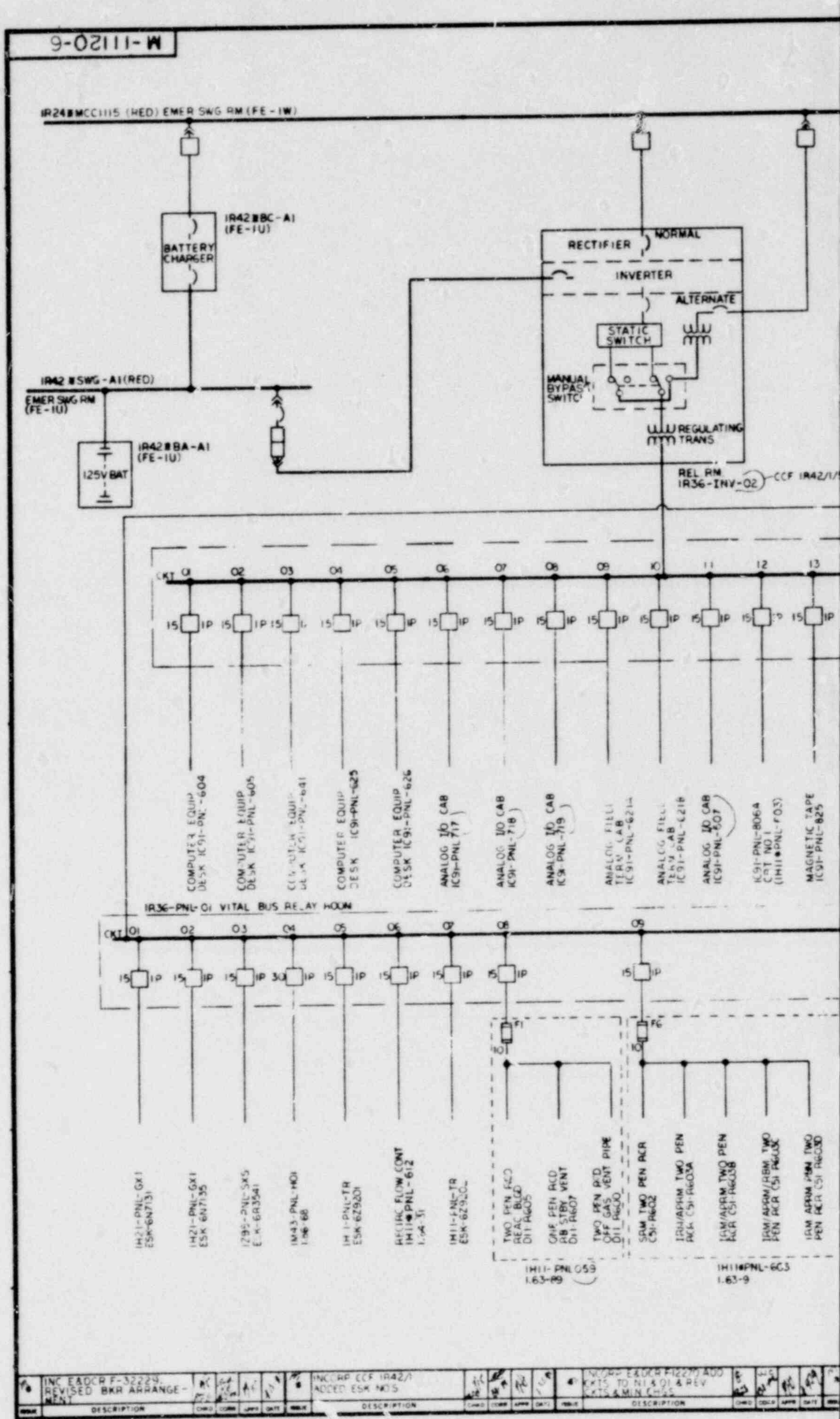
SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

LILCO DRAWING NUMBER M-11085-9

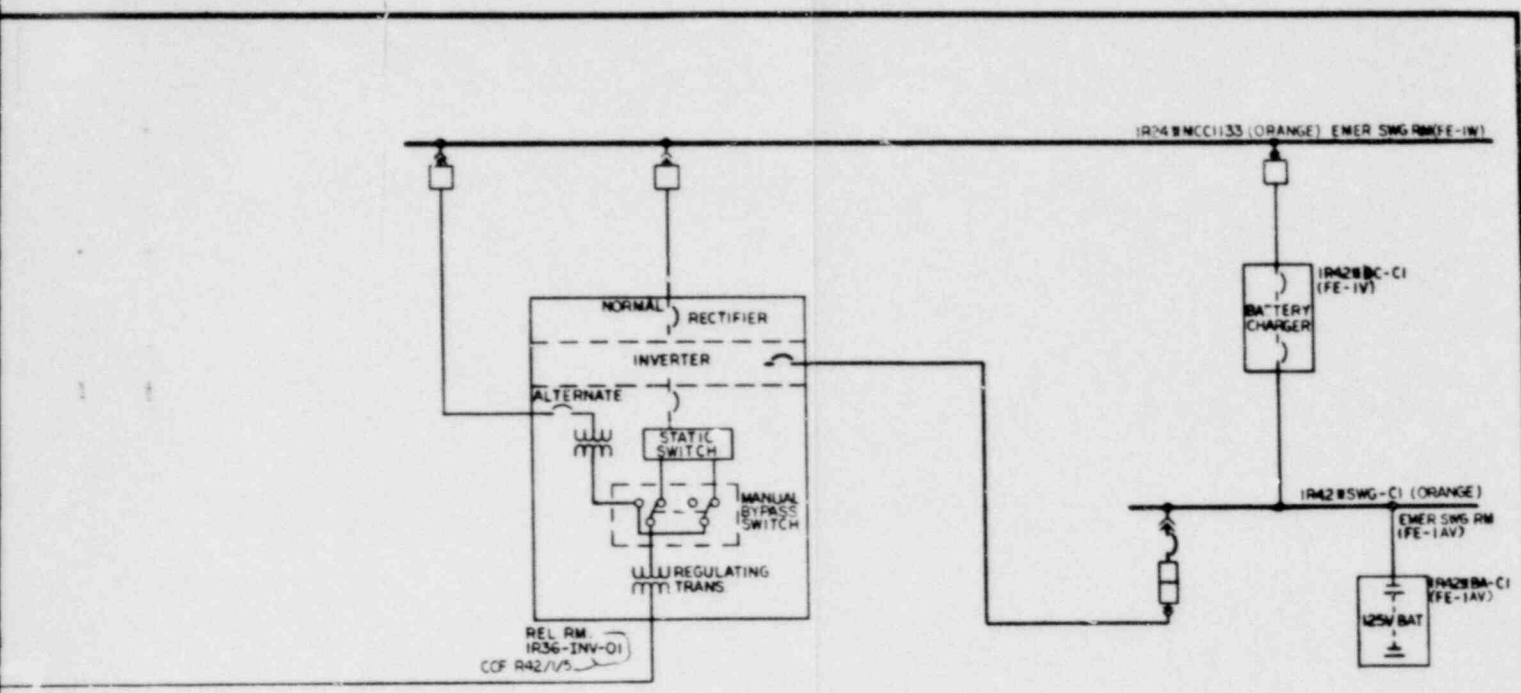
S&W DWG. No. 116000 2 FE-1A-9

THE INFORMATION ON THIS DRAWING MAY NOT BE COPIED OR USED FOR OTHER THAN THE CONSTRUCTION, MAINTENANCE OR REPAIR OF THE PLANT FACILITY DESCRIBED IN THE TITLE BLOCK.

NO.	DESCRIPTION	CHKD	CORR	APPR	DATE
3	NOW SHOWN AND TITLE CHANGED				
2	ADDED & REMOVED RELAYS SEL. WIR. TRANS. & GEN. NOS.				
1	ORIGINAL ISSUE				



M-11120-6
1R24#MCC1115 (RED) EMER SWG RM (FE-1W)
1R42#BC-A1
(FE-1U)
BATTERY CHARGER
RECTIFIER
NORMAL
INVERTER
ALTERNATE
STATIC SWITCH
MANUAL BYPASS SWITCH
REGULATING TRANS
1R42#SWG-A1(RED)
EMER SWG RM
(FE-1U)
1R42#BA-A1
(FE-1U)
125V BAT
REL RM
1R36-INV-02
CCF 1R42/1
CKT 01 02 03 04 05 06 07 08 09 10 11 12 13
COMPUTER EQUIP DESK 1C91-PNL-604
COMPUTER EQUIP DESK 1C91-PNL-605
COMPUTER EQUIP DESK 1C91-PNL-641
COMPUTER EQUIP DESK 1C91-PNL-625
COMPUTER EQUIP DESK 1C91-PNL-626
ANALOG I/O CAB 1C91-PNL-717
ANALOG I/O CAB 1C91-PNL-718
ANALOG I/O CAB 1C91-PNL-719
ANALOG FIELD TERM CAB 1C91-PNL-6214
ANALOG FIELD TERM CAB 1C91-PNL-6218
ANALOG I/O CAB 1C91-PNL-807
1C91-PNL-8064 CRT NO 1 (1H11#PNL-F03)
MAGNETIC TAPE 1C91-PNL-825
1R36-PNL-01 VITAL BUS RELAY ROOM
CKT 01 02 03 04 05 06 07 08 09
1H21-PNL-GX1 ESK-6N713
1H21-PNL-GX1 ESK-6N735
1Z95-PNL-SXS ESK-6R3541
1R43-PNL-H01 1.98-68
1H11-PNL-TR ESK-6Z9201
RECIRC FLOW CONT 1H11#PNL-612 1.64-31
1H11-PNL-TR ESK-6Z920
TWO PEN RCD REAC BLDG D11-R605
ONE PEN RCD RB STBY VENT D11-R607
TWO PEN R'D OFF GAS VENT PIPE D11-R600
SRM TWO PEN RCR C51-R602
IRM/APRM TWO PEN RCR C51-R603A
IRM/APRM TWO PEN RCR C51-R603B
IRM/APRM/RBM TWO PEN RCR C51-R603C
IRM APRM RBM TWO PEN RCR C51-R603D
1H11-PNL059
1.63-89
1H11#PNL-603
1.63-9
INC E&DCR F-32229, REVISED BKR ARRANGEMENT
INCORP CCF 1R42/1 ADDED ESK NOS
INCORP E&DCR F12277 ADD CKTS TO N1 & 01 & REV CKTS & MIN CHGS
DESCRIPTION



1C91-PNL-N1 120VAC COMPUTER PNL REL RM EL44-0"

SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
COMP DRUM MEMORY 1C91-PNL-610
CARD PUNCH 1C91-PNL-830
DIGITAL OUT TERM CAB 1C91-PNL-609
CONT DSPLY GEN 1C91-PNL-824
LINE PRINTER 1C91-PNL-823
DIGITAL INPUT TERM CAB 1C91-PNL-622
SPARE
CENTRAL SYS UNIT COMPLEX 1C91-PNL-612
SPARE
1C91-PNL 831 DISC MEMORY
FUTURE

NOTES
1. GENERAL NOTES & REFERENCES FE-1M

NUCLEAR SAFTY RELATED
QA CAT I, II

850 MWe

W.O. 48923

ONE LINE DIAG 120VAC
VITAL BUS & COMPUTER
SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

LILCO DRAWING NUMBER M-11120-6

S & W DWG. No. 11600.02-FE-1AM-6

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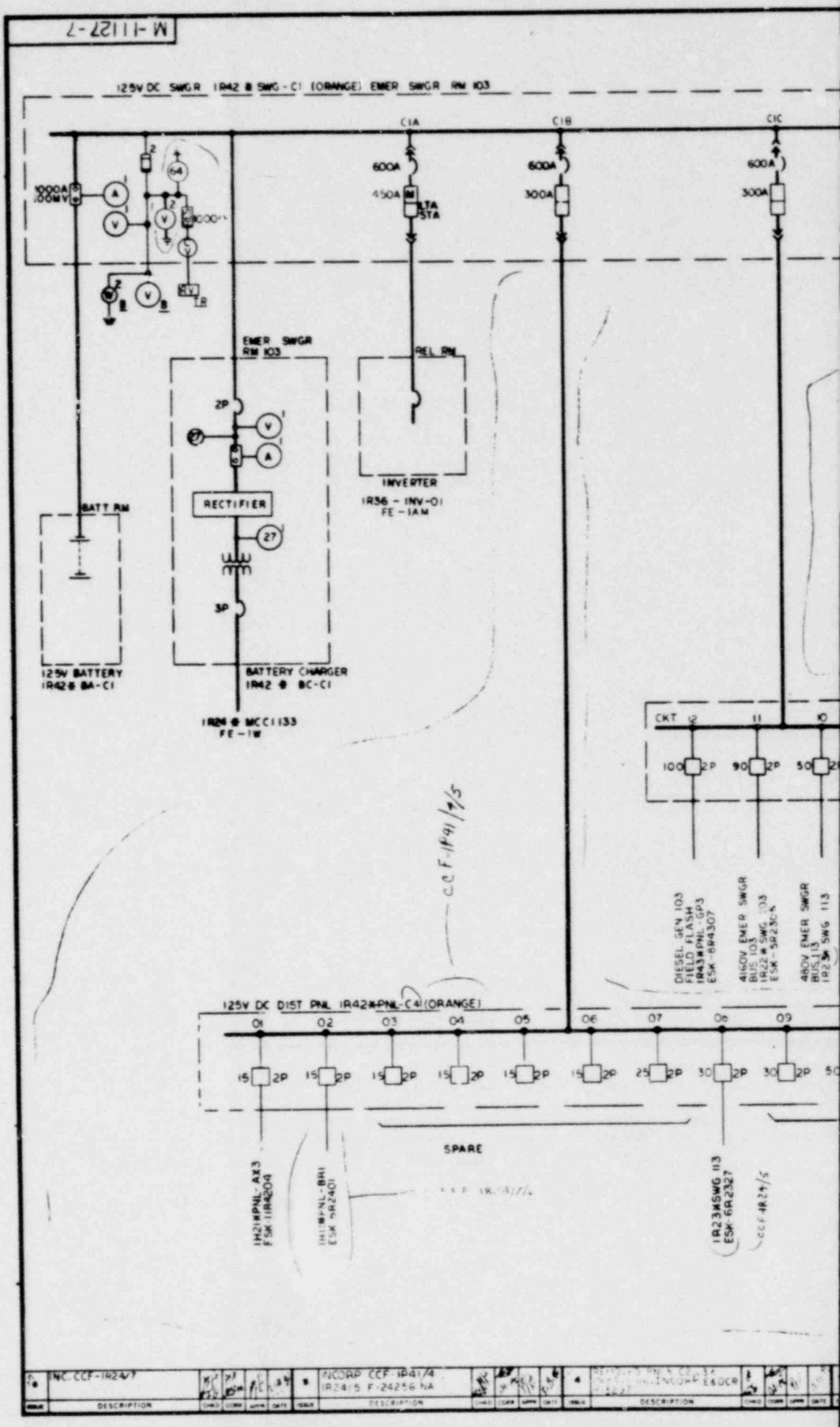
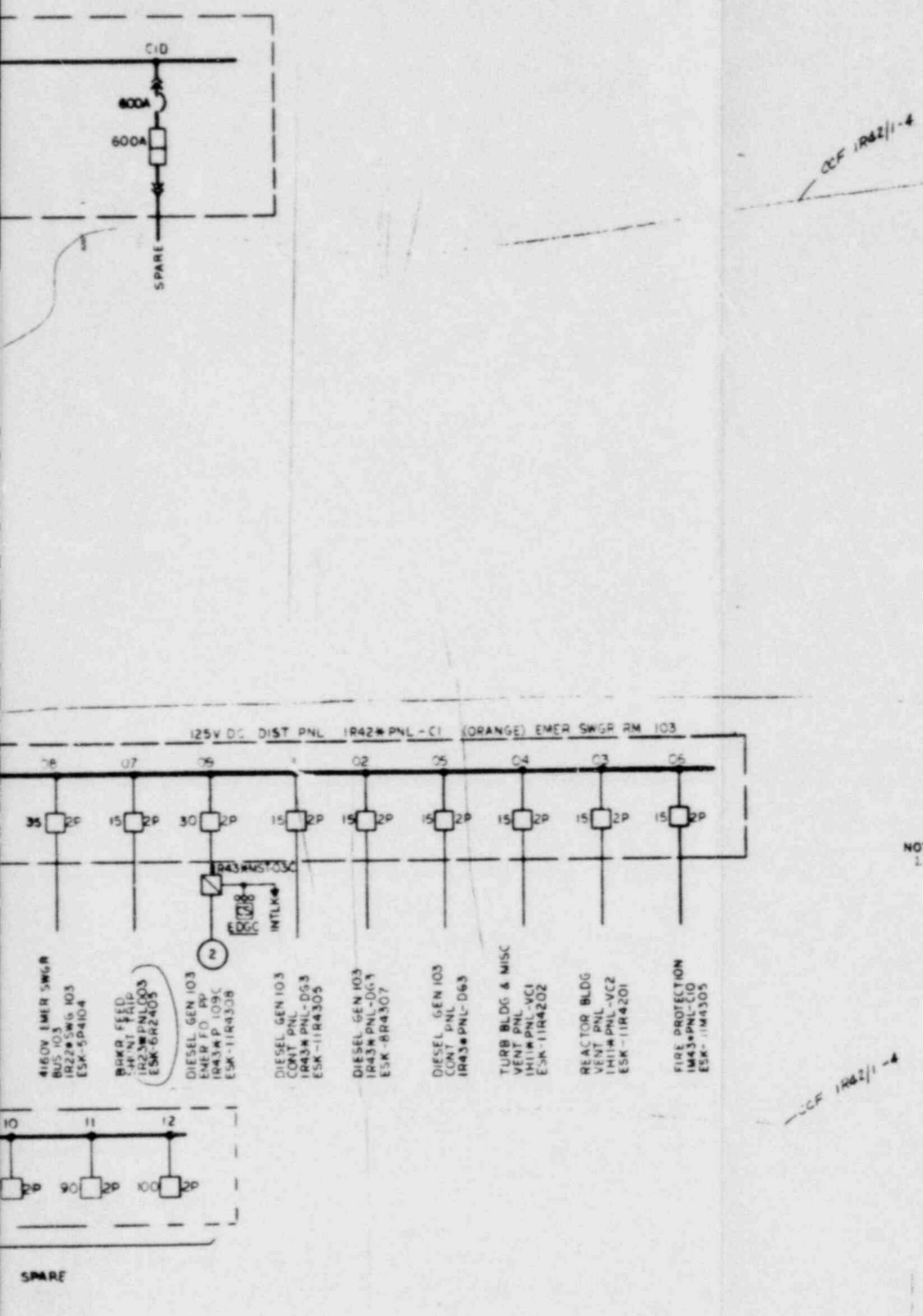
M-1127-7



NO.	DESCRIPTION	CHKD	CORR	APPR	DATE
0	NC-CCF-1R24/7				
1	NCORP CCF-1R41/4 1R24/5 F-24256 NA				
4	INCORP ESDER				



CID
600A
600A
SPARE
CCF 1R42/1-4
125V DC DIST PNL 1R42*PNL-C1 (ORANGE) EMER SWGR RM 103
08
07
09
02
05
04
03
06
35 2P
15 2P
30 2P
15 2P
15 2P
15 2P
15 2P
15 2P
15 2P
1R43*MST-03C
EDGC
INTLK
2
4160V EMER SWGR BUS 103 1R22*SWG 103 ESK-5P4104
BRKR FEED SHUNT TRIP 1R23*PNL003 ESK-6R2405
DIESEL GEN 103 EMER FO PP 1R43*P 109C ESK-11R4308
DIESEL GEN 103 CONT PNL 1R43*PNL-DG3 ESK-11R4305
DIESEL GEN 103 1R43*PNL-DG1 ESK-8R4307
DIESEL GEN 103 CONT PNL 1R43*PNL-DG3
TURB BLDG & MISC VENT PNL 1H11*PNL-VC1 ESK-11R4202
REACTOR BLDG VENT PNL 1H11*PNL-VC2 ESK-11R4201
FIRE PROTECTION 1M43*PNL-C10 ESK-11M4305
10
11
12
2P
90 2P
100 2P
SPARE
CCF 1R42/1-4

NOTES:
1. GENERAL NOTES & REFERENCES FE-1H.

NUCLEAR SAFETY RELATED
QA CAT I

850 MWe W.O. 48923

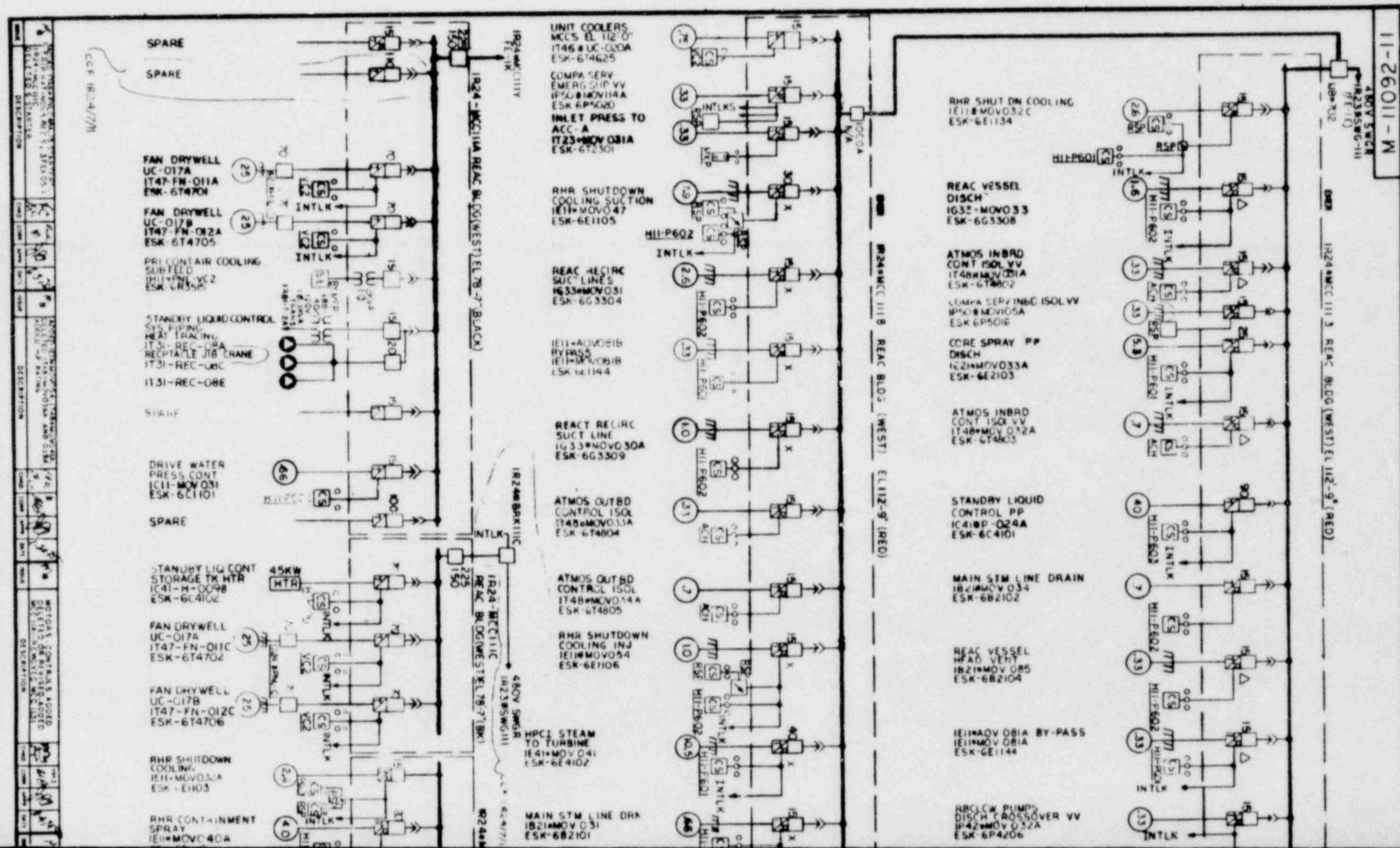
ONE LINE DIAGRAM
125V DC DISTRIBUTION BUS "C"
SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

LILCO DRAWING NUMBER M-11127-7

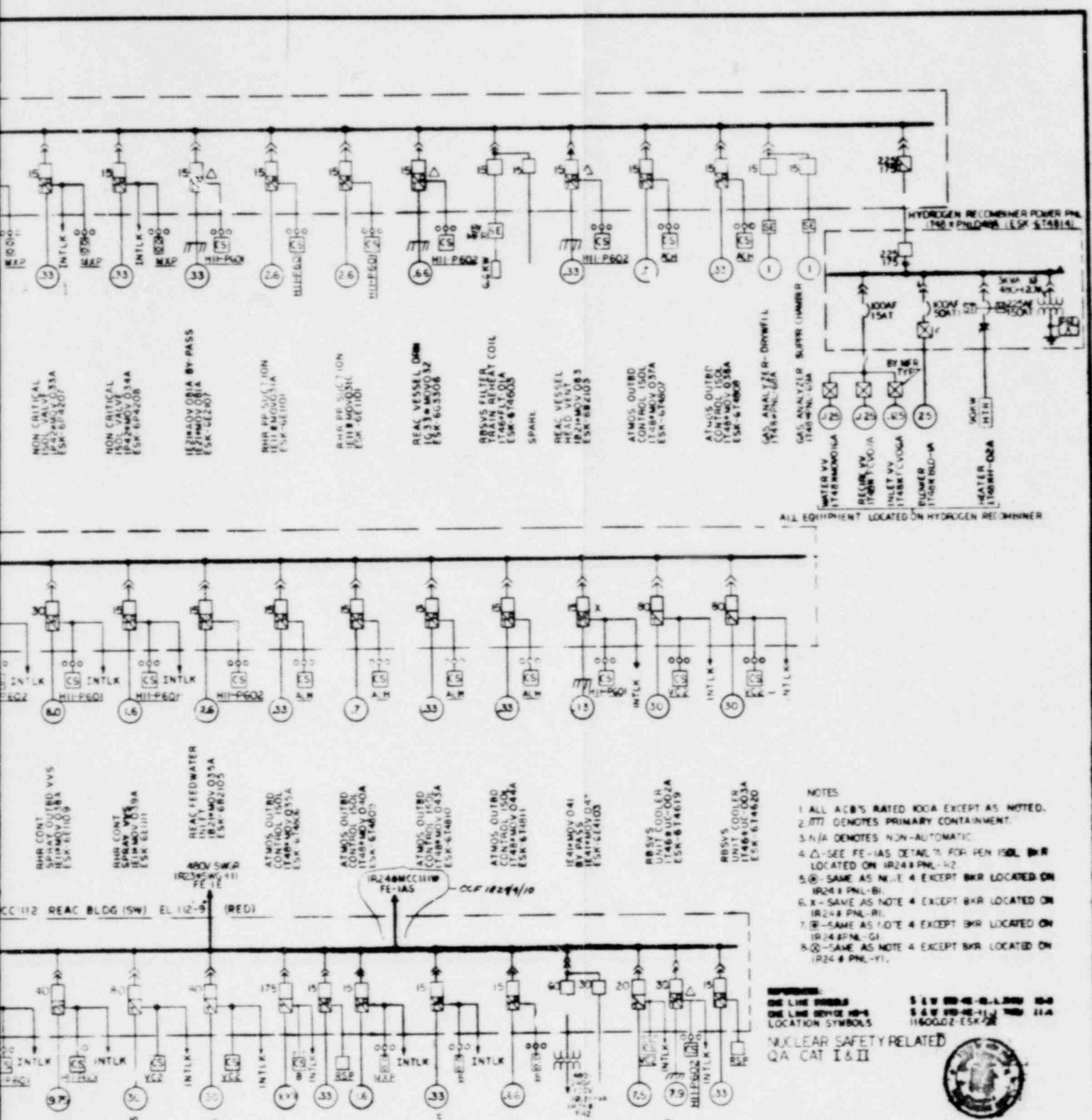
THE INFORMATION ON THIS DRAWING MAY NOT BE COPIED OR USED FOR OTHER THAN THE CONSTRUCTION, MAINTENANCE OR REPAIR OF THE PLANT FACILITY DESCRIBED IN THE TITLE BLOCK.

ISSUE	DESCRIPTION	CHKD	COMP	APPR	DATE
3	ADDED & REV CKTS INCORP ...				
2	REV CKTS ADDED ESK REF & MINOR CHNGS				
1	ORIGINAL ISSUE				

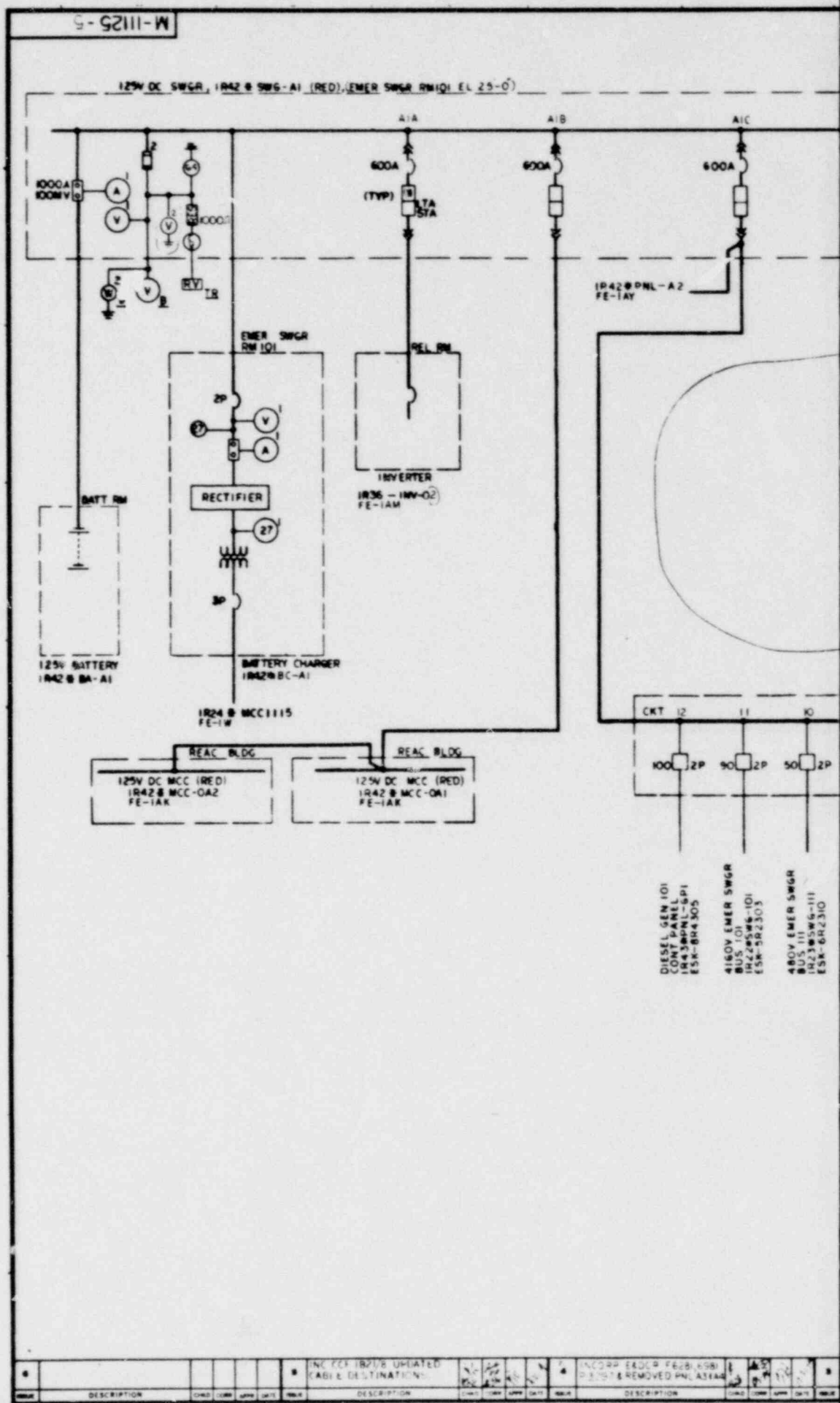
S & W DWG. No. 11600.02-FE-1AV-7



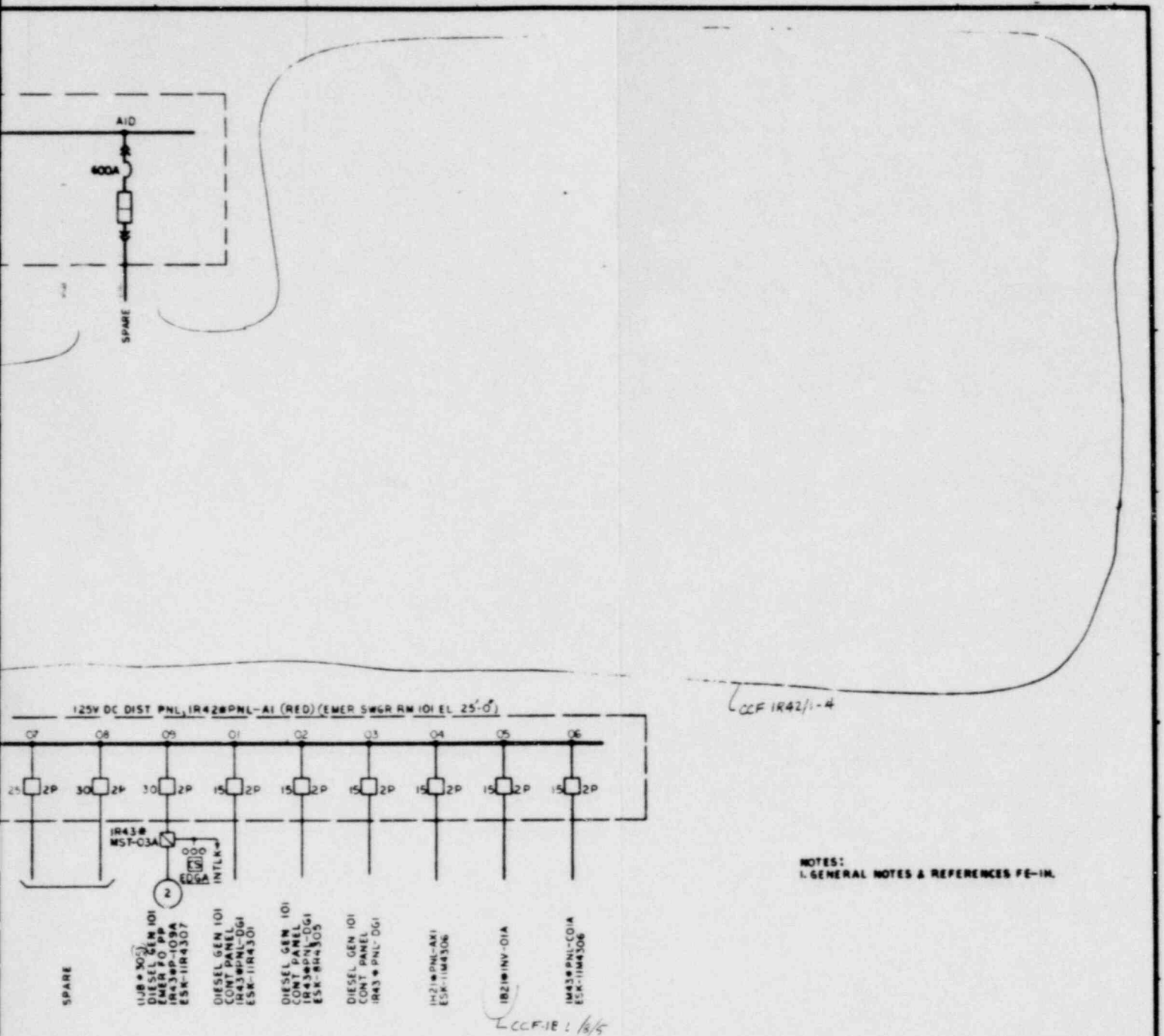
M-11092-11
480V SWGR
1R24*MCC 111 3 REAC BLDG (WEST) EL 112'-9" (RED)
1R24*MCC 111B REAC BLDG (WEST) EL 112-9" (RED)
1R24-MCC111A REAC BLDG (WEST) EL 78'-7" (BLACK)
1R24-MCC111C REAC BLDG (WEST) EL 78'-7" (BK)
480V SWGR 1R23*SWG111
SPARE
FAN DRYWELL UC-017A 1T47-FN-011A ESK-6T4701
FAN DRYWELL UC-017B 1T47-FN-012A ESK-6T4705
PRI CONTAIR COOLING
STANDBY LIQUID CONTROL
1T31-REC-08C
1T31-REC-08E
DRIVE WATER PRESS CONT 1C11-MOV031 ESK-6C1101
STANDBY LIQ CONT STORAGE TK HTR 1C41-H-0098 ESK-6C4102
45KW HTR
FAN DRYWELL UC-017A 1T47-FN-011C ESK-6T4702
FAN DRYWELL UC-017B 1T47-FN-012C ESK-6T4706
RHR SHUTDOWN COOLING
RHR CONTAINMENT SPRAY
UNIT COOLERS MCCS EL 112'-0" 1T46#UC-020A ESK-6T4625
INLET PRESS TO ACC-A 1T23*MOV 031A ESK-6T2301
RHR SHUTDOWN COOLING SUCTION 1E11*MOV047 ESK-6E1105
REAC RECIRC SUCT LINES 1G33*MOV031 ESK-6G3304
REACT RECIRC SUCT LINE 1G33*MOV030A ESK-6G3309
ATMOS OUTBD CONTROL ISOL 1T48*MOV033A ESK-6T4804
ATMOS OUTBD CONTROL ISOL 1T48*MOV014A ESK-6T4805
RHR SHUTDOWN COOLING INJ 1E11*MOV054 ESK-6E1106
HPCI STEAM TO TURBINE 1E41*MOV041 ESK-6E4102
MAIN STM LINE DRN 1B21*MOV031 ESK-6B2101
RHR SHUT DN COOLING 1E11*MOV032C ESK-6E1134
REAC VESSEL DISCH 1G33-MOV033 ESK-6G3308
ATMOS INBRD CONT ISOL VV
CORE SPRAY PP DISCH 1E21*MOV033A ESK-6E2103
STANDBY LIQUID CONTROL PP 1C41*P-024A ESK-6C4101
MAIN STM LINE DRAIN 1B21*MOV034 ESK-6B2102
REAC VESSEL HEAD VENT 1B21*MOV085 ESK-6B2104
1E11*AOV081A BY-PASS 1E11*MOV081A ESK-6E1144
RECIRC PUMPS DISCH CROSSOVER VV 1B42*MOV032A ESK-6P4206
H11-P601
H11-P602
INTLK


HYDROGEN RECOMBINER POWER PNL
ALL EQUIPMENT LOCATED ON HYDROGEN RECOMBINER
480V SWGR
CC112 REAC BLDG (SW) EL 112'-9" (RED)
NOTES
1. ALL ACB'S RATED 100A EXCEPT AS NOTED.
2. (T) DENOTES PRIMARY CONTAINMENT.
3. N/A DENOTES NON-AUTOMATIC.
4. Δ-SEE FE-1AS DETAIL 'A' FOR PEN ISOL BKR LOCATED ON 1R24 PNL-R2.
5. ⊛-SAME AS NOTE 4 EXCEPT BKR LOCATED ON 1R24 PNL-R1.
6. X-SAME AS NOTE 4 EXCEPT BKR LOCATED ON 1R24 PNL-R1.
7. ⊕-SAME AS NOTE 4 EXCEPT BKR LOCATED ON 1R24 PNL-G1.
8. ⊗-SAME AS NOTE 4 EXCEPT BKR LOCATED ON 1R24 PNL-Y1.
REFERENCES:
ONE LINE DIAGR
ONE LINE DEVICE NOS
LOCATION SYMBOLS
NUCLEAR SAFETY RELATED
QA CAT I & II
850 MWe
ONE LINE DIAG - REACTOR BLDG
480V MCC1112,1113,1114 & 1115
SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.
M-11092-11
S&W DWG. No. 11600.02-FE-1H-11

M-1125-5



	DESCRIPTION	CHKD	CORR	APPR	DATE
●	INC PER 1B2108 UPDATED CABLE DESTINATIONS				
●	INCORP ERDCR F62B1698 ADDED & REMOVED PNL A3 EAR				



NOTES:
1. GENERAL NOTES & REFERENCES FE-1H.

NUCLEAR SAFETY RELATED
QA CAT I

850 MWe

W.O. 48923

ONE LINE DIAGRAM
125V DC DISTRIBUTION BUS "A"
SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

A

LILCO DRAWING NUMBER M-1125-5

S & W DWG. No. 11600.02-FE-1A-5

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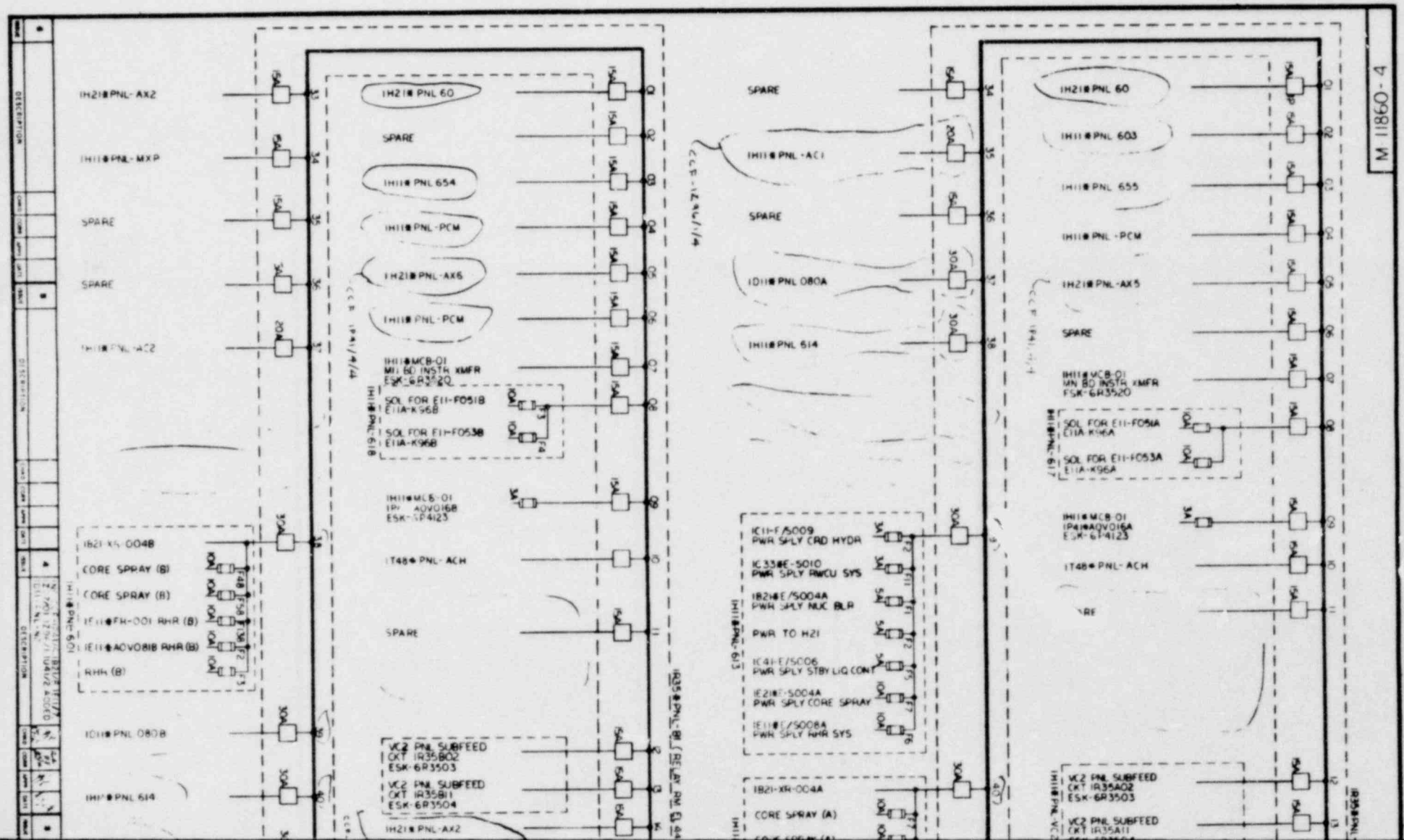
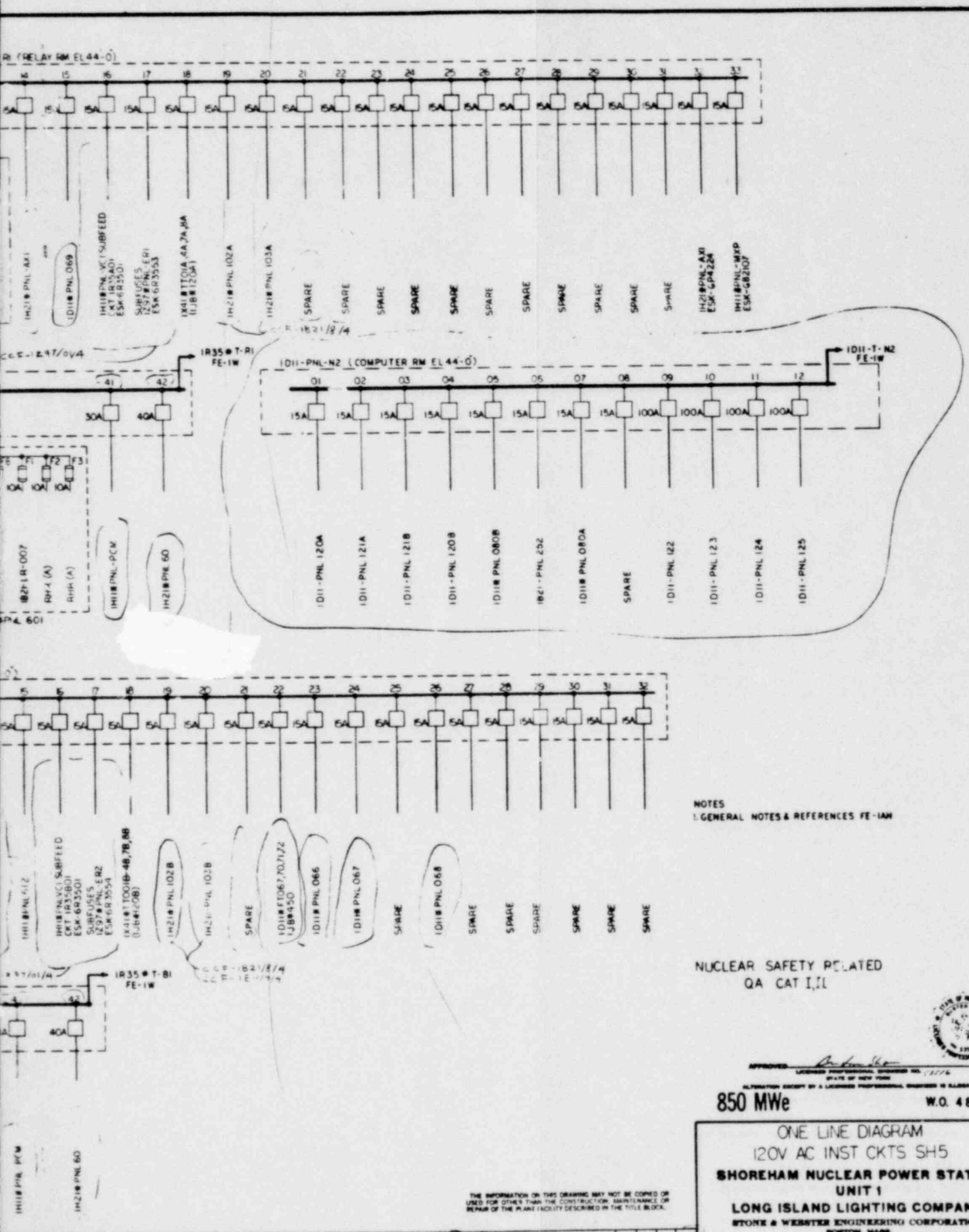
DESCRIPTION	CHKD	CORR	APPD	DATE
NCR PP E&DCR F 5847 ADDED LATS & MIN CHGS				
REMOVED 1R42●PNL-A2 & AS. ADDED TRIP RATINGS, REARRANGED & ADDED CKT NOS, MINOR CHANGES				
ORIGINAL ISSUE				


M 11860-4
1H21 PNL-AX2
1H11 PNL-MXP
SPARE
SPARE
1H11 PNL-AC2
1H21 PNL 60
SPARE
1H11 PNL 654
1H11 PNL-PCM
1H21 PNL-AX6
1H11 PNL-PCM
1H11 MCB-01
MN BD INSTR XMFR
ESK-6R3520
SOL FOR E11-F051B
C11A-K96B
SOL FOR E11-F053B
C11A-K96B
1H11 MCB-01
1P AOV016B
ESK-5P4123
1T48 PNL-ACH
SPARE
1B21-X4-004B
CORE SPRAY (B)
CORE SPRAY (B)
E11 FH-001 RHR (B)
E11 AOV018 RHR (B)
RHR (B)
1D11 PNL 080B
1H11 PNL 614
VC2 PNL SUBFEED
CKT 1R35B02
ESK-6R3503
VC2 PNL SUBFEED
CKT 1R35B11
ESK-6R3504
1H21 PNL-AX2
SPARE
1H11 PNL-AC1
SPARE
1D11 PNL 080A
1H11 PNL 614
1H21 PNL 60
1H11 PNL 603
1H11 PNL 655
1H11 PNL-PCM
1H21 PNL-AX5
SPARE
1H11 MCB-01
MN BD INSTR XMFR
ESK-6R3520
SOL FOR E11-F051A
C11A-K96A
SOL FOR E11-F053A
C11A-K96A
1H11 MCB-01
1P AOV016A
ESK-6P4123
1T48 PNL-ACH
SPARE
E11-F/S009
PWR SPLY CRD HYDR
C33-E/S010
PWR SPLY RWCU SYS
1B21-E/S004A
PWR SPLY NUC BLR
PWR TO H21
C41-E/S006
PWR SPLY STBY LIQ CONT
E21-E/S004A
PWR SPLY CORE SPRAY
E11-E/S008A
PWR SPLY RHR SYS
1B21-X4-004A
CORE SPRAY (A)
VC2 PNL SUBFEED
CKT 1R35A02
ESK-6R3503
VC2 PNL SUBFEED
CKT 1R35A11



NOTES
1. GENERAL NOTES & REFERENCES FE-1AM

NUCLEAR SAFETY RELATED
QA CAT I,IL

850 MWe

W.O. 48923

ONE LINE DIAGRAM
120V AC INST CKTS SH5

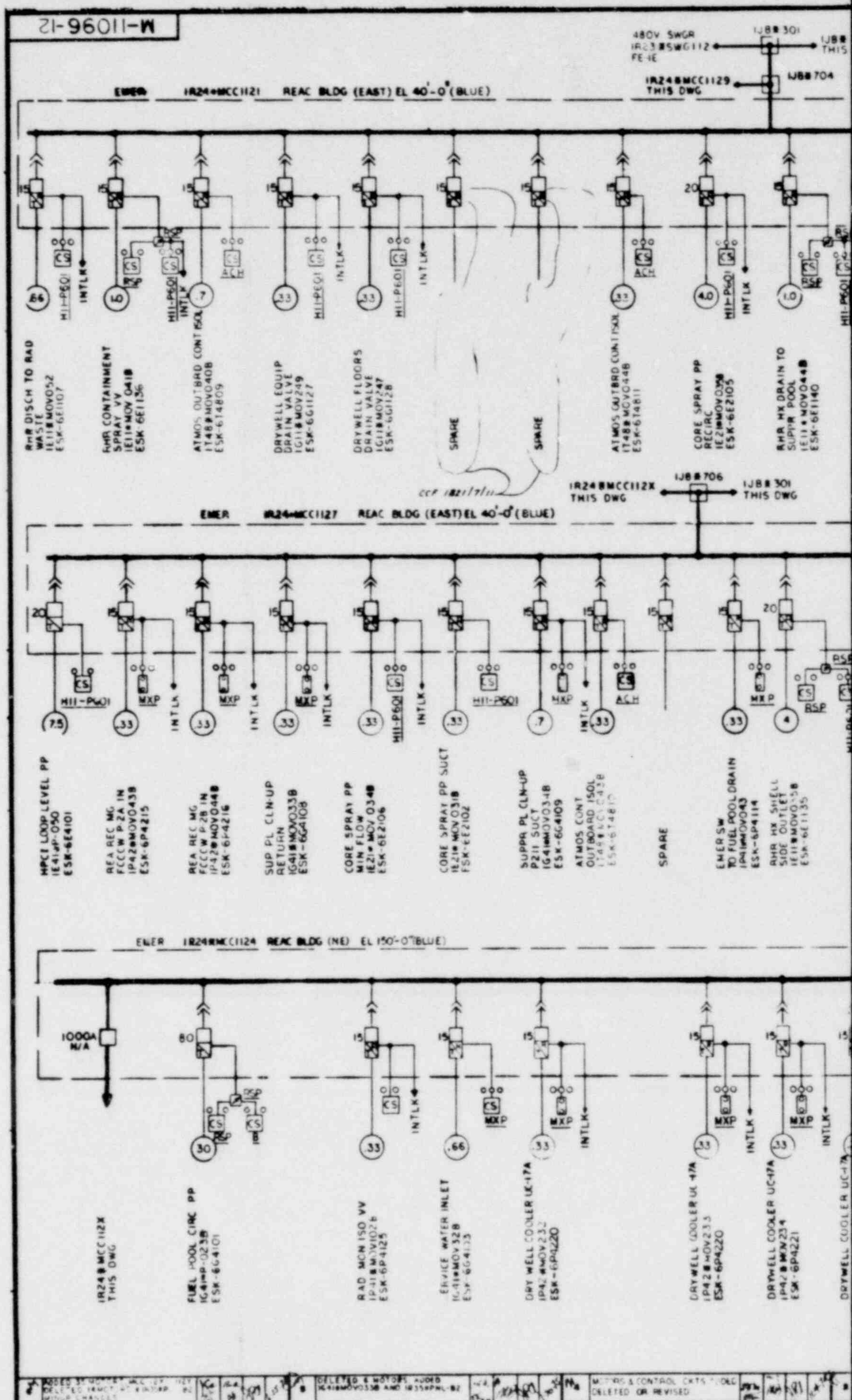
SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

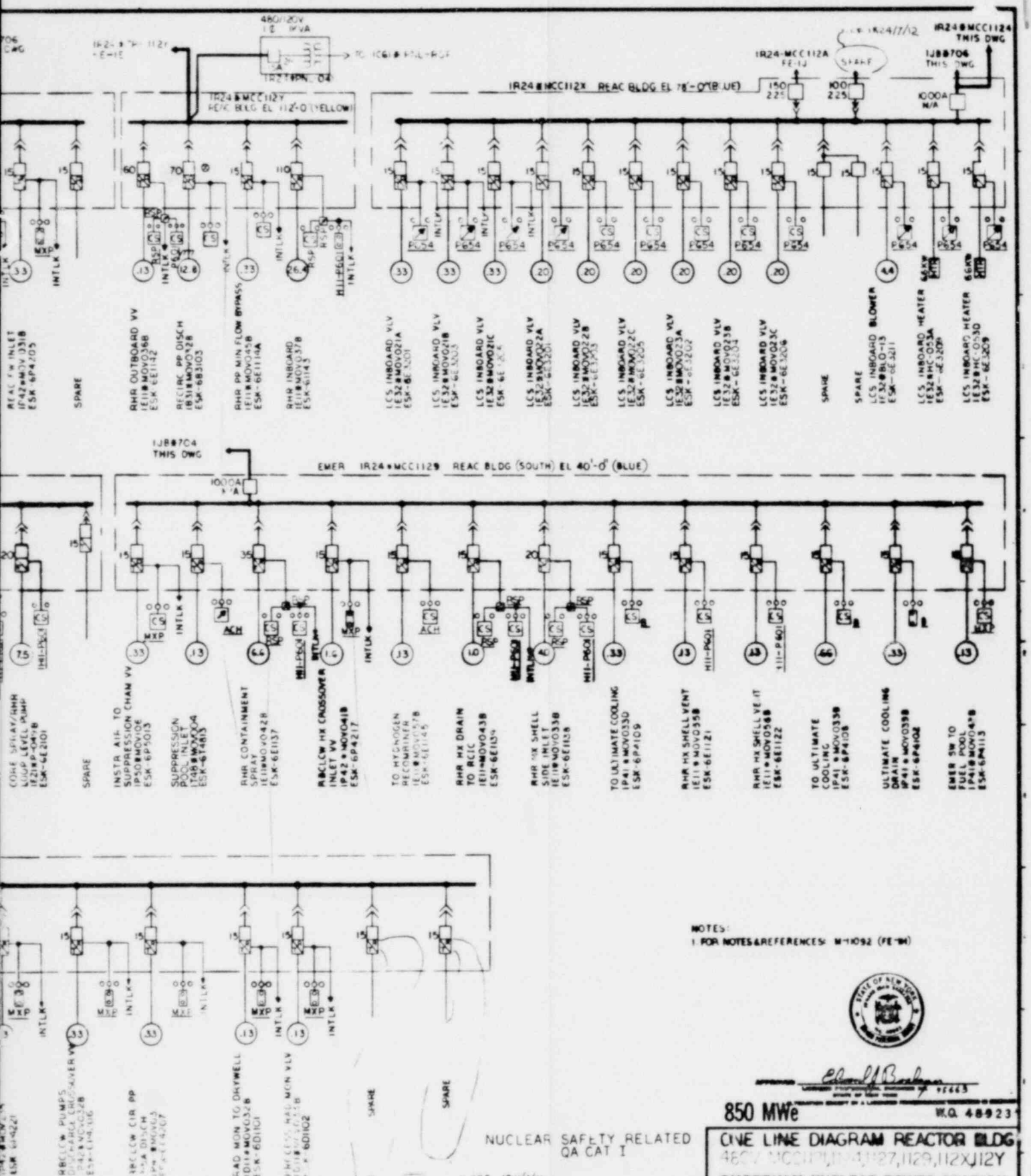
LILCO DRAWING NUMBER M-11860-4

S & W DWG. No. 11600.02 FE-1K2-4

THE INFORMATION ON THIS DRAWING MAY NOT BE COPIED OR USED FOR OTHER THAN THE CONSTRUCTION, MAINTENANCE, OR REPAIR OF THE PLANT FACILITY DESCRIBED IN THE TITLE BLOCK.

DESCRIPTION	CHKD	CORR	APPR	DATE
ORIGINAL ISSUE				
ADDED PDS FOR RAT MON & MIN CHGS				
REVISED TO AGREE WITH PANEL LAYOUT				


M-11096-12
480V SWGR
1R23*SWG112
1JB*301
1JB*704
1R24*MCC1129 THIS DWG
EMER 1R24*MCC1121 REAC BLDG (EAST) EL 40'-0" (BLUE)
RHR DISCH TO RAD WASTE 1E11*MOV052 ESK-6E1107
RHR CONTAINMENT SPRAY VV 1E11*MOV 041B ESK-6E1136
ATMOS OUTBRD CONT ISOL 1T48*MOV040B ESK-6T4809
DRYWELL EQUIP DRAIN VALVE 1G11*MOV249 ESK-6G1127
DRYWELL FLOORS DRAIN VALVE 1G11*MOV247 ESK-6G1128
SPARE
SPARE
ATMOS OUTBRD CONT ISOL 1T48*MOV044B ESK-6T4811
CORE SPRAY PP RECIRC 1E21*MOV035B ESK-6E2105
RHR HX DRAIN TO SUPPR POOL 1E11*MOV044B ESK-6E1140
1R24*MCC112X THIS DWG
1JB*706
1JB*301 THIS DWG
EMER 1R24*MCC1127 REAC BLDG (EAST) EL 40'-0" (BLUE)
HPCI LOOP LEVEL PP 1E41*P-050 ESK-6E4101
REA REC MG FCCCW P 2A IN 1P42*MOV043B ESK-6P4215
REA REC MG FCCCW P 2B IN 1P42*MOV044B ESK-6P4216
SUP PL CLN-UP RETURN 1G41*MOV033B ESK-6G4108
CORE SPRAY PP MIN FLOW 1E21*MOV 034B ESK-6E2106
CORE SPRAY PP SUCT 1E21*MOV031B ESK-6E2102
SUPPR PL CLN-UP P211 SUCT 1G41*MOV034B ESK-6G4109
ATMOS CONT OUTBOARD ISOL
SPARE
EMER SW TO FUEL POOL DRAIN 1P41*MOV043 ESK-6P4114
RHR HX SHELL SIDE OUTLET 1E11*MOV058 ESK-6E1135
EMER 1R24*MCC1124 REAC BLDG (NE) EL 150'-0" (BLUE)
1000A N/A
1R24*MCC112X THIS DWG
FUEL POOL CIRC PP 1G41*P-023B ESK-6G4101
RAD MON ISO VV ESK-6P4125
SERVICE WATER INLET
DRY WELL COOLER UC-47A 1P42*MOV232 ESK-6P4220
DRYWELL COOLER UC-47A 1P42*MOV233 ESK-6P4220
DRYWELL COOLER UC-47A 1P42*MOV234 ESK-6P4221
DRYWELL COOLER UC-47A
H11-P601
INTLK
CS
RSP
ACH
MXP
DESCRIPTION
DELETED OR REVISED



NOTES:
1 FOR NOTES & REFERENCES: M-11092 (FE-1M)

NUCLEAR SAFETY RELATED
QA CAT I

850 MWe

W.O. 489231

ONE LINE DIAGRAM REACTOR BLDG

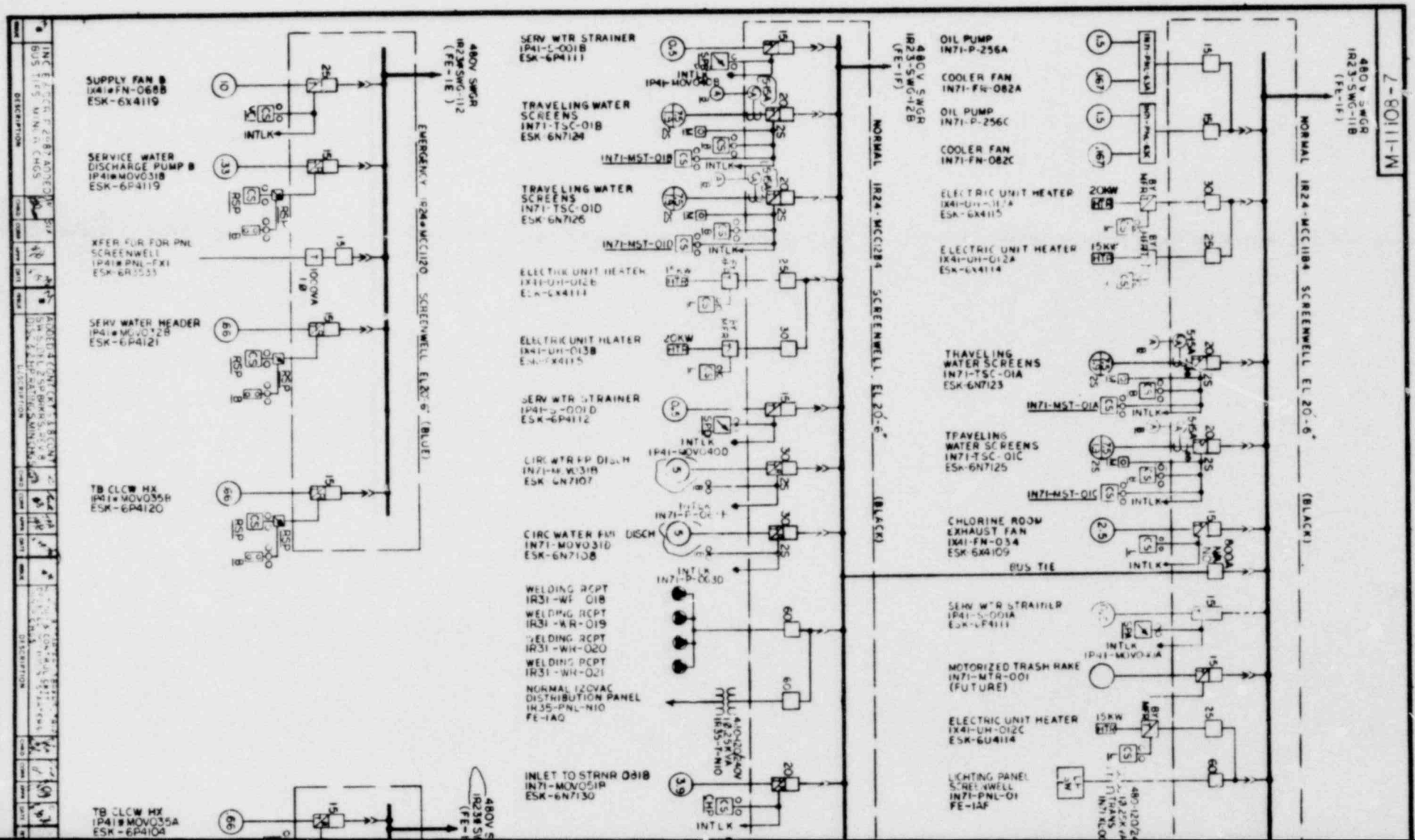
480V MCC1121,1123,1127,1129,112X,112Y

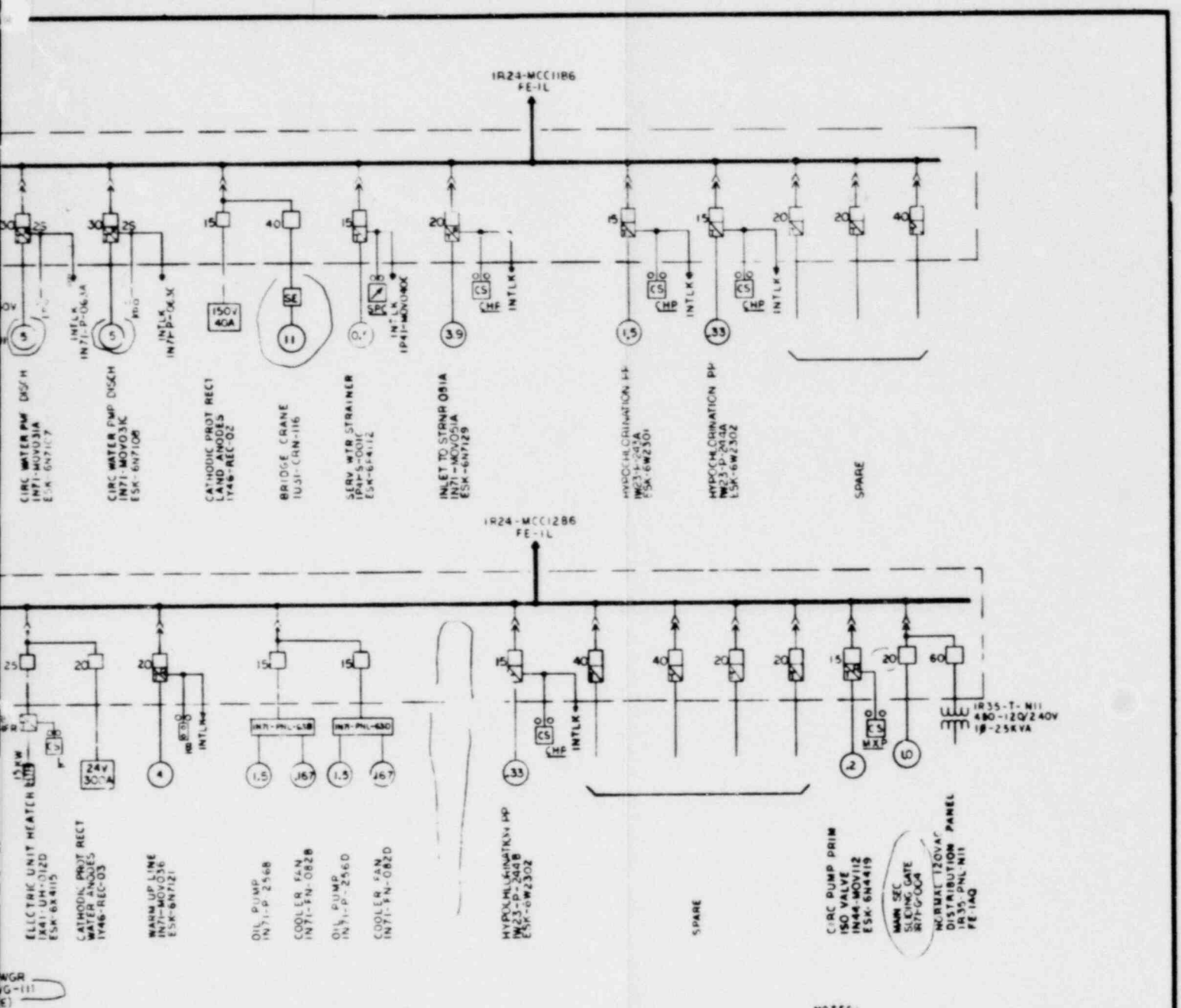
SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

10 | LILCO DRAWING NUMBER M-11096-12

S&W DWG. No. 11600: O2-FE-1M-12

THE INFORMATION ON THIS DRAWING MAY NOT BE COPIED OR USED FOR OTHER THAN THE CONSTRUCTION, MAINTENANCE OR REPAIR OF THE PLANT FACILITY DESIGNED IN THE TITLE BLOCK.


M-11108-7
SUPPLY FAN B
IX41•FN-068B
ESK-6X4119
SERVICE WATER DISCHARGE PUMP B
IP41•MOV031B
ESK-6P4119
XFER FLR FOR PNL SCREENWELL
IP41•PNL-FX1
ESK-6R2533
SERV WATER HEADER
IP41•MOV032B
ESK-6P4121
TB CLCW HX
IP41•MOV035B
ESK-6P4120
TB CLCW HX
IP41•MOV035A
ESK-6P4104
SERV WTR STRAINER
IP41-S-001B
ESK-6P4111
TRAVELING WATER SCREENS
IN71-TSC-01B
ESK 6N7124
IN71-MST-01B
TRAVELING WATER SCREENS
IN71-TSC-01D
ESK-6N7126
IN71-MST-01D
ELECTRIC UNIT HEATER
IX41-UH-012B
ESK-6X4113
ELECTRIC UNIT HEATER
IX41-UH-013B
ESK-6X4115
SERV WTR STRAINER
IP41-S-001D
ESK-6P4112
CIRC WTR FP DISCH
IN71-MOV031B
ESK 6N7107
CIRC WATER PMP DISCH
IN71-MOV031D
ESK-6N7108
WELDING RCPT
IR31-WR-018
WELDING RCPT
IR31-WR-019
WELDING RCPT
IR31-WR-020
WELDING RCPT
IR31-WR-021
NORMAL 120VAC DISTRIBUTION PANEL
IN35-PNL-N10
FE-1AQ
INLET TO STRNR 0B1B
IN71-MOV051B
ESK-6N7130
OIL PUMP
IN71-P-256A
COOLER FAN
IN71-FN-082A
OIL PUMP
IN71-P-256C
COOLER FAN
IN71-FN-082C
ELECTRIC UNIT HEATER
IX41-UH-012A
ESK-6X4115
ELECTRIC UNIT HEATER
IX41-UH-012A
ESK-6X4114
TRAVELING WATER SCREENS
IN71-TSC-01A
ESK-6N7123
IN71-MST-01A
TRAVELING WATER SCREENS
IN71-TSC-01C
ESK-6N7125
IN71-MST-01C
CHLORINE ROOM EXHAUST FAN
IX41-FN-034
ESK-6X4109
BUS TIE
SERV WTR STRAINER
IP41-S-001A
ESK-6P4111
MOTORIZED TRASH RAKE
IN71-MTR-001
(FUTURE)
ELECTRIC UNIT HEATER
IX41-UH-012C
ESK-6U4114
LIGHTING PANEL SCREENWELL
IN71-PNL-01
FE-1AF
480V SWGR IR2S-SWG-11B (FE-1E)
480V SWGR IR2S-SWG-12B (FE-1F)
480V SWGR IR2S-SWG-11B (FE-1H)
NORMAL IR24-MCC028 SCREENWELL EL 20'-6" (BLACK)
EMERGENCY IR24-MCC020 SCREENWELL EL 20'-6" (BLUE)
NORMAL IR24-MCC018 SCREENWELL EL 20'-6" (BLACK)



NOTES:
1. GENERAL NOTES AND REFERENCES M-1092 (FE-1M)

NUCLEAR SAFETY RELATED
QA CAT I & II

850 MWe

W.O. 48923

ONE LINE DIAGRAM SCREENWELL
480V MCC 1184, 1284, 1110, 1120

SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

10 LILCO DRAWING NUMBER M-1108-7

S&W DWG. No. 1160002-FE-1Z-7

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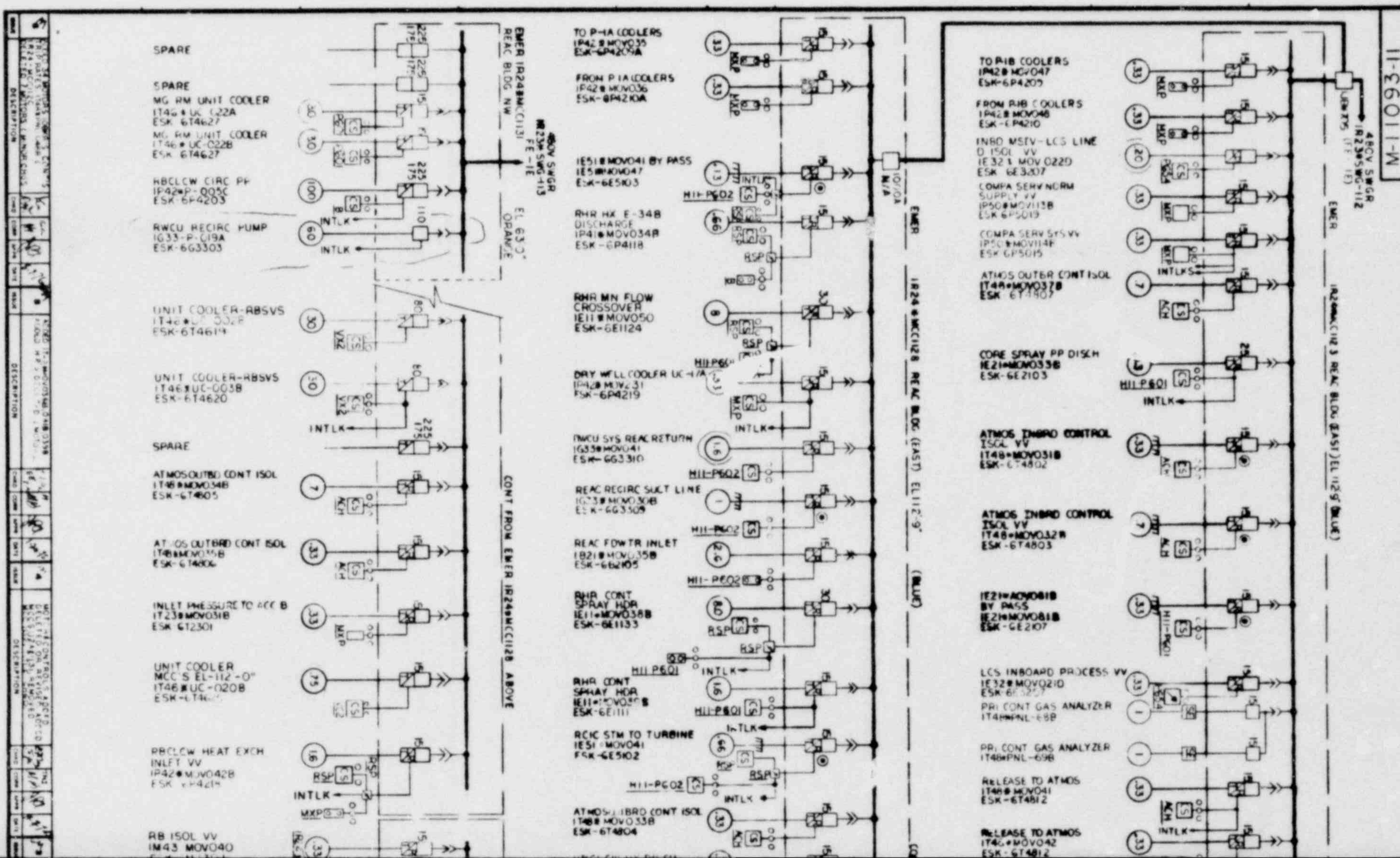
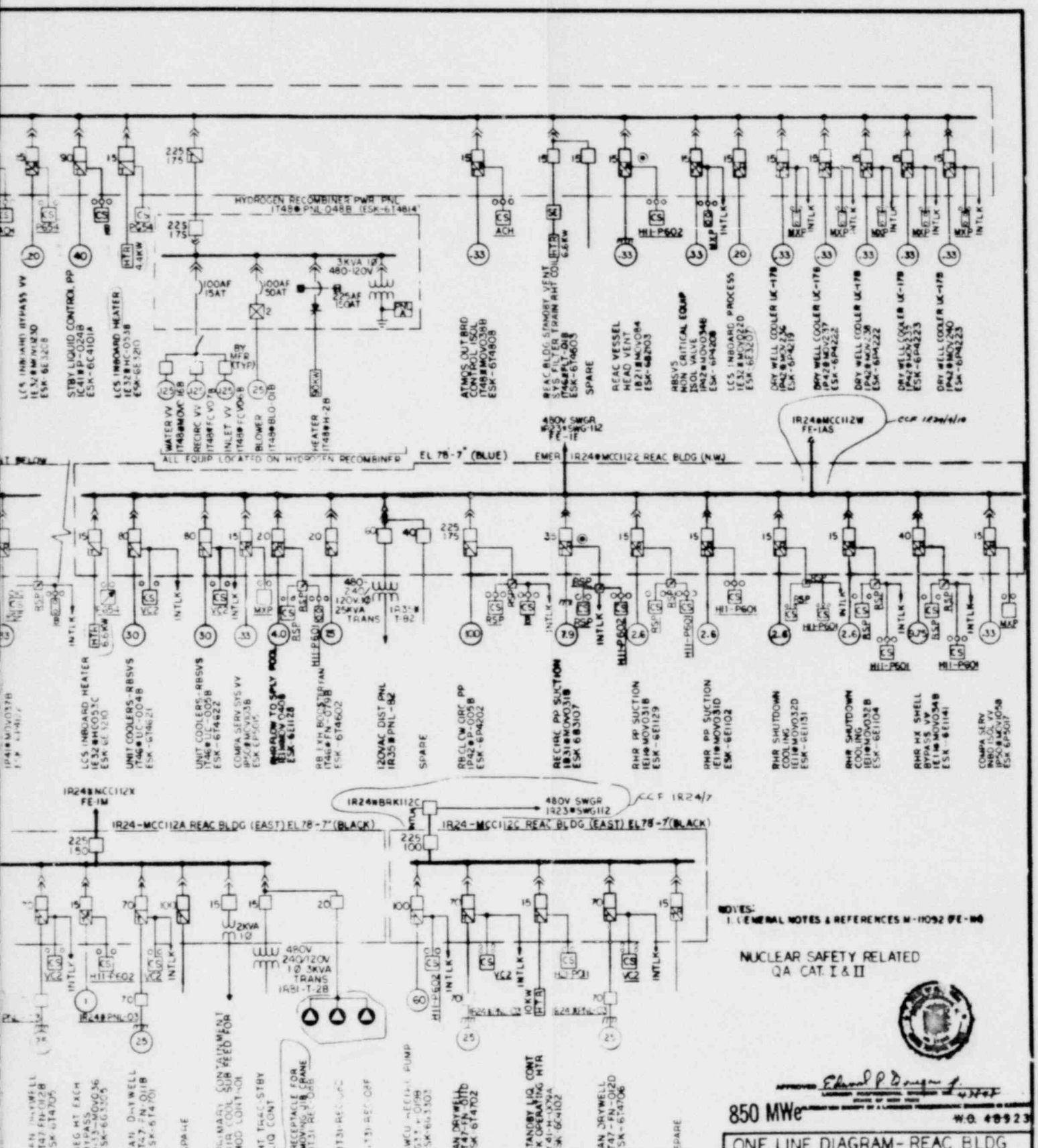

M-11093-11
480V SWGR
1R23#SWG-112
EMER 1R24#MCC1123 REAC BLDG (EAST) EL 112'9" (BLUE)
TO P-1B COOLERS
1P42#MOV047
ESK-6P4205
FROM P-1B COOLERS
1P42#MOV048
ESK-6P4210
INBD MSIV-LCS LINE
D ISOL VV
1E32 MOV 022D
ESK 6E3207
COMPA SERV NORM
SUPPLY VV
1P50#MOV113B
ESK 6P5019
COMPA SERV SYS VV
1P50#MOV114F
ESK 6P5015
ATMOS OUTBR CONT ISOL
1T48#MOV037B
CORE SPRAY PP DISCH
1E21#MOV033B
ESK-6E2103
ATMOS INBRD CONTROL
ISOL VV
1T48#MOV031B
ESK-6T4802
ATMOS INBRD CONTROL
ISOL VV
1T48#MOV032B
ESK-6T4803
1E21#MOV081B
BY PASS
1E21#MOV081B
ESK-6E2107
LCS INBOARD PROCESS VV
1E32#MOV021D
PRI CONT GAS ANALYZER
1T48#PNL-69B
PRI CONT GAS ANALYZER
1T48#PNL-69B
RELEASE TO ATMOS
1T48#MOV041
ESK-6T4812
RELEASE TO ATMOS
1T46#MOV042
ESK-6T4812
EMER 1R24#MCC1128 REAC BLDG (EAST) EL 112'-9" (BLUE)
10/0A
N/A
TO P-1A COOLERS
1P42#MOV035
ESK-6P4209A
FROM P-1A COOLERS
1P42#MOV036
ESK-6P4210A
1E51#MOV041 BY PASS
1E51#MOV047
ESK-6E5103
RHR HX E-34B
DISCHARGE
1P41#MOV034B
ESK-6P4118
RHR MN FLOW
CROSSOVER
1E11#MOV050
ESK-6E1124
DRY WELL COOLER UC-1/A
1P42B MOV231
ESK-6P4219
RWCU SYS REAC RETURN
1G33#MOV041
ESK-6G3310
REAC RECIRC SUCT LINE
1G33#MOV030B
ESK-6G3309
REAC FDWTR INLET
1B21#MOV035B
ESK-6B2105
RHR CONT
SPRAY HDR
1E11#MOV038B
ESK-6E1133
RHR CONT
SPRAY HDR
ESK-6E1111
RCIC STM TO TURBINE
1E51#MOV041
ESK-6E5102
ATMOS INBRD CONT ISOL
1T48#MOV033B
ESK-6T4804
480V SWGR
1R23#SWG-113
FE-1E
EMER 1R24#MCC1131
REAC BLDG NW
EL 63'0"
ORANGE
CONT FROM EMER 1R24#MCC1128 ABOVE
SPARE
SPARE
MG RM UNIT COOLER
1T46#UC-022A
ESK 6T4627
MG RM UNIT COOLER
1T46#UC-022B
ESK 6T4627
RBCLCW CIRC PP
1P42#P-003C
ESK-6P4203
RWCU RECIRC PUMP
1G33-P-019A
ESK-6G3303
UNIT COOLER-RBSVS
1T46#UC-002B
ESK-6T4619
UNIT COOLER-RBSVS
1T46#UC-003B
ESK-6T4620
SPARE
ATMOS OUTBD CONT ISOL
1T48#MOV034B
ESK-6T4805
ATMOS OUTBRD CONT ISOL
1T48#MOV035B
ESK-6T4806
INLET PRESSURE TO ACC B
1T23#MOV031B
ESK 6T2301
UNIT COOLER
MCC'S EL-112-0"
1T46#UC-020B
RBCLCW HEAT EXCH
INLET VV
1P42#MOV042B
RB ISOL VV
1M43 MOV040
MXP
CS
ACH
INTLK
RSP
H11-P601
H11-P602



NOTES:
1. GENERAL NOTES & REFERENCES M-11092 (FE-1A)

NUCLEAR SAFETY RELATED
QA CAT. I & II

850 MWe

W.O. 48923

ONE LINE DIAGRAM - REAC BLDG
480V MCC1122, 1123, 1128, 112A/12C & 1131

SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

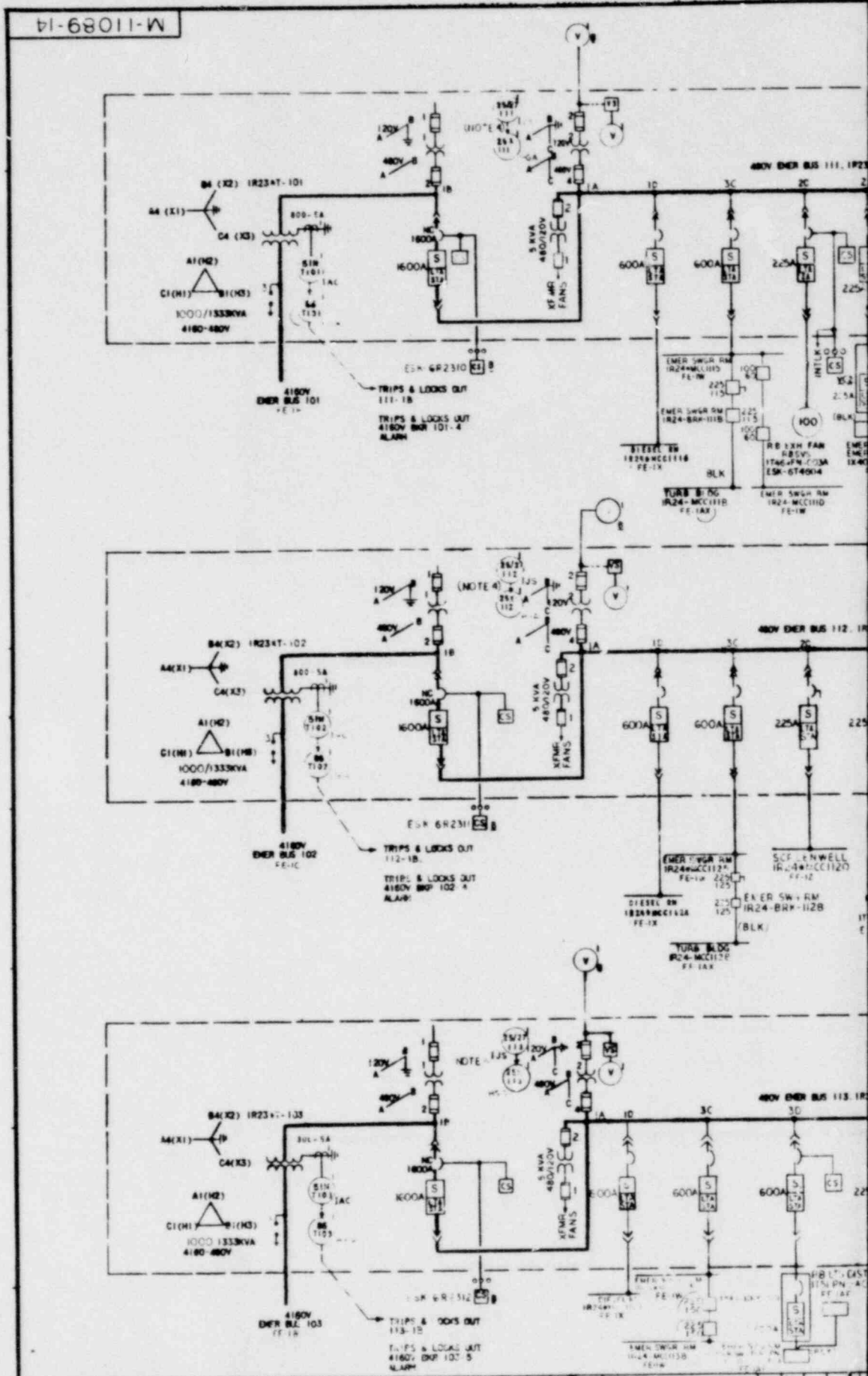
10 | LILCO DRAWING NUMBER M-11093-11

ORIGINAL ISSUE

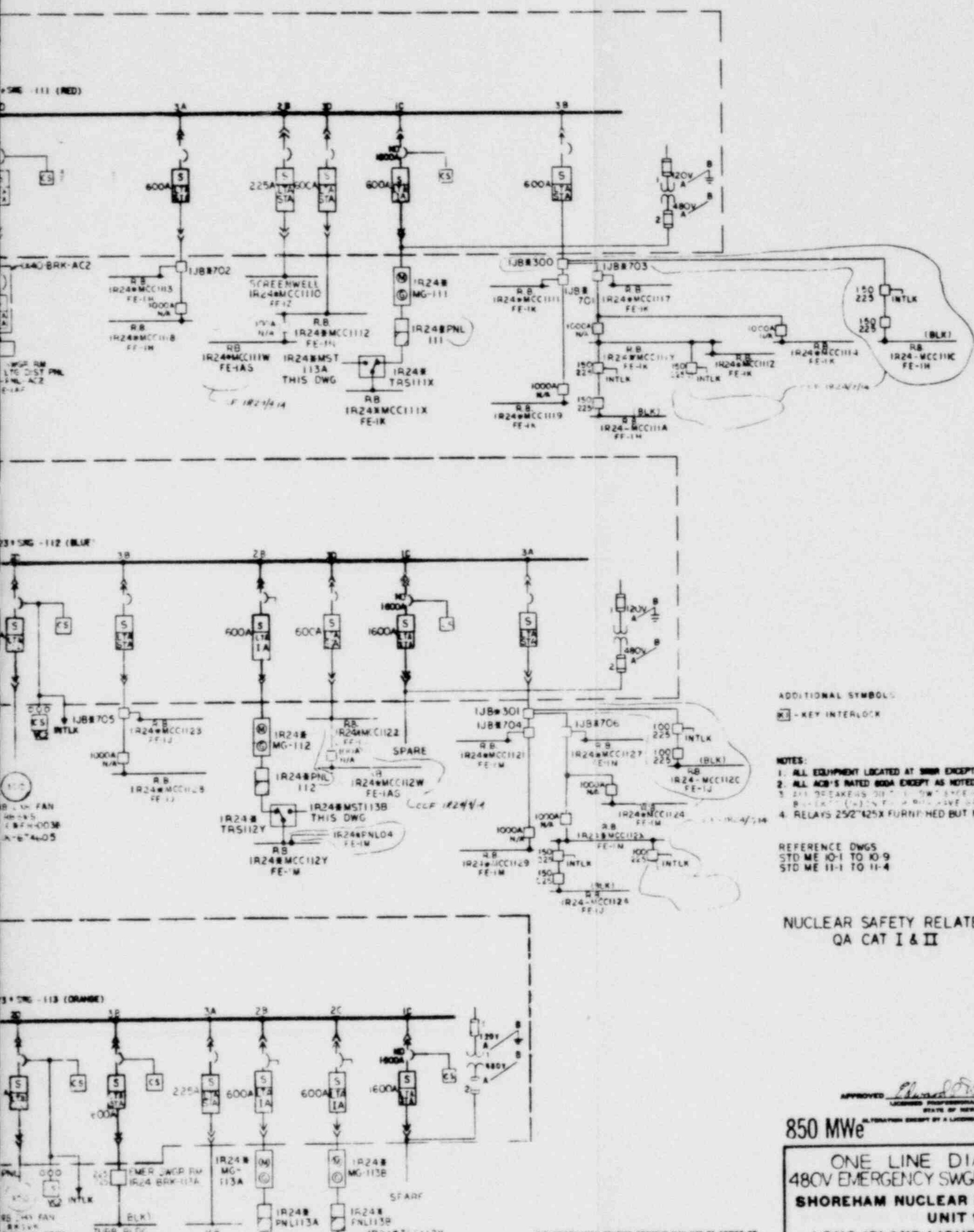
THE INFORMATION ON THIS DRAWING MAY NOT BE COPIED OR USED FOR OTHER THAN THE CONSTRUCTION, MAINTENANCE OR REPAIR OF THE PLANT FACILITY DESCRIBED IN THE TITLE BLOCK

S&W DWG. No. 11600.02-FE-1J-11

M-11089-14



ISSUE	DESCRIPTION	CHKD	CONFR	APPR	DATE
6	DELETED MCC1132 ADDED LTG PNL NO'S ADDED MCC 1111-0, 1111-B, 1113-A, 1113-B, 1112-D, 1112-B, 1112-A, 1113-D, 1113-A				
5					
4					



SWG -111 (RED)
600A
225A
1600A
IR24#PNL 111
IR24# MG-111
IR24#TRS111X
R.B. IR24#MCC111X FE-1K
SCREENWELL IR24#MCC1110
IR24#MST 113A THIS DWG
1JB#300
1JB#702
1JB#703
INTLK
(BLK)
IR24-MCC111C FE-1H
IR24-MCC111A FE-1H
SWG -112 (BLUE)
IR24# MG-112
IR24#PNL 112
IR24# TRS112Y
IR24#MST113B THIS DWG
R.B. IR24#MCC112Y FE-1M
1JB#301
1JB#704
1JB#705
1JB#706
SPARE
IR24-MCC112C FE-1J
IR24-MCC112A FE-1J
SWG -113 (ORANGE)
IR24# MG-113A
IR24# MG-113B
IR24# PNL113A
IR24# PNL113B
IR24# TRS111X THIS DWG
IR24# TRS112Y THIS DWG
EMER SWGR RM IR24 BRK-113A
TURB BLDG
SPARE

ADDITIONAL SYMBOLS

KI - KEY INTERLOCK

NOTES:

1. ALL EQUIPMENT LOCATED AT SWGR EXCEPT AS NOTED.
2. ALL ACB'S RATED 600A EXCEPT AS NOTED.
3. [illegible]
4. RELAYS 25/2"425X FURNISHED BUT NOT WIRED.

REFERENCE DWGS

STD ME 10-1 TO 10-9		ONE LINE SYMBOLS
STD ME 11-1 TO 11-4		DEVICE NUMBERS

NUCLEAR SAFETY RELATED
QA CAT I & II

APPROVED [signature]
LICENSED PROFESSIONAL ENGINEER No. 43148
STATE OF NEW YORK

850 MWe

W.O. 48923

ONE LINE DIAGRAM
480V EMERGENCY SWGR BUS 111,112,113

SHOREHAM NUCLEAR POWER STATION
UNIT 1

LONG ISLAND LIGHTING COMPANY

STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

LILCO DRAWING NUMBER M-11089-14

	DESCRIPTION	CHKD	CORR	APPR	DATE
2	ADDED SUPP FANS & MCC 004A,B, SH'S, & SYS. CODE NOS				
1	ORIGINAL ISSUE				

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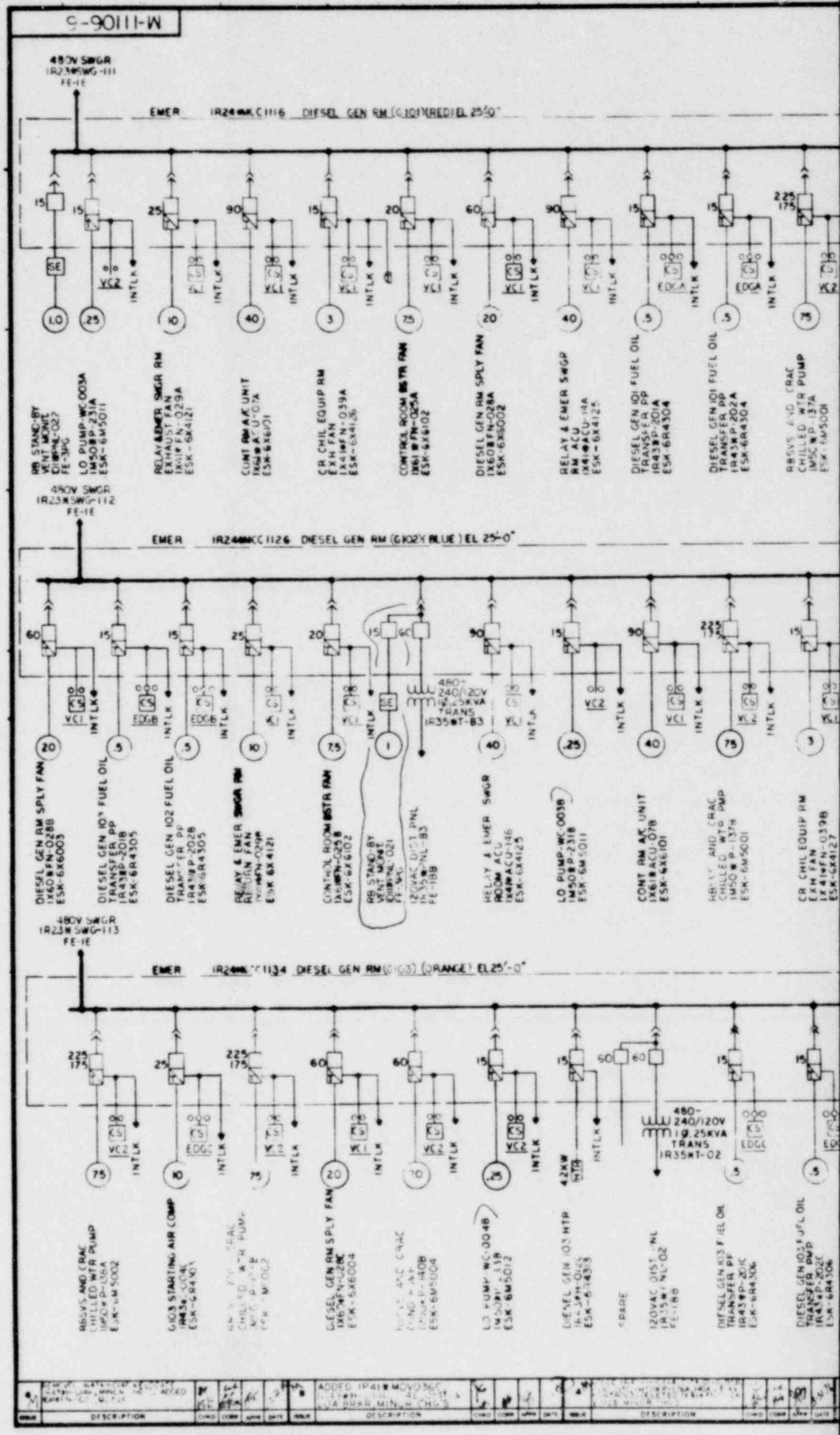
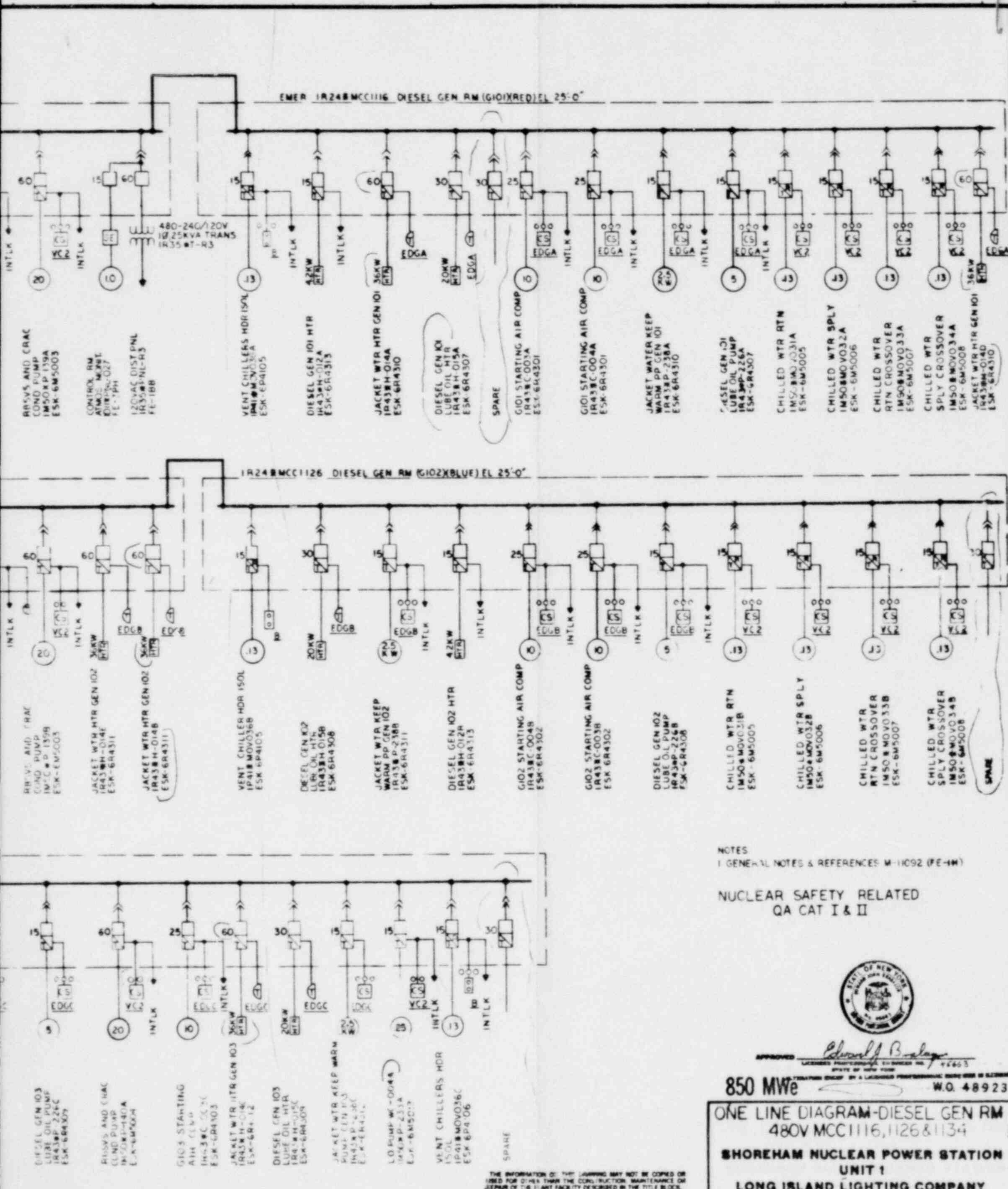
S & W DWG. No. 11600.02-FE-1E-14


M-11106-5
480V SWGR
1R23*SWG-111
FE-1E
EMER 1R24*MCC1116 DIESEL GEN RM (G101)(RED) EL 25'-0"
480V SWGR
1R23*SWG-112
FE-1E
EMER 1R24*MCC1126 DIESEL GEN RM (G102)(BLUE) EL 25'-0"
480V SWGR
1R23*SWG-113
FE-1E
EMER 1R24*MCC1134 DIESEL GEN RM (G103) (ORANGE) EL 25'-0"
INTLK
480-240/120V
1Ø 25KVA
TRANS
1R35*T-02
DESCRIPTION


EMER 1R24 MCC1116 DIESEL GEN RM (G101)(RED) EL 25'-0"
1R24 MCC1126 DIESEL GEN RM (G102)(BLUE) EL 25'-0"
480-240/120V 1Ø 25KVA TRANS 1R35 T-R3
INTLK
EDGA
EDGB
EDGC
VC2
CS
RBSVS AND CRAC COND PUMP 1M50 P-139A ESK-6M5003
CONTROL RM ATMOS MONIT
120VAC DIST PNL FE-188
VENT CHILLERS HDR ISOL ESK-6P4105
DIESEL GEN 101 HTR 1R43 H-012A ESK-6R4313
JACKET WTR HTR GEN 101 1R43 H-014A ESK-6R4310
DIESEL GEN 101 LUBE OIL HTR 1R43 H-015A ESK-6R4307
SPARE
G101 STARTING AIR COMP 1R43 C-003A ESK-6R4301
G101 STARTING AIR COMP 1R43 C-004A ESK-6R4301
JACKET WATER KEEP WARM PP GEN 101 1R43 P-238A ESK-6R4310
DIESEL GEN 101 LUBE OIL PUMP 1R43 P-226A ESK-6R4307
CHILLED WTR RTN ESK-6M5005
CHILLED WTR SPLY 1M50 MOV032A ESK-6M5006
CHILLED WTR RTN CROSSOVER 1M50 MOV033A ESK-6M5007
CHILLED WTR SPLY CROSSOVER 1M50 MOV034A ESK-6M5008
JACKET WTR HTR GEN 101 ESK-6R4310
RBSVS AND CRAC COND PUMP ESK-6M5003
JACKET WTR HTR GEN 102 1R43 H-014B ESK-6R4311
JACKET WTR HTR GEN 102 1R43 H-014B ESK-6R4311
VENT CHILLER HDR ISOL 1P41 MOV036B ESK-6P4105
DIESEL GEN 102 LUBE OIL HTR 1R43 H-015B ESK-6R4308
JACKET WTR KEEP WARM PP GEN 102 1R43 P-238B ESK-6R4311
DIESEL GEN 102 HTR 1R43 H-012B ESK-6R4313
G102 STARTING AIR COMP 1R43 C-004B ESK-6R4302
G102 STARTING AIR COMP 1R43 C-003B ESK-6R4302
DIESEL GEN 102 LUBE OIL PUMP 1R43 P-226B ESK-6R4308
CHILLED WTR RTN 1M50 MOV031B ESK-6M5005
CHILLED WTR SPLY 1M50 MOV032B ESK-6M5006
CHILLED WTR RTN CROSSOVER 1M50 MOV033B ESK-6M5007
CHILLED WTR SPLY CROSSOVER 1M50 MOV034B ESK-6M5008
SPARE
DIESEL GEN 103 LUBE OIL PUMP 1R43 P-226C
RBSVS AND CRAC COND PUMP
G103 STARTING AIR COMP ESK-6R4303
JACKET WTR HTR GEN 103 1R43 H-014C
DIESEL GEN 103 LUBE OIL HTR
JACKET WTR KEEP WARM PUMP GEN 103
LO PUMP
VENT CHILLERS HDR ISOL 1P41 MOV036C ESK-6P4106
SPARE

NOTES
1. GENERAL NOTES & REFERENCES M-11092 (FE-1M)

NUCLEAR SAFETY RELATED
QA CAT I & II

APPROVED Edward J. Barbiero — LICENSED PROFESSIONAL ENGINEER NO. 44663 STATE OF NEW YORK

850 MWe

W.O. 48923

ONE LINE DIAGRAM-DIESEL GEN RM
480V MCC1116, 1126 & 1134

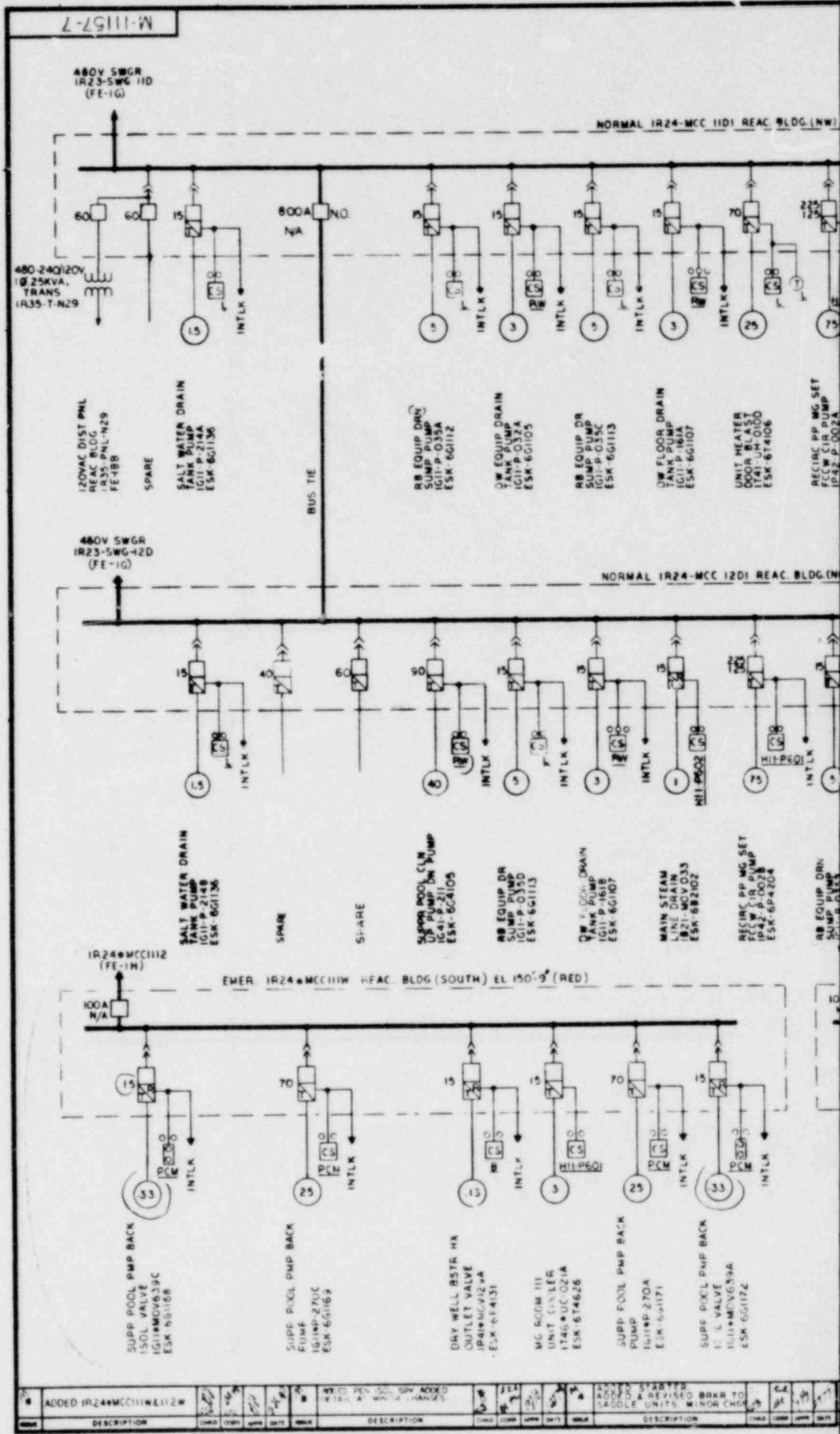
SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

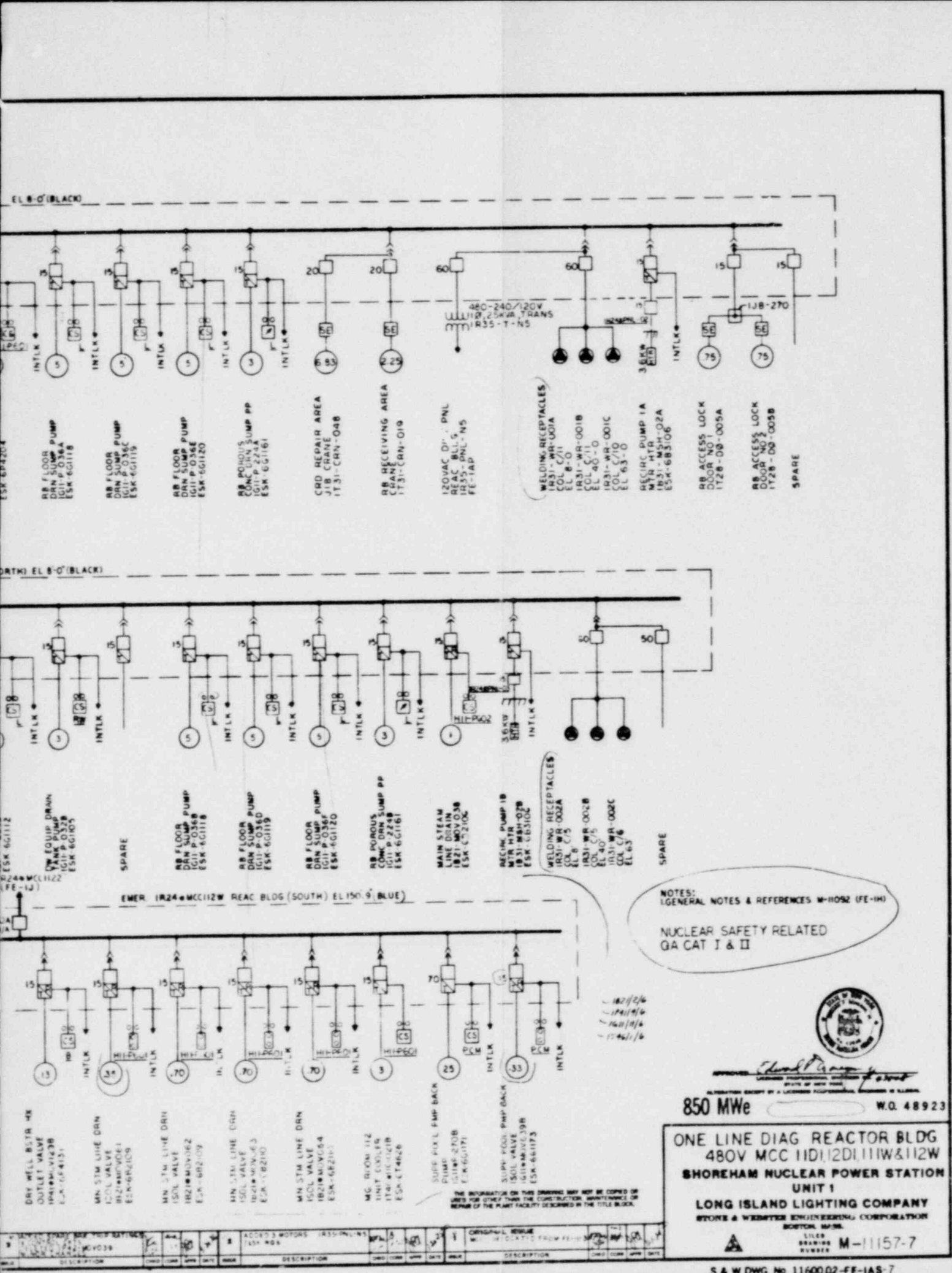
LILCO DRAWING NUMBER M-11106-6

THE INFORMATION OF THIS DRAWING MAY NOT BE COPIED OR USED FOR OTHER THAN THE CONSTRUCTION, MAINTENANCE OR REPAIR OF THE PLANT FACILITY DESCRIBED IN THE TITLE BLOCK.

NO.	DESCRIPTION
5	DELETED 6 MOTORS, ADDED 5 MOTORS, CHGD HP RATINGS
	ORIGINAL ISSUE

S & W DWG. No. 11600.02-FE-1X-6


M-1157-7
480V SWGR
1R23-SWG 11D
(FE-1G)
NORMAL 1R24-MCC 11D1 REAC BLDG.(NW)
480-240/120V
@ 25KVA.
TRANS
1R35-T-N29
800A
N/A
N.O.
120VAC DIST PNL
REAC BLDG
1R35-PNL-N29
FE-188
SPARE
SALT WATER DRAIN
TANK PUMP
1G11-P-214A
ESK-6G1136
BUS TIE
RB EQUIP DRN
SUMP PUMP
1G11-P-035A
ESK-6G1112
DW EQUIP DRAIN
TANK PUMP
1G11-P-032A
ESK-6G1105
RB EQUIP DR
SUMP PUMP
1G11-P-035C
ESK-6G1113
DW FLOOR DRAIN
TANK PUMP
1G11-P-161A
ESK-6G1107
UNIT HEATER
DOOR BLAST
1T41-UH-0100
ESK-6T4106
RECIRC PP MG SET
FCCW CIR PUMP
1P42-P-002A
480V SWGR
1R23-SWG-12D
(FE-1G)
NORMAL 1R24-MCC 12D1 REAC. BLDG.(N
SALT WATER DRAIN
TANK PUMP
1G11-P-214B
ESK-6G1136
SPARE
SPARE
SUPPR POOL CLN
DR PUMP DW PUMP
1G41-P-211
ESK-6G4105
RB EQUIP DR
SUMP PUMP
1G11-P-035D
ESK 6G1113
DW FLOOR DRAIN
TANK PUMP
1G11-P-161B
ESK 6G1107
MAIN STEAM
LINE DRAIN
1B21-MOV-033
ESK 6B2102
RECIRC PP MG SET
FCCW CIR PUMP
1P42-P-002B
ESK-6P4204
1R24•MCC1112
(FE-1H)
EMER. 1R24•MCC111W REAC. BLDG (SOUTH) EL 150'-9" (RED)
100A
N/A
SUPP POOL PMP BACK
ISOL VALVE
1G11•MOV-039C
ESK 6G1168
SUPP POOL PMP BACK
PUMP
1G11•P-270C
ESK-6G1169
DRY WELL BSTR HX
OUTLET VALVE
1P41•MOV-012A
ESK-6P4131
MG ROOM III
UNIT COOLER
1T46•UC-021A
ESK-6T4626
SUPP POOL PMP BACK
PUMP
1G11•P-270A
ESK-6G1171
SUPP POOL PMP BACK
ISOL VALVE
1G11•MOV-039A
ESK-6G1172
ADDED 1R24•MCC111N&112W
DESCRIPTION
DESCRIPTION
DESCRIPTION



850 MWe

W.O. 48923

ONE LINE DIAG REACTOR BLDG
480V MCC 11D,12D,111W&112W

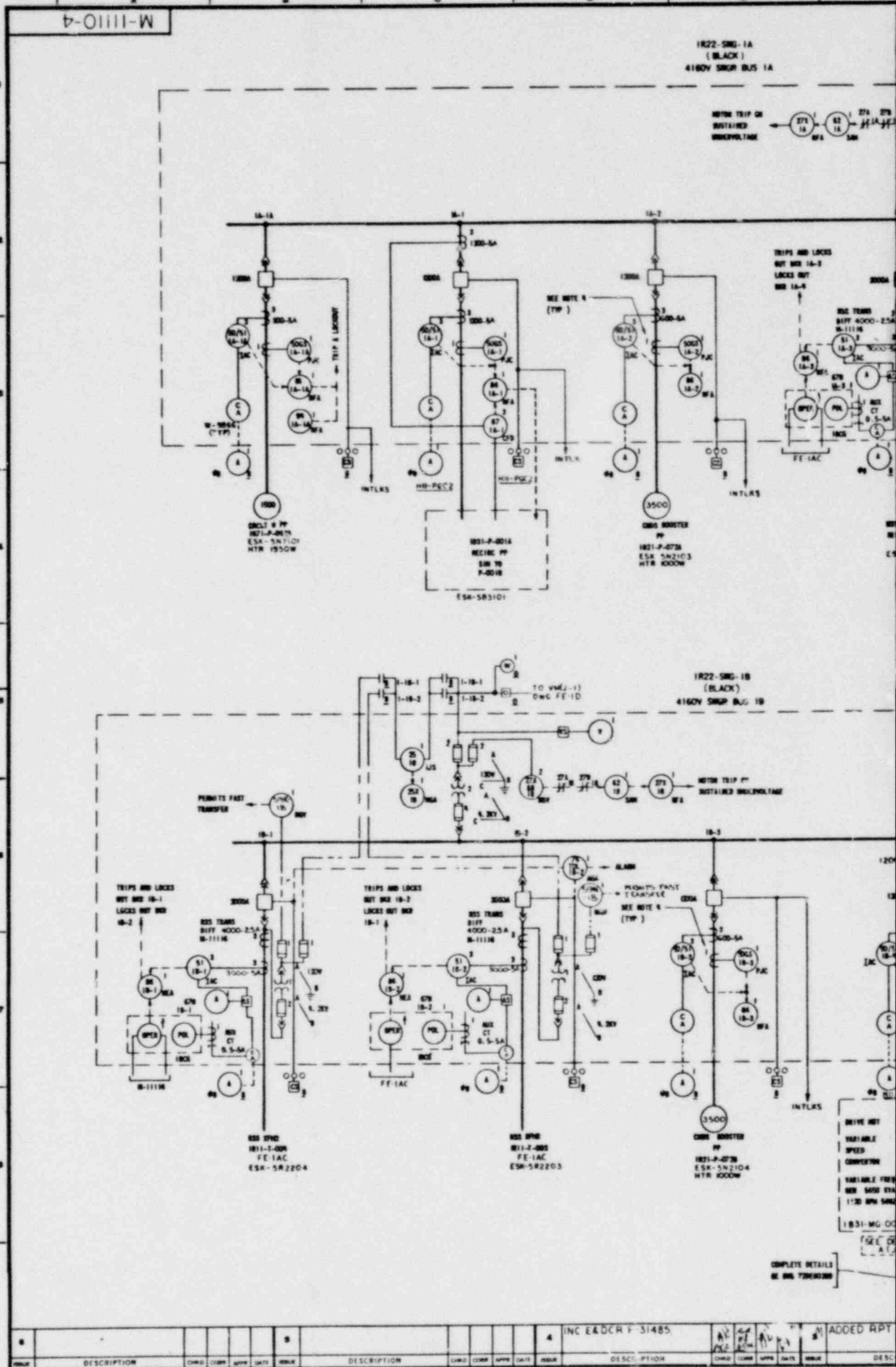
SHOREHAM NUCLEAR POWER STATION
UNIT 1

LONG ISLAND LIGHTING COMPANY

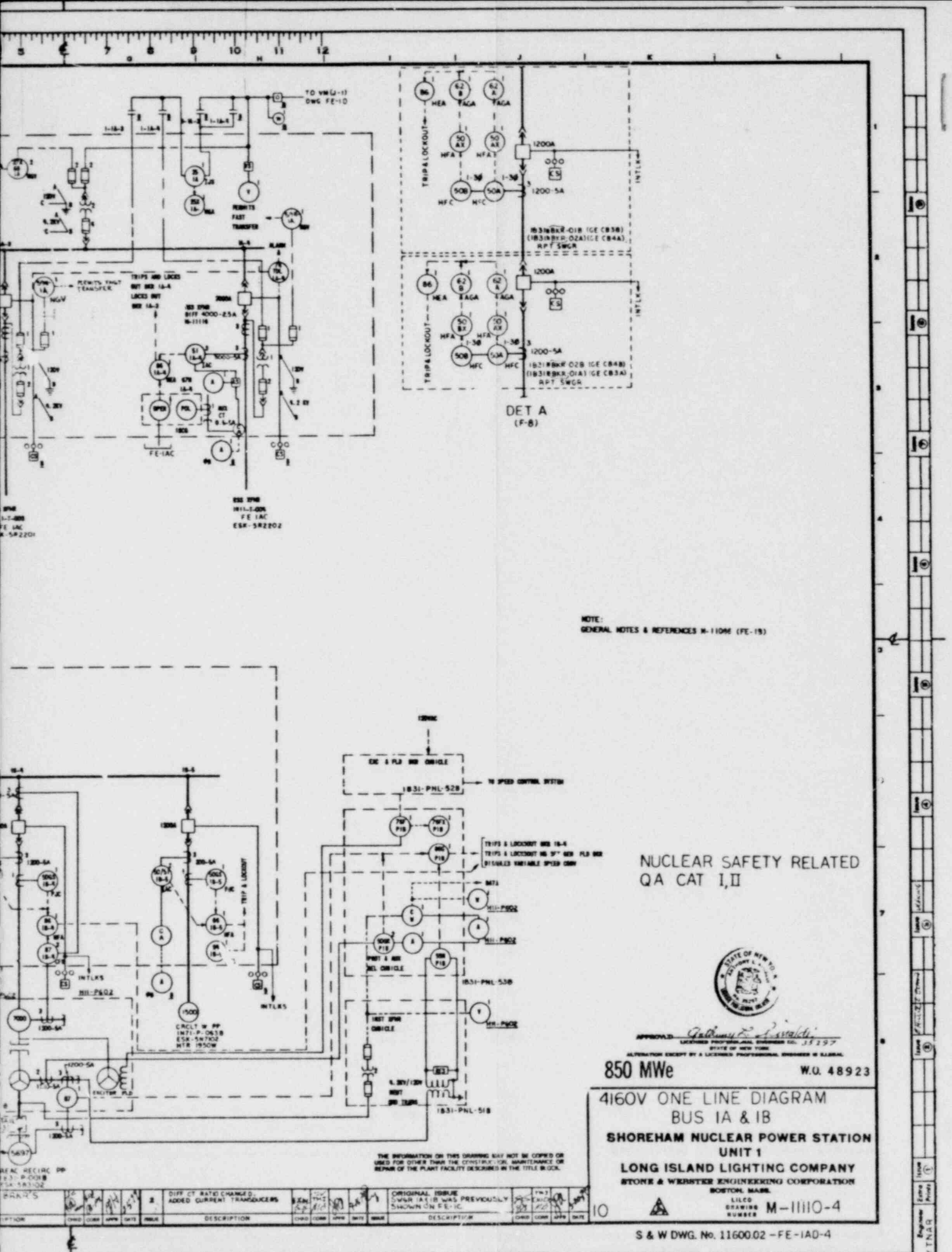
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

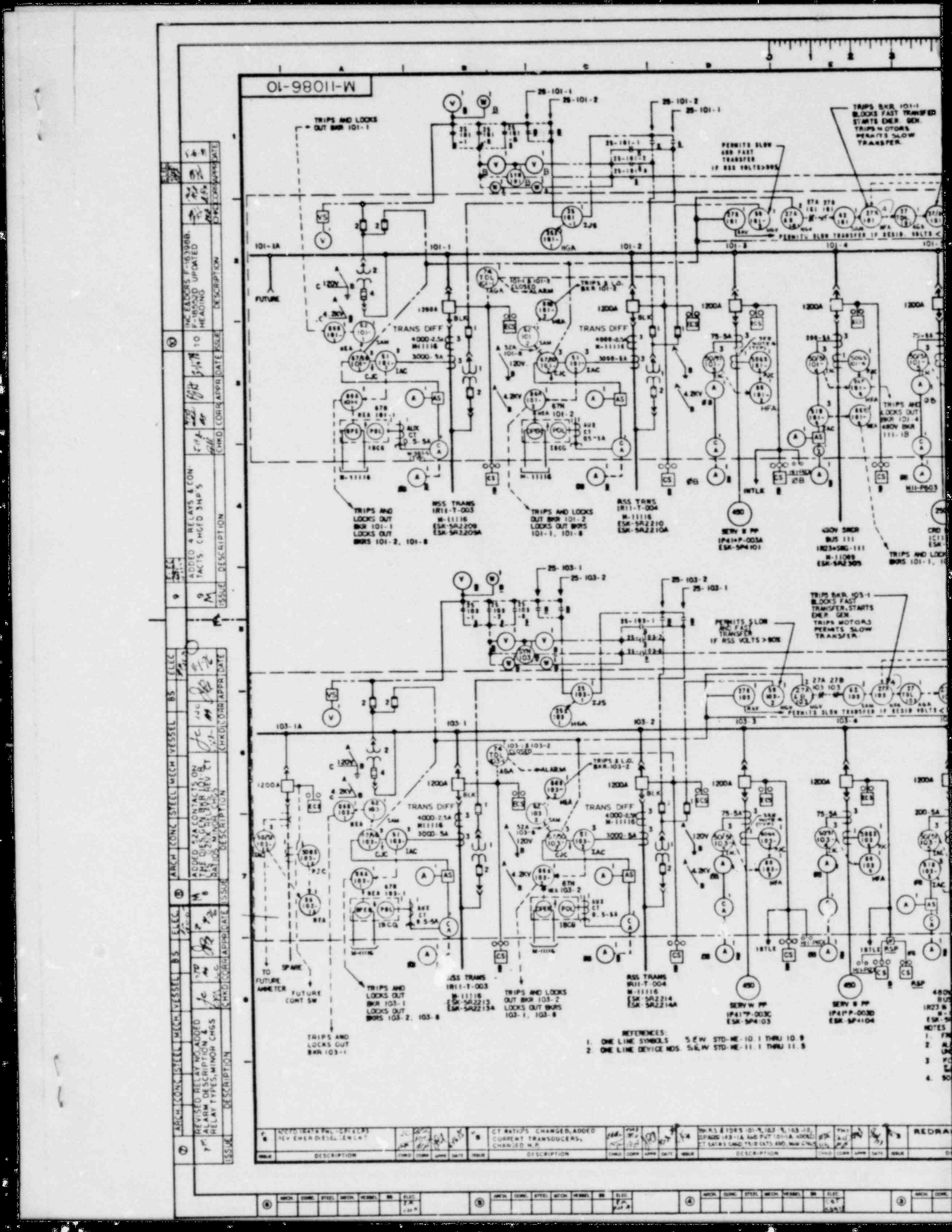
FILED DRAWING NUMBER M-11157-7

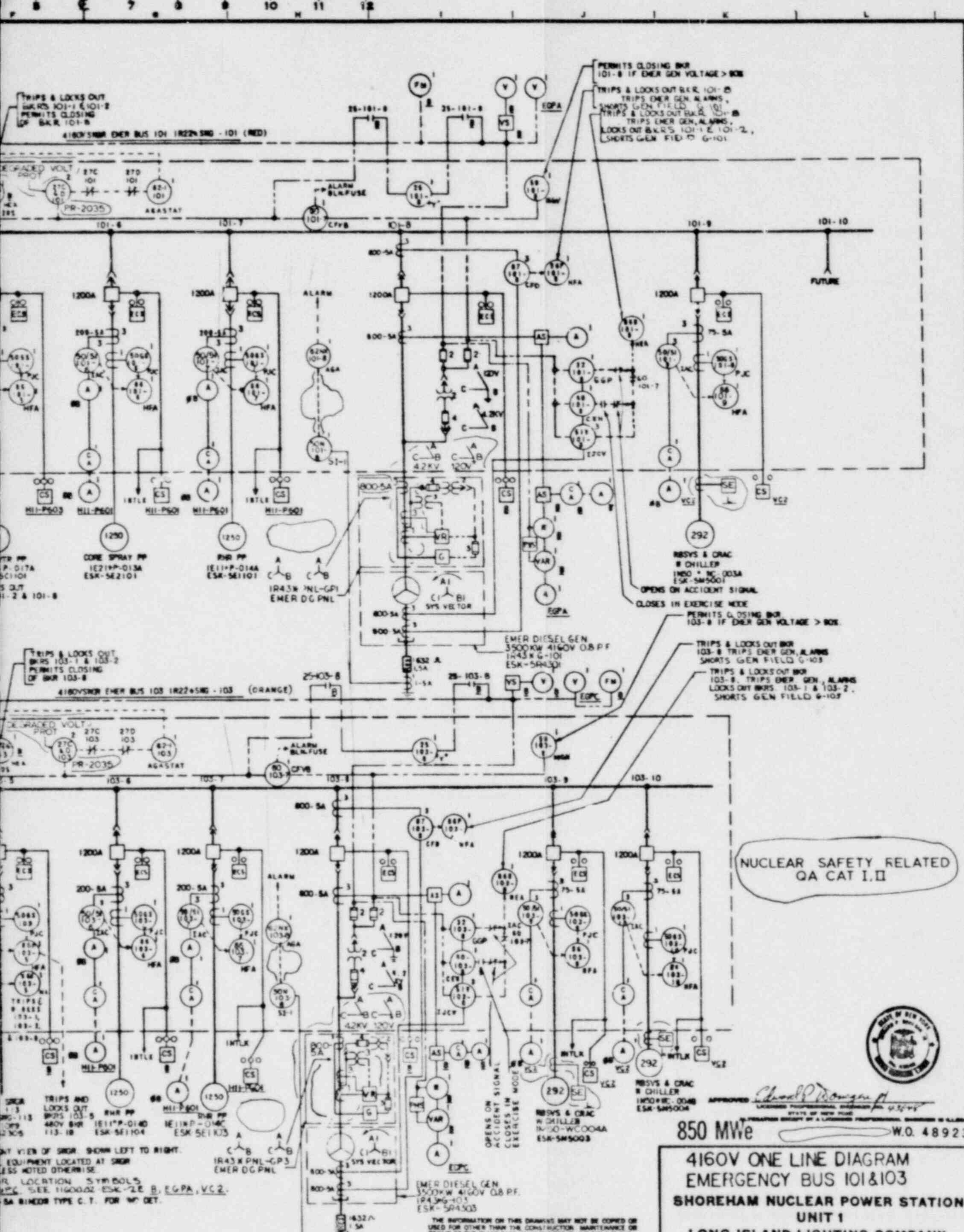
S & W DWG. No. 11600.02-FE-1AS-7



M-11110-4
1R22-SWG-1A
(BLACK)
4160V SWGR BUS 1A
MOTOR TRIP ON SUSTAINED UNDERVOLTAGE
TRIP & LOCKOUT
SEE NOTE 4 (TYP)
TRIPS AND LOCKS OUT BKR 1A-3 LOCKS OUT BKR 1A-5
INTLKS
ESK-5N7101
HTR 1950W
1B31-P-001A
RECIRC PP
ESK-5R3101
3500
CRDS BOOSTER PP
1R21-P-072A
ESK 5N2103
HTR 1000W
FE-1AC
TO VM(J-1) DWG FE-1D
1R22-SWG-1B
(BLACK)
4160V SWGR BUS 1B
MOTOR TRIP ON SUSTAINED UNDERVOLTAGE
PERMITS FAST TRANSFER
TRIPS AND LOCKS OUT BKR 1B-1 LOCKS OUT BKR 1B-2
TRIPS AND LOCKS OUT BKR 1B-2 LOCKS OUT BKR 1B-1
RSS TRANS
ALARM
SEE NOTE 4 (TYP)
ESK-5R2204
ESK-5R2203
1R21-P-072B
ESK-5N2104
HTR 1000W
DRIVE MOT
VARIABLE SPEED CONVERTER
1B31-MG
COMPLETE DETAILS
INC E&DCR F-31485
ADDED RPT
ISSUE
DESCRIPTION
CHKD
COMM
APPR
DATE
ARCH.
CONC.
STEEL
MECH.
VESSEL
ELEC.


TO VM(U-1) DWG FE-1D
DET A (F-8)
1200A
1200-5A
TRIP & LOCKOUT
INTLKS
HFA
HFC
1831-PNL-528
1831-PNL-538
1831-PNL-518
INTLKS
INTLKS
CRCLT W PP
INTI-P-0038
ESK-5N702
HTR 1950W
EXCITER PLD
NOTE:
GENERAL NOTES & REFERENCES M-1100 (FE-1B)
NUCLEAR SAFETY RELATED
QA CAT I,II
850 MWe
W.O. 48923
4160V ONE LINE DIAGRAM
BUS 1A & 1B
SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.
LILCO DRAWING NUMBER M-1110-4
S & W DWG. No. 11600.02-FE-1AD-4
DIFF CT RATIO CHANGED. ADDED CURRENT TRANSDUCERS
ORIGINAL ISSUE
Designed by G. SINGH
Drawn by G. SINGH
Des. Ch'd by H. FALISE
Ch'd by E. VENNELL


M-11086-10
TRIPS AND LOCKS OUT BKR 101-1
PERMITS SLOW AND FAST TRANSFER IF RSS VOLTS>90%
TRIPS BKR 101-1 BLOCKS FAST TRANSFER STARTS EMER. GEN. TRIPS MOTORS PERMITS SLOW TRANSFER
101-1A
FUTURE
101-1
101-2
101-3
101-4
TRANS DIFF
RSS TRANS 1R11-T-003 M-11116 ESK-5A2209 ESK-5A2209A
RSS TRNS 1R11-T-004 M-11116 ESK-5A2210 ESK-5A2210A
TRIPS AND LOCKS OUT BKR 101-1 LOCKS OUT BKRS 101-2, 101-8
TRIPS AND LOCKS OUT BKR 101-2 LOCKS OUT BKRS 101-1, 101-8
SERV W PP 1P41*P-003A ESK-5P4101
480V SWGR BUS 111 1R23*SWG-111 M-11089 ESK-5A2305
PERMITS SLOW AND FAST TRANSFER IF RSS VOLTS >90%
TRIPS BKR 103-1 BLOCKS FAST TRANSFER, STARTS EMER. GEN. TRIPS MOTORS PERMITS SLOW TRANSFER
103-1A
103-1
103-2
103-3
103-4
TO FUTURE AMMETER
SPARE
FUTURE CONT SW
TRIPS AND LOCKS OUT BKR 103-1
TRIPS AND LOCKS OUT BKR 103-1 LOCKS OUT BKRS 103-2, 103-8
RSS TRANS 1R11-T-003 M-11116 ESK-5A2213 ESK-5A2213A
TRIPS AND LOCKS OUT BKR 103-2 LOCKS OUT BKRS 103-1, 103-8
RSS TRANS 1R11-T-004 M-11116 ESK-5A2214 ESK-5A2214A
SERV W PP 1P41*P-003C ESK-5P4103
SERV W PP 1P41*P-003D ESK-5P4104
REFERENCES:
1. ONE LINE SYMBOLS S&W STD-ME-10.1 THRU 10.9
2. ONE LINE DEVICE NOS. S&W STD-ME-11.1 THRU 11.5
ADDED 4 RELAYS & CONTACTS. CHGED 3HP'S
INC. E&DCRS F-16398B, F-18552D UPDATED HEADING
REVISED RELAY NO. ADDED ALARM DESCRIPTION & RELAY TYPES, MINOR CHGS
CT RATIOS CHANGED, ADDED CURRENT TRANSDUCERS, CHANGED H.P.
ISSUE
DESCRIPTION
CHKD
CORR
APPR
DATE
ARCH
CONC
STEEL
MECH
VESSEL
BS
ELEC
REDRA


4160V SWGR EMER BUS 101 1R22*SWG-101 (RED)
4160V SWGR EMER BUS 103 1R22*SWG-103 (ORANGE)
PERMITS CLOSING BKR 101-8 IF EMER GEN VOLTAGE > 90%
PERMITS CLOSING BKR 103-8 IF EMER GEN VOLTAGE > 90%
DEGRADED VOLT PROT
PR-2035
AGASTAT
ALARM BLN.FUSE
FUTURE
CORE SPRAY PP 1E21*P-013A ESK-5E2101
RHR PP 1E11*P-014A ESK-5E1101
1R43*PNL-GP1 EMER DG PNL
1R43*PNL-GP3 EMER DG PNL
EMER DIESEL GEN 3500KW 4160V 0.8 P.F. 1R43*G-101 ESK-5R4301
EMER DIESEL GEN 3500KW 4160V 0.8 P.F. 1R43*G-103 ESK-5R4303
SYS VECTOR
RBSYS & CRAC B CHILLER
OPENS ON ACCIDENT SIGNAL
CLOSES IN EXERCISE MODE
NUCLEAR SAFETY RELATED QA CAT I,II
850 MWe
W.O. 48923

4160V ONE LINE DIAGRAM EMERGENCY BUS 101&103

SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

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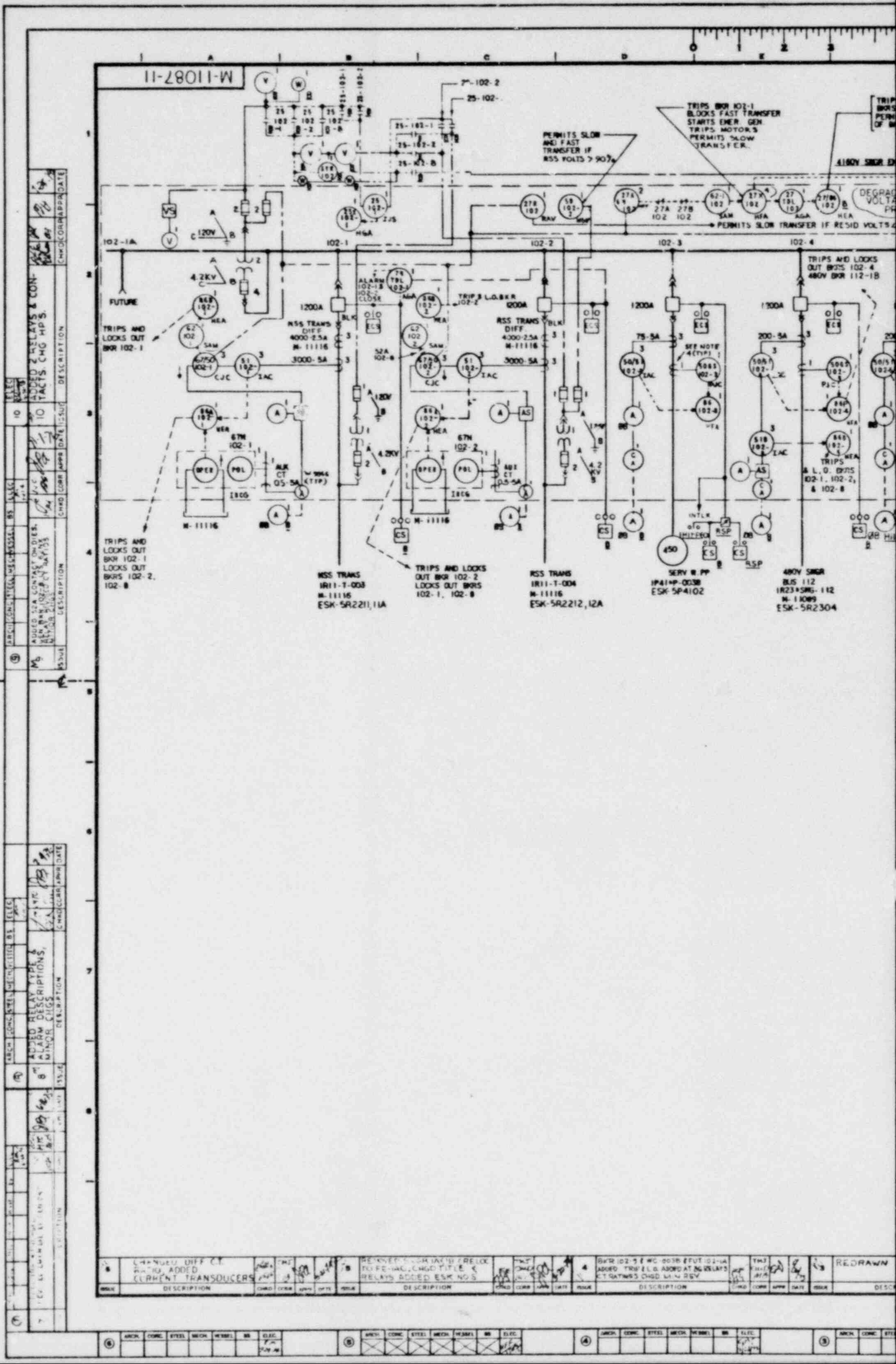
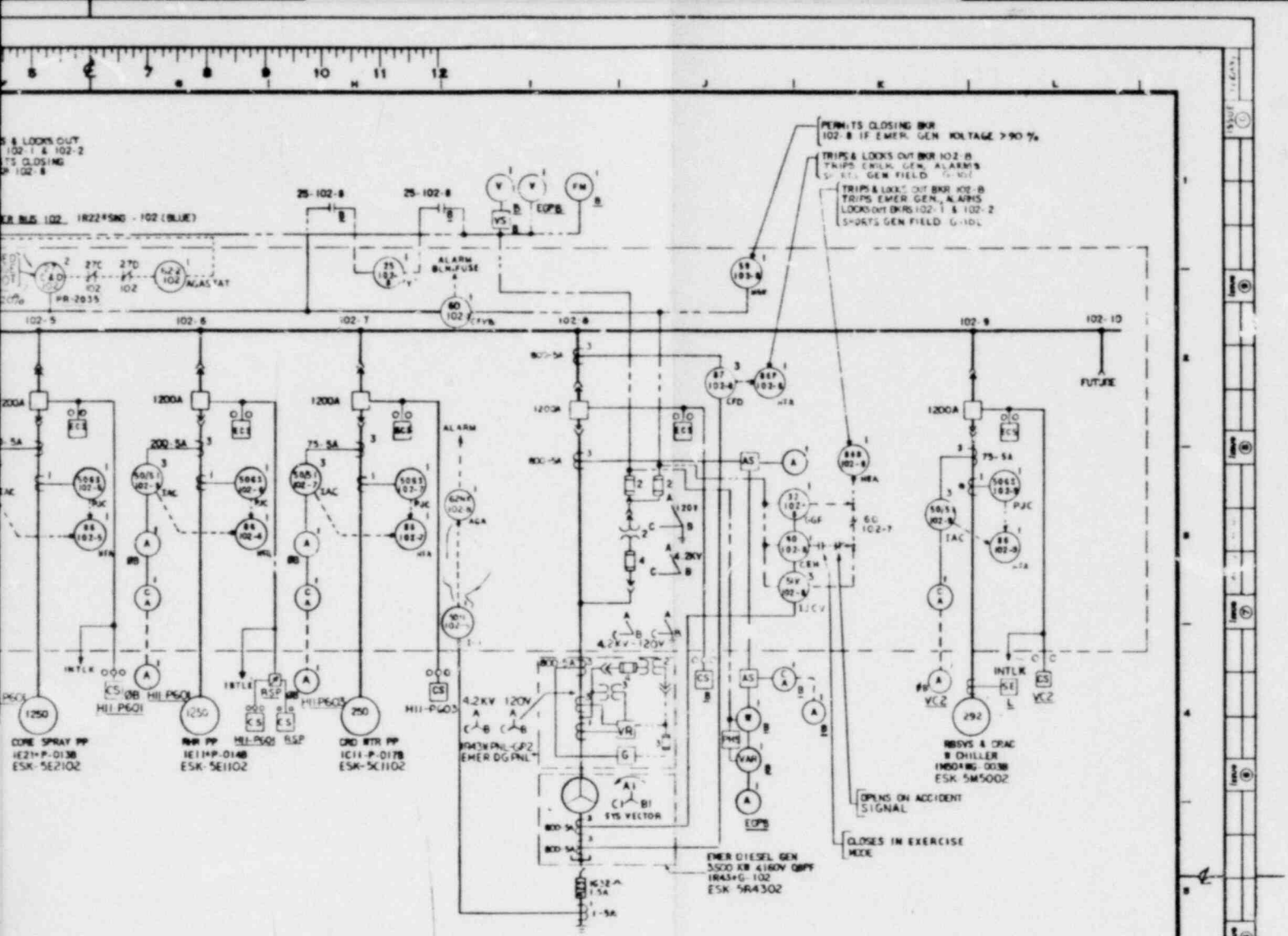
LILCO DRAWING NUMBER M-11086-10

S & W DWG. No. 11600.02-FE-1B-10

Drawn by HDC



M-11087-11
PERMITS SLOW AND FAST TRANSFER IF RSS VOLTS > 90%
TRIPS BKR 102-1 BLOCKS FAST TRANSFER STARTS EMER GEN TRIPS MOTORS PERMITS SLOW TRANSFER
PERMITS SLOW TRANSFER IF RESID VOLTS
102-1A
FUTURE
120V
4.2KV
TRIPS AND LOCKS OUT BKR 102-1
102-1
102-2
102-3
102-4
1200A
RSS TRANS DIFF 4000-2.5A M-11116
3000-5A
67N 102-1
67N 102-2
M-11116
TRIPS AND LOCKS OUT BKR 102-1 LOCKS OUT BKRS 102-2, 102-8
RSS TRANS 1R11-T-003 M-11116 ESK-5R2211,11A
TRIPS AND LOCKS OUT BKR 102-2 LOCKS OUT BKRS 102-1, 102-8
RSS TRANS 1R11-T-004 M-11116 ESK-5R2212,12A
SERV W PP 1P41*P-003B ESK-5P4102
TRIPS AND LOCKS OUT BKRS 102-4 480V BKR 112-1B
TRIPS & L.O. BKRS 102-1, 102-2, & 102-8
480V SWGR BUS 112 1R23*SWG-112 M-11089 ESK-5R2304
480V SWGR
DEGRADED VOLTAGE
ADDED 2 RELAYS & CONTACTS. CHG HPS.
ADDED 52A CONTACT ON DIES.
ADDED RELAY TYPE & ALARM DESCRIPTIONS, MINOR CHGS.
CHANGED DIFF CT RATIO, ADDED CURRENT TRANSDUCERS
REDRAWN



NUCLEAR SAFETY RELATED
QA CAT I & II

APPROVED _____
LICENSED PROFESSIONAL ENGINEER NO. _____
STATE OF NEW YORK

850 MWe W.O. 48923

4160V ONE LINE DIAGRAM EMER BUS 102

SHOREHAM NUCLEAR POWER STATION UNIT 1

LONG ISLAND LIGHTING COMPANY

STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

10 LILCO DRAWING NUMBER M-11087-11

S&W DWG. No. 11600.02-FE-1C-11

ISSUE	DESCRIPTION	CHKD	CORR	APPR	DATE
11	INC'L. (CR F-16398) F-18552D.				
2	REMOVED SWS. ADDED RELAYS REV. TRANS. & MOTOR NOS. ADDED SYS. CODE NOS.				
1	ORIGINAL ISSUE				

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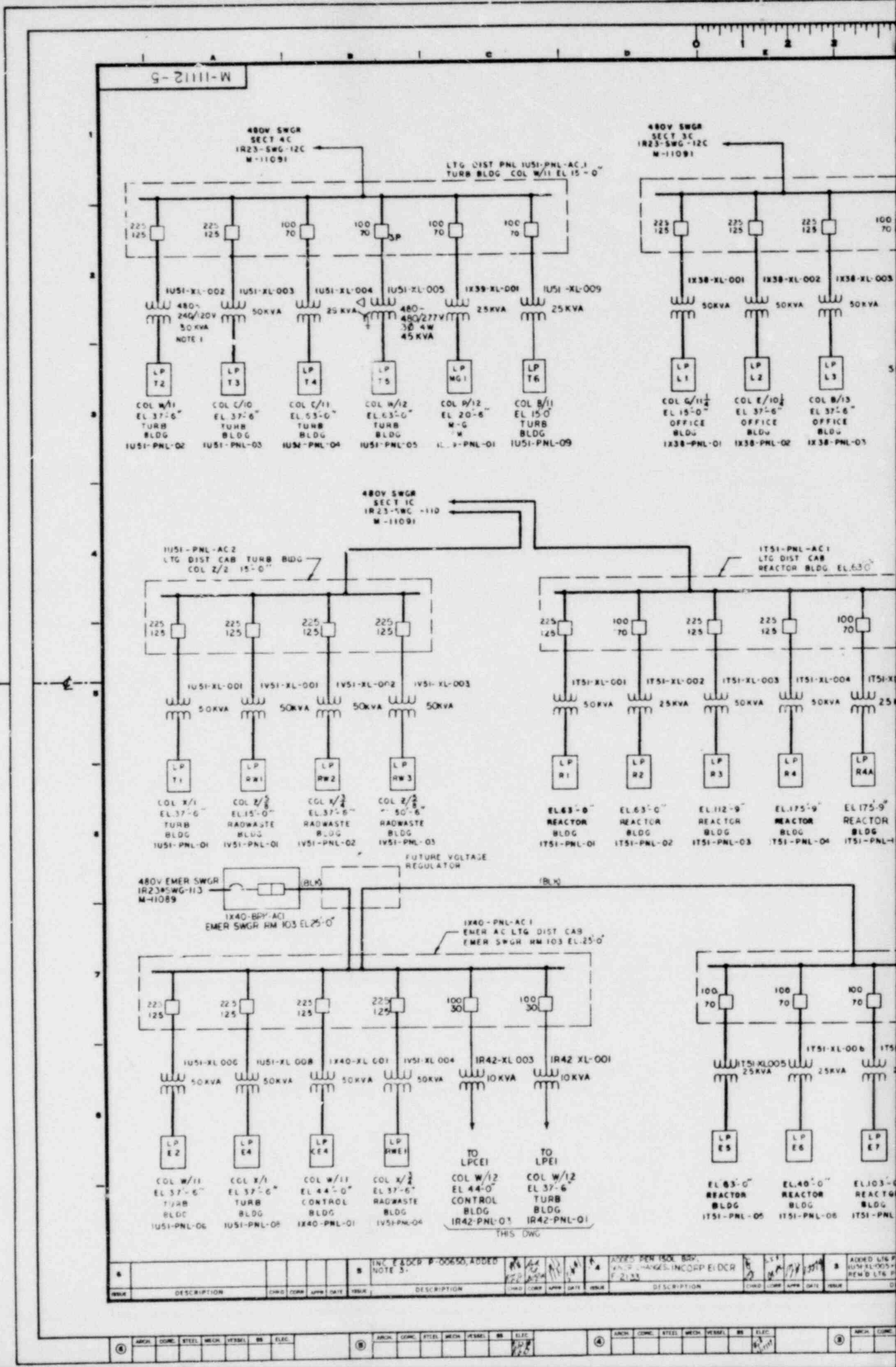
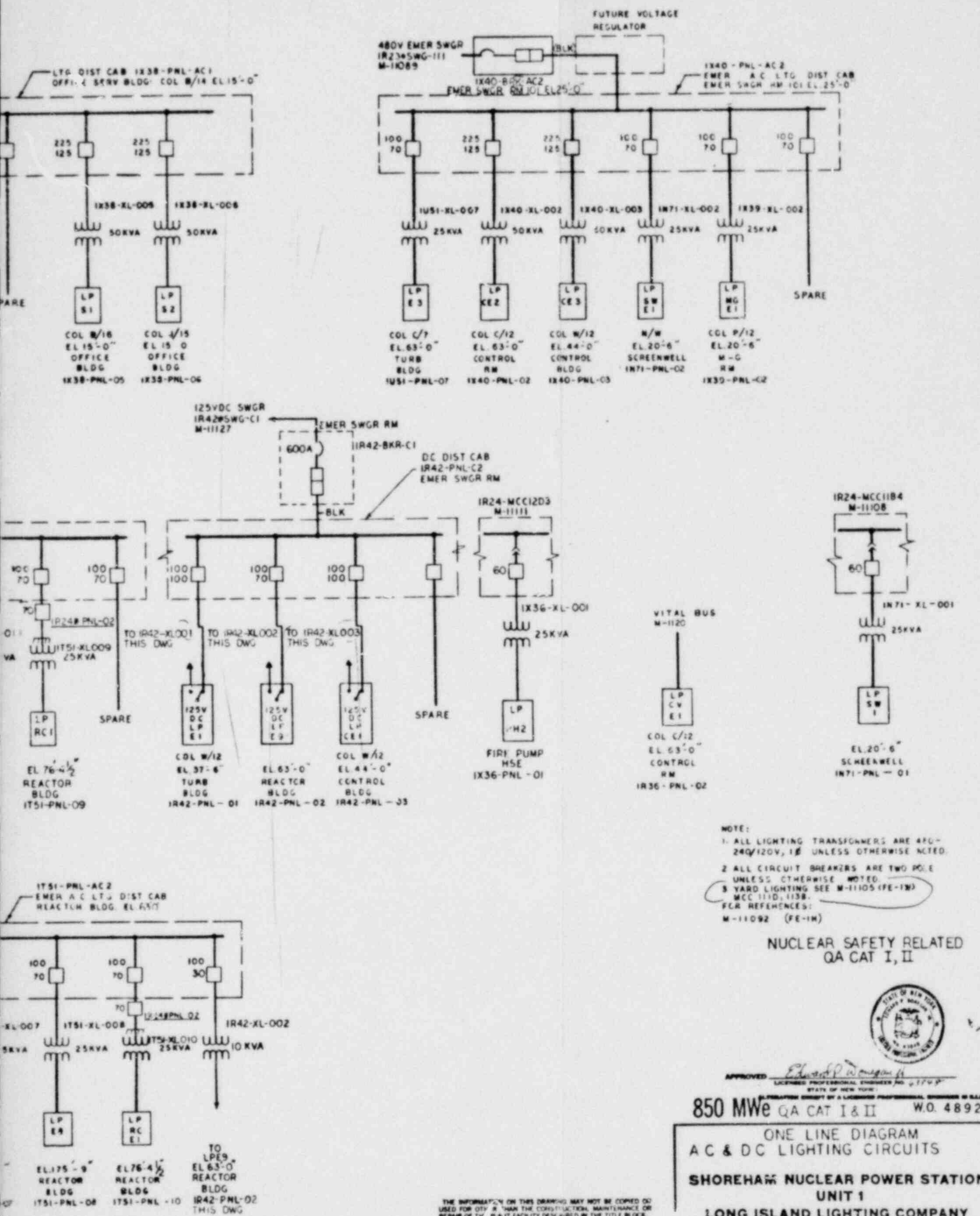
Designed by _____ Dsn. Ckd'd by _____

Drawn by _____ Ckd'd by _____



M-11112-5
480V SWGR SECT 4C 1R23-SWG-12C M-11091
LTG DIST PNL 1U51-PNL-AC.1 TURB BLDG COL W/11 EL 15'-0"
1U51-XL-002
1U51-XL-003
1U51-XL-004
1U51-XL-005
1X39-XL-001
1U51-XL-009
480-240/120V 50 KVA NOTE 1
50KVA
25 KVA
480-480/277V 3Ø 4W 45KVA
25KVA
25KVA
LP T2
LP T3
LP T4
LP T5
LP MG1
LP T6
COL W/11 EL 37'-6" TURB BLDG 1U51-PNL-02
COL C/10 EL 37'-6" TURB BLDG 1U51-PNL-03
COL C/11 EL 53'-0" TURB BLDG 1U51-PNL-04
COL W/12 EL 63'-0" TURB BLDG 1U51-PNL-05
COL P/12 EL 20'-6" M-G
COL B/11 EL 15'0" TURB BLDG 1U51-PNL-09
480V SWGR SECT 3C 1R23-SWG-12C M-11091
1X38-XL-001
1X38-XL-002
1X38-XL-003
50KVA
LP L1
LP L2
LP L3
OFFICE BLDG 1X38-PNL-01
OFFICE BLDG 1X38-PNL-02
COL B/13 EL 37'-6" OFFICE BLDG 1X38-PNL-03
480V SWGR SECT 1C 1R23-SWG-11D M-11091
1U51-PNL-AC2 LTG DIST CAB TURB BLDG COL Z/2 15'-0"
1T51-PNL-AC1 LTG DIST CAB REACTOR BLDG EL 63'0"
1U51-XL-001
1V51-XL-001
1V51-XL-002
1V51-XL-003
50KVA
LP T1
LP RW1
LP RW2
LP RW3
COL X/1 EL 37'-6" TURB BLDG 1U51-PNL-01
EL 15'-0" RADWASTE BLDG 1V51-PNL-01
EL 37'-6" RADWASTE BLDG 1V51-PNL-02
RADWASTE BLDG 1V51-PNL-03
1T51-XL-001
1T51-XL-002
1T51-XL-003
1T51-XL-004
50KVA
25KVA
LP R1
LP R2
LP R3
LP R4
LP R4A
EL 63'-0" REACTOR BLDG 1T51-PNL-01
EL 63'-0" REACTOR BLDG 1T51-PNL-02
EL 112'-9" REACTOR BLDG 1T51-PNL-03
EL 175'-9" REACTOR BLDG 1T51-PNL-04
EL 175'-9" REACTOR BLDG
FUTURE VOLTAGE REGULATOR
480V EMER SWGR 1R23-SWG-113 M-11089
(BLK)
1X40-BPY-AC1 EMER SWGR RM 103 EL 25'-0"
1X40-PNL-AC1 EMER AC LTG DIST CAB EMER SWGR RM 103 EL 25'-0"
1U51-XL-006
1U51-XL-008
1X40-XL-001
1V51-XL-004
1R42-XL-003
1R42-XL-001
50KVA
10KVA
LP E2
LP E4
LP CE4
LP RWE1
TO LPCE1
TO LPE1
COL W/11 EL 37'-6" TURB BLDG 1U51-PNL-06
COL X/1 EL 37'-6" TURB BLDG 1U51-PNL-08
COL W/11 EL 44'-0" CONTROL BLDG 1X40-PNL-01
EL 37'-6" RADWASTE BLDG 1V51-PNL-04
COL W/12 EL 44'-0" CONTROL BLDG 1R42-PNL-03
COL W/12 EL 37'-6" TURB BLDG 1R42-PNL-01
THIS DWG
1T51-XL-005 25KVA
1T51-XL-006 25KVA
LP E5
LP E6
LP E7
EL 63'-0" REACTOR BLDG 1T51-PNL-05
EL 40'-0" REACTOR BLDG 1T51-PNL-06
INC. E&DCR P-00650, ADDED NOTE 3.
ADDED PEN ISOL BRK. INCORP E&DCR F-2133
ISSUE
DESCRIPTION
CHKD
COORD
APPR
DATE
ARCH
CONC
STEEL
MECH
VESSEL
ELEC



LTG DIST CAB 1X38-PNL-AC1
OFFICE SERV BLDG: COL B/14 EL 15'-0"
225 125
225 125
1X38-XL-005
1X38-XL-006
50KVA
50KVA
SPARE
LP S1
LP S2
COL B/16 EL 15'-0" OFFICE BLDG 1X38-PNL-05
COL J/15 EL 15'-0" OFFICE BLDG 1X38-PNL-06
FUTURE VOLTAGE REGULATOR
480V EMER SWGR 1R23#SWG-111 M-11089
BLK
1X40-BKR-AC2
EMER SWGR RM 101 EL 25'-0"
1X40-PNL-AC2
EMER A.C. LTG DIST CAB
EMER SWGR RM 101 EL 25'-0"
100 70
225 125
225 125
100 70
100 70
100 70
1U51-XL-007
1X40-XL-002
1X40-XL-003
1N71-XL-002
1X39-XL-002
25KVA
50KVA
50KVA
25KVA
25KVA
SPARE
LP E3
LP KE2
LP CE3
LP SW E1
LP MG E1
COL C/7 EL 63'-0" TURB BLDG 1U51-PNL-07
COL C/12 EL 63'-0" CONTROL RM 1X40-PNL-02
COL N/12 EL 44'-0" CONTROL BLDG 1X40-PNL-03
N/W EL 20'-6" SCREENWELL 1N71-PNL-02
COL P/12 EL 20'-6" M-G RM 1X39-PNL-02
125VDC SWGR 1R42#SWG-C1 M-11127
EMER SWGR RM
600A
1R42-BKR-C1
DC DIST CAB 1R42-PNL-C2 EMER SWGR RM
BLK
1R24-MCC12D3 M-11111
1R24-MCC1184 M-11108
100 70
100 70
70
1R24# PNL-02
1T51-XL009 25KVA
LP RC1
EL 76'-4½" REACTOR BLDG 1T51-PNL-09
SPARE
100 100
100 70
100 100
TO 1R42-XL001 THIS DWG
TO 1R42-XL002 THIS DWG
TO 1R42-XL003 THIS DWG
125V DC LP E1
125V DC LP E9
125V DC LP CE1
SPARE
COL W/12 EL 37'-6" TURB BLDG 1R42-PNL-01
EL 63'-0" REACTOR BLDG 1R42-PNL-02
COL W/12 EL 44'-0" CONTROL BLDG 1R42-PNL-03
60
1X36-XL-001
25KVA
LP H2
FIRE PUMP HSE 1X36-PNL-01
VITAL BUS M-1120
LP CV E1
COL C/12 EL 63'-0" CONTROL RM 1R36-PNL-02
60
1N71-XL-001
25KVA
LP SW 1
EL 20'-6" SCREENWELL 1N71-PNL-01
1T51-PNL-AC2
EMER A.C. LTG DIST CAB
REACTOR BLDG. EL 63'
100 70
100 70
100 30
70
1T51-XL-008
1T51-XL-010
1R42-XL-002
25KVA
25KVA
10 KVA
LP E4
LP RC E1
EL 175'-9" REACTOR BLDG 1T51-PNL-08
EL 76'-4½" REACTOR BLDG 1T51-PNL-10
TO LPE9 EL 63'-0" REACTOR BLDG 1R42-PNL-02 THIS DWG

NOTE:

1. ALL LIGHTING TRANSFORMERS ARE 480-240/120V, 1Ø UNLESS OTHERWISE NOTED.
2. ALL CIRCUIT BREAKERS ARE TWO POLE UNLESS OTHERWISE NOTED.
3. YARD LIGHTING SEE M-11105 (FE-1W) MCC 111D, 1138.

FOR REFERENCES:
M-11092 (FE-1H)

NUCLEAR SAFETY RELATED
QA CAT I, II

APPROVED Edward P. Donegan Jr.
LICENSED PROFESSIONAL ENGINEER NO.
STATE OF NEW YORK

850 MWe QA CAT I & II W.O. 48923

ONE LINE DIAGRAM
A C & D C LIGHTING CIRCUITS

SHOREHAM NUCLEAR POWER STATION UNIT 1

LONG ISLAND LIGHTING COMPANY

STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

LILCO DRAWING NUMBER M-11112 -5

S & W DWG. No. 11600.02-FE-1AF-5

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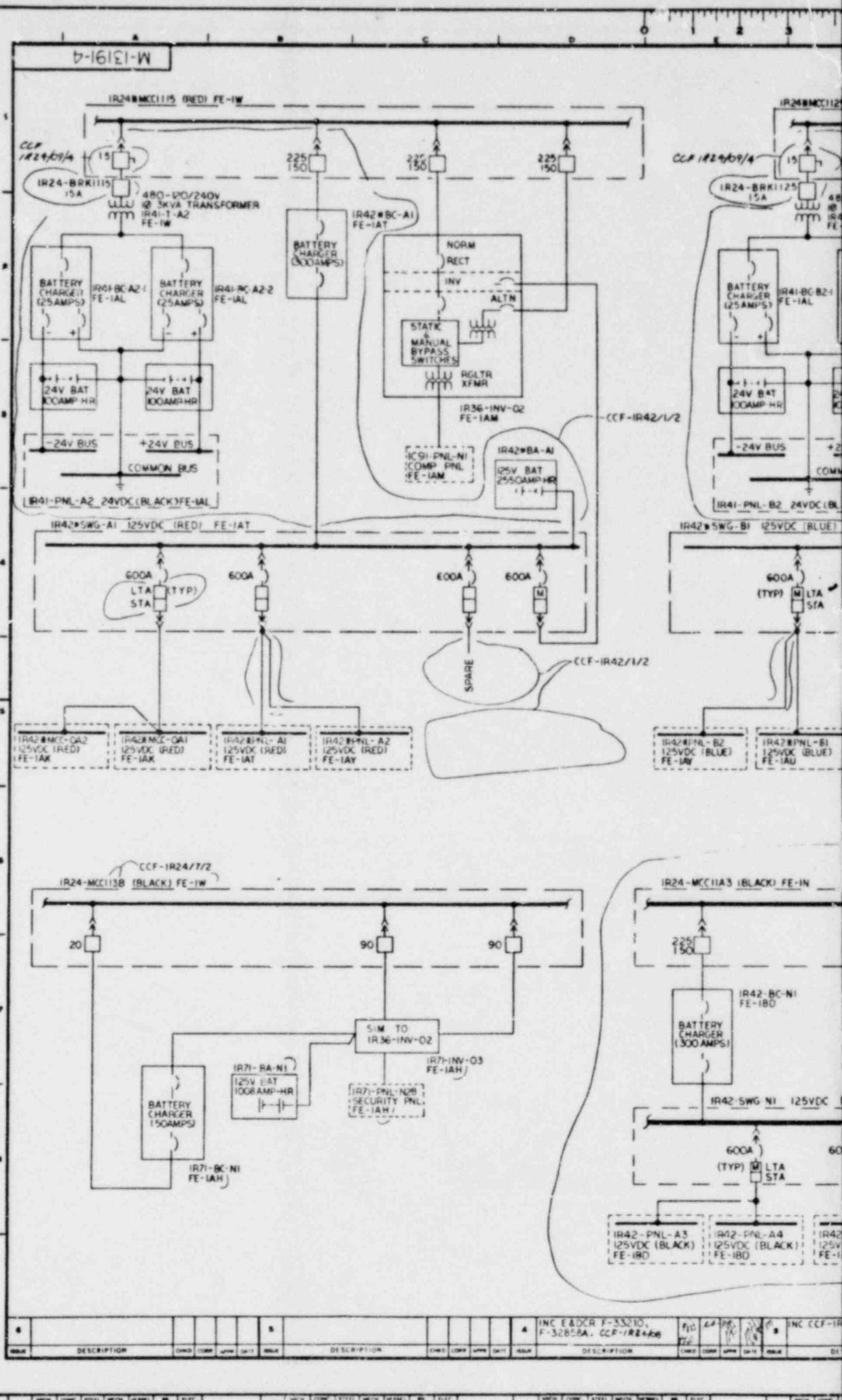
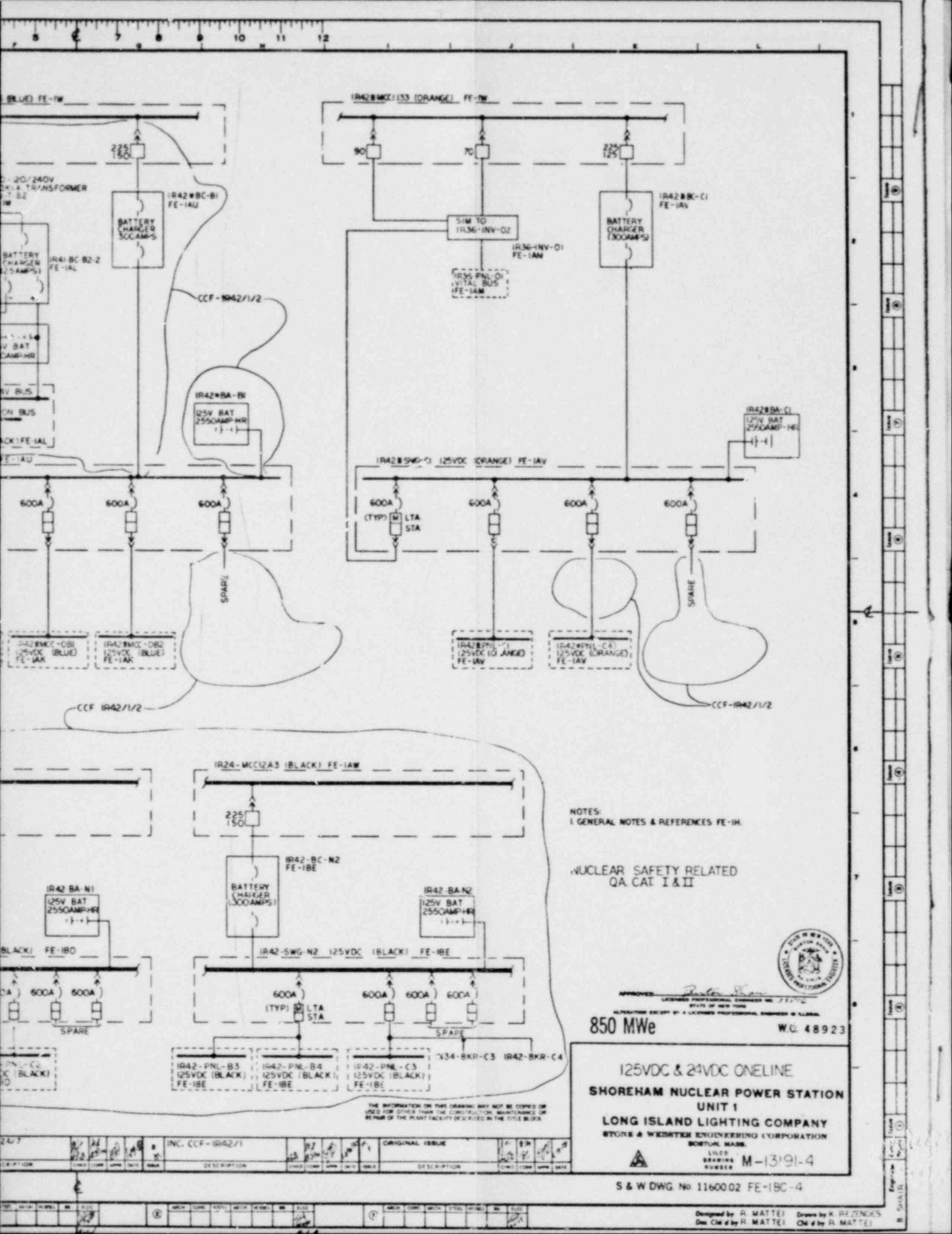
FOR LIST OF CHANGES SEE BCB-1AF-2					
ORIGINAL ISSUE					1
DESCRIPTION	CHKD	COMP	APPR	DATE	ISSUE

Designed by
Des. Chk'd by
Drawn by G. TRIFENBERG
Chk'd by H. FALISE
M. BYTNAR

M-1319-4


IR24▸MCC1115 (RED) FE-1W
CCF IR24/09/4
15
225 150
IR24-BRK1115 15A
480-120/240V @ 3KVA TRANSFORMER IR41-T-A2 FE-1W
IR42▸BC-A1 FE-1AT
BATTERY CHARGER (300AMPS)
BATTERY CHARGER (25AMPS)
IR41-BC-A2-1 FE-1AL
IR41-BC-A2-2 FE-1AL
24V BAT 100AMP-HR
-24V BUS
+24V BUS
COMMON BUS
IR41-PNL-A2 24VDC (BLACK) FE-1AL
NORM
RECT
INV
ALTN
STATIC & MANUAL BYPASS SWITCHES
REGLTR XFMR
IR36-INV-02 FE-1AM
CCF-IR42/1/2
IC91-PNL-N1 COMP PNL FE-1AM
IR42▸BA-A1
125V BAT 2550AMP-HR
IR42▸SWG-A1 125VDC (RED) FE-1AT
600A
LTA STA (TYP)
SPARE
IR42▸MCC-QA2 125VDC (RED) FE-1AK
IR42▸MCC-QA1 125VDC (RED) FE-1AK
IR42▸PNL-A1 125VDC (RED) FE-1AT
IR42▸PNL-A2 125VDC (RED) FE-1AY
IR42▸SWG-B1 125VDC (BLUE)
IR42▸PNL-B2 125VDC (BLUE) FE-1AV
IR42▸PNL-B1 125VDC (BLUE) FE-1AU
CCF-IR24/7/2
IR24-MCC113B (BLACK) FE-1W
20
90
SIM. TO IR36-INV-02
IR71-INV-03 FE-1AH
IR71-BA-N1
125V BAT 100AMP-HR
IR71-PNL-N28 SECURITY PNL FE-1AH
BATTERY CHARGER (50AMPS)
IR71-BC-N1 FE-1AH
IR24-MCC113A (BLACK) FE-1N
IR42-BC-N1 FE-1BD
IR42-SWG-N1 125VDC
IR42-PNL-A3 125VDC (BLACK) FE-1BD
IR42-PNL-A4 125VDC (BLACK) FE-1BD
INC E&DCR F-33210, F-32858A, CCF-IR24/08
INC CCF-IR


IR42*MCC1133 (ORANGE) FE-1W
90
70
225
125
IR42*BC-B1
FE-1AU
BATTERY CHARGER 300AMPS
225
150
IR41 BC B2-2
FE-1AL
SIM TO
IR36-INV-02
IR36-INV-01
FE-1AN
IR36-PNL-01
VITAL BUS
FE-1AM
IR42*BC-C1
FE-1AV
BATTERY CHARGER (300AMPS)
CCF-IR42/1/2
IR42*BA-B1
125V BAT
2550AMP-HR
IR42*BA-C1
125V BAT
2550AMP-HR
IR42*SWG-C1 125VDC (ORANGE) FE-1AV
600A
(TYP)
LTA
STA
SPARE
IR42*MCC-DB1
125VDC (BLUE)
FE-1AK
IR42*MCC-DB2
125VDC (BLUE)
FE-1AK
IR42*PNL-C1
125VDC (ORANGE)
FE-1AV
IR42*PNL-C4
125VDC (ORANGE)
FE-1AV
CCF IR42/1/2
CCF-IR42/1/2
IR24-MCC12A3 (BLACK) FE-1AW
225
150
IR42-BC-N2
FE-1BE
BATTERY CHARGER (300AMPS)
IR42 BA-N1
125V BAT
2550AMP-HR
IR42-BA-N2
125V BAT
2550AMP-HR
(BLACK) FE-1BD
IR42-SWG-N2 125VDC (BLACK) FE-1BE
SPARE
IR42-PNL-B3
125VDC (BLACK)
FE-1BE
IR42-PNL-B4
125VDC (BLACK)
FE-1BE
IR42-PNL-C3
125VDC (BLACK)
FE-1BE
IR34-BKR-C3
IR42-BKR-C4
NOTES:
1. GENERAL NOTES & REFERENCES FE-1H.
NUCLEAR SAFETY RELATED
QA CAT. I & II
APPROVED
850 MWe
W.O. 48923
125VDC & 24VDC ONELINE
SHOREHAM NUCLEAR POWER STATION
UNIT 1
LONG ISLAND LIGHTING COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.
LILCO DRAWING NUMBER M-13191-4
S & W DWG. No. 11600.02 FE-1BC-4
INC. CCF-IR42/1
ORIGINAL ISSUE
DESCRIPTION
Designed by R. MATTEI
Drawn by K. REZENDES
Chk'd by R. MATTEI
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Shoreham Outstanding SER Issue #3

Piping Vibration Test Program-Small Bore Piping/Instrumentation Lines

Position:

The vibration monitoring program will include all essential safety-related small bore piping and instrumentation lines. Visual inspections will be made of the accessible portions of those lines during pre-operational or start-up testing to identify any excessive vibration that could result in fatigue failure.

The piping and instrumentation lines to be included in the vibration monitoring program will be identified at least 3 months prior to the performance of the test. The essential instrumentation lines to be inspected will include at least the Reactor Pressure Vessel level indicator instrument lines, the Reactor Core Isolation Cooling instrument lines outside the containment, the High Pressure Coolant Injection instrumentation lines on the HPCI steam line outside the containment,and the Control Rod Drive lines inside containment.

The Main Steam Instrument lines monitoring main steam flow will be inaccessible during the startup testing. Accordingly, these lines will be manually excited and visually inspected prior to startup testing.

Shoreham Outstanding SER Issue #5
LOCA Loadings on Reactor Vessel Supports and Internals

Request 112.21:

Recent refinements in analysis of fluid pressure differential loads on PWR reactor internal structures following ruptures of reactor coolant pipes at certain locations have indicated that large horizontal dynamic loads may occur on internal structures and be transmitted to reactor vessel supports. Additional information is requested for Shoreham Unit 1 to aid in our assessment of this effect, if any, on BWR plants. Provide the following information:

(1) The resulting dynamic horizontal loads on reactor vessel supports following postulated ruptures of a steam line, a feedwater line, and a recirculation line in the vicinity of a reactor vessel nozzle safe-end. Also provide the distribution of loads in the reactor vessel lateral support.

(2) Demonstrate that the analytical methods, models and load considerations have adequately considered the dynamic forces that result from:

   (a) Reaction forces which consist of blowdown jet forces and the release of strain energy resulting from the postulated rupture mechanism and the expulsion of fluid.

   (b) Transient differential (asymmetric) pressures in the annular region between the outside of the vessel and the inside of the shield wall (the vessel cavity).

   (c) Transient differential (asymmetric) pressure across the core barrel within the reactor vessel.

(3) A summary of the method and results of reactor internal structures dynamic analysis under simultaneous occurrence of steam line break (SLB) and safe shutdown earthquake (SSE). The method summary should include the reactor internals forcing functions and the method used to develop them. If only vertical excitation due to SLB is considered, provide results of analyses to demonstrate that horizontal excitation is small.

(4) An evaluation to show that the effects of LOCA plus SSE loads will not impair the safety functions of either reactor internal structures or control rods.

(5) Provide drawings of the reactor support system sufficient to show the geometry, dimensions of all principal elements and the type of material they are fabricated from.

Response to Request 112.21

Shoreham considered the effects of mainsteam line, recirc and feedwater line breaks at the reactor nozzle safe-ends. The governing break was used for the design loading on each component within the GE scope. The attached figure is a general illustration of the loads considered in each type of break. The pressure loads (Load Type 1) were addressed in request 041.1 and plots of the resultant pressures may be found as part of FSAR Section 6.2.1.3.5. From these pressures, net overturning forces are distributed along the inner surfaces of the biological shield wall and the outer surfaces of the RPV. A unique set of forces are considered for both feedwater and recirc line-breaks. Since the steamline nozzle is above the shieldwall-vessel annulus, the pressure loads are considered negligible for a steamline break.

Pipe whip restraint loads (Load Type 2) are calculated as time-dependent concentrated loads at the elevation of the pipe whip restraint. The jet thrust from the nozzle (Load Type 3) is a force modelled as a concentrated force on the RPV at the elevation of the affected nozzle. To this force is added a force due to the impingement of the thrust from the broken line (Load Type 4). Both forces are zero at time zero and rise to a constant force within 1 millisecond.

1. The results of the loads evaluation where annulus pressurization was a governing load for the RPV support skirt is shown here:

VESSEL SUPPORT SKIRT

LOAD CASE	ACCEPTANCE CRITERIA	V(kips)	H(kips)	M(in-kips x 1000)
NL + (A-ΔP) + JR + AP+SSE	Faulted	3692.4	2753.5	279.3
NL + (I-ΔP) + JR + AP	Faulted	3383.0	2738.0	278.1

The distribution of loads is discussed in the previously submitted response to NRC questions 041.1 and 221.30.

2. Analytical methods, models and load considerations are discussed in the response to NRC questions 041.1 and 221.30.

3.,4. The results of the loads evaluation study where annulus pressurization was a governing load for the reactor internal structures are shown in the following table:

SHROUD SUPPORT

LOAD CASE	ACCEPTANCE CRITERIA	P(psi)	V(kips)	H(kips)	M (in-kips x 1000)
NL + (I-ΔP) + JR = AP	Faulted	48.4	805.5	384.4	25.9

SHROUD (BUCKLING MODE)

(KSI)

LIMITING LOAD COMBINATION	CRITERIA	CALCULATED	ALLOWABLE
NL + (A-ΔP) + JR + AP + SSE	Faulted	4.59	17.7

SHROUD HEAD BOLTS

(P_{M+B}, KSI)

LIMITING LOAD COMBINATION	CRITERIA	CALCULATED	ALLOWABLE (Tested)
NL + (A-ΔP) + JR + AP + SSE	Faulted	99.90	115.0

SHROUD HEAD LUGS
(P_{M+B}, KSI)

LIMITING LOAD COMBINATION	CRITERIA	CALCULATED	ALLOWABLE (Tested)
NL + (A-ΔP) + JR + AP + SSE	Faulted	69.07	80.0

TOP GUIDE BEAM END PINS
(SHEAR, KSI)

LIMITING LOAD COMBINATION	CRITERIA	CALCULATED	ALLOWABLE
NL + (A-ΔP) + JR + AP + SSE	Faulted	12.80	20.3

JET PUMP
(PSI)

LIMITING LOAD COMBINATION	CRITERIA	CALCULATED	ALLOWABLE
NL + (A-ΔP) + JR + AP + SSE	Faulted	27,813	50,800

CORE ΔP LINE
(PSI)

LIMITING LOAD COMBINATION	CRITERIA	CALCULATED	ALLOWABLE
NL + (A-ΔP) + JR + AP + SSE	Faulted	18,670	49,200

HEAD SPRAY NOZZLE
(PSI)

LIMITING LOAD COMBINATION	CRITERIA	CALCULATED	ALLOWABLE
NL + (A-ΔP) + JR + AP + SSE	Faulted	1,790	49,950

NL = Normal Load
A-Δ P= Accident LOCA Δ Pressure Force
I-Δ P= Interlock Δ Pressure Force
JR = Jet Reaction
AP = Annulus Pressurization Loads
SSE= Safe Shutdown Earthquake

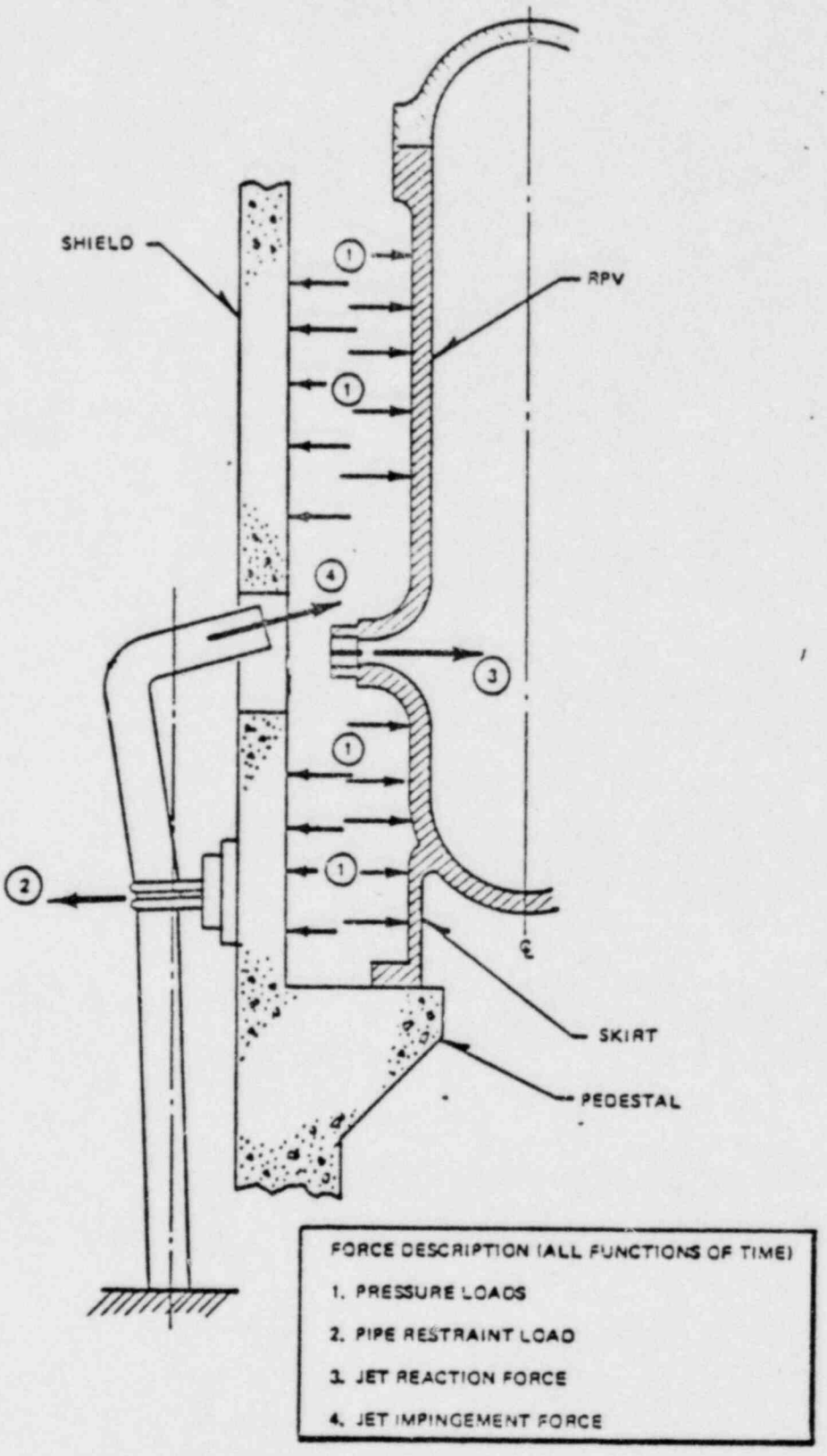


Figure [redacted]. Loading Description

SER OPEN ITEM #13

NUREG-0619
"FEEDWATER NOZZLE AND
CONTROL ROD RETURN LINE CRACKING"

RESPONSE:

Control Rod Drive REturn Line Nozzle Cracking

Postmodification CRD-System Performance Test

The CRD System will be tested to prove satisfactory system operation; return flow capability will be demonstrated to be equal to or in excess of the flow required to satisfy the base-case conditions and two-CRD-pump operation, if concurrent operation of two CRD pumps are required to achieve this flow.

CRD Hydraulic System Maintenance Procedures

For Shoreham, all lines are constructed of stainless steel and do not require procedural modifications for flushing the exhaust-water header and cleaning the filters in the insert and exhaust lines.

Triple Sleeve Sparger Design

The welded thermal sleeve feedwater sparger has been replaced with an improved interference fit sparger,also called the triple sleeve sparger, for the Shoreham Nuclear Power Station.

Clad Removal

Feedwater nozzle cladding will not be used for the Shoreham Nuclear Power Station.

System Modifications

(a) Low Flow Feedwater Controller - the Shoreham Nuclear Power Station low flow feedwater control system consists of two low flow control valves in parallel with split range control. The split range control enables control to below 0.1% of rated flow. The basic purpose of utilizing a dual element control scheme is to limit feedwater temperature fluctuations to within 50°F peak-to-peak on a continuous basis. Feedwater temperature variations will be monitored during start-up to evaluate the need for additional controls. If necessary, administrative controls and/or procedures will be developed to guide the operators during low flow operation to further minimize thermal cycling.

(b) Reactor Water Cleanup System (RWCU) - RWCU discharge currently has the capability to deliver flow to all feedwater nozzles at Shoreham.

Operating Procedure Modifications

The following procedural modifications will be evaluated for Shoreham Plant operation:

(a) RWCU flow will be directed to all feedwater nozzles at maximum flow rate and exit temperature during all low flow conditions prior to turbine loading.

(b) Low load, reduced pressure synchronization of the turbine will be evaluated during start-up.

(c) Maximum feedwater heating will be initiated as soon as possible by isolating all feedwater heaters except the highest stage of feedwater heating.

(d) During start-ups and shutdowns, the feedwater control system will be operated to maintain low flow control sufficient to eliminate on-off feedwater operation and with sufficient controllability to preclude greater than 25°F peak-to-peak mixture temperature variations during steady demand.

(e) In general, plant operating procedures will be modified to minimize subcooling, particularly at high feedwater flow rates.

Pre-Service Inspection

(a) Performance of PT has been accomplished for each nozzle prior to the installation of the sparger.

(b) Performance of a baseline UT will be accomplished for each nozzle after the installation of the sparger. Test results will be retained with the plant's permanent records.

In-Service Inspection

(a) At every second scheduled refueling outage, an external UT will be performed of all feedwater nozzle safe ends, bores and inside blend radii. If nozzle cracks are indicated, the sparger will be removed and a PT of the nozzle bore and blend radii will be performed; and repairs will be made as required.

(b) At every fourth scheduled refueling outage, a visual inspection of all spargers will be conducted.

(c) At every ninth scheduled refueling outage (or after 135 startup/shutdown cycles) a PT examination will be performed. The PT will include removal of a sparger from one nozzle followed by flapper wheel grinding and PT examination of both the nozzle of the removed sparger and the accessible portions of the other nozzles.

If any cracks are detected, all spargers will be removed and a complete examination of all nozzles will be conducted. All nozzle cracks will be evaluated and repaired as required.

(d) An on-line monitoring system for detecting leakage through degraded seals and/or cracks in thermal sleeve welds will be evaluated and considered for Shoreham feedwater nozzle application after fuel load, in lieu of continued in-service inspection.

Shoreham Outstanding SER Issue #14
Jet Pump Hold-Down Beams

Shoreham will conduct periodic inspections of the Jet Pump Hold-down Beams as part of the overall in-service inspection program.

Non-destructive tests of the Jet Pump Hold-down Beams will be performed following detensioning of the installed beams (presently preloaded at 30,000 pounds force), and prior to retensioning the beams (to be preloaded at 25,000 pounds force).

The in-service inspections to be performed will consist of:

1. Visual inspections via T.V. cameras to authenticate Jet Pump structural integrity, and -

2. Ultrasonic inspection of the Jet Pump Hold-down Beams

Inspection frequencies are being developed by General Electric for these beams. Shoreham will conduct in-service inspections in accordance with the G.E. recommendations for the beams installed.

Shoreham Outstanding SER Issue #18

NUREG 0313

"Technical Report on Material Selection" and Processing Guidelines for BWR Coolant Pressure Boundary Piping

Both NRC (Pipe Cracking Study Group) and industrial study groups such as GE and EPRI "Owner's Groups" have been investigating the phenomena of BWR stress corrosion cracking for a number of years. One common conclusion that has been drawn from these studies is that the stress corrosion cracking issue is not a safety issue. The conclusion that austenitic stainless steel will "leak before breaking" is substantiated and supported by all the above groups. In addition, no incident to date has led to a major release of radioactivity to the environment, and the relatively small cracks have been identified either by leak detection or ISI. Therefore, we believe the stress corrosion cracking issue is one of reliability, not safety, and should be addressed accordingly. Although the Shoreham plant's initial design did contain many of the "service sensitive" lines outlined in NUREG 0313, Shoreham has been cognizant of these industry problems and has taken steps to mitigate future concerns about stress corrosion cracking.

Accordingly, we believe that the problem of stress corrosion cracking has, to a large degree, been eliminated for Shoreham. In particular: (a) the recirculation bypass line has been eliminated, (b) the core spray line and safe end materials have been changed and, (c) the CRD return line has been eliminated. Therefore, the only primary pressure boundary piping which has remained 304 stainless steel is the reactor recirculation system. A modification of the piping material for this system to an alternative material was not practical in the time table for Shoreham.

In an effort to further reduce the potential for stress corrosion cracking in the recirculation system, sections of the shop fabricated piping were solution heat treated prior to field erection. These piping sections were received from GE in a non-heat treated condition. The heat treating should eliminate all concerns about stress corrosion cracking for the shop welds that were heat treated. For the field welds, LILCO did institute a number of measures whereby the welding techniques used were modified such that sensitization was minimized and the welding residual stresses introduced during the welding process were reduced to the best extent practical. These measures included: (1) welding process control (i.e., preheat temperature and interpass temperature control), (2) grinding restrictions, and (3) weld filler material ferrite control as required by Regulatory Guide 1.33.

NUREG-0313, Revision 1

To address NUREG-0313 specifically for Shoreham, the ASME Code Class 1 and Class 2 reactor cooling pressure boundary piping meets the guidelines stated in Part 2 except for portions of the reactor recirculation system (B31) as described above, and, stainless steel to carbon steel transition welds between the Recirculation System and the Reactor Water Cleanup, Core Spray and Residual Heat Removal System. As stated previously, only field welds and shop welds classified as "nonconforming" would fall under the requirements for Part 3 of NUREG-0313.

Part 3:

A. 1.0 ISI

The recirculation system welds and transition welds classified as "nonconforming" will be inspected in accordance with Part III B1.0 of NUREG-0313 to the extent practicable for Shoreham Nuclear Power Station. Attempts will be made to inspect all welds with the appropriate ISI UT techniques, but physical interference in some locations may preclude the inspection. Although NUREG-0313 Revision 1 implies that recirculation riser lines and recirculation inlet lines at safe end curves should be considered "Service Sensitive", we would argue that this has not been documented for BWR 4 designs such as Shoreham. First, most of the riser sections for Shoreham have been solution heat treated and, therefore, IGSCC is not a concern. For the recirculation system heater to riser welds these welds will be inspected as Nonconforming Lines, but non-Service Sensitive. For recirculation nozzles/thermal sleeve designs similar to Shoreham (i.e., Fitzpatrick), no evidence of cracking has been discovered. Therefore, until further IGSCC incidents are documented in these areas we believe it is appropriate to classify these areas as Nonconforming, but Non-Service Sensitive.

2.0 Leak Detection

The Shoreham primary containment leakage detection system is in full compliance with Regulatory Guide 1.45. The technical specification limits for reactor coolant leakage will be includes as part of the Technical Specification submittal for Shoreham. We believe a change in limiting conditions for leakage is not warranted since this issue is not a safety concern and thus the present limiting conditions are acceptable.

Response to SER Open Item No. 22

NSSS Scope

The applicant's response to the NSSS scope of this outstanding issue is currently under development and will be submitted to the NRC with our May 27, 1981 submittal.

BOP Scope Only

Subsection 50.55a of 10CFR Part 50 states that piping which is part of the reactor coolant pressure boundary meets the requirements applicable to Class 1 piping of editions of Section III of the ASME Boiler and Pressure Vessel Code and Addenda in effect on the date of the order of the piping. For Shoreham, this would be the 1971 Edition through Winter 1972 Addenda of ASME III. Application of this section Code is appropriate since no reactor coolant pressure boundry piping was ordered more than 6 months prior to the date of issuance of the construction permit (4-14-73). Impact testing was performed on these materials in accordance with the requirements of NB-2300 of ASME Section III.

Subsection 50.55a of 10CFR Part 50 states that valves which are part of the reactor coolant pressure boundary may meet the requirements applicable to Class 1 valves of Section III of the ASME Boiler and Pressure Vessel Code and Addenda in effect on the date of the order of the valves. Application of the aforementioned Code is appropriate since no reactor coolant pressure boundary valves were ordered more than 12 months prior to the date of issuance of the construction permit.

Paragraph I.A.3 specifies that materials for valves shall meet the requirements of G3100 of the ASME Code. Since all Class I piping systems, including valves which are part of the reactor coolant pressure boundary, are subject to a seismic analysis, this requirement has been complied with.

Bolting material used for installation within the reactor coolant pressure boundary has been procured to meet the impact testing requirements of NB-2300 of the 1971 ASME Section III Code through Winter 1972 Addenda.

Verification of Code compliance with the aforementioned requirements was achieved by documentation reviews performed (1) during normal receipt inspection as required by Shoreham's quality assurance program, and (2) prior to final code approval of ASME data reports.

Shoreham Outstanding SER Issue #36
Containment Purge System

1. The two 6-inch containment vent isolation valves are only occasionally open during power operation, a time estimated at less than 60 hrs/year. The valves are signaled to close automatically upon accident signals and are "fail safe" in that spring force closes the valves upon signal receipt or upon loss of instrument air. The valves are not considered as active valves as defined in Regulatory Guide 1.48 and are therefore not required to meet requirements of MEB-2. The valves do meet the applicable seismic criteria and are fully functionally tested in the vendor's shop and in the final field location.

2. Although the drywell vent isolation valves are infrequently operated as stated in item (1), a debris screen will be provided to ensure that isolation valve closure will not be prevented by debris which could potentially become entrained in the escaping air and steam.

3. The drywell and suppression pool vent isolation valves will be tested in accordance with technical specification requirements to ensure automatic closure when required. The provisions available for leakage rate testing of these vent valves consist of a 3/4 inch test connection located between the isolation valves. This connection provides testability of both valves for each penetration simultaneously during plant operation.

SHOREHAM OUTSTANDING ISSUE #38

Fracture Prevention of Containment Pressure Boundary

NSSS Scope

The applicant's response to the NSSS scope of this outstanding issue is currently under development and will be submitted to the NRC with our May 27, 1981 submittal.

BOP Scope

To ensure compliance with GDC 51, ferritic materials used in the reactor containment pressure boundary were procured to the requirements of ASME Section III. Where required by this code, impact testing at $0^{\circ}F$ or lower was performed on these materials, and has been verified by material documentation review.

Shoreham Outstanding SER Issue #44
Level Measurement Errors

LEVEL MEASUREMENT ERRORS
(due to environmental temperature effects on level instrument reference legs)

Reactor vessel water level is measured by means of a produced differential pressure between a reference leg and a variable leg. The reference leg is connected to the upper part of the vessel (steam zone) and provides the constant head using an overflow type condensing chamber. The variable leg is connected to the lower part of the vessel. The produced differential pressure is therefore a function of water level.

General Electric has conducted a review of the effects of high drywell temperature on reactor vessel water level instrumentation. Although instrument accuracy is affected by varying drywell temperature and boil-off in the reference leg, there would be no impact on the scram or other level trip functions, nor would post-accident operator action be impaired.

The worst case scenario evaluated was as follows:

- Small break LOCA occurs in drywell
- Scram and auto ECCS (ADS and LPCI/CS) are actuated
- Some time after LPCI/Core Spray have reestablished normal RPV water level, operator diverts or shuts off LPCI/Core Spray from RPV
- 10-12 hours after the initiating event, RPV water level error is at its maximum
- Upon receipt of low level alarm (Level 2), operator must re-initiate LPCI/Core Spray injection.

Were this unlikely series of events to occur it would be necessary for the operator to restart or redirect low pressure ECCS to the RPV in order to avoid core uncovery. Shoreham specific analysis verified that the operator would have from 10 to 15 minutes to redirect low pressure ECCS for the worst case scenario presented above, even with a nonconservative water level indication associated with long term boiloff. Operating procedures and training will specifically address the need to be aware of this phenomenon in this small break long term LOCA.

SHOREHAM OUTSTANDING ISSUE #46

OIE BULLETIN 79-27

Request 223.90:

Provide a response to IE Bulletin 79-27, dated November 11, 1979, for Shoreham.

Response:

On Shoreham, a protection sequence for shutdown was developed showing the different paths that could be used to achieve cold shutdown. (Figure 223.90-1) Based on the sequence, it was determined that only Class 1E systems are necessary to achieve cold shutdown. Tables 223.90-1 and 2 list the Class 1E systems and components with power sources that could be used to achieve cold shutdown. Also, attached are Shoreham's Class 1E one-line diagrams.

Following are responses to the various sections of IE Bulletin 79-27:

1.a. On Shoreham, only the Class 1E buses are required to achieve a cold shutdown condition. These are the 4,160 V, bus, 101, 102, and 103, 480 V bus, 111, 112, and 113, and 125 V dc bus A, B, and C.

Indication and alarms provided in the control room for the above buses are identified on Tables 223.90-3 and 4. In addition to the above, all Class 1E pumps, motor operated valves, and electrical logics have control power voltage monitors which, upon loss of power, will sound their respective system inoperative or degraded alarms as required by Regulatory Guide 1.47. In addition, they alarm in the plant process computer at the component level.

1.b. The instrument and control system loads for those systems required to achieve cold shutdown have been reviewed. The loss of any one of the buses serving these systems and the resulting loss of control and instrumentation will not affect the ability to achieve cold shutdown since redundant and diverse equipment and systems are supplied from independent buses. Table 223.90-5 lists all meter indication for the required systems and their power source classification. In the four cases on Table 223.90-5 where instrumentation required for safe shutdown is not powered from Class 1E buses they are backed up by Class 1E recorders supplied from 1E power.

1.c. There are no design modifications required based on the reviews for Items 1.a. and 1.b. above.

Request 223.90:

Response:

2. The alarm response procedures (ARP) used by the control room operators upon loss of power to Class 1E buses supplying power to safety related instrumentation and control systems, will be reviewed. This review will assure that the ARP's identify the indications and symptoms resulting from the power failures in item 1 above and state the appropriate operator action.

3. There are no Class 1E UPS Systems at Shoreham, but there are three non-Class 1E UPS Systems; one feeding the vital bus, a second feeding the computer, and the third feeding the security system. As stated in 1.a above, the UPS systems are not required to shut the plant down. In any case, each inverter is normally fed from a rectified 480 V ac source with 125 V dc backup from the station batteries. There is also an alternate 480 V ac source which can be manually switched or switched automatically via a static transfer switch or loss of inverter output.

   a. There are no time delays involved in the switching of these supplies.

   b. In addition to system transformer taps, the inverter input is furnished with a potentiometer which will be used to adjust the threshold value of the input voltages to optimize the input range.

   c. The protection transfer circuitry will be adjusted for undervoltage and overcurrent to provide the maximum equipment availability while insuring power supply compatibility with load requirements and equipment ratings.

TABLE 223.90-1
PLANT SAFE SHUTDOWN
SELECTION OF SHUTDOWN SYSTEMS

Based on the shutdown model and use of safety-related systems only, the selection of shutdown systems is made as follows:

1. System B21 - Nuclear Boiler

   The eleven ADS and safety-relief valves are required to operate only manually. Automatic initiation is not necessary and will not normally occur since no LOCA, and therefore no high drywell pressure, is assumed which is required for automatic initiation. The three head vent valves MOV083, 084, and 085 are required to prevent blowdown of the reactor vessel into the primary containment due to opening of two series valves.

   The SRV's may be utilized for a combination hot/cold shutdown operation. With the vessel at high pressure, the valves can provide sufficient pressure relieving capacity to enable the low head systems (LPCI and Core Spray) to provide core inventory. With the vessel at low pressure, the valves can provide extended core cooling by holding the valves open, enabling the low head systems to provide a suppression pool/reactor vessel circulation path. Cooling would be provided directly or indirectly via the RHR heat exchanger.

2. System B31 - Reactor Recirculation System

   The two pressure switches, PS023A and B, for automatic RHR system operation are needed.

3. System C41 - Standby Liquid Control

   The safety-related portions of this system are required in the event control rod insertion is not completed. It is not desirable to have this system operate unless it is actually required.

4. System C61 - Reactor Plant Remote Shutdown

   The eight safety-related indicating transmitter circuits for RHR main flow (FT001), reactor vessel pressure (PT006), service water header pressure (PT011), suppression pool temperature (TT022A and B), and level (LT026), and drywell pressure (PT012) and temperature (TT021) are required.

5. System E11 - Residual Heat Removal

All safety-related components, except the following eight valves, are required. The two head spray isolation valves MOV053 and 054 are not required for shutdown since cable failure resulting in both valves opening presents no problem since there is a check valve in series with these MOV's to prevent reactor blowdown. The four heat exchanger vent valves MOV055A and B and 056A and B are not required for shutdown even during the steam condensing mode since cable failure resulting in opening of these valves will drain a one inch line from the heat exchanger opening to the suppression pool, an acceptable event. The two hydrogen recombiner subsystem valves MOV057A and B are not required for a non-LOCA condition and failure of valve cabling will cause valves to open, an event which will not result in significant degrading of the RHR cooling system.

6. System E21 - Core Spray

All safety-related components are required, except the two testable check valve bypass valves MOV081A and B, which are not required during shutdown. If these valves were to change state, there would be no adverse effect on system operation. Automatic initiation which is based on reactor water level is also required. Initiation signals based on reactor primary containment pressure are not required since there should be no high pressure condition without LOCA. Also, failure of the high drywell pressure initiation signal will neither prevent injection nor cause the injection valves to open prematurely because a reactor pressure permissive in the control circuit of the injection valves will prevent valve opening on high reactor pressures. This permissive is considered a required component.

7. System E41 - High Pressure Coolant Injection

All safety-related components are required, except the five items identified below. One is the loop level pump P-050 which, if lost, will not adversely affect the system since the time prior to initiation and between operating cycles is short enough to prevent significant draindown of the pump discharge piping. Another item is the inboard isolation valve bypass valve MOV047 which is not required for shutdown and will not affect system operation in either the open or closed position. Also, the turbine exhaust vacuum breaker MOV049 is not required and is used only after a LOCA. Lastly, the condenser exhaust vacuum breaker PCV144 and steamline trap bypass valve LCV091 are not required for shutdown

and will, in fact, fail in the closed position on loss of air due to loss of offsite power. Assuming availability of air, failure of the control circuit resulting in valve opening is not detrimental to system operation. Automatic initiation based on reactor water level is required. Initiation due to high drywell pressure is not required since there should be no such condition without LOCA. Also, failure of drywell pressure initiation signal will not prevent injection, and if premature injection occurs, it will not adversely affect reactor operation. Instrumentation to identify HPCI steamline break which can cause steamline isolation is required.

8. System E51 - Reactor Core Isolation Cooling

All safety-related components are required, except those five corresponding to the E41 System (P-051, MOV047, MOV049, PCV144 and LCV091) and for the same reasons. Automatic initiation is also required.

9. System G33 - Reactor Water Cleanup

The containment isolation valves MOV033 and 034 are required to be closed to isolate the reactor from the remainder of the RWCU System. This isolation is necessary if standby liquid control system initiation is required.

10. System G41 - Fuel Pool Cooling and Cleanup

The two service water inlet valves, MOV032A and B, used for ultimate cooling water connection and the corresponding valves in the service water system, are required to be closed to prevent pumping service water to the spent fuel storage pool, an event which in time could cause flooding in the reactor building.

11. System M43 - Fire Protection

Only the safety-related portion of this system is required to prevent inadvertent shutdown of the ventilation system or nonclosure of CO_2 dampers so that the CO_2 is confined to a fire area.

12. System M50 - RBSVS and Control Room A-C Chilled Water

All safety-related components are required.

13. System P41 - Service Water

All safety-related components are required except the two radiation monitoring system isolation valves MOV102A and B which are not needed during a non-LOCA condition. In addition, a failure causing the valves to open will not result in unacceptable conditions. Automatic initiation is also required.

14. System P42 - Reactor Building Closed Loop Cooling Water System

The three P-005A, B, and C RBLCLW circulating pumps and the two heat exchanger inlet isolation valves MOV042A and B are required to supply cooling to RHR pump seals. Valves separating Category I from Category II piping and Division I from Division II piping are not required. Operation of selected components will be manual and no automatic initiation is required.

15. System P50 - Compressed Air

The MOV's and pressure switches used to supply and/or isolate the air to the SRV accumulators are required. All other components are Category II.

16. Systems R22, 23, 24, 35, 42, 43 - Electrical Distribution

All Class 1E electrical distribution and interconnecting cable is required.

17. System T46 - Standby Ventilation System

Only the fourteen unit coolers in the reactor building are required to maintain the ambient temperature around the components needed for shutdown. Manual operation only is required; automatic initiation is not needed. Ventilation equipment required for maintaining negative pressure in the reactor building secondary containment is not needed. The filtering equipment is not required since there is no LOCA/release of radiation.

18. System X41 - Miscellaneous Room HVAC

All safety-related ventilation components are required in these miscellaneous areas.

19. System X60 - Diesel/Generator Ventilation

All safety-related ventilation components in the D/G rooms are required.

20. System X61 - Control Room A-C

All safety-related components are required, except the two air-operated valves AOV37A and B which isolate the redundant portions of ducts that will remain intact, assuming no seismic condition. These dampers will fail closed on loss of offsite power.

TABLE 223.90-2

SHUTDOWN EQUIPMENT LIST

Shoreham Plant Shutdown
Safe Shutdown Component List
(EQUIP VS CKT VS ESK)

IDENTITY	DESCRIPTION	ESK	CKT NO	PNR SC	PNR SC LOC	EQUIP LOC(1) EL-AZ
	AUTOMATIC DEPRESSURIZATION SYSTEM					
1B21*SV092AX/Y	ADS VLV 1B21*RV-92A SOVA/B	1.61-236/7		1R42*PNLA2/B2	EL 40' RELAY RM	102-218
1B21*SV092BX/Y	ADS VLV 1B21*RV-92B SOVA/B	1.61-236/7		1R42*PNLA2/B2	EL 40' RELAY RM	102-234
1B21*SV092CX	ADS VLV 1B21*RV-92C SOVA	1.61-238		1R42*PNLA2	EL 40' RELAY RM	102-234
1B21*SV092DX	ADS VLV 1B21*RV-92D SOVA	1.61-238		1R42*PNLA2	EL 40' RELAY RM	102-244
1B21*SV092EX/Y	ADS VLV 1B21*RV-92E SOVA/B	1.61-236/7		1R42*PNLA2/B2	EL 40' RELAY RM	102-253
1B21*SV092FX	ADS VLV 1B21*RV-92F SOVA	1.61-238		1R42*PNLA2	EL 40' RELAY RM	102-124
1B21*SV092GX	ADS VLV 1B21*RV-92G SOVA	1.61-238		1R42*PNLA2	EL 40' RELAY RM	102-115
1B21*SV092HX/Y	ADS VLV 1B21*RV-92H SOVA/B	1.61-236/7		1R42*PNLA2/B2	EL 40' RELAY RM	102-142
1B21*SV092JX/Y	ADS VLV 1B21*RV-92J SOVA/B	1.61-236/7		1R42*PNLA2/B2	EL 40' RELAY RM	102-126
1B21*SV092KX/Y	ADS VLV 1B21*RV-92K SOVA/B	1.61-236/7		1R42*PNLA2/B2	EL 40' RELAY RM	102-90
1B21*SV092LX/Y	ADS VLV 1B21*RV-92L SOVA/B	1.61-236/7		1R42*PNLA2/B2	EL 40' RELAY RM	102-270
	CORE SPRAY SYSTEM					
	DIVISION 1					
1E21*P013A	CORE SPRAY PUMP	5E21A01	1E21A01	1R22*SWG101	EMER SWGR RM EL 25'	8-103
1E21*P049A	KEEP FILLED PUMP	6E2101	1E21A02	1R24*MCC117	R.B. EL 40'	8-101
1E21*MOV031A	PUMP SUCTION VV	6E2102	1E21A02	1R24*MCC117	R.B. EL 40'	24-148
1E21*MOV033A	DISCHARGE VV	6E2103	1E21A04	1R24*MCC113	R.B. EL 112'	104-115
1E21*MOV035A	RECIRC VV	6E2105	1E21A06	1R24*MCC111	R.B. EL 40'	53-108
1E21*MOV034A	MIN FLOW VV	6E2106	1E21A07	1R24*MCC117	R.B. EL 40'	14-98
1B21*PS023A	PRES INTLK B21-N021A(H21*P004)	1.61-76				78-79
1B21*PS023C	PRES INTLK B21-N021C(H21*P009)	1.61-76				78-102
1E21*PDS033A	CS D/P INTLK (H21*P001)	6E2103	1E21A04	1R24*MCC11[illegible]	R.B. EL 112"	8-110
1E21*FIS002A	MIN FLOW (H21*P001)					8-110
	DIVISION 2					
1E21*P013B	CORE SPRAY PUMP	5E2102	1E21B01	1R22*SWG-102	EMER SWGR RM EL 25'	8-257
1E21*P049B	KEEP FILLED PUMP	6E2101	1E21B02	1R24*MCC1127	R.B. EL 40'	8-259
1E21*MOV031B	PUMP SUCTION VV	6E2102	1E21B02	1R24*MCC1127	R.B. EL 40'	24-112
1E21*MOV033B	DISCHARGE VV	6E2103A	1E21B04	1R24*MCC1123	R.B. EL 112'	104-245
1E21*MOV035B	RECIRC VV	6E2105	1E21B06	1R24*MCC1121	R.B. EL 40'	53-253
1E21*MOV034B	MIN FLOW VV	6E2106	1E21B07	1R24*MCC1127	R.B. EL 40'	14-262
1B21*PS023B	PRES INTLK B21-N021B(H21*P005)	1.61-77				78-257
1E21*PS023D	PRES INTLK B21-N021D(H21*P010)	1.61-77				78-280
1E21*PDS033B	CS D/P INTLK (H21*P019)	6E2103	1E21A04	1R24*MCC1123	R.B. EL 112	8-248
1E21*FIS002B	MIN FLOW (H21*P019)					8-248
1E41*P074	VACUUM PUMP	11E4101	1E41N01	1R42*MCC0B1	R.B. EL 40'	8-170
1E41*P075	VACUUM TANK COND PUMP	11E4101A	1E41N02	1R42*MCC0B1	R.B. EL 40'	8-166
1E41*P127	AUX LO PUMP	11E4102	1E41N03	1R42*MCC0B1	R.B. EL 40'	8-160
1E41*MOV031	HPCI PUMP SUCT FM CON ST TK VV	11E4109	1E41N09	1R42*MCC0B1	R.B. EL 40'	20-220
1E41*MOV032	HPCI PUMP SUCT FM SUP POOL VV	11E4110	1E41N10	1R42*MCC0B1	R.B. EL 40'	24-210
1E41*MOV034	HPCI STEAM SUP OUTERD ISO VV	11E4105	1E41B01	1R42*MCC0B2	R.B. EL 112'	64-161
1E41*MOV035	HPCI PUMP DISCHARGE VV	11E4106	1E41N06	1R42*MCC0B2	R.B. EL 112'	64-168
1E41*MOV036	MIN FLOW VV	11E4112	1E41N12	1R42*MCC0B1	R.B. EL 40'	18-197
1E41*MOV037	HPCI TEST BYPASS VV TO CST VV	11E4107	1E41N07	1R42*MCC0B1	R.B. EL 40'	18-195
1E41*MOV038	HPCI TEST BYPASS VV TO CST VV	11E4108	1E41N08	1R42*MCC0B1	R.B. EL 40'	18-205
1E41*MOV039	LUB OIL COOL VV	11E4114	1E41N13	1R42*MCC0B1	R.B. EL 40'	16-190
1E41*MOV041	STEAM SUPPLY INBRD ISOL VV	6E4102	1E41A01	1R42*MCC1118	R.B. EL 112'	66-188
1E41*MOV042	HPCI STEAM OUT BRD ISOL VV	11E4103	1E41B01	1R42*MCC0B2	R.B. EL 112'	66-192

1E41*MOV043	HPCI STEAM TO TUBINE SUPPLY VV	11E4104	1E41N04	1R42*MCC0B1	R.B. EL 40'	17-184
1E41*MOV044	HPCI TURBINE EXHAUST VV	11E4114	1E41M19	1R42*MCC0B1	R.B. EL 40'	20-187
1E41*MOV040	WARMUP ISOL VV	11E4117	1E41N22	1R42*MCC0B2	R.B. EL 112'	64-189
1E41*SOV081	STM LN DRN VV (015-190)	1.61-129				15-190
1E41*SOV082	STM LN DRN VV (015-190)	1.61-129				15-190
1E41*SOV083	COND DISCH VV (009-184)	1.61-129				9-184
1E41*SOV090	COND DISCH VV (009-184)	1.61-129				12-185
1E41*FS003	HPCI PP DISCH (H21*P014)	1.61-125				8-167
1B21*LIS027B	HL TRIP B21-N024B(H21*P004)	1.61-25				78-79
1B21*LIS027D	HL TRIP B21-N024D(H21*P005)	1.61-24				78-297
1E41*PS021C	LO PP SUCT E41-N017(H21*P014)	1.61-24				8-167
1E41*PS026A	HI TURD EX E41-N017A(H21*P014)	1.61-24				8-167
1E41*PS026B	HI TURB EX E41-N017B(H21*P014)	1.61-24				8-167
1E41*PS025B	HI TURD EX E41-N012B(H21*P014)	1.61-24				8-167
1E41*PS025D	HI TURD EX E41-N012D(H21*P014)	1.61-24				8-167
1E41*PS023B	STM PRES L E41-N001B(H21*P036)	1.61-24				8-160
1E41*PS023D	STM PRES L E41-N001D(H21*P036)	1.61-24				8-160
1E41*PDS022B	HI STM D/P E41-N005 (H21*D026)	1.61-25				8-160
1E41*TE054B	HI AREA T E41-N601B(034-185)	1.61-88				34-185
1E41*TE055B	HI AREA T E41-N602B(034-210)	1.61-88				66-210
1E41*TE054A	HI AREA T E41-N601A(034-100_	1.61-88				34-180
1E41*TE055A	HI AREA T E41-N602A(034-200)	1.61-88				34-200
1E41*PDS022A	HI STM D/P E41-N004 (H21*P016)	1.61-25				8-157
1B21B-K32A	B21B-K32A(H11*P614)	1.61-125				CB/63-C12
1B21B-K32B	B21B-K32B(H11*P614)	1.61-125				MG/21-N12
1B31B-K31A	B31B-K31A(B31-PNL53A)	1.61-207				MG/21-P12
1B31B-K31B	B31B-K31B(B31-PNL53B)	1.61-208				8-178
1E41*PS025A	HI TURB EX E41-N012A(H21*P034)	1.61-25				8-178
1E41*PS025C	HI TURB EX E41-N012C(H21*P034)	1.61-25				8-157
1E41*PS023A	STM PRES L E41-N001A(H21*P016)	1.61-25				8-157
1E41*PS023C	STM PRES L E41-N001C(H21*P016)	1.61-25				8-157
1E41*LS092A	SUPR POOL LVL	1.61-125				27-135
1E41*LS092B	SUPR POOL LVL	1.61-125				27-325
1E41*LS093A	COND STRG TK-30 LVL	1.61-125				YARD
1E41*LS093B	COND STRG TK-30 LVL	1.61-125				YARD
1E41*TE56A						66-205
1E41*TE56B						66-210
VV	TURB STOP & LVL SW	1.61-264				
1E41*MOV043-LS6		1.61-264				17-184
1E41*MOV032-LS2		1.61-264				24-210
VV	RV LL (H21-P005)	1.61-264				78-257
VV	RV LL (H21-P005)	1.61-264				78-257
CKT	RV HL & TRIP(H21*P004)	1.61-264				78-79
CKT	MAN ISOL (H11*P601)	1.61-264				CB/63-C12
CKT TRIP SOL		1.61-200				63-208

REACTOR CORE ISOLATION COOLING SYSTEM-RB

DIVISION 1

1E51*P076	COND VCUUM PUMP	11E5101	1E51N11	1R24*MCC10A2	R.B. EL 112'	8-227
1E51*P077	COND. CONDENSATE PUMP	11E5116	1E51N12	1R24*MCC10A2	R.B. EL 112'	8-230
1E51*MOV031	RC PUMP SUCT FROM CON TK VV	11E5108	1E51N01	1R24*MCC10A2	R.B. EL 112'	11-217
1E51*MOV032	RCIC PUMP SUCT SUP POOL VV	11E5106	1E51N02	1R24*MCC10A2	R.B. EL 112'	24-202
1E51*MOV034	RCIC PUMP DISCHARGE VV	11E5105	1E51N04	1R24*MCC10A1	R.B. EL 40'	16-200
1E51*MOV035	RCIC PUMP DISCHARGE VV	11E5104	1E51N05	1R24*MCC10A2	R.B. EL 112'	78-193
1E51*MOV036	MIN FLOW VV	11E5109	1E51N06	1R24*MCC10A2	R.B. EL 112'	20-234
1E51*MOV037	TEST BYPASS VV	11E5107	1E51N07	1R24*MCC10A1	R.B. EL 40'	20-201
1E51*MOV038	LUBE OIL COLL. VV	11E5110	1E51N08	1R24*MCC10A2	R.B. EL 112'	15-220
1E51*MOV041	RCIC STEAM SUP INBRD ISO VV	6E5102	1E51A01	1R24*MCC112B	R.B. EL 112'	87-180
1E51*MOV042	RCIC STEAM SUP TO TUR OI VV	11E5102	1E51B01	1R24*MCC10A2	R.B. EL 112'	88-180

TABLE 223.90-2

SHUTDOWN EQUIPMENT LIST

1E51*MOV043	RCIC STEAM SUP TO TUR SUP VV	11E5103	1E51N09	1R24*MCC10A2	R.B. EL 112'	11-224
1E51*MOV044	RCIC TUR TRIP AND THROTTLE VV	11E5111	1E51N10	1R24*MCC10A2	R.B. EL 112'	11-222
1E51*MOV045	RCIC TUR EXH TO SUP POOL VV	11E5113	1E51N14	1R24*MCC10A1	R.B. EL 40'	31-217
1E51*MOV046	VAC PP DISCHVV	11E5114	1E51N15	1R24*MCC10A1	R.B. EL 40'	29-226
1E51*MOV048	BYPASS VV	11E5112	1E51B02	1R24*MCC10A2	R.B. EL 112'	86-180
1E51*AOV081	DRAIN POT DRAIN	1.61-211				09-245
1E51*AOV083	COND E-36 DRAIN	1.61-211				09-245
1E51*LCV095	COND E-38 DRAIN	1.61-211				09-245
1E51*PS023A	REAC PRS L E51-N019A(H21*P035)	1.61-207				40-100
1E51*PS023B	REAC PRS L E51-N019B(H21*P038)	1.61-208				40-170
1E51*PS023C	REAC PRS L E51-N019C(H21*P035)	1.61-207				40-100
1E51*PS023D	REAC PRS L E51-N019D(H21*P038)	1.61-208				40-170
1E51*PS025A	HI TURB EX E51-N012A(H21*P017)	1.61-207				8-205
1E51*PS025B	HI TURB EX E51-N012B(H21*P037)	1.61-208				8-175
1E51*PS025C	HI TURB EX E51-N012C(H21*P017)	1.61-207				8-205
1E51*PS025D	HI TURB EX E51-N012D(H21*P037)	1.61-208				8-175
1E51*PDS022A	HI STM D/P E51-N017 (H21*P035)	1.61-207				40-100
1E51*PDS022B	HI STM D/P E51-N018 (H21*P038)	1.61-208				40-170
1E51*TE053A	HI AREA T E51-N601A	1.61-89				13-200
1E51*TE053B	HI AREA T E51-N601B	1.61-89				77-180
1E51*TE054A	HI AREA T E51-N602A	1.61-89				87-175
1E51*TE054B	HI AREA T E51-N602B	1.61-89				71-185
1B21*LIS027A	HI WTR LBL B21-N024A(H21*P004)	1.61-207				78-79
1B21*LIS027C	HI WTR LVL B21-N024C(H21*P005)	1.61-208				78-257
1E51*PS021L	LO PP SUCT E51-N006 (H21*P017)	1.61-207				8-205
1E51*PS026A	HI TURB EX E51-N009A(H21*P017)	1.61-207				8-205
1E51*PS026B	HI TURB EX E51-N009B(H21*P017)	1.61-207				8-205
1E51*MOV043	INTLKS	1.61-207				11-224
1E51*FS003	MIN FLOW,1E51*MOV36 (H21*P017)	1.61-208				8-205
1E51*MOV032	INTLKS	1.61-208				24-202
1E51*TE55A	HI AREA TEMP E51-N025A	1.61-240				17-190
1E51*TE55B	HI AREA TEMP E51-N025B	1.61-240				22-200
1E51*TE55C	HI AREA TEMP E51-N025C	1.61-240				31-200
1E51*TE55D	HI AREA TEMP E51-N025D	1.61-240				31-202
1E51*TE56A	HI AREA TEMP E51-N026A	1.61-240				63-180
1E51*TE56B	HI AREA TEMP E51-N026B	1.61-240				63-200
1E51*TE56C	HI AREA TEMP E51-N026C	1.61-240				63-180
1E51*TE56D	HI AREA TEMP E51-N026D	1.61-240				63-200
LS	RCIC TRIP CKT,H1/H2(C61*P-RSP)	1.61-208				63-208
LS4	RCIC TRIP CKT,TURB STP VV(P-RSP)	1.61-208				63-208
1E51*LS001	H1/H2 (C61*P-RSP)	1.61-208				63-208
CKT	RCIC INITIATE (H11*P602)	1.61-207				CB/63-C13
CKT	RCIC TRIP	1.61-207				
CKT	RCIC TRIP	1.61-211				63-208
	RHR SHUTDOWN COOLING SYSTEM					
	DIVISION 1					
1E11*P014A	RHR PUMP	5E1101	1E11A01	1R22*SWG-101	EMER SWGR RM EL 25'	8-95
1E11*P014C	RHR PUMP	5E1103	1E11C01	1R22*SWG-103	EMER SWGR RM EL 25'	8-80
1E11*MOV032A	RHR SHUTDOWN COOL INJECTION VV	6E1103	1E11A04	1R24*MCC1112	R.B. EL 112'	15-083
1E11*MOV032C	RHR SHUTDOWN COOL INJECTION VV	6E1134	1E11C04	1R24*MCC1113	R.B. EL 112'	18-064
1E11*MOV033A	RHR HX SHELL SIDE INLET VV	6E1116	1E11A16	1R24*MCC1119	R.B. EL 40'	25-105
1E11*MOV034A	RHR HX SHELL SIDE BYPASS VV	6E1120	1E11A17	1R24*MCC1112	R.B. EL 112'	28-073
1E11*MOV035A	RHR HX SHELL SIDE OUTLET VV	6E1115	1E11A18	1R24*MCC1117	R.B. EL 40'	31-087
1E11*MOV036A	RHR OUTBOARD VV	6E1126	1E11A19	1R24*MCC111X	R.B. EL 112'	73-092
1E11*MOV037A	RHR INBOARD VV	6E1125	1E11A07	1R24*MCC111X	R.B. EL 112'	73-083
1E11*MOV047	RHR SHUT COOL SUCT INB ISOS VV	6E1105	1E11N02	1R24*MCC1118	R.B. EL 112'	84-016
	DIVISION 2					

1E11*P014B	RHR PUMP	5E1102	1E11B01	1R22*SWG-102	EMER SWGR RM EL 25'	8-265
1E11*P014D	RHR PUMP	5E1104	1E11D01	1R22*SWG-103	EMER SWGR RM EL 25'	8-280
1E11*MOV032B	RHR SHUTDOWN COOL INJECTION VV	6E1104	1E11B04	1R24*1122	R.B. EL 112'	15-277
1E11*MOV032D	RHR SHUTDOWN COOL INJECTION VV	6E1131	1E11D04	1R24*1122	R.B. EL 112'	18-296
1E11*MOV033B	RHR HX SHELL SIDE INLET VV	6E1138	1E11B16	1R24*1129	R.B. EL 40'	25-255
1E11*MOV034B	RHR HX SHELL SIDE BYPASS VV	6E1141	1E11B17	1R24*1122	R.B. EL 112'	28-208
1E11*MOV035B	RHR HX SHELL SIDE OUTLET VV	6E1135	1E11B18	1R24*1127	R.B. EL 40'	31-278
1E11*MOV036B	RHR OUTBOARD VV	6E1142	1E11B19	1R24*112Y	R.B. EL 112'	73-265
1E11*MOV037B	RHR INBOARD VV	6E1143	1E11B07	1R24*112Y	R.B. EL 112'	73-263
1E11*MOV048	RHR SHUT COOL SUCT OUB ISOS VV	11E1101	1E11N05	1R42*MCC0B2	R.B. EL 112'	73-096
1E11*MOV050	RHR CROSS HDR SHUTOFF VV	6E1124	1E11N01	1R24*1128	R.B. EL 112'	66-281

RHR LOW PRESSURE COOLANT INJECTION MODE-RB

DIVISION 1

1E11*P014A	RHR PUMP	5E1101	1E11A01	1R22*SWG-101	EMER SWGR RM EL 25'	8-95
1E11*P014C	RHR PUMP	5E1103	1E11C01	1R22*SWG-103	EMER SWGR RM EL 25'	8-80
1E11*MOV031A	RHR PUMP SUCTION VV	6E1101	1E11A03	1R24*MCC1113	R.B. EL 112'	24-085
1E11*MOV031C	RHR PUMP SUCTION VV	6E1101	1E11C03	1R24*MCC1113	R.B. EL 112'	24-069
1E11*MOV034A	RHR HX SHELL BYPASS VV	6E1120	1E11A17	1R24*MCC1112	R.B. EL 112'	28-073
1E11*MOV036A	RHR OUTBOARD VV	6E1126	1E11A19	1R24*MCC111X	R.B. EL 112'	73-092
1E11*MOV037A	RHR INBOARD VV	6E1125	1E11A07	1R24*MCC111X	R.B. EL 112'	73-083

DIVISION 2

1E11*P014B	RHR PUMP	5E1102	1E11B01	1R22*SWG-102	EMER SWGR RM EL 25'	8-265
1E11*P014D	RHR PUMP	5E1104	1E11D01	1R22*SWG-103	EMER SWGR RM EL 25'	8-280
1E11*MOV031B	RHR PUMP SUCTION VV	6E1129	1E11B03	1R24*MCC1122	R.B. EL 112'	24-275
1E11*MOV031D	RHR PUMP SUCTION VV	6E1102	1E11D03	1R24*MCC1122	R.B. EL 112'	24-291
1E11*MOV034B	RHR HX SHELL VV	6E1141	1E11B17	1R24*MCC1122	R.B. EL 112'	28-288

RHR SHUTDOWN COOLING MODE

DIVISION 1

1E11*P014A	RHR PUMP	5E1101	1E11A01	1R22*SWG-101	EMER SWGR RM EL 25'	8-95
1E11*P014C	RHR PUMP	5E1103	1E11C01	1R22*SWG-103	EMER SWGR RM EL 25'	8-80
1E11*MOV033A	RHR SHUTDOWN COOL INJECTION VV	6E1103	1E11A04	1R24*MCC1112	R.B. EL 112'	15-083
1E11*MOV032C	RHR SHUTDOWN COOL INJECTION VV	6E1134	1E11C04	1R24*MCC1113	R.B. EL 112'	18-064
1E11*MOV033A	RHR HX SHELL SIDE INLET VV	6E1116	1E11A16	1R24*MCC1119	R.B. EL 40'	25-105
1E11*MOV034A	RHR HX SHELL SIDE BYPASS VV	6E1120	1E11A17	1R24*MCC1112	R.B. EL 112'	28-073
1E11*MOV035A	RHR HX SHELL SIDE OUTLET VV	6E1115	1E11A18	1R24*MCC1117	R.B. EL 40'	31-087
1E11*MOV036A	RHR OUTBOARD VV	6E1126	1E11A19	1R24*MCC111X	R.B. EL 112'	73-092
1E11*MOV037A	RHR INBOARD VV	6E1125	1E11A07	1R24*MCC111X	R.B. EL 112'	73-083
1E11*MOV047	RHR SHUT COOL SUCT INB ISOS VV	6E1105	1E11N02	1R24*MCC1118	R.B. EL 112'	84-016

DIVISION 2

1E11*P014B	RHR PUMP	5E1102	1E11B01	1R22*SWG-102	EMER SWGR RM EL 25'	8-265
1E11*P014D	RHR PUMP	5E1104	1E11D01	1R22*SWG-103	EMER SWGR RM EL 25'	8-280
1E11*MOV032B	RHR SHUTDOWN COOL INJECTION VV	6E1104	1E11B04	1R24*MCC1122	R.B. EL 112'	15-277
1E11*MOV032D	RHR SHUTDOWN COOL INJECTION VV	6E1131	1E11D04	1R24*MCC1122	R.B. EL 112'	18-296
1E11*MOV033B	RHR HX SHELL SIDE INLET VV	6E1138	1E11B16	1R24*MCC1129	R.B. EL 40'	25-255

TABLE 223.90-2

SHUTDOWN EQUIPMENT LIST

1E11*MOV034D	RHR HX SHELL SIDE BYPASS VV	6E1141	1E11B17	1R24*MCC1122	R.B. EL 112'	28-288
1E11*MOV035B	RHR HX SHELL SIDE OUTLET VV	6E1135	1E11B18	1R24*MCC1127	R.B. EL 40'	31-278
1E11*MOV036B	RHR OUTBOARD VV	6E1142	1E11D19	1R24*MCC112Y	R.B. EL 112'	73-265
1E11*MOV037B	RHR INBOARD VV	6E1143	1E11D07	1R24*MCC112Y	R.B. EL 112'	73-263
1E11*MOV048	RHR SHUT COOL SUCT OUB ISOS VV	11E1101	1E11N05	1R42*MCC002	R.B. EL 112'	73-096
1E11*MOV050	RHR CROSS HDR SHUTOFF VV	6E1124	1E11N01	1R24*MCC1128	R.B. EL 112'	66-281

RHR LOW PRESSURE COOLANT INJECTION MODE-RB

DIVISION 1

1E11*P014A	RHR PUMP	5E1101	1E11A01	1R22*SWG-101	EMER SWGR RM EL 25'	8-95
1E11*P014C	RHR PUMP	5E1103	1E11C01	1R22*SWG-103	EMER SWGR RM EL 25'	8-80
1E11*MOV031A	RHR PUMP SUCTION VV	6E1101	1E11A03	1R24*MCC1113	R.B. EL 112'	24-085
1E11*MOV031C	RHR PUMP SUCTION VV	6E1101	1E11C03	1R24*MCC1113	R.B. EL 112'	24-069
1E11*MOV034A	RHR HX SHELL BYPASS VV	6E1120	1E11A17	1R24*MCC1112	R.B. EL 112'	28-073
1E11*MOV036A	RHR OUTBOARD VV	6E1126	1E11A19	1R24*MCC111X	R.B. EL 112'	73-092
1E11*MOV037A	RHR INBOARD VV	6E1125	1E11A07	1R24*MCC111X	R.B. EL 112'	73-083

DIVISION 2

1E11*P014B	RHR PUMP	5E1102	1E11B01	1R22*SWG-102	EMER SWGR RM EL 25'	8-265
1E11*P014D	RHR PUMP	5E1104	1E11D01	1R22*SWG-103	EMER SWGR RM EL 25'	8-280
1E11*MOV031B	RHR PUMP SUCTION VV	6E1129	1E11B03	1R24*MCC1122	R.B. EL 112'	24-275
1E11*MOV031D	RHR PUMP SUCTION VV	6E1102	1E11D03	1R24*MCC1122	R.B. EL 112'	24-291
1E11*MOV034B	RHR HX SHELL VV	6E1141	1E11B17	1R24*MCC1122	R.B. EL 112'	28-288
1E11*MOV036B	RHR OUTBOARD VV	6E1142	1E11B19	1R24*MCC112Y	R.B. EL 112'	73-265
1E11*MOV037B	RHR INBOARD VV	6E1143	1E11B07	1R24*MCC112Y	R.B. EL 112'	73-263
1E11*MOV050	RHR CROSS HDR SHUTOFF VV	6E1124	1E11N01	1R24*MCC1128	R.B. EL 112'	66-281

RHR CONDENSING MODE-RB

1E41*MOV041	STEAM SUPPLY INBOARD ISOL VV	6E4102	1E41A01	1R24*MCC1118	R.B. EL 112'	66-188

RHR INTERLOCKS & TRIPS

DIVISION 1

1B31*PS023A	LP INTLK B31-N018A(H21*P006)	1.61-196	40-180
1B21*PS023C	PRES INTLK B21-N021C(H21*P009)	1.61-76	78-102
1B21*PS023A	PRES INTLK B21-N021A(H21*P004)	1.61-76	78-79
1B21*LIS027A	LO HTR LVL B21-N024A(H21*P004)	1.61-27	78-79
1B21*LIS027C	LO HTR LBL B21-N024C(H21*P005)	1.61-27	78-257
1B21*K83	B21-K83 (H11*P602)	1.61-219	CB/44-C12
1B21*K6A	B21-K6A (H11*P609)	1.61-196	CB/63-C13
1B21*K6C	B21-K6C (H11*P609)	1.61-196	CB/63-C13
1E11*PNS031A	PNP INTLK	1.61-220	24-85
1E11*PNS031C	PNP INTLK	1.61-220	24-69
1E11*PNS032A	PNP INTLK	1.61-220	14-82
1E11*PNS032C	PNP INTLK	1.61-220	18-64
1E11*PDS001A	MINFLOW (H21*P018)	1.61-219	8-75
1B21*LIS029A	LL/HP (H21*P004)	1.61-076	78-79
1E11*PS139A	LL/HP (H21*P004)	1.61-219	78-79

1B21*LIS029C	LL/HP (H21*P004)	1.61-076				78-79
	DIVISION 2					
1B31*PS023B	LP INTLK B31-N018B(H21*P022)	1.61-196				40-353
1B21*PS023D	PRES INTLK B21-N021D(H21*P0010)	1.61-77				78-260
1B21*PS023B	PRES INTLK B21-N021B(H21*P005)	1.61-77				78-257
1B21*LIS027B	LO WTR LVL B21-N024B(H21*P004)	1.61-29				78-79
1B21*LIS027D	LO WTR LVL B21-N024D(H21*P005)	1.61-29				78-257
1B21*K84	B21-K84 (H11*P623)	1.61-196				CB/44-C12
1B21*K6B	B21-K6B (H11*P611)	1.61-193				CB/63-C13
1B21*K6D	B21-K6D (H11*P611)	1.61-193				CB/63-C13
1E11*PNS031B	PMP INTLK	1.61-223				24-275
1E11*PNS031D	PMP INTLK	1.61-223				24-291
1E11*PNS032B	PMP INTLK	1.61-223				15-278
1E11*PNS032D	PMP INTLK	1.61-223				16-296
1E11*PDS001B	MINFLOW (H21*P021)	1.61-219				8-287
CKT	MAN INTIATE	1.61-219				
1E11*PS139B	LL/HP (H21*P005)	1.61-219				78-257
	STANDBY LIQUID CONTROL SYSTEM					
	DIVISION 1					
1C41*P024A	SLC LIQUID CONT PUMP	6C4101	1C41A01	1R24*MCC113	R.B. EL 112'	112-168
	DIVISION 2					
1C41*P024B	SLC LIQUID CONT PUMP	6C4101A	1C41B01	1R24*MCC1123	R.B. EL 112'	112-166
INTER CKT	C02 FIRE PROT CKT,DIESEL RM	11M4304		1R42*PNL-A2, B2 & C1		CONTROL BUILDING EL 63'
INTER CKT	C02 FIRE PROT CKT,BTY RM	11M4303		1R42*PNL-A2, B2 & C1		CONTROL BUILDING EL 63'
INTER CKT	C02 FIRE PROT CKT,EMER SWG RM	11M4305		1R42*PNL-A2, B2 & C1		CONTROL BUILDING EL 63'
INTER CKT	C02 FIRE PROT CKT,RELAY RM	11M4306		1R42*PNL-A1	EMER SWGR RM EL 25'	CONTROL BUILDING EL 25'
	SERVICE WATER SYSTEM-PH/RB					
	DIVISION 1					
1P41*P003A	SERVICE WATER PUMP	5P4101	1P41A01	1R22*SWG101	EMER SWGR RM EL 25'	SCREENWELL EL 20'
1P41*MOV031A	SWP DISCH VV	6P4101	1P41A02	1R24*MCC1110	SCRW EL 20'-6'	SCREENWELL EL 20'
1P41*MOV032A	SW HEADER ISOL VV	6P4103	1P41A05	1R24*MCC1110	SCRW EL 20'-6'	SCREENWELL EL 20'
1P41*MOV033A	SW CROSS TIE VV	6P4108	1P41A03	1R24*MCC1119	R.B. EL 40'	30-30
1P41*MOV033C	SW CROSS TIE VV	6P4109	1P41C03	1R24*MCC1119	R.B. EL 40'	31-40
1P41*MOV034A	RHR HX DISCH VV	6P4110	1P41A08	1R24*MCC1112	R.B. EL 112'	27-91
1P41*MOV035A	TBCLCH ISOL VV	6P4104	1P41A06	1R24*MCC1110	SCRW EL 20'-6'	SCREENWELL EL 20'
1P41*MOV036A	VENT CHILL ISOL VV	6P4105	1P41A07	1R24*MCC1116	DIESEL GEN RM EL 22'	12-46
1P41*MOV037A	RBCLCH HX OUTLET VV	6P4107	1P41A09	1R24*MCC1112	R.B. EL 112'	23-290
1P41*MOV039A	ULT COOLING DRN VV	6P4102	1P41A04	1R24*MCC1119	R.B. EL 40'	34-046
1P41*MOV042A	SW TO FUEL POOL VV	6P4113	1P41A12	1R24*MCC1119	R.B. EL 40'	15-040
1P41*AOV016A	EMER DIESEL HX OUTLET VV	6P4123	1P41A24	1R35*PNLR1	RELAY RM EL 44'	CB/27-L13
	DIVISION 2					
1P41*P003B	SERVICE WATER PUMP	5P4102	1P41B01	1R22*SWG102	EMER SWGR RM EL 25'	SCREENWELL EL 20'
1P41*MOV031B	SWP DISCH VV	6P4119	1P41B02	1R24*MCC1120	SCRW EL 20'-6"	SCREENWELL EL 20'
1P41*MOV032B	SW HEADER ISOL VV	6P4121	1P41B05	1R24*MCC1120	SCRW EL 20'-6"	SCREENWELL EL 20'
1P41*MOV033B	SW CROSS TIE VV	6P4108	1P41503	1R24*MCC1129	R.B. EL 40'	30-030
1P41*MOV033D	SW CROSS TIE VV	6P4109	1P41C03	1R24*MCC1129	R.B. EL 40'	31-040
1P41*MOV034B	RHR HX DISCH VV	6P4118	1P41B08	1R24*MCC1128	R.B. EL 112'	27-268
1P41*MOV035B	TBCLCH ISOL VV	6P4120	1P41B06	1R24*MCC1120	SCRW EL 20'-6"	SCREENWELL EL 20'
1P41*MOV036B	VENT CHILL ISOL VV	6P4105	1P41B07	1R24*MCC1126	DIESEL GEN RM EL 22'	12-046
1P41*MOV037B	RBCLCH HX OUTLET VV	6P4122	1P41B09	1R24*MCC1128	R.B. EL 112'	23-294

TABLE 223.90-2

SHUTDOWN EQUIPMENT LIST

1P41*MOV039B	ULT COOLING DRN VV	6P4102	1P41B04	1R24*MCC1129	R.B. EL 40'	34-046
1P41*MOV042B	SH TO FUEL POOL VV	6P4113	1P41B12	1R24*MCC1129	R.B. EL 40'	15-040
1P41*MOV043	FUEL POOL DRN VV	6P4114	1P41N01	1R24*MCC1127	R.B. EL 40'	12-046
1P41*AOV016B	EMER DIESEL HX OUTLET VV	6P4123	1P41B24	1R35*PNLB1	RELAY RM EL 44'	CB/27-C13
	DIVISION 3					
1P41*P003C	SERVICE WATER PUMP	5P4103	1P41C01	1R22*SNG103	EMER SWGR RM EL 25'	SCREENWELL EL 20'
1P41*P003D	SERVICE WATER PUMP	5P4104	1P41D01	1R22*SNG103	EMER SWGR RM EL 25'	SCREENWELL EL 20'
1P41*MOV031C	SWP DISCH VV	6P4101	1P41C02	1R24*MCC1133	EMER SWGR RM EL 25'	SCREENWELL EL 20'
1P41*MOV031D	SWP DISCH VV	6P4117	1P41D02	1R24*MCC1133	EMER SWGR RM EL 25'	SCREENWELL EL 20'
1P41*MOV036C	VENT CHILL ISOL VV	6P4106	1P41C07	1R24*MCC1134	DIESEL GEN RM EL 22'	12-046
1P41*AOV016C	EMER DIESEL HX OUTLET VV	6P4124	1P41C24	1R35*PNL01	RELAY RM EL 25'	CB/27-C13
	EMERG SW TO FUEL POOL					
	DIVISION 1					
1G33*MOV033	RV DISCH	6G3308	1G33N12	1R24*MCC1113	EMER SWGR RM EL 25'	121-190
	DIVISION 2					
1G33*MOV034	RV DISCH VV	11G3301	1G33N13	1R24*MCC0B2	R.B. EL 112'	121-190
	REACTOR WATER CLEAN-UP SYSTEM					
	DIVISION 1					
1G41*MOV032A	SERVICE WTR INLET VV	6G4103	1G41A04	1R24*MCC1114	EMER SWGR RM EL 25'	162-147
	DIVISION 2					
1G41*MOV032B	SERVICE WTR INLET VV	6G4103	1G41B04	1R24*MCC1124	R.B. EL 150'	162-149
	RBCLCW SYSTEM-RB					
	DIVISION 1					
1P42*P005A	RBCLCW COOLING WATER PUMP	6P4201	1P42A01	1R24*MCC1112	R.B. EL 112'	150-NW
1P42*MOV042A	RBCLCW HX INLET VV	6P4214	1P42A10	1R24*MCC1112	R.B. EL 112'	30-349
	DIVISION 2					
1P42*P005B	RBCLCW COOLING WATER PUMP	6P4202	1P42B01	1R24*MCC1122	R.B. EL 112'	30-352
1P42*MOV042B	RBCLCW HX INLET VV	6P4218	1P42B10	1R24*MCC1128	R.B. EL 112'	150-NW
	DIVISION 3					
1P42*P005C	RBCLCW COOLING WATER PUMP	6P4203	1P42C01	1R24*MCC1131	R.B. EL 63'	150-NE
	EMERGENCY GENERATOR-EGR					
	DIVISION 1					
1R43*G-101	EDG G101 PROT-GEN DIFF CKT	8R4301	1R43A03			DG RM/22-L15
1R43*G-101	VR CT G-101 PROT	8R4301	1R43A24			DG RM/22-L15
1R43*G-101	EMER DG 51/40/32 PROT	8R4301	1R43A05			DG RM/22-L15
1R43*G-101	EMER DG 50N GND PROT	8R4301	1R43A28			DG RM/22-L15
1R43*G-101	CURRENT TEST BCK AND RESIS BOX	8R4301	1R43A27			DG RM/22-L15
1R43*G-101	GOVENOR HYDRAULIC ACTUATOR	11R4302	1R43A23	1R42*PNL-A1	EMER SWGR RM EL 25'	DG RM/22-L15
1R43*G-101	EG-A CONT BOX AND MOT OP POT	8R4301	1R43A06		EMER SWGR RM EL 25'	DG RM/22-L15
1R43*G-101	VR CT G-101 PROT	8R4301	1R43A25		EMER SWGR RM EL 25'	DG RM/22-L15
1R43*G-101	VOLT REGULATOR	8R4305	1R43A26		EMER SWGR RM EL 25'	DG RM/22-L15
1R43*G-101	START CIRCUIT	11R4301	1R43A12	1R42*PNL-A1	EMER SWGR RM EL 25'	DG RM/22-L15
1R43*G-101	START CIRCUIT	11R4301	1R43A22	1R42*PNL-A1	EMER SWGR RM EL 25'	DG RM/22-L15
1R43*G-101	START CIRCUIT	11R4302	1R43A23	1R42*PNL-A1	EMER SWGR RM EL 25'	DG RM/22-L15
	DIVISION 2					
1R43*G-102	EDG G102 PROT-GEN DIFF CKT	8R4302	1R43B03		EMER SWGR RM EL 25'	DG RM/22-C15

1R43*G-102	EMER DG 51/40/32 PROT	8R4302	1R43B05		EMER SWGR RM EL 25'	DG RM/22-C15
1R43*G-102	EMER DG 50N GND PROT	8R4302	1R43B08		EMER SWGR RM EL 25'	DG RM/22-C15
1R43*G-102	CURRENT TEST BCK AND RESIS BOX	8R4302	1R43B27		EMER SWGR RM EL 25'	DG RM/22-C15
1R43*G-102	GOVENOR HYDRAULIC ACTUATOR	11R4304	1R43B23	1R42*PNL-B1	EMER SWGR RM EL 25'	DG RM/22-C15
1R43*G-102	EG-A CONT BOX AND MOT OP POT	8R4302	1R43B06		EMER SWGR RM EL 25'	DG RM/22-C15
1R43*G-102	VR CT G-102 PROT	8R4302	1R43B25		EMER SWGR RM EL 25'	DG RM/22-C15
1R43*G-102	VOLT REGULATOR	8R4306	1R43B26		EMER SWGR RM EL 25'	DG RM/22-C15
1R43*G-102	VR CT G-102 PROT	8R4302	1R43B24		EMER SWGR RM EL 25'	DG RM/22-C15
1R43*G-102	START CIRCUIT	11R4303	1R43B12	1R42*PNL-B1	EMER SWGR RM EL 25'	DG RM/22-C15
1R43*G-102	START CIRCUIT	11R4303	1R43B22	1R42*PNL-B1	EMER SWGR RM EL 25'	DG RM/22-C15
1R43*G-102	START CIRCUIT	11R4304	1R43B23	1R42*PNL-B1	EMER SWGR RM EL 25'	DG RM/22-C15
	DIVISION 3					
1R43*G-103	EDG G103 PROT-GEN DIFF CKT	8R4303	1R43C03			DG RM/22-L15
1R43*G-103	EMER DG 51/40/32 PROT	8R4303	1R43C05			DG RM/22-L15
1R43*G-103	EMER DG 50N GND PROT	8R4303	1R43C28			DG RM/22-L15
1R43*G-103	CURRENT TEST BCK AND RESIS BOX	8R4303	1R43C27			DG RM/22-L15
1R43*G-103	GOVENOR HYDRAULIC ACTUATOR	11R4306	1R43C23	1R42*PNL-C1	EMER SWGR RM EL 25'	DG RM/22-L15
1R43*G-103	EG-A CONT BOX AND MOT OP POT	8R4303	1R43C06		EMER SWGR RM EL 25'	DG RM/22-L15
1R43*G-103	VR CT G-103 PROT	8R4303	1R43C25		EMER SWGR RM EL 25'	DG RM/22-L15
1R43*G-103	VOLT REGULATOR	8R4307	1R43C26		EMER SWGR RM EL 25'	DG RM/22-L15
1R43*G-103	VR CT G-103 PROT	8R4303	1R43C24		EMER SWGR RM EL 25'	DG RM/22-L15
1R43*G-103	START CIRCUIT	11R4305	1R43C12	1R42*PNL-C1	EMER SWGR RM EL 25'	DG RM/22-L15
1R43*G-103	START CIRCUIT	11R4305	1R43C22	1R42*PNL-C1	EMER SWGR RM EL 25'	DG RM/22-L15
1R43*G-103	START CIRCUIT	11R4306	1R43C24	1R42*PNL-C1	EMER SWGR RM EL 25'	DG RM/22-L15
	DIESEL FUEL TRANSFER SYS-EGB					
	DIVISION 1					
1R43*P-201A	EG FUEL OIL TRANSFER PUMP	6R4304	1R43A09	1R24*MCC1116	DIESEL GEN RM EL 22'	YARD
1R43*P-202A	EG FUEL OIL TRANSFER PUMP	6R4304	1R43A10	1R24*MCC1116	DIESEL GEN RM EL 22'	YARD
	DIVISION 2					
1R43*P-201B	EG FUEL OIL TRANSFER PUMP	6R4305	1R43B09	1R24*MCC1126	DIESEL GEN RM EL 22'	YARD
1R43*P-202B	EG FUEL OIL TRANSFER PUMP	6R4305	1R43B10	1R24*MCC1126	DIESEL GEN RM EL 22'	YARD
	DIVISION 3					
1R43*P-201C	EG FUEL OIL TRANSFER PUMP	6R4306	1R43C09	1R24*MCC1134	DIESEL GEN RM EL 22'	YARD
1R43*P-202C	EG FUEL OIL TRANSFER PUMP	6R4306	1R43C10	1R24*MCC1134	DIESEL GEN RM EL 22'	YARD
	HVAC SYSTEMS					
	CRAC/RBSVS CHILL WATER SYSTEM-CB					
	DIVISION 1					
1H50*P137A	CHILLED WATER PUMP	6H5001	1H50A06	1R24*MCC1116	DIESEL GEN RM EL 22'	CB/63-L12
1H50*P139A	COND WATER PUMP	6H5003	1H50A10	1R24*MCC1116	DIESEL GEN RM EL 22'	CB/63-L12
1H50*P231A	LUBE OIL PUMP	6H5011	1H50A14	1R24*MCC1116	DIESEL GEN RM EL 22'	CB/63-C16
1H50*WC003A	WATER CHILLER	5H5001	1H50A01	1R22*SWG101	EMER SWGR RM EL 25'	CB/63-L12
1H50*WC003A	CHILLER CONTROLS	5H5001A	1H50A03	1R35*PNL-R1	RELAY RM EL 44'	CB/63-L12
1H50*HOV031A	RETURN VV	6H5005	1H50A04	1R24*MCC1116	DIESEL GEN RM EL 22'	CB/71-L13
1H50*HOV032A	SUPPLY VV	6H5006	1H50A05	1R24*MCC1116	DIESEL GEN RM EL 22'	CB/75-L13
1H50*HOV033A	RET XOVER VV	6H5007	1H50A06	1R24*MCC1116	DIESEL GEN RM EL 22'	CB/75-L13
1H50*HOV034A	SUP X-OVER VV	6H5008	1H50A07	1R24*MCC1116	DIESEL GEN RM EL 22'	CB/75-L13
1H50*AOV068A	ISOL BYPASS VV	6H5009	1H50A12	1R35*PNL-R1	RELAY RM EL 44'	CB/71-L12
1H50*AOV069A	ISOL BYPASS VV	6H5010	1H50A13	1R35*PNL-R1	RELAY RM EL 44'	CB/75-L12
	DIVISION 2					
1H50*P137B	CHILLED WATER PUMP	6H5001	1H50B08	1R24*MCC1126	DIESEL GEN RM EL 22'	CB/63-L13
1H50*P139B	COND WATER PUMP	6H5003	1H50B10	1R24*MCC1126	DIESEL GEN RM EL 22'	CB/63-L13

TABLE 223.90-2

SHUTDOWN EQUIPMENT LIST

1M50*P231B	LUBE OIL PUMP	6M5011	1M50B14	1R24*MCC1126	DIESEL GEN RM EL 22'	CB/63-L13
1M50*HC003B	WATER CHILLER	5M5002	1M50B01	1R22*SWG102	EMER SWGR RM EL 25'	CB/63-L13
1M50*MC003B	CHILLER CONTROLS	5M5002A	1M50B03	1R35*PNL-B1	EMER SWGR RM EL 25'	CB/63-L13
1M50*MOV031B	RETURN VV	6M5005	1M50B04	1R24*MCC1126	DIESEL GEN RM EL 22'	CB/71-L13
1M50*MOV032B	SUPPLY VV	6M5006	1M50B05	1R24*MCC1126	DIESEL GEN RM EL 22'	CB/75-L13
1M50*MOV033B	RET X-OVER VV	6M5007	1M50D06	1R24*MCC1126	DIESEL GEN RM EL 22'	CB/75-L13
1M50*MOV034B	SUP X-OVER VV	6M5008	1M50D07	1R24*MCC1126	DIESEL GEN RM EL 22'	CB/71-L13
1M50*MOV068B	ISOL BYPASS VV	6M5009	1M50B12	1R35*PNL-B1	RELAY RM EL 44'	CB/71-L13
1M50*MOV069B	ISOL BYPASS VV	6M5010	1M50B13	1R35*PNL-B1	RELAY RM EL 44'	CB/75-L13
	DIVISION 3					
1M50*P140A	COND WATER PUMP	6M5004	1M50A11	1R24*MCC1134	DIESEL GEN RM EL 22'	CB/63-L12
1M50*P140B	COND WATER PUMP	6M5012	1M50C14	1R24*MCC1134	DIESEL GEN RM EL 22'	CB/63-L13
1M50*P233A	LUBE OIL PUMP	6M5012	1M50C14	1R24*MCC1134	DIESEL GEN RM EL 22'	CB/63-L15
1M50*P233B	LUBE OIL PUMP	6M5012	1M50D14	1R24*MCC1134	DIESEL GEN RM EL 22'	CB/63-L12
1M50*HC004A	WATER CHILLER	5M5003	1M50C01	1R22*SWG103	EMER SWGR RM EL 25'	CB-63-L12
1M50*HC004B	WATER CHILLER	5M5004	1M50D01	1R22*SWG103	EMER SWGR RM EL 25'	CB/63-L13
1M50*MC004A	CHILLER CONTROLS	5M5003A	1M50C03	1R35*PNL-01	RELAY RM EL 44'	CB/63-L12
1M50*MC004B	CHILLER CONTROLS	5M5004A	1M50D03	1R35*PNL-01	RELAY RM EL 44'	CB/63-L13
	RBSVS SYSTEM-RB					
	DIVISION 1					
1T46*UC002A	UNIT COOLER	6T4619	1T46A13	1R24*MCC1118	R.B. EL 112'	8-332
1T46*UC003A	UNIT COOLER	6T4620	1T46A14	1R24*MCC1118	R.B. EL 112'	8-81
1T46*UC004A	REFUEL LVL UC	6T4621	1T46A15	1R24*MCC1112	R.B. EL 112'	218-60
1T46*UC005A	REFUEL LVL UC	6T4622	1T46A16	1R24*MCC1112	R.B. EL 112'	218-323
1T46*UC020A	RB MCC RM UC	6T4625	1T46A23	1R24*MCC1118	R.B. EL 112'	112-80
1T46*UC021A	MG RM 111 112 UC	6T4626	1T46A33	1R24*MCC1114	R.B. EL 150'	150-22
CKT	RBSVS/CRAC ACC SIGNAL	11T4601	1T46A19			CB/48-C14
CKT	RBSVS INITIAT SIGNAL	11T4602				CB/48-C14
	DIVISION 2					
1T46*UC002B	UNIT COOLER	6T4619	1T46B13	1R24*MCC1128	R.B. EL 112'	40-275
1T46*UC003B	UNIT COOLER	6T4620	1T46B14	1R24*MCC1128	R.B. EL 112'	40-85
1T46*UC004B	REFUEL LVL UC	6T4621	1T46B15	1R24*MCC1122	R.B. EL 112'	218-143
1T46*UC005B	REFUEL LVL UC	6T4622	1T46B16	1R24*MCC1122	R.B. EL 112'	218-240
1T46*UC020B	RB MCC RM UC	6T4625	1T46B23	1R24*MCC1128	R.B. EL 112'	112-227
1T46*UC021B	MG RM 111 112 UC	6T4626	1T46B33	1R24*MCC1127	R.B. EL 40'	150-340
CKT	RBSVS/CRAC ACC SIGNAL	11T4601	1T46B19			CB/48-C14
CKT	RBSVS INITIAT SIGNAL	11T4603				CB/48-C14
	DIVISION 3					
1T46*UC022B	MG RM 113 UC	6T4627	1T46B34	1R24*MCC1131	R.B. EL 63'	161-340
1T46*UC022A	MG RM 113 UC	6T4627	1T46A34	1R24*MCC1131	R.B. EL 63'	161-22
CKT	RBSVS INITIAT SIGNAL	11T4604				ESHG ROOM/25-K13
	RELAY/SWGR ROOM VENT SYSTEM-CB					
	DIVISION 1					
1X41*ACU014A	CHILL WT COOL	6X4125	1X41A01	1R24*MCC1116	DIESEL GEN RM EL 22'	HVAC/44-C14
1X41*MOD035A	CHILL WT COOL	6X4125	1X41A01	1R24*MCC1116	DIESEL GEN RM EL 22'	HVAC/53-C12
1X41*FN029A	RELAY RM EXHAUST FAN	6X4121	1X41A02	1R24*MCC1116	DIESEL GEN RM EL 22'	HVAC/44-C13
	DIVISION 2					
1X41*ACU014B	CHILL WT COOL	6X4125	1X41B01	1R24*MCC1126	DIESEL GEN RM EL 22'	HVAC/44-C13
1X41*MOD035B	CHILL WT COOL	6X4125	1X41B01	1R24*MCC1126	DIESEL GEN RM EL 22'	HVAC/55-C12
1X41*FN029B	RELAY RM EXHAUST FAN	6X4121	1X41B02	1R24*MCC1126	DIESEL GEN RM EL 22'	HVAC/44-C13
	CHILLER EQUIP RM VENT SYSTEM-CB					

TABLE 223.90-2

	DIVISION 1					
1X41*FN039A	RBSV CHILL EQUIP RM FAN	6X4126	1X41A19	1R24*MCC1116	DIESEL GEN RM EL 22'	HVAC/63-C39
1X41*MOD031A	RBSV INTAKE DAMPER	6X4126	1X41A19	1R24*MCC1116	DIESEL GEN RM EL 22'	HVAC/63-L16
1X41*MOD032A	RBSV EXHAUST DAMPER	6X4126	1X41A19	1R24*MCC1116	DIESEL GEN RM EL 22'	HVAC/63-L16
	DIVISION 2					
1X41*FN039B	RBSV CHILL EQUIP RM FAN	6X4127	1X41B19	1R24*MCC1126	DIESEL GEN RM EL 22'	HVAC/63-C15
1X41*MOD031B	RBSV INTAKE DAMPER	6X4127	1X41B19	1R24*MCC1126	DIESEL GEN RM EL 22'	HVAC/63-L16
1X41*MOD032B	RBSV EXHAUST DAMPER	6X4127	1X41B19	1R24*MCC1126	DIESEL GEN RM EL 22'	HVAC/63-L16
	BATTERY ROOM VENT SYSTEM-CB					
	DIVISION 1					
1X41*FN072A	BTY RM VENT FAN	6X4128	1X41A03	1R24*MCC1115	EMER SWGR RM EL 25'	CB/30-K16
1X41*MOD039A	BTY RM DISCHARGE DAMPER	6X4128	1X41A03	1R24*MCC1115	EMER SWGR RM EL 25'	CB/27-K16
1X41*MOD040A	BTY RM EXHAUST DAMPER	6X4128	1X41A03	1R24*MCC1115	EMER SWGR RM EL 25'	CB/30-K16
1X41*MOD041A	BTY RM EXHAUST DAMPER	6X4128	1X41A03	1R24*MCC1115	EMER SWGR RM EL 25'	CB/26-K16
	DIVISION 2					
1X41*FN072B	BTY RM VENT FAN	6X4129	1X41B03	1R24*MCC1125	EMER SWGR RM EL 25'	CB/30-C16
1X41*MOD039B	BTY RM DISCHARGE DAMPER	6X4129	1X41B03	1R24*MCC1125	EMER SWGR RM EL 25'	CB/29-C16
1X41*MOD040B	BTY RM EXHAUST DAMPER	6X4129	1X41B03	1R24*MCC1125	EMER SWGR RM EL 25'	CB/30-C16
1X41*MOD041B	BTY RM EXHAUST DAMPER	6X4129	1X41B03	1R24*MCC1125	EMER SWGR RM EL 25'	CB/26-C16
	DIVISION 3					
1X41*FN072C	BTY RM VENT FAN	6X4130	1X41C03	1R24*MCC1133	EMER SWGR RM EL 25'	CB/39-K16
1X41*MOD039C	BTY RM DISCHARGE DAMPER	6X4130	1X41C03	1R24*MCC1133	EMER SWGR RM EL 25'	CB/37-K16
1X41*MOD040C	BTY RM EXHAUST DAMPER	6X4130	1X41C03	1R24*MCC1133	EMER SWGR RM EL 25'	CB/41-C16
1X41*MOD041C	BTY RM EXHAUST DAMPER	6X4130	1X41C03	1R24*MCC1133	EMER SWGR RM EL 25'	CB/35-K16
	EMERGENCY GEN ROOM VENT SYSTEM-EGB					
	DIVISION 1					
1X61*FN025A	FILTER BOAST FAN	6X6102	1X61A02	1R24*MCC1116	DIESEL GEN RM EL 22'	EGB/63-C12
1X60*FN028A	EMER VENT FAN	6X6002	1X60A02	1R24*MCC1116	DIESEL GEN RM EL 22'	EGB/22-L15
1X60*MOD31A	DAMPER	6X6002	1X60A02	1R24*MCC1116	DIESEL GEN RM EL 22'	EGB/38-L16
1X60*MOD32A	DAMPER	6X6002	1X60A02	1R24*MCC1116	DIESEL GEN RM EL 22'	EGB/34-L12
	DIVISION 2					
1X61*FN025B	FILTER BOAST FAN	6X6102	1X61B02	1R24*MCC1126	DIESEL GEN RM EL 22'	EGB/63-C12
1X60*FN028B	EMER VENT FAN	6X6003	1X60B02	1R24*MCC1126	DIESEL GEN RM EL 22'	EGB/22-L15
1X60*MOD31B	DAMPER	6X6003	1X60B02	1R24*MCC1126	DIESEL GEN RM EL 22'	EDG/38-L16
1X60*MOD32B	DAMPER	6X6003	1X60B02	1R24*MCC1126	DIESEL GEN RM EL 22'	EDG/CA12
	DIVISION 3					
1X60*FN028C	EMER VENT FAN	6X6004	1X60C02	1R24*MCC1134	DIESEL GEN RM EL 22'	EDG/22-L15
1X60*MOD31C	DAMPER	6X6004	1X60C02	1R24*MCC1134	DIESEL GEN RM EL 22'	EDG/38-CA16
1X60*MOD32C	DAMPER	6X6004	1X60C02	1R24*MCC1134	DIESEL GEN RM EL 22'	EDG/34-CA12
	SCREEN WELL PUMP HOUSE VENT					
	DIVISION 1					
1X41*FN068A	PP HS FAN	6X4118	1X41A15	1R24*MCC1110		SCREENWELL EL 20'
	DIVISION 2					
1X41*FN068B	PP HS FAN	6X4119	1X41B15	1R24*MCC1120		SCREENWELL EL 20'
	CONTROL ROOM AIR CONDITIONING SYSTEM-CB					

TABLE 223.90-2

SHUTDOWN EQUIPMENT LIST

	DIVISION 1					
1X61*MOV031A	CRAC ISOL VV	6X6104	1X61A05	1R24*MCC1115	EMER SWGR RM EL 25'	CB/78-C12
1X61*MOV32A	CRAC ISOL VV	6X6110	1X61A09	1R24*MCC1115	EMER SWGR RM EL 25'	CB/67-C16
1X61*AOV36A	CRAC NORM AIR INTAKE VV	6X6106	1X61A06	1R35*PNL-R1	RELAY ROOM EL 44'	CB/66-C16
1X61*AOV30A	CRAC ISOS VV	6X6108	1X61A03	1R35*PNL-P1	RELAY ROOM EL 44'	CB/73-C16
1X61*ACU70A	CRAC UNIT	6X6101	1X61A01	1R24*MCC1116	DIESEL GEN RM EL 22'	CB/71-C13
1X61*MOD34A	CRAC UNIT DAMPER	6X6101	1X61A01	1R24*MCC1116	DIESEL GEN RM EL 22'	CB/77-C16
1X61*TCV021A	CRAC-COOLING COIL VV	13X6101	1X61A10			CB/71-C13
CKT	CRAC EMER INIT SIGN (PNL VX1)	11X6101	1X61A07	1R42*PNL-A2		CB/44-C12
1X61*TIC021A	CRAC ACU07A COOLING CONTROL	13X6101	1X61A10			CB/63-K12
1X61*TE021A	CRAC TEMP ELEMENT	13X6101	1X61A10			CB/67-12K
1X61*AOV039A	ISOL DAMPERS	6X6109	1X61A04	1R35*PNL-R1	RELAY RM EL 44'	CB/77-C16
1X61*FN025A	FILTER BOASTER FAN	6X6102	1X61A02	1R24*MCC1116	DIESEL GEN RM EL 22'	CB/63-C12
1X61*MOD033A	FILTER BOASTER FAN DAMPER	6X6102	1X61A02	1R24*MCC1116	DIESEL GEN RM EL 22'	CB/77-C12
	DIVISION 2					
1X61*MOV031B	CRAC ISOL VV	6X6105	1X61B05	1R24*MCC1125	EMER SWGR RM EL 25'	CB/78-C12
1X61*MOC032B	CRAC ISOL VV	6X6111	1X61B09	1R24*MCC1125	EMER SWGR RM EL 25'	CB/70-C16
1X61*AOV36B	CRAC NORM AIR INTAKE VV	6X6106	1X61B06	1R35*PNL-B1	RELAY RM EL 44'	CB/70-C16
1X61*AOV30B	CRAC ISOL VV	6X6108	1X61B03	1R35*PNL-B1	RELAY RM EL 44'	CB/73-C16
1X61*AUC70B	CRAC UNIT	6X6101	1X61B01	1R24*MCC1126	DIESEL GEN RM EL 22'	CB/71-C13
1X61*MOD34B	CRAC UNIT DAMPER	6X6101	1X61B01	1R24*MCC1126	DIESEL GEN RM EL 22'	CB/77-C16
1X61*TCV021B	CRAC-COOLING COIL VV	13X6102	1X61B10			CB/71-C13
CKT	CRAC EMERG INIT SIGN (PNL VX1)	11X6102	1X61B07	1R42*PNL-B2		CB/44-C12
1X61*TIC021B	CRAC ACU70B COOLING CONTROL	13X6102	1X61B10			CB/63-K12
1X61*TE021B	CRAC TEMP ELEMENT	13X6101	1X61B10			CB/67-K12
1X61*APV039B	ISOL DAMPERS	6X6109	1X61B04	1R35*PNL-B1	RELAY RM EL 44'	
1X61*FN025B	FILTER BOASTER FAN	6X6102	1X61B02	1R24*MCC1126	DIESEL GEN RM EL 22'	CB/63-C12
1X61*MOD033B	FILTER BOASTER FAN DAMPER	6X6102	1X61B02	1R24*MCC1126	DIESEL GEN RM EL 22'	CB/74-C12
	COMPRESSED AIR SYSTEM					
	DIVISION 1					
1P50*MOV104	INSTR AIR TO SUPPR CHAMBER VV	6P5012	1P50N05	1R24*MCC1112	R.B. EL 78'	30-250
1P50*MOV103A	COMPRESS AIR SRV OUTBRD ISOL VV	6P5014	1P50A12	1R24*MCC1112	R.B. EL 112'	90-250
1P50*MOV105A	COMPRESS AIR SRV INBRD ISOL VV	6P5016	1P50A13	1R24*MCC1113	R.B. EL 112'	75-220
1P50*MOV113A	COMPRESS AIR SRV NORMAL SUP VV	6P5018	1P50A14	1R24*MCC1112	R.B. EL 112'	90-250
1P50*MOV114A	COMPRESS AIR SRV EMERG SUP VV	6P5020	1P50A15	1R24*MCC1118	R.B. EL 112'	90-250
1P50*PS113A	SERVICE AIR HEADER NORMAL SUP	1.61-273				151-170
1P50*PS105A	SERVICE AIR HEADER PRESSURE	1.61-272				151-155
	DIVISION 2					
1P50*MOV106	INSTR AIR TO SUPPR CHAMBER VV	6P5013	1P50N07	1R24*MCC1129	R.B. EL 40'	30-250
1P50*MOV103B	COMPRESS AIR SRV OUTBRD ISOL VV	6P5015	1P50B12	1R24*MCC1122	R.B. EL 40'	90-070
1P50*MOV105B	COMPRESS AIR SRV INBRD ISOL VV	6P5017	1P50B13	1R24*MCC1122	R.B. EL 112'	89-255
1P50*MOV113B	COMPRESS AIR SRV NORMAL SUP VV	6P5019	1P50B14	1R24*MCC1123	R.B. EL 112'	151-220
1P50*MOV114B	COMPRESS AIR SRV EMERG SUP VV	6P5015	1P50B15	1R24*MCC1123	R.B. EL 112'	89-070
1P50*PS113B	SERVICE AIR HEADER NORMAL SUP	1.61-273				151-220
1P50*PS105B	SERVICE AIR HEADER PRESSURE	1.61-272				151-220
	SWGR MCC PNLS-CR/RB/PH					
	DIVISION 1					
1R22*SWG101	4160V-HVN RHR SW CS SWG111	FE-1B				EL 25'
ACB 101-1	EMERG BUS NORM SUPPLY	5R2209	1R22A01	1R22*SWG101	EMER SWGR RM EL 25'	EL-25'
ACB 101-2	EMER BUS RES SUPPLY	5R2210	1R22A02	1R22*SWG101	EMER SWGR RM EL 25'	EL-25'
BUS 101 SEQ	PROGRAM CKT SW RHR CS HVN	5R2217	1R22A03		EMER SWGR RM EL 25'	EL-25'
BUS	4160 REL & MET CKT	8R1205	1R22A04	1R22*SWG101	EMER SWGR RM EL 25'	EL-25'
	DIVISION 2					

TABLE 223.90-2

SHUTDOWN EQUIPMENT LIST

1R22*SWG102	4160V-HVN RHR SH CS SWG112				EMER SWGR RM EL 25'	EL-25'
ACB 102-1	EMERG BUS NORM SUPPLY	5R2211	1R22B01	1R22*SWG102	EMER SWGR RM EL 25'	EL-25'
ACB 102-2	EMERG BUS RES SUPPLY	5R2212	1R22B02	1R22*SWG102	EMER SWGR RM EL 25'	EL-25'
BUS 102 SEQ	PROGRAM CKT SH RHR CS	5R2218	1R22B03		EMER SWGR RM EL 25'	EL-25'
BUS	4160 REL & MET CKT	8R2206	1R22B04	1R22*SWG102	EMER SWGR RM EL 25'	EL-25'
	DIVISION 3					
1R22*SWG103	4160V-HVN RHR SH SWG113	FE-1AV		1R42*PNL-C1	EMER SWGR RM EL 25'	EL-25'
ACB 103-1	EMERG BUS NORM SUPPLY	5R2213	1R22C01	1R22*SWG103	EMER SWGR RM EL 25'	EL-25'
ACB 103-2	EMERG BUS RES SUPPLY	5R2214	1R22C02	1R22*SWG103	EMER SWGR RM EL 25'	EL-25'
BUS 103 SEQ	PROGRAM CKT SH HVN	5R2219	1R22C03		EMER SWGR RM EL 25'	EL-25'
BUS	4160 REL & MET CKT	8R2207	1R22C04	1R22*SWG103	EMER SWGR RM EL 25'	EL-25'
	DIVISION 1					
ACB 101-4	FEEDER TO EMERG BUSS 111	5R2303	1R23A01	1R22*SWG101	EMER SWGR RM EL 25'	EL-25'
1R23*T-101	TRANSFORMER	FE-1B		1R22*SWG101	EMER SWGR RM EL 25'	EL-25'
1R23*SWG111	480V -1R24*MCC1110-9&PNLR1				EMER SWGR RM EL 25'	EL-25'
1JB*701	1R24*MCC1111/9	FE-1E		1R23*SWG-111	EMER SWGR RM EL 25'	EL-25'
1JB*703	1R24*MCC1117/4/Y/Z/A/C	FE-1E		1R23*SWG-111	EMER SWGR RM EL 25'	EL-25'
1JB*300	1JB*701/3	FE-1E		1R23*SWG-111	EMER SWGR RM EL 25'	EL-25'
1JB*702	1R24*MCC1113/8	FE-1E		1R23*SWG-111	EMER SWGR RM EL 25'	EL-25'
	DIVISION 2					
ACB 102-4	FEEDER TO EMERG BUS 112	5R2304	1R23B01	1R22*SWG102	EMER SWGR RM EL 25'	EL-25'
1R23*T-102	TRANSFORMER	FE-1B		1R22*SWG102	EMER SWGR RM EL 25'	EL-25'
1R23*SWG112	480V -1R24*MCC1120-9&PNLB1				EMER SWGR RM EL 25'	EL-25'
1JB*706	1R24*MCC1127/4/X/A/C	FE-1E		1R23*SWG-112	EMER SWGR RM EL 25'	EL-25'
1JB*704	1R24*MCC1121/9	FE-1E		1R23*SWG-112	EMER SWGR RM EL 25'	EL-25'
1JB*301	1JB*704/6	FE-1E		1R23*SWG-112	EMER SWGR RM EL 25'	EL-25'
1JB*705	1R24*MCC1123/8	FE-1E		1R23*SWG-112	EMER SWGR RM EL 25'	EL-25'
	DIVISION 3					
ACB 103-5	FEEDER TO EMERG BUS 113	5R2305	1R23C01	1R22*SWG103	EMER SWGR RM EL 25'	EL-25'
1R23*SWG113	480V -1R24*MCC1131-4&PNL01				EMER SWGR RM EL 25'	EL-25'
1R23*T-103	TRANSFORMER	FE-1B		1R22*SWG103	EMER SWGR RM EL 25'	EL-25'
	DIVISION 1					
1R35*PNLR1	120V -HVN SW		1R35A02	1R24*MCC1115	EMER SWGR RM EL 25'	EL-25'
1R24*MCC1110	480V -X41,P41				EMER SWGR RM EL 25'	EL-25'
1R24*MCC1111	480V -E11,E21				EMER SWGR RM EL 25'	EL-25'
1R24*MCC1112	480V -B31,P42,T46,E11	FE-1E		1R23*SWG-111	EMER SWGR RM EL 25'	EL-25'
1R24*MCC1113	480V -E21,G33,C41,E11				EMER SWGR RM EL 25'	EL-25'
1R24*MCC1114	480V -G41	FE-1H		1R24*SWG111	EMER SWGR RM EL 25'	EL-25'
1R24*MCC1115	480V -R42,R35,X41,X61,	FE-1E		1R23*SWG-111	EMER SWGR RM EL 25'	EL-25'
1R24*MCC1116	480V -M50,P41,R43,X41,X60.X61	FE-1E		1R23*SWG-111	EMER SWGR RM EL 25'	EL-25'
1R24*MCC1117	480V -E11,E21				EMER SWGR RM EL 25'	EL-25'
1R24*MCC1118	480V -E41,E11,T46	FE-1K/H		1R23*SWG111	EMER SWGR RM EL 25'	EL-25'
1R24*MCC1119	480V -E11,P41	FE-1K		1R23*SWG111	EMER SWGR RM EL 25'	R.B. EL 40'
1R24*MCC111X	480V -E11,B31	FE-1K		1R24*TRS111X	R.B. EL 112'	R.B. EL 112'-6'
1R24*MCC111Z		FE-1K		1R24*MCC111Y	R.B. EL 78'	R.B. EL 112'-6'
1R24*TRS111Y	TRANSFER SWITCH	FE-1E				R.B. EL 112'-6'
1R24*TRS111X	TRANSFER SWITCH	FE-1E		1R24*MG113A/111		R.B. EL 150
1R24*MG-111	MOTOR GENERATOR	FE-1E		1R23*SWG-111	EMER SWGR RM EL 25'	R.B. EL 150'
1JB*703	1R24*MCC111Y/7/4/Z	FE-1H		1R24*SWG111	EMER SWGR RM EL 25'	EL 8'
	DIVISION 2					
1R24*MCC1120	480V -P41,X41				EMER SWGR RM EL 25'	SCREENWELL
1R24*MCC1121	480V -E11				EMER SWGR RM EL 25'	R.B. EL 40'
1R24*MCC1122	480V -E11,B31,P42,T46	FE-1E		1R23*SWG-112	EMER SWGR RM EL 25'	R.B. EL 112'
1R24*MCC1123	480V -E21,C41				EMER SWGR RM EL 25'	R.B. EL 112'

TABLE 223.90-2

SHUTDOWN EQUIPMENT LIST

1R24*MCC1124	480V -G41				EMER SWGR RM EL 25'	R.B. EL 150'
1R24*MCC1125	480V -R42,R35,X41,X61	FE-1E		1R23*SWG-112	EMER SWGR RM EL 25'	EMER SWGR ROOM
1R24*MCC1126	480V -M50,P41,R43,X41,X60,X61	FE-1E		1R23*SWG-112	EMER SWGR RM EL 25'	DIESEL GEN ROOM
1R24*MCC1127	480V -E11,E21,P41				EMER SWGR RM EL 25'	R.B. EL 40'
1R24*MCC1128	480V -E11,E51,P41,P42,T46	FE-1J		1R23*SWG112	EMER SWGR RM EL 25'	R.B. EL 112'
1R24*MCC1129	480V -E11,P41	FE-1M		1R23*SWG112	EMER SWGR RM EL 25'	R.B. EL 40'
1R24*TRS112Y	TRANSFER SWITCH	FE-1E		1R24*MG113B/112		R.B. EL 150'
1R24-MCC112A		FE-1J		1R24*MCC112X	R.B. EL 78'	R.B. EL 78
1R24-MCC112C		FE-1M		1R24*MCC112X	R.B. EL 78'	R.B. EL 78
1R24*MCC112X		FE-1M		1R23*SWG112	EMER SWGR RM EL 25'	R.B. EL 78'
1R24*MCC112Y	480V -B31	FE-1M		1R24*TRS112Y	R.B. EL 112'	R.B. EL 112'
1R24*MG112	MOTOR GENERATOR	FE-1E		1R23*SWG-112	EMER SWGR RM EL 25'	R.B. EL 150'
1R24*PNL-01		FE-9NY		1R23*MCC112Y	R.B. EL 112'	R.B. EL 112'
	DIVISION 3					
1R24*MCC1131	480V -P42,T46	FE-1E		1R23*SWG-113	EMER SWGR RM EL 25'	R.B. EL 63'
1R24*MCC1134	480V -M50,P41,R43,X60,	FE-1E		1R23*SWG-113	EMER SWGR RM EL 25'	DIESEL GEN ROOM
1R24*MG113A	MOTOR GENERATOR	FE-1E		1R24*SWG113	EMER SWGR RM EL 25'	R.B. EL 150'
1R24*MG113B	MOTOR GENERAOTR	FE-1E		1R24*SWG113	EMER SWGR RM EL 25'	R.B. EL 150'
	DIVISION 1					
1R35*PNLR1	120V -M50,R43		1R35A02	1R24*MCC1115	EMER SWGR RM EL 25'	EMER SWGR ROOM EL 25
1R35*TR1	480V/120V XFMR PNLR1	FE-1H		1R24*MCC1115	EMER SWGR RM EL 25'	EMER SWGR ROOM EL 25
1R35*T-R2	TRANSFORMER	FE-1H		1R24*MCC1112	R.B. EL 112'	R.B. EL 112
1R35*T-R3	TRANSFORMER	FE-1X		1R24*MCC116	DIESEL GEN RM EL 22'	DIESEL GEN ROOM EL 20
	DIVISION 2					
1R35*PNLB1	120V -M50,R43		1R35B02	1R24*MCC1125	EMER SWGR RM EL 25'	R.B. EL 44'
1R35*TB1	480V/120V XFMR PNLB1			1R24*MCC1125	EMER SWGR RM EL 25'	EMER SWGR ROOM EL 25
1R35*T-B2	TRANSFORMER	FE-1J		1R24*MCC1122	R.B. EL 112'	R.B. EL 112'
1R35*T-B3	TRANSFORMER	FE-1X		1R24*MCC1126	DIESEL GEN RM EL 25'	DIESEL GEN ROOM
	DIVISION 3					
1R35*T01	480V/120V XFMR PNL01	FE-1H		1R24*MCC1133	EMER SWGR RM EL 25'	EMER SWGR ROOM EL 25
1R35*PNL-01		FE-1H		1R35*T-01	EMER SWGR RM EL 25'	R.B. EL 25'
1R35*T-02	TRANSFORMER	FE-1X		1R24*MCC1134	DIESEL GEN RM EL 22'	DIESEL GEN ROOM
	DIVISION 1					
1R42*DCA1	125DC- 1R42*SWGa1 BAT CH	FE-1H		1R24*MCC1115	EMER SWGR RM EL 25'	EMER SWGR ROOM
1R42*PNL-A1	125DC- SWG101&111 DG	FE-1AT		1R42*SWG101	EMER SWGR RM EL 25'	EMER SWGR ROOM
1R42*BAA1	125DC- 1R42*SWGA1 BAT					BATT ROOM
1R42*SWGA1	125DC- PNLA1&A2					EMER SWGR ROOM
1R42*PNLA2	125DC- ADS &GE LOGIC					EMER SWGR ROOM
1H11*PNL-VC1	125 VDC PNL FEED	11R4202		1R42*PNL-A	RELAY RM EL 44'	CONTROL ROOM EL-63
1H11*PNL-VC2	125 VDC PNL FEED	11R4201		1R42*PNL-A2	RELAY RM EL 44'	CONTROL ROOM EL-63

TABLE 223.90-2

IDENTITY	DESCRIPTION	ESK	CKT.NO.	PWR SC	PWR SC LOC	EQUIP L
	RHR SUPPRESSION POOL COOLING MODE					
1E11*P-014A	RHR Pump	5E1101	1E11A01	1R22*SWG-101	Emer Swgr Rm El 25'	8-95
1E11*P-014C	RHR Pump	5E1102	1E11C01	1R22*SWG-103	Emer Swgr Rm El 25'	8-90
1E11*MOV 031A	RHR Pump Suction VV	6E1101	1E11A03	1R24*MCC1113	R. B. El 112'	24-065
1E11*MOV 031C	RHR Pump Suction VV	6E1101	1E11C03	1R24*MCC1113	R. B. El 112'	24-069
1E11*MOV 033A	RHR HX Shell Inlet VV	6E1116	1E11A16	1R24*MCC1119	R. B. El 40'	25-105
1E11*MOV 034A	RHR HX Shell Side Bypass VV	6E1120	1E11A17	1R24*MCC1112	R. B. El 112'	28-073
1E11*MOV 035A	RHR HX Shell Side Outlet VV	6E1115	1E11A18	1R24*MCC1117	R. B. El 40'	31-087
1E11*MOV 040A	RHR Flow to Supp Pool	6E1110	1E11A10	1R24*MCC1112	R. B. El 112'	72-6
1E11*MOV 042A	RHR Flow to Supp Pool	6E1112	1E11A12	1R24*MCC1119	R. B. El 40'	29-0
	DIVISION 2					
1E11*P-014B	RHR Pump	5E1102	1E11B02	1R22*SWG-102	Emer Swgr Rm El 25'	8-265
1E11*P-014D	RHR Pump	5E1104	1E11D02	1R22*SWG-103	Emer Swgr Rm El 25'	8-280
1E11*MOV 031B	RHR Pump Suction VV	6E1129	1E11B03	1R24*MCC1122	R. B. El 112'	24-275
1E11*MOV 031D	RHR Pump Suction VV	6E1102	1E11D03	1R24*MCC1122	R. B. El 112'	24-291
1E11*MOV 033B	RHR HX Shell Inlet VV	6E1138	1E11B16	1R24*MCC1129	R. B. El 40'	25-255
1E11*MOV 034B	RHR HX Shell Side Bypass VV	6E1141	1E11B17	1R24*MCC1122	R. B. El 112'	28-288
1E11*MOV 035B	RHR HX Shell Side Outlet VV	6E1135	1E11B18	1R24*MCC1127	R. B. El 40'	31-278
1E11*MOV 040B	RHR Flow to Supp Pool	6E1128	1E11B10	1R24*MCC1122	R. B. El 112'	73-6
1E11*MOV 042B	RHR Flow to Supp Pool	6E1137	1E11B12	1R24*MCC1129	R. B. El 40'	29-0

(1) THE EQUIPMENT IN THE REACTOR BUILDING IS LOCATED BY ELEVATION(FT.) AND AZIMUTH(DEGREES): EXAMPLE- 112-230 I.E. REACTOR BUILDING, ELEVATION 112FT AND 230 DEGREES. THE EQUIPMENT OUTSIDE THE REACTOR BUILDING IS LOCATED BY AREA, ELEVATION, LINE AND COLUMN: EXAMPLE- CB/63-C13 I.E. CONTROL BUILDING, ELEVATION 63FT., LINE C AND COLUMN 13.

TABLE 223.90-3

INDICATION PROVIDED IN CONTROL ROOM FOR CLASS IE BUSES REQUIRED TO ACHIEVE COLD SHUTDOWN CONDITION

Meter	Service
VM-1R22A04	4,160 V Bus 101 Volts
AM-1R22A06	NSST Bus 101 Amps
AM-1R22A08	RSST Bus 101 Amps
VM-1R22B04	4,160 V Bus 102 Volts
AM-1R22B06	NSST Bus 102 Amps
AM-1R22B08	RSST Bus 102 Amps VM-1R22C04 4,160 V Bus 103 Volts
AM-1R22C06	NSST Bus 103 Amps AM-1R22C08 RSST Bus 103 Amps
VM-1R23N17	480 V Emergency Switchgear Bus 111 Volts
VM-1R23N21	480 V Emergency Switchgear Bus 112 Volts
AM-1R23B04	480 V Emergency Switchgear Bus 112 Amps
VM-1R23N25	480 V Emergency Switchgear Bus 113 Volts
AM-1R23C04	480 V Emergency Switchgear Bus 113 Amps
VM-1R42A02	125 V DC Battery Bus A Volts VM-1R42B02 125 V DC Batterh Bus B Volts VM-1R42C02 125 V DC Battery Bus C Volts
VM-1R43N01	Emergency Diesel Generator 101 Incoming Volts
VM-1R43N01	Emergency Diesel Generator 101 Running Volts
VM-1R43A04	Emergency Diesel Generator 101 Volts
1R43-SI061Y	Emergency Diesel Generator 101 Speed FM-1R43A04 Emergency Diesel Generator 101 Frequency
VAR-1R43A08	Emergency Diesel Generator 101 Vars
WM-1R43A08	Emergency Diesel Generator 101 Watts
AM-1R43A08	Emergency Diesel Generator 1012 Amps
Var-1R43B08	Emergency Diesel Generator 102 Vars

TABLE 223.90-3 (CONT'D)

Meter	Service
VM-1R43B08	Emergency Diesel Generator 102 Watts
AM-1R43B08	Emergency Diesel Generator 102 Amps
VM-1R43N02	Emergency Diesel Generator 102 Incoming Volts
VM-1R43N02	Emergency Diesel Generator 102 Running Volts
VM-1R43B04	Emergency Diesel Generator 102 Volts
1R43-SI062Y	Emergency Diesel Generator 102 Speed
FM1R43B04	Emergency Diesel Generator 102 Frequency
VAR-1R43C08	Emergency Diesel Generator 103 Vars WM-1R43C08 Emergency Diesel Generator 103 Watts
AM-1R43C08	Emergency Diesel Generator 103 Amps
VM-1R43N03	Emergency Diesel Generator 103 Incoming Volts
VM-1R43C04	Emergency Diesel Generator 103 Volts
1R43-SI063Y	Emergency Diesel Generator 103 Speed
FM-1R43C04	Emergency Diesel Generator 103 Frequency

Notes:

1. All meters are located on the main control board
2. All meter circuits are Class IE

TABLE 223.90-4

ALARMS PROVIDED IN CONTROL ROOM FOR CLASS IE BUSES REQUIRED TO ACHIEVE COLD SHUTDOWN CONDITION

ALARM NO.	ALARM DESCRIPTION
0062	4kV Emer Bus 101 Undervoltage
0063	4kV Emer Bus 102 Undervoltage
0064	4kV Emer Bus 103 Undervoltage
0077	Bus 101 TC2 Supply Breaker Loss of Control
0078	Bus 102 TC2 Supply Breaker Loss of Control
0079	Bus 103 TC2 Supply Breaker Loss of Control
0089	Bus 102 Supply or Feeder Breaker Auto Trip
0093	Bus 103 Supply or Feeder Breaker Auto Trip
0105	Bus 101 Supply or Feeder Breaker Auto Trip
0249	Bus 101 Supply or Feeder Breakers Loss of Control
0250	Bus 102 Supply or Feeder Breakers Loss of Control
0251	Bus 103 Supply or Feeder Breakers Loss of Control
0300	Bus 101 Program Loss of Control
0301	Bus 102 Program Loss of Control
0302	Bus 103 Program Loss of Control
0344	Bus 101 Supply Breakers Paralleled
0345	Bus 102 Supply Breakers Paralleled
0346	Bus 103 Supply Breakers Paralleled
0349	Diesel Generator 101 Pt Blown Fuse
0350	Diesel Generator 102 Pt Blown Fuse
0351	Diesel Generator 103 Pt Blown Fuse
0170	Emer Bus 111 Supply Breaker Overcurrent Trip
0171	Emer Bus 111 Supply Breaker Trans Ground Trip
0255	Emer Bus 112 Supply Breaker Overcurrent Trip
0256	Emer Bus 113 Supply Breaker Overcurrent Trip
0257	Emer Bus 111 Supply Breaker Loss of Control
0258	Emer Bus 112 Supply Breaker Loss of Control
0259	Emer Bus 113 Supply Breaker Loss of Control
0260	Emer Bus 112 Supply Transformer Ground Trip
0261	Emer Bus 113 Supply Transformer Ground Trip
1426	Low Press Coolant Inj MG Set 111/113A Trouble
1427	Low Press Coolant Inj MG Set 112/113B Trouble
0200	125VDC Battery Charger A1 Trouble
0201	125VDC Battery Charger B1 Trouble
0202	125VDC Battery Charger C1 Trouble
0357	125V Battery A Ground
0358	125V Battery B Ground
0359	125V Battery C Ground
0403	125VDC Bus A1 Breaker Overcurrent Trip
0404	125VDC Bus B1 Breaker Overcurrent Trip
0405	125VDC Bus C1 Breaker Overcurrent Trip
0091	Emer Generator 102 Ground Overcurrent
0107	Emer Generator 101 Ground Overcurrent
0121	Emer Generator 103 Ground Overcurrent
0293	Diesel Generator 101 Voltage Regulator Pwr Failure
0294	Diesel Generator 102 Voltage Regulator

TABLE 223.90-4 (CONT'D)

ALARM NO.	ALARM DESCRIPTION
	Pwr Failure
0295	Diesel Generator 103 Voltage Regulator Pwr Failure
0336	Diesel 103 System Degraded
0337	Diesel 103 System Inoperative
0374	Diesel 102 System Degraded
0375	Diesel 102 System Inoperative
0368	Diesel 101 System Degraded
0369	Diesel 101 System Inoperative

Note: All alarms are located on the main control board.

TABLE 223.90-5

METER INDICATION

Meter	Location	Service	Meter Power	Transducer Power	Required Safe Shutdown	I.E. Recorder Back-up
1B21-LI007 (B21-R610)	601	Reactor Pressure Vessel Water Level	Non-Class 1E	Class 1E	Yes	Yes
1B21-LI005 (B21-R605)	602	Reactor Pressure Vessel Water Level	Non-Class 1E	Non-Class 1E	No	
1B21-FI016A (B21-R609A)	602	Cal Jet Pump Flow	Non-Class 1E	Non-Class 1E	No	
1B21-FI016B (B21-R609B)	602	Cal Jet Pump Flow	Non-Class 1E	Non-Class 1E	No	
1B21-FI016C (B21-R609C)	602	Cal Jet Pump Flow	Non-Class 1E	Non-Class 1E	No	
1B21-FI016D (B21-R609D)	602	Cal Jet Pump Flow	Non-Class 1E	Non-Class 1E	No	
1B21-FI013A (B21-R611A)	602	Jet Pump Flow	Non-Class 1E	Non-Class 1E	No	
1B21-FI013B (B21-R611B)	602	Jet Pump Flow	Non-Class 1E	Non-Class 1E	No	
1B21-LI004D (B21-R604)	603	Reactor Pressure Vessel Water Level	Non-Class 1E	Non-Class 1E	Yes	Yes
1B21-PDI011B	619	Jet Pump 1 Differential Pressure	Non-Class 1E	Non-Class 1E	No	
1B21-PDI011D (B21-R608D)	619	Jet Pump 2 Differential Pressure	Non-Class 1E	Non-Class 1E	No	
1B21-PDI011F (B21-R608F)	619	Jet Pump 3 Differential Pressure	Non-Class 1E	Non-Class 1E	No	
1B21-PDI01H (B21-R608H).	619	Jet Pump 4 Differential Pressure	Non-Class 1E	Non-Class 1E	No	
1B21-PDI011K (B21-R608K)	619	Jet Pump 5 Differential Pressure	Non-Class 1E	Non-Class 1E	No	
1B21-PDI011M (B21-R608M)	619	Jet Pump 6 Differential Pressure	Non-Class 1E	Non-Class 1E	No	
1B21-PDI011P (B21-R608P)	619	Jet Pump 7 Differential Pressure	Non-Class 1E	Non-Class 1E	No	

TABLE 223.20-5 (CONT'D)

Meter	Location	Service	Meter Power	Transducer Power	Required Safe Shutdown	I.E. Recorder Back-up
1B21-PDI1011S (B21-R608S)	619	Jet Pump 8 Differential Pressure	Non-Class 1E	Non-Class 1E	No	
1B21-PDI011U (B21-R6080)	619	Jet Pump 9 Differential Pressure	Non-Class 1E	Non-Class 1E	No	
1B21-PDI011W (B21-R608W)	619	Jet Pump 10 Differential Pressure	Non-Class 1E	Non-Class 1E	No	
1B21-PDI011A (B21-R608A)	619	Jet Pump 11 Differential Pressure	Non-Class 1E	Non-Class 1E	No	
1B21-PDI011C (B21-R608C)	619	Jet Pump 12 Differential Pressure	Non-Class 1E	Non-Class 1E	No	
1B21-PDI011E (B21-R608E)	619	Jet Pump 13 Differential Pressure	Non-Class 1E	Non-Class 1E	No	
1B21-PDI011G (B21-R608G)	619	Jet Pump 14 Differential Pressure	Non-Class 1E	Non-Class 1E	No	
1B21-PDI011J (B21-R608J)	619	Jet Pump 15 Differential Pressure	Non-Class 1E	Non-Class 1E	No	
1B21-PDI011L (B21-R603L)	619	Jet Pump 16 Differential Pressure	Non-Class 1E	Non-Class 1E	No	
1B21-PDI011N (B21-R608N)	619	Jet Pump 17 Differential Pressure	Non-Class 1E	Non-Class 1E	No	
1B21-PDI011R (B21-R608R)	619	Jet Pump 18 Differential Pressure	Non-Class 1E	Non-Class 1E	No	
1B21-PDI011T (B21-R608T)	619	Jet Pump 19 Differential Pressure	Non-Class 1E	Non-Class 1E	No	
1B21-PDI011V (B21-R608V)	619	Jet Pump 20 Differential Pressure	Non-Class 1E	Non-Class 1E	No	
1B21-TI001E	MCB	Feedwater Temperature	Non-Class 1E	Non-Class 1E	No	
1B21-TI001F	MCB	Feedwater Temperature	Non-Class 1E	Non-Class 1E	No	
1C41-P1002A (C41-R600)	603	Pump Out Pressure (Discharge Pressure)	Non-Class 1E	Non-Class 1E	No	
1C41-LI001A (C41-R601)	603	Standby Liquid Control Tank Level	Non-Class 1E	Non-Class 1E	No	

TABLE 223.90-5 (CONT'D)

Meter	Location	Service	Meter Power	Transducer Power	Required Safe Shutdown	I.E. Recorder Back-up
1E11*FI006A (E11-R602A)	601	RHR "A" Service Water Flow	Non-Class 1E	Class 1E	No	
1E11*FI001A (E11-R603A)	601	RHR "A" Discharge Header Flow	Non-Class 1E	Class 1E	No	
1B11*LI002A (E11-R604A-1)	601	RHR "A" Heat Exchanger Shell Level	Non-Class 1E	Class 1E	No	
1E11*PI003A (E11-R606A-1)	601	RHR "A" Heat Exchanger Pressure	Non-Class 1E	Class 1E	No	
1E11-PN1056A (E11-R610A)	601	Position Indicator for 1E11*MOV056A (E11-F103A)	Non-Class 1E	Class 1E	No	
1B11-PN1055A (E11-R611A)	601	Position Indicator for 1E11*MOV055A (E11-F104A)	Non-Class 1E	Class 1E	No	
(E11-R700A)	601	RHR Pump "A" Amps	Non-Class 1E	Class 1E	No	
1B11*FI006B (E11-R602B)	601	RHR "B" Service Water Flow	Non-Class 1E	Class 1E	No	
1211*FI1001B (1B11-R603B)	601	RHR "B" Discharge Header Flow	Non-Class 1E	Class 1E	No	
1E11*L1002B (E11-R604B-1	601	RHR "B" Heat Exchanger Shell Level	Non-Class 1E	Class 1E	No	
1E11*PI003B (E11-R606B-1)	601	RHR "B" Heat Exchanger Pressure	Non-Class 1E	Class 1E	No	
1E11*FI004 (E11-R607)	601	Shutdown Head Cooling Flow	Non-Class 1E	Class 1E	No	
1E11*PI005 (E11-R609-1)	601	RHR Heat Exchanger Drain to RCIC	Non-Class 1E	Class 1E	No	
1E11-PN1056B (E11-R610B)	601	Position Indicator for 1E11*MOV056B (E11-F103B)	Non-Class 1E	Class 1E	No	
1E11-PN1055B (E11-R611B)	601	Position Indicator for 1E11*MOV055B (E11-F104B)	Non-Class 1E	Class 1E	No	
(E11-R700B)	601	RHR Pump "B" Amps	Non-Class 1E	Class 1E		
(E11-R700C)	601	RHR Pump "C" Amps	Non-Class 1E	Class 1E	No	
(E11-R700D)	601	RHR Pump "D" Amps	Non-Class 1E	Class 1E	No	

TABLE 223.90-5 (CONT'D)

Meter	Location	Service	Meter Power	Transducer Power	Required Safe Shutdown	I.E. Recorder Back-up
1E21-P1001A (E21-R600A)	601	Core Spray Pump "A" Discharge Pressure	Non-Class 1E	Class 1E	No	
1E21-F1002A (E21-R601A)	601	Core Spray "A" Flow	Non-Class 1E	Class 1E		
(E21-R700A)	601	Core Spray Pump "A" Amps	Non-Class 1E	Class 1E	No	
1E21-P1001B (E21-R600B)	601	Core Spray Pump "B" Discharge Pressure	Non-Class 1E	Class 1E	No	
1E21-F1002B (E21-R601B)	601	Core Spray "B" Flow	Non-Class 1E	Class 1E	No	
(E21-R700B)	601	Core Spray Pump "B" Amps	Non-Class 1E	Class 1E	No	
1E41-P1003 (E41-R600-1)	601	Pump Discharge Flow	Non-Class 1E	Class 1E	No	
1E41-P1002 (E41-R601)	601	Pump Discharge Pressure	Non-Class 1E	Class 1E	No	
1E41-P1004 (E41-R602)	601	Turbine Steam Inlet Pressure	Class 1E	Non-Class 1E	No	
1E41-P1005 (E41-R603)	601	Turbine Exhaust Pressure	Class 1E	Non-Class 1E	No	
1E41-P1001 (E41-R606)	601	Pump Suction Pressure	Class 1E	Non-Class 1E	No	
1E41-T1152	601	Suppression Pool Temperature	Non-Class 1E	Non-Class 1E	Yes	Yes
1E41-L1013	601	Suppression Pool Level	Non-Class 1E	Non-Class 1E	Yes	Yes
1E51-F1003 (E51-R600-1)	602	Pump Discharge Flow	Non-Class 1E	Class 1E	No	
1E51-P1014 (E51-R603)	602	Turbine Exhaust Pressure	Non-Class 1E	Class 1E	No	
1E51-P1015 (E51-R604)	602	Pump Suction Pressure	Non-Class 1E	Class 1E	No	
1E51*P1002 (E51-R601)	602	Pump Discharge Pressure	Non-Class 1E	Class 1E	No	
1E51*P1004 (E51-R602)	602	Turbine Steam Inlet Pressure	Non-Class 1E	Class 1E	No	

TABLE 223.90-5 (CONT'D)

Meter	Location	Service	Meter Power	Transducer Power	Required Safe Shutdown	I.E. Recorder Back-up
AM-1M43N05	FP	Motor-Driven Fire Pump Amps	Non-Class 1E	Non-Class 1E	No	
1M43-FI002	FP	Fire Protection Water Flow to Reactor Building	Non-Class 1E	Non-Class 1E	No	
1M50-TI089A	VC2	RBSVS Chilled Water System "A" Temperature	Class 1E	Class 1E	No	
AM-1M50A02	VC2	RBSVS Water Chiller "3A" Amps	Class 1E	Class 1E	No	
1M50-TI089B	VC2	RBSVS Chilled Water System "B" Temperature	Class 1E	Class 1E	No	
AM-1M50B02	VC2	RBSVS Water Chiller "3B" Amps	Class 1E	Class 1E	No	
AM-1M50C02	VC2	RBSVS Water Chiller "4A" Amps	Class 1E	Class 1E	No	
AM-1M50D02	VC2	RBSVS Water Chiller "4B" Amps	Class 1E	Class 1E	No	
1P41-PI001A	MCB	Service Water Header "A" Pressure	Non-Class 1E	Non-Class 1E	No	
1P41-PI001B	MCB	Service Water Header "B" Pressure	Non-Class 1E	Non-Class 1E	No	
AM-1P41A10	MCB	Service Water Pump "A" Amps	Non-Class 1E	Class 1E	No	
AM-1P41B10	MCB	Service Water Pump "B" Amps	Non-Class 1E	Class 1E	No	
AM-1P41C10	MCB	Service Water Pump "C" Amps	Non-Class 1E	Class 1E	No	
AM-1P41D10	MCB	Service Water Pump "D" Amps	Non-Class 1E	Class 1E	No	
1P42-PI002A	MCB	RBCLCW Pump Header Pressure	Non-Class 1E	Non-Class 1E	No	
1P42-PI002B	MCB	RBCLCW Pump Header Pressure	Non-Class 1E	Non-Class 14	No	
1P42-TI201A	MXP	Dry Well Cooler Outlet Temperature	Non-Class 1E	Non-Class 1E	No	
1P42-TI201B	MXP	Dry Well Cooler Outlet Temperature	Non-Class 1E	Non-Class 1E	No	
M-1P50A02	MCB	Instrument and Service Air Compressor "A" Amps	Non-Class 1E	Non-Class 1E	No	
AM-1P50B02	MCB	Instrument and Service Air Compressor "B" Amps	Non-Class 1E	Non-Class 1E	No	
AM-1P50C02	MCB	Instrument and Service Air Compressor "C" Amps	Non-Class 1E	Non-Class 1E	No	
1P50-PI001	MCB	Compressed Air header Pressure	Non-Class 1E	Non-Class 1E	No	
1P50-PI002	MCB	Instrument Air Header Pressure	Non-Class 1E	Non-Class 1E	No	
1P50-PI116A	MXP	Accumulator Header Pressure	Class 1E	Class 1E	Yes	N.R.
1P50-PI116B	MXP	Accumulator Header Pressure	Class 1E	Class 1E	Yes	N.R.

TABLE 223.90-5 (CONT'D)

Meter	Location	Service	Meter Power	Transducer Power	Required Safe Shutdown	I.E. Recorder Back-up
1T46-PI020	VC2	Reactor Building Vent Exhaust Air Flow	Non-Class 1E	Non-Class 1E	No	
1T46-PDI003A	VC2	RBSVS Filter Train "A" Differential Pressure	Class 1E	Class 1E	No	
1T46-MI002A	VC2	RBSVS Filter Train "A" Moisture	Class 1E	Class 1E	No	
1T46-PDI003B	VC2	RBSVS Filter Train "B" Differential Pressure	Class 1E	Class 1E	No	
1T46-MI002B	VC2	RBSVS Filter Train "B" Moisture	Class 1E	Class 1E	No	
1X41-TI008A	VC1	Space Temperature - Screenwell Pump House	Class 1E	Class 1E	No	
1X41-TI008B	VC1	Space Temperature - Screenwell Pump House	Class 1E	Class 1E	No	
1X41-TI001A	VC1	Space Temperature - Emergency Switchgear Room No. 1	Class 1E	Class 1E	No	
1X41-TI001B	VC1	Space Temperature - Emergency Switchgear Room No. 1	Class 1E	Class 1E	No	
1X41-TI002A	VC1	Space Temperature - Emergency Switchgear Room No. 2	Class 1E	Class 1E	No	
1X41-TI002B	VC1	Space Temperature - Emergency Switchgear Room No. 2	Class 1E	Class 1E	No	
1X41-TI003A	VC1	Space Temperature - Emergency Switchgear Room No. 3	Class 1E	Class 1E	No	
1X41-TI003B	VC1	Space Temperature - Emergency Switchgear Room No. 3	Class 1E	Class 1E	No	
1X41-TI004A	VC1	Space Temperature - Relay Room Temperature	Class 1E	Class 1E	No	
1X41-TI004B	VC1	Space Temperature - Relay Room Temperature	Class 1E	Class 1E	No	
1X41-TI007A	VC1	Space Temperature - Battery Room "A"	Class 1E	Class 1E	No	
1X41-TI007B	VC1	Space Temperature - Battery Room "B"	Class 1E	Class 1E	No	
1X41-TI007C	VC1	Space Temperature - Battery Room "C"	Class 1E	Class 1E	No	
1X41-TI006A	VC1	Space Temperature - Chiller Equipment Room	Class 1E	Class 1E	No	
1X41-TI006B	VC1	Space Temperature - Chiller Equipment Room	Class 1E	Class 1E	No	
1X41-T1005A	VC1	Space Temperature - HVAC Equipment Room	Class 1E	Class 1E	No	
1X41-TI005B	VC1	Space Temperature - HVAC Equipment Room	Class 1E	Class 1E	No	

TABLE 223.90-5 (CONT'D)

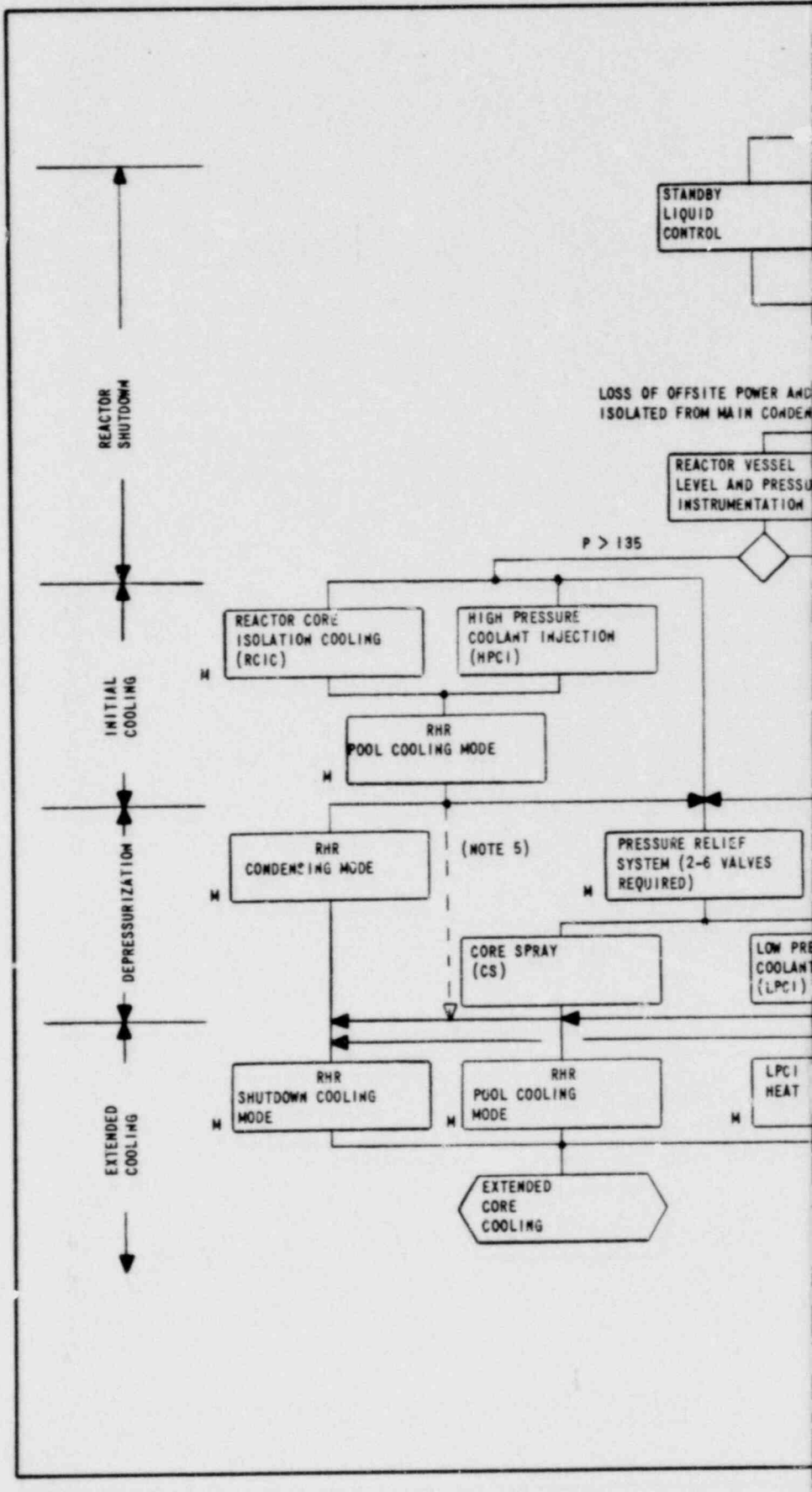
Meter	Location	Service	Meter Power	Transducer Power	Required Safe Shutdown	I.E. Recorder Back-up
1X41-TI009A	VC1	Space Temperature - Computer Room	Class 1E	Class 1E	No	
1X41-TI009B	VC1	Space Temperature - Computer Room	Class 1E	Class 1E	No	
1X60-TI001A	VC1	Space Temperature - Diesel Generator Room 101	Class 1E	Class 1E	No	
1X60-TI001B	VC1	Space Temperature - Diesel Generator Room 102	Class 1E	Class 1E	No	
1X60-TI001C	VC1	Space Temperature - Diesel Generator Room 103	Class 1E	Class 1E	No	
1X61-FI002A	VC1	Outdoor Air Inlet Flow	Class 1E	Class 1E	No	
1X61-PI002B	VC1	Outdoor Air Inlet Flow	Class 1E	Class 1E	No	

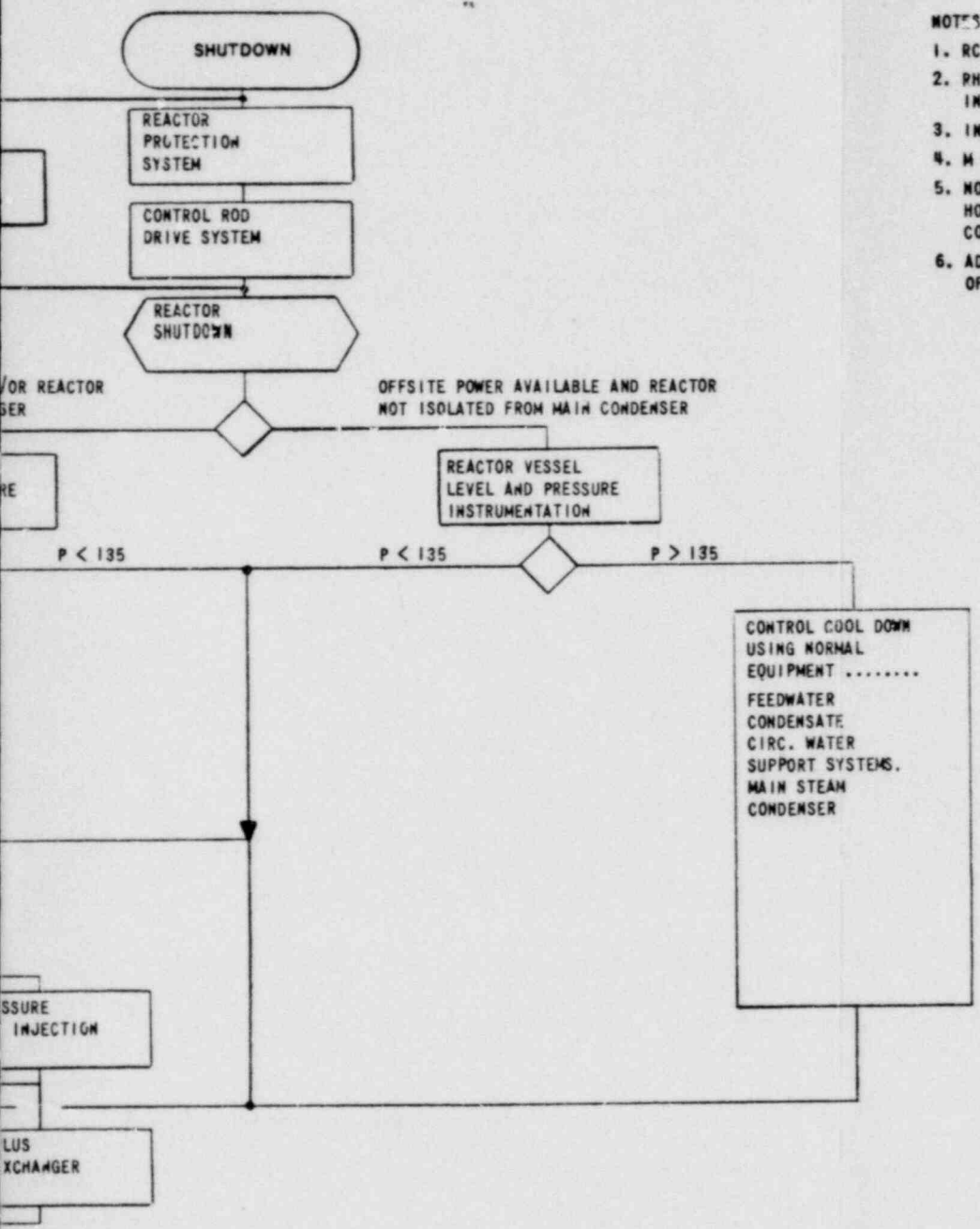
NOTES:

1. Systems required for safe shutdown: B21, C41, C61, E11, E21, E41, E51, M43, M50, P41, P42, P50, T46, X41, X60, X61.

ADDITIONAL METERS

1P41*FI 146A	B	RBCLCW Hx Svce Wtr Outlet Flow (A)	Class 1E	Class 1E	Yes	NR
1P41*FI146B	B	RBCLCW Hx Svce Wtr Outlet Flow (B)	Class 1E	Class 1E	Yes	NR
1P41*FI149A	B	RHR Hx Svce Wtr Outlet Flow (A)	Class 1E	Class 1E	Yes	NR
1P41*FI149B	B	RHR Hx Svce Wtr Outlet Flow (B)	Class 1E	Class 1E	Yes	NR
1P41*PDI150A	B	Svce Wtr Pmp "A" Strainer ΔP	Class 1E	Class 1E	Yes	NR
1P41*PDI150B	B	Svce Wtr Pmp "B" Strainer ΔP	Class 1E	Class 1E	Yes	NR
1P41*PDI150C	B	Svce Wtr Pmp "C" Strainer ΔP	Class 1E	Class 1E	Yes	NR
1P41*PDI150D	B	SVCE Wtr Pmp "D" Strainer ΔP	Class 1E	Class 1E	Yes	NR
1P41*PNI034A	B	RHR Hx A Svce Wtr Outlet VV position	Class 1E	Class 1E	Yes	NR
1P41*PNI034B	B	RHR Hx B Svce Wtr Outlet VV Position	Class 1E	Class 1E	Yes	NR
1P41*PNI037A	B	RBCLCW Hx A Svce Wtr Outlet VV Position	Class 1E	Class 1E	Yes	NR
1P41*PNI037B	B	RBCLCW Hx B svce Wtr Outlet VV Position	Class 1E	Class 1E	Yes	NR
1P11-LI002	B	Cond Stg Tk Level	Non-Class 1E	Non-Class 1E	No	
1B21*LI004	602	Reactor Level	Class 1E	Class 1E	Yes	NR
1B21*PI004	602	Reactor Pressure	Class 1E	Class 1E	Yes	NR


REACTOR SHUTDOWN
INITIAL COOLING
DEPRESSURIZATION
EXTENDED COOLING
STANDBY LIQUID CONTROL
LOSS OF OFFSITE POWER AND
ISOLATED FROM MAIN CONDEN
REACTOR VESSEL LEVEL AND PRESSU INSTRUMENTATION
P > 135
REACTOR CORE ISOLATION COOLING (RCIC)
HIGH PRESSURE COOLANT INJECTION (HPCI)
RHR POOL COOLING MODE
RHR CONDENSING MODE
(NOTE 5)
PRESSURE RELIEF SYSTEM (2-6 VALVES REQUIRED)
CORE SPRAY (CS)
LOW PR COOLANT (LPCI)
RHR SHUTDOWN COOLING MODE
RHR POOL COOLING MODE
LPCI HEAT
EXTENDED CORE COOLING



NOTES:

1. RCIC IS AUTO START, MANUAL RESET.
2. RHR CONDENSING MODE REQUIRES NON-SAFETY INSTRUMENT AIR.
3. INSTRUMENTATION NOT SHOWN.
4. M - MANUAL,
5. NO FORCED COOLDOWN CAPABILITY THIS PATH HOWEVER PLANT REMAINS SAFE IN HOT SHUTDOWN CONDITION AND WILL EVENTUALLY DEPRESSURIZE.
6. ADDITIONAL FLEXIBILITY EXISTS IN THAT PATHS OF MANY OPERATIONS MAY BE RETRACED.

FIG. 223.90-1

SHUTDOWN MODEL PROTECTION SEQUENCE FOR SHUTDOWN

SHOREHAM NUCLEAR POWER STATION-UNIT 1
CABLE SEPARATION ANALYSIS REPORT

Electrical One-Line Diagrams for Outstanding Issue No. 46 are packaged separately.

Shoreham Outstanding SER Issue #50
Low and/or Degraded Grid Voltage Condition

Request 223.87 (Revised Response)

It has come to our attention that some applicants did not intend to conduct confirmatory tests of some distribution systems and transformers supplying power to vital buses as required by Position 3 of Regulatory Guide 1.68, and more specifically by Part 4 of the staff position on degraded grid voltage (applied to all plants in licensing review by the Power Systems Branch since 1976). Part 4 of the degraded grid voltage position states as follows:

> "4. The voltage levels at the safety-related buses should be optimized for the full load and minimum load conditions that are expected throughout the anticipated range of voltage variations of the offsite power source by appropriate adjustment of the voltage tap settings of the intervening transformers. We require that the adequacy of the design in this regard be verified by actual measurement and by correlation of measured values with analysis results. Provide a description of the method for making this verification; before initial reactor power operation, provide the documentation required to establish that this verification has been accomplished."

Your test description in FSAR Chapter 14 does not contain sufficient detail for us to determine if you intend to conduct such a test. It is our position that confirmatory tests of all vital buses must be conducted including all sources of power supplies to the buses. Modify your test description to indicate that this testing will be conducted in accordance with Regulatory Guide 1.68 and the above cited position.

Response:

The adequacy of the design of the 4160, 480 and 120 V safety distribution systems, including power and control circuits, shall be verified in concept by actual measurement of selected voltages and loads. Also a correlation of measured values with analytical results will be used to confirm that the voltage levels at the safety-related buses have been optimized for the full load and minimum load conditions that are expected throughout the anticipated range of voltage variations of the offsite power source with the selected taps on the intervening transformers. Documentation will be available when the tests are complete. These tests will be performed prior to fuel load.

The test will be run according to the following:

Electrical System Verification Specific Checkout and Initial Operation Test

Objective

To demonstrate the capability of the offsite sources to supply power to the safety-related buses at full load and minimum load throughout the anticipated range of voltage variations of the offsite power source by correlation of measured values with analytical results.

Prerequisites

1. The applicable general prerequisites, as listed in FSAR Section 14.1.3.4, will be met.

2. The appropriate sections of the 4KV, 480V, and 120 V ac power distribution system necessary to this test will be operational.

3. Sufficient loads available for loading of system. Sufficient will be deemed to be when 30% of the connected load is available.

Test Method

(1) The adequacy of the design in regard to safety-related bus voltage levels will be verified by actual measurement and by correlation of measured values with analysis results. The verification and test will be performed prior to initial reactor operation on all sources of offsite power by:

(a) loading the station distribution buses, including all Class IE buses down to the 120/240 volt level, to at least 30%, of their total connected load.

(b) recording the existing grid and Class IE bus voltages down to the 120/240 volt level, to steady state conditions and during the starting of both a large Class IE and non-Class IE motor (not concurrently);

Note: To minimize the number of instrument locations, the bus voltages and loading need only be recorded on that string of buses which previously showed the lowest analyzed voltages.

(c) Using the same analytical techniques and assumptions as used in the previous voltage analyses, and the measured existing grid voltage and loading conditions recorded during conduct of the test, derive a new set of analytical values for the Class IE bus voltages down to the 120/240 volt level;

Acceptance Criteria

1. With good correlation between the analytical results and the test result, the test verification requirement will be met.

2. In general the test results should not be more than 2% lower than the analytical results; however, the difference between the two, when substracted from the voltage levels determined in the original analyses, should not be less than the Class IE equipment minimum voltage limits. The above tests will be performed prior to fuel loading with the results verified by NRC Division of Inspection and Enforcement.

Shoreham Outstanding SER Issue #51
Fracture Toughness of Steam Line

Request 121.40:

The applicant's response to Q 121.25 (FSAR Rev. 18-June 1980, states that main steam line piping was procured to the requirements of 1967 ANSI B 31.1 which did not require toughness testing. Because portions of the main steam line are part of the reactor coolant boundary, the applicant must provide information to demonstrate compliance with the fracture toughness requirements of Appendix G, 10 CFR Part 50 for the main steam line piping, including the process piping within the main steam penetrations.

Response:

NSSS Scope The applicant's response to the NSSS scope of this outstanding issue is currently under development and will be submitted to the NRC with our May 27, 1981 submittal.

BOP Scope Process Piping Within the Main Steam Penetrations

The process piping within the main steam penetrations up to the outboard MSIV meets the fracture toughness requirements of N-330 of the 1968 ASME Section III Code, through Summer 1969 Addenda. The requirements outlined in this edition are in compliance for the thickness used with those specified by NB-2300 of the 1971 ASME Section III Code, through Winter 1972 Addenda, as required by Appendix G of 10 CFR Part 50.

The process piping beyond the outboard MSIV up to the turbine stop valve is Code Class 2 and was procured to the requirements of the 1971 ASME Section III Code, through Winter 1972 Addenda, as specified by Subsection NC, for which no impact testing is required.

The fracture toughness requirements of the outboard isolation valve will be provided with our NSSS Scope response to SER open item No. 38, which will be provided with our May 27, 1981 submittal.

Shoreham Outstanding Issue #51
Feedwater Line Materials

Request 121.41:

The Applicant's response to Q 121.25 (FSAR Rev. 18-June 1980) did not address compliance with the fracture toughness requirements of Appendix G, 10 CFR Part 50 for the feedwater system materials which are classified Quality Group A/ASME Code Class 1 and are part of the reactor coolant pressure boundary. The Applicant must provide information to demonstrate that the fracture toughness of those materials in the feedwater system that are part of the reactor coolant pressure boundary is in compliance with the requirements of Appendix G to 10 CFR Part 50.

Response:

The feedwater system reactor pressure boundary materials inside the primary containment from the reactor vessel nozzle to the inboard isolation valve were procured to the requirements of the 1971 ASME III Subsection NB, through Winter 1972 Addenda, which is in compliance with the fracture toughness requirements of Appendix G of 10CFR part 50.

The feedwater system reactor pressure boundary materials between the containment isolation valves have fracture toughness requirements in accordance with N-330 of the 1968 ASME Section III Code, through Summer 1969 Addenda. The requirements outlined in this code edition are identical to those specified by NB-2300 of the 1971 ASME Section III Code, through Winter 1972 Addenda, as required by Appendix G of 10CFR50.

The feedwater system materials beyond the outboard isolation valve, up to and including the outboard high integrity motor operated check valve, were procured to the requirements of the 1971 ASME Subsection NB, through Winter 1972 Addenda, which is in compliance with the fracture toughness requirements of Appendix G of 10CFR part 50.

To ensure compliance with GDC 51, ferritic materials used in the reactor containment pressure boundary were procured to the requirements of ASME Section III. Where required by this code, impact testing at $0^{o}F$ or lower was performed on these materials, and has been verified by material documentation review.

Shoreham Outstanding SER Issue #56
Financial Qualification

Request 1.a.

Indicate the estimated annual cost by year to operate each unit of the subject facility for the first seven full years of each unit's commercial operation. The types of costs included in the estimates should be indicated and include (but not necessarily be limited to) operation and maintenance expense (with fuel costs shown separately), depreciation, taxes and a reasonable return on investment. (Enclosed is a form which should be used for each year of the seven year period.)

Indicate the projected plant capacity factor (in percent) for each unit during each of the seven years. Provide separate estimates using 50 percent and 60 percent plant capacity factors.

Response 1.a.

See the attached forms for the response to question 1.a. using projected plant capacity factors of 50% for the first seven full years of Shoreham's commercial operation and 60% for the years 1987 through 1989. The requested separate estimates using a projected plant capacity factor of 60% for the years 1983 through 1986 were submitted to the NRC via SNRC-561 dated April 30, 1981.

ATTACHMENT FOR ITEM NO. 1.a.

ESTIMATED ANNUAL COST OF OPERATING NUCLEAR GENERATING

UNIT: SHOREHAM NUCLEAR POWER STATION, UNIT NO. 1

FOR THE CALENDAR YEAR 1983

(thousands of dollars)

Operation and maintenance expenses	
Nuclear Power Generation	
Nuclear fuel expense (plant factor 50%	$ 44,100
Other operating expenses.....	15,122
Maintenance expenses.....	5,786
Total Nuclear Power Generation.....	65,008
Transmission expenses.....	150
Administrative and general expenses	
Property and liability insurance.....	4,137
Other A.& G. expenses.....	3,345
Total A.& G. expenses.....	7,482
TOTAL O&M EXPENSES.....	72,640
Depreciation expense.....	67,142
Taxes other than income taxes	
Property taxes.....	35,000
Other.....	27,210
Total taxes other than income taxes.....	62,210
Income taxes - Federal	97,004
Income taxes - Other	-
Deferred income taxes - net	58,208
Investment tax credit adjustments - net	(1,100)
Return (rate of return: 13.7 %)	294,434
TOTAL ANNUAL COST OF OPERATION	$ 650,538

ATTACHMENT FOR ITEM NO. 1.a.

ESTIMATED ANNUAL COST OF OPERATING NUCLEAR GENERATING

UNIT: SHOREHAM NUCLEAR POWER STATION, UNIT NO. 1

FOR THE CALENDAR YEAR 1984

(thousands of dollars)

Operation and maintenance expenses	
Nuclear Power Generation	
Nuclear fuel expense (plant factor 50%	$ 41,000
Other operating expenses	21,452
Maintenance expenses	16,186
Total Nuclear Power Generation	78,638
Transmission expenses	160
Administrative and general expenses	
Property and liability insurance	5,038
Other A.& G. expenses	6,022
Total A.& G. expenses	11,060
TOTAL O&M EXPENSES	89,858
Depreciation expense	67,142
Taxes other than income taxes	
Property taxes	37,600
Other	26,000
Total taxes other than income taxes	63,600
Income taxes - Federal	74,776
Income taxes - Other	-
Deferred income taxes - net	22,216
Investment tax credit adjustments - net	(1,400)
Return (rate of return: 13.7 %)	287,965
TOTAL ANNUAL COST OF OPERATION	$ 604,157

ATTACHMENT FOR ITEM NO. 1.a.

ESTIMATED ANNUAL COST OF OPERATING NUCLEAR GENERATING

UNIT: SHOREHAM NUCLEAR POWER STATION, UNIT NO. 1

FOR THE CALENDAR YEAR 1985

(thousands of dollars)

Operation and maintenance expenses	
Nuclear Power Generation	
Nuclear fuel expense (plant factor 50%	$ 36,100
Other operating expenses	20,019
Maintenance expenses	11,882
Total Nuclear Power Generation	68,001
Transmission expenses	170
Administrative and general expenses	
Property and liability insurance	5,418
Other A.& G. expenses	5,080
Total A.& G. expenses	10,493
TOTAL O&M EXPENSES	78,669
Depreciation expense	67,142
Taxes other than income taxes	
Property taxes	40,400
Other	24,239
Total taxes other than income taxes	64,639
Income taxes - Federal	88,343
Income taxes - Other	-
Deferred income taxes - net	22,216
Investment tax credit adjustments - net	(1,800)
Return (rate of return: 13.7 %)	278,306
TOTAL ANNUAL COST OF OPERATION	$ 597,515

ATTACHMENT FOR ITEM NO. 1.a.

ESTIMATED ANNUAL COST OF OPERATING NUCLEAR GENERATING

UNIT: SHOREHAM NUCLEAR POWER STATION, UNIT NO. 1

FOR THE CALENDAR YEAR 19 86

(thousands of dollars)

Operation and maintenance expenses	
Nuclear Power Generation	
Nuclear fuel expense (plant factor 50%)	$ 37,800
Other operating expenses	20,110
Maintenance expenses	12,683
Total Nuclear Power Generation	70,593
Transmission expenses	180
Administrative and general expenses	
Property and liability insurance	5,717
Other A.& G. expenses	5,248
Total A.& G. expenses	10,965
TOTAL O&M EXPENSES	81,738
Depreciation expense	67,142
Taxes other than income taxes	
Property taxes	43,500
Other	25,939
Total taxes other than income taxes	69,439
Income taxes - Federal	100,225
Income taxes - Other	-
Deferred income taxes - net	22,216
Investment tax credit adjustments - net	(1,800)
Return (rate of return 13.7 %)	269,112
TOTAL ANNUAL COST OF OPERATION	$ 608,072

ATTACHMENT FOR ITEM NO. 1.a.

ESTIMATED ANNUAL COST OF OPERATING NUCLEAR GENERATING

UNIT: SHOREHAM NUCLEAR POWER STATION, UNIT NO. 1

FOR THE CALENDAR YEAR 1987

(thousands of dollars)

Operation and maintenance expenses	
Nuclear Power Generation	
Nuclear fuel expense (plant factor 50%)	$ 41,700
Other operating expenses	21,397
Maintenance expenses	13,494
Total Nuclear Power Generation	76,591
Transmission expenses	190
Administrative and general expenses	
Property and liability insurance	5,873
Other A.& G. expenses	5,584
Total A.& G. expenses	11,457
TOTAL O&M EXPENSES	88,238
Depreciation expense	67,142
Taxes other than income taxes	
Property taxes	46,700
Other	26,805
Total taxes other than income taxes	73,505
Income taxes - Federal	109,439
Income taxes - Other	-
Deferred income taxes - net	22,216
Investment tax credit adjustments - net	(1,800)
Return (rate of return: 13.7 %)	259,790
TOTAL ANNUAL COST OF OPERATION	$ 618,530

ATTACHMENT FOR ITEM NO. 1.a.

ESTIMATED ANNUAL COST OF OPERATING NUCLEAR GENERATING

UNIT: SHOREHAM NUCLEAR POWER STATION, UNIT NO. 1

FOR THE CALENDAR YEAR 19 88

(thousands of dollars)

Operation and maintenance expenses	
Nuclear Power Generation	
Nuclear fuel expense (plant factor 50%	$ 45,200
Other operating expenses.....	22,744
Maintenance expenses.....	14,344
Total Nuclear Power Generation.....	82,288
Transmission expenses.....	200
Administrative and general expenses	
Property and liability insurance.....	5,915
Other A.& G. expenses.....	5,920
Total A.& G. expenses.....	11,835
TOTAL O&M EXPENSES.....	94,323
Depreciation expense.....	67,142
Taxes other than income taxes	
Property taxes.....	49,700
Other.....	25,786
Total taxes other than income taxes.....	75,486
Income taxes - Federal	117,173
Income taxes - Other	-
Deferred income taxes - net	22,216
Investment tax credit adjustments - net	(1,800)
Return (rate of return: 13.7 %)	250,531
TOTAL ANNUAL COST OF OPERATION	$ 625,071

ATTACHMENT FOR ITEM NO. 1.a.

ESTIMATED ANNUAL COST OF OPERATING NUCLEAR GENERATING

UNIT: SHOREHAM NUCLEAR POWER STATION, UNIT NO. 1

FOR THE CALENDAR YEAR 19 89

(thousands of dollars)

Operation and maintenance expenses	
Nuclear Power Generation	
Nuclear fuel expense (plant factor 50%	$ 50,600
Other operating expenses	24,178
Maintenance expenses	15,248
Total Nuclear Power Generation	90,026
Transmission expenses	210
Administrative and general expenses	
Property and liability insurance	6,156
Other A.& G. expenses	6,304
Total A.& G. expenses	12,460
TOTAL O&M EXPENSES	102,696
Depreciation expense	67,142
Taxes other than income taxes	
Property taxes	53,000
Other	27,811
Total taxes other than income taxes	80,811
Income taxes - Federal	123,340
Income taxes - Other	-
Deferred income taxes - net	22,216
Investment tax credit adjustments - net	(1,800)
Return (rate of return: 13.7 %)	241,273
TOTAL ANNUAL COST OF OPERATION	$ 635,678

ATTACHMENT FOR ITEM NO. 1.a.

ESTIMATED ANNUAL COST OF OPERATING NUCLEAR GENERATING

UNIT: SHOREHAM NUCLEAR POWER STATION, UNIT NO. 1

FOR THE CALENDAR YEAR 1987

(thousands of dollars)

Operation and maintenance expenses	
Nuclear Power Generation	
Nuclear fuel expense (plant factor 60%	$ 50,100
Other operating expenses	21,397
Maintenance expenses	13,494
Total Nuclear Power Generation	84,991
Transmission expenses	190
Administrative and general expenses	
Property and liability insurance	5,873
Other A.& G. expenses	5,584
Total A.& G. expenses	11,457
TOTAL O&M EXPENSES	96,638
Depreciation expense	67,142
Taxes other than income taxes	
Property taxes	46,700
Other	26,805
Total taxes other than income taxes	73,505
Income taxes - Federal	109,439
Income taxes - Other	-
Deferred income taxes - net	22,216
Investment tax credit adjustments - net	(1,800)
Return (rate of return: 13.7 %)	259,790
TOTAL ANNUAL COST OF OPERATION	$ 626,930

ATTACHMENT FOR ITEM NO. 1.a.

ESTIMATED ANNUAL COST OF OPERATING NUCLEAR GENERATING

UNIT: SHOREHAM NUCLEAR POWER STATION, UNIT NO. 1

FOR THE CALENDAR YEAR 1988

(thousands of dollars)

Operation and maintenance expenses	
Nuclear Power Generation	
Nuclear fuel expense (plant factor 60%)	$ 54,300
Other operating expenses	22,744
Maintenance expenses	14,344
Total Nuclear Power Generation	91,388
Transmission expenses	200
Administrative and general expenses	
Property and liability insurance	5,915
Other A.& G. expenses	5,920
Total A.& G. expenses	11,835
TOTAL O&M EXPENSES	103,423
Depreciation expense	67,142
Taxes other than income taxes	
Property taxes	49,700
Other	25,786
Total taxes other than income taxes	75,486
Income taxes - Federal	117,173
Income taxes - Other	-
Deferred income taxes - net	22,216
Investment tax credit adjustments - net	(1,800)
Return (rate of return: 13.7 %)	250,531
TOTAL ANNUAL COST OF OPERATION	$ 634,171

ATTACHMENT FOR ITEM NO. 1.a.

ESTIMATED ANNUAL COST OF OPERATING NUCLEAR GENERATING

UNIT: SHOREHAM NUCLEAR POWER STATION, UNIT NO. 1
FOR THE CALENDAR YEAR 19 89

(thousands of dollars)

Operation and maintenance expenses	
Nuclear Power Generation	
Nuclear fuel expense (plant factor 60%)	$ 60,700
Other operating expenses	24,178
Maintenance expenses	15,248
Total Nuclear Power Generation	100,126
Transmission expenses	210
Administrative and general expenses	
Property and liability insurance	6,156
Other A.& G. expenses	6,304
Total A.& G. expenses	12,460
TOTAL O&M EXPENSES	112,796
Depreciation expense	67,142
Taxes other than income taxes	
Property taxes	53,000
Other	27,811
Total taxes other than income taxes	80,811
Income taxes - Federal	123,340
Income taxes - Other	-
Deferred income taxes - net	22,216
Investment tax credit adjustments - net	(1,800)
Return (rate of return: 13.7 %)	241,273
TOTAL ANNUAL COST OF OPERATION	$ 645,773

SHOREHAM SER OPEN ITEM #61
Scram Discharge Volume

SCRAM DISCHARGE

This issue is defined in an NRC report entitled, "Safety Concerns Associated With Pipe Break in the BWR Scram System". General Electric has prepared a generic response in behalf of the BWR licensees to address this issue. An evaluation of the postulated pipe break scenario and the NRC staff recommendations is documented in GE report NEDO-24342, GE Evaluation In Response to NRC Request Regarding BWR Scram System Pipe Breaks. LILCO supports the conclusions reached by GE. NEDO-24342 was transmitted from GE to the NRC with an April 30, 1981 letter from Mr. G. Sherwood to Mr. Darrell G. Eisenhut.

Response to the staff's generic concerns is summarized as follows:

1. The postulated pipe rupture in the scram discharge volume (SDV) is an extremely remote event. General Electric's analysis of the probability of the sequence of events leading to eventual fuel damage from the postulated pipe break has been determined to be less than 2×10^{-9}. This places the frequency beyond the range of occurrences which need to be taken into account in the design of nuclear facilities. (See Appendix A of NEDO-24342).

   Even if the postulated SDV pipe rupture were to occur, a number of radiation and sump alarms, as well as scram discharge valve position indications, signal to the operating staff the existence of a pipe rupture outside the primary containment. In the event of pipe rupture in the BWR scram discharge piping, automatic system operation would assure adequate core cooling. Current procedures provide sufficient guidance to the operator to depressurize the reactor. With depressurization, the break discharge can be controlled so as to preclude any core damage. (See Sections 7 and 8 of NEDO-24342).

2. The SDV piping at Shoreham has been designed, fabricated, installed and tested in accordance with the 1971 Edition through Winter 1972 Addenda of ASME Section III for Class 2 Components. Documentation required by the aforementioned edition of the Code will be available for inspection. Furthermore, the load combinations specified for these piping systems were for full operating temperature and pressure, yet these piping systems are exposed to that temperature and pressure environment only about 1% of the time. These piping systems have not exhibited a rupture in over 360 reactor years of operation. (See Section 6 of NEDO-24342).

SCRAM DISCHARGE (continued)

3. The NRC staff recommendations need not be implemented because the postulated sequence is of such low probability that design changes are unnecessary. Even if the postulated pipe rupture should occur, current procedures provide sufficient guidance to the operators to initiate depressurization and isolation if necessary. Additional pumps, which are not part of the emergency core cooling system, are also available to provide more than sufficient water even if all the emergency core cooling pumps fail to operate. (See Sections 7 and 8 of NEDO-24342).

4. GE has reviewed the applicability of the general design criteria to the scram discharge volume system, and conclude that the scram discharge volume design conforms to 10 CFR 50 Appendix A, GDC 14, 35, 55, and 10 CFR 50.2(v), 10 CFR 55a (including footnote 2), and 10 CFR 50.46. The scram discharge volume design has been reviewed by the staff on each operating plant licensing application as well as the recent LaSalle operating license review. (See Section 6 and Appendix D of NEDO-24342).

5. The postulated scram discharge system pipe rupture was evaluated to demonstrate compliance with 10CFR50.46. The results of the evaluation showed that the peak clad temperatures remain well below 1700°F. (See Sections 7.6 and 8.5 of NEDO-24342)

In summary, the General Electric evaluation demonstrates that the NRC postulated pipe break with the subsequent sequence of events is such a extremely remote event it should not be considered in the design basis of BWRs. In addition, we have high confidence that such a postulated pipe break would not be a hazard to the public.

The GE analysis reconfirms the adequacy of the scram system safety features used in boiling water reactors for more than 20 years. It establishes that General Electric's conclusions regarding the safety of the boiling water reactor scram system design, and that the NRC reviews and approvals of the design, were correct. Thus, implementation of the recommendations of the NRC report would not result in a meaningful improvement in the safety of the Shoreham boiling water reactor.