Florida Power & Light Company, 6501 South Ocean Drive, Jensen Beach, FL 34957

March 22, 2001

L-2001-064
10 CFR 50 Appendix E

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Re: St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
Emergency Plan Implementing Procedure

In accordance with 10 CFR 50 Appendix E, enclosed is a copy of the revised procedure that implements the Emergency Plan as listed below.

Number	Title	Revision	Implementation Date
EPIP-09	Off-Site Dose Calculations	4	March 9, 2001

EPIP-09 Revision 4 revised fan flow rates to accommodate for maintenance acceptance criteria and included a minor correction to a number used in an example.

Please contact us if there are any questions regarding this procedure.

Very truly yours,

Rajiv S. Kundalkar
Vice President
St. Lucie Plant

RSK/spt

Enclosure

cc: Regional Administrator, USNRC, Region II (2 copies)
Senior Resident Inspector, USNRC, St. Lucie Plant w/o

A045
A009

FPL

ST. LUCIE PLANT

EMERGENCY PLAN IMPLEMENTING PROCEDURE

SAFETY RELATED

Procedure No.
EPIP-09

Current Revision No.
4

Effective Date
03/09/01

Title:

OFF-SITE DOSE CALCULATIONS

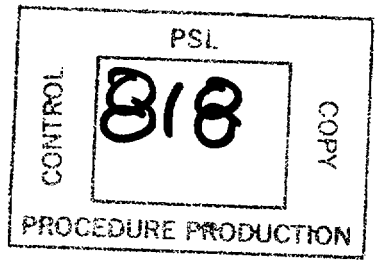
Responsible Department: **EMERGENCY PREPAREDNESS**

REVISION SUMMARY:

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)



Revision	FRG Review Date	Approved By	Approval Date
0	12/15/97	J. Scarola Plant General Manager	12/15/97
4	02/01/01	R. G. West Plant General Manager N/A Designated Approver N/A Designated Approver (Minor Correction)	02/02/01

S___OPS	
DATE	
DOCT	PROCEDURE
DOCN	EPIP-09
SYS	
COM	COMPLETED
ITM	4

TABLE OF CONTENTS

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) /R4

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

3. ¶4 Condition Report 00-1426 Supplement 1 (Fan Flowrates) /R4

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) outside 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

/R4

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	Mid	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	Mid	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 60 Meter) **WIND SPEED:**_____**mph**

   C. Enter 10 Meter (alternate 60 Meter) **WIND DIRECTION (from)**_____**deg.**

   D. Enter Delta-T (60 Meter minus 10 Meter temperatures)_____deg. F

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

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.

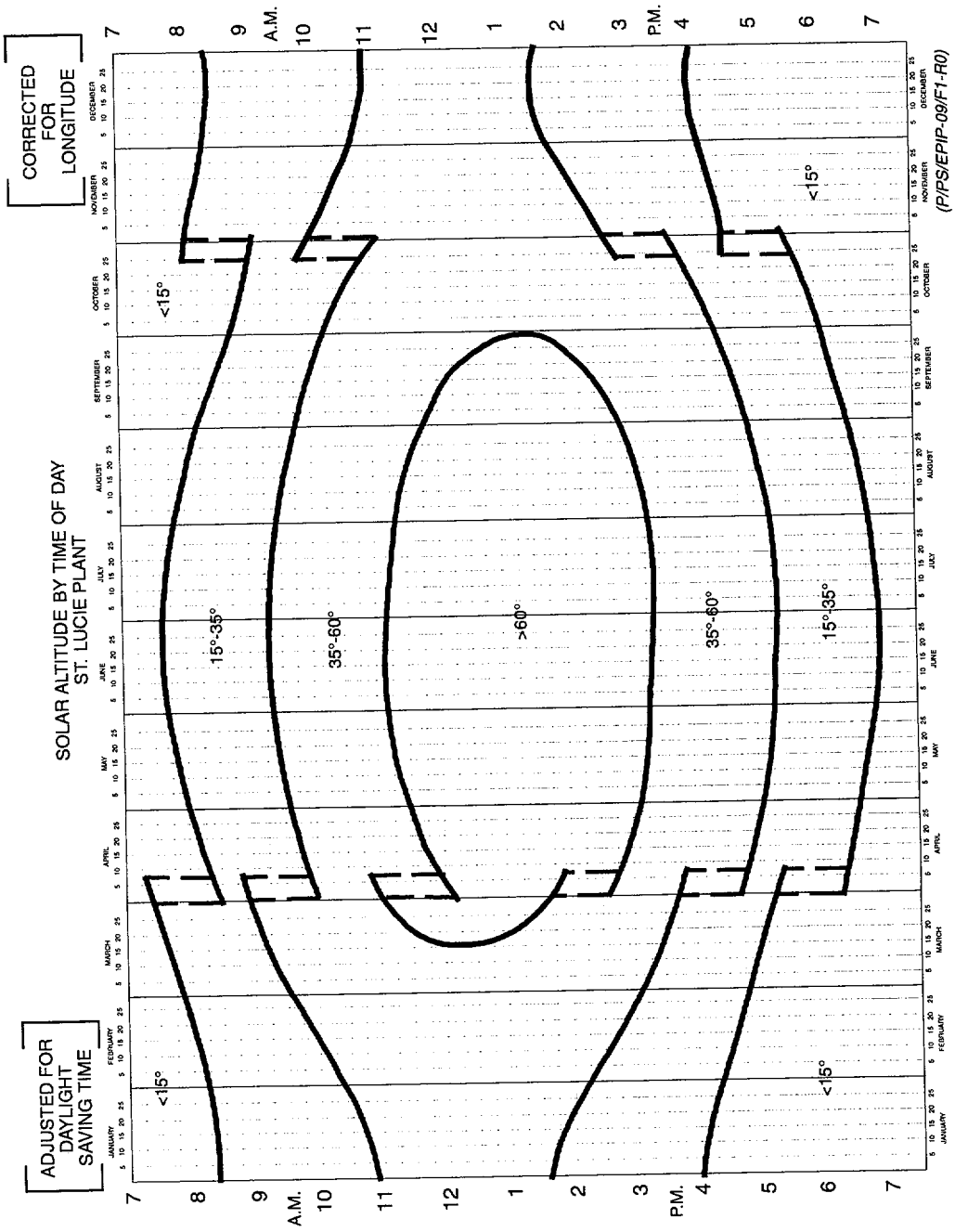
B. **1.** From line 1C, multiply the wind speed in knots by 1.15 to obtain the **WIND SPEED**: _____ mph

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

/R4

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					

/R4 /R4 /R4

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

/R4

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					

/R4 /R4 /R4

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)

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

2

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

/R4

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			

/R4 /R4 /R4

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 2
(Page 1 of 3)

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

/R4

ATTACHMENT 2
RELEASE RATE DATA
(Page 11 of 19)

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

2

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			

/R4 /R4 /R4

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)

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

2

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
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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:

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

5. Estimate End Containment Atmosphere Density:

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

6. Estimate % Mass Lost:

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

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

_____(**Z**)
_____mr/hr x_____(miles) =_____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