OPS

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

Central File

May 30, 1980

Mr. James P. O'Reilly, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Serial No. 485
NO/RGS:smv
Docket Nos. 50-280
50-281
50-338
50-339
License Nos. DPR-32
DPR-37
NPF-4
NPF-7

Dear Mr. O'Reilly:

IE BULLETIN 79-27
NORTH ANNA POWER STATION UNITS 1 AND 2
SURRY POWER STATION UNITS 1 AND 2

This letter is in response to IE Bulletin 79-27: "Loss of Non-Class IE Instrumentation and Control Power System Bus During Operation".

We have completed our review of the subject bulletin and have found that the units can be brought safely to a shutdown condition assuming the failure of a single bus supplying instrument and control power to safety-related and non-safety related equipment with no restoration of power to the bus. The primary emphasis in the review comments was on the ability to achieve a safe hot shutdown condition for the plant which is the licensing requirement applicable to our facilities. The ability to achieve the cold shutdown condition was also considered in the review. Our review of the class IE and non-class IE buses indicates that the instrument and control system loads connected to the vital, semi-vital and 125 V D-C buses include all instrument and control equipment required to achieve the hot or cold shutdown condition based on revised procedures. Thus, we have concluded that no equipment on other instrument and control power buses is required to maintain the unit in a hot or cold shutdown condition.

NRC Request

"(1) Review the class IE and non-class IE buses supplying power to safety and non-safety-related instrumentation and control systems which could affect the ability to achieve a cold shutdown condition using existing procedures or procedures developed under item 2 below. For each bus:

a) Identify and review the alarm and/or indication provided in the control room to alert the operator to the loss of power to the bus.

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b) Identify the instrument and control system loads connected to the bus and evaluate the effects of loss of power to these loads including the ability to achieve a cold shutdown condition.

c) Describe any proposed design modifications resulting from these reviews and evaluations, and your proposed schedule for implementing those modifications."

Response

1.a As indicated in our interim response to IE Bulletin 79-27 on March 7, 1980, the results of our review indicates that the operator has available in the control room alarm and/or direct indication for the loss of power to the vital and D.C. distribution systems for the North Anna and Surry stations. There are no alarms and/or direct indications for the loss of semi-vital buses in the control room. However, the operator can be alerted by a combination of alarms and/or direct indications from individual instruments or equipment and determine that a loss of power has occurred.

1.b All instrument and control system loads connected to the vital, semi-vital and D.C. buses have been identified and reviewed from a systems operability standpoint. This particular review was limited to ensuring that the unit could be safely placed in a hot or cold shutdown condition without any of the valves or instrumentation powered from the bus of concern.

Components within systems associated with reaching hot or cold shutdown and powered from the bus were highlighted on flow diagrams which gave an overview of valves or instrumentation that would not be available for the shutdown. (This assumes power is not restored to the bus during the shutdown).

The electrical one line diagrams (Attachments 1 and 2) were then reviewed and components which have redundant circuits were marked with an "R". Components which, in our engineering judgement, are not required for safely reaching a hot or cold shutdown condition were marked with an "N".

The balance of the components which are not redundant and may be required for a safe shutdown were then reviewed individually. The review explored the necessity of the component and focused on possible alternative solutions to operability to achieve and maintain the unit in the hot or cold shutdown condition.

The results of the review of the instrument and control system loads connected to the buses indicates that no safety equipment required for shutdown is lost. All safety

functions will initiate as designed and other equipment required to be manually operated for the shutdown can be operated when required.

1.c As a result of our review and evaluation, we have determine that no design modifications are required to ensure that the plants can achieve the hot or cold shutdown condition.

NRC Request

"(2) Prepare emergency procedures or review existing ones that will be used by control room operators, including procedures required to achieve a cold shutdown condition, upon loss of power to each class IE and non-class IE bus supplying power to safety and non-safety-related instrument and control systems. The emergency procedures should include:

a) The diagnostics/alarms/indicators/symptons resulting from the review and evaluation conducted per item 1 above.

b) The use of alternate indication and/or control circuits which may be powered from other non-class IE or class IE instrumentation and control buses.

c) Methods of restoring power to the bus.

Describe any proposed design modification or administrative controls to be implemented resulting from these procedures, and your proposed schedule for implementing the changes."

Response

A review was performed by Vepco North Anna and Surry Site Personnel of procedures to be used by control room operators upon a loss of power to each class IE and non-class IE bus supplying power to safety and non-safety-related instrument and control systems. The review revealed that there are presently no procedures which specifically addressed this type of occurrence. Changes to procedures are being made to incorporate the requirements of this bulletin, Items 2a, 2b, and 2c. Therefore, the control room operator will be provided with the information needed to achieve a hot or cold shutdown condition upon the loss of a particular bus supplying power to safety-related instrumentation and control systems. These procedures will address the loss of each vital, semi-vital and 125V DC bus giving a list of loads associated with each specific bus. In the procedures, there will be a list of the parameters and indications lost with a description of operator action to be taken. The procedures are in draft form and are to be reviewed by the Station Nuclear Safety and Operating Committees with implementation expected by June 15, 1980.

Although the control room operators will be provided with additional procedural requirements which will ensure the ability to achieve a hot or cold shutdown condition for the loss of bus occurrence, some parameter indication and control will not be available. It has been determined that certain design modifications can be made to improve upon the control and parameter indication evaluation capability presently available to the control room operators. The following design modifications will be implemented at the next scheduled outage of sufficient length of each unit:

North Anna Units 1 and 2

	Bus	Breaker No.	Component	Design Modification
1.	Vital Bus 1-I, 2-I Primary Plant Process Rack "1"	3	T-1413,2413 T-1423,2423 T-1433,2433	T_H for each loop would be powered from a separate vital bus.
2.	Vital Bus 1-I, 2-I	34	Annunciator	Automatic or manual swapover to another power source.
3.	Vital Bus 1-I, 2-I	13	MCB Vital SOV Panel "A"	Manual swapover to another power source.
4.	Vital Bus 1-I, 2-I	32	Vital Instrument Panel 1-I, 2-I	Same as comment 3.
5.	Vital Bus 1-II, 2-II Primary Plant Process Rack "2"	3	T-1410,2410 T-1420,2420 T-1430,2430	T_C for each loop would be powered from a separate vital bus.
6.	Vital Bus 1-II	9 10 11 12 13	Gai-Tronics	Automatic or manual swapover to another power source.
7.	Vital Bus 1-III, 2-III	14	MCB Vital SOV Panel "B"	Manual swapover to another power source.

North Anna Units 1 and 2 (Continued)

	Bus	Breaker No.	Component	Design Modification
8.	Vital Bus 1-III, 2-III	32	Vital Instrument Panel 1-III	Same as comment 7.
9.	Semi-Vital Bus 1A, 2A	-	Alarm/ Indication	Indication of loss of bus to be provided in the control room.
10.	Semi-Vital Bus 1B, 2B	-	Alarm/ Indication	Same as item 9.
11.	125V DC Bus 1-I 2-I	-	Voltage Transducer	Loss of any vital bus will cause control room voltage indication for corresponding 125V DC bus to be lost. Modification will provide distinction of loss of vital bus when the corresponding 125V DC bus is available.
12.	125V DC Bus 1-II, 2-II	-	Voltage Transducer	Same as Item 11.
13.	125V DC Bus 1-III, 2-III	-	Voltage Transducer	Same as Item 11.
14.	125V DC Bus, 1-IV, 2-IV	-	Voltage Transducer	Same as Item 11.

Surry Units 1 and 2

	Bus	Breaker No.	Component	Design Modification
15.	Vital Bus 1-I	3 4	T-1413 T-1423 T-1433	Same as Item 1.

Surry Units 1 and 2 (Continued)

	Bus	Breaker No.	Component	Design Modification
16.	Vital Bus 2-I	5 6	T-2413 T-2423 T-2433	Same as Item 1.
17.	Vital Bus 1-I	22 34	Gai-Tronics	Same as Item 6.
18.	Vital Bus 1-II,	3	FT-1122	Change to another power source since FT-1160 is on same vital bus.
19.	Vital Bus 2-II	4	FT-2122	Change to another power source since FT-2160 is on same vital bus.
20.	Vital Bus 1-II	11 12	TE-1410,2410 TE-1420,2420 TE-1430,2430	Same as Item 5.
21.	Semi-Vital Bus Unit 1, 2	-	Alarm/ Indication	Same as Item 9.
22.	125V DC Bus	-	Alarm/ Indication	Same as Item 9.
23.	125V DC Bus 1A	8	Annunciator	Same as Item 2.
24.	125V DC Bus 1-1, 1-2	-	Voltage Transducer	Same as Item 11.

NRC Request

"(3) Re-review IE Circular No. 79-02, Failure of 120 Volt Vital AC Power Supplies, dated January 11, 1979, to include both class IE and non-class IE safety-related power supply inverters. Based on a review of operating experience and your re-review of IE Circular No. 79-02, describe any proposed design modifications or administrative controls to be implemented as a result of the re-review."

Response

3. We have rereviewed IE Circular 79-02 to include non-class IE power supply inverters. The following describes the results of our review for both class IE and non-class IE inverters.

a. North Anna Units 1 and 2

As indicated in our interim response to IE Bulletin 79-27 of March 7, 1980, there is no time delay, circuitry used in the inverter circuits. The normal DC power supply is from batteries. There is an alternate 120V AC power source which is manually actuated through an external transfer switch. This is used only as a maintenance by-pass device. Based on this arrangement, items 1, 2 and 3 to the referenced Circular are not applicable. With regard to item 4, maintenance procedures include reset of the manual transfer switch after maintenance is complete and ensures operability of the safety system.

It has been determined that the loss of non-class IE inverters would not affect the ability to achieve a hot or cold shutdown condition.

We have recently experienced an event on North Anna Unit 1 involving an inverter trip. We are currently investigating this event. Our investigation will be reported to you as a Licensee Event Report (LER/RO 80-47/01T-0).

b. Surry Units 1 and 2

For the class IE inverters, it has been determined (item 1) that no time delay circuitry is used in the inverter circuits. In response to item 2 of the circular, a design change has been initiated to install a high voltage limiting unit on each of the main station battery chargers. These units would limit the input voltage to the inverter to 125 volts ± 10%. This is the tolerance of the equipment served by the buses. For item 3, the normal mode of operation is to have a "Sola" transformer provide power to one of the vital bus panels and the battery charger/inverter provide power to the other vital bus panel. The "Sola" transformer can be manually shifted by a transfer switch to supply power to both vital buses if an inverter fails. The administrative controls (item 4) for the operability of safety systems after maintenance is verified by the performance of associated periodic tests, which directly check the instrumentation and control logic without the initiation of the

safety function. Since the loss of non-class IE inverters does not affect the ability to achieve a hot or cold shutdown condition, items 1 through 4 do not apply.

Very truly yours,

B. R. Sylvia
Manager - Nuclear
Operations & Maintenance

Attachment

RGS/smv:U8

cc: Mr. Victor Stello, Director
Office of Inspection and Enforcement

COMMONWEALTH OF VIRGINIA)
) S. S.
CITY OF RICHMOND)

Before me, a Notary Public, in and for the City and Commonwealth aforesaid, today personally appeared B. R. Sylvia, who being duly sworn, made oath and said (1) that he is Manager-Nuclear Operations and Maintenance of the Virginia Electric and Power Company, (2) that he is duly authorized to execute and file the foregoing statements in behalf of that Company, and (3) that the statements are true to the best of his knowledge and belief.

Given under my hand and notarial seal this 30th day of May, 1980.

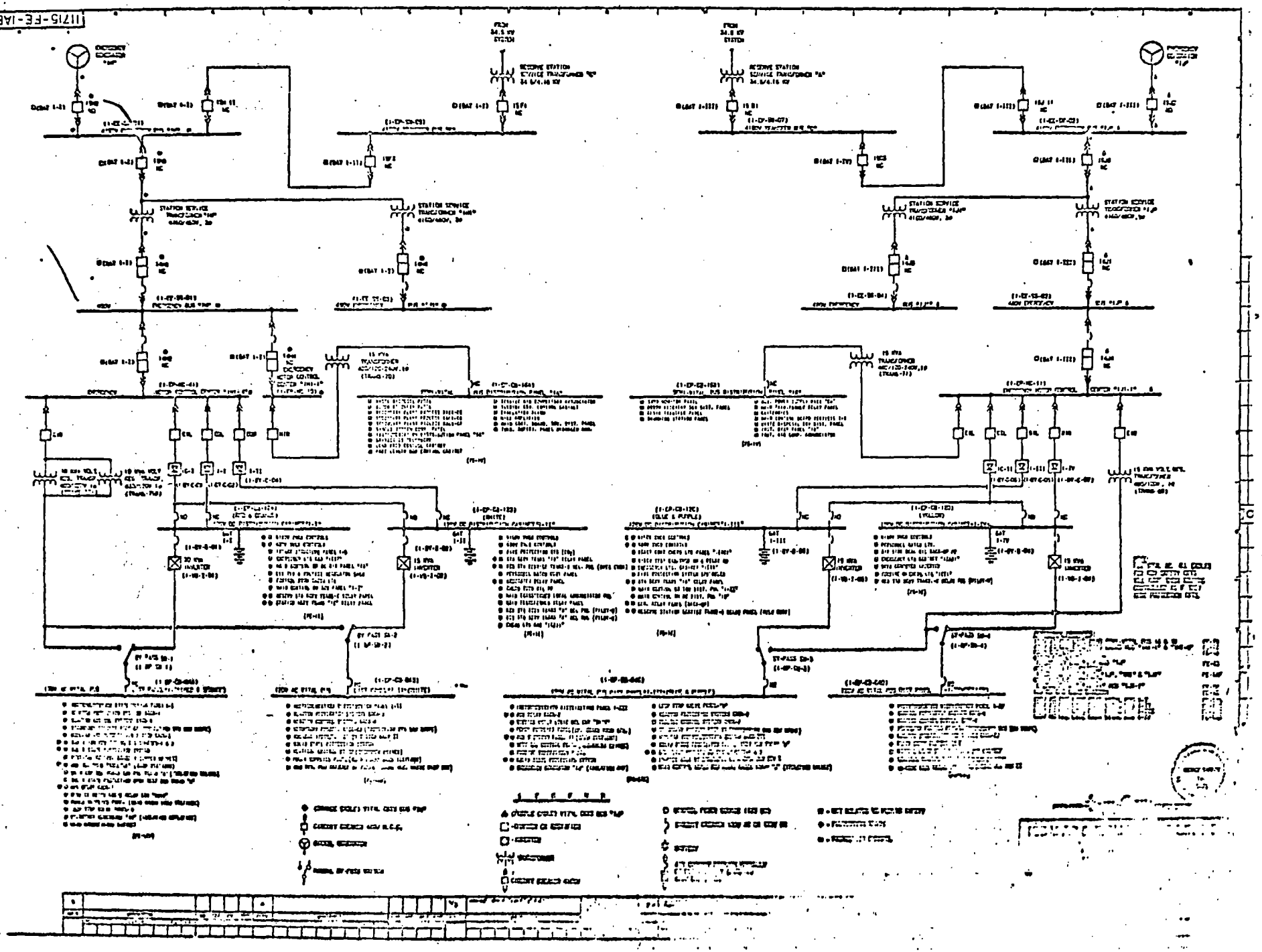
My Commission expires January 20, 1981.

Robert M. Neil
Notary Public

(SEAL)

ATTACHMENT 1

120V AC & 125V DC ONE LINE DIAG.
VITAL POWER
NORTH ANNA UNIT 1



VOLTMETER ON MCB & ANNUNCIATION FOR LOSS OF INVERTER

VITAL BUS 1-I 1-EP-CB-04A

- R 1 — NIS PANEL -I (PROTECTION) 1-EI-CB-36A
- R 2 — NIS PANEL -I (NON-PROTECTION) 1-EI-CB-36A
- 3 — PRI. PLANT PROCESS RACK 1 PROTECTION SET I 1-EI-CB-51 (SEE ATTACH. 1) PINK
- 4 — PRI. PLANT PROCESS RACK 5 CONTROL SET 5 1-EI-CB-55 (SEE ATTACH. 1)
- R 5 — SAFEGUARDS AUX. RELAYS CKT. (ESK-5OE) @ 1-EP-CB-28H
- R 6 — SAFEGUARDS AUX RELAYS CKT (ESK-5BE) @ 1-EP-CB-28H
- R 7 — SSP CHANNEL I, RACK A INPUTS 1-EI-CB-47A
- R 8 — SSP CHANNEL I, RACK B INPUTS 1-EI-CB-47B
- N 9 — EMER. GEN "1H" BATTERY VOLTAGE TRANSDUCER @ 1-EE-EG-01C
- 10 — AUX RELAY RACK-1 TRAIN A 1-EI-CB-48A (SEE ATTACH. 1) BLUE
- R 11 — LS-CW106A1, 122A2, 106A3 & 107A (ESK-115) @ 1-EP-CB-86A
- N 12 — POWER SUPPLY FOR HIC-FW100A-2, B-2 & C-2 @ 1-EI-CB-06A
- 13 —
- N 14 — CONTAINMENT H2 ANALYZER @ JB-1103
- R 15 — LOOP STOP VV PROTECTION RACK "A" TRAIN A 1-EI-CB-63A
- N 16 — LR-CW100 & 104, PS-FW153, LR-1477 & FR-1475 @ 1-EI-CB-04
- N 17 — FR-1154A & B, TR-1412 & HC-1-41 & 46 @ 1-EI-CB-03
- R 18 — SW-HV130A, 130A A & 2300A @ 1-EI-CB-56A
- R 19 — SAFEGUARDS TEST CAB. TRAIN A 1-EI-CB-62A
- R 20 — WATER INDUCTION ANNUNCIATOR PNL 1-EI-CB-215
- N 21 — TV-BS 112A
- 22 — SECONDARY PLANT PROCESS RACK CA 1-EI-CB-23A (SEE ATTACH. 1) PINK
- 23 — POWER SUPPLY FOR HIC-1110, 1347, 1142, 1336 & LM 101A @ 1-EP-CB-25
- N 24 — HEAT TRACING ANNUNCIATOR @ 1-EI-CB-151
- N 25 — ACD-HV 161-1
- R 26 — 1-HV-5-1A, MOV-HV 115-1 & 2, PDS-HV122BA @ 1-EP-CB-71A
- R 27 — RC INSTRUMENT AIR DRYER 1-IA-D-01A
- R 28 — SPARE
- R 29 — SSP TRAIN A OUTPUTS 1-EI-CB-47C
- R 30 — SSP AUX. RELAY RACK TRAIN A 1-EI-CB-64A
- N 31 — TI-AM 101A-2 & 111A-2 @ 1-EI-CB-03
- 32 —
- N 33 — RADIATION MONITOR CAB. 1-2 1-EI-CB-49A
- N 34 — ANNUNCIATOR FEEDER 1-EI-CB-21
- 35 — FEEDER FROM 1-YD-I-02
- N 36 — FUTURE

VITAL INSTRUMENT PNL 1-I 1-EP-CB-80A GREEN

- N 1 — LT-1470 (FM-875)
- N 2 — FT-1110 (FM-90B)
- N 3 — EMER GEN BATTERIES VOLTAGE RECORDER-UNITS 1 & 2
- R 4 — LT-1115 (FM-90B)
- N 5 — STATION BATTERIES VOLTAGE RECORDER-UNIT 1
- N 6 — LS-95103 (FM-35A)
- N 7 — VV MON. LTGS FOR MOV-1869A & 1890A (FM-41A)
- N 8 — FR-CV 150-1
- R 9 — LIT-RS 151A (FM-35A)
- N 10 — TV-CC 104A (FM-23B)
- R 11 — TV-SW 101B (FM-23A)
- N 12 — TV-CC 115B (FM-23B)
- N 13 — SPARE
- R 14 — ACOUSTIC MONITOR PNL 1-EI-CB-190
- N 15 — S.G BLOWDOWN TRIP VV INTERLOCKS
- N 16 — LS-95102 (FM-35A)
- N 17 — AUX. BLDG. AMBIENT TEMP INDICATORS CHANNEL-I TI-AM 100A & 106A
- N 18 — AOD-HV 175-1, 2, 3 & 4 POSITION INDICATION & PDS-HV 167A
- N 19 — LR-DA 115A
- N 20 — TV-BD 100G
- N 21 — TV-BD 100H
- N 22 — TV-BD 100J
- N 23 — VOLTAGE TRANSDUCER FOR 1-EP-CB-12A
- N 24 — VV MON. LTGS FOR MOV-1865A, B & C (FM-[illegible])

MCB VITAL SOV PNL "A" 1-EP-CB-19A-YELLOW

- N 1 — TV-BD 100A
- N 2 — TV-BD 100C
- N 3 — TV-BD 100E
- N 4 — TV-CV 150A
- N 5 — TV-CV 150C
- N 6 — TV-DA 100A
- N 7 — TV-DG 100A
- N 8 — TV-LM 100A
- N 9 — TV-LM 100C
- N 10 — TV-LM 100E
- N 11 — TV-LM 100G
- N 12 — TV-LM 101A & C
- N 13 — TV-MS 113A (FM-148)
- N 14 — TV-MS 113B (FM-148)
- N 15 — TV-MS 113C (FM-148)
- N 16 — TV-RM 100A
- N 17 — TV-RM 100B
- R 18 — TV-SI 100
- R 19 — TV-VP 102A, B, C, D, E, F, G & H
- N 20 — TV-IA 101A
- N 21 — TV-SS 100A
- N 22 — TV-SS 101A
- N 23 — TV-SS 102A
- N 24 — TV-SS 103A
- N 25 — TV-SS 104A
- N 26 — TV-SS 106A
- N 27 — TV-SV 102-1
- N 28 — TV-VS 100A
- N 29 — TV-CC 115A (FM-23B)
- N 30 — TV-CC 105A (FM-23B)
- N 31 — TV-CC 105B (FM-23B)
- N 32 — TV-CC 105C (FM-23B)
- N 33 — TV-CC 101A (FM-23B)
- N 34 — TV-CC 102A (FM-23B)
- N 35 — TV-CC 102C (FM-23B)
- N 36 — TV-CC 102E (FM-23B)
- N 37 — TV-CC 103A (FM-23B)
- N 38 — TV-SI 101 (FM-91B)
- N 39 — TV-CC 104B (FM-23B)
- N 40 — TV-CC 104C (FM-23B)
- N 41 — FCV-AS 100A
- N 42 — FCV-AS 100B
- N 43 — TV-MS 109 (FM-14B)
- N 44 — TV-MS 110 (FM-14B)
- N 45 — TV-SV 102-2
- N 46 — AOD-HV 158-1
- N 47 — SOV-HV 128-1 EXH. ALERT AB [illegible] TRAIN A
- R 48 — TV-SW 101A (FM-23A)

NOTES:

R: REDUNDANT

N: NO SHUTDOWN FUNCTION

VITAL BUS 1-I ONE LINE DIAGRAM 1-EP-CB-04A, 80A & 19A NORTH ANNA - UNIT 1

STONE & WEBSTER ENGINEERING CORP

DWG NO IE 79-27/NTIS-E-1A

VITAL BUS 1-II 1-EP-CB-04B

[VOLTMETER ON MCB & ANNUNCIATOR FOR LOSS OF INVERTER]

R	1	NIS PANEL -II (PROTECTION) 1-EI-CB-36B
R	2	NIS PANEL -II (NON-PROTECTION) 1-EI-CB-36B
(SEE ATTACH-2)	3	PRI PLANT PROCESS RACK-2 PROTECTION SET-2 1-EI-CB-52
(SEE ATTACH-2)	4	PRI PLANT PROCESS RACK-6 CONTROL SET-2 1-EI-CB-56
N	5	SPARE
N	6	SPARE
R	7	SSP CHANNEL -II RACK A INPUTS 1-EI-CB-41A
R	8	SSP CHANNEL -II RACK B INPUTS 1-EI-CB-41A
N	9	GAI-TRONICS - TURBINE & SERVICE BLDG
N	10	GAI-TRONICS - AUXILIARY BLDG
N	11	GAI-TRONICS - # 1 CONTAINMENT
N	12	GAI-TRONICS - # 2 CONTAINMENT
N	13	GAI-TRONICS - EVACUATION ALARM
N	14	SPARE
N	15	SPARE
N	16	FR-1435, YR-1701, TR-1634, TR-MS101-1&2, MS102-1&2 AND MS103-3, PR-MS102, MS110-1&2 AND CNTMT R & R-55 10; 101 & 1-EI-CB-04
N	17	NR-1-42, TR-1410 AND FR-1113
N	18	SPARE
N	19	SPARE
N	20	SPARE
V	21	SPARE
	22	SECONDARY PLANT PROCESS RACK-CB 1-EI-CB-23B
	23	HIC-1MS104, FW1100A1, FW1100B1, FW1100C1, LM-1018 & 1196 in 1-EI-CB-25
V	24	VIC-1113A & 1114A
N	25	SPARE
N	26	SPARE
N	27	SPARE
N	28	SPARE
N	29	SPARE
N	30	SPARE
N	31	SPARE
	32	
N	33	BORON RECOVERY CONTROL BD ANNUNCIATOR 1-EI-CB-13
N	34	WASTE DISPOSAL CONTROL BD ANNUNCIATOR 1-EI-CB-12
	35	FEEDER FROM 1-VB-I-02
N	36	FIXTURE

VITAL INSTRUMENT PNL 1-II 1-EP-CB-30B

N	1	FT-1113
N	2	TI-AM 110C-2 & 111C-2
N	3	SPARE
N	4	SPARE
N	5	SPARE
N	6	SPARE
N	7	SPARE
N	8	SPARE
N	9	SPARE
N	10	SPARE
N	11	SPARE
N	12	SPARE
N	13	SPARE
N	14	SPARE
N	15	SPARE
N	16	SPARE
N	17	SPARE
N	18	SPARE
N	19	SPARE
N	20	SPARE
N	21	SPARE
N	22	SPARE
N	23	VOLTAGE TRANSDUCER FOR 1-EP-CB-12B
N	24	TI-AM 122A-1, B-1 & C-1

NOTES:

R = REDUNDANT

N = NO SHUTDOWN FUNCTION

STONE & WEBSTER ENGINEERING CORP

VITAL BUS 1-II ONE LINE DIAGRAM 1-EP-CB-04B & 30B

DWG. NO.

VITAL BUS 1-III 1-EP-CB-04C

[VOLTMETER ON MCB / ANNUNCIATOR FOR LOSS OF INVERTER]

- R 1 — NIS PANEL - III (PROTECTION) 1-EI-CB-36A
- R 2 — NIS PANEL - III (NON-PROTECTION) 1-EI-CB-36A
- 3 — PRI. PLANT PROCESS RACK - 3 PROTECTION SET-3 1-EI-CB-53 (SEE NOTE 2) - PINK
- 4 — PRI. PLANT PROCESS RACK - 7 CONTROL SET-7 1-EI-CB-57 (SEE NOTE 2) - PINK
- N 5 — IN-CORE INSTRUMENTATION WHITTAKER T/C JB 38-675
- N 6 — EMER GEN "1J" BATTERY VOLTAGE TRANSDUCER @ 1-EE-EG-03C
- R 7 — SSP CHANNEL III RACK A INPUTS 1-EI-CB-47A
- R 8 — SSP CHANNEL III RACK B INPUTS 1-EI-CB-47B
- N 9 — TV-SS 112B
- N 10 — AUX RELAY RACK-2 TRAIN B 1-EI-CB-49B (SEE NOTE 2) - PINK
- R 11 — SAFEGUARDS AUX RELAYS CKT (ESK-6B6) @ 1-EP-CB-28J
- R 12 — SAFEGUARDS AUX RELAYS CKT (ESK-6B6) @ 1-EP-CB-28J
- N 13 — POWER SUPPLY FOR HIC-1-122, MS101A, B & C @ 1-EI-CB-06B
- 14 —
- R 15 — LOOP STOP IV PROTECTION CAB. B TRAIN B 1-EI-CB-63B
- R 16 — FR-1458 @ 1-EI-CB-04
- N 17 — TR-1413, NR-1-43 & 45 AND NM-45A & B @ 1-EI-CB-03
- R 18 — SOV-HV 1302B, 1306B & 2300B @ 1-EI-CB-56B
- R 19 — SAFEGUARDS TEST CAB. TRAIN B 1-EI-CB-62B
- N 20 — SPARE
- N 21 — SPARE
- 22 — SECONDARY PLANT PROCESS RACK CC 1-EI-CB-23C (SEE NOTE 2) - PINK
- N 23 — POWER SUPPLY FOR HIC-1137, 1114, 1105, 1755 & LQ-FN44 @ 1-EI-CB-25
- N 24 — TURBINE SUPERVISORY PANEL RECEPTACLE 1-EI-CB-10
- N 25 — TURBINE SUPERVISORY PANEL 1-SI-CB-10
- N 26 — 1-HY-5-1B, MOV-HV 116-1 & 2, PDS-HV122 EB @ 1-EP-CB-71B
- R 27 — LS-CV/106B1, 106B2, 106B3 & 107B @ 1-EP-CB-86B
- R 28 — SSP AUX. RELAY RACK TRAIN B 1-EI-CB-64B
- R 29 — SSP TRAIN B OUTPUTS 1-EI-CB-47F
- R 30 — R.C. INSTRUMENT AIR DRYER - 1-IA-D-02B
- N 31 — SPARE
- 32 —
- N 33 — RADIATION MONITOR CAB. 1-2 1-EI-CB-42B
- N 34 — COMPUTER I/O RACK-2 FEEDER 1-EI-CB-18C
- 35 — FEEDER FROM 1-EP-CB-04A
- N 36 — FUTURE

VITAL INSTRUMENT PNL 1-II 1-EP-CB-12C — GREEN

- R 1 — LT-1112 (FM. 40B)
- N 2 — TI-AM 101B-2 & 111B-2 @ 1-EI-CB-03
- N 3 — SPARE
- N 4 — SPARE
- R 5 — LIT-RS 151B (FM. 95A)
- N 6 — LQ-DA 113B
- N 7 — VV MON. LTGS FOR MOV-1869B, 1370B, 1836
- N 8 — AOD-HV 115-1, 2, 3 & 4 POSITION INDICATION
- N 9 — AOD-HV 160-1
- N 10 — SPARE
- N 11 — SPARE
- N 12 — SPARE
- N 13 — SPARE
- N 14 — SPARE
- N 15 — SPARE
- N 16 — SPARE
- N 17 — AUX BLDG. AMBIENT TEMP INDICATORS CHANNEL-II TI-AM 100B → 109B
- N 18 — SPARE
- N 19 — SPARE
- N 20 — LS-DA 100
- N 21 — SPARE
- N 22 — LS-DA 103
- N 23 — VOLTAGE TRANSDUCER FOR 1-EP-CB-12C
- N 24 — LS-DA 105

MCB VITAL SOV PNL "B" 1-EP-CB-19B — YELLOW

- N 1 — TV-BD 100B
- N 2 — TV-BD 100D
- N 3 — TV-BD 100F
- N 4 — TV-LV 150B
- N 5 — TV-CV 150D
- N 6 — TV-DA 100B
- N 7 — TV-DG 108B
- N 8 — TV-LM 101B
- N 9 — TV-LM 100D
- N 10 — TV-LM 100F
- N 11 — TV-LM 100H
- N 12 — TV-LM 101B & D
- N 13 — TV-MS 113A (FM-14B)
- N 14 — TV-MS 113B (FM-14B)
- N 15 — TV-MS 113C (FM-14B)
- N 16 — TV-RM 100C
- R 17 — TV-SI 102 (FM-41B)
- N 18 — SPARE
- N 19 — TV-SS 100B
- N 20 — TV-SS 101B
- N 21 — TV-SS 102B
- N 22 — TV-SS 103B
- N 23 — TV-SS 104B
- N 24 — TV-SS 106B
- N 25 — TV-SV 103
- N 26 — TV-VS 100B
- N 27 — TV-CC 100A (FM-23B)
- N 28 — TV-CC 100B (FM-23B)
- N 29 — TV-CC 100C (FM-23B)
- N 30 — TV-CC 101B (FM-23B)
- N 31 — TV-CC 102B (FM-23B)
- N 32 — TV-CC 102D (FM-23B)
- N 33 — TV-CC 102F (FM-23B)
- N 34 — TV-CC 103B (FM-23B)
- N 35 — TV-CC 104A (FM-23B)
- N 36 — TV-CC 104B (FM-23B)
- N 37 — TV-CC 104C (FM-23B)
- N 38 — TV-IA 102B
- N 39 — TV-MS 109 (FM-14B)
- N 40 — TV-MS 110 (FM-14B)
- R 41 — AOD-HV 115B-1
- N 42 — SOV-HV 128-2 (EXH. INLET FOR FAN-1-VS-F-4 TRAIN B)
- R 43 — TV-SW 10A (FM-22A)
- N 44 — TV-YP 101A, B, C, D, E, F, G & H
- N 45 — TV-CC 115C (FM-23B)
- R 46 — TV-SW 101B (FM-22A)
- N 47 — TV-RM 100D (FM-26A)
- N 48 — SPARE

NOTES:

R = REDUNDANT

N = NO SHUTDOWN FUNCTION

REV	DESCRIPTION
4	
3	
2	
1	

VITAL BUS 1-III ONE LINE DIAGRAM 1-EP-CB-04C, 12C & 19B NORTH ANNA - UNIT 1

STONE & WEBSTER ENGINEERING CORP

DWG NO. 1E 59-23/1715-E-1C

VITAL BUS 1-IV 1-EP-CB-04D [VOLTMETER ON MCB / ANNUNCIATOR FOR LOSS OF INVERTER]

	No.	Circuit
R	1	NIS PANEL -IV (PROTECTION) 1-EI-CB-36D
R	2	NIS PANEL -IV (NON-PROTECTION) 1-EI-CB-36D
(SEE ATTACH-2)	3	PRI PLANT PROCESS RACK-4 PROTECTION SET-4 1-EI-CB-54
(SEE ATTACH-2)	4	PRI. PLANT PROCESS RACK-8 CONTROL SET-8 1-EI-CB-53
R	5	WHITTAKER T/C JUNCTION BOX-2 JB-676
N	6	SPARE
R	7	SSP CHANNEL -IV RACK A INPUTS 1-EI-CB-47A
R	8	SSP CHANNEL -IV RACK B INPUTS 1-EI-CB-47B
N	9	SPARE
N	10	SPARE
N	11	SPARE
N	12	ANNUNCIATOR DEMULTIPLEXER
N	13	SPARE
N	14	SPARE
N	15	SPARE
N	16	SPARE
N	17	PR-1444, LR-1459, NR-1-44, TR-144B, 1403, 1409A, B, C & D @ 1-EI-CB-03
N	18	SPARE
N	19	SPARE
N	20	SPARE
N	21	SPARE
(SEE ATTACH-2)	22	SECONDARY PLANT PROCESS RACK-CD 1-EI-CB-23D
N	23	SPARE
N	24	SPARE
N	25	SPARE
N	26	SPARE
N	27	SPARE
N	28	SPARE
N	29	SPARE
N	30	SPARE
N	31	SPARE
	32	
N	33	SPARE
N	34	SPARE
	35	FEEDER FROM 1-VB-I-04
N	36	FUTURE

VITAL INSTRUMENT PNL 1-IV 1-EP-CB-80D

	No.	Circuit
N	1	PT-MS132
N	2	PT-MS133
N	3	PT-LO100
N	4	PT-LO101
N	5	PT-LO102
N	6	PT-MS126
N	7	PQ-MS131
N	8	LS-DA110B
N	9	LQ-DA111A
N	10	LQ-DA111B
N	11	LS-DB600A
N	12	LS-DB600B
N	13	SPARE
N	14	SPARE
N	15	SPARE
N	16	SPARE
N	17	SPARE
N	18	SPARE
N	19	SPARE
N	20	SPARE
N	21	TI-AM122A-2, B-2 & C-2
N	22	LS-FC100
N	23	VOLTAGE TRANSDUCER FOR 1-EP-CB-12D
N	24	LS-FC101

NOTES:
R: REDUNDANT
N: NO SHUTDOWN FUNCTION

VITAL BUS 1-IV
ONE LINE DIAGRAM
1-EP-CB-04D & 80D
NORTH ANNA - UNIT 1

STONE & WEBSTER ENGINEERING CORP

DWG. NO. 11715-E-1D

SEMI-VITAL BUS 1A 1-EP-CB-16A [NO CONTROL ROOM ALARM/INDICATION]

N	1	WASTE GAS COMPRESSOR ALT RELAY CKT (1-EI-CB-12
N	2	TR-CP-100, BR 103 A & B, BR 111 A & B; PR-BR 116 A & B; LP-BR 114 A & B AND TR-BR 150 A & B (1-EI-CB-13
(see Note-2)	3	SECONDARY PLANT PROCESS RACK CC (1-EI-CB-15E
N	4	SOV-BC 103
N	5	EARTHQUAKE INSTRUMENT PANEL 1-EI-CB-151
	6	
N	7	SECONDARY PLANT PROCESS RACK CC (1-EI-CB-61
N	8	SOV-SS 107 A & B, 109 A, B, C & D AND 103 A, B & C
N	9	SOV-SS 110 A, B & C, 111 A, B & C, 113, 123 & 124
N	10	SECONDARY PLANT PROCESS RACK CA (1-EI-CB-44
N	11	SERVICE AIR COMPRESSOR ANNUNCIATOR 1-EI-CB-29
	12	
N	13	LOAD FREQUENCY CONTROL PNL (CONTROL RM) 1-EI-CB-17A
N	14	STATION METERING PNL 1-EI-CB-11
N	15	LOAD FREQUENCY CONTROL PNL (SWGR RM) 1-EI-CB-17
N	16	TURBINE EH GOVERNOR CONTROL PNL 1-EI-CB-20
N	17	TG-LW 109 (a) 1-EI-CB-12
N	18	PHA-BC 111; PHS-BC 111; PHC-BC 111; LC-BC 123; LI-BC 113 AND TI-BC 120 & 121
N	19	PI-LM 101 A-1 & 2 & 1-EI-CB-05
N	20	PART LENGTH CONTROL ROD CAB 1-EI-CB-40
N	21	TURBINE VV PIT MCV HEATER PNL 1-EP-CB-39D
N	22	AUX. BLDG MOV HEATER PNL 1-EP-CB-39L
N	23	MS & QUENCH SPRAY MOV HEATER PNL 1-EP-CB-39H
N	24	ENVIRONMENTAL LAB EQUIPMENT RACK RECP-110
N	25	TG-AM 113 & 115 (a) 1-EI-CB-80
	26	FEEDER BKR FROM TRANSFORMER

SEMI-VITAL INSTRUMENT DIST. PNL 1A 1-EP-CB-91A

N	1	MG-LM 100
N	2	PI-LM 1-2 & RECP-93
N	3	LT-DA 110
N	4	RSS TRANSF OVERLOAD ALARM CKT
N	5	PDS-FW 102 & PDS-FW 102
N	6	PT-1459A
N	7	AOD-HV 102-1, 2, 3 & 4 AND 103-1, 2, 3 & 4
N	8	AOD-HV 104-1, 2, 3 & 4
N	9	AOD-HV 107-1, 2, 3 & 4
N	10	SUBCOOLING MON. PNL 1-EI-CB-131A
R	11	1-HV-F-60A
N	12	1-HV-HV-2
N	13	1-HV-AC-5
N	14	1-HV-F-17
N	15	FIT-LM 100-1
N	16	FIT-LM 100-2
N	17	FIRE PROT-BATTERY I-I 1-FP-CB-12
N	18	FIRE PROT-BATTERY I-II 1-FP-CB-13
N	19	FIRE PROT-BATTERY I-III 1-FP-CB-14
N	20	FIRE PROT-BATTERY I-IV 1-FP-CB-15
N	21	FIRE PROT-MCC ROOM 1-FP-CB-16
N	22	FIRE PROT-RECORDS RM-1 1-FP-CB-C6
N	23	FIRE PROT-RECORDS RM-2 1-FP-CB-C7
N	24	FIRE PROT-P/I RM-1 1-FP-CB-16

STEAM DRAIN SYS DIST PNL 1-EP-CB-99

N	1	LCV-SD 140A
N	2	LCV-SD 140B
N	3	LCV-SD 141A
N	4	LCV-SD 141B
N	5	LCV-SD 121A
N	6	LCV-SD 121B
N	7	LCV-SD 123A
N	8	LCV-SD 123B
N	9	LCV-SD 124A
N	10	LCV-SD 124B
N	11	LCV-SD 130 A & C
N	12	LCV-SD 130 B & D
N	13	NRV-SD 133 A & C
N	14	NRV-SD 133 B & D
N	15	WTR INDICATION INTERLOCK CKT
N	16	WTR INDICATION INTERLOCK CKT
N	17	WTR INDICATION INTERLOCK CKT
N	18	WTR INDICATION INTERLOCK CKT
N	19	GROUND SD LEAK DETECTION PNL 1-EI-CB-73D
N	20	ES WT-124-1 & 123-2
N	21	WTR INDICATION INTERLOCK CKT
N	22	WTR INDICATION INTERLOCK CKT
N	23	TV-CC 116A
N	24	TV-CC 116B
N	25	TV-CC 116C
N	26	NAA-SS-C1
N	27	NAA-SS-C2
N	28	NAA-SS 103
N	29	ES-WT 123-1 & 2
N	30	ES-IP 12

Notes:
R = REDUNDANT
N = NO SHUTDOWN FUNCTION

STONE & WEBSTER ENGINEERING CORP

SEMI-VITAL BUS 1A
ONE LINE DIAGRAM
1-EP-CB-16A, 91A & 99
NORTH ANNA UNIT 1

DWG NO 12 [illegible] 34-E CA

SEMI-VITAL BUS 1B 1-EP-CB-16B [TO CONTROL ROOM ALARM/INDICATION]

N		INSTRUMENT AIR COMPRESSOR ANNUNCIATOR 1-EI-CB-29
N		RCP THERMOCOUPLE TRANSFER BOX JB-791
N		PIPE LEAK DETECTION PNL 1-EI-CB-32
N		AUX. BLDG MOV HEATER PNL B 1-EP-CB-24M
N		MS & QUENCH SPRAY MOV HEATER PNL B 1-EP-CB-36J
N		TIC - GW102, 103 & 104 @ 1-EI-CB-12
N		RADIATION MONITOR PANEL - UNIT 2 2-EI-CB-43A
N		SPILLWAY SUPERVISORY PANEL 1-EI-CB-121
N		WEATHER TOWER PANEL 1-EI-CB-111
N		LOOSE PARTS MONITOR PANEL 1-EI-CB-157
N		IMPULSE DEVICE & AMPLIFIER FOR 33 WATT-HOUR METERS @ 1-EP-CB-01
N		TI - AM109A, B1C
N		PORTABLE RADIO COMMUNICATION TRANSMITTER - UNIT 1
R		PI - LM1018-1 & 2 @ 1-EI-CB-05
N		SECONDARY PLANT PROCESS AUX. POWER RACK-CH 1-EI-CB-23H
N		LS-DC101, LSH-LW110, LSL-LW110, LT-LW111 & PDIS-LW132 1-EI-CB-24
N		PS-LW103 @ 1-EI-CB-57
N		IR-1160 AND CRT DISPLAY @ 1-EI-CB-03
N		PORTABLE RADIO COMMUNICATOR @ OPERATOR'S DESK CONTROL RM
N		REHEAT CONTROL VALVE CABINET 1-EI-CB-30
N		SECONDARY PLANT PROCESS AUX. POWER RACK-CH 1-EI-CB-23H
		FEEDER FROM TRANSFORMER
N		SPARE

BORON RECOVERY SYS SOV DIST PNL 1-EP-CB-22 *

N	1	TV-BR124A & 125A
N	2	TV-BR101A
N	3	TV-BR101B
N	4	TV-BR102A & 120A
N	5	TV-BR102B & 120B
N	6	TV-BR124B & 125B
N	7	LCV-BR104A-1
N	8	BORON SYS INTERLOCKING RELAYS CKT
N	9	LCV-BR104B-1
N	10	BORON SYS INTERLOCKING RELAYS CKT
N	11	TV-BR107A-1
N	12	TV-BR107A-2
N	13	TV-BR107B-1
N	14	TV-BR107B-2
N	15	FCV-BR109A
N	16	FCV-BR109B
N	17	TV-BR110A
N	18	TV-BR110B
N	19	TV-BR111A
N	20	TV-BR111B
N	21	TV-BR113A
N	22	TV-BR113B
N	23	TV-BR114A
N	24	TV-BR114B
N	25	TV-BR115A
N	26	TV-BR115B
N	27	TV-BR115C
N	28	PCV-BR116A & TCV-BR103A
N	29	PCV-BR116B & TCV-BR103B
N	30	TV-BR117A
N	31	TV-BR117B
N	32	TV-BR117C
N	33	PCV-BR118A
N	34	PCV-BR118B
N	35	TV-BR119
N	36	TV-BR123
N	37	PCV-BR159B
N	38	PCV-BR159A
N	39	PCV-BR129
N	40	TV-BR122C
N	41	TV-BR122B
N	42	TV-BR122A
N	43	TV-BR121C
N	44	TV-BR121B
N	45	TV-BR121A
N	46	BORON EVAPORATOR INTERLOCKING RELAYS CKT
N	47	BORON EVAPORATOR INTERLOCKING RELAYS CKT
N	48	SPARE

SEMI-VITAL INSTRUMENT DIST PNL 1B 1-EP-CB-81B

N	1	NR PI-LM107 @ RECP-74
N	2	H_2 & O_2 ANALYZER PANEL 1-EI-CB-59
N	3	HIGH RANGE EFFLUENT RADIATION MON. JB-25HD
N	4	TIC 1100
N	5	LT-CW104
N	6	1-PB-EJ-01 @ 1-EP-CB-74
N	7	ACD-HV113-1, 2, 3 & 4
N	8	1-HV-AC-3
N	9	1-HV-AC-4
N	10	SUBCOOLING MONITORING PANEL 1-EI-CB-131B
N	11	1-HV-F-60A
N	12	1-HV-HV-4
N	13	1-HV-P-6
N	14	SOV-CW120
N	15	PURGE SYS. RADIATION MON. INTERLOCK CKT
N	16	RADIATION MONITOR CHANNEL FAILURE ALARM
N	17	LS-DA39 A/B
N	18	SPARE
N	19	FIRE PROT - S.W. ROOM-2 1-FP-CB-19
N	20	FIRE PROT - CONTROL ROOM 1-FP-CB-05
N	21	FIRE PROT - CABLE TRAY AM 1-FP-CB-02
N	22	FIRE PROT - SERVICE BLDG 1-FP-CB-03
N	23	FIRE PROT - SWGR ROOM 1-FP-CB-01
N	24	FIRE PROT - AUXILIARY BLDG 1-FP-CB-04

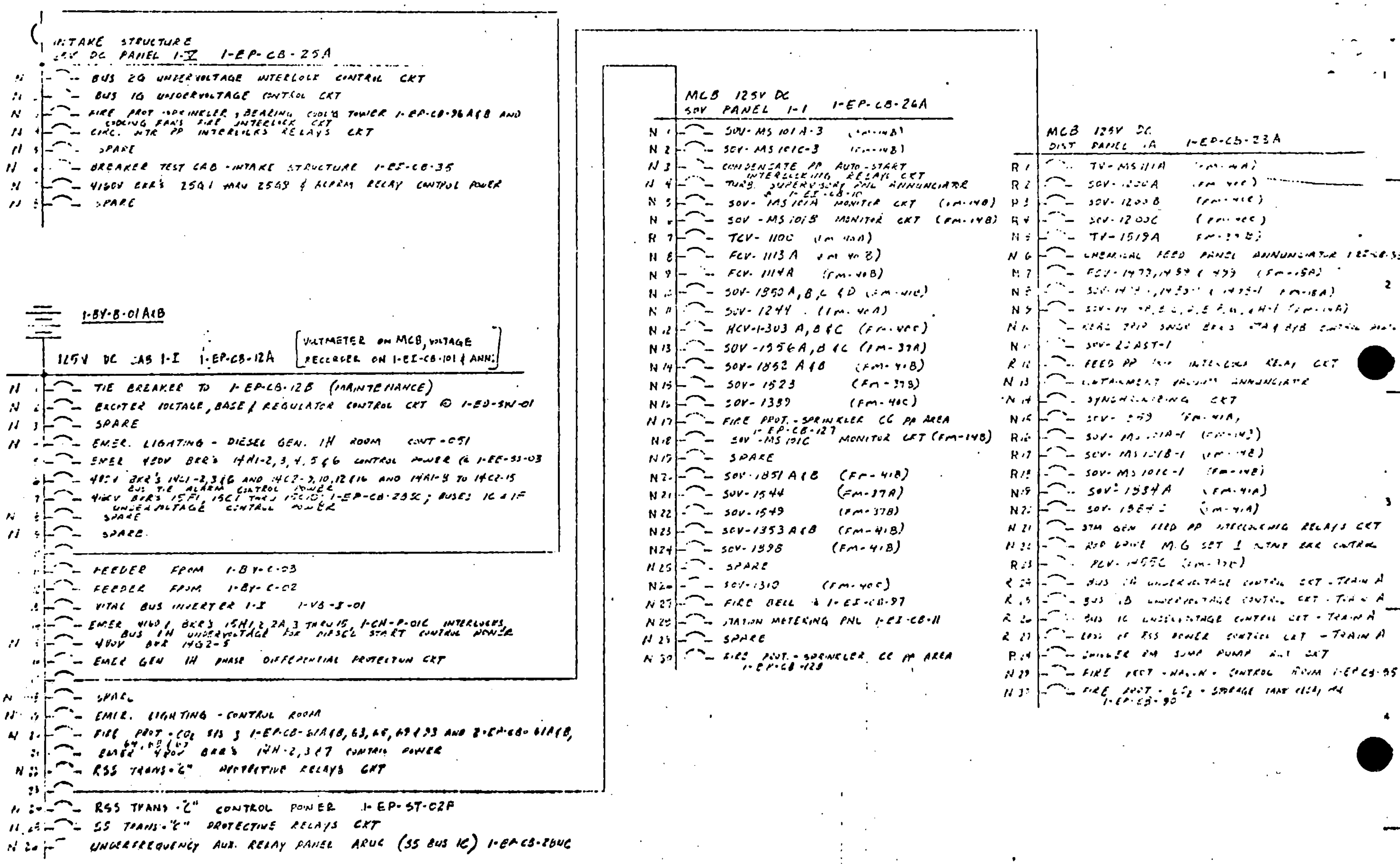
WASTE DISPOSAL SYS SOV DIST PNL 1-EP-CB-21

N	1	TV-GW113
N	2	LCV-LW103A-1
N	3	TV-GW114
N	4	LCV-LW103B-1
N	5	TV-GW106
N	6	LCV-LW104
N	7	TV-GW103A
N	8	TV-GW103B
N	9	1-LVI-EN-01
N	10	SPARE
V	11	SPARE
N	12	FCV-LW109
N	13	SPARE
N	14	FCV-LW115
N	15	FCV-LW119
N	16	FCV-GW100
N	17	LG-LW114
N	18	LSL-LW113A&B AND 114
N	19	SPARE
V	20	SPARE
N	21	SPARE
N	22	SPARE
N	23	SPARE
N	24	LIQUID WASTE INTERLOCKING RELAYS CKT
N	25	SPARE
N	26	LIQUID WASTE INTERLOCKING RELAYS CKT
N	27	SPARE
N	28	SPARE
N	29	SPARE
N	30	SPARE
N	31	SPARE
N	32	SPARE
N	33	SPARE
N	34	SPARE
N	35	SPARE
N	36	SPARE

NOTES:
@ = REDUNDANT
N = NO SHUTDOWN FUNCTION

STONE & WEBSTER ENGINEERING CORP

SEMI-VITAL BUS 1B
ONE LINE DIAGRAM
1-EP-CB-16B, 81B, 22 & 21
NORTH ANNA - UNIT 1
DWG. NO. SE 12 27/1115-E-CB



NOTES

R = REDUNDANT

N = NO SHUTDOWN FUNCTION

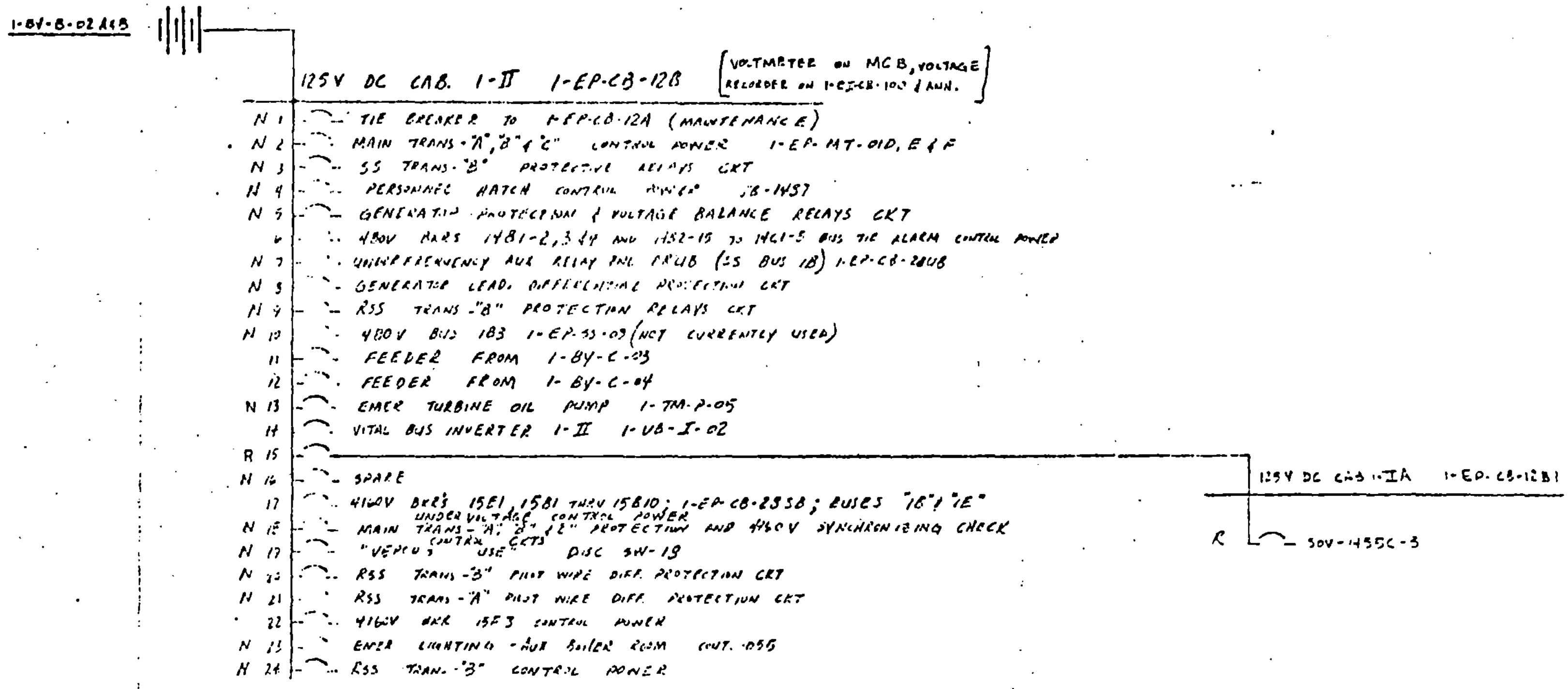
125V DC BUS 1-I ONE LINE DIAGRAM

1-EP-CB-12A, 25A, 23A & 26A

NORTH ANNA - UNIT 1

STONE & WEBSTER ENGINEERING CORP.

DWG. NO. IE 11715-E-3A



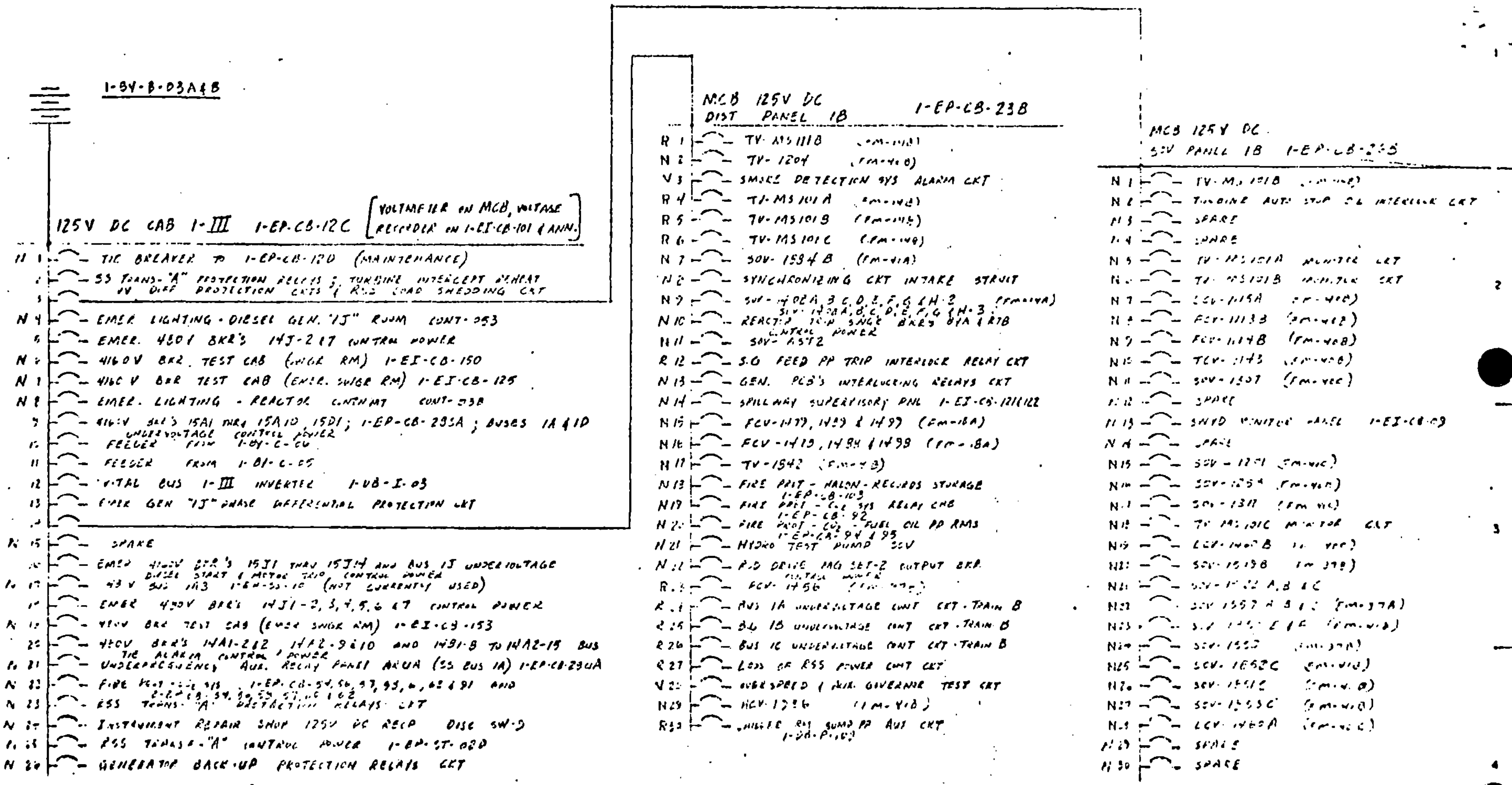
NOTES:

R = REDUNDANT
N = NO SHUTDOWN FUNCTION

125 V DC BUS 1-II
ONE LINE DIAGRAM
1-EP-CB-12B & 12B1
North Anna - Unit 1

STONE & WEBSTER ENGINEERING CORP

DWG. NO. 3L 79 37/6716-E-3B (?)



NOTES:

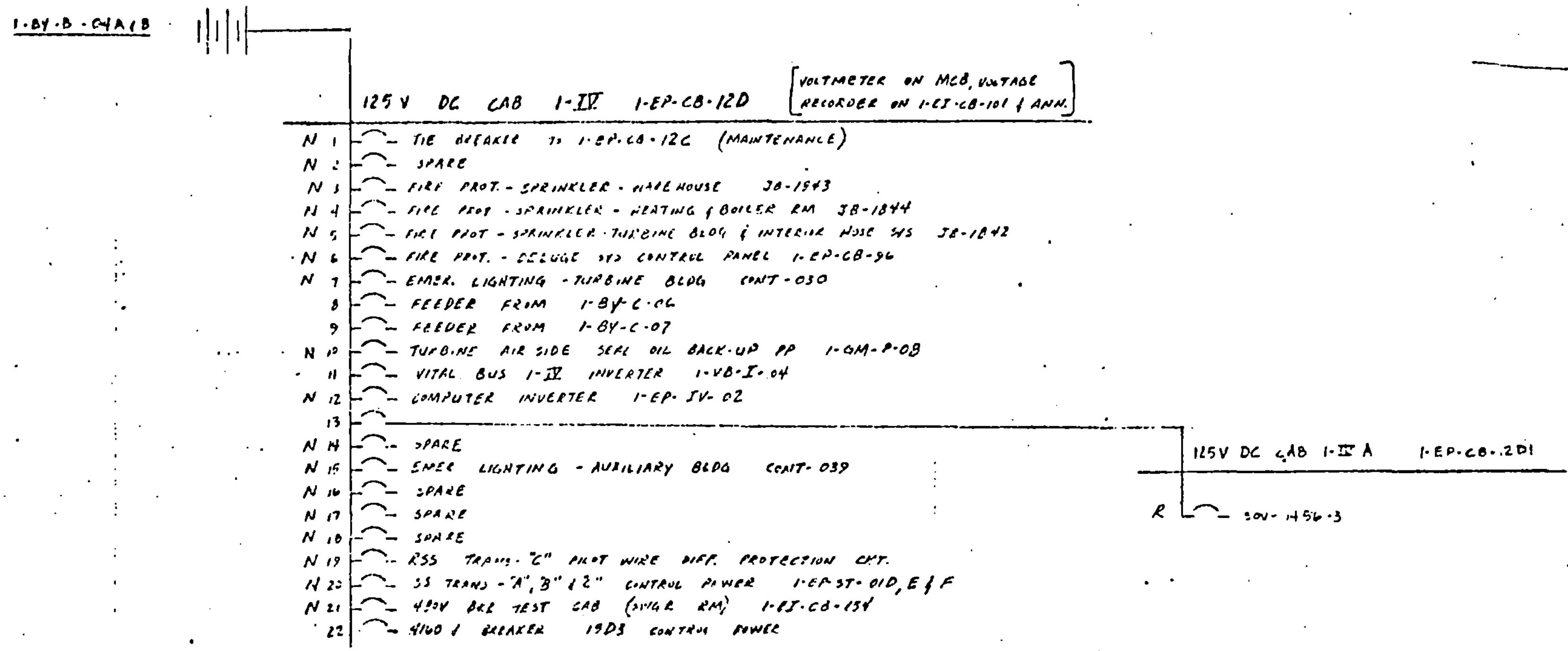
R= REDUNDANT

N= NO SHUTDOWN FUNCTION

4		125V DC BUS 1-III
3		ONE LINE DIAGRAM
2		1-EP-CB-12C, 23B & 26B
1		NORTH ANNA - UNIT 1

STONE & WEBSTER ENGINEERING CORP

DWG NO.



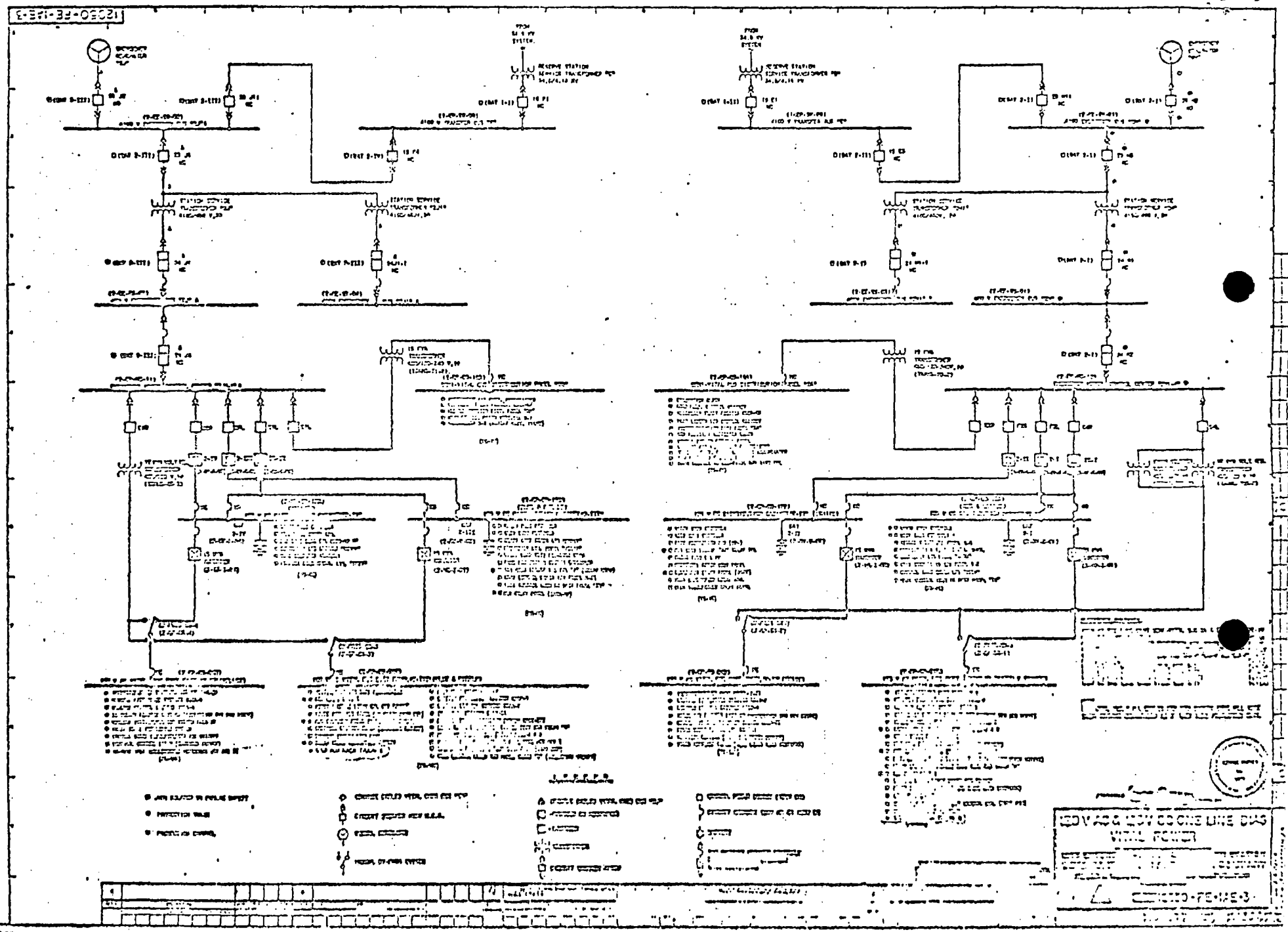
NOTES:
R = REDUNDANT
N = NO SHUTDOWN FUNCTION

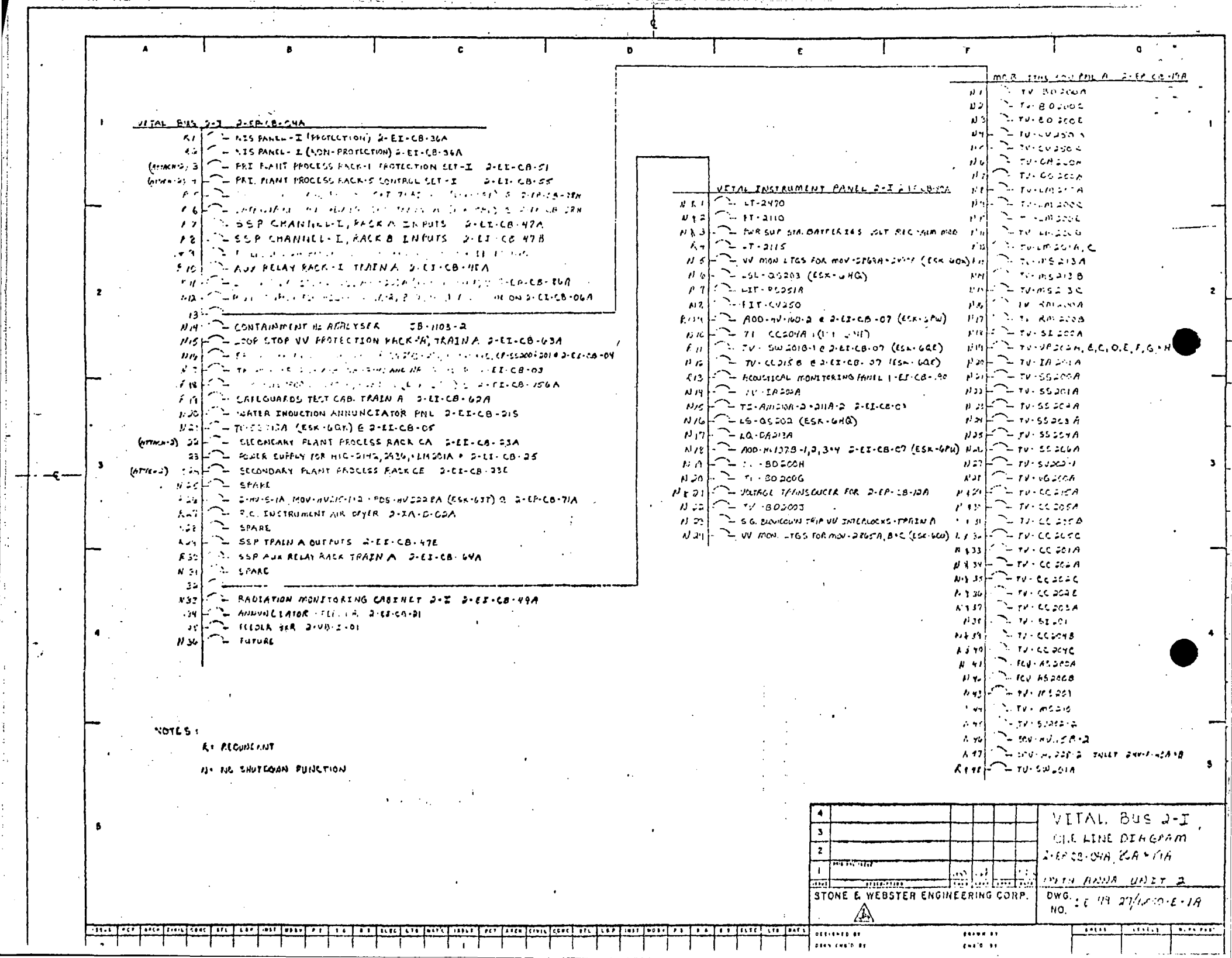
125 V DC BUS 1-IV
ONE LINE DIAGRAM
1-EP-CB-12D & 12D1
NORTH ANNA UNIT 1

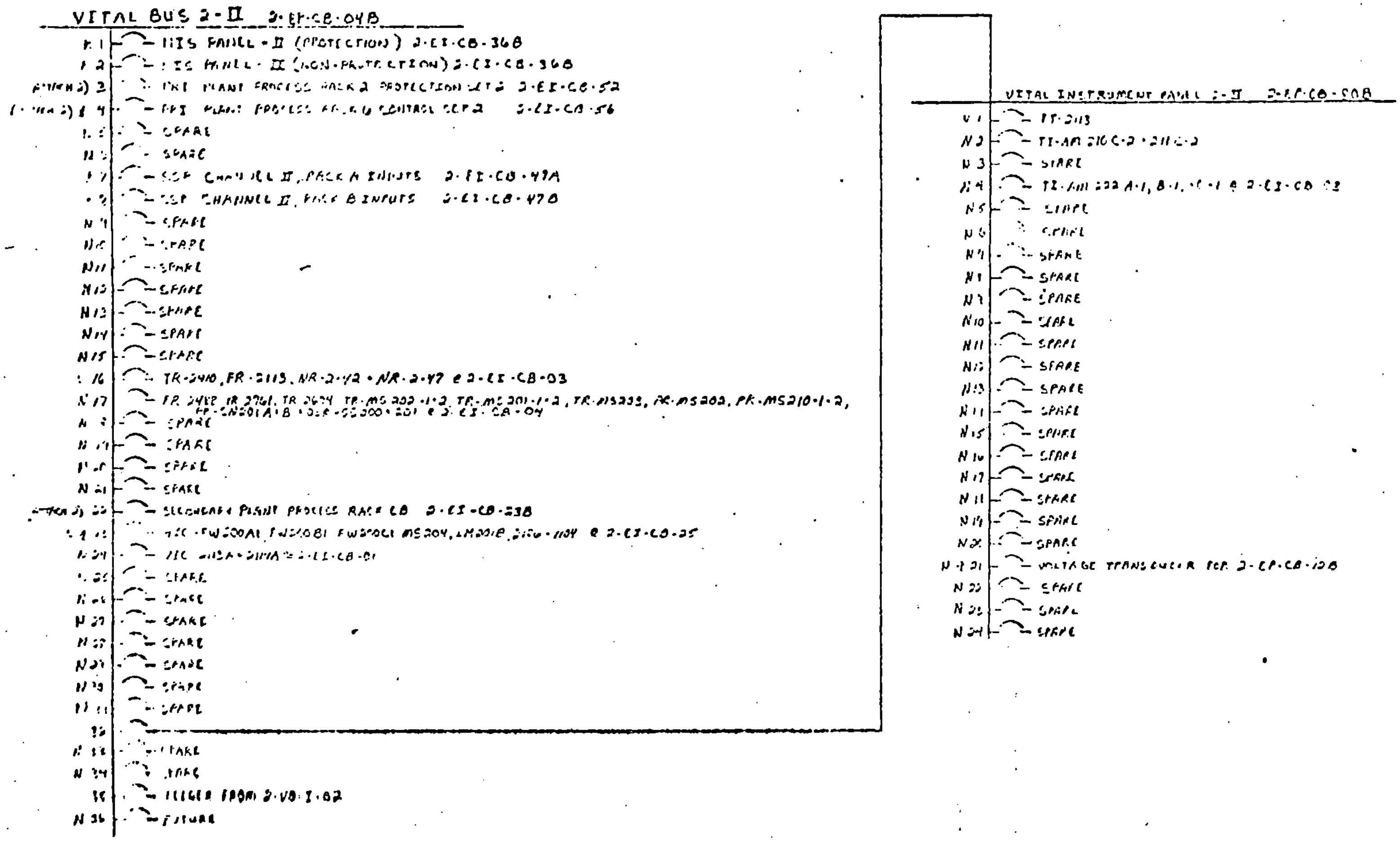
STONE & WEBSTER ENGINEERING CORP.

DWG. NO. IE 11-27/175-E-3D

120V AC & 125V DC ONE LINE DIAG.
VITAL POWER
NORTH ANNA UNIT 2




VITAL BUS 2-I 2-EP-CB-04A
K1 — NIS PANEL-I (PROTECTION) 2-EI-CB-36A
K5 — NIS PANEL-I (NON-PROTECTION) 2-EI-CB-36A
(NOTE 3) 3 — PRI PLANT PROCESS RACK-I PROTECTION SET-I 2-EI-CB-51
(NOTE 3) 4 — PRI. PLANT PROCESS RACK-I CONTROL SET-I 2-EI-CB-55
P6 — SSP CHANNEL-I, RACK A INPUTS 2-EI-CB-47A
P7 — SSP CHANNEL-I, RACK B INPUTS 2-EI-CB-47B
S10 — AUX RELAY RACK-I TRAIN A 2-EI-CB-48A
N14 — CONTAINMENT H2 ANALYSER CB-1103-2
N15 — LOOP STOP VV PROTECTION RACK 'A', TRAIN A 2-EI-CB-63A
N21 — TI-CC201A (ESK-6GK) & 2-EI-CB-05
F18 — SAFEGUARDS TEST CAB. TRAIN A 2-EI-CB-62A
N20 — WATER INDUCTION ANNUNCIATOR PNL 2-EI-CB-21S
(NOTE 3) 22 — SECONDARY PLANT PROCESS RACK CA 2-EI-CB-23A
23 — POWER SUPPLY FOR HIC-2142, 2436, LI-2301A & 2-EI-CB-25
(NOTE 2) 24 — SECONDARY PLANT PROCESS RACK CE 2-EI-CB-23E
N26 — SPARE
25A — 2-HV-5-1A MOV-HV2IC-1+2 · PDS-HV2228A (ESK-63T) & 2-EP-CB-71A
A27 — P.C. INSTRUMENT AIR DRYER 2-IA-D-02A
28 — SPARE
A29 — SSP TRAIN A OUTPUTS 2-EI-CB-47E
R30 — SSP AUX RELAY RACK TRAIN A 2-EI-CB-64A
N31 — SPARE
32 —
N33 — RADIATION MONITORING CABINET 2-I 2-EI-CB-49A
34 — ANNUNCIATOR - FEEDWATER 2-EI-CB-01
35 — FEEDWATER 2-VB-I-01
N36 — FUTURE
VITAL INSTRUMENT PANEL 2-I 2-EI-CB-03A
N&R1 — LT-2470
N&R2 — PT-2110
N&R3 — PWR SUP STA. BATTERIES 125 VOLT DIST. SWBD
A4 — LT-2115
N5 — VV MON LTGS FOR MOV-SI86A+SV201A (ESK-6GN)
N6 — LSL-QS203 (ESK-6HQ)
P7 — LIT-PR05IA
N8 — FIT-CV250
R9&10 — A00-HV-160-2 & 2-EI-CB-07 (ESK-6PW)
N10 — TI CC204A (1 OF 2)
F11 — TV-SW2018-1 & 2-EI-CB-07 (ESK-6QE)
N12 — TV-CC215B & 2-EI-CB-07 (ESK-6QE)
R13 — ACOUSTICAL MONITORING PANEL 1-EI-CB-90
N19 — TV-IA204A
N15 — TE-AM304A-2+211A-2 2-EI-CB-03
N16 — LS-QS202 (ESK-6HQ)
N17 — LQ-DA213A
N18 — A00-N-1378-1,2,3+4 2-EI-CB-07 (ESK-6PW)
N19 — TI-BD200H
N20 — TI-BD200G
N&R21 — VOLTAGE TRANSDUCER FOR 2-EP-CB-12A
N22 — TV-BD2003
N23 — S.G. BLOWDOWN TRIP VV INTERLOCKS-TRAIN A
N24 — VV MON. LTGS FOR MOV-2765A,B+C (ESK-6GG)
MCR LTGS FOR PNL A 2-EP-CB-15A
N1 — TV-BD200A
N2 — TV-BD200E
N3 — TV-BD200E
N4 — TV-CV250A
N5 — TV-CV250C
N6 — TV-CA200A
N7 — TV-CC200A
N8 — TV-LM2000A
N9 — TV-LM2000B
N10 — TV-LM2000C
N11 — TV-LM2000D
N12 — TV-LM2001A, C
N13 — TV-IA201A
N14 — TV-IA201B
N15 — TV-IA201C
N16 — TV-IA201D
N17 — TV-SS200A
N18 — TV-SS201A
N19 — TV-SS202A
N20 — TV-SS203A
N21 — TV-SS204A
N22 — TV-SS205A
N23 — TV-SS206A
N24 — TV-SV200-1
N25 — TV-VG200A
N26 — TV-CC215A
N27 — TV-CC205A
N28 — TV-CC205A
N29 — TV-CC205C
N30 — TV-CC201A
N31 — TV-CC206A
N32 — TV-CC206C
N33 — TV-CC206E
N34 — TV-CC205A
N35 — TV-SI201
N36 — TV-CC204B
N37 — TV-CC204C
N38 — FCV-AS200A
N39 — FCV-AS200B
N40 — TV-IP5201
N41 — TV-MS216
N42 — TV-SV202-2
N43 — SOV-AV-228-2
N44 — SOV-AV-228-2 VALVE 2HV-1-12A+B
N45 — TV-SW201A
NOTES:
R: RECUPERANT
N: NO SHUTDOWN FUNCTION
VITAL BUS 2-I
SINGLE LINE DIAGRAM
2-EP-CB-04A, 6A+11A
SOUTH TEXAS UNIT 2
STONE & WEBSTER ENGINEERING CORP.
DWG. NO. 2C 99 27/15-0-E-1A



NOTES:

R: REDUNDANT

N: NO SHUTDOWN FUNCTION

4	
3	
2	
1	[illegible]

VITAL BUS 2-II

ONE LINE DIAGRAM

2-EP-CB-04B + 20B

NORTH ANNA UNIT 2

STONE & WEBSTER ENGINEERING CORP.

DWG. NO. [illegible]

VITAL BUS 2-III 2-EP-CB-04C

- R 1 — NIS PANEL - III (PROTECTION) 2-EI-CB-30C
- R 2 — NIS PANEL - III (NON-PROTECTION) 2-EI-CB-30C
- (ATTACH-2) R 3 — PRI. PLANT PROCESS RACK-3 PROTECTION SET-3 2-EI-CB-53
- (ATTACH-2) R 4 — PRI. PLANT PROCESS RACK-7 CONTROL SET-7 2-EI-CB-57
- R 5 — IN-CORE INSTRUMENTATION WHITTAKER T/C 3B CB-07C-2
- N R 6 — EMERGENCY 2Z BATTERY VOLTAGE TRANSDUCER @ 2-EE-EG-04C
- R 7 — SSP CHANNEL III RACK A INPUTS 2-EI-CB-47A
- R 8 — SSP CHANNEL III RACK B INPUTS 2-EI-CB-47B
- R 9 — TV-SS 212B (ESK 6GA)
- R 10 — AUX RELAY RACK-2 TRAIN-B 2-EI-CB-49B
- R 11 — SAFEGUARDS AUX RELAYS CAT-TRAIN B (ESK 5AG) 2-EP-CB-28B
- R 12 — SAFEGUARDS AUX. RELAYS CAT TRAIN B (ESK 5AG) 2-EP-CB-28B
- N 13 — POWER SUPPLY FOR HIC 2122, MS201A B, C 2-EI-CB-06B
- 14
- R 15 — LOOP STOP VV PROTECTION CAB B TRAIN B 2-EI-CB-63B
- R 16 — FR-2458 @ 2-EI-CB-04
- N 17 — NR 2-43, NR-2-45, TR-2413 AND NM-45A+B @ 2-EI-CB-03
- R 18 — SOV-HV2306, 2300D+2306B @ 2-EI-CB-156B
- R 19 — SAFEGUARDS TEST CAB. TRAIN B 2-EI-CB-62B
- N 20 — SPARE
- N 21 — SPARE
- (ATTACH-2) R 22 — SECONDARY PLANT PROCESS RACK CC 2-EI-CB-23C
- N 23 — HIC-2127, 2114, +2752 @ 2-EI-CB-26
- N 24 — TURBINE SUPERVISORY PANEL RECEPTACLES 2-EI-CB-10
- N 25 — TURBINE SUPERVISORY PANEL 2-EI CB-10
- R 26 — 2-HV-2-1B, MOV-HV216-1+2 (ESK-6ST) @ 2-EP-CB-71B
- R 27 — LS-LW2065 1, 82, 83, AND 27B (ESK-11TU) @ 2-EP-CB-86B
- R 28 — SSP AUX RELAY RACK TRAIN B 2-EI-CB-64B
- R 29 — SSP TRAIN B OUTPUTS
- R 30 — PC INSTRUMENT AIR DRYER 2-IA-D-02B
- N 31 — SPARE
- 32
- N 33 — RADIATION MONITOR PNL 2-2 2-EI-CB-49B
- N 34 — COMPUTER I/C RACK 2 2-EI-CB-19C
- 35 — FEEDER FROM 2-VB-2-03
- N 36 — FUTURE

VITAL INSTRUMENT PNL 2-III 2-EP-CB-30C

- R 1 — LT-2112
- R 2 — TI-AM2108-2 + 2118-2
- N 3 — SPARE
- N 4 — SPARE
- N 5 — JV MONITOR LGTS FOR MOV-2836 2867B+2890B
- N 6 — LQ-DA213B
- N 7 — SPARE
- N 8 — ACO-HV107A-1, 2, 3+4 @ 2-EI-CB-07
- N 9 — AOO-HV161-2 @ 2-EI-CB-07
- N 10 — SPARE
- N 11 — SPARE
- N 12 — SPARE
- N 13 — SPARE
- R 14 — LIT-RS251B
- N 15 — SPARE
- N 16 — SPARE
- N 17 — SPARE
- N 18 — SPARE
- N 19 — SPARE
- N 20 — LS-LW200
- N 21 — VOLTAGE TRANSDUCER FOR 2-EP-CB-12C
- N 22 — SPARE
- N 23 — SPARE
- N 24 — SPARE

TSC VITAL BUS PNL 2-III [illegible] 2-EP-CB-98

- N 1 — TV-BD200B
- N 2 — TV-BD200D
- N 3 — TV-BD200F
- N 4 — TV-CU200B
- N 5 — TV-CU200D
- N 6 — TV-DA200B
- N 7 — TV-DG200B
- N 8 — TV-LM200B
- N 9 — TV-LM200D
- N 10 — TV-LM200F
- N 11 — TV-LM200H
- N 12 — TV-LM201B, D
- N 13 — TV-MS212A
- N 14 — TV-MS212B
- N 15 — TV-MS212C
- N 16 — TV-RM200C
- R 17 — TV-SI200B
- N 18 — SPARE
- N 19 — TV-SS200B
- N 20 — TV-SS201B
- N 21 — TV-SS202B
- N 22 — TV-SS203
- N 23 — TV-SS204B
- N 24 — TV-SS206B
- N 25 — TV-SV203
- N 26 — TV-VG200B
- N+ 27 — TV-CC200A
- N+ 28 — TV-CC200B
- N+ 29 — TV-CC200C
- N+ 30 — TV-CC201B
- N+ 31 — TV-CC202B
- N+ 32 — TV-CC202D
- N+ 33 — TV-CC202F
- N+ 34 — TV-CC203B
- N+ 35 — TV-CC204A
- N+ 36 — TV-CC204B
- N+ 37 — TV-CC204C
- N 38 — TV-IA201B
- N 39 — TV-MS209
- N 40 — TV-MS210
- R 41 — SOV-HV115A-2
- N 42 — SOV-HV222-1
- R 43 — TV-SW201A-2
- N 44 — TV-IA202A B, C, D, E, F, G+H-2
- N 45 — TV-CC215C
- R 46 — TV-SW201B-2
- N 47 — TV-SA200D
- N 48 — TV-IA202B

NOTES

R = REDUNDANT

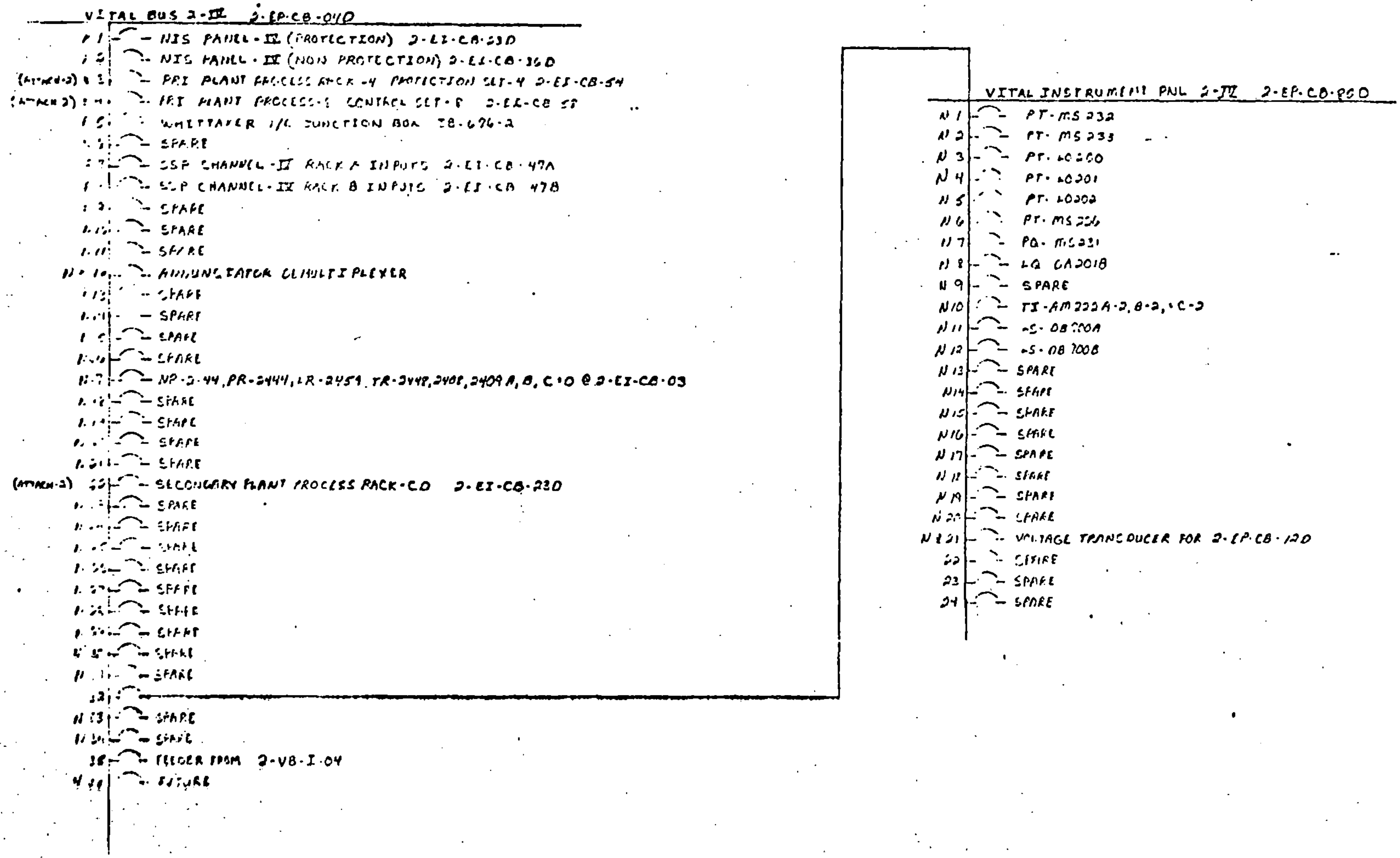
N = NO SHUTDOWN FUNCTION

4						
3						
2						
1	[illegible]					

VITAL BUS 2-III
ONE LINE DIAGRAM
2-EP-CB-04C, 30C + 98
NORTH ANNA - UNIT 2

STONE & WEBSTER ENGINEERING CORP.

DWG. NO. 12050-[illegible]



NOTES:

R = REDUNDANT

N = NO SHUTDOWN FUNCTION

VITAL BUS 2-III
ONE LINE DIAGRAM
2-EP-CB-04D + 12D
NORTH ANNA - UNIT 2

STONE & WEBSTER ENGINEERING CORP.

DWG NO. 11715-FE-21A-10

SEMI-VITAL BUS 2A 2-EP-CB-16A

- N 1 — OFFICE BLDG TELEPHONE PNL 3B-600D
- 2
- N 3 — SPARE
- N 4 — SOV-BC 203
- N 5 — PHA-BC 211 PHC-BC 211, PHC-BC 311, LC-BC 223 CI-BC 213, TI-BC 220-201 @ 2-EI-CB-80
- N 6 — UNIT 2 AMB. TEMP. MON. TE-AM 215, 201, 215, 216, 217A, B, C & D AND 221 @ 2-EI-CB-80
- N 7 — FCV 245 G,L ALARM CKT
- N 8 — SOV-SS 207A-D, 208A, B, C & D, 209A, B & C @ 1-EI-CB-26
- N 9 — SOV-SS 210A, B & C, 219 223 & 224 @ 1-EI-CB-26
- N 10 — TI-AM 209A D, A, B & C-2 @ 1-EI-CB-79
- N 11 — SERVICE AIR COMPRESSOR ANNUNCIATOR @ 2-EI-CB-21
- N* 12 — R.C. AUX. MONITOR LNG PNL @ 2-EI-CB-97A
- N 13
- N* 14 — TOTALIZERS FOR UNIT 2 STATION SERVICE SYS & GEN W-H METER 2-EI-CB-11
- N 15 — LOAD FREQUENCY CONTROL PNL 2-EE-CB-17
- N 16 — UTILITY OUTLETS IN CABINET @ 2-EI-CB-20
- N 17 — SPARE
- 18
- N A — PT-LM 201A-1 & 2 @ 2-EI-CB-05
- N 20 — PART LENGTH CONTROL ROD CAB 2-EI-CB-46
- N 21 — TURBINE VV PIT MOV HEATER PNL 2-EP-CB-98D
- N 22 — AUX. BLDG MOV HEATER PNL 2-EP-CB-96L
- N 23 — MS, QUENCH SPRAY MOV HEATER PNL A 2-EP-CB-98M
- 24 — PORTABLE RADIO COMMUNICATOR TRANSMITTER UNIT-B
- 25 — FEEDER FROM TRANS-70-2

MCB NON-VITAL SOV PNL 2-EP-CB-20

- N 1 — SV-ES 200A, NRV-ES 200A
- N 2 — TV-ES 200B, NRV-ES 200B
- N 3 — TV-ES 201A, NRV-ES 201A, LCV-SD 202A
- N 4 — TV-ES 201B, NRV-ES 202B, LCV-SD 202B
- N 5 — TV-ES 202A, NRV-ES 203A
- N 6 — TV-ES 202B, NRV-ES 203B
- N 7 — TV-ES 203A, NRV-ES 204A, LCV-SD 205A
- N 8 — TV-ES 203B, NRV-ES 204B, LCV-SD 205B
- N 9 — TV-SV 200A
- N 10 — TV-SV 200B
- N 11 — TV-SV 200C
- N 12 — TV-SV 200D
- N 13 — TV-SV 201A
- N 14 — TV-SV 201B
- N 15 — TV-SV 201C
- N 16 — TV-SV 201D
- N* 17 — TV-CC 206A
- N* 18 — TV-CC 206B
- N* 19 — TV-CC 206C
- N* 20 — TV-CC 207A
- N* 21 — TV-CC 207B
- N* 22 — TV-CC 208A
- N* 23 — TV-CC 208B
- N 24 — LCV-SD 201
- N 25 — TV-CV 200
- N 26 — SPARE
- N 27 — SPARE
- N 28 — TV-MS 202A, B, C & D
- N 29 — TV-WT 200
- N 30 — SOV-LD 702-703
- N 31 — CONT ELEC FAN ACD MONITOR CKT @ 2-EI-CB-09
- N 32 — SPARE
- N 33 — SPARE
- N* 34 — FCV-FW 205A
- N* 35 — FCV-FW 205B
- N* 36 — FCV-FW 205C
- N 37 — FCV-SD 200A
- N 38 — FCV-SD 200B
- N 39 — FCV SD 200C
- N 40 — FCV-SD 202A, B & C
- N 41 — FCV-CN 204A & B
- N 42 — LCV-VP 204A, B, C, D
- N 43 — FCV-CN 207
- N 44 — SPARE
- N 45 — SPARE
- N 46 — FCV-WT 202
- N 47 — FCV-WT 203
- N 48 — FCV-SD 231

SEMI-VITAL INSTRUMENT DIST. PNL 2A 2-EP-CB-21A

- N 1 — MA-LM 200-1-2
- N 2 — PI-LM 202
- N 3 — HT-DA 210
- N 4 — SPARE
- N 5 — PDA-FW 202
- N 6 — ACO-HV-N3-1, 2, 3 & 4
- N 7 — SPARE
- N 8 — TIT-LM 200-2
- N 9 — SPARE
- N 10 — SPARE
- N 11 — SPARE
- N 12 — 2 HV-HV-2
- N 13 — SPARE
- N 14 — SPARE
- N 15 — PIT-LM 300-1
- N* 16 — FIRE PROTECTION-BATTERY RM 2-III 2-EP-CP-09
- N* 17 — FIRE PROTECTION-BATTERY RM 2-IV 2-EP-CP-10
- N* 18 — FIRE PROTECTION-BATTERY RM 2-I 2-EP-CP-11
- N* 19 — FIRE PROTECTION-BATTERY RM 2-II 2-EP-CP-12
- N* 20 — FIRE PROTECTION-MCC RM 2-EP-CP-13
- N 21 — SPARE
- N 22 — SPARE
- N 23 — SUBCOOLING MONITOR PANEL 2-EE-CB-81A
- N 24 — SPARE

STEAM DRAIN SYS DIST PNL 2-EP-CB-99

- N 1 — LCV SD-221A
- N 2 — LCV SD-221B
- N 3 — LCV SD-222A
- N 4 — LCV SD-222B
- N 5 — LCV SD-223A
- N 6 — LCV SD-223B
- N 7 — LCV SD-224A
- N 8 — LCV SD-224B
- N 9 — LCV SD-225A
- N 10 — LCV SD-225B
- N 11 — LCV SD-226A & C
- N 12 — LCV SD-226B & D
- N 13 — LCV SD-227A & C
- N 14 — LCV SD-227B & D
- N 15 — WATER SUCTION INTERLOCK CIRCUIT
- N 16 — WATER SUCTION INTERLOCK CIRCUIT
- N 17 — WATER SUCTION INTERLOCK CIRCUIT
- N 18 — WATER SUCTION INTERLOCK CIRCUIT
- N 19 — CHEMICAL ... DETECTION PNL 2-EI-CB-79A
- N 20 — ES-WT 202-1 & WT 2-7 3B-603-2
- N 21 — WATER SUCTION INTERLOCK CIRCUIT
- N 22 — WATER SUCTION INTERLOCK CIRCUIT
- N 23 — TV-CC 2-1A
- N 24 — TV-CC 2-1B
- N 25 — TV-CC 2-1C
- N 26 — RRA-ES 201
- N 27 — RRA-ES 203
- N 28 — RRA-ES 203
- N 29 — ES-WT 200-1 & 2 3B-698-2
- N 30 — INTAKE TUNNEL LEVEL AUXILIARY CKT

NOTES

R = REDUNDANT

N = NO SHUTDOWN FUNCTION

4							SEMI VITAL BUS 2A ONE LINE DIAGRAM 2-EP-CB-16A 21A TO 20 NORTH ANNA UNIT 2
3							
2							
1							
NO.	DESCRIPTION						

STONE & WEBSTER ENGINEERING CORP.

DWG. NO. IE 79-27/ [illegible]-E-2A

SEMI-VITAL BUS 2B 2-EP-CB-16B

- N1 — INSTRUMENT AIR COMPRESSER ANN. 2-EI-CB-29
- N2 —
- (REVISION 3) 3 — SECONDARY PLANT PROCESS RACK-C.F. 2-EI-CB-23F
- N4 — PCP 2-1 [illegible] TRANSFER BOX TB-791-2
- N5 — PIPE WEAR DETECTION SYS PNL 2-EI-CB-32
- N6 — SPARE
- N7 — MOV 2456 ALARM CKT
- N8 — AUX BUILDING MOV HEATER PNL E 2-EP-CB 98K
- N9 — AUX BLDG MOV HEATER PNL E 2-EP-CB 98M
- N10 — MS, CLEARCH SPRAY MOV HEATER PNL B 2-EP-CB-98J
- N11 — IMPULSE DEVICE AND AMPLIFIER FOR 55 WATT-HOUR METER @ 2-EP-CB-02
- N12 — SPARE
- N13 — SPARE
- N14 — SPARE
- R15 — PI-LM 2018 1&2
- N16 — SPARE
- N17 — SPARE
- N18 — SPARE
- N19 — SPARE
- N#20 — POWER SUPPLY FOR YR-2760 AND ARCB CRT DISPLAY @ 2-EI-CB-03
- N21 — SPARE
- N22 — SPARE
- N23 — ELEMENT CONTROL VALVE CABINET 2-EI-CB-30
- N24 — SPARE
- 25 — FEEDER FROM TRANS-71-2

SEMI-VITAL
INSTRUMENT DIST. PNL 2B 2-EP-CB-91B

- N1 — IIR PI-LM207
- R#2 — HIGH RANGE EFFLUENT RAD MONITORS 2B-2E49-2
- N3 — LT-CN204
- N4 — SPARE
- N5 — SPARE
- N6 — SPARE
- P7 — ACC-HV103-1,2,3+4 AND AOD-HV102-1,2,3+4 @ 2-EI-CB-07
- R8 — AOC HV104-1,2,3+4 @ 2-EI-CB-07
- R9 — AOD-HV107-1,2,3+4 @ 2-EI-CB-07
- N10 — SPARE
- N11 — SPARE
- N12 — 2-HV-MV-4
- N13 — SPARE
- N14 — SPARE
- #15 — RADIATION MONITORING INTERLOCK RELAY CKT
- N16 — SPARE
- N#17 — FIRE PROTECTION-CONTROL RM 2-FP-CP-05
- N#18 — FIRE PROTECTION-CATRAY RM 2-FP-CP 02
- N#19 — FIRE PROTECTION-SERVICE BLDG 2-FP-CP-03
- N#20 — FIRE PROTECTION-SWGR RM 2-FP-CP-01
- N#21 — FIRE PROTECTION-AUX BLDG 2-FP-CP-04
- N22 — SPARE
- R23 — SUBCOOLING MONITOR PANEL 2-EI-CB-191B
- N24 — SPARE

NOTES:
R - REDUNDANT
N NO SHUTDOWN FUNCTION

4						
3						
2						
1	[illegible]					

STONE & WEBSTER ENGINEERING CORP

SEMI-VITAL BUS 2B
ONE LINE DIAGRAM
2-EP-CB-16B & 91B
NORTH ANNA UNIT-2

DWG. NO. [illegible]

ENTARE STRUCTURE

125V DC PANEL 2-I ... 2-EP-CB-25A

- R#1 — BUS 1G UNDERVOLTAGE INTERLOCK CKT
- R#2 — PNL 2G UNDERVOLTAGE INTERLOCK CKT
- N#3 — FIRE PROTECTION-BEARING COOLING TOWER DELUGE SYSTEM 2-EP-CB-96A*B
- N4 — CERC WATER PP INTERLOCK RELAYS CKT 2-EP-CB-07
- N5 — SPARE
- N6 — SPARE
- N#7 — 4160V BKR'S 1501 THRU 1510 *LOSS OF DC ALARM CONTROL POWER
- N8 — SPARE
- N9 — FUTURE
- 10

2-BY-B-01A*B

125V DC CAB 2-I 2-EP-CB-12A

- N1 — GEN EXCITER 24A VOLTAGE REGULATOR *EXCITER AND BASE ADJUSTER CONTROL POWER 2 EA SW-01
- N2 — FUSE 24A TO 2-EP-CB-12E (MAINTENANCE)
- N3 — SPARE
- N4 — EMERGENCY LIGHTING-DIESEL GEN 2H ROOM CONT-052
- #5 — EMER 4160V BKRS 2AH1-2,3,4,5*6 CONTROL POWER @ 2-EE-SS-03
- #6 — 4160V BKRS 2HC1-2,3,4H AND 2HC2-9,10,12 1/6 AND 2HA1-8 TO 2HC2-15 SPRING ALARM CONTROL POWER
- #7 — 4160V SWGR 2EE1 THRU 2EE10 ; 2-EP-CB-26EC AND BUS 2C UNDERVOLTAGE TRIPPING POWER
- N8 — SPARE
- N9 — SPARE
- 10
- 11 — FEEDER FROM 2-BY-C-03
- 12 — FEEDER FROM 2-BY-C-02
- 13 — VITAL BUS INVERTER 2-I 2-VB-I-01
- N14 — SPARE
- #15 — EMER 4160V BKRS 2EH1-THRU 5 *HIS AND BUS 2H UNDERVOLTAGE * DEGRADED VOLTAGE CONTROL POWER
- #16 — EMER GEN 2H PHASE DIFFERENTIAL RELAY PROTECTION CKT
- 17
- N18 — SPARE
- N19 — EMER LTG - CONTROL ROOM CONT-037-2
- N20 — SPARE
- #21 — EMER 4160V BKRS 2AH-3,3*9 CONTROL POWER
- 22
- N23 — SPARE
- N24 — SPARE
- N#25 — SECTIONS 5 BUS OVERCURRENT SWGR 11 FEEDER PROTECTION CKT
- N#26 — UNDERFREQUENCY AUX. RELAY PNL 4160 (SS BUS) 2-EP-CB-29UC

NOTES:

R: REDUNDANT

N: 1/0 SHUTDOWN FUNCTION

MCB 125V DC SOV PNL 2-I 2-EP-CB-26A

- N1 — SOV-MS 2011A-3
- N2 — SOV-MS 2011C-3
- N3 — CONDENSATE PUMP AUTO-START INTERLOCKING RELAY CKT
- N4 — TURB SUPERVISORY PNL ANN @ 2-EE-CB-10
- N5 — TV-MS2011A MONITOR CKT
- N6 — TV-MS2011B MONITOR CKT
- N7 — SPARE
- N8 — FCV-113-2113A
- N9 — FCV-2119A
- N10 — SOV-2852A B,C*D (ACC SAMPLE TEST)
- N#11 — SOV-2344
- N#12 — HCV-2903 A,B*C
- N13 — SOV-2556 A,B*C
- N#14 — SOV-2852 A*B
- N#15 — SOV-2523
- N#16 — SOV-2319
- N17 — SPARE
- N18 — TV-MS2011C MONITOR CKT
- N19 — SPARE
- N#20 — SOV-2852C
- N21 — SOV-2544
- N#22 — SOV-2549
- N#23 — SOV-2903 A*B
- N#24 — SOV-2852C
- N25 — SPARE
- N26 — SOV-2310
- N27 — SPARE
- N28 — STATION METERING PNL 4EE-CB-11
- N29 — SPARE
- N30 — SPARE

MCB 125V DC DIST PNL 2A 2-EE-CB-22A

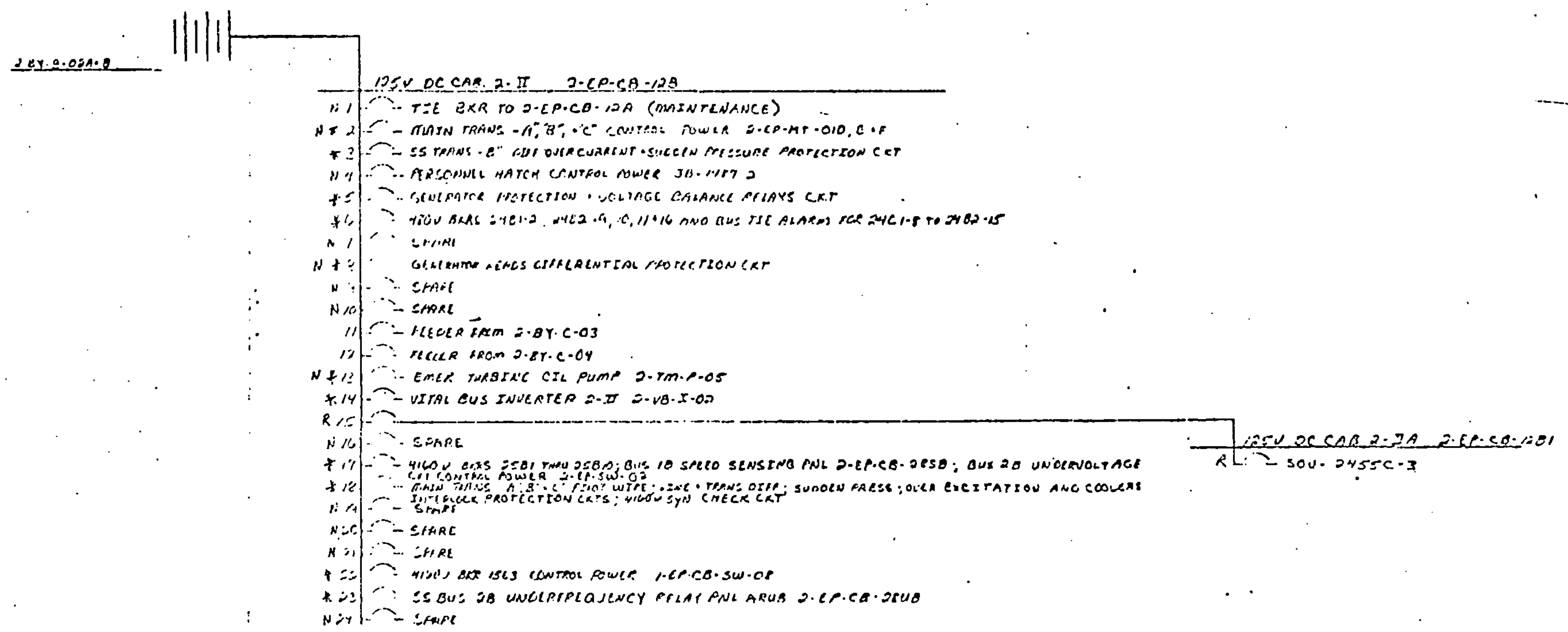
- R1 — TV-MS2011A
- R2 — SOV-2220A
- R3 — SOV-2220B
- R4 — SOV-2220C
- N#5 — SOV-2519A
- N6 — CHEMICAL FEED PNL ANNUNCIATOR 2-EI-CB-45
- N7 — FCV-2439 2WP, 2441
- N8 — FCV-2432, 2WP, 2434
- N9 — SOV-2402A-1 TWO W
- N#10 — PERCENT TRIP SWGR 2-RS RTA*B*YB 2-EI-CB-10A
- N11 — SOV-2004T
- R#12 — AUX FEEDWATER PPL TURBO CKT TRAIN A 2-EP-CB-24A
- N13 — CONTAINMENT VACUUM ANNUNCIATOR 2-EP CB 22A
- N14 — SOV-2859
- N15 — SPARE
- #16 — SOV-MS2011A-1
- R17 — SOV-MS2011B-1
- R18 — SOV-MS2011C-1
- N#19 — SOV-2824A
- N#20 — SOV-2824C
- N#21 — STM GEN FEEDWTR PP INTERLOCKING RELAYS CKT
- N#22 — MG SET-1 OUTPUT BREAKER CONTROL POWER
- R23 — FCV-2455C
- R#24 — BUS 1A UNDERVOLTAGE CKT-TRAIN A
- R#25 — BUS 2C UNDERVOLTAGE CKT-TRAIN A
- R#26 — BUS 2C UNDERVOLTAGE CKT-TRAIN A
- R#27 — LOSS OF RESERVE STATION POWER-TRAIN A
- N28 — SPARE
- N#29 — FIRE PROTECTION-CONTROL RM HALON SYS. 2-EP-CB-55
- R30 — CHILLER RM SUMP PUMP AUX CKT 2-EP-CB-2

4						
3						
2						
1	INITIAL ISSUE					

125 V DC BUS 2-I
ONE LINE DIAGRAM
2-EP-CB-12A, 22A, 24A & 26A
NORTH ANNA - UNIT 2

STONE & WEBSTER ENGINEERING CORP.

DWG. NO 12E 77-27/12E50-E-3A



NOTES:

R: REDUNDANT

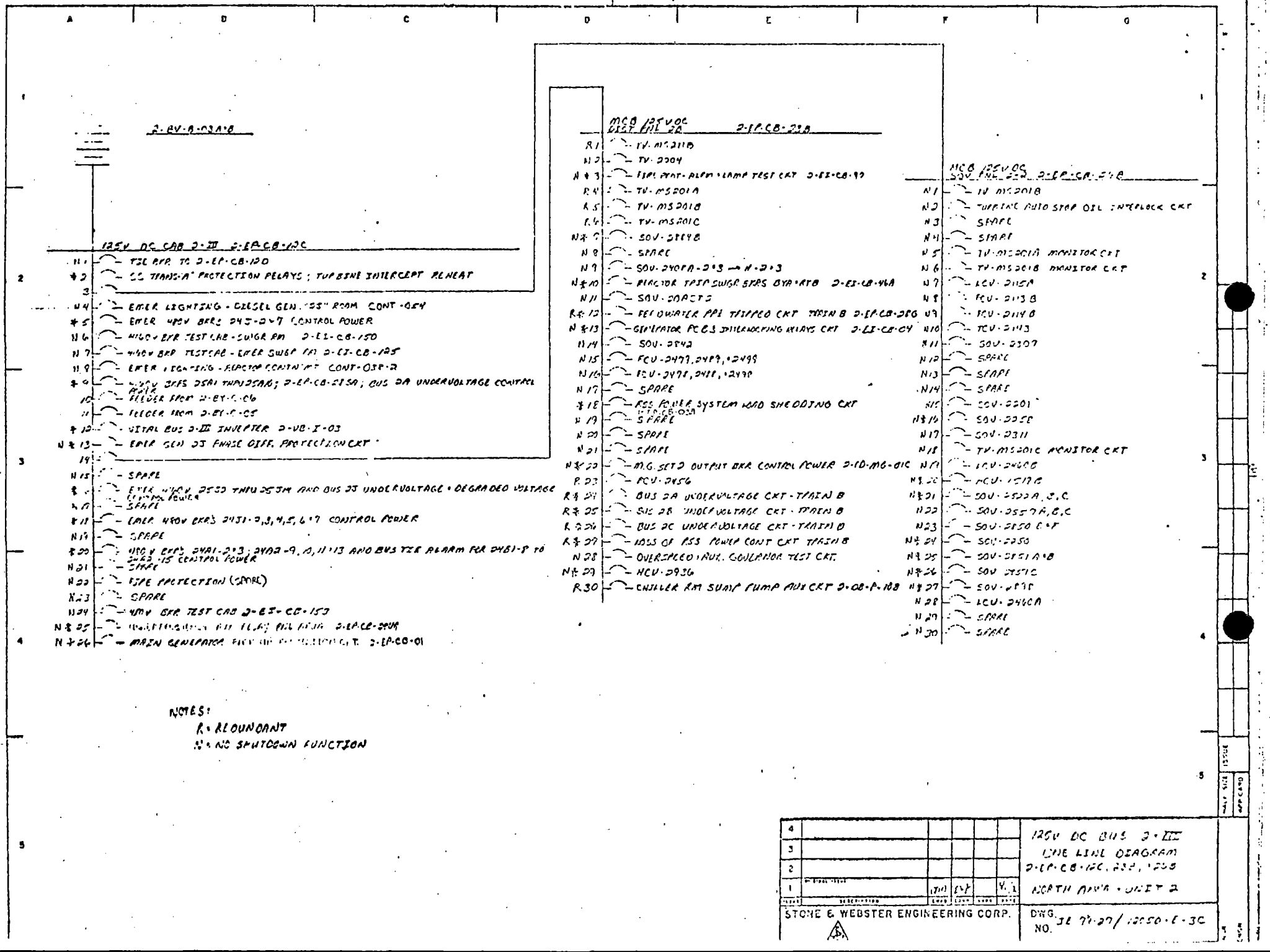
N: NO SHUTDOWN FUNCTION

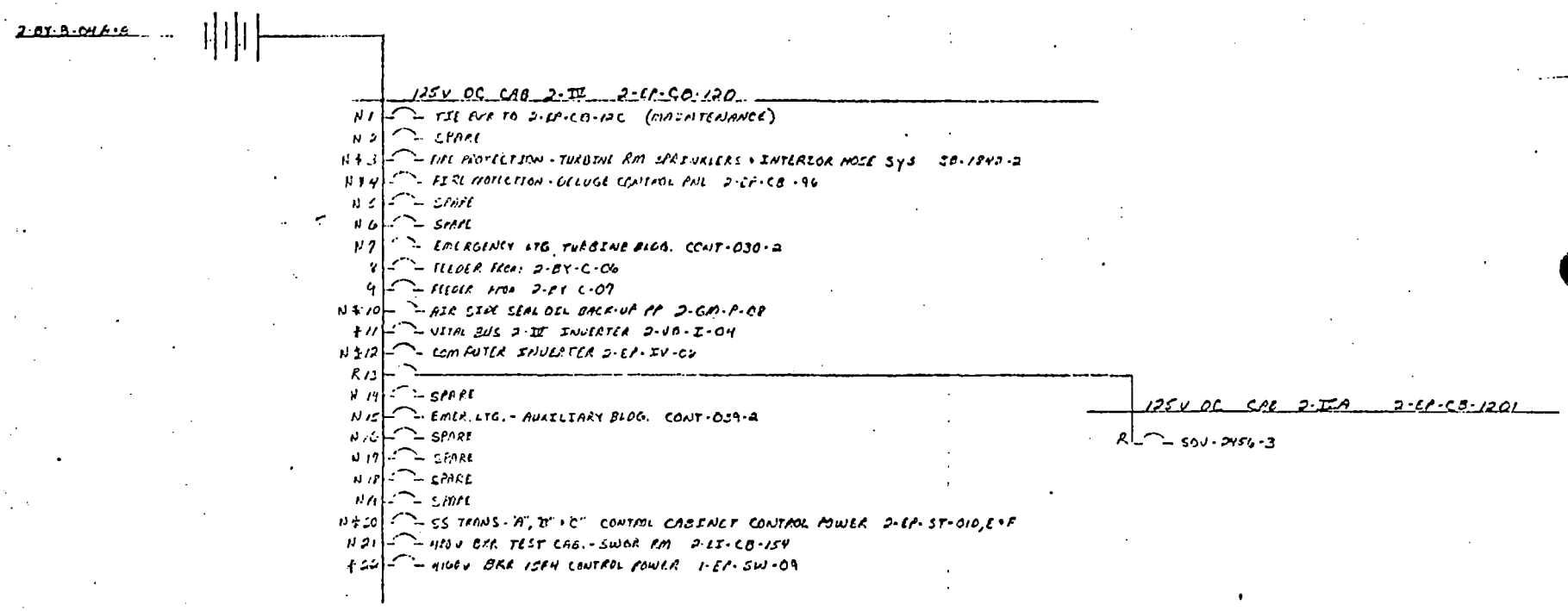
125 V DC BUS 2-II
ONE LINE DIAGRAM
2-EP-CB-12B + 12B1

NORTH ANNA - UNIT 2

STONE & WEBSTER ENGINEERING CORP.

DWG NO. 11 79-57/12050-E-3B


2-BV-A-03A-B
125V DC CAB 2-III 2-EP-CB-12C
N1 TIE BKR TO 2-EP-CB-12D
#2 "A" TRANS-A" PROTECTION RELAYS ; TURBINE INTERCEPT REHEAT
N4 EMER LIGHTING - DIESEL GEN. "2S" ROOM CONT-054
#5 EMER 480V BKRS 2A3-2A7 CONTROL POWER
N6 4160V BKR TEST CAB - SWGR RM 2-EI-CB-150
N7 480V BKR TEST CAB - EMER SWGR RM 2-EI-CB-125
N9 EMER LIGHTING - REACTOR CONTAINMENT CONT-052-2
#10 125V DIFF 2SA1 THRU 2SA8; 2-EP-CB-215A ; BUS 2A UNDERVOLTAGE CONTROL POWER
FEEDER FROM 2-BY-C-06
FEEDER FROM 2-EI-F-05
#12 VITAL BUS 2-III INVERTER 2-VB-I-03
N#13 EMER GEN 2S PHASE DIFF. PROTECTION CKT
N15 SPARE
#16 EMER 480V 2S3D THRU 2S3M AND BUS 2S UNDERVOLTAGE + DEGRADED VOLTAGE CONTROL POWER
N17 SPARE
#18 EMER 480V BKRS 2A31-2,3,4,5,6,7 CONTROL POWER
N19 SPARE
#20 480 V BKRS 2HA1-2,3 ; 2HA2-9, 10, 11, 13 AND BUS TIE ALARM FOR 2HB1-2 TO 2HB2-15 CONTROL POWER
N21 SPARE
N22 FIRE PROTECTION (SPARE)
N23 SPARE
N24 480V BKR TEST CAB 2-EI-CB-153
N#25 [illegible] 2-EP-CB-20UR
N#26 MAIN GENERATOR FIELD [illegible] 2-EP-CB-01
MCB 125V DC DIST PNL 2A 2-EP-CB-23B
R1 TV-MS211B
N2 TV-2304
N#3 ESFL PROT. ALRM + LAMP TEST CKT 2-EI-CB-99
R4 TV-MS201A
R5 TV-MS201B
R6 TV-MS201C
N#7 SOV-2214B
N8 SPARE
N9 SOV-2407A-2*3 → N-2*3
N#10 REACTOR TRIP SWGR STBS BYP+RTB 2-EI-CB-46A
N11 SOV-2042*3
R#12 FEEDWATER APT TRIPPED CKT TRAIN B 2-EP-CB-28B
N#13 GENERATOR PCB 3 INTERLOCKING RELAYS CKT 2-EI-CB-04
N14 SOV-2242
N15 FCV-2477, 2487, 2497
N16 FCV-2478, 2488, 2498
N17 SPARE
#18 RSS POWER SYSTEM LOAD SHEDDING CKT
N19 SPARE
N20 SPARE
N21 SPARE
N#22 M.G. SET 2 OUTPUT BKR CONTROL POWER 2-10-MG-01C
R23 FCV-2456
R#24 BUS 2A UNDERVOLTAGE CKT - TRAIN B
R#25 BUS 2B UNDERVOLTAGE CKT - TRAIN B
R#26 BUS 2C UNDERVOLTAGE CKT - TRAIN B
R#27 LOSS OF RSS POWER CONT CKT TRAIN B
N28 OVERSPEED + AUX. GOVERNOR TEST CKT.
N#29 HCV-2936
R30 CHILLER RM SUMP PUMP AUX CKT 2-08-P-10B
MCB 125V DC SOV PNL 2B 2-EP-CB-24B
N1 TV-MS201B
N2 TURBINE AUTO STOP OIL INTERLOCK CKT
N3 SPARE
N4 SPARE
N5 TV-MS201A MONITOR CKT
N6 TV-MS201B MONITOR CKT
N7 LCV-2113A
N8 FCV-2113B
N9 FCV-2114B
N10 FCV-2114
N11 SOV-2307
N12 SPARE
N13 SPARE
N14 SPARE
N15 SOV-2201
N#16 SOV-2252
N17 SOV-2311
N18 TV-MS201C MONITOR CKT
N19 LCV-2460B
N#20 HCV-1513B
N#21 SOV-2522A, B, C
N22 SOV-2557A, B, C
N23 SOV-2250 C+T
N#24 SOV-2250
N#25 SOV-2251A+B
N#26 SOV 2251C
N#27 SOV-2251
N28 LCV-2460A
N29 SPARE
N30 SPARE
NOTES:
R = REDUNDANT
# = NO SHUTDOWN FUNCTION
125V DC BUS 2-III
ONE LINE DIAGRAM
2-EP-CB-12C, 23B, 24B
NORTH ANNA - UNIT 2
STONE & WEBSTER ENGINEERING CORP.
DWG. NO. SE 77-27/12250-E-3C



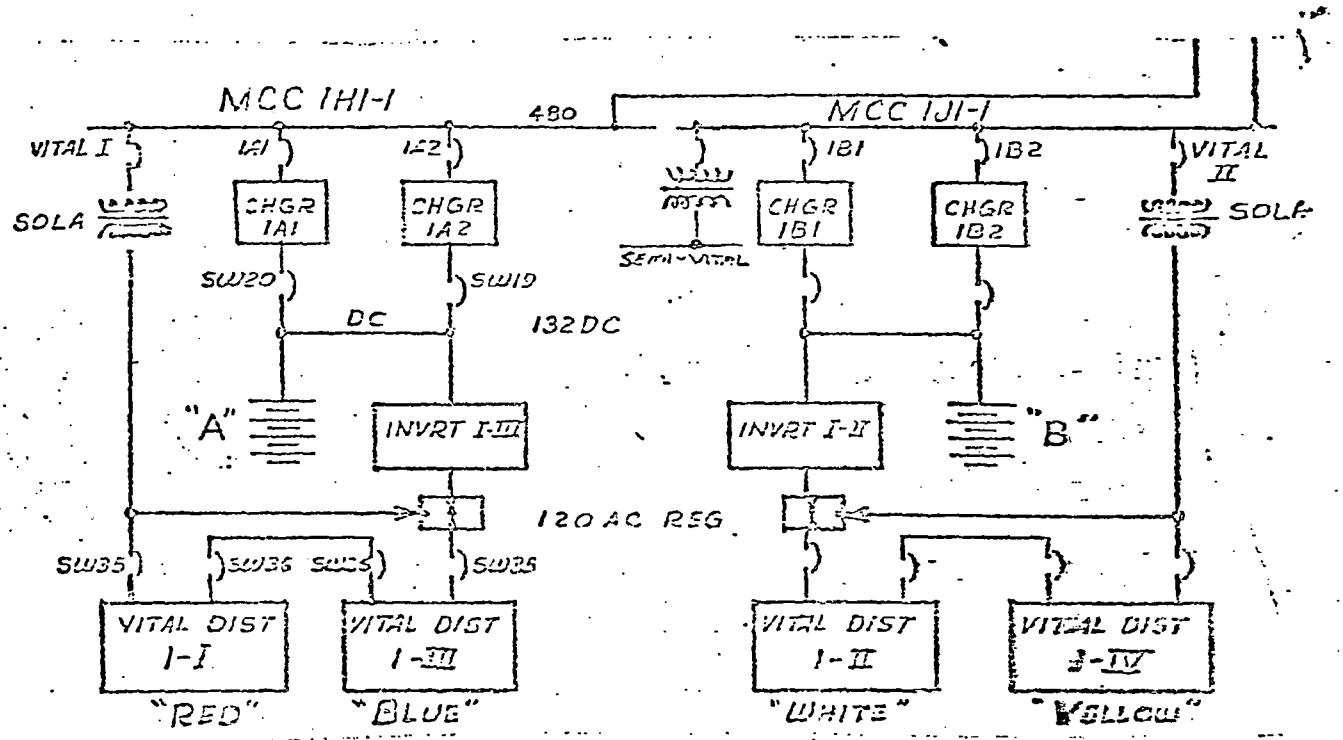
NOTES:
R: RECURDANT
N: NO SHUTDOWN FUNCTION

STONE & WEBSTER ENGINEERING CORP

125V DC BUS 2-IV
ONE LINE DIAGRAM
2-EP-CB-120 & 1201
NORTH ANNA UNIT 2

DWG NO. 11 [illegible] E-30

ATTACHMENT 2



120V AC & 125V DC ONE LINE DIAG.

VITAL POWER

SURRY UNIT 1

CONTROL ROOM ALARM/INDICATION

Voltmeter on MCB

VITAL BUS 1-I

SEE ATT #3 N 1 — PROCESS RACK 1TB7 (FE 4AA) 1VB 4
N 2 — PROCESS RACK 1TB8 (FE 4AA) 1VB 6
N 3 — PROCESS RACK 2TB7 (FE 4AA) 1VB 8
N 4 — PROCESS RACK 2TB8 (FE 4AA) 1VB 10
5 — PROCESS RACK 3TB7 (FE 4AB) 1VB 12
6 — PROCESS RACK 3TB8 (FE 4AB) 1VB 14
7 — PROCESS RACK 6TB7 (FE 4AC) 1VB 16
8 — PROCESS RACK 6TB8 (FE 4AC) 1VB 18
9 — PROCESS RACK 7TB7 (FE 4AD) 1VB 20
10 — PROCESS RACK 7TB8 (FE 4AD) 1VB 22
11 — HIC 142 (YG750, RHR to LTDN FLO CONT STA), HIC 110 (YG753, BORIC ACID RECIRC FLO CONT STA), POWER SUPPLY FOR HAGAN INSTS.
N 12 — TR 412 (Tave-ΔT REC ... Sw), LT 1470 (PRESS RLF TK)
N 13 — TV MS 100, TV MS 109, TV MS 110, TV DA 100A, TV CC 107, TV RM 100A, TV RM 100C, TV SV 102, TV SV 103, CLS RACK 1A, CLS RACK 2A, MG RACK 5 Inst. Rm.
R N 14 — TV LM 100A, TV LM 100C, TV LM 100E, TV LM 100G, TV LM 101A, TV CV 150A, TV CV 150C, CLS RACK 1A
N 15 — TV SS 100A (PRESS LIQ SAMP LN), TV SI 101A (N, RLF), TV SS 103 (RHR INLT), TV BD 100E ($S 1C BD), 4160 V EMER SWGR BUS 1H CKT 15H A
16 — TV DG 108A, TV DG 109A, TV CC 109A, TV SS 101A, TV SS 102A, TV SS 104A, TV SS 106A, RELAY RA (Mounted on MCB), STA RACK Ch I + III Compt III, STA RACK Ch II + III Compt V, MCC 1 B1-2
R 17 — NIS PNL 1 - MN CONT RM (FE 3CC) 1VB 171
R 18 — NIS VOLT REG
N 19 — SPARE (Future: Aux Vent Pnl - Misc Power)
N 20 — VOLTMETER VB-1
SEE ATT #3 N 21 — MB1 RACK INST RM TB8 (FE 4AA) 1VB 206
N 22 — GAITRONICS TELE (FE 80A) 1VB 211
N 23 — 1-VS-F-40AB, 1-VS-FL-3A (SAFEGUARDS EXH FAN, AUX BLDG FILTER BANK)
N 24 — SPARE (Future: To RMT Logic Cab A (DC 77-09) Cable No. 1VB237)
N 25 — EVACUATION ALARM
N 26 — TIC 107 NrTK A, TIC 109, TIC 100, TIC 934A
N 27 — SPARE (Future: TV IA 100, TV IA 101A Cable No 1VB362)
R 28 — STA RACK Compt III (FE 4BD) 1VB 225
N 29 — SOV SI 102 A1
N 30 — SOV SI 202 A1
31 — TV BD 100A
32 — TV BD 100E
33 — TV BD 100C
N 34 — GAITRONICS TELE (From Ckt 22)
N 35 — TB 1... AUTO THROWOVER SW 1VB 801
N 36 — VITAL BUS DIST PNL 1-III 1VB 2

NOTES:

R = REDUNDANT

N = NO SHUTDOWN FUNCTION

SURRY UNIT 1
VITAL BUS 1-I
ONE LINE DIAGRAM

STONE & WEBSTER ENGINEERING CORP.

DWG. NO. 1E 79-27/11448-E-10

CONTROL ROOM ALARM / INDICATION

Voltmeter on MCB

VITAL BUS 1-II

SEE ATT #3 #1 – PROCESS RACK 5TB7 1VB 246
#2 – PROCESS RACK 5TB8 1VB 248
#3 – PROCESS RACK 8TB7 1VB 250
#4 – PROCESS RACK 8TB8 1VB 252
#5 – PROCESS RACK 9TB7 1VB 254
#6 – PROCESS RACK 9TB8 1VB 256
N 7 – PROCESS RACK 10TB7 1VB 258
N 8 – PROCESS RACK 10TB8 1VB 260
N 9 – PROCESS RACK 11TB7 1VB 262
N 10 – PROCESS RACK 11TB8 1VB 264
N 11 – PROCESS RACK 12TB7 1VB 266
N 12 – PROCESS RACK 12TB8 1VB 268
N 13 – PROCESS RACK 13TB7 1VB 270
N 14 – PROCESS RACK 13TB8 1VB 272
#15 – PROCESS RACK 19TB7 1VB 274
#16 – PROCESS RACK 19TB8 1VB 276
N 17 – FR-113 ([illegible] Demin Water Flow Recorder) ← (Cond Storage Tk Cont Sta)
#18 – FR-488 (Stm Flow, Feed Flow B Recorder), LC-CN104, FC 400F, PC 444G, PC 444H, PC 444J (Air Press Cont Sta), LC 459G (Prz level Cont. Sta)
#19 – HIC 186 (RCP Seal Wtr Cont. Sta), TR 604 (RHR Pump Dischg Temp Recorder)
#R 20 – TV RM 100B, TV CC 105B, TV CC 110B, TV 1204 (Letdown Line), CLS RACK 1B, SIS RACK Ch I·III Compt VI
#R 21 – TV SI 101B, TV VG 109B, TV DG 108B, TV CC 109B, TV BD 100B, TV BD 100D, TV BD 100F, 43BD1, 43BD2, 43BD3, 4160 Emer Swbd Bus 1J, Ckt 1534, SIS Rack Ch I+II Compt VI, SIS Rack Ch II+III Compt V, MN Cont BD SF PNL, MCC 1C1-1
N SEE ATT #3 22 – INST RM RACK MB2 TBE (FE 4A) 1VB 361 (S) Dwg. 5975 DR 2, MN BD RACK MB2
R 23 – NIS VOLTAGE REGULATOR
N 24 –
R 25 – NIS PNL 2 MN CONT RM (FE 3CC) 1VB 372
N 26 – VITAL BUS VOLTMETER VB-II
N 27 – RCP VIB DET PNL CONT RM 1VB 755
R 28 – SIS RACK Compt VI (FE 4BH) 1VB 392
N 29 – TRANSMITTER HZ-A-GW 105
N 30 – SOV-SI-102A1
N 31 – CHEM REC PNL CONT RM
N 32 – SOV-SI-202B1
N 33 – SPACE
N 34 – SPACE
N 35 – AUTO THROWOVER SW.
N 36 – VITAL BUS DIST PNL 1-II

NOTES:

R = REDUNDANT

N = NO SHUTDOWN FUNCTION

4						SURRY UNIT 1
3						VITAL BUS 1-II
2						ONE LINE DIAGRAM
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
ISSUE	DESCRIPTION					

STONE & WEBSTER ENGINEERING CORP.

DWG. NO. 11448-E-11

CONTROL ROOM ALARM / INDICATION

Voltmeter on MCB

VITAL BUS 1-III

SEE ATT #3	N 1	—	PROCESS RACK 14 TB 7 IVB 406
	N 2	—	PROCESS RACK 14 TB 8 IVB 409
	N 3	—	PROCESS RACK 15 TB 7 IVB 412
	N 4	—	PROCESS RACK 15 TB 8 IVB 415
	N 5	—	PROCESS RACK 16 TB 7 IVB 418
	N 6	—	PROCESS RACK 16 TB 8 IVB 421
	N 7	—	PROCESS RACK 17 TB 7 IVB 424
	N 8	—	PROCESS RACK 17 TB 9 IVB 427
	N 9	—	PROCESS PACK 18 TB 7 IVB 430
	N 10	—	PROCESS RACK 18 TB 9 IVB 433
	N 11	—	PROCESS RACK 20 TB 7 IVB 436
	N 12	—	PROCESS RACK 20 TB 8 IVB 439
	N 13	—	PROCESS RACK 23 TB 7 IVB 444
	N 14	—	PROCESS RACK 23 TB 8 IVB 447
	N 15	—	FQ 750 (Hogen Instr.), LT 112 (Sel Sw.)
	N 16	—	PC 145 B (Low Press Extr), PC 140 B, FC 122 C (Stg Flow Cont to RHx), FC 114 A (Drain Water to Blend. Cont), FC 113 A (boric acid flow Cont., FC 478 F, FC 498 F, FR 498 H
	N 17	—	FC 605 C (RHr main Bypass Flow Cont)
	R 18	—	TV CC 105 A, TV CC 110 A, TV RC 1519 A, CLS RACK 2A, SIB RACK Compt VII
SEE ATT #3	N 19	—	RPSA RACK - INST RM IVB 446
	R 20	—	NIS VOLT REG
	N 21	—	SPARE
SEE ATT #3	N 22	—	VB RACK 3 TB8 INST RM (FE 48) IVB 536
	R 23	—	NIS PNL 3 MN CONTROL RM IVB 522
	N 24	—	
	N 25	—	VENT PNL UNIT 2 IVB 450
	N 26	—	VOLTMETER VB-III
	R 27	—	STA RACK COMPT VI (FE 48D), 50V FW 135 A1, 50V FW 135 B1, 50V FW 135 C1
	N 28	—	SPARE (Future Aux Bldg Sup Fan)
	N 29	—	SPARE
	N 30	—	FUSE TO LAMP PNL FOR HT TRACING
	N 31	—	SPACE
	N 32	—	SPACE
	N 33	—	SPACE
	N 34	—	SPACE
	N 35	—	AUTO THROWOVER PNL
	N 36	—	VITAL BUS DIST PNL 1-I

NOTES:

R - REDUNDANT

N - NO SHUTDOWN FUNCTION

SURRY UNIT 1

VITAL BUS 1-III

ONE LINE DIAGRAM

STONE & WEBSTER ENGINEERING CORP.

DWG. NO. 11 27 27/1-448-E 12

CONTROL ROOM ALARM/INDICATION

Voltmeter on MCB

VITAL BUS 1-IV

SEE ATT = 3	* 1	PROCESS RACK 21 TB 7 1VB 566
	* 2	PROCESS RACK 21 TB 8 1VB 568
	* 3	PROCESS RACK 22 TB 7 1VB 570
	* 4	PROCESS RACK 22 TB 8 1VB 572
	* 5	PROCESS RACK 25 TB 7 1VB 574
	* 6	PROCESS RACK 25 TB 8 1VB 576
	* 7	PROCESS RACK 26 TB 7 1VB 578
	* 8	PROCESS RACK 26 TB 8 1VB 580
	N 9	PROCESS RACK 27 TB 7 1VB 582
	N 10	PROCESS RACK 27 TB 8 1VB 584
	N 11	PROCESS RACK 28 TB 7 1VB 586
	N 12	PROCESS RACK 28 TB 8 1VB 588
	N 13	PROCESS RACK 29 TB 7 1VB 590
	N 14	PROCESS RACK 29 TB 8 1VB 592
	N 15	LR 459 (PZR LEVEL REC), TR 409A (ROD POS INS LMT BANK A,B,C,D), TR 408 (Tave REC)
	* 16	TV CC 105C, TV LM 100B, TV LM 100D, TV LM 100F, TV LM 100H, TV LM 101B, CLS RACK 1B
	* R 17	TV SI 100; TV SS 100B, TV SS 101B, TV SS 106B, TV SS 102B, TV SS 104B, SIB RACK CH I-III Compt VI, CLS RACK 1B
	* R N 18	TV CC 105C, TV CV 150B, TV CV 150D, TV DA 100B, CLS RACK 1B
	R 19	NIS VOLT REG
SEE ATT = 3	20	RP 5B RACK - INST RM (FE 4AE) 1VB 717
	N 21	SPARE (Future Cont. Inst Air (TV IA101B) Cable # 1VB 373)
	* N 22	PART LENGTH ROD CONT CAB (FE 5A) 1VB 731 - DISCONNECTED PER DC 78-525
SEE ATT = 3	N 23	MB 4 RACK - INST RM (FE 4B) 1VB 741
	N 24	SPARE (Future 1-HV-1-A2 Sum Vent)
	R,N 25	E/P (A2), 1-VS-F-3A, CLS PNL 2B
	N 26	VOLTMETER VB-IV
	R 27	NIS PNL 4 - MN CONT RM (FE 3CD) 1VB 716
	* R 28	SIB RACK Compt VII (FE 4GH), SOV FW 155A2, SOV FW 155B2, SOV FW 155C2
	N 29	VENT PNL UNIT 2 (11548-FE-3CH) 1VB 699
	N 30	FUSE TO LAMP PNL FOR HT TRACING
	N 31	SPARE (Future RMT LOGIC CAB B (DC 77-09) Cable # 1VB 736)
	N 32	TIC 166 (Boric Acid Tank C), TIC 934 B (BIT SI-TK-2)
	N 33	SPARE
	N 34	SPARE
	N 35	SOLA TRANSFORMER
	N 36	VITAL BUS DIST PNL 1-II

NOTES:

R = REDUNDANT

N = NO SHUTDOWN FUNCTION

SURRY UNIT 1
VITAL BUS I-IV
ONE LINE DIAGRAM

STONE & WEBSTER ENGINEERING CORP.

DWG. NO. 1E 79-27/11448-E-13

CONTROL ROOM ALARM / INDICATION

LOSS OF INDIVIDUAL INDICATING LIGHTS ON MCB FED FROM SEMI-VITAL BUS

SEMI VITAL BUS UNIT 1

SEE ATT-3

- N 1 — WASTE DISPOSAL PNL-[illegible] (FC [illegible]) 1SVB 6
- N 2 — BORON REC PNL MN [illegible] RM (FC [illegible]) 1SVB 8
- * N 3 — INST RM RACK MB 5 TB 3 (FC 4C) 1SVB 10
- * N 4 — INST RM RACK MB 6 TB 3 (FC 4C) 1SVB 12
- * N 5 — INST RM RACK MB 7 TB 3 (FC 4D) 1SVB 14
- * 6 — INST RM RACK MB 9 TB 3 (FC 4D) 1SVB 16
- N 7 — INST RM RACK WD 1 TB 3 (FC 4F) 1SVB 18
- N 8 — INST RM RACK WD 2 TB 3 (FC 4F) 1SVB 20
- N 9 — INST RM RACK WD 3 TB 3 (FC 4G) 1SVB 22
- N 10 — INST RM RACK BR 1 TB 3 (FC 4E) 1SVB 24
- N 11 — INST RM RACK BR 2 TB 3 (FC 4E) 1SVB 26
- N 12 — INST RM RACK BR 3 TB 3 (FC 4G) 1SVB 28
- N 13 — 1-SW-P-5A
- N 14 — 1-SW-P-5B
- N 15 — 1-SW-P-5C
- N 16 — 1-SW-P-5D
- N 17 — 1-SW-P-6
- N 18 — [illegible] (TRN GR DRIVE CONT SW), TURB TERM BOX K (@DWG 870C855 SH3)
- N 19 — XMTR MT-LM 100-1, XMTR MT-LM 100-2
- N 20 — 120V AC + 25 [illegible], [illegible] AR, BM, [illegible], M1, M2, N, P)
- N 21 — FT BR 132, FE BR 132 ([illegible])
- N 22 — WEATHER PNL UNIT 1 REC
- N 23 — 1 VS-V-4 (SAFEGUARD SUPPLY HTG & VENT UNIT) SEE ESK-6FA
- N 24 — GAS TURB GEN PNL - CONT RM 1SVB [illegible]
- N 25 — MASTER INTAKE SUPV PNL I/D RACK 00 ([illegible])
- * 26 — STM BYPASS CONT. FC 4048 FC MS 101A, FC MS 101B, FC MS 101C
- N 27 — [illegible] TRANS REL PNL - [illegible] SUPPLY SOCKET
- N 28 — [illegible] CONT CAB #1, TBA1
- N 29 — 1 SW-P-[illegible]A
- N 30 — [illegible] SOV CONT CAB ([illegible] #2)
- N 31 — 1 SW-P-6C
- N 32 — [illegible] TRANSFORMER [illegible] 2ND RACK 2
- N 33 — FT SD 104A, FT SD 104B, FT SD 106A, FT SD 106B
- * 34 — SOV SA 175
- N 35 — ACOUSTICAL MONITORING
- R 36 — SUB COOLING METERING [illegible] A UNIT 1 SCM 100A
- N 37 — SPARE ([illegible])
- R 38 — SUB COOLING METERING UNIT 2 SCM 200A
- N 40 — SPARE
- N — 25 KVA 480V - 240/120V TRANS [illegible] MCC 1J1 (98P) 1J6P6136
- — AC DIST PNL 1-1 (FC 23) 1SVB 2 (SEE 11S 79-27/11448-E-14 NO 2 OF 2)

NOTES:

R- REDUNDANT

N- NO SHUTDOWN FUNCTION

SUPPLY UNIT 1
SEMI-VITAL BUS
ONE LINE DIAGRAM

STONE & WEBSTER ENGINEERING CORP.

DWG [illegible] 79-27/11448-E-14
NO 1 OF 2

AC DIST PNL 1-1

1SVB2 from SEMI VITAL BUS

- N 1 — SOV MS 100A, SOV MS 100B, SOV MS 100C, SOV MS 100D ([illegible], SEL SW w LTS), SOV SV 100A, SOV SV 100B ([illegible] SEP VENT, SEL SW w LTS)
  SOV SV 101A, SOV SV 101B ([illegible] Sel Sw w LTS)
- R 2 — SOV BR 149 ([illegible] Sel Sw w Lts), SOV CC 100 ([illegible] Sel Sw w Lts), SOV CC 108, BORON RK #3, INST RM MB RACK 5
- N 3 — SOV NS 101 ([illegible] Sel Sw w Lts) SOV CC 112A+B, SOV CC 113A+B ([illegible] TK CC Side, Sel Sw w Lts)
- R 4 — SOV CC 101A, SOV CC 101B, SOV CC 102A, SOV CC 102B
- N 5 — FCV-GW 160, FCV GW 260, FCV GW 101, HCV GW 106, SOV LW 112, SOV LW 105, SOV AS 105
- N 6 — PS VP 101-102, PSA-X, PSB-X ([illegible] PP Cont, Aux Relay), RLY MON w Lts.
- N 7 — SOV BR 101 D-G, SOV BR 103, TC BR 100, LC BR 100, PC [illegible] 130, TC [illegible], TC BR 105A, PC BR 109B, FC BR 101A+B, LC BR 107A+B, BR-C-1A+1B, 3R1,2,1-X,
  TC BR 117A+B, TC BR 111A+B, LC BR 104A+B, FC BR 102A+B, PC AS 110A+B, LC BR 108A+B
- N 8 — MOV BR 100A, SOV AS 110A+B, SOV BR 101R-S, SOV BR 104A+B, SOV BR 106A+B, SOV BR 107A+B, LC BR 101, PC BR 109A, TC BR 103B, TC BR 116A+B+C, SS 1XA1+2,
  SS 1BX1+2, SS2-XCA+B, SS2-XDA+B
- N 9 — SOV ES 103A+B, SOV LS 104A+B, SOV ES 105A+B, SOV ES 106A+B, SOV ES 107A+B, SOV ES 108A+B ([illegible]), SOV SD 124A+B, LS SD 130A+B, LS SD 131A+B
- R N 10 — SOV CV 102 ([illegible] SOV, Sel Sw w Lts)
- N 11 — TURB SUPV PNL
- N 12 — ERSS 101 ([illegible]) RELAY MON IND LTS, EH GOV [illegible] CAB, PC WT 100
- N 13 — EH GOV CONT CAB
- N 14 — EH GOV CONT CAB
- R 15 — PERMISSIVE LTS MCB, MISC RLY RACK 1, RP1A RACK, RP3A RACK, RP4A RACK
- R N 16 — SOV FW 107, FCV FW 150A+B, S/G FD PP RECIRC VV LTS, COND PP RECIRC VV LTS, 4160V SWGR BUS 1A+1B CUB 15A5+B5, 4160V SWGR BUS 1A CUB 15A4
- R 17 — STATUS TRIP LTS-MCB, RP1A RACK, RP2A RACK, RP3A RACK
- R 18 — STATUS TRIP LTS-MCB, RP2A RACK, RP4A RACK, MISC RLY RACK 1
- N 19 — LOAD FREQ CONT PNL CHART DRIVE
- N 20 — SOV SD 103A+B, SOV SD 132A+B, LS SD 132A+B
- N 21 — TS/1-4CB (RCP TEMP REC MULTI POINT, WESTRONIC RTD)
- R 22 — MISC RLY RACK 1 (FE 4 63) 1M 466
- R 23 — BYPASS LTS, AT+TAN DEFEAT CONT SW (TM-109A), STA RACK [illegible] V, RP1A RACK, RP2A RACK, MISC RELAY RACK 1
- N 24 — NR 41, 42, 43, 44 (PWR RANGE FLUX RECORDERS), PR FW 153 (FDWTR PRESS REC), SYNCHROSCOPE, NIS PNL 1 CONT RM TB104, PNL 2 RM 204, PNL 3 RM 304,
  PN 4 RM 404, PNL 1 RM 105, PNL 2 RM 205, PNL 3 RM 305, PNL 4 RM 405
- N 25 — PWR SUP-STA SERV-DC-1, MERC WTTD REL-STA SERV-AEC SUP, PWR SUP SCKT MN TRANS REL PNL, STA SERV TOTALIZER

NOTES:

R - REDUNDANT

N - NO SHUTDOWN FUNCTION

SURRY UNIT 1
SEMI VITAL BUS
ONE LINE DIAGRAM

STONE & WEBSTER ENGINEERING CORP.

DWG. NO. [illegible]

CONTROL ROOM ALARM/INDICATION

Voltmeter
Gnd Ind Lts

DC SWBD 1A

*	1	DC PNL 1-1 See Drawing FE 79-27/11444-E-17
*	2	4 KV SWGR BUS 1H CKT 15H1
*	3	480v SWGR 1A1
		RES SS TRANS REL PNL
*	4	480v SWGR 1C1
N	5	MN-SS TRANS ANN
		RES SS DC ANN
N	6	SPARE
N	7	HAZARD 3,7,10,15,17,19, EMPC
N	8	ANN LOGIC CAB
*	9	4160v SWGR BUS 1A CUB 15A1
R	10	CLS PNL 1A - INST RM (FE 4P) 1825
N	11	SPARE
N	12	WASTE DISPOSAL ANN (WD), BORON RECOV SYST. ANN (BR)
N	13	CONTROL RM LTG PNL 1CC1
N	14	CABLE VAULT CONTACTORS FOR 1CC1, 1CC2, 1CC3, 1CC4
N		PERSONEL HATCH
*	15	480 v SWGR 1H
N	16	RLY MON. IND LTS, 62SD133 RLY, 62AST2 RLY, 25G-X (Synch Aux Rly), 86 LFT (Low Flo Lockout Relay), 25GBX1-2-3 (GEN 1 APT RLYS - SYNC), 25GBY1-2-3 (GEN 2 APT RLYS - SYNC), AUTO SYN RACK (FE 18M), CHG CAB (FE 2D), R1 (AUTO STOP TRIP AUX RLY), 52X1 2,3-44 (GEN OCB INTL'K LATCHING RLYS), 15 RX-LX (SPEED CHG RLYS - SYNC), 60 RX-LX (VOLT CHG RLYS - SYNC); 63X AST3 (MS VV AUX RLY); TD (AUT MAN TIME DELAY RLY); 94 AST RLY; RELAY PNL - 230KV SWYD RLY HOUSE (C
*	N 17	VOLT REG - EXC CUB 1
	N 18	480v BKR TEST PNL
	N 19	BATT CHGR 1A2
	N 20	BATT CHGR 1A1
	N 21	DC STR - EMER TURB OIL PUMP
	N 22	ANN LOGIC CAB
*	N 23	DC SWBD 1B TIE
*	N 24	VOLTMETER, WEATHER - BATT REC PNL, BATT GND DET IND LTS.
*	25	INVERTER I-IV (VITAL BUS)

NOTES:

R = REDUNDANT

N = NO SHUTDOWN FUNCTION

SURRY UNIT 1
DC SWBD 1A
ONE LINE DIAGRAM

STONE & WEBSTER ENGINEERING CORP.

DWG NO. FE 79-27/11418-E-15

A | B | C | D | E | F | G

CONTROL ROOM ALARM/INDICATION

LOSS OF INDIVIDUAL LOAD INDICATING LIGHTS ON MCB

DC PNL 1-1

- *N 1 — SOV 1522A (Pr Wtr to RCP Stg PP, Sel Sw w Lts), SOV 1556A (Loop Drn Hdr STP VV, Sel Sw w Lts), SOV 1303A (RCP No 1 Seal Lk Off, Sel Sw w Lts), SOV 1557A (Loop Fill Hdr STP VV, Sel Sw w Lts)
- *N 2 — SOV 1556 B (Loop Drn Hdr STP VV, Sel Sw w Lts), SOV 1310 (Chg LN Isol, Sel Sw w Lts), SOV 1557 B (Loop Fill Hdr STP VV, Sel Sw w Lts), SOV 1522 B (Pr Wtr to RCP Stg, Sel Sw w Lts), SOV 1303 B (RCP Seal Leakoff Isol, Sel Sw w Lts)
- *N 3 — SOV 1556 C (Loop Drn Hdr Stp VV, Sel Sw w Lts), SOV 1544 (Rx Vessel Seal Lk Off, Sel Sw w Lts), SOV 1519 B (Pri Wtr to RLF TK, Sel Sw w Lts), SOV 1303 C (RCP Seal Lk Off), SOV 1311 (Aux Spry VV, Sel Sw w Lts), SOV 1557 C (Loop Fill Hdr Stp VV, Sel Sw w Lts), SOV 1523 (PZR RELF SOV), SOV 1522 C (Pr Wtr to RCP Stg, Sel Sw w Lts)
- *N 4 — SOV 1244 (Demin Divert VV, Sel Sw w Lts)
- *N 5 — SOV PCV 455C (PZR RELIEF VV, Sel Sw w Lts), SOV-1590 (PZR REL TK 1+2 Isol VV, Sel Sw w Lts), SOV-1549 (PZR REL TK Vent, Sel Sw w Lts), SIA Rack Compt V
- * 6 — SOV-LCV 460 B (HIGH PRESS LTDN STP VV, Sel Sw w Lts), MISC REL RACK 1
- * 7 — SOV-LCV 460 A (HIGH PRESS LTDN STP VV, Sel Sw w Lts), MISC REL RACK 1
- N 8 — SOV MS 101 AA, AC, BA, BC, CA CC (MN STM TRIPS, SEL SW w LTS), SIA RACK Compt III
- *N 9 — TV 884 A-C (Boron Inj Tk Recirc, Sel Sw w Lts), SIA RACK Ch II + IV Compt V
- * 10 — SOV 1200 A-B-C (LTDN Orifice Stp VV, Sel Sw w Lts), SOV-1201 (Exc LTDN HX Isol, Sel Sw w Lts), 4160v EMER BUS 1J
- * N 11 — 500 KV, 345 KV, 230 KV CB IND (LTS)
- N 12 — GAS TURB GEN PNL
- *R 13 — Rx TRIP BKR 1B
- R 14 — RPA 5 RACK - INST RM (FE 4A2) 1891
- R 15 — NIS REC SEL SWS CONTROL SWS - DET BF (Source Range)
- * 16 — SOV 1478 A, SOV 1488 A, SOV 1498 A (MN FDWTR VVs)
- R 17 — SIA RACK COMPT VI (FE 4BD) 18115
- N 18 — ROD DRIVE SUPPLY CAB (FE 5K) 18118
- N 19 — SPARE
- N 20 — ANN AT CMPR 1-SA-C-1

NOTES:

R - REDUNDANT
N - NO SHUTDOWN FUNCTION

4					
3					
2					
1	[illegible]				

STONE & WEBSTER ENGINEERING CORP.

SURRY UNIT 1
DC PNL 1-1 DIST.
ONE LINE DIAGRAM

DWG. NO. TC 77-27/11448-E-17

CONTROL ROOM ALARM/INDICATION

Voltmeter
Ground Det

DC SWBD 1B

N 1	—	SPRINKLER ANN, MANUAL CONT. PNL
N 2	—	4160v EMER. SWGR TEST CAB - RLY RM
	—	4160v SWGR TEST CAB - SWGR ROOM
* 3	—	480v SWGR 1B1
* 4	—	4160v EMER SWGR BUS 1J CUB 15J2
* 5	—	4160v SWGR BUS 1B Bkr Ckt 15B1
* 6	—	DC DIST PNL 1-2 (See Drawing IE 79-27/11448-E-10)
N 7	—	SPARE
N 9	—	EMER LTG PNL 1EAB1, TEST PB
* 9	—	4160v SWGR BUS 1C Bkr Ckt 15C1
N 10	—	ANN LOGIC CAB
* 11	—	480v EMER SWGR BUS 1J
N 12	—	PERS HATCH OUTDOOR CONT PNL
N 13	—	SPARE
N 14	—	INTAKE STR SUPV PNL AT CONT. RM, UNIT 2 DIGITAL COMP
	—	TURB SUPV INST PNL ANN
N 15	—	EMER LTG CONT (ET) TURB RM
* 16	—	AUX BLR 1-HS-E-9A (1-HS-E-9B CONT PNLS.
R 17	—	CLS PNL 1B - INST RM (FE 40) 1B 55
N 18	—	RELAY MON IND LTS, 52X1 2,3-4C (GEN OCB INTERLOCK RELAYS)
N 19	—	SPARE
N 20	—	GEN REL PNL - REL RM (FE 306) 1B114
R N 21	—	COMPUTER INVERTER - RELAY RM
N 22	—	DC STR-AIR SIDE SEAL BACK UP PP
N 23	—	BATT CHGR 1B2
N 24	—	BATT CHGR 1B1
*	—	VOLTMETER, GND DET., IND LTS, WEATHER + BATT REC PNL
N	—	TIE TO SWBD 1A
* 26	—	VITAL BUS INVERTER 1-II

NOTES:

R-REDUNDANT

N-NO SHUTDOWN FUNCTION

4							
3							
2							
1							
	DESCRIPTION						

STONE & WEBSTER ENGINEERING CORP.

SURRY UNIT 1
DC SWBD 1B
ONE LINE DIAGRAM

DWG. IE 79-27/11448-E-16
NO.

CONTROL ROOM ALARM / INDICATION

LOSS OF INDIVIDUAL LOAD INDICATING LIGHTS ON MCB

DC PNL 1-2

* 1	SOV 1850 A (ACC ATAT 1 TEST LN, Sol Sw & LTS), SOV 1850 B (ACC ATAT 1 INJ TEST LN, Sol Sw & LTS), SOV 1898 (11, SUP TO MNFLD, Sol Sw & LTS), SOV 1851 A (ACC ATAT 1 DRN, Sol Sw & LTS), SOV 1852 A (ACC ATAT 1 DRN TO DR TR TK, Sol Sw & LTS), SOV 1853 A (ACC ATAT 1 VENT, Sol Sw & LTS)
* 2	SOV 1850 C (ACC ATAT 2 TEST LN, Sol Sw & LTS), SOV 1850 D (ACC ATAT 2 INJ TEST LN, Sol Sw & LTS), SOV 1851 B (ACC ATAT 2 DRN, Sol Sw & LTS) SOV 1852 B (ACC ATAT 2 DRN TO DR TR TK, Sol Sw & LTS), SOV 1853 B (ACC ATAT 2 VENT, Sol Sw & LTS)
* 3	SOV 1850 E (ACC ATAT 3 TEST LN, Sol Sw & LTS), SOV 1850 F (ACC ATAT 3 INJ TEST LN, Sol Sw & LTS), SOV 1851 C (ACC ATAT 3 DRN, Sol Sw & LTS), SOV 1852 C (ACC ATAT 3 DRN TO DR TR TK, Sol Sw & LTS), SOV 1853 C (ACC ATAT 3 VENT)
N 4	MISC RLL RACK - INST RM (FE 4BJ) 1B 116
* 5	SOV WJ 114 A (Pri Grd Isol to BLNDR, Sol Sw & LTS), SOV WJ 114 B (DLTN INJ VOL CONT TK, Sol Sw & LTS), SOV W 100 (TEMP CONT BORIC ACID BATH TK, Sol Sw & LTS), SOV WJ 113A (BORIC ACID INJ TO BLNDR, Sol Sw & LTS), SOV WJ 113 B (MKUP INJ CHG PP HDR, Sol Sw & LTS), MISC RLL RACK 1
N 6	SPARE
* N 7	SOV MS 102 (TURB DRN AUX STM GEN FD PP), PP DISCHG PRESS LTS
* N 8	SOV FCV 1456 (PRESS REL VV, Sol Sw & LTS), TV 884 B (BIT RECIRC VV, Sol Sw & LTS), SIB RACK Compt VI
N 9	SIN CONT BD RR PNL (FE 3 BU) 1M 141
N 10	ANN. PB ACK RES, PB LAMP TEST
* R 11	2v TRIP BKR 1C
N 12	SPARE
N 13	ROD DRIVE SUP CAB (FE 5K) 1B 119
R 14	RPB 5 RACK - INST RM (FE 4A2) 1B 92
* 15	SOV 1478 B, SOV 1488 B, SOV 1498 B (MN FDWTR VVs)
N 16	CO2 FP ANN-CONT RM (4A2 1, 2.3, 2.5, 2.7 2.9, 2.10, 21.7, 21.11, 21.13, 21.15, 21.9, Comp Start Pnl at CO2 STAG TK, PS @ CO2 CYC RK)
R 17	SIB RACK COMPT VII (FE 4BH) 1B 120
N 18	SPACE
* 19	SOV MS 101 AB-BB-CB (MN STM TRIP VVs, Sol Sw & LTS), SIB RACK COMPT VII, SIB RACK CL II-VII COMPT VII
N 20	LOCAL ANN @ COMPT 1-1A-C-1

NOTES:

R- REDUNDANT

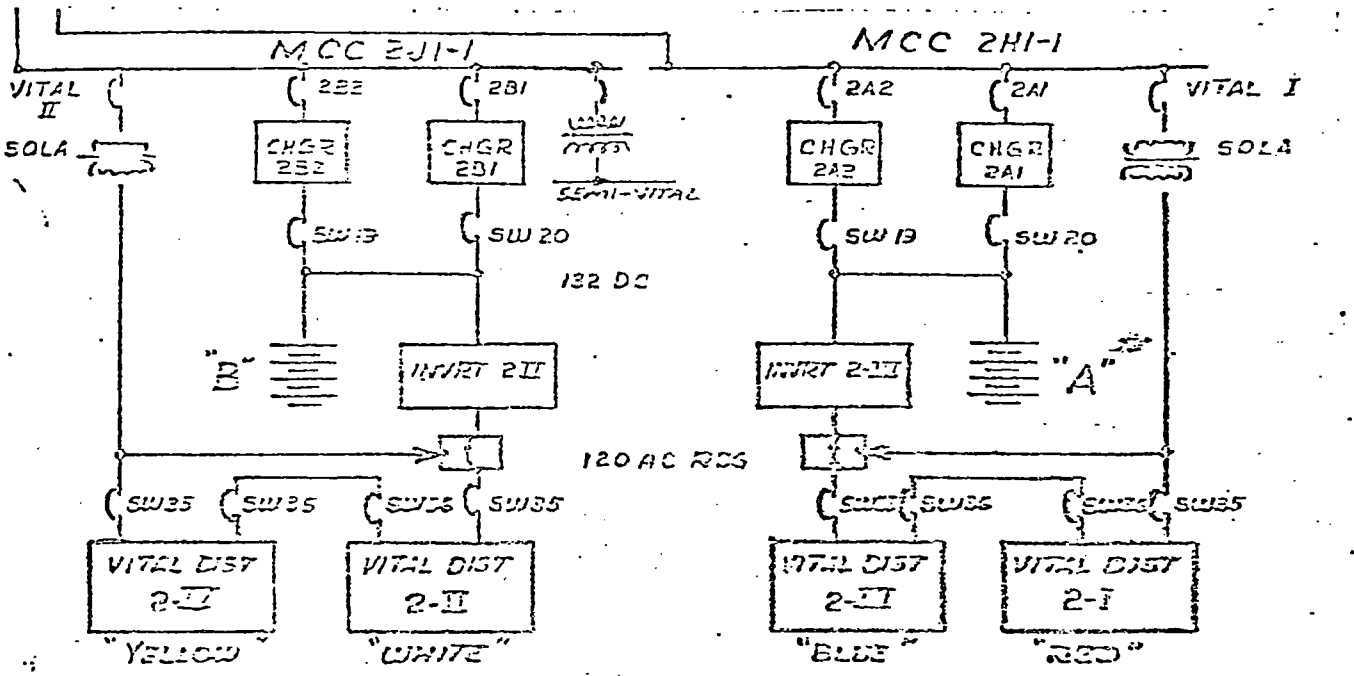
N- NO SHUTDOWN FUNCTION

4							
3							
2							
1							
ISSUE	DESCRIPTION						

STONE & WEBSTER ENGINEERING CORP.

CURRY UNIT 1
DC PNL 1-2 DIST.
ONE LINE DIAGRAM

DWG IE 79 27/11445-E-18
NO



120V AC & 125V DC ONE LINE DIAG.

VITAL POWER

SURRY UNIT 2

CONTROL ROOM ALARM/INDICATION

Voltmeter On MCB

VITAL BUS 2-1

SEE ATT #3

- N 1 — PROCESS RACK 1 TB 7 (FE 4AA) 2 VB 4
- N 2 — PROCESS RACK 1 TB 8 (FE 4AA) 2 VB 6
- N 3 — PROCESS RACK 2 TB 7 (FE 4AA) 2 VB 8
- N 4 — PROCESS RACK 2 TB 8 (FE 4AA) 2 VB 10
- * 5 — PROCESS RACK 3 TB 7 (FE 4AB) 2 VB 12
- * 6 — PROCESS RACK 3 TB 8 (FE 4AB) 2 VB 14
- * 7 — PROCESS RACK 6 TB 7 (FE 4AC) 2 VB 16
- * 8 — PROCESS RACK 6 TB 8 (FE 4AC) 2 VB 18
- * 9 — PROCESS RACK 7 TB 7 (FE 4AD) 2 VB 20
- * 10 — PROCESS RACK 7 TB 8 (FE 4AD) 2 VB 22
- * 11 — HIC 142 (RHR to Letdown Flow Control), HIC 479, HIC 934, YQ 751, 2 IHN
- * 12 — TR 412 (Cont. Sw. Temp/ΔT Proc Common), LT 2-470 (Per Relief Tank), NR 46 (Power Range Overpower Flux Recorder)
- * 13 — TV MS 209, CMFA 1A, TV MS 210, TV CC 207, TV RM 200A, SOV SV 202, TV RM 200C, TV DA 200A, 3-2DAA, SOV SV 203
- * 14 — TV LM 200A-C-E, TV LM 201 A, TV CV 250A
- * 15 — TV SS 203, TV SI 201A, TV SS 200A, TV BD 200A-C-E
- * 16 — TV DG 208A, TV SS 204 A, TV CC 209 A, TV SS 206A, TV 201A, TV 202A, TV 209A
- N 17 — VITAL BUS 2-I VOLTMETER
- R 18 — NIS VOLTAGE REGULATOR
- N 19 — PERSONNEL RAD MON STA
- R 20 — NIS-TB 121-7,8,9,10

SEE ATT #3

- R 21 — NI PROCESS RACK 1 CH 1 TB 8 - 5,6,7,8,9,10,11,12, MB RACK 1
- N 22 — SPARE
- N 23 — 1VS FL 3A, 1VS F 40 AB, 1M324 E/P (AI) 1VS FL 3A
- N 24 — SPARE (future RMT Logic Cab 2VB236)
- N 25 — SPARE (future Isol Unit Cabs)
- * 26 — TIC 162, TIC 103, TIC 2-934A
- N 27 — SPARE (future Cont Inst Air 2VB213)
- R 28 — SIA RACK COMPT II (FE 4BD) 2VB225
- * N 29 — SOV SI 202A1
- * N 30 — SOV SI 102A2
- * 31 — SOV TV BD 203A
- * 32 — SOV TV BD 203B
- * 33 — SOV TV BD 203C
- N 34 — SPARE
- N 35 — SOLA TRANS
- N 36 — TIE TO VITAL BUS 2-III

NOTES:

R- REDUNDANT

N- NO SHUTDOWN FUNCTION

STONE & WEBSTER ENGINEERING CORP.

...ERY UNIT 2
...TAL BUS 2-I
...E LINE DIAGRAM

DWG 12 77-27/11548-C-10
NO

A | B | C | D | E | F | G

CONTROL ROOM ALARM/INDICATION

Voltmeter On MCB

VITAL BUS 2-II

SEE ATT#3
* 1 PROCESS RACK 5 TB 7 (FE 4AC) 2 VB 246
* 2 PROCESS RACK 5 TB 8 (FE 4AC) 2 VB 248
* 3 PROCESS RACK 8 TB 7 (FE 4AD) 2 VB 250
* 4 PROCESS RACK 8 TB 8 (FE 4AD) 2 VB 252
* 5 PROCESS RACK 9 TB 7 (FE 4AE) 2 VB 254
* 6 PROCESS RACK 9 TB 8 (FE 4AE) 2 VB 256
N 7 PROCESS RACK 10 TB 7 (FE 4AE) 2 VB 258
N 8 PROCESS RACK 10 TB 8 (FE 4AE) 2 VB 260
N 9 PROCESS RACK 11 TB 7 (FE 4AF) 2 VB 262
N 10 PROCESS RACK 11 TB 8 (FE 4AF) 2 VB 264
N 11 PROCESS RACK 12 TB 7 (FE 4AF) 2 VB 266
N 12 PROCESS RACK 12 TB 8 (FE 4AF) 2 VB 268
N 13 PROCESS RACK 13 TB 7 (FE 4AG) 2 VB 270
N 14 PROCESS RACK 13 TB 8 (FE 4AG) 2 VB 272
* 15 PROCESS RACK 19 TB 7 (FE 4AK) 2 VB 274
* 16 PROCESS RACK 19 TB 8 (FE 4AK) 2 VB 276
* 17 FR 113 (Boric Acid Demin Water Flow Recorder), FT 2113, 1 CH TK 1C, 259 C, YIC 113 (Boric Acid Flow Tot), YIC 114A (Demin Water Flow Tot)
* 18 FR 488 (FW Flow Rec 2 B S/G), LCCN 204 (Cond Stg. Tk Cont Sta), FC 488 F, PC 444 J+H+G (Pr Press Conts), LC 459 G (Pr Level Cont)
* 19 YG 752, TR 410 (CL Loop Temp Rec), FX CV 250, LT-2-928, LT-2-924, LT-2-920, HIC 186, HIC 479
* 20 TV RM 200 B, TV CC 210 B, TV CC 205 B, TR 413 (Hot Leg Loop Temp Rec)
* R 21 TV DG 208 B, TV CC 109 B, TV BD 200 D, TV BD 200 F, TV VG 209 B, TV SI 201 B, TV 2204, SIB RACK Compt VI, 3 DG 208 B

SEE ATT#3
R 22 MB RACK 2 TB 8+9-11,12
R 23 NIS PNL 2 TB 221-1,4
N 24 SPARE
N 25 VITAL BUS VOLTMETER
N 26 SPARE
R 27 NIS PNL 2 TB 221-7,8,9,10
R 28 SIB RACK COMPT VI (FE 4 BB) 2 VB 392
N 29 112-A-GW-203
* 30 SOV-SI-202 B1
N 31 SPARE
R 32 AUX SHUTDOWN PNL 1-J5-PH-4 (FE 3CE), SOV SI 102 B2
N 33 SPARE ([illegible])
N 34 RAD MON SOUND [illegible] AMP
N 35 AUTO THROWOVER SW TO VB 2-IV
N 36 BUS TIE TO VB 2-IV

NOTES:
R- REDUNDANT
N- NO SHUTDOWN FUNCTION

SURRY UNIT 2
VITAL BUS 2-II
ONE LINE DIAGRAM

STONE & WEBSTER ENGINEERING CORP.

DWG. NO. 11448-27/11549-E-11

CONTROL ROOM ALARM/INDICATION

Voltmeter on MCB

VITAL BUS 2-III

SEE ATT #3	N 1	PROCESS RACK 14 TB 7 (FE 4AG) 2VB 406
	N 2	PROCESS RACK 14 TB 8 (FE 4AG) 2VB 409
	N 3	PROCESS RACK 15 TB 7 (FE 4AH) 2VB 412
	N 4	PROCESS RACK 15 TB 8 (FE 4AH) 2VB 415
	N 5	PROCESS RACK 16 TB 7 (FE 4AH) 2VB 418
	N 6	PROCESS RACK 16 TB 8 (FE 4AH) 2VB 421
	* 7	PROCESS RACK 17 TB 7 (FE 4AJ) 2VB 424
	* 8	PROCESS RACK 17 TB 8 (FE 4AJ) 2VB 427
	* 9	PROCESS RACK 18 TB 7 (FE 4AJ) 2VB 430
	* 10	PROCESS RACK 18 TB 8 (FE 4AJ) 2VB 433
	* 11	PROCESS RACK 20 TB 7 (FE 4AK) 2VB 436
	* 12	PROCESS RACK 20 TB 8 (FE 4AK) 2VB 441
	* 13	PROCESS RACK 23 TB 7 (FE 4AM) 2VB 444
	* 14	PROCESS RACK 23 TB 8 (FE 4AM) 2VB 447
	* 15	YQ 750, LT 2-112, TC 144 A (NRHX Cool Flow Cont), FC 114 A (Demin Water & Bleeder Cont), FC 113 A (Boric Acid Flow Cont), IND LTS, HIC 137, HIC 499, HIC 758, HFC 114
	* 16	FR 498 (STM-FD Flow), FC 498 F, FC 478 F, PC 145 B (LP LTDN PRESS Cont), FC 160 B (Loop Fill Hdr Flow Cont), FC 122 C (Chg Flow Cont To RHX), IND LTS
	* 17	FC 605 C (RHX MAN BYP Flow Cont), EWF
	* 18	TV CC 205 A, TV CC 210 A, SOV 2519
	R 19	RPS RACK 5 TRN A TB T3-1 THROUGH 10
	R 20	NIS VOLT REG
	N 21	AUX BLDG FAN
SEE ATT #3	R 22	MB RACK 3 TB 8-9-11, 12
	N 23	VITAL BUS VOLTMETER
	N 24	SPARE
	N 25	XGT, VENT PNL (AM)
	* R 26	SIB RACK COMPT III, SOV FW 255 A1-B1-C1
	R 27	NIS PNL 3 TB 32-9, 10
	N 28	TELE EQUIP
	N 29	CARRIER TELE
	N 30	SEQUENTIAL REC
	N 31	SPARE
	N 32	SPARE
	N 33	SPARE
	N 34	SPARE
	N 35	AUTO THROWOVER SW TO VB 2-I
	N 36	TIE TO VB 2-I

NOTES:

R - REDUNDANT

N - NO SHUTDOWN FUNCTION

STONE & WEBSTER ENGINEERING CORP.

SURRY UNIT 2
VITAL BUS 2-III
ONE LINE DIAGRAM

DWG. NO. E 79-27/11548-E-12

CONTROL ROOM ALARM/INDICATION

Voltmeter on MCB

VITAL BUS 2-IV

SEE ATT #3	# 1	PROCESS RACK 21 TB 7 (FE 4AL) 2 VB 566
	# 2	PROCESS RACK 21 TB 8 (FE 4AL) 2 VB 568
	# 3	PROCESS RACK 22 TB 7 (FE 4AL) 2 VB 570
	# 4	PROCESS RACK 22 TB 8 (FE 4AL) 2 VB 572
	# 5	PROCESS RACK 25 TB 7 (FE 4AN) 2 VB 574
	# 6	PROCESS RACK 25 TB 8 (FE 4AN) 2 VB 576
	# 7	PROCESS RACK 26 TB 7 (FE 4AN) 2 VB 578
	# 8	PROCESS RACK 26 TB 8 (FE 4AN) 2 VB 580
	N 9	PROCESS RACK 27 TB 7 (FE 4AF) 2 VB 582
	N 10	PROCESS RACK 27 TB 8 (FE 4AP) 2 VB 584
2	N 11	PROCESS RACK 28 TB 7 (FE 4AP) 2 VB 586
	N 12	PROCESS RACK 28 TB 8 (FE 4AP) 2 VB 588
	N 13	PROCESS RACK 29 TB 7 (FE 4AQ) 2 VB 590
	N 14	PROCESS RACK 29 TB 8 (FE 4AQ) 2 VB 592
	N 15	TR 409A (Rod Pos Indication Limit Bank Rec), 1-29-13, LR CN 200, LR CN 204
	# 16	TV LM 200H, TV CC 210 C, TV LM 200F, TV LM 200D, TV LM 200B, TV LM 201B
	# 17	TV SI 200, TV SS 200B, TV SS 201B, TV SS 202B, TV SS 204B, TV SS 206B
	# 18	TV CV 250 D, TV DA 200B, TV CV 250 D, TV CC 205C
	R 19	NIS PNL 4
	R 20	RPS B RACK
	R 21	RMT LOGIC CAB B
	N 22	PART LENGTH ROD CAB (DISCONNECTED PER DC 78-525)
3 SEE ATT #3	R 23	MB4 RACK TB 8-9-11, 12
	N 24	SPARE (Column: HV18-2 Aux Vent)
	NR 25	[illegible] 3A, CLS PNL 2B
	N 26	VITAL BUS VOLTMETER
	R 27	NIS PNL 4 TB 921-7, 8
	# R 28	SIB RACK COMPT III, SOV FW 255A2-B2-C2
	N 29	RCP VIB DET PNL
	N 30	SPARE
	N 31	SPARE (Column: Cond Unit Air 2VB 743)
	# 32	TIC 164, TIC 2-934B
	N 33	CHEM REC PNL
	N 34	SPARE
4	N 35	SOLA TRANS
	N 36	TIE TO VB 2-II

NOTES:

R - REDUNDANT

N - NO SHUTDOWN FUNCTION

SURRY UNIT 2

VITAL BUS 2-IV

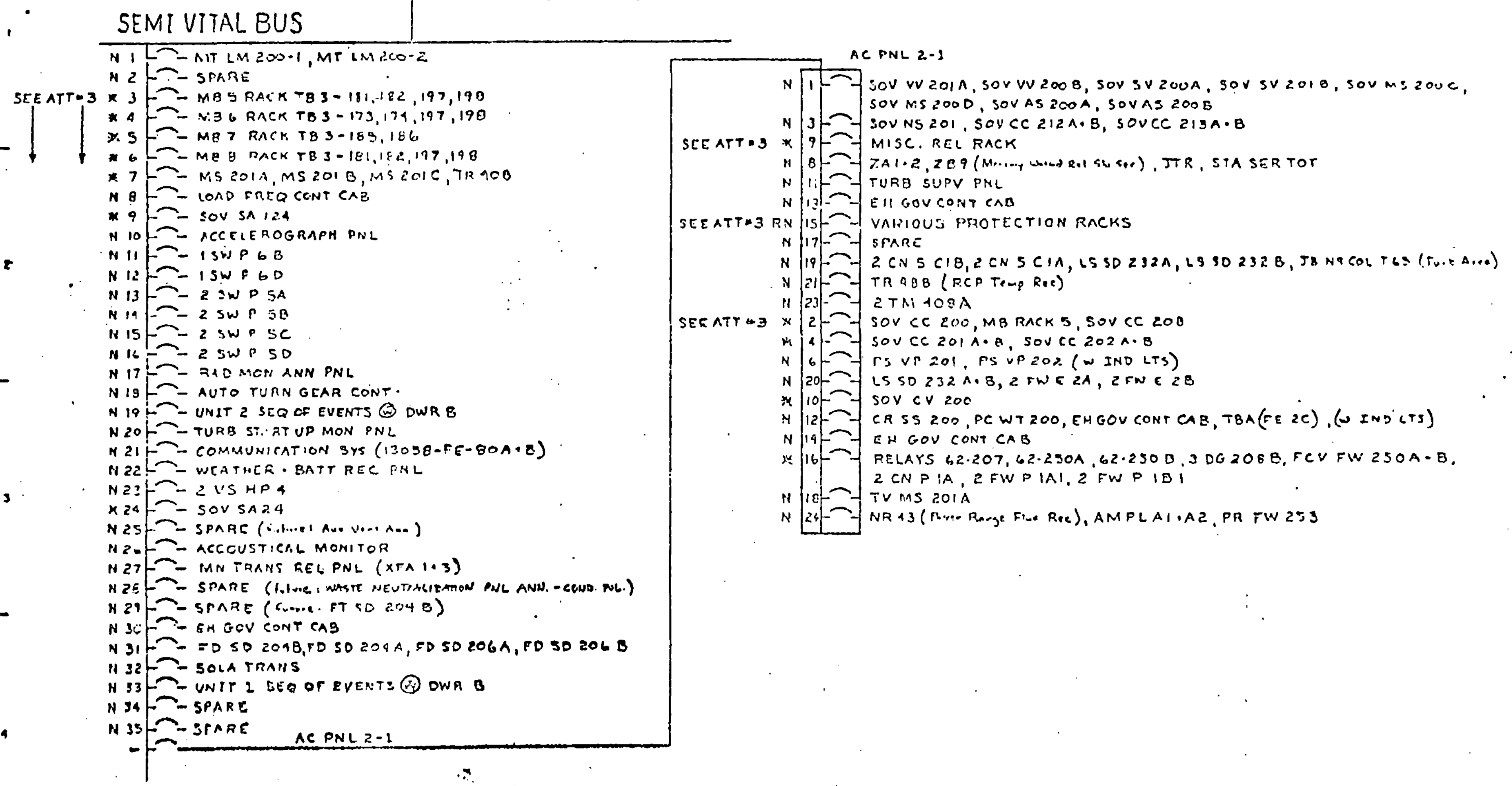
ONE LINE DIAGRAM

STONE & WEBSTER ENGINEERING CORP.

DWG. NO. 12E79-27/11548-E-13

CONTROL ROOM ALARM/INDICATION

Various Indicating Lights extinguish on Power Failure


SEMI VITAL BUS
N 1 MT LM 200-1, MT LM 200-2
N 2 SPARE
SEE ATT#3
* 3 MB 5 RACK TB 3-181,182,197,198
* 4 MB 6 RACK TB 3-173,174,197,198
* 5 MB 7 RACK TB 3-185,186
* 6 MB 8 RACK TB 3-181,182,197,198
* 7 MS 201A, MS 201B, MS 201C, TR 408
N 8 LOAD FREQ CONT CAB
* 9 SOV SA 124
N 10 ACCELEROGRAPH PNL
N 11 1 SW P 6B
N 12 1 SW P 6D
N 13 2 SW P 5A
N 14 2 SW P 5B
N 15 2 SW P 5C
N 16 2 SW P 5D
N 17 RAD MON ANN PNL
N 18 AUTO TURN GEAR CONT.
N 19 UNIT 2 SEQ OF EVENTS @ DWR B
N 20 TURB START UP MON PNL
N 21 COMMUNICATION SYS (13058-FE-80A+B)
N 22 WEATHER + BATT REC PNL
N 23 2 VS HP 4
X 24 SOV SA 24
N 25 SPARE
N 26 ACCOUSTICAL MONITOR
N 27 MN TRANS REL PNL (XFA 1+3)
N 28 SPARE (WASTE NEUTRALIZATION PNL ANN. - COND. PNL.)
N 29 SPARE (FT SD 204 B)
N 30 EH GOV CONT CAB
N 31 FD SD 204B, FD SD 204A, FD SD 206A, FD SD 206 B
N 32 SOLA TRANS
N 33 UNIT 1 SEQ OF EVENTS @ DWR B
N 34 SPARE
N 35 SPARE
AC PNL 2-1
AC PNL 2-1
N 1 SOV VV 201A, SOV VV 200B, SOV SV 200A, SOV SV 201B, SOV MS 200C, SOV MS 200D, SOV AS 200A, SOV AS 200B
N 3 SOV NS 201, SOV CC 212A+B, SOV CC 213A+B
SEE ATT#3 * 9 MISC. REL RACK
N 8 ZA1+2, ZB9 (Moisture Sep Rel Sh Sep), TTR, STA SER TOT
N 11 TURB SUPV PNL
N 13 EH GOV CONT CAB
SEE ATT#3 RN 15 VARIOUS PROTECTION RACKS
N 17 SPARE
N 19 2 CN 5 C1B, 2 CN 5 C1A, LS SD 232A, LS SD 232 B, TB N9 COL T65 (Turb Area)
N 21 TR 488 (RCP Temp Rec)
N 23 2 TM 408A
SEE ATT#3 X 2 SOV CC 200, MB RACK 5, SOV CC 208
X 4 SOV CC 201 A+B, SOV CC 202 A+B
N 6 PS VP 201, PS VP 202 (w IND LTS)
N 20 LS SD 232 A+B, 2 FW E 2A, 2 FW E 2B
X 10 SOV CV 200
N 12 CR SS 200, PC WT 200, EH GOV CONT CAB, TBA (FE 2C), (w IND LTS)
N 14 EH GOV CONT CAB
X 16 RELAYS 62-207, 62-250A, 62-250 D, 3 DG 208B, FCV FW 250A+B, 2 CN P 1A, 2 FW P 1A1, 2 FW P 1B1
N 18 TV MS 201A
N 24 NR 43 (Power Range Flux Rec), AMPL A1+A2, PR FW 253

NOTES:

R=REDUNDANT

N=NO SHUTDOWN FUNCTION

SURRY UNIT 2
SEMI VITAL BUS
ONE LINE DIAGRAM

STONE & WEBSTER ENGINEERING CORP.

DWG. 11548-E 14

CONTROL ROOM ALARM/INDICATION
Individual Load Indicating Lights
Voltmeter

DC SWBD 2A

SEE ATT'D	* 1	DC DIST PNL 2-1 (SEE DWG IE 79-27/11548-E-17), SOV 2498A, SOV 2478A, HCV 2498A, HCV 2478A, MISC REL RACK 1, SOV 2488A, HCV 2486A
	* 2	4160 V SWGR BUS 2H
	* 3	480 V SWGR BUS 2A1
	* 4	480 V SWGR BUS 2C1
	N 5	CA 4-5, CC 7-8 (Mn Trans # 2 Cont), MN TRANS 2, SS TRANS 2A-2B-2C
	N 6	BLANK
	N 7	HAZARDS 4,8,16-18, MVAR RELAY
	N 8	ANN LOGIC CAB
	* 9	4160 V SWGR BUS 2A
	R 10	CLS PNL 1A
	N 11	DC SW ELECTRIC SHOP
	N 12	BLANK
	N 13	DC LIGHTING, UV RLY (LP2C1), SIM TO UV RLY 2T3
	N 14	DC LIGHTING (Rx Cont.), 2ERC1
	* 15	480 V EMER SWGR 2H
	NR 16	TURB AUX TB B-A-ER, RPA RACK 3 COMPT III, RLY 3-25T2, 4160 V SWGR BUS 2B, EH GOV CONT CAB, RLY 94 AST, TD RLY, RLY 62-2AST 2, RLY 86 LFT, RLY 62 SD 233, RLY 52-X3-1C, WHITE IND LTS
	N 17	GEN EXC CUB
	N 18	BLANK
	N 19	BATT CHRG 2A2
	N 20	BATT CHRG 2A1
	N 21	EMER TURB OIL PUMP
	N 22	ANN LOGIC CAB
	* N 23	BUS TIE TO DC SWBD 2B
	* N 24	WEATHER TOWER PNL, VOLTMETER, WHT IND LTS
	* 25	VITAL BUS INVERTER 2-III

NOTES:
R- REDUNDANT
N- NO SHUTDOWN FUNCTION

4						SURRY UNIT 2
3						DC SWBD 2A
2						ONE LINE DIAGRAM
1						
	DESCRIPTION					

STONE & WEBSTER ENGINEERING CORP.

DWG. IE 79-27 / 11548-E-15
NO.

CONTROL ROOM ALARM/INDICATION

Individual Load Indicating Lights

DC DIST PNL 2-1

* 1	SOV 2554A, SOV 2557A, SOV 2303A,
* 2	SOV 2556 B, SOV 2557 B, SOV 2310, SOV 2522 B, SOV 2303 B
* 3	SOV 2522 C, SOV 2303 C, SOV 2556 C, SOV 2519 C, SOV 2311, SOV 2557 B, SOV 2523, SOV 2544
* 4	SOV 2258 (VCT Vent VV), SOV 2241
* P 5	SOV 2550, SOV 2455 C, SOV 2549, SIA RACK COMPT II
* 6	SOV 2460 B
* 7	SOV 2460 A
NR 8	SIA RACK COMPT II, RACK 296, TV MS 201A, TV MS 201 B, TV MS 201 C, SLB-A
* 9	TV 2884 C, TV 2884 A
* 10	SOV 2200 A, SOV 2200 B, SOV 2200 C, SOV 2201
N 11	BLANK
N 12	HAZARDS 2·4·6·8·12·14·16·18·19, FS NR Co, MASTER VV AT LP Co, TK
* 13	P. TRIP BKR 1B, R. TRIP BYPASS BKR 2C
R 14	RPAS RACK
N 15	ROD DRIVE SUPPLY CAB
* 16	HCV 2478A, HCV 2488A, HCV 2491A, SOV 2478A, SOV 2488A, SOV 2498A
R 17	SIA RACK COMPT II
N 18	NIS REC and SEL SW

NOTES:

R-REDUNDANT

N-NO SHUTDOWN FUNCTION

4									
3									
2									
1									
NO.	DESCRIPTION	BY	CHK	APP'D	DATE				

STONE & WEBSTER ENGINEERING CORP.

SURRY UNIT 2
DC DIST PNL 2-1
ONE LINE DIAGRAM

DWG. NO. 79-27/11548-E-17

AREA	LEVEL	REV. NO.

CONTROL ROOM-ALARM/INDICATION

Individual Load Indicating Lights
Voltmeter

DC SWBD 2B

	N 1	—
	N 2	— 4160V EMER SWGR TEST CAB(RLY RM), 4160 V EMER SWGR TEST CAB (SWGR RM)
*	3	— 480V SWGR BUS 2B1
*	4	— 4160 V SWGR BUS 2J
*	5	— 4160 V SWGR BUS 2B
SEE ATT*3	R 6	— DC DIST PNL 2-2 (SEE DWG IE 79-27/11948-E-18), SOV 2478 B, SOV 2488 B, SOV 2498 B, MISC RLY RACK 1
	N 7	— SPRINKLER VV CONT PNL
	N 8	— 2EAB1
*	9	— 4160 V SWGR BUS 2C
	N 10	— ANN LOGIC CAB
*	11	— 480V EMER SWGR BUS 2J
	N 12	— PERSONNEL HATCH OUTDOOR CONTROL PNL
	N 13	— BLANK
	N 14	— TURB SUPV INST PNL
	N 15	— LP 2 CT 1
	N 16	— WHITE IND LTS
	R 17	— CLS PNL 1B
	N 18	— BLANK
*	19	— VITAL BUS INVERTER 2-II
	N 20	— GEN RLY PNL (RLY RM)
*	N 21	— COMPUTER INVERTER
	N 22	— AIR SIDE SEAL BACKUP PUMP
	N 23	— BATT CHGR 2B2
	N 24	— BATT CHGR 2B1
	N 25	— BLANK
*	N 26	— WEATHER TOWER PNL, VOLTMETER, WHT IND LTS
*	—	— BUS TIE TO DC SWBD 2A

NOTES:
R = REDUNDANT
N = NO SHUTDOWN FUNCTION

SURRY UNIT 2
DC SWBD 2B
ONE LINE DIAGRAM

STONE & WEBSTER ENGINEERING CORP.

DWG. IE 79-27/11548-E-16
NO.

CONTROL ROOM ALARM/INDICATION

Individual Load Indicating Lights Extinguish

DC DIST PNL 2-2

*	1	SOV 2851 A, SOV 2852 A, SOV 2853 A, SOV 2898, SOV 2850 B, SOV 2850 A
*	2	SOV 2850 E, SOV 2850 F, SOV 2851 C, SOV 2852 C, SOV 2853 C, neg Ind Lts
*	3	SOV W2 114 A, SOV W2 114 B, SOV W2 113 A, SOV 113 B
*	4	AUX SHUTDOWN PNL, PS FW 252, SOV MS 202
*	5	LS SD 213 X, HP HTR DR TK
*	R 6	R. TRIP BKR 1C, R. TRIP BYPASS BKR 2B
	N 7	ROD DRIVE SUPPLY CAB
	R 8	SIB RACK COMPT VI
	NR 9	SIB RACK COMPT VI, SLB-B, SOV MS 201 AB+BB+CB (Test Buttons), neg Ind Lts
	N 10	CO_2 ANN CONT ROOM
*	11	SOV 2850 C, SOV 2850 D, SOV 2851 B, SOV 2852 B, SOV 2853 B
SEE ATT 3 *	12	MISC RLY RACK
	N 13	SPARE CABLE TO EDG 2 CONT PNL
*	R 14	TV 2884 B, SIB RACK COMPT V, SOV 2456
	N 15	CHEM FD CONT CAB
	R 16	RPBS RACK
	N 17	2-1A-C-1, ANN (2-SA-C-1)
	N 18	SPARE
	N 19	SLB-B CONTACTS, JBA (1/FM 488 B), JCA, JDA (1 FM 478A), TV 201 AP1+BP1+CP1
	N 20	TEST RECEPT (VEPCO INST SHOP)
	N 21	SPARE

NOTES:

R- REDUNDANT

N- NO SHUTDOWN FUNCTION

4									
3									
2									
1									

STONE & WEBSTER ENGINEERING CORP.

SURRY UNIT 2

DC DIST PNL 2-2

ONE LINE DIAGRAM

DWG NO. 12-27/11548-E-18