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February 6, 1985
RBG- 20,086
File No. G9.5, G9.23,
G9.8.6.2

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Denton:

River Bend Station - Unit 1
Docket No. 50-458

Enclosed are revisions to the River Bend Station Final Safety Analysis Report for your information. Attachment 2 supplements and/or revises my letter of November 29, 1984 (RBG-19,576) on this subject. These revisions support previous discussions with your staff and will be appropriately included in a future FSAR amendment.

The purpose of these revisions is to establish a qualified load for each of the diesel generators, to provide revised positions on Regulatory Guides 1.9 and 1.108 and to address HPCS independence. Discussion of these revisions is provided in Attachment 1.

Sincerely,

Eddie R Grant
for J. E. Booker
Manager-Engineering
Nuclear Fuels & Licensing
River Bend Nuclear Group

JEB/WJR/ERG/je

Enclosure

B001
1/40

Attachment 1

DISCUSSION OF NEW DIESEL GENERATOR LOADING SCHEME

The following description covers the systems or equipment affected by the diesel generator load reduction to approximately 3130 kW each for diesel generators 1EGS*EG1A and 1EGS*1EG1B. This loading scheme reassigns one of the standby service water pumps from Division I to the Division III bus. This change is reflected by revised Table 8.3-3.

DG Loading Scheme Changes

1. The following changes are applicable to both 1EGS*EG1A and 1EGS*EG1B during all combinations of available standby diesel generators:

   a. Standby cooling tower fans are reassigned to a ≥2.0-hr sequence and are activated by operator action.

   b. Spent fuel pool cooling pumps are reassigned to operate at a ≥2.0-hr sequence. These pumps shall be activated by operator action after 2.0 hr of LOCA.

   c. Control room reheat coils (1HVC*CH1A and 1B) are not required to operate when control building air-conditioning is running. Likewise, during colder months, the chiller load may be less than that reflected in the load tables or none at all. In any case, reheat coils are not expected to operate when the full air-conditioning load is required to be supplied by the diesel generator sets.

   d. In order to provide adequate cooling of the safety-related equipment and its areas, it is necessary to operate two control building chillers. One chiller receives an automatic actuation signal at 60 sec, whereas the second chiller is energized automatically at 10-min.

   e. Water leg pumps for low-pressure core spray (LPCS), residual heat removal (RHR), and reactor core isolation cooling (RCIC) pumps are no longer required to operate during a LOCA. These water leg pumps were shown to actuate at a 10-sec sequence; whereas, their main pumps get actuated within 2 to 7 sec, if required. The water leg pumps are not required to operate if their associated pumps operate.

2. In addition to the changes given in Item 1, the following changes apply only to 1EGS*EG1A loading:

   a. Deleted 1E21*C002 and 1E51*C003 (See item 1.e) and 1HVR*UC8. In addition, 1HVY*FN1C is assigned to the orange bus and is deleted from diesel generator 1EGS*EG1A.

b. LPCS or RHR A pump shall be manually tripped after 2.0 hr of LOCA, depending upon the available diesel generator sets. See applicable notes at the end of load tables.

c. Control building HVAC shall operate on diesel generator 1EGS*EG1A or 1EGS*EG1B, depending upon available diesel generator sets. See notes at the end of the load tables.

3. In addition to changes given in Item 1, the following changes apply only to 1EGS*EG1B loading:

   a. Deleted pump 1E12*C003. (See item 1.e)

   b. RHR C is tripped manually by the operator after 2.0 hr of operation after LOCA, depending upon the combinations of the available diesel generator sets. See load tables and the applicable notes.

   c. Control building HVAC shall operate on diesel generator 1EGS*EG1A or 1EGS*EG1B, depending upon the combination of the available diesel generator sets. See load tables and the applicable notes.

Standby Service Water System Changes

1. Deleted 1SWP*2C from diesel generator 1EGS*EG1A and assigned to 1E22*S004 bus.

2. Deleted 1SWP*MOV40C from motor control center (MCC) 1EHS*MCC16A and assigned to MCC 1E22*S002.

3. Deleted 1HVY*FN1C from MCC 1EHS*MCC16A and assigned to MCC 1E22*MCCS002.

4. Added one MOV to isolate spent fuel pool heat exchanger 1SFC*E1A. This MOV is tentatively assigned to 1EHS*MCC2A.

5. In order to comply with Appendix R requirements, capability to operate HPCS diesel generator system SWP*P2C and its associated discharge valve, pump room vent fan, generator room vent fan, etc, will be provided on Division III switchgear or control panels.

HPCS Preoperational Testing

Pursuant to recent discussions with your Staff which denied our request for deviations from Regulatory Guide 1.108, enclosed are revisions to our letter of November 29, 1984 on this subject. GSU still considers the overload testing and the number of required preoperational start tests to be excessive, unnecessary and possibly detrimental to diesel generators, and will pursue relaxation of periodic testing in the future.

TABLE 1.8-1 (Cont)

5 3. Paragraph C.3.b - Regulatory Guide 1.16 is addressed in a separate compliance statement.

FSAR Sections - 8.3.1, 14.2.12

For the standby diesel generators,

3. Paragraph C.2.a(3) - Exception is taken to performance of the overload test since the diesel generators will not be operated above their rated load.

4. Paragraph C.2.a(9) - The on-site preoperational reliability tests required by this section were performed with the exception that the standby diesel generators were subjected to two (2) fast starts and ten (10) modified starts as discussed in Section 8.3.1.1.5.2.

is designed to operate automatically for at least 10 min without any actions required by the main control room operator. Once initiated, the LPCI logic seals in and can be reset by the main control room operator only when initiating conditions return to normal.

Reactor vessel water level (trip level 1) is monitored by two redundant differential pressure transmitters. Drywell pressure is monitored by two redundant pressure transmitters.

Additionally, a reactor low pressure permissive is provided in one-out-of-two twice logic before the injection valves are to be signaled open. Manual initiation of the LPCS is provided, which bypasses the initiation logic except that
11 the reactor low pressure permissive must be present to open the injection valves. Reactor pressure is monitored by eight pressure sensors, four per division, mounted on racks in the reactor building. Division I provides the interlocks for the LPCI A loop; Division II provides the interlocks for the LPCI B and LPCI C loops.

To initiate the Division II LPCI (Loops B and C), the vessel level trip unit relay contacts and the two drywell pressure trip unit relay contacts are connected in a one-out-of-two twice arrangement so that no single instrument failure can prevent initiation of LPCI.

The Division I LPCI (Loop A) receives its initiation signal from the LPCS logic.

The LPCI system components respond to an automatic initiation signal simultaneously (or sequentially as noted), as follows (the Loop A components are controlled from the Division I logic; the Loop B and C components are controlled from the Division II logic):

1. The Division II diesel generator is signaled to start from the Loop B and C initiation logic.

2. If normal auxiliary (offsite) power is available at the pump motor buses the LPCI Loop A, B, and C pumps are signaled to start. If offsite power is not available and the diesel generators are providing power to the pump motor buses, sequential loading of the diesel generators is required. This
7 is accomplished by delaying the start of the LPCI pumps A and B by [illegible] sec while allowing the LPCS and LPCI C pumps to start ~~immediately.~~ 2 seconds after closing of their associated diesel generator air circuit breaker.

2. System Operation

Schematic arrangements of system mechanical equipment and operator information displays are shown in Fig. 9.2.1a through 9.2-1d. The SSW system component control logic is shown in Fig. 7.3-11. Instrument location drawings and elementary diagrams are identified in Section 1.7.

The SSW system consists of two redundant mechanical systems. Each system consists of two 50-percent capacity service water pumps with associated valves and standby cooling tower fans. The SSW system is divided into two independent piping loops with manual crossover capability between the loops. INSERT 1

Automatic initiation of the SSW system occurs when the normal service water system pressure or the reactor plant component cooling water (RPCCW) system pressure drops below preset values. The initiation signal also activates the SSW system recorders in the main control room. These recorders monitor the following parameters:

1. SSW supply and return flow
2. SSW header pressure and standby cooling tower level.

Loss of RPCCW system pressure automatically isolates all lines serving safety-related equipment from the RPCCW system. ~~and, instead, allows the SSW system to provide the necessary cooling.~~

A LOCA condition with adequate RPCCW system pressure allows the RPCCW system to supply cooling water to the following pumps and coolers:

1. RHR pumps
2. Fuel pool coolers
3. RWCU pump seal and motor bearing coolers
4. Control rod drive pump coolers. 15

The remaining equipment serviced by the RPCCW system is isolated.

~~A LOCA condition and~~ Low RPCCW system pressure automatically isolates all lines served by the RPCCW system and, instead, allows the SSW system to provide cooling water to the following equipment:

1. RHR pumps

Insert 1 (Page 7.3-25)

One of the redundant mechanical SSW systems contains electrical Division I (1SWP*P2A) and Division III (1SWP*P2C) pumps. The other mechanical SSW system includes Division II pumps (1SWP*P2B, D). Standby cooling tower fans are divided between electrical Divisions I and II only.

7.3.1.1.12 Diesel Generator Building Ventilation System

1. System Function

The purpose of the diesel generator building ventilation system is to prevent the temperature of the air inside each diesel generator room from exceeding 122°F when the diesel generator is in operation and the outdoor temperature is 96°F.

The instrumentation requirements for this system are contained in Section 9.4.5.5.

2. System Operation

Schematic arrangements of system mechanical equipment and operator information displays are shown in Fig. 9.4-5. The diesel generator building ventilation system component control logic is shown in Fig. 7.3-18. Instrument location drawings and elementary diagrams are identified in Section 1.7.

The ~~Each~~ diesel generator room ventilation system is described in Section 9.4.5.2.2. consists of a normal and an emergency ventilating system. Normal ventilation for each room is supplied by an exhaust fan. Two full capacity redundant exhaust fans are provided for each room. One fan is the emergency exhaust fan and the other fan is the emergency standby exhaust fan. Initiation of the emergency exhaust fan occurs automatically when the diesel generator is running or the ambient room temperature exceeds 110°F. Initiation of the emergency standby exhaust fan occurs automatically if the emergency exhaust fan fails to run when required. Status lights in the diesel generator control room indicate the motor-driven fans which are energized. Inoperability status lights are located in the main control room.

7.3.1.1.13 SSW Pump House Ventilation System

1. System Function

The purposes of the SSW pump house ventilation system are as follows:

1. To prevent the temperature of the air inside the pump rooms from exceeding 122°F when the equipment is in operation and the outdoor temperature is 96°F.

2. To ensure adequate air flow in the switchgear rooms.

The instrumentation requirements for this system are contained in Section 9.4.5.5.

2. System Operation

Schematic arrangements of system mechanical equipment and operator information displays are shown in Fig. 9.4-6b. The SSW pump house ventilation system component control logic is shown in Fig. 7.3-19. Instrument location drawings and elementary diagrams are identified in Section 1.7.

The SSW pump house ventilation system consists of two full capacity fans for each pump room. ~~(A and B)~~. Pump rooms A and B contain Divisions I ~~and II~~ ,II and III equipment, ~~respectively~~. Initiation of the operating fan occurs automatically when the ambient room temperature exceeds 110°F.

The SSW pump house ventilation system also includes two full capacity redundant fans in each switchgear room (A and B). Initiation of the switchgear room standby fan occurs automatically on operating fan failure.

Status lights for the motor-driven fans are provided in the main control room.

7.3.1.1.14 Auxiliary Building Ventilation System

1. System Function

The purpose of the auxiliary building ventilation system instrumentation and controls is to prevent the temperature of the air inside each area from exceeding 122°F when the equipment inside the area is in operation and the outdoor temperature is 96°F.

The instrumentation requirements for the auxiliary building ventilation system are contained in Section 9.4.3.5.

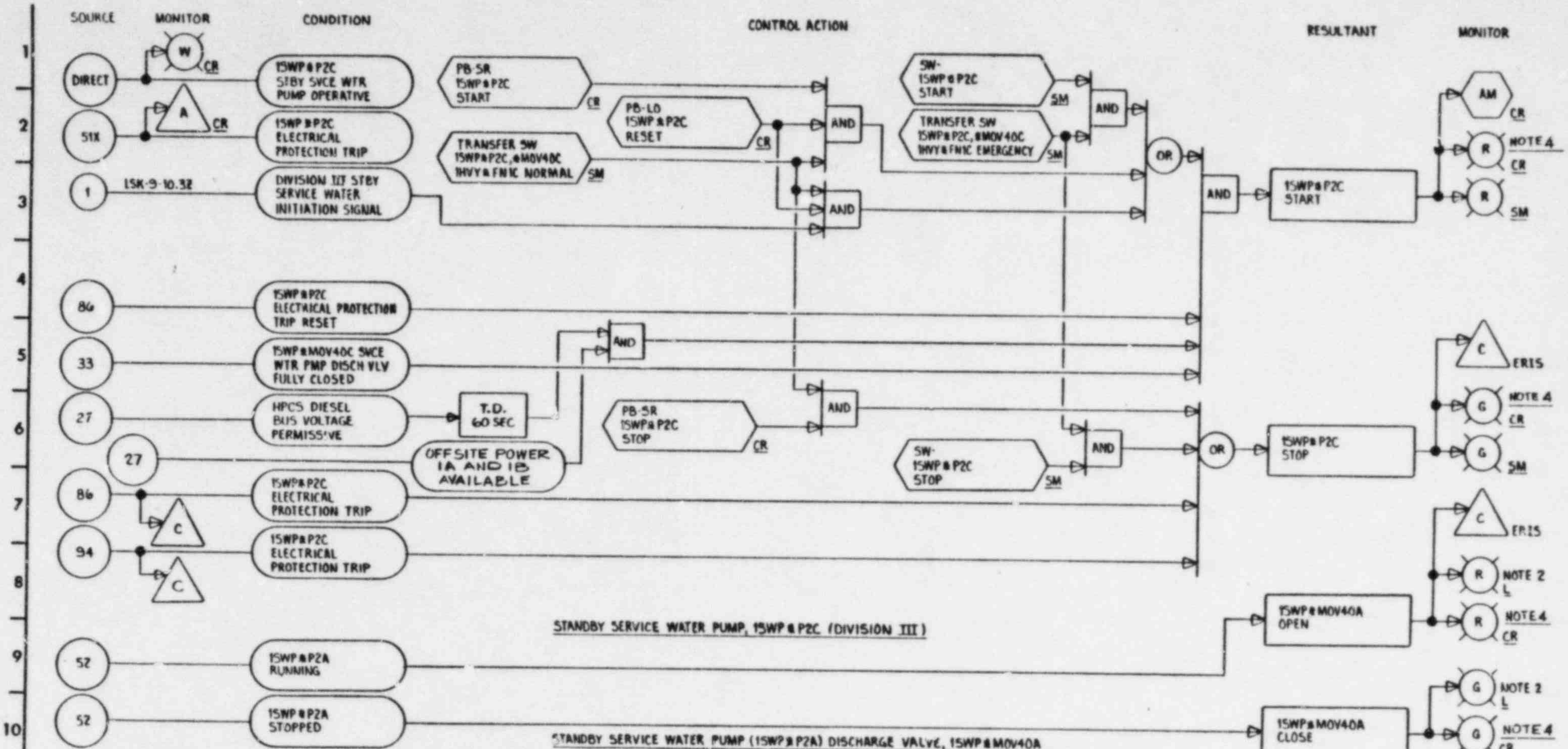
2. System Operation

Schematic arrangements of system mechanical equipment and operator information displays are shown in Fig. 9.4-7a through 9.4-7c. The auxiliary building ventilation system component control logic is shown in Fig. 7.3-20. Instrument location drawings and elementary diagrams are identified in Section 1.7.

FSAR Figure 7.3-11 Sheets 3, 5, 6, 8, 9 & 11

will be updated to reflect the attached LSK's.

9-10.3C, E, F, H, J, & L (respectively)



NOTES:

1. CONTROL OF DIVISION I STANDBY SERVICE WATER PUMP (1SWP*P2A) DISCHARGE VALVE, 1SWP*MOV40A IS SHOWN. CONTROL OF THE FOLLOWING STANDBY SERVICE WATER PUMP DISCHARGE VALVES IS SIMILAR:

   DIVISION II
   1SWP*MOV40B (FOR 1SWP*P2B)
   1SWP*MOV40D (FOR 1SWP*P2D)

   DIVISION III
   1SWP*MOV40C (FOR 1SWP*P2C)

2. RSS (REMOTE SHUTDOWN PANEL) PILOT LIGHTS, 1SWP*MOV40A ONLY.
   4KV SWITCHGEAR PANEL PILOT LIGHTS, 1SWP*MOV40C ONLY.
3. REFER TO NOTE 5 ON LSK-9-10.3A FOR SETPOINTS.
4. MAIN CONTROL ROOM INDICATING LIGHTS DISABLED WHEN TRANSFER SWITCH IS IN EMERGENCY POSITION.

NUCLEAR SAFETY RELATED
QA CAT I, II

LOGIC DIAGRAM
SERVICE WATER-STANDBY
RIVER BEND STATION-UNIT I
GULF STATES UTILITIES COMPANY
STONE & WEBSTER ENGINEERING CORPORATION

12210-LSK-9-10.3C

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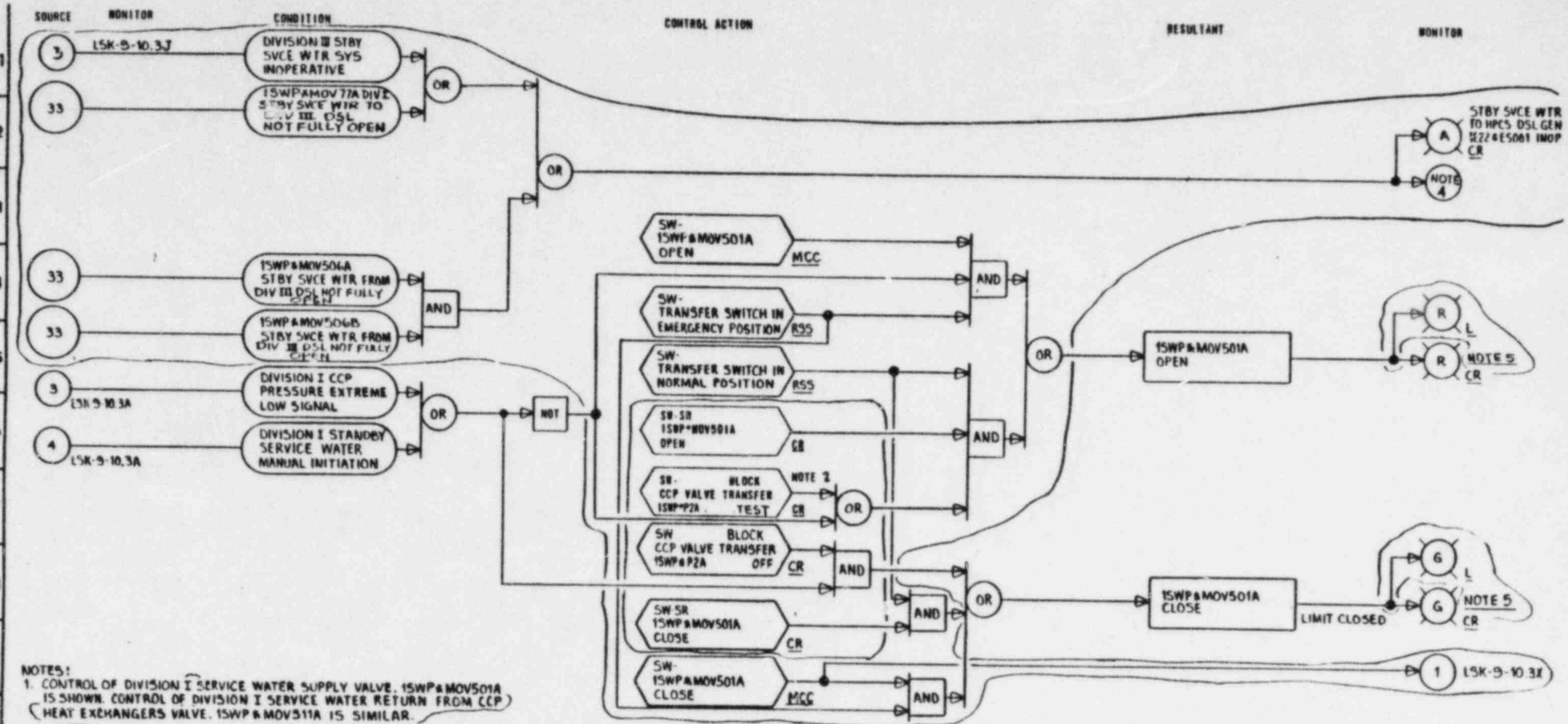

DIVISION I STANDBY SERVICE WATER INLET VALVE TO CCP HEAT EXCHANGERS, 1SWP*MOV501A

NOTES:

1. CONTROL OF DIVISION I SERVICE WATER SUPPLY VALVE, 1SWP*MOV501A IS SHOWN. CONTROL OF DIVISION I SERVICE WATER RETURN FROM CCP HEAT EXCHANGERS VALVE, 1SWP*MOV511A IS SIMILAR.
2. SEE LSK-9-1C (G, FOR ADDITIONAL SWITCH DEVELOPMENTS.
3. REFER TO NOTE 5 ON LSK-9-10.3A, FOR SETPOINTS.
4. THIS OUTPUT GOES TO GE FCD (E22-1040) DWG 152D8167 SH 3 SWEC FILE NO 0221.414-000-036.
5. MAIN CONTROL ROOM INDICATION IS DISABLED WHEN TRANSFER SWITCH IS IN EMERGENCY POSITION.

NUCLEAR SAFETY RELATED
QA CAT I

LOGIC DIAGRAM
SERVICE WATER-STANDBY
RIVER BEND STATION - UNIT 1
GULF STATES UTILITIES COMPANY
STONE & WEBSTER ENGINEERING CORPORATION

12210-LSK-9-10.3E

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				11-3-84	8-1-84	NO CHANGE 3-4-83	2-26-82	NO CHANGE 9/14/79	10/19/78	3/29/78	CRF 6-30-77	FREEZE 1/17/77	4/21/75	9-18-74

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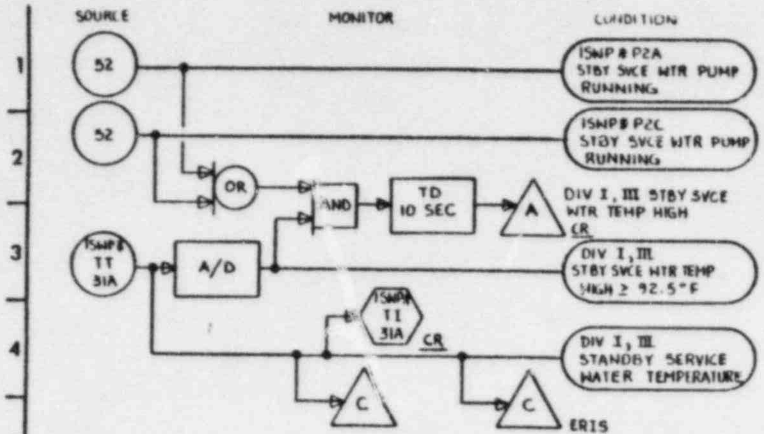

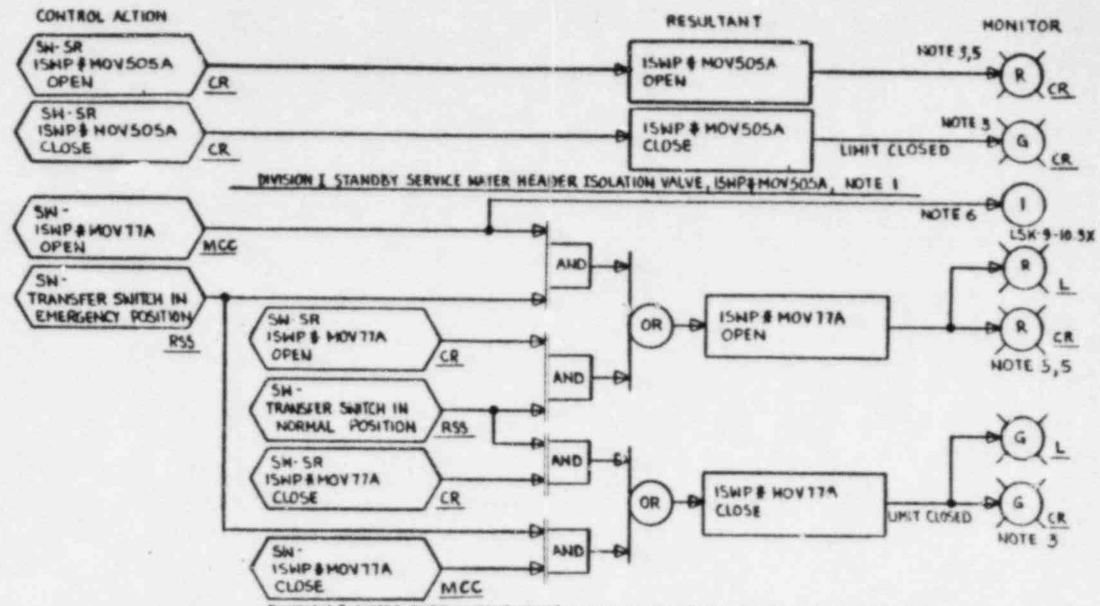

NOTES:

1. THE DIVISION I STANDBY SERVICE WATER HEADER ISOLATION VALVE, ISWP # MOV505A IS SHOWN. CONTROL OF THE FOLLOWING VALVES IS SIMILAR:

	DIVISION I	DIVISION II
STANDBY SERVICE WATER HEADER ISOLATION VALVE	ISWP # MOV505A	ISWP # MOV505B
STANDBY SERVICE WATER SUPPLY TO IHVR # UCS	SEE NOTE 2	ISWP # MOV73B
STANDBY SERVICE WATER RETURN TO STANDBY COOLING TOWER NO 2	ISWP # MOV61A	ISWP # MOV61B
STANDBY SERVICE WATER SUPPLY TO AUXILIARY BUILDING UNIT COOLERS	SEE NOTE 2	ISWP # MOV174
STANDBY SERVICE WATER RETURN FROM AUXILIARY BUILDING UNIT COOLERS	↓	ISWP # MOV175
STANDBY SERVICE WATER SUPPLY TO HPCS DIESEL	↓	ISWP # MOV77B
RHR PUMP SEAL SUPPLY VALVE	ISWP # MOV190	—
STANDBY SERVICE WATER ISOL VALVE TO CONTAINMENT AND DRYWELL UNIT COOLERS	SEE NOTE 2	ISWP # MOV507B (TORQUE CLOSE)
STANDBY SERVICE WATER ISOL VALVE FROM CONTAINMENT AND DRYWELL UNIT COOLERS	↓	ISWP # MOV81B (TORQUE CLOSE)

2. THE DIVISION I SERVICE WATER SUPPLY VALVE, ISWP # MOV77A TO DIVISION III STANDBY DIESEL IS SHOWN. CONTROL OF THE FOLLOWING VALVES IS SIMILAR.

	DIVISION I	DIVISION II
STANDBY SERVICE WATER RETURN FROM HPCS DIESEL	ISWP # MOV506B	ISWP # MOV506A
STANDBY SERVICE WATER ISOL VALVE TO CONTAINMENT AND DRYWELL UNIT COOLERS (TORQUE CLOSE)	ISWP # MOV507A	SEE NOTE 1
STANDBY SERVICE WATER ISOL VALVE FROM CONTAINMENT AND DRYWELL UNIT COOLERS (TORQUE CLOSE)	ISWP # MOV81A	↓
STANDBY SERVICE WATER SUPPLY TO IHVR # UCS	ISWP # MOV73A	↓
STANDBY SERVICE WATER RETURN FROM IHVR # UCS	ISWP # MOV74B	ISWP # MOV74A (SEE NOTE 8)
STANDBY SERVICE WATER SUPPLY TO AUXILIARY BUILDING UNIT COOLERS	ISWP # MOV172	SEE NOTE 1
STANDBY SERVICE WATER RETURN FROM AUXILIARY BUILDING UNIT COOLERS	ISWP # MOV171	SEE NOTE 1

NOTES: (CONT'D)

3. FOLLOWING MOV'S HAVE ONE SET OF INDICATING LIGHTS AT TWO DIFFERENT PANELS IN CONTROL ROOM. ISWP # MOV77A & B, # MOV506A & B ON H13 # P601 & H13 # P870 ISWP # MOV171, # MOV172, # MOV173, # MOV174, # MOV73A & B AND # MOV74A & B ON H13 # P863 & H13 # P870 MAIN CONT. RM INDICATION IS DISABLED WHEN TRANSFER SWITCH IN EMERG. POSITION.
4. ASSOCIATED EQUIPMENT IDENTIFICATION NUMBERS:

DIVISION I	DIVISION II
ISWP # TT31A	ISWP # TT31B
ISWP # TI31A	ISWP # TI31B

5. EMERGENCY RESPONSE INFORMATION SYSTEM (ERIS) INPUTS ARE PROVIDED FROM THE FOLLOWING VALVE OPEN SIGNALS:

DIVISION I	DIVISION II
ISWP # MOV507A	ISWP # MOV507B
ISWP # MOV81A	ISWP # MOV81B

6. LOCAL OPEN SWITCH PROVIDES SIGNAL FOR WHITE LIGHT FOR VALVES ISWP # MOV77A, # MOV81A, # MOV507A AND # MOV73A. LOCAL CLOSE SWITCH PROVIDES SIGNAL FOR WHITE LIGHT FOR VALVES ISWP # MOV74B AND # MOV506B.
7. REFER TO NOTE 5 ON LSK-9-10.3A FOR SETPOINTS.
8. TRANSFER SWITCH AND LOCAL CONTROL SWITCH FOR ISWP # MOV74A AND ISWP # MOV506A LOCATED ON RSS2 PANEL.
9. THE POWER ASSIGNMENTS FOR ISWP # MOV506A AND ISWP # MOV506B (NORMALLY OPEN VALVES) ARE OPPOSITE FROM THEIR FLOW PATHS SINCE ISOLATION OF THE FLOW PATH MAY BE REQUIRED DURING LOSS OF THE ASSOCIATED FLOW PATH POWER. ISWP # MOV74A AND B ARE SIMILAR.

NUCLEAR SAFETY RELATED
QA CAT I, II

REDRAWN

LOGIC DIAGRAM
SERVICE WATER - STANDBY
RIVER BEND STATION - UNIT 1
GULF STATES UTILITIES COMPANY
STONE & WEBSTER ENGINEERING CORPORATION

12210- LSK-9-10.5F

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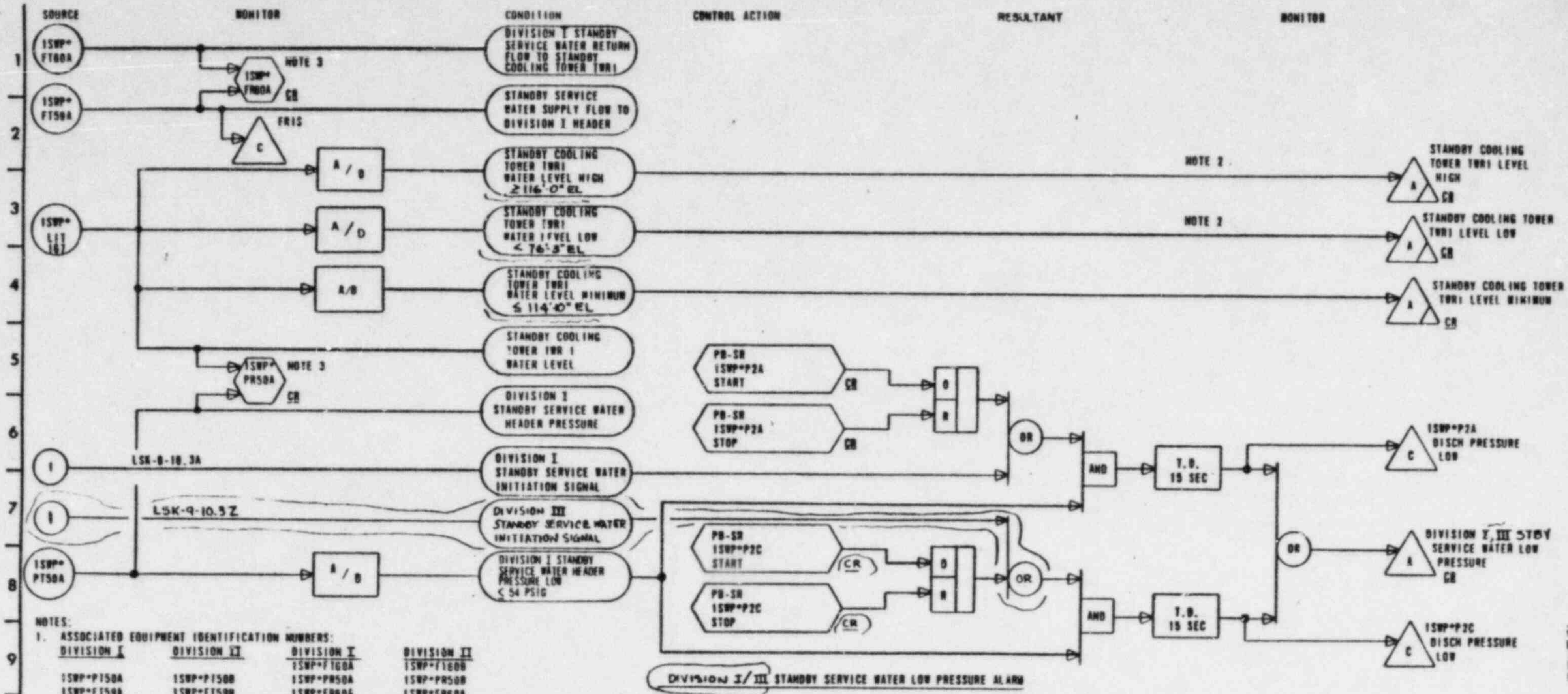

NOTES:

1. ASSOCIATED EQUIPMENT IDENTIFICATION NUMBERS:

DIVISION I	DIVISION II	DIVISION I	DIVISION II
1SWP*PT50A	1SWP*PT50B	1SWP*FT60A	1SWP*FT60B
1SWP*FT59A	1SWP*FT59B	1SWP*PR50A	1SWP*PR50B
		1SWP*FR60A	1SWP*FR60A
		1SWP*LIT187	1SWP*LIT184

2. ALARMS COMMON FOR BOTH DIVISIONS OF STANDBY SERVICE WATER.
3. SEE LSK-9-10.3H FOR FURTHER STANDBY SERVICE WATER RECORDING DETAILS.
4. REFER TO NOTE 5 OF LSK-9-10.3A FOR SETPOINTS.

NUCLEAR SAFETY RELATED
QA CAT I & II

LOGIC DIAGRAM
SERVICE WATER - STANDBY
RIVER BEND STATION - UNIT 1
GULF STATES UTILITIES COMPANY
STONE & WEBSTER ENGINEERING CORPORATION

12210-LSK-9-10.3H

13	12	11	10	9	8	7	6	5	4	3	2	1
		11-30-84	8-7-84	3-4-83	3-26-82	9/14/79	10/19/78 NO CHANGE	3/29/78	6-20-77 CRF	1/17/77 FREEZE	4/21/75	9-18-74

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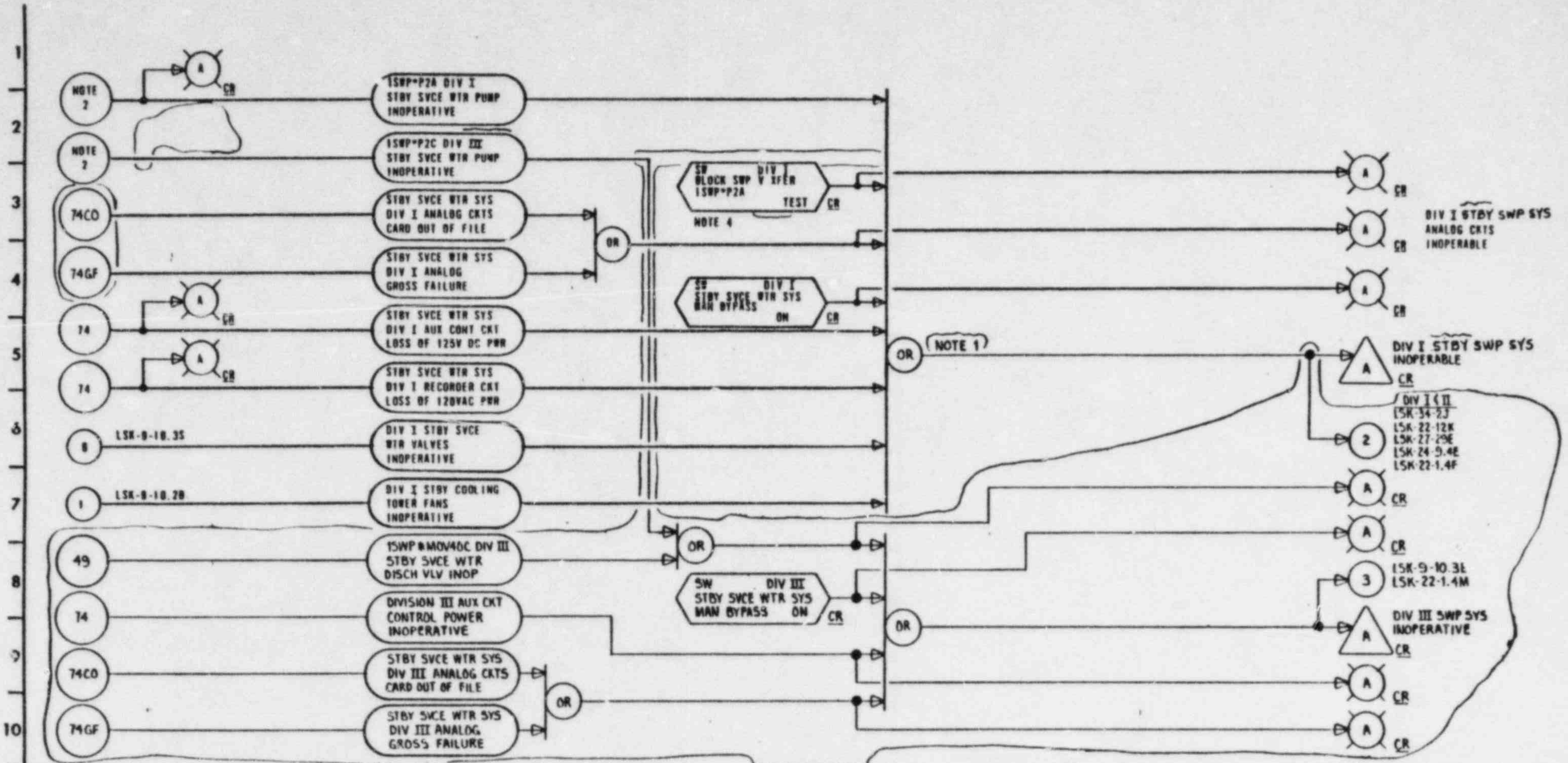

NOTES:

1. DIV I STANDBY SERVICE WATER SYSTEM INOPERABILITY LOGIC IS SHOWN. DIV II IS SIMILAR. (EXCEPT FOR THE FACT THAT DIV II HAS TWO PUMPS. SEE NOTE 3.)
2. SEE LSK-24-7 FOR TYPICAL BREAKER INOPERABILITY LOGIC.
3. ASSOCIATED EQUIPMENT IDENTIFICATION NO:

DIVISION I	DIVISION II
1SWP&P2A	1SWP&P2B
	1SWP&P2D

4. THIS BLOCK TRANSFER SWITCH ALLOWS FOR ROUTINE MAINTENANCE AND TESTING OF DIV I SWP PUMP WITHOUT INITIATING SERVICE WATER VALVE TRANSFER.

NOTES (CONT'D)

5. REFER TO NOTE 5 ON LSK-9-10.3A FOR SETPOINTS.

NUCLEAR SAFETY RELATED
QA CAT I (I-II)

LOGIC DIAGRAM
SERVICE WATER - STANDBY
RIVER BEND STATION - UNIT 1
GULF STATES UTILITIES COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
12210-LSK-9-10.3J

REDRAWN 3-4-83

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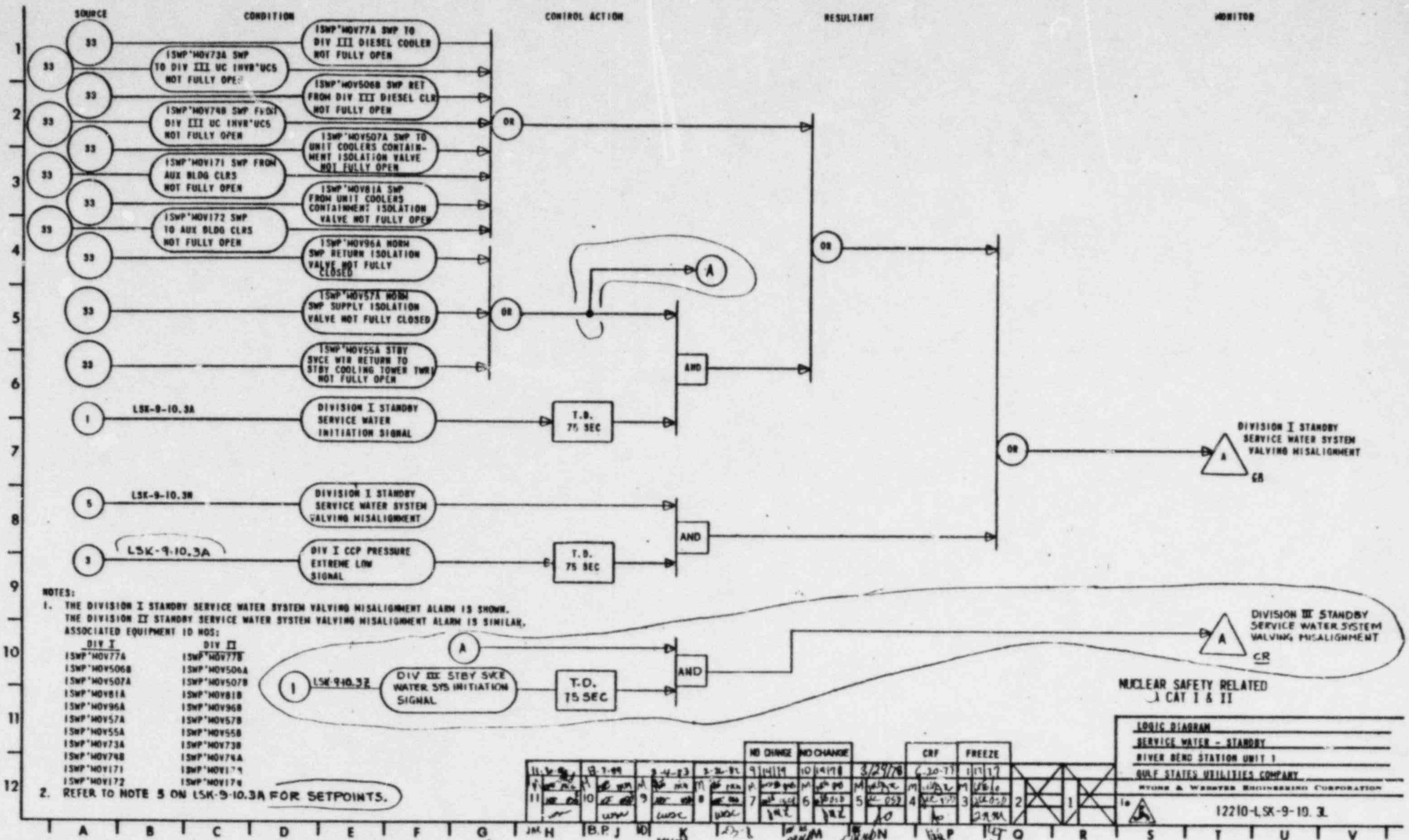

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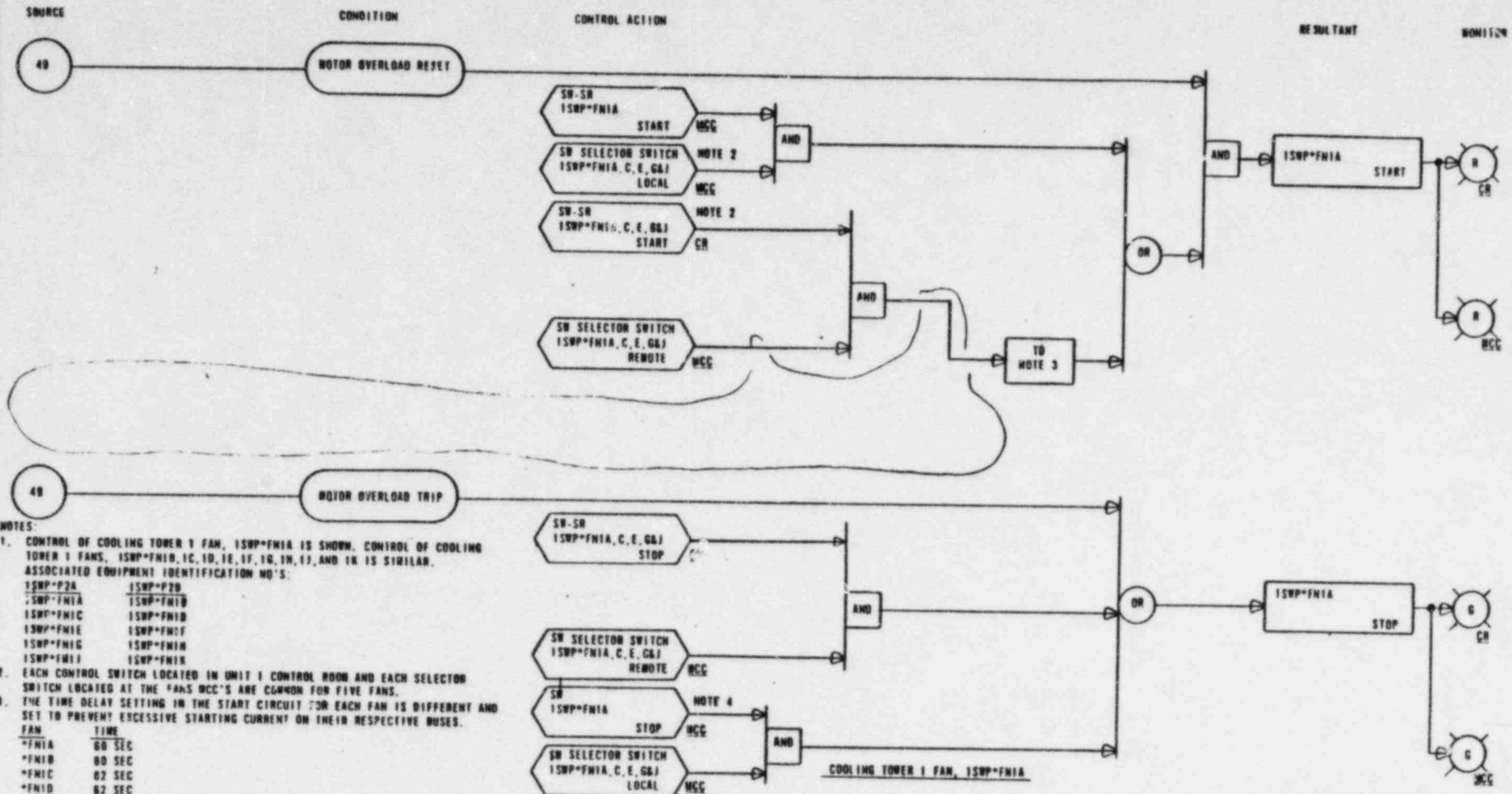
FSAR Figure 7.3-11
Sheet 13

will be updated to reflect the attached LSK's.

9-10.2A



NOTES:

1. CONTROL OF COOLING TOWER 1 FAN, 1SWP*FN1A IS SHOWN. CONTROL OF COOLING TOWER 1 FANS, 1SWP*FN1B, 1C, 1D, 1E, 1F, 1G, 1H, 1J, AND 1K IS SIMILAR. ASSOCIATED EQUIPMENT IDENTIFICATION NO'S:

1SWP*P2A	1SWP*P2B
1SWP*FN1A	1SWP*FN1B
1SWP*FN1C	1SWP*FN1D
1SWP*FN1E	1SWP*FN1F
1SWP*FN1G	1SWP*FN1H
1SWP*FN1J	1SWP*FN1K

2. EACH CONTROL SWITCH LOCATED IN UNIT 1 CONTROL ROOM AND EACH SELECTOR SWITCH LOCATED AT THE FANS MCC'S ARE COMMON FOR FIVE FANS.
3. THE TIME DELAY SETTING IN THE START CIRCUIT FOR EACH FAN IS DIFFERENT AND SET TO PREVENT EXCESSIVE STARTING CURRENT ON THEIR RESPECTIVE BUSES.

FAN	TIME
*FN1A	60 SEC
*FN1B	60 SEC
*FN1C	62 SEC
*FN1D	62 SEC
*FN1E	64 SEC
*FN1F	64 SEC
*FN1G	66 SEC
*FN1H	66 SEC
*FN1J	68 SEC
*FN1K	68 SEC

4. ANY CONTROL SWITCH IN THE GROUP OF 5 FANS WILL STOP ALL FANS IN THE GROUP.
5. SETPOINTS SHOWN ARE FOR UNDERSTANDING PURPOSE. REFER TO SETPOINT CALC FOR ACTUAL VALUES.

NUCLEAR SAFETY RELATED
QA CAT I

LOGIC DIAGRAM - STANDBY SERVICE WATER
STANDBY COOLING TOWER FANS
RIVER BEND STATION - UNIT 1
GULF STATES UTILITIES COMPANY
STONE & WEBSTER ENGINEERING CORPORATION

12210-LSK-9-10.2A

A B C D E F G H J K L M N P Q R S T U V

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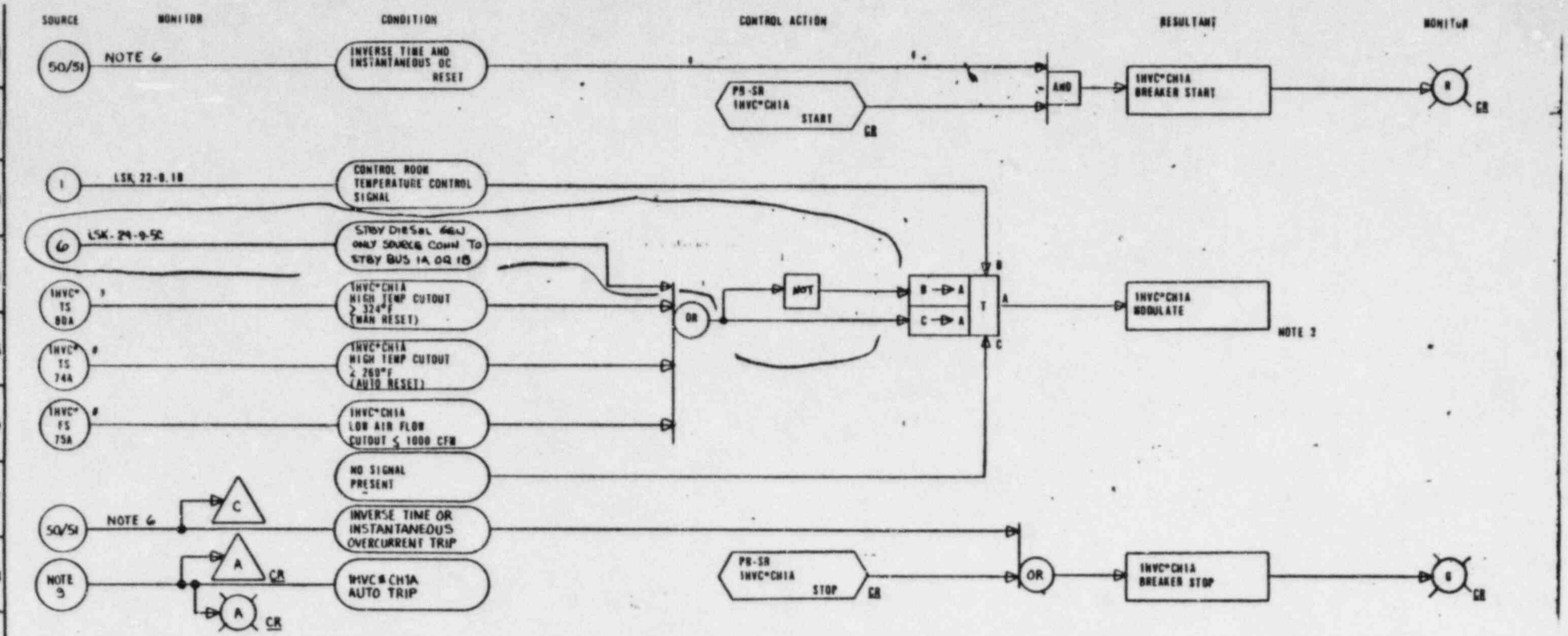
FSAR Figure 7.3-12
Sheet 3

will be updated to reflect the attached LSK's.

22-9.1C



NOTES:

1. CONTROL OF CONTROL ROOM AIR CONDITIONING UNIT (1HVC*ACU1A) HEATER, 1HVC*CH1A IS SHOWN. CONTROL OF CONTROL ROOM AIR CONDITIONING UNIT (1HVC*ACU1B) HEATER 1HVC*CH1B IS SIMILAR.
2. HEATER IS MODULATED BY SCR CONTROLLER. SCR CONTROLLER HAS ITS OWN LOCAL PILOT LIGHTS FOR HEATER STATUS.
3. (#) DENOTES EQUIPMENT SUPPLIED BY HEATER MANUFACTURER.
4. ASSOCIATED EQUIPMENT IDENTIFICATION NUMBERS:

DIVISION I	DIVISION II
1HVC*CH1A	1HVC*CH1B
1HVC*TS74A	1HVC*TS74B
1HVC*FS75A	1HVC*FS75B
1HVC*TT41A	1HVC*TT41B
1HVC*TS80A	1HVC*TS80B

5. SEE LSK-24-8.2J FOR 1HVC*CH1A BREAKER INOPERATIVE LIGHT.

CONTROL ROOM AIR CONDITIONING UNIT (1HVC*ACU1A) HEATER 1HVC*CH1A

6. THIS IS A SOLID STATE DEVICE WITH A DIRECT ACTING TRIP AND AUTOMATIC LOCKOUT WITH MANUAL RESET FEATURE.
7. SEE LSK-24-10.1 FOR TYPICAL LOAD CENTER INDICATING LIGHTS LOGIC.
8. REFER TO NOTE 7 ON LSK-22-9.1A FOR SETPOINTS.
9. CONTROL PUSHBUTTON IN AFTER START POSITION AND BREAKER TRIPPED.

NUCLEAR SAFETY RELATED
QA CAT I, II

LOGIC DIAGRAM - CONTROL BUILDING AIR CONDITIONING - CONTROL ROOM
RIVER BEND STATION - UNIT 1
GULF STATES UTILITIES COMPANY
STONE & WEBSTER ENGINEERING CORPORATION

REDRAWN

12	11	10	9	8	7	6	5	4	3	2	1
				11-24-80	8-30-81	12-15-81	1-4-82	5/7/81	8/4/79	2/22/78	7-29-75

12210-LSK-22-9.1C

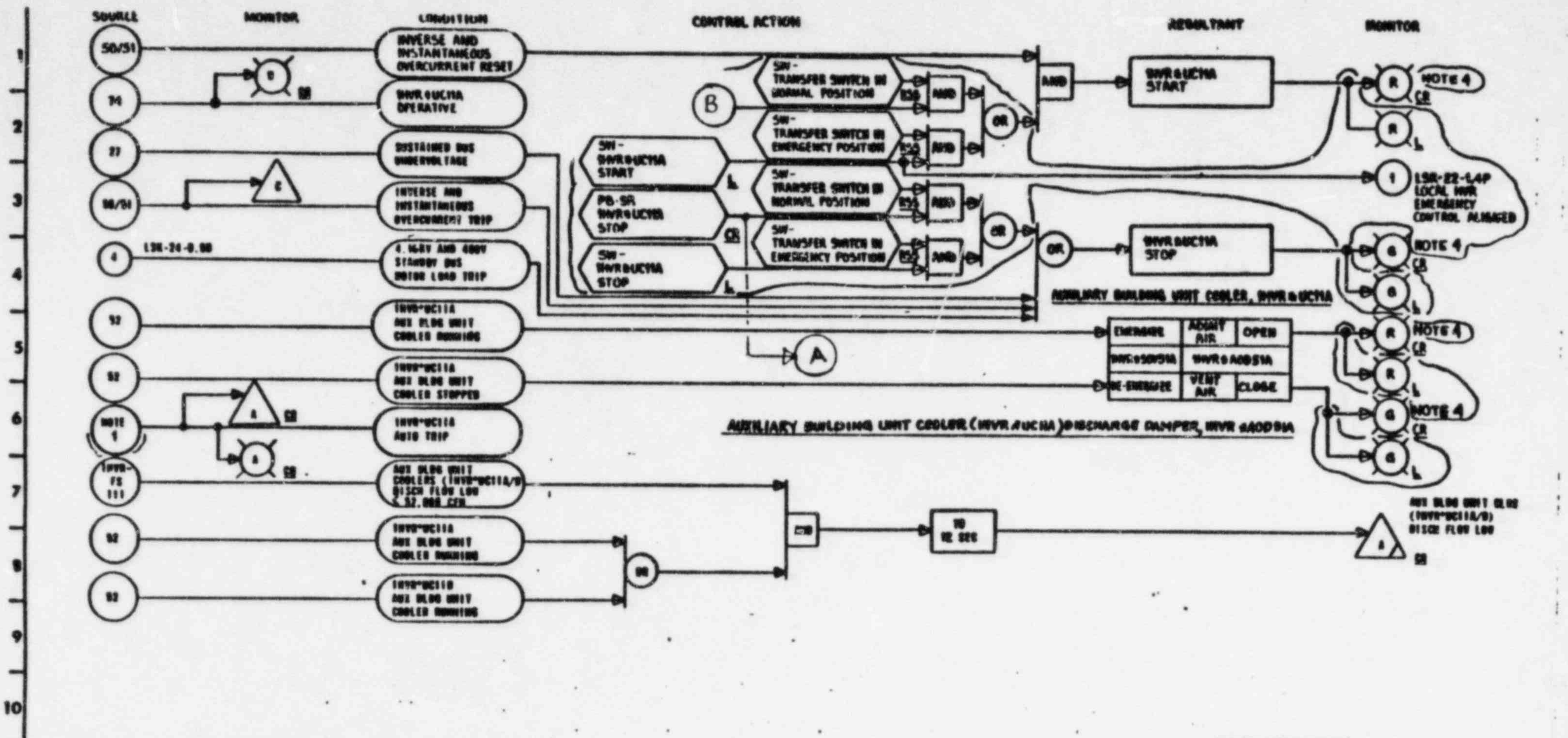
DOCUMENT USER CONSULT E&DCR/N&D LISTING FOR CHANGES

A 9660.8

FSAR Figure 7.3-14
Sheet 5

will be updated to reflect the attached LSK's.

22-1.4E



NOTES:

1. AUTO TRIP: PUSHBUTTON IN AFTER START CONDITION AND BREAKER TRIPPED.
2. SEE LSK-24-10.1 FOR TYPICAL BREAKER CONTROL LOGIC.
3. REFER TO NOTE 5 ON LSK-22-1.4A FOR SETPOINTS.
4. MAIN CONTROL ROOM INDICATION IS ISOLATED WHEN TRANSFER SWITCH IS PLACED IN EMERGENCY POSITION.

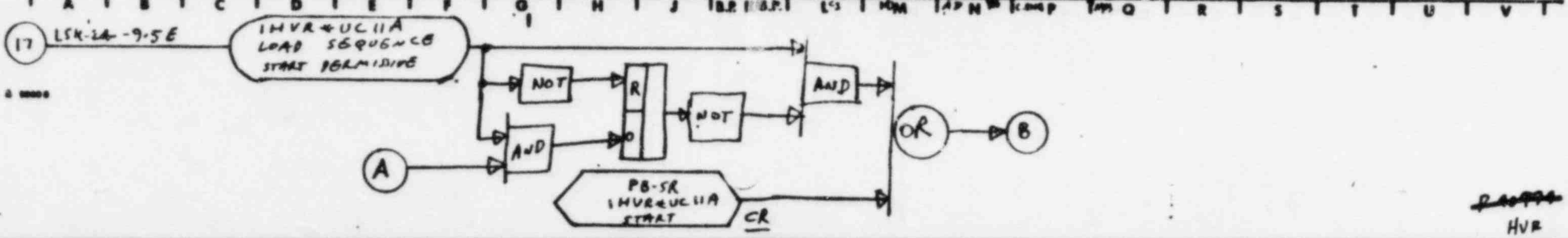
NUCLEAR SAFETY RELATED
QA CAT I & II

DOCUMENT USER CONSULT EADCR/HAD LISTING FOR CHANGES

LOGIC DIAGRAM
AUXILIARY BUILDING VENTILATION
RIVER BEND STATION - UNIT 1
GULF STATES UTILITIES COMPANY
STONE & WEBSTER ENGINEERING CORPORATION

12210-LSK-22-1.4E

A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V

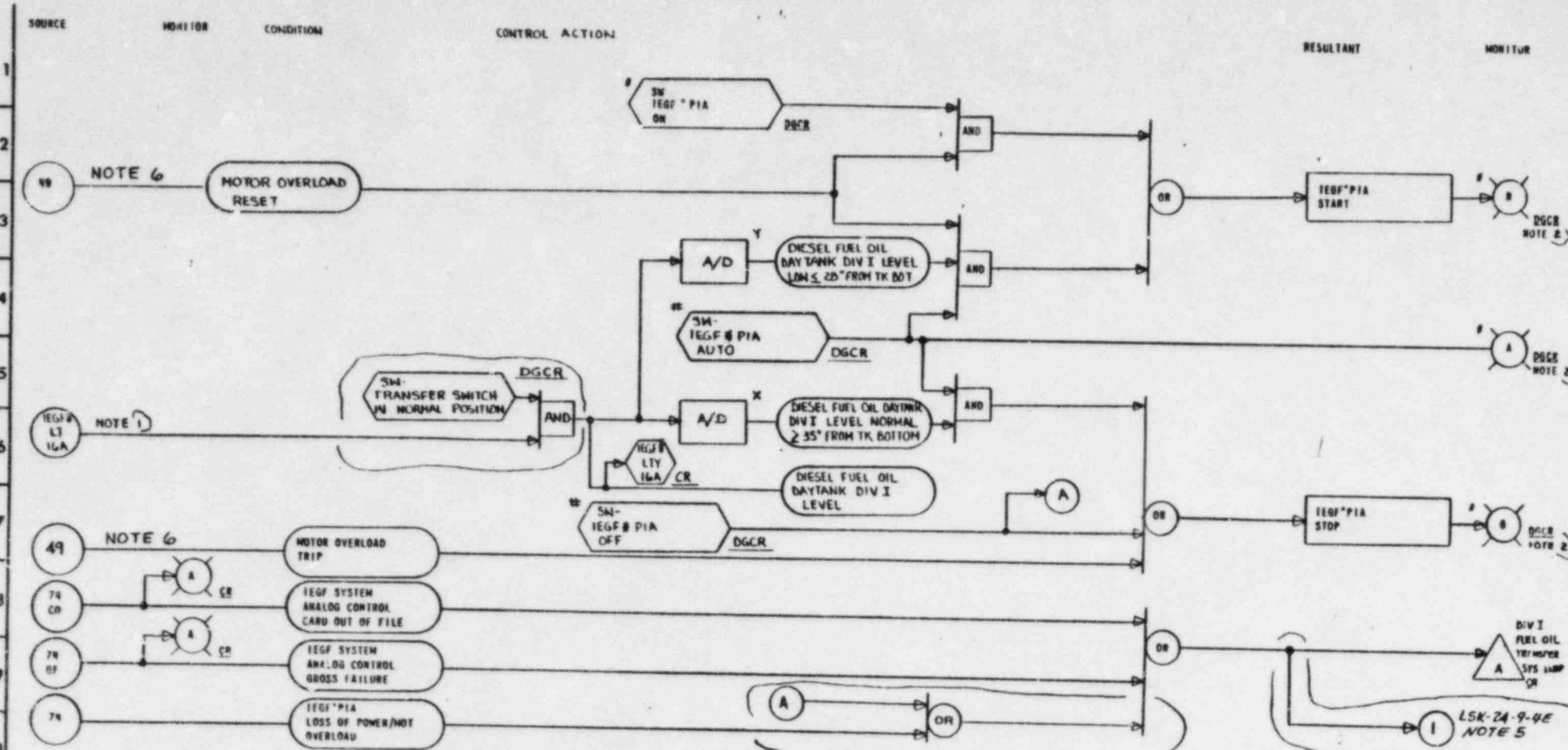


HVR

FSAR Figures 7.3-15
Sheets 1 & 2

will be udated to reflect the attached LSK's.

8-9.2A, B



STANDBY GENERATOR FUEL OIL TRANSFER PUMP (IEGF*PIA) DIVISION I

NOTES:

1. SEE LSK-8-9.2B FOR ADDITIONAL TRANSMITTER LOGIC.
2. # DENOTES STANDBY DIESEL GENERATOR MANUFACTURER SUPPLIED EQUIPMENT FOR DIV I.
3. SETPOINTS ARE FOR UNDERSTANDING PURPOSE. REFER TO SETPOINT CALC FOR ACTUAL VALUES.
4. LOGIC FOR DIVISION I DIESEL TRANSFER IS SHOWN. LOGIC FOR DIVISION III IS SIMILAR.

DIVISION I	DIVISION III
IEGF*PIA	IEGF*PIC
IEGF*LT16A	IEGF*LT16C

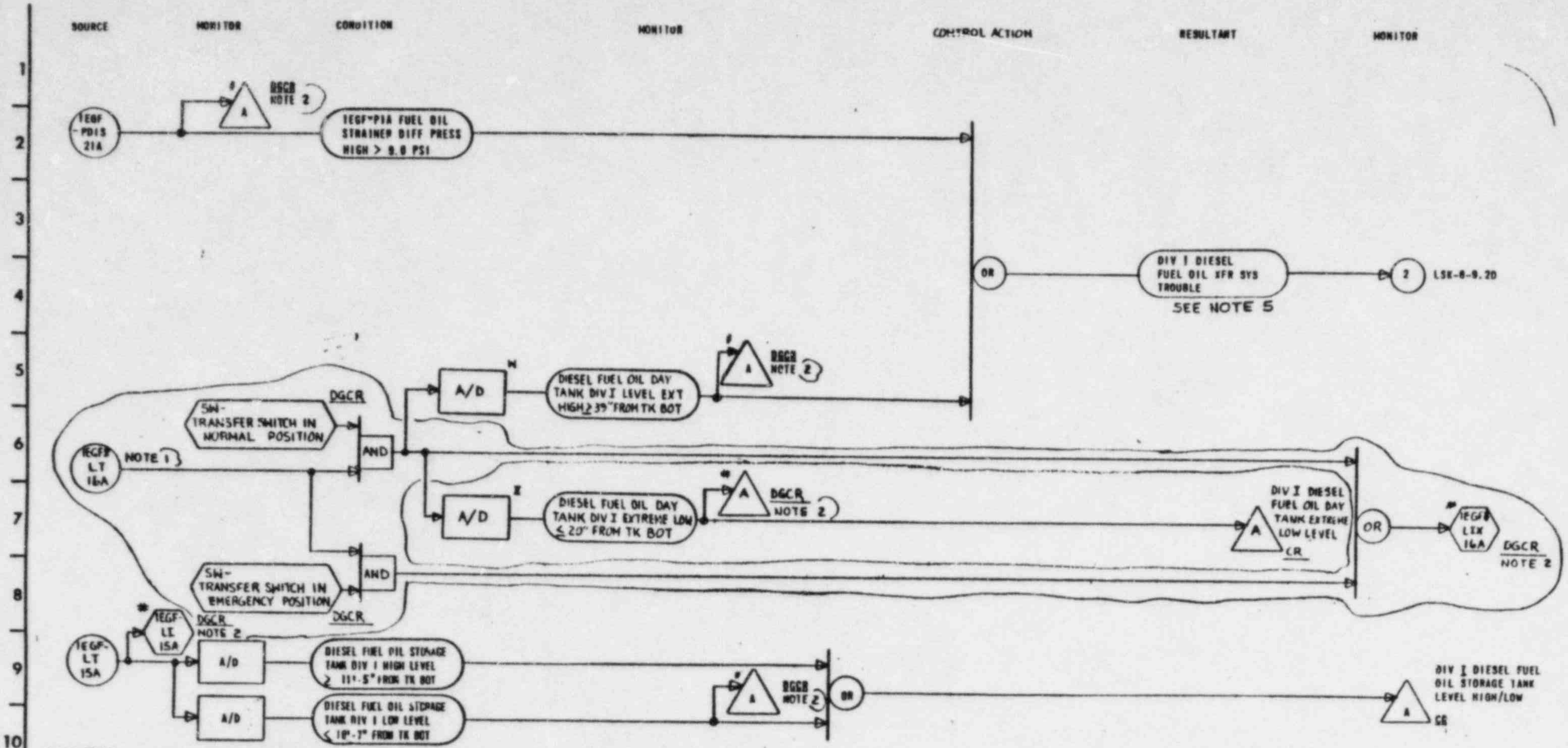
5. THIS OUTPUT FOR DIVISION III GOES TO G.E. FCD (E22-1040) DWG NO. 152D8167 SH3 SWEC FILE NO. 0221.414-000-036.
6. DIVISION III MCC BY G.E.-NED.

DOCUMENT USER CONSULT EADCR/N&D LISTING FOR CHANGES

NUCLEAR SAFETY RELATED QA CAT I, II

STONE & WEBSTER ENGINEERING CORPORATION

12210-LSK-8-9.2A



NOTES:

1. SEE LSK-8-9.2A FOR ADDITIONAL TRANSMITTER LOGIC.
2. * DENOTES STANDBY DIESEL GENERATOR MANUFACTURER SUPPLIED EQUIPMENT FOR DIV I.
3. LOGIC FOR DIVISION I DIESEL TRANSFER IS SHOWN. LOGIC FOR DIVISION III IS SIMILAR.

DIVISION I	DIVISION III
1EGF * PIA	1EGF * PIC
1EGF * LT16A	1EGF * LT16C

4. REFER TO NOTE 3 ON LSK-8-9.2A FOR SETPOINTS.
5. DIV III DIESEL FUEL OIL TRANSFER SYSTEM TROUBLE SIGNAL GOES TO GE-HPCS. SEE GE 828E537AA SH12

DOCUMENT USER CONSULT E&DCR/N&D LISTING FOR CHANGES

NUCLEAR SAFETY RELATED
QA CAT I, II

LOGIC DIAGRAM - STANDBY GENERATOR FUEL - FUEL TRANSFER SYSTEM
RIVER BEND STATION - UNIT 1
GULF STATES UTILITIES COMPANY
STONE & WEBSTER ENGINEERING CORPORATION

				NO CHNG		FREEZE	
8	7	6	5	4	3	2	1
		5-25-83	11-19-81	8/31/79	4/8/78	12/13/75	11-27-73

12210-L SK-8-9.2B

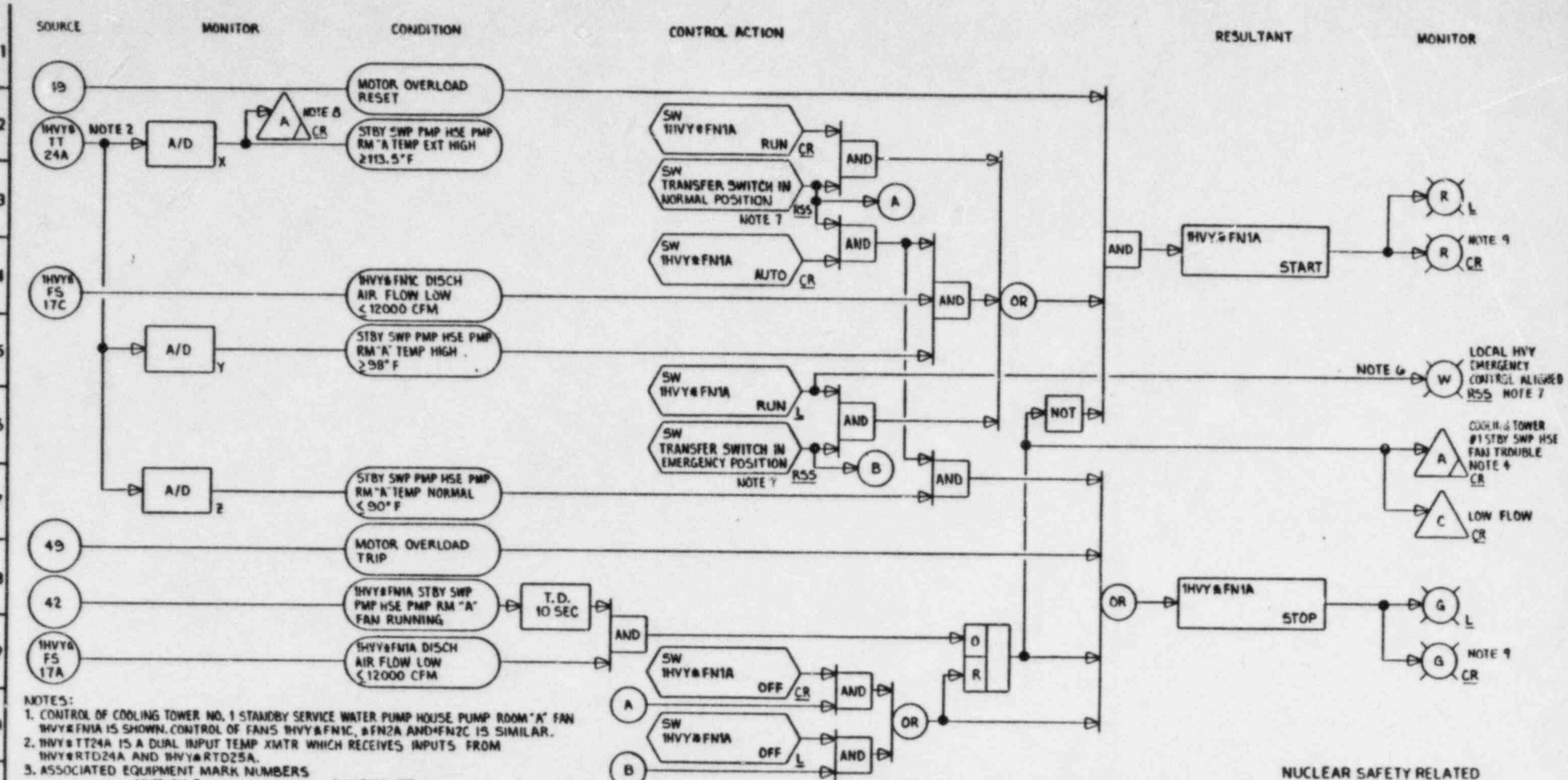
A B C D E F G H J K L M N P Q R S T U V

1 2 3 4 5 6 7 8 9 10 11 12

FSAR Figure 7.3-19
Sheet 1

will be updated to reflect the attached LSK's.

22-8.1A



NOTES:

1. CONTROL OF COOLING TOWER NO. 1 STANDBY SERVICE WATER PUMP HOUSE PUMP ROOM "A" FAN 1HVY*FN1A IS SHOWN. CONTROL OF FANS 1HVY*FN1C, *FN2A AND *FN2C IS SIMILAR.
2. 1HVY*TT24A IS A DUAL INPUT TEMP XMTR WHICH RECEIVES INPUTS FROM 1HVY*RTD24A AND 1HVY*RTD25A.
3. ASSOCIATED EQUIPMENT MARK NUMBERS

DIVISION I			DIVISION III
1HVY*FN1A	1HVY*FN2A	1HVY*FN2C	1HVY*FN1C
1HVY*TT24A	1HVY*TT24A	1HVY*TT24A	1HVY*TT24C
1HVY*FS17A	1HVY*FS21A	1HVY AFS21C	1HVY*FS17E
1HVY*FS17C			1HVY*FS17F

4. COMMON ALARM FOR DIV I, II & III. REFER TO NOTE 4 ON LSK-22-8.1F FOR ADDITIONAL INPUTS.
5. SETPOINTS SHOWN ARE FOR UNDERSTANDING PURPOSE. REFER TO SETPOINT CALC FOR ACTUAL VALUES.
6. COMMON INDICATING LIGHT FOR 1HVY*FN1A, *FN2A AND *FN2C.

STANDBY SERVICE WATER PUMP HOUSE PUMP ROOM "A" FAN, 1HVY*FN1A

NOTES (CONT'D)

7. TRANSFER SWITCH AND WHITE LIGHT FOR 1HVY*FN1C IS LOCATED ON DIV III, 4KV SWGR SEE LSK-9-10.3C FOR ADDITIONAL SWITCH INPUTS.
8. PUMP HOUSE PUMP ROOM A TEMP EXT HIGH ANN IS COMMON FOR DIV I & DIV III.
9. MAIN CONTROL ROOM INDICATION IS DISABLED WHEN TRANSFER SWITCH IS IN EMERGENCY POSITION.

NUCLEAR SAFETY RELATED
QA CAT I, II

LOGIC DIAGRAM
YARD STRUCTURES-VENTILATION
RIVER BEND STATION-UNIT 1
GULF STATES UTILITIES COMPANY
STONE & WEBSTER ENGINEERING CORPORATION

12210-LSK-22-8.1A

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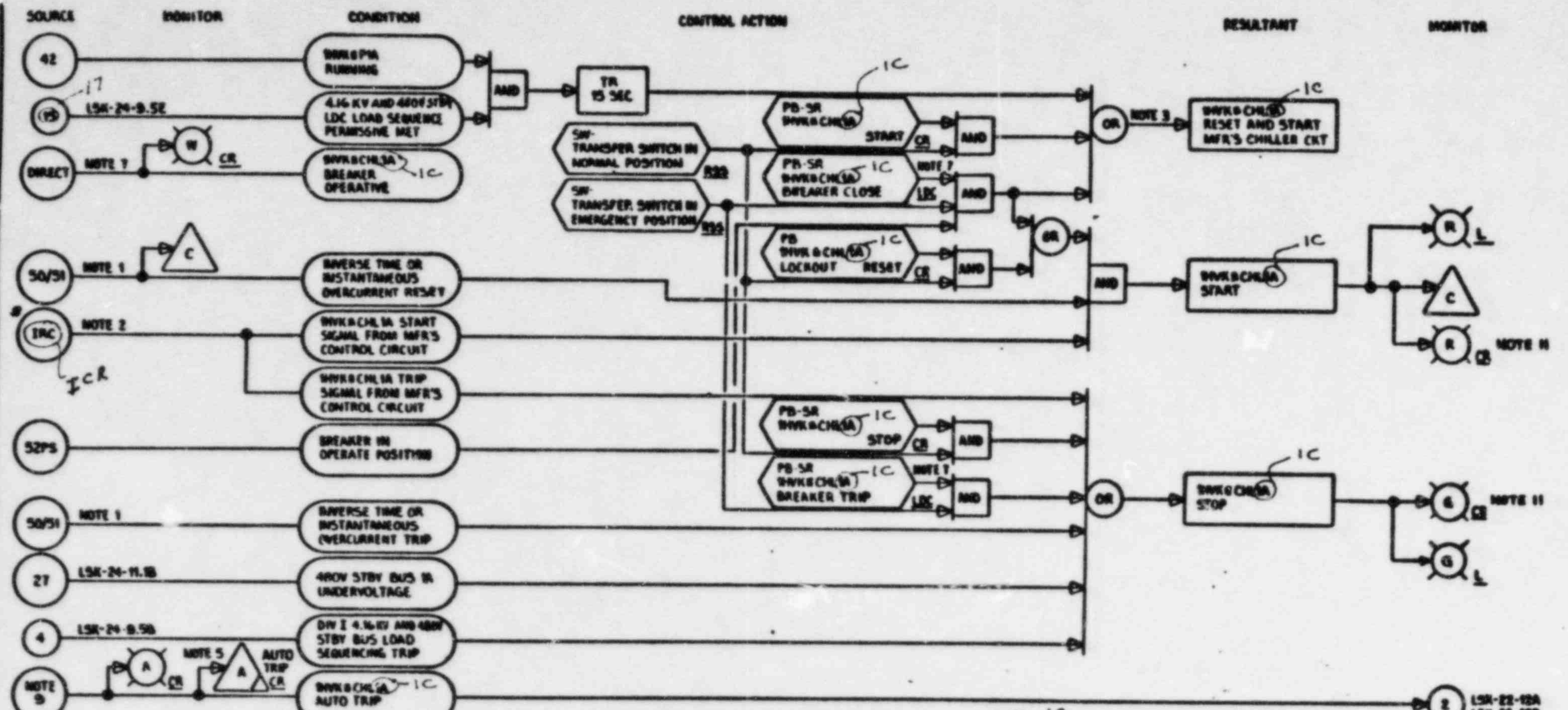
LISTING FOR CHANGES

FSAR Figure 7.3-20
Sheet 4

will be updated to reflect the attached LSK's.

22-1.4D



CONTROL BUILDING CHILLED WATER COMPRESSOR, HVK*CHL1A

NOTES:
1. THIS IS A SOLID STATE DEVICE WITH DIRECT-ACTING TRIP AND AUTOMATIC LOCKOUT WITH MANUAL RESET FEATURE.
2. START OR TRIP SIGNAL IS INTERLOCK WITH MFR'S CONTROL SCHEME (S&W FILE NO. 0216.210-085-008B).
3. RESET AND START SIGNALS INITIATE MFR'S CONTROL SCHEME (REF. NOTE 2).
4. # DENOTES SUPPLIED BY CHILLER COMPRESSOR MANUFACTURER.
5. COMMON AUTO TRIP ALARM WINDOW FOR HVK*CHL1A AND HVK*CHL1C.
6. SEE LSK-24-9.5E FOR LOAD SEQUENCE START SIGNAL.
7. SEE LSK-24-10.1 FOR TYPICAL LOAD CENTER BREAKER LOGIC. "BREAKER CLOSE" AND "BREAKER TRIP" PUSHBUTTON IS THE SAME PUSHBUTTON IDENTIFIED AS "BREAKER TEST CLOSE" AND "BREAKER TEST TRIP" ON LSK-24-10-1.

NOTES (CONT'D)
8. LOGIC FOR MOTOR OVERLOAD CONDITION APPEARS ON LSK-24-11.2.
9. BREAKER IN AFTER CLOSE CONDITION AND BREAKER TRIPPED.
10. REFER TO NOTE 3 ON LSK-22-12A FOR SETPOINTS.
11. MAIN CONTROL ROOM INDICATION IS DISABLED WHEN TRANSFER SWITCH IS IN EMERGENCY POSITION

NUCLEAR SAFETY RELATED
QA CAT I, II

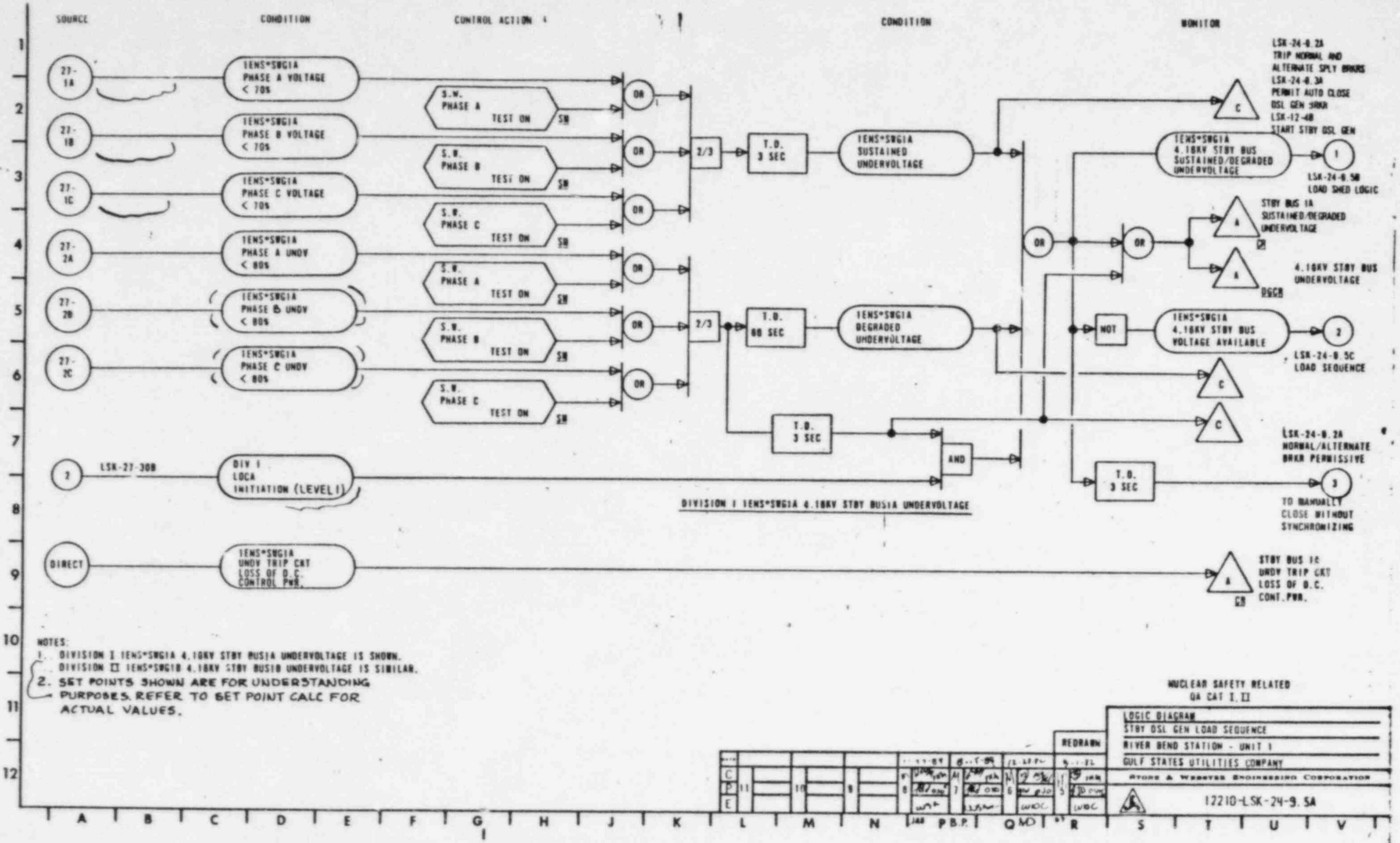
LOGIC DIAGRAM
CONTROL BUILDING CHILLED WATER
RIVER BEND STATION - UNIT 1
GULF STATES UTILITIES COMPANY
STONE & WEBSTER ENGINEERING CORPORATION

12210-LSK-22-12C

FSAR Figure 7.3-23
Sheets 29 thru 38

will be updated to reflect the attached LSK's.

24-9.5A thru F



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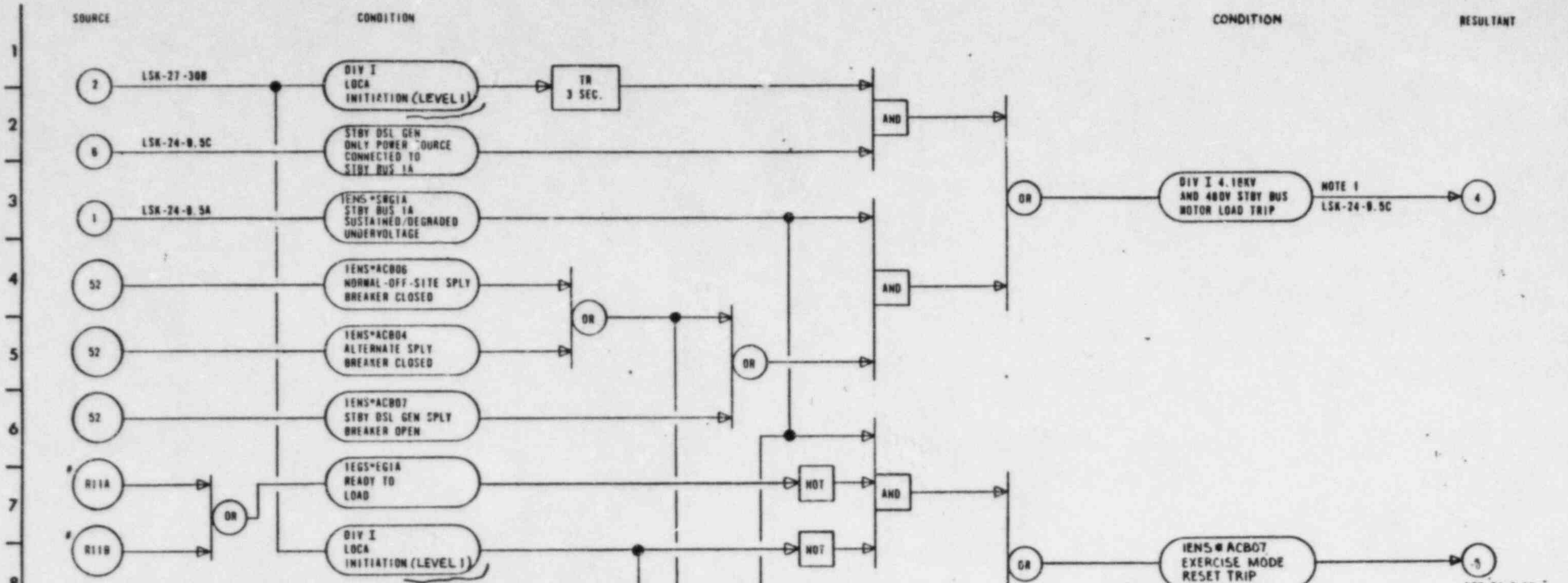
LISTING FOR CHANGES



NOTES:

1. DIVISION I 4.16KV AND 480V STBY BUS MOTOR LOAD TRIP IS SHOWN. DIVISION II 4.16KV AND 480V STBY BUS MOTOR LOAD TRIP IS SIMILAR. THE FOLLOWING LOADS ARE TRIPPED:

DIV I LOAD IDENT.	DIV I REF LOGIC	DIV II LOAD IDENT.	DIV II REF LOGIC
1E71*C001	GE-NEBG DWG. FCD762E294AA	1E12*C002C	GE-NEBG DWG. FCD762E426AA
1E12*C002A	GE-NEBG DWG. FCD762E426AA	1E12*C002B	GE-NEBG DWG. FCD762E426AA
1SWP*P2A	LSK-9-10.3P	1SWP*P2B	LSK-9-10.3P
		1SWP*P2D	LSK-9-10.3AA
1HVC*ACU1A	LSK-22-9.1A	1HVC*ACU1B	LSK-22-9.1A
1HVK*CHL1A	LSK-22-12C	1HVK*CHL1B	LSK-22-12M
1HVK*CHL1C	LSK-22-12D	1HVK*CHL1D	LSK-22-12M
1SFC*P1A	LSK-34-2A	1SFC*P1B	LSK-34-2A
1HVC*ACU2A	LSK-22-9.2A	1HVC*ACU2B	LSK-22-9.2A
1HVP*FN2A	LSK-22-7B	1HVP*FN2B	LSK-22-7B
1HVR*FN11A	LSK-22-1.8A	1HVR*FN11B	LSK-22-1.8A
1HVR*UC11A	LSK-22-1.4E	1HVR*UC11B	LSK-22-1.4M
1GTS*FN1A	LSK-27-15A	1GTS*FN1B	LSK-27-15A
1HVR*UC1A	LSK-22-1.5A	1HVR*UC1B	LSK-22-1.5E
		1HVR*UC1C	LSK-22-1.5B
		1IMS-CHG1D	LSK-24-11.2

2. # - DENOTES BY DSL. GEN. MFG.

DIV I 4.16KV AND 480V STBY BUS MOTOR LOAD TRIP

3. REFER TO NOTE 2 ON LSK-24-9.5A FOR SETPOINTS.

NUCLEAR SAFETY RELATED
QA CAT I, II

LOGIC DIAGRAM
STBY DSL GEN LOAD SEQUENCE
RIVER BEND STATION - UNIT 1
GULF STATES UTILITIES COMPANY
STONE & WEBSTER ENGINEERING CORPORATION

REDRAWN 3-1-82

12210-LSK-24-9.5B

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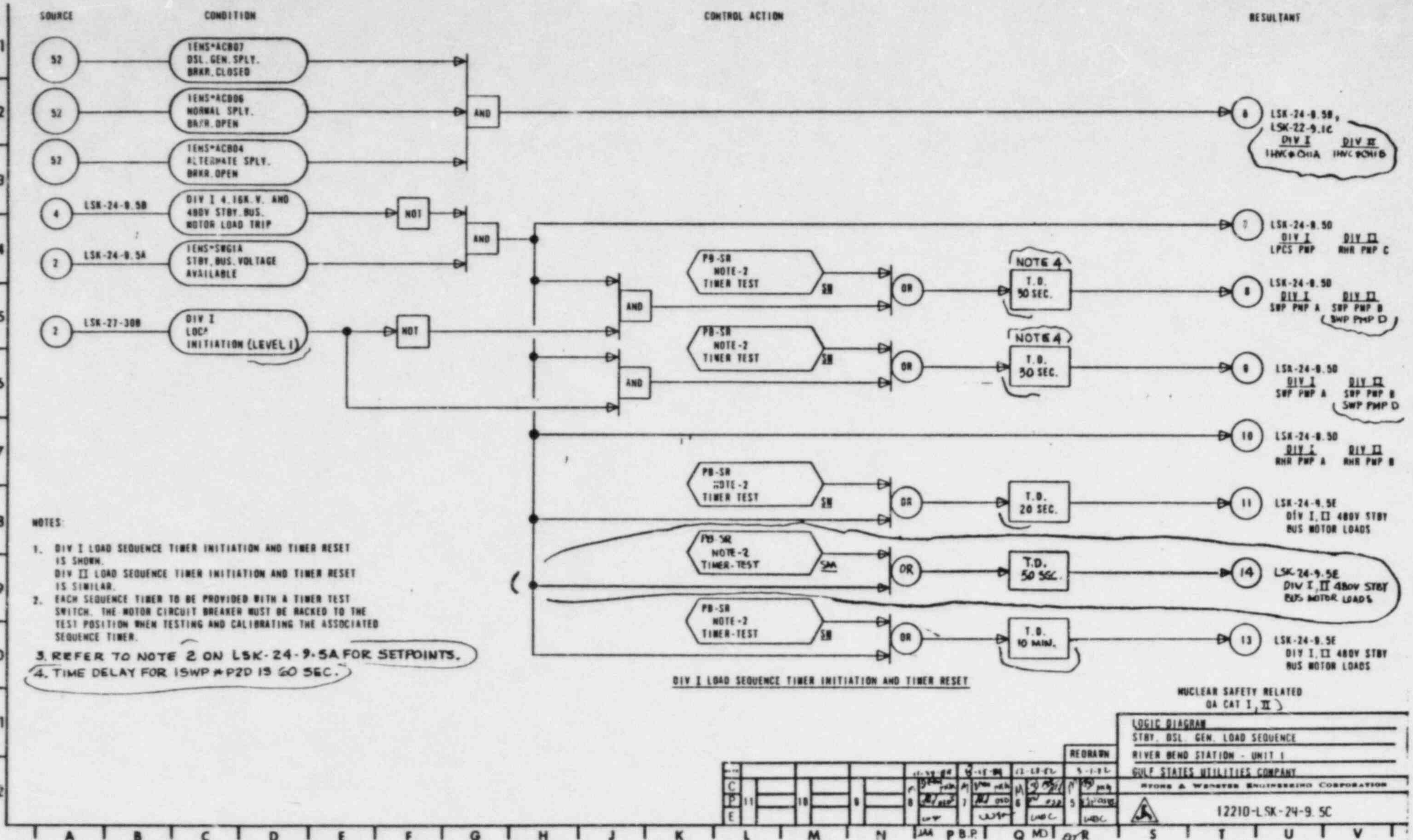

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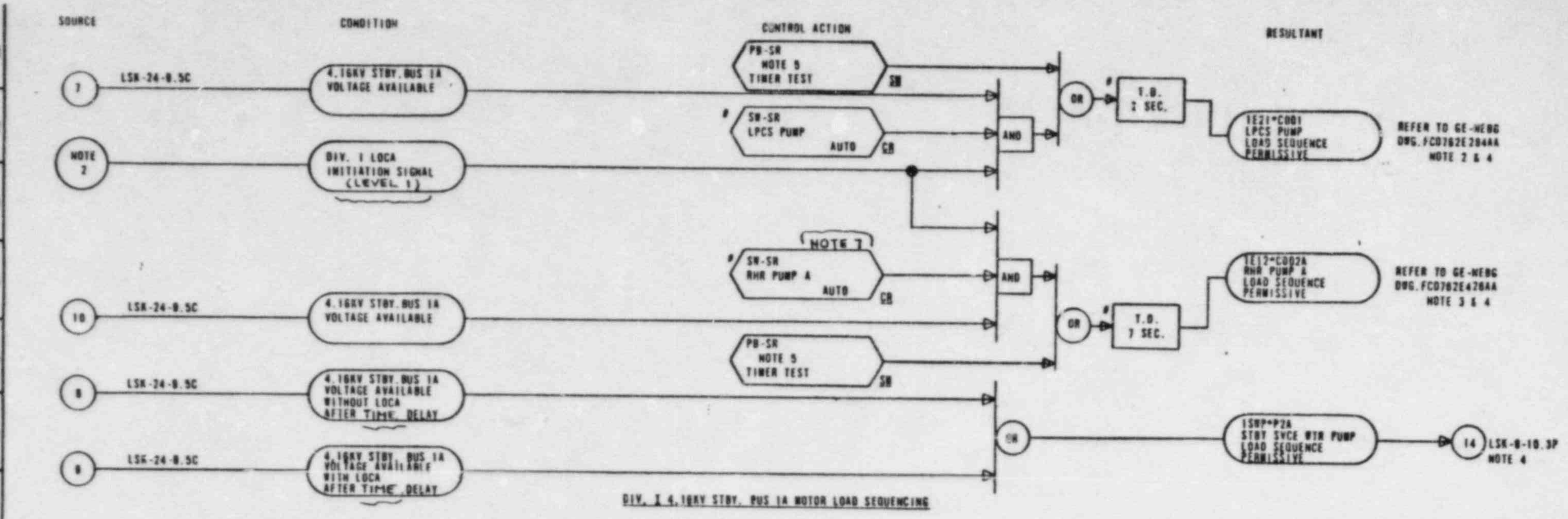


DIV. I 4.16KV STBY. BUS 1A MOTOR LOAD SEQUENCING

NOTES:

1. # DENOTES GE NEBG SUPPLIED EQUIPMENT.
2. THIS LOGIC IS ALSO SHOWN ON GE-NEBG FCD762E294AA.
3. THIS LOGIC IS ALSO SHOWN ON GE-NEBG FCD762E426AA.
4. DIV. I 4.16KV STBY. BUS 1A MOTOR LOAD SEQUENCE PERMISSIVES ARE SHOWN. DIV. II 4.16KV STBY BUS 1B MOTOR LOAD SEQUENCE PERMISSIVES ARE SIMILAR.

ASSOCIATED EQUIPMENT

DIV. I LOAD IDENT.	DIV. I REF. LOGIC	DIV. II LOAD IDENT.	DIV. II REF. LOGIC
1E21*C001	GE NEBG DWG. FCD762E294AA	1E12*C002C	GE NEBG DWG. FCD762E426AA
1E12*C002A	GE NEBG DWG. FCD762E426AA	1E12*C002B	GE NEBG DWG. FCD762E426AA
1SWP*P2A	LSK-8-10.3P	1SWP*P2B, P2D	LSK-8-10.3P, AA

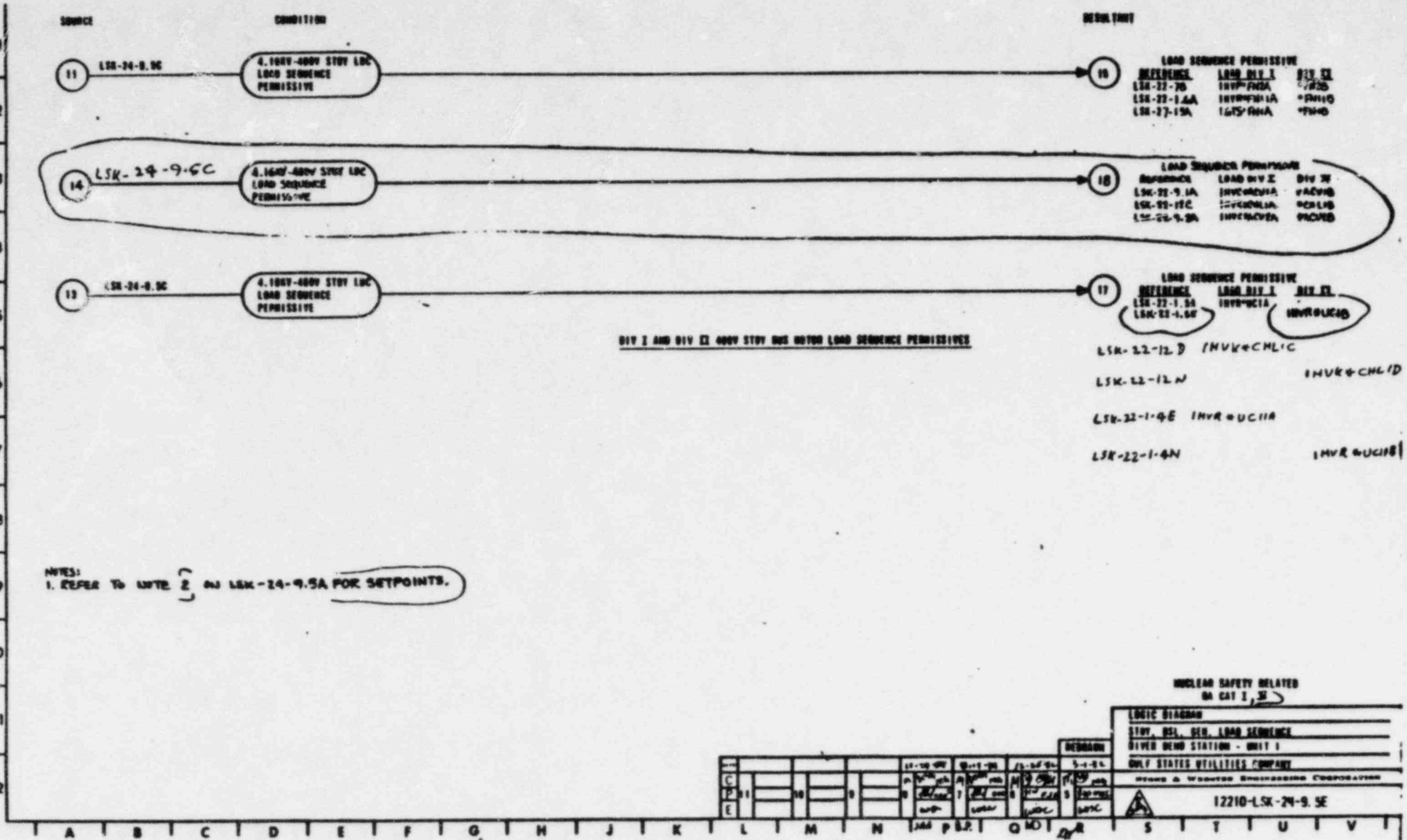
5. REFER TO LSK-24-8.5C NOTE 2.
6. REFER TO NOTE 2 ON LSK-24-9.5A FOR SETPOINTS.
7. RHR PUMP A IN AUTO MEANS CONTROL SWITCH NOT IN START OR STOP POSITION. MAIN CONTROL ROOM ISOLATION OF START AND STOP IS SHOWN ON GE-NEBG FCD762E426AA

NUCLEAR SAFETY RELATED
QA CAT I, II

LOGIC DIAGRAM
STBY. DSL. GEN. LOAD SEQUENCE
RIVER BEND STATION - UNIT 1
GULF STATES UTILITIES COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
12210-LSK-24-9.5D

A B C D E F G H J K L M N P Q R S T U V

DOCUMENT USER
CONSULT E&DCR/N&D
LISTING FOR CHANGES



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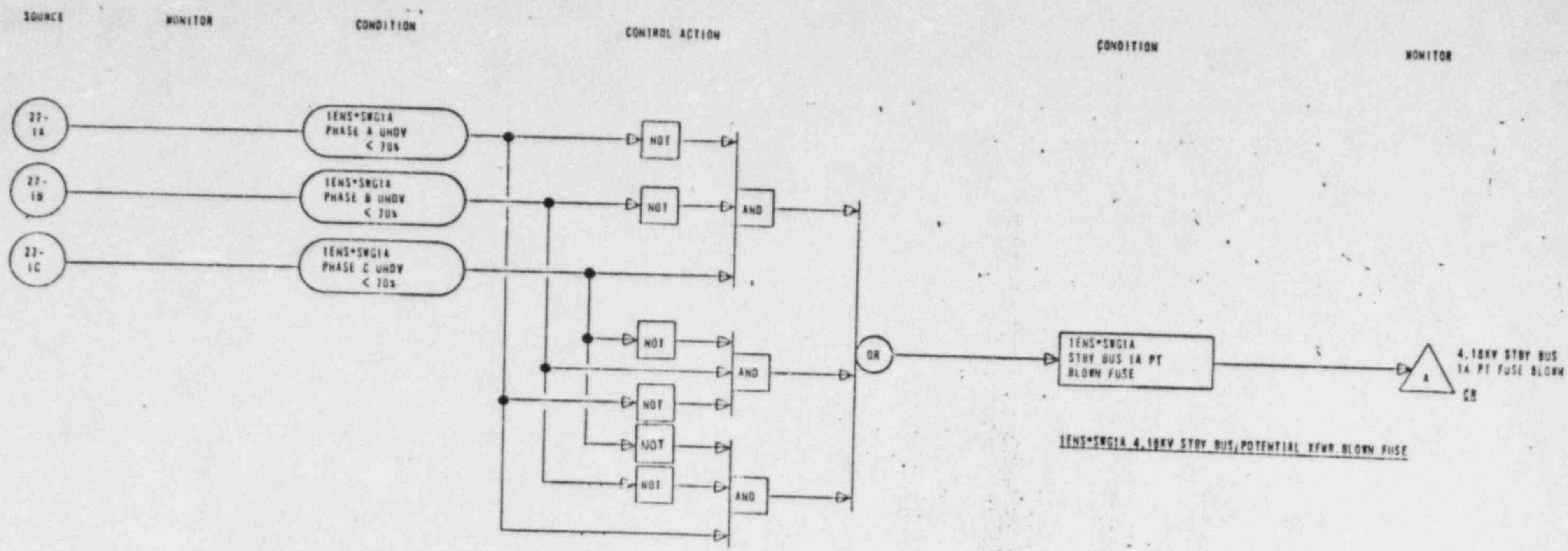

NOTES:

1. 1ENS*SWG1A (DIV I) POTENTIAL XFMR. BLOWN FUSE ALARM IS SHOWN.
   1ENS*SWG1B (DIV II) POTENTIAL XFMR. BLOWN FUSE ALARM IS SIMILAR.
2. REFER TO NOTE 5 ON LSK-2A-9.5A FOR SETPOINTS.

NUCLEAR SAFETY RELATED
QA CAT I & II

LOGIC DIAGRAM
STBY. DSL. GEN. LOAD SEQUENCE
RIVER BEND STATION - UNIT 1
GULF STATES UTILITIES COMPANY
STONE & WEBSTER ENGINEERING CORPORATION

	NO CHANGE	REDRAWN
	12-20-84	7-1-84

12210-LSK-24-9.5F

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LISTING FOR CHANGES

The next 2 pages are revisions to RBG-19,754 dated 12-21-84.

Insert A for Page 7.4-11a

The following SSW system equipment/function has a transfer switch located in the Division III diesel generator control room and a control switch located at the Division III switchgear.

Insert A →

1SWP*P2C - SSW pump

Insert 1 →

The following SSW system equipment/functions have transfer and control switches located at the Division II remote shutdown panel:

1SWP*P2B - SSW pump

11 1SWP ~~1SPW~~*P2D - SSW pump

1SWP*MOV96B - Motor-operated valve (isolate normal SW supply)

1SWP ~~1SPW~~*MOV55B - Motor-operated valve (cooling tower inlet)

~~1E12*MOVR068B - Motor operated valve (SW outlet from RHR heat exchanger)~~

Insert 2 →

See Fig. 7.3-11.

The following SSW system instrumentation is provided on the Division I and Division II remote shutdown panels:

11 1SWP*FI64A and FI64B - Flow indicators (RHR heat exchangers A and B)

Valve position and pump status indicators.

e. Containment Atmosphere Monitoring System

11 The following containment atmosphere monitoring system instrumentation is provided on the Division I remote shutdown panel:

11 1CMS*TR103 - Recorder drywell pressure/temperature and suppression pool level/temperature

The following control building air conditioning system equipment/functions have transfer switches at the Division II remote shutdown panel and control switches located at the equipment or motor control center:

1HVC*AOD5B - Standby switchgear return fan suction damper
1HVC*AOD12B - Standby switchgear ACU discharge damper
1HVC*AOD38B - Standby switchgear ACU inlet damper

i. Yard Structures Ventilation System

The following yard structure ventilation system equipment/functions have transfer switches located at the Division I remote shutdown panel and control switches located at the equipment motor control center:

1HVY*FN1A - Standby service water pumphouse ventilation fan
1HVY*FN2A - Standby service water pumphouse ventilation fan
1HVY*FN2C - Standby service water pumphouse ventilation fan

The following Division III (I) yard structure ventilation system equipment has transfer and control switches located at the equipment motor control center:

1HVY*FN1C - Standby service water pumphouse ventilation fan

j. Main Steam Safety/Relief Valves

The following main steam safety and relief valves, vents and drains system equipment/function has a transfer switch located at the Division I remote shutdown panel and a control switch located at the equipment motor control center:

1SVV*MOV1A - Motor-operated valve (containment isolation)

k. Diesel Generator and Power Supply Systems

The following diesel generator and power supply system equipment/functions have local transfer and control switches at the Division I diesel generator control panel:

1HVP*FN6A - DG room 'A' ventilation supply fan
1HVP*FN2A - DG room 'A' ventilation exhaust fan
1HVP*AOD11A - Air-operated damper (DG room 'A')
1EGS*EG1A - Standby diesel generator
1EGF*P1A - DG fuel oil transfer pump
1EGF*PCV25A - Pressure-control valve (DG fuel oil return line)
1EGF*LT16A - DG fuel oil day tank level transmitter
1EGF*LIX16A - DG fuel oil day tank level power supply
1EGF*LIY16A - DG fuel oil day tank level instrument relay
1ENS*ACB01 - Standby bus (1ENS*SWG1A) distribution breaker
1ENS*ACB04 - Standby bus (1ENS*SWG1A) alternater supply breaker

TABLE 7.5-2 (Cont)

16. The Category 2 requirement for the SLCS storage tank instrumentation is not considered appropriate for the following reasons:

    a. The current design basis for the SLCS assumes a need for an alternative method of reactivity control without a concurrent loss-of-coolant accident or high-energy line break. The environment in which the SLCS instrumentation must work is, therefore, a mild environment for qualification purposes.

    b. The current design basis for the SLCS recognizes that the system has an importance to safety that is less than the importance to safety of the reactor protection system and the engineered safeguards systems.

    Category 3 instrumentation is used on River Bend Station.

17. The cooling water temperature and flow to ESF components is interpreted as main temperature and flow at the headers. The service water system, described in Chapter 9, performs as follows: When pressure is available, the normal service water system functions. This normal service water system temperature and flow is monitored by a Category 3 instrument. Should the pressure decrease, the standby service water system automatically begins to operate; the temperature and flow instrumentation for this sytem exceeds Regulatory Guide 1.97, Category 2 qualification. The maximum anticipated temperature of the standby service water system at the pump discharge is 95°F. Therefore, the temperature range provided is from 0°F to 125°F.
    85

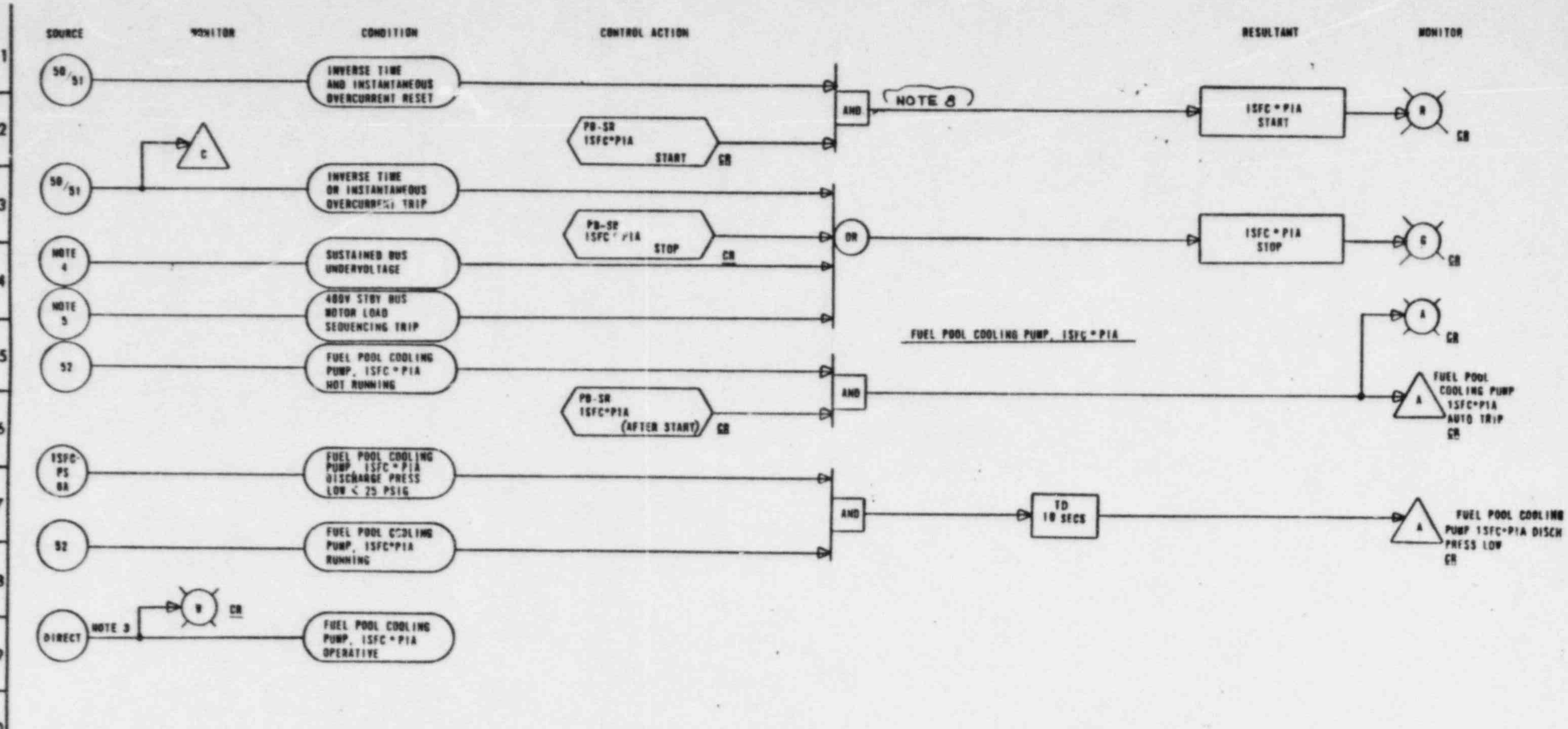
18. The high radioactivity liquid tanks to be monitored are waste collectors, some floor drains, regenerant chemical, phase separator, and backwash.

19. The emergency ventilation dampers are interpreted to mean those dampers actuated under accident conditions, whose failure could result in a radioactive discharge to the environment. The control room damper position is also indicated. The areas in this plant which have emergency dampers are the fuel, reactor, and radwaste buildings.

FSAR Figure 7.6-7 Sheet 1

will be updated to reflect the attached LSK's.

34-2A



NOTES:

1. CONTROL OF DIV I FUEL POOL COOLING PUMP, ISFC*P1A, IS SHOWN. CONTROL OF DIV II FUEL POOL COOLING PUMP, ISFC*P1B, IS SIMILAR.
2. ASSOCIATED EQUIPMENT IDENTIFICATION NUMBERS

ISFC*P1A	ISFC*P1B
ISFC-PS8A	ISFC-PS8B

3. REFER TO LSK-24-10.1 FOR OPERATIVE AND INOPERATIVE LOGIC DEVELOPMENT

NOTES: (CONT'D)

4. SEE LSK-24-11.1B FOR DEVELOPMENT OF ISFC*P1A AND ISFC*P1B UNDERVOLTAGE TRIP.
5. SEE LSK-24-8.5B FOR DEVELOPMENT OF ISFC*P1A AND ISFC*P1B LOAD SEQUENCING TRIP.
6. LOGIC FOR MOTOR OVERLOAD IS SHOWN ON LSK-24-11.2.
7. SETPOINT INFO ARE APPROX. FOR UNDERSTANDING PURPOSE. FOR ACTUAL SETPOINT INFO SEE PERTINENT SETPOINT CALC.
8. FUEL POOL COOLING PUMPS ISFC*P1A, B SHALL NOT BE USED FOR FIRST 2 HOURS AFTER LOCA INITIATION UNTIL DIESEL LOAD HAS BEEN REDUCED.

NUCLEAR SAFETY RELATED
Q.A. CAT. I & II

LOGIC DIAGRAM
FUEL POOL COOLING AND CLEANUP
RIVER BEND STATION - UNIT 1
GULF STATES UTILITIES COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
12210-LSK-34-2A

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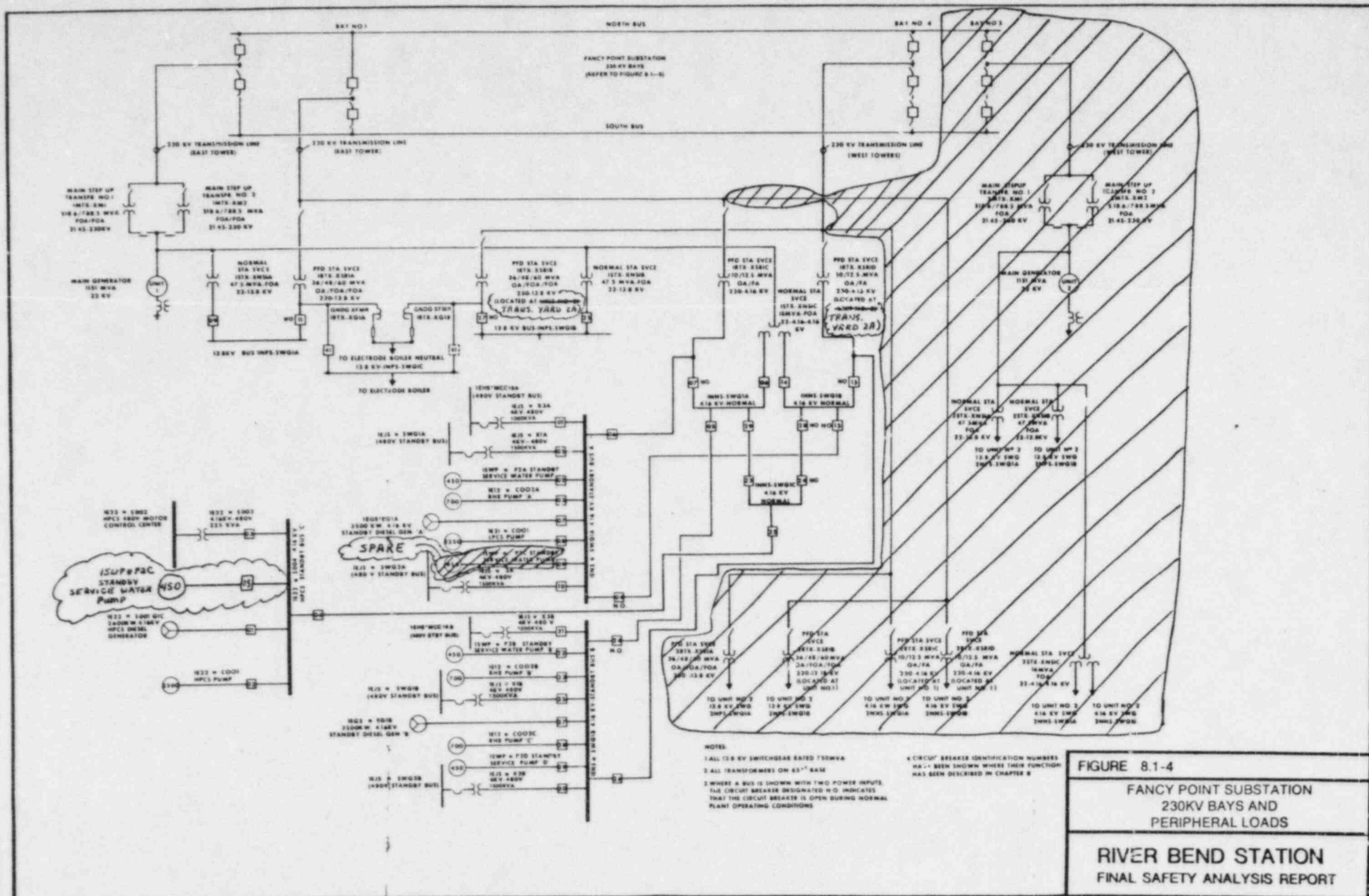

FIGURE 8.1-4

FANCY POINT SUBSTATION
230KV BAYS AND
PERIPHERAL LOADS

RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT

AMENDMENT 13 JUNE 1984

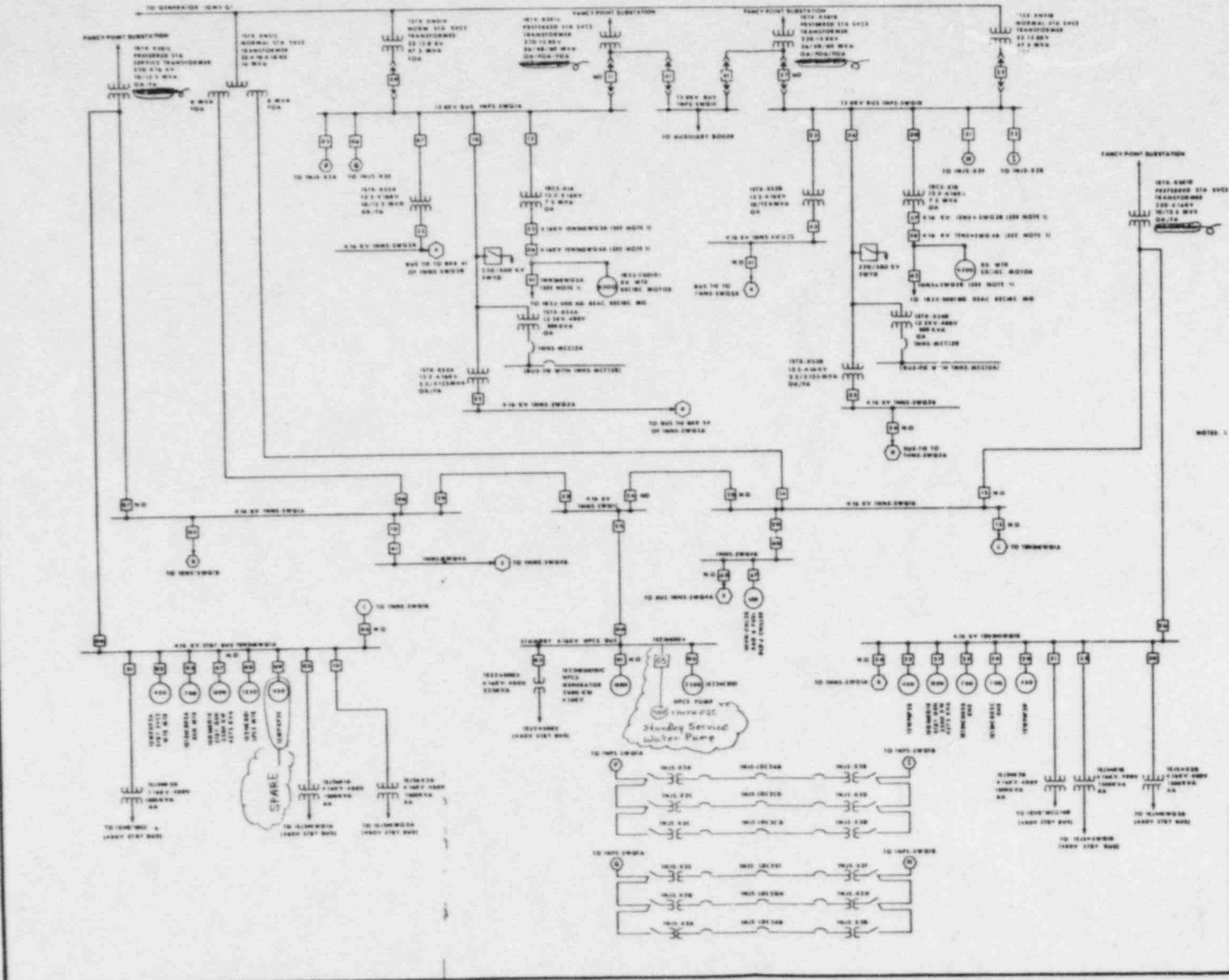

FIGURE 8.1-6

STATION SERVICE- ONE LINE DIAGRAM

RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT

AMENDMENT 13 JUNE 1984

The next 25 pages are revisions to RBG-19,567 dated 11-29-84.

When the HPCS diesel generator is called upon to operate under accident conditions, the only protective devices used are the generator differential relays and engine overspeed trip device. The engine overspeed trip device is mechanical and trips the engine directly. The trips are annunciated in the main control room. Other protective relays, such as loss of excitation, anti-motoring (reverse power), overcurrent with voltage restraint, high jacket water temperature, and low lube oil pressure, are used to protect the machine when it is operating during periodic tests. These relays are automatically removed from the tripping circuits under accident conditions. In addition to these protective relays, a normal time delay overcurrent relay senses generator overload and causes an alarm in the main control room. The generator differential relays and overspeed trip device are retained under accident conditions to protect against what can be major faults which could cause significant damage. All the bypassed protective devices cause alarms in the main control room and the operator then has sufficient information to take necessary corrective action. Because during accident conditions the HPCS diesel generator is performing a safety-related function, these protective devices are insignificant so far as the engine condition is concerned. The engine is capable of operating under these abnormal conditions, and it is left to the operator's judgment whether to operate the engine or trip it manually.

8.3.1.1.4.2.1 Qualification Testing

A prototype test has been performed to establish the adequacy of the diesel generator unit to successfully accelerate the HPCS pump and system loads. The test consists of starting an HPCS system in an actual HPCS pump loop test (HPCS system in condensate to condensate test mode) with auxiliary loads several times within the design time requirement. A topical report on HPCS power system unit, NEDO-10905, and subsequent amendments describe and show theoretical and experimental evidence as to the adequacy of the design. The topical report has been further amended to include the results of the prototype qualification test cited above.

→ INSERT FROM PAGES 8.3-53, 54, & 55 WITH THEIR INSERTS.

8.3.1.1.4.3 Containment Electrical Penetration Protection

Electric circuits penetrating the primary containment through Class 1E electrical penetrations are classified as follows:

1. Medium voltage power 4.16-kV, three-phase

surveillance or system operating procedure to place the diesel in an automatic standby readiness condition.

Compliance with Technical Specifications, administrative and system operating procedures, and the preventive maintenance and surveillance testing schedule ensures optimum equipment readiness and availability upon demand.

8.3.1.1.5.3 High Pressure Core Spray Power Supply System

12 Readiness of the HPCS diesel generator is demonstrated by periodic testing according to Regulatory Guide 1.108 and is described in the Technical Specifications. The testing program is designed to test the ability to start and accept the HPCS design ~~System~~ loads connected to the bus. ~~or its equivalent load.~~ After the HPCS diesel generator has reached its engine temperature
15 equilibrium, it is run under the 2-hr rated load for 2 hr and then run for 22 hr under the rated load. This ensures that cooling and lubrication are adequate for extended periods of operation. Full functional tests of the automatic control circuitry are conducted on a periodic basis to demonstrate correct operation (Section 7.3.2).

Means are provided for periodically testing the chain of system elements from sensing devices through driven equipment to assure that the HPCS power supply is functioning in accordance with design requirements. The drawout feature of protective relays allows replacement relays to be installed while the relay that is removed is bench tested and calibrated.

Startup of onsite power units can be initiated ~~effected~~ by simulation of LOCA signal or loss of power to the plant auxiliary power system. Connection of the HPCS diesel generator to the HPCS bus takes place automatically on loss of plant auxiliary power to the HPCS bus (HPCS bus low voltage). The HPCS diesel generator bus directional overcurrent, ground overcurrent, and phase overcurrent protective relaying provides a trip to the offsite power feeder breaker in case of loss of offsite power while the diesel generator is in the test mode operation.

supplemented by extensive functional tests during the refueling outage, the latter based on simulation of actual accident conditions. These tests demonstrate the operability of diesel generator sets, battery system components, and logic systems and thereby verify the continuity of the systems and the operability of the components.

Because the diesel generator is a standby unit, readiness is of prime importance. Readiness is demonstrated by periodic testing The testing program is designed to test the ability to start the HPCS loads as well as to run under equivalent load as required by Regulatory Guide 1.108. This ensures that cooling and lubrication are adequate for extended periods of operation. Full functional tests of the automatic control circuitry are conducted in accordance with the Technical Specification on a periodic basis to demonstrate correct operation.

Criterion 21

The protection system of the HPCS power supply is designed to be highly reliable and testable during reactor operation. The HPCS diesel generator is only part of the high pressure core spray system. If it fails, the redundant automatic depressurization system reduces the reactor pressure so that flow from LPCI and LPCS systems enters the reactor vessel in time to cool the core and limit fuel cladding temperature.

Regulatory Guide 1.6

The HPCS diesel generator unit supplies power only for the HPCS and ~~its HPCS~~ other auxiliaries as shown in Table 8.3-3; therefore, failure of any single component of the HPCS diesel generator does not prevent the startup and operation of any other standby power supply. The failure of any other standby diesel generator does not impede the operation of the HPCS diesel generator and its load group, thus meeting the requirements of Regulatory Guide 1.6.

Regulatory Guide 1.6, Position 1 Conformance

The HPCS Class 1E loads are assigned to a single division of the load groups. The assignment is determined by the nuclear safety functional redundancy of the loads such that the loss of any one division does not prevent the minimum safety functions from being performed.

~~Insert 7 - Page 8.3-52~~

~~of the HPCS diesel generator set to start and accelerate to rated speed its required loads, as described in Regulatory Guide 1.108 (see Section 1.8).~~

Insert 8 - Page 8.3-54

a. Four (4) cold fast starts;
b. Four (4) hot fast starts; and
c. Sixty-one (61) modified starts.

The fast starts are conducted from the main control room by simulation of an ESF signal with the engine in a ready standby status. Following each fast start, the engine is loaded to the ESF bus load shown in Table 8.3-3, and run at that load for approximately four (4) hours. The modified starts include a prelube period as recommended by the manufacturer, loading to approximately 2600 kW within 3 to 5 minutes, and operation at this load for approximately one (1) hour. Modified starts may be performed with the engine at its operating temperature. During and/or following this testing, some individual components of the diesel generator or its support systems may require maintenance and/or replacement. This maintenance and/or replacement due to wear does not require retesting.

Insert 9 - Page 8.3-56

(approximately 2500 hp), one medium size pump (450 hp), and other miscellaneous loads;

Insert 10 - Page 8.3-53

The HPCS diesel generator comprises of a single generator driven by a single engine. This diesel generator set neither operation in parallel with any other diesel generator set nor has tandom engines driving the single generator.

Insert - Page 8.3-55

e. Unsuccessful start attempts which were conducted with the intent of eventual failure, e.g. the last attempt when determining capacity of the air start system.

Regulatory Guide 1.6, Position 2 Conformance

The HPCS bus (Division III of the ac load groups) is connectable to two different (preferred) offsite power sources. The HPCS bus is also connectable to the HPCS diesel generator as the standby onsite power source (Fig. 8.3-3).

The HPCS diesel generator breaker can be closed automatically only if all other source breakers to the HPCS bus are open. There is no automatic connection to any other division load group.

Regulatory Guide 1.6, Position 3 Conformance

There is no automatic or manual connection of the HPCS system dc load group to any other division load group.

Regulatory Guide 1.6, Position 4 Conformance

1. The diesel generators connected to the other divisions of the load groups are physically and electrically independent of each other. The diesel generator connected to the HPCS division load group cannot be automatically paralleled with the diesel generator that is connected to another division load group.

2. The HPCS diesel generator is connected to one independent division. No means exist for automatically connecting the HPCS load group with any other.

3. The HPCS load group is fed from only one diesel generator, as shown in Fig. 8.3-3. No means are provided for transferring its loads to any other diesel generator.

4. No means exist for manually connecting the HPCS load group to those of another division. The HPCS load group is physically and electrically independent of all others.

Regulatory Guide 1.6, Position 5 Conformance

INSERT 10 →

In order to comply with the requirements, the tests described in NEDO 10905, Section 6.6 have been, or will be, performed.

Start and Load Reliability Test

→ INSERT ON PAGE 8.3-33.

INSERT ON PAGE 8.3-33.

1. Prior to initial fuel loading of the reactor unit, a series of tests will be conducted to establish the capability of the HPCS diesel generator unit to consistently start and load within the required time.

2. With the exception of those diesel engine/generator designs that are identical (minor changes may be justified by analysis) to the diesel generator unit(s) which have been previously qualified for the HPCS application, all other different diesel engine/generator combinations will be individually qualified for reliable start and load acceptance requirements.

3. An acceptable start and load reliability test is defined as follows: A total of 69 valid start and loading tests with no failure or 128 valid start and loading tests with a single failure will be performed. Failure of the unit to successfully complete this series of tests as prescribed will require a review of the system design adequacy, the cause of the failure to be corrected, and the tests continued until 128 valid tests are achieved without exceeding the one failure. The start and load tests will be conducted as follows:

INSERT 8 →

a. Engine cranking will begin upon receipt of the start signal, and the diesel generator set will accelerate to specified frequency and voltage within the required time interval.

b. Immediately following step No. 1 (Paragraph a.) the diesel generator set shall accept a single step load consisting of the main HPCS pump motor load (fully loaded) or larger motor load (fully loaded) and additional loads (inductive and/or resistive) as required to total at least 100 percent of the continuous rating of the diesel generator unit.

c. At least 90 percent of these tests shall be performed with the diesel generator set initially at "warm standby," based on jacket water and lube oil temperatures at or below values recommended by the engine manufacturer. After load is applied, the diesel generator set will continue to operate until jacket water and lube oil temperatures are within

±10°F (5 1/2°C) of normal engine operating temperatures for the corresponding load.

d. The remainder of these tests (10 percent or less) will be performed with the engine initially at normal operating temperature equilibrium (defined as jacket water and lube oil temperature within ±10°F (5 1/2°C) of normal operating temperatures as established by the engine manufacturer for the corresponding load).

INSERT ON PAGE 8.3-33.

If the cause for failure to start or accept load in accordance with the preceding sequence falls under any of the following categories, that particular test may be disregarded, and the test sequence resumed without penalty following identification of the cause for the unsuccessful attempt:

a. Unsuccessful start attempts which can definitely be attributed to operator error including setting of alignment control switches, rheostats, potentiometers, or other adjustments that may have been changed inadvertently prior to that particular start test.

b. A starting and/or loading test performed during routine maintenance or trouble-shooting. All maintenance procedures are defined prior to conducting the start and load acceptance qualification tests and become a part of the normal maintenance schedule after installation.

c. Failure of any of the temporary service systems such as dc power source, output circuit breaker, load, interconnecting piping, and any other temporary setup which will not be part of the permanent installation.

d. Failure to carry load which can be definitely attributed to loadings in excess of the HPCS diesel generator rating.

NEW INSERT (item e.)

Regulatory Guide 1.9

Conformance with Regulatory Guide 1.9 is described in the following subsections for each regulatory position of Paragraph C of the guide.

Regulatory Guide 1.9, Position 1 Conformance

Table 8.3-3 shows that the continuous rating of the diesel generator is greater than the maximum coincidental steady-state loads requiring power at any time. Intermittent loads such as motor-operated valves are not considered for long-term loads.

Regulatory Guide 1.9, Position 2 Conformance

See Table 8.3-3 for the 2,000-hr rating of the HPCS diesel generator, the 30-min rating, and the maximum coincidental load for conformance with this position. The ratings are described in Table 8.3-3. The long-term steady-state load shown therein is within the continuous rating of the diesel generator.

Regulatory Guide 1.9, Position 3 Conformance

The load requirements will be verified and test data will be included in this SAR following the preoperational tests.

Regulatory Guide 1.9, Position 4 Conformance

The design function of the HPCS diesel generator unit is considered to be a justifiable departure from strict conformance to Regulatory Guide 1.9, regarding voltage and frequency limits during the initial loading transient. The HPCS system consists of one large pump and motor combination
INSERT 9 ~~which represents more than 90 percent of the total load;~~ consequently, limiting the momentary voltage drop to 25 percent and the momentary frequency drop to 5 percent would not significantly enhance the reliability of HPCS operation. To meet these regulatory guide requirements, a diesel generator unit approximately two to three times as large as that required to carry the continuous ~~rated~~ full load would be necessary. However, the frequency and voltage overshoot requirements of Regulatory Guide 1.9 are met. A factory testing program on a prototype unit has verified the following functions:

1. System fast-start capabilities

2. Load carrying capability

3. Load rejection capability

4. Ability of the system to accept and carry the required loads

REPLACE ENTIRE TABLE WITH ATTACHED.

THIS REVISION SUPERCEDES THAT OF RBG-19,576 DATED 11-29-84.

TABLE 8.3-2

AUTOMATIC AND MANUAL
LOADING AND UNLOADING OF
ENGINEERED SAFETY FEATURES BUS

				Minimum Operating Requirement							
				Forced Shutdown				Loss-of-Coolant Accident			
Item Description(7)	Number on Bus	Redundant Equipment Identification	kW Ea(6,9)	Number Required	Running kW	Time to Start(1)	Time to Stop	Number Required	Running kW	Time to Start(1)	Time to Stop
DIVISION I (IEGS*EG1A Running) (IEGS*EG1B Unavailable)											
ENGINEERED SAFETY FEATURE LOADS											
1E21*C002	1	None	2.15	1	2.15	10 sec(3)	(3)	1	2.15	10 sec(3)	(3)
1HVK*P1A&C	2	Division II Systems	31	1	31	10 sec(3)	(3)	1	31	10 sec(3)	(3)
1SWP*P3A&C	2	Division II Systems	5.6	1	5.6	10 sec(3)	(3)	1	5.6	10 sec(3)	(3)
1HVC*ACU3A	1	Division II Systems	1.9	1	1.9	10 sec(3)	(3)	1	1.9	10 sec(3)	(3)
1HVC*FLT3AH	1	Division II Systems	23	-	-	-	-	1	23	10 sec(3)	(3)
1HVC*FN1A	1	Division II Systems	16.3	-	-	-	-	1	16.3	10 sec(3)	(3)
1HVC*FN2A	1	Division II Systems	19.2	1	19.2	10 sec(3)	(3)	1	19.2	10 sec(3)	(3)
1HVC*FN3A&3D	2	Division II Systems	0.90	1	0.90	10 sec(3)	(3)	1	0.90	10 sec(3)	(3)
1HVR*UC2	1	None	2.9	1	2.9	10 sec(3)	(3)	1	2.9	10 sec(3)	(3)
1HVR*UC3	1	None	4.7	1	4.7	10 sec(3)	(3)	1	4.7	10 sec(3)	(3)
1HVR*UC6	1	None	33	1	33	10 sec(3)	(3)	1	33	10 sec(3)	(3)
1HVR*UC7	1	None	9.6	1	9.6	10 sec(3)	(3)	1	9.6	10 sec(3)	(3)
1HVR*UC8	1	None	8.1	1	8.1	10 sec(3)	(3)	1	8.1	10 sec(3)	(3)
1HVF*FN3A	1	Division II Systems	25	1	25	10 sec(3)	(3)	1	25	10 sec(3)	(3)
1HVF*FLT2AH	1	Division II Systems	57	1	57	10 sec(3)	(3)	1	57	10 sec(3)	(3)
1HVY*FN1A&C	2	Division II Systems	5.3	1	5.3	10 sec(3)	(3)	1	5.3	10 sec(3)	(3)
1HVY*FN2A&C	2	Division II Systems	2.0	2	4.0	10 sec(3)	(3)	2	4.0	10 sec(3)	(3)
1LSV*C3A	1	Division II Systems	10.8	-	-	-	-	1	10.8	10 sec(3)	(3)
1E51*C003	1	None	3.63	1	3.63	10 sec(3)	(3)	1	3.63	10 sec(3)	(2)
Motor-operated Valves(12)	Set	Division II Systems	98 kW total	98 kW total	98	10 sec(2)	(2)	98 kW total	98	10 sec(2)	(2)
120-V ac Standby Power	Misc. Load	Division II Systems	50 kW total	50 kW total	50	10 sec(3)	(3)	50 kW total	50	10 sec(3)	(3)
1ENB*INV01A	1	Division II Systems	20	1	20	10 sec(3)	(3)	1	20	10 sec(3)	(3)
120V INSTR. (NSSS)	1	None	10	1	10	10 sec(3)	(3)	1	10	10 sec(3)	(3)
1ENB*CHGR1A	1	Division II Systems	71.7	1	71.7	10 sec(3)	(3)	1	71.7	10 sec(3)	(3)
RAD. MON.	1	Division II Systems	20	1	20	10 sec(3)	(3)	1	20	10 sec(3)	(3)
1EGF*P1A	1	Division II Systems	0.61	1	0.61	10 sec(3)	(3)	1	0.61	10 sec(3)	(3)

TABLE 8.3-2a

AUTOMATIC AND MANUAL LOADING OF ESF BUSES

Case 1: DGs 1EGS*EG1A and 1E22*S001G1C Operating
DG 1EGS*1EG1B Has Failed

(Note: DG 1E22*S001G1C loading is shown in Table 8.3-3)

Load Description	Load ID No.	No. on Bus	No. Reqd	Time Start (1)	Nameplate (2)hp/kW	Running BHP(2)	Running kW(2)	Time Stop	Block Load Total-kW	Remarks
Control Bldg Chilled Water Pump	1HVK*P1A or 1C	2	1	10 sec	50	37	31.0	(3)		(3)
Control Bldg Chilled Cond Recirc Pump	1SWP*P3A or 3C	2	1	10 sec	15	6.3	5.6	(3)		(3)
Equip Room Air-Condition Unit Motor	1HVC*ACU3A	1	1	10 sec	5	1.93	1.9	(3)		(3)
Charcoal Filter Heater	1HVC*FLT3AH	1	1	10 sec	23 kW	-	23.0	(3)		(3)
Filter Train Booster Fan	1HVC*FN1A	1	1	10 sec	25	19	16.3	(3)		(3)
Stdby Swgr Room Exhaust Fan	1HVC*FN2A	1	1	10 sec	30	23.4	19.2	(3)		(3)
Battery Room Exhaust Fan	1HVC*FN3A/D	2	1	10 sec	1.5	0.9	0.9	(3)		(3)
Auxiliary Bldg Unit Coolers	1HVR*UC2	1	1	10 sec	5	3.22	2.9	(3)		(3)
	1HVR*UC3	1	1	10 sec	7.5	5.22	4.7	(3)		(3)
	1HVR*UC6	1	1	10 sec	40	39.0	33.0	(3)		(3)
	1HVR*UC7	1	1	10 sec	15	11.0	9.6	(3)		(3)
Filter Train Exhaust Blower	1HVF*FN3A	1	1	10 sec	40	30.0	25.0	(3)		(3)
Filter Train Heater	1HVF*FLT2AH	1	1	10 sec	57 kW	-	57.0	(3)		(3)
Stdby Serv Water Pmp Hse Supply Fan	1HVY*FN1A	2	1	10 sec	7.5	5.85	5.3	(3)		(3)
Leakage Cont Sys Air Compressor	1LSV*C3A	1	1	10 sec	50	50	43.0	(3)		(3,10)
Motor Operated Valves	Misc	Misc	Misc	10 sec	-	-	98.0	(3,4)		(4,3)
120-V AC Stdby Power	Misc	Misc	Misc		50 KVA		45.0	(5)		(3)
Stdby Vital Bus 'A' UPS System	1ENB*INV01A	1	1	10 sec	20 KVA	-	14.0	(5)		(3)
120-V Instrumentation NSSS	Misc	Misc	Misc	10 sec	10 kW	-	10 kW	(5)		(3)
125-V DC Battery Charger	1ENB*CHGR1A	1	1	10 sec	71.7 kW	-	71.7	(5)		(3)
Radiation Monitoring System	1RE*RMS	1	1	10 sec	20 kW	-	15.0	(5)		(3)
Safety Ltg - Aux Bldg	1LAC-XLC9	1	1	10 sec	15 kW	-	10.0	(5)		(3,6)
Stdby Cooling Tower #1 Swgr Fan	1HVY*FN2A	2	1	10 sec	3	2.03	2.0	(3)		(3)
Stdby D/G Fuel Trans Pump	1EGF*P1A	1	1	10 sec	3	0.81	0.61	(3)		(3)
Total: 10 Sec Load Block									544.71	
Low Pressure Core Spray Pump	1E21*C001	1	1	12 sec	1250	1250	917.2	(11,3)		(3,4)
Total: 12 Sec Load Block									917.2	
Residual Heat Removal Pump 'A'	1E12*C002A	1	1	17 sec	700 hp	630	509.2	(3)		(3)
Total: 17 Sec Load Block									509.2	
Stdby DG Room Vent Fan	1HVP*FN2A/3A	2	1	30 sec	100	90.2	73.2	(3)		(3)

TABLE 8.3-2a (Cont)

Load Description	Load ID No.	No. on Bus	No. Reqd	Time Start (1)	Nameplate (2)hP/kW	Running BHP(2)	Running kW(2)	Time Stop	Block Load Total-kW	Remarks
Annulus Mixing System Fan	1HVR*FN11A	1	1	30 sec	150	135.0	109.0	(3)		
Stdby Gas Treatment Exhaust Blower	1GTS*FN1A	1	1	30 sec	60	50.5	41.6	(3)		
Stdby Gas Treatment Heater	1GTS*H1A	1	1	30 sec	72 kW	-	72	(3)		(3)
Total: 30 Sec Load Block									295.8	
Stdby Service Water Pump Motor 'A'	1SWP*P2A	1	1	40 sec	450 hp	413	328.5	(3)		(3, 10)
Total: 40 Sec Load Block									328.5	
Control Building Chillers	1HVK*CHL1A/1C	2	2	60 sec	250	242.6	200	(3)		(3,9)
Cont Room Air Conditiong Unit	1HVC*ACU1A	1	1	60 sec	75	60	50	(3)		(3)
Stdby Swgr Room Air Handling Unit	1HVC*ACU2A	1	1	60 sec	75	63.8	53	(3)		(3)
Cont Bldg Chillers - L.O. Pumps	1HVK*CH1APL	2	2	60 sec	1.5	1.5	1.4	(3)		(3,9)
	1HVK*CH1CPL	2	2	60 sec	1.5	1.5	1.4	(3)		(3,9)
Total: 60 Sec Load Block									305.8	
Control Building Chiller	1HVK*CHL1A/1C	2	2	10 min	250	242.6	200	(3)		(3,9)
Containment Unit Cooler	1HVR*UC1A	1	1	10 min	150	83.6	68	(3)		(3)
Auxiliary Bldg Unit Cooler	1HVR*UC11A	1	1	10 min	75	63.3	52.5	(3)		(3)
Total: 10 Min Load Block									320.5	
Standby Cooling Tower Fans	1SWP*FN1A	10	10	>2.0HR	40	40	34	(5)		(5,8)
	1SWP*FN1C	10	10	>2.0HR	40	40	34	(5)		(5,8)
	1SWP*FN1E	10	10	>2.0HR	40	40	34	(5)		(5,8)
	1SWP*FN1G	10	10	>2.0HR	40	40	34	(5)		(5,8)
	1SWP*FN1J	10	10	>2.0HR	40	40	34	(5)		(5,8)
	1SWP*FN1L	10	20	>2.0HR	40	40	34	(5)		(5,8)
	1SWP*FN1N	10	10	>2.0HR	40	40	34	(5)		(5,8)
	1SWP*FN1Q	10	10	>2.0HR	40	40	34	(5)		(5,8)
	1SWP*FN1S	10	10	>2.0HR	40	40	34	(5)		(5,8)
	1SWP*FN1U	10	10	>2.0HR	40	40	34	(5)		(5,8)
Fuel Pool Cooling Pumps	1SFC*P1A	1	1	>2.0HR	100	75	62	(5)		(5,8)
Drywell Hydrogen Mixing Fan	1CPM*FN1A	1	1	>2.0HR	1.5	1.0	0.97	(5)		(5,8)
Standby Liquid Control Pump	1C41*C001A	1	1	>2.0HR	40	-	37.3	(5)		(5,7, 8)
Hydrogen Recombiner	1HCS*RBNR1A	1	1	>2.0HR	75 kW	-	75.0	(5)		(5,8)
Total: >2 hr Load Block									515.27	

Total Load: 3736.98 kW

(See Notes and Load Profile (Fig. 8.3-14a) for Effective Loads)

TABLE 8.3-2b

AUTOMATIC AND MANUAL LOADING OF ESF BUSES

Case II: DGs 1EGS*EG1B and 1E22*S001G1C operating. DG 1EGS*1EG1A has failed

[Note: DG 1E22*S001G1C loading is shown in Table 8.3-3]

Load Description	Load ID No.	No. on Bus	No. Rec'd	Time Start (1)	Nameplate (2)HP/kW	Running BHP(2)	Running kw(2)	Time Stop	Block Load Total kW	Remarks
Control Bldg. Chilled Water Pump	1HVK*P1B or 1D	2	1	10 sec	50	37	31.0	(3)		(3)
Control Bldg. Chilled Cond. Recirc. Pump	1HVK*P1B or 1D	2	1	10 sec	15	6.3	5.6	(3)		(3)
Equipment Room Air Condition Unit	1HVC*ACU3B	1	1	10 sec	5	1.93	1.9	(3)		(3)
Charcoal Filter Heater	1HVC*FLT3BH	1	1	10 sec	23kw	-	23.0	(3)		(3)
Filter Train Booster Fan	1HVC*FN1B	1	1	10 sec	25	10	16.3	(3)		(3)
Stdby Swgr Room Exhaust Fan	1HVC*FN2B	1	1	10 sec	30	22.4	19.2	(3)		(3)
Battery Room Exhaust Fan	1HVC*FN3B/E	2	1	10 sec	1.5	0.9	0.9	(3)		(3)
Auxiliary Building Unit Coolers	1HVR*UC4	1	1	10 sec	7.5	4.37	4.0	(3)		(3)
										(3)
	1HVR*UC9	1	1	10 sec	30	26	21.8	(3)		(3)
	1HVR*UC10	1	1	10 sec	5	1.9	1.7	(3)		(3)
Filter Train Exhaust Blower	1HVF*FN3B	1	1	10 sec	40	30	25.0	(3)		(3)
Filter Train Heater	1HVF*FLT2BH	1	1	10 sec	57kw	-	57.0	(3)		(3)
Leakage Cont. System-Air Comp.	1LSV*C3B	1	1	10 sec	50	50	43.0	(3)		(3)
Motor-Operated Valves	Misc.	Misc.	Misc.	10 sec	-	-	98.0	(4,3)		(3,4)
120V ac Stdby Power	Misc.	Misc.	Misc.	10 sec	50kva	-	45.0	(9)		(3)
Stdby Vital Bus (B) UPS	1ENB*INV01B	1	1	10 sec	20kw	-	20.0	(5)		(3)
120V Power NSSS Instrumentation	Misc.	Misc.	Misc.	10 sec	10kw	-	10.0	(9)		(3)
Stdby Cooling Tower Swgr. Fan	1HVY*FN2B/2D	2	1	10 sec	3	2.03	2.0	(5,3)		(3,12)
Stndby Serv. Water Pumphouse Fan	1HVY*FN1B/1D	2	1	10 sec	7.5	5.85	5.3	(5,3)		(3,12)
Stdby DG Fuel Transfer Pump	1EGF*P1B	1	1	10 sec	3	0.81	0.61	(3)		(3,12)
125 V dc battery charger	1ENB*CHGR1B	1	1	10 sec	71.7kw	-	71.7	(5)		(3)
Radiation Monitoring System	1ME*RMS	1	1	10 sec	20kw	-	15.0	(5)		(3,6)
Safety Lighting - Aux. Bldg.	1LAC-XLC9	1	1	10 sec	15	-	10.0	(5)		(3)
Total: 10 Sec Load Block									528.01	
Residual Heat Removal Pump	1E12*C002C	2	2	12 sec	700	630	509.2	(3)		(3,13)
Total: 12 Sec Load Block									509.2	
Residual Heat Removal Pump	1E12*C002B	2	2	17 sec	700	630	509.2	(3)		(3,13)
Total: 17 Sec Load Block									509.2	

TABLE 8.3-2b (Cont)

Load Description	Load ID No.	No. on Bus	No. Rec'd	Time Start (1)	Nameplate (2)HP/kW	Running BHP(2)	Running kw(2)	Time Stop	Block Load Total kW	Remarks
Stdby DG Room Vent Fan	1HVP*FN2B/3B	2	1	30 sec	100	90.2	73.2	(3)		(3)
Annulus Mixing System Fan	1HVR*FN11B	1	1	30 sec	150	135	109.0	(3)		(3)
Stdby Gas Treatment Exh. Blower	1GTS*FN1B	1	1	30 sec	60	50.5	41.6	(3)		(3)
Stdby Gas Treatment Heater	1GTS*H1B	1	1	30 sec	72kw	-	72.0	(3)		(3)
Total: 30 Sec Load Block									295.8	
Stdby Service Water Pump	1SWP*P2B	2	2	40 sec	450	413	328.5	(3)		(3,14)
Total: 40 Sec Load Block									328.5	
Control Building Chillers	1HVK*CHL 1B	2	2	60 sec	250	242.6	200.0	(3)		(3,9)
Control Bldg. Air Condition. Unit	1HVC*ACLL1B	1	1	60 sec	75	60	50.0	(3)		(3)
Stdby Swgr Room Air Handling Unit	1HVC*AFU2B	1	1	60 sec	75	63.8	53.0	(3)		(3)
Cont Bldg Chillers-L.O. Pumps	1HVK*CHL1VPL	2	2	60 sec	1.5	1.5	1.4	(3)		(3)
	1HVK*CKL1DPL				1.5	1.5	1.4	(3)		
Total: 60 Sec Load Block									305.8	
Stdby Service Water Pump	1SWP*P2D	2	2	70 Sec	450	413	328.5	(5)		(3,14)
Total: 70 Sec Load Block									328.5	
Auxiliary Building Unit Cooler	1HVR*UC11B	1	1	10 min	75	63.3	52.5	(3)		(3)
Containment Unit Cooler	1HVR*UC1B	1	1	10min	150	83.6	68.0	(3)		(3)
Control Building Chiller	1HVK*CHL1B/1D	2	2	10min	250	242.5	200.0	(3)		(3,9)
Total: 10 Min Load Block									320.5	
Standby Cooling Tower Fans	1SWP*FN1B	10	10	>2.0 HR	40	40	34	(5)		(5,8)
	1SWP*FN1D	10	10	>2.0 HR	40	40	34	(5)		(5,8)
	1SWP*FN1F	10	10	>2.0 HR	40	40	34	(5)		(5,8)
	1SWP*FN1H	10	10	>2.0 HR	40	40	34	(5)		(5,8)
	1SWP*FN1K	10	10	>2.0 HR	40	40	34	(5)		(5,8)
	1SWP*FN1M	10	10	>2.0 HR	40	40	34	(5)		(5,8)
	1SWP*FN1P	10	10	>2.0 HR	40	40	34	(5)		(5,8)
	1SWP*FN1R	10	10	>2.0 HR	40	40	34	(5)		(5,8)
	1SWP*FN1T	10	10	>2.0 HR	40	40	34	(5)		(5,8)
	1SWP*FN1V	10	10	>2.0 HR	40	40	34	(5)		(5,8)
Fuel Pool Cooling Pumps	1SFC*P1B	1	1	>2.0 HR	100	75	62	(5)		(5,8)
Drywell Hydrogen Mixing Fan	1CPM*FN1B	1	1	>2.0 HR	1.5	1.0	0.97	(5)		(5,8)
Stdby Liquid Control Pump	1C41*C001B	1	1	>2.0 HR	40	-	37.3	(5)		(5,8)
Hydrogen Recombiner	1HCS*RBNR1B	1	1	>2.0 HR	75kw	-	75.0	(5)		(5,8)

TABLE 8.3-2b (Cont)

Load Description	Load ID No.	No. on Bus	No. Rec'd	Time Start (1)	Nameplate (2)HP/kW	Running BHP(2)	Running kW(2)	Time Stop	Block Load Total kW	Remarks
Total: >2-hr Load Block									515.27	

Total Load: 3640.78 kW

(See Notes and Load Profile (Fig. 8.3-14b) for Effective Loads)

TABLE 8.3-2c

AUTOMATIC AND MANUAL LOADING OF ESF BUSES

Case III: DGs 1EGS*EG1A and 1EGS*EG1B Operating. DG 1E22*S001G1C has failed.

A. DG 1EGS*EG1A Loads

Load Description	Load ID No.	No. on Bus	No. Rec'd	Time Start (1)	Nameplate (2)HP/kW	Running BHP(2)	Running kW(2)	Time Stop	Block Load Total kW	Remarks
Control Bldg. Chilled Water Pump	1HVK*P1A or 1C	2	1	10 sec	50	37	31.0	(3,5)		(3,15)
Control Bldg. Chilled Cond. Recirc. Pump	1SWP*P3A or 3C	2	1	10 sec	15	6.3	5.6	(3,5)		(3,15)
Equip. Room Air Cond. Unit Motor	1HVC*ACU3A	1	1	10 sec	5	1.93	1.9	(3,5)		(3,15)
Charcoal Filter Heater	1HVC*FLT3AH	1	1	10 sec	23 kW	-	23.0	(3)		(3)
Filter Train Booster Fan	1HVC*FN1A	1	1	10 sec	25	19	16.3	(3)		(3)
Standby Swgr. Room Exhaust Fan	1HVC*FN2A	1	1	10 sec	30	27.4	19.2	(3)		(3)
Battery Room Exhaust Exhaust Fan	1HVC*FN3A/D	2	1	10 sec	1.5	0.9	0.9	(3)		(3)
Auxiliary Bldg Unit Cooler	1HVR*UC2	1	1	10 sec	5	3.22	2.9	(3)		(3)
Auxiliary Bldg Unit Cooler	1HVR*UC3	1	1	10 sec	7.5	5.22	4.7	(3)		(3)
Auxiliary Bldg Unit Cooler	1HVR*UC6	1	1	10 sec	40	39.0	33.0	(3)		(3)
Auxiliary Bldg Unit Cooler	1HVR*UC7	1	1	10 sec	15	11.0	9.6	(3)		(3)
Filter Train Exhaust Blower	1HVF*FN3A	1	1	10 sec	40	30.0	25.0	(3)		(3)
Filter Train Heater	1HVF*FLT2AH	1	1	10 sec	57 kW	-	57.0	(3)		(3)
Standby Serv. Water Pumphouse Supply Fan	1HVY*FN1A	2	1	10 sec	7.5	5.85	5.3	(3)		(3,10)

TABLE 8.3-2c (Cont)

Load Description	Load ID No.	No. on Bus	No. Req'd	Time Start (1)	Nameplate (2) HP/kW	Running BHP(2)	Running kW(2)	Time Stop	Block Load Total kW	Remarks
Pumphouse Supply Fan										
Leakage Cont. Sys Air Compressor	1LSV*C3A	1	1	10 sec	50	50	43.0	(3)		(3)
Motor-Operated Valves	Misc.	Misc.	Misc.	10 sec	-	-	98.0	(3,4)		(4,3)
120-V ac Standby Power	Misc.	Misc.	Misc.	-	50 kW	-	45.0	(5)		(3)
Standby Vital Bus A UPS System	1ENB*INV01A	1	1	10 sec	20 kVA	-	14.0	(5)		(3)
120-V Instrumentation-NSSS	Misc.	Misc.	Misc.	10 sec	10 kW	-	10 kW	(5)		(3)
125-V dc Battery Charger	1ENB*CHGR1A	1	1	10 sec	71.7 kW	-	71.7	(5)		(3)
Radiation Monitoring System	1ME*RMS	1	1	10 sec	20 kW	-	15.0	(5)		(3)
Safety Ltg - Aux Bldg	ILAC-XLC9	1	1	10 SEC	15 kW	-	10.0	(5)		(3,6)
Stdby Cooling Tower #1 Swgr Fan	1HVY*FN2A	2	1	10 sec	3	2.03	2.0	(3)		(3)
Stdby D/G Fuel Trans Pump	1EGF*P1A	1	1	10 sec	3	0.81	0.61	(3)		(3)
Total: 10 Sec Load Block									544.71	
Low Pressure Core Spray Pump	1E21*C001	1	1	12 sec	1,250 hp	1,250	917.2	(11,3)		(3,4)
Total: 12 Sec Load Block									917.2	
Residual Heat Removal Pump A	1E12*C002A	1	1	17 sec	700 hp	630	509.2	(3,15)		(3,15)
Total: 17 Sec Load Block									509.2	

TABLE 8.3-2c (Cont)

Load Description	Load ID No.	No. on Bus	No. Rec'd	Time Start (1)	Nameplate (2)HP/kW	Running BHP(2)	Running kW(2)	Time Stop	Block Load Total kW	Remarks
Std by DG Room Vent Fan	1HVP*FN2A/3A	2	1	30 sec	100	90.2	73.2	(3)		(3)
Annulus Mixing System Fan	1HVR*FN11A	1	1	30 sec	150	135.0	109.0	(3)		
Stdby Gas Treatment Exhaust Blower	1GTS*FN1A	1	1	30 sec	60	50.5	41.6	(3)		
Stdby Gas Treatment Heater	1GTS*H1A	1	1	30 sec	72 kW	-	72.0	(3)		(3)
Total: 30 Sec Load Block									295.8	
Stdby Service Water Pump Motor A	1SWP*P2A	1	1	40 sec	450 hp	413	328.5	(3)		(3,10)
Total: 40 Sec Load Block									328.5	
Control Building Chillers	1HVK*CHL1A/1C	2	2	60 sec	250	242.6	200	(3,15)		(3,15)
Control Room Air Conditioning Unit	1HVC*ACU1A	1	1	60 sec	75	60	50	(3,15)		(3,15)
Stdby Swgr Room Air Handling Unit	1HVC*ACU2A	1	1	60 sec	75	63.8	53	(3,15)		(3,9,15)
Cont Bldg Chillers - L.O. Pumps	1HVK*CH1APL	2	2	60 sec	1.5	1.5	1.4	(3,15)		(3,9,15)
	1HVK*CH1CPL				1.5	1.5	1.4	(3,15)		(3,9,15)
Total: 60 Sec Load Block									305.8	
Cont Bldg Chillers	1HVK*CHL1A/1C	2	2	10 min	250	242.6	200	(3,15)		(3,9,15)
Containment Unit Cooler	1HVR*UC1A	1	1	10 min	150	83.6	68	(3)		(3)
Aux Bldg Unit Cooler	1HVR*UC11A	1	1	10 min	75	63.3	52.5	(3)		(3)
Total: 10 Min Load Block									320.5	
Standby Cooling Tower Fans	1SWP*FN1A	10	10	>2.0 Hr	40	40	34	(5)		(5,8)
	1SWP*FN1C	10	10	>2.0 Hr	40	40	34	(5)		(5,8)

TABLE 8.3-2c (Cont)

Load Description	Load ID No.	No. on Bus	No. Rec'd	Time Start (1)	Nameplate (2)HP/kW	Running BHP(2)	Running kW(2)	Time Stop	Block Load Total kW	Remarks
	1SWP*FN1E	10	10	>2.0 Hr	40	40	34	(5)		(5,8)
	1SWP*FN1G	10	10	>2.0 Hr	40	40	34	(5)		(5,8)
	1SWP*FN1J	10	10	>2.0 Hr	40	40	34	(5)		(5,8)
	1SWP*FN1L	10	10	>2.0 Hr	40	40	34	(5)		(5,8)
	1SWP*FN1N	10	10	>2.0 Hr	40	40	34	(5)		(5,8)
	1SWP*FN1Q	10	10	>2.0 Hr	40	40	34	(5)		(5,8)
	1SWP*FN1S	10	10	>2.0 Hr	40	40	34	(5)		(5,8)
	1SWP*FN1U	10	10	>2.0 Hr	40	40	34	(5)		(5,8)
Fuel Pool Cooling Pump	1SFC*P1A	1	1	>2.0 Hr	100	75	62	(5)		(5,8)
Drywell Hydrogen Mixing Fan	1CPM*FN1A	1	1	>2.0 Hr	1.5	1.0	0.97	(5)		(5,8)
Stdby Liquid Control Pump	1C41*C001A	1	1	>2.0 Hr	40	-	37.3	(5)		(5,7,8)
Hydrogen Recombiner	1HCS*RBNR1A	1	1	>2.0 Hr	75 kW	-	75.0	(5)		(5,8)
Total: >2 Hr Load Block									519.27	

TOTAL LOAD: 3,736.98 kW

(See Notes and Load Profiles (Fig. 8.3-15a and 8.3-15b) for Effective Loads)

TABLE 8.3-2c (Cont)

B. DG 1EGS*EG1B Loads

Load Description	Load ID No.	No. on Bus	No. Rec'd	Time Start (1)	Nameplate (2)HP/kW	Running BHP(2)	Running kW(2)	Time Stop	Block Load Total kW	Remarks
Control Bldg Chilled Water Pump	1HVK*P1B or 1D	2	1	10 sec	50	37	31.0	(3,15)		(3,15)
Cont Bldg Chilled Cond Recirc Pump	1SWP*P3B or 3D	2	1	10 sec	15	6.3	5.6	(3,15)		(3,15)
Equipment Room Air Conditioning Unit	1HVC*ACU3B	1	1	10 sec	5	1.93	1.9	(3,15)		(3,15)
Charcoal Filter Heater	1HVC*FLT3BH	1	1	10 sec	23 kW	-	23.0	(3)		(3)
Filter Train Booster Fan	1HVC*FN1B	1	1	10 sec	25	19	16.3	(3)		(3)
Stdby Swgr Room Exhaust Fan	1HVC*FN2B	1	1	10 sec	30	22.4	19.2	(3)		(3)
Battery Room Exhaust Fan	1HVC*FN3B/E	2	1	10 sec	1.5	0.9	0.9	(3)		(3)
Aux Bldg Unit Cooler	1HVR*UC4	1	1	10 sec	7.5	4.37	4.0	(3)		(3)
Aux Bldg Unit Cooler	1HVR*UC9	1	1	10 sec	30	26	21.8	(3)		(3)
Aux Bldg Unit Cooler	1HVR*UC10	1	1	10 sec	5	1.9	1.7	(3)		(3)
Filter Train Exhaust Blower	1HVF*FN3B	1	1	10 sec	40	30	25.0	(3)		(3)
Filter Train Heater	1HVF*FLT2BH	1	1	10 sec	57 kW	-	57.0	(3)		(3)
Leakage Cont System - Air Comp	1LSV*C3B	1	1	10 sec	50	50	43.0	(3)		(3)
Motor-Operated Valves	Misc.	Misc.	Misc.	10 sec	-	-	98.0	(4,3)		(3,4)
120 V ac Stdby Power	Misc.	Misc.	Misc.	10 sec	50 kVa	-	45.0	(5)		(3)
Stdby Vital Bus B UPS	1ENB*INV01B	1	1	10 sec	20 kW	-	20.0	(5)		(3)
120 V Power - NSSS Instrumentation	Misc.	Misc.	Misc.	10 sec	10 kW	-	10.0	(5)		(3)

TABLE 8.3-2c (Cont)

Load Description	Load ID No.	No. on Bus	No. Rec'd	Time Start (1)	Nameplate (2)HP/kW	Running BHP(2)	Running kW(2)	Time Stop	Block Load Total kW	Remarks
Stdby Cooling Tower Swgr Fan	1HVY*FN2B/2D	2	1	10 sec	3	2.03	2.0	(5, 3)		(3, 12)
Stby Serv Water Pump House Fan	1HVY*FN1B/1D	2	1	10 sec	7.5	5.85	5.3	(5, 3)		(3, 12)
Stdby DG Fuel Transfer Pump	1EGF*P1B	1	1	10 sec	3	0.81	0.61	(3)		(3)
125 V dc Battery Charger	1ENB*CHGR1B	1	1	10 sec	71.7 kW	-	71.7	(5)		(3)
Radiation Monitoring System	1RE*RMS	1	1	10 sec	20 kW	-	15.0	(5)		(3, 6)
Safety Lighting - Aux Building	1LAC-XLC9	1	1	10 sec	15 kW	-	10.0	(5)		(3)
Total: 10 Sec Load Block									528.01	
Residual Heat Removal Pump	1E12*C002C	2	2	12 sec	700	630	509.2	(3, 13, 15)		(3, 13, 15)
Total: 12 Sec Load Block									509.2	
Residual Heat Removal Pump	1E12*C002B	2	2	17 sec	700	630	509.2	(3, 13, 15)		(3, 13, 15)
Total: 17 Sec Load Block									509.2	
Stdby DG Room Vent Fan	1HVP*FN2B/3B	2	1	30 sec	100	90.2	73.2	(3)		(3)
Annulus Mixing System Fan	1HVR*FN11B	1	1	30 sec	150	135	109.0	(3)		(3)
Stdby Gas Treatment Exhaust Blower	1GTS*FN1B	1	1	30 sec	60	50.5	41.6	(3)		(3)
Stdby Gas Treatment Heater	1GTS*H1B	1	1	30 sec	72 kW	-	72.0	(3)		(3)
Total: 30 Sec Load Block									295.8	
Stdby Service Water Pump	1SWP*P2B	2	2	40 sec	450	413	328.5	(3)		(3, 14)

TABLE 8.3-2c (Cont)

Load Description	Load ID No.	No. on Bus	No. Rec'd	Time Start (1)	Nameplate (2) HP/kW	Running BHP(2)	Running kW(2)	Time Stop	Block Load Total kW	Remarks
Total: 40 Sec Load Block									328.5	
Control Bldg Chillers	1HVK*CHL18-1D	2	2	60 sec	250	242.6	200.6	(3,15)		(3,9,15)
Control Bldg Air Conditioning Unit	1HVC*ACU1B	1	1	60 sec	75	60	50.0	(3,15)		(3,15)
Stdby Swgr Room Air Handling Unit	1HVC*ACU2B	1	1	60 sec	75	63.8	53.0	(3,15)		(3,15)
Cont Bldg Chillers - L.O. Pumps	1HVK*CHL1BPL	2	2	60 sec	1.5	1.5	1.4	(3,15)		(3,15)
				60 sec	1.5	1.5	1.4	(3,15)		(3,15)
Total: 60 Sec Load Block									305.8	
Stdby Service Water Pump	1SWP*P2D	2	2	70 sec	450	413	328.5	(5)		(3,14)
Total: 70 Sec Load Block									328.5	
Auxiliary Building Unit Cooler	1HVR*UC11B	1	1	10 min	75	63.3	52.5	(3)		(3)
Containment Unit Cooler	1HVR*UC1B	1	1	10 min	150	83.6	68.0	(3)		(3)
Control Building Chiller	1HVK*CHL1B/1D	2	2	10 min	250	242.5	200.0	(3,15)		(3,9,15)
Total: 10 Min Load Block									320.5	
Standby Cooling Tower Fans	1SWP*FN1B	10	10	>2.0 Hr	40	40	34	(5)		(5,8)
	1SWP*FN1D	10	10	>2.0 Hr	40	40	34	(5)		(5,8)
	1SWP*FN1F	10	10	>2.0 Hr	40	40	34	(5)		(5,8)
	1SWP*FN1H	10	10	>2.0 Hr	40	40	34	(5)		(5,8)

TABLE 8.3-2c (Cont)

Load Description	Load ID No.	No. on Bus	No. Rec'd	Time Start (1)	Nameplate (2)HP/kW	Running BHP(2)	Running kW(2)	Time Stop	Block Load Total kW	Remarks
	1SWP*FN1K	10	10	>2.0 Hr	40	40	34	(5)		(5,8)
	1SWP*FN1M	10	10	>2.0 Hr	40	40	34	(5)		(5,8)
	1SWP*FN1P	10	10	>2.0 Hr	40	40	34	(5)		(5,8)
	1SWP*FN1R	10	10	>2.0 Hr	40	40	34	(5)		(5,8)
Tower Fans	1SWP*FN1T	10	10	>2.0 Hr	40	40	34	(5)		(5,8)
	1SWP*FN1V	10	10	>2.0 Hr	40	40	34	(5)		(5,8)
Fuel Pool Cooling Pump	1SFC*P1B	1	1	>2.0 Hr	100	75	62	(5)		(5,8)
Drywell Hydrogen Mixing Fan	1CPM*FN1B	1	1	>2.0 Hr	1.5	1.0	0.97	(5)		(5,8)
Stdby Liquid Control Pump	1C41*C001B	1	1	>2.0 Hr	40	-	37.3	(5)		(5,8)
Hydrogen Recombiner	1HCS*RBNR2B	1	1	>2.0 Hr	75 kW	-	75.0	(5)		(5,8)
Total Load: >2-Hr Load Block									515.27	

TOTAL LOAD: 3,640.78 kW

(See Notes and Load Profiles (Fig. 8.3-15a and 8.3-15b)for Effective Loads)

NOTES FOR TABLES 8.3-2A, 2B, & 2C

1. The time indicated in this column is reckoned from the instant LOCA and LOOP signals are given to emergency diesel generators. Maximum time for standby diesel generators to start and attain rated speed and frequency, including diesel generator air circuit breaker (ACB) to close, is 10 sec. Time is in seconds unless indicated otherwise.

2. Nameplate horsepower and brake horsepower are supplied by vendors for their furnished equipment. The required kilowatts for each load are calculated by using brake horsepower and the efficiency data supplied by vendors of the respective equipment.

3. This load starts and/or stops automatically with satisfactory complete actuation or energization of its associated pump, valves, pressure or temperature switches' interlocks, or energization of the required buses from the standby power sources.

4. Motor operators of the MOVs stop automatically when the valve action is completed. All MOV loads complete their intended operation and are deenergized within 10 min of diesel generator ACB closing.

5. Started and/or stopped manually by operator.

6. 1LAC-XLC9 has three sources of power from which it may select. This is not tripped on LOCA and is normally connected to diesel generator 1EGS*EG1A.

7. 1C41*C001A and B may be energized at the discretion of the plant operator.

8. These loads shall be manually activated by the operator after LPCS in Case I or RHR C in Case II are manually tripped by the operator.

9. One control building chiller receives an automatic start signal at 60 sec. Due to inherent design, a chiller shall automatically start after a time delay of 10 to 13 sec from receipt of a start signal (i.e., the chiller would start at 70 to 73 sec). The second control building chiller is started automatically at 10 min, when all MOVs have cycled off.

10. 1HVY*FN1A is supplied from diesel generator 1EGS*EG1A. 1HVY*FN1C and 1SWP*P2C are supplied from 1E22*S001G1C independently. The operator shall shutoff either 1HVY*FN1A or 1HVY*FN1C at his discretion if both fans operate simultaneously.

11. The LPCS pump shall be manually tripped after 2 hr or less of operation, but not before it has accomplished its function, to permit additional loading of the diesel generator.

12. One cooling fan shall start at 10 sec. Only one of the two fans shall operate.

13. RHR C pump actuates at 12 sec and RHR B actuates at 17 sec.

14. One standby service water pump is sequenced to start at 40 sec. The second service water pump is started automatically at 70 sec. Since discharge valves associated with each standby service water pump take 30 sec to cycle, actual start of the first service water pump occurs at 30 sec from the diesel generator circuit breaker closing.

15. During LOCA with LOOP concurrent with HPCS diesel generator failure, load reduction of 1EGS*EG1A and 1EGS*EG1B is accomplished by maneuvering the following control building heating, ventilation, and air-conditioning (CB-HVAC) loads:

    Control building chilled water pumps (1HVK*P1A or 1C), chilled condensate recirculation pumps (1SWP*P3A or 3C), and equipment room air conditioning unit (1HVC*ACU3A), which actuate automatically at 10 sec; control building chiller (1HVK*CHL1A) and its associated lubricating oil pump (1HVK*CHL1APL), control room air conditioning unit (1HVC*ACU1A), and standby switchgear room air handling unit (1HVC*ACU2A), which actuate at 60 sec; and control building chiller (1HVK*CHL1C) and its associated lubricating oil pump (1HVK*CHL1CPL), which actuate at 10 min, are manually tripped from diesel generator 1EGS*EG1A by the operator at 20 minutes, after verifying that their redundant units are running satisfactorily on diesel generator 1EGS*EG1B. In this case, RHR pump C operating on 1EGS*EG1B is manually tripped after 2 hrs. or less of operation, but not before it has accomplished its function, to permit additional loading of diesel generator 1EGS*EG1B.

    It should be noted that all components of the Control Building HVAC noted above have to operate as a group. If there is a failure of any of these components in Division B, then the whole load group must be kept operating in Division A (on 1EGS*EG1A), and the corresponding control building HVAC loads in Division B are tripped. In this case, load reduction of diesel generator 1EGS*EG1A is accomplished by manually tripping RHR A after 2.0 hr or less of operation. Tripping of RHR C operating on diesel generator 1EGS*EG1B is not required if RHR A is tripped from diesel generator 1EGS*EG1A.

16. This standby service water pump receives an automatic start signal at 40 sec from LOCA/LOOP occurrence or 30 sec from diesel generator 1EGS*EG1A air circuit breaker closure.

17. 1SWP*P2C shall be delayed to start automatically until 60 sec from the HPCS diesel generator circuit breaker closure. This delay assures eliminating any potential of water hammer in a division piping in the event 1SWP*P2A has previously started.

NOTE: THIS REVISION SUPERCEDES THAT OF RBG-19,576 (11-29-84).

TABLE 8.3-3

HPCS DIESEL GENERATOR LOADING DURING A DBE

Equipment ID No.	Description	Connected Load	Maximum Running Load
1E22*C001	HPCS pump motor	2,500 hp	1,875.0 kW
1SWP*P2C	Standby Service Water Pump Motor	450 HP	328.5 kW[1]
1HVC*FN3F	Gen. Battery Room Exhaust Fan	150 HP	0.9 kW
1HVP*FN6C	Gen. Vent Supply Fan	1.0 HP	0.8 kW
1HVR*UC5	HPCS Pump & Room Unit Cooler	40 HP	28.3 kW
1HVC*FN3C	Battery Room Exhaust Fan	(Redundant)	
1E22*S001DGH	DG IMRS Heater	-	15.0 kW
1EGF*P1C	Fuel Oil Transfer Pump	3.0	0.6 kW
1E22*S001COP	Circulating Oil Pump	1.0	1.0 kW
1E22*S0011CGR	Battery Charger	29 kVA	20.0 kW
1E22*S002PNL	Misc. 120V AC Loads	10 kVA	8.0 kW
1HVP*FN3A	DG Room Vent Fan	100 HP	74.6 kW
Misc. Valves (HPCS)	Max. Coincident Load	36.5 HP	34.0 kW
1HVY*FN1C	Standby Service Water Pump Room Vent Fan	7.5 HP	5.3 kW
1SWP*MOV40C	Standby Service Water Pump Discharge Valve	0.7 HP	0.5 kW
			2,392.5 kW

(1)Standby service w[illegible] pump shall be sequenced to operate at 30 sec after HPCS DG circuit breaker closes.

NOTE: Total running load 2,392.5 kW
HPCS diesel generator continuous rating 2,600 kW
HPCS diesel generator 2,000-hr rating 2,850 kW
HPCS diesel generator 30-min rating 3,050 kW

The continuous rating is subject to 10 percent overload for 2 hr out of a 24-hr period of operation. The 2,000-hr and 30-min ratings are not subject to overload.

TABLE 8.3-7

NON-CLASS 1E EQUIPMENT SUPPLIED FROM
CLASS 1E BUSES

Load	Description	Total Load	Voltage	Class 1E Bus	Function
1BYS-CHGR1A	Normal battery charger (battery 1BYS-BAT01A)	80 kVA	480	1EJS*SWG1A	To allow recharging of normal batteries following sustained loss of offsite power. (Note 1)
1BYS-CHGR1B	Normal battery charger (battery 1BYS-BAT01B)	80 kVA	480	1EJS*SWG1B	To allow recharging of normal batteries following sustained loss of offsite power. (Note 1)
1IHS-CHGR1D	Information handling system battery charger (battery 1IHS-BAT01D)	80 kVA	480	1EJS*SWG2B	Turbine and auxiliary building loads which should remain operating during loss of offsite power. (Note 1)
1NHS-MCC101	Normal motor control center for turbine mezzanine level and auxiliary building	186 kVA	480	1EJS*SWG1B	Turbine and auxiliary building loads which should remain operating during loss of offsite power. (Note 1)
1NHS-MCC102A	Normal motor control center for auxiliary and turbine buildings	192 kVA	480	1EJS*SWG2A	Turbine and auxiliary building loads which should remain operating during loss of offsite power. (Note 1)
1NHS-MCC102B	Normal motor control center for auxiliary and turbine buildings	220 kVA	480	1EJS*SWG2B	Turbine and auxiliary building loads which should remain operating during loss of offsite power. (Note 1)
1HVR-UC1C	Containment unit cooler	150 hp	480	1EJS*SWG2B	To furnish qualified protection for penetration circuit to in-containment unit cooler. (Note 1)
Various	Unqualified heaters furnished with Class IE MOV's	_____	120	Various 120V distribution panelboards	To provide heat to MOV motor and limit switch compartment to reduce condensation. (Note 2)

3

11

INSERT B *

NOTE: 1) Selected non-Class 1E loads, as shown on the above list, are connected to the Class 1E ac system to ensure a continuous supply of power to them during a loss of offsite power. These loads are kept operating during a loss of offsite power to preclude potential equipment damage and to provide additional operational flexibility, but are tripped on LOCA and must be manually restarted.

2) See Insert A

INSERT 'B' FOR TABLE 8.3-7.

TABLE 8.3-7 (cont'd)

LOAD	DESCRIPTION	TOTAL LOAD	VOLTAGE	CLASS 1E BUS	FUNCTION
1C71-P001	RPS Bus	25 kVA (estimate)	120	1RPS*XRC1041	RPS bus is energized from alternate source of power, Class 1E voltage regulating transformer, to ensure availability of NMS during LOOP. (Note 3)
1c71-P002	RPS Bus	25 kVA	120	1RPS*RC1081	RPS bus is energized from alternate source of power, Class 1E voltage regulating transformer, to ensure availability of NMS during LOOP. (Note 3)
1LAC-XLC9	Main Control Room Lighting System Transformer	15 kVA	480	1EHS*MCC14A	To furnish 20% lighting in the Main Control Room upon loss of non-Class 1E sources of power to remaining 80% (Note 4)
1LAC-XLC9	Main Control Room Lighting System Transformer	15kVA	480	1EHS*MCC14B	To furnish 20% lighting in the Main Control Room upon loss of non-Class 1E sources of power to remaining 80% (Note 4)

Insert A for Table 8.3-7

2. Non-Class 1E heaters mounted in safety-related motor operated valves and temporarily connected to Class 1E panelboards during the construction phase are determined at the panelboards after equipment release and prior to exceeding at 5 percent power.

3. The Class 1E voltage regulating transformers is connected to the non-safety related RPS bus panelboard via two series connected independent Class 1E electrical protection assemblies (EPA's) and a circuit breaker and normally open contact in the RPS bus panelboard. The RPS bus is normally energized from a non-Class 1E RPS motor generator set. Upon loss of power from the MG set, the RPS bus can be manually transferred, via a switch in the main control room, to the alternate source upon closure of the normally open contact. The two series-connected Class 1E EPA's, each acting independently, will open circuit during overvoltage, undervoltage or under frequency. Hence, any adverse circuit condition on the non-safety related RPS bus will cause the Class 1E EPA's to open, thus protecting the voltage regulating transformer and its own upstream Class 1E source of power.

4. The lighting transformer, although not procured Class 1E, is identical in design and construction to RBS Class 1E small dry type transformers. It is connected to its Class 1E source of power via series-connected circuit breaker and fuse in the motor control center. Failure of one of these equivalently sized protection devices does not render the other inoperable, thus satisfying the single failure criterion.

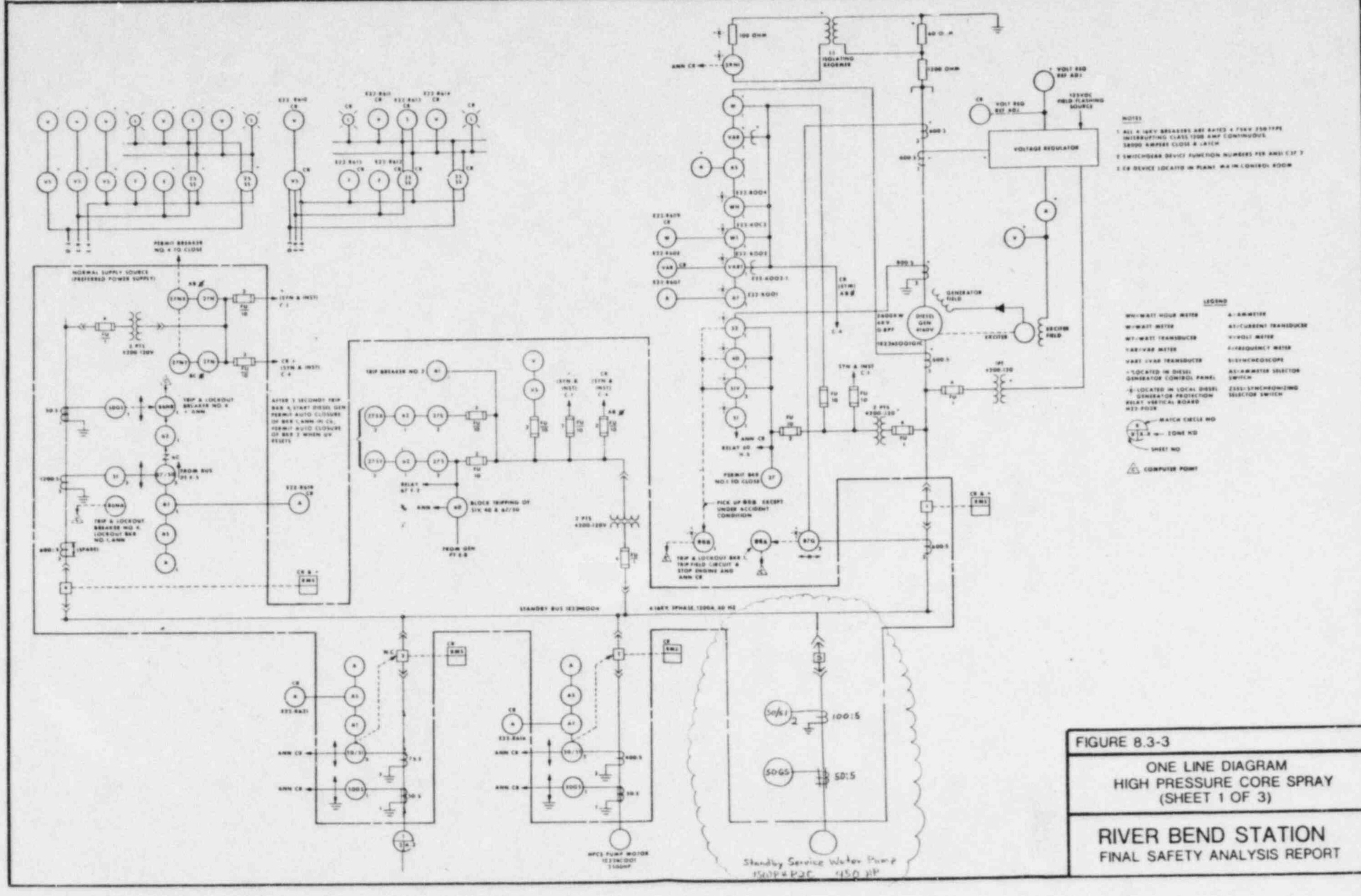

FIGURE 8.3-3

ONE LINE DIAGRAM
HIGH PRESSURE CORE SPRAY
(SHEET 1 OF 3)

RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT

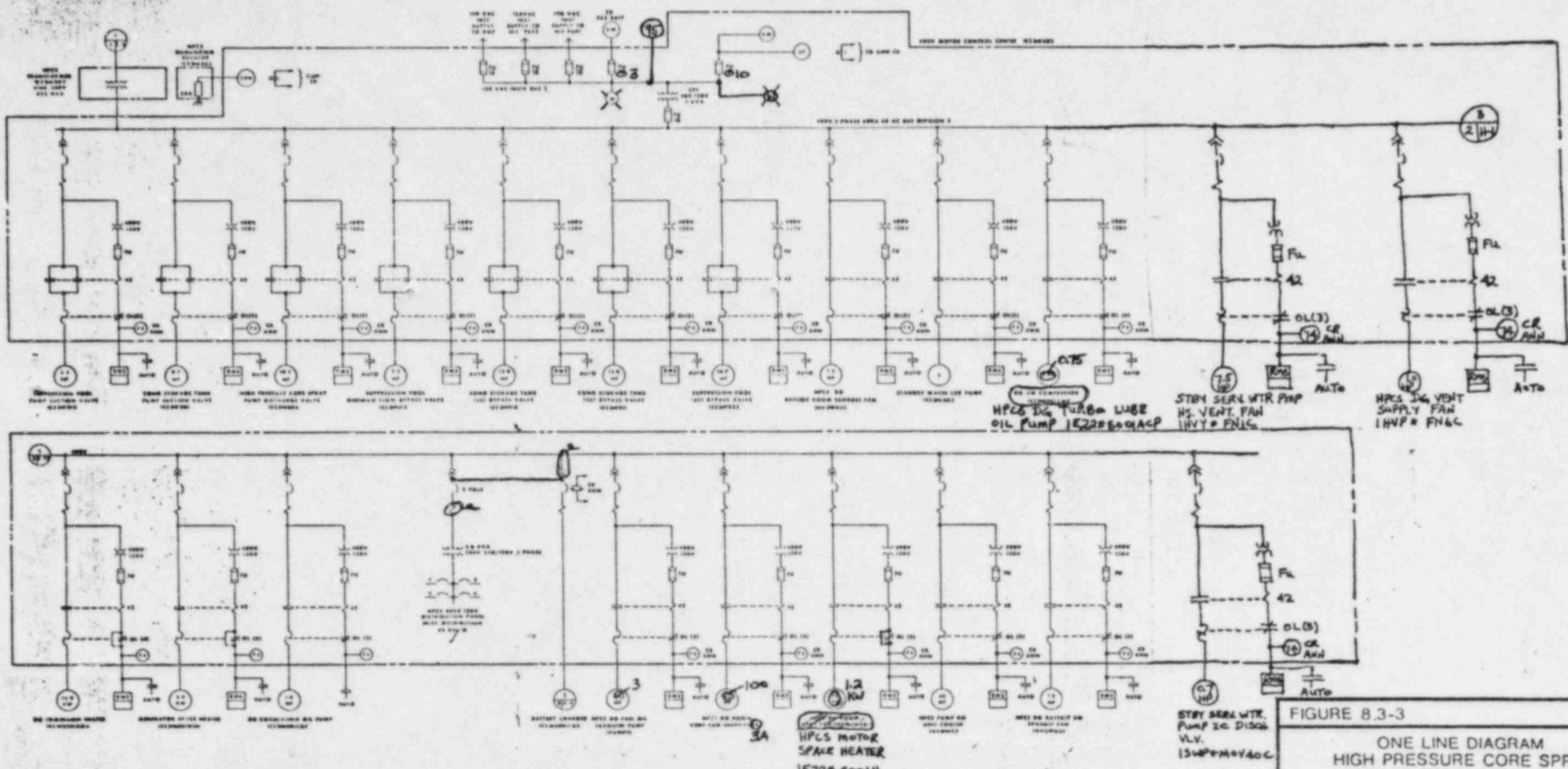

FIGURE 8.3-3

ONE LINE DIAGRAM
HIGH PRESSURE CORE SPRAY
SHEET 2 OF 3

RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT

The next 5 pages are revisions to RBG-19,576 dated 11-29-84.

Insert for Figures 8.3-14a, 15a & 15b.

Insert 1

3. STEADY STATE LOADING IS BASED ON REDUCTIONS OF 98 KW (MOVs) at 10 MIN, AND 917.2 KW (LPCS) AFTER 2.0 HRS OR LESS OF OPERATION FOLLOWING LOCA.

Insert 2

. STEADY STATE LOADING IS BASED ON REDUCTIONS OF 98 KW (MOVs) AT 10 MIN AND 509.2 KW (RHR C)

Insert 3

. STEADY STATE LOADING IS BASED ON REDUCTIONS OF 98 KW (MOVs) AT 10 MIN AND 509.2 KW (RHR A)

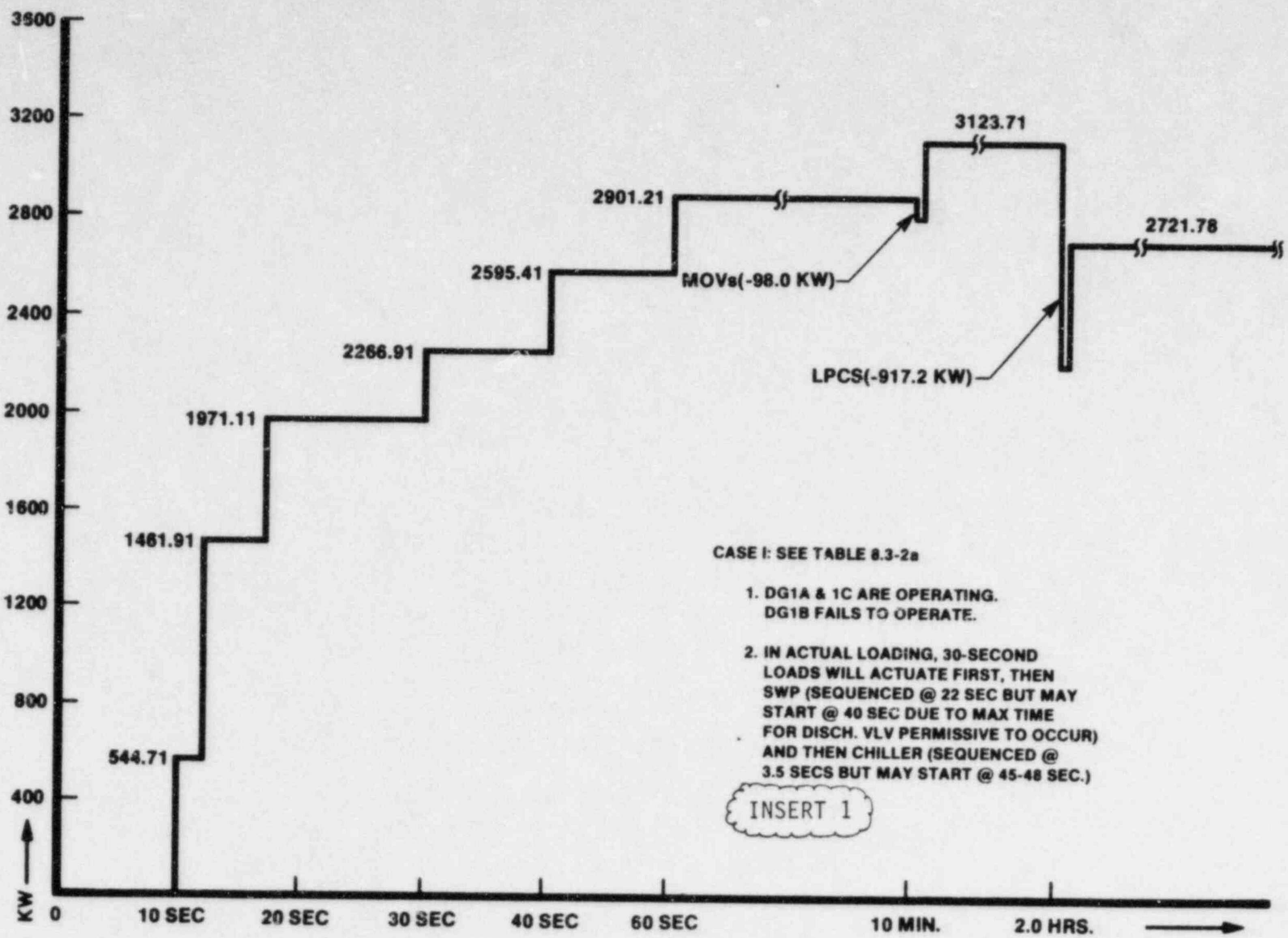
3500
3200
2800
2400
2000
1600
1200
800
400
KW
0
10 SEC
20 SEC
30 SEC
40 SEC
60 SEC
10 MIN.
2.0 HRS.
544.71
1461.91
1971.11
2266.91
2595.41
2901.21
3123.71
2721.78
MOVs(-98.0 KW)
LPCS(-917.2 KW)
CASE I: SEE TABLE 8.3-2a
1. DG1A & 1C ARE OPERATING. DG1B FAILS TO OPERATE.
2. IN ACTUAL LOADING, 30-SECOND LOADS WILL ACTUATE FIRST, THEN SWP (SEQUENCED @ 22 SEC BUT MAY START @ 40 SEC DUE TO MAX TIME FOR DISCH. VLV PERMISSIVE TO OCCUR) AND THEN CHILLER (SEQUENCED @ 3.5 SECS BUT MAY START @ 45-48 SEC.)
INSERT 1

Fig. 8.3-14a

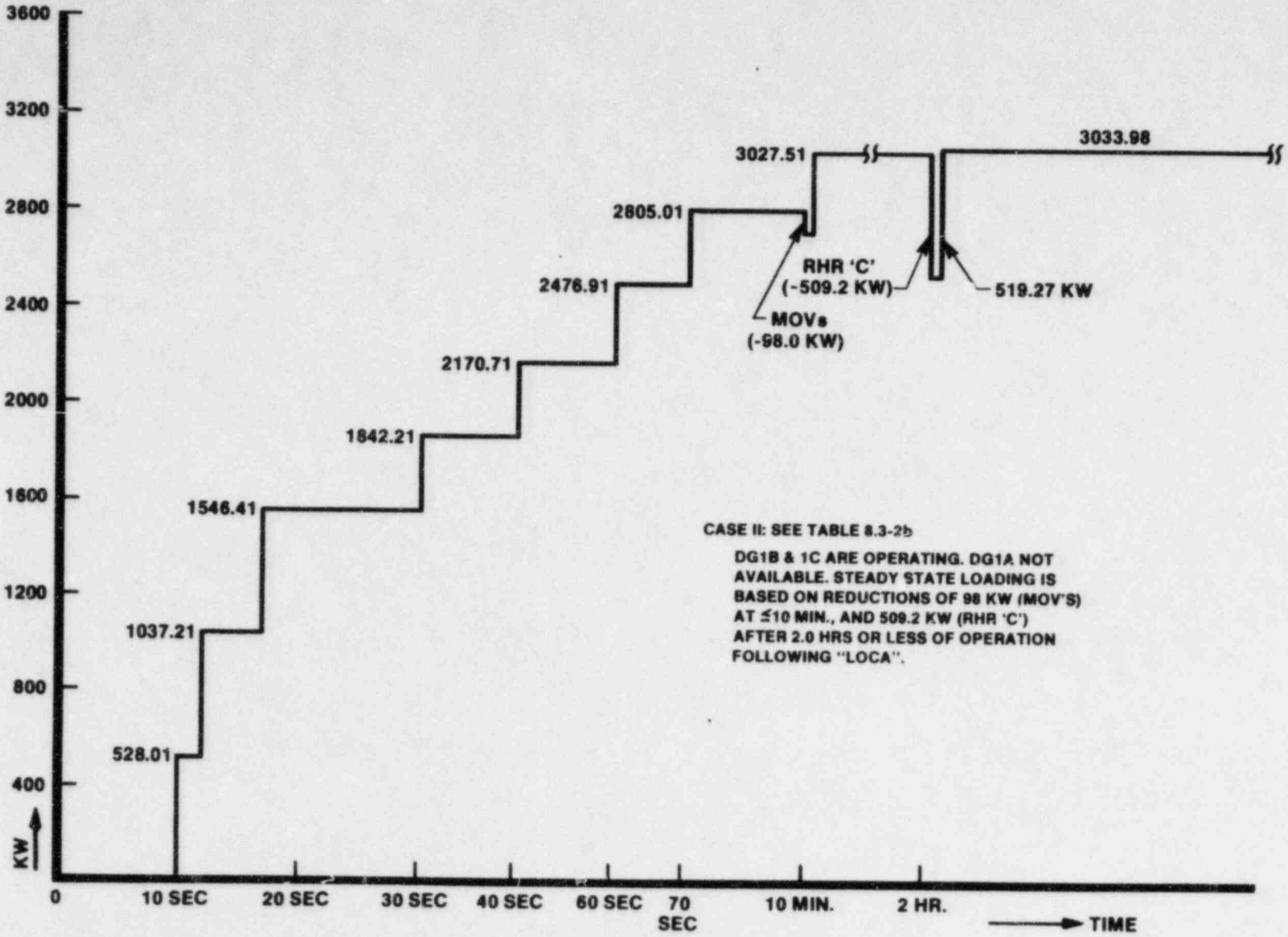
3600
3200
2800
2400
2000
1600
1200
800
400
KW
0
10 SEC
20 SEC
30 SEC
40 SEC
60 SEC
70 SEC
10 MIN.
2 HR.
TIME
528.01
1037.21
1546.41
1842.21
2170.71
2476.91
2805.01
3027.51
3033.98
RHR 'C' (-509.2 KW)
MOVs (-98.0 KW)
519.27 KW
CASE II: SEE TABLE 8.3-2b
DG1B & 1C ARE OPERATING. DG1A NOT AVAILABLE. STEADY STATE LOADING IS BASED ON REDUCTIONS OF 98 KW (MOV'S) AT ≤10 MIN., AND 509.2 KW (RHR 'C') AFTER 2.0 HRS OR LESS OF OPERATION FOLLOWING "LOCA".

Fig. 8.3-14b

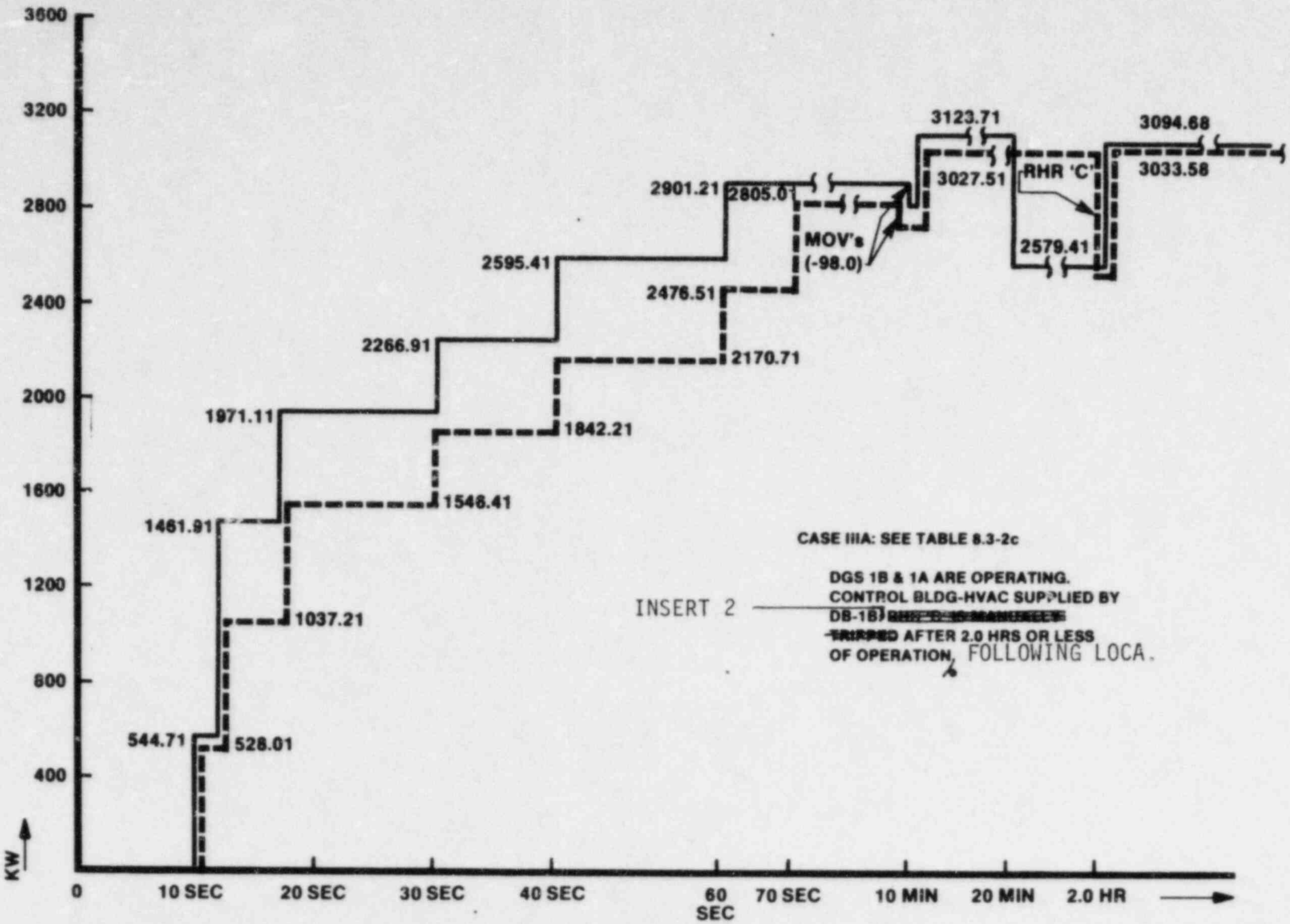
3600
3200
2800
2400
2000
1600
1200
800
400
KW
0
10 SEC
20 SEC
30 SEC
40 SEC
60 SEC
70 SEC
10 MIN
20 MIN
2.0 HR
544.71
528.01
1461.91
1037.21
1971.11
1546.41
2266.91
1842.21
2595.41
2170.71
2476.51
2901.21
2805.01
MOV's (-98.0)
3123.71
3027.51
RHR 'C'
2579.41
3094.68
3033.58
CASE IIIA: SEE TABLE 8.3-2c
DGS 1B & 1A ARE OPERATING.
CONTROL BLDG-HVAC SUPPLIED BY
DB-1B, ~~RHR 'D' IS MANUALLY~~
~~TRIPPED~~ AFTER 2.0 HRS OR LESS
OF OPERATION, FOLLOWING LOCA.
INSERT 2

Fig. 8.3-15a

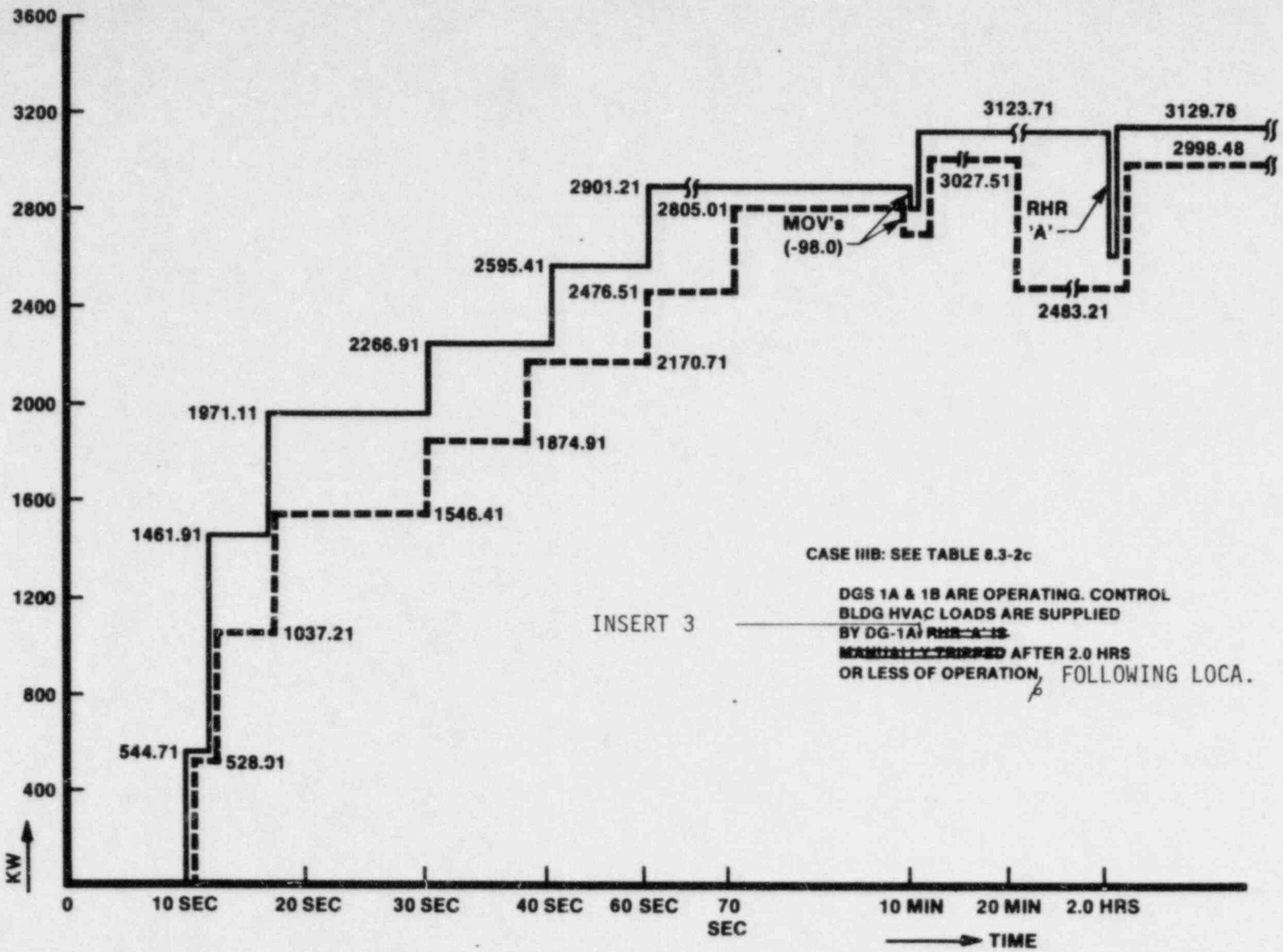
3600
3200
2800
2400
2000
1600
1200
800
400
KW
0
10 SEC
20 SEC
30 SEC
40 SEC
60 SEC
70 SEC
10 MIN
20 MIN
2.0 HRS
TIME
544.71
528.01
1461.91
1037.21
1971.11
1546.41
2266.91
1874.91
2595.41
2170.71
2476.51
2901.21
2805.01
MOV's (-98.0)
3123.71
3027.51
RHR 'A'
2483.21
3129.78
2998.48
CASE IIIB: SEE TABLE 8.3-2c
DGS 1A & 1B ARE OPERATING. CONTROL
BLDG HVAC LOADS ARE SUPPLIED
BY DG-1A ~~RHR 'A' IS~~
~~MANUALLY TRIPPED~~ AFTER 2.0 HRS
OR LESS OF OPERATION FOLLOWING LOCA.
INSERT 3

Fig. 8.3-15b

2. The system automatically performs its emergency cooling function assuming any single active or passive failure coincident with a loss of offsite power.

3. The system is designed to Safety Class 3 requirements, as defined in Section 3.2.3.3 for pumps, piping, and valving.

4. The system is designed to Seismic Category I requirements, as defined in Section 3.7.

5. Protection is provided from extreme natural phenomena such as earthquakes, tornadoes, and floods, as described in Sections 3.2, 3.3, 3.5, and 3.8.

6. Protection is provided from the effects of externally and internally generated missiles, as described in Section 3.5.

7. Protection is provided from the effects of pipe whip and jet impingement from high- and moderate-energy line breaks, as described in Section 3.6.

mechanical subsystems

8. Fire cannot render both redundant ~~Divisions I and II of the system~~ inoperable (Section 9.5.1).

~~9. Interconnection of the ultimate heat sink between the River Bend Station's two units does not compromise the intended safety function, as described in Section 3.1.2.~~

9. ~~10.~~ Redundancy is provided to permit isolation of inoperable components, subsystems, or piping without compromising their intended safety functions, as described in Section 9.2.7.3.

10. ~~11.~~ Provision is provided to permit operational functional testing of safety-related equipment during shutdown, as described in Section 9.2.7.4.

11. ~~12.~~ Nonseismic pipe, ductwork, or components are analyzed to ensure that their failure or collapse during an SSE does not compromise the system's safety function.

The essential components served by the standby service water
15 system are listed in Table 9.2-14. These and other major
components and their design data are listed in Table 9.2-15.
Interfaces between the normal cooling water supply and the
standby service water system terminate in a Safety Class 3
check valve to allow for automatic initiation of standby
cooling upon loss of normal cooling.

During operation, the standby service water pumps take suction from the standby cooling tower water storage basin, which is maintained at a water level of approximately 113 ft 4 in msl, as described in Section 9.2.5.

The water level should be +66 ft msl after 30 days of
operation without makeup, as described in Section 9.2.5.
The standby service water pumps are specified to have the
minimum pump submergence required to operate at the extreme
15 low water level of 65 ft 0 in msl.

Service water pump motors are mounted above el 118 ft 4 in msl (Fig. 9.2-23) in the standby service water pumpwell (SSWP). The maximum flood level for this area is 95 ft 1 in msl (Section 2.4.2), and maximum basin water level is 115 ft msl, which corresponds to the water level in the basin at overflow conditions. Electrical components for the standby service water pumps are located at a minimum of 20 ft above the probable maximum flood level.

The standby service water pumps are capable of operating
within the extremes of maximum and minimum basin water
level. Basin level is manually controlled to maintain the
15 water level at el 113 ft 4 in, which is the minimum required
basin operating level.

Electric power for the standby service water system may be
supplied from either the preferred or standby power
supplies. The preferred power supply is drawn from either
of two offsite power sources. Standby electrical power is
provided from Class 1E systems (Section 8.3.1). Standby
service water pump~~s~~ 2A ~~and 2C are~~ is supplied by the 4-kV bus 1EGS*EG1A
15 to which standby diesel generator ~~1A~~ is connected. Pumps 2B
and 2D are supplied from the 4-kv bus to which standby diesel
15 generator ~~1D~~ 1EGS*EG1B is connected. Standby service water pump 2C is supplied by the 4-kv bus to which HPCS diesel generator 1E22*S001 is connected. Details on the electric system
are discussed in Section 8.3.1.

A corrosion allowance of 0.125 in has been provided for all standby service water system piping to prevent the degradation of system performance by long-term corrosion.

standby service water system and components is described in Section 9.2.5.

Service water flow rate to the main control room chilled water chillers is based upon heat removal requirements with the chilled water system at maximum capacity, i.e., maximum ambient temperature plus maximum heat gain from control building equipment. Service water flow rate to the diesels is based on diesels operating at rated capacity for the accident duration. RHR heat exchanger flow rates are based on heat transfer requirements for fully fouled heat exchangers, as are flow rates for the containment unit coolers.

Maximum standby service water flow requirements total 6,950 gpm per pump. An additional flow margin is available through specification of 7,690 gpm pump capacity. Standby cooling tower heat removal capacity is discussed in Section 9.2.5.

During the initial phase of recovery from a LOCA, all Standby Service Water Pumps start automatically although one standby service water pump satisfies the cooling requirements of all the previously listed equipment, except the RHR heat exchangers. RHR heat exchangers are not required during this phase of recovery. When the residual heat removal heat exchangers are required, two standby service water pumps must operate. Automatic isolation of the normal service water header serving the control, diesel generator, and auxiliary buildings allows standby service water to cool essential components within these buildings under all accident conditions. Each standby service water system can, if required, be isolated into two separate redundant standby service water systems by closing the appropriate isolation valves.

The two redundant systems merge to supply a single component in two locations. These are:

1. HPCS diesel generator jacket water cooler

2. HPCS pump room unit cooler.

In these locations, component cooling water supply lines are provided with motor-operated valves and check valves, while return lines are provided with motor-operated valves. These valves can be closed by operator action, either to isolate the component should a failure occur, or to isolate an operating SSW system from an inoperable redundant system.

and with offsite power available,

On loss of pressure to the normal service water or reactor plant component cooling water systems, the standby service water pumps and standby cooling tower fans start without introducing transients on the reactor coolant pressure boundary. At the same time, the normal service water is isolated automatically and the standby service water system lines are opened to the required components. If the standby service water pumps and fans are operating and a loss of offsite power occurs, the pumps and fans trip. Upon transfer to standby diesel generator power, the pumps and fans restart according to the load sequencing and maximum elapsed time listed in Tables 8.3-2 for the ~~standby~~ diesel generators.

emergency

2A, 2B, and 2C and 8.3-3

Initiation of the SSW system is described in Section 7.3.1.1.8. SSW system control logic is shown in Fig. 7.3-11.

or loss of any single emergency power supply, ie. Division I, II, or III power,

The standby service water system is capable of accommodating any single component failure without affecting the overall system capability of effecting safe shutdown and cooldown or postaccident heat dissipation, as detailed in Table 9.2-16 and the FMEA. Operator actions may be required to isolate a failed component from the remainder of the standby service water system, or to transfer cooling to the redundant portion of the system, if the redundant portion was in a shutdown state. A transient analysis was performed based on the following initial conditions:

Insert A

1. A main steam line (or recirculation suction line) double-ended-rupture (DER) long-term response

2. The redundant portion of the system is in a shutdown state

3. Suppression pool temperature has not yet peaked.

A single passive or active failure (e.g., fan trip, flow, level, pressure, or temperature condition) in the standby service water system initiates an alarm in the main control room. Upon annunciation, the operator responds by initiating the necessary valve action to isolate standby service water to the independent redundant portion of the system or to isolate a failed component or portion of the system initiating the alarm condition from the remainder of the standby service water system. The conservative assumption is made that standby service water to the residual heat removal heat exchanger in the suppression pool cooling mode is lost for 10 min while the operator is establishing shell-side flow to the residual heat removal

Insert A

A failure of Division I power results in the unavailability of 1SWP*P2A and associated motor operated isolation valves. Pump 1SWP*P2C starts automatically on Division III power but is not required since the 100% redundant "B" subsystem is fully operable on Division II power.

Operator action to close NSW return valve is required after 20 minutes to limit water loss from the unisolated A subsystem to the non-safety related normal service water subsystem.

A failure of Division II power results in a loss of the "B" subsystem. Division I pump 1SWP*P2A and Division III pump 1SWP*P2C in the "A" subsystem operates to provides all required cooling.

A failure of Division III power will result in the unavailability of 1SWP*P2C. The three operable pumps will provide for all short term cooling requirements. With the HPCS pump unavailability due to the loss of Division III power operator action is required after 20 minutes to permit cooling of two RHR heat exchanger trains. The fully operable "B" subsystem can handle RHR heat exchanger cooling with two pumps. Operator action is required to limit water demands on the remaining "A" subsystem pump 1SWP*P2A to the following essential equipment.

RHR heat exchangers train "A"

RHR pump cooler

Auxiliary Building Unit Coolers

Standby Diesel Generator "A"

heat removal heat exchanger in the redundant portion of the system. A transient analysis indicates that the suppression pool temperature increase is less than 1°F, and the containment pressure increase is less than 0.1 psi. This transient analysis shows that the design objectives of the system can be met following the failure of a single component. No components of the standby service water system are shared between Units 1 and 2. Interconnection of the ultimate heat sink components is discussed in Section 9.2.5.

Large-scale leakage from the standby service water system due to major piping or component failures can be detected by the following methods:

1. Standby service water flows in each redundant header are monitored in the pump discharge and tower return headers and displayed on the standby service water flow recorder. A mismatch in these flows indicate large-scale leakage.

2. Pump discharge header pressure transmitters alarm if the header pressure drops below 85 percent of the required header pressure.

Small-scale leakage from standby service water piping or components can be detected by the following methods:

1. Routine maintenance and inservice inspection

2. Monitoring building and tunnel sump levels

3. Monitoring the operation of components cooled by the standby service water system.

9.2.7.4 Testing and Inspection Requirements

The standby service water pumps are tested at regular intervals to ensure their availability. Isolation valves are also tested on a periodic basis to ensure their operability. The system can be proven operable during refueling shutdown by removing decay heat from reactor core through the residual heat removal (RHR) system heat exchangers.

The standby service water pumps (4) for RBS have been
identified as deep draft pumps as described in I&E Bulletin
11 79-15, dated July 1979. The program for assuring long-term
operability for these pumps is described below.

TABLE 9.2-13

STANDBY SERVICE WATER SYSTEM
SAFEGUARD EQUIPMENT STATUS FOLLOWING A DBA

Component[1]	0-~~10~~ 20 min	~~10-30 min~~	~~30~~ 20 min-~~6~~ 2 hr	~~6~~ 2 hr-24 hr	24 hr-30 day
RHR Pump A	Off	~~Operating~~	Operating	Operating	Operating
~~RHR Pump C~~	~~Operating~~	~~Operating~~	~~Operating~~	~~Operating~~	~~Operating~~
RHR Heat Exch A	Off	~~Operating~~	Operating	Operating	Operating
HPCS Pump	Operating	~~Operating~~	Operating	Operating	Operating
LPCS Pump	Operating	~~Off~~	Off	Off	Off
SSW Pump A	Operating	~~Operating~~	Operating	Operating	Operating
SSW Pump C	~~Off~~ operating	~~Operating~~	Operating	Operating	Operating
SCT Fans A-E	~~Operating~~ off	~~Operating~~	~~Operating~~ off	Operating	Operating
SCT Fans L-P	Off	~~Operating~~	~~Operating~~ off	Operating	Operating
SDG A	Operating	~~Operating~~	Operating	Operating	Operating
HPCS DG	Operating		Operating	Operating	Operating

[1]Loop A only is assumed to operate following DBA.

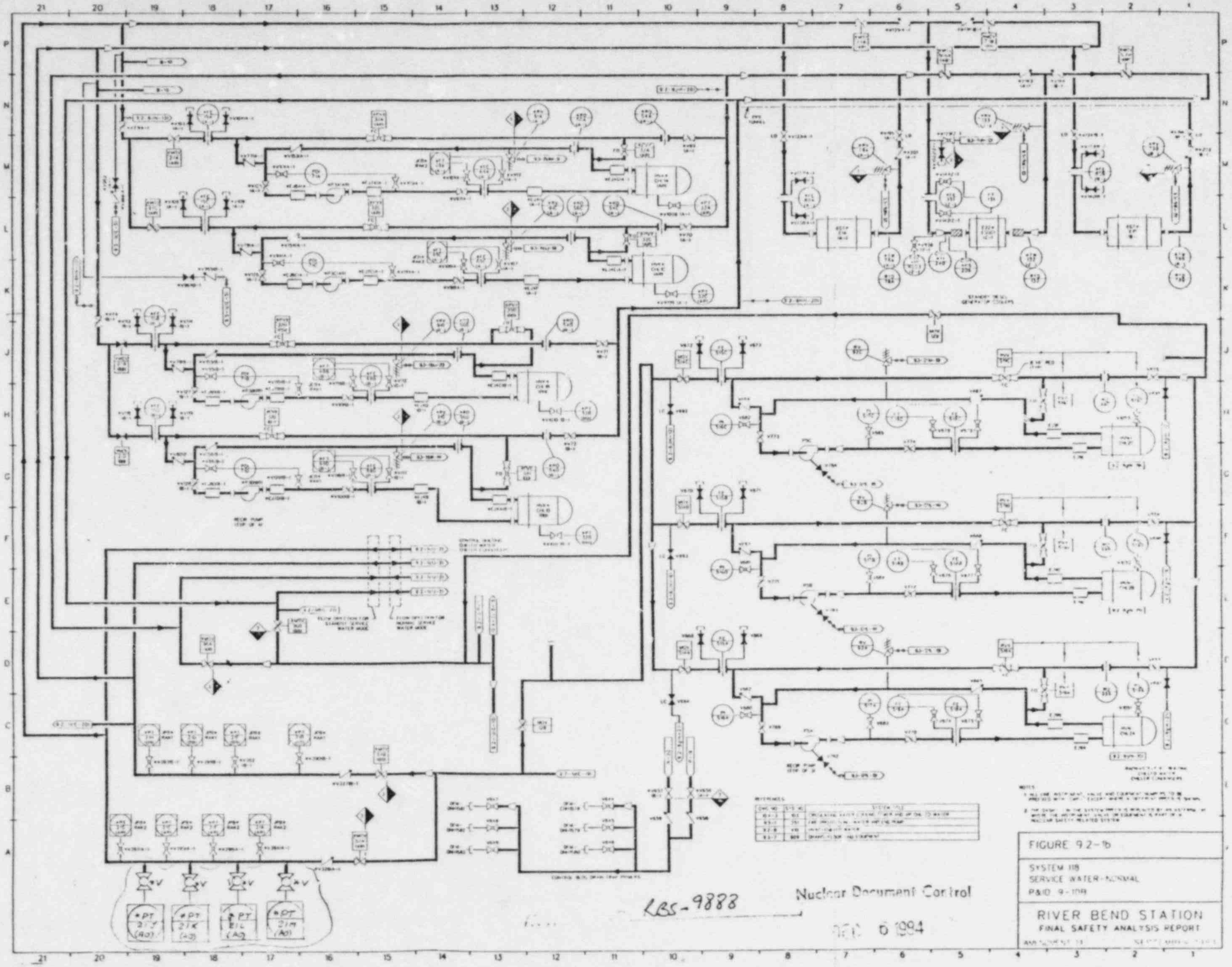
FIGURE 9.2-1b
SYSTEM 118
SERVICE WATER-NORMAL
P&ID 9-10B
RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT
Nuclear Document Control
LBS-9888
DEC 6 1984

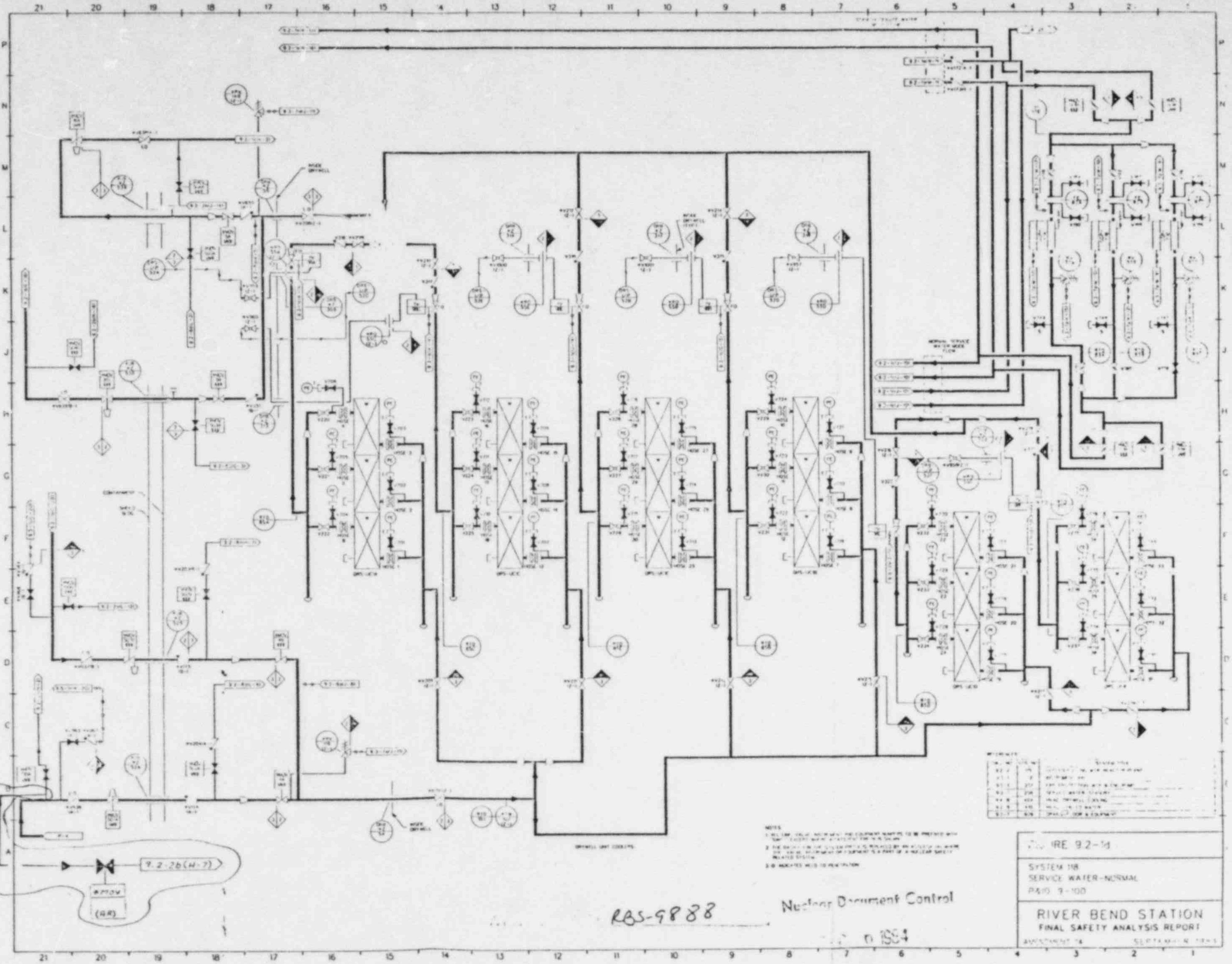

FIGURE 9.2-1d
SYSTEM 118
SERVICE WATER-NORMAL
P&ID 9-10D
RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT
9.2-26(H-7)
RBS-9888
Nuclear Document Control

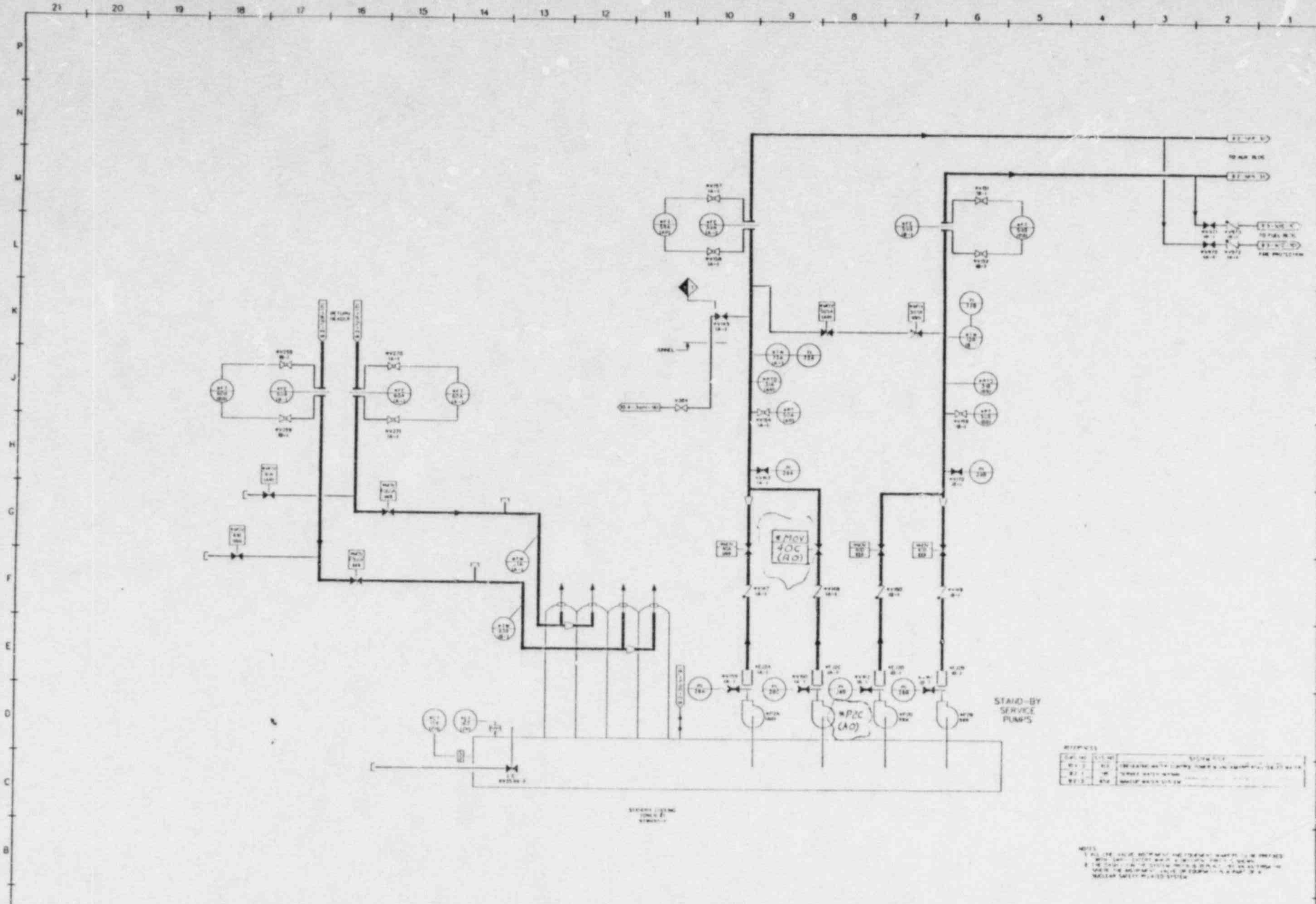

FIGURE 9.2-1e

SYSTEM 256
SERVICE WATER – STANDBY
P&ID 9-10E

RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT
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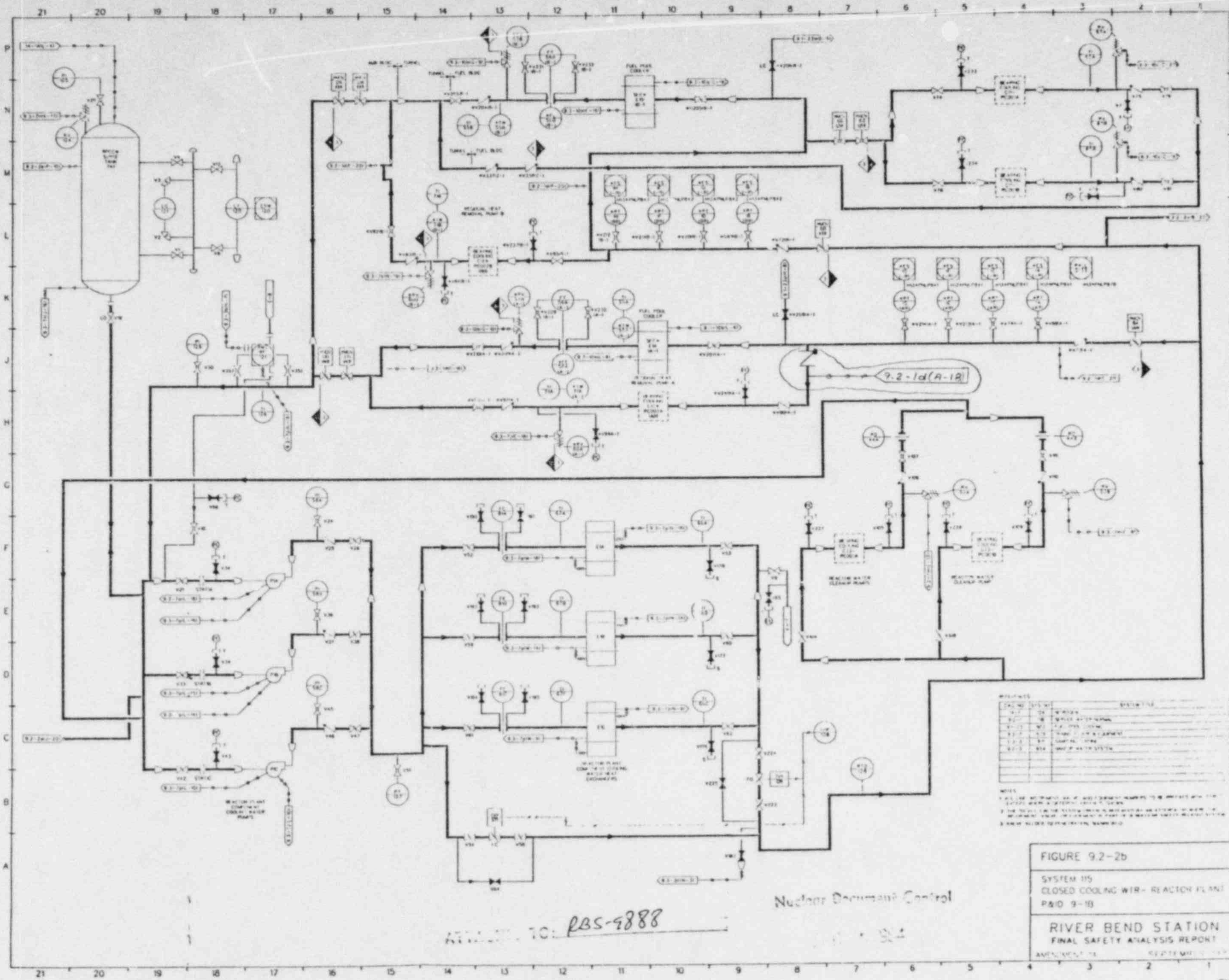

FIGURE 9.2-2b
SYSTEM 115
CLOSED COOLING WTR - REACTOR PLANT
P&ID 9-18
RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT
9.2-1d(A-1R)
REACTOR PLANT COMPONENT COOLING WATER PUMPS
REACTOR WATER CLEANUP PUMPS
FUEL POOL COOLER
Nuclear Document Control
RBS-4888

the emergency standby exhaust fan (FN3A, B) of either Room A or B activates a standby diesel generator inoperative alarm in the main control room. An inoperative condition of the Room C emergency ventilation system exhaust fan (FN5A) and similar conditions for the Room C emergency ventilation system standby exhaust fan (FN5B) activates a diesel generator Room C emergency ventilation system inoperative alarm in the main control room. During loss of offsite power, the emergency exhaust fan or emergency standby exhaust fan starts up after a preset time of sustained bus voltage. Emergency exhaust fan trouble alarms are activated in the main control room for each diesel generator room if the emergency exhaust fans and emergency standby exhaust fans are not running after 1 min of diesel generator operation, or if there is a high diesel room temperature or auto-trip of either of the emergency exhaust fans or emergency standby exhaust fans of Room A or B.

Control switches are provided in the main control room for either automatic or manual operation of the diesel generator control room ventilation supply fan (FN6A, B, C). In the automatic mode, the fan starts up if the ambient temperature in the diesel generator control room rises above 75°F, and stops if the ambient temperature falls below 65°F.

9.4.5.5.3 Standby Service Water Pump House Ventilation System

Control switches are provided in the main control room for either automatic or manual operation of the SSW pump house pump room fans (FN1A, B, C, D) and switchgear room fans (FN2A, B, C, D). Control logic is provided to stop a fan which has been running for 10 sec when the fan discharge air flow is below a preset limit. This condition activates an SSW pump house fan trouble alarm in the main control room. In the automatic mode, SSW pump house pump room or switchgear room high temperature automatically starts the
15 respective SSW pump house fan. When the room temperature returns to normal, the fan which is running stops. A SSW pump house ventilation system inoperative alarm is provided in the main control room for each division.

15 Control switches are provided in the main control room for manual, automatic, or backup operation of remote intake air room ventilation fans (FN32A, B) in the SSW pump area. The ventilation fan starts and stops automatically to control the room temperature and humidity within preset limits. Duct heaters (CH6A, B) provide heating to control humidity and low room temperature when the ventilation fan is required to run to control these parameters. A running fan

Local control switches and indicating lights are included with remote shutdown panel transfer switches, which isolate the controls of SSW pumphouse pump room fans (FN1A,C) and switchgear foom fans (FN2A,C).

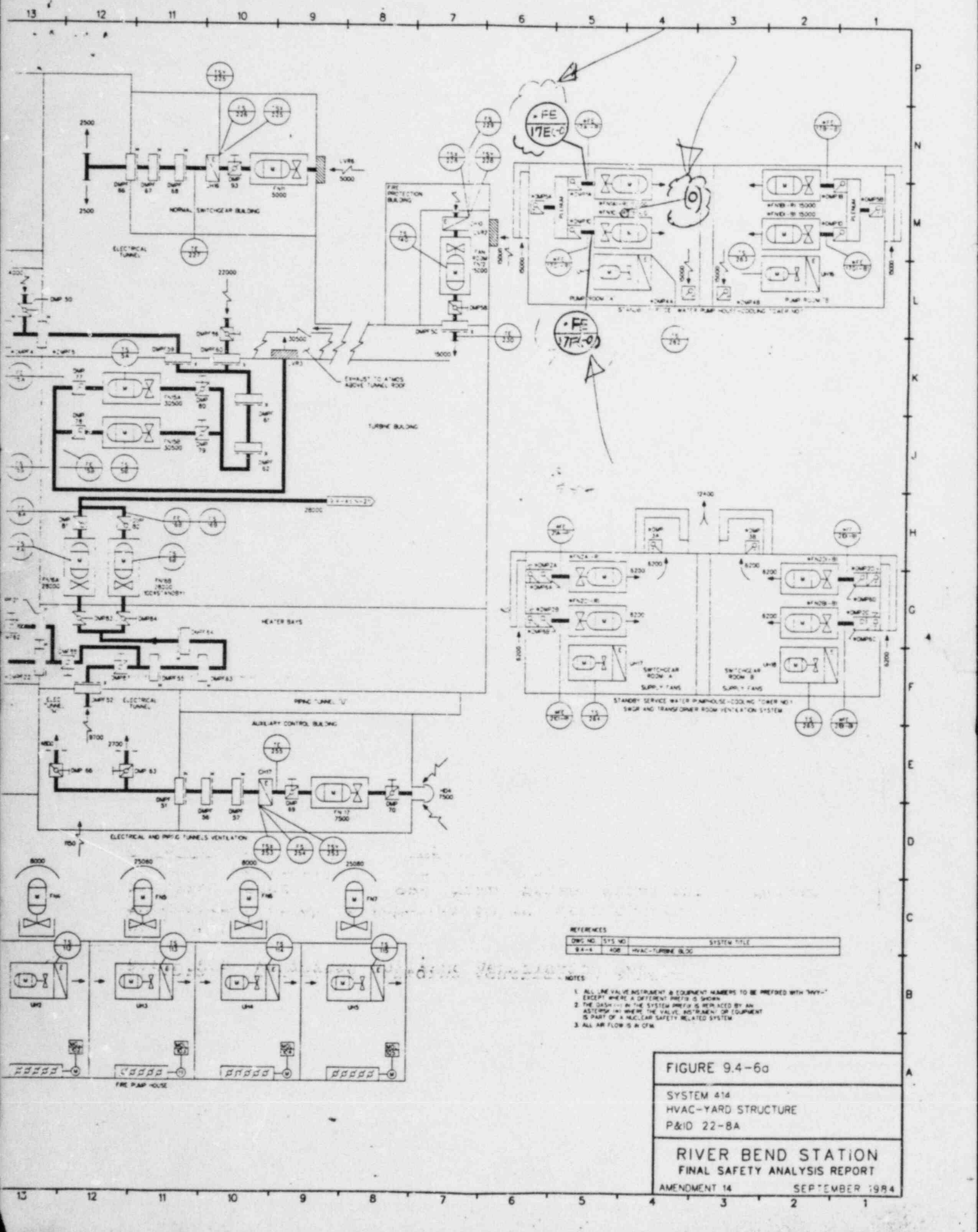

FIGURE 9.4-6a

SYSTEM 414
HVAC-YARD STRUCTURE
P&ID 22-8A

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