GENERAL ELECTRIC

NUCLEAR POWER

SYSTEMS DIVISION

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MFN 053-83
JNF 015-83

March 15, 1983

U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, DC 20555

Attention: Mr. D.G. Eisenhut, Director
Division of Licensing

Gentlemen:

SUBJECT: IN THE MATTER OF 238 NUCLEAR ISLAND
GENERAL ELECTRIC STANDARD SAFETY ANALYSIS REPORT (GESSAR II)
DOCKET NO. STN 50-447

REVISED DRAFT RESPONSES

Attached please find revised final draft responses to selected questions of the Commission's August 25, 1982 and November 15, 1982 information requests. Only modifications (new or revised) to the responses of the referenced letters are provided. Responses are provided in the attachments as indicated below:

Attachment Number	Branch
1	Power Systems
2	Reactor Systems

Sincerely,

RWilla for

Glenn G. Sherwood, Manager
Nuclear Safety & Licensing Operation

Attachments

cc: F.J. Miraglia (w/o attachments)
D.C. Scaletti
C.O. Thomas (w/o attachments)
L.S. Gifford (w/o attachments)

E003

ATTACHMENT NO. 1

DRAFT RESPONSES TO
POWER SYSTEMS BRANCH
QUESTIONS

430.04 (8.3.1) The undervoltage relaying described in Section 8.3.1.1.7 of your FSAR, by itself, will not protect the Class 1E equipment against a degraded voltage condition. Branch Technical Position PSB-1 contained in Chapter 8 of the Standard Review Plan (SRP) requires that a second level of undervoltage protection be provided to protect Class 1E equipment against degraded voltage conditions. Describe your compliance with this position for Class 1E, Divisions 1, 2 and 3.

Response

The [redacted] GESSAR II design is based on a stable grid voltage conditions with maximum fluctuation of ±5% at the interface points (Refer to Note 4 of fig. 8.3-2 "6900 V S/L Buses E & F".

The Applicant is requested to perform a voltage analysis of his system and guarantee that he can meet the above requirement.

With reference to the Branch Technical Position, PSB-1, [redacted] the following comments apply:

Paragraph B.1

The [redacted] GESSAR II design provides Bus Undervoltage relaying set at 70% for divisions 1 & 2, and 73% for division 3 (HPCS), to detect a loss of the offsite power at the class IE buses and isolate these buses from the BOP. The feeder undervoltage relaying provide a second level of undervoltage protection which satisfy the following requirements as stated in PSB-1

B.1.a) The selection of undervoltage and time delay set points will be determined from an analysis of the voltage requirements of the class IE loads at all onsite system distribution levels;

B.1.b.1) The [redacted] GESSAR II design provides a time delay setting for the feeder undervoltage relaying to insure the existance of a sustained degraded voltage condition.

Division 1 and 2

Following this delay, an alarm in the control room will alert the operator to the degraded condition. The operator would have the option, if necessary, to separate the class IE distribution system from the degraded offsite power system and perform a manual bus transfer to the other offsite power source or the Diesel Generator.

Division 3

Following this delay, if the degraded voltage condition still persists, loss of offsite power operational sequence is started. This sequence includes automatic tripping of the offsite power feeder breaker, starting of the HPCS D/G and transfer of the Division 3 bus from offsite to the D/G. Offsite breaker open indication, D/G running indication and the D/G breaker closed indications provide the control room operator the necessary information.

B.1.b.2) The GESSAR II design does not provide a second time delay as suggested in the PSB-1.

<u>Division 1 and 2</u>

It is left up to operator discretion to isolate the class IE buses, required, as stated in B.1.b.1 above.

<u>Division 3</u>

The HPCS (Division 3) bus is automatically separated from the offsite power system upon a sustained degraded voltage condition as described in B.1.b.1 above for Division 3.

B.1.C.1&2) GESSAR II complies. Refer to Fig. 8.3-2 "6900 Volt Single Line Buses E & F", and Fig. 8.3-14a "HPCS Power System – Simplified-One Line Diag."

B.1.C.3

Division 1 and 2

GESSAR II complies. Refer subsection 8.3.1.1.7(2).

Division 3

The HPCS is an independent bus and has no common trippings with Division 1 or 2. No load shedding is required for the HPCS bus loads.

B.1.C.4

Division 1 and 2

The voltage sensors (feeder under voltage relaying) do not automatically initiate the disconnection of the offsite power sources whenever the voltage set point and time delay limits have been exceeded. Instead, an alarm is initiated in the Control Room, and the isolation can be done manually by the operator.

Division 3

The voltage senors (feeder undervoltage relaying) automatically initiate the disconnection of the offsite power sources whenever the voltage set point and time delay limits have been exceeded.

B.1.C.5) The [redacted] GESSAR II design provides means for device testing and calibrating during plant operation.

B.1.C.6) GESSAR II complies.

B.1.d) The Technical Specifications will include limiting conditions for operations, surveillance requirements and will be provided by the Applicants.

The trip set points and the allowable values for the second-level voltage protection sensors and associated time delay devices are plant unique items which will be provided by the Applicant.

Paragraph B.2

The GESSAR II design does not provide automatic load shedding for Division 1 or 2 in case of sustained degraded voltage above 70% of rated. The Division 3 bus loads require no load shedding.

Paragraph B.3

A voltage drop calculation was performed which shows that all safety related buses down to the 480 volt level, provide full load operation voltages for safe continuous operation of all energized loads, based on a BOP supply voltage of 6.9 KV ± 5%.

Paragraph B.4

This recommended testing procedure will be addressed in the pre-operational test procedures.

QUESTION 430.14

State in Section 8.3.1.1 of your FSAR, whether the nuclear system protection system (NSPS) non-Class 1E power supplies which feed the "B" scram solenoids have a separate and redundant Class 1E protective package installed between the power supply and bus consisting of overvoltage, undervoltage and underfrequency protection. If not, this package should be installed to protect the solenoids against a condition which could fail them in the unsafe direction. Discuss the susceptibility of the load drivers to power supply anomalies such as over/undervoltage, over/underfrequency, voltage transients, voltage spikes, EMI and harmonics. The protective package must provide protection against any conditions which would fail the load drivers in the unsafe (i.e., shorted or closed) direction.

RESPONSE:

Current NSPS non-1E power supply design by GE consists of ~~four~~ two independent Uninterruptable Power ~~systems~~ supplies (UPS) similar to Clinton design. Refer to Sec. 8.3.1.1.4.2 markup for detail. Each includes a battery charger, 125 VDC battery, an inverter, ~~[illegible]~~, an Electrical Protection Assembly (EPA), a 480-120V regulating transformer, a manual bypass (inverter bypass) switch and essential metering devices for the UPS.

The EPA consists of over-under voltage and under frequency monitoring circuitry and an output disconnecting device (circuit breaker). The EPA provides over-under voltage and under frequency protection to the RPS loads and related power supply associated with the scram pilot valve solenoids and the MSIV pilot valve solenoids by disconnecting the bus from the input power whenever the UPS output voltage and frequency deviates beyond the preset limits. These limits are to be established by field calculations. The EPA is designed to meet the IEEE-323 and IEEE-344 requirements.

A second supply is through the 480-120V regulating transformer. ~~and the isolation transformer~~. The regulating transformer provides voltage regulation of ±½%. It is furnished with a harmonic distortion filter to reduce the maximum output distortion to 5% RMS. The regulating transformer is virtually immune to lightning or transient surges on the line and has a low audible noise level of 65 dB at 5 feet. The transformer is qualified for IEEE-344 and IEEE-323 requirements.

The power supply through the bypass circuit, including regulating transformer ~~and the isolation transformer~~ is also monitored by the EPA as described above. The new load driver cards are designed to meet the requirements of IEEE-472 and are capable of operation within voltage variations of 24-200V AC or DC. They also operate on square wave pulses and are therefore insensitive to harmonic voltages from their power supply.

430.14 text modification

8.3.1.1.4.2 Nuclear Systems Protection System (NSPS) Power Supply

The NSPS power supply is shown in Figure 8.3-1* and in Figures 8.3-20a, b, c, d, with each bus supplying ~~Class 1E~~ power for the independent trip systems of the Nuclear Systems Protection System (NSPS). Four NSPS control power buses (Divisions 1, 2, 3 and 4) have been established. They are each normally supplied independently from inverters which, in turn, are supplied from the DC buses of the corresponding NSPS division. Use of solid-state static transfer switches makes it possible to energize the NSPS control power buses from alternate Class 1E AC sources for added continuity. The second input to the transfer switch is from a regulating transformer, connected to the same ESF divisional power as the battery supplying the inverter for corresponding NSPS Divisions ~~1, 2, and 3~~. ~~For the Division 4 alternate supply, a Division regulating transformer is used~~. A manual bypass switch is provided for each NSPS bus to facilitate manual transfer of the bus feed from the inverter to the alternate source.

The NSPS power supply buses are designed to provide power to the four-division NSPS logic system that operates the RPS and other safety functions controlled by the NSPS. These buses also supply power to ~~RPS and Nuclear Steam Supply Shutoff System (NS4) solenoid valves~~ & neutron monitoring system and parts of the process radiation monitoring system and leak detection instrumentation. Power is applied so as to prevent inadvertent operation of the reactor scram ~~NSSS~~ initiation or ECCS initiation upon loss of any single power supply. Actual functioning of the NSPS is covered in Sections 7.2, 7.3 and 7.4.

⇨ INSERT "A"

Routine maintenance can be conducted in equipment associated with the NSPS Power Supply. Inverters and solid-state switches can be inspected, serviced and tested channel by channel without tripping the RPS logic.

* Note: Figure 8.3-1 will be modified to match the "new" Figures 8.3-20a through 8.3-20d.

GESSAR II
Section 8.3.1.1.4.2
INSERT "A"

Two nondivisional RPS power supply buses have also been established. Each of the two nondivisional RPS buses is normally supplied independently from an inverter which in turn is supplied from a separate nondivisional DC bus. Use of a manual transfer switch for each of these buses makes it possible to energize each bus from an alternate nondivisional AC source for added continuity. The second input to the transfer switch is from a regulating transformer, connected to the same nondivisional power bus as the battery supplying the inverter for the corresponding RPS bus. The RPS power supply buses are designed to provide power to the RPS scram and Nuclear Steam Supply Shutoff System (NS^4) solenoid valves.

8.3.1.1.4.2.1 Components

Each of the four essential NSPS power supplies includes the following components:

(1) a power distribution cabinet, including the NSPS 120 VAC bus and circuit breakers for the individual loads;

(2) a solid-state inverter, to convert 125 VDC battery power to 120VAC NSPS power;

(3) a solid-state transfer switch to sense inverter failure and automatically switch to alternate power;

(4) a 120V/120V isolation transformer to provide noise isolation for the alternate 120 VAC power supply; ~~and~~

(5) a 480V/120V transformer for the alternate power supply;

(6) a manual bypass switch to manually transfer NSPS supply from inverter to an alternate source; and

(7) a power monitor to monitor the power supply anomalies such as over/under voltage, under frequency and provide trip signal when the preset limits are exceeded.

The nondivisional portion of the NSPS power supply consists of the following:

(1) a power distribution cabinet, including the 120 VAC nondivisional bus and circuit breakers for the individual loads;

(2) a solid-state inverter to convert 125VDC battery power to 120VAC NSPS power;

~~(2) a solid state transfer switch and to sense inverter failure and automatically switch to alternate power;~~

~~(4) a 480V/120V isolation transformer for each of the two nondivisional power supplies;~~

(3) a 480/120V transformer for the alternate power supply;

(4) a manual bypass switch to manually transfer NSP supply from inverter to an alternate source; and

(5) a power monitor to monitor the power supply anomalies such as over/under voltage, under frequency and provide trip signal when the preset limits are exceeded.

8.3.1.1.4.2.2 Power Sources

The NSPS power supply sources consist of three types of power. (1) Class 1E 120 VAC; (2) non-Class 1E 120 VAC; and (3) Class 1E 125 VDC.

(1) Class 1E 120 VAC: Four NSPS divisional 120 VAC buses are each fed by a 480V Class 1E power supply via two paths. The normal path is from the normal battery charger to a divisional battery bus which powers an inverter. (The battery can also be fed by nonessential AC powered ~~and~~ a alternate battery charger.) The alternate path is direct, through a Class 1E stepdown transformer.

(2) Non-Class 1E 120 VAC: Two ~~A single~~ nondivisional 120 VAC RPS buses are ~~is~~ fed by ~~one of~~ two independent 480 VAC nondivisional power supplies. A separate stepdown transformer is provided for alternate input to the [illegible] transfer switch ~~each~~ 120 VAC ~~load circuit on this power supply.~~

(3) Class 1E 125 VDC: The nuclear system protection system also utilizes 125 VDC power from the Class 1E batteries.

8.3.1.1.4.2.3 Operating Configuration

The four 120 VAC essential power supplies operate independently, providing four divisions of inverter power supplies for the NSPS. The normal lineup for each division is through an essential 480 VAC power supply, the normal battery charger, ~~and~~ the inverter, the static transfer switch and the manual bypass switch. Transfer from the inverter, directly to the essential AC source is done automatically in case of inverter failure, or manually for maintenance or testing. Annunciation in the control room is provided for the following: switching to the alternate source; inverter failure, and manual bypass. The nonessential 120 VAC RPS power supply supplies independent power to the RPS scram solenoids and the

8.3.1.1.4.2.3 Operating Configuration (Continued)

MSIV solenoids for isolation. The nonessential 120 VAC bus is normally lined up to the preferred 480 VAC nondivisional power supply. Transfer to the alternate nondivisional power supply is done ~~automatically~~ manually on loss of preferred power or ~~manually~~ for maintenance or testing. Control room annunciation is provided for transfer to the alternate source.

8.3.1.1.5 Class 1E Electric Equipment Considerations

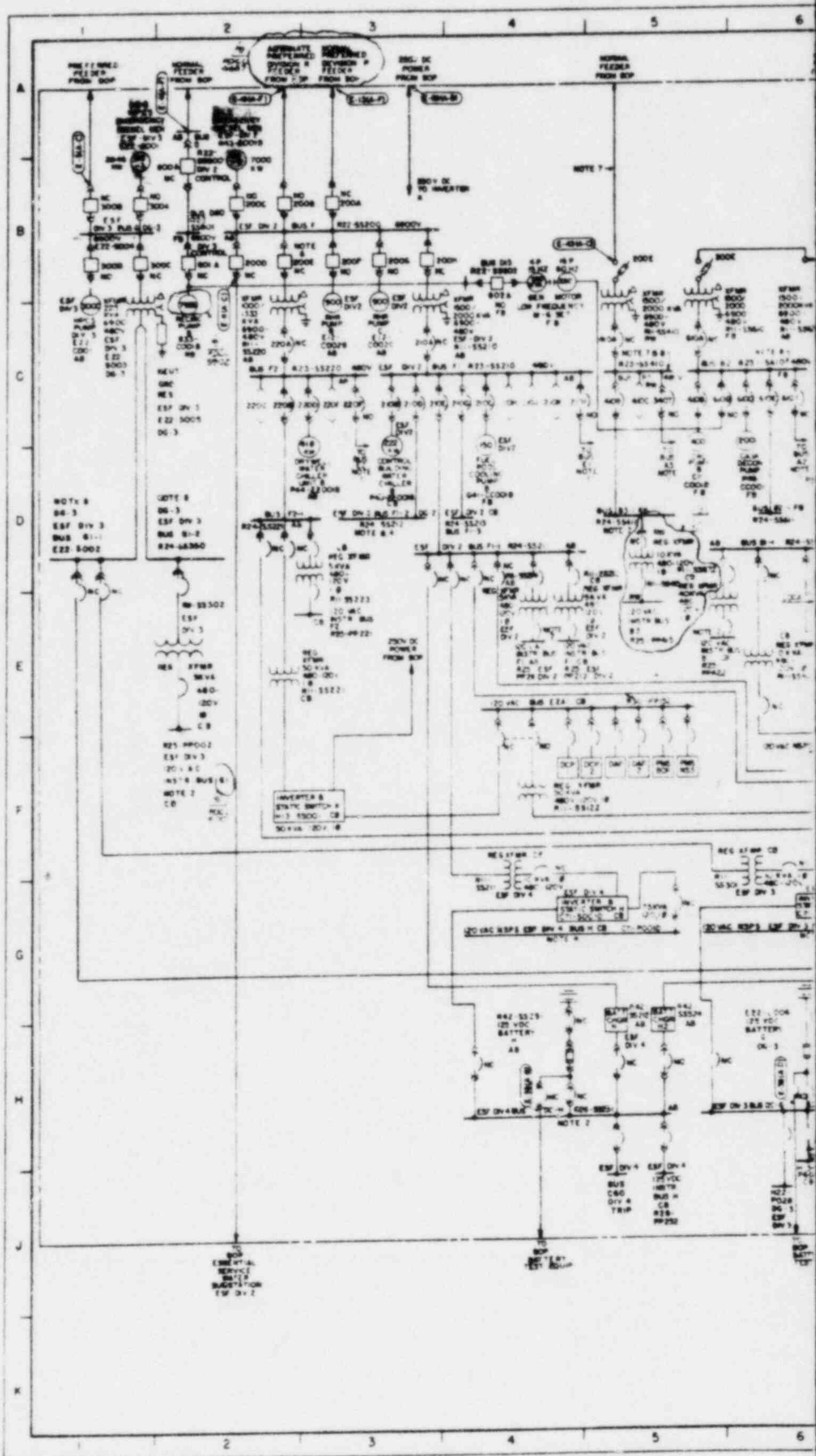
The following guidelines are utilized for Class 1E equipment.

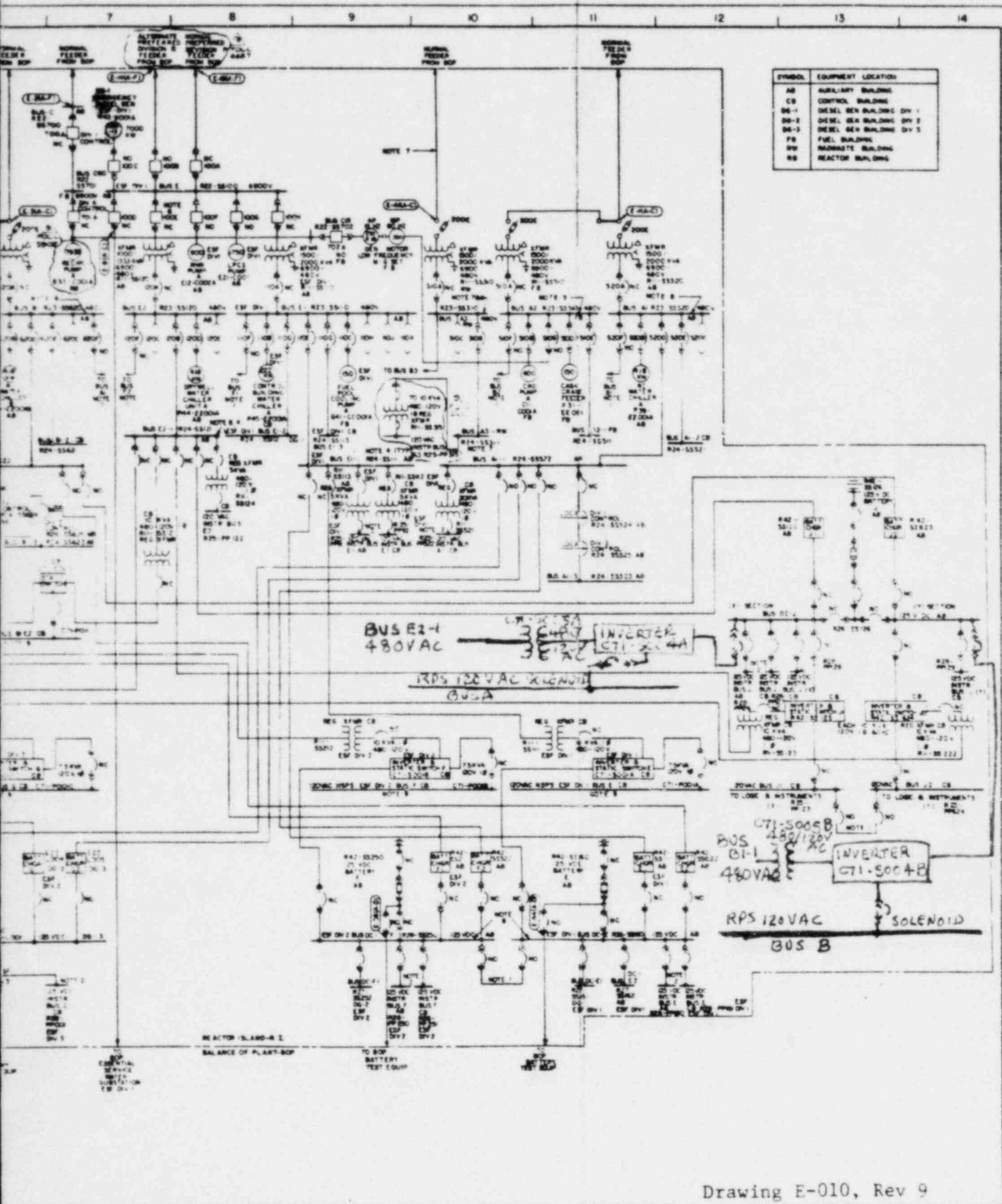
8.3.1.1.5.1 Physical Separation and Independence

Equipment of one division is segregated from equipment of other divisions and nondivisional equipment, in accordance with IEEE Std 384-1974, Regulatory Guide 1.75 and General Design Criterion 17. The overall design objective is to locate the divisional equipment and its associated control, instrumentation, electrical supporting systems and interconnecting cabling such that separation is maintained among all divisions. Divisional separation is achieved through the use of barriers and spatial separation. The latter is enhanced by totally enclosed raceways.

Redundant divisions of electric equipment and cabling are located in separate rooms or areas and/or are provided with spatial separation, such that no single event may disable more than one of the redundant divisions or prevent safe shutdown of the plant.

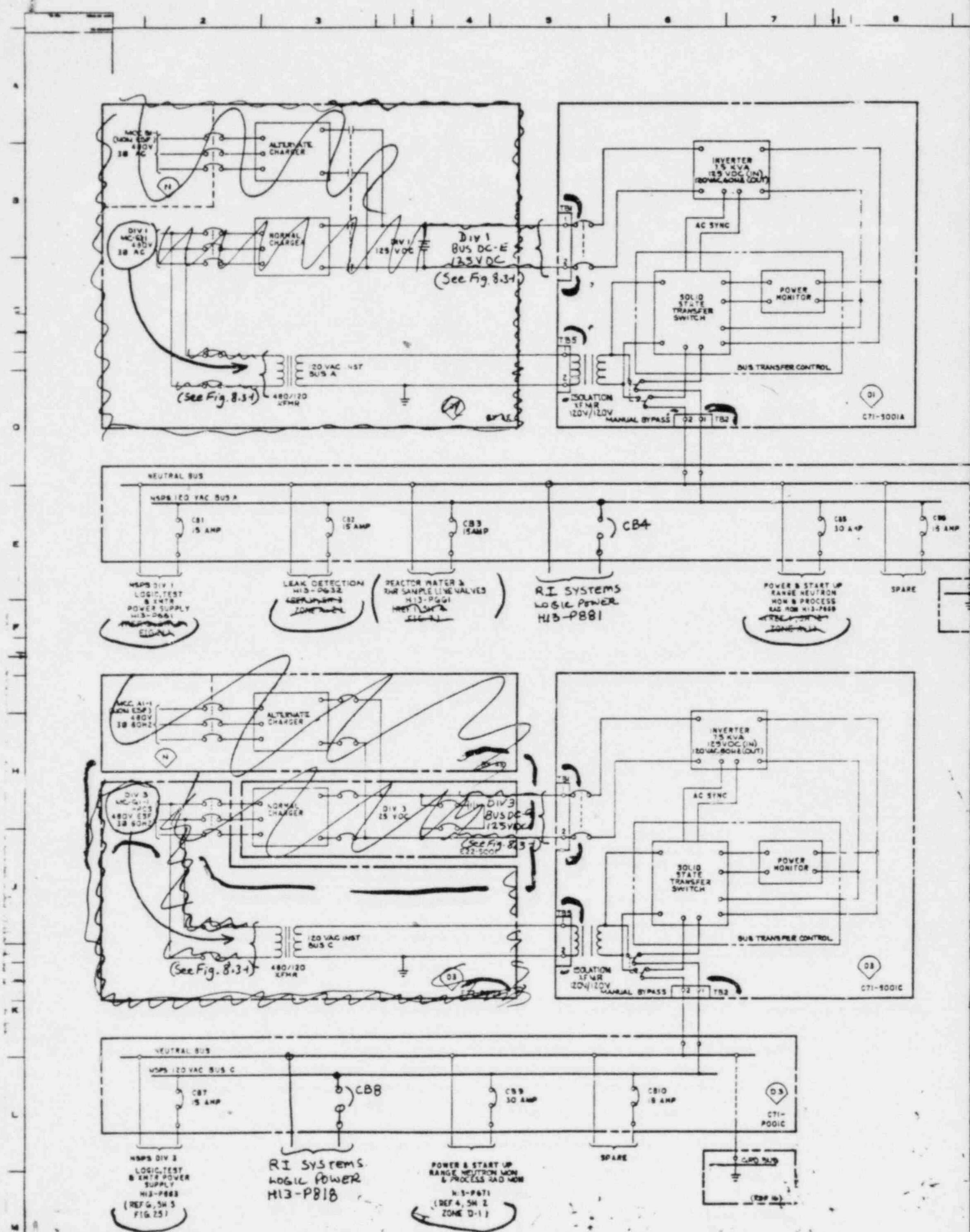
Cables entering the drywell area from the containment area utilize a standard conduit sleeve and conduit seal. The seals are located in each divisional sector and at elevations to serve the equipment inside the drywell and to maintain acceptable spatial separation





UPDATE FIG. 8.3-1 AS MARKED

Figure 8.3-1. Nuclear Island Single Line AC & DC Aux Power System



ALTERNATE CHARGER
DIV 1 MC-631 480V 3Ø AC
NORMAL CHARGER
DIV 1 125 VDC
Div 1 Bus DC-E 125 VDC
(See Fig. 8.3-1)
120 VAC INST BUS A
480/120 XFMR
INVERTER 7.5 KVA 125 VDC (IN) 120VAC, 60HZ (OUT)
AC SYNC
SOLID STATE TRANSFER SWITCH
POWER MONITOR
BUS TRANSFER CONTROL
TB4
TB5
ISOLATION XFMR 120V/120V
MANUAL BYPASS
TB2
C71-S001A
NEUTRAL BUS
NSPS 120 VAC BUS A
CB1 15 AMP
CB2 15 AMP
CB3 15 AMP
CB4
CB5 30 AMP
CB6 15 AMP
NSPS DIV 1 LOGIC, TEST & XMTR POWER SUPPLY H13-P661
LEAK DETECTION H13-P632
REACTOR WATER & RHR SAMPLE LINE VALVES H13-P661
RI SYSTEMS LOGIC POWER H13-P881
POWER & START UP RANGE NEUTRON MON & PROCESS RAD MON H13-P669
SPARE
ALTERNATE CHARGER
480V 3Ø 60HZ
DIV 3 MC-611 480V ESF 3Ø 60HZ
NORMAL CHARGER
DIV 3 125 VDC
DIV 3 Bus DC-G 125 VDC
(See Fig. 8.3-1)
120 VAC INST BUS C
480/120 XFMR
(See Fig. 8.3-1)
INVERTER 7.5 KVA 125VDC (IN) 120VAC, 60HZ (OUT)
AC SYNC
SOLID STATE TRANSFER SWITCH
POWER MONITOR
BUS TRANSFER CONTROL
ISOLATION XFMR 120V/120V
MANUAL BYPASS
TB2
C71-S001C
NEUTRAL BUS
NSPS 120 VAC BUS C
CB7 15 AMP
CB8
CB9 30 AMP
CB10 15 AMP
C71-P001C
NSPS DIV 3 LOGIC, TEST & XMTR POWER SUPPLY H13-P663 (REF 6, SH 5 FIG 25)
RI SYSTEMS LOGIC POWER H13-P818
POWER & START UP RANGE NEUTRON MON & PROCESS RAD MON H13-P671 (REF 4, SH 2 ZONE D-1)
SPARE
GRD BUS

EIS IDENT: NSPS
12 POWER DISTRIB

GENERAL ELECTRIC — 828E546

ELEM DIAG
NSPS POWER DISTRIBUTION
STANDARD PLANT

OVERALL REVISION B

1	8
2	8
3	8
4	8

MPL NO. C71-1060

NUCLEAR SAFETY RELATED

DIVISION 1 THRU 4

FIG. 1
LOGIC TO LOGIC OPTICAL ISOLATOR

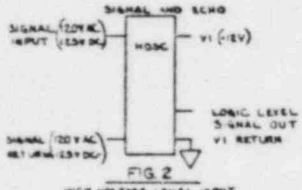


FIG. 2
HIGH VOLTAGE LEVEL INPUT DIGITAL SIGNAL CONDITIONER

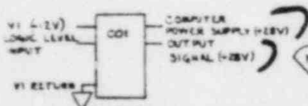


FIG. 8
COMPUTER OPTICAL ISOLATOR

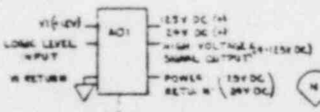


FIG. 19
ANNUNCIATOR OPTICAL ISOLATOR (ALSO USED FOR TRANSIENT TEST) LOGIC LEVEL INPUT

NOTES:

1. THE LOADS SHOWN ARE ESTIMATED NOT MEASURED QUANTITIES. AC LOADS ARE BASED ON 60 HZ.
2. NEUTRAL BUS SHALL BE GROUNDED AT THE NEUTRON MONITORING CABINET IN EACH DIVISION.
4. INVERTER ASSEMBLIES TO BE LOCATED IN EQUIPMENT ROOM IN CLOSE PROXIMITY OF ASSOCIATED 125V BATTERY.
5. UNLESS OTHERWISE INDICATED, THE FOLLOWING REFERENCE DESIGNATIONS SHOWN ON THIS DIAGRAM ARE PREFIXED WITH C71B-

REFERENCE DESIGNATION	NAME
CBX	CIRCUIT BREAKER

6. ALL BRANCH CIRCUITS TO BE RUN IN INDIVIDUAL GROUNDED CONDUIT.
7. SUPPLIED ONLY ON PROJECTS WITH PGCC.
8. RUN IN CONDUIT WITH NO OTHER WIRING.
9. SEE REFERENCE 19 FOR SPECIAL SEPARATION REQUIREMENTS OF SSX AND ISX POWER TO SOLENOIDS.

REFERENCE DOCUMENTS:

1. B21-1090 NUC. ST. SUPPLY SHUTOFF SYS ELEM DIAG (B21H)
2. B21-1060 AUTO DEPRESSURIZATION SYS ELEM DIAG (B21C)
3. C11-1060 CONTROL ROD DRIVE HYD SYS ELEM DIAG (C11B)
4. C51-1070 START-UP RGE NEUT MON SYS ELEM DIAG (C51A)
5. C51-1080 POWER RANGE NEUT MON SYS ELEM DIAG (C51B)
6. C71-1050 REACTOR PROTECTION SYSTEM ELEM DIAG (C71A)
7. E12-1050 RESIDUAL HEAT REMOVAL SYS ELEM DIAG (E12A)
8. E21-1050 LOW PRESS CORE SPRAY SYS ELEM DIAG (E21A)
9. E22-1050 HIGH PRESS CORE SPRAY SYS ELEM DIAG (E22A)
10. E22-1070 HPCS POWER SUPPLY SYSTEM ELEM DIAG (E22B)
11. E31-1050 LEAK DETECTION SYSTEM ELEM DIAG (E31A)
12. E51-1050 REAC CORE ISLN CLG SYSTEM ELEM DIAG (E51A)
13. G33-1050 REACTOR WTR CLEAN-UP SYS ELEM DIAG (G33A)
14. G41-1050 FUEL POOL CLG & CLNUP SYS ELEM DIAG (G41A)
15. 21A5794 INVERTER ASSEMBLY PURCHASE SPEC.
16. A62-4010 SPECIAL WIRE & CABLE SPEC.
17. REMOVED
18. A62-2160 NSPS BLOCK DIAGRAM
19. A62-4050 ELEC EQUIP SEPARATION SPEC.

X — MATCH NUMBER
X XX — ZONE
SHEET NUMBER

MATCH CIRCLE
LAST MATCH CIRCLE USED 18

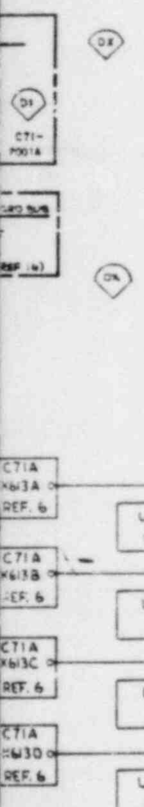
EQUIPMENT IDENT SYMBOLS

- (DX) — CLASS IE, DIV. X, NUCLEAR SAFETY RELATED
- (AX) — ASSOCIATED WITH AND TREATED AS CLASS IE, DIV X
- (N) — NON-DIVISIONAL
- SSX — SPECIAL SOLENOID POWER FOR RPS SOLENOIDS.
- ISX — SPECIAL SOLENOID POWER FOR NS4 (MSIV) SOLENOIDS.
- INDICATES SIGNAL COMMON.
- INDICATES PANEL POWER GROUND BUS.

INDICATES PGCC LINE CODE
INDICATES TERMINATION CABINET
INDICATES BAY
INDICATES TERMINATION MODULE
INDICATES TERMINATION MODULE TERMINAL NO'S
INDICATES WIRE IDENT

TPI = TEST PULSE INPUT
TPO = TEST PULSE OUTPUT

INTERFACE TO REF DOC	LOCATED ON THIS DOC. SH(S)
4	1, 3
6	1, 2

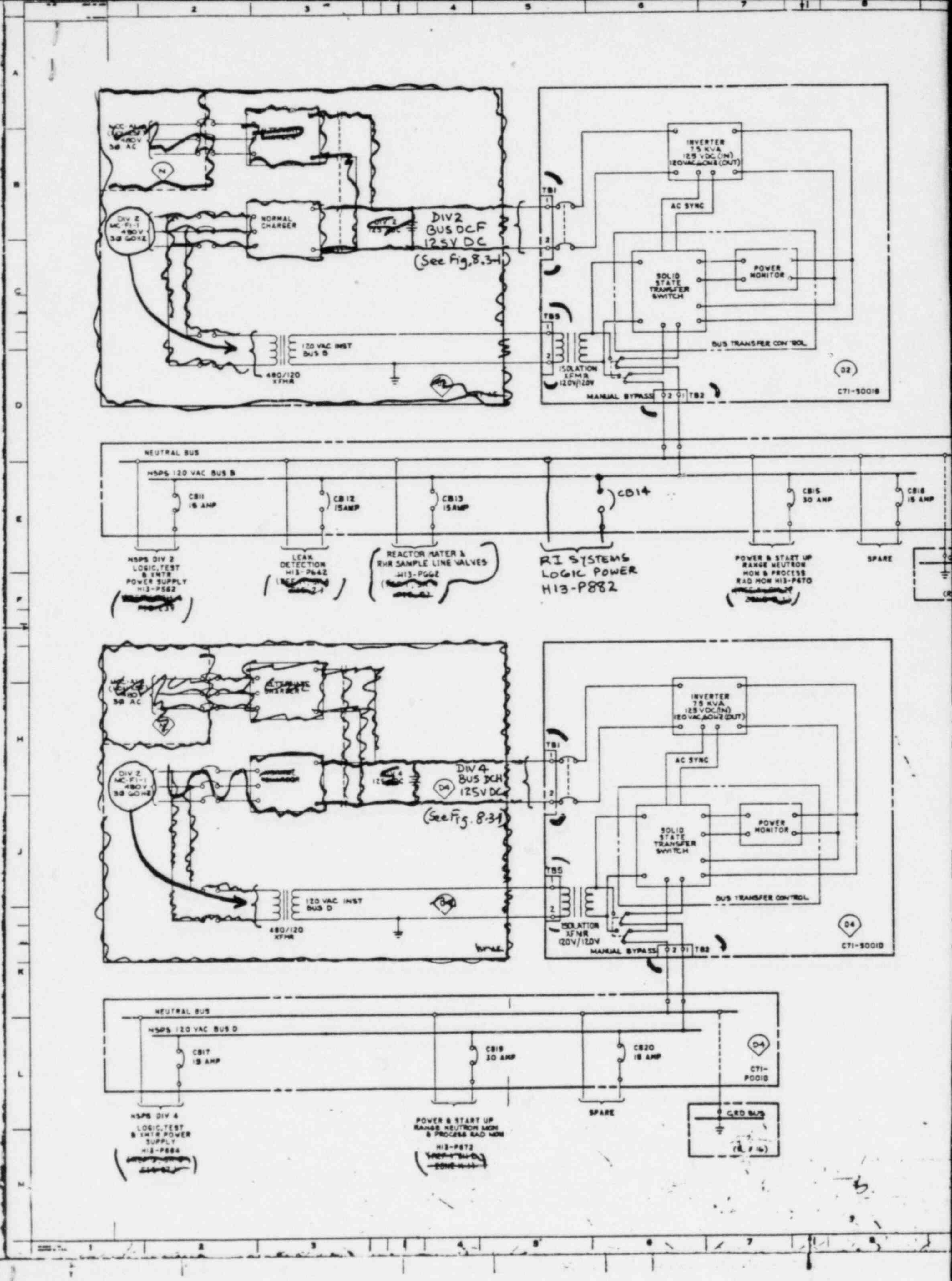


RPS POWER SUPPLY
(REF. 6)

LINE CODES LAST USED IS THIS SHEET NONE

A AMO-456

UPDATE GESSAR II FIG. 8.3-20a AS PER THIS DWG.



INVERTER 7.5 KVA 125 VDC (IN) 120VAC,60HZ (OUT)
AC SYNC
NORMAL CHARGER
DIV 2 MC-F1-1 480V 3Ø 60HZ
DIV2 BUS DCF 125V DC
(See Fig. 8.3-1)
TB1
TB5
TB2
SOLID STATE TRANSFER SWITCH
POWER MONITOR
BUS TRANSFER CONTROL
120 VAC INST BUS B
480/120 XFMR
ISOLATION XFMR 120V/120V
MANUAL BYPASS
C71-S001B
NEUTRAL BUS
HSPS 120 VAC BUS B
CB11 15 AMP
CB12 15AMP
CB13 15AMP
CB14
CB15 30 AMP
CB16 15 AMP
HSPS DIV 2 LOGIC, TEST & XMTR POWER SUPPLY H13-P562
LEAK DETECTION H13-P642
REACTOR WATER & RHR SAMPLE LINE VALVES H13-P662
RI SYSTEMS LOGIC POWER H13-P882
POWER & START UP RANGE NEUTRON MON & PROCESS RAD MON H13-P670
SPARE
DIV 2 MC-F1-1 480V 3Ø 60HZ
DIV4 BUS DCH 125V DC
(See Fig. 8.3-1)
INVERTER 7.5 KVA 125 VDC (IN) 120 VAC,60HZ (OUT)
AC SYNC
SOLID STATE TRANSFER SWITCH
POWER MONITOR
BUS TRANSFER CONTROL
120 VAC INST BUS D
480/120 XFMR
ISOLATION XFMR 120V/120V
MANUAL BYPASS
C71-S001D
NEUTRAL BUS
HSPS 120 VAC BUS D
CB17 15 AMP
CB19 30 AMP
CB20 15 AMP
C71-P001D
GRD BUS
HSPS DIV 4 LOGIC, TEST & XMTR POWER SUPPLY H13-P684
POWER & START UP RANGE NEUTRON MON & PROCESS RAD MON H13-P672
SPARE

NSPS POWER DISTRIBUTION

STANDARD PLANT

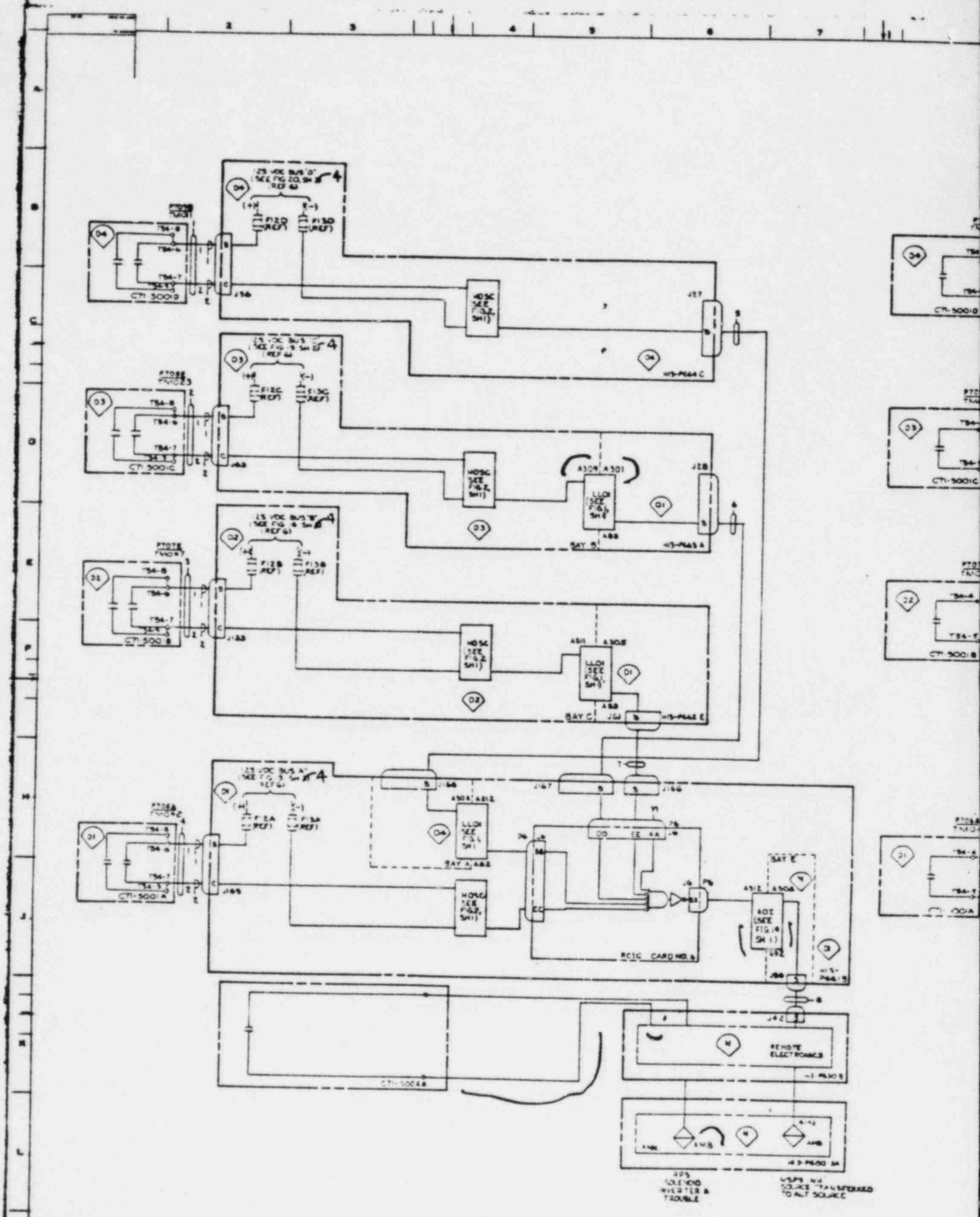
TABLE 1
ISOLATOR POWER CABLE TABULATION

ISOLATOR TYPE	FROM					TO							
	DIV	PANEL	CONN	PIN	LINE CODE	PANEL	CONN	PIN	FILE	CARD	ELEM SHT	ELEM ZONE	SERVICE
LL01	1	H13-P661C	J166	F	14	H13-P662E	J061	F	A83	A303	3	F5	+12VDC
LL01	1	H13-P661C	J166	G	14	H13-P662E	J061	G	A83	A303	3	F5	-12VDC
LL01	1	H13-P661C	J167	F	15	H13-P663E	J028	F	A83	A301	3	D5	+12VDC
LL01	1	H13-P661C	J167	G	15	H13-P663E	J028	G	A83	A301	3	D5	-12VDC
LL01	4	H13-P664	J027	F	16	H13-P661	J168	F	A82	A304	3	J6	+12VDC
LL01	4	H13-P664	J027	G	16	H13-P661A	J168	G	A82	A304	3	J6	12VDC
A02	N	H13-P630B	J042	D	15	H13-P661E	J056	D	A92	A304	3	J7	+125VDC
A01	N	H13-P630B	J042	E	15	H13-P661E	J056	E	A92	A304	3	J7	-125VDC

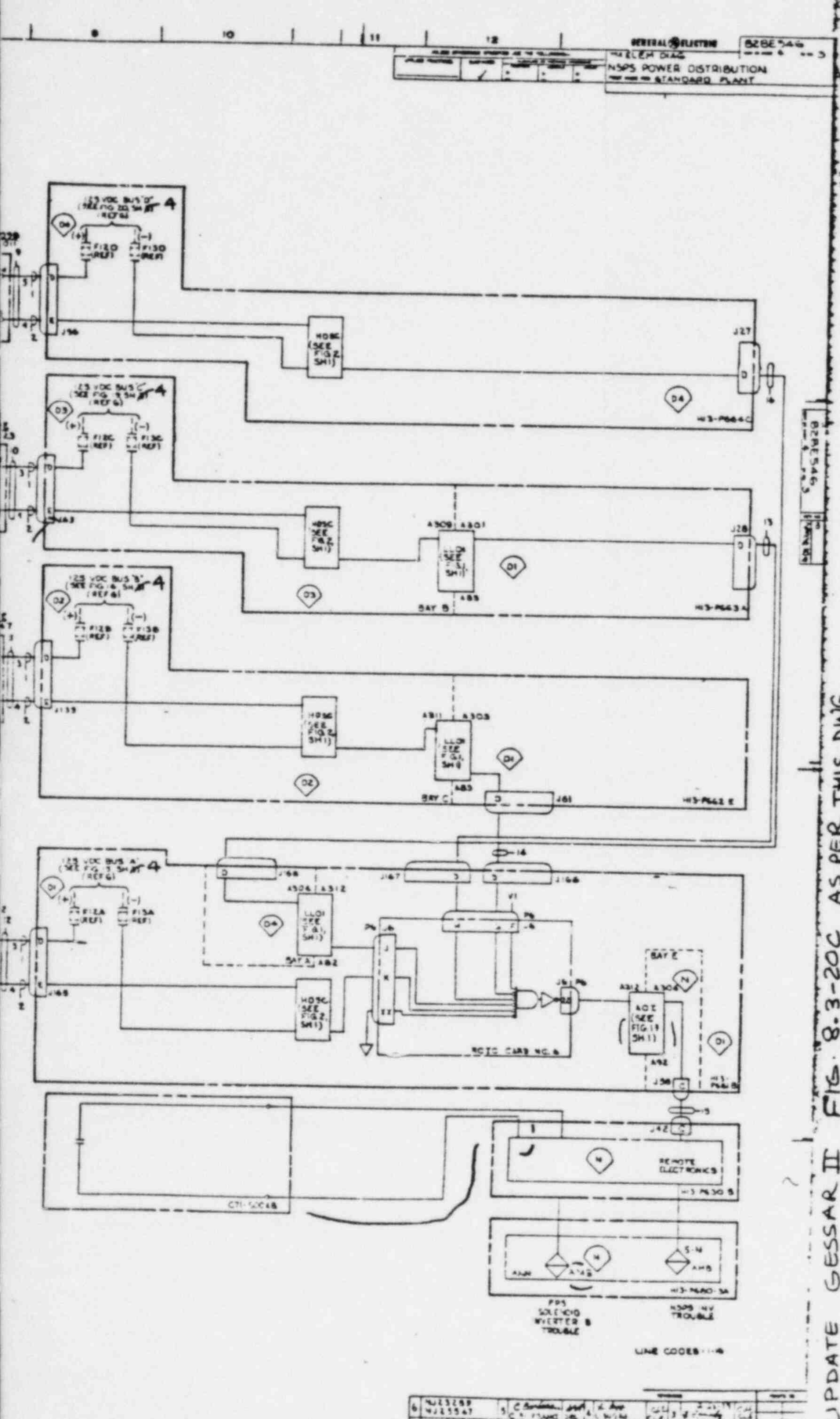
LINE CODES THIS SHEET NONE

828E546

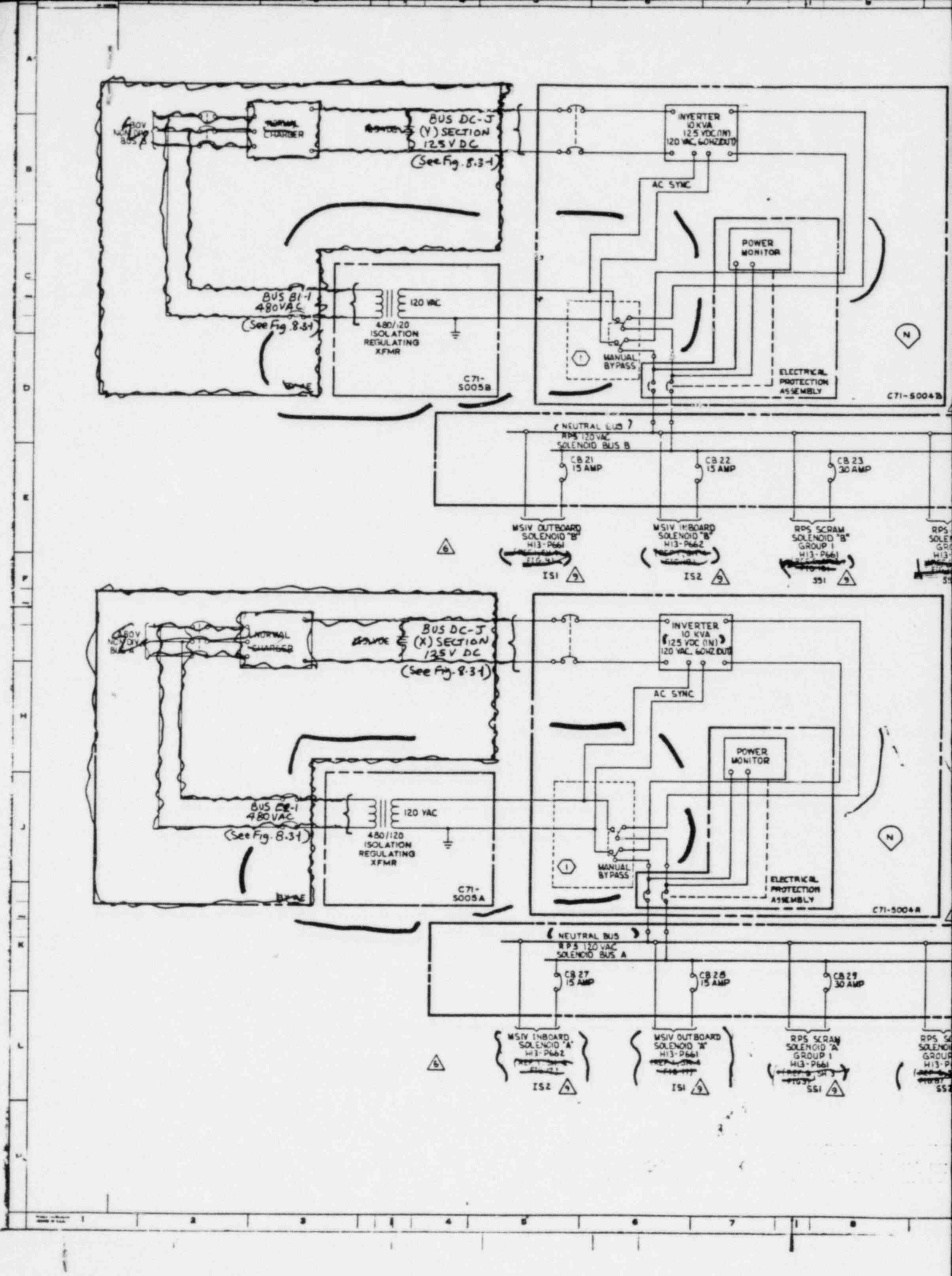
UPDATE GESSAR II FIG. 8.3-30b AS PER THIS DWG



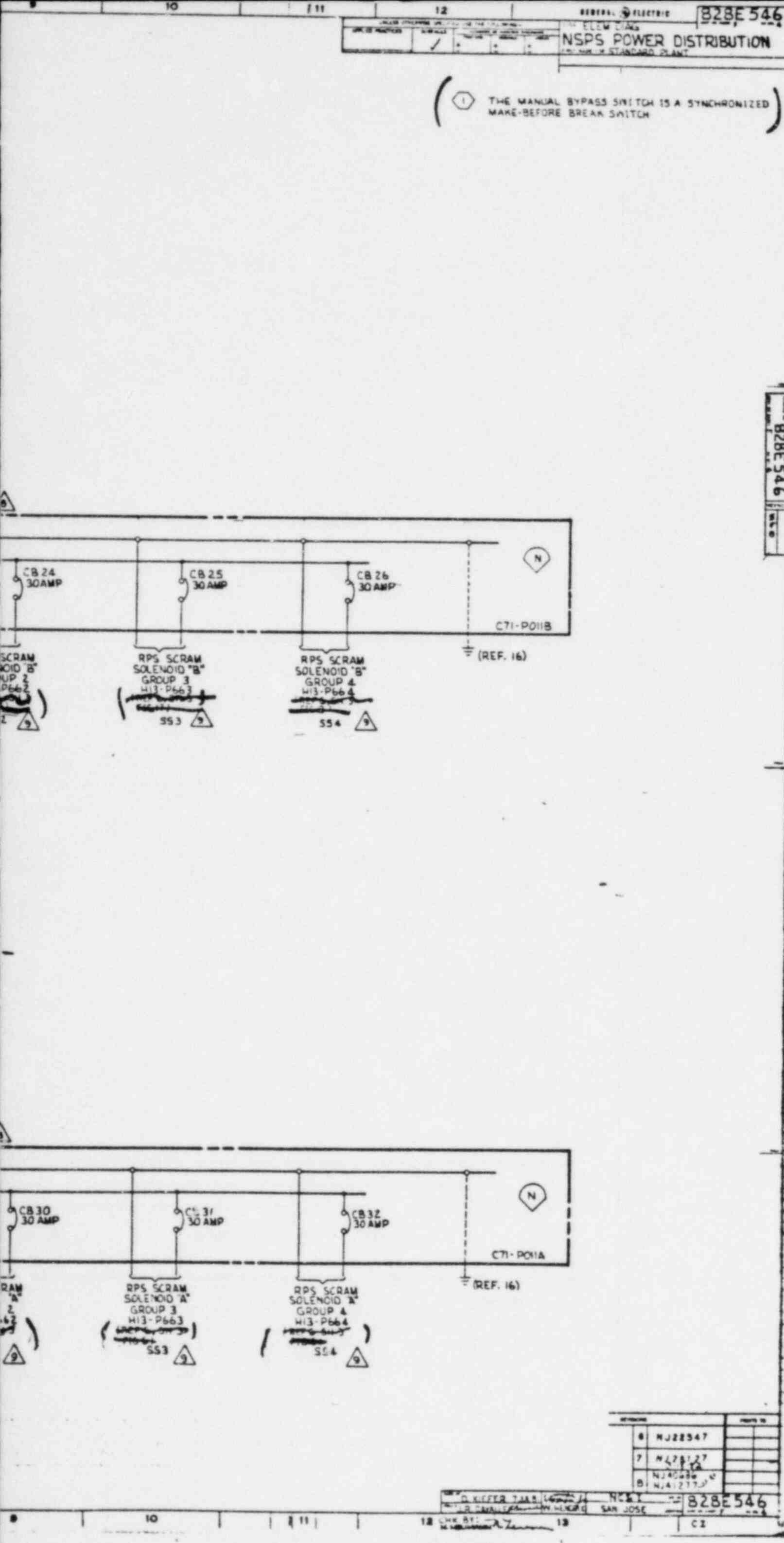
CT1-5001D
CT1-5001C
CT1-5001B
CT1-5001A
CT1-5004A
HOSC
LLOI
J27
J28
BAY C
REMOTE ELECTRONICS



UPDATE GESSAR II FIG. 8.3-20C AS PER THIS DWG.



NORMAL CHARGER
BUS DC-J (Y) SECTION 125V DC
(See Fig. 8.3-1)
INVERTER 10 KVA 125 VDC (IN) 120 VAC, 60HZ (OUT)
AC SYNC
POWER MONITOR
BUS B1-1 480VAC
(See Fig. 8.3-1)
120 VAC
480/120 ISOLATION REGULATING XFMR
C71-S005B
MANUAL BYPASS
ELECTRICAL PROTECTION ASSEMBLY
C71-S004B
NEUTRAL BUS
RPS 120 VAC SOLENOID BUS B
CB 21 15 AMP
CB 22 15 AMP
CB 23 30 AMP
MSIV OUTBOARD SOLENOID "B" H13-P661
IS1
MSIV INBOARD SOLENOID "B" H13-P662
IS2
RPS SCRAM SOLENOID "B" GROUP I H13-P661
SS1
NORMAL CHARGER
BUS DC-J (X) SECTION 125V DC
(See Fig. 8.3-1)
INVERTER 10 KVA 125 VDC (IN) 120 VAC, 60HZ (OUT)
AC SYNC
POWER MONITOR
480VAC
(See Fig. 8.3-1)
120 VAC
480/120 ISOLATION REGULATING XFMR
C71-S005A
MANUAL BYPASS
ELECTRICAL PROTECTION ASSEMBLY
C71-S004A
NEUTRAL BUS
RPS 120 VAC SOLENOID BUS A
CB 27 15 AMP
CB 28 15 AMP
CB 29 30 AMP
MSIV INBOARD SOLENOID "A" H13-P662
IS2
MSIV OUTBOARD SOLENOID "A" H13-P661
IS1
RPS SCRAM SOLENOID "A" GROUP I H13-P661
SS1



ADD THIS DWG AS FIG. 8.3-30d (WITH MARKINGS INCORPORATED) TO GESSAR II

ATTACHMENT NO. 2

DRAFT RESPONSES TO
REACTOR SYSTEMS BRANCH
QUESTIONS

440.13 (6.3) **Identify the relief valve discharge lines in the ECCS which penetrate primary containment and have outlets below the surface of the suppression pool. Since these lines form part of the primary containment, our concern is that excessive dynamic loads resulting from waterhammer during relief valve actuation may cause cracking or rupture of these lines. Provide additional information concerning measures you have taken to prevent this type of damage to these lines.**

Response

All ECCS relief valves, except RHR relief valve number E12-F055, that discharge to the suppression pool, discharge subcooled water. Actuation of these relief valves are caused by small quantities of water that either leak back from the reactor and/or result from thermal expansion of water in the ECCS lines. Since these actuation conditions are characterized by pressure slowly approaching the relief valve set point and discharge of small quantities of water, significant water hammer and dynamic loads do not occur.

RHR relief valve number E12-F055 is provided to prevent overpressurization of the RHR heat exchanger during the steam condensing mode (SCM). Actuation of this relief valve would occur if the steam pressure reducing valve number E12-F051 failed open during the SCM and steam would be discharged to the suppression pool. The dynamic loading associated with actuation of E12-F055 during the SCM will be ~~submitted March 31, 1983 when the response to similar containment questions are submitted.~~ provided by the Applicant. This loading depends on the specific characteristics of equipment-vendor dependent valves E12-F051 and E12-F055 as well as the fouling factor for the RHR heat exchanger.

440.20 We state in the SRP (e.g., in Section 15.1) that for anticipated transients, the most limiting plant systems single failure shall be identified and assumed in the analysis. Accordingly, describe the worst single failure for each events analyzed in Chapter 15 of your FSAR. Provide analyses including these postulated failures for the five most limiting events identified in your FSAR.

Response

Chapter 15 contains evaluations of postulated single failures associated with anticipated transients. Plant nuclear safety operational analysis (NOSA), the system-level qualitative-type failure modes and effects analysis of essential protective sequences in Appendix 15A, show compliance with the single active component failure or the single operator error criteria.

The five most limiting analyzed Chapter 15 transients are:

1. Loss of Feedwater Heater-Manual Flow Control (Subsection 15.1.1)

2. Feedwater Control Failure-Maximum Demand (Subsection 15.1.2)

3. Pressure Regulation Downscale Failure (Subsection 15.2.1)

4. Generator Load Rejection with Failure of Bypass (Subsection 15.2.2)

5. Turbine Trip with Failure of Bypass (Subsection 15.2.3)

In reviewing the expected sequence of events utilized in simulating the plant performance for each of these transients, it was determined that postulating a single active safety-related component failure does not alter the transients. For the feedwater control failure - maximum demand transient in which credit is taken for full turbine bypass capacity, a single active component failure would result in the loss of one of the turbine bypass paths. However, the consequence of loosing one bypass path is not expected to result in fuel failure.