REPORT: P187R40

DOCUMENTATION MANAGEMENT
DOCUMENT ON-LINE CONTROL SYSTEM
TRANSMITTAL / RECEIPT ACKNOWLEDGMENT

50-346

A045

TRANSMITTAL NUMBER: 0003-03960
TRANSMITTAL DATE : 03/30/2000
TRANSMITTAL PAGE : 001

COPY NUMBER : 1665

TO: DOC. CONTROL DESK,

USNRC
DIVISION OF EMERGENCY
PREPARDNESS
WASHINGTON, D.C. 20555

AS THE HOLDER OF THESE DOCUMENT COPIES, YOU ARE RESPONSIBLE FOR THEIR CONTROL AND MAINTENANCE IN ACCORDANCE WITH THE ACTIONS SPECIFIED BY THIS TRANSMITTAL. DOCUMENTS WHICH ARE NO LONGER CURRENT SHALL EITHER BE REMOVED AND DESTROYED OR MARKED TO REFLECT THAT THEY ARE SUPERSEDED OR VOIDED AND ARE NO LONGER CONSIDERED CONTROLLED.

****** ENSURE THAT DOCUMENTS ARE FILED IN TAB ORDER AS IDENTIFIED ON THE TABLE OF CONTENTS, AS APPLICABLE ******

IF YOU HAVE ANY QUESTIONS, PLEASE CONTACT DOCUMENT CONTROL, DAVIS-BESSE NUCLEAR POWER STATION, TELEPHONE (419) 321-7483.

THE ATTACHED DOCUMENT COPIES ARE DISTRIBUTION ONLY. NO RECEIPT ACKNOWLEDGMENT IS REQUIRED.

REPORT: P187R40

DOCUMENTATION MANAGEMENT
DOCUMENT ON-LINE CONTROL SYSTEM
TRANSMITTAL / RECEIPT ACKNOWLEDGMENT

TRANSMITTAL NUMBER: 0003-03960
TRANSMITTAL DATE : 03/30/2000
TRANSMITTAL PAGE : 002

COPY NUMBER : 1665

	TYPE	DOCUMENT			STATUS
TOC EPIB			SHT/SEC:		
REMOVE:	TOC	EPIB	SHT/SEC:	REV/SUB: 0048	REVISED
INSERT:	TOC	EPIB	SHT/SEC:	REV/SUB: 0049	APPROVED
MANUAL: EPIB			SHT/SEC:		
PROC HS-EP-02240			SHT/SEC:		
REMOVE:	PROC	HS-EP-02240	SHT/SEC:	REV/SUB: 0004	APPROVED
	PC	C94-0669			APPROVED
INSERT:	PROC	HS-EP-02240	SHT/SEC:	REV/SUB: 0004	APPROVED
	PC	C00-0388			APPROVED
	PC	C94-0669			APPROVED

END OF TRANSMITTAL

MANUAL TABLE OF CONTENTS

DB EMERGENCY PLAN IMPLEMENTING PROCEDURES VOL B

MANUAL: EPIB REVISION: 49

DATE 03/30/00

TAB	PROCEDURE NUMBER	REV	ST	EFFECT DATE	ALTERATIONS	ALTERATION EFF DATE	TITLE
001	RA-EP-02010	02	CE	1/29/99			EMERGENCY MANAGEMENT
002	RA-EP-02110	01	CE	11/8/99			EMERGENCY NOTIFICATION
003	RA-EP-02220	00	CE	8/20/96	C 991526	11/8/99	EMERGENCY CONTROL CENTER ACTIVATION AND RESPONSE
004	HS-EP-02230	03	CE	2/24/89	C 897261	1/8/90	DOSE ASSESSMENT CENTER ACTIVATION AND RESPONSE
					C 922045	1/1/93	
005	HS-EP-02240	04	CE	12/29/93	C 940669	4/22/94	OFFSITE DOSE ASSESSMENT
					C 000388	3/30/00	
006	RA-EP-02245	00	CE	4/8/97	C 972719	6/11/98	PROTECTIVE ACTION GUIDELINES
007	HS-EP-02250	05	CE	8/21/92	C 922629	9/7/93	RADIATION MONITORING TEAM SURVEYS
					C 932223	12/29/93	
008	HS-EP-02260	04	CE	8/27/90	C 912319	1/1/93	RADIOLOGICAL CONTROLS IN THE DBAB
					C 931696	8/6/93	
					C 932754	12/29/93	
					C 941061	6/17/94	
009	RA-EP-02270	01	CE	6/10/97			FACILITIES SUPPORT
010	RA-EP-02290	01	CE	5/26/95			EMERGENCY FACILITIES EQUIPMENT OPERATION
011	RA-EP-02310	00	CE	6/29/95			TSC ACTIVATION AND RESPONSE
012	RA-EP-02320	01	CE	7/28/95	C 972100	11/6/97	EMERGENCY TECHNICAL ASSESSMENT
					C 972879	1/30/98	
					C 990015	1/22/99	

PROCEDURE DEVELOPMENT FORM
ED 7635-14

SHEET	PROCEDURE ACTIVITY TRACKING NO.
1 OF 2	00-0388

SECTION 1 – IDENTITY

PROCEDURE NO. / CURRENT REVISION	PROPOSED REVISION NO.	PROPOSED CHANGE NO.			
HS-EP-02240/R-4			☐ NEW	☐ CANCELLATION	☐ RESTRICTED
SUPERSEDES			☐ REVISION	☐ INACTIVATION	
N/A	N/A	C-2	☒ CHANGE	☐ REACTIVATION	ESTIMATED EXPIRATION (DATE / EVENT)
			☐ TEMPORARY	APPROVAL	

PROCEDURE TITLE
Offsite Dose Assessment

PROCEDURE CLASSIFICATION	PAT / PCR NOS. CLOSED OUT
☒ SR ☐ QR ☐ N-QR CHANGE TO? ☐ YES ☒ NO	PCRs 97-2912, 96-0551 ☐ CONTINUED

ACTIVITY SUMMARY / PURPOSE
(1) Add System Parameter Display System (SPDS) as an alternate dose assessment program
(2) Add SPDS to protective actions
(3) Attachment 3, Table 5, Column (G): "3" to "6"
(4) Attachment 4, 2.a: Delete "OR OTSG is boiled dry,"

☐ CONTINUED

ORIGINAL IF RED

SECTION 2 - CONCURRENT EFFECTIVE DOCUMENTS ☐ CONTINUED

DOCUMENT NO. / REVISION	DOCUMENT TITLE	PAT NO. / CHANGE REQUEST

SECTION 3 - REVIEW ORGANIZATIONS

	REQUIRED						REQUESTED	
RP								

☐ CONTINUED ☒ CONTINUED

PROCEDURE PREPARER	DATE	QUALIFIED REVIEWER	DATE
Paul F. Timmerman	3/6/00	D. J. Gordon	3/7/00

SECTION 4 – ATTACHMENTS

COMPLETED AND ATTACHED

YES	N/A		YES	N/A		YES	N/A	
☐	☒	VALIDATION CHECKLIST	☒	☐	SAFETY REVIEW	☐	☒	REVISED CROSS REFERENCES LIST
☒	☐	COMMITMENT VERIFICATION SUMMARY	☒	☐	DOCUMENT REVIEW SHEETS	☒	☒	PCRs per Eileen w/PT 3/30/00
☐	☒	SAFETY EVALUATION NO. _____				☐	☒	OTHER _____

FINAL QUALIFIED REVIEWER CONCURRENCE	DATE
	03/17/00

SECTION 5 - TEMPORARY APPROVAL

MANAGEMENT SRO	DATE	APPROVAL AUTHORITY	DATE
N/A	N/A	N/A	N/A

SECTION 6 - CONCURRENCE / FINAL APPROVAL

PROCEDURE SPONSOR	DATE 3/17/00	☐ MANAGER - BUSINESS SERVICES (BSA) N/A	DATE
☐ DIRECTOR – SUPPORT SERVICES (NA) N/A	DATE	☐ SRB Dave Eshelman	DATE 3-30-00
☐ DIRECTOR – TECHNICAL SERVICES (E&S) N/A	DATE	☑ PLANT MANAGER James H Lash / BS Cook	DATE 3/30/00
DIRECTOR – WORK MANAGEMENT (WMD) N/A	DATE	APPROVAL AUTHORITY James R. Funda / DHL	DATE 3-30-00

SECTION 7 - TRAINING / PROCEDURE EFFECTIVITY

TRAINING COMPLETE	ALTERATION EFFECTIVE DATE	PROCEDURE SPONSOR	DATE
☑ YES ☐ N/A	3-30-00	James R. Funda / DHL	3-30-00

SECTION 1 - IDENTITY (CONTINUED)

(5) Attachment 4, Data Sheet 3: Add a NOTE identifying release rates are a gross approximation.
(6) Pg 25, Step 2, Change 'Record" to "Determine" and delete space to enter average steam flow.
(7) Pg 25, Step 2.b: add "or AVV" after "MSSV" and delete current step 2.d
(8) Pg 25, Step 2.c: Add "contact the TSC for release rates from AFPT lasting longer than 1 hour."
(9) Pg 25, Step 2.d, New step to record average steam flow in Step 6.
(10) Pg 27, Attachment 4, Data Sheet 4, NOTE: Add to second sentence:"...from the OTSG via an open MSSV, an open AVV, an unisolible steam leak to the atmosphere, or ..."
(11) Pg 27, Step 3: Delete "Chemistry Advisor"
(12) Pg 27, Step 3.a, Add "Emergency RP Manager"
(13) Pg 27, New Step:"3.c. Record in Step 4."
(14) Pg 28, Attachment 4, Data Sheet 5: Step 2: Same changes as (7) and (8)above
(15) Pg 28, New Step: "2.d. Record in Step 4."
(16) Pg 28, Step 3; Change "uCi/cc" to "uCi/gm"
(17) Pg 28, Step 3, Delete "Chemistry Advisor"
(18) Pg 28, Step 3, Add new last sentence dealing with temperature conversion.
(19) Pg 28, Step 4; Change "uCi/cc" to "uCi/gm" and change "3.5E-6" to "1.26E-7"
(20) Pg 43, Attachment 7, Table 4, Column F, Line 9 & 9.5: Change "1.5E-6" to " 1.5E-5"
(21) Pg 46a, new Attachment 9,

SECTION 2 - CONCURRENT EFFECTIVE DOCUMENTS (CONTINUED)

DOCUMENT NO. / REVISION	DOCUMENT TITLE	PAT NO. / CHANGE REQUEST

SECTION 3 - REVIEW ORGANIZATIONS (CONTINUED)

REQUIRED						REQUESTED	
____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____

PROCEDURE DEVELOPMENT FORM

ED 7635-10

SHEET 1 OF 1

PROCEDURE ACTIVITY TRACKING NUMBER 94-0669

SECTION 1 - IDENTITY

PROCEDURE NO.	PROPOSED REVISION NO.	PROPOSED CHANGE NO.		
HS-EP-02240 R4	-NA-	C-1	☐ NEW ☐ CANCELLATION ☐ REVISION ☐ N/A REACTIVATION ☐ LIMITED REVISION ☐ REACTIVATION	☐ NORMAL CHANGE ☑ LIMITED CHANGE ☐ TEMPORARY APPROVAL ☐ RESTRICTED FROM ____ TO ____ (DATE/EVENT)
OLD NO. (for number change) -NA-				

PROCEDURE TITLE: OFFSITE DOSE ASSESSMENT

PROCEDURE CLASSIFICATION	SAFETY REVIEW REQUIRED?	PAT/PCR NOS. CLOSED OUT
☑ SR ☐ QR ☐ N-QR CHANGE TO? ☐ YES ☑ NO	☑ YES ☐ NO ☐ PERFORMED IN CONJUNCTION WITH OTHER ACTIVITY	PCR 94-0465 ☐ CONTINUED

ACTIVITY SUMMARY/PURPOSE: ATTACHMENT 4, PAGE 1 OF 9, CHANGE STEP 3.0 TO ATTACHMENT 3 AS OPPOSED TO ATTACHMENT 4. ☐ CONTINUED

PROCEDURE PREPARER Jay S. [signature] DATE 3-28-94

SECTION 2 - QUALIFIED REVIEW

VALIDATION REQUIRED?	METHOD OF VALIDATION	ALARA REVIEW REQUIRED?
☐ YES ☒ NO	N/A	☐ YES ☒ NO

JUSTIFICATION: Alternation is editorial in nature and does not require validation or ALARA Review ☐ CONTINUED

QUALIFIED REVIEWER [signature] B W Cape DATE 3-29-94

SECTION 3 - CROSS-DISCIPLINARY REVIEW/CONCURRENCE DUE: -NA-

REQUIRED	REQUESTED	CONCURRENCE	ORG	CONCURRENCE /DATE	REQUIRED	REQUESTED	CONCURRENCE	ORG	CONCURRENCE /DATE
☐	☐	☐		N/A	☐	☐	☐		
☐	☐	☐			☐	☐	☐		
☐	☐	☐			☐	☐	☐		
☐	☐	☐			☐	☐	☐		
☐	☐	☐			☐	☐	☐		
☐	☐	☐			☐	☐	☐		

SECTION 4 - ATTACHMENTS

COMPLETED AND ATTACHED

YES	N/A		YES	N/A		YES	N/A	
☐	☑	DOCUMENT INTERFACE WORKSHEET	☐	☑	VALIDATION CHECKLIST	☐	☑	VENDOR MANUAL CONFIRMATION FORM
☐	☑	COMMITMENT VERIFICATION SUMMARY	☑	☐	SAFETY REVIEW	☐	☑	DOCUMENT REVIEW SHEETS
☐	☑	EDITORIAL VERIFICATION CHECKLIST	☐	☑	SAFETY EVALUATION	☐	☑	REVISED CROSS REFERENCES LIST
						☑	☐	OTHER PCR 94-0466 5

QUALIFIED REVIEWER CONCURRENCE [signature] DATE 3-29-94

SECTION 5 - TEMPORARY APPROVAL

MGMT SRO -NA- DATE -NA-

SECTION 6 - CONCURRENCE/FINAL APPROVAL

PROCEDURE SPONSOR	DATE	☑ SRB	DATE
☑ APPROVAL AUTHORITY [signature]	DATE 3/30/94	☑ PLANT MANAGER [signature]	DATE 4/11/94

3-29-94

SECTION 7 - TRAINING/PROCEDURE EFFECTIVITY

TRAINING REQUIRED?	JUSTIFICATION FOR NO TRAINING	TRAINING COMPLETION DATE	SURVEILLANCE AND PERIODIC TEST PROGRAM CHANGE FORM SUBMITTED
☐ YES ☒ NO	This alternation is editorial in nature and therefore does not require training ☐ CONTINUED	N/A	☐ YES ☒ N/A

PROCEDURE EFFECTIVE (DATE OR EVENT) APR 22 1994 PROCEDURE SPONSOR [signature] DATE 4/12/94

Davis-Besse Nuclear Power Station

EMERGENCY PLAN IMPLEMENTING PROCEDURE

HS-EP-02240

(Supersedes R3, C-3)

Offsite Dose Assessment

REVISION 4/Total Rewrite

Prepared by: _____ 11-1-93
Date

Sponsor: William J. O'Connor 11/4/93
Manager - Regulatory Affairs Date

Approved by: _____ 11/4/93
Director - Nuclear Services Date

Approved by: _____ 11/5/93
Plant Manager Date

Effective Date: 12/29/93

Procedure Classification:

X Safety Related

_____ Quality Related

_____ Non-Quality Related

LIST OF EFFECTIVE PAGES

Page	Change No.
1	
2	C-2
3	C-2
4	
5	
6	C-2
7	
8	
9	
10	
11	C-2
12	C-2
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	C-2

Page	Change No.
23	
24	C-2
25	C-2
26	
27	C-2
28	C-2
29	
30	
31	
32	
33	
34	
35	
36	
37	
38	
39	
40	
41	
42	
43	C-2
44	

Page	Change No.
45	
46	
46a	C-2
47	

TABLE OF CONTENTS

1.0 PURPOSE

1.1 This procedure is intended to estimate offsite dose rates from noble gases and radioiodines during accidental, uncontrolled airborne releases.

2.0 REFERENCES

2.1 Developmental

2.1.1 NRC Regulatory Guide 1.4, Assumptions Used for Evaluating the Potential Consequences of a Loss of Coolant Accident for Pressurized Water Reactors

2.1.2 NRC Regulatory Guide 1.109, Calculation of Annual Dose to Man From Routine Releases or Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR 50, Appendix I

2.1.3 NRC Regulatory Guide 1.145, Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants

2.1.4 EPA-400-R-92-001, May 1992, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents

2.1.5 Letter; Correction Factor for Noble Gas Measurements Assuming All Activity as Xe^{133}, from Gregory Stoetzel, Battelle Pacific Northwest Laboratories, September 24, 1984

2.1.6 BT-10372, Letter from Bechtel to Toledo Edison concerning Quantification of Radiation Release from Main Steam Line, June 4, 1980

2.1.7 Davis-Besse Nuclear Power Station Emergency Plan

2.2 Implementing

2.2.1 DB-OP-02531, Steam Generator Tube Leak

2.2.2 HS-EP-02230, Dose Assessment Center Activation and Response

2.2.3 HS-EP-02245, Protective Action Guidelines

2.2.4 HS-EP-02320, Emergency Technical Assessment

2.2.5 Davis-Besse Nuclear Power Station Emergency Plan Telephone Directory

3.0 DEFINITIONS

3.1 DADS - The Data Acquisition and Display System provides plant parameters, meteorology data, and dose calculations. DADS updates MODCOMP data at 30-second intervals and Validyne data at 1-second intervals. The meteorological data is provided at 15 minute intervals, and is an average over that time period. DADS stores information from the last 24 hours.

3.2 LAKE BREEZE - A meteorological condition that may occur on clear, sunny days. During a lake breeze, a radioactive release can travel inland, rise, reverse course in an overhead return flow, and then return to land in a convoluted path.

3.3 MODCOMP - The station computer which monitors plant instruments and systems.

3.4 SECTOR - One of the 16 areas bounded by radii 22½ degrees apart into which the 10-mile EPZ is divided. Sectors are designated by the letters A through R, excluding I and O. Sector A lies north of DBNPS, Sector E lies east, Sector J lies south, and Sector N lies west.

3.5 VALIDYNE - A high speed data acquisition system that monitors 100 critical plant parameters.

4.0 RESPONSIBILITIES

4.1 Emergency Director shall:

4.1.1 Direct calculation of the release and dose rates using available, qualified dose assessment personnel including Licensed Reactor Operators and Senior Reactor Operators.

4.2 Qualified Dose Assessment Personnel shall:

4.2.1 Perform dose calculations in accordance with Section 6.0 of this procedure.

4.2.2 Report the results of dose calculations to the Emergency Director or Dose Assessment Coordinator, as applicable.

5.0 INITIATING CONDITIONS

This procedure shall be implemented at the request of the Emergency Director, or Dose Assessment Coordinator when an accidental airborne release of radioactivity is in progress or imminent.

6.0 PROCEDURE

6.1 Projection of Offsite Dose Rates Using Plant Data

6.1.1 Determine the release pathway of the radioactive release.

6.1.2 IF the release is from more than one point (e.g., SJAE and AVV),
THEN sum the resulting dose rates for each point to obtain the total dose rate.

6.1.3 To use the Data Acquisition and Display System (DADS)
REFER TO Attachment 1, Dose Calculations Using DADS.

6.1.4 Alternatives to DADS are:

a. The Safety Parameter Display System (SPDS) Process Book

1. Select the dose calculation tab.

2. Double click the "Dose Rate Calculation and PARs" display title.

3. REFER TO Attachment 9, Calculations using SPDS.

b. The Offsite Dose Assessment Nomogram per Attachment 2, Instructions for Offsite Dose Nomogram.

c. The appropriate hand calculation below:

RELEASE INDICATIONS	ATTACHMENT
RE 4598 (Station Vent)	3
Secondary Side Releases	4
RE 4596 (Dome Monitors)	5
RE 4597 (Containment Atmosphere)	6

6.2 Projection of Offsite Dose Rates Using Field Monitoring Data

6.2.1 Use the DADS program in accordance with Attachment 1, Dose Calculation Using DADS.

6.2.2 IF DADS is not available,
THEN use Attachment 7, Dose Projections Based on Field Monitoring Data.

6.3 Meteorological Data

6.3.1 Obtain 15 minute average meteorological data from any of the following:

a. Access the DADS nongraphic terminal next to the DADS graphic terminal and call up the meteorological data.

b. Access the DADS graphic terminal next to the DADS nongraphic terminal and access the meteorological data.

6.3.2 IF the systems in 6.3.1 cannot be accessed, THEN obtain meteorological data from the following:

a. Access data from the meteorological tower using the points listed below:

Parameters	MET Tower Points
Wind Speed, 612′ Elevation, in MPH	M006
Wind Speed, 827′ Elevation, in MPH	M005
Wind Direction, 612′ Elevation, in degrees	M003
Wind Direction, 827′ Elevation, in degrees	M002
Ambient Temperature, 612′ Elevation, in °F	M012
Temp. Differential, 827′-612′, in °F	M011
Temp. Differential, 917′-612′, in °F	M010

b. Contact the National Weather Service using the Emergency Plan Telephone Directory.

6.3.3 Use wind speed and wind direction from one of the following elevations of the meteorology tower, in order of preference.

a. 10 meters (612 feet above sea level)

b. 75 meters (827 feet above sea level)

c. 100 meters (917 feet above sea level)

d. Use conservative wind speed of 2 mph (0.9 m/s).

6.3.4 Obtain atmospheric stability class from one of the following indicators in order of preference:

1. Lower delta T (see Table 1.)

2. Upper delta T (see Table 2.)

3. Standard deviation of wind direction from 10 meter elevation (see Table 3.)

4. Use conservative stability class of F.

Table 1. Stability Class from Lower Differential Temperature

Stability Class	Description	Range $\Delta T°F/(75-10)m$
A	Extremely unstable	$\Delta T \leq -2.2$
B	Moderately unstable	$-2.2 < \Delta T \leq -2.0$
C	Slightly unstable	$-2.0 < \Delta T \leq -1.7$
D	Neutral	$-1.7 < \Delta T \leq -0.6$
E	Slightly stable	$-0.6 < \Delta T \leq 1.7$
F	Moderately stable	$1.7 < \Delta T \leq 4.6$
G	Extremely stable	$4.6 < \Delta T$

Table 2. Stability Class from Upper Differential Temperature

Stability Class	Description	Range $\Delta T°F/(100-10)m$
A	Extremely unstable	$\Delta T \leq -3.1$
B	Moderately unstable	$-3.1 < \Delta T \leq -2.8$
C	Slightly unstable	$-2.8 < \Delta T \leq -2.5$
D	Neutral	$-2.5 < \Delta T \leq -0.8$
E	Slightly stable	$-0.8 < \Delta T \leq 2.5$
F	Moderately stable	$2.5 < \Delta T \leq 6.6$
G	Extremely stable	$6.6 < \Delta T$

Table 3. Stability Class from Standard Deviation of Wind Direction

Stability Class	Description	Range
A	Extremely unstable	$SD \geq 22.5$
B	Moderately unstable	$22.5 > SD \geq 17.5$
C	Slightly unstable	$17.5 > SD \geq 12.5$
D	Neutral	$12.5 > SD \geq 7.5$
E	Slightly stable	$7.5 > SD \geq 3.8$
F	Moderately stable	$3.8 > SD \geq 2.1$
G	Extremely stable	$2.1 > SD$

6.3.5 Contact the National Weather Service (NWS) or equivalent agencies to investigate upcoming weather conditions.

a. The NWS telephone number is listed in the Emergency Plan Telephone Directory in the Other Resources Section.

b. The Delaware Operations Center may provide weather forecasts, and is listed in the Emergency Plan Telephone Directory in the Other Resources Section.

6.3.6 IF in the Emergency Control Center,
THEN determine if a lake breeze is occurring by looking for the following simultaneous conditions:

a. Calendar date between March 15 and September 15.

b. Time of day between sunrise and sunset.

c. Wind direction from between 0° to 90°.

d. Wind speed less than 12 mph.

e. Wind speed decreases with height on meteorological tower.

f. Stability Class A through D.

6.3.7 IF a lake breeze is occurring while an airborne radioactive release is in progress or imminent,
THEN the Dose Assessment Coordinator should:

a. Inform the Ohio EMA of the lake breeze and that the plume may not follow the course indicated by the meteorological tower wind direction.

b. Inform the Radiation Monitoring Teams (RMTs) that higher-than-projected dose rates may occur in the plume pathway.

6.4 Protective Actions

6.4.1 IF using DADS to perform dose calculations,
THEN use DADS to determine protective action recommendations.

a. REFER TO Attachment 1, Dose Calculations Using DADS.

b. REFER TO HS-EP-02245, Protective Action Guidelines.

6.4.2 IF using Safety Parameters Display System (SPDS) to perform protective actions, THEN use SPDS to determine Protective Action Recommendations:

a. Select the dose calculation tab
b. Double click the Dose Rate Calculation and PARs" display title
c. REFER TO Attachment 9, Calculations Using SPDS
d. REFER TO RA-EP-02245, Protective Action Guidelines.

6.4.3 IF NOT using DADS or SPDS to perform dose calculations, THEN REFER TO RA-EP-02245, Protective Action Guidelines, to determine protective action recommendations.

6.5 Total Population Dose

NOTE 6.5.1

The Radiation Protection Section will provide a more definitive estimate of the total population dose after more detailed population and radiological data have been obtained.

6.5.1 During Recovery from an emergency event, obtain an estimate of the total population dose using Attachment 8, Estimation of Total Population Dose.

7.0 FINAL CONDITIONS

7.1 Dose assessment personnel have been relieved of all emergency support duties.

7.2 All equipment and supplies have been returned to their normal storage locations.

7.3 Records have been collected and forwarded to the Emergency Preparedness Unit which will subsequently forward them to Nuclear Records Management.

8.0 RECORDS

8.1 The following quality assurance records are completed by this procedure and shall be listed on the Nuclear Records List, captured, and submitted to Nuclear Records Management in accordance with NG-NA-00106:

8.1.1 Printouts from DADS terminals

8.1.2 Offsite Dose Nomograms

8.1.3 Data Sheet 1: Total Effective Dose Equivalent (TEDE) Rate

8.1.4 Data Sheet 2: Thyroid Dose Rates from Radioiodines

8.1.5 Data Sheet 3: Release Rate from Main Steam Line Monitor Readings

8.1.6 Data Sheet 4: Release Rates from Noble Gases and Radioiodines Using Primary Parameters

8.1.7 Data Sheet 5: Release Rate from Unisolated OTSG Steam Sample

8.1.8 Data Sheet 6: Release Rates from SJAE Releases

8.1.9 Data Sheet 7: Estimated Release Rate with Solid OTSG

8.1.10 Attachment 5: Calculations for Containment Releases Using RE 4596A or 4596B

8.1.11 Attachment 6: Release Rate Calculations for Releases from Containment Using the High Range Noble Gas Monitor, RE 4597 AB or RE 4597 BB

8.1.12 Attachment 7: Dose Projections Based on Field Monitoring Data

8.1.13 Attachment 8: Estimation of Total Population Dose

8.2 The following non-quality assurance records are completed by this procedure and may be captured and submitted to Nuclear Records Management, in accordance with NG-PS-00106:

8.2.1 None

ATTACHMENT 1: DOSE CALCULATIONS USING DADS

1. IF DADS graphic terminal switch is ON
AND DADS is accessed,
THEN go to Step 5.

2. IF DADS graphic terminal switch is in the OFF position,
THEN move the power switch to the ON position. This message should appear on the screen:

```
IDT BIOS
CP/M-86
Industrial Data Terminals
173 Heatherdown Drive
Westerville, Ohio  43081
(614) 882-3282
C>
```

2.1 IF the above message does NOT appear on the screen
OR problems are encountered,
THEN call the Computer Technician in the TSC for assistance.

3. Press F1. The following message should appear on the screen:

```
PASSTHRU USES SERIAL PORT #1
```

4. Press F2 twice. The TSC menu should appear as follows:

```
    F1   -    SPDS
    F2   -    CRT DISPLAYS
    F3   -    HARDCOPY
    F4   -    GROUP ASSIGNMENTS
    F5   -    DOSE CALCULATIONS
    F6   -    ENGINEERING AIDS
    F7   -    OPERATOR AIDS
    F8   -    SPDS TEST VERSION
    F9   -    SPARE
    F10  -    LOGOUT
    F11  -    LOGIN ON SYSTEM
    F12  -    TSC MENU
```

4.1 IF the screen displayed is NOT a menu,
THEN press F12.

ATTACHMENT 1: DOSE CALCULATIONS USING DADS (Continued)

4.2 IF the screen display is NOT the main menu,
THEN press CTRL and reset keys simultaneously,
AND press F3.

4.3 IF step 4.2 fails to obtain the main menu,
THEN contact the TSC Computer Technician.

5. Follow user prompts to predict offsite dose.

ATTACHMENT 2: INSTRUCTIONS FOR OFFSITE DOSE ASSESSMENT NOMOGRAM

1. Obtain a nomogram from the Control Room, or the Dose Assessment Center (See Figure 1 at the end of this attachment.)

2. Record Name, Date, and Time on the nomogram.

3. Determine monitor reading:

   3.1 IF the release is from the Station Vent,
   THEN plot the appropriate RE 4598 noble gas reading in µCi/cc on Scale B (AA/BA Channel 1 - Normal Range, AB/BB Channel 1 - Mid-Range, or AB/BB Channel 2 - High Range.

   3.2 IF the release is from the MSSV, AVV, or AFPT,
   THEN plot the cpm reading of RE 600 or RE 609 in the gross mode on Scale B.

4. Determine Total Effective Dose Equivalent (TEDE) rates.

> NOTE 4.1
>
> Flow rates given on nomogram are conservative values for each release pathway.

   4.1 Plot the flow rate on Scale (A).

   4.2 Draw a line from the monitor reading on Scale (B) to the flow rate on Scale (A). This line intersects Scale (C) at the release rate.

   4.3 Obtain lower delta T or stability class, and windspeed in accordance with Section 6.3 of this procedure.

   4.4 Plot lower delta T or stability class on Scale (1).

   4.5 Plot windspeed on Scale (2).

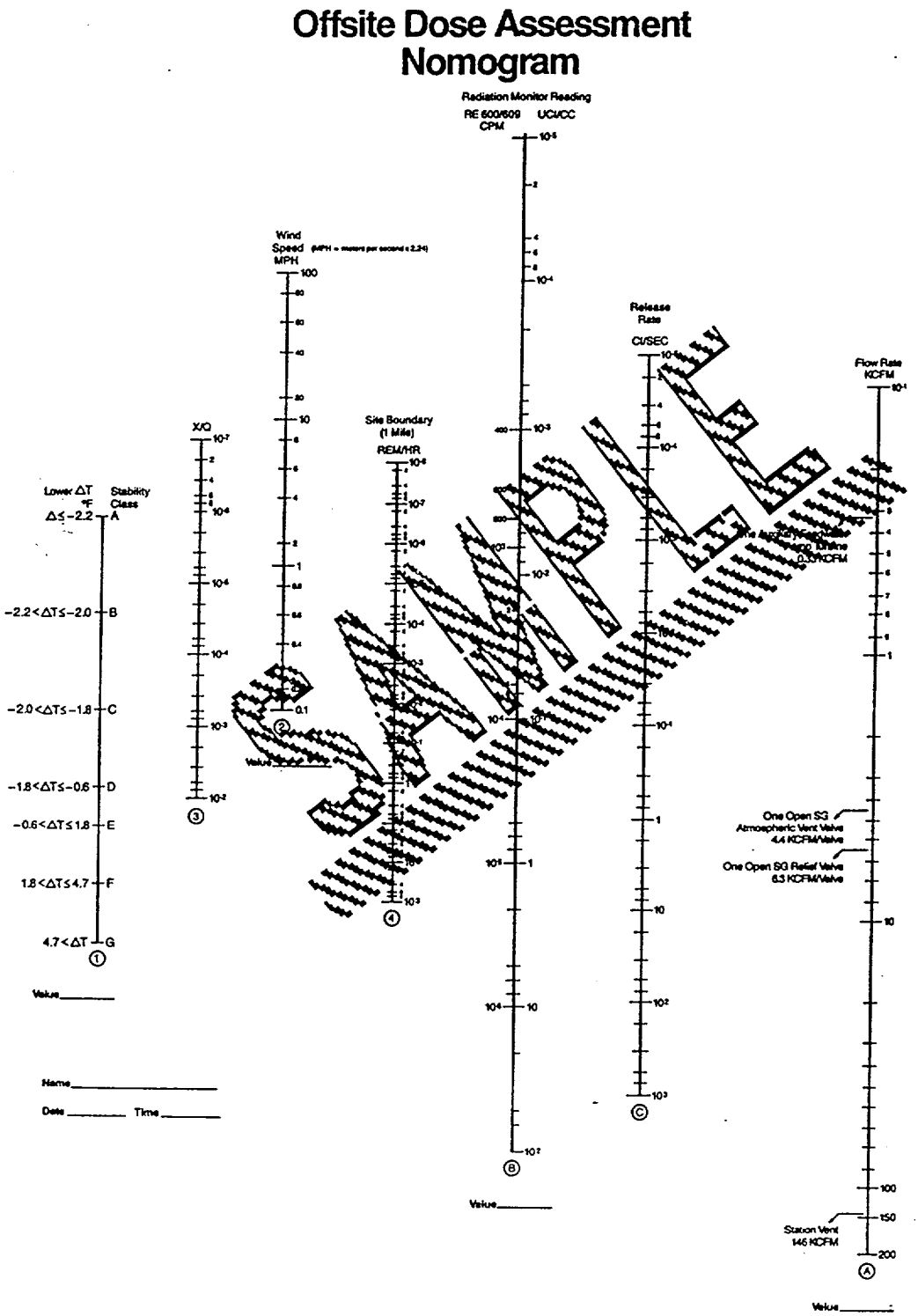
   4.6 Draw a line from the lower delta T or stability class on Scale (1) to the wind speed on Scale (2). This line intersects Scale (3) at the X/Q value.

   4.7 Draw a line from the release rate on Scale (C) to the X/Q value on Scale (3). This line intersects Scale (4) at the TEDE rate for the Site Boundary (0.75 miles).

   4.8 Obtain TEDE rates at 2, 5, and 10 miles by dividing the Site Boundary TEDE rate by 5, 15, or 40, respectively.

ATTACHMENT 2: INSTRUCTIONS FOR OFFSITE DOSE ASSESSMENT NOMOGRAM (Continued)

Figure 1. Offsite Dose Assessment Nomogram



ATTACHMENT 3: STATION VENT RELEASE CALCULATIONS

NOTE

The following Total Effective Dose Equivalent (TEDE) calculation is based solely on noble gas. The contribution from radioiodides and particulates have been neglected to expedite calculations.

CAUTION

Use DATA SHEET 1 and DATA SHEET 2 for dose calculation only if DADS is not available.

DATA SHEET 1: TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE) RATE

1. Record the date and time. Date _____ Time _____

2. Record the appropriate noble gas activity from RE 4598 in step 4. (AA/BA Channel 1 - Normal Range, AB/BB Channel 1 - Mid Range, or AB/BB Channel 2 - High Range)

3. Record the Unit Vent flow rate from Computer Point F885 (or F883) in Step 4.
   a. IF flow rate is NOT available,
      THEN use 146 KCFM
      AND contact the TSC to verify the flow rate

4. Calculate the estimated release rate for noble gas by multiplying the values below and entering in Column (E) of Table 2.

   _____ $\frac{\mu Ci}{cc}$ x _____ KCFM x 0.472 $\frac{cc \cdot Ci}{sec \cdot KCFM \cdot \mu Ci}$ = _____ $\frac{Ci}{sec}$

   (From 2.) (From 3.) (Release Rate)

5. Record the wind speed. Convert the wind speed to m/sec and enter in Column (C) of Table 2.

   _____ mph x 0.447 $\frac{m/sec}{mph}$ = _____ m/sec

   Wind Speed Wind Speed

ATTACHMENT 3: STATION VENT RELEASE CALCULATIONS (CONT.)

DATA SHEET 1 (Cont.)

Table 1. $\frac{\chi u}{Q}$ (m^{-2}) for Stability Classes as a Function of Downwind Distances

Miles	A	B	C	D	E	F	G
0.75	2.1E-6	1.4E-5	3.5E-5	9.9E-5	2.0E-4	4.5E-4	1.3E-3
2	1.1E-7	2.0E-6	5.8E-6	2.2E-5	4.6E-5	1.0E-4	2.8E-4
5	7.1E-9	3.2E-7	1.1E-6	5.5E-6	1.3E-5	3.1E-5	8.2E-5
10	8.9E-10	8.0E-8	3.2E-7	2.0E-6	5.1E-6	1.3E-5	3.4E-5

6. Record Stability Class. (circle one) A B C D E F G
(From Step 6.3.4)

7. Using Table 1. of this attachment, enter $\chi u/Q$ (m^{-2}) at distances of 0.75, 2, 5, and 10 miles for the stability class in step 6. in Column (B) of Table 2.

8. Divide Column (B) by Column (C), and enter in Column (D) of Table 2.

9. Multiply Column (D) by Column (E) and enter in Column (F) of Table 2.

10. Determine the appropriate Noble Gas Correction Factor from Table 3 and enter in Column (G) of Table 2. Multiply Column (F) by Column (G) and enter in Column (H) of Table 2.

Table 2. Total Effective Dose Equivalent (TEDE) Rate

Column(A)	Column(B)	Column(C)	Column(D)	Column(E)	Column(F)	Column(G)	Column(H)
Downwind Distance (Miles)	$\frac{\chi \mu}{Q}$ (m-2)	Windspeed (m/sec)	χ/Q (sec/M^3)	Release Rate (ci/sec)	Noble Gas conc. (µci/cc)	Noble Gas correction factor	TEDE Rate (Rem/hr)
N/A	From Table 1.	From Step 5.	B / C = D	From Step 4.	D x E = F	From Table 3.	F x G = H
0.75							
2.00							
5.00							
10.00							

ATTACHMENT 3: STATION VENT RELEASE CALCULATIONS (CONT.)

1. IF fuel damage or cladding failures have occurred,
THEN use the following table to obtain the Noble Gas correction factor.
OTHERWISE use 10.0 for the Noble Gas correction factor

DATA SHEET 1 (Cont.)

Table 3. Noble Gas Correction Factor
(Round time to the nearest value)

Hours After Reactor Shutdown	Noble Gas Correction Factor	Hours After Reactor Shutdown	Noble Gas Correction Factor
0	1540	31	22.8
0.5	892	32	22.6
1	673	33	22.4
1.5	565	34	22.2
2	491	35	22.0
2.5	432		
3	381	36	21.9
3.5	338	37	21.8
4	301	38	21.6
4.5	268	39	21.5
5	240	40	21.4
6	193	41	21.4
7	158	42	21.3
8	130	43	21.2
9	108	44	21.1
10	90.6	45	21.1
11	77.0	46	21.0
12	66.3	47	21.0
13	57.8	48	20.9
14	51.0	49	20.9
15	45.5	50	20.8
16	41.2	51	20.8
17	37.7	52	20.8
18	34.8	53	20.7
19	32.5	54	20.7
20	30.7	55	20.7
21	29.1	56 - 60	20.6
22	27.9		
23	26.9	61 - 65	20.5
24	26.0		
25	25.3	66 - 75	20.4
26	24.7	76 - 96	20.3
27	24.2		
28	23.8	≥97	20.2
29	23.4		
30	23.1		

ATTACHMENT 3: STATION VENT RELEASE CALCULATIONS (Cont.)

NOTE

The following thyroid calculation is based on the inhalation pathway for radioiodides. The external dose from radioiodide is neglected to expedite calculations.

DATA SHEET 2: THYROID DOSE RATES FROM RADIOIODIDES

1. Record the date and time. Date _____ Time _____

2. Record the value of I-131 activity from Channel 3 of RE 4598 AA/BA in Step 4.
   a. Noble gases can make the I-131 reading falsely high. Request that Radiation Protection personnel verify the I-131 reading.
   b. IF the release continues, THEN insert a silver zeolite cartridges into RE 4598 AA or RE 4598 BA.
   c. IF the RE 4598 AA/BA Iodine-131 reading exceeds $3.0E^{-2}$ µCi/cc, THEN request that RP personnel provide the I-131 concentration.

3. Record the Unit Vent flow rate from Computer Point F885 (or F883) in step 4.
   a. IF flow rate is NOT available, THEN use 146 KCFM AND contact the TSC to verify the flow rate

4. Calculate the estimated release rate of I-131 by multiplying the values below and enter in Column (E) of Table 5.

$$\underset{\text{(From 2.)}}{\_\_\_\_\_}\ \frac{\mu Ci}{cc} \times \underset{\text{(From 3.)}}{\_\_\_\_\_}\ KCFM \times 0.472\ \frac{cc \cdot Ci}{sec \cdot KCFM \cdot \mu Ci} = \underset{\text{(Release Rate)}}{\_\_\_\_\_}\ \frac{Ci}{sec}$$

5. Record the wind speed. Convert the wind speed to m/sec and enter in Column (C) of Table 5.

$$\underset{\text{Wind Speed}}{\_\_\_\_\_}\ mph \times 0.447\ \frac{m/sec}{mph} = \underset{\text{Wind Speed}}{\_\_\_\_\_}\ m/sec$$

ATTACHMENT 3: STATION VENT RELEASE CALCULATIONS (Cont.)

DATA SHEET 2 (Cont.)

Table 4. $\frac{\chi\mu}{Q}$ (m^{-2}) for Stability Classes as a Function of Downwind Distances

	STABILITY CLASS						
MILES	A	B	C	D	E	F	G
0.75	2.1E-6	1.4E-5	3.5E-5	9.9E-5	2.0E-4	4.5E-4	1.3E-3
2	1.1E-7	2.0E-6	5.8E-6	2.2E-5	4.6E-5	1.0E-4	2.8E-4
5	7.1E-9	3.2E-7	1.1E-6	5.5E-6	1.3E-5	3.1E-5	8.2E-5
10	8.9E-10	8.0E-8	3.2E-7	2.0E-6	5.1E-6	1.3E-5	3.4E-5

6. Record Stability Class (circle one) A B C D E F G (From Step 6.3.4)

7. Using Table 4. of this attachment, enter $\frac{\chi\mu}{Q}$ (m^{-2}) for the stability class in step 6, at distances of 0.75, 2, 5, and 10 miles in Column (B) of Table 5.

8. In Table 5, divide Column (B) by Column (C), and enter in Column (D).

9. In Table 5, multiply Column (D) by Column (E) and enter in Column (F).

10. Determine the appropriate Radioiodide Correction Factor from Table 6 and enter in Column (G) of Table 5. Multiply Column (F) by Column (G) and enter in Column (H) of Table 5.

Table 5. Thyroid Dose Rate

Column (A)	Column (B)	Column (C)	Column (D)	Column (E)	Column (F)	Column (G)	Column (H)
Downwind Distance (Miles)	$\frac{\chi\mu}{Q}$ (m^{-2})	Windspeed $\left(\frac{m}{sec}\right)$	$\frac{\chi}{Q}$ $\left(\frac{sec}{m^3}\right)$	Release Rate $\left(\frac{Ci}{sec}\right)$	Radioiodide conc. $\left(\frac{\mu Ci}{cc}\right)$	Radioiodide correction factor	Thyroid Dose Rate $\left(\frac{Rem}{hr}\right)$
N/A	From Table 4	From Step 5	B / C = D	From Step 4	D x E = F	From Table 6	F x G = H
0.75							
2.00							
5.00							
10.00							

ATTACHMENT 3: STATION VENT RELEASE CALCULATIONS (CONT.)

Table 6. Radioiodide Correction Factor
(Round time to the nearest value)

Hours After Reactor Shutdown	Correction Factor	Hours After Reactor Shutdown	Correction Factor	Hours After Reactor Shutdown	Correction Factor
0	2.88 E+06	26	2.25 E+06	65 - 67	1.97 E+06
0.5	2.86 E+06	27	2.24 E+06		
1	2.83 E+06	28	2.23 E+06	68 - 70	1.96 E+06
1.5	2.81 E+06	29	2.22 E+06		
2	2.79 E+06	30	2.21 E+06	71 - 73	1.95 E+06
2.5	2.77 E+06				
		31	2.19 E+06	74 - 77	1.94 E+06
3	2.75 E+06	32	2.18 E+06		
3.5	2.73 E+06	33	2.17 E+06	78 - 81	1.93 E+06
4	2.71 E+06	34	2.16 E+06		
4.5	2.70 E+06	35	2.15 E+06	82 - 86	1.92 E+06
5	2.68 E+06				
		36	2.14 E+06	87 - 92	1.91 E+06
5.5	2.67 E+06	37	2.14 E+06		
6	2.65 E+06	38	2.13 E+06	93 - 98	1.90 E+06
6.5	2.64 E+06	39	2.12 E+06		
7	2.62 E+06	40	2.11 E+06	99 - 107	1.89 E+06
7.5	2.61 E+06				
		41	2.10 E+06	108 - 118	1.88 E+06
8	2.59 E+06	42	2.10 E+06		
8.5	2.58 E+06	43	2.09 E+06	119 - 135	1.87 E+06
9	2.57 E+06	44	2.08 E+06		
9.5	2.55 E+06	45	2.07 E+06	136 - 173	1.86 E+06
10	2.54 E+06				
		46 - 47	2.06 E+06	≥174	1.85 E+06
11	2.52 E+06				
12	2.49 E+06	48 - 49	2.05 E+06		
13	2.47 E+06				
14	2.45 E+06	50 - 51	2.04 E+06		
15	2.43 E+06				
		52 - 53	2.03 E+06		
16	2.41 E+06				
17	2.39 E+06	54 - 55	2.02 E+06		
18	2.37 E+06				
19	2.36 E+06	56 - 57	2.01 E+06		
20	2.34 E+06				
		58 - 59	2.00 E+06		
21	2.32 E+06				
22	2.31 E+06	60 - 61	1.99 E+06		
23	2.29 E+06				
24	2.28 E+06	62 - 64	1.98 E+06		
25	2.27 E+06				

ATTACHMENT 4: SECONDARY SIDE RELEASE CALCULATIONS

1. IF the release is from more than one point (for example: AFPT and SJAE),
   THEN add the dose rates from each point to obtain the total dose rate.

2. For MSSV, AVV, and AFPT releases, determine which parameters are available as calculation inputs.

   a. IF primary system parameters are available
      THEN REFER TO DATA SHEET 4.

   b. IF main steam line monitors (RE 600/RE 609) are available,
      THEN REFER TO DATA SHEET 3.

   c. IF the OTSG is solid,
      THEN REFER TO DATA SHEET 7.

   d. IF an OTSG steam sample is available,
      THEN REFER TO DATA SHEET 5.

3. IF a SJAE release occurs
   AND the Station Vent monitors are functioning,
   THEN perform Station Vent calculations using DATA SHEET 1 and DATA SHEET 2 of Attachment 3.

4. IF a SJAE release occurs,
   AND the Station Vent monitors are NOT functioning,
   THEN REFER TO DATA SHEET 6.

ATTACHMENT 4: SECONDARY SIDE RELEASE CALCULATIONS (Cont.)

DATA SHEET 3
Release Rate from Main Steam Line Monitor Readings

NOTE

The release rates estimated using this method are gross approximations. More accurate release rates may be determined by using RCS activity and estimated primary to secondary leak rates.

NOTE

RE 609 (DADS point R787) is for OTSG No. 1, and RE 600 (DADS point R788) is for OTSG No. 2. Both readings are listed under Engineering Aids - TSC Status Display.

1. Record the date and time Date _____ Time _____

2. Determine average steam flow rate in lbm/hr.
   a. Consult TSC Engineers.
   b. IF a MSSV or AVV release is occurring,
      THEN use Table 1. of this attachment.
   c. IF an AFPT release is occurring,
      AND duration of release is less than one hour,
      THEN use 4.4 E4 lbm/hr
      OTHERWISE contact TSC Engineers for release rates from AFPT lasting longer than one hour.
   d. Record in Step 6.

3. Verify that the analyzer/gross switch of RE 600 or RE 609 is in the GROSS MODE position.

4. Calculate net reading of RE 600 or RE 609 by subtracting 300 cpm from the actual reading.
   _____ - 300 cpm = _____cpm
   RE 600 or RE 609 (circle one)

5. Calculate radionuclide concentration in the steam by multiplying the net RE 609 or RE 600 reading by the value obtained from Figure 1 of this attachment.
   _____cpm x _____ = _____ $\frac{\mu Ci}{cc}$
   (Step 4.) (Figure 1 value)

6. Calculate Release Rate by multiplying the steam flow with the activity concentration then by the given correction factor.
   _____ $\frac{lbm}{hr}$ x _____ $\frac{\mu Ci}{cc}$ x 3.5 E-6 = _____ $\frac{Ci}{sec}$
   (From 2.) (From 5.) (Release Rate)

ATTACHMENT 4: SECONDARY SIDE RELEASE CALCULATIONS (Cont.)

DATA SHEET 3 (Cont.)

7. Perform one of the following:

   a. Insert the Release Rate into Step 4 of DATA SHEET 1 of Attachment 3 and complete DATA SHEET 1.
   b. Plot the noble gas release rate on scale (C) of the Offsite Dose Assessment Nomogram and complete Attachment 2, Instructions for Offsite Dose Assessment Nomogram.

Table 1. Average MSSV Flow Rate vs. Time After Reactor Trip

Minutes After Reactor Trip	Average Steam Flow Rate (lbm/hr)
1	9.00 E5
2	7.00 E5
3	5.97 E5
4	5.37 E5
5	4.97 E5
6	4.70 E5
8	4.30 E5
10	4.00 E5
15	3.59 E5
20	3.34 E5
25	3.15 E5
30	3.00 E5
35	2.89 E5
40	2.78 E5
50	2.59 E5
$\geq$60	2.42 E5

ATTACHMENT 4: SECONDARY SIDE RELEASE CALCULATIONS (Cont.)

DATA SHEET 4

Release Rates from Noble Gases and Radioiodides Using Primary Parameters

NOTE

- DATA SHEET 4 assumes all activity leaking from the Primary is released to atmosphere. This assumption is accurate if steam is being released directly from the OTSG via an open MSSV, an open AVV, an unisolable steam leak to the atmosphere, or if the affected OTSG is being used to supply Auxiliary Feed Pump Turbines. In other cases, the calculation is conservative.
- Place emphasis on the latest leak rate as it will vary throughout the transient. The latest leak rate can be obtained by monitoring safety injection flow rate (i.e., HPI and Makeup).

1. Record the date and time. Date _____ Time _____

2. Obtain the primary to secondary leak rate in gpm from the TSC Engineers or Operations Advisor and record in Step 4.

3. Obtain the latest Reactor Coolant I-131 and Xe-133 concentration ($\frac{\mu Ci}{cc}$).
   a. IF fuel damage is NOT indicated,
      AND activity concentrations are NOT known,
      THEN obtain pre-trip values from the Emergency RP Manager, and
      Multiply the I-131 value by 10 (to account for Iodine spiking).
   b. IF fuel damage is indicated,
      AND activity concentrations are NOT known,
      THEN obtain estimates from TSC Engineers.
   c. Record in Step 4.

4. Calculate the Release Rate.

   Radioiodine: _____ gpm x _____ $\frac{\mu Ci}{cc}$ x 6.3E-5 = _____ $\frac{Ci}{sec}$

   (Secondary Leak Rate) (I-131) (Release Rate)

   Noble Gas: _____ gpm x _____ $\frac{\mu Ci}{cc}$ x 6.3E-5 = _____ $\frac{Ci}{sec}$

   (Secondary Leak Rate) (Xe-133) (Release Rate)

5. Perform one of the following:
   a. Insert the Release Rate into Step 4 of DATA SHEET 1 of Attachment 3 and complete DATA SHEET 1 for noble gas.
   b. Insert the Release Rate into Step 4 of DATA SHEET 2 of Attachment 3 and complete DATA SHEET 2 for radioiodides.
   c. Plot the noble gas release rate on scale (C) of the Offsite Dose Assessment Nomogram and complete Attachment 2, Instructions for Offsite Dose Assessment Nomogram.

ATTACHMENT 4: SECONDARY SIDE RELEASE CALCULATIONS (Cont.)

DATA SHEET 5

Release Rate from Unisolated OTSG Steam Sample

1. Record the date and time Date _____ Time _____

2. Determine the total steam flow in lbm/hr, from the following:
   a. Consult TSC Engineers,
   b. IF a MSSV or AVV release is occurring,
      THEN use Table 1. of this attachment,
   c. IF an AFPT release is occurring,
      AND release duration is less than one hour,
      THEN use 4.4E4 lbm/hr,
      OTHERWISE Contact TSC Engineers for release rates from AFPT lasting longer than one hour,
   d. Record in Step 4.

3. Obtain the Xe-133 or I-131 concentration $\left(\frac{\mu Ci}{gm}\right)$ of the OTSG steam sample.

   Record in Step 4. (Sample $\left(\frac{\mu Ci}{cc}\right)$ may be converted directly to $\left(\frac{\mu Ci}{gm}\right)$ provided the sample was analyzed at room temperature.)

4. Calculate the Release Rate by multiplying the steam flow by the concentration then by the correction factor (based on water density).

   _____ $\frac{lbm}{hr}$ x _____ $\frac{\mu Ci}{gm}$ x 1.26E-7 = _____ $\frac{Ci}{sec}$

   (From 2.) (From 3.) (Release Rate)

5. Perform one of the following:
   a. Insert the Release Rate into Step 4 of DATA SHEET 1 of Attachment 3 and complete DATA SHEET 1 for noble gas.
   b. Insert the Release Rate into Step 4 of DATA SHEET 2 of Attachment 3 and complete DATA SHEET 2 for radioiodides.
   c. Plot the noble gas release rate on scale (C) of the Offsite Dose Assessment Nomogram and complete Attachment 2, Instructions for Offsite Dose Assessment Nomogram.

ATTACHMENT 4: SECONDARY SIDE RELEASE CALCULATIONS (Cont.)

DATA SHEET 6

Release Rates from SJAE Releases

> **NOTE**
>
> SJAE releases pass through the Station Vent, and will contribute to the Station Vent Monitor Readings.

1. Record the date and time. Date _____ Time _____
2. Record the SJAE noble gas activity in cpm from RE 1003A or RE 1003B in Step 5.
3. Record the SJAE flow rate in cfm from FI 1002 in Step 5.
4. Choose the appropriate correction factor and record in Step 5.

   ° For RE 1003A, use 1.3 E-11
   ° For RE 1003B, use 1.5 E-11

5. Calculate the Release Rate of noble gases by multiplying the values below.

   _____ (From 2.) cpm x _____ (From 3.) cfm x _____ (From 4.) = _____ (Release Rate) Ci/sec

6. Perform one of the following:
   a. Insert the Release Rate into Step 4 of DATA SHEET 1 of Attachment 3 and complete DATA SHEET 1.
   b. Plot the noble gas release rate on scale (C) of the Offsite Dose Assessment Nomogram and complete Attachment 2, Instructions for Offsite Dose Assessment Nomogram.

ATTACHMENT 4: SECONDARY SIDE RELEASE CALCULATIONS (Cont.)

DATA SHEET 7

Estimated Release Rate with Solid OTSG

NOTE
Complete this data sheet for every incident in which the relief valves open. The number of MSSVs open and length of time that they are open may only be obtainable by direct observation.

1. Record the date and time. Date _____ Time _____

2. Determine the reading of RE 609 or RE 600 (circle one)

_____ (Gross Reading) cpm - 300 cpm (Background) = _____ (Net Reading) cpm

3. Use time after reactor shutdown to determine the Reactor Coolant activity conversion factor from Figure 1. _____ $\frac{\mu Ci/cc}{cpm}$

4. Determine flow rate for MSSVs. (Maximum flow rate of each MSSV is 1.46 E5 cc/sec)

_____ number of MSSVs open x 1.46 E5 $\frac{cc}{sec}$ = _____ $\frac{cc}{sec}$

5. Determine Release Rate of MSSVs:

_____ (From 4.) $\frac{cc}{sec}$ x _____ (From 3.) $\frac{\mu Ci/cc}{cpm}$ x _____ (From 2.) cpm x 1.0 E-6 $\frac{Ci}{\mu Ci}$ = _____ (Release Rate) Ci/sec

6. Determine flow rate for AVVs:

One AVV open 9.5 E4 cc/sec |_|
Two AVVs open 1.9 E5 cc/sec |_|
(Check one)

7. Determine Release Rate for AVV.

_____ (From 6.) $\frac{cc}{sec}$ x _____ (From 3.) $\frac{\mu Ci/cc}{cpm}$ x _____ (From 2.) cpm x 1.0 E-6 $\frac{Ci}{\mu Ci}$ = _____ (Release Rate) Ci/sec

8. Determine Total Release Rate.

_____ (From 5.) Ci/sec + _____ (From 7.) Ci/sec = _____ (Total Release Rate) Ci/sec

ATTACHMENT 4: SECONDARY SIDE RELEASE CALCULATIONS (Cont.)

DATA SHEET 7 (Cont.)

9. Perform one of the following:

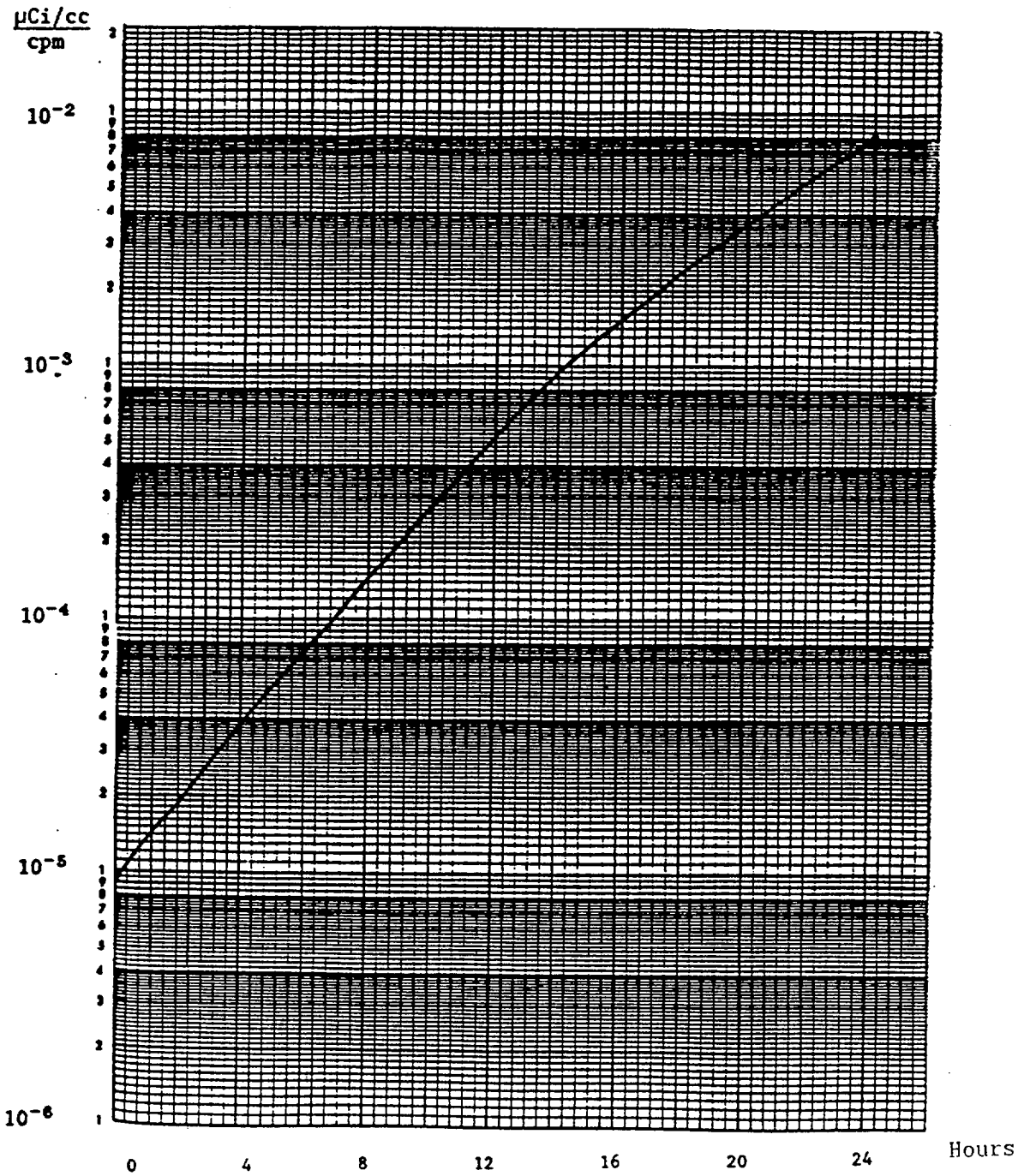
   a. Insert the Release Rate into Step 4 of DATA SHEET 1, Attachment 3 and complete DATA SHEET 1.

   b. Plot the release rate on scale (C) of the Offsite Dose Assessment Nomogram and complete Attachment 2, Instructions for Offsite Dose Assessment Nomogram.

ATTACHMENT 4: SECONDARY SIDE RELEASE CALCULATIONS (Cont.)

FIGURE 1.

NORMAL REACTOR COOLANT ACTIVITY (0.1% FAILED FUEL) CONVERSION FACTOR vs. TIME AFTER SHUTDOWN



ATTACHMENT 5: CALCULATIONS FOR CONTAINMENT RELEASES USING RE 4596A OR RE 4596B

NOTE

- Obtain containment radiation level from DADS by accessing SPDS, F16 - Radiation Trends.
- Obtain containment pressure from DADS by accessing SPDS, F17 - Containment Trends, or by accessing CRT DISPLAYS: points P314, P315, P316, and P317.

CAUTION

Use this attachment for the following conditions only:

- Station Vent Monitors are not available
- It is known that the release is bypassing the Station Vent Monitors

1.	Record the date and time.	Date _____ Time _____
2.	Determine the containment radiation level: RE 4596A or RE 4596B (circle one).	_____ REM/hr
3.	Determine the elapsed time since the reactor was tripped or occurred a significant down-power maneuver (i.e., greater than 30%).	_____ hours
4.	IF containment spray is available, THEN use Figure 1, of this attachment, OTHERWISE use Figure 2 of this attachment (check one).	Figure 1. ☐ spray available Figure 2. ☐ no spray available
5.	Determine the radiation monitor multiplication factor from Figure 1 or Figure 2.	XE-133 factor _____ I-131 factor _____
6.	Determine the uncorrected release rate:	

$$\frac{\text{REM/hr}}{\text{(From 2.)}} \times \frac{\text{XE-133 Factor}}{\text{(From 5.)}} = \frac{\text{Ci/sec}}{\text{(XE-133 Release Rate)}}$$

$$\frac{\text{REM/hr}}{\text{(From 2.)}} \times \frac{\text{I-131 Factor}}{\text{(From 5.)}} = \frac{\text{Ci/sec}}{\text{(I-131 Release Rate)}}$$

ATTACHMENT 5: CALCULATIONS FOR CONTAINMENT RELEASES USING RE 4596A OR RE 4596B
(Cont.)

NOTE 7.

The prior calculation assumes the Technical Specification leak rate of 0.5% per day at 38.0 PSIG. A leak area of 0.13 square inches should be used, unless it is known that additional leak paths from containment exist, and the leak area can be estimated. The calculation provided in step 7. may be utilized to correct for any leak area or containment pressure.

7. IF conditions warrant, THEN correct for containment pressure, and leak rate using the following equation:

$$\underset{\text{XE-133 Uncorrected Release Rate (from 6.)}}{\frac{\text{Ci}}{\text{sec}}} \times \left[\frac{\text{(Leak Area)}\ \text{in}^2}{0.13\ \text{in}^2}\right] \times \left[\frac{\text{(CTMT Pressure)}\ \text{PSIG}}{38\ \text{PSIG}}\right]^{1/2} = \underset{\text{XE-133 Corrected Release Rate}}{\frac{\text{Ci}}{\text{sec}}}$$

$$\underset{\text{I-131 Uncorrected Release Rate (from 6.)}}{\frac{\text{Ci}}{\text{sec}}} \times \left[\frac{\text{(Leak Area)}\ \text{in}^2}{0.13\ \text{in}^2}\right] \times \left[\frac{\text{(CTMT Pressure)}\ \text{PSIG}}{38\ \text{PSIG}}\right]^{1/2} = \underset{\text{I-131 Corrected Release Rate}}{\frac{\text{Ci}}{\text{sec}}}$$

8. Record the wind speed. Convert the wind speed from mph to m/sec. _____ (Wind Speed) mph x 0.447 m/sec / mph = _____ (Wind Speed) m/sec

9. Record Stability Class (circle one) A B C D E F G

(From Step 6.3.4)

10. Using Table 1. of this attachment, enter the $\chi u/Q$ (m^{-2}) at distances of 0.75, 2, 5, and 10 miles for the stability class in step 9. in Column (A).

11. Divide Column (A) by the windspeed (m/sec) from step 8., and enter in Column (B).

12. Obtain a release rate (Ci/sec) from step 6. or step 7. of this attachment and place in Column (C).

13. Enter the noble gas correction factor from Table 3. of Attachment 3 in Column (D) for the Total Effective Dose Equivalent rate.

14. Enter the Radioiodine correction factor from Table 6. of Attachment 3 in Column (D) for the Thyroid Dose rate.

ATTACHMENT 5: CALCULATIONS FOR CONTAINMENT RELEASES USING RE 4596A OR RE 4596B
(Cont.)

15. To determine the Total Effective Dose Equivalent rate and Thyroid dose rate, complete the following equation:

{Column (B) value} X {Column (C) value} X {Column (D) value} =
{Column (E) Dose rate (REM/hr)}

TOTAL EFFECTIVE DOSE EQUIVALENT RATE

Downwind Distance (Miles)	(A) $\frac{X\mu}{Q}$ (m^{-2})	(B) $\frac{X}{Q}$ (sec/m^3)	(C) XE-133 Release Rate (Ci/sec)	(D) Correction Factor from Table 3. of Attachment 3	(E) Dose Rate (REM/hr)
0.75					
2					
5					
10					

THYROID DOSE RATE

Downwind Distance (Miles)	(A) $\frac{X\mu}{Q}$ (m^{-2})	(B) $\frac{X}{Q}$ (sec/m^3)	(C) I-131 Release Rate (Ci/sec)	(D) Correction Factor from Table 6. of Attachment 3	(E) Dose Rate (REM/hr)
0.75					
2					
5					
10					

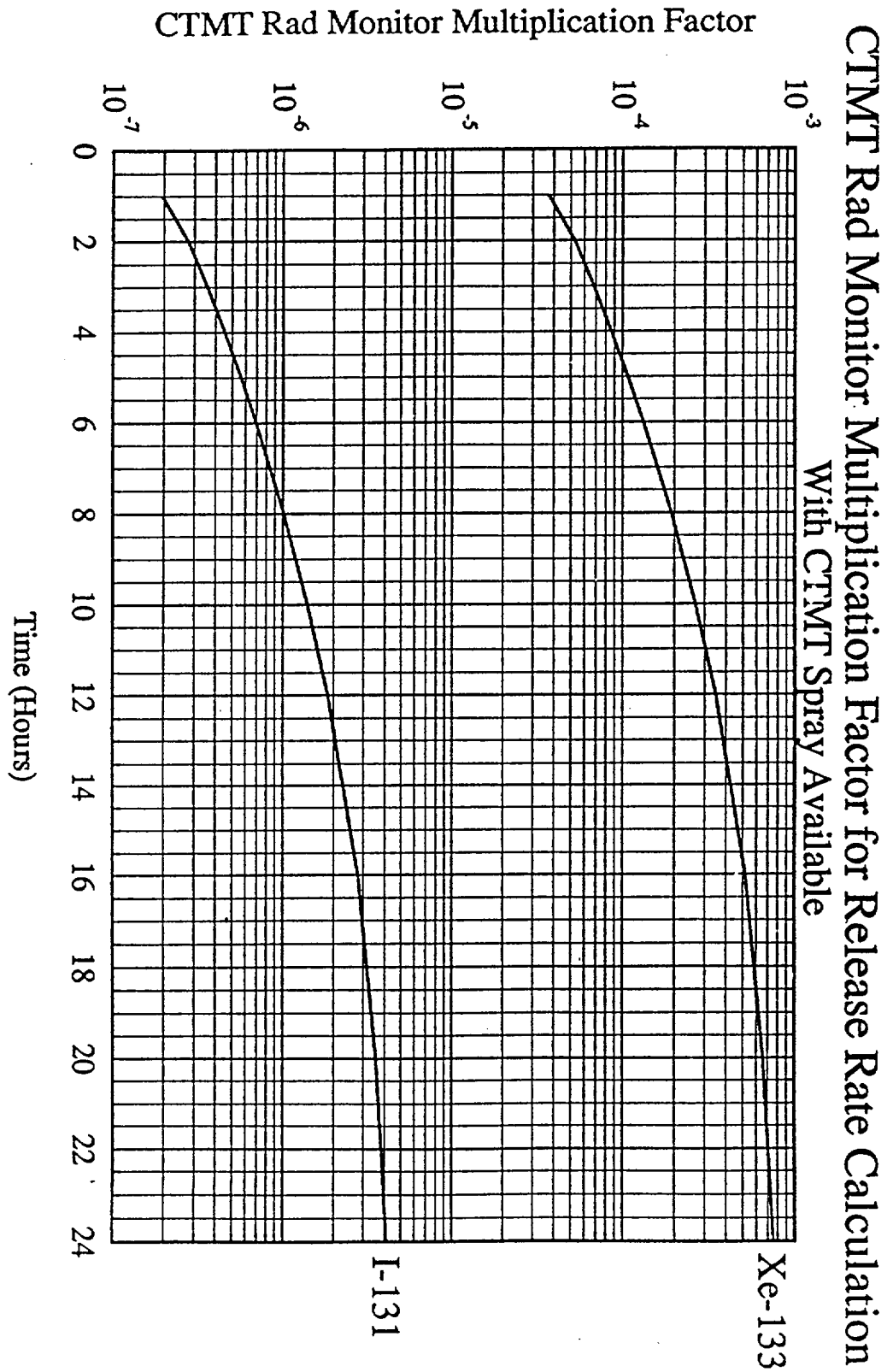
ATTACHMENT 5: CALCULATIONS FOR CONTAINMENT RELEASES USING RE 4596A OR RE 4596B
(Cont.)

Table 1. $\frac{\chi u}{Q}$ (m^{-2}) for Stability Classes as a Function of Downwind Distances

Miles	A	B	C	D	E	F	G
0.75	2.1E-6	1.4E-5	3.5E-5	9.9E-5	2.0E-4	4.5E-4	1.3E-3
2	1.1E-7	2.0E-6	5.8E-6	2.2E-5	4.6E-5	1.0E-4	2.8E-4
5	7.1E-9	3.2E-7	1.1E-6	5.5E-6	1.3E-5	3.1E-5	8.2E-5
10	8.9E-10	8.0E-8	3.2E-7	2.0E-6	5.1E-6	1.3E-5	3.4E-5

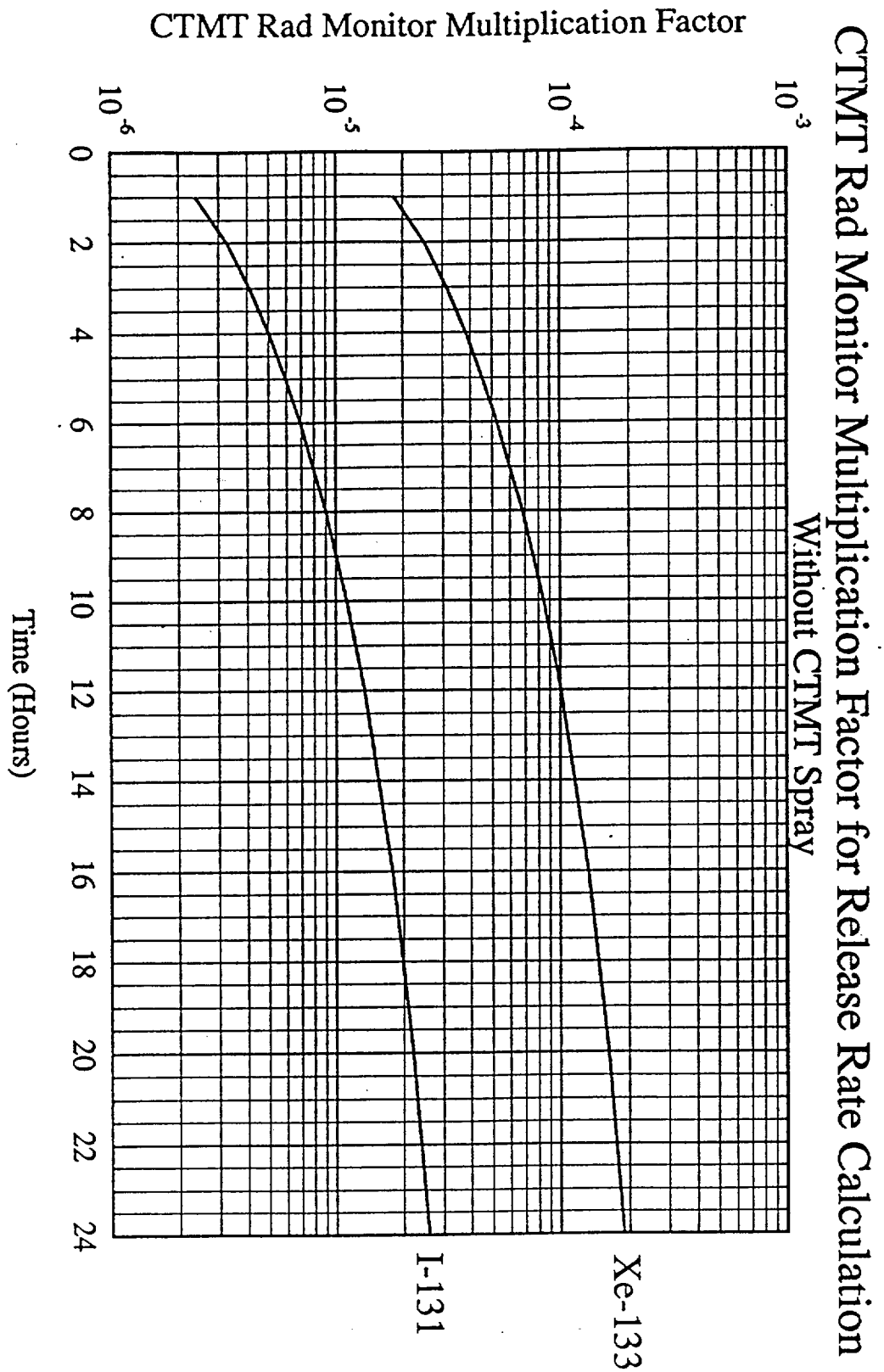
ATTACHMENT 5: CALCULATIONS FOR CONTAINMENT RELEASES USING RE 4596A OR RE 4596B
(Cont.)

FIGURE 1



ATTACHMENT 5: CALCULATIONS FOR CONTAINMENT RELEASES USING RE 4596A OR RE 4596B
(Cont.)

FIGURE 2



ATTACHMENT 6: RELEASE RATE CALCULATIONS FOR RELEASES FROM CONTAINMENT USING THE HIGH RANGE NOBLE GAS MONITOR, RE 4597 AB OR RE 4597 BB

1. Record the date and time. Date _____ Time _____

NOTE 2.

- Obtain containment noble gas concentration from DADS by accessing SPDS, F16 - Radiation Trends.
- Obtain containment pressure from DADS by accessing SPDS, F17 - Containment Trends; or by accessing CRT DISPLAYS: points P314, P315, P316, and P317.

2. Determine the containment noble gas concentration from RE 4597 AB or RE 4597 BB (circle one). _____ µCi/cc

3. Determine the containment pressure in psia and convert to psig, if necessary. _____ PSIA - 14.7 = _____ PSIG

4. Determine the containment leak rate fraction by multiplying the square root of containment pressure in PSIG times 8.3 E-4.

   $\sqrt{\text{(From 3.)}}$ PSIG x 8.3 E-4 = _____ leak rate (fraction per day)

   IF containment pressure cannot be obtained, THEN use 5.0 E-3 leak rate fraction per day.

5. Determine the Release Rate from containment.

$$0.928 \frac{\text{cc-Ci}}{\text{sec-µCi}} \times (\text{From 4.}) \times \left(\frac{\text{µci}}{\text{cc}}\right)_{\text{From 2.}} = \text{(Release Rate)} \text{ Ci/sec}$$

6. Perform one of the following:
   a. Insert the Release Rate into Step 4 of DATA SHEET 1 of Attachment 3 and complete DATA SHEET 1 for noble gas.
   b. Plot the release rate on scale (C) of the Offsite Dose Assessment Nomogram and complete Attachment 2, Instructions for Offsite Dose Assessment Nomogram.

ATTACHMENT 7: DOSE PROJECTIONS BASED ON FIELD MONITORING DATA

> **NOTE**
>
> This calculation does not include that contribution to TEDE from radioiodide internal exposure. The maximum amount of difference associated with this assumption is 3% of the total.

TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE)

1. Record date and time. Date _____ Time _____

2. Record the distance downwind that the sampling location lies from the release point (to the nearest ½ mile) _____ miles.

3. Record Stability Class (circle one) A B C D E F G

   (From Step 6.3.4)

4. Record survey meter reading (closed-window). (A)_____mREM/hr

5. Record $\frac{Xu}{Q}$ value at the sampling location (from Table 4. of this attachment). (B)_____m^{-2}

6. Record $\frac{Xu}{Q}$ values for 0.75, 2, 5, and 10 miles in column (C) (from Table 4. of this attachment).

7. Divide (A) by (B) and multiply times (C) then divide by 1000 to obtain the TEDE rate for each downwind distance below.

Table 1. TEDE Rate

	(C)	(D)
Downwind Distance	$\frac{Xu}{Q}$ (m^{-2})	TEDE RATE $(\frac{A}{B}) \times C \div 1000 = \frac{REM}{hr}$
0.75 mile		
2 mile		
5 mile		
10 mile		

ATTACHMENT 7: DOSE PROJECTIONS BASED ON FIELD MONITORING DATA (Cont.)

THYROID DOSE RATE (CDE)

1. Record date and time. Date _____ Time _____

2. Record sample start time. _____

3. Record net reading of air sampler cartridge _____ net cpm.

4. Record air sampler flow rate _____ CFM.

5. Record sample collection time _____ minutes.

6. Determine Sample volume $\frac{\text{\_\_\_\_\_ CFM}}{\text{(From 4.)}} \times \frac{\text{\_\_\_\_\_ minutes}}{\text{(From 5.)}} = \frac{\text{\_\_\_\_\_ ft}^3}{\text{(Total Volume)}}$

7. Multiply the net cpm reading by 4.2 E-9 $\frac{\mu Ci/cc \cdot ft^3}{cpm}$ and divide by the sample volume.

$\frac{\text{\_\_\_\_\_ net cpm}}{\text{(From 3.)}} \times 4.2\text{ E-9} \div \frac{\text{\_\_\_\_\_ ft}^3}{\text{(From 6.)}} = \frac{\text{\_\_\_\_\_ } \mu Ci/cc}{\text{(Iodine Air Conc.)}}$

8. Record the distance downwind that the sampling location lies from the release point (to the nearest ½ mile) _____ miles.

9. Record Stability Class (circle one) A B C D E F G

(from Step 6.3.4)

10. Multiply Iodine Air Concentration by the appropriate correction factor from Table 6. of Attachment 3 to obtain Thyroid Dose Rate at sampling location.

$\frac{\text{\_\_\_\_\_ } \mu Ci}{cc} \times \frac{\text{\_\_\_\_\_}}{\text{from Table 6. of Attachment 3}} =$ (A) _____ $\frac{REM}{hr}$

11. Record $\frac{Xu}{Q}$ value at the sampling location (from Table 4. of this attachment) (B) _____ m^{-2}

12. Record $\frac{Xu}{Q}$ values for 0.75, 2, 5, and 10 miles in Column (C) (from Table 4. of this attachment).

ATTACHMENT 7: DOSE PROJECTIONS BASED ON FIELD MONITORING DATA (Cont.)

13. Divide (A) by (B) and multiply times (C) to obtain Thyroid Dose Rate (D) [Committed Dose Equivalent (CDE)].

Table 2. Thyroid Dose Rate

	(C)	(D)
Downwind Distance	$\frac{\chi u}{Q}$ (m^{-2})	THYROID DOSE RATE $(\frac{A}{B}) \times C = \frac{REM}{hr}$
0.75 mile		
2 mile		
5 mile		
10 mile		

14. Total Organ Dose Equivalent (TODE) to the Thyroid is equal to:

$$TEDE_r + CDE_{tr} = TODE_{tr}$$

(REM/hr) (REM/hr) (REM/hr)

$TODE_{tr}$ = Total Organ Dose Equivalent (TODE) to the Thyroid @ distance r

$TEDE_r$ = Total Effective Dose Equivalent (TEDE) @ distance r

CDE_{tr} = Committed Dose Equivalent (CDE) to the Thyroid @ distance r

Table 3. TODE to the Thyroid

Downwind Distance	$TEDE_r$ (REM/hr)	CDE_{tr} (REM/hr)	$TODE_{tr}$ (REM/hr)
0.75 mile			
2 mile			
5 mile			
10 mile			

ATTACHMENT 7: DOSE PROJECTIONS BASED ON FIELD MONITORING DATA (Cont.)

Table 4. $\frac{\chi\mu}{Q}$ (m^{-2}) for Various Stability Classes as a Function of Distance

	Stability Class						
MILES	A	B	C	D	E	F	G
0.75	2.1E-6	1.4E-5	3.5E-5	9.9E-5	2.0E-4	4.5E-4	1.3E-3
1	9.0E-7	8.0E-6	2.1E-5	6.3E-5	1.3E-4	2.9E-4	8.0E-4
1.5	2.6E-7	3.6E-6	9.8E-6	3.3E-5	7.0E-5	1.6E-4	4.3E-4
2	1.1E-7	2.0E-6	5.8E-6	2.2E-5	4.6E-5	1.0E-4	2.8E-4
2.5	5.7 E-8	1.3E-6	3.9E-6	1.5E-5	3.3E-5	7.7E-5	2.1E-4
3	3.3 E-8	8.9E-7	2.8E-6	1.2E-5	2.6E-5	6.0E-5	1.6E-4
3.5	2.1E-8	6.5E-7	2.1E-6	9.3E-6	2.1E-5	4.9E-5	1.3E-4
4	1.4E-8	5.0E-7	1.7E-6	7.6E-6	1.7E-5	4.1E-5	1.1E-4
4.5	9.8E-9	4.0E-7	1.3E-6	6.4E-6	1.5E-5	3.5E-5	9.4E-5
5	7.1E-9	3.2E-7	1.1E-6	5.5E-6	1.3E-5	3.1E-5	8.2E-5
5.5	5.4E-9	2.7E-7	9.3E-7	4.8E-6	1.1E-5	2.7E-5	7.3E-5
6 & 6.5	3.8E-9	2.1E-7	7.5E-7	4.0E-6	9.5E-6	2.3E-5	6.2E-5
7 & 7.5	2.4E-9	1.5E-7	5.6E-7	3.2E-6	7.8E-6	1.9E-5	5.1E-5
8 & 8.5	1.6E-9	1.2E-7	4.5E-7	2.6E-6	6.6E-6	1.7E-5	4.3E-5
9 & 9.5	1.1E-9	9.4E-8	3.7E-7	2.2E-6	5.6E-6	1.5E-5	3.8E-5
10	8.9E-10	8.0E-8	3.2E-7	2.0E-6	5.1E-6	1.3E-5	3.4E-5

ATTACHMENT 8: ESTIMATION OF TOTAL POPULATION DOSE

NOTE

Use this attachment during Recovery, as a first estimate of Total Population dose from the release.

1. IF DADS is available,
THEN select Total Population Dose option on the main menu, and complete.
OTHERWISE complete the following worksheet.

Sector Worksheet Instructions

1. Record Total Effective Dose Equivalent (TEDE) or thyroid dose rate for a given release in REM/hr in Column (A).

   1.1 Use the 0.75-mile TEDE and thyroid dose rates for the 0-2 mile population, the 2-mile TEDE and thyroid dose rates for the 2-5 mile population, and the 5-mile TEDE and thyroid dose rates for the 5-10 mile population for conservatism.

2. Multiply Column (A) times exposure duration and record in Column (B).

3. Record the number of persons in the affected sector for the given distance and time of exposure in Column (C).

   3.1 IF an evacuation has occurred,
   THEN local officials may have the number of individuals remaining in the sector.

   3.2 IF an evacuation has not occurred,
   OR local officials do not have the required information,
   THEN take the data from "Development of Evacuation Time Estimates for Davis-Besse Nuclear Power Station".

4. Multiply Column (B) times Column (C) and record in Column (D).

5. Total the Column (D) values.

6. GO TO Cumulative Exposure Worksheet, Page 4 of this attachment.

ATTACHMENT 8: ESTIMATION OF TOTAL POPULATION DOSE (Cont.)

1. Date of exposure: _____ Sector: _____

2. Time exposure began: _____

3. Exposure duration: _____ hours

TOTAL EFFECTIVE DOSE EQUIVALENT

Mile	(A) REM/hr	(B) REM	(C) Number of Persons	(D) PERSON-REM
0-2				
2-5				
5-10				

Total Effective Dose Equivalent (TEDE) PERSON-REM _____

THYROID

Mile	(A) REM/hr	(B) REM	(C) Number of Persons	(D) PERSON-REM
0-2				
2-5				
5-10				

Total
Thyroid PERSON-REM _____

ATTACHMENT 8: ESTIMATION OF TOTAL POPULATION DOSE (Cont.)

Cumulative Exposure Worksheet

1. Record the total PERSON-REM values from each Sector Worksheet. Sum the total PERSON-REM values to obtain the estimated Total Population Dose.

Date/Time/Sector	TEDE PERSON-REM	Cumulative TEDE PERSON-REM	Total Thyroid PERSON-REM	Cumulative Thyroid PERSON-REM

Date Completed_____ Name_____

ATTACHMENT 9:
CALCULATIONS USING SPDS

NOTE

- Ensure that the correct instrument is selected. The Drop Down boxes allow different instruments to be selected.
- Instrument readings that are applicable to the selected release paths will appear.
- Some instrument readings do not have a corresponding computer point. These inputs require manual entry per Section B.

A. COMPUTER INPUTS

1. CLICK the Release Path(s).
2. VERIFY instrument readings for the Release Path(s) selected are correct.
   a. IF instrument readings are not displayed or appear incorrect,
      (1) VERIFY the computer selection box is checked for the instrument.
      (2) VERIFY the correct instrument(s) is selected.
      (3) IF the instrument reading is now correct,
      GO TO step A.3.
      (4) IF the instrument reading(s) requires manual input,
      GO TO step B.2.
3. ENTER the hours since reactor trip (0-24) AND
   PRESS the Enter Key.
4. ENTER the release start (HH:MM) AND
   PRESS the Enter Key.
5. ENTER the projected release duration (hrs.) AND
   PRESS the Enter Key.
6. REVIEW the Dose, Dose Rates and Protective Action.
7. GO TO step A.3 to repeat dose assessment and protective action calculations.

B. MANUAL INPUT

1. CLICK the Release Path(s).
2. CLICK the computer selection box for the instrument(s) AND
   VERIFY that the computer selection box is empty.
3. ENTER the selected instrument reading(s) in the instrument box(s).
4. ENTER the hours since reactor trip (0-24) AND
   PRESS the Enter Key.
5. ENTER the release start (HH:MM) AND
   PRESS the Enter Key.
6. ENTER the projected release duration (hrs.) AND
   PRESS the Enter Key.
7. REVIEW the Dose, Dose Rates and Protective Action.
8. GO TO step B.3 to repeat dose assessment and protective action calculations.

COMMITMENTS

Step Number	Reference	Comments
Attachment 5	TERMS 0 13593	Distance calculation methodology has been reexamined for compatibility with HS-EP-02245
Attachment 3	TERMS 0 13594	Output data (dose rate) has been made consistent throughout this procedure
Attachment 5, Attachment 6	TERMS 0 13539	Dose rates based on CTMT dome monitor and CTMT atmosphere sampling system
Step 6.3.6	TERMS 0 14992	Addresses lake breeze
Attachment 3	TERMS 0 13506	Noble gas correction factor which changes with time after reactor shutdown