APPENDIX I TO "SAFE SHUTDOWN ANALYSIS"
RESPONSE TO 10CFR50 APPENDIX R
FIRE PROTECTION - SECTION III.J
EMERGENCY LIGHTING

JAMES A. FITZPATRICK NUCLEAR POWER PLANT
POWER AUTHORITY OF THE STATE OF NEW YORK

JUNE 1981

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SECTION A

A.1 PURPOSE

The purpose of this report is to identify the emergency lighting requirements for those areas of the FitzPatrick Plant needed for operation of safe shutdown equipment as defined in the "Safe Shutdown Analysis" report dated September 1979 and revised October 1980. This report also identifies the emergency lighting required for ingress and egress routes to those areas. This study addresses the requirements set forth in the NRC's 10CFR Part 50, Appendix R, Section III.J, "Emergency Lighting".

A.2 SUMMARY OF RESULTS

The present study recommends the installation of new emergency lighting for local operation of equipment (i.e. MOV's, pumps, MCC, etc.) required for safe shutdown. In addition, new emergency lighting is recommended along operator routes for ingress and egress to safe shutdown equipment.

The new emergency lighting recommended in this study will be provided by individual battery packs which will meet the eight hour requirement of Section III.J of Appendix R. The approximate number of new eight hour battery packs shown on Figures 5-1 thru 5-15 totals 115. This number may be revised during the installation phase to accomodate actual site configurations of equipment in addition to special lighting requirements at operating equipment or panels. Where battery packs (with integrally mounted lamps) cannot be located adjacent to equipment or panels, battery packs with remote lamps will be used to provide proper illumination.

Lighting levels of approximately 1/2 to 1 foot candle will be maintained for access to equipment, and approximately 3 foot candles will be maintained for equipment operation.

In general, the battery packs will be normally supplied from the local AC lighting circuit in the area, so that the battery pack lights will automatically go on should the AC lighting in the area fail.

Maintenance for battery packs will be performed in accordance with the manufacturer's recommendations.

A.3 ASSUMPTIONS

The following are the assumptions and design bases used for the Safe Shutdown Analysis, and are also applicable for the Emergency Lighting Analysis.

1. The only consequence of fire that is considered unacceptable will be the inability to safely shutdown and maintain the plant in a safe shutdown mode.

2. It is assumed that:

   a. The reactor is operating at 100 percent power when a fire occurs.

   b. Only onsite emergency power is available in achieving safe shutdown.

   c. The reactor is isolated from the main condenser.

3. It was assumed that there is a 72 hr. period in which to achieve cold shutdown. During this 3-day period, credit may be taken for manual system operation, as well as for reasonable repairs, etc.

4. No single or concurrent failures other than those directly attributable to the fire were considered.

5. It was assumed that for any fire in a given fire zone all shutdown equipment and cable within that area is lost.

6. Loss of a cable does not automatically mean loss of components connected to that cable. Each cable was evaluated to determine whether it is essential to the functioning of the components to which it is connected before it is concluded that the component is lost.

   Other failures due to hot shorts, opens, or grounds were also considered.

7. Fire areas or zones are identical to those identified in the Safe Shutdown Analysis Report.

8. No credit is taken in this analysis for the existing Emergency AC or DC Lighting Systems.

A.4 DEFINITIONS

1. Safe shutdown means hot shutdown or cold shutdown.

2. Hot shutdown means the reactor mode switch is in the shutdown position, * and the average reactor coolant temperature is greater than 212°F.

3. Cold shutdown means the reactor mode switch is in the shutdown position, and the average reactor coolant temperature is less than or equal to 212°F.

4. Fire Area - an area completely enclosed by fire rated barriers.

5. Fire Zone - subdivision of a fire area defined for convenience of analysis.

* When the mode switch is in the shutdown position, the reactor has scrammed.

SECTION B

B.1 METHOD OF ANALYSIS

The procedure shown below was followed for each fire zone or area defined in the "Safe Shutdown Analysis" report to determine the new emergency lighting required.

1. Review the report to evaluate the systems needed to achieve cold shutdown.

2. Identify the local or manual operation (remote from the control room) of equipment needed for the systems identified above as needed for safe shutdown.

3. Determine the areas in which this equipment is located.

4. Determine an operator path from the control room to the required areas.

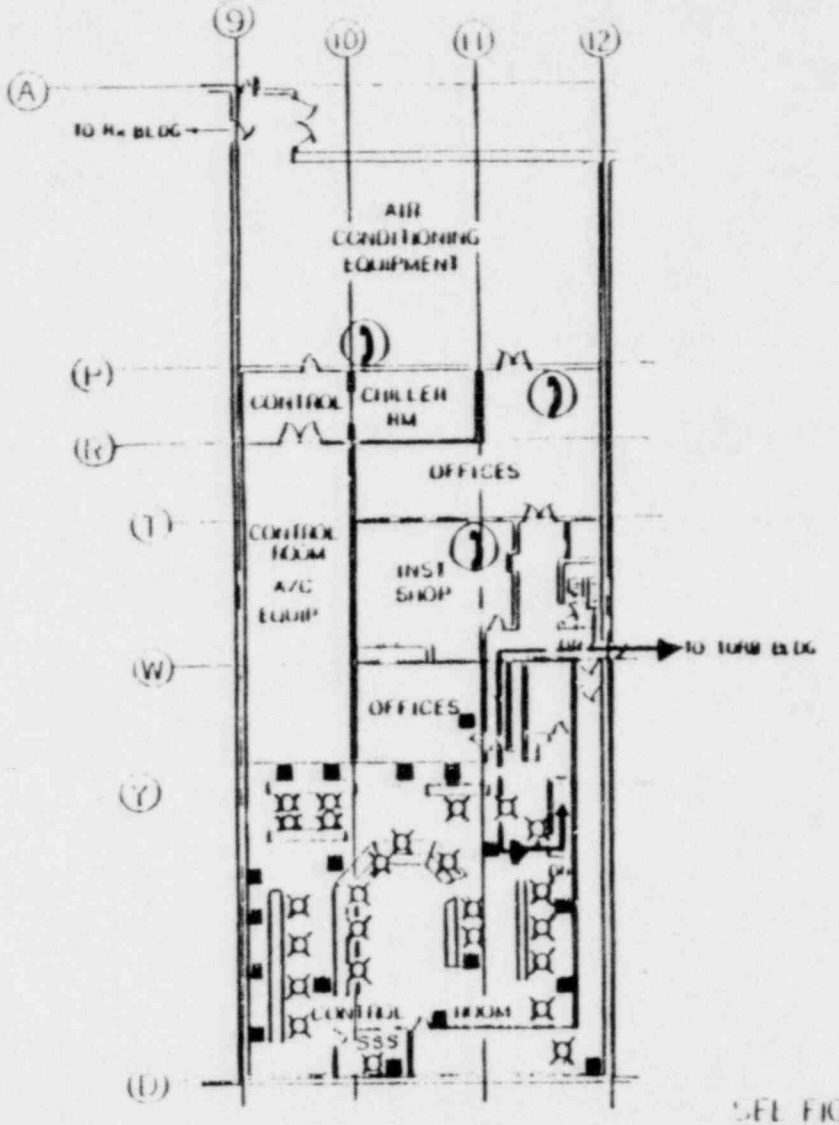
5. Locate new emergency lighting in these areas and along the ingress and egress routes.

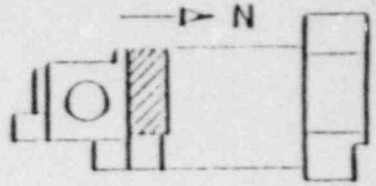
SECTION C

C.1 METHOD OF PRESENTATION

The attached figures 5-1 thru 5-15 show the approximate number of new 8 hour battery packs required to satisfy the requirements of Section III.J "Emergency Lighting". The actual number and location may be modified during installation due to actual site configurations.

Each figure shows the location of the equipment required for safe shutdown as identified in the Safe Shutdown Analysis Report. The battery packs are located to provide access to this equipment as well as to provide proper illumination at the equipment.





SYMBOLS

- ● - EQUIPMENT
- ⌘ - EMERGENCY LIGHTING (EXIST.)
- ■ - BATTERY PACK (NEW) (18)

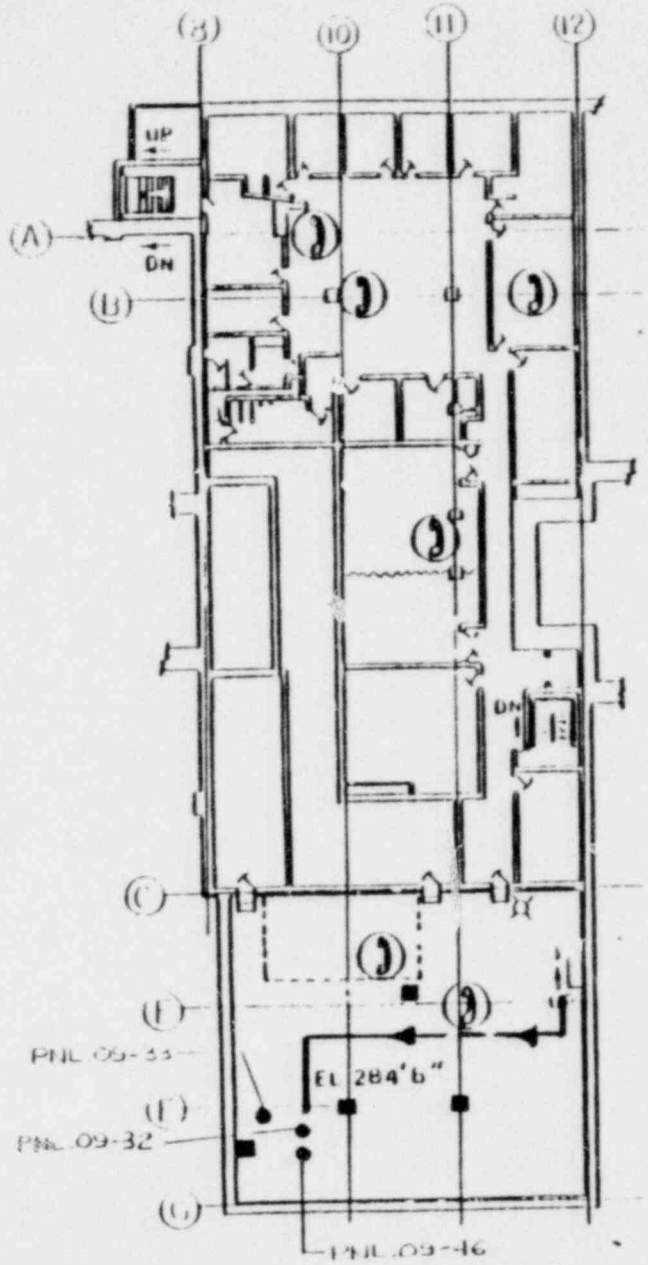
SEE FIGURE 5-3 FOR ADDITIONAL BATTERY PACKS IN THIS AREA

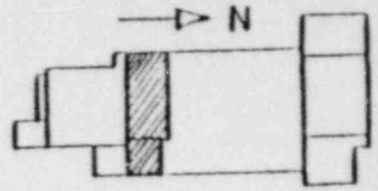
FIGURE 5-1

POWER AUTHORITY OF THE STATE OF NEW YORK
JAMES A. FITZPATRICK NUCLEAR POWER PLANT

AREA PLAN
ADMINISTRATION BLDG
EL 300'

FIGURE 5-1





SYMBOLS

● - EQUIPMENT
⌑ - EMERGENCY LIGHTING (EXIST.)
■ - BATTERY PACK (NEW) (4)

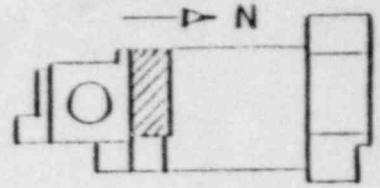
SEE FIGURE 5-7
FOR ADDITIONAL BATTERY
PACKS IN THIS AREA

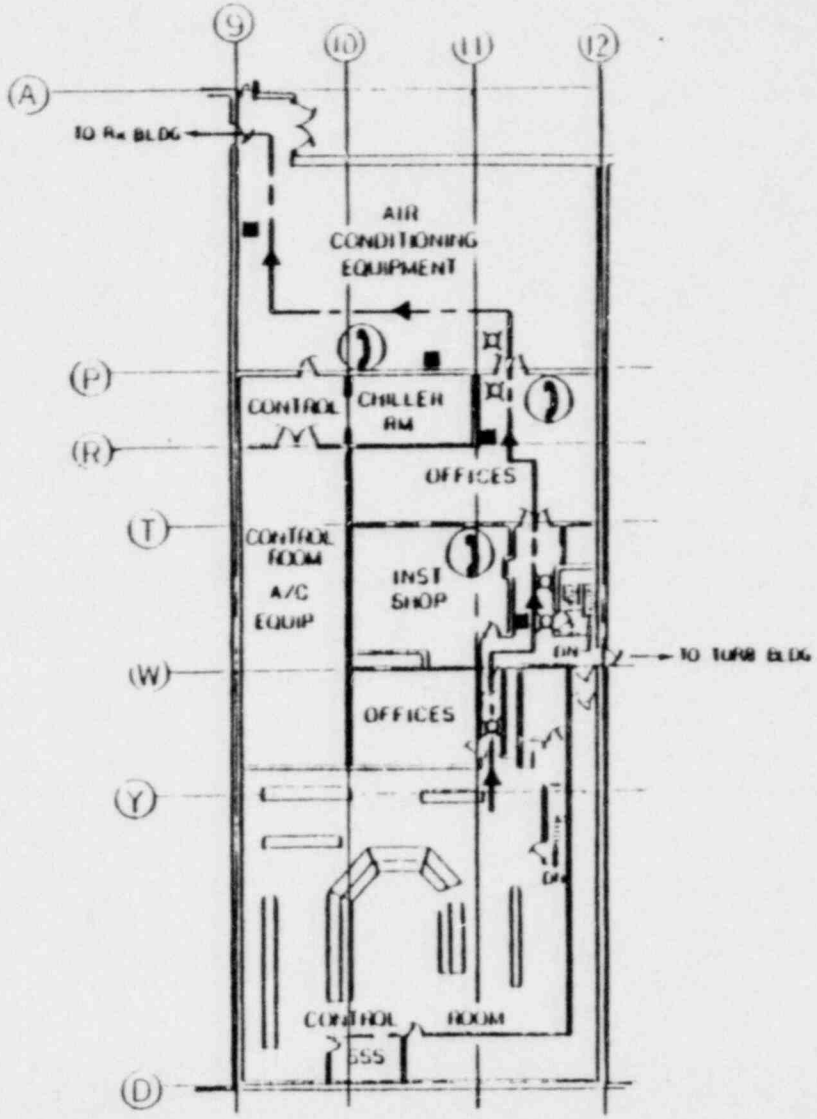
FIGURE 5-2

POWER AUTHORITY OF THE STATE OF N. Y.
JAMES A. FITZPATRICK
NUCLEAR POWER PLANT

AREA PLAN
ADMINISTRATION BLDG
EL 284' & 286'

FIGURE 5-2





SYMBOLS

- ● - EQUIPMENT
- ⌑ - EMERGENCY LIGHTING (EXIST.)
- ■ - BATTERY PACK (NEW)(4)

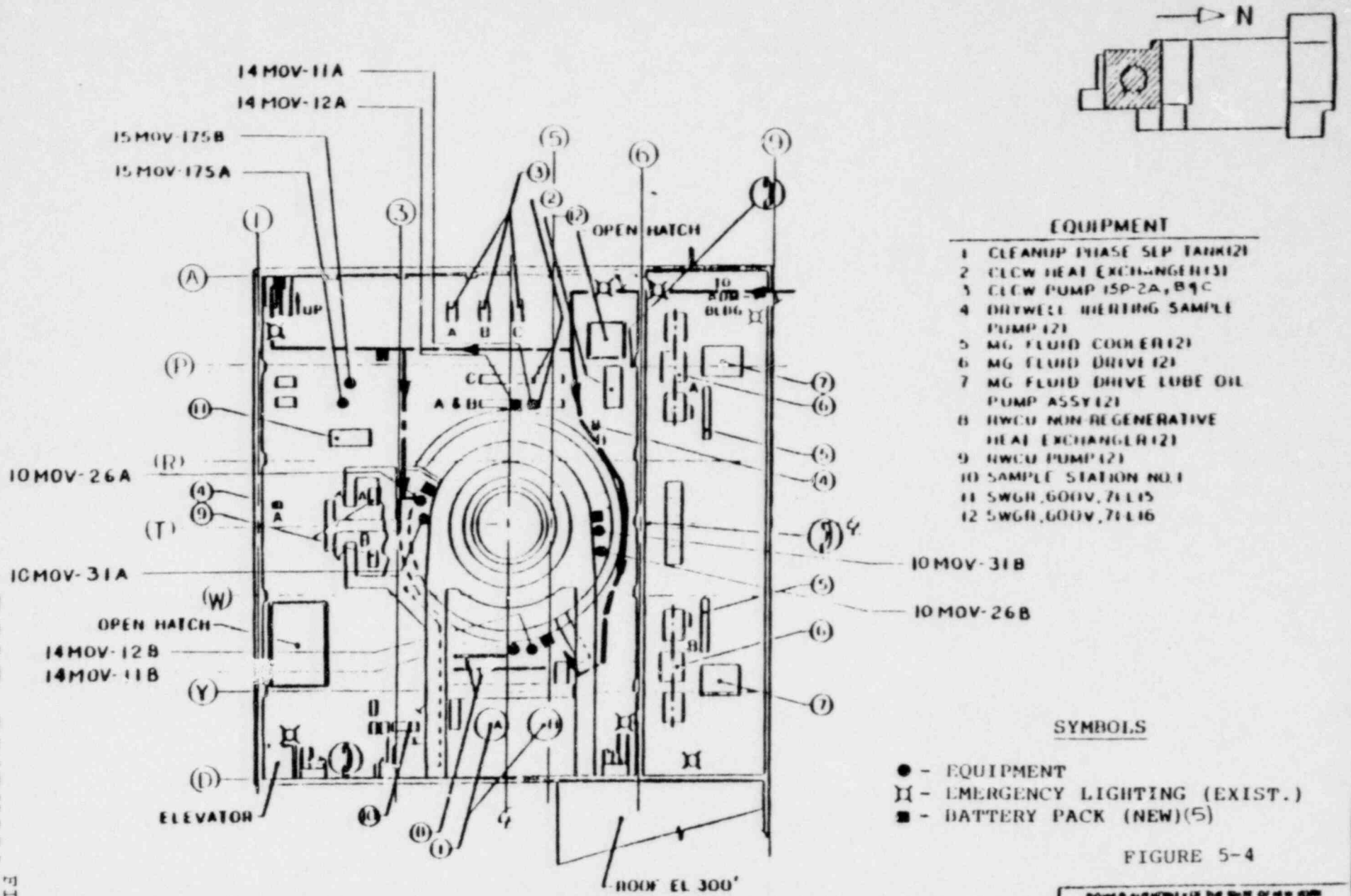
SEE FIGURE 5-1
FOR ADDITIONAL BATTERY
PACKS IN THIS AREA

FIGURE 5-3

POWER AUTHORITY OF THE STATE OF NEW YORK
JAMES A FITZPATRICK
NUCLEAR POWER PLANT

AREA PLAN
ADMINISTRATION BLDG

EL 300'



EQUIPMENT

1 CLEANUP PHASE SEP TANK(2)
2 CLCW HEAT EXCHANGER(3)
3 CLCW PUMP ISP-2A, B & C
4 DRYWELL HEATING SAMPLE PUMP (2)
5 MG FLUID COOLER(2)
6 MG FLUID DRIVE (2)
7 MG FLUID DRIVE LUBE OIL PUMP ASSY(2)
8 RWCU NON-REGENERATIVE HEAT EXCHANGER(2)
9 RWCU PUMP(2)
10 SAMPLE STATION NO.1
11 SWGR.600V.7A.15
12 SWGR.600V.7A.16

SYMBOLS

● - EQUIPMENT
⌶ - EMERGENCY LIGHTING (EXIST.)
■ - BATTERY PACK (NEW)(5)

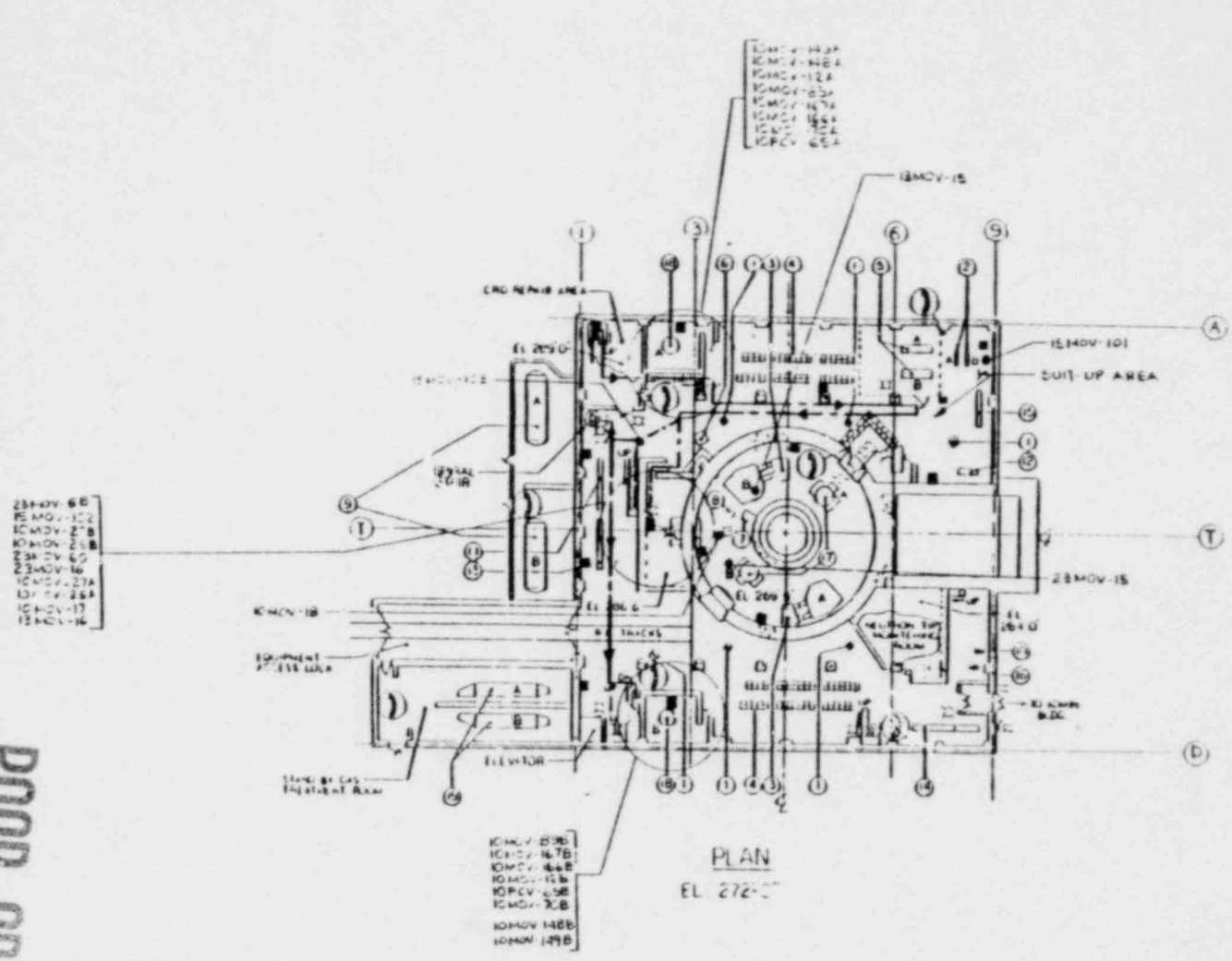
FIGURE 5-4

SEE FIGURE 5-6
FOR ADDITIONAL BATTERY
PACKS IN THIS AREA

POWER AUTHORITY OF THE STATE OF NEW YORK
JAMES A FITZPATRICK
NUCLEAR POWER PLANT

AREA PLAN
REACTOR BLDG
EL. 300'

FIGURE 5-4



PLAN

EL 272'-0"

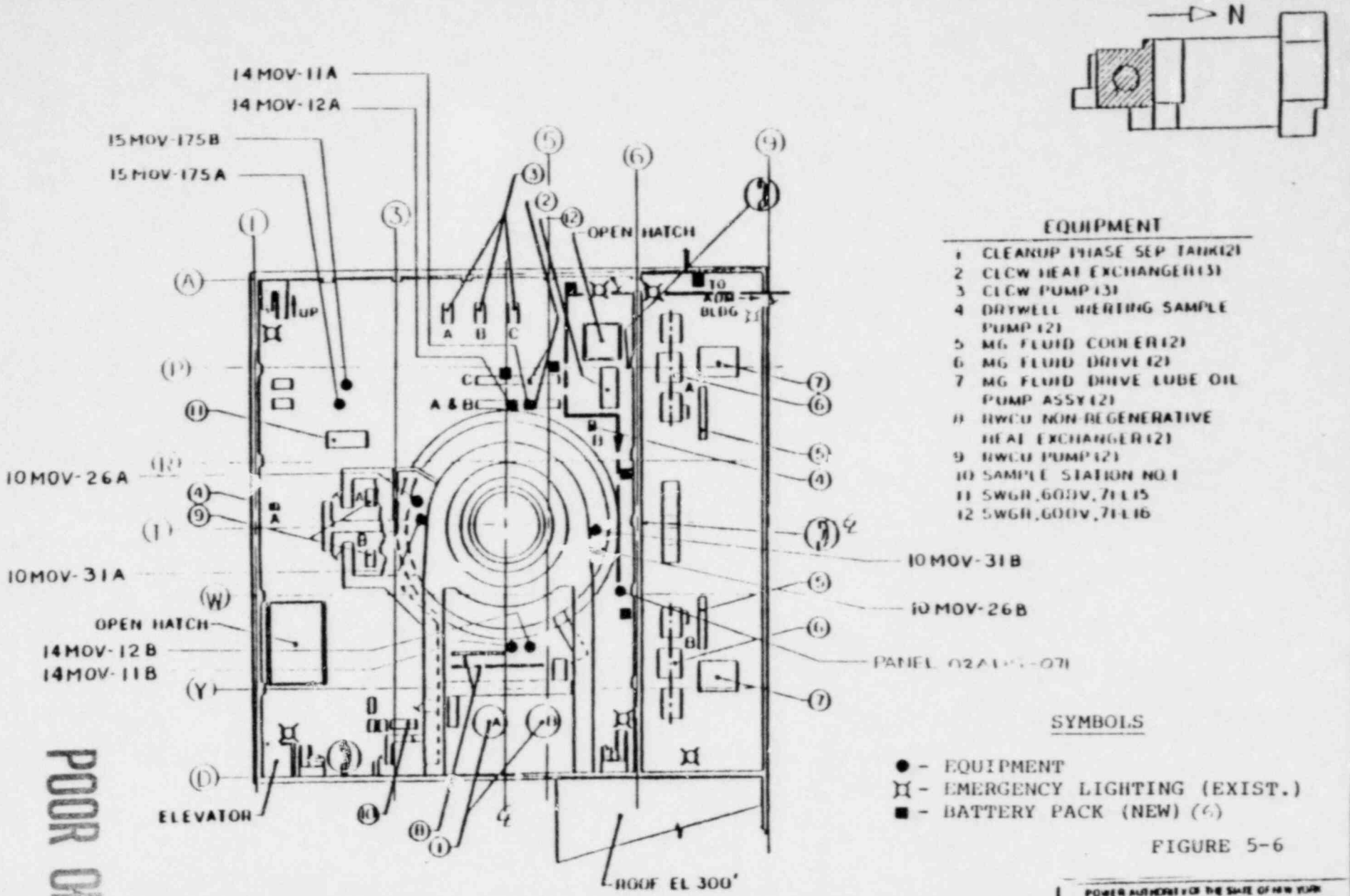
SEE FIGURE 5-9 FOR ADDITIONAL BATTERY PACKS IN THIS AREA

FIGURE 5-5

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

AREA PLAN REACTOR BLDG EL 272'

POOR ORIGINAL



EQUIPMENT

1 CLEANUP PHASE SEP TANK(2)
2 CLCW HEAT EXCHANGER(3)
3 CLCW PUMP(3)
4 DRYWELL EQUIPMENT SAMPLE PUMP(2)
5 MG FLUID COOLER(2)
6 MG FLUID DRIVE(2)
7 MG FLUID DRIVE LUBE OIL PUMP ASSY(2)
8 RWCU NON-REGENERATIVE HEAT EXCHANGER(2)
9 RWCU PUMP(2)
10 SAMPLE STATION NO.1
11 SWGR, 600V, 71E15
12 SWGR, 600V, 71E16

SYMBOLS

● - EQUIPMENT
⌑ - EMERGENCY LIGHTING (EXIST.)
■ - BATTERY PACK (NEW) (6)

FIGURE 5-6

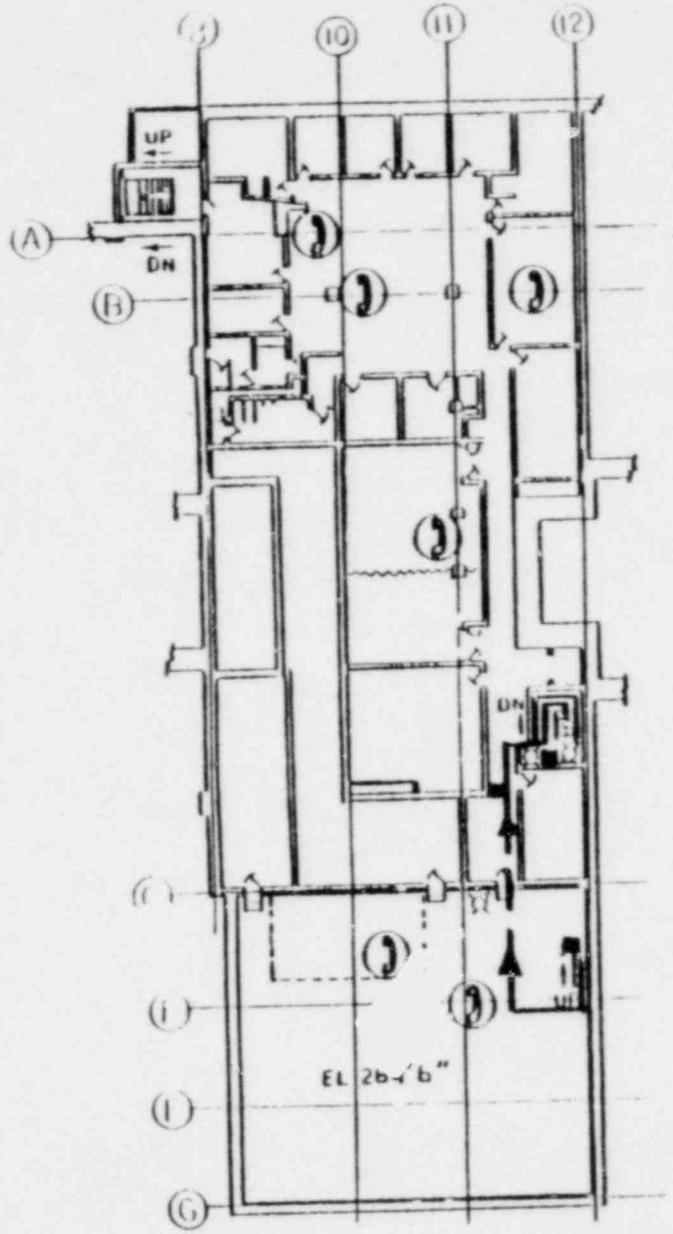
SEE FIGURE 5-4 FOR ADDITIONAL BATTERY PACKS IN THIS AREA

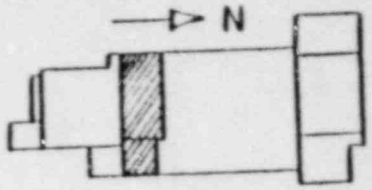
POWER AUTHORITY OF THE STATE OF NEW YORK
JAMES A. FITZPATRICK NUCLEAR POWER PLANT

AREA PLAN REACTOR BLDG EL 300'

POOR ORIGINAL

FIGURE 5-6





SYMBOLS

● - EQUIPMENT
⌑ - EMERGENCY LIGHTING (EXIST.)
■ - BATTERY PACK (NEW) (3)

SEE FIGURE 5-2
FOR ADDITIONAL BATTERY
PACKS IN THIS AREA

FIGURE 5-7

POWER AUTHORITY OF THE STATE OF N.Y.
JAMES A. FITZPATRICK
NUCLEAR POWER PLANT

AREA PLAN
ADMINISTRATION BLDG
EL 284' & 286'

FIGURE 5-7

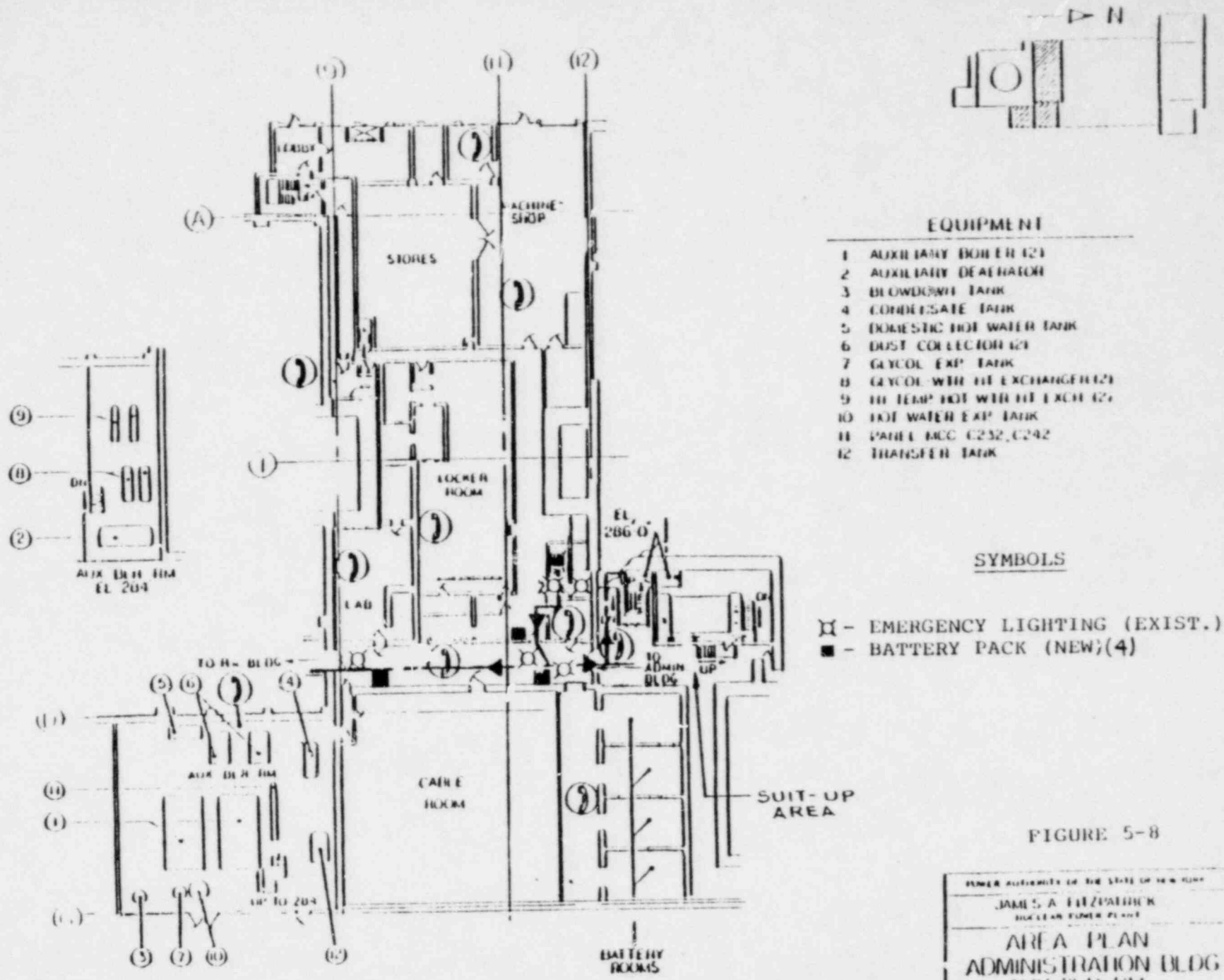
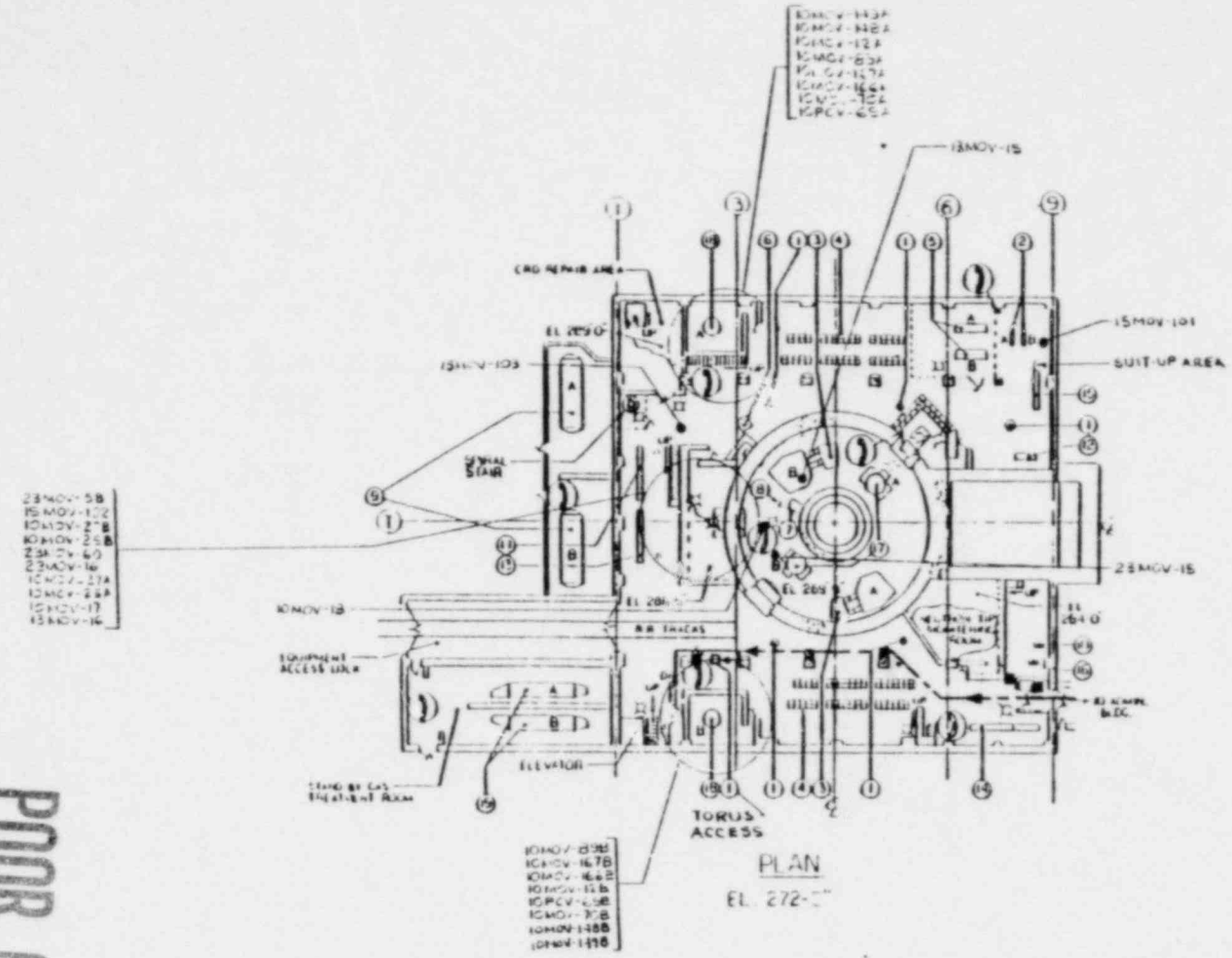
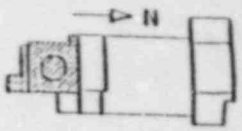


FIGURE 5-8

FIGURE 5-8





EQUIPMENT

1. ACCESS HATCH TO TORUS (6)
2. CONDENSATE TRANSFER PUMP (2)
3. COOLING COILS & BLOWERS (2)
4. CRD HYD CONTROL UNITS
5. CRD WATER PUMP (2)
6. EQUIPMENT HATCH TO TORUS
7. LADDER TO EL 256'6"
8. LADDER TO EL 292'0"
9. LIQUID NITROGEN TANK (2)
10. PANEL BMCC 6
11. PANEL MCC C132, C121
12. PANEL MCC C133
13. PANEL MCC C142, C161
14. PANEL MCC C143, C162
15. PANEL MCC C152
16. PANEL MCC C164
17. RECIRC. PUMP (2)
18. RHR HEAT EXCHANGER (2)
19. STANDBY GAS TREATMENT FILTER TRAIN (2)

SYMBOLS

- ● - EQUIPMENT
- ⌑ - EMERGENCY LIGHTING (EXIST.)
- ● - BATTERY PACK (NEW) (5)

SEE FIGURE 5-5 FOR ADDITIONAL BATTERY PACKS IN THIS AREA

FIGURE 5-9

POWER AUTHORITY OF THE STATE OF NEW YORK
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
AREA PLAN REACTOR BLDG
EL 272'

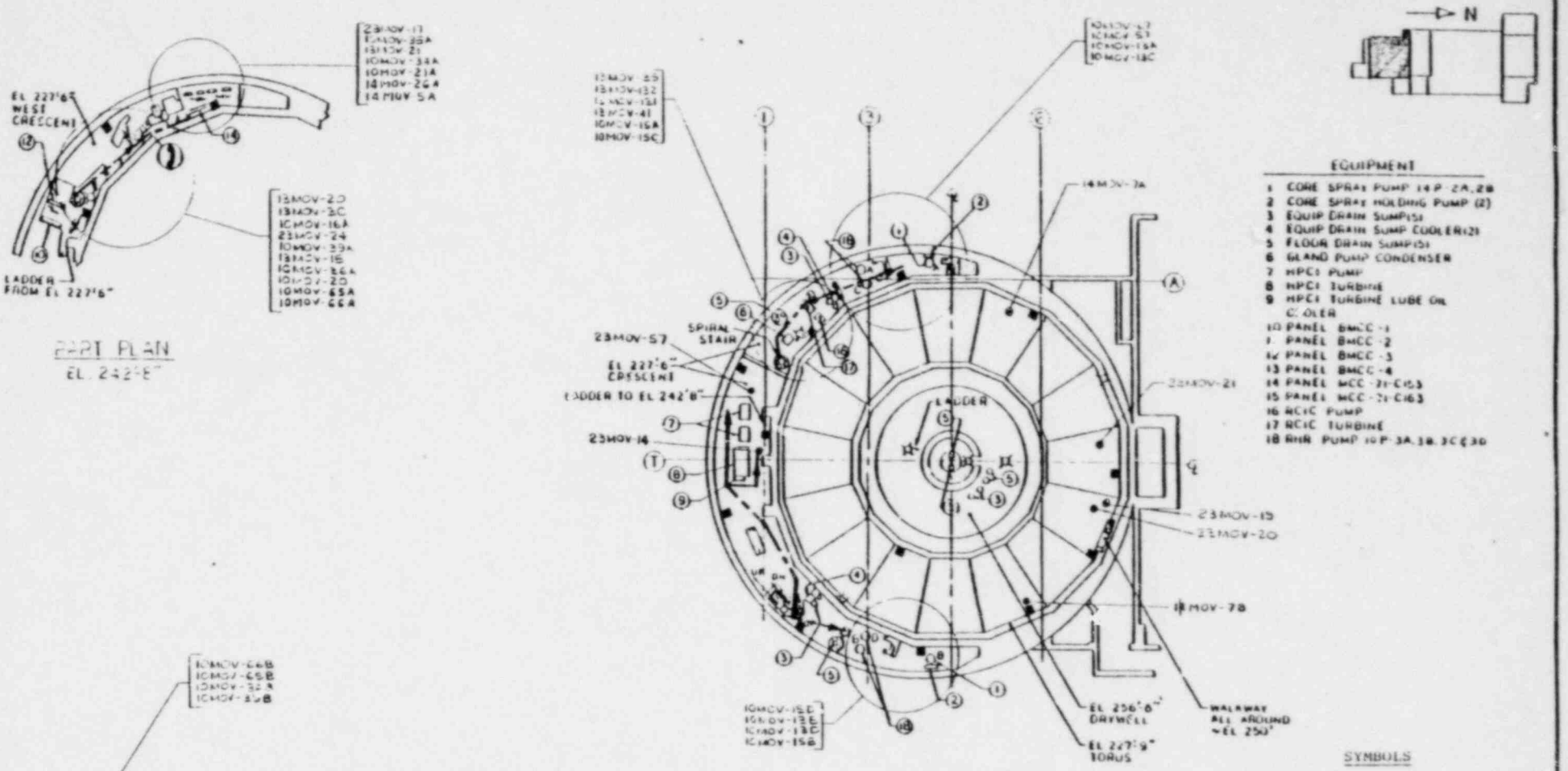
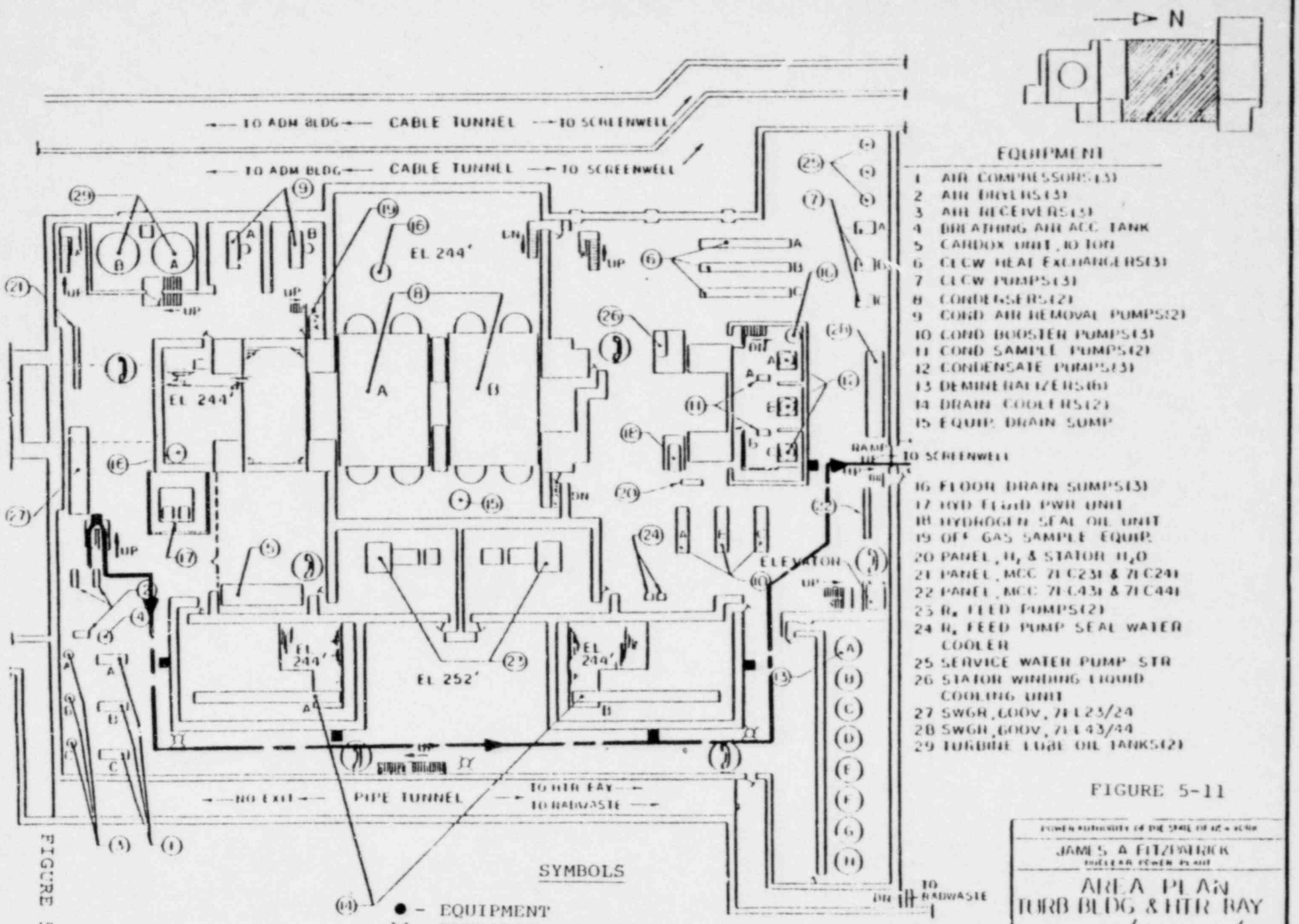


FIGURE 5-10



EQUIPMENT

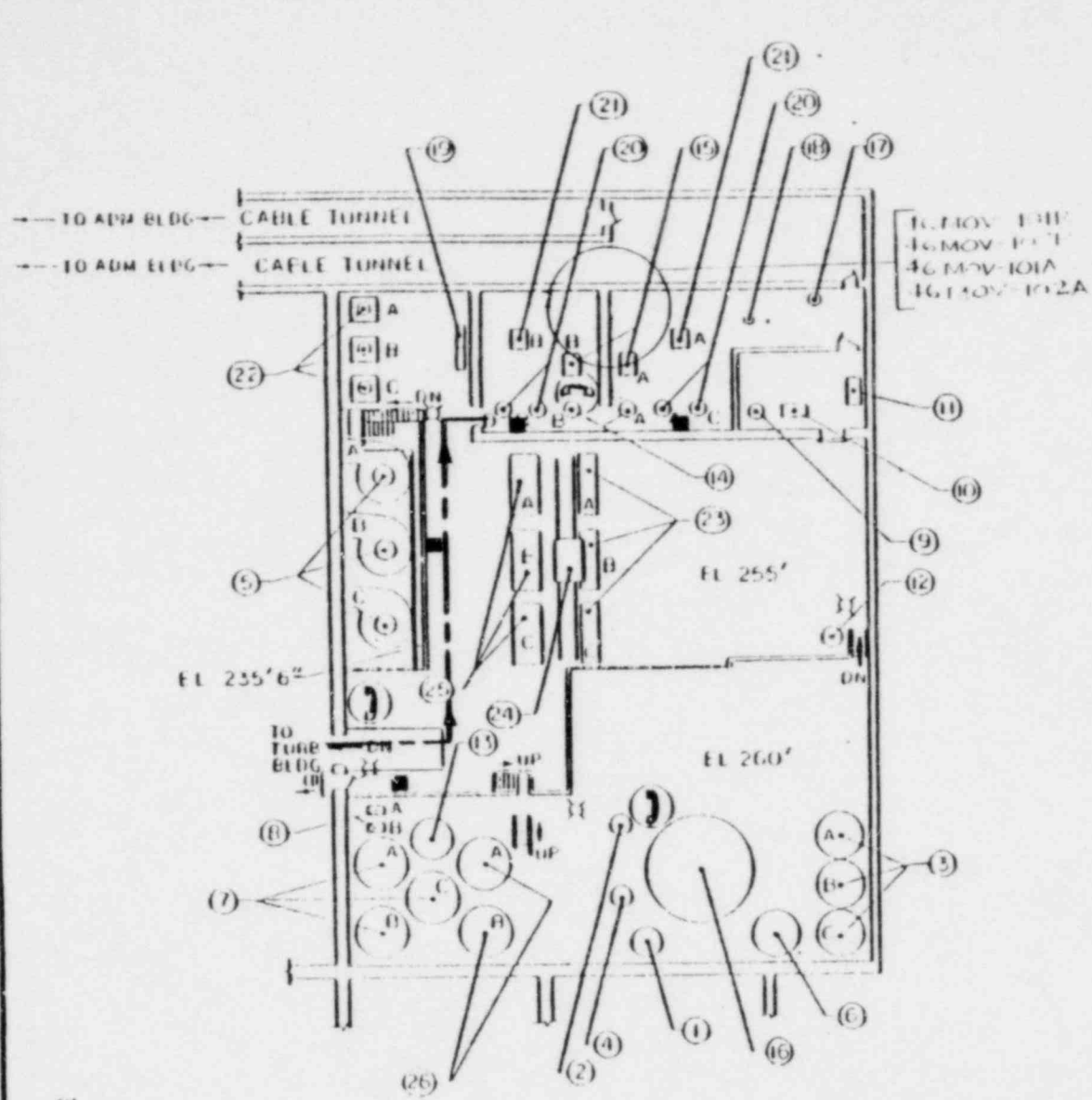
1 AIR COMPRESSORS(3)
2 AIR DRYERS(3)
3 AIR RECEIVERS(3)
4 BREATHING AIR ACC TANK
5 CARBOX UNIT, 10 TON
6 CLCW HEAT EXCHANGERS(3)
7 CLCW PUMPS(3)
8 CONDENSERS(2)
9 COND AIR REMOVAL PUMPS(2)
10 COND BOOSTER PUMPS(3)
11 COND SAMPLE PUMPS(2)
12 CONDENSATE PUMPS(3)
13 DEMINERALIZERS(6)
14 DRAIN COOLERS(2)
15 EQUIP DRAIN SUMP
16 FLOOR DRAIN SUMPS(3)
17 HYD FLUID PWR UNIT
18 HYDROGEN SEAL OIL UNIT
19 OFF GAS SAMPLE EQUIP.
20 PANEL, H_2 & STATOR H_2O
21 PANEL, MCC 71C23 & 71C24
22 PANEL, MCC 71C43 & 71C44
23 R. FEED PUMPS(2)
24 R. FEED PUMP SEAL WATER COOLER
25 SERVICE WATER PUMP STR
26 STATOR WINDING LIQUID COOLING UNIT
27 SWGR, 600V, 71E23/24
28 SWGR, 600V, 71E43/44
29 TURBINE LUBE OIL TANKS(2)

FIGURE 5-11

POWER AUTHORITY OF THE STATE OF NEW YORK
JAMES A FITZPATRICK NUCLEAR POWER PLANT

AREA PLAN
TURB BLDG & TURB BAY
EL 244' & 252'

FIGURE 5-11



EQUIPMENT

1 ACTIVATED CARBON FILTER
2 ANION EXCHANGER
3 ANTHRACITE FILTER TANK(3)
4 CATION EXCHANGER
5 CIRCULATING WATER PUMP(3)
6 CLEARWELL TANK
7 DEMIN WATER STORAGE TK(3)
8 DEMIN WATER TRANS PUMP(2)
9 DIESEL DRIVEN FIRE PUMP
10 DIESEL ENGINE
11 DIESEL FUEL TANK
12 DISCHARGE SAMPLE TANK
13 DOMESTIC WATER STORAGE TK
14 EMER SERVICE WATER PUMP(2)
15 EMER SERVICE WATER STR(2)
16 HIGH FLOW RATE CLARIFIER
17 HYDRO-PNEUMATIC TANK
18 MOTOR DRIVEN FIRE PUMP
19 PANEL MCC C333 & C343
20 RHR SERVICE WATER PUMP(4)
21 RHR SERVICE WATER STR(2)
22 SERVICE WATER PUMP(3)
23 TRASH RACK(3)
24 TRASH RAKE
25 TRAVELING WATER SCREEN(3)
26 WASTE RESIN HOLD TANK(2)

SYMBOLS

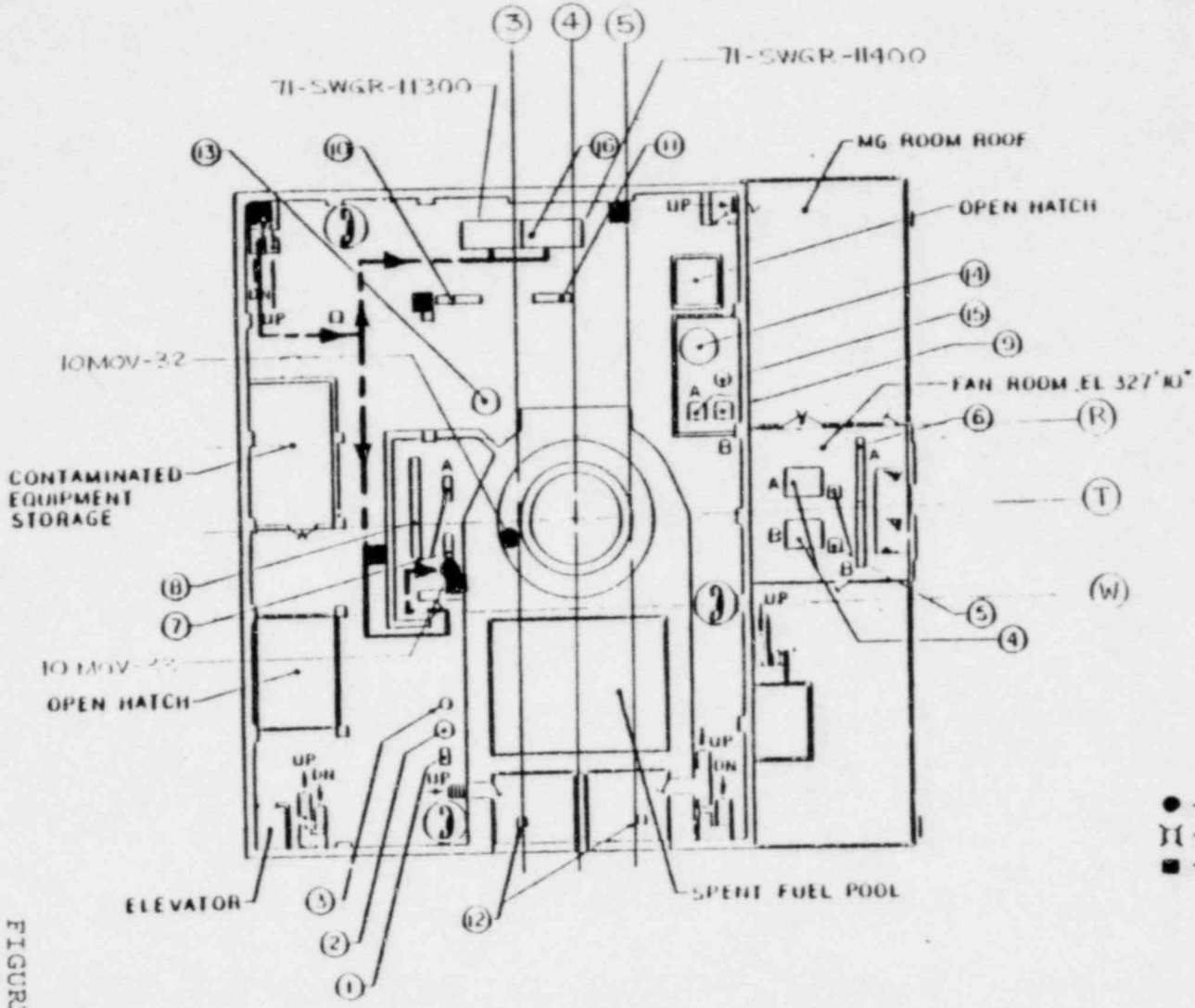
● - EQUIPMENT
⌑ - EMERGENCY LIGHTING (EXIST.)
■ - BATTERY PACK (NEW)(4)

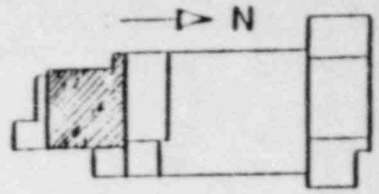
FIGURE 5-12

POWER AUTHORITY OF THE STATE OF NEW YORK
JAMES A. FITZPATRICK NUCLEAR POWER PLANT

AREA PLAN
SCREENWELL
EL 255' & 260'

FIGURE 5-12





EQUIPMENT

1 CLEAN UP PRECOAT PUMP
2 CLEAN UP PRECOAT TANK
3 CLEAN UP RESIN FEED TANK
4 FAN(2)
5 FAN MOTOR(2)
6 FILTER(2)
7 FUEL POOL CLEAN UP RECIRC PUMP(2)
8 FUEL POOL HEAT EXCH(2)
9 LIQUID POISON PUMP(2)
10 PANEL, MCC 71-C13
11 PANEL, MCC 71-C14
12 RWCU HOLDING PUMP(2)
13 REACTOR BLDG COOLING WATER MAKEUP TANK
14 STANDBY LIQUID CONTROL TK
15 STANDBY LIQUID CONTROL TEST TANK
16 SWGR, 600V 71 L13/14

SYMBOLS

● - EQUIPMENT
⋈ - EMERGENCY LIGHTING (EX. T.)
■ - BATTERY PACK (NEW) (5)

FIGURE 5-13

POWER AUTHORITY OF THE STATE OF NEW YORK
JAMES A. FITZPATRICK NUCLEAR POWER PLANT

AREA PLAN
REACTOR BLDG
EL 326'

FIGURE 5-13

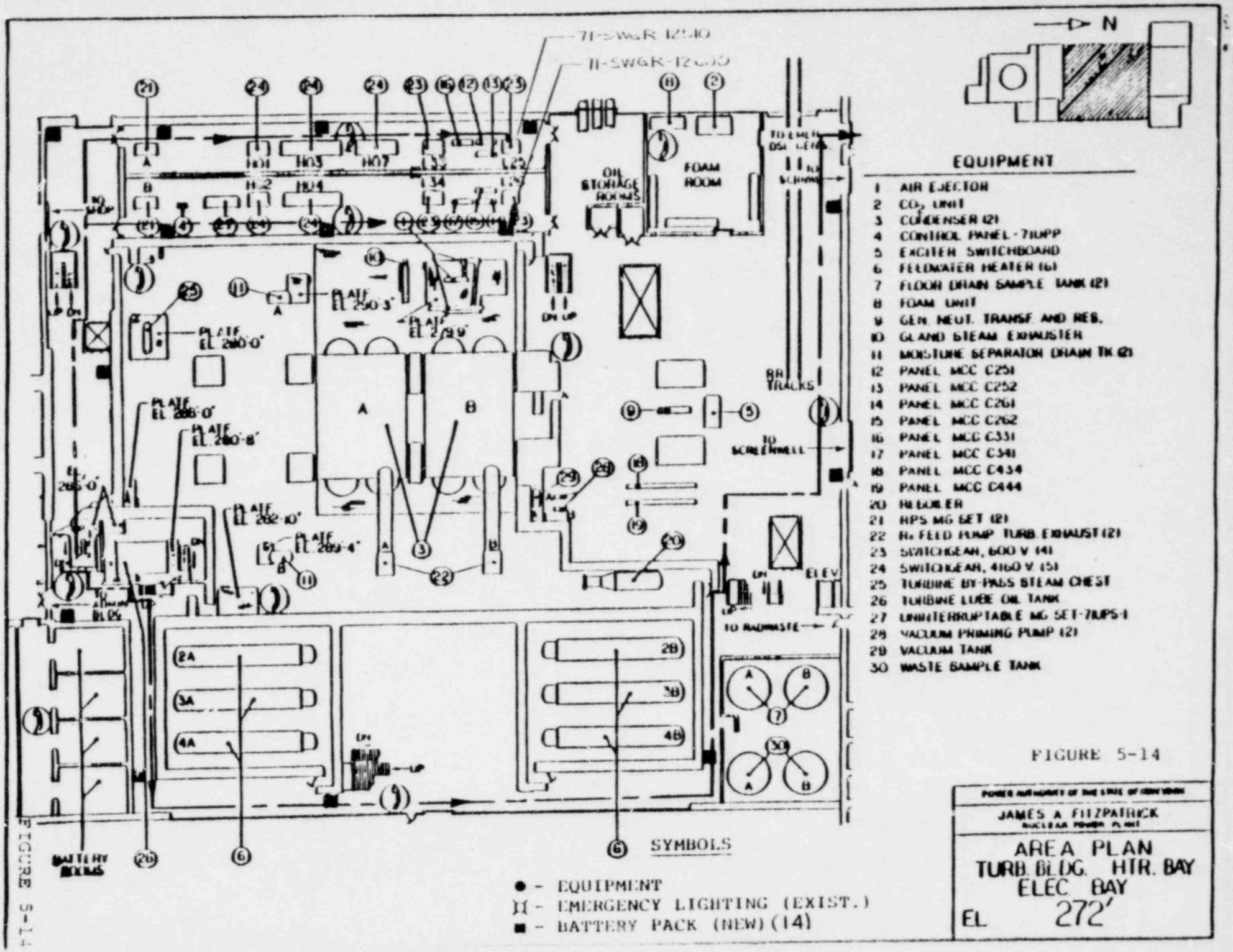
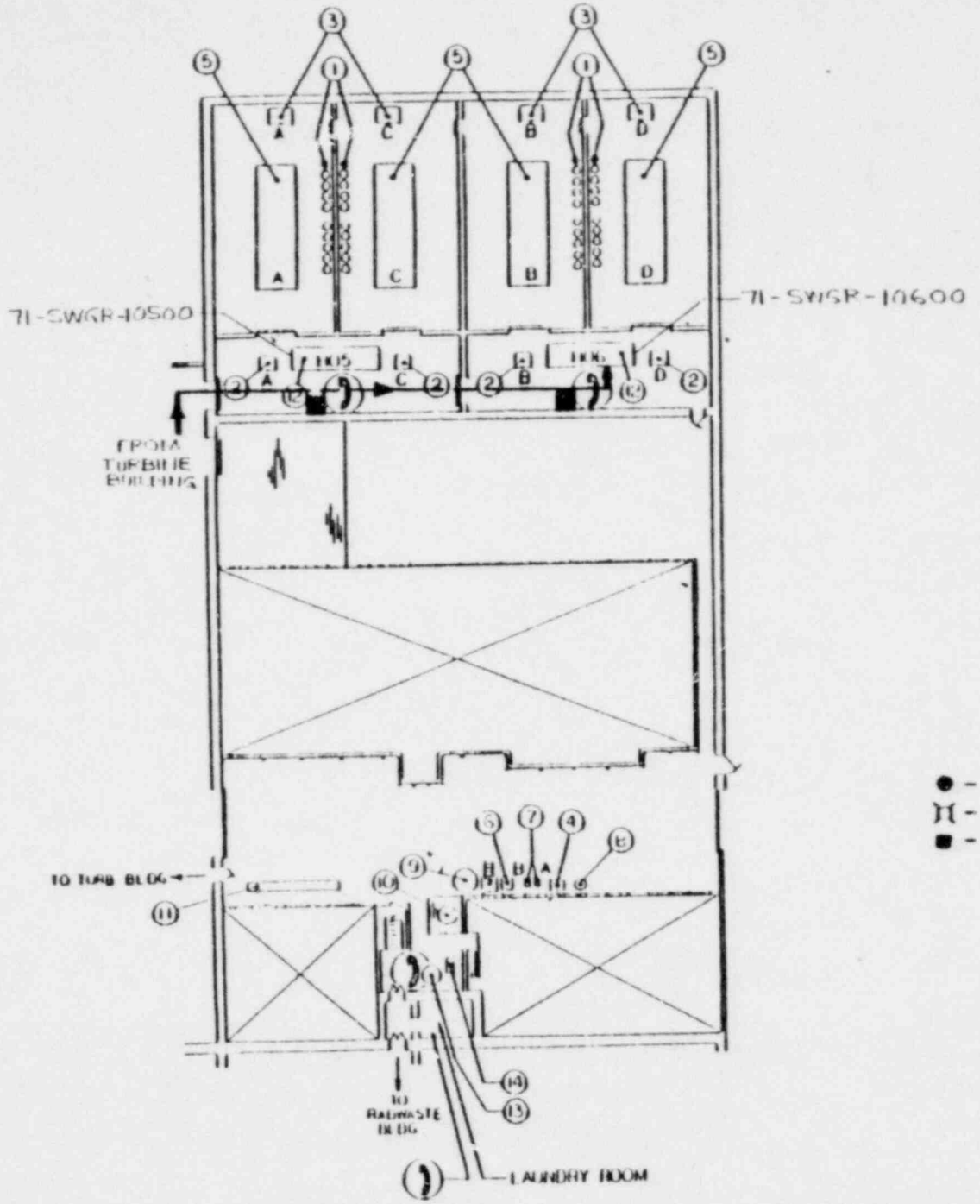


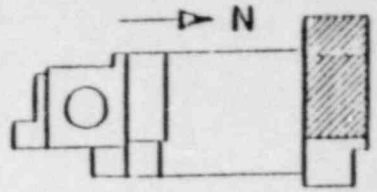
FIGURE 5-14

POWER AUTHORITY OF THE STATE OF NEW YORK
JAMES A FITZPATRICK NUCLEAR POWER PLANT

AREA PLAN
TURB. BLDG. HTR. BAY
ELEC. BAY
EL 272'

FIGURE 5-14





	EQUIPMENT	ZONE
1	AIR RECEIVERS	B1,C1
2	CONTROL PANEL (4)	B2,C2,D2
3	DAY TANK (4)	B1,C1,D1
4	DUST COLLECTOR	C4
5	EMERGENCY DIESEL GENERATOR(4)	B1,C1,D1
6	FERRIC SULPHATE FEEDER	C4
7	FERRIC SULPHATE PUMP (2)	C4
8	HYDRATED LIME HOPPER	C4
9	LAKE SAMPLE TANK	C4
10	MIXED BED EXCHANGER	C4
11	PANEL MCC C334,C344	B4
12	SWITCHGEAR, 4160 V (2)	B2,C2
13	VACUUM DEAERATOR	C5
14	VACUUM PUMP	C4

SYMBOLS

- ● - EQUIPMENT
- ⋈ - EMERGENCY LIGHTING (EXIST.)
- ■ - BATTERY PACK (NEW)(2)

FIGURE 5-15

POWER AUTHORITY OF THE STATE OF NEW YORK
JAMES A FITZPATRICK NUCLEAR POWER PLANT

AREA PLAN SCREENWELL & EMER. GEN. BLDG
EL 272'

FIGURE 5-15