FPL	ST. LUCIE PLANT EMERGENCY PLAN IMPLEMENTING PROCEDURE SAFETY RELATED	Procedure No. **EPIP-09** Current Revision No. **5** Effective Date **06/28/01**

Title:

OFF-SITE DOSE CALCULATIONS

Responsible Department: **EMERGENCY PREPAREDNESS**

REVISION SUMMARY:

Revision 5 – Clarified Delta T determination. (J. R. Walker, 06/18/01)

Revision 4 – Revised fan flow rates to accommodate for maintenance acceptance criteria and included minor correction to a number used in an example. (Steve Knapp, 02/02/01)

Revision 3 - Made human factors improvements; identified applicable unit, relocated note and caution messages, changed table, revised instructions for changing date and time on Class A computer, and changed responsible department from Training to Emergency Preparedness. (Steve Knapp, 09/11/00)

Revision 2 - Revised procedure number to address QA comment from periodic review (Appendix J). (J. R. Walker, 03/18/99)

PSL CONTROL COPY 818 PROCEDURE PRODUCTION

Revision	FRG Review Date	Approved By	Approval Date
0	12/15/97	J. Scarola Plant General Manager	12/15/97
5	06/14/01	R. G. West Plant General Manager	06/18/01
		N/A Designated Approver	
		N/A Designated Approver (Minor Correction)	

S___OPS	
DATE	
DOCT	PROCEDURE
DOCN	EPIP-09
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COM	COMPLETED
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1.0 PURPOSE

1.1 Discussion

1. This procedure is applicable to both Unit 1 and Unit 2. Should both units be affected, provisions have been made on the worksheets to sum the release rates.

2. The Chemistry Department, as directed by the Emergency Coordinator (EC) or his designee, shall perform off-site dose calculations in accordance with this procedure until the Technical Support Center (TSC) or Emergency Operations Facility (EOF) is manned and operational.

3. Off-site dose calculations and assessment shall be performed in the EOF when it is manned and operational. The TSC may continue to perform dose assessment and compare results with the dose assessment group in the EOF.

4. The off-site dose estimates, release rates and radiation levels in containment are used by the EC for emergency classification or off-site Protective Action Recommendations (PARs).

5. This procedure has an Attachment 4, TSC/EOF Dose Assessment Guidance for Responding to an Unmonitored Containment Burp, for use by TSC and/or EOF dose assessment personnel to assess unmonitored releases resulting from rapid containment depressurization events.

6. Attachment 5, Estimate of Containment Volume Loss, addresses a rapid depressurization (i.e., greater than design basis) of containment through an estimate of containment volume loss.

7. Attachment 6, Release Rate from Field Team Measurements, is also included which provides a method to back calculate a release rate from Field Monitoring Team survey results.

8. A computer dose calculation model is available for use by dose assessment personnel in both the TSC and EOF. This model estimates off-site dose rates and cumulative doses. The model parallels this procedure. Instructions for use of the computer model are provided in Attachment 7, Off-site Dose Calculations - Class A Computer Method.

2.0 REFERENCES / RECORDS REQUIRED / COMMITMENT DOCUMENTS

NOTE

One or more of the following symbols may be used in this procedure:

§ Indicates a Regulatory commitment made by Technical Specifications, Condition of License, Audit, LER, Bulletin, Operating Experience, etc. and shall NOT be revised without Facility Review Group review and Plant General Manager approval.

¶ Indicates a management directive, vendor recommendation, plant practice or other non-regulatory commitment that should NOT be revised without consultation with the plant staff.

Ψ Indicates a step that requires a sign off on an attachment.

2.1 References

1. St. Lucie Plant Updated Final Safety Analysis Report (UFSAR), Unit 1 and Unit 2
2. St. Lucie Plant Radiological Emergency Plan (E-Plan)
3. E-Plan Implementing Procedures (EPIP-00 - 13)
4. HP-2, FP&L Health Physics Manual
5. QI-17-PSL-1, Quality Assurance Records
6. Bases for Accident Dose Calculations for St. Lucie Nuclear Power Plant (Bases prepared by HMM Associates of Waltham, Massachusetts)
7. NUREG-0654, Rev. 1, FEMA Rep-1, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, November, 1980
8. NUREG/BR-150, Vol. 1, Response Technical Manual
9. EPA-400-R-92-001, EPA Manual of Protection Action Guides and Protective Actions for Nuclear Incidents, October, 1991.
10. ¶2 FPL Engineering Calculation PSL-BFJM-93-032, March, 1994.

2.2 Records Required

1. All completed data/worksheets or computer generated forms providing similar information, shall be maintained in the plant files in accordance with QI-17-PSL-1.

2.3 Commitment Documents

1. ¶1 Condition Report 96-2609 (ERDADS Data/Fan Status)

2. ¶3 PMAI PM99-09-016 (PARs Based on FMT Data)

3. ¶4 Condition Report 00-1426 Supplement 1 (Fan Flowrates)

4. ¶5 PMAI PM01-05-073, Condition Report CR 01-0351 (Determination of Delta T)

/R5

3.0 RESPONSIBILITIES

3.1 The Chemistry Department shall be responsible for performing off-site dose calculations, when directed by the Emergency Coordinator.

3.2 The EOF Dose Assessor shall take primary responsibility for dose assessment when the EOF is operational.

4.0 DEFINITIONS

4.1 Abbreviations/Acronyms

1. **PAR** - Protective Action Recommendation - designation used on the Dose Calculation Worksheet that refers to data that should be used when determining Protective Action Recommendations.

2. **SNF** - State Notification Form - designation used on the Dose Calculation Worksheet that refers to data that should be transferred to the State Notification Form.

4.2 **Affected Unit** - (for purposes of this procedure) - a reactor unit that has activated the Emergency Plan and has a **release**.

4.3 **Iodine Removal System** - is defined as any one Containment Spray occurring with its chemical addition system injecting the chemicals:

Unit 1 - Sodium Hydroxide

Unit 2 - Hydrazine

4.4 **Particulate Factor (PF)** - a factor used when core melt or overheat is under way to account for the particulate in the release pathway.

4.5 **Release** - during any declared emergency, one of the following is true:

1. Any effluent monitor increase of (approximately) 10 times or one decade above pre-transient values

OR

2. Health Physics detecting airborne radioactivity levels in excess of 25 percent Derived Air Concentration (DAC) <u>outside</u> of plant buildings due to failure of equipment associated with the declared emergency.

4.6 Symbols - the following symbols are used in this procedure:

1. < = less than
2. ≤ = less than or equal to
3. > = greater than
4. ≥ = greater than or equal to
5. E =stands for exponent and indicates the power to which 10 is raised, "or times 10 to the power of", e.g.:

   A. E + 04 = 10^4 = 10,000

   B. E - 04 = 10^{-4} = 0.0001

5.0 INSTRUCTIONS

CAUTION

1. Large errors may result if the ERDADS computer is NOT addressing the affected unit's database.

¶1 2. "No data" after a parameter name means that this input is NOT available from ERDADS for this unit.

5.1 Data Acquisition

1. ERDADS - Emergency Response Data Acquisition and Display System, the following information is available on the display screens indicated.

A. Meteorological Data -

Display: **SMD** (Site Meteorological Data)

B. Plant Parameter Data -

CAUTION

¶1 Certain parameters (e.g., fan status) available on Unit 2 are NOT available on Unit 1.

Display: in the TSC - **SF (1/2)** (Safety Functions and Equipment Status)

in the EOF - **EF (1/2)**

C. Radiological Data -

Display: **RG (1/2)** (Radiation Gaseous Source Term)

RBS (Health Physics Evaluation Screen - containment radiation levels and trends)

R11 (Area Radiation Monitors, Unit 1)

R21 (Area Radiation Monitors, Unit 2)

5.1 Data Acquisition (continued)

1. (continued)

D. Chemistry Data -

Display: **R12** (S/G Blowdown, Steam Jet Air Ejector, Unit 1)

R22 (S/G Blowdown, Steam Jet Air Ejector, Unit 2)

E. To access data -

1. Press "CLEAR"

2. Type in "Pup Unit (1/2)"

3. Press "EXEC"ute, top of screen will read "Unit change is complete" or "Current Unit is same as entered Unit"

4. Press "EPIP"

5. The "PAGE UP" and "PAGE DOWN" keys will cause the following display sequence:

SMD - RG(1/2) - SF(1/2) - RBS - EF(1/2) - SMD

F. To go directly to a screen -

1. Press "CLEAR"

2. Type in screen designation, e.g., "**RG1**"

3. Press "DISPLAY"

2. Sound-powered Phone Talker - the Sound-powered Phone Talker can be utilized as a primary source of information or as an alternate method to ERDADS.

A. Primary source - status of fans needed for dose assessment exhaust fans 6, 7, 8, 9, 10, 15, 16 and 17.

5.1 Data Acquisition (continued)

3. Unit 1 determine gross Noble gas concentrations via Eberline Control Terminal A or B:

A. Enter the following sequence on the keypad for each applicable channel number:

1. Press 10 MIN HIST

2. Determine the applicable pathway channel number from the table below:

3. Enter the applicable pathway channel number

4. Press ENTER (value appears in window)

5. Press PRINT

6. Press FILE

7. Press ENTER

8. Enter the next to last point from the lowest non-alarming range into the applicable Data column in step 6.

NOTE

Use a steamline channel ONLY if the Safeties and/or Atmospheric Steam Dumps are releasing steam. Monitors have one range.

Path	Range Low	Range Mid	Range Hi
Plant Vent	**1-5**	**1-7**	**1-9**
ECCS – A	**2-5**	**2-7**	**2-9**
ECCS – B	**3-5**	**3-7**	**3-9**
Fuel Bldg.	**4-5**	**4-7**	**4-9**
Steamline A	**N/A**	**5-1**	**N/A**
Steamline B	**N/A**	**5-2**	**N/A**

5.1 Data Acquisition (continued)

4. Unit 2 determine gross Noble gas concentrations via the PC-11, Radiation Monitoring Console. Use the following keystroke sequence for each applicable channel number:

A. Press Key F8 to display Control Menu

B. Use the ARROW Key to highlight the RM-80 Utility Task under the status display

C. Press ENTER key

D. Press Key F1 to select Historical Display

E. Press Key F4 to select Graph 10 Minute

> **NOTE**
> Start with lowest scale not in alarm.

F. Determine the applicable pathway channel number, from the table below:

G. At prompt, type **M** and the Channel Number (see below)

H. Press ENTER

I. Record Top #1 reading in applicable DATA column.

J. Press Key F10

K. Press Key F10

5.1 Data Acquisition (continued)

4. (continued)

L. Press Key F1 to display All Monitor Schematic

Applicable Pathway Channel Number

NOTE
Use a steamline channel only if the Safeties and/or Atmospheric Steam Dumps are releasing steam. Monitors have one range. Use NET value (Channel - Background).

Path	Range Low	Range Mid	Range Hi
Plant Vent	**621**	**622**	**623**
ECCS – A	**601**	**602**	**603**
ECCS – B	**611**	**612**	**613**
Fuel Bldg. (If NOT diverted)	**413**	**N/A**	**N/A**
Steamline A	**N/A**	**631**	**N/A**
Steamline B	**N/A**	**632**	**N/A**
Background (Steamline)	**N/A**	**633**	**N/A**

END OF SECTION 5.1

CAUTION

Wind speed, wind direction and Delta temperature values should vary with time, i.e., chart recorders in the Unit 1 Control Room and A1A Site Tower Shack should NOT be straight-lining. If initial efforts to correct straight-lining fail, alternate sources of data (described below) may be used in lieu of straight-lining data.

NOTE

Section 5.2 through 5.5 provide a method for estimating Total Dose (TEDE) and Thyroid Dose (CDE) dose rates and projected Total Dose (TEDE) and Thyroid Dose (CDE) doses via hand calculations. The Class A computer method may be used in lieu of hand calculations in accordance with Attachment 7.

5.2 Complete ONE Data Sheet from Attachment 1, Meteorological Data, selected from one of the three prioritized methods listed below.

Primary Method — Data Sheet 1 - SITE TOWER
The ERDADS terminals, Unit 1 Control Room and site tower chart recorders provide 15 minute average data.

OR

1st alternate — Data Sheet 2 - NOAA/NWS
This primary back up is for use if site tower data is NOT available.

OR

2nd alternate — Data Sheet 3 - DEFAULT
For use if both site tower and NOAA/NWS data are NOT available.

5.3 The DOSE CALCULATION WORKSHEET is determined as part of completing one of the Meteorological Data Sheets. The Dose Calculation Worksheet will be used to determine doses after the Release Rate Worksheet is completed.

NOTE

If both units are in a declared emergency and both units have or had a release, then the site release rate is the sum of both units' release rates.

NOTE TO TSC / EOF DOSE ASSESSMENT PERSONNEL

A rapid, unexplained containment pressure reduction (NOT due to operation of spray, additional coolers, etc.) may indicate an unmonitored release. For guidance in responding to this event, refer to Attachment 4.

5.4 Determine the site release rate by completing ONE Data Sheet from Attachment 2, Release Rate Data, for each affected unit. For the accident type, select the Data Sheet(s) from the four prioritized methods listed below.

Primary method, All accidents	CHEMISTRY GRAB SAMPLING for Unit 1: Data Sheet 1A for Unit 2: Data Sheet 2A
	OR
1st alternate, All accidents	EFFLUENT MONITORS for Unit 1: Data Sheet 1B for Unit 2: Data Sheet 2B
	OR
2nd alternate, LOCA Only	CONTAINMENT HI-RANGE RADIATION MONITOR either Unit: Data Sheet 3
	OR
	POST LOCA MONITORS, either Unit: Data Sheet 4
	OR
3rd alternate, All accidents	DEFAULT, only if no other source of data is available either Unit: Data Sheet 5

5.5 Calculate the offsite dose rates and projected doses by following the instructions on the selected Data Sheet of Attachment 3, DOSE CALCULATION WORKSHEET.

5.6 The Emergency Coordinator shall be provided with dose calculation results as they are prepared in the TSC.

5.7 The Recovery Manager (RM) shall be provided with dose calculation results as they are prepared in the EOF.

5.8 The TSC Chemistry Supervisor (EOF HP Manager when EOF operational) should monitor release rates and meteorological conditions to determine how frequently to update the dose rate estimates.

1. Release and dose estimates shall be revised at least hourly for the first 8 hours after the accident unless it is determined that releases of radioactivity have been terminated.

2. When doing hand calculations, If any of the following averages change by the amounts indicated below, over a period of 30 minutes or less, Then dose estimates shall be updated.

A. Release rates increase by more than 25 percent.

OR

B. Wind speed decreases to less than one half of previous value.

OR

C. Atmospheric stability becomes more stable by more than one class (e.g., change from stability D to F).

OR

D. Wind direction changes by more than 22.5 degrees (i.e., plume centerline is more than one sector away from prior location).

END OF SECTION 5.0

ATTACHMENT 1
METEOROLOGICAL DATA
(Page 1 of 10)

DATA SHEET 1 SITE TOWER
(Page 1 of 3)

1. Gather Data:

A. Date & Time of meteorological observations _____/_____

B. Enter 10 Meter (alternate 57.9 Meter) **WIND SPEED**: _____**mph**

C. Enter 10 Meter (alternate 57.9 Meter) **WIND DIRECTION (from)** _____**deg.**

D. Enter Delta-T (displayed by ERDADS)_____deg. F

E. ¶5 If Delta T is not available from ERDADS, Then:

1. Enter the difference: 57.9 meter temperature minus 10 meter temperature: _____

2. Multiply that difference by 1.044: _____

3. Use that product in Step 2, below.

2. Using Delta-T (ΔT) and the guide below, determine and enter the Stability Class _____.

If DELTA-T is	Then Stability Class is
less than or equal to -1.7	A
-1.6 to -1.5	B
-1.4	C
-1.3 to -0.5	D
-0.4 to +1.4	E
+1.5 to +3.6	F
greater than +3.6	G

/R5

ATTACHMENT 1
METEOROLOGICAL DATA
(Page 2 of 10)

DATA SHEET 1 SITE TOWER
(Page 2 of 3)

3. Using the guide below, determine and circle the **AFFECTED SECTORS.**

NOTE
If the wind direction is directly on the edge of two sectors (e.g., 11°, 33°, 56°, etc.), an additional sector should be added to the Protective Action Recommendation (PAR). For example, if the wind direction is from 78°, then the affected sectors for the PAR should be L, M, N and P.

Wind From	Affected Sectors	Wind From	Affected Sectors	Wind From	Affected Sectors
348 - 11	HJK	123 - 146	PQR	236 - 258	CDE
11 - 33	JKL	146 - 168	QRA	258 - 281	DEF
33 - 56	KLM	168 - 191	RAB	281 - 303	EFG
56 - 78	LMN	191 - 213	ABC	303 - 326	FGH
78 - 101	MNP	213 - 236	BCD	326 - 348	GHJ
101 - 123	NPQ	there is no	O sector	there is no	I sector

ATTACHMENT 1
METEOROLOGICAL DATA
(Page 3 of 10)

DATA SHEET 1 SITE TOWER
(Page 3 of 3)

4. Check for Sea Breeze effect:

Only if All of the following conditions are met, then the Sea Breeze effect is YES

If one or more conditions are not met, then the Sea Breeze effect is NO

- Stability Class A, B or C
- Time of day 6 AM to 7PM
- Wind Direction (from) is between 0 through EAST to 180 degrees
- 10 meter air temperature greater than HISTORICAL AVERAGE SURFACE WATER, listed below:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
69	65	69	73	76	79	80	81	81	79	74	71

Sea Breeze Impact (Yes or No) _____

5. Using the guide below, select a DOSE CALCULATION WORKSHEET:

Stab. Class	Seabreeze Impact	Dose Calc Worksheet	Stab. Class	Seabreeze Impact	Dose Calc Worksheet	Stab. Class	Dose Calc Worksheet
A	YES	1				D	7
A	NO	2	C	YES	5	E	8
B	YES	3	C	NO	6	F	9
B	NO	4				G	10

6. Copy information to the selected DOSE CALCULATION WORKSHEET:

A. **WIND DIRECTION** and the **AFFECTED SECTORS** to line A

B. **WIND SPEED** to line 2

7. This data sheet is completed, proceed to release rate determination.

END OF DATA SHEET 1

ATTACHMENT 1
METEOROLOGICAL DATA
(Page 4 of 10)

DATA SHEET 2 NOAA / NWS
(Page 1 of 6)

1. Gather Data: Call NOAA/National Weather Service (NWS) station (phone number in the St. Lucie Plant Emergency Response Directory, Section 4.0, Off-site Support. When the NOAA person answers, identify FPL - St. Lucie Plant as calling party and obtain:

   A. Date/Time of observation: _____/_____ Eastern Standard Time
   Daylight Savings Time
   (circle eastern or daylight)

   B. **WIND DIRECTION** (From): _____Degrees

   C. **WIND SPEED**: _____Knots

   D. Sunrise: _____ am Sunset: _____ pm

   E. Sky Condition: Clear Scattered Overcast Broken
   (circle)

   F. If sky condition is overcast or broken, then enter Ceiling Height

   _____ ft.

   G. Estimated air temperature for Ft. Pierce area _____°F

   H. If time permits, ask for a weather forecast for the area: _____

   _____

2. Determine and circle the Solar Radiation Characteristic (nil, weak, slight, etc.):

   A. IF Daytime (1 hour after sunrise to 1 hour before sunset), THEN

   1. Determine Solar Altitude from Figure 1 (at the end of this data sheet), using time and date.

ATTACHMENT 1
METEOROLOGICAL DATA
(Page 5 of 10)

DATA SHEET 2 NOAA/NWS
(Page 2 of 6)

2. **A.** (continued)

2. Circle the Solar Radiation Characteristic on the table below, using Sky Condition, Ceiling Height and Solar Altitude.

Day Sky Condition	Ceiling, Feet	Solar Altitude			
		< 15 deg	15 to < 35 deg	35 to 60 deg	> 60 deg
Overcast	< 7000	Nil	Nil	Nil	Nil
	7K to 16K	Weak	Weak	Weak	Slight
	> 16000	Weak	Weak	Slight	Moderate
Broken	< 7000	Weak	Weak	Weak	Slight
	7K to 16K	Weak	Weak	Slight	Moderate
	> 16000	Weak	Slight	Moderate	Strong
Clear Scattered	not applicable	Weak	Slight	Moderate	Strong

B. IF NOT Daytime, circle the Solar Radiation Characteristic on the table below, using Sky Condition and Ceiling Height (Solar Altitude is not applicable).

Night Sky Condition	Ceiling, Ft.	Solar Radiation Characteristic
Overcast	less than 7000	Nil
	7000 or higher	Weak Loss
Broken	not applicable	Weak Loss
Clear or scattered	not applicable	Strong Loss

ATTACHMENT 1
METEOROLOGICAL DATA
(Page 6 of 10)

DATA SHEET 2 NOAA/NWS
(Page 3 of 6)

3. Using the Wind Speed in Knots and the Solar Radiation Characteristic, find in the table below and circle the Stability Class.

Solar Radiation	Wind Speed in KNOTS								
	0-1	> 1-3	> 3-5	> 5-6	> 6-7	> 7-9	> 9-10	> 10-11	> 11
Strong	A	A	A	B	B	B	C	C	C
Moderate	A	B	B	B	B	C	C	C	D
Slight	B	B	C	C	C	C	C	D	D
Weak	C	C	C	D	D	D	D	D	D
Nil	D	D	D	D	D	D	D	D	D
Weak Loss	F	F	E	E	D	D	D	D	D
Strong Loss	G	G	F	F	E	E	E	D	D

4. Using the guide below, determine and circle the **AFFECTED SECTORS**.

NOTE
If the wind direction is directly on the edge of two sectors (e.g. 11°, 33°, 56°, etc.), an additional sector should be added to the Protective Action Recommendation (PAR). For example, if the wind direction is from 78°, then the affected sectors for the PAR should be L, M, N and P.

Wind From	Affected Sectors	Wind From	Affected Sectors	Wind From	Affected Sectors
348 - 11	HJK	123 - 146	PQR	236 - 258	CDE
11 - 33	JKL	146 - 168	QRA	258 - 281	DEF
33 - 56	KLM	168 - 191	RAB	281 - 303	EFG
56 - 78	LMN	191 - 213	ABC	303 - 326	FGH
78 - 101	MNP	213 - 236	BCD	326 - 348	GHJ
101 - 123	NPQ	there is no	O sector	there is no	I sector

ATTACHMENT 1
METEOROLOGICAL DATA
(Page 7 of 10)

DATA SHEET 2 NOAA/NWS
(Page 4 of 6)

5. Check for Sea Breeze effect:

Only if ALL of the following conditions are met, then the Sea Breeze effect is YES.

If one or more conditions are not met, then the Sea Breeze effect is NO.

- Stability Class A, B or C
- Time of day 6 AM to 7 PM
- Wind Direction (from) is between 0 through East to 180 degrees
- 10 meter air temperature greater than HISTORICAL AVERAGE SURFACE WATER, listed below:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
69	65	69	73	76	79	80	81	81	79	74	71

Sea Breeze Impact (Yes or No) _____

6. Using the guide below, select a DOSE CALCULATION WORKSHEET (Attachment 3):

Stab. Class	Seabreeze Impact	Dose Calc Worksheet	Stab. Class	Seabreeze Impact	Dose Calc Worksheet	Stab. Class	Dose Calc Worksheet
A	YES	1				D	7
A	NO	2	C	YES	5	E	8
B	YES	3	C	NO	6	F	9
B	NO	4				G	10

ATTACHMENT 1
METEOROLOGICAL DATA
(Page 8 of 10)

DATA SHEET 2 NOAA/NWS
(Page 5 of 6)

7. Copy information to the selected DOSE CALCULATION WORKSHEET:

   A. From line 1B, copy the **WIND DIRECTION** to line A of Dose Calculation Worksheet.

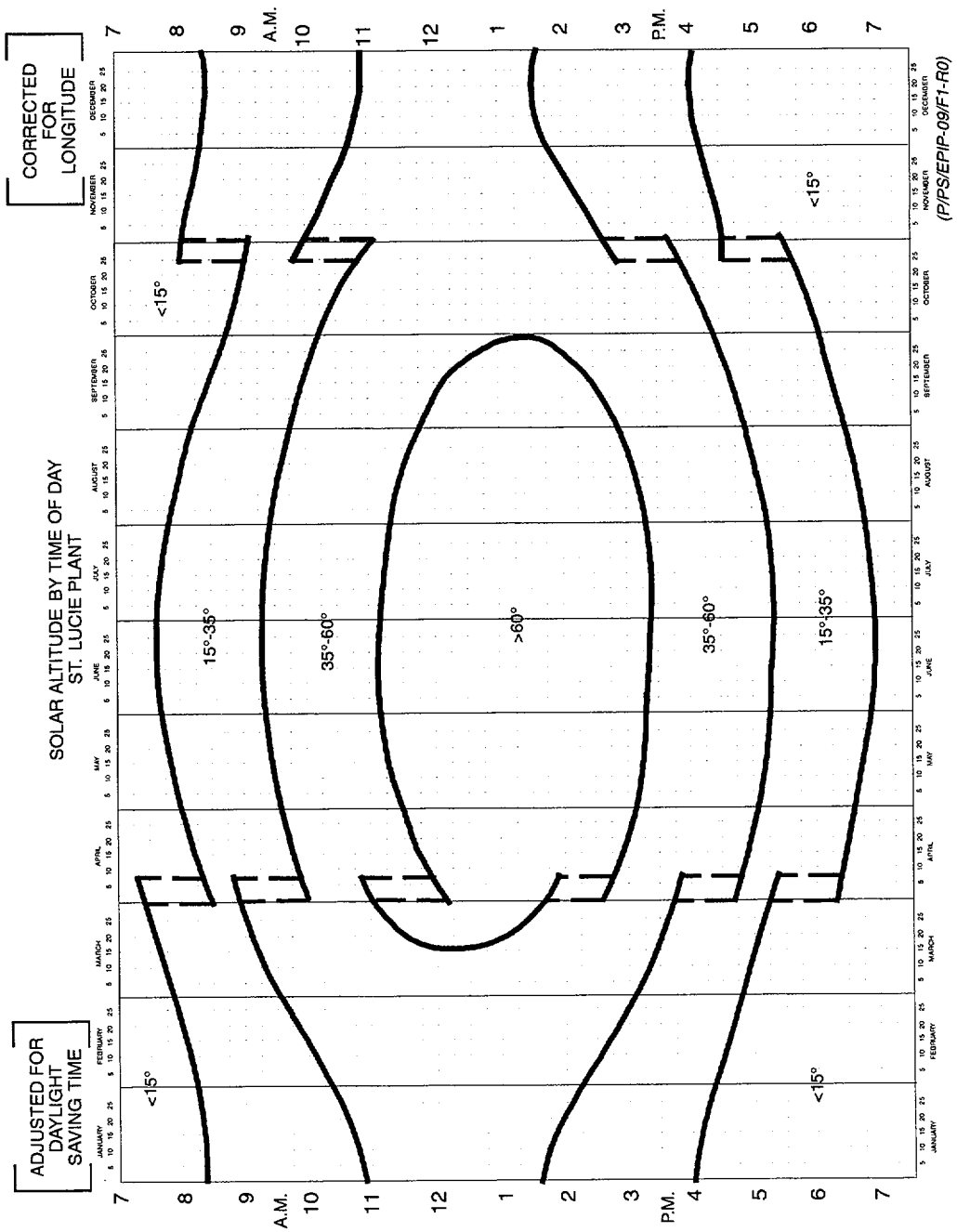
   B. **1.** From line 1C, multiply the wind speed in knots by 1.15 to obtain the **WIND SPEED**: _____ mph

   2. Copy **WIND SPEED** in mph to line 2 of Dose Calculation Worksheet.

   C. From line 4, copy the **AFFECTED SECTORS** to line A of Dose Calculation Worksheet.

8. This data sheet is completed, proceed to release rate determination.

ATTACHMENT 1
METEOROLOGICAL DATA
(Page 9 of 10)
DATA SHEET 2 NOAA/NWS
(Page 6 of 6)
FIGURE 1. SOLAR ALTITUDE



END OF DATA SHEET 2

ATTACHMENT 1
METEOROLOGICAL DATA
(Page 10 of 10)

DATA SHEET 3 DEFAULT
(Page 1 of 1)

NOTE
This method is to be used only if Site Met Tower and NOAA/NWS data are not available.

1. If Daytime Hours (1 hour after sunrise to 1 hour before sunset)

Then select DOSE CALCULATION WORKSHEET 7 and

A. Enter **AFFECTED SECTORS** = ALL in line A

B. Check Default method in line A

C. Enter **WIND SPEED** = 5 mph in line 2.

2. If Not Daytime

Then select DOSE CALCULATION WORKSHEET 9 and

A. Enter **AFFECTED SECTORS** = ALL in line A

B. Check Default method in line A

C. Enter **WIND SPEED** = 3 mph in line 2.

This data sheet is completed, proceed to release rate determination.

END OF DATA SHEET 3

END OF ATTACHMENT 1

ATTACHMENT 2
RELEASE RATE DATA
(Page 1 of 19)

DATA SHEET 1A UNIT 1 CHEMISTRY GRAB SAMPLING
(Page 1 of 3)

1

1. Date and time of data: _____/_____

2. Ask Emergency Coordinator:

   A. Accident Type_____

   B. Is core overheating or melting (yes/no)_____

   1. If the core IS overheating or melting PF = 4.4,
   If not, PF = 1.0; Enter **PF** = _____

   C. Potential **DURATION** of release (if unknown, use 2): _____ hours

3. Enter sample assay data of gross Noble gas and DEQ Iodine-131 µCi/cc concentration in the step 5 table below under µCi/cc.

4. Choose and calculate the applicable pathway(s):

   A. Check the ON fans and line thru the SCFM of the fans NOT running.

   B. Add up the flows in the spaces provided.

   C. Enter total pathway SCFM in the SCFM column in step 5.

PLANT VENT

Fan		√on	¶4 SCFM
1-HVE-6A	Shield Bldg	____	6600
1-HVE-6B		____	6600
1-HVE-7A	H_2 Purge	____	950
1-HVE-7B		____	950
1-HVE-8A	RCB Exhaust	____	52500
1-HVE-8B		____	52500
1-HVE-10A	RAB Exhaust	____	92563
1-HVE-10B		____	92563

(Add) Plant Vent Total = _____

FUEL BUILDING

Fan		√on	¶4 SCFM
1-HVE-15	New Fuel	____	10563
1-HVE-16A	Fuel Pool	____	11385
1-HVE-16B		____	11385
1-HVE-17	H&V Room	____	6250

(Add) Fuel Bldg. Total = _____

ECCS AREA

Fan	¶4 SCFM
1-HVE-9A	33000
1-HVE-9B	33000

ATTACHMENT 2
RELEASE RATE DATA
(Page 2 of 19)

DATA SHEET 1A UNIT 1 CHEMISTRY GRAB SAMPLING
(Page 2 of 3)

1

5. Calculate Release Rates by completing the table below:
µCi/cc x SCFM x factor = Ci/sec

Pathway	TYPE	µCi/CC	¶4 SCFM	factor	Noble Gas, Ci/sec	Iodine, Ci/sec
Plant Vent	Noble Gas			4.72 E -04		
	Iodine					
Fuel Bldg.	Noble Gas			4.72 E -04		
	Iodine					
ECCS - A	Noble Gas		33,000	4.72 E -04		
	Iodine					
ECCS - B	Noble Gas		33,000	4.72 E -04		
	Iodine					

6. Calculate the Site Release Rate, Ci/sec, by completing the table below.

		Noble Gas, Ci/sec	Iodine, Ci/sec
A.	Total the Unit 1 release rates determined above		
B.	IF Unit 2 is AFFECTED, enter its release rates		
C.	Add A and B to obtain the SITE RELEASE RATES		

7. Enter the SITE RELEASE RATES in the selected DOSE CALCULATION WORKSHEET:

A. On line B, check Grab Sample under Unit 1

B. Enter the **NOBLE GAS RELEASE RATE** into line 8

C. Enter the **IODINE RELEASE RATE** into line 1

D. Enter the **DURATION** (if 2 affected units, use longest) into line 6

E. Enter the **PF** (Particulate Factor) (if 2 affected units, use largest) into line 11

ATTACHMENT 2
RELEASE RATE DATA
(Page 3 of 19)

DATA SHEET 1A UNIT 1 CHEMISTRY GRAB SAMPLING
(Page 3 of 3)

8. This data sheet is completed, follow the instructions on the DOSE CALCULATION WORKSHEET (Attachment 3). 1

END OF DATA SHEET 1A

ATTACHMENT 2
RELEASE RATE DATA
(Page 4 of 19)

DATA SHEET 2A UNIT 2 CHEMISTRY GRAB SAMPLING
(Page 1 of 3)

2

1. Date and time of data: _____/_____

2. Ask Emergency Coordinator:

A. Accident Type_____

B. Is core overheating or melting (yes/no)_____

1. If the core IS overheating or melting PF = 4.4,
If not, PF = 1.0; Enter **PF** = _____

C. Potential **DURATION** of release (if unknown, use 2): _____ hours

3. Enter sample assay data of gross Noble gas and DEQ Iodine-131 µCi/cc concentration in the step 5 table below under µCi/cc.

4. Choose and calculate the applicable pathway(s):

A. Check the ON fans.

B. Add up the flows in the spaces provided.

C. Enter total pathway SCFM in the SCFM column in step 5.

PLANT VENT

Fan		√on	¶4 SCFM
2-HVE-6A	Shield Bldg	____	6600
2-HVE-6B		____	6600
2-HVE-7A	H_2 Purge	____	2500
2-HVE-7B		____	2500
2-HVE-8A	RCB Exhaust	____	52500
2-HVE-8B		____	52500
2-HVE-10A	RAB Exhaust	____	105625
2-HVE-10B		____	105625

(Add) Plant Vent Total = _____

FUEL BUILDING
If NOT Diverted to Plant Vent, Use Stated Flow

Fan		√on	¶4 SCFM
2-HVE-15	New Fuel	____	12125
2-HVE-16A	Fuel Pool	____	12500
2-HVE-16B	Fuel Pool	____	12500
2-HVE-17	Bldg H&V	____	7500

(Add) Fuel Bldg. Total = _____

ECCS AREA

Fan	¶4 SCFM
2-HVE-9A	33000
2-HVE-9B	33000

ATTACHMENT 2
RELEASE RATE DATA
(Page 5 of 19)

DATA SHEET 2A UNIT 2 CHEMISTRY GRAB SAMPLING
(Page 2 of 3)

2

5. Calculate Release Rates by completing the table below:
µCi/cc x SCFM x factor = Ci/sec

Pathway	TYPE	µCi/CC	¶4 SCFM	factor	Noble Gas, Ci/sec	Iodine, Ci/sec
Plant Vent	Noble Gas			4.72 E -04		
	Iodine					
Fuel Bldg.	Noble Gas			4.72 E -04		
	Iodine					
ECCS - A	Noble Gas		33,000	4.72 E -04		
	Iodine					
ECCS - B	Noble Gas		33,000	4.72 E -04		
	Iodine					

6. Calculate the Site Release Rate, Ci/sec, by completing the table below.

		Noble Gas, Ci/sec	**Iodine, Ci/sec**
A.	Total the Unit 2 release rates determined above		
B.	IF Unit 1 is AFFECTED, enter its release rates		
C.	Add A and B to obtain the SITE RELEASE RATES		

7. Enter the SITE RELEASE RATES in the selected DOSE CALCULATION WORKSHEET:

A. On line B, check Grab Sample under Unit 2

B. Enter the **NOBLE GAS RELEASE RATE** into line 8

C. Enter the **IODINE RELEASE RATE** into line 1

D. Enter the **DURATION** (if 2 affected units, use longest) into line 6

E. Enter the **PF** (Particulate Factor) (if 2 affected units, use largest) into line 11

ATTACHMENT 2
RELEASE RATE DATA
(Page 6 of 19)

DATA SHEET 2A UNIT 2 CHEMISTRY GRAB SAMPLING
(Page 3 of 3)

2

8. This data sheet is completed, follow the instructions on the DOSE CALCULATION WORKSHEET (Attachment 3).

END OF DATA SHEET 2A

ATTACHMENT 2
RELEASE RATE DATA
(Page 7 of 19)

DATA SHEET 1B UNIT 1 EFFLUENT MONITORS
(Page 1 of 3)

1

1. Date and time of data: _____/_____

2. Ask Emergency Coordinator:

   A. Accident Type_____

   B. Is core overheating or melting (yes/no) _____

   1. If the core IS overheating or melting PF = 4.4,
   If not, PF = 1.0; Enter **PF** = _____

   C. Potential **DURATION** of release (if unknown, use 2): _____ hours

3. Determine Noble Gas (NG) concentrations and enter into data column in step 6.

4. Choose and calculate the applicable pathway(s):

   A. Check the ON fans.

   B. Add up the flows in the spaces provided.

   C. Enter total pathway SCFM in the SCFM column in step 6.

PLANT VENT

Fan		√on	¶4 SCFM
1-HVE-6A	Shield Bldg	___	6600
1-HVE-6B		___	6600
1-HVE-7A	H_2 Purge	___	950
1-HVE-7B		___	950
1-HVE-8A	RCB Exhaust	___	52500
1-HVE-8B		___	52500
1-HVE-10A	RAB Exhaust	___	92563
1-HVE-10B		___	92563

(Add) Plant Vent Total = _____

FUEL BUILDING

Fan		√on	¶4 SCFM
1HVE-15	New Fuel	___	10563
1-HVE-16A	Fuel Pool	___	11385
1-HVE-16B		___	11385
1-HVE-17	H&V Room	___	6250

(Add) Fuel Bldg. Total = _____

ECCS AREA

Fan	¶4 SCFM
1-HVE-9A	33000
1-HVE-9B	33000

ATTACHMENT 2
RELEASE RATE DATA
(Page 8 of 19)

1

DATA SHEET 1B UNIT 1 EFFLUENT MONITORS
(Page 2 of 3)

5. Select Pathways IODINE FACTOR (IF) for the accident type below and enter under **IF** Column in step 6.

PATHWAY	LOCA	SGTR	MSLB	WASTE GAS TR	FUEL HANDLING	CASK DROP
Plant Vent	**0.01**	**1. E-06**	**1.0**	**4. E-05**	0	0
ECCS	**0.01**	0	0	0	0	0
Fuel Bldg.	0	0	0	0	**0.04**	**1.3**
Steamline	0	**1. E-03**	0	0	0	0

6. Calculate Release Rates by completing the table below:
DATA x SCFM x factor = N.G. Ci/sec x IF = Iodine Ci/sec

Pathway	DATA	¶4 SCFM	factor	Noble Gas, Ci/sec	IF	Iodine Ci/sec
Plant Vent	uCi/cc		4.72 E-04			
ECCS-A	uCi/cc	33,000	4.72 E-04			
ECCS-B	uCi/cc	33,000	4.72 E-04			
Fuel Bldg.	uCi/cc		4.72 E-04			
Steamline A	mr/hr	1.0	1.24 E-02			
Steamline B	mr/hr	1.0	1.24 E-02			

7. Calculate the Site Release Rate, Ci/sec, by completing the table below.

	Noble Gas, Ci/sec		Iodine, Ci/sec
A. Enter the Unit 1 release rates determined from this worksheet			
B. IF Unit 2 is AFFECTED, enter its release rates			
C. Add A and B to obtain the SITE RELEASE RATES			

ATTACHMENT 2
RELEASE RATE DATA
(Page 9 of 19)

DATA SHEET 1B UNIT 1 EFFLUENT MONITORS
(Page 3 of 3)

1

8. Enter the SITE RELEASE RATES in the selected DOSE CALCULATION WORKSHEET:

A. On line B, check Effluent Monitor under Unit 1

B. Enter the **NOBLE GAS RELEASE RATE** into line 8

C. Enter the **IODINE RELEASE RATE** into line 1

D. Enter the **DURATION** (if 2 affected units, use longest) into line 6

E. Enter the **PF** (Particulate Factor) (if 2 affected units, use largest) into line 11.

9. This data sheet is completed, follow the instructions on the DOSE CALCULATION WORKSHEET (Attachment 3).

END OF DATA SHEET 1B

ATTACHMENT 2
RELEASE RATE DATA
(Page 10 of 19)

DATA SHEET 2B UNIT 2 EFFLUENT MONITORS
(Page 1 of 3)

2

1. Date and time of data: _____/_____

2. Ask Emergency Coordinator:

   A. Accident Type

   B. Is core overheating or melting (yes/no)_____

   1. If the core IS overheating or melting PF = 4.4,
   If not, PF = 1.0; Enter **PF** = _____

   C. Potential **DURATION** of release (if unknown, use 2): _____ hours

3. Determine Noble Gas (NG) concentrations and enter into data column in step 6.

4. Choose and calculate the applicable pathway(s):

   A. Check the ON fans.

   B. Add up the flows in the spaces provided.

   C. Enter total pathway SCFM in the SCFM column in step 6.

PLANT VENT

Fan		√on	¶4 SCFM
2-HVE-6A	Shield Bldg	___	6600
2-HVE-6B		___	6600
2-HVE-7A	H_2 Purge	___	2500
2-HVE-7B		___	2500
2-HVE-8A	RCB Exhaust	___	52500
2-HVE-8B		___	52500
2-HVE-10A	RAB Exhaust	___	105625
2-HVE-10B		___	105625

(Add) Plant Vent Total = _____

FUEL BUILDING
IF NOT DIVERTED

Fan		√on	¶4 SCFM
2HVE-15	New Fuel	___	12125
2-HVE-16A	Fuel Pool	___	12500
2-HVE-16B		___	12500
2-HVE-17	H&V Room	___	7500

(Add) Fuel Bldg. Total =_____

ECCS AREA

Fan	¶4 SCFM
2-HVE-9A	33000
2-HVE-9B	33000

ATTACHMENT 2
RELEASE RATE DATA
(Page 11 of 19)

2

DATA SHEET 2B UNIT 2 EFFLUENT MONITORS
(Page 2 of 3)

5. Select Pathways IODINE FACTOR (IF) for the accident type below and enter under **IF** Column in step 6.

PATHWAY	LOCA	SGTR	MSLB	WASTE GAS TR	FUEL HANDLING	CASK DROP
Plant Vent	**0.01**	**1. E-06**	**1.0**	**4. E-05**	**0.04**	**1.3**
ECCS	**0.01**	0	0	0	0	0
Fuel Bldg.	0	0	0	0	**0.04**	**1.3**
Steamline	0	**1. E-03**	0	0	0	0

6. Calculate Release Rates by completing the table below:
DATA x SCFM x factor = N.G. Ci/sec x IF = Iodine Ci/sec

Pathway	**DATA**	¶4 **SCFM**	**factor**	Noble Gas, Ci/sec	**IF**	Iodine Ci/sec
Plant Vent	uCi/cc		4.72 E-04			
ECCS-A	uCi/cc	33,000	4.72 E-04			
ECCS-B	uCi/cc	33,000	4.72 E-04			
Fuel Bldg.	uCi/cc		4.72 E-04			
Steamline A	mr/hr	1.0	1.24 E-02			
Steamline B	mr/hr	1.0	1.24 E-02			

7. Calculate the Site Release Rate, Ci/sec, by completing the table below.

	Noble Gas, Ci/sec		Iodine, Ci/sec
A. Enter the Unit 2 release rates determined from this worksheet			
B. IF Unit 1 is AFFECTED, enter its release rates			
C. Add A and B to obtain the SITE RELEASE RATES			

ATTACHMENT 2
RELEASE RATE DATA
(Page 12 of 19)

2

DATA SHEET 2B UNIT 2 EFFLUENT MONITORS
(Page 3 of 3)

8. Enter the SITE RELEASE RATES in the selected DOSE CALCULATION WORKSHEET:

A. On line B, check Effluent Monitor under Unit 2.

B. Enter the **NOBLE GAS RELEASE RATE** into line 8.

C. Enter the **IODINE RELEASE RATE** into line 1.

D. Enter the **DURATION** (if 2 affected units, use longest) into line 6.

E. Enter the **PF** (Particulate Factor) (if 2 affected units, use largest) into line 11.

9. This data sheet is completed, follow the instructions on the DOSE CALCULATION WORKSHEET (Attachment 3).

END OF DATA SHEET 2B

ATTACHMENT 2
RELEASE RATE DATA
(Page 13 of 19)

DATA SHEET 3 CONTAINMENT HI-RANGE RADIATION MONITORS
(Applicable to Unit 1 and Unit 2)
(Page 1 of 3)

NOTE
If both units are using this method, then complete one worksheet for each unit.

1. Date and time of data: _____/_____

2. Ask Emergency Coordinator:

A. Accident Type

B. Is core overheating or melting (yes/no)_____

1. If the core IS overheating or melting PF = 4.4,
If not, PF = 1.0; Enter **PF** = _____

C. Potential **DURATION** of release (if unknown, use 2): _____ hours

3. Obtain highest CHRRM reading and time since trip:

A. Highest CHRRM reading: _____ R/hr,

B. Hours since Reactor Trip: _____ hours;

C. Copy the CHRRM R/hr to step 6 and 8.

4. Find in the table below and enter into step 6 and 8, the Core Fraction factor (CF).

Hours Since Reactor Trip	CF	Hours Since Reactor Trip	CF
0	5.00 E - 07	> 2.0 to ≤ 4.0	6.25 E - 06
> 0 to ≤ 0.5	1.00 E - 06	> 4.0 to ≤ 8.0	1.25 E - 05
> 0.5 to ≤ 1.0	1.67 E - 06	> 8.0	2.22 E - 05
> 1.0 to ≤ 2.0	3.33 E - 06		

ATTACHMENT 2
RELEASE RATE DATA
(Page 14 of 19)

DATA SHEET 3 CONTAINMENT HI-RANGE RADIATION MONITORS
(Applicable to Unit 1 and Unit 2)
(Page 2 of 3)

5. Find in the table below and enter into step 6 the Noble Gas Reduction Factor (NGRF).

Hours Since Rx Trip	NGRF	Hours Since Rx Trip	NGRF	Hours Since Rx Trip	NGRF	Hours Since Rx Trip	NGRF
0	1.0	> 4 to ≤ 5	0.44	> 9 to ≤ 10	0.26	> 14 to ≤ 15	0.16
> 0 to ≤ 1	0.90	> 5 to ≤ 6	0.39	> 10 to ≤ 11	0.23	> 15 to ≤ 16	0.16
> 1 to ≤ 3	0.70	> 6 to ≤ 7	0.35	> 11 to ≤ 12	0.21	> 16 to ≤ 17	0.14
> 2 to ≤ 3	0.60	> 7 to ≤ 8	0.32	> 12 to ≤ 13	0.19	> 17 to ≤ 18	0.14
> 3 to ≤ 4	0.50	> 8 to ≤ 9	0.28	> 13 to ≤ 14	0.18	> 18	0.13

6. Calculate the NOBLE GAS RELEASE RATE, N.G. Ci/sec:
_____R/hr **x** _____ (CF) **x** _____ (NGRF) **x** 40 = _____ N.G. Ci/sec

7. If the Iodine Removal System IS in use then Iodine Conversion Value (ICV) = 0.6, if NOT in use then ICV = 1.6. Copy the selected ICV into step 8.

8. Calculate the IODINE RELEASE RATE, Iod. Ci/sec:
_____R/hr **x** _____ (CF) **x** _____ (ICV) = _____ Iod. Ci/sec

9. Calculate the Site Release Rate, Ci/sec, by completing the table below.

	Noble Gas	Iodine
A) Enter the release rates determined from this worksheet		
B) IF the other Unit is AFFECTED, enter its release rates		
C) Add A and B to obtain the SITE RELEASE RATES		

ATTACHMENT 2
RELEASE RATE DATA
(Page 15 of 19)

DATA SHEET 3 CONTAINMENT HI-RANGE RADIATION MONITORS
(Applicable to Unit 1 and Unit 2)
(Page 3 of 3)

10. Enter the SITE RELEASE RATES in the selected DOSE CALCULATION WORKSHEET:

A. On line B, check CHRRM under the Unit(s) using the CHRRM method.

B. Enter the **NOBLE GAS RELEASE RATE** into line 8.

C. Enter the **IODINE RELEASE RATE** into line 1.

D. Enter the **DURATION** (if 2 affected units, use longest) into line 6.

E. Enter the **PF** (Particulate Factor) (if 2 affected units, use largest) into line 11.

11. This data sheet is completed, follow the instructions on the DOSE CALCULATION WORKSHEET (Attachment 3).

END OF DATA SHEET 3

ATTACHMENT 2
RELEASE RATE DATA
(Page 16 of 19)

DATA SHEET 4 POST LOCA MONITORS
(Applicable to Unit 1 or Unit 2)
(Page 1 of 2)

NOTE
If both units are using this method, then complete one worksheet for each unit.

1. Date and time of data: _____/_____

2. Ask Emergency Coordinator:

   A. Accident Type_____

   B. Is core overheating or melting (yes/no)_____

   1. If the core IS overheating or melting PF = 4.4,
   If not, PF = 1.0; Enter **PF** = _____

   C. Potential **DURATION** of release (if unknown, use 2): _____ hours

3. For the Reactor Unit(s), using this method, obtain the Highest POST LOCA reading _____ mR/hr

4. For the applicable Unit(s), find the release rates in the table below and enter them in step 5A.

Post Loca Monitor Reading (mR/hr)	Noble Gas Release Rate (Ci/sec)	Iodine Release Rate, (Ci/sec) with Iodine Removal System	
		In Use	Not in Use
≤ 60	Negligible	Negligible	Negligible
> 60 ≤ 100	2.0	0.03	0.1
> 100 ≤ 1000	10.0	0.14	0.4
> 1000	40.0	0.60	1.6

ATTACHMENT 2
RELEASE RATE DATA
(Page 17 of 19)

DATA SHEET 4 POST LOCA MONITORS
(Applicable to Unit 1 or Unit 2)
(Page 2 of 2)

5. Calculate the Site Release Rate, Ci/sec, by completing the table below.

	Noble Gas	Iodine
A) If used, enter the AFFECTED Unit's release rates determined from this worksheet		
B) IF the other Unit is AFFECTED enter its release rates		
C) Add A and B to obtain the SITE RELEASE RATES		

6. Enter the SITE RELEASE RATES in the selected DOSE CALCULATION WORKSHEET:

A. On line B, check Post LOCA under the Unit(s) using the Post LOCA method.

B. Enter the **NOBLE GAS RELEASE RATE** into line 8.

C. Enter the **IODINE RELEASE RATE** into line 1.

D. Enter the **DURATION** (if 2 affected units, use longest) into line 6.

E. Enter the **PF** (Particulate Factor) (if 2 affected units, use largest) into line 11.

7. This data sheet is completed, follow the instructions on the DOSE CALCULATION WORKSHEET (Attachment 3).

END OF DATA SHEET 4

ATTACHMENT 2
RELEASE RATE DATA
(Page 18 of 19)

DATA SHEET 5 DEFAULT
(Applicable to Unit 1 or Unit 2)
(Page 1 of 2)

CAUTION
Use this method only if there is no data to use in other methods.

1. Date and time of data: _____/_____

2. Ask Emergency Coordinator:

A. Accident Type_____

B. Is core overheating or melting (yes/no)_____

1. If the core IS overheating or melting PF = 4.4,
If not, PF = 1.0; Enter **PF** = _____

C. Potential **DURATION** of release (if unknown, use Default Duration from the table below):

_____ hours

3. For the affected Unit(s) and the accident type, select and circle the Noble Gas and Iodine Release Rates in the table below.

Accident Type	Default Duration	Release Rates, Ci/sec	
		Noble Gas	Iodine
LOCA WITHOUT Iodine Removal System in use	2 hours	37	1.6
LOCA WITH Iodine Removal System in use	2 hours	37	0.6
Steam Generator Tube Rupture	0.5 hours	2.0	4.0 E - 05
Main Steam Line Break	0.5 hours	0.04	0.01
Fuel Handling	0.5 hours	11	4.0 E - 03
Cask Drop	0.5 hours	2.0	0.03
Waste Gas Decay Tank Rupture	0.5 hours	2.0	2.0 E - 06

ATTACHMENT 2
RELEASE RATE DATA
(Page 19 of 19)

DATA SHEET 5 DEFAULT
(Applicable to Unit 1 or Unit 2)
(Page 2 of 2)

4. Calculate the Site Release Rate, Ci/sec, by completing the table below.

	Noble Gas	Iodine
A) Enter the release rates determined from this worksheet		
B) IF the other Unit is AFFECTED enter its release rates		
C) Add A and B to obtain the SITE RELEASE RATES		

5. Enter the SITE RELEASE RATES in the selected DOSE CALCULATION WORKSHEET:

A. On line B, check Default under the Unit(s) using the default method.

B. Enter the **NOBLE GAS RELEASE RATE** into line 8.

C. Enter the **IODINE RELEASE RATE** into line 1.

D. Enter the **DURATION** (if 2 affected units, use longest) into line 6.

E. Enter the **PF** (Particulate Factor) (if 2 affected units, use largest) into line 11.

6. This data sheet is completed, follow the instructions on the DOSE CALCULATION WORKSHEET (Attachment 3).

END OF DATA SHEET 5

END OF ATTACHMENT 2

ATTACHMENT 3
DOSE CALCULATION WORKSHEET
(Page 1 of 10)

DATA SHEET 1
Stability Class = A Seabreeze Impact = YES

A. Met Summary: **WIND DIRECTION** (from) _____ **AFFECTED SECTORS** _____
check method used: _____Tower _____NOAA/NWS _____Default

B. Release Rate Method:

Unit 1		Unit 2
_____	Grab Sample	_____
_____	Effluent Monitor	_____
_____	CHRRM	_____
_____	POST LOCA	_____
_____	Default	_____
_____	Attachment 4/6	_____

Date and time of data from release rate determination: _____/_____

Follow the instructions to calculate doses @						
line	Instruction for THYROID DOSES (CDE)	1 Mile	2 Miles	5 Miles	10 Miles	
1	Enter the **IODINE RELEASE RATE**, Ci/sec					**SNF**
2	Enter the **WIND SPEED**, mph					**SNF**
3	Divide line 1 by line 2					
4	Iodine Dose Factors,	2.3 E + 04	8.1 E + 03	2.3 E + 03	8.0 E + 02	
5	Multiply line 3 by line 4 to obtain **THYROID DOSE RATE** (CDE), mrem/hr					**SNF**
6	Enter **DURATION** of release, hours					**SNF**
7	Multiply line 5 by line 6 to obtain **PROJECTED THYROID DOSE** (CDE), mrem					**PAR**
line	Instructions for TOTAL DOSES (TEDE)	1 mile	2 miles	5 miles	10 miles	
8	Enter **NOBLE GAS RELEASE RATE**, Ci/sec					**SNF**
9	Enter **WIND SPEED** from line 2, above					
10	Divide line 8 by line 9					
11	Enter the **PARTICULATE FACTOR**					
12	Multiply line 10 by line 11					
13	Dose Factors	5.0	2.6	0.73	0.26	
14	Multiply line 12 by line 13					
15	Enter (Line 5 multiplied by 0.04)					
16	Add line 14 and 15 to obtain **TOTAL DOSE RATE (TEDE)**, mrem/hr					**SNF**
17	Enter **DURATION** from line 6, above					
18	Multiply line 16 by line 17 to obtain **TOTAL DOSE (TEDE)**, mrem					**PAR**
19	Forward this worksheet (or a copy) to the Emergency Coordinator {RM if done in EOF}					

C. Dose Calculations completed; continue monitoring releases and assessing doses.

END OF DATA SHEET 1

ATTACHMENT 3
DOSE CALCULATION WORKSHEET
(Page 2 of 10)

DATA SHEET 2
Stability Class = A Seabreeze Impact = NO

A. Met Summary: **WIND DIRECTION** (from) _____ **AFFECTED SECTORS** _____
check method used: _____Tower _____NOAA/NWS _____Default

B. Release Rate Method:

Unit 1		Unit 2
_____	Grab Sample	_____
_____	Effluent Monitor	_____
_____	CHRRM	_____
_____	POST LOCA	_____
_____	Default	_____
_____	Attachment 4/6	_____

Date and time of data from release rate determination: _____/_____

Follow the instructions to calculate doses @						
line	Instruction for THYROID DOSES (CDE)	1 Mile	2 Miles	5 Miles	10 Miles	
1	Enter the **IODINE RELEASE RATE**, Ci/sec					**SNF**
2	Enter the **WIND SPEED**, mph					**SNF**
3	Divide line 1 by line 2					
4	Iodine Dose Factors,	3.8 E + 03	1.8 E + 03	7.9 E + 02	4.0 E + 02	
5	Multiply line 3 by line 4 to obtain **THYROID DOSE RATE (CDE)**, mrem/hr					**SNF**
6	Enter **DURATION** of release, hours					**SNF**
7	Multiply line 5 by line 6 to obtain **PROJECTED THYROID DOSE (CDE)**, mrem					**PAR**
line	Instructions for TOTAL DOSES (TEDE)	1 Mile	2 Miles	5 Miles	10 Miles	
8	Enter **NOBLE GAS RELEASE RATE**, Ci/sec					**SNF**
9	Enter **WIND SPEED** from line 2, above					
10	Divide line 8 by line 9					
11	Enter the **PARTICULATE FACTOR**					
12	Multiply line 10 by line 11					
13	Dose Factors	0.82	0.57	0.25	0.13	
14	Multiply line 12 by line 13					
15	Enter (Line 5 multiplied by 0.04)					
16	Add line 14 and 15 to obtain **TOTAL DOSE RATE (TEDE)**, mrem/hr					**SNF**
17	Enter **DURATION** from line 6, above					
18	Multiply line 16 by line 17 to obtain **TOTAL DOSE (TEDE)**, mrem					**PAR**
19	Forward this worksheet (or a copy) to the Emergency Coordinator {RM if done in EOF}					

C. Dose calculations completed; continue monitoring releases and assessing doses.

END OF DATA SHEET 2

ATTACHMENT 3
DOSE CALCULATION WORKSHEET
(Page 3 of 10)

DATA SHEET 3
Stability Class = B Seabreeze Impact = YES

A. Met Summary: **WIND DIRECTION** (from) _____ **AFFECTED SECTORS** _____
check method used: _____Tower _____NOAA/NWS _____Default

B. Release Rate Method:

Unit 1		Unit 2
_____	Grab Sample	_____
_____	Effluent Monitor	_____
_____	CHRRM	_____
_____	POST LOCA	_____
_____	Default	_____
_____	Attachment 4/6	_____

Date and time of data from release rate determination: _____/_____

Follow the instructions to calculate doses @						
line	Instruction for THYROID DOSES (CDE)	1 Mile	2 Miles	5 Miles	10 Miles	
1	Enter the **IODINE RELEASE RATE**, Ci/sec					**SNF**
2	Enter the **WIND SPEED**, mph					**SNF**
3	Divide line 1 by line 2					
4	Iodine Dose Factors,	3.0 E + 04	1.1 E + 04	3.0 E + 03	1.1 E + 03	
5	Multiply line 3 by line 4 to obtain **THYROID DOSE RATE (CDE)**, mrem/hr					**SNF**
6	Enter **DURATION** of release, hours					**SNF**
7	Multiply line 5 by line 6 to obtain **PROJECTED THYROID DOSE (CDE)**, mrem					**PAR**
line	Instructions for TOTAL DOSES (TEDE)	1 Mile	2 Miles	5 Miles	10 Miles	
8	Enter **NOBLE GAS RELEASE RATE**, Ci/sec					**SNF**
9	Enter **WIND SPEED** from line 2, above					
10	Divide line 8 by line 9					
11	Enter the **PARTICULATE FACTOR**					
12	Multiply line 10 by line 11					
13	Dose Factors	9.6	3.4	0.97	0.36	
14	Multiply line 12 by line 13					
15	Enter (Line 5 multiplied by 0.04)					
16	Add line 14 and 15 to obtain **TOTAL DOSE RATE (TEDE)**, mrem/hr					**SNF**
17	Enter **DURATION** from line 6, above					
18	Multiply line 16 by line 17 to obtain **TOTAL DOSE (TEDE)**, mrem					**PAR**
19	Forward this worksheet (or a copy) to the Emergency Coordinator {RM if done in EOF}					

C. Dose calculations completed; continue monitoring releases and assessing doses.

END OF DATA SHEET 3

ATTACHMENT 3
DOSE CALCULATION WORKSHEET
(Page 4 of 10)

DATA SHEET 4
Stability Class = B Seabreeze Impact = NO

A. Met Summary: **WIND DIRECTION** (from) _____ **AFFECTED SECTORS** _____
check method used: _____Tower _____NOAA/NWS _____Default

B. Release Rate Method:

Unit 1		Unit 2
_____	Grab Sample	_____
_____	Effluent Monitor	_____
_____	CHRRM	_____
_____	POST LOCA	_____
_____	Default	_____
_____	Attachment 4/6	_____

Date and time of data from release rate determination: _____/_____

Follow the instructions to calculate doses @						
line	Instruction for THYROID DOSES (CDE)	1 Mile	2 Miles	5 Miles	10 Miles	
1	Enter the **IODINE RELEASE RATE**, Ci/sec					**SNF**
2	Enter the **WIND SPEED**, mph					**SNF**
3	Divide line 1 by line 2					
4	Iodine Dose Factors,	2.3 E + 04	6.0 E + 03	1.1 E + 03	5.7 E + 02	
5	Multiply line 3 by line 4 to obtain **THYROID DOSE RATE (CDE)**, mrem/hr					**SNF**
6	Enter **DURATION** of release, hours					**SNF**
7	Multiply line 5 by line 6 to obtain **PROJECTED THYROID DOSE (CDE)**, mrem					**PAR**
line	Instructions for TOTAL DOSES (TEDE)	1 Mile	2 Miles	5 Miles	10 Miles	
8	Enter **NOBLE GAS RELEASE RATE**, Ci/sec					**SNF**
9	Enter **WIND SPEED** from line 2, above					
10	Divide line 8 by line 9					
11	Enter the **PARTICULATE FACTOR**					
12	Multiply line 10 by line 11					
13	Dose Factors	7.4	1.9	0.36	0.18	
14	Multiply line 12 by line 13					
15	Enter (Line 5 multiplied by 0.04)					
16	Add line 14 and 15 to obtain **TOTAL DOSE RATE (TEDE)**, mrem/hr					**SNF**
17	Enter **DURATION** from line 6, above					
18	Multiply line 16 by line 17 to obtain **TOTAL DOSE (TEDE)**, mrem					**PAR**
19	Forward this worksheet (or a copy) to the Emergency Coordinator {RM if done in EOF}					

C. Dose calculations completed; continue monitoring releases and assessing doses.

END OF DATA SHEET 4

ATTACHMENT 3
DOSE CALCULATION WORKSHEET
(Page 5 of 10)

DATA SHEET 5
Stability Class = C Seabreeze Impact = YES

A. Met Summary: **WIND DIRECTION** (from) _____ **AFFECTED SECTORS** _____
check method used: _____Tower _____NOAA/NWS _____Default

B. Release Rate Method:

Unit 1		Unit 2
_____	Grab Sample	_____
_____	Effluent Monitor	_____
_____	CHRRM	_____
_____	POST LOCA	_____
_____	Default	_____
_____	Attachment 4/6	_____

Date and time of data from release rate determination: _____/_____

Follow the instructions to calculate doses @						
line	Instruction for THYROID DOSES (CDE)	1 Mile	2 Miles	5 Miles	10 Miles	
1	Enter the **IODINE RELEASE RATE**, Ci/sec					**SNF**
2	Enter the **WIND SPEED**, mph					**SNF**
3	Divide line 1 by line 2					
4	Iodine Dose Factors,	6.0 E + 04	1.7 E + 04	3.9 E + 03	1.5 E + 03	
5	Multiply line 3 by line 4 to obtain **THYROID DOSE RATE (CDE)**, mrem/hr					**SNF**
6	Enter **DURATION** of release, hours					**SNF**
7	Multiply line 5 by line 6 to obtain **PROJECTED THYROID DOSE (CDE)**, mrem					**PAR**
line	Instructions for TOTAL DOSES (TEDE)	1 Mile	2 Miles	5 Miles	10 Miles	
8	Enter **NOBLE GAS RELEASE RATE**, Ci/sec					**SNF**
9	Enter **WIND SPEED** from line 2, above					
10	Divide line 8 by line 9					
11	Enter the **PARTICULATE FACTOR**					
12	Multiply line 10 by line 11					
13	Dose Factors	19.0	5.3	1.2	0.48	
14	Multiply line 12 by line 13					
15	Enter (Line 5 multiplied by 0.04)					
16	Add line 14 and 15 to obtain **TOTAL DOSE RATE (TEDE)**, mrem/hr					**SNF**
17	Enter **DURATION** from line 6, above					
18	Multiply line 16 by line 17 to obtain **TOTAL DOSE (TEDE)**, mrem					**PAR**
19	Forward this worksheet (or a copy) to the Emergency Coordinator {RM if done in EOF}					

C. Dose calculations completed; continue monitoring releases and assessing doses.

END OF DATA SHEET 5

ATTACHMENT 3
DOSE CALCULATION WORKSHEET
(Page 6 of 10)

DATA SHEET 6
Stability Class = C Seabreeze Impact = NO

A. Met Summary: **WIND DIRECTION** (from) _____ **AFFECTED SECTORS** _____
check method used: _____Tower _____NOAA/NWS _____Default

B. Release Rate Method:

Unit 1		Unit 2
_____	Grab Sample	_____
_____	Effluent Monitor	_____
_____	CHRRM	_____
_____	POST LOCA	_____
_____	Default	_____
_____	Attachment 4/6	_____

Date and time of data from release rate determination: _____/_____

Follow the instructions to calculate doses @						
line	Instruction for THYROID DOSES (CDE)	1 Mile	2 Miles	5 Miles	10 Miles	
1	Enter the **IODINE RELEASE RATE**, Ci/sec					**SNF**
2	Enter the **WIND SPEED**, mph					**SNF**
3	Divide line 1 by line 2					
4	Iodine Dose Factors,	6.0 E + 04	1.7 E + 04	3.3 E + 03	9.5 E + 02	
5	Multiply line 3 by line 4 to obtain **THYROID DOSE RATE (CDE)**, mrem/hr					**SNF**
6	Enter **DURATION** of release, hours					**SNF**
7	Multiply line 5 by line 6 to obtain **PROJECTED THYROID DOSE (CDE)**, mrem					**PAR**
line	Instructions for TOTAL DOSES (TEDE)	1 Mile	2 Miles	5 Miles	10 Miles	
8	Enter **NOBLE GAS RELEASE RATE**, Ci/sec					**SNF**
9	Enter **WIND SPEED** from line 2, above					
10	Divide line 8 by line 9					
11	Enter the **PARTICULATE FACTOR**					
12	Multiply line 10 by line 11					
13	Dose Factors	19.0	5.3	1.0	0.30	
14	Multiply line 12 by line 13					
15	Enter (Line 5 multiplied by 0.04)					
16	Add line 14 and 15 to obtain **TOTAL DOSE RATE (TEDE)**, mrem/hr					**SNF**
17	Enter **DURATION** from line 6, above					
18	Multiply line 16 by line 17 to obtain **TOTAL DOSE (TEDE)**, mrem					**PAR**
19	Forward this worksheet (or a copy) to the Emergency Coordinator {RM if done in EOF}					

C. Dose calculations completed; continue monitoring releases and assessing doses.

END OF DATA SHEET 6

ATTACHMENT 3
DOSE CALCULATION WORKSHEET
(Page 7 of 10)

DATA SHEET 7
Stability Class = D Seabreeze Impact = N/A

A. Met Summary: **WIND DIRECTION** (from) _____ **AFFECTED SECTORS** _____
check method used: _____Tower _____NOAA/NWS _____Default

B. Release Rate Method:

Unit 1		Unit 2
_____	Grab Sample	_____
_____	Effluent Monitor	_____
_____	CHRRM	_____
_____	POST LOCA	_____
_____	Default	_____
_____	Attachment 4/6	_____

Date and time of data from release rate determination: _____/_____

Follow the instructions to calculate doses @						
line	Instruction for THYROID DOSES (CDE)	1 Mile	2 Miles	5 Miles	10 Miles	
1	Enter the **IODINE RELEASE RATE**, Ci/sec					**SNF**
2	Enter the **WIND SPEED**, mph					**SNF**
3	Divide line 1 by line 2					
4	Iodine Dose Factors,	1.7 E + 05	6.0 E + 04	1.7 E + 04	5.7 E + 03	
5	Multiply line 3 by line 4 to obtain **THYROID DOSE RATE (CDE)**, mrem/hr					**SNF**
6	Enter **DURATION** of release, hours					**SNF**
7	Multiply line 5 by line 6 to obtain **PROJECTED THYROID DOSE (CDE)**, mrem					**PAR**
line	Instructions for TOTAL DOSES (TEDE)	1 Mile	2 Miles	5 Miles	10 Miles	
8	Enter **NOBLE GAS RELEASE RATE**, Ci/sec					**SNF**
9	Enter **WIND SPEED** from line 2, above					
10	Divide line 8 by line 9					
11	Enter the **PARTICULATE FACTOR**					
12	Multiply line 10 by line 11					
13	Dose Factors	53.0	19.0	5.3	1.8	
14	Multiply line 12 by line 13					
15	Enter (Line 5 multiplied by 0.04)					
16	Add line 14 and 15 to obtain **TOTAL DOSE RATE (TEDE)**, mrem/hr					**SNF**
17	Enter **DURATION** from line 6, above					
18	Multiply line 16 by line 17 to obtain **TOTAL DOSE (TEDE)**, mrem					**PAR**
19	Forward this worksheet (or a copy) to the Emergency Coordinator {RM if done in EOF}					

C. Dose calculations completed; continue monitoring releases and assessing doses.

END OF DATA SHEET 7

ATTACHMENT 3
DOSE CALCULATION WORKSHEET
(Page 8 of 10)

DATA SHEET 8
Stability Class = E Seabreeze Impact = N/A

A. Met Summary: **WIND DIRECTION** (from) _____ **AFFECTED SECTORS** _____
check method used: _____Tower _____NOAA/NWS _____Default

B. Release Rate Method:

Unit 1		Unit 2
_____	Grab Sample	_____
_____	Effluent Monitor	_____
_____	CHRRM	_____
_____	POST LOCA	_____
_____	Default	_____
_____	Attachment 4/6	_____

Date and time of data from release rate determination: _____/_____

Follow the instructions to calculate doses @						
line	Instruction for THYROID DOSES (CDE)	1 Mile	2 Miles	5 Miles	10 Miles	
1	Enter the **IODINE RELEASE RATE**, Ci/sec					**SNF**
2	Enter the **WIND SPEED**, mph					**SNF**
3	Divide line 1 by line 2					
4	Iodine Dose Factors,	3.0 E + 05	1.2 E + 05	3.8 E + 04	1.4 E + 04	
5	Multiply line 3 by line 4 to obtain **THYROID DOSE RATE (CDE)**, mrem/hr					**SNF**
6	Enter **DURATION** of release, hours					**SNF**
7	Multiply line 5 by line 6 to obtain **PROJECTED THYROID DOSE (CDE)**, mrem					**PAR**
line	Instructions for TOTAL DOSES (TEDE)	1 Mile	2 Miles	5 Miles	10 Miles	
8	Enter **NOBLE GAS RELEASE RATE**, Ci/sec					**SNF**
9	Enter **WIND SPEED** from line 2, above					
10	Divide line 8 by line 9					
11	Enter the **PARTICULATE FACTOR**					
12	Multiply line 10 by line 11					
13	Dose Factors	94.0	39.0	12.0	4.5	
14	Multiply line 12 by line 13					
15	Enter (Line 5 multiplied by 0.04)					
16	Add line 14 and 15 to obtain **TOTAL DOSE RATE (TEDE)**, mrem/hr					**SNF**
17	Enter **DURATION** from line 6, above					
18	Multiply line 16 by line 17 to obtain **TOTAL DOSE (TEDE)**, mrem					**PAR**
19	Forward this worksheet (or a copy) to the Emergency Coordinator {RM if done in EOF}					

C. Dose calculations completed; continue monitoring releases and assessing doses.

END OF DATA SHEET 8

ATTACHMENT 3
DOSE CALCULATION WORKSHEET
(Page 9 of 10)

DATA SHEET 9
Stability Class = F Seabreeze Impact = N/A

A. Met Summary: **WIND DIRECTION** (from) _____ **AFFECTED SECTORS** _____
check method used: _____Tower _____NOAA/NWS _____Default

B. Release Rate Method:

Unit 1		Unit 2
_____	Grab Sample	_____
_____	Effluent Monitor	_____
_____	CHRRM	_____
_____	POST LOCA	_____
_____	Default	_____
_____	Attachment 4/6	_____

Date and time of data from release rate determination: _____/_____

Follow the instructions to calculate doses @						
line	Instruction for THYROID DOSES (CDE)	1 Mile	2 Miles	5 Miles	10 Miles	
1	Enter the **IODINE RELEASE RATE**, Ci/sec					**SNF**
2	Enter the **WIND SPEED**, mph					**SNF**
3	Divide line 1 by line 2					
4	Iodine Dose Factors,	5.3 E + 05	2.5 E + 05	7.9 E + 04	3.5 E + 04	
5	Multiply line 3 by line 4 to obtain **THYROID DOSE RATE (CDE)**, mrem/hr					**SNF**
6	Enter **DURATION** of release, hours					**SNF**
7	Multiply line 5 by line 6 to obtain **PROJECTED THYROID DOSE (CDE)**, mrem					**PAR**
line	Instructions for TOTAL DOSES (TEDE)	1 Mile	2 Miles	5 Miles	10 Miles	
8	Enter **NOBLE GAS RELEASE RATE**, Ci/sec					**SNF**
9	Enter **WIND SPEED** from line 2, above					
10	Divide line 8 by line 9					
11	Enter the **PARTICULATE FACTOR**					
12	Multiply line 10 by line 11					
13	Dose Factors	1.7 E + 02	7.8 E + 01	2.5 E + 01	1.1 E + 01	
14	Multiply line 12 by line 13					
15	Enter (Line 5 multiplied by 0.04)					
16	Add line 14 and 15 to obtain **TOTAL DOSE RATE (TEDE)**, mrem/hr					**SNF**
17	Enter **DURATION** from line 6, above					
18	Multiply line 16 by line 17 to obtain **TOTAL DOSE (TEDE)**, mrem					**PAR**
19	Forward this worksheet (or a copy) to the Emergency Coordinator {RM if done in EOF}					

C. Dose calculations completed; continue monitoring releases and assessing doses.

END OF DATA SHEET 9

ATTACHMENT 3
DOSE CALCULATION WORKSHEET
(Page 10 of 10)

DATA SHEET 10
Stability Class = G Seabreeze Impact = N/A

A. Met Summary: **WIND DIRECTION** (from) _____ **AFFECTED SECTORS** _____
check method used: _____Tower _____NOAA/NWS _____Default

B. Release Rate Method:

Unit 1		Unit 2
_____	Grab Sample	_____
_____	Effluent Monitor	_____
_____	CHRRM	_____
_____	POST LOCA	_____
_____	Default	_____
_____	Attachment 4/6	_____

Date and time of data from release rate determination: _____/_____

	Follow the instructions to calculate doses @					
line	Instruction for THYROID DOSES (CDE)	1 Mile	2 Miles	5 Miles	10 Miles	
1	Enter the **IODINE RELEASE RATE**, Ci/sec					**SNF**
2	Enter the **WIND SPEED**, mph					**SNF**
3	Divide line 1 by line 2					
4	Iodine Dose Factors,	9.1 E + 05	4.7 E + 05	1.8 E + 05	7.9 E + 04	
5	Multiply line 3 by line 4 to obtain **THYROID DOSE RATE (CDE)**, mrem/hr					**SNF**
6	Enter **DURATION** of release, hours					**SNF**
7	Multiply line 5 by line 6 to obtain **PROJECTED THYROID DOSE (CDE)**, mrem					**PAR**
line	Instructions for TOTAL DOSES (TEDE)	1 Mile	2 Miles	5 Miles	10 Miles	
8	Enter **NOBLE GAS RELEASE RATE**, Ci/sec					**SNF**
9	Enter **WIND SPEED** from line 2, above					
10	Divide line 8 by line 9					
11	Enter the **PARTICULATE FACTOR**					
12	Multiply line 10 by line 11					
13	Dose Factors	2.9 E + 02	1.5 E + 02	5.7 E + 01	2.5 E + 01	
14	Multiply line 12 by line 13					
15	Enter (Line 5 multiplied by 0.04)					
16	Add line 14 and 15 to obtain **TOTAL DOSE RATE (TEDE)**, mrem/hr					**SNF**
17	Enter **DURATION** from line 6, above					
18	Multiply line 16 by line 17 to obtain **TOTAL DOSE (TEDE)**, mrem					**PAR**
19	Forward this worksheet (or a copy) to the Emergency Coordinator {RM if done in EOF}					

C. Dose calculations completed; continue monitoring releases and assessing doses.

END OF DATA SHEET 10

END OF ATTACHMENT 3

ATTACHMENT 4
TSC/EOF DOSE ASSESSMENT GUIDANCE
FOR RESPONDING TO AN UNMONITORED CONTAINMENT BURP
(Page 1 of 8)

1. Purpose

This attachment provides methods for TSC and/or EOF Dose Assessment personnel to define release rates from a containment burp and includes NRCs RTM-91 methods for estimating dose rates based on plant/reactor conditions.

2. Discussion

A. A containment burp is any suspected release from the containment that may be indicated by a rapid decrease of the containment pressure or rapid decrease in the Containment High Range Radiation Monitor that is determined, by operations or engineering, not due to changes in equipment operation (e.g., additional containment spray, additional containment coolers, etc.).

B. It must be remembered and understood that the methodology provided in this appendix includes conservative assumptions and is intended to provide the means to estimate an upper bound to the release, not an exact release rate.

3. Contents

Section 1: Provides guidance in estimating release rates during a LOCA resulting from rapid containment depressurizations; that is, an unmonitored burp release. The guidance is further sub-divided into three cases:

Case 1 - Rapid decrease in CHRRM reading during burp

Case 2 - No change in CHRRM reading during burp

Case 3 - Increase in CHRRM reading during burp

Section 2: Provides guidance in estimating doses based on plant/reactor conditions following the methodology in NRC RTM-91.

ATTACHMENT 4
TSC/EOF DOSE ASSESSMENT GUIDANCE
FOR RESPONDING TO AN UNMONITORED CONTAINMENT BURP
(Page 2 of 8)

4. Basis

Section 1:

Assumes CHRRM is responding only to Noble Gases
Assumes Curies in (from core) < < Curies lost
2 E + 06 R/hr = 100% Core Inventory of Noble Gas (1 ÷ $CF_{T=O}$, CF from EPIP-09)
6.43 E + 08 Curies of Noble Gas is 100% Core Inventory (PSL2 UFSAR)
322 = 6.43 E + 08 Curies ÷ 2 E + 06 R/hr

Section 2:

NRC's Response Technical Manual RTM-91 Vol. 1, Rev. 1, pg. C-2.

5. Percent Mass Loss

A. Use Attachment 5, Estimate of Containment "% Mass Loss", to determine the values required in the following calculations.

ATTACHMENT 4
TSC/EOF DOSE ASSESSMENT GUIDANCE
FOR RESPONDING TO AN UNMONITORED CONTAINMENT BURP
(Page 3 of 8)

DATA SHEET 1
(Applicable to Unit 1 or Unit 2)
(Page 1 of 5)

Case 1: Rapid Decrease in CHRRM Reading

NOTE

1. A CHRRM drop of about 3 percent per hour may be due to radiological decay.
2. The CHRRM may drop by as much as 10 percent very quickly if containment spray is actuated due to Iodine washout.

METHOD:

1. Date and time of data: _____/_____

2. Calculate Delta-CHRRM:

Start CHRRM _____ - End CHRRM _____ = _____ Delta-CHRRM, R/hr

3. Calculate Duration:

A. Clock Time End _____ - Clock Time Start _____ = _____ Delta-Clock

B. Convert Delta-Clock to Delta-Seconds: _____ Δ sec

4. Estimate Curies Lost:

Delta CHRRM _____ x 322 Ci N.G. per R/hr = _____ Noble Gas Curies Lost

5. Estimate Noble Gas Release Rate (loss rate):

Noble Gas Curies lost _____ ÷ _____ Δ sec = _____ Noble Gas Ci/sec

6. Estimate the Iodine Release Rate:

N.G. Ci/sec _____ x 0.01 (Iodine Factor) = _____ Iodine Ci/sec

7. Utilize the current meteorological conditions and appropriate Dose Calculation Worksheets (circle 4 next to Attachment as method) or enter as Direct if using the computer, to estimate Offsite Doses.

ATTACHMENT 4
TSC/EOF DOSE ASSESSMENT GUIDANCE
FOR RESPONDING TO AN UNMONITORED CONTAINMENT BURP
(Page 4 of 8)

DATA SHEET 1
(Applicable to Unit 1 or Unit 2)
(Page 2 of 5)

Case 2: Constant CHRRM Reading

NOTE
Engineering may be requested to evaluate the percent mass lost in the burp.

METHOD:

1. Date and time of data: _____/_____

2. Estimate Noble Gas Curies in the containment:

   CHRRM R/hr _____ x 322 Ci N.G. per R/hr = _____ Noble Gas Curies in can

3. Calculate Duration:

   A. Clock Time End _____ - Clock Time Start _____ = _____ Delta-Clock

   B. Convert Delta-Clock to Delta-Seconds: _____ Δ sec

4. Estimate Curies Lost:

   A. Determine "% Mass Loss"

   B. N.G. Curies in can _____ x _____ % mass lost ÷ 100 = _____ Noble Gas Curies lost

5. Estimate Noble Gas Release Rate (loss rate):

   Noble Gas Curies lost _____ ÷ _____ Δ sec = _____ Noble Gas Ci/sec

ATTACHMENT 4
TSC/EOF DOSE ASSESSMENT GUIDANCE
FOR RESPONDING TO AN UNMONITORED CONTAINMENT BURP
(Page 5 of 8)

DATA SHEET 1
(Applicable to Unit 1 or Unit 2)
(Page 3 of 5)

Case 2: Constant CHRRM Reading

6. Estimate the Iodine Release Rate:

N.G. Ci/sec _____ x 0.01 (Iodine Factor) = _____ Iodine Ci/sec

7. Utilize the current meteorological conditions and appropriate Dose Calculation Worksheets (circle 4 next to Attachment as method) or enter as Direct if using the computer, to estimate Offsite Doses.

ATTACHMENT 4
TSC/EOF DOSE ASSESSMENT GUIDANCE
FOR RESPONDING TO AN UNMONITORED CONTAINMENT BURP
(Page 6 of 8)

Section 1
(Applicable to Unit 1 or Unit 2)
(Page 4 of 5)

Case 3: Increasing CHRRM Reading

NOTE
Engineering may be requested to evaluate the percent mass lost in the burp.

METHOD:

1. Date and time of data: _____/_____

2. Calculate average CHRRM reading

   (Start CHRRM _____ + End CHRRM _____) ÷ 2 = _____ Avg CHRRM, R/hr

3. Estimate Noble Gas Curies in the containment:

   Avg. CHRRM R/hr_____x 322 Ci N.G. per R/hr =_____Noble Gas Curies in can

4. Calculate Duration:

   A. Clock Time End _____ - Clock Time Start _____ = _____ Delta-Clock

   B. Convert Delta-Clock to Delta-Seconds: _____ Δ sec

5. Estimate Curies Lost:

   A. Determine "% Mass Loss"

   B. N.G. Curies in can _____x_____% mass lost ÷ 100 = _____Noble Gas Curies lost

ATTACHMENT 4
TSC/EOF DOSE ASSESSMENT GUIDANCE
FOR RESPONDING TO AN UNMONITORED CONTAINMENT BURP
(Page 7 of 8)

DATA SHEET 1
(Applicable to Unit 1 or Unit 2)
(Page 5 of 5)

Case 3: Increasing CHRRM Reading

6. Estimate Noble Gas Release Rate (loss rate):

Noble Gas Curies lost _____ ÷ _____ Δ sec = _____ Noble Gas Ci/sec

7. Estimate the Iodine Release Rate:

N.G. Ci/sec _____ x 0.01 (Iodine Factor) = _____ Iodine Ci/sec

8. Utilize the current meteorological conditions and appropriate Dose Calculation Worksheets (circle 4 next to Attachment as method) or enter as Direct if using the computer, to estimate Offsite Doses.

END OF DATA SHEET 1

ATTACHMENT 4
TSC/EOF DOSE ASSESSMENT GUIDANCE
FOR RESPONDING TO AN UNMONITORED CONTAINMENT BURP
(Page 8 of 8)

TABLE 1
(Applicable to Unit 1 or Unit 2)

Use this method IF there is not radiological data (e.g., CHRRM, containment grab sample, etc.) AND the accident has progressed past gap failure AND the containment has undergone catastrophic failure (e.g., know there should be pressure and there is none).

NOTE
The following method provides DOSES, not release rates. Doses based on stability class D and four m.p.h. wind speed.

REACTOR ACCIDENT CONSEQUENCE OVERVIEW
Containment Leakage

Core Condition	Containment Status	Mitigating System Status (A)	Acute Dose (rem) 1 hour Release @ 1 mile(B)	
			WB	THY
MELT Release From Core 4500°F	Early total Failure (< 1 hr)	No Mitigation	1000+	10^5+
		Mitigated	250	10^4
	Late total failure (2 - 12 hr)	N/A	250	10^4
	Major Leakage (100% / day)	N/A	10	10^3
	Design leakage	N/A	10^{-2}	1
Gap Release From Core 1500°F	Early total Failure (< 1 hr)	No Mitigation	50	10^4
		Mitigated	10	10^3
	Late total failure (2 - 12 hr)	N/A	5	10^3
	Major Leakage (100% / day)	N/A	10^{-1}	10
	Design Leakage	N/A	10^{-4}	10^{-2}

Notes: (A) Sprays, filters
(B) 1 hour cloud immersion and inhalation plus 3 hours of ground shine

END OF TABLE 1

END OF ATTACHMENT 4

ATTACHMENT 5
¶2 ESTIMATE OF CONTAINMENT "% MASS LOSS"
(Page 1 of 2)

(Applicable to Unit 1 or Unit 2)

1. Purpose

The purpose of this calculation is to provide a method to estimate containment % mass release to the environment during a post-LOCA containment depressurization transient (containment "burp").

2. Discussion

A. The scope of this calculation is St. Lucie Units 1 and 2.

B. The dose assessment group can use the containment mass release data to estimate the radiation release to the environment (using Attachment 4, TSC/EOF Dose Assessment Guidance for Responding to an Unmonitored Containment Burp) provided the containment radiological conditions are known.

C. The containment de-pressurization event should be large (greater than 5.0 psi change), over a short period of time since the methodology does not accurately credit the effect of containment heat removal systems.

3. Acquire the following data:

> **NOTE**
> The "time span" for data observation should be the same as used for the calculation on Attachment 4, Case 2 or 3.

A. Containment Pressure just before blowdown transient:_____ psig {Pstart}

B. Containment Temperature just before blowdown transient:_____ deg F {Tstart}

C. Containment Pressure just after blowdown transient:_____ psig {Pend}

D. Containment Temperature just after blowdown transient:_____ deg F {Tend}

ATTACHMENT 5
ESTIMATE OF CONTAINMENT "% MASS LOSS"
(Page 2 of 2)

(Applicable to Unit 1 or Unit 2)

4. Estimate Initial Containment Atmosphere Density:

$$\frac{144 \ x \ (14.7 + ...Pstart)}{53.3 \ x \ (460 + ...Tstart)} = ___ \ Initial\ Density$$

5. Estimate End Containment Atmosphere Density:

$$\frac{144 \ x \ (14.7 + ...Pend)}{53.3 \ x \ (460 + ...Tend)} = ___ \ End\ Density$$

6. Estimate % Mass Lost:

$$\left(1 \ minus \left(\frac{.....End\ Density}{.....Initial\ Density}\right)\right) x\ 100 = _____ \% \ mass\ lost$$

END OF ATTACHMENT 5

ATTACHMENT 6
FIELD TEAM MEASUREMENTS ASSESSMENT
(Page 1 of 3)

¶3 This attachment provides methods to estimate a release rate from Field Monitoring Team survey meter measurements and provides guidance on comparing field measurements to dose projections.

> **NOTE**
> Survey meter Gamma (closed window) results must be from plume centerline; that is, the maximum value from a lateral transverse of the plume.

1. DATE:_____, TIME:_____, Unit:_____

2. If the survey meter measurement was at 1 mile value, Then go to Step 4.

3. Estimate the 1 mile value:

Estimated 1 mile value = Survey meter results x (downwind distance, miles)^{Z}
Where the exponent **Z** = 2 for Stability Class A, B
1.5 for Stability Class C, D
1.0 for Stability Class E, F, G

_____mr/hr x_____(miles)$^{(Z)}$ =_____Estimated 1 mile mr/hr
meter results downwind distance

4. For the met conditions at time of sampling, select the Dose Calculation Worksheet (DCW).

A. Use Wind Speed in Miles Per Hour, mph

B. Copy from Line 13, the 1 mile Dose factor as the DF for use in Step 5.

5. Estimate Noble Gas Release Rate: Estimated 1 mile mr/hr ÷ DF x Wind Speed

_____mr/hr ÷_____(DF) x_____mph = _____Noble Gas Ci/sec

ATTACHMENT 6
FIELD TEAM MEASUREMENTS ASSESSMENT
(Page 2 of 3)

6. Estimate Iodine Release Rate (IF = Iodine Factor, see the affected units' Effluent Monitor Worksheet):

_____N.G. Ci/sec x _____(IF) = _____Iodine (131 Deq) Ci/sec

7. Utilize the current meteorological conditions and appropriate Dose Calculation Worksheets (circle 6 next to Attachment as method), or enter release rates as Direct if using the computer, to estimate Offsite Doses from this attachment.

Comparing Field Measurements To Dose Projections

NOTE

1. "Reasonable comparison" between Field Measurements & Dose Calculations is if the two are within an order of magnitude. Too many assumptions preclude better precision.
2. A survey team measurements `off centerline' will yield a low estimated release rate. The Field Monitoring Coordinator (EOF) has a method for estimating centerline values for these situations.

Survey Meter DDE Readings

The computerized dose calculation program estimates the `survey meter reading' DDE and for the pre-designated sampling locations (refer to Field Survey Map for descriptions of the locations). This Survey Meter Estimate is sum of immersion in plume of Noble Gas, and plume shine from iodine & particulates. The noble gasses are the majority of the exposure source. The program adjusts for gap versus core mix of noble gasses in response to the Core Damage Situation question.

The manual method does not calculate a DDE from immersion in noble gas. Referring to a Dose Calculation Worksheet apropos to the met conditions, a value could be estimated by multiplying the value calculated on line 10 by the Dose Factors listed on line 13. These Dose Factors are based on a core mix of noble gasses, and include the X/Q for the prevailing meteorological conditions.

ATTACHMENT 6
FIELD TEAM MEASUREMENTS ASSESSMENT
(Page 3 of 3)

Thyroid CDE

Thyroid dose projections, both procedure & computer, are based on a release of I-131 Deq Ci/sec. The field teams measure I-131 in the plume; their procedure has a time dependent factor to account for the dose from the other iodines. The factor starts at about 1.4 and decays to 1 (one) over about 24 hours. Dividing projected thyroid dose rate, mr/hr by 1.3 E + 9 will estimate the Iodine 131(Deq) concentration uCi/cc.

Time of Sample v. Time of Release

Time of field measurement minus (downwind distance, miles / wind speed, m.p.h.) will yield the `time' of the release rate estimated. The computerized calculations use a time window 15 or 30 minutes long. Select the latest printout that has a Release Observation Time before the time estimated above.

Estimating Dose Rates Or Concentrations At Other Distances (e.g., 1, 2, 5, 10 miles)

Estimated Value @ Dist x = Measured value times $(DWD/Dist\ x)^z$
Where: DWD = Measurement downwind distance, miles
Dist x = other distance, miles
Z = exponent based on stability class
(ref EPA-520 Rev. 6/79, page 5.10.)

END OF ATTACHMENT 6

ATTACHMENT 7
OFF-SITE CALCULATIONS - CLASS A COMPUTER METHOD
(Page 1 of 7)

Discussion

The computer-based Class A Model dose calculation program utilizes inputs and processes similar to the manual procedure. However, the refinements available in the computer based process allow for a wider range of input information and mathematical complexity than available in the manual method. These instructions provide the guidance for using the computer based process to derive calculated off-site doses in a manner similar to that discussed for the manual calculation. Not all input screens available in the computer program are needed by the general user and are, therefore not discussed in these instructions. These screens may be utilized by personnel familiar with their intended use.

The computerized Class A Model provides two (2) types of dose calculations. The "Actual Dose Calculation" which is accomplished in advection steps of fifteen (15) or thirty (30) minutes and is a cumulative dose determination and the "Forecast Dose Calculation" which is a projected dose determination based on a given time period such as two (2) hours. Personnel having expertise in dose calculation methodology may utilize that expertise in combination with the advanced methods available through the screen driven menus to modify and refine these basic calculations.

NOTE
If the Technical Support Center (TSC) and Emergency Operations Facility (EOF) are manned and operational, dose assessment personnel at these locations should coordinate their efforts in order to calculate the most accurate available off-site dose projections.

Computer Startup

1. Ensure the uninterruptible power supply to the computer is energized to prevent data loss if a power interruption occurs.

2. Ensure that the floppy disk drive is empty.

3. Turn on the display monitor, the printer and the computer.

ATTACHMENT 7
OFF-SITE CALCULATIONS - CLASS A COMPUTER METHOD
(Page 2 of 7)

4. Following system startup, check the date and time on the computer.

> **NOTE**
> Correcting the date and time should be done prior to using a stand-alone computer. When using a computer on the LAN, contact a LAN administrator if the date and/or time need to be changed.

A. If the dose calculation program starts, Then the date and time is shown in the upper left of the monitor.

B. Correct the date and time as necessary (time should match ERDADS).

Changing the date/time.

1. Depress Function Key F5 (to quit the Class A software).

2. Type "Y".

3. Depress the "ENTER" key.

4. At the system prompt, type "TIME" (or "DATE" as required).

5. Depress the "ENTER" key.

6. Type correct data and depress "ENTER" key.

C. If the dose calculation program does not start, Then the date and time is checked at the system prompt using Steps 4-6 above.

5. When the computer displays the system prompt, and has correct date/time, type "FPL" and depress "ENTER" key to return to Class A software.

Pre-use QC Check

1. If time and manpower permits, Then perform a pre-use verification QC check following the instructions in the FPL Class A Emergency Offsite Dose Calc Program User Guide.

2. At the completion of the pre-use QC check, exit to the Main Menu, and proceed to step 3 of Performing Calculations, below.

ATTACHMENT 7
OFF-SITE CALCULATIONS - CLASS A COMPUTER METHOD
(Page 3 of 7)

NOTE
If editing is required, edit the information in accordance with the displayed instructions.

Performing Calculations

CAUTION
Changing "Advection time step" after a calculation step can cause the Class A model to generate errors.

1. When the plant site menu is displayed, Then depress the Function Key (i.e., F1-Unit 1 or F2-Unit 2) to select the affected St. Lucie Plant Unit.

2. When the program asks, "Is this an exercise [Y/N]?", Then answer appropriately and depress the "ENTER" key.

3. When the Main Menu is displayed, Then select the F1 Function Key to start calculations.

4. When prompted by the program, "Warning - Start calculations will destroy previous dose values. OK [Y/N]?", Then depress "Y" and the "ENTER" key to reinitialize the data files.

NOTE
1. Thirty minute advection steps are normally used except for fuel handling accidents, for which fifteen minutes advection time steps should be used.

2. Once advection time is selected it should not be changed while running the program to prevent generating errors.

5. Select from the screen functions displayed on the General Accident Information Worksheet to edit the type of accident, reactor trip time, release start time, and advection step in the format shown on the screen by depressing the corresponding Function Keys, F1, F2, F3 or F4 respectively, Then depress "ENTER" after each new entry.

ATTACHMENT 7
OFF-SITE CALCULATIONS - CLASS A COMPUTER METHOD
(Page 4 of 7)

6. When the correct type of accident, reactor trip time, release start time, and the advection time step have been entered, Then depress the F5 Function Key to accept the inputs.

7. When the Input Menu is displayed, Then depress the F1 Function Key to bring up the Meteorological Data menu.

8. When the Meteorological Data Summary Menu is displayed, Select the data sheet corresponding to the source of the data (i.e., Site Tower (ERDADS, chart recorder), Airport (NOAA, NWS), Default).

9. Enter the meteorological data gathered in the format shown using the displayed Function Keys, Then depress the "ENTER" key after each new entry.

10. When all necessary meteorological data has been entered, Then depress the F5 Function Key to accept the data and go to the Meteorological data Summary Menu.

11. Review the entered meteorological data, Depress the F5 Function Key to accept the data and Then return to the Input Menu.

12. When the Input Menu is displayed, Then depress the F2 Function Key to bring up the Source Term Data menu.

13. If the accident type is a LOCA or SGTR, Respond appropriately to the question about the Core Damage Situation.

14. If the accident type is a LOCA, Respond appropriately to the question about the Iodine Removal System Status.

15. When the Source Term Summary Menu is displayed, Select the data sheet corresponding to the source of the data (i.e., Grab Sampling, Effluent Monitors, CHRRM, Post LOCA Monitors, Default).

16. Enter the source term data gathered in the format shown using the displayed Function Keys, Then depress the "ENTER" key after each new entry.

ATTACHMENT 7
OFF-SITE CALCULATIONS - CLASS A COMPUTER METHOD
(Page 5 of 7)

17. When the input of source term information has been completed, Then depress the appropriate Function Key to accept the data and return to the Input Menu.

18. If a final check of data accuracy is needed, Then depress the F3 Function Key to review a summary of the meteorological and source term data, Depress the F1 Function Key to print or the F2 Function Key to exit.

19. If the meteorological or source term data need to be revised, Go to step 7 or step 12 above, respectively.

20. Depress the F4 Function Key at the screen prompt, "Proceed with calculations [Y/N]?", and answer "Y", Depress the "ENTER" key to begin calculations.

> **NOTE**
> "CRT Displays" may be used instead of "Print Reports".

21. When the Output Menu is displayed, Then depress the F3 Function Key to select "Print Reports".

22. When the Printed Report Menu is displayed, Then depress the displayed Function Keys to select the desired reports.

> **CAUTION**
> Ensure that the printer and print buffer are on line and ready for use prior to proceeding with the printing task. If either device is not ready for use, the computer will exit the dose calculation program.

23. Depress any key to begin printing.

24. When the Output Menu is displayed, Then depress the F6 Function Key to select the Run Mode Menu.

25. When the Run Mode Menu is displayed, Then depress the F1 Function Key to select the Actual Calculation Mode and perform the next advection step (cumulative dose calculation) or depress the F2 Function Key to select the Forecast Calculation Mode.

ATTACHMENT 7
OFF-SITE CALCULATIONS - CLASS A COMPUTER METHOD
(Page 6 of 7)

NOTE

1. Forecast periods are typically two (2) hours.
2. Forecast doses assume release rates and meteorological conditions remain constant during the forecasting period chosen.
3. Consider the reasonableness of assuming constant meteorological conditions and release rates for forecasting periods exceeding two (2) hours.

26. Edit the forecast period as desired using the displayed instructions.

27. When the forecast period has been accepted, the Input Menu: Forecast Calculation Mode will be displayed, Then depress the displayed Function Keys to review and/or edit the inputs as necessary.

28. When all inputs are acceptable, Then depress the F4 Function Key to perform calculations, at the screen prompt, "Proceed with calculations [Y/N]?", and answer "Y", and Depress the "ENTER" key to begin calculations.

NOTE
"CRT Displays may be used instead of "Print Reports".

29. When the Output Menu - Forecast Calculations mode is displayed, Then depress the F3 Function Key to select "Print Reports".

30. When the Printed Report Menu is displayed, Then depress the displayed Function Keys to select the desired reports.

ATTACHMENT 7
OFF-SITE CALCULATIONS - CLASS A COMPUTER METHOD
(Page 7 of 7)

CAUTION
The printer and print buffer must be on line and ready!

NOTE
1. The Emergency Coordinator should be provided with a printout of actual calculated doses, Protective Action Recommendations (PARs), and as requested, forecasted doses.
2. The Emergency Coordinator should be updated every thirty minutes during periods of actual or potential off-site release.

31. When the reports have been printed, Then return to the Run Mode Menu to update information and repeat the dose calculation process as needed due to release rate or meteorological changes.

32. Depress the F1 Function Key for the Actual Calculation Mode or the F2 Function Key for the Forecast Calculation Mode or the F3 Function Key to return to the Main Menu and quit.

33. Review the Summary of Met and Source Data displays for all subsequent calculations even if the inputs do not change so that they can be reviewed and accepted. Also ensure that the Noble Gas Reduction Factor is reset to its proper value.

END OF ATTACHMENT 7

FPL	ST. LUCIE PLANT HEALTH PHYSICS PROCEDURE SAFETY RELATED	Procedure No. **HP-201** Current Revision No. **9** Effective Date **06/15/01**

Title:

EMERGENCY PERSONNEL EXPOSURE CONTROL

PSL CONTROL COPY 818 PROCEDURE PRODUCTION

Responsible Department: **HEALTH PHYSICS**

REVISION SUMMARY:

Revision 9 – THIS PROCEDURE HAS BEEN COMPLETELY REWRITTEN. Deleted exposure guideline basis, added TMI shielding study and made editorial and administrative changes. (J. R. Walker, 06/11/01)

Revision	FRG Review Date	Approved By	Approval Date
0	02/01/82	J. H. Barrow (for) Plant General Manager	02/02/82
9	06/07/01	R. G. West Plant General Manager	06/11/01
		N/A Designated Approver	
		N/A Designated Approver (Minor Correction)	

S___OPS	
DATE	
DOCT	PROCEDURE
DOCN	HP-201
SYS	
COM	COMPLETED
ITM	9

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ATTACHMENT 3 FPL TMI PLANT SHIELDING STUDY – UNIT 2 17

1.0 PURPOSE

1.1 This procedure provides the methods to be followed to control radiological exposure of personnel during emergencies.

2.0 REFERENCES

NOTE

One or more of the following symbols may be used in this procedure:

§ Indicates a Regulatory commitment made by Technical Specifications, Condition of License, Audit, LER, Bulletin, Operating Experience, etc. and shall NOT be revised without Facility Review Group review and Plant General Manager approval.

¶ Indicates a management directive, vendor recommendation, plant practice or other non-regulatory commitment that should NOT be revised without consultation with the plant staff.

Ψ Indicates a step that requires a sign off on an attachment.

2.1 10 CFR 20, Standards for Protection Against Radiation.

2.2 St. Lucie Plant Radiological Emergency Plan (E-Plan)

2.3 E-Plan Implementing Procedures (EPIP 00 – 13)

2.4 HP-2, "FPL Health Physics Manual."

2.5 Nuclear Energy Policy on Exposure Limits for Emergency Response Personnel, Revision to Policy Statement, Ltr. No. JNO-HP-94-056, October 26, 1994.

2.6 HPP-30, "Personnel Monitoring."

2.7 HP-33, "Pocket Dosimeters."

2.8 HPP-60, "Respiratory Protection Manual."

2.9 HPP-61, "Use of Respiratory Protective Equipment."

2.10 HPP-63, "DAC-Hour Assessment."

2.11 HP-203, "Personnel Access Control During Emergencies."

2.12 EPA-400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents.

2.13 FPL TMI Plant Shielding Study

3.0 RELATED SYSTEM STATUS

NONE

4.0 PRECAUTIONS / LIMITATIONS

4.1 All personnel exposures will be maintained As Low As Reasonably Achievable (ALARA).

4.2 When Health Physics normal operating procedures and emergency procedures differ, the emergency procedures take precedence.

4.3 Entries into radiation areas exceeding 10R/hr should not be made without EC or TSCHPS authorization.

4.4 Emergency response personnel should have their exposures limited to the following doses.

1. 5 rem deep dose equivalent (external exposure) as measured by self-reading dosimeter, or
2. 50 rem to the thyroid from inhalation of iodines.

5.0 RECORDS

5.1 When completed, the forms listed below shall be maintained in the plant files in accordance with QI-17-PSL-1, "Quality Assurance Records."

1. Form HP 203.1, Evacuated Area Re-entry Authorization.
2. Form HP 203.2, Emergency Access Control Log Sheet.

6.0 INSTRUCTIONS

6.1 Guidance for controlling exposures under emergency conditions is provided in:

1. Attachment 1, Exposure Limits for Emergency Response Personnel.
2. Attachment 2, FPL TMI Plant Shielding Study – Unit 1.
3. Attachment 3, FPL TMI Plant Shielding Study – Unit 2.

END OF SECTION 6.1

6.2 Initial Re-Entry Team

1. The initial Re-entry Team shall consist of at least two persons one of whom shall be a Health Physics Technician (HPT).

2. The initial Re-entry Team shall use the protective measures and monitoring equipment as directed by the TSCHPS as indicated on the Evacuated Area Re-entry Authorization, form HP 203.1 (see HP-203, "Personnel Access Control During Emergencies").

3. The initial Re-entry Team members shall carry dosimetry equipment as directed by the TSCHPS as indicated on the Evacuated Area Re-entry Authorization, form HP 203.1 (see HP-203).

4. The Re-entry Team shall be logged in on the Emergency Access Control Log Sheet, HP 203.2 (see HP-203) prior to entering the evacuated area. The TSCHPS and HPOSC Supervisor shall collaborate on assigned initial stay-times based on available dose rate information. The Re-entry Team will frequently check their dosimeters and withdraw to a safe area before exceeding the assigned limits.

END OF SECTION 6.2

6.3 Subsequent Entries

1. The TSCHPS and HPOSC (HP Supervisor in the Operational Support Center) shall analyze the data obtained from the initial entry and shall set requirements for subsequent entries based on this data. Form HP 203.1 (see HP-203) shall be used for all entries unless otherwise directed by the TSCHPS.

2. All subsequent entries shall be made with health physics coverage until the areas entered are declared open for limited access by the TSCHPS. No areas previously unsurveyed shall be entered without health physics coverage.

3. The Evacuated Area Re-entry Authorization form HP 203.1 (see HP-203) should be completed and doses recorded on an individual before that individual is allowed to enter the area a second time to ensure he does not exceed emergency exposure guidelines.

NOTE

The attachments (2 for Unit 1 and 3 for Unit 2) contain area dose rates of the Reactor Auxiliary Buildings (RABs) based on a Three Mile Island Unit 2 (TMI – 2) type accident. These attachments should be referred to prior to entry into an area where dose rates are unknown. The dose rates may be verified by Area Radiation Monitors (ARMs).

END OF SECTION 6.3

ATTACHMENT 1
EXPOSURE LIMITS FOR EMERGENCY RESPONSE PERSONNEL
(Page 1 of 1)

NOTE

1. Both Total Dose (TEDE) and Thyroid Dose (CDE) should be used for purposes of controlling exposure.
2. Protective clothing, including respirators, should be used where appropriate.

For the following missions, the exposure limit is[1]:	Total Dose[2] (TEDE)	THYROID[3] (CDE)
Performance of actions that would not directly mitigate the event, minimize escalation, or minimize effluent releases.	5 REM	50 REM
Performance of actions that mitigate the escalation to the event, rescue persons from a non-life threatening situation, minimize exposures or minimize effluent releases.	10 REM	100 REM
Performance of actions that decrease the severity of the event or terminate the processes causing the event in an attempt to control effluent releases to avoid extensive exposure of large populations. Also, rescue of persons from a life-threatening situation.	25 REM	250 REM
Rescue of person from a life-threatening situation. (Volunteers[4] should be above the age of 45.)	(5)	(5)

(1) Exposure limits to the lens of the eye are 3 times the Total Dose (TEDE) values listed.

(2) Total Dose (TEDE) is the total whole body exposure from both external and internal (weighted) sources - Total Effective Dose Equivalent.

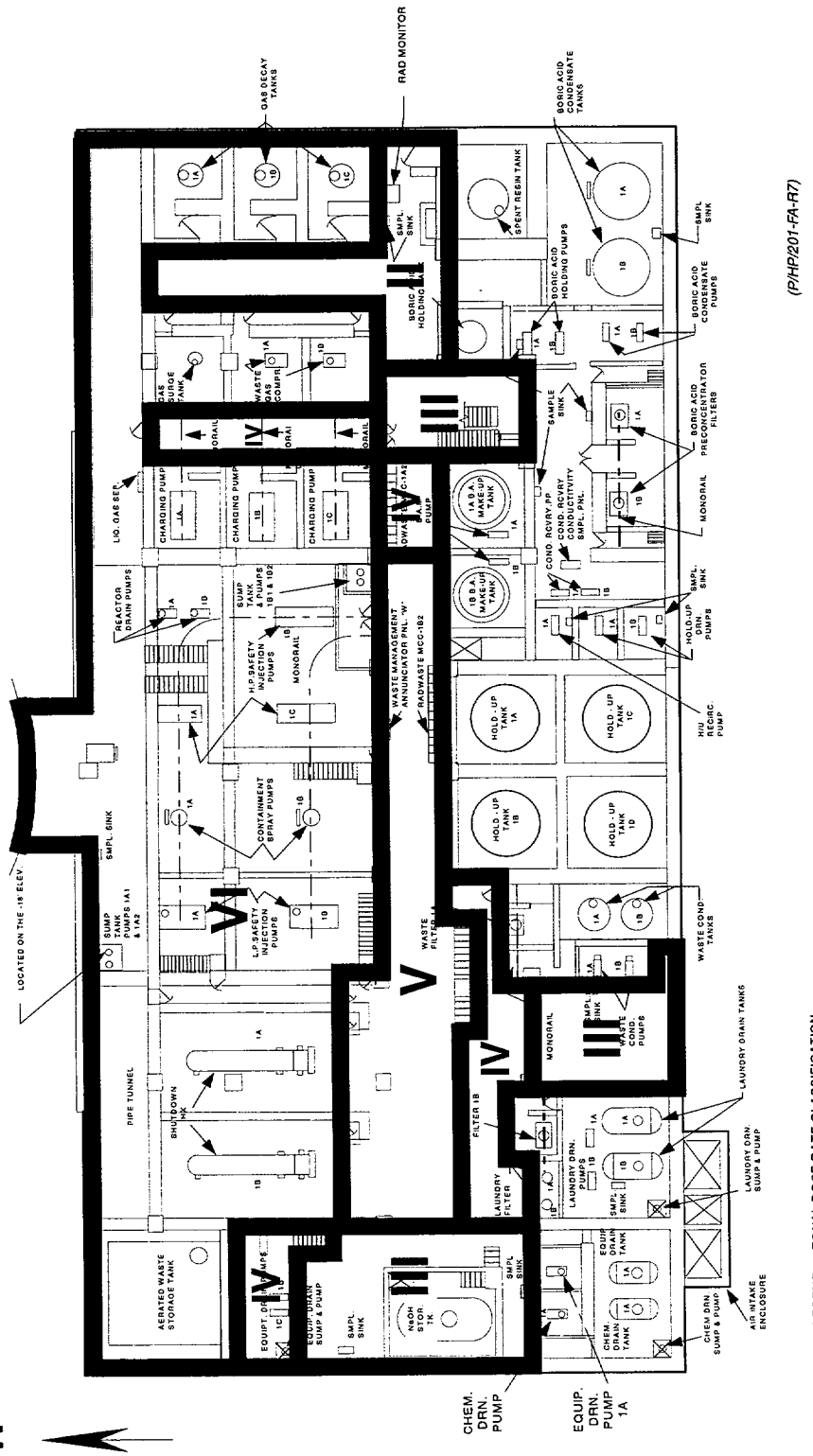
(3) Thyroid Dose (CDE) commitment from internal sources - Committed Dose Equivalent. The same dose limits also apply to other organs (CDE), skin (Shallow Dose Equivalent) and extremities (Extremity Dose Equivalent).

(4) Volunteers with full awareness of risks involved including numerical levels of dose at which acute effects of radiation will be incurred and numerical estimates of the risk of delayed effects.

(5) No upper limit for Total Dose (TEDE) and/or Thyroid Dose (CDE) exposure has been established because it is not possible to prejudge the risks that one person should be allowed to take to save the life of another. Also, no specific limit is given for thyroid exposure since in the extreme case, complete thyroid loss might be an acceptable sacrifice for a life saved. This should not be necessary if respirators and/or thyroid protection for rescue personnel are available as the result of adequate planning.

END OF ATTACHMENT 1

ATTACHMENT 2
FPL TMI PLANT SHIELDING STUDY – UNIT 1
(Page 1 of 8)



(P/HP/201-FA-R7)

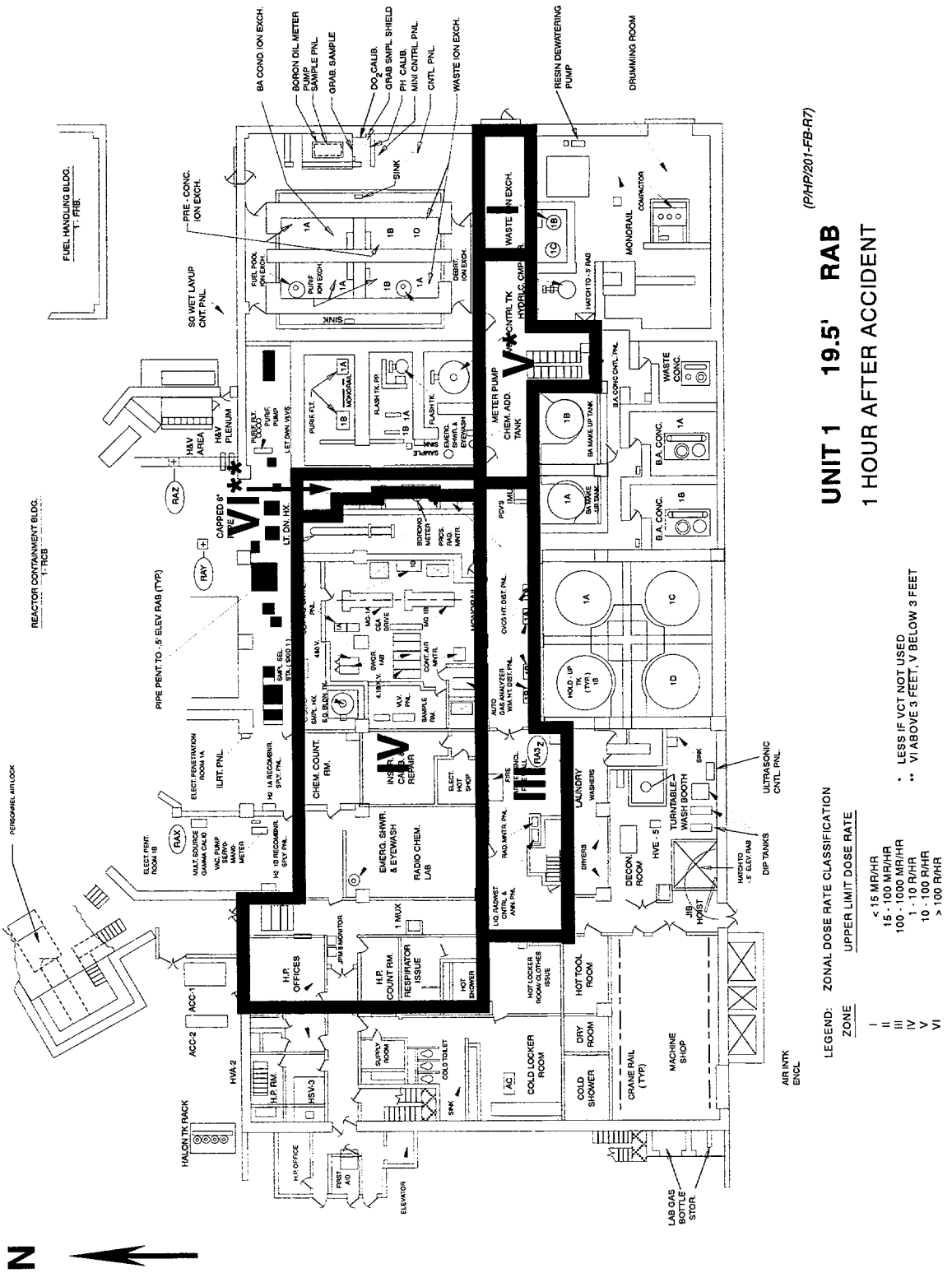
UNIT 1 - 0.5' RAB

1 HOUR AFTER ACCIDENT

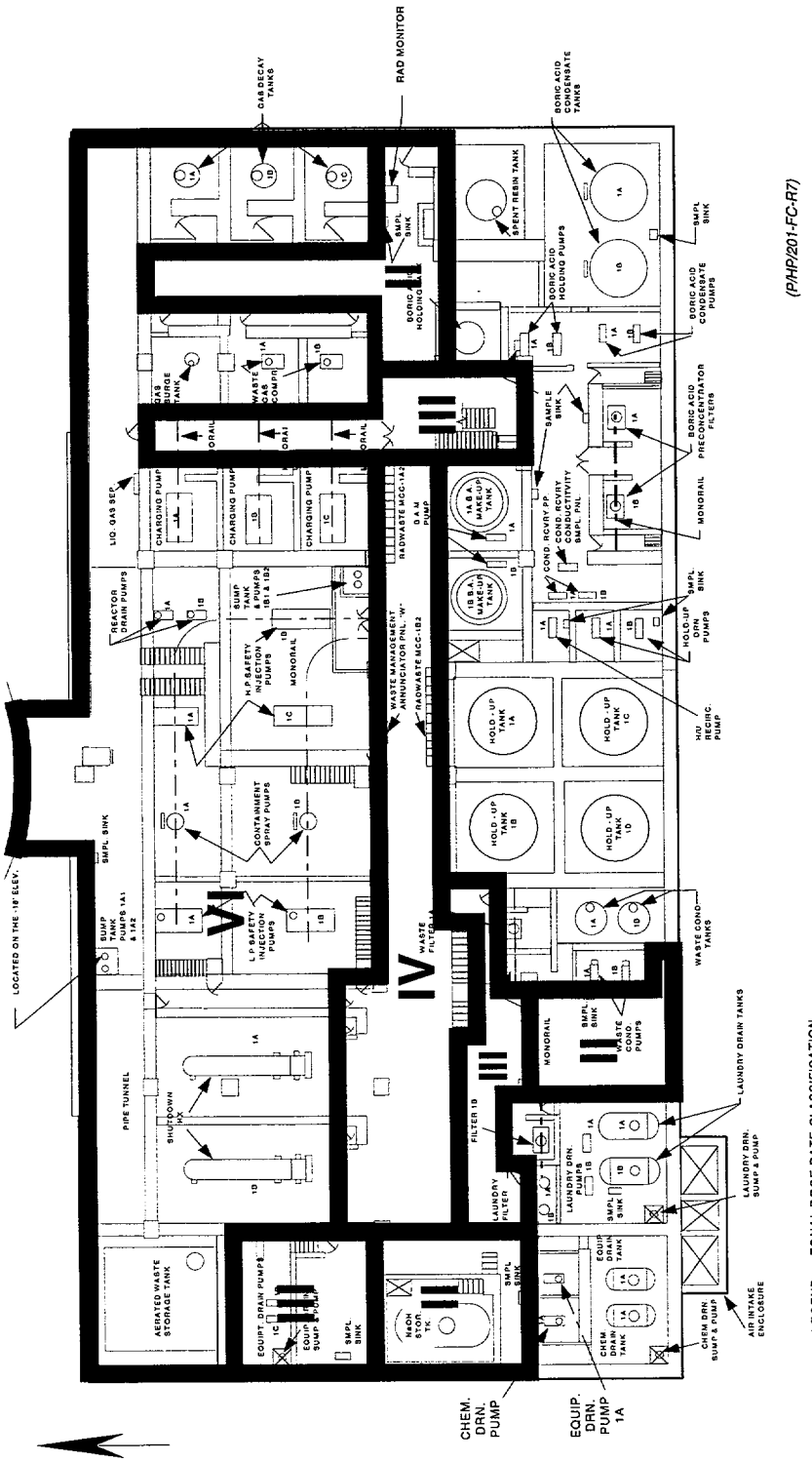
LEGEND: ZONAL DOSE RATE CLASSIFICATION

ZONE	UPPER LIMIT DOSE RATE
I	< 15 MR/HR
II	15 - 100 MR/HR
III	100 - 1000 MR/HR
IV	1 - 10 R/HR
V	10 - 100 R/HR
VI	> 100 R/HR

ATTACHMENT 2
FPL TMI PLANT SHIELDING STUDY – UNIT 1
(Page 2 of 8)



ATTACHMENT 2
FPL TMI PLANT SHIELDING STUDY – UNIT 1
(Page 3 of 8)



(P/HP/201-FC-R7)

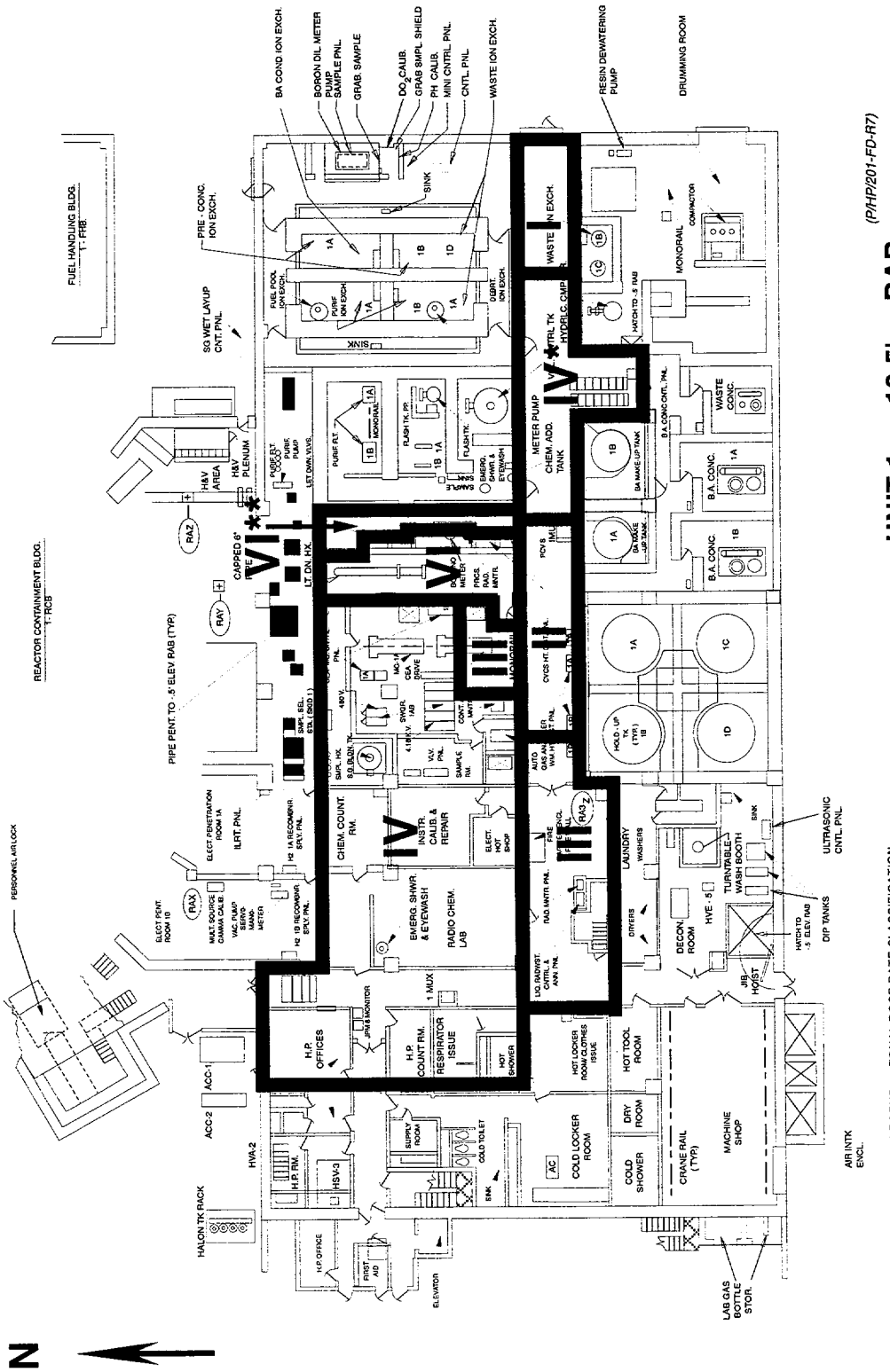
UNIT 1 - 0.5' RAB

10 HOURS AFTER ACCIDENT

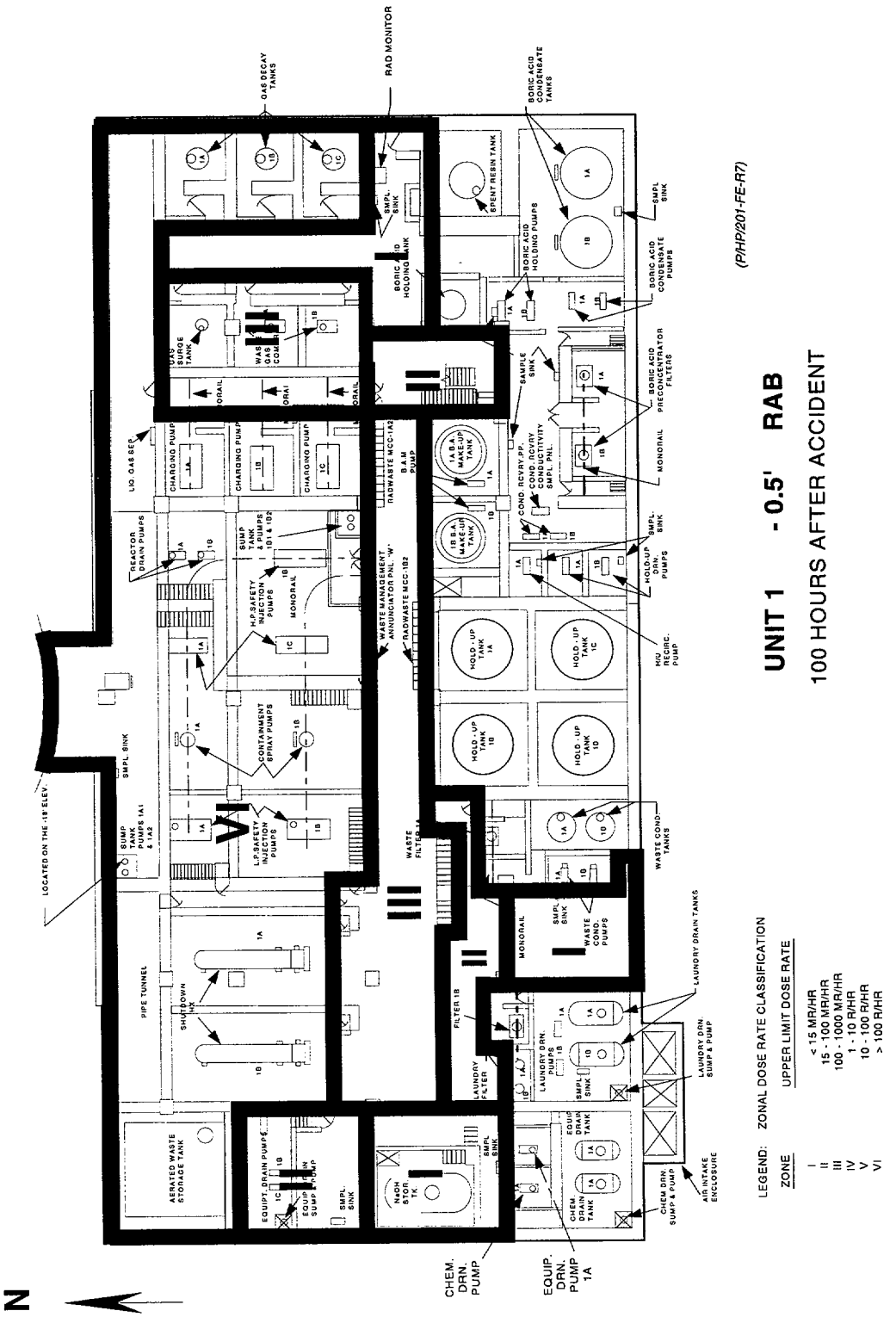
LEGEND: ZONAL DOSE RATE CLASSIFICATION

ZONE	UPPER LIMIT DOSE RATE
I	< 15 MR/HR
II	15 - 100 MR/HR
III	100 - 1000 MR/HR
IV	1 - 10 R/HR
V	10 - 100 R/HR
VI	> 100 R/HR

ATTACHMENT 2
FPL TMI PLANT SHIELDING STUDY – UNIT 1
(Page 4 of 8)



ATTACHMENT 2
FPL TMI PLANT SHIELDING STUDY – UNIT 1
(Page 5 of 8)



(P/HP/201-FE-R7)

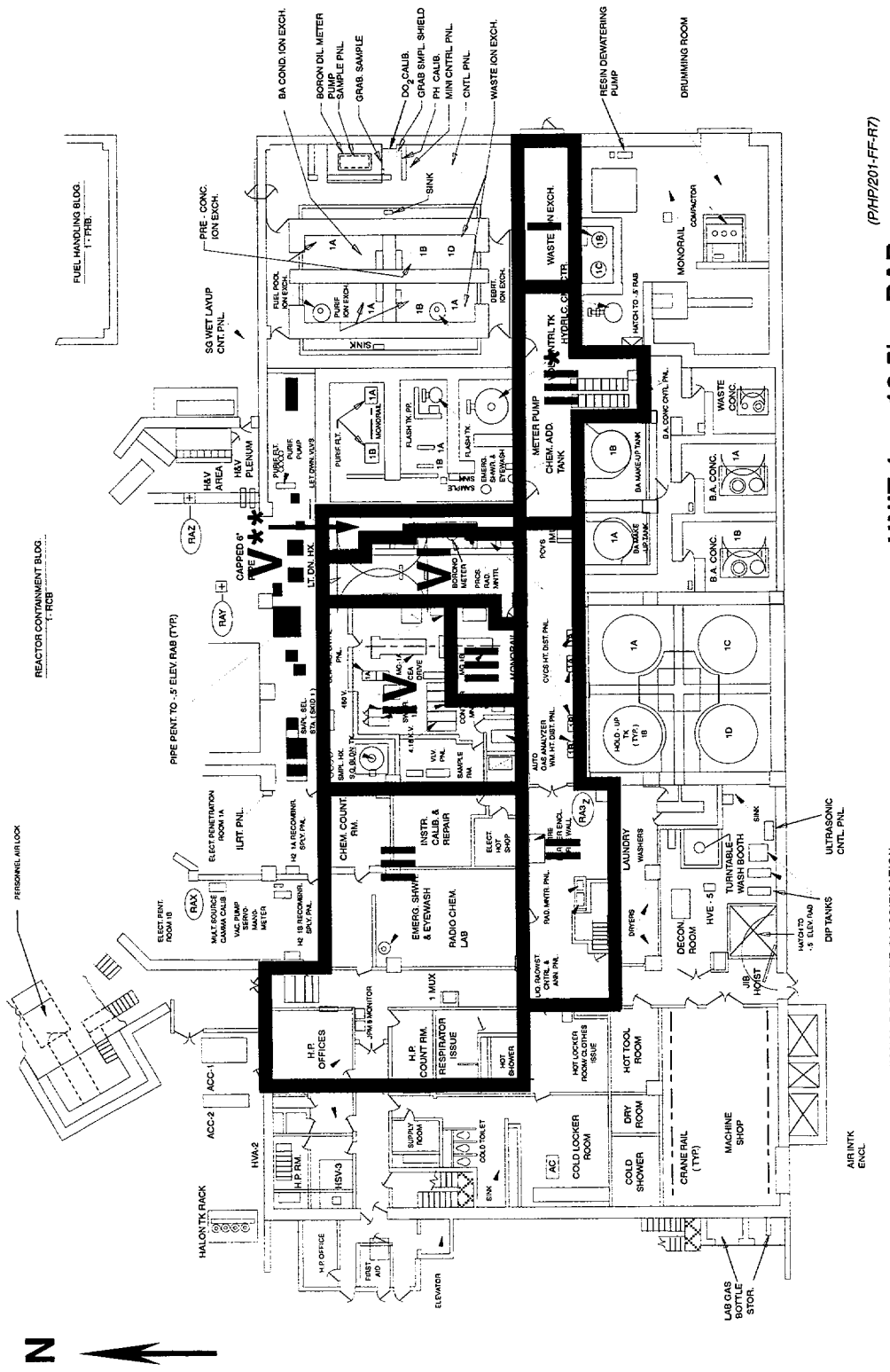
UNIT 1 - 0.5' RAB

100 HOURS AFTER ACCIDENT

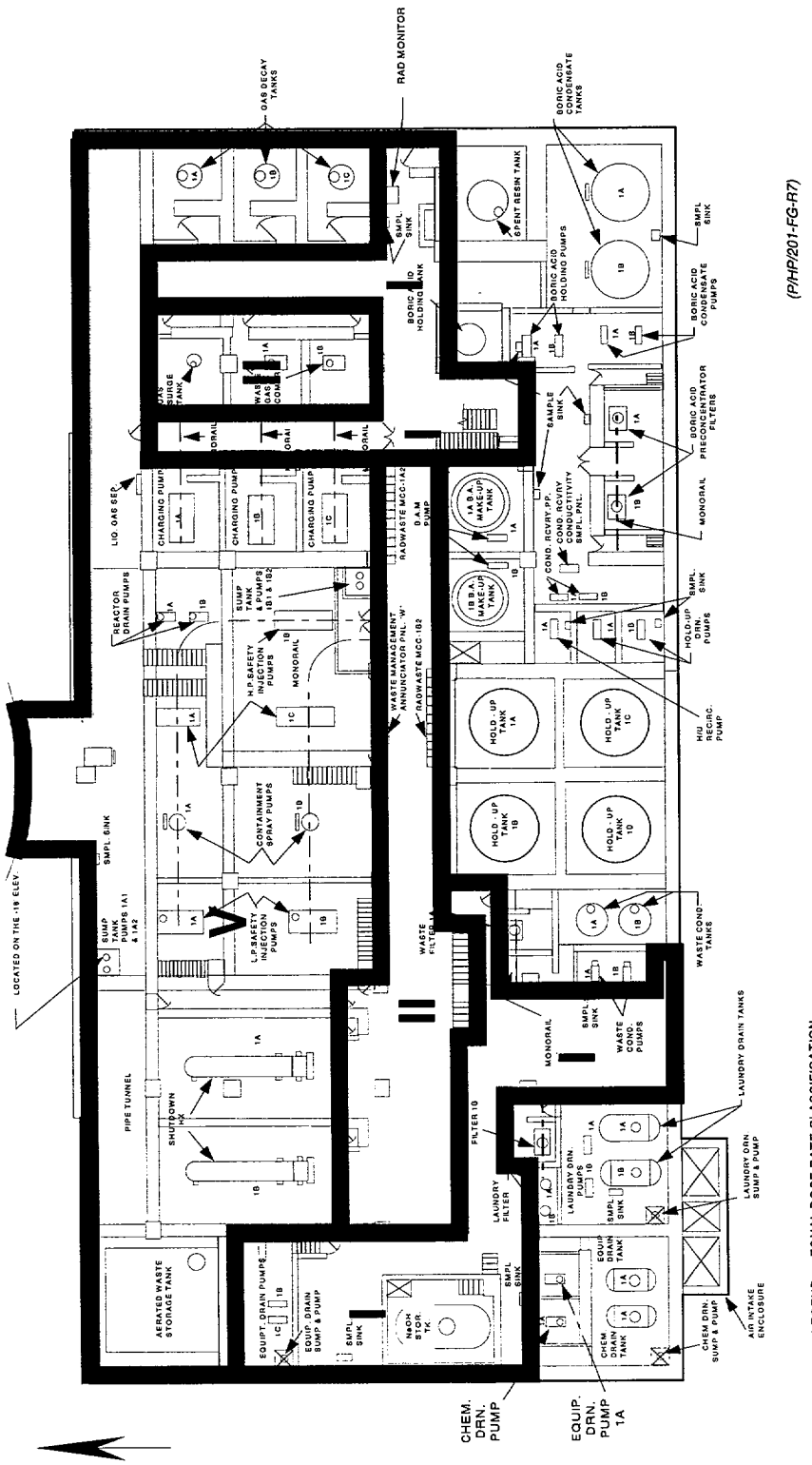
LEGEND: ZONAL DOSE RATE CLASSIFICATION

ZONE	UPPER LIMIT DOSE RATE
I	< 15 MR/HR
II	15 - 100 MR/HR
III	100 - 1000 MR/HR
IV	1 - 10 R/HR
V	10 - 100 R/HR
VI	> 100 R/HR

ATTACHMENT 2
FPL TMI PLANT SHIELDING STUDY – UNIT 1
(Page 6 of 8)



ATTACHMENT 2
FPL TMI PLANT SHIELDING STUDY – UNIT 1
(Page 7 of 8)



(P/HP/201-FG-R7)

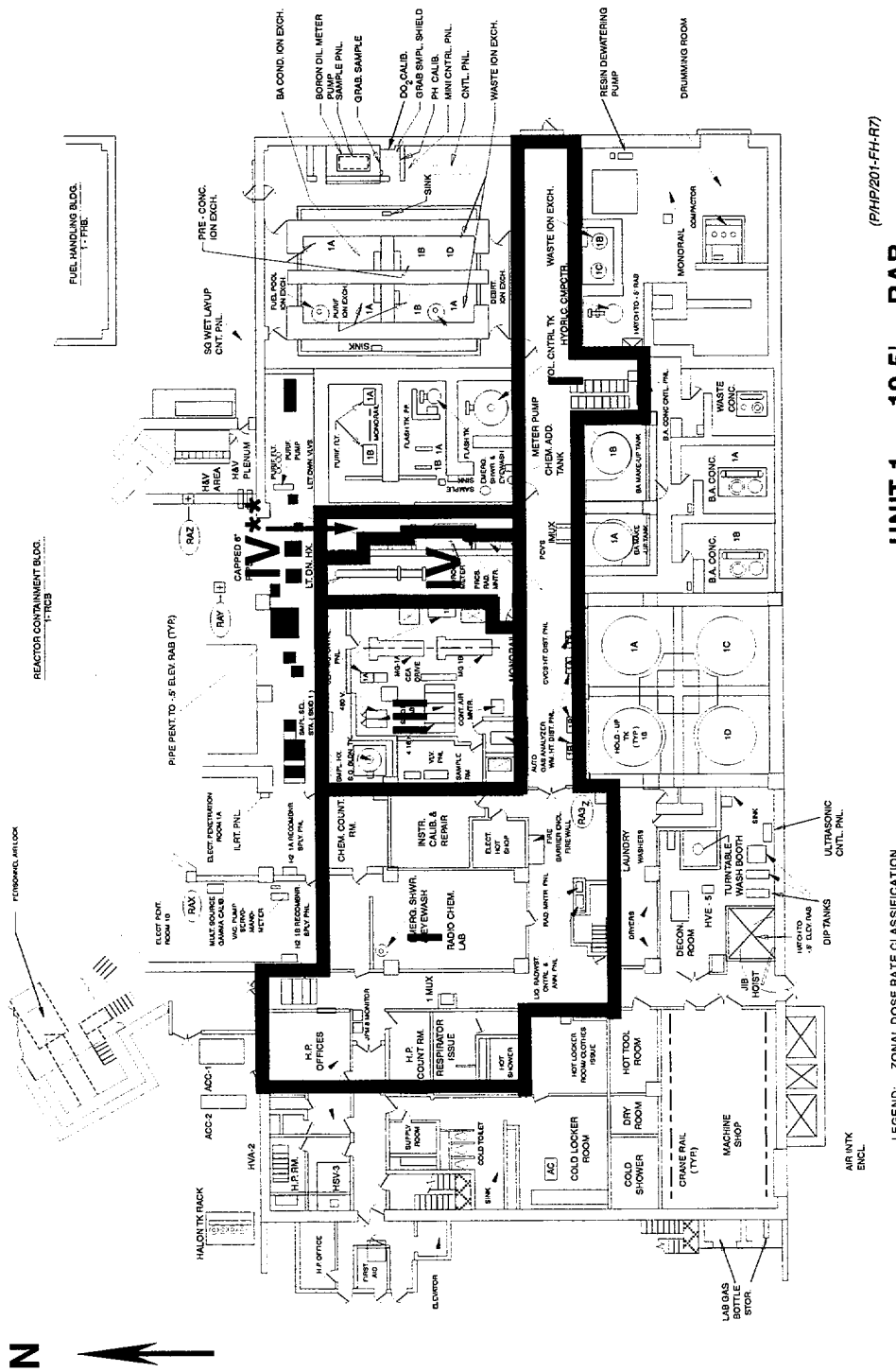
UNIT 1 - 0.5' RAB

1000 HOURS AFTER ACCIDENT

LEGEND: ZONAL DOSE RATE CLASSIFICATION

ZONE	UPPER LIMIT DOSE RATE
I	< 15 MR/HR
II	15 - 100 MR/HR
III	100 - 1000 MR/HR
IV	1 - 10 R/HR
V	10 - 100 R/HR
VI	> 100 R/HR

ATTACHMENT 2
FPL TMI PLANT SHIELDING STUDY – UNIT 1
(Page 8 of 8)



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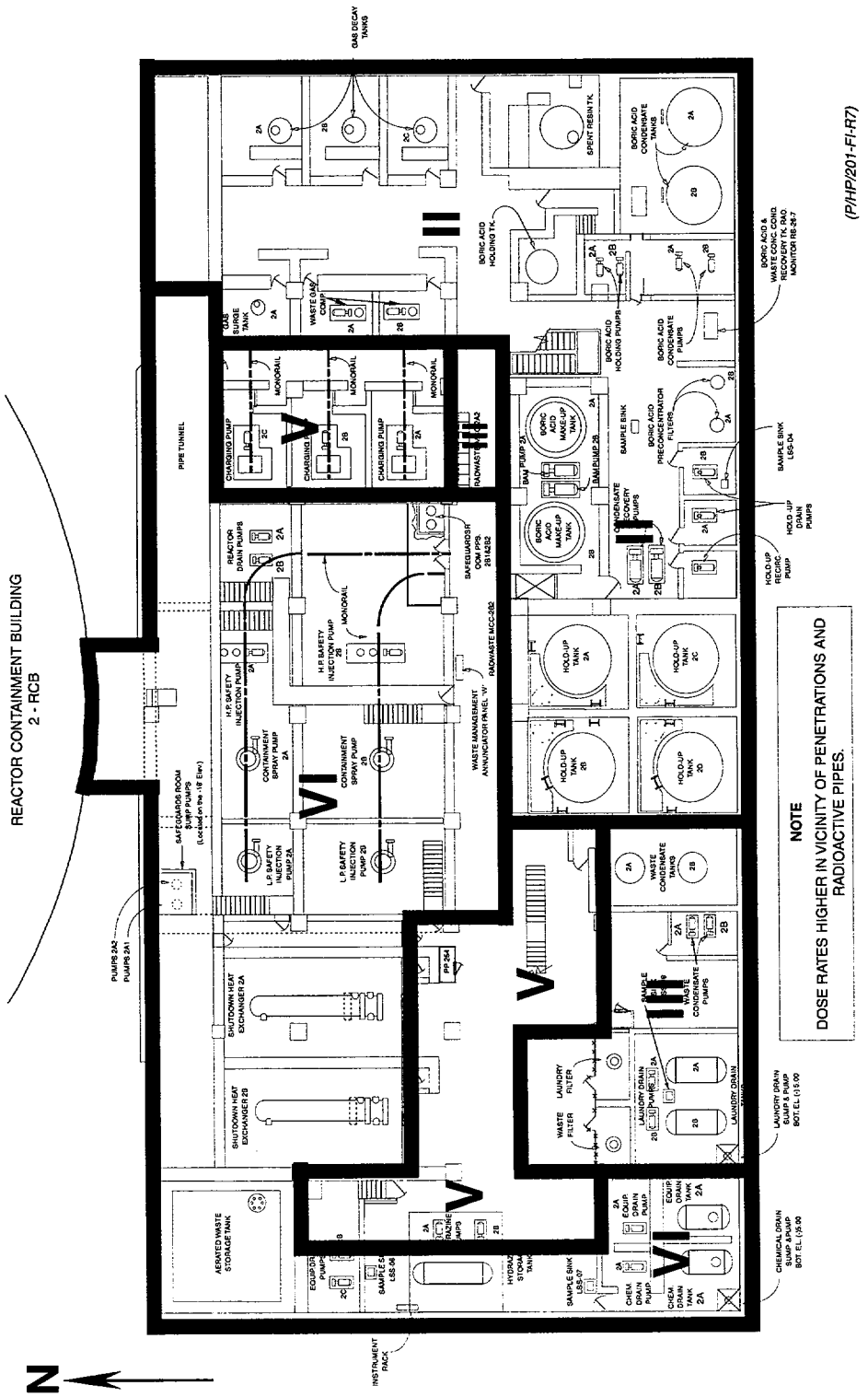

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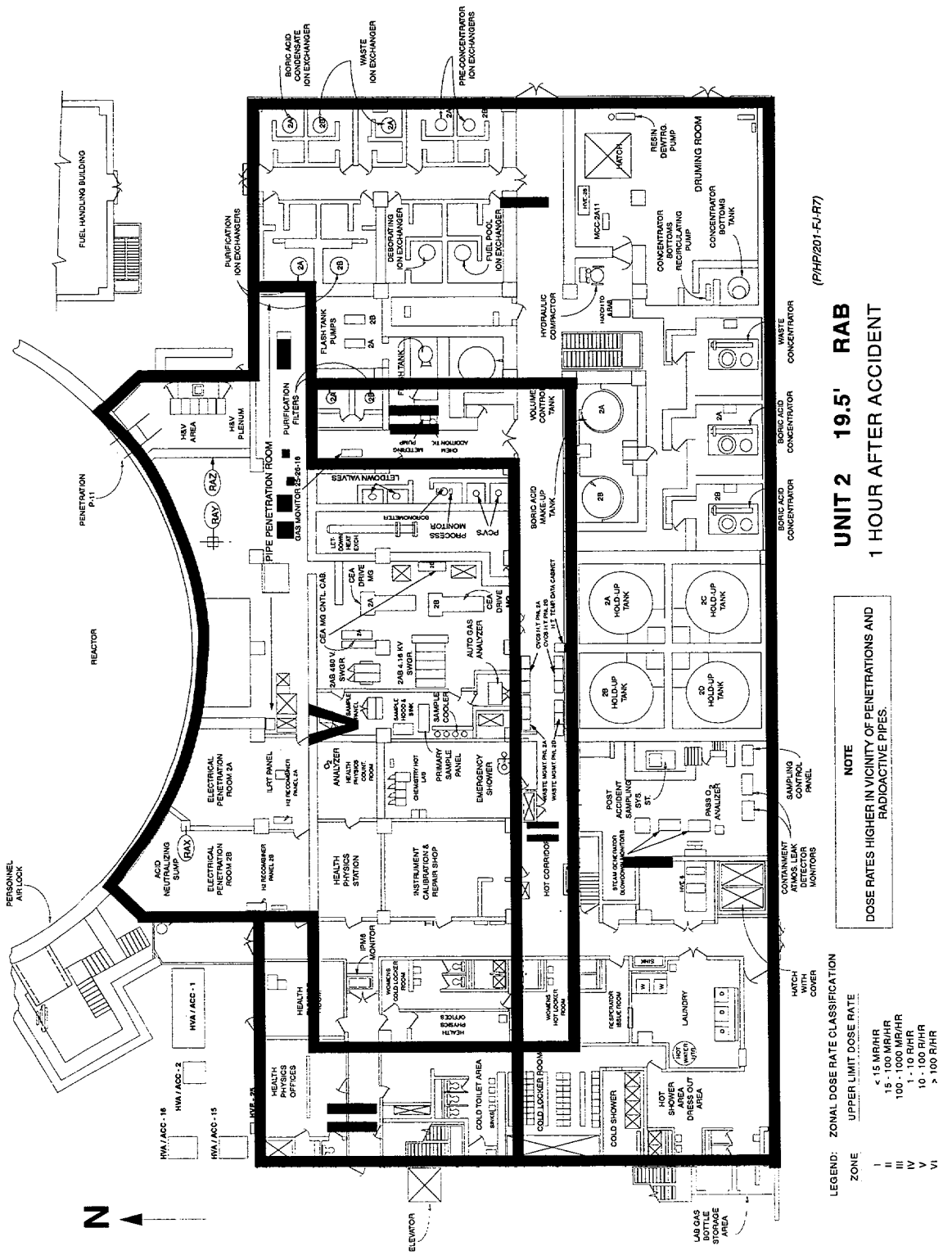

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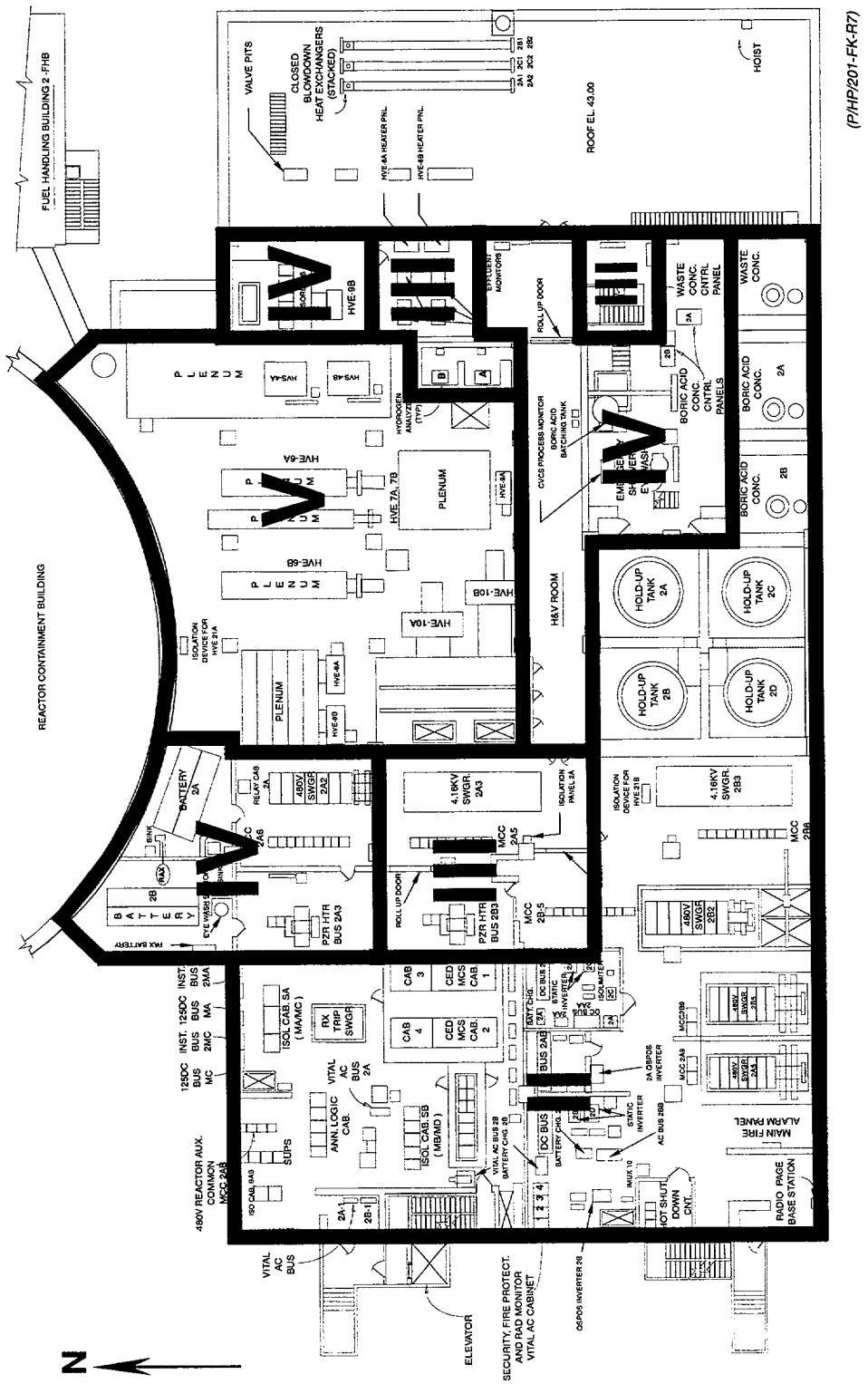

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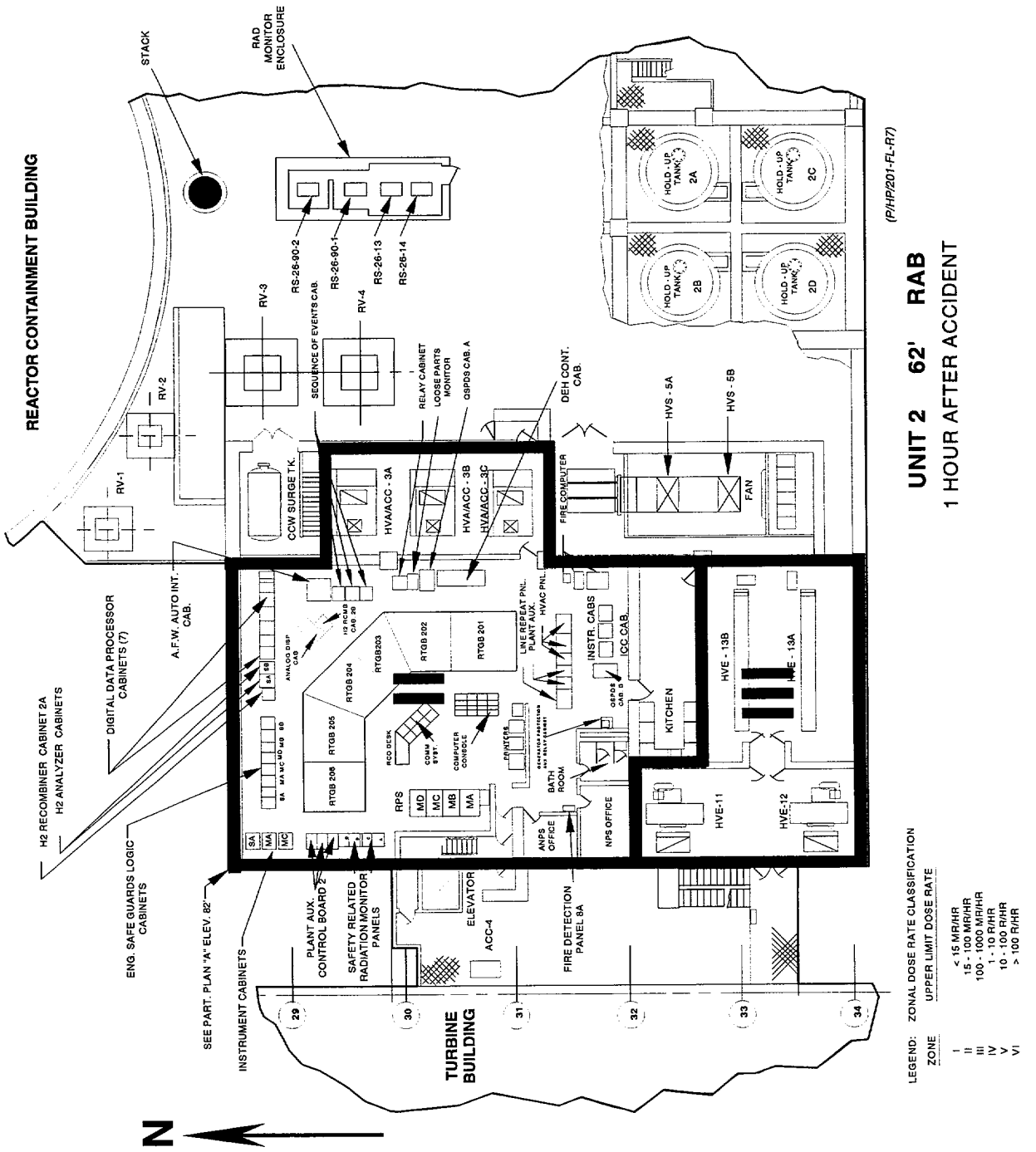

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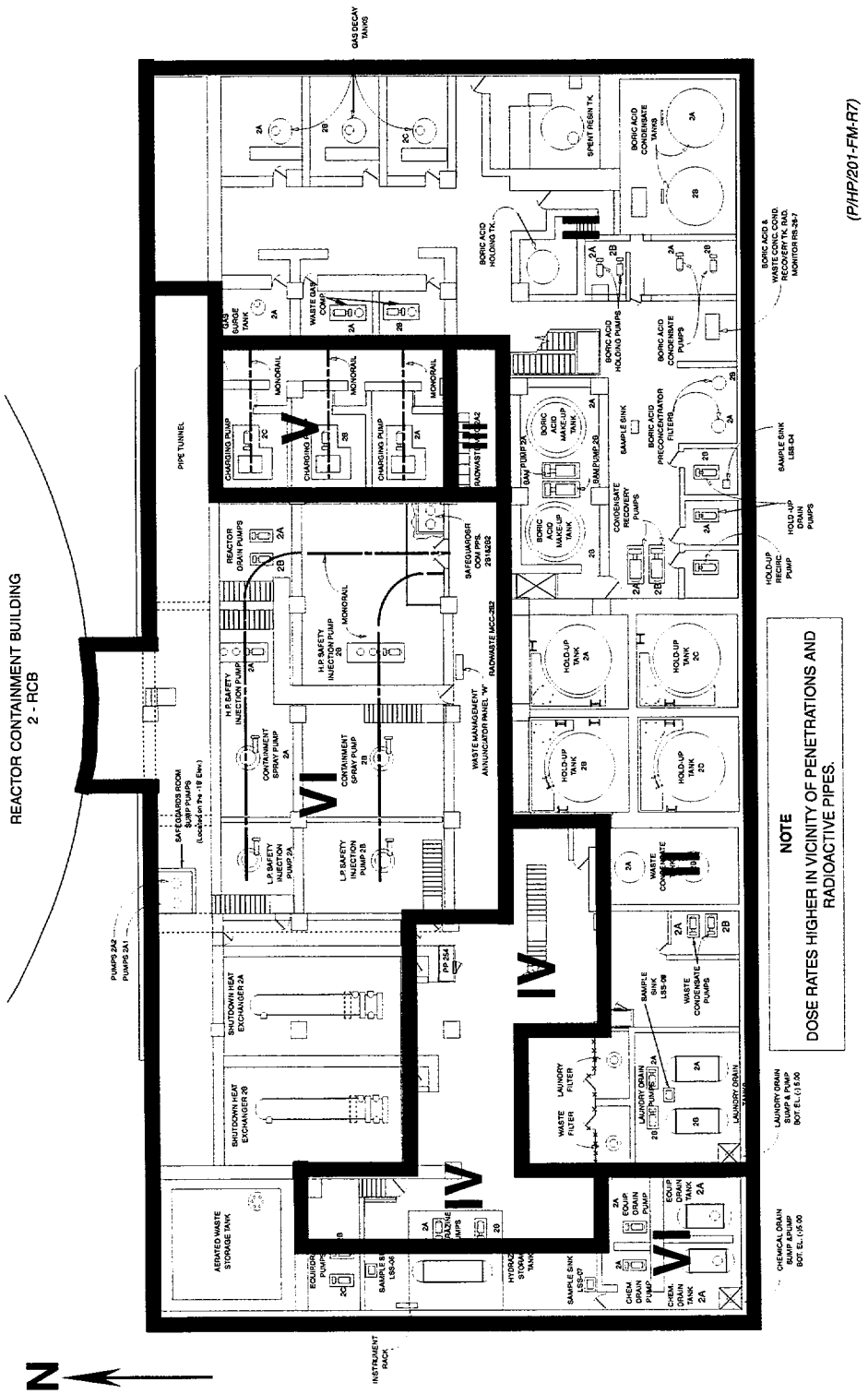

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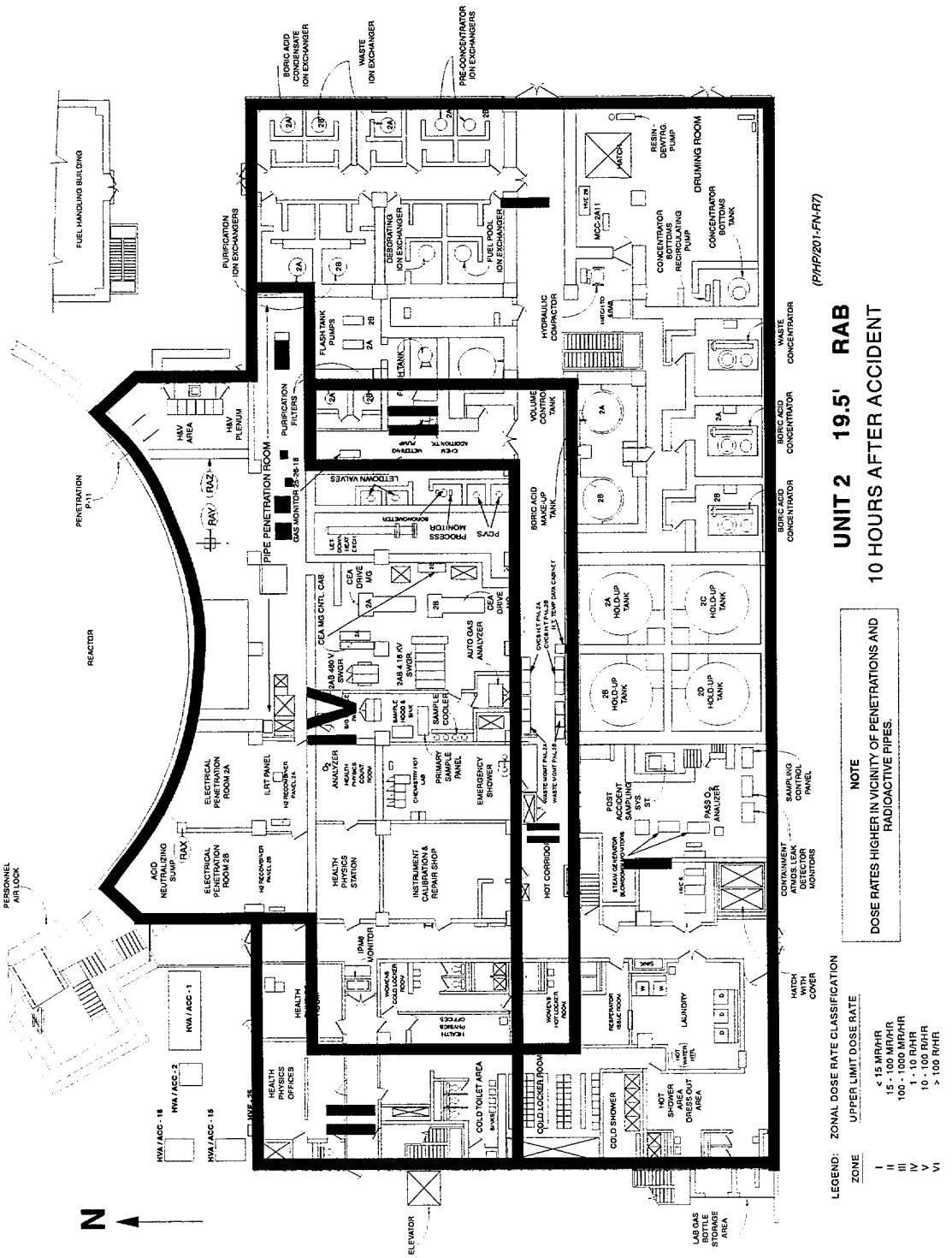

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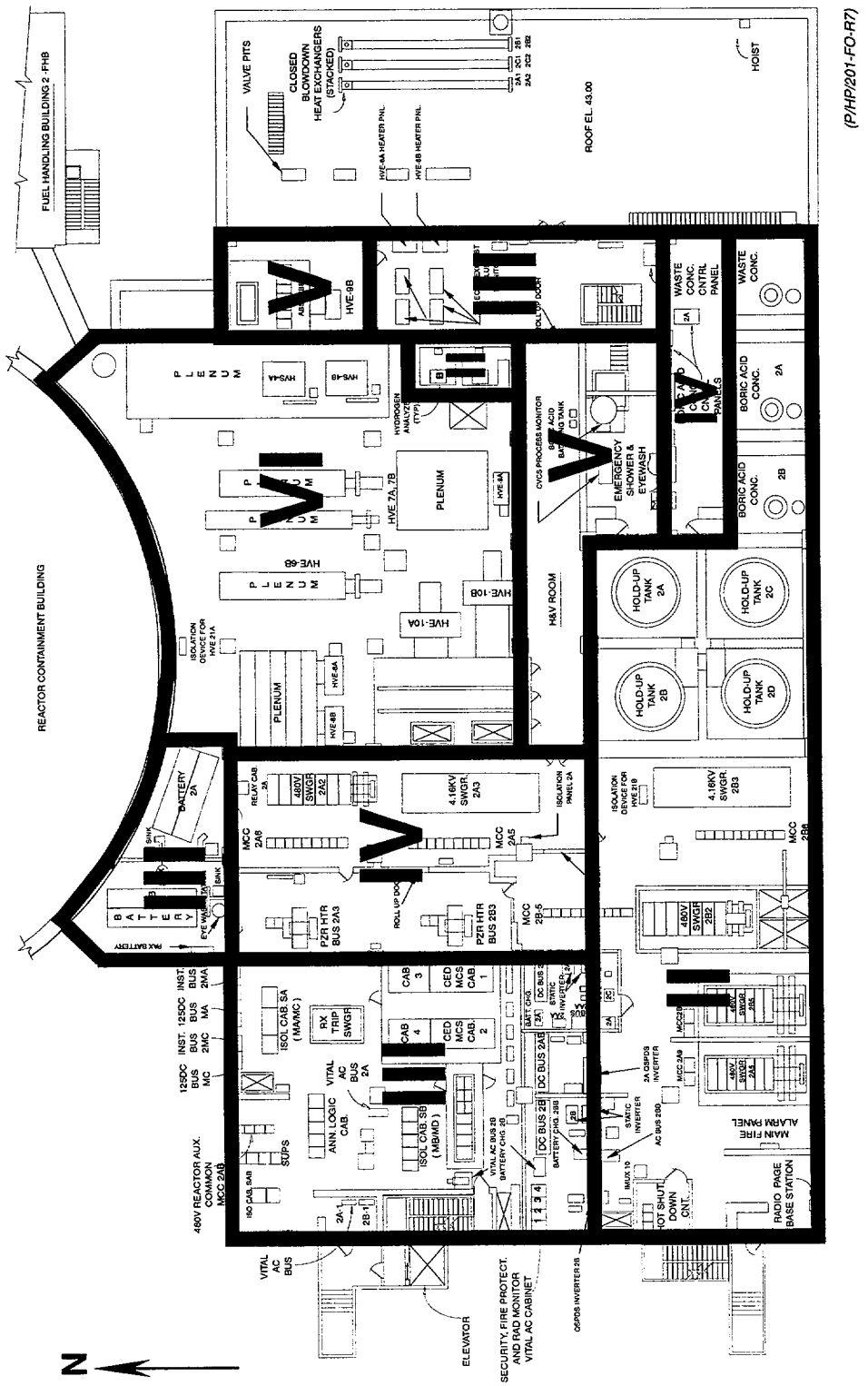

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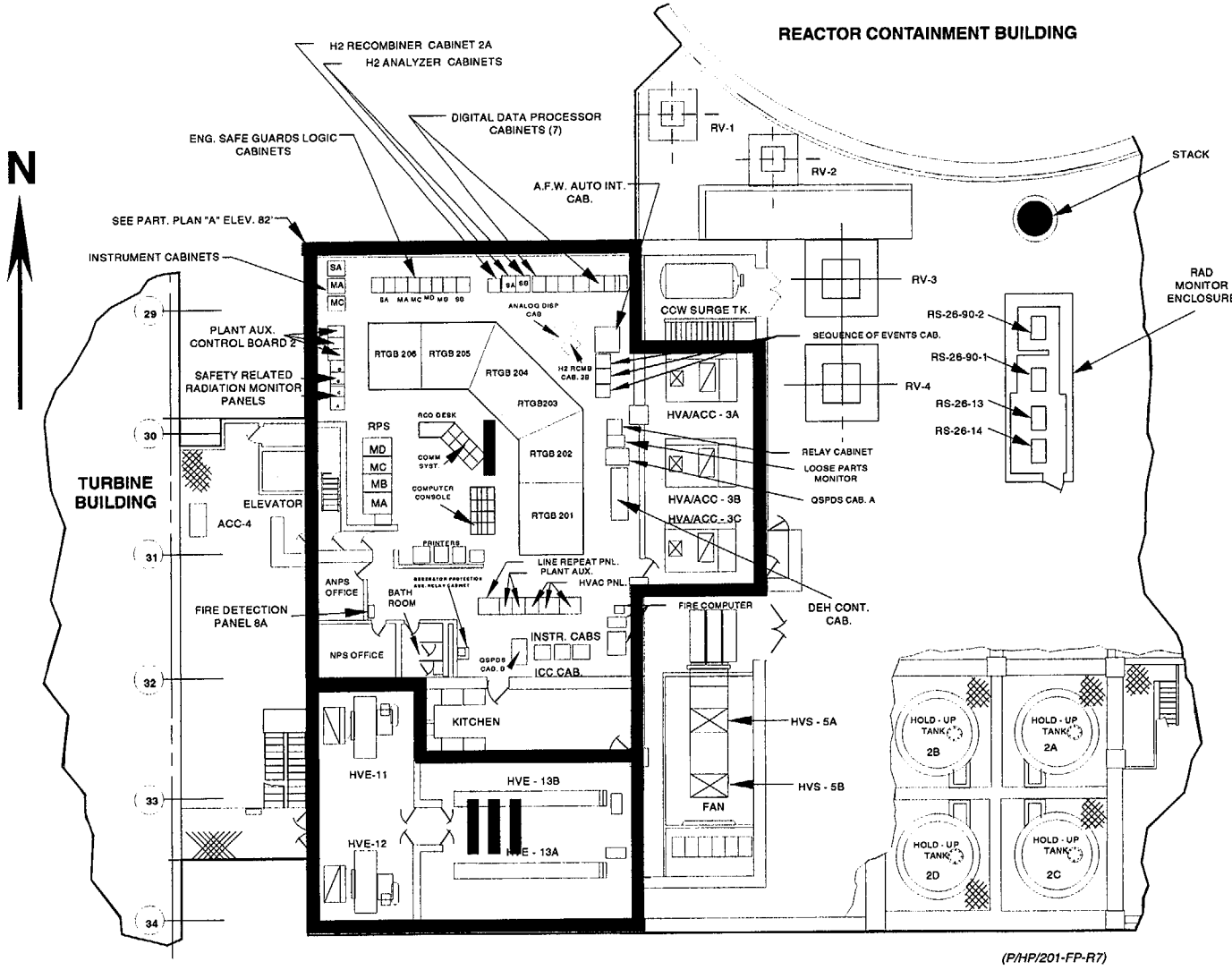

(P/HP/201-FP-R7)

UNIT 2 62' RAB
10 HOURS AFTER ACCIDENT

LEGEND: ZONAL DOSE RATE CLASSIFICATION

ZONE	UPPER LIMIT DOSE RATE
I	< 15 MR/HR
II	15 - 100 MR/HR
III	100 - 1000 MR/HR
IV	1 - 10 R/HR
V	10 - 100 R/HR
VI	> 100 R/HR

ATTACHMENT 3
FPL TMI PLANT SHIELDING STUDY – UNIT 2
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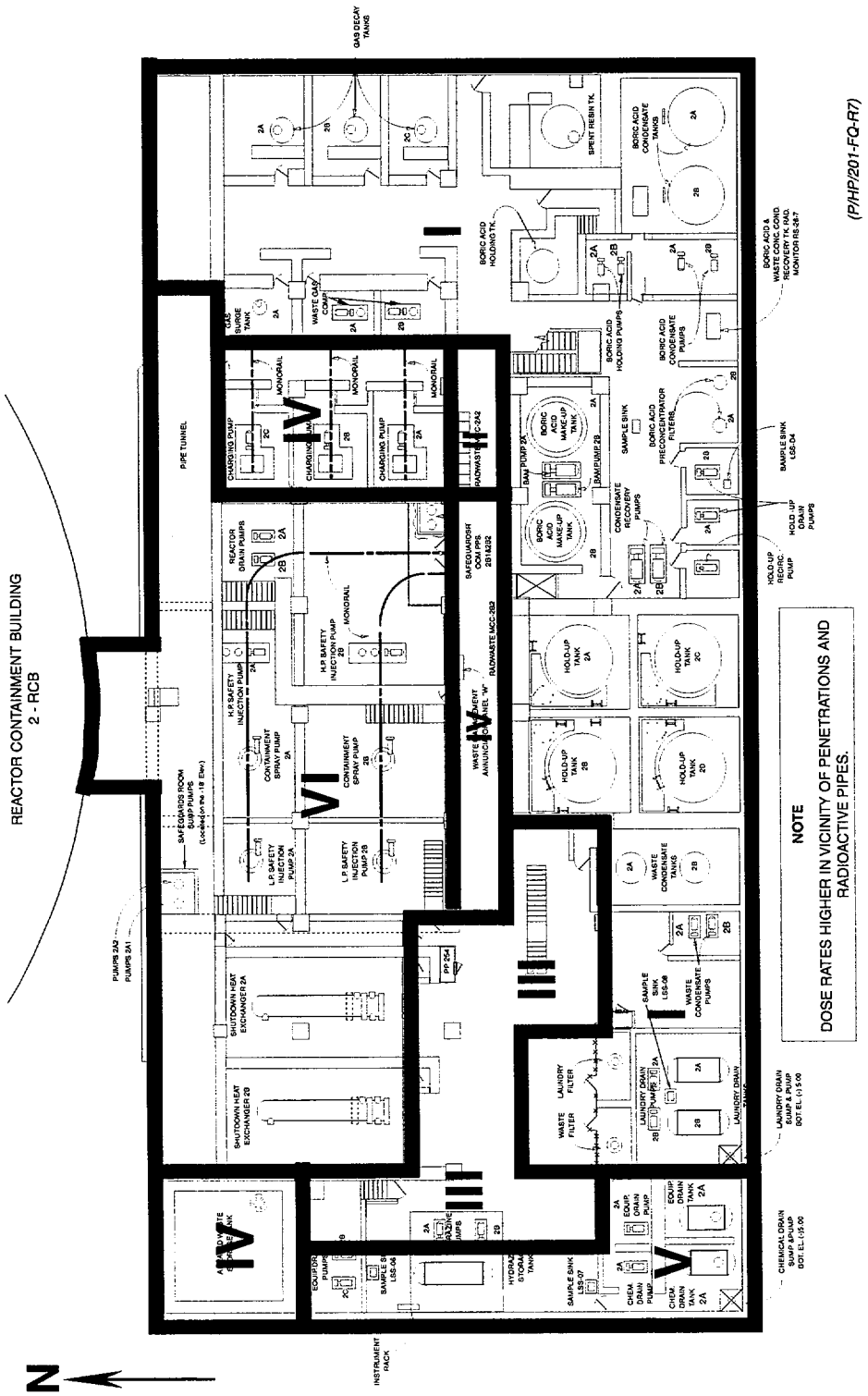

(P/HP/201-FQ-R7)

UNIT 2 -0.5' RAB

100 HOURS AFTER ACCIDENT

NOTE

DOSE RATES HIGHER IN VICINITY OF PENETRATIONS AND RADIOACTIVE PIPES.

LEGEND: ZONAL DOSE RATE CLASSIFICATION

ZONE	UPPER LIMIT DOSE RATE
I	< 15 MR/HR
II	15 - 100 MR/HR
III	100 - 1000 MR/HR
IV	1 - 10 R/HR
V	10 - 100 R/HR
VI	> 100 R/HR

ATTACHMENT 3
FPL TMI PLANT SHIELDING STUDY – UNIT 2
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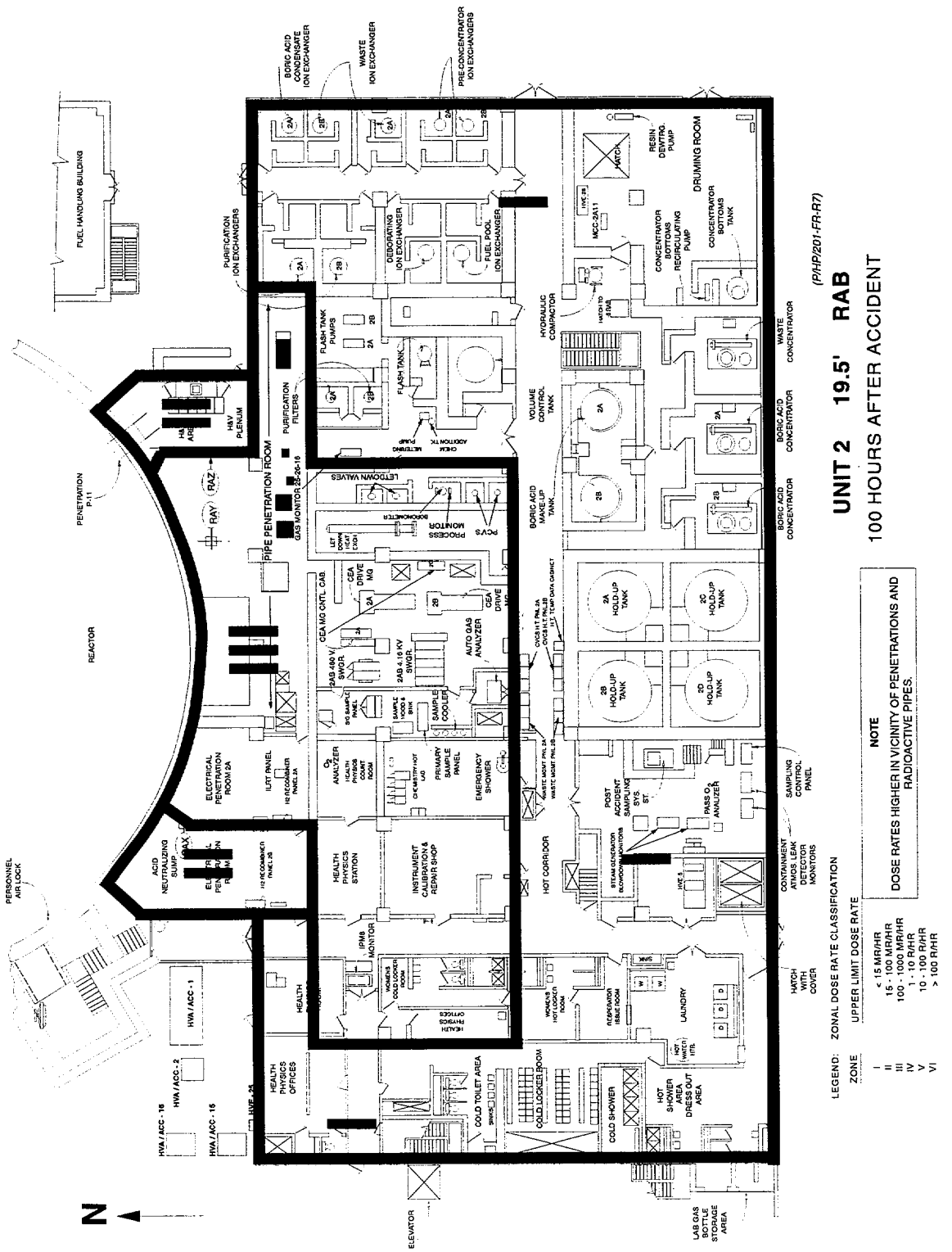

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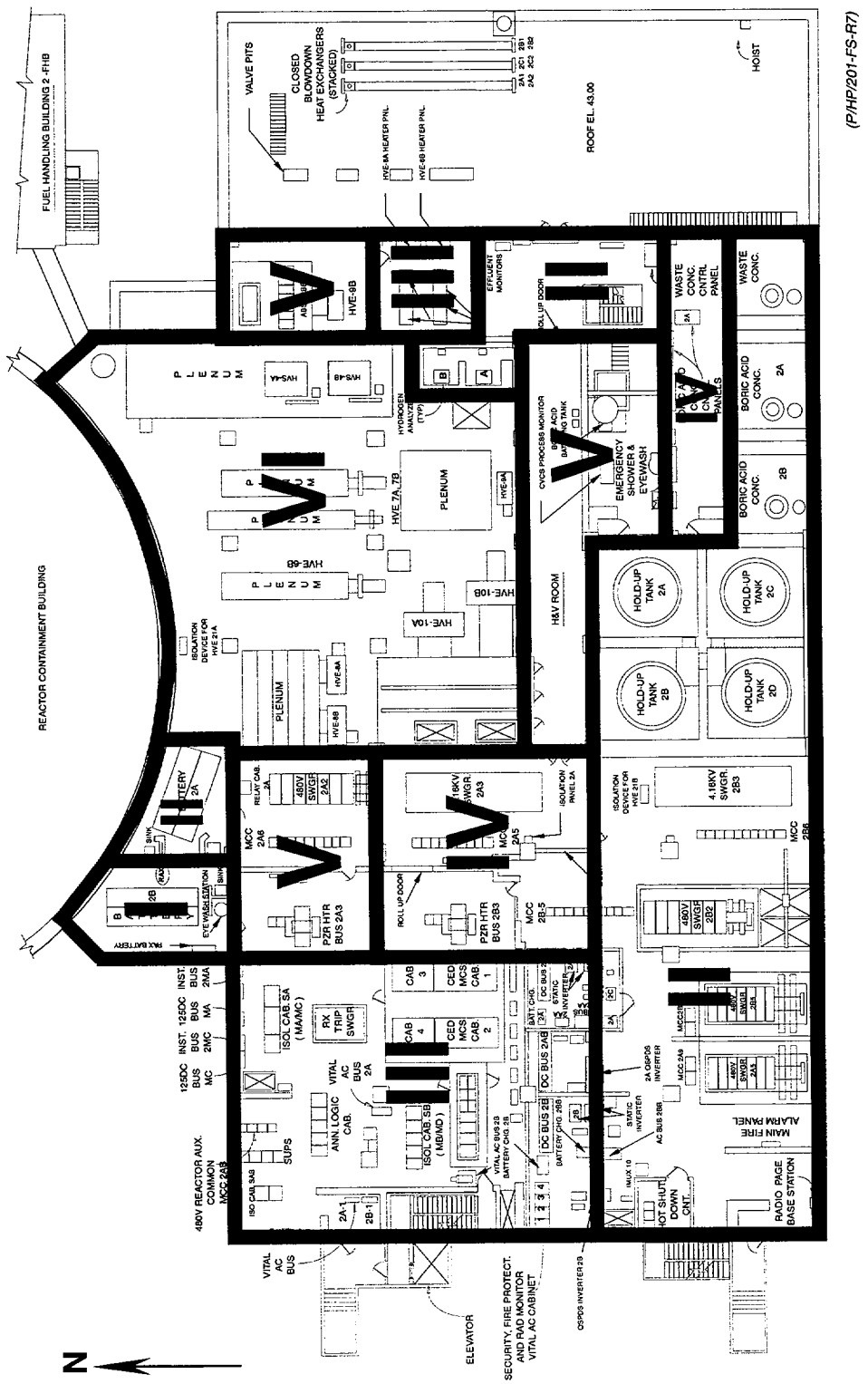

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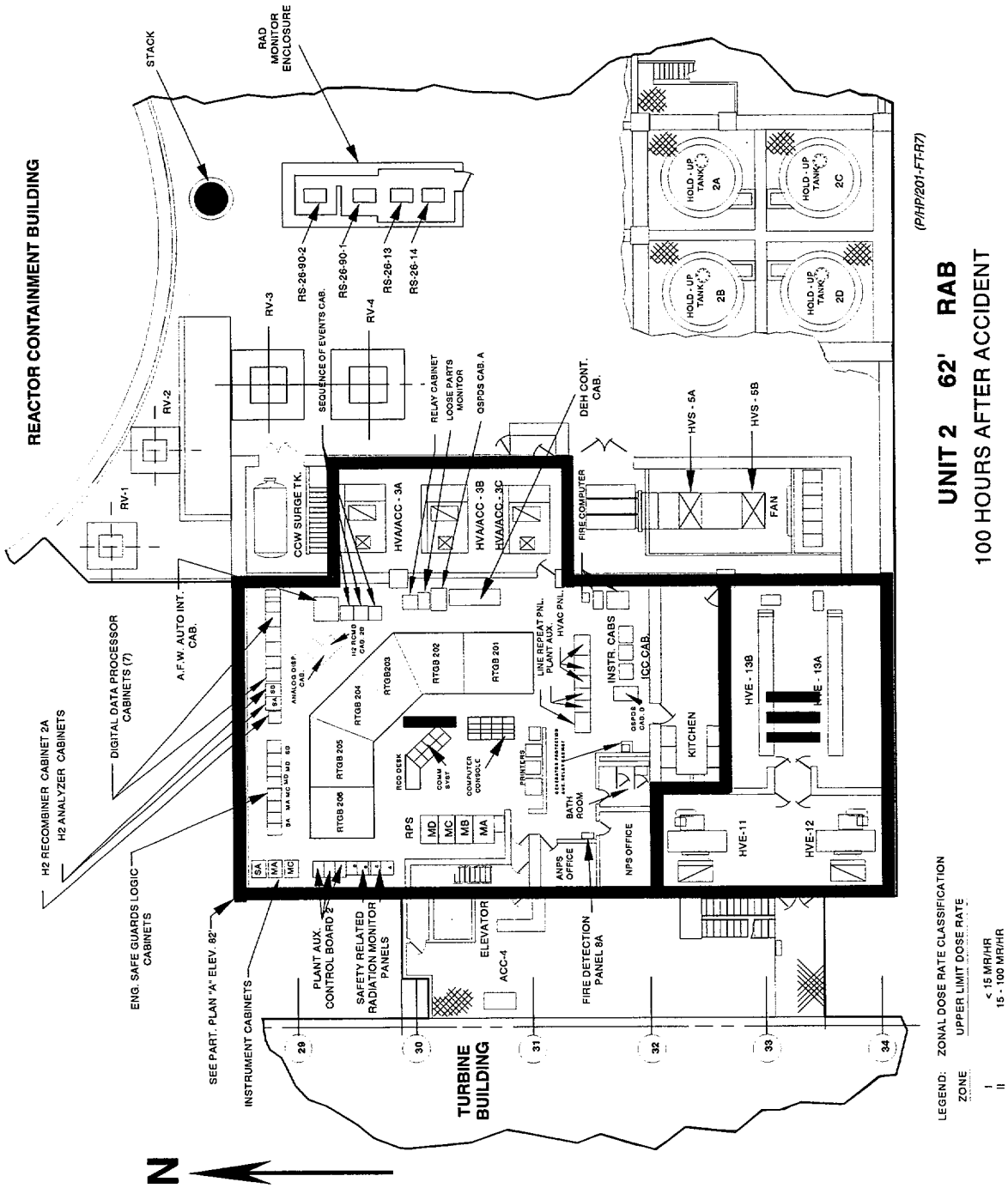

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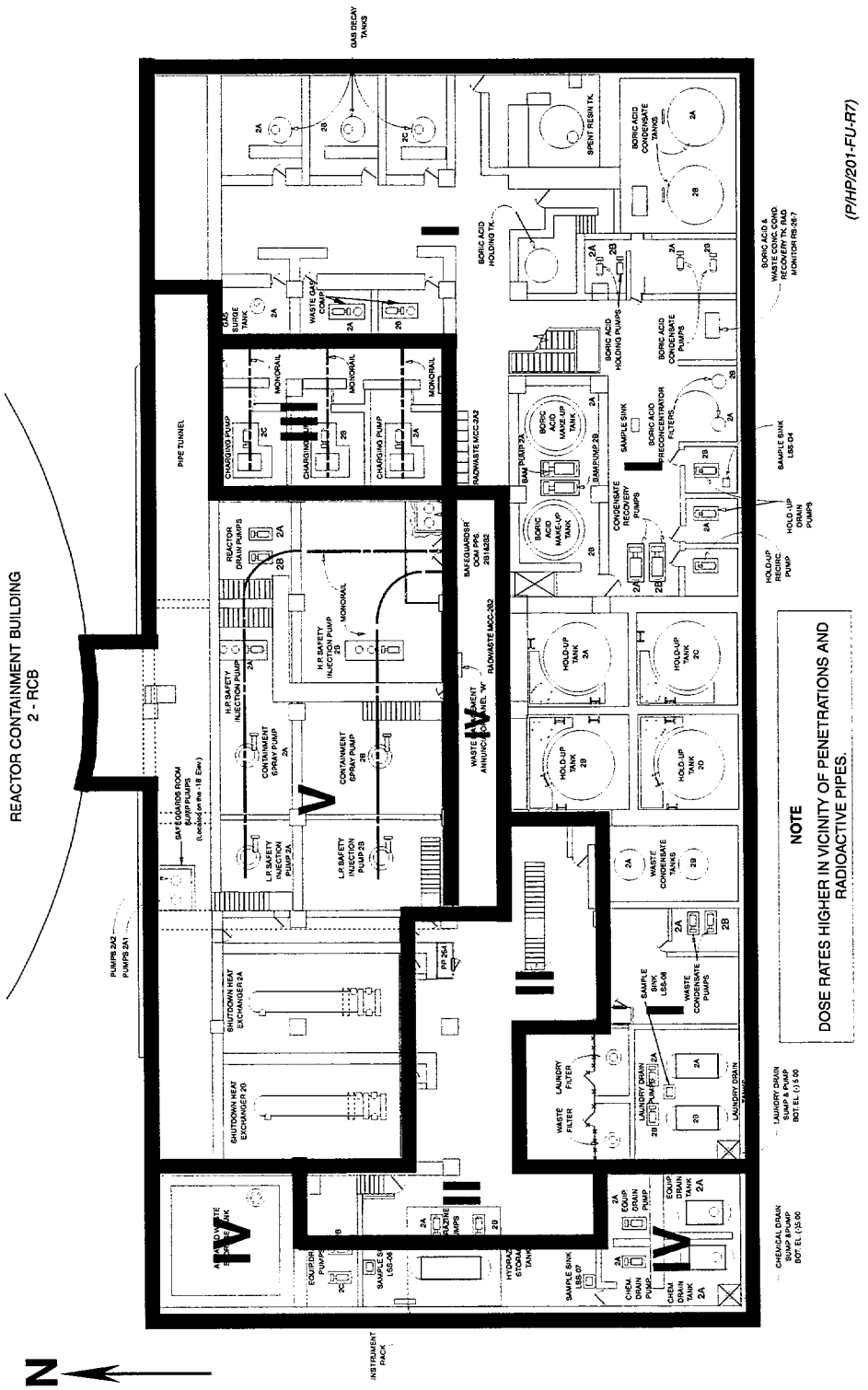

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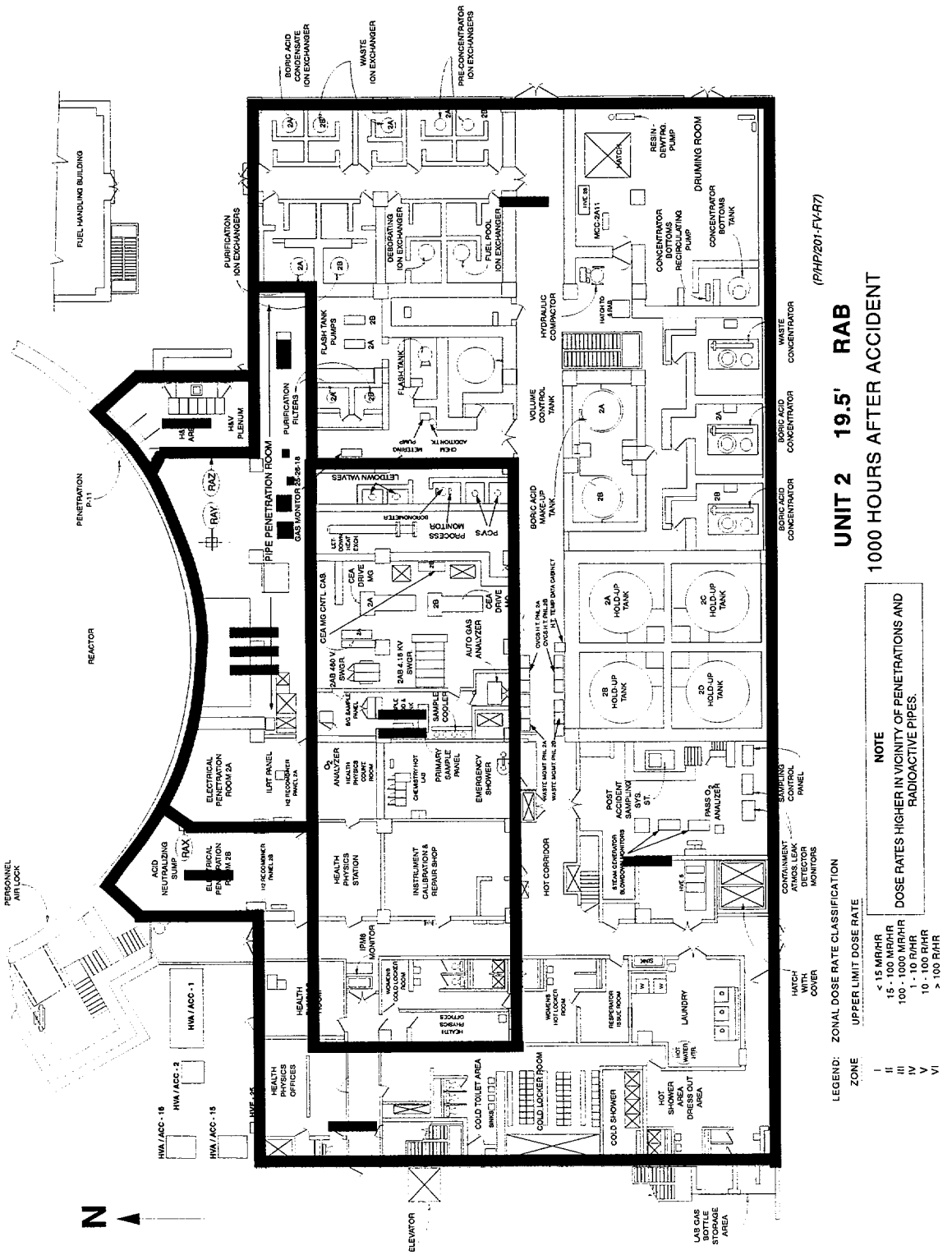

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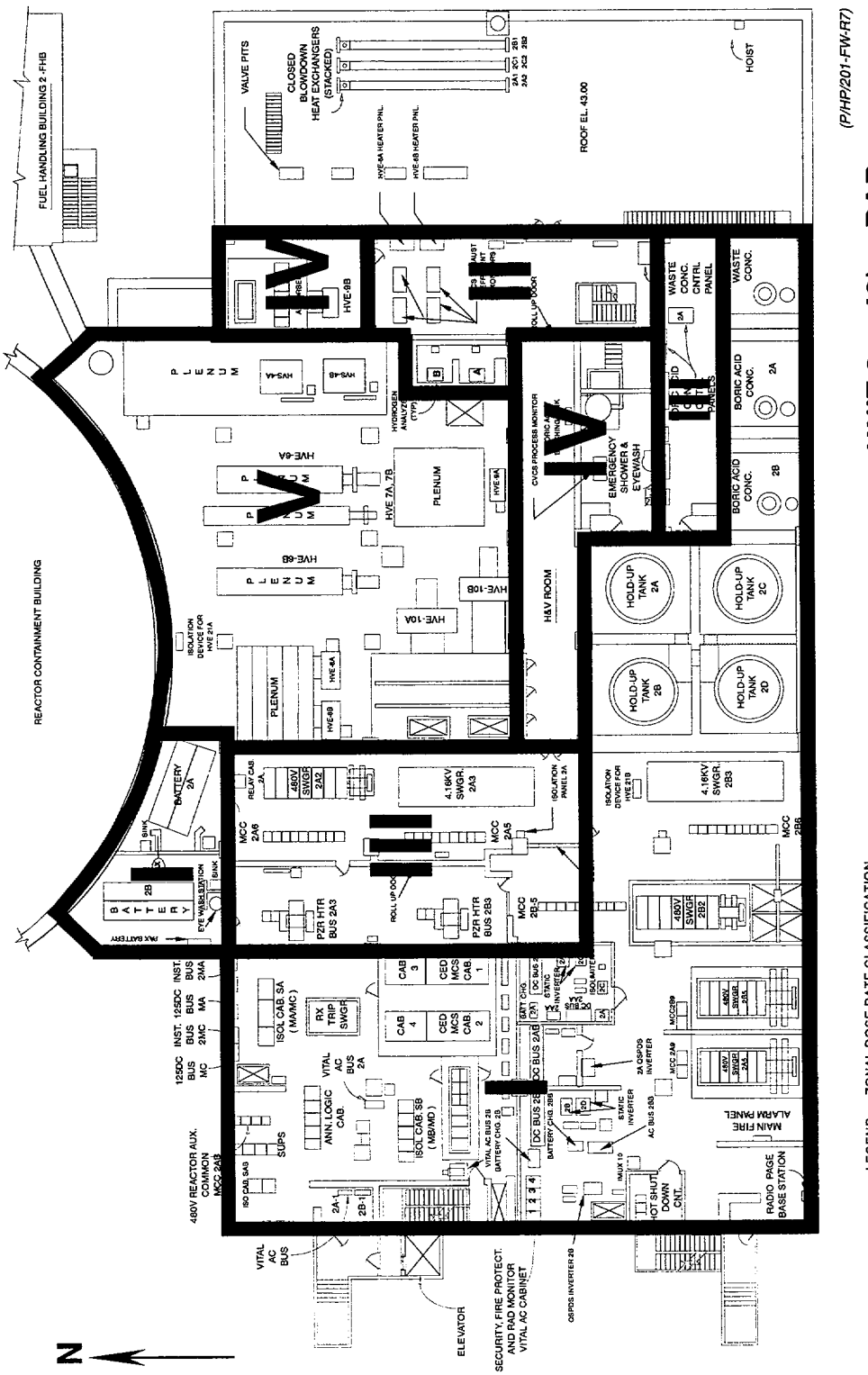

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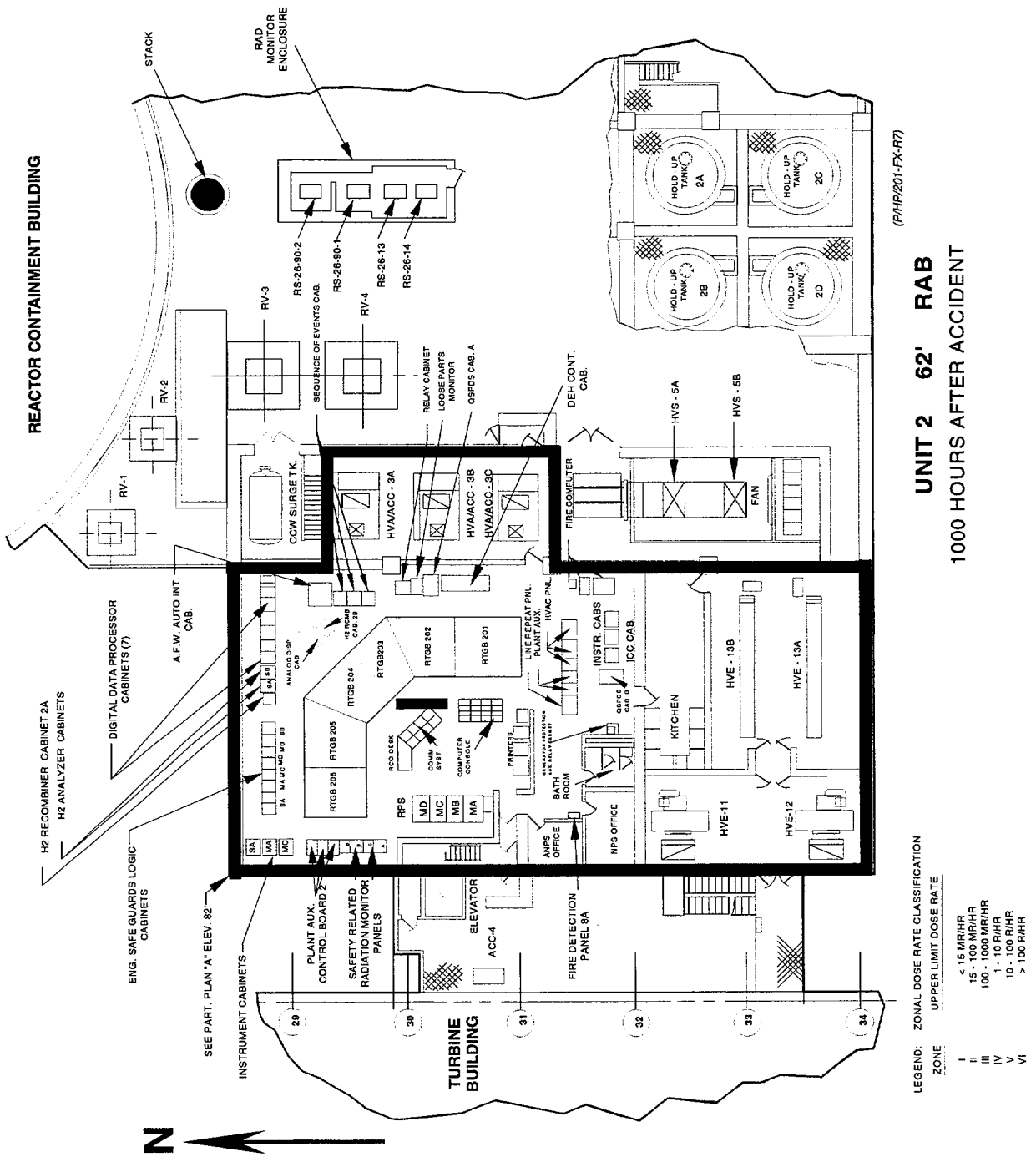

END OF ATTACHMENT 3

FPL	ST. LUCIE PLANT HEALTH PHYSICS PROCEDURE SAFETY RELATED	Procedure No. **HP-203** Current Revision No. **18** Effective Date **06/15/01**

Title:

PERSONNEL ACCESS CONTROL DURING EMERGENCIES

Responsible Department: **HEALTH PHYSICS**

REVISION SUMMARY:

Revision 18 – THE PROCEDURE HAS BEEN COMPLETELY REWRITTEN. Streamlined Re-entry paperwork. Changed Radiation Protection Technician to Health Physics Technician. Deleted TMI Shielding Study reference and maps, and moved them to HP-201. Made administrative changes. (D. Calabrese, 04/26/01)

PSL CONTROL COPY 818 PROCEDURE PRODUCTION

Revision	FRG Review Date	Approved By	Approval Date
0	02/01/82	J.H. Barrow (for) Plant General Manager	02/04/82
18	04/26/01	R.G. West Plant General Manager	04/26/01
		N/A Designated Approver	
		N/A Designated Approver (Minor Correction)	

S___OPS	
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DOCT	PROCEDURE
DOCN	HPP-203
SYS	
COM	COMPLETED
ITM	18

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NOTE

Initial work activities directed by the OSC Supervisor, at the ALERT LEVEL, are considered pre-re-entry and certain aspects of this procedure may be relaxed (e.g., HP paperwork & coverage). Following a site evacuation order or if radiological conditions exist outside the RCA, all provisions of this procedure are required for re-entry into the affected area.

1.0 PURPOSE

1.1 This procedure provides guidelines for control of personnel access to the plant and radiologically affected areas during and following an emergency.

2.0 PRECAUTIONS AND LIMITATIONS

2.1 The Emergency Coordinator (EC) may waive the requirements of this procedure to allow access for the search and rescue of injured or lost personnel or to place the plant in a safe condition.

2.2 Re-entry into the plant following evacuation during an emergency shall be made only when authorized by the EC.

2.3 All re-entry teams dispatched from the Operational Support Center (OSC) shall be briefed by the HP Supervisor in the Operational Support Center (HPOSC) on the radiological conditions that are known or expected to be encountered, their allowed exposure, and protective clothing and equipment necessary.

2.4 Entry to the plant shall be through the East Security Building unless otherwise directed by the EC.

2.5 The re-entry access control point is established at the OSC at a location(s) designated by the Technical Support Center Health Physics Supervisor (TSCHPS).

2.6 The EC may adjust access control restrictions if the plant conditions and radiological conditions warrant.

CAUTION

The area radiation monitors provide only the dose rates at the detector locations. Radiation levels in areas outside the immediate detector locations may be significantly higher.

2.7 Entries into radiation areas exceeding 10 R/hr should not be made without EC or TSCHPS authorization.

2.8 Exposure to emergency response personnel should be maintained As Low As Reasonably Achievable (ALARA). Actions taken during an emergency should take into consideration the amount of exposure required to accomplish the task versus the potential benefit to the public health and safety.

2.9 Personnel shall be restricted from further exposure if their DDE reaches 5.0 Rem or if their thyroid CDE reaches 50 Rem.

2.10 Personnel reaching the dose limits in 2.9 above may be allowed to receive additional exposure after a determination of dose has been finalized by the reading of their TLD or bioassay as appropriate.

3.0 DEFINITIONS

3.1 Re-entry - Access to areas where evacuation (local or site) has been ordered constitutes a re-entry. Re-entry into an evacuated area is authorized only by the Emergency Coordinator (EC).

3.2 Re-entry Team - A group of qualified personnel who will enter an evacuated area under the authorization of the EC to accomplish an assigned task (e.g., rescue, damage control, repair, etc.). The initial Re-entry Team shall consist of at least two persons one of whom shall be an OSC Health Physics Technician. (HPT).

4.0 REFERENCES

NOTE

One or more of the following symbols may be used in this procedure:

§ Indicates a Regulatory commitment made by Technical Specifications, Condition of License, Audit, LER, Bulletin, Operating Experience, etc. and shall NOT be revised without Facility Review Group review and Plant General Manager approval.

¶ Indicates a management directive, vendor recommendation, plant practice or other non-regulatory commitment that should NOT be revised without consultation with the plant staff.

Ψ Indicates a step that requires a sign off on an attachment.

4.1 St. Lucie Plant Radiological Emergency Plan (E-Plan)

4.2 E-Plan Implementing Procedures (EPIP 00-13).

4.3 Nuclear Energy Policy on Exposure Limits for Emergency Response Personnel, Revision to Policy Statement, Ltr No. JNO-HP-94-056, October 26, 1994.

4.4 HP-112, Multibadging

4.5 HP 201, Emergency Personnel Exposure Control

4.6 HP-206, Analysis of Emergency In-plant Air Samples

4.7 $¶_1$ Condition Report, CR-01-0078, OSC Re-Entry Team Performance

5.0 RECORDS REQUIRED

5.1 The following documents when completed shall be maintained in the plant files in accordance with QI-17-PSL-1 "Quality Assurance Records."

1. Form HP 203.1, Evacuated Area Re-entry Authorization and any attachments
2. Form HP 203.2, Emergency Access Control Log Sheet
3. Form HP 203.3, Emergency Responder Dose Control Form
4. Form HP 203.4, Emergency Exposure Authorization

6.0 INSTRUCTIONS

6.1 The Health Physics representative in charge of HP activities at the OSC (HPOSC) is responsible for ensuring access control to radiologically affected areas. The HPOSC should perform the following steps:

1. Contact the TSCHPS to determine where the access control point(s) are to be established.

2. Select an OSC HP Tech (HPT) to man the access control point(s).

3. Brief the Re-entry Team members on the conditions within the areas using available information from surveys and area monitors.

4. Evaluate the need for multibadges or extremity monitoring.

5. Instruct the Re-entry Team members that no one is permitted to enter the area without providing a completed Evacuated Area Re-entry Authorization form (HP-203.1) unless authorized by the Nuclear Plant Supervisor (NPS)/Emergency Coordinator (EC).

6. Complete form HP-203.1 for each Re-entry Team.

7. Instruct the Re-entry Team members that initial entry into an evacuated area must be made by at least two people, one of whom must be an OSC HPT.

8. Coordinate with Re-entry Supervisors on selection of Re-entry Team members (exposure histories, respiratory qualification status, authorization to exceed 10CFR Part 20 exposure limits, etc.).

9. Complete Form HP-203.4, "Emergency Exposure Authorization," for each Re-entry Team which may exceed the 10CFR Part 20 exposure limits.

END OF SECTION 6.1

6.2 The OSC HPT at the access control point should perform the following steps:

1. Position himself in such a manner that personnel accessing the area must pass by him.

2. Review form HP 203.1 to ensure that the individual is authorized entry and that the individual has the required protective equipment specified by the HPOSC.

3. Deny access to anyone who does not have a completed HP 203.1 or does not have all the required equipment as listed on the form.

4. Log the individual into the area on the Emergency Access Control Log Sheet form (HP 203.2) for each individual entering the area.

5. When an individual exits from the area, complete the log entry on form HP 203.2.

6. Report to the HPOSC any personnel contamination or exposures in excess of the allowed exposure.

7. Ensure that personnel monitoring devices are taken by the individual to the OSC for further processing and recording.

8. Check items removed from the area for contamination.

9. In the event that an individual is contaminated, detain the individual and request assistance from the HPOSC to escort and decontaminate him.

10. Record any survey data taken by the Re-entry team in the Remarks section of the Evacuated Area Re-entry Authorization form (HP 203.1) as dose rate information for future entries. Transmit this information to the HPOSC also.

END OF SECTION 6.2

6.3 The OSC Dosimetry Technician performs the following:

1. Issue TLDs to personnel not in possession of their regular TLD.

2. Check respirator quals of re-entry team members.

3. At the conclusion of the re-entry, the dose received by the individual shall be entered on form HP-203.3, "Emergency Response Dose Control," to maintain a current dose record of DDE and CDE (Thyroid) for the individual. It should be entered after air sample results have been determined in accordance with HP-206, "Analysis of Emergency In-plant Air Samples."

END OF SECTION 6.3

HP 203.1

¶1 **EVACUATED AREA RE-ENTRY CHECKLIST**

(Page 1 of 1)

TEAM NO. _____

_____ Dose and Dosimetry

1. Team member names and TLD numbers to Dosimetry
2. Exposure limits
3. Dose extension – refer to Form HP-203.4
4. Appropriate dosimetry

_____ Respiratory Protection

1. SCBA
2. Respirator
3. Other

_____ Dress-out

1. Dress-out requirements

_____ Briefing

1. Radiological considerations
2. Ingress/egress
3. Stay times
4. Decon
5. Other

Completed by: _____ Date: ___/___/___

HP 203.2

EMERGENCY ACCESS CONTROL LOG SHEET

(Page 1 of 1)

Date____/____/____ Location_____

Name	TLD #	Time In	Time Out	Init.

HP 203.3

EMERGENCY RESPONDER DOSE CONTROL FORM

(Page 1 of 1)

Name:_____ TLD#:_____ Department:_____

Date	Time In	Time Out	Air Sample No.	Gamma Dose (DDE) Limit (mrem)	Gamma Dose (DDE) This Entry (mrem)	Previous Gamma Dose (DDE) Total (mrem)	Update Gamma (1) Dose (DDE) Total (mrem)	Thyroid Dose Limit (CDE) (mrem)	Thyroid Dose (CDE) This Entry (mrem)	Previous Thyroid Dose (CDE) Total (mrem)	Updated Thyroid (2) Dose (CDE) Total (mrem)

(1) Gamma Dose (DDE) Limit shall not exceed 5,000 mrem without EC authorization

(2) Thyroid Dose (CDE) Limit shall not exceed 50,000 mrem without EC authorization

HP 203.4

EMERGENCY EXPOSURE AUTHORIZATION

(Page 1 of 2)

I. Team Information

	Name/Dept	TLD	Signature*	Date/Time
1.				
2.				
3.				
4.				

* Your signature indicates that you have received and understand the briefing information regarding the risks associated with this exposure.

II. Reason for Entry

_____

_____

_____

III. Authorization

Exposure Limit:_____ TSC HPS[1]:_____ Date:_____

Emergency Coordinator[1]:_____ Date:_____

Recovery Manager[1,2]:_____ Date:_____

[1]Signature may be authorized by phone
[2]Signature not mandatory

IV. Briefing Information

A. For exposures exceeding 5 remTEDE or 100 rem CDE:

1. Persons should be volunteers and experienced at the task requiring the re-entry (for expected exposures exceeding 25 rem TEDE or 250 rem CDE, persons **should be above the age of 45**).

2. Persons shall have full awareness of risks involved including numerical levels of dose at which acute effects of radiation will be incurred and numerical estimates of the risk of delayed effects. (See below)

HP 203.4

EMERGENCY EXPOSURE AUTHORIZATION

(Page 2 of 2)

B. Effects from an acute dose of radiation:

1. Prompt[1]

   a. 5 - 100 Rem — Minor changes in the blood, like reduced white cell and platelet counts.

   b. > 100 Rem — Can cause nausea, vomiting, fatigue, loss of appetite, and loss of hair, severity increases with increased dose.

   c. > 450 Rem — Can be fatal without proper medical care.

2. Delayed - Cancer/Life Span[2], consult table below:

	10 Rem Exposure		25 Rem Exposure	
Age at Exposure	Cancer Risk	Approx. Days Lost	Cancer Risk	Approx. Days Lost
21-30	< 0.3%	50	< 0.7%	124
31-40	< 0.3%	40	< 0.7%	100
41-50	< 0.3%	31	< 0.7%	77
51-60	< 0.3%	21	< 0.7%	65
61-70	< 0.3%	12	< 0.7%	29

3. Delayed - Genetic Effects[3]

   a. One Rem results in an estimated risk of genetically-related disorders in all generations (current and future) of 1x10 E-4 per person-rem (or 1 in 10,000).

References:

[1] Knapp, S. and M. Cooper, 1995. A Layman's Guide to Radiation Safety, FPL St. Lucie Nuclear Plant, Ft. Pierce, Florida 86 pp.

[2] Derived from Cohen, Bernard L., 1990. The Nuclear Energy Option, Plenum Publication Corporation, New York, New York, 338 pp.

[3] EPA 400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, Appendix B Office of Radiation Programs US EPA, Washington, DC, p. B-23.

FPL	ST. LUCIE PLANT HEALTH PHYSICS PROCEDURE SAFETY RELATED	Procedure No. **HP-204** Current Revision No. **8** Effective Date **06/15/01**

Title:

IN-PLANT RADIATION AND CONTAMINATION SURVEYS DURING EMERGENCIES

Responsible Department: **HEALTH PHYSICS**

REVISION SUMMARY:

Revision 8 – THE PROCEDURE HAS BEEN COMPLETELY REWRITTEN. Deleted TMI Shielding Study and related text information (relocated). Made editorial/administrative changes. (J.R. Walker, 06/11/01)

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PROCEDURE PRODUCTION

Revision	FRG Review Date	Approved By	Approval Date
0	02/01/82	J.H. Barrow (for) Plant General Manager	02/04/82
8	06/07/01	R.G. West Plant General Manager	06/11/01
		N/A Designated Approver	
		N/A Designated Approver (Minor Correction)	

S___OPS	
DATE	
DOCT	PROCEDURE
DOCN	HPP-204
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COM	COMPLETED
ITM	11

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1.0 PURPOSE

1.1 This procedure provides guidelines for performing radiological surveys under accident conditions.

1.2 DISCUSSION

1. During an emergency, one of the primary responsibilities of the Health Physics Department shall be to evaluate the radiological conditions within the plant. In addition, Operations will require surveys to assess radiological conditions in accordance with the Emergency Operating Procedures (EOPs). Given the higher than normal radiation levels which could be encountered while performing surveys, preplanning of surveys shall be essential to maintaining exposures ALARA.

2.0 PRECAUTIONS AND LIMITATIONS

2.1 All surveys will be performed under the authorization of the Technical Support Center Health Physics Supervisor (TSCHPS) and/or the Emergency Coordinator (EC).

2.2 The buddy system will be used for entries into areas with unknown, extreme or variable radiological conditions.

2.3 Appropriate protective clothing, respiratory protection equipment and dosimetry shall be worn at all times.

2.4 No individual shall exceed the personnel exposure limits listed in Health Physics Procedure HP-201, "Emergency Personnel Exposure Control" unless authorized in accordance with that procedure.

3.0 RELATED SYSTEM STATUS

- None

4.0 REFERENCES

NOTE

One or more of the following symbols may be used in this procedure:

§ Indicates a Regulatory commitment made by Technical Specifications, Condition of License, Audit, LER, Bulletin, Operating Experience, etc. and shall NOT be revised without Facility Review Group review and Plant General Manager approval.

¶ Indicates a management directive, vendor recommendation, plant practice or other non-regulatory commitment that should NOT be revised without consultation with the plant staff.

Ψ Indicates a step that requires a sign off on an attachment.

4.1 St. Lucie Plant Radiological Emergency Plan (E-Plan).

4.2 E-Plan Implementing Procedures (EPIP 00-13)

4.3 HP-2, "FPL Health Physics Manual."

4.4 HPP-4, "Scheduling of Health Physics Activities."

4.5 HPP-20, "Area Radiation and Contamination Surveys."

4.6 HP-201, "Personnel Emergency Exposure Control."

4.7 HP-203, "Personnel Access Control During Emergencies."

5.0 RECORDS REQUIRED

5.1 Plant survey maps when complete shall be maintained in the plant files in accordance with QI-17-PSL-1, Quality Assurance Records.

6.0 INSTRUCTIONS

6.1 In the event of a Steam Generator Tube Rupture (SGTR), the Emergency Coordinator, in conjunction with the TSCHPS, should initially post areas which could be contaminated. These areas could include the entire turbine building. Specific areas that may experience increasing dose rates include:

1. Steam Trestle
2. Condenser Air Ejector
3. Condensate Polisher
4. Ion Exchangers and Filters located in the Steam Generator Blowdown Treatment Facility
5. Condensers

Attachment C contains survey maps of these areas.

6.2 Prior to entering an area to perform initial surveys, the TSCHPS and/or HPOSC (HP Supervisor in the Operational Support Center) shall review available data to determine the expected exposure rates. This review will include but not be limited to the following:

1. All recent surveys of access ways and cubicle entrances.
2. The plant Area Radiation Monitoring System (ARMS).

6.3 The HPOSC and TSCHPS shall assign stay times and verify Evacuated Area Re-Entry Authorization form (HP-203.1) is completed prior to entry.

6.4 The survey route and sample points and methods shall be determined prior to entry by the HPOSC. See HP-205, "Emergency Inplant Air Sampling" for emergency air sampling. This information shall be designated on the Plant Survey Maps (see HPP-4, "Scheduling of Health Physics Activities").

6.5 The survey team shall be briefed by the HPOSC prior to entering the evacuated area. Special techniques or conditions shall be emphasized and noted in the Plant Survey Maps (see HPP-4).

6.6 Surveys shall be conducted in accordance with Health Physics Procedure HPP-20, "Area Radiation and Contamination Surveys," along with any additional techniques or conditions specified by the HPOSC.

6.7 Exercise extreme caution around spill areas due to the potentially high contamination levels and near holes in shield walls such as doorways. Avoid potential Hot Spots as much as practicable.

6.8 Exercise caution in removing protective clothing to preclude spread of contamination.

6.9 Surveys shall be documented in accordance with HPP-20 and maintained at the OSC.

6.10 The TSCHPS and HPOSC shall use the information from the initial surveys to determine future actions with regard to the Emergency affected area.

6.11 Attachment A (Unit 1) and Attachment B (Unit 2) contain a description of the plants ARMS channels. Included are the channel number, area monitored by each detector and the physical location of the detector. These attachments should be referred to when preparing for re-entry into evacuated areas.

ATTACHMENT A
UNIT 1 AREA RAD MONITORS
(Page 1 of 2)

DETECTOR ID	AREA MONITORED	DETECTOR LOCATION
RE-26-1	Unit 1 Control Room Area	CR, Rear RPS Cab D
RE-26-2	Spent Fuel Pool Area	Refuel Stairs, Door 169 N
RE-26-3	Containment Radiation CIS A	0 degrees, Approx. 90' EL
RE-26-4	Containment Radiation CIS B	270 degrees, Approx. 90' EL
RE-26-5	Containment Radiation CIS C	180 degrees, Approx. 90' EL
RE-26-6	Containment Radiation CIS D	90 degrees, Approx. 90' EL
RE-26-7	Fuel Pool Area	Fuel Pool, N Wall, Center
RE-26-8	Fuel Pool Canal Area	Fuel Pool, SW Corner
RE-26-9	Fuel Pool Pump Area	In Door 169, 24' North
RE-26-10	Boric Acid Pre-Concentrator Area	Mid of EWHW, S Wall
RE-26-11	Waste Filter Area	SW Sect of EWHW, Locked
RE-26-12	Laundry Filter Area	SW Sect of EWHW, Locked
RE-26-13	Waste Gas Compressor Area	N Off W End of EWHW, Locked
RE-26-14	Charging Pumps Area	1B's Entr, on Pillar
RE-26-15	B/A Hold Up Pump Area	RAB, -.5' Across from 1A HU Drain Pump
RE-26-16	Ion Exchanger (Sample Heat Exchanger)	MG Room, Left to Smpl Rm
RE-26-17	Ion Heat Exchanger Area	Eastern NS HW,Do2 Cal Cage
RE-26-18	Ion Exchanger Valves	Vlv Gal, Mid W Wall
RE-26-19	Drumming Station Area	Last S Exit on EW HW, Turn Left

ATTACHMENT A
UNIT 1 AREA RAD MONITORS
(Page 2 of 2)

DETECTOR ID	AREA MONITORED	DETECTOR LOCATION
RE-26-20	Purification Filter Area	N Wall of VCT HW
RE-26-21	Spent Resin Tank Area	E End of EW HW
RE-26-22	HPSI & Cont Spray Pump Area	RAB 19.5' West Wall at Turn in Catwalk
RE-26-23	Decon Room Area	On South Wall of Decon Room
RE-26-24	HVAC Room Area - Fan Room	On RA2 Pillar, Ctr of Rm
RE-26-25	Chemical Drain Pump Area	NW Corn or EW HW, UP Ladder
RE-26-26	Flash Tank Pump Area	W Wall (Mid) of VCT HW
RE-26-27	Boronometer Enclosure Area	Left off VCT HW to Let-Down
RE-26-36	Refueling Pool Area	RCB 62' on Elevator Wall
RE-26-37	New Fuel Storage Area	NFB 48' EL West Wall
RE-26-38	Aerated Waste Storage Area	Far NW Cor of EW HW, Up Ladder
RE-26-39	Boric Acid Concentrator Area	RAB 19.5' Near Entrance to 1A BA Conc.
RE-26-46	Outside Air Intake A	62' HVAC Room
RE-26-47	Outside Air Intake B	62' HVAC Room
RE-26-52	Containment Post LOCA - Fan Room	15' W of NE Cor, 15' Up RCB Wall, Fan Room
RE-26-53	Containment Post LOCA	20' E of NW Cor, Fan Room RCB Wall
RE-26-58	Containment High Range A	0 Degrees Approx 90' El RCB
RE-26-59	Containment High Range B	180 Degrees Approx 90' El

ATTACHMENT B
UNIT 2 AREA RAD MONITORS
(Page 1 of 3)

DETECTOR ID	AREA MONITORED	DETECTOR LOCATION
RIM-26-1	Control Room	NE corner of control room
RIM-26-2	Outside Personnel Hatch	RCB 62' by elevator
RIM-26-3	Elect. Penetration Room	CIS A CH, 0 , north wall
RIM-26-4	Elect. Penetration Room	CIS B CH, 270 , west wall
RIM-26-5	Elect. Penetration Room	CIS C CH, 180 , south wall
RIM-26-6	Elect. Penetration Room	CIS D CH, 90 , east wall
RIM-26-7	Spent Fuel Bldg.	62', east wall south of cask crane area
RIM-26-8	Spent Fuel Bldg.	62', east wall north of transfer canal
RIM-26-9	Spent Fuel Bldg.	62', SE wall of fuel pool
RIM-26-10	Spent Fuel Bldg.	62', SW wall of fuel pool
RIM-26-11	Spent Fuel Bldg.	62', West (center) fuel of pool
RIM-26-12	Spent Fuel Bldg.	62', north end of fuel pool, west of cask area
RIM-26-13	Waste Gas Comp.	-.5', on top of wall between A & B compressors
RIM-26-14	Charging Pump Room	-.5', on wall between B & C pump
RIM-26-15	Hold Up Drain Pump	-.5', under stairway near B.A. hold up tank
RIM-26-16	Sample Room	19.5', beside M.G. set area
RIM-26-17	Ion Exchange Hall	19.5', east end RAB, north-south hallway

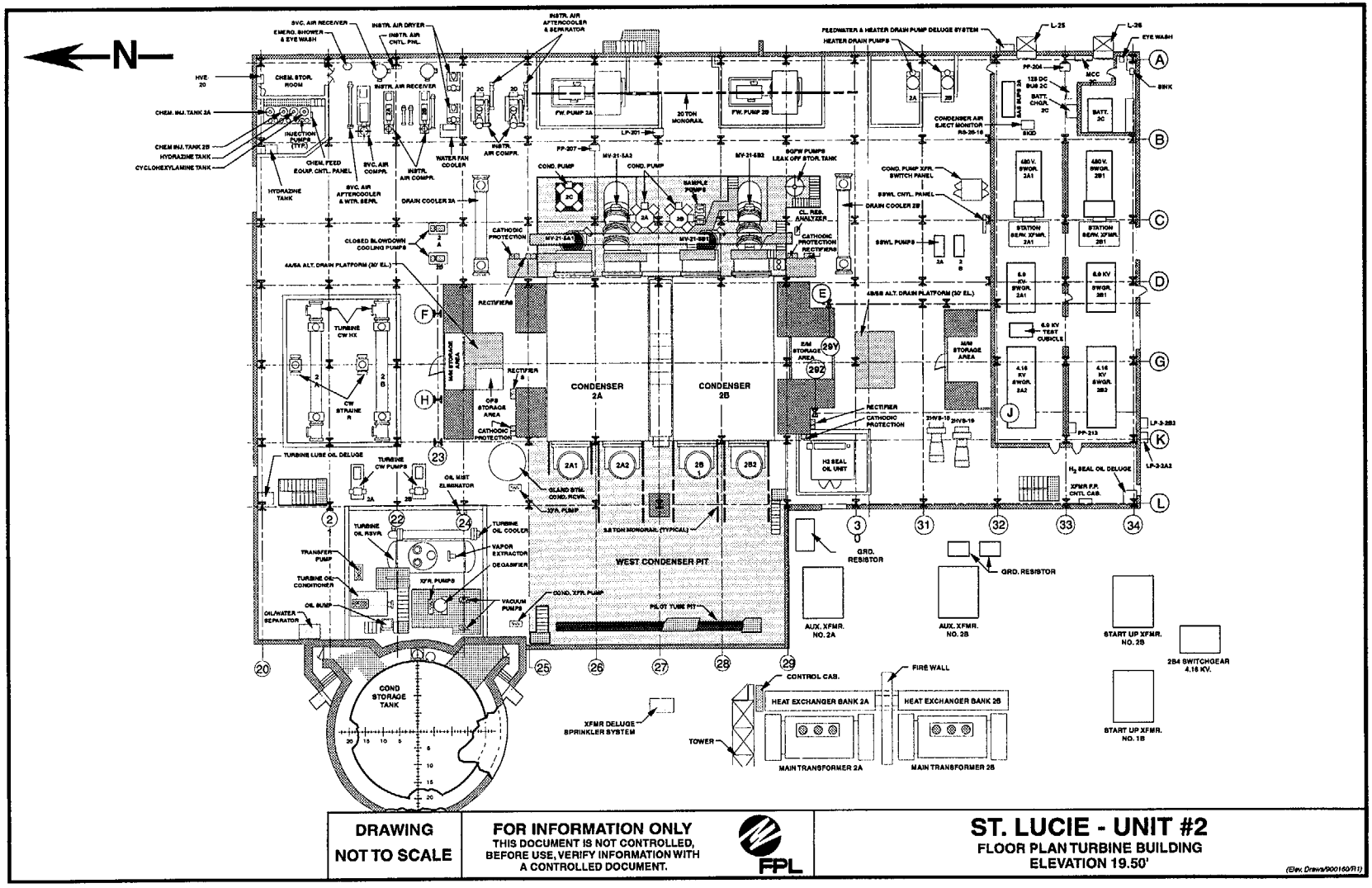
ATTACHMENT B
UNIT 2 AREA RAD MONITORS
(Page 2 of 3)

DETECTOR ID	AREA MONITORED	DETECTOR LOCATION
RIM-26-18	Flash Tank Pump	19.5', room west of ion exchange hallway
RIM-26-19	Drumming Station	19.5', inside door to the right
RIM-26-20	Purif. Filter	19.5', west end of VCT hallway
RIM-26-21	Spent Resin Hall	-.5', east end of hallway
RIM-26-22	ECCS Equipment	-.5', HPSI room, left of entrance
RIM-26-23	Decon. Area	19.5', laundry room west corner
RIM-26-24	HVAC	43', between HVE-6B and HVE 6A
RIM-26-25	Chemical Drain	-.5', west end of room
RIM-26-26	VCT Hall	19.5', left wall of VCT hall
RIM-26-27	Boronometer	19.5', inside door to left, up high
RIM-26-28	New Fuel Storage	FHB 48', SW wall
RIM-26-29	Aerated Waste	-.5', west end, right wall
RIM-26-30	B.A. Concentrator	19.5', between A & B Concentrator
RIM-26-31	Fuel Pool Filter	FHB 19.5', west wall
RIM-26-32	Outside Personnel Hatch	Just inside personnel hatch (right)
RIM-26-33	Refueling Canal	FHB 62', SW wall of transfer canal
RIM-26-34	Fuel Pool Pump	FHB 19.5', pool pump room, east wall
RIM-26-35	B.A. Precon. Filter	-.5', on west wall by precon. filter

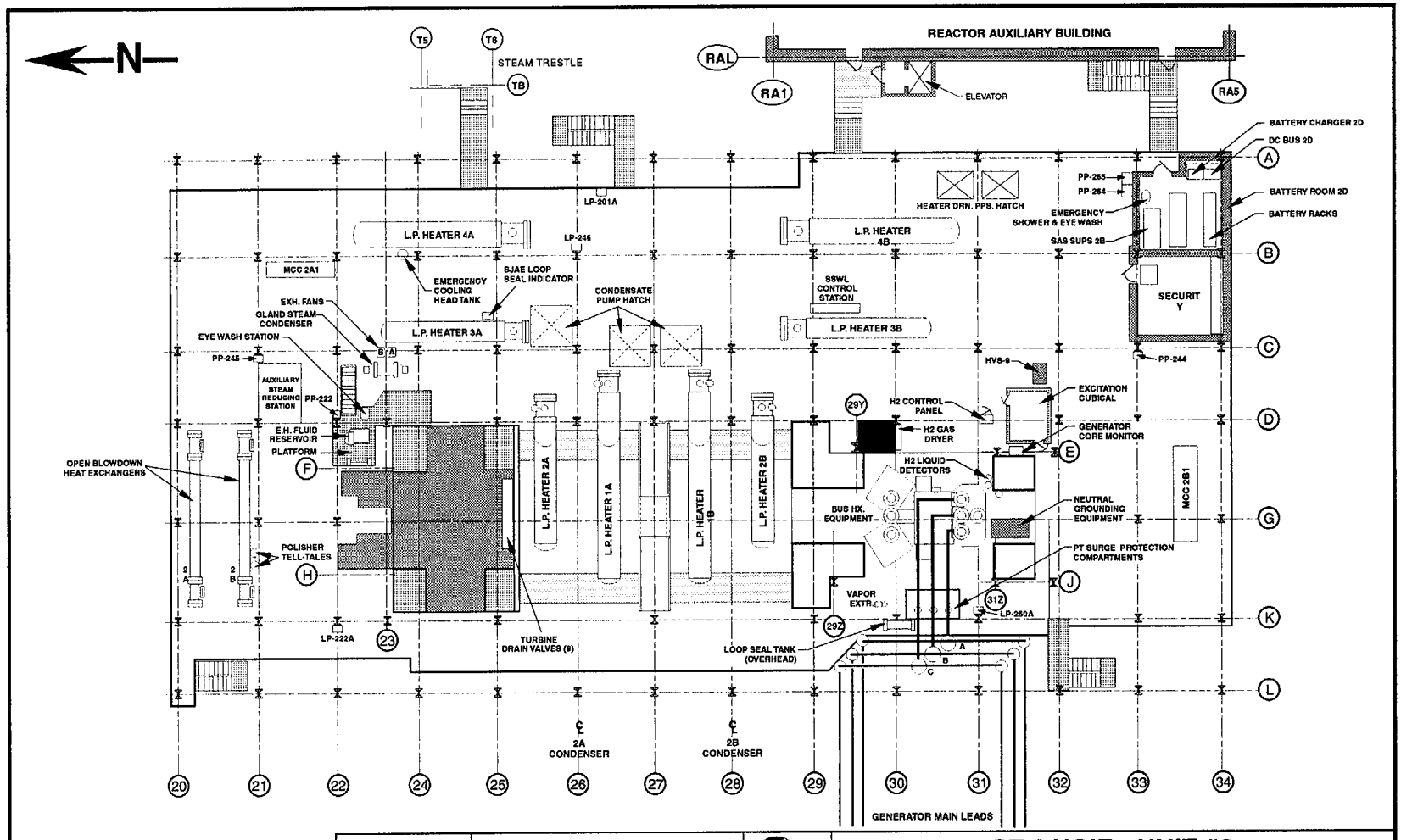
ATTACHMENT B
UNIT 2 AREA RAD MONITORS
(Page 3 of 3)

DETECTOR ID	AREA MONITORED	DETECTOR LOCATION
RIM-26-36	Waste Filter	-.5', on wall above waste filters, west end
RIM-26-37	ECCS Equipment	-.5', above wall between A & B LPSI
RIM-26-38	Control Room Post LOCA	90 top of FHB (east)
RIM-26-39	Control Room Post LOCA	210 (south) mounted on stack
RIM-26-40	Control Room	RCB 62', 0 , north wall
RIM-26-41	Control Room	RCB 62', 180 , south wall
RIM-26-61	Control Room Outside Air Intake	Behind kitchen of Control Room, in duct
RIM-26-62	Control Room Outside Air Intake	C.C.W. surge tank room
RIM-26-65	Control Room Outside Air Intake	Behind kitchen of Control Room, in duct
RIM-26-66	Control Room Outside Air Intake	C.C.W. surge tank room
RIM-26-69	ECCS Effluent Post LOCA	43' RAB near access to roof
RIM-26-70	ECCS Effluent Post LOCA	43' RAB near access to roof
RIM-26-71	Unit 2 Battery Room	Steam trestle A main steam
RIM-26-72	Unit 2 Battery Room	Steam trestle B main steam
RIM-26-73	Unit 2 Battery Room	Between A & B main steam
RIM-26-90	Post LOCA Plant Stack	62', behind Control Room on roof

ATTACHMENT C
(Page 1 of 11)



ATTACHMENT C
(Page 2 of 11)



ATTACHMENT C
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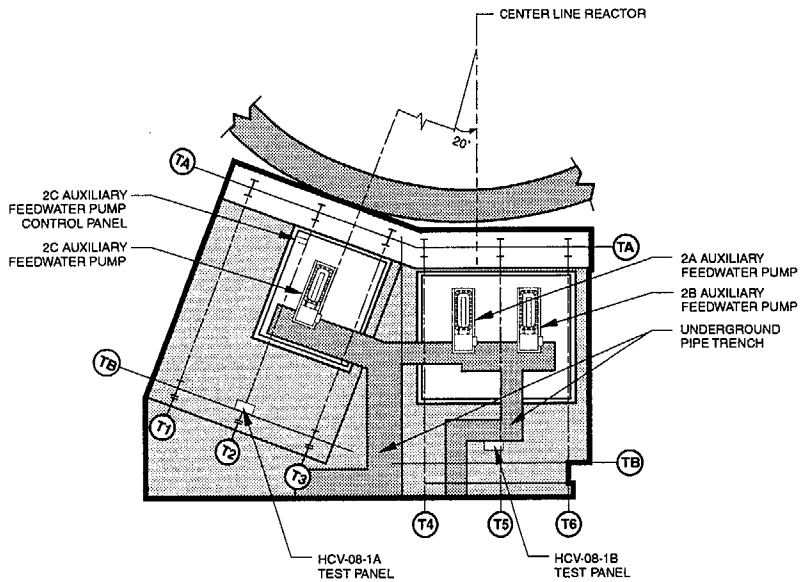
FLOOR PLAN ELEVATION 19.50'



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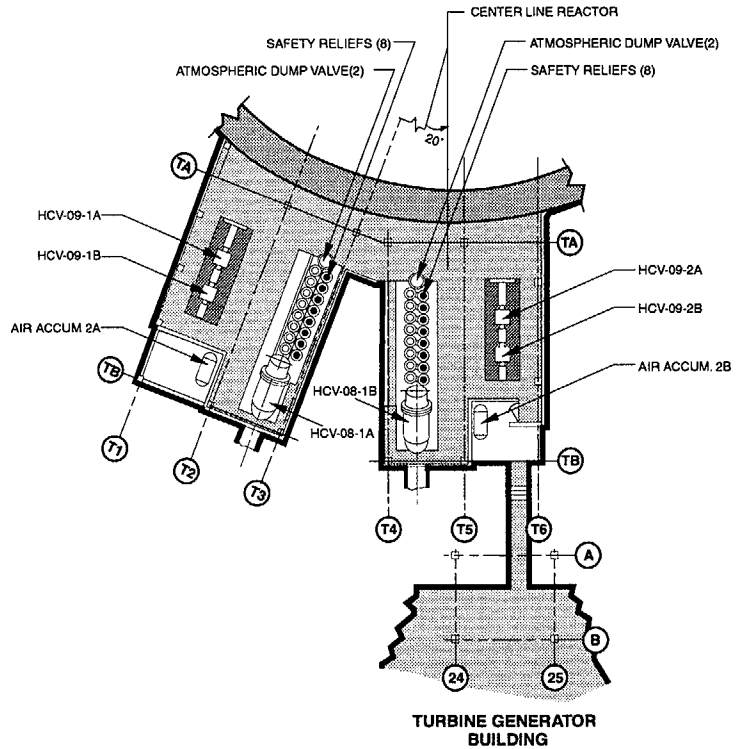

DRAWING NOT TO SCALE	FOR INFORMATION ONLY THIS DOCUMENT IS NOT CONTROLLED, BEFORE USE, VERIFY INFORMATION WITH A CONTROLLED DOCUMENT.	FPL	ST. LUCIE - UNIT #2 FLOOR PLAN STEAM TRESTLE (Elev. Drawg/900160/R1)

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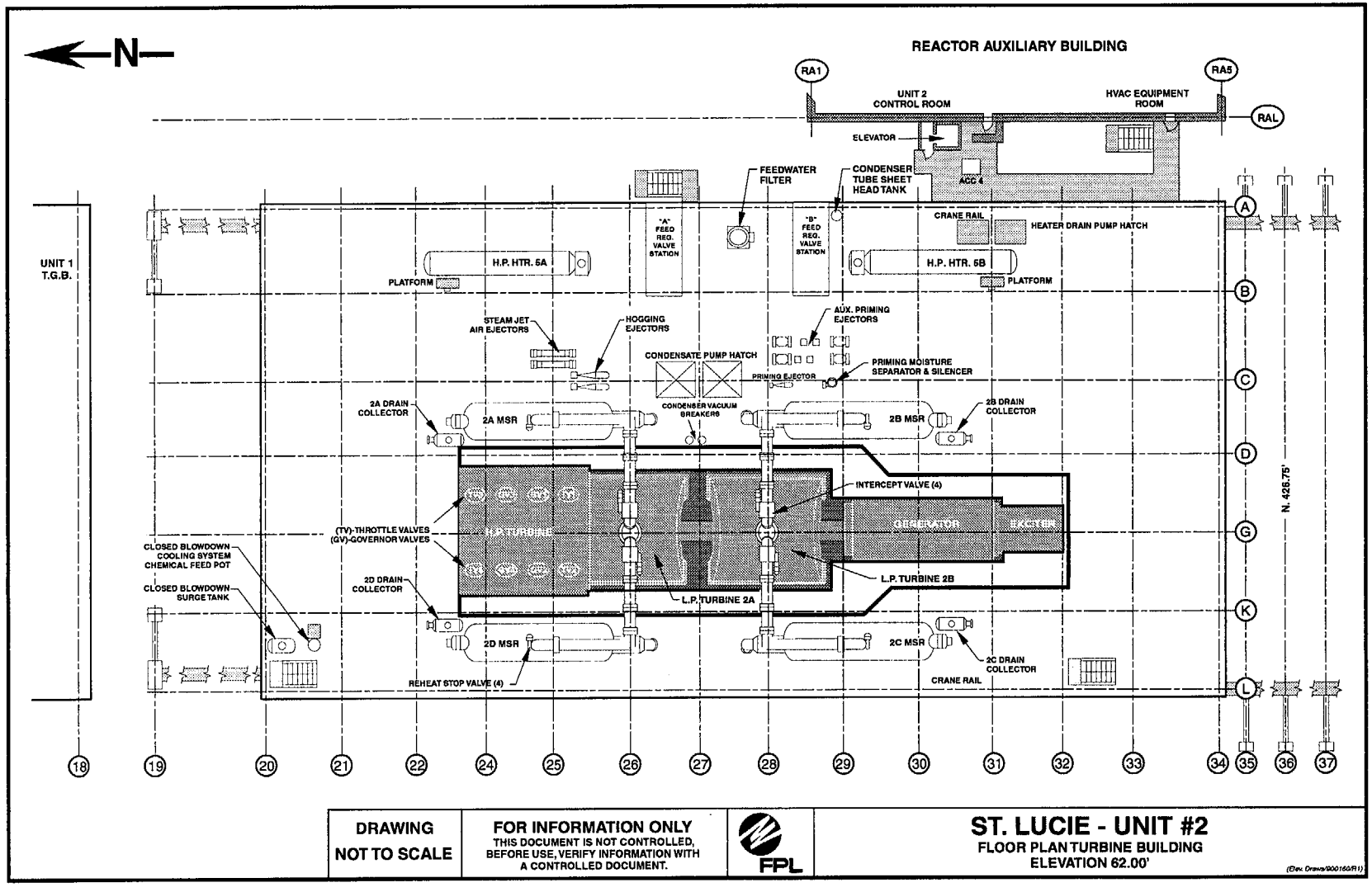

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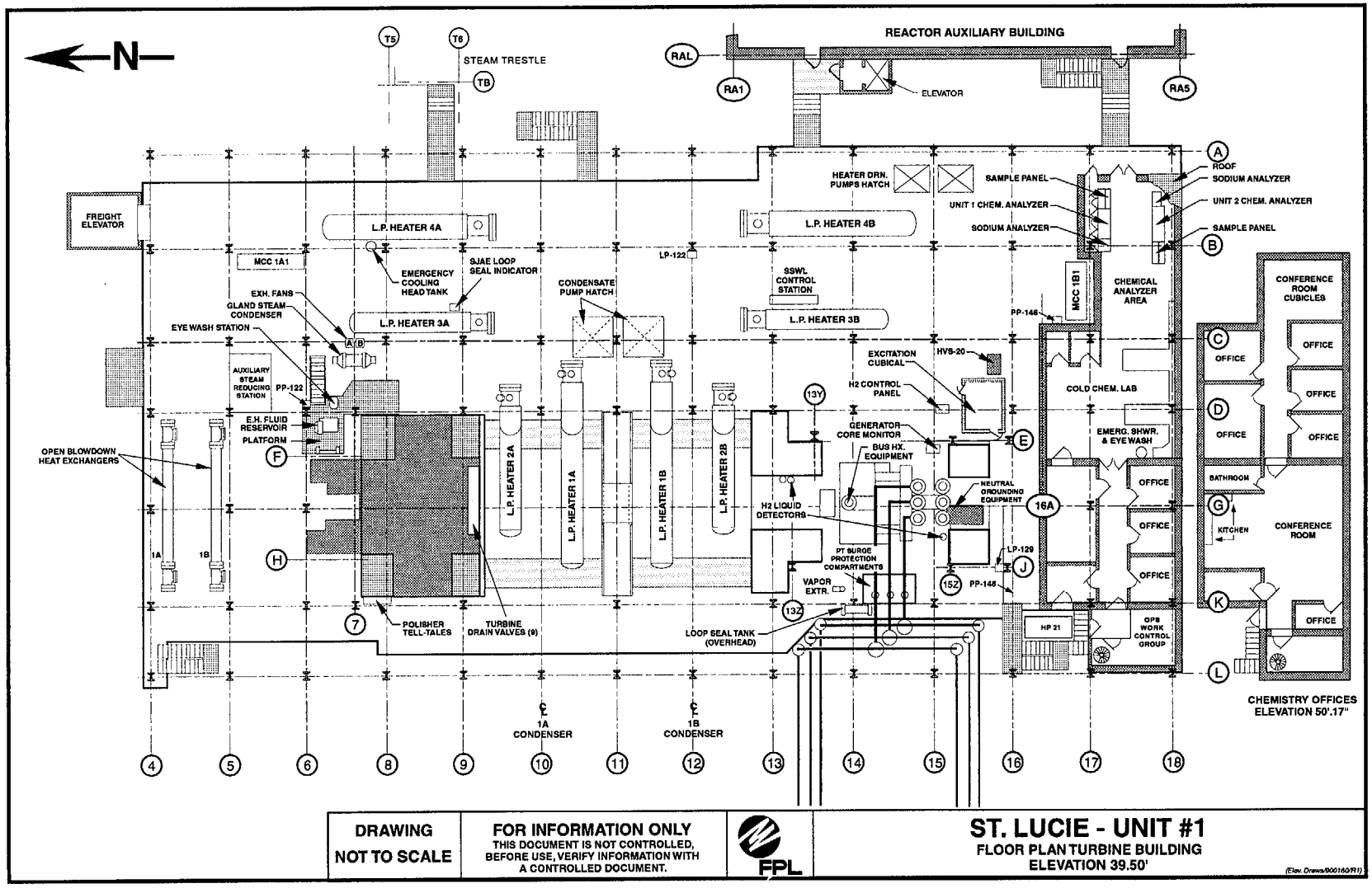

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ATTACHMENT C
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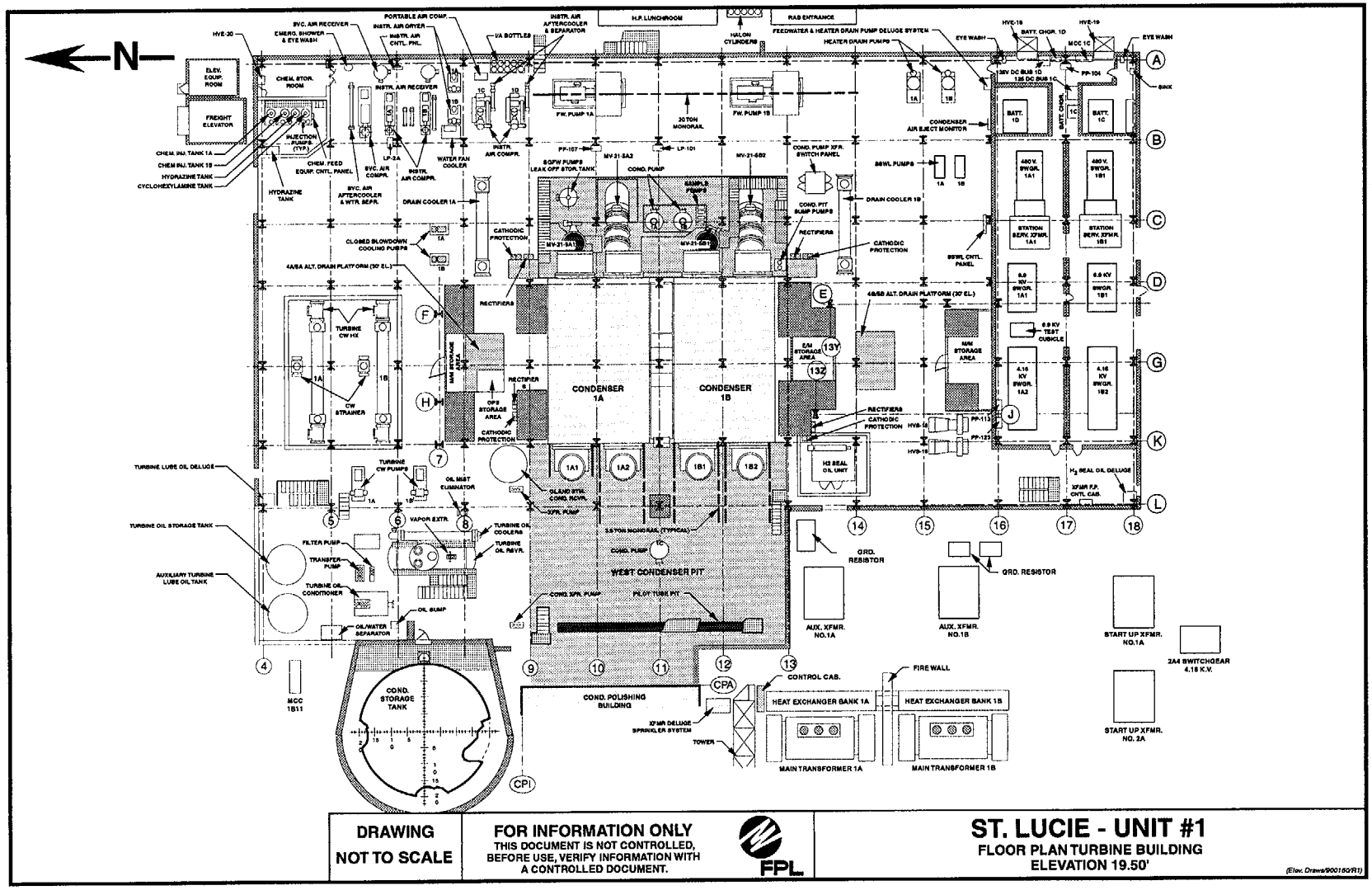

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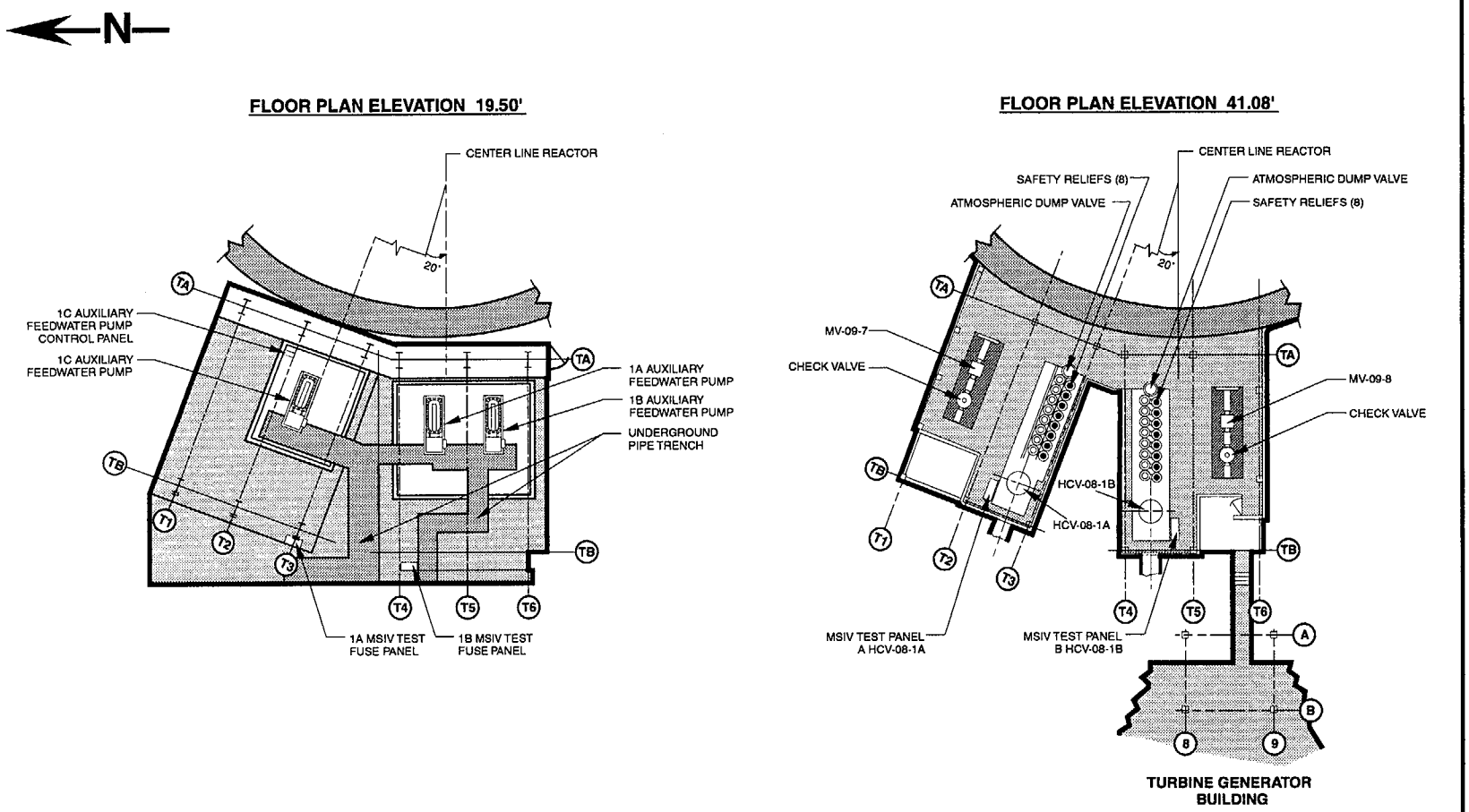
(Elev. Drawa/900160/R1)

ATTACHMENT C
(Page 7 of 11)



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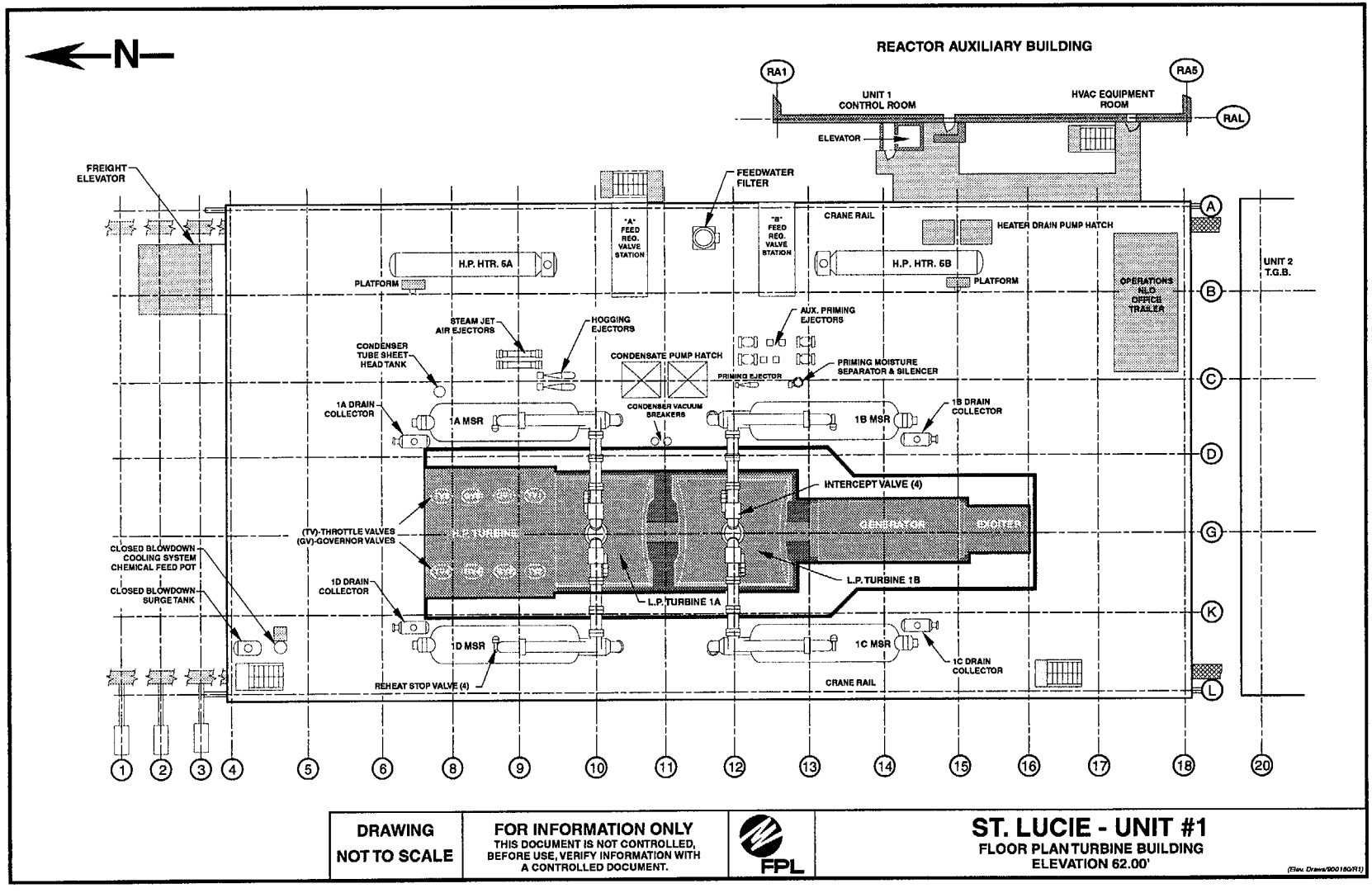

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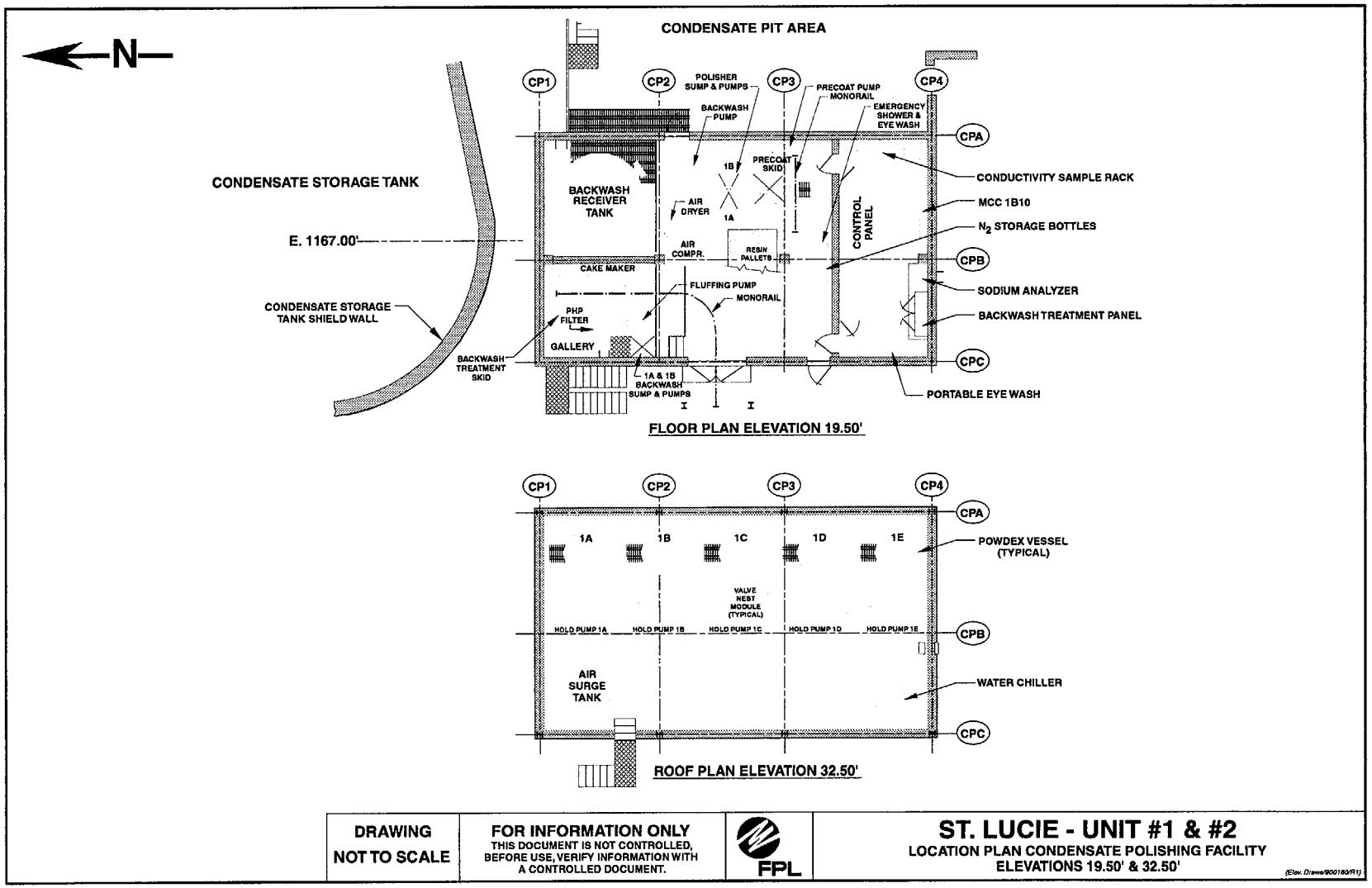
ATTACHMENT C
(Page 9 of 11)



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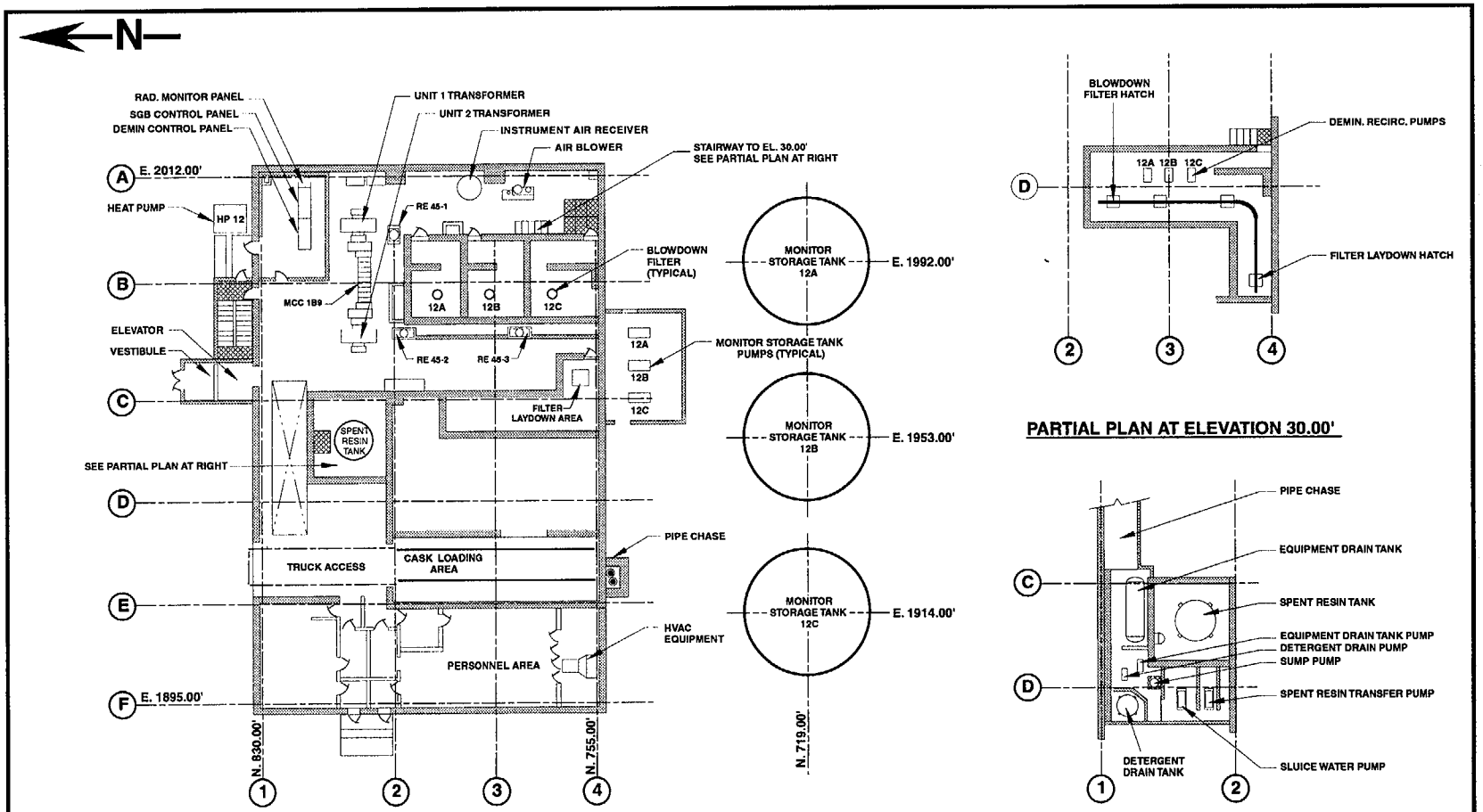

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ATTACHMENT C
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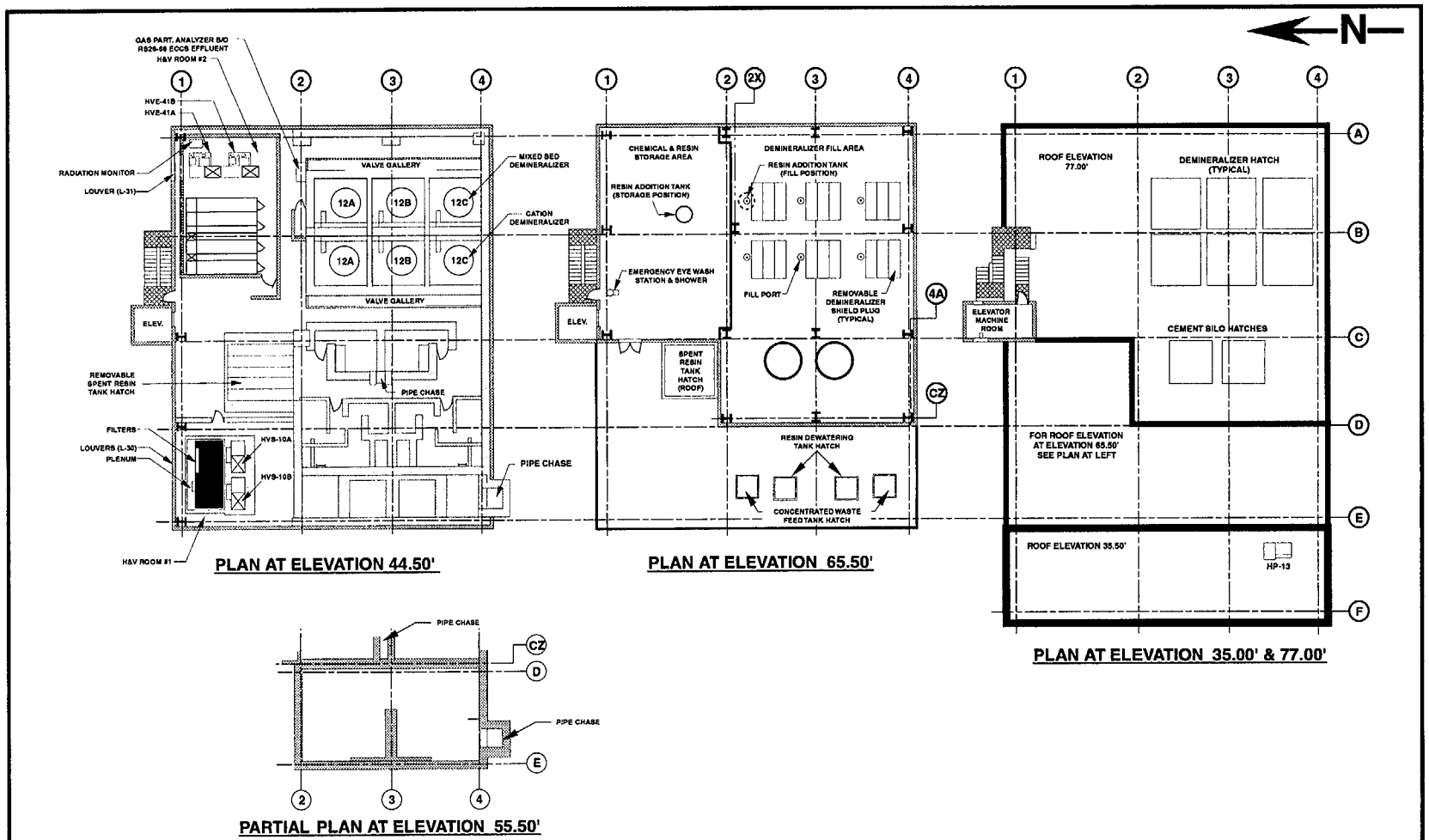

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