EBASCO SERVICES INCORPORATED
ST. LUCIE UNIT #2

PROCEDURE
FOR
INSPECTION OF CONCRETE MASONRY WALLS

2-ESSE/AS-001

REV. NO.	DATE	PREPARED BY	REVIEWED BY	APPROVED BY	PAGES AFFECTED
Original	1/8/82	R. Pavlovsky	T.G. Karan	G.H. Krauss	ALL

ATTACHMENT D

Project Identification
No. 2-ESSE/AS-001

EBASCO SERVICES INCORPORATED
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C O N T E N T S

A T T A C H M E N T S

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1.0 PURPOSE

The purpose of this procedure is to describe the method of field investigation and data compilation for use in the masonry wall design re-evaluation.

2.0 SCOPE

.1 Phase I Inspection - The buildings on the St. Lucie Unit #2 site that contain concrete masonry walls covered by this procedure are the Reactor Auxiliary Building, Reactor Containment Building, and the Fuel Handling Building.

The RAB has many concrete masonry walls performing various functions throughout the building. The RCB contains one concrete masonry wall near the pressurizer at Elevation 73.00' for radiation shielding. The FHB has two concrete masonry walls at Elevation 19.50' for shielding around the valve chamber for the fuel pool purification filter. Phase I of the inspection will be to identify the number, location and type (i.e., reinforced or non-reinforced) of all concrete masonry walls in the above buildings. This will be accomplished by using the Ebasco concrete masonry wall drawings along with a confirmatory plant walk through and a spot check on each wall for the verification of the existence of reinforcing (reinforcing bar and/or dur-o-wall).

.2 Phase II Inspection - This phase will be to inspect the concrete masonry walls identified in Phase I; to identify and locate safety related items mounted on the walls or in close proximity to the walls and to record the location to verify wall thickness & composition (where possible) and weight of significant safety related and non-safety related items mounted on the walls.

.3 Phase III Verification - After the inspections are completed the capacity of the concrete masonry walls to withstand design loads will be verified.

3.0 REFERENCES

.1 NRC Bulletin 80-11 dated May 8, 1980

.2 General Arrangement Dwgs.

Reactor Auxiliary Building	2998-G-069 (R9)
	G-070 (R9)
	G-071 (R9)
	G-072 (R9)
	G-075 (R8)
	G-076 (R7)
Reactor Containment Building	2998-G-065 (R7)
Fuel Handling Building	2998-G-073 (R8)

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.0 .3 Miscellaneous Structural Steel Dwg. 2998-G-814 Sh 5 (R 0)

.4 Concrete Masonry Wall Drawing 2998-G-786, Sh 2, (R4)
786, Sh 3, (R3)
820, Sh 1, (R3)
820, Sh 2, (R4)
FSG-2998-CH-155, (R5)
CH-156, (R3)
CH-183, (R2)
CH-184, (R1)
CH-185, (R2)
CH-202, (R2)
FSG-2998-CH-203, (R3)
2998-G-603, Sh 4, (R3)
2998-G-604, Sh 4, (R2)

4.0 PRECAUTIONS

.1 During this inspection period the plant will be under construction. However, some systems have been completed and turned over to Florida Power & Light. Care must be exercised to avoid any accidental upsetting of instruments, equipment or systems. Also, many electrical items are energized. The inspector is warned to avoid any contact with these items.

.0 PROCEDURE

.1 PHASE I

a) All concrete masonry wall drawings (Reference 3.4) will be assembled and from them a reproducible set of reference drawings will be made. Each concrete masonry wall will be given a unique number and the type of wall (i.e., reinforced, un-reinforced and cantilevered) will be indicated. The master reference drawings will be made from sepias of General Arrangement drawings (Reference 3.2) and will be given field sketch G size (FSG) numbers in accordance with Company Procedure E-74. The person completing the FSG drawings will initial them in the "DRAWN BY" section of the title block.

b) An inspection data sheet will be produced for each wall shown on the master reference drawings. (See attachment #1). The person producing the data sheet will fill in the following information:

Wall Number
Wall Surface
Reference Drawing (FSG)
Plant Area (RAB, RCB, or FHB)
Floor Elevation (-0.50', 19.50', 43.00', 62.00')
Location (HVAC Room, Locker Room, Drumming Station, etc)
Function of Wall (shield wall, pressure retaining wall, etc)
Thickness and Composition of wall
Type of Reinforcement - Horizontal
Type of Reinforcement - Vertical

The person preparing the inspection data sheet will sign the sheet in the "PREPARED BY" section.

PROCEDURE FOR INSPECTION OF CONCRETE MASONRY WALLS

5.0 .1 PHASE I (continued)

c) A detailed walkthrough of the Reactor Auxiliary Building will be performed by Engineering personnel, to identify concrete masonry walls and insure the completeness of the master reference drawings. Care will be taken to insure that all areas of the RAB will be inspected. The engineers performing the walkthrough will initial the FSG drawings in the "CHECKED BY" section of the title block.

d) The master reference drawings will be maintained by the Ebasco Site Support Engineering Group (ESSE).

e) During the walkthrough, each concrete masonry wall will be scanned with a metal detector - James Electronics Model C-4952 R-Meter, or equivalent - to verify the existence of reinforcing (reinforcing bar and or dur-o-wall). The R-Meter measures the disturbances by external magnetic material of a magnetic field generated by the probe. The R-Meter will be used to detect the existence of reinforcing. No attempt will be made to determine reinforcing bar size or depth of embedment, therefore no calibration of the instrument is required. Each inspector will read the James R-meter Operating Manual (Attachment #6).

Each wall will be scanned with the James R-Meter horizontally to verify the existence of at least one reinforced vertical column as shown on the Reference 3.4 drawings and scanned with the James R-Meter vertically for at least six (6) courses of concrete masonry units to verify the existence of at least two (2) dur-o-wall reinforced horizontal joints. This information will be entered on the inspection data sheet and the person performing the inspection will initial the data sheet in the "PHASE I INSPECTION BY" section.

f) All entries made on the inspection data sheets shall be made in black ink. Copies of the data sheets may be made for use as a field work copy. The person doing the inspection must then transfer any markings from the copy to the original.

.2 PHASE II INSPECTION: All walls identified and verified in the Phase I inspection will be further inspected as follows:

a) The wall will be located and a survey made to determine if there is any safety related equipment in the vicinity of the wall or if there is any safety related equipment mounted on the wall.

b) If there is no safety related equipment identified, "No Safety Related Equipment" will be written on the inspection data sheet and the inspector(s) will go on to the next wall.

c) If there is safety related equipment identified, the inspection will proceed as follows:

5.0 .2 d) The thickness & composition of the wall will be verified if possible.

e) A sketch will be made of the wall locating all significant safety related & non-safety related equipment loads on the wall.

f) Dimensions on the sketch shall be plus or minus six (6) inches.

g) Loads will be distributed to the location of the thru bolts used in mounting the item. If the center of gravity of the item is within 1'-0 of the face of the wall, this cantilever will be ignored and loads will be directly distributed to the thru-bolts.

h) If available, existing field change requests (FCR's) that detail items mounted on the block wall shall be attached to the data sheet.

i) Photographs may be used for reference or backup if the inspection team considers them helpful. All photographs will be identified with the wall number and surface and attached to the data sheet for that wall.

j) The person performing the inspection will initial the data sheet in the "PHASE II INSPECTION BY" section.

k) All entries made on the inspection data sheets shall be made in black ink. Copies of the data sheets may be made for use as a field work copy. The person doing the inspection must then transfer any markup from the copy of the original.

.3 PHASE III VERIFICATION:

a) Copies of all inspection data sheets will be forwarded to the N.Y.O. lead A-S Engineer for evaluation. Wall Designs will then be evaluated and verified by the New York Office.

b) Following the New York Office review wall acceptance or repair suggestions will be forwarded to the field for evaluation.

c) Following disposition, the ESSE lead A-S Engineer will sign the inspection data sheet in the "VERIFIED BY" section.

6.0 SIGNATURE LIST

.1 All personnel involved in this inspection shall have their full name typed, their handwritten signature and initials recorded on the subject list (Attachment #2).

7.0 RESPONSIBILITY

.1 This procedure will be maintained by the ESSE office. The signature of the ESSE Project Engineer is required for implementation.

PROCEDURE FOR INSPECTION OF CONCRETE MASONRY WALLS

7.0 RESPONSIBILITY (continued)

.2 The ESSE lead A-S Engineer is responsible for the verification of the concrete masonry walls inspected by this procedure.

.3 The ESSE lead A-S Engineer is responsible for reporting any non-conformances related to this inspection.

8.0 DEFINITIONS

.1 Safety Related System/Component is defined as:

any system that functions to shut down the reactor, or cool the core; or cool another safety system; or the containment, and contains, controls or reduces radioactivity released in an accident. (LOCA and Post Accident Monitoring)

.2 Significant equipment is defined as:

any equipment which in the judgement of the inspectors, contributes a load to the concrete masonry wall greater than twenty-five (25) $\pm$ 1 pounds per square foot of wall surface.

.3 Close Proximity is defined as:

1) distance equal to approximately five (5) feet for reinforced and un-reinforced full height walls, and;

2) a distance equal to the height of the wall plus 1'-0 for cantilevered reinforced walls.

9.0 TRAINING

.1 All inspectors will be Ebasco design or engineering personnel.

.2 All inspectors are required to read and be familiar with NRC Bulletin 80-11 dated May 8, 1980.

.3 All inspectors are required to read and be familiar with this procedure.

.4 Inspectors performing Phase I inspection are required to read and be familiar with the James R-Meter Operating Manual.

10.0 RECORD RETENTION

.1 All original inspection data sheets (Attachment #1) shall be stamped "ORIGINAL" in red ink and be retained in the active files by the ESSE Group.

.2 Any changes to the stamped inspection form shall be noted as a revision, initialed and dated by the revisor.

PROCEDURE FOR INSPECTION OF CONCRETE MASONRY WALLS

6.0 RECORD RETENTION (continued)

.3 Drawings will be kept in the ESSE office until the completion of the project.

.4 Xerox copies of all original data sheets will be forwarded to the Ebasco New York Office.

.5 At the end of Phase III all data sheets will be compiled and forwarded to the Project Quality Assurance File (PQAF) for storage.

.6 Master reference drawings (FSG's) will be maintained by the ESSE office.

EBASCO SERVICES INCORPORATED
ST. LUCIE UNIT #2

INSPECTION DATA SHEET

PHASE I OFFICE WORK:

WALL NO. _____ WALL SURFACE _____ (NORTH, SOUTH, EAST, WEST)

REFERENCE DRAWING _____

PLANT AREA _____ FLOOR ELEVATION _____

LOCATION _____

FUNCTION OF WALL _____

THICKNESS & COMPOSITION OF WALL _____

TYPE OF REINFORCEMENT:

HORIZONTAL _____ VERTICAL _____

PHASE II FIELD WORK:

SPOT CHECK VERIFICATION:

HORIZONTAL
REINFORCEMENT _____ YES _____ NO

THICKNESS _____ YES _____ NO

SPOT CHECK VERIFICATION:

VERTICAL
REINFORCEMENT _____ YES _____ NO

COMPOSITION _____ YES _____ NO

SKETCH: - WALL CONFIGURATION & EQUIPMENT LOCATION
(Use additional sheets if required)

N (Indicates North)

PREPARED BY: _____ DATE _____

PHASE I INSPECTION BY: _____ DATE _____

PHASE II INSPECTION BY: _____ DATE _____

VERIFIED BY: _____ DATE _____

ATTACHMENT # 2
PROJECT IDENTIFICATION
NO. 2-ESSE/AS-001

EBASCO SERVICES INCORPORATED

ST. LUCIE UNIT # 2

SIGNATURE LIST

NAME	SIGNATURE	INITIALS
THOMAS G. KARAN	Thomas G. Karan	TGK
ROBERT PAVLOVSKY	Robert P. Pavlovsky	R.P.
MARK MILLER	Mark Miller	M.M.

Attachment #4
Project Identification
No. 2-ESSE/AS-001

EBASCO SERVICES INCORPORATED

ST. LUCIE UNIT # 2

INSPECTION FLOW PLAN

1. Identify concrete masonry walls using existing drawings.

2. Verify that all walls have been properly identified by field inspection.

3. Record all safety related equipment and significant non-safety related equipment.

4. Re-evalu ate the structural adequacy of the concrete masonry walls.

Attachment # 6
Project Identification
No. 2-ESSE/AS-001

EBASCO SERVICES INCORPORATED

ST. LUCIE UNIT # 2

RECORD OF TRAINING

1. The following personnel certify that they have read and understand NRC Bulletin 80-11 dated May 8, 1980:

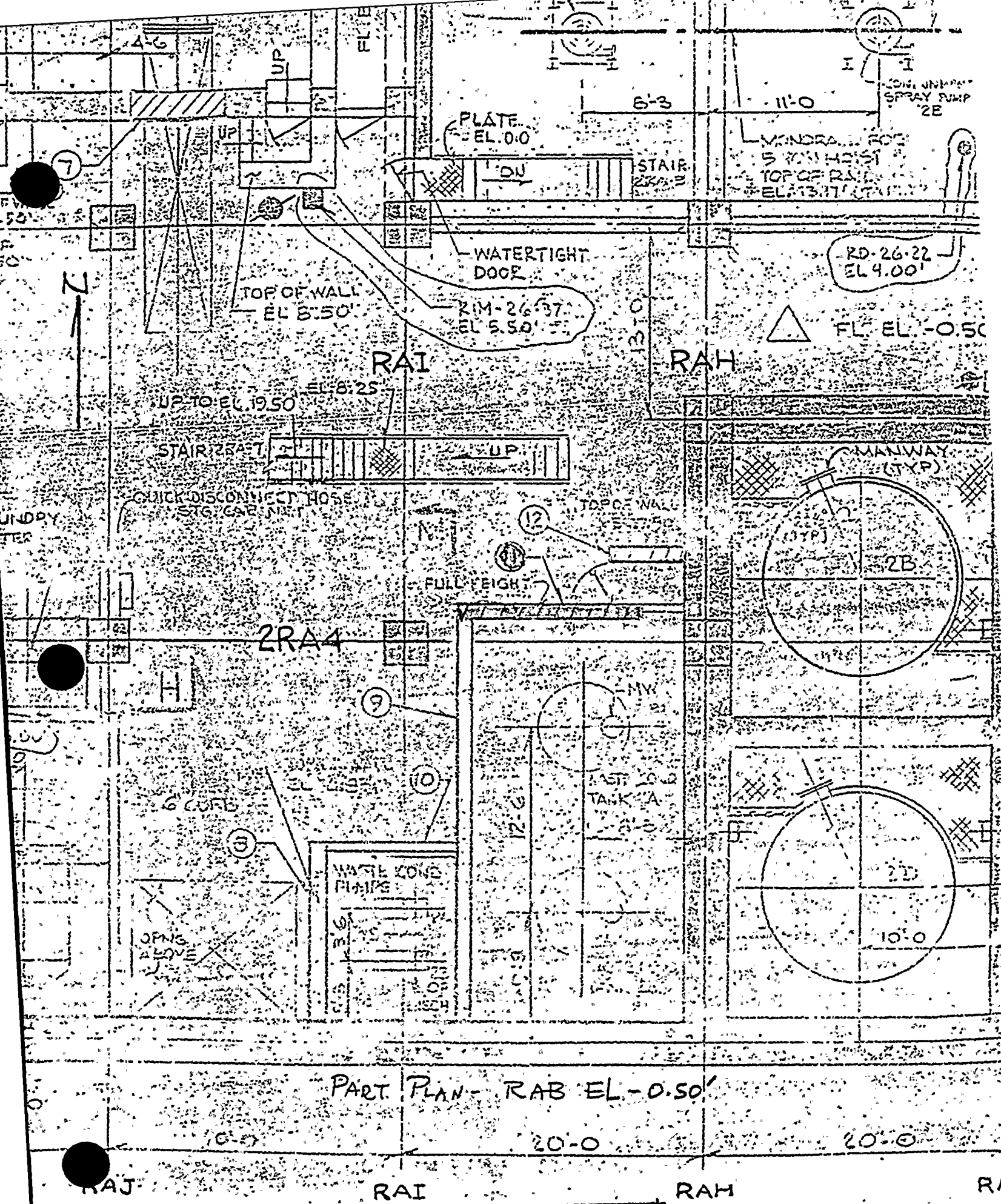
Thomas G Haran
Robert P Pavlovsky
Mark Miller

2. The following personnel certify that they have read and understand the Inspection Procedure for Concrete Masonry Walls (2-ESSE/AS-001)

Thomas G Haran
Robert P Pavlovsky
Mark Miller

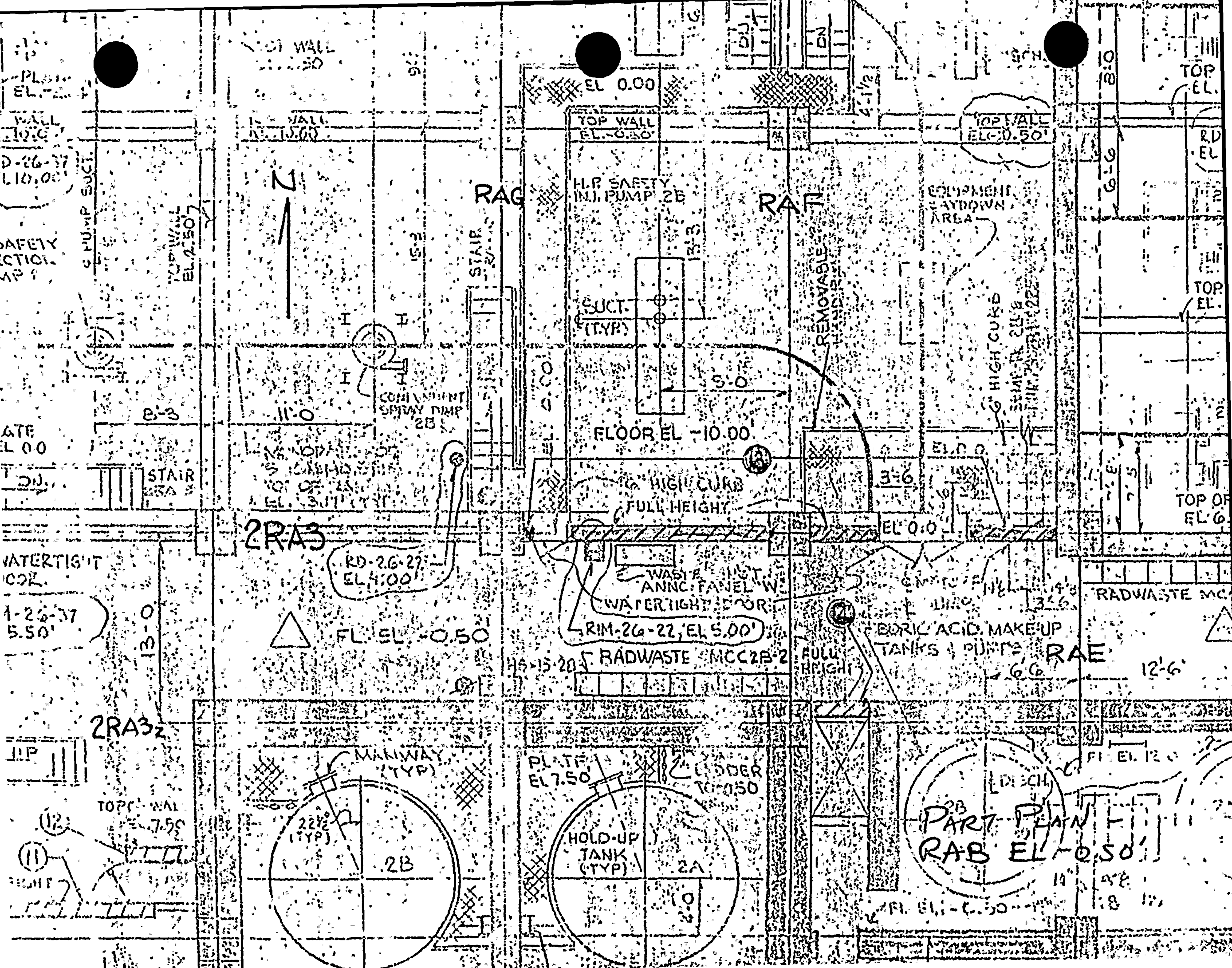
3. The following personnel certify that they have read and understand the Operating Manual for the James R-Meter Model C-4952:

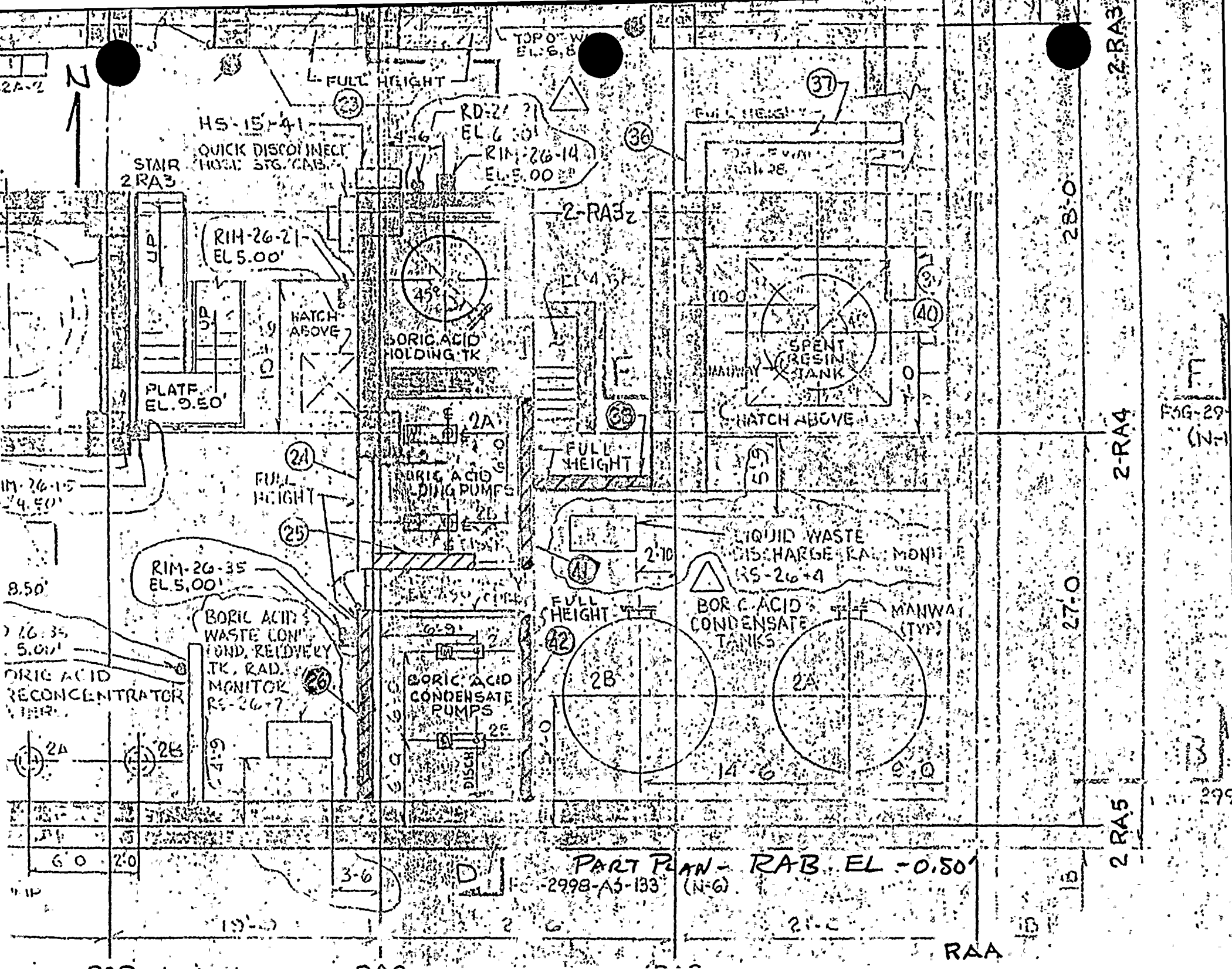
Thomas G Haran
Robert P Pavlovsky
Mark Miller

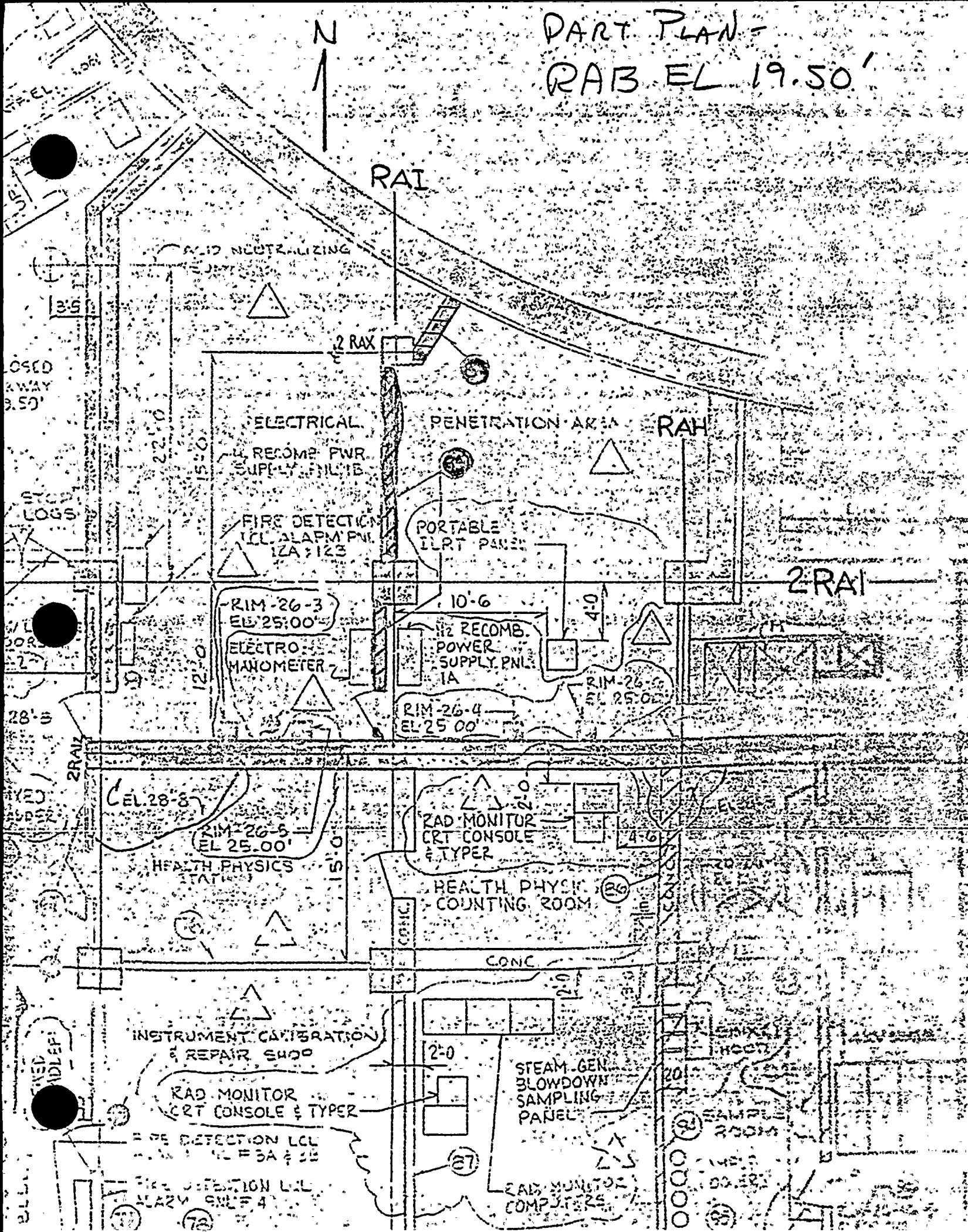


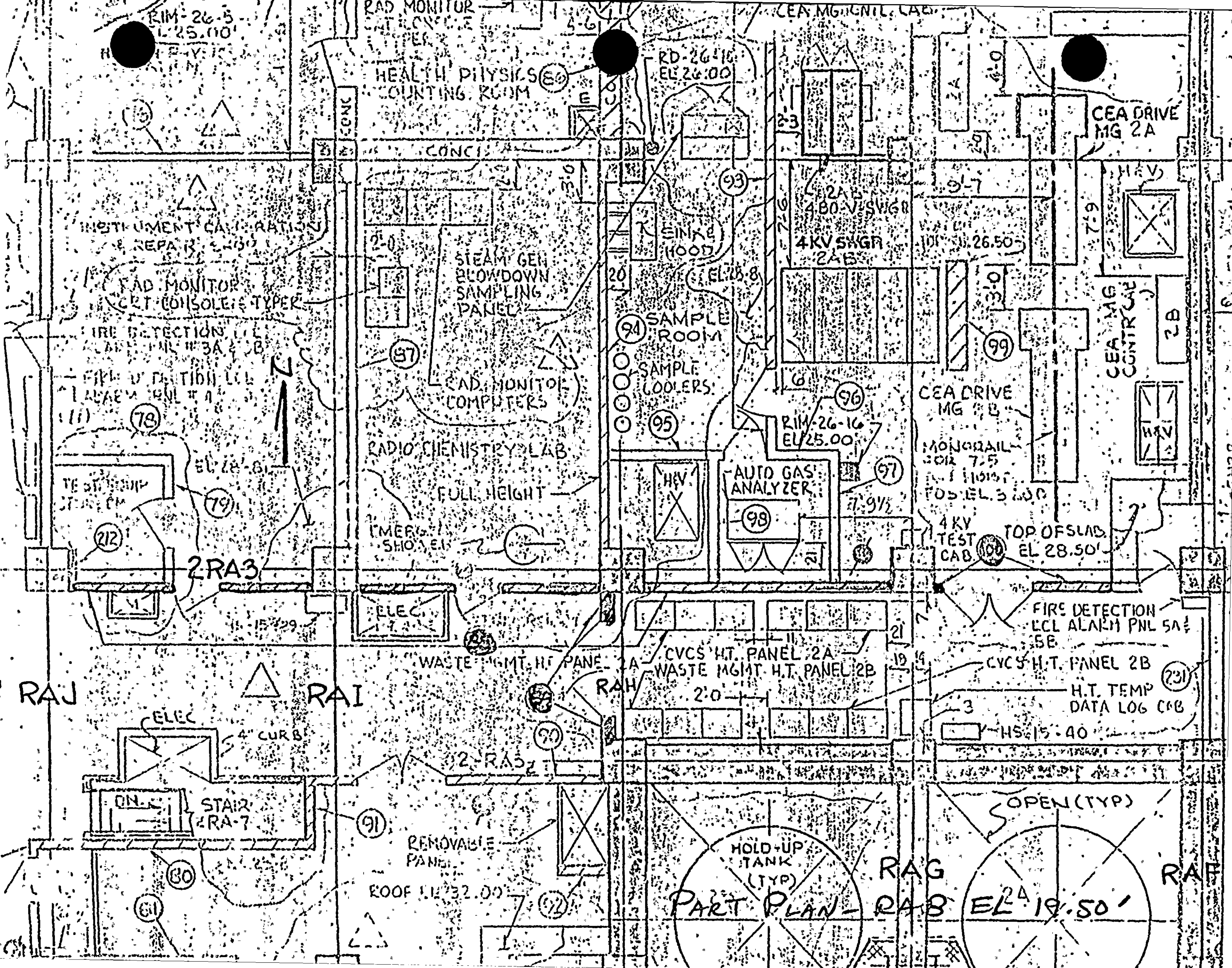
PART PLAN - RAB EL. -0.50'

ATTACHMENT E

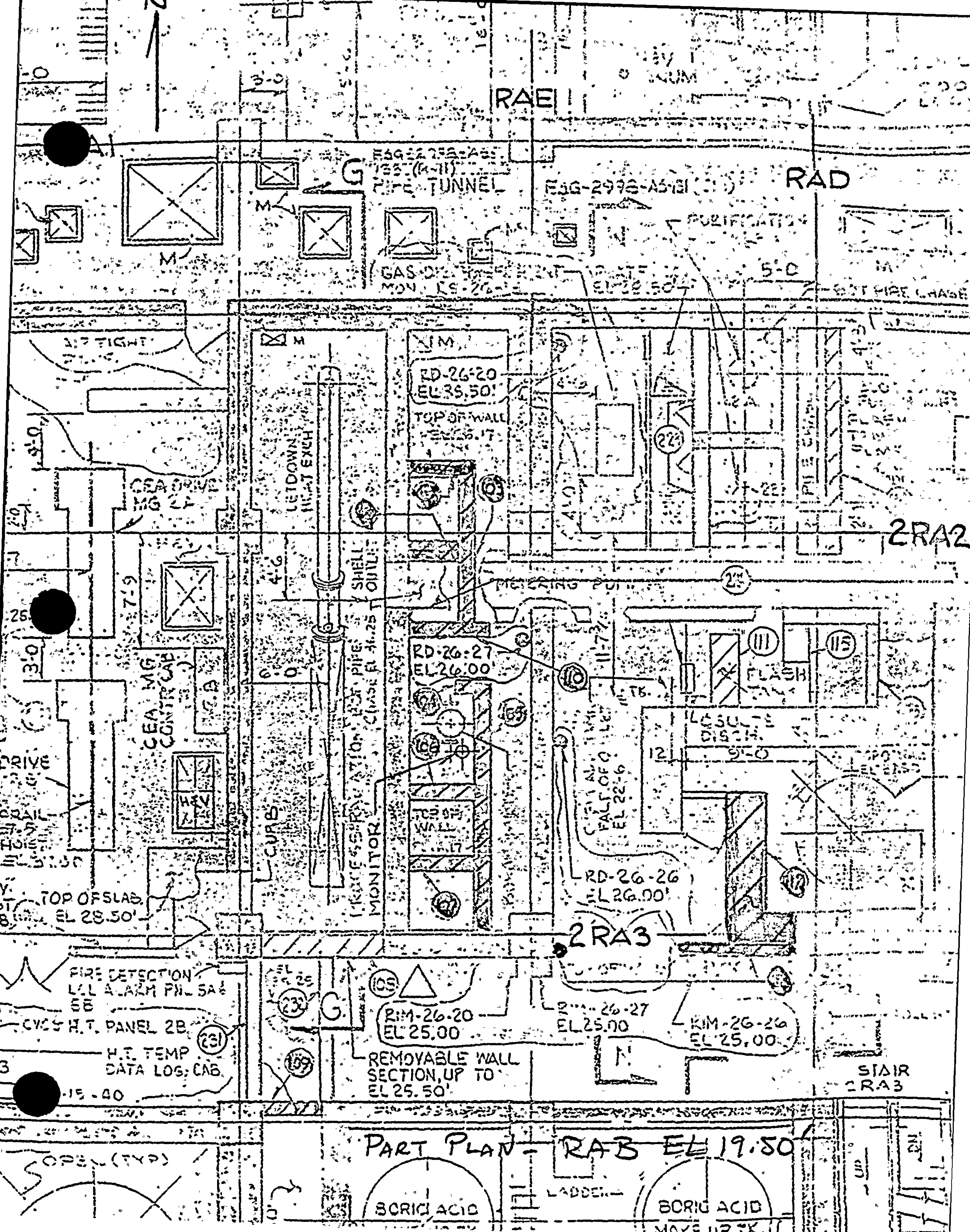

N
RAG
RAF
RAE
2RA3
2RA3z
EL 0.00
TOP WALL EL-0.50'
H.P. SAFETY INJ. PUMP 2B
SUCT. (TYP)
FLOOR EL -10.00
STAIR
CONTAINMENT SPRAY PUMP 2B
6" HIGH CURB
FULL HEIGHT
REMOVABLE HANDRAIL
EQUIPMENT LAYDOWN AREA
HIGH CURB
EL 0.0
RD-26-27 EL 4.00'
WASTE ANNC. PANEL W/ WATERTIGHT DOOR
RIM-26-22, EL 5.00'
FL. EL -0.50
RADWASTE MCC 2B-2
BORIC ACID MAKE-UP TANKS & PUMPS
RADWASTE MC
WATERTIGHT DOOR
MANWAY (TYP)
22½° (TYP)
2B
PLATF. EL 7.50'
LADDER TO -0.50
HOLD-UP TANK (TYP)
2A
PART PLAN RAB EL -0.50'
FL. EL -0.50
TOP OF EL 6.

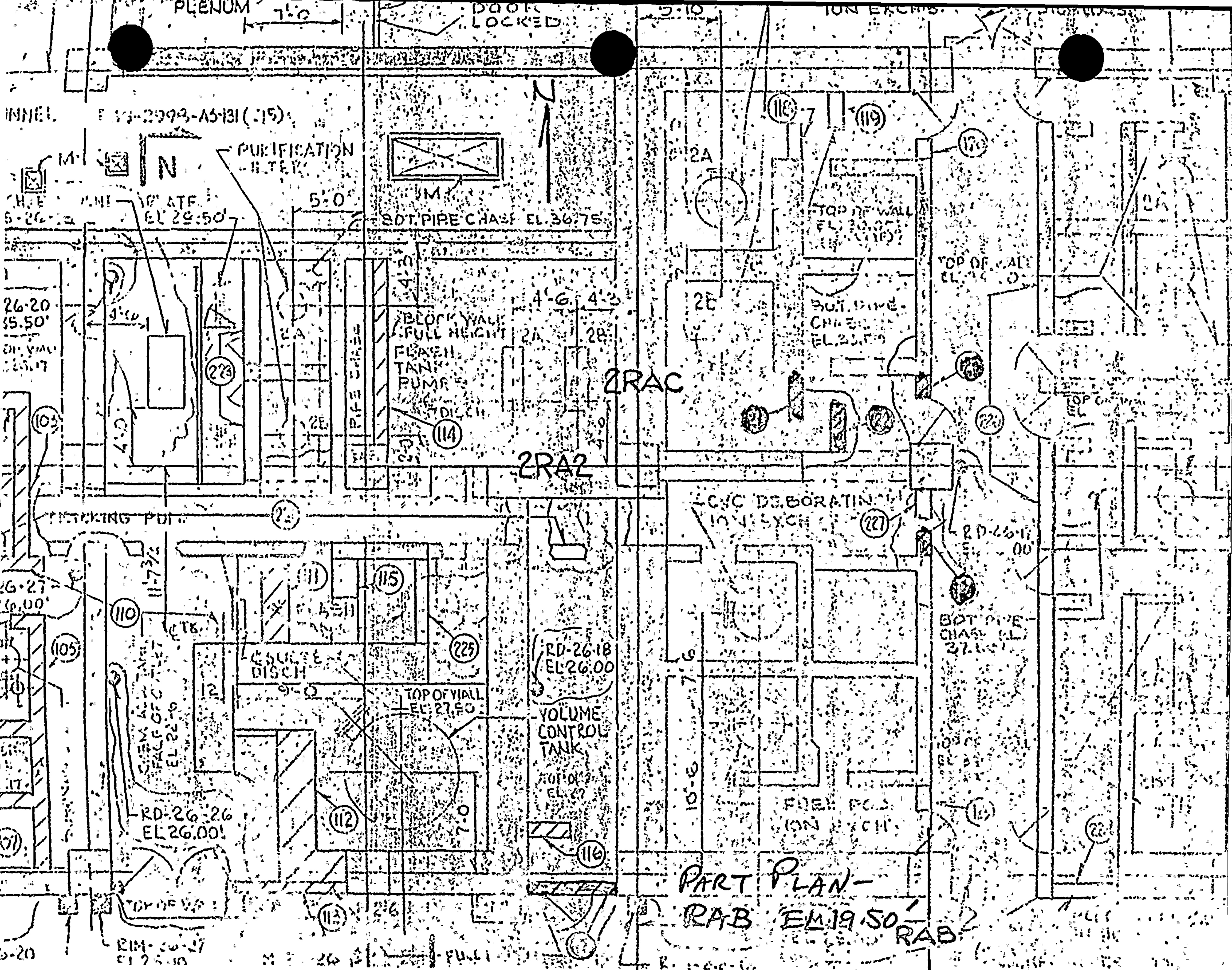

FULL HEIGHT
HS-15-41
QUICK DISCONNECT
STAIR 2RA3
RIM-26-21
EL 5.00'
PLATF.
EL. 9.50'
HATCH ABOVE
BORIC ACID HOLDING TK
2A
BORIC ACID FDING PUMPS
FULL HEIGHT
RIM-26-35
EL 5.00'
BORIC ACID WASTE COND. RECEIVER TK. RAD. MONITOR RS-26-7
BORIC ACID CONDENSATE PUMPS
DISCH
2-RA3
2-RA4
2-RA5
SPENT RESIN TANK
HATCH ABOVE
LIQUID WASTE DISCHARGE RA. MONIT RS-26-4
BORIC ACID CONDENSATE TANKS
2B
2A
MANWAY (TYP)
28'-0
27'-0
PART PLAN - RAB. EL -0.50'
2998-A5-133
(N-6)
RAA

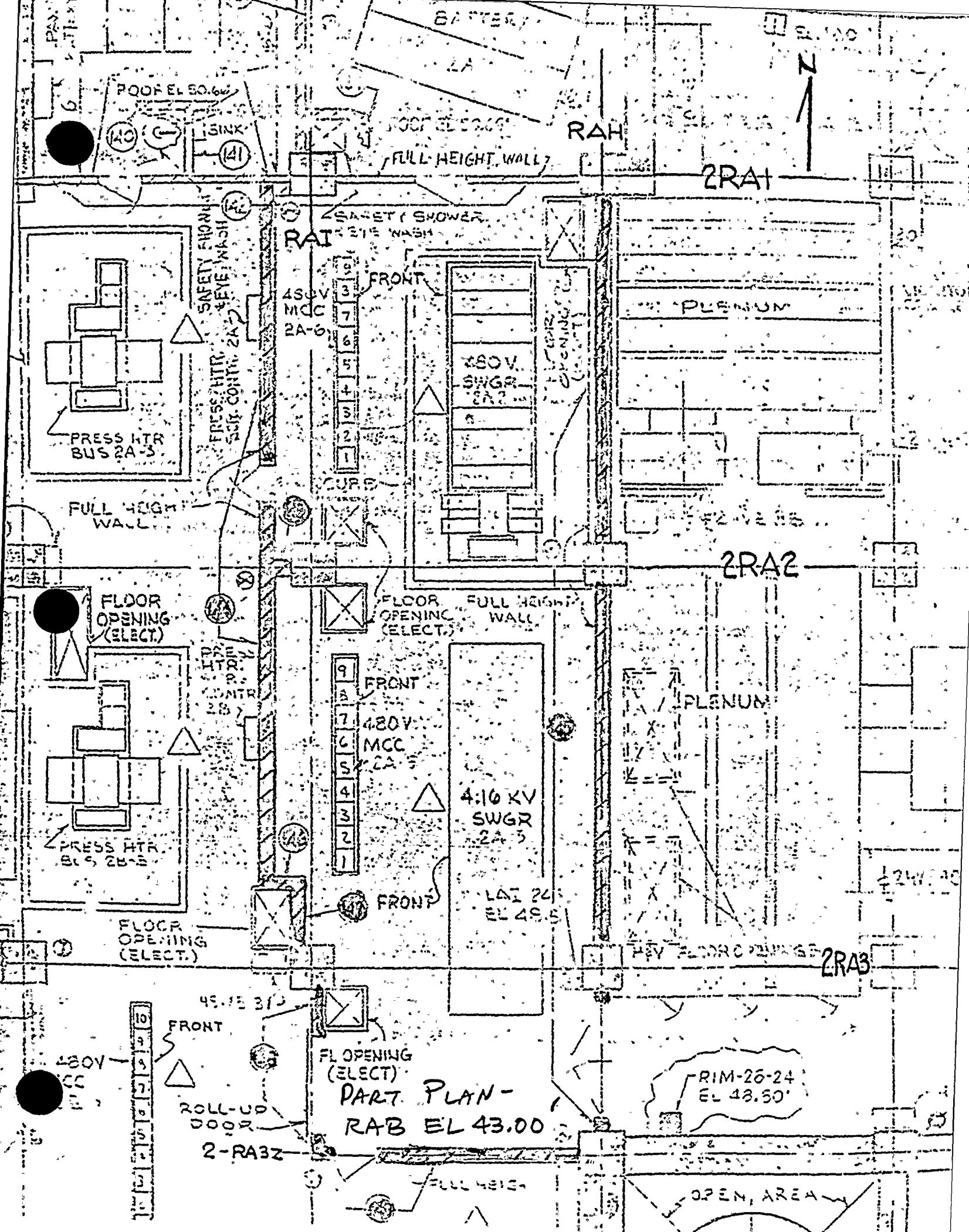

N
PART PLAN -
RAB EL 19.50'
RAI
2 RAX
ELECTRICAL
PENETRATION AREA
RAH
2 RAI
RECOMB PWR SUPPLY PNL 1B
FIRE DETECTION LCL ALARM PNL 1ZA & 1Z3
PORTABLE ILRT PANEL
RIM-26-3 EL 25.00'
ELECTRO MANOMETER
1/2 RECOMB. POWER SUPPLY PNL 1A
RIM-26-4 EL 25.00'
RIM-26-5 EL 25.00'
EL 28-8
HEALTH PHYSICS STATION
RAD MONITOR CRT CONSOLE & TYPER
HEALTH PHYSICS COUNTING ROOM
CONC
INSTRUMENT CALIBRATION & REPAIR SHOP
RAD MONITOR CRT CONSOLE & TYPER
STEAM GEN BLOWDOWN SAMPLING PANEL
RAD MONITOR COMPUTERS
SAMPLE ROOM
HOOD
10'-6
4'-0
2'-0
4'-6
12'-0
15'-0
22'-0
28'-8

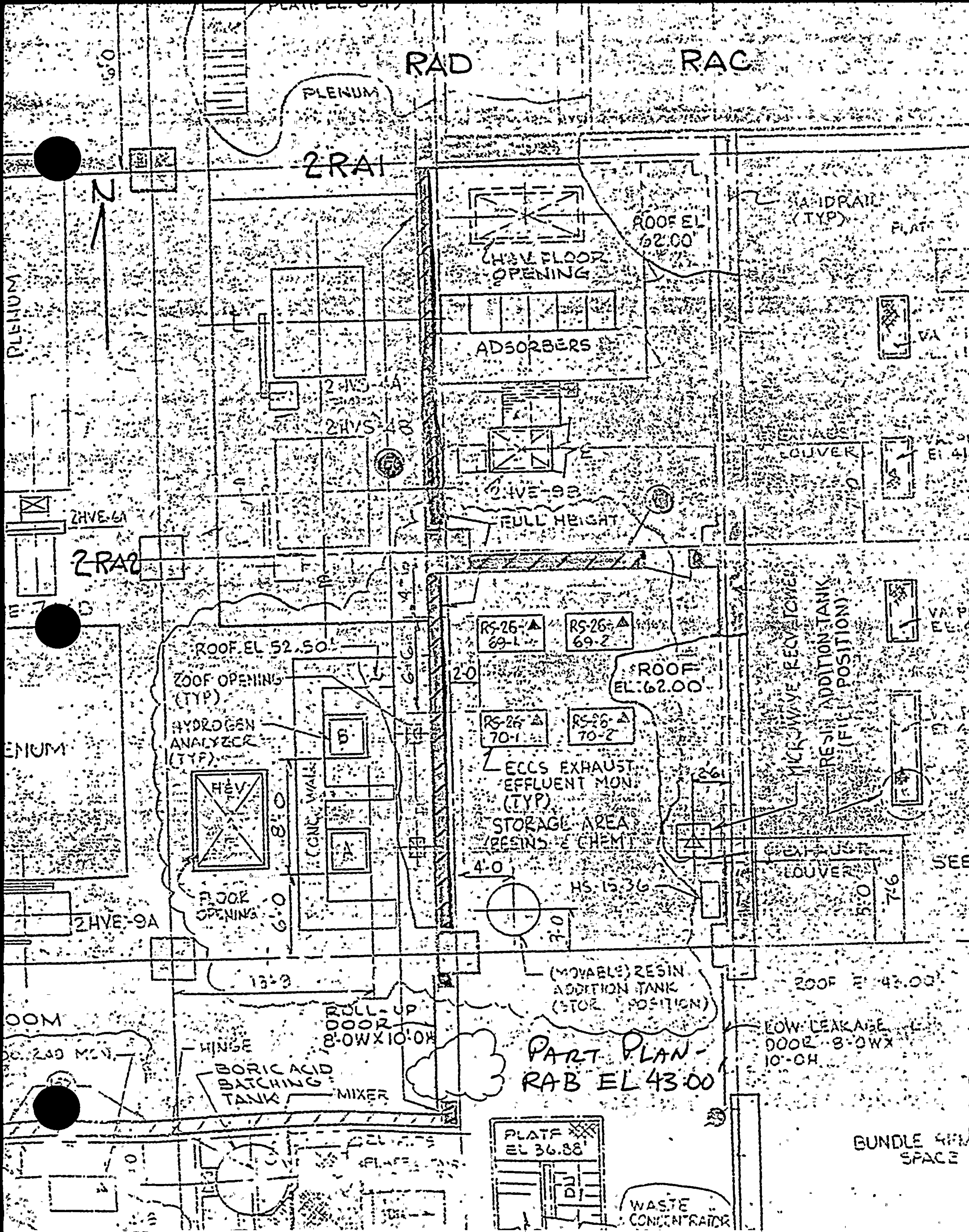


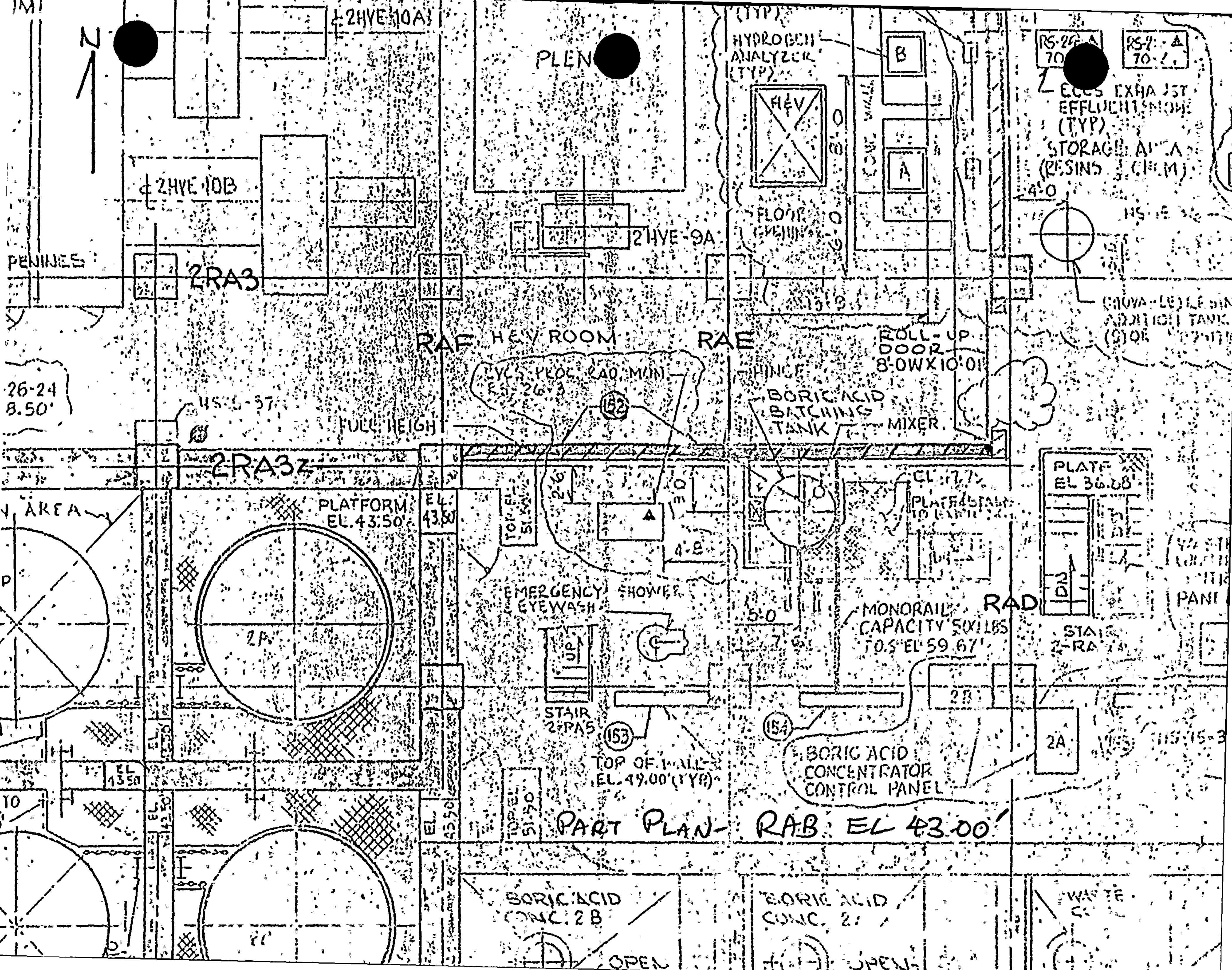
RAD MONITOR
CEA MG CNTL CAB
RD-26-16
EL 26.00
HEALTH PHYSICS
COUNTING ROOM
80
CEA DRIVE
MG 2A
CONC
93
2AB
480 V SWGR
4KV SWGR
2AB
SINK & HOOD
EL 28.8
26.50
STEAM GEN
BLOWDOWN
SAMPLING
PANEL
INSTRUMENT CALIBRATION
& REPAIR
RAD MONITOR
CRT CONSOLE & TYPER
FIRE DETECTION LCL
ALARM PNL #3A & 3B
94
SAMPLE
ROOM
SAMPLE
COOLERS
99
CEA MG CONTROL
2B
97
RAD MONITOR
COMPUTERS
96
CEA DRIVE
MG 2B
78
95
RIM-26-16
EL 25.00
MONORAIL
RADIO CHEMISTRY LAB
EL 28'-8"
AUTO GAS
ANALYZER
97
HV
79
FULL HEIGHT
98
212
EMERG
SHOWER
4 KV
TEST
CAB
100
TOP OF SLAB
EL 28.50'
2RA3
ELEC
FIRE DETECTION
LCL ALARM PNL 5A &
5B
CVCS H.T. PANEL 2A
WASTE MGMT H.T. PANEL 2A
WASTE MGMT H.T. PANEL 2B
CVCS H.T. PANEL 2B
231
RAJ
RAI
RAH
2'-0
H.T. TEMP
DATA LOG CAB
ELEC
4" CURB
90
HS-15-40
2-RA5
OPEN (TYP)
STAIR
2RA-7
91
REMOVABLE
PANEL
HOLD-UP
TANK
(TYP)
RAG
RAF
80
ROOF EL 32.00
92
81
PART PLAN-RAB EL 19.50'
2A

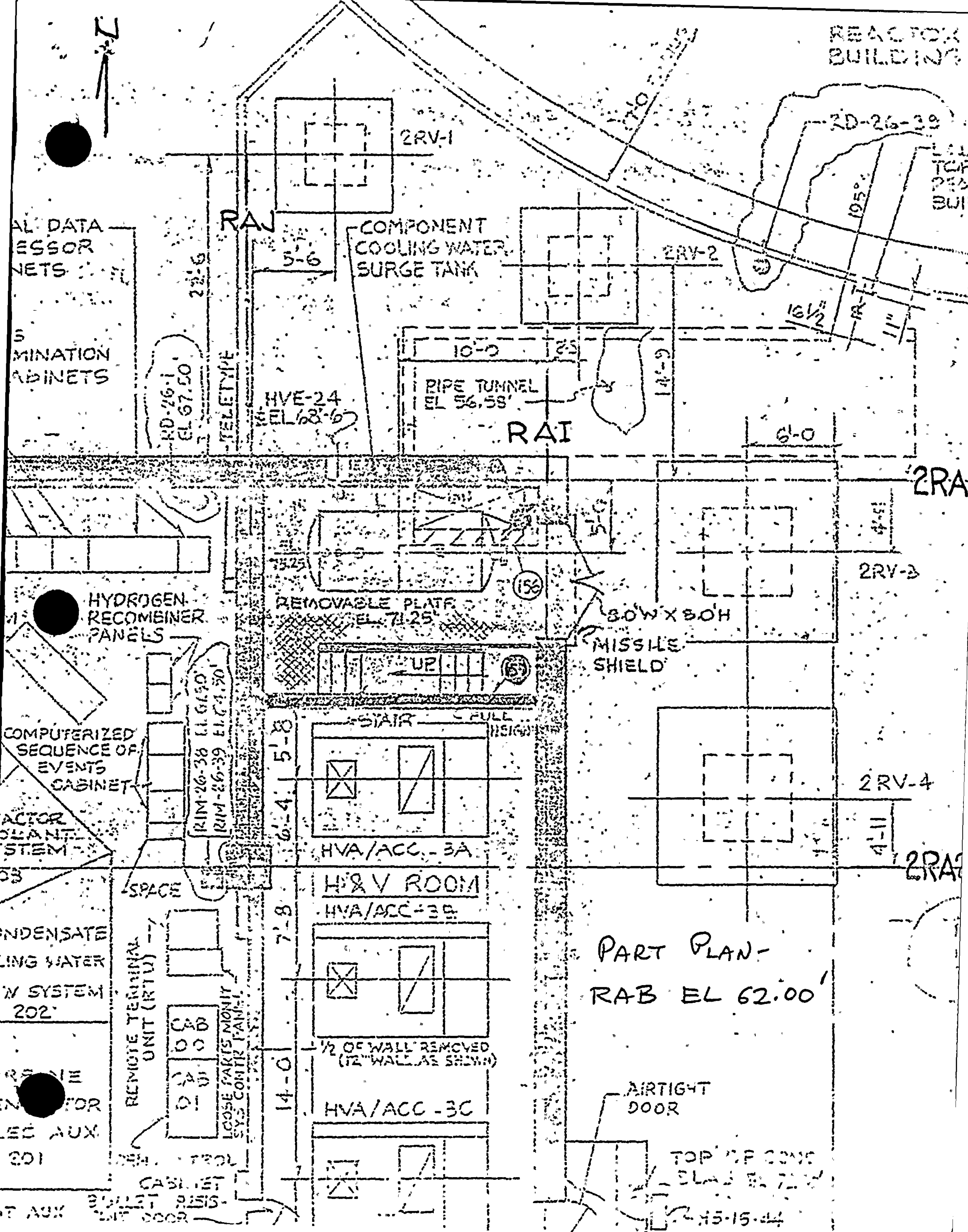

RAE
RAD
2RA2
2RA3
PIPE TUNNEL
PURIFICATION
GAS DISCHARGE MON
AIR TIGHT
CEA DRIVE MG 2A
CEA MG CONTR CAB
H&V
LETDOWN HEAT EXCH
SHELL OUTLET
PIPE CHASE EL 36.25
CURB
PROCESS RADIATION MONITOR
RD-26-20
EL 35.50'
TOP OF WALL
RD-26-27
EL 26.00'
METERING PUMP
FLASH TANK
RD-26-26
EL 26.00'
PIPE CHASE
TOP OF SLAB EL 28.50'
FIRE DETECTION
CVCS H.T. PANEL 2B
H.T. TEMP DATA LOG. CAB.
RIM-26-20
EL 25.00
REMOVABLE WALL SECTION, UP TO EL 25.50'
KIM-26-26
EL 25.00
STAIR 2RAB
PART PLAN - RAB EL 19.50'
OPEN (TYP)
BORIC ACID
LADDER
BORIC ACID MAKE UP TK.


PLENUM
DOOR LOCKED
PURIFICATION FILTER
BOT. PIPE CHASE EL.36.75
BLOCK WALL FULL HEIGHT
FLASH TANK PUMP
2RAC
2RA2
TOP OF WALL
BOT. PIPE CHASE
CVC DEBORATING ION EXCH.
RD-26-17 EL 26.00'
BOT PIPE CHASE EL
RD-26-18 EL 26.00
VOLUME CONTROL TANK
TOP OF WALL EL 27.50
RD-26-26 EL 26.00'
FLASH TANK
FUEL POOL ION EXCH.
PART PLAN - RAB EL 19.50'
RAB


BATTERY
2A
ROOF EL 50.66'
SINK
140
141
ROOF EL 50.66'
RAH
FULL HEIGHT WALL
2RA1
SAFETY SHOWER
EYE WASH
RA1
SAFETY SHOWER
EYE WASH
FRONT
480V MCC 2A-6
480V SWGR 2A2
PLENUM
PRESS HTR BUS 2A-3
PRESS HTR SUP. CONT. 2A2
CURB
FULL HEIGHT WALL
2RA2
FLOOR OPENING (ELECT.)
FLOOR OPENING (ELECT.)
FULL HEIGHT WALL
PRESS HTR BUS 2B-3
PRESS HTR SUP. CONT. 2B3
FRONT
480V MCC 2A-5
4160 KV SWGR 2A-3
PLENUM
FRONT
LAT 24 EL 49.5
FLOOR OPENING (ELECT.)
2RA3
FRONT
480V MCC
FL OPENING (ELECT)
PART PLAN - RAB EL 43.00
RIM-26-24 EL 48.50'
ROLL-UP DOOR
2-RA3Z
OPEN AREA


RAD
RAC
PLENUM
2RA1
N
HANDRAIL (TYP)
ROOF EL 62.00
H&V FLOOR OPENING
ADSORBERS
2HVS-4A
2HVS-4B
EXHAUST LOUVER
2HVE-9B
FULL HEIGHT
2HVE-6A
2RA2
ROOF EL 52.50
ROOF OPENING (TYP)
HYDROGEN ANALYZER (TYP)
RS-26-69-1
RS-26-69-2
ROOF EL 62.00
RS-26-70-1
RS-26-70-2
ECCS EXHAUST EFFLUENT MON. (TYP)
STORAGE AREA (RESINS & CHEM)
MICROWAVE RECV TOWER
RESIN ADDITION TANK (FILL POSITION)
CONC WALK
H&V
B
A
PLENUM
EXHAUST LOUVER
HS-15-36
FLOOR OPENING
2HVE-9A
(MOVABLE) RESIN ADDITION TANK (STOR. POSITION)
ROOF EL 43.00
ROLL-UP DOOR 8-0WX10-0H
LOW LEAKAGE DOOR 8-0WX 10-0H
PART PLAN - RAB EL 43.00
ROOM
HINGE
BORIC ACID BATCHING TANK
MIXER
PLATF EL 36.88
WASTE CONCENTRATOR
BUNDLE
SPACE


2HVE-10A
PLEN
HYDROGEN
ANALYZER
(TYP)
H&V
B
A
ECCS EXHAUST
EFFLUENT MONI
(TYP)
STORAGE AREA
(RESINS & CHEM)
2HVE-10B
2HVE-9A
FLOOR
OPENING
2RA3
RAF
H&V ROOM
RAE
ROLL-UP
DOOR
8-0WX10-0
HINGE
26-24
8.50'
BORIC ACID
BATCHING
TANK
MIXER
FULL HEIGHT
2RA3z
PLATFORM
EL 43.50
PLATF
EL 36.08
EMERGENCY SHOWER
& EYEWASH
MONORAIL
CAPACITY 500 LBS
T.O.S. EL 59.67'
RAD
STAIR
2-RA5
TOP OF WALL
EL 49.00' (TYP)
BORIC ACID
CONCENTRATOR
CONTROL PANEL
2A
2B
PART PLAN - RAB EL 43.00'
BORIC ACID
CONC. 2B
OPEN


REACTOR BUILDING
2RV-1
2RV-2
2RV-3
2RV-4
2RD-26-39
RAJ
RAI
2RA
COMPONENT COOLING WATER SURGE TANK
5-6
PIPE TUNNEL EL 56.58'
10-0
HVE-24 EL 68'-6
TELETYPE
RD-26-1 EL 67.50
AL DATA ESSOR NETS
MINATION CABINETS
HYDROGEN RECOMBINER PANELS
REMOVABLE PLATF EL 71.25'
8.0'W X 8.0'H
MISSILE SHIELD
UP
STAIR
RIM-26-38 EL 64.50
RIM-26-39 EL 64.50
COMPUTERIZED SEQUENCE OF EVENTS CABINET
HVA/ACC - 3A
H&V ROOM
HVA/ACC - 3B
HVA/ACC - 3C
SPACE
REMOTE TERMINAL UNIT (RTU)
CAB 00
CAB 01
LOOSE PARTS MONIT SYS CONTR PANEL
1/2 OF WALL REMOVED (12" WALL AS SHOWN)
AIRTIGHT DOOR
PART PLAN - RAB EL 62.00'