REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8001220418 DOC.DATE: 80/01/14 NOTARIZED: NO DOCKET #
FACIL:50-250 Turkey Point Plant, Unit 3, Florida Power and Light C 05000250
50-251 Turkey Point Plant, Unit 4, Florida Power and Light C 05000251
AUTH.NAME AUTHOR AFFILIATION
UHRIG,R.E. Florida Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
SCHWENCER,A. Operating Reactors Branch 1

SUBJECT: Forwards responses to NRC 791212 ltr re Lessons Learned Task Force recommendations,Items 2.1.7.a & 2.1.7.b,Auxiliary feedwater sys is automatically initiated except for steam generator level maint.

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	22 REAC SFTY BR	1	1	23 PLANT SYS BR	1	1
	24 EEB	1	1	25 EFLT TRT SYS	1	1
	3 LPDR	1	1	4 NSIC	1	1
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P.O. BOX 529100, MIAMI, FL 33152

FLORIDA POWER & LIGHT COMPANY

January 14, 1980
L-80-22

Office of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Schwencer:

Re: Turkey Point Units 3 & 4
Docket Nos. 50-250 and 50-251
Auxiliary Feedwater System

The attached information is submitted in response to your letter of December 12, 1979 regarding Lessons Learned recommendations 2.1.7.a and 2.1.7.b.

The referenced blue prints are being duplicated and will be forwarded when available.

Very truly yours,

Robert E. Uhrig

Robert E. Uhrig
Vice President
Advanced Systems & Technology

REU/MAS/RJA/ah

Attachments 3

cc: J. P. O'Reilly, Region II
Harold F. Reis, Esquire

A039
S 3/3

8001220418

ATTACHMENT 1

Re: Turkey Point Units 3 & 4
Docket Nos. 50-250 & 50-251
Auxiliary Feedwater System
Lessons Learned Item 2.1.7.a

System Description

The auxiliary feedwater system (AFWS) for the Turkey Point plant (Units 3 & 4) consists of three steam turbine driven pumps. All three pumps are aligned to deliver feedwater to all three generators of either unit. Each pump normally delivers 600 gpm (@2775 ft. head) feedwater to the three steam generators (SG) in each unit. The control room operator can manually direct flow from the pumps to any one or all three steam generators of either unit. Under a design basis accident, only one pump would be required in order to cool that plant down to a condition where the RHR system can be put into operation to continue the safe plant shutdown process.

Primary water supply for the AFWS comes from the seismic Category I condensate storage tanks (CST) of both units. Each CST has a capacity of 250,000 gallons with a minimum reserved storage capacity of 185,000 gallons of demineralized water. With this quantity of water, the unit can be kept at hot standby condition for 15 hours and then cooled to 350 F, at which point the RHR system can be put in service, or the unit can be kept at hot standby condition for about 23 additional hours. All the manually operated valves associated with CST's are locked open. A secondary water supply comes from the non-seismic Category I water treatment system. An additional feedwater supply can be provided from the main feedwater system of the adjacent Units 1 & 2 (non-nuclear power plant).

Components - Design, Classification

The AFWS is designed according to seismic Category I requirements. The AFWS is classified as an engineered safety related system and its associated instrumentation and controls are designed accordingly.

Power Sources

The turbine driven pumps are supplied with steam from the main steam line of either or both units upstream of the MSIV. The AFW auto initiation system selects the steam supply from the Unit which has lost its normal feedwater supply. The turbines have an atmosphere exhaust. Steam can also be manually supplied from the Unit having normal feedwater supply and from an auxiliary steam system connection to Units 1 & 2. The turbine driven pump steam supply line has a normally closed AC motor operated valve in series with a normally closed DC solenoid air operated pressure control valve. The pump

discharge control valves are DC solenoid/air operated valves. The air supply for all valves are backed by a seismically qualified nitrogen supply that automatically initiates on loss of normal air supply.

Controls

The steam generator water level is manually controlled by the control room operator using either one or all of the DC solenoid/air operated flow control valves by setting the required flow on the flow indicator located in the control room.

Local manual operation of these valves can be performed in the unlikely event of loss of all instrument air. The AFW pump feedwater discharge rate is always greater than the turbine steam consumption when the steam pressure is higher than 120 psig. When the steam pressure is reduced to 120 psig, the RHR system is started and the AFW pumps are shut down.

Information Available to Operator

Low water level in the condensate storage tank will alarm and annunciate in the main control room. In addition, AFW flow indication, SG water level, and control valve position demand signal indication are provided in the control room.

Initiating Signals for Automatic Operation

All three AFW pumps will automatically start by any of the following signals:

(a) safety injection
(b) low-low water level in any of the three steam generators
(c) loss of voltage on both 4160V buses
(d) loss of both main feedwater pumps

Any one of these signals will automatically open the normally closed motor operated valve and air operated pressure control valve in series which isolate the main steam line from the steam supply header of each AFW pump turbine. Air to operate the AFW flow control system to the steam generators is supplied when the steam supply valves commence opening. The AFWS can also be started manually in the control room or from the local station.

Criteria Compliance

1. NRC The design shall provide for the automatic initiation of the auxiliary feedwater system.

   FPL As shown in the preceding description, the AFWS is automatically initiated. Any one of the following

signals will initiate the automatic opening of the steam supply valves and auxiliary feedwater control valves.

1. safety injection
2. low-low level in any of the three steam generators
3. loss of voltage on both 4160V buses
4. loss of both feedwater pumps under normal operating conditions.

However, the feedwater regulator valves in the system as historically operated are normally closed and are modulated by operator action from the Control Room to maintain steam generator level. The Auxiliary Feedwater System has been operated with the feedwater regulator valves normally closed because it was felt the pumps performed better that way.

In order to provide fully automatic flow initiation, one of the two alternatives listed below will be taken:

1) The system will be modified so that the auxiliary feedwater control valves will be automatically opened to a predetermined position after a short time delay sufficient to enable the turbine driven auxiliary feed pump to attain full speed, or

2) The normal lineup of the system will be changed so that the auxiliary feedwater control valves will be normally open a preset predetermined amount so that feed flow to the steam generators will be initiated with no operator action whenever the auxiliary feedwater pumps are started.

The action will be completed on Unit 3 prior to startup following the refueling outage now in progress. The action will be completed on Unit 4 prior to February 15, 1980.

2. NRC The automatic initiation signals and circuits shall be designed so that a single failure will not result in the loss of auxiliary feedwater system function.

FPL All initiating signals are derived from redundant sources powered from separate power supplies. The safety injection and steam generator level signals are 2/3 logic.

All DC powered solenoid valves that must energize to initiate or control AFW are redundant and powered from separate battery backed buses.

The normal air supply for pneumatic valves are backed with a seismically qualified nitrogen supply.

3. NRC Testability of the initiating signals and circuits shall be a feature of the design.

   FPL The Turkey Point Technical Specifications require that each AFW pump be tested once each month. Since three AFW pumps are shared by two units, each pump is normally tested twice a month (assuming both units are operating). Auxiliary feedwater flow is initiated by manually opening valves (from the Control Room) to admit steam to the AFW pump turbines and thereby establish AFW flow to the steam generators. Testing of initiating signals and circuits is performed during each Integrated Safeguards Test (performed during refueling outages). There are normally two refueling outages per year at Turkey Point (one outage per year for each of the two nuclear units).

4. NRC The initiating signals and circuits shall be powered from the emergency buses.

   FPL As stated in (2) above, all signals and circuits are supplied from redundant vital power sources.

5. NRC Manual capability to initiate the auxiliary feedwater system from the control room shall be retained and shall be implemented so that a single failure in the manual circuits will not result in the loss of system function.

   FPL The manual capability to initiate the AFWS even with a single failure has been maintained.

6. NRC The AC motor driven pumps and valves in the auxiliary feedwater system shall be included in the automatic actuation (simultaneous and/or sequential) of the loads onto the emergency buses.

   FPL The only components requiring AC power to initiate AFW are the Steam Stop valves to the turbines. These valves are connected to a vital bus and are automatically loaded onto the diesel generators.

7. NRC The automatic initiating signals and circuits shall be designed so that their failure will not result in the loss of manual capability to initiate the AFWS from the control room.

   FPL The AFWS is designed so that manual capability to initiate AFW is maintained even with failures in either the initiating signals or circuits.

ATTACHMENT 2

Re: Turkey Point Units 3 & 4
Docket Nos. 50-250 & 50-251
Auxiliary Feedwater System
Lessons Learned Item 2.1.7b

System Description

Each steam generator has an existing flow indicating loop consisting of orifice plate/flanges, pneumatic transmitter, square root extractor, and indicators local to the pump and on the main control board.

Components - Design Classification

The auxiliary feedwater flow indication system is designed according to seismic Category I requirements.

Power Sources

The auxiliary feedwater flow indication system is a pneumatic system, therefore, it does not require electrical power. To provide the equivalent of vital power, a seismically qualified nitrogen supply is used as a backup to the normal instrument air system. Upon a loss of normal air supply the nitrogen supply will automatically maintain flow indication.

Criteria Compliance

1. NRC Auxiliary feedwater flow indication to each steam generator shall satisfy the single failure criterion.

   FPL The auxiliary feedwater flow indication system is backed by level indication on each steam generator.

2. NRC Testability of the auxiliary feedwater flow indication channels shall be a feature of the design.

   FPL Indication of AFW system flow to the steam generators is tested by operating a pump, establishing the required flow, and checking the pump performance parameters for consistency with the indicated flow. If an inconsistency exists, the instrumentation is checked/calibrated. This is the normal procedure for the monthly pump runs, then the flow instrumentation is checked during each pump test.

3. NRC Auxiliary feedwater flow instrument channels shall be powered from the vital instrument buses.

   FPL No electrical power is required for the auxiliary feedwater flow indication. Equivalent vital power is supplied by a seismically qualified nitrogen backup to the normal air supply for the pneumatic indication system. The nitrogen supply is automatically initiated upon loss of normal air.

4. NRC Each auxiliary feedwater channel should provide an indication of feed flow with an accuracy on the order of ± 10%.

FPL The auxiliary feedwater flow indication system supplies an indication of feed flow with an accuracy of better than ± 10%.

ATTACHMENT 3

Re: Turkey Point Units 3 & 4
Docket Nos. 50-250 & 50-251
Auxiliary Feedwater System
Drawing References (2.1.7.a & 2.1.7.b)

Electrical Schematics for Auxiliary Feedwater (attached)

5610-E-26 sheet 12
5610-E-26 sheet 12A
5610-E-26 sheet 12B

P&I drawings for Steam Supply System including Auxiliary Feedwater (see FSAR)

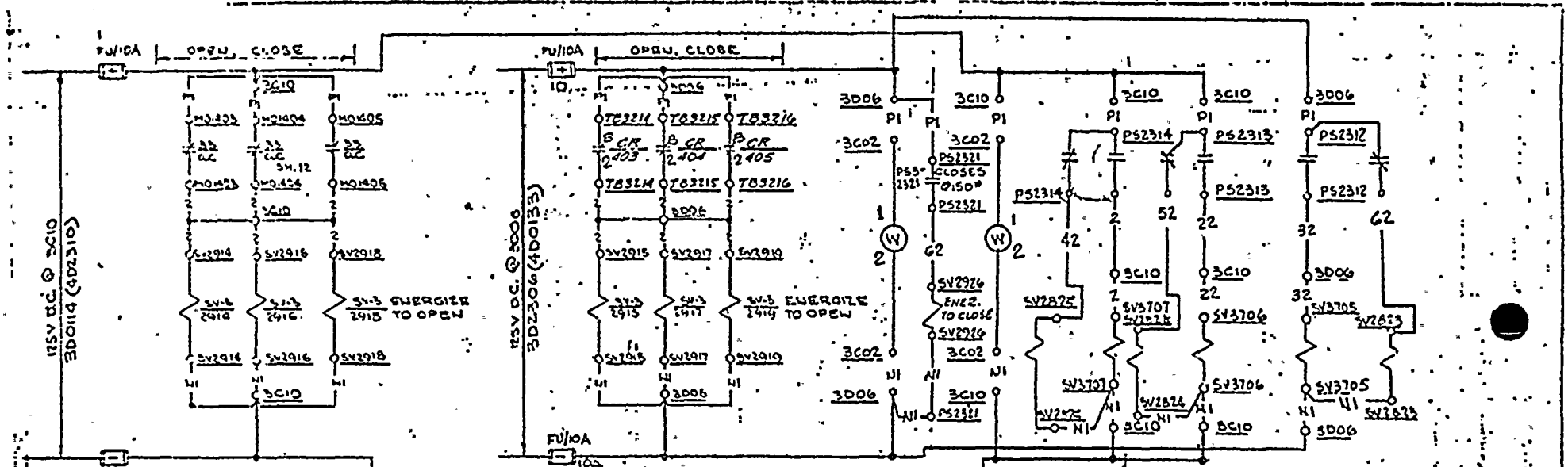
Figure 10.2-1
Figure 10.2-2

One line electrical diagram (see FSAR)

Figure 8.2-3
Figure 8.2-4a
Figure 8.2-4b

Vital power - nitrogen supply back-up (attached)

5610-M-339/79-112 (Preliminary)

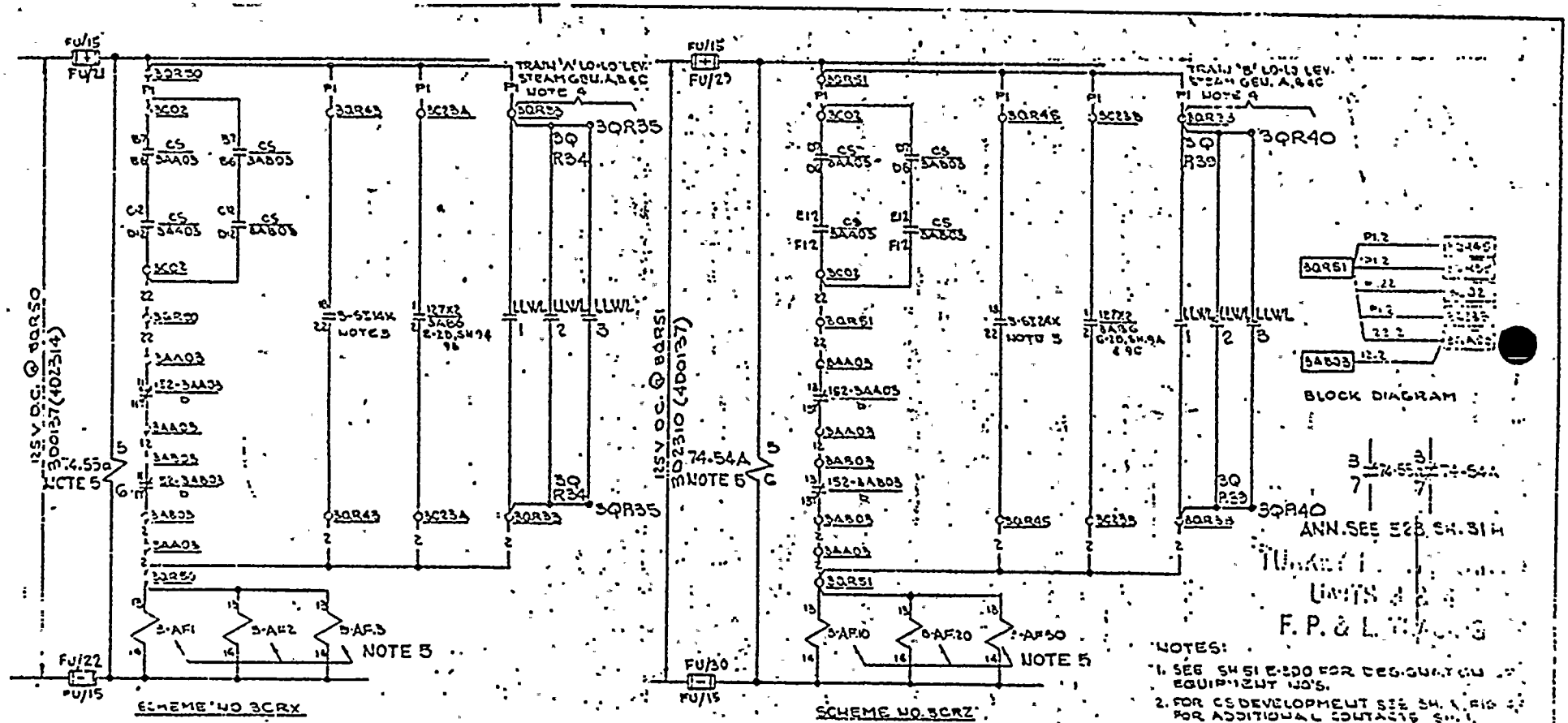


EQUIPMENT	SCHEME NO	LOCAT.
AUXILIARY FEEDWATER CONT VLV.#3	SV2914	3C10
BACK-UP #3	SV2915	3D06
AUXILIARY FEEDWATER CONT VLV.#4	SV2914	4C10
BACK-UP #4	SV2915	4D06

NOTES:
1. SEE 8-300 SHT FOR DESIGNATION OF EQUIPMENT NO'S.

TURKEY POINT PLANT
UNITS 3 & 4
F. P. & L. TRACING
AUXILIARY FEEDWATER
TO STEAM GEN. CONTROL VLV.
ELEMENTARY DIAGRAM
FEEDWATER & CONDENSATE
FLORIDA POWER & LIGHT COMPANY
TURKEY POINT NUCLEAR UNITS
UNIT NO. 3 1970-760 MW INSTALLATION
UNIT NO. 4 1971-760 MW INSTALLATION
BECHTEL CORPORATION
POWER AND INDUSTRIAL DIVISION
5610-E-26 sh.128
(PL,R,-)
C-5017-16 sh.14

REV.	DESCRIPTION	ENG	CK	SUPV	MATL	APPROVALS	DATE
7	ADDED 3C10 & 3D06 CIRCUIT NUMBERS						
6	ADDED PS2321 & SV2926 TO SCHEME SV2914 & SV2915						



EQUIPMENT	SCHEME NO	LOCATION								127	51	152/0	
AUTO START TURB DRIV. PPS	3CRX	3AA03	3AB03	3QR50	3QR43	3QR33	3C23A	3C02		3A86	3-51144	3AA03	3AB03
BACK-UP	3CRZ	3AA03	3AB03	3QR51	3QR45	3QR38	3C23B	3C02		3A86	3-51244	3AA03	3AB03
AUTO START TURB. DRIV. PPS	4CRX	4AA03	4AB03	4QR50	4QR43	4QR33	4C23A	4C02		4A86	4-51144	4AA03	4AB03
BACK-UP	4CRZ	4AA03	4AB03	4QR51	4QR45	4QR38	4C23B	4C02		4A86	4-51244	4AA03	4AB03

POSITION	MAN		3AF2		3AF3	
	EQUIPMENT	DWG NO	EQUIPMENT	DWG. NO	EQUIPMENT	DWG NO
1-2 NO						
3-4 NC						
5-6 NC			MOV3-1411	(E25,SH3)C	MOV3-1426	(E25,SH3)C
7-8 NC			-1412		1427	
9-10 NO	MOV3-1404	(E26,SH12)B	-1411		1426	
11-12 NO	MOV3-1405		-1412		1427	

3AF10		3AF20		3AF30	
EQUIPT.	DWG. NO	EQUIPT.	DWG. NO	EQUIPT.	DWG. NO
MOV3-1403	E-26,SH12	MOV3-1410	E-25,SH3C	MOV3-1427	E-25,SH3C
		MOV3-1412	E25,SH3C	MOV3-1427	E-25,SH3C
MOV3-1404	E26,SH 12				
		MOV3-1412	E25,SH3C	MOV3-1427	E-25,SH3C

C-501746-7 SH.13

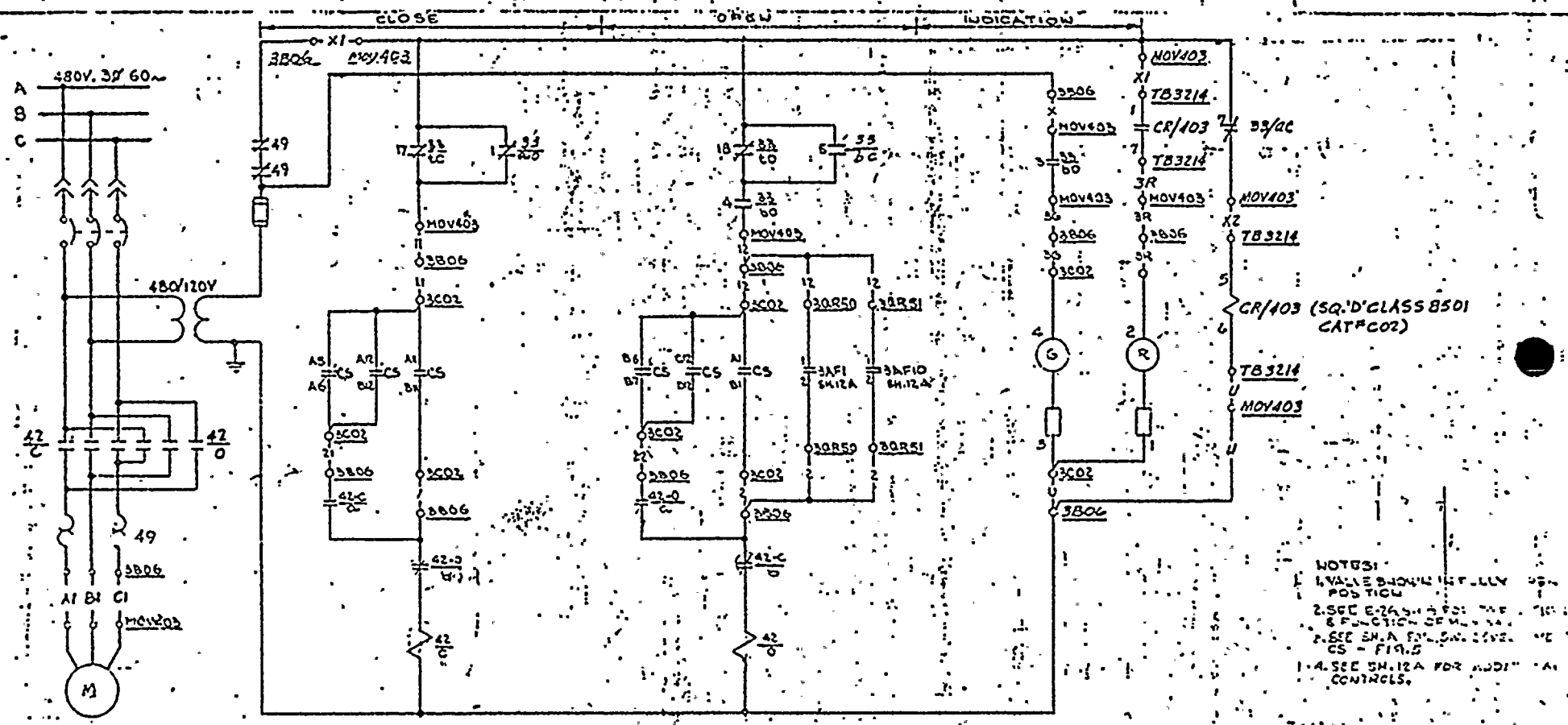
ELEMENTARY DIAGRAM
FEED WATER & CONDENSATE

FLORIDA POWER & LIGHT COMPANY
TURKEY POINT NUCLEAR UNITS
UNIT NO 3 1970 760 MW INSTALLED
UNIT NO 4 1971 760 MW INSTALLED

ELECTRIC CORPORATION
POWER AND INDUSTRIAL DIVISION

5610-E-26 SH. 2 E

NO.	REVISION	DATE	APPROVALS	MATL	SUPV	CHK	DR	ENG
3	ADDED D.C. CIRCUIT NUMBERS							
2	ADDED ELEMENTARY DIAGRAM TO TITLE							
1	ADDED BLOCK DIAGRAM							
REV.	DESCRIPTION							



EQUIPMENT	SCHEME NO	STARTER	LOCATION						AFI	AFIO	CR	TB
AUX. F.W. PP STM SUPPLY MOV-3-1403	3B0630	42-30630	3B06	3BR51	MOV403	3CO2				1-2	403	3214
MOV-3-1404	3B0627	42-30627	3B05	3BR51	MOV404	3CO2	3BR50	9-10	9-10	404	3215
MOV-3-1405	3B0724	42-30724	3B07		MOV405	3CO2	3BR50	11-12		405	3216
MOV-4-1403	4B0630	42-40630	4B06	4BR51	MOV403	4CO2				1-2	403	4214
MOV-4-1404	4B0627	42-40627	4B05	4BR51	MOV404	4CO2	4BR50	9-10	9-10	404	4215
MOV-4-1405	4B0724	42-40724	4B07		MOV405	4CO2	4BR50	11-12		405	4216

BLOCK DIAGRAM

(PL,R,-)

C-501746 SH.12

AUX. FEEDWATER PP STM SUPPLY

ELEMENTARY

FEEDWATER

FLORIDA POWER

5610-E-26 SH. 12