EMERGENCY PLAN IMPLEMENTING PROCEDURES

REVISION CONTROL SHEET

Revision No. 13

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Page/Proc	Date	Rev.	Page/Proc	Date	Rev.	Page/Proc	Date	Rev.
INDEX	3-15-83	6						
1.1	3-1-82	1						
1.2	6/9/82	2						
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2.1	1/15/82	2						
2.2	10/4/82	4						
2.3	12/2/81	0						
3.1	3/1/82	2						
3.2	3/1/82	3						
3.3a	3/11/83	2						
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4.1	DELETED							
4.2	5/11/81	0						
4.3	10/19/81	1						
4.4	7/30/82	1						
4.5	5/13/82	0						
5.1	11/24/81	1						
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1.0 PURPOSE

This procedure provides instructions for estimating the downwind dose rates resulting from noble gas and radioiodine releases immediately following an emergency at DAEC.

2.0 APPLICABILITY

This procedure applies to immediate specific steps to be taken by control room operations personnel during a release of radioactive materials to the environment.

3.0 RESPONSIBILITIES

3.1 Shift Supervising Engineer

Perform dose projection calculations until the Site Radiation Protection Coordinator arrives or the EOF is manned.

3.2 Site Radiation Protection Coordinator

Initially evaluate the results of dose projection calculations.

Initially identify the need for field survey data to backup projected dose calculations.

3.3 Emergency Coodinator

Initially advise local and State authorities of the results of dose projection calculations and provide protective action recommendations as required.

4.0 INTRODUCTION

The major objective of this procedure is to perform the offsite dose estimate for comparison with protective action guidelines to determine the appropriate emergency action to be taken following an accidental atmospheric release of radioactive material. As a result of this objective the procedure has been developed with four major parts. The first consists of the main body of the procedure and contains general information about the procedure, general instructions for its use and the protective action guidelines. The second part consists of a Data Summary Sheet, Attachment I, which contains all the monitor data necessary for the dose projections. The third part, Attachment II, consists of a summary Table to be completed during the dose estimation procedure. This table contains all the information necessary for comparison with the protective action guidelines. The completion of this table requires a number of calculations to be performed. These calculations are set up in detail on Calculation Sheets which comprise the fourth part of the procedure, Attachment III. The, Data Summary Sheet, Summary Table, and the Calculation Sheets are designed to be used together, that is, the Calculation Sheets are required to complete the Summary Table while

information from the Data Summary Sheet and Summary Table is required in many of the calculations performed on the Calculation Sheets. When calculations are required the Summary Table references the appropriate segment of the Calculation Sheets to be completed, likewise when data is required from the Data Summary Sheet and Summary Table the appropriate Data Summary Sheet or Summary Table line number is referenced on the Calculation Sheet.

NOTE

A supply of Data Summary Sheets, Summary Tables, and Calculation Sheets are to be maintained in the Control Room and Technical Support Center (TSC) for emergency use.

5.0 INSTRUCTIONS

5.1 This simplified method shall be used by operations personnel for determining initial dose estimates only. It should be used until the Site Radiation Protection Coordinator arrives, but not beyond one(1) hour after shutdown. At that time, EPIP 3.3b shall be used.

One (1) hour after shutdown decay factor.

5.2 If an accidental atmospheric release of radioactive material has been identified or there is a significant change in the release rate a dose projection is to be performed as follows.

5.2.1 Complete Data Summary Sheet.

5.2.2 Complete Section I of the Summary Table, General Information, using Calculation Sheet I where referenced.

5.2.3 Complete Section II of the Summary Table, Release Information, to determine the total gaseous release rate from the Reactor Building Stacks, the Offgas Stack, and the Turbine Building Roof Exhaust. Use Calculation Sheet II, where referenced, to perform the necessary release rate calculations.

When multiple monitor ranges are available complete the calculations for ONE range ONLY. Use the range which gives a reading nearest mid-scale.

5.2.4 Complete Section III of the Summary Table, Dose Information. Use Calculation Sheet III, where referenced, to perform all necessary calculations. Calculation Sheet III is divided into five sections of which only two are to be completed. Section I is always completed and determines, based on the atmospheric stability, which one of the remaining four sections is to be used to perform the dose estimation. The Calculation Sheet subsections referenced in Section III of the Summary Table are those of the appropriate section for dose estimation as determined by Section I. That is, Sections II through V of Calculation Sheet III have the same format only the constants which are dependent on atmospheric stability are different.

5.2.5 Report the results of the dose estimation calculations, i.e., supply copies of the Summary Table, to the Emergency Coordinator and/or the Site Radiation Protection Coordinator.

5.2.6 The Operations Shift Supervisor shall compare the dose estimates from the Summary Table to the following Protective Action Guidelines and initiate the appropriate action until the Site Radiation Protection Coordinator is available.

PROTECTIVE ACTION GUIDELINES

Projected Exposure to An Individual In the Population	Recommended Action
Whole Body = less than 1 Rem or Thyroid = less than 5 Rem.	1. No protective action required. 2. Issue an advisory to seek shelter and await further instructions or voluntarily evacuate. 3. Monitor environmental radiation levels.
Whole Body = 1 to 5 Rem or Thyroid = 5 to 25 Rem	1. Seek shelter and await further instructions. 2. Consider evacuation, particularly for children and pregnant women. 3. Monitor environmental radiation levels. 4. Control access.
Whole Body = 5 Rem and above or Thyroid = 25 Rem and above	1. Conduct evacuation of populations in the predetermined area. 2. Monitor environmental radiation levels and adjust area for evacuation based on these controls. 3. Control access.

6.0 REFERENCES

1. Duane Arnold Energy Center Emergency Plan
2. IELP Corporate Emergency Response Plan

7.0 ATTACHMENTS

1. Data Summary Sheet
2. Summary Table
3. Calculation Sheets

APPROVED BY: Keith Young DATE: 4/28/83
Radiation Protection Supervisor

REVIEWED BY: [illegible] DATE: 4/-9/83
ALARA Coordinator

APPROVED BY: RE Brink for DATE: 4-30-83
Operations Supervisor

REVIEWED BY: BR York DATE: 4-30-83
Chairman, Operations Committee

APPROVED BY: BR York for DATE: 4-30-83
Plant Superintendent - Nuclear

ATTACHMENT I, DATA SUMMARY SHEET

Date: _____ Recorded By: _____
Time: _____ Calculation Number: _____

I. METEROLOGICAL DATA

1. Wind Direction[a] _____ degrees
2. Wind speed[a] _____ mph
3. Δ T[b] _____ °F

NOTES:

[a]Obtain wind speed and direction from met panel in control room or Cedar Rapids Flight Service at 9-364-7127.

[b]Obtain from atmospheric Δ T recorder readout in control room.

II. RELEASE DATA

A. Reactor Building Stacks - Obtain release concentrations from the effluent monitoring system.

			Range		
1. "A" Stack Conc.[a]	_____ uCi/cc	Hi ☐	Int. ☐	Nor. ☐
2. "B" Stack Conc.[a]	_____ uCi/cc	Hi ☐	Int. ☐	Nor. ☐
3. "C" Stack Conc.[a]	_____ uCi/cc	Hi ☐	Int. ☐	Nor. ☐
4. "A" Stack Flow[b]	_____ cfm			
5. "B" Stack Flow[b]	_____ cfm			
6. "C" Stack Flow[b]	_____ cfm			

ATTACHMENT I, DATA SUMMARY SHEET (continued)

B. Offgas Stack - obtain release concentration from the effluent monitoring system.

		Range
1. Offgas Stack Conc.[a]	_____uCi/cc	Hi ☐ Int. ☐ Nor. ☐
2. Offgas Stack Flow[c]	_____cfm	

C. Turbine Exhaust - obtain release concentration from the effluent monitoring system.

1. Turb. Exhaust Conc.[a]	_____uCi/cc	Hi ☐ Int. ☐ Nor. ☐
2. Turb. Exhaust Flow[d]	_____cfm	

Notes (a-d):

a. Data collected from Kaman Effluent Monitoring System see PASAP 6.0 and PCP 10.6A for system operating instructions.

b. Data available either from the Kaman Effluent Monitoring System or from Control Room Panel 1C-23.

c. Data available either from the Kaman Effluent Monitoring System or from Control Room Panel 1C-02.

d. Data available either from the Kaman Effluent Monitoring System or can be estimated by: 18,000 cfm for each fan in slow speed
36,000 cfm for each fan in fast speed

ATTACHMENT I, DATA SUMMARY SHEET (continued)

D. Miscellaneous Data

1. Is Standby Gas Treatment for Offgas Stack Exhaust in operation:

   YES [ ] NO [ ]

2. Anticipated duration of release _____hours. (If no estimate is available use 1.77 hours.)

ATTACHMENT II, SUMMARY TABLE

Calculations Performed By: _____

I. GENERAL INFORMATION

1. Calculation Number: _____ Date: _____ Time: _____
2. Time after Shutdown: _____ hours
3. Wind Direction: _____ deg. (Data Summary Sheet Section I, line 1).
4. Down Wind Direction: _____ deg. (180° different from 3 above)
5. Wind Speed _____ meters/sec (Calculation Sheet I,A.1)
6. Δ T: _____ °F, Stability Class: _____ (calc. sheet I. sec. B)

II. RELEASE INFORMATION

1. Exposure Time _____ hours (Data Summary Sheet Section II D, line 2).
2. Release rate Reactor Bldg. Stack: _____ Ci/sec or 0.3 x _____ Ci/sec. = _____ actual Ci/sec. (see Note A) (Calc. sheet II, sec. I)
3. Release rate - offgas stack _____ Ci/sec a or 0.3 x _____ Ci/sec. = _____ actual Ci/sec. (see Note A) (Calc. sheet II, sec. II)
4. Release rate - Turbine Bldg. Roof Exhaust: _____ Ci/sec 0.3 x _____ Ci/sec = _____ actual Ci/sec. (see Note A) (calc. sheet II, sec. III)
5. Total Gaseous Release Rate: _____ Ci/sec (add release rates from previous three lines)

Note A: If the monitor readings were obtained from the intermediate or high range effluent monitor multiply by 0.3 to obtain actual realease rates. This corrects for monitor response at 1 hour per P.A.S.A.P. 7.1.

ATTACHMENT II, SUMMARY TABLE (continued)

III. DOSE INFORMATION

1. Cal. sheet III, section number for remainder of calculations: _____ (calc. sheet III, sec. I)

	Distance from Source			
	Site Bdy[a]	Point of max. X/Q for Offgas Stack release[b]	2mi	5mi	10mi
2. Normalized concentration, X/Q, sec/m^3, Ground level release (calc. sheet III, subsect.A)[c]	____	_____	_____	_____	_____
3. Normalized concentration, X/Q, sec/m^3, Elevated release (calc. sheet III,subsect. B)[c]	____	_____	_____	_____	_____
4. Whole body dose rate, mrem/hr (calc. sheet III, subsect. B)[c]	____	_____	_____	_____	_____
5. Whole body dose, mrem (calc. sheet III, subsect. C)[c]	____	_____	_____	_____	_____
6. Thyroid dose commitment[d], mrem (calc. sheet III, subsect. D)[c]	____	_____	_____	_____	_____
7. Total plume width, meters(miles) (calc. sheet III, subsect. E)[c]	____	_____	_____	_____	_____
8. Plume arrival time, hr (calc. sheet III, subsect. F)[c]	____	_____	_____	_____	_____

ATTACHMENT II, SUMMARY TABLE (continued)

NOTES:

[a]Assumes wind direction in the ESE sector. For directions in other sectors doses will be lower and plume arrival time and width will be greater.

[b]For stability class FG the distance to the maximum X/Q is greater than 10 miles. In order to limit the dose information to the EPZ a distance of 10 miles is used for class FG.

[c]Calculation sheet subsection refers to the subsection of the Calculation Sheet III section as given in line 1 of Section III of this table.

[d]The thyroid dose commitment given is for an infant, i.e., the worst case. The adult dose commitment is obtained by multiplying by 0.58.

ATTACHMENT III, CALCULATION SHEET I

GENERAL INFORMATION

A. Wind Speed

1. Wind Speed _____mph (Data Summary Sheet, Section I, line 2) x 0.447 =

|_____| Meters/sec (to Summary Table sec. I, line 5)

B. Stability Class

1. ΔT |_____| °F - obtained from Data Summary Sheet, Section I, line 3 (to Summary Table sec. I, line 6)

2. Stability class is determined from the following table as a function of ΔT.

Stability class |_____| (to Summary Table, sec I, line 6)

Δ T Range, °F	Stability Class
-1.26 or less	AB
-1.26 to -1.11	C
-1.11 to 1.11	DE
1.11 or greater	FG

ATTACHMENT III, CALCULATION SHEET II Page 1 of 3

RELEASE INFORMATION

I. Reactor Building Stack Releases

1. "A" Stack Conc.[a] _____ uCi/cc x "A" Stack Flow[a]

_____ cfm x 472 = _____ uCi/sec

2. "B" Stack Conc.[a] _____ uCi/cc x "B" Stack Flow[a]

_____ cfm x 472 = _____ uCi/sec

3. "C" Stack Conc.[a] _____ uCi/cc x "C" Stack Flow[a]

_____ cfm x 472 = _____ uCi/sec

4. "A" Stack Release Rate _____ uCi/sec
"B" Stack Release Rate _____ uCi/sec
"C" Stack Release Rate _____ uCi/sec
Total Release Rate _____ uCi/sec x

$$\frac{1 \text{ Curie}}{10^6 \text{ uCi}} = \boxed{} \text{ Ci/sec}$$

(To Summary Table, Sec. II, Line 2)

Note:
a. Obtain data from Data Summary Sheet, Section II.A, line 2.

II. Offgas Stack Releases

1. Stack Conc.[a] _____ uCi/cc x Offgas Stack

Flow[a] _____ cfm x 472 = _____ uCi/sec

2. Release rate _____ uCi/sec x $\frac{1 \text{ Curie}}{10^6 \text{ uCi}}$ =

$\boxed{}$ Ci/sec

(To Summary Table, Sec. II, Line 3)

Note:
a. Obtain data from Data Summary Sheet, Section II.B.

ATTACHMENT III, CALCULATION SHEET II (continued) Page 2 of 3

III. Turbine Building Releases

1. Release Conc.[a] _____ uCi/cc x Flow[a] _____ cfm x 472 =

_____ uCi/sec

2. Release rate _____ uCi/sec x $\frac{1 \text{ Curie}}{10^6 \text{ uCi}}$ =

Ci/sec

(To Summary Table Sec. II, Line 4)

Note:

a. Obtain data from Data Summary Sheet, Section II.C.

ATTACHMENT III, CALCULATION SHEET III Page 3 of 3

DOSE INFORMATION

I. Section for the remaining calculations [ ] - Appropriate section is determined from the following table based on the atmospheric stability class. Complete ONLY ONE section.

Stability Class (from Summary Table, Section I, line 6)	Section
AB	II (page 18 of 41)
C	III (page 22 of 41)
DE	IV (page 28 of 41)
FG	V (page 35 of 41)

ATTACHMENT III, CALCULATION SHEET III (continued)

II. Dose information for atmospheric stability class AB

A. Normalized concentration, Ground Level Release - Results for Summary Table, Section III, Line 2.

1. $4.0 \times 10^{-5} \div$ _____ m/sec[a] = [ ] $\frac{sec}{m^3}$ at site boundary

2. $5.3 \times 10^{-5} \div$ _____ m/sec[a] = [ ] $\frac{sec}{m^3}$ at point of max X/Q for offgas stack release

3. $3.8 \times 10^{-7} \div$ _____ m/sec[a] = [ ] $\frac{sec}{m^3}$ at 2 miles

4. $4.0 \times 10^{-8} \div$ _____ m/sec[a] = [ ] $\frac{sec}{m^3}$ at 5 miles

5. $7.4 \times 10^{-9} \div$ _____ m/sec[a] = [ ] $\frac{sec}{m^3}$ at 10 miles

NOTE:

[a]Obtain wind speed from Summary Table, Section I, line 5.

B. Normalized concentration, Elevated Release - Results for Summary Table Section III, line 3.

1. $2.2 \times 10^{-5} \div$ _____ m/sec[a] = [ ] $\frac{sec}{m^3}$ at site boundary

2. $2.4 \times 10^{-5} \div$ _____ m/sec[a] = [ ] $\frac{sec}{m^3}$ at point of max X/Q for offgas stack release

3. $3.5 \times 10^{-7} \div$ _____ m/sec[a] = [ ] $\frac{sec}{m^3}$ at 2 miles

4. $3.9 \times 10^{-8} \div$ _____ m/sec[a] = [ ] $\frac{sec}{m^3}$ at 5 miles

5. $7.6 \times 10^{-9} \div$ _____ m/sec[a] = [ ] $\frac{sec}{m^3}$ at 10 miles

NOTE:
[a]Obtain wind speed from Summary Table Section I, line 5.

ATTACHMENT III, CALCULATION SHEET III (continued)

C. Whole body dose rate - Results from Summary Table Section III, line 4.

1. _____ $\frac{Ci^a}{sec}$ + _____ $\frac{Ci^b}{sec}$ = _____ $\frac{Ci}{sec}$

2. [_____ $\frac{Ci}{sec}$ (from line 1) x 32.0

divided by _____ $\frac{m^c}{sec}$] + [_____ $\frac{Ci^d}{sec}$ x 11.0^e

divided by _____ $\frac{m^c}{sec}$] = [_____] $\frac{mrem}{hr}$ at site boundary

3. [_____ $\frac{Ci}{sec}$ (from line 1) x 42.4

divided by _____ $\frac{m^c}{sec}$] + [_____ $\frac{Ci^d}{sec}$ x 12.0^e

divided by _____ $\frac{m^c}{sec}$] = [_____] $\frac{mrem}{hr}$ at point of max X/Q for offgas stack release

4. [_____ $\frac{Ci}{sec}$ (from line 1) x 0.304

divided by _____ $\frac{m^c}{sec}$] + [_____ $\frac{Ci^d}{sec}$ x 0.280^e

divided by _____ $\frac{m^c}{sec}$] = [_____] $\frac{mrem}{hr}$ at 2 miles

5. [_____ $\frac{Ci}{sec}$ (from line 1) x 3.20×10^{-2}

divided by _____ $\frac{m^c}{sec}$] + [_____ $\frac{Ci^d}{sec}$ x 3.8×10^{-2e}

divided by _____ $\frac{m^c}{sec}$] = [_____] $\frac{mrem}{hr}$ at 5 miles

ATTACHMENT III, CALCULATION SHEET III (continued)

6. [_____ $\frac{Ci}{sec}$ (from line 1) x 5.92×10^{-3}

divided by _____ $\frac{m^c}{sec}$] + [_____ $\frac{Ci}{sec}^{d}$ x 1.7×10^{-2e}

divided by _____ $\frac{m^c}{sec}$] = [_____] $\frac{mrem}{hr}$ at 10 miles

NOTES:

[a]Reactor building stack release rate from Summary Table, Section II, line 2.

[b]Turbine building roof exhaust release rate from Summary Table, Section II, line 4.

[c]Wind speed from Summary Table, Section I, line 5.

[d]Offgas stack release rate from Summary Table, Section II, line 3.

[e]If Standby Gas Treatment is in operation (see Data Summary Sheet, Section II D, line 1) multiply this number by 0.662.

D. Whole body dose - Results for Summary Table Section III, line 5.

1. _____ $\frac{mrem}{hr}$ (from line C2) x _____ hr[a]

= [_____] mrem at site boundary

2. _____ $\frac{mrem}{hr}$ (from line C3) x _____ hr[a]

= [_____] mrem at point of max X/Q for offgas stack release

3. _____ $\frac{mrem}{hr}$ (from line C4) x _____ hr[a]

= [_____] mrem at 2 miles

4. _____ $\frac{mrem}{hr}$ (from line C5) x _____ hr[a]

= [_____] mrem at 5 miles

ATTACHMENT III, CALCULATION SHEET III (continued)

5. _____ $\frac{mrem}{hr}$ (from line C6) x _____ hr[a]

= | _____ | mrem at 10 miles

NOTE:

[a]Obtain exposure time from Summary Table, Section II, line 1.

E. Thyroid Dose Commitment - Result for Summary Table, Section III, line 6.

1. (_____ $\frac{Ci^a}{sec}$ + _____ $\frac{Ci^b}{sec}$) x 0.3 = _____ $\frac{Ci}{sec}$

2. _____ $\frac{Ci^c}{sec}$ x 0.3[d] = _____ $\frac{Ci}{sec}$

3. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.1)

\+ _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.1)

= _____ $\frac{Ci}{m^3}$

4. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.2)

\+ _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.2)

= _____ $\frac{Ci}{m^3}$

5. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.3)

\+ _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.3)

= _____ $\frac{Ci}{m^3}$

6. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.4)

\+ _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.4)

= _____ $\frac{Ci}{m^3}$

ATTACHMENT III, CALCULATION SHEET III (continued)

7. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.5)
   + _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.5)
   = _____ $\frac{Ci}{m^3}$

8. _____ $\frac{Ci}{m^3}$ (line 3) x _____ hr^e x 3.8×10^8
   = [_____] mrem at site boundary

9. _____ $\frac{Ci}{m^3}$ (line 4) x _____ hr^e x 3.8×10^8
   = [_____] mrem at point of max X/Q for offgas stack release.

10. _____ $\frac{Ci}{m^3}$ (line 5) x _____ hr^e x 3.8×10^8
    = [_____] mrem at 2 miles

11. _____ $\frac{Ci}{m^3}$ (line 6) x _____ hr^e x 3.8×10^8
    = [_____] mrem at 5 miles

12. _____ $\frac{Ci}{m^3}$ (line 7) x _____ hr^e x 3.8×10^8
    = [_____] mrem at 10 miles

NOTES:

[a]Reactor building stack release rate from Summary Table, Section II, line 2.

[b]Turbine building roof exhaust release rate from Summary Table, Section II, line 4.

[c]Offgas stack release rate from Summary Table, Section II, line 3.

[d]If Standby Gas Treatment is in operation (See Data Summary Sheet, Section II.D, line 1) use 0.003, otherwise use 0.3.

ATTACHMENT III, CALCULATION SHEET III (continued)

[e]Obtain exposure time from Summary Table, Section II, line 1.

F. Plume width - The following are the plume widths to be placed in the Summary Table, Section III, line 7.

Site Bdy[a]	Point of maximum X/Q for Offgas Stack release	2mi	5mi	10mi
530	470	3200	6200	11000

G. Plume arrival time - Results for Summary Table Section III, line 8.

1. 0.125 divided by _____ $\frac{m}{sec}^a$ = |___| hr to Site Boundary

2. 0.111 divided by _____ $\frac{m}{sec}^a$ = |___| hr to point of max X/Q for offgas stack release

3. 0.894 divided by _____ $\frac{m}{sec}^a$ = |___| hr to 2 miles

4. 2.23 divided by _____ $\frac{m}{sec}^a$ = |___| hr to 5 miles

5. 4.47 divided by _____ $\frac{m}{sec}^a$ = |___| hr to 10 miles

NOTE:

[a]Obtain wind speed from Summary Table, Section I, line 5.

ATTACHMENT III, CALCULATION SHEET III (continued)

III. Dose information for atmospheric stability class C.

A. Normalized concentration, Ground level release - Results for Summary Table, Section III, line 2.

1. 1.8×10^{-4} ÷ _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at site boundary

2. 3.2×10^{-5} ÷ _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at point of max X/Q for offgas release

3. 6.0×10^{-6} ÷ _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at 2 miles

4. 1.2×10^{-6} ÷ _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at 5 miles

5. 3.7×10^{-7} ÷ _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at 10 miles

NOTE:

[a]Obtain wind speed from Summary Table Section I, line 5.

B. Normalized concentration, Elevated release - Results for Summary Table, Section III, line 3.

1. 1.0×10^{-6} ÷ _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at site boundary

2. 3.3×10^{-5} ÷ _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at point of max X/Q for offgas stack release

3. 5.1×10^{-6} ÷ _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at 2 miles

4. 1.2×10^{-6} ÷ _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at 5 miles

5. 3.7×10^{-7} ÷ _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at 10 miles

NOTE:

[a]Obtain wind speed from Summary Table, Section I, line 5.

ATTACHMENT III, CALCULATION SHEET III (continued)

C. Whole body dose rate - Results from Summary Table, Section III, line 4.

1. _____ $\frac{Ci^a}{sec}$ + _____ $\frac{Ci^b}{sec}$ = _____ $\frac{Ci}{sec}$

2. _____ $\frac{Ci}{sec}$ (from line 1) x 144

divided by _____ $\frac{mc}{sec}$ + _____ $\frac{Ci^d}{sec}$ x 9.30e

divided by _____ $\frac{mc}{sec}$ = $\left|\frac{\text{_____}}{\text{_____}}\right|\frac{mrem}{hr}$ at site boundary

3. _____ $\frac{Ci}{sec}$ (from line 1) x 25.6

divided by _____ $\frac{mc}{sec}$ + _____ $\frac{Ci^d}{sec}$ x 10.5e

divided by _____ $\frac{mc}{sec}$ = $\left|\frac{\text{_____}}{\text{_____}}\right|\frac{mrem}{hr}$ at point of max X/Q for offgas stack release

4. _____ $\frac{Ci}{sec}$ (from line 1) x 4.80

divided by _____ $\frac{mc}{sec}$ + _____ $\frac{Ci^d}{sec}$ x 6.50e

divided by _____ $\frac{mc}{sec}$ = $\left|\frac{\text{_____}}{\text{_____}}\right|\frac{mrem}{hr}$ at 2 miles

5. _____ $\frac{Ci}{sec}$ (from line 1) x 0.960

divided by _____ $\frac{mc}{sec}$ + _____ $\frac{Ci^d}{sec}$ x 1.45e

divided by _____ $\frac{mc}{sec}$ = $\left|\frac{\text{_____}}{\text{_____}}\right|\frac{mrem}{hr}$ at 5 miles

ATTACHMENT III, CALCULATION SHEET III (continued)

6. _____ $\frac{Ci}{sec}$ (from line 1) x 0.296

divided by _____ $\frac{m^c}{sec}$ + _____ $\frac{Ci^d}{sec}$ x 0.350[e]

divided by _____ $\frac{m^c}{sec}$ = $\left|\frac{\quad}{\quad}\right|\frac{mrem}{hr}$ at 10 miles

NOTES:

[a]Reactor building stack release rate from Summary Table, Section II, line 2.

[b]Turbine building roof exhaust release rate from Summary Table, Section II, line 4.

[c]Wind speed from Summary Table, Section I, line 5.

[d]Offgas stack release rate from Summary Table, Section II, line 3.

[e]If Standby Gas Treatment is in operation (see Data Summary Sheet, Section II D, line 1) multiply this number by 0.662.

D. Whole body dose - Results for Summary Table, Section III, line 5.

1. _____ $\frac{mrem}{hr}$ (from line C2) x _____ hr[a]

= $\left|\frac{\quad}{\quad}\right|$ mrem at site boundary

2. _____ $\frac{mrem}{hr}$ (from line C3) x _____ hr[a]

= $\left|\frac{\quad}{\quad}\right|$ mrem at point of max X/Q for offgas stack release

3. _____ $\frac{mrem}{hr}$ (from line C4) x _____ hr[a]

= $\left|\frac{\quad}{\quad}\right|$ mrem at 2 miles

4. _____ $\frac{mrem}{hr}$ (from line C5) x _____ hr[a]

= $\left|\frac{\quad}{\quad}\right|$ mrem at 5 miles

ATTACHMENT III, CALCULATION SHEET III (continued)

5. _____ $\frac{mrem}{hr}$ (from line C6) x _____ hr[a]

= | _____ | mrem at 10 miles

NOTE:

[a]Obtain exposure time from Summary Table, Section II, line 1.

E. Thyroid Dose Commitment - Result for Summary Table, Section III, line 6.

1. (_____ $\frac{Ci^a}{sec}$ + _____ $\frac{Ci^b}{sec}$) x 0.3 = _____ $\frac{Ci}{sec}$

2. _____ $\frac{Ci^c}{sec}$ x 0.3[d] = _____ $\frac{Ci}{sec}$

3. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.1)

+ _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.1)

= _____ $\frac{Ci}{m^3}$

4. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.2)

+ _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.2)

= _____ $\frac{Ci}{m^3}$

5. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.3)

+ _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.3)

= _____ $\frac{Ci}{m^3}$

ATTACHMENT III, CALCULATION SHEET III (continued)

6. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.4)

\+ _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.4)

= _____ $\frac{Ci}{m^3}$

7. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.5)

\+ _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.5)

= _____ $\frac{Ci}{m^3}$

8. _____ $\frac{Ci}{m^3}$ (line 3) x _____ $hr^e \times 3.8 \times 10^8$

= $\left|\frac{\quad}{\quad}\right|$ mrem at site boundary

9. _____ $\frac{Ci}{m^3}$ (line 4) x _____ $hr^e \times 3.8 \times 10^8$

= $\left|\frac{\quad}{\quad}\right|$ mrem at point of max. X/Q for offgas stack release

10. _____ $\frac{Ci}{m^3}$ (line 5) x _____ $hr^e \times 3.8 \times 10^8$

= $\left|\frac{\quad}{\quad}\right|$ mrem at 2 miles

11. _____ $\frac{Ci}{m^3}$ (line 6) x _____ $hr^e \times 3.8 \times 10^8$

= $\left|\frac{\quad}{\quad}\right|$ mrem at 5 miles

12. _____ $\frac{Ci}{m^3}$ (line 7) x _____ $hr^e \times 3.8 \times 10^8$

= $\left|\frac{\quad}{\quad}\right|$ mrem at 10 miles

ATTACHMENT III, CALCULATION SHEET III (continued)

NOTES:

[a]Reactor building stack release rate from Summary Table, Section II, line 2.

[b]Turbine building roof exhaust release rate from Summary Table, Section II, line 4.

[c]Offgas stack release rate from Summary Table, Section II, line 3.

[d]If Standby Gas Treatment is in operation (See Data Summary Sheet, Section II.D, line 1) use 0.003, otherwise use 0.3.

[e]Obtain release duration from Summary Table, Section II, line 1.

F. Plume width - The following are the plume widths to be placed in the Summary Table, Section III, line 7.

Site Bdy	Point of maximum X/Q for Offgas Stack release	2mi	5mi	10mi
310 meters	720	1900	2700	6600

G. Plume arrival time - Results for Summary Table, Section III, line 8.

1. 0.125 divided by _____ $\frac{m^a}{sec}$ = [ ] hr to Site Boundary
2. 0.333 divided by _____ $\frac{m^a}{sec}$ = [ ] hr to point of max X/Q for offgas stack release
3. 0.894 divided by _____ $\frac{m^a}{sec}$ = [ ] hr to 2 miles
4. 2.23 divided by _____ $\frac{m^a}{sec}$ = [ ] hr to 5 miles
5. 4.47 divided by _____ $\frac{m^a}{sec}$ = [ ] hr to 10 miles

NOTE:

[a]Obtain wind speed from Summary Table, Section I, line 5.

ATTACHMENT III, CALCULATION SHEET III (continued)

IV. Dose information for atmospheric stability class DE.

A. Normalized concentration, Ground level release - Results for Summary Table, Section III, line 2.

1. 7.3×10^{-4} divided by _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at site boundary

2. 2.2×10^{-5} divided by _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at point of max X/Q for offgas stack release

3. 3.1×10^{-5} divided by _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at 2 miles

4. 7.2×10^{-6} divided by _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at 5 miles

5. 2.4×10^{-6} divided by _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at 10 miles

NOTE:

[a]Obtain wind speed from Summary Table, Section I, line 5.

B. Normalized concentration, Elevated release - Results for Summary Table, Section III, line 3.

1. 1.6×10^{-11} divided by _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at site boundary

2. 7.0×10^{-6} divided by _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at point of max X/Q for offgas stack release

3. 6.6×10^{-6} divided by _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at 2 miles

4. 4.7×10^{-6} divided by _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at 5 miles

5. 2.0×10^{-6} divided by _____ m/sec[a] = _____ $\frac{sec}{m^3}$ at 10 miles

NOTE:

[a]Obtain wind speed from Summary Table, Section I, line 5.

ATTACHMENT III, CALCULATION SHEET III (continued)

C. Whole body dose rate - Results from Summary Table, Section III, line 4.

1. _____ $\frac{Ci}{sec}^{a}$ + _____ $\frac{Ci}{sec}^{b}$ = _____ $\frac{Ci}{sec}$

2. _____ $\frac{Ci}{sec}$ (from line 1) x 584

   divided by _____ $\frac{m^c}{sec}$ + _____ $\frac{Ci}{sec}^{d}$ x 8.00^{e}

   divided by _____ $\frac{m^c}{sec}$ = $\frac{\text{_____}}{\text{_____}}$ $\frac{mrem}{hr}$ at site boundary

3. _____ $\frac{Ci}{sec}$ (from line 1) x 17.6

   divided by _____ $\frac{m^c}{sec}$ + _____ $\frac{Ci}{sec}^{d}$ x 8.00^{e}

   divided by _____ $\frac{m^c}{sec}$ = $\frac{\text{_____}}{\text{_____}}$ $\frac{mrem}{hr}$ at point of max X/Q for offgas stack release

4. _____ $\frac{Ci}{sec}$ (from line 1) x 24.8

   divided by _____ $\frac{m^c}{sec}$ + _____ $\frac{Ci}{sec}^{d}$ x 9.00^{e}

   divided by _____ $\frac{m^c}{sec}$ = $\frac{\text{_____}}{\text{_____}}$ $\frac{mrem}{hr}$ at 2 miles

5. _____ $\frac{Ci}{sec}$ (from line 1) x 5.76

   divided by _____ $\frac{m^c}{sec}$ + _____ $\frac{Ci}{sec}^{d}$ x 5.10^{e}

   divided by _____ $\frac{m^c}{sec}$ = $\frac{\text{_____}}{\text{_____}}$ $\frac{mrem}{hr}$ at 5 miles

ATTACHMENT III, CALCULATION SHEET III (continued)

6. _____ $\frac{Ci}{sec}$ (from line 1) x 1.92

divided by _____ $\frac{m^c}{sec}$ + _____ $\frac{Ci^d}{sec}$ x 2.05[e]

divided by _____ $\frac{m^c}{sec}$ = $\left|\frac{\quad}{\quad}\right|$ $\frac{mrem}{hr}$ at 10 miles

NOTES:

[a]Reactor building stack release rate from Summary Table, Section II, line 2.

[b]Turbine building roof exhaust release rate from Summary Table, Section II, line 4.

[c]Wind speed from Summary Table, Section I, line 5.

[d]Offgas stack release rate from Summary Table, Section II, line 3.

[e]If Standby Gas Treatment is in operation (see Data Summary Sheet, Section II D, line 1) multiply this number by 0.682.

D. Whole body dose - Results for Summary Table, Section III, line 5.

1. _____ $\frac{mrem}{hr}$ (from line C2) x _____ hr[a]

= $\left|\frac{\quad}{\quad}\right|$ mrem at site boundary

2. _____ $\frac{mrem}{hr}$ (from line C3) x _____ hr[a]

= $\left|\frac{\quad}{\quad}\right|$ mrem at point of max X/Q for offgas stack release

3. _____ $\frac{mrem}{hr}$ (from line C4) x _____ hr[a]

= $\left|\frac{\quad}{\quad}\right|$ mrem at 2 miles

4. _____ $\frac{mrem}{hr}$ (from line C5) x _____ hr[a]

= $\left|\frac{\quad}{\quad}\right|$ mrem at 5 miles

ATTACHMENT III, CALCULATION SHEET III (continued)

5. _____ $\frac{mrem}{hr}$ (from line C6) x _____ hr[a]

= $\frac{\text{_____}}{\text{_____}}$ mrem at 10 miles

NOTE:

[a]Obtain exposure time from Summary Table, Section II, line 1.

E. Thyroid Dose Commitment - Result for Summary Table, Section III, line 6.

1. (_____ $\frac{Ci}{sec}$[a] + _____ $\frac{Ci}{sec}$[b]) x 0.3 = _____ $\frac{Ci}{sec}$

2. _____ $\frac{Ci}{sec}$[c] x 0.3[d] = _____ $\frac{Ci}{sec}$

3. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.1)

\+ _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.1)

= _____ $\frac{Ci}{m^3}$

4. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.2)

\+ _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.2)

= _____ $\frac{Ci}{m^3}$

5. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.3)

\+ _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.3)

= _____ $\frac{Ci}{m^3}$

ATTACHMENT III, CALCULATION SHEET III (continued)

6. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.4)

   \+ _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.4)

   = _____ $\frac{Ci}{m^3}$

7. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.5)

   \+ _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.5)

   = _____ $\frac{Ci}{m^3}$

8. _____ $\frac{Ci}{m^3}$ (line 3) x _____ $hr^e \times 3.8 \times 10^8$

   = _____ mrem at site boundary

9. _____ $\frac{Ci}{m^3}$ (line 4) x _____ $hr^e \times 3.8 \times 10^8$

   = _____ mrem at point of max X/Q for offgas stack release

10. _____ $\frac{Ci}{m^3}$ (line 5) x _____ $hr^e \times 3.8 \times 10^8$

    = _____ mrem at . miles

11. _____ $\frac{Ci}{m^3}$ (line 6) x _____ $hr^e \times 3.8 \times 10^8$

    = _____ mrem at 5 miles

ATTACHMENT III, CALCULATION SHEET III (continued)

12. _____ $\frac{Ci}{m^3}$ (line 7) x _____ hr^e x 3.8×10^8

= | _____ | mrem at 10 miles

NOTES:

[a]Reactor building stack release rate from Summary Table, Section II, line 2.

[b]Turbine building roof exhaust release rate from Summary Table, Section II, line 4.

[c]Offgas stack release rate from Summary Table, Section II, line 3.

[d]If Standby Gas Treatment is in operation (See Data Summary Sheet, Section II.D, line 1) use 0.003, otherwise use 0.3

[e]Obtain release duration from Summary Table, Section II, line 1.

F. Plume width - The following are the plume widths to be placed in the Summary Table, Section III, line 7.

Site Bdy	Point of maximum X/Q for Offgas Stack release	2mi	5mi	10mi
190 meters	1400	1100	2400	4300

G. Plume arrival time - Results for Summary Table, Section III, line 8.

1. 0.125 divided by _____ $\frac{m^a}{sec}$ = | _____ | hr to Site Boundary

2. 1.11 divided by _____ $\frac{m^a}{sec}$ = | _____ | hr to point of max X/Q for offgas stack release

3. 0.894 divided by _____ $\frac{m^a}{sec}$ = | _____ | hr to 2 miles

4. 2.23 divided by _____ $\frac{m^a}{sec}$ = | _____ | hr to 5 miles

ATTACHMENT III, CALCULATION SHEET III (continued)

5. 4.47 divided by _____ $\frac{m^a}{sec}$ = $\frac{\quad}{\quad}$ hr to 10 miles

NOTES:

[a]Obtain wind speed from Summary Table, Section I, line 5.

ATTACHMENT III, CALCULATION SHEET III (continued)

V. Dose information for atmospheric stability class FG.

A. Normalized concentration, Ground level release - Results for Summary Table, Section III, line 2

1. $4.0 \times 10^{-3} \div$ _____ $m/sec^a =$ _____ $\frac{sec}{m^3}$ at site boundary

2. $2.0 \times 10^{-5} \div$ _____ $m/sec^a =$ _____ $\frac{sec}{m^3}$ at point of max X/Q for offgas stack release

3. $2.1 \times 10^{-4} \div$ _____ $m/sec^a =$ _____ $\frac{sec}{m^3}$ at 2 miles

4. $5.5 \times 10^{-5} \div$ _____ $m/sec^a =$ _____ $\frac{sec}{m^3}$ at 5 miles

5. $2.0 \times 10^{-5} \div$ _____ $m/sec^a =$ _____ $\frac{sec}{m^3}$ at 10 miles

NOTE:

[a]Obtain wind speed from Summary Table, Section I, line 5.

B. Normalized concentration, Elevated release - Results for Summary Table Section III, line 3.

1. 0.0 $\div$ _____ $m/sec^a =$ _____ $\frac{sec}{}$ at site boundary

2. $1.7 \times 10^{-4} \div$ _____ $m/sec^a =$ _____ $\frac{sec}{m^3}$ at point of max X/Q for offgas stack release

3. $1.7 \times 10^{-11} \div$ _____ $m/sec^a =$ _____ $\frac{sec}{m^3}$ at 2 miles

ATTACHMENT III, CALCULATION SHEET III (continued)

4. $2.2 \times 10^{-7} \div$ _____ m/sec^a = | _____ | $\frac{sec}{m^3}$ at 5 miles

5. $1.7 \times$ _____ m/sec^a = | _____ | $\frac{sec}{m^3}$ at 10 miles

NOTE:

[a]Obtain wind speed from Summary Table, Section I, line 5.

C. Whole body dose rate - Results from Summary Table, Section III, line 4.

1. _____ $\frac{Ci^a}{sec}$ + _____ $\frac{Ci^b}{sec}$ = _____ $\frac{Ci}{sec}$

2. _____ $\frac{Ci}{sec}$ (from line 1) x 3.20×10^3

divided by _____ $\frac{m^c}{sec}$ + _____ $\frac{Ci^d}{sec}$ x 7.00^e

divided by _____ $\frac{m^c}{sec}$ = | _____ | $\frac{mrem}{hr}$ at site boundary

3. _____ $\frac{Ci}{sec}$ (from line 1) x 16.0

divided by _____ $\frac{m^c}{sec}$ + _____ $\frac{Ci^d}{sec}$ x 3.40^e

divided by _____ $\frac{m^c}{sec}$ = | _____ | $\frac{mrem}{hr}$ at point of max X/Q for offgas stack release

4. _____ $\frac{Ci}{sec}$ (from line 1) x 168.0

divided by _____ $\frac{m^c}{sec}$ + _____ $\frac{Ci^d}{sec}$ x 5.00^e

divided by _____ $\frac{m^c}{sec}$ = | _____ | $\frac{mrem}{hr}$ at 2 miles

ATTACHMENT III, CALCULATION SHEET III (continued)

5. _____ $\frac{Ci}{sec}$ (from line 1) x 44.0

divided by _____ $\frac{m^c}{sec}$ + _____ $\frac{Ci^d}{sec}$ x 4.20[e]

divided by _____ $\frac{m^c}{sec}$ = |_____| $\frac{mrem}{hr}$ at 5 miles

6. _____ $\frac{Ci}{sec}$ (from line 1) x 16.0

divided by _____ $\frac{m^c}{sec}$ + _____ $\frac{Ci^d}{sec}$ x 3.40[e]

divided by _____ $\frac{m^c}{sec}$ = |_____| $\frac{mrem}{hr}$ at 10 miles

NOTES:

[a]Reactor building stack release rate from Summary Table, Section II, line 2.

[b]Turbine building roof exhaust release rate from Summary Table, Section II, line 4.

[c]Wind speed from Summary Table, Section I, line 5.

[d]Offgas stack release rate from Summary Table, Section II, line 3.

[e]If Standby Gas Treatment is in operation (see Data Summary Sheet, Section II.D, line 1) multiply this number by 0.662.

D. Whole body dose - Results for Summary Table Section III, line 5.

1. _____ $\frac{mrem}{hr}$ (from line C2) x _____ hr[a]

= |_____| mrem at site boundary

2. _____ $\frac{mrem}{hr}$ (from line C3) x _____ hr[a]

= |_____| mrem at point of max X/Q for offgas stack release

ATTACHMENT III, CALCULATION SHEET III (continued)

3. _____ $\frac{mrem}{hr}$ (from line C4) x _____ hr[a]

= [____] mrem at 2 miles

4. _____ $\frac{mrem}{hr}$ (from line C5) x _____ hr[a]

= [____] mrem at 5 miles

5. _____ $\frac{mrem}{hr}$ (from line C6) x _____ hr[a]

= [____] mrem at 10 miles

NOTE:

[a]Obtain exposure time from Summary Table, Section II, line 1.

E. Thyroid Dose Commitment - Result for Summary Table, Section III, line 6.

1. (_____ $\frac{Ci^a}{sec}$ + _____ $\frac{Ci^b}{sec}$) x 0.3 = _____ $\frac{Ci}{sec}$

2. _____ $\frac{Ci^c}{sec}$ x 0.3[d] = _____ $\frac{Ci}{sec}$

3. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.1)

+ _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.1)

= _____ $\frac{Ci}{m^3}$

4. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.2)

+ _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.2)

= _____ $\frac{Ci}{m^3}$

ATTACHMENT III, CALCULATION SHEET III (continued)

5. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.3)

\+ _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.3)

= _____ $\frac{Ci}{m^3}$

6. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.4)

\+ _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.4)

= _____ $\frac{Ci}{m^3}$

7. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (line A.5)

\+ _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (line B.5)

= _____ $\frac{Ci}{m^3}$

8. _____ $\frac{Ci}{m^3}$ (line 3) x _____ hre x 3.8×10^8

= [_____] mrem at site boundary

9. _____ $\frac{Ci}{m^3}$ (line 4) x _____ hre x 3.8×10^8

= [_____] mrem at point of max X/Q for offgas stack release

10. _____ $\frac{Ci}{m^3}$ (line 5) x _____ hre x 3.8×10^8

= [_____] mrem at 2 miles

ATTACHMENT III, CALCULATION SHEET III (continued)

11. _____ $\frac{Ci}{m^3}$ (line 6) x _____ $hr^e \times 3.8 \times 10^8$

= [ ] mrem at 5 miles

12. _____ $\frac{Ci}{m^3}$ (line 7) x _____ $hr^e \times 3.8 \times 10^8$

= [ ] mrem at 10 miles

NOTES:

[a]Reactor building stack release rate from Summary Table, Section II, line 2.

[b]Turbine building roof exhaust release rate from Summary Table, Section II, line 4.

[c]Offgas stack release rate from Summary Table, Section II, line 3.

[d]If Standby Gas Treatment is in operation (See Data Summary Sheet, Section II.D, line 1) use 0.003, otherwise use 0.3.

[e]Obtain release duration from Summary Table, Section II, line 1.

F. Plume Width - The following are the plume widths to be placed in the Summary Table, Section III, line 7.

Site Bdy	Point of maximum X/Q for Offgas Stack release	2mi	5mi	10mi
90 meters	2000	530	970	2000

G. Plume arrival time - Results for Summary Table, Section III, line 8.

1. 0.125 ÷ _____ $\frac{m}{sec}$ = [ ] hr to Site Boundary

2. 4.47 ÷ _____ $\frac{m}{sec}$ = [ ] hr to point of max X/Q for offgas stack release

ATTACHMENT III, CALCULATION SHEET III (continued)

3. 0.894 ÷ _____ $\frac{m}{sec}^a$ = [ ] hr to 2 miles

4. 2.23 ÷ _____ $\frac{m}{sec}^a$ = [ ] hr to 5 miles

5. 4.47 ÷ _____ $\frac{m}{sec}^a$ = [ ] hr to 10 miles

NOTE:

[a]Obtain wind speed from Summary Table, Section I, line 5.

1.0 PURPOSE

This procedure provides instructions for estimating the downwind dose rates resulting from noble gas and radioiodine releases during an emergency at DAEC.

2.0 APPLICABILITY

This procedure applies to immediate specific steps to be taken by radiological assessment personnel during a release of radioactive material (after the first hour following shutdown) to the environment.

3.0 RESPONSIBILITIES

3.1 Site Radiation Protection Coordinator

Perform dose projection calculations until the EOF is manned.

Evaluate the results of dose projection calculations.

Initially identify the need for field survey data to backup projected dose calculations.

3.2 Emergency Coordinator

Initially advise local and State authorities of the results of dose projection calculations and provide protective action recommendations as required.

3.3 IELP Radiological Assessment Coordinator

Perform dose projection calculations.

Provide protective action recommendations as required.

4.0 INTRODUCTION

The major objective of this procedure is to perform the offsite dose estimate for comparison with protective action guidelines to determine the appropriate emergency action to be taken following an accidental atmospheric release of radioactive material. As a result of this objective the procedure has been developed with five major parts. The first consists of the main body of the procedure and contains general information about the procedure, general instructions for its use and the protective action guidelines. The second part consists of a Data Summary Sheet, Attachment I, which contains all the monitor data necessary for the dose projections. The third part, Attachment II, consists of a summary Table to be completed during the dose estimation procedure. This table contains all the information necessary for comparison with the protective action guidelines. The completion of this table requires a number of calculations to be performed. These calculations are set up in detail on Calculation Sheets which comprise the fourth part of the procedure, Attachment III. The, Data

Summary Sheet, Summary Table, and the Calculation Sheets are designed to be used together, that is, the Calculation Sheets are required to complete the Summary Table while information from the Data Summary Sheet and Summary Table is required in many of the calculations performed on the Calculation Sheets. When calculations are required the Summary Table references the appropriate segment of the Calculation Sheets to be completed, likewise when data is required from the Data Summary Sheet and Summary Table the appropriate Data Summary Sheet or Summary Table line number is referenced on the Calculation Sheet. The fifth part, Attachment IV, contains all the figures referenced in the Calculation Sheets.

NOTE

A supply of Data Summary Sheets, Summary Tables, and Calculation Sheets are to be maintained in the Technical Support Center (TSC) and Emergency Operations Facility (EOF) for emergency use.

5.0 INSTRUCTIONS

5.1 If an off-site radiological release has been identified, use the simplified method EPIP 3.3a for the initial dose calculation (within the first hour following shutdown). Subsequent dose calculations shall be made utilizing the methods contained within this procedure.

5.2 If an accidental atmospheric release of radioactive material has been identified or there is a significant change in the release rate a dose projection is to be performed as follows.

5.2.1 Complete Data Summary Sheet.

5.2.2 Complete Section I of the Summary Table, General Information, using Calculation Sheet I where referenced.

5.2.3 Complete Section II of the Summary Table, Release Information, to determine the total gaseous release rate from the Reactor Building Stacks, the Offgas Stack, and the Turbine Building Roof Exhaust. Use Calculation Sheet II, where referenced, to perform the necessary release rate calculations.

When multiple monitor ranges are available complete the calculations for ONE range ONLY. Use the range which gives a reading nearest mid-scale.

5.2.4 Complete Section III of the Summary Table, Dose Information. Use Calculation Sheet III, where referenced, to perform all necessary calculations. Calculation Sheet III is divided into five sections of which only two are to be completed. Section I is always completed and determines, based on the atmospheric stability, which one of the remaining four sections is to be used to perform the dose estimation. The Calculation Sheet subsections referenced in Section III of the Summary Table are those of the appropriate section for dose estimation as determined by Section I. That is, Sections II through V of Calculation Sheet III have the same format only the constants which are dependent on atmospheric stability are different.

5.2.5 Complete Section IV of the Summary Table if an estimate of the release rate is to be made from a field exposure rate measurement.

5.2.6 Report the results of the dose estimation calculations, i.e., supply copies of the Summary Table, to the Emergency Coordinator and/or the Site Radiation Protection Coordinator or the Radiological Assessment Coordinator.

5.2.7 The Site Radiation Protection Coordinator or the Radiological Assessment Coordinator shall compare the dose estimates from the Summary Table to the following Protective Action Guidelines and initiate the appropriate action.

PROTECTIVE ACTION GUIDELINES

Projected Exposure to An Individual In the Population	Recommended Action
Whole Body = less than 1 Rem or Thyroid = less than 5 Rem.	1. No protective action required. 2. Issue an advisory to seek shelter and await further instructions or voluntarily evacuate. 3. Monitor environmental radiation levels.
Whole Body = 1 to 5 Rem or Thyroid = 5 to 25 Rem	1. Seek shelter and await further instructions. 2. Consider evacuation, particularly for children and pregnant women. 3. Monitor environmental radiation levels. 4. Control access.
Whole Body = 5 Rem and above or Thyroid = 25 Rem and above	1. Conduct evacuation of populations in the predetermined area. 2. Monitor environmental radiation levels and adjust area for evacuation based on these controls. 3. Control access.

6.0 REFERENCES

1. Duane Arnold Energy Center Emergency Plan
2. IELP Corporate Emergency Response Plan

7.0 ATTACHMENTS

1. Data Summary Sheet
2. Summary Table
3. Calculation Sheets
4. Figures

APPROVED BY: Keith Young — DATE: 5/6/83
Radiation Protection Supervisor

REVIEWED BY: [signature] — DATE: 5/9/83
ALARA Coordinator

APPROVED BY: R E Zook for — DATE: 5-9-83
Operations Supervisor

REVIEWED BY: B R York — DATE: 5/16/83
Chairman, Operations Committee

APPROVED BY: B R York for — DATE: 5/16/83
Plant Superintendent - Nuclear

ATTACHMENT I, DATA SUMMARY SHEET

Date: _____ Recorded By: _____
Time: _____ Calculation Number: _____

I. METEROLOGICAL DATA

1. Wind Direction[a] _____ (Wind from)
2. Wind speed[a] _____ mph
3. ΔT[b] _____ °F
4. Time after shutdown _____ (hours)
5. Time release started _____ (24 hour clock)

NOTES:

[a]Obtain wind speed and direction from met panel in control room or Cedar Rapids Flight Service at 9-364-7127.

[b]Obtain from atmospheric ΔT recorder readout in control room.

II. RELEASE DATA

A. Reactor Building Stacks - Obtain release concentrations from the effluent monitoring system.

Range[e]

1. "A" Stack Conc.[a] ___uCi/cc x ___MRCF(if applicable)=___corrected uCi/cc
   Hi ☐ Int. ☐ Nor. ☐
2. "B" Stack Conc.[a] ___uCi/cc x ___MRCF(if applicable)=___corrected uCi/cc
   Hi ☐ Int. ☐ Nor. ☐
3. "A" Stack Conc.[a] ___uCi/cc x ___MRCF(if applicable)=___corrected uCi/cc
   Hi ☐ Int. ☐ Nor. ☐
4. "A" Stack Flow[b] _____cfm
5. "B" Stack Flow[b] _____cfm
6. "C" Stack Flow[b] _____cfm

ATTACHMENT I, DATA SUMMARY SHEET (continued)

B. Offgas Stack - obtain release concentration from the effluent monitoring system.

Range[e]

1. Offgas Stack Conc.[a] ___uCi/cc x ___MRCF(if applicable)= ___corrected uCi/cc

Hi ☐ Int. ☐ Nor. ☐

2. Offgas Stack Flow[c] _____cfm

C. Turbine Exhaust - obtain release concentration from the effluent monitoring system.

1. Turb. Exhaust Conc[a] ___uCi/cc x ___MRCF(if applicable)= ___corrected uCi/cc

Hi ☐ Int. ☐ Nor. ☐

2. Turb. Exhaust Flow[d] _____cfm

Notes (a-e):

a. Data collected from Kaman Effluent Monitoring System see PASAP 6.0 and PCP 10.6A for system operating instructions.

b. Data available either from the Kaman Effluent Monitoring System or from Control Room Panel 1C-23.

c. Data available either from the Kaman Effluent Monitoring System or from Control Room Panel 1C-02.

d. Data available either from the Kaman Effluent Monitoring System or can be estimated by: 18,000 cfm for each fan in slow speed
36,000 cfm for each fan in fast speed

e. If the high or intermediate range is used, use Fig. 26 to get the Monitor Response Correction Factor (MRCF).

ATTACHMENT I, DATA SUMMARY SHEET (continued)

D. Miscellaneous Data

1. Is Standby Gas Treatment for Offgas Stack Exhaust in operation:

YES [ ] NO [ ]

2. Anticipated duration of release _____ hours. (If no estimate is available use 1.77 hours.)

3. Iodine activity to noble gas activity ratio-optional, to be completed only if known to be different than default valves(0.3).

3a. _____ Reactor Building Stacks and Turbine Building Vent

3b. _____ Offgas Stack

III. Field Exposure Rate Information

1. Time of measurement after shutdown _____ hours.

2. Distance from release point to measurement location _____ meters.

3. Exposure rate _____ mR/hr.

ATTACHMENT II, SUMMARY TABLE

Calculations Performed By: _____

I. GENERAL INFORMATION

1. Calculation Number: _____ Date: _____ Time: _____
2. Time after Shutdown: _____ hours
3. Wind Direction (direction wind is blowing from): _____ deg. (Data Summary Sheet Section I, line 1).
4. Down Wind Direction: _____ deg. (Calc. Sheet I, Sec. A, line 1)
5. Wind Speed: _____ meters/sec. (Calc. sheet I, Sec. A, line 2)
6. ΔT: _____ °F, Stability Class: _____ (Calc. Sheet I., Sec. B)
7. Down wind Sector _____ (Calc. Sheet I, Section A, Line 3)
8. Time release started _____ hr. (24 hr. clock).

II. RELEASE INFORMATION

1. Exposure Time _____ hours (Data Summary Sheet, Section II.D, line 2).
2. Release rate Reactor Bldg. Stack: _____ Ci/sec (Calc. Sheet II, Sec. I)
3. Release rate - offgas stack _____ Ci/sec (Calc. Sheet II, Sec. II)
4. Release rate - Turbine Bldg. Roof Exhaust: _____ Ci/sec (Calc. Sheet II, Sec. III.)
5. Total Gaseous Release Rate: _____ Ci/sec (add release rates from previous three lines)

ATTACHMENT II, SUMMARY TABLE (continued)

III. DOSE INFORMATION

Cal. sheet III, section number for remainder of dose calculations: ____ (From calc. sheet III, section I)

		Down Wind Location					
	Site Bndry	Point of max. X/Q for Offgas Stack release[a,e]	2mi	5mi	10mi	Additional Locations[d] No. 1	No. 2	No. 3
1. Distance to location, meters (miles) (Calc. Sheet III, subsection A)[b]	____	____	3218 (2)	8045 (5)	16090 (10)	____	____	____
2. Normalized concentration, X/Q, sec/m^3, Ground level release (Calc. Sheet III, Subsect. B)[b]	____	____	____	____	____	____	____	____
3. Normalized concentration, X/Q, sec/m^3, Elevated release (Calc. Sheet III, Subsect. C)[b]	____	____	____	____	____	____	____	____
4. Whole body dose rate mrem/hr (Calc. Sheet III, Subsect. D)[b]	____	____	____	____	____	____	____	____
5. Whole body dose, mrem (Calc. Sheet III, Subsect. E)[b]	____	____	____	____	____	____	____	____
6. Thyroid dose commitment,[c] mrem (Calc. Sheet III, Subsect. F)[b]	____	____	____	____	____	____	____	____
7. Plume width, meters (miles) (Calc. Sheet III, Subsect. G)[b]	(____)	(____)	(____)	(____)	(____)	(____)	(____)	(____)
8. Plume arrival time, hr (Calc. Sheet III, Subsect. H)[b]	____	____	____	____	____	____	____	____

NOTE: a,b,c,d and e -- see next page

ATTACHMENT II, SUMMARY TABLE (continued)

ATTACHMENT II, SUMMARY TABLE (continued)

NOTES:

[a]For stability class FG the distance to the maximum X/Q is greater than 10 miles. In order to limit the dose information to the EPZ a distance of 10 miles is used for class FG.

[b]Calculation sheet subsection refers to the subsection of the Calculation Sheet III section as given in the heading of this table and also in Calc. Sheet III, Section I.

[c]The thyroid dose commitment given is for an infant, i.e., the worst case. The adult dose commitment is obtained by multiplying by 0.58.

[d]Additional locations may be added at users discretion.

[e]Maximum X/Q is the location corresponding to the point of maximum ground level X/Q for an offgas stack (elevated) release.

IV. Release Rate From Exposure Rate (Field Measurement)

Estimated total gaseous release rate _____ Ci/sec (Calc. Sheet IV)

Caution: This estimate should be considered to be a lower limit of the release rate.

ATTACHMENT III, CALCULATION SHEET I

GENERAL INFORMATION

A. Wind Speed

1. Downwind direction: _____deg. (180° different from wind direction).

2. Wind Speed _____mph (Data Summary Sheet, Section I, line 2) x 0.447 =

|_____| Meters/sec (To Summary Table Sec. I, line 4)

3. Sector designation

Down Wind Direction, deg.	Sector
348.750 - 11.25	A
11.25 - 33.75	B
33.75 - 56.25	C
56.25 - 78.75	D
78.75 - 101.25	E
101.25 - 123.75	F
123.75 - 146.25	G
146.25 - 168.75	H
168.75 - 191.25	J
191.25 - 213.75	K
213.75 - 236.25	L
236.25 - 258.75	M
258.75 - 281.25	N
281.25 - 303.75	P
303.75 - 326.25	Q
326.25 - 348.75	R

B. Stability Class

1. ΔT |_____| °F - (obtained from Data Summary Sheet, Section I, line 3) (To Summary Table, Sec. I, line 7)

2. Stability class is determined from the following table as a function of ΔT.

Stability class |_____| (To Summary Table, Sec I, line 7)

ΔT Range, °F	Stability Class
-1.26 or less	AB
-1.26 to -1.11	C
-1.11 to 1.11	DE
1.11 or greater	FG

ATTACHMENT III, CALCULATION SHEET II Page 1 of 5

RELEASE INFORMATION

I. Reactor Building Stack Releases

1. "A" Stack Conc.[a] _____ uCi/cc x "A" Stack Flow[a]

_____ cfm x 472 = _____ uCi/sec

2. "B" Stack Conc.[a] _____ uCi/cc x "B" Stack Flow[a]

_____ cfm x 472 = _____ uCi/sec

3. "C" Stack Conc.[a] _____ uCi/cc x "C" Stack Flow[a]

_____ cfm x 472 = _____ uCi/sec

4. "A" Stack Release Rate _____ uCi/sec
"B" Stack Release Rate _____ uCi/sec
"C" Stack Release Rate _____ uCi/sec
Total Release Rate _____ uCi/sec x

$$\frac{1 \text{ Curie}}{10^6 \text{ uCi}} = \boxed{} \text{ Ci/sec}$$

(To Summary Table, Sec. II, Line 2)

Note:
a. Obtain data from Data Summary Sheet, Section II.A.

II. Offgas Stack Releases

1. Stack Conc.[a] _____ uCi/cc x Offgas Stack Flow[a] _____ cfm x 472 = _____ uCi/sec

2. Release rate _____ uCi/sec x $\frac{1 \text{ Curie}}{10^6 \text{ uCi}}$ =

$\boxed{}$ Ci/sec

(To Summary Table, Sec. II, Line 3)

Note:
a. Obtain data from Data Summary Sheet, Section II.B.

ATTACHMENT III, CALCULATION SHEET II (continued) Page 2 of 5

III. Turbine Building Releases

1. Release Conc.[a] _____ uCi/cc x Flow[a] _____ cfm x 472 =

_____ uCi/sec

2. Release rate _____ uCi/sec x $\frac{1 \text{ Curie}}{10^6 \text{ uCi}}$ =

[ ] Ci/sec

(To Summary Table Sec. II, Line 4)

Note:

a. Obtain data from Data Summary Sheet, Section II.C.

ATTACHMENT III, CALCULATION SHEET III Page 5 of 5

DOSE INFORMATION

I. Section for the remaining calculations [ ] - Appropriate section is determined from the following table based on the atmospheric stability class. Complete ONLY ONE section.

Stability Class (from Summary Table, Section I, line 6)	Section
AB	II (page 16 of 94)
C	III (page 29 of 94)
DE	IV (page 42 of 94)
FG	V (page 54 of 94)

ATTACHMENT III, CALCULATION SHEET III (continued)

II. Dose information for atmospheric stability class AB

A. Variable distance and Xu/Q Values

1. Obtain distance to site boundary and Xu/Q for ground level and elevated releases from following Table using the down wind direction from Summary Table, Section I, line 4.

Distance = _____ m

$\frac{Xu}{Q}$ (Ground Level Rel.) = _____ $\frac{1}{m^2}$

$\frac{Xu}{Q}$ (Elevated Rel.) = _____ $\frac{1}{m^2}$

Down Wind Direction deg.	Distance to Site Bdy, meters	$\frac{Xu}{Q}$, $\frac{1}{m^2}$ Ground Level Rel.	Elevated Rel.
0 - 11.25	1200	3.8 x 10-6	3.7 x 10-6
11.25 - 33.75	1600	1.9 x 10-6	1.9 x 10-6
33.75 - 56.25	700	1.4 x 10-5	1.2 x 10-5
56.25 - 78.75	610	1.9 x 10-5	1.5 x 10-5
78.75 - 101.25	490	3.2 x 10-5	2.0 x 10-5
101.25 - 123.75	450	4.0 x 10-5	2.2 x 10-5
123.75 - 146.25	480	3.3 x 10-5	2.1 x 10-5
146.25 - 168.75	500	3.0 x 10-5	1.9 x 10-5
168.75 - 191.25	460	3.9 x 10-5	2.2 x 10-5
191.25 - 213.75	500	3.0 x 10-5	1.9 x 10-5
213.75 - 236.25	630	1.8 x 10-5	1.4 x 10-5
236.25 - 258.75	720	1.3 x 10-5	1.2 x 10-5
258.75 - 281.25	670	1.5 x 10-5	1.3 x 10-5
281.25 - 303.75	730	1.3 x 10-5	1.1 x 10-5
303.75 - 326.25	980	6.2 x 10-6	5.8 x 10-6
326.25 - 348.75	1300	3.1 x 10-6	3.0 x 10-6
348.75 - 360.00	1200	3.8 x 10-6	3.7 x 10-6

2. Distance to point of maximum $\frac{Xu}{Q}$ for offgas stack release = 400 m.

ATTACHMENT III, CALCULATION SHEET III (continued)

B. Normalized concentration, Ground Level Release - Results for Summary Table, Section III, Line 2.

1. _____ $\frac{1}{m^2}$[a] ÷ _____ m/sec[b] = [_____] $\frac{sec}{m^3}$ at site boundary

2. 5.3 x 10^{-5} ÷ _____ m/sec[b] = [_____] $\frac{sec}{m^3}$ at point of max X/Q for offgas stack release

3. 3.8 x 10^{-7} ÷ _____ m/sec[b] = [_____] $\frac{sec}{m^3}$ at 2 miles

4. 4.0 x 10^{-8} ÷ _____ m/sec[b] = [_____] $\frac{sec}{m^3}$ at 5 miles

5. 7.4 x 10^{-9} ÷ _____ m/sec[b] = [_____] $\frac{sec}{m^3}$ at 10 miles

6. _____ $\frac{1}{m^2}$[c] ÷ _____ m/sec[b] = [_____] $\frac{sec}{m^3}$ at additional location No. 1

7. _____ $\frac{1}{m^2}$[c] ÷ _____ m/sec[b] = [_____] $\frac{sec}{m^3}$ at additional location No. 2

8. _____ $\frac{1}{m^2}$[c] ÷ _____ m/sec[b] = [_____] $\frac{sec}{m^3}$ at additional location No. 3

NOTE:

[a]Obtain $\frac{Xu}{Q}$ for ground level release from Section II, Subsection A, line 1.

[b]Obtain wind speed from Summary Table, Section I, line 5.

[c]Obtain ground level release $\frac{Xu}{Q}$ for additional locations using Figure 1 and appropriate distance from Summary Table, Section III, line 1.

ATTACHMENT III, CALCULATION SHEET III (continued)

C. Normalized concentration, Elevated Release - Results for Summary Table, Section III, line 3.

1. _____ $\frac{1^a}{m^2}$ ÷ _____ m/sec[b] = | _____ | $\frac{sec}{m^3}$ at site boundary

2. 2.4 x 10^{-5} ÷ _____ m/sec[b] = | _____ | $\frac{sec}{m^3}$ at point of max X/Q for offgas stack release

3. 3.5 x 10^{-7} ÷ _____ m/sec[b] = | _____ | $\frac{sec}{m^3}$ at 2 miles

4. 3.9 x 10^{-8} ÷ _____ m/sec[b] = | _____ | $\frac{sec}{m^3}$ at 5 miles

5. 7.6 x 10^{-9} ÷ _____ m/sec[b] = | _____ | $\frac{sec}{m^3}$ at 10 miles

6. _____ $\frac{1^c}{m^2}$ ÷ _____ m/sec[b] = | _____ | $\frac{sec}{m^3}$ at additional location No. 1

7. _____ $\frac{1^c}{m^2}$ ÷ _____ m/sec[b] = | _____ | $\frac{sec}{m^3}$ at additional location No. 2

8. _____ $\frac{1^c}{m^2}$ ÷ _____ m/sec[b] = | _____ | $\frac{sec}{m^3}$ at additional location No. 3

NOTE:

[a]Obtain $\frac{Xu}{Q}$ for elevated release from Section II, Subsection A, line 1.

[b]Obtain wind speed from Summary Table, Section I, line 5.

[c]Obtain elevated release $\frac{Xu}{Q}$ for additional locations using Figure 2 and appropriate distance from Summary Table, Section III, line 1.

ATTACHMENT III, CALCULATION SHEET III (continued)

D. Whole body dose rate - Results for Summary Table Section III, line 4.

1. _____ $\frac{Ci^a}{sec}$ + _____ $\frac{Ci^b}{sec}$ = _____ $\frac{Ci}{sec}$

2a. _____ FI^m x _____ DFI^d = _____

2b. (1 - _____ FI^m) x _____ $DFNG^e$ = _____

2c. _____ (line 2a) + _____ (line 2b) = _____ DF

3. $\frac{Du}{Q}$ for site boundary:

3a. _____ FI^c x _____ $DUOQI^f$ x _____ $TCFI^g$ = _____

3b. (1 - _____ FI^c) x _____ $DUOQNG^h$ x _____ $TCFNG^i$ = _____

3c. _____ (line 3a) + _____ (line 3b) = _____

4. $\frac{Du}{Q}$ for location of maximum $\frac{Xu}{Q}$:

4a. _____ FI^c x 18.0 x _____ $TCFI^g$ = _____

4b. (1 - _____ FI^c) x 9.20 x _____ $TCFNG^i$ = _____

4c. _____ (line 4a) + _____ (line 4b) = _____

5. $\frac{Du}{Q}$ for 2 miles:

5a. _____ FI^c x 0.360 x _____ $TCFI^g$ = _____

5b. (1 - _____ FI^c) x 0.250 x _____ $TCFNG^i$ = _____

5c. _____ (line 5a) + _____ (line 5b) = _____

6. $\frac{Du}{Q}$ for 5 miles:

6a. _____ FI^c x 5.00 x 10^{-2} x _____ $TCFI^g$ = _____

6b. (1 - _____ FI^c) x 3.40 x 10^{-2} x _____ $TCFNG^i$ = _____

6c. _____ (line 6a) + _____ (line 6b) = _____

ATTACHMENT III, CALCULATION SHEET III (continued)

7. $\frac{Du}{Q}$ for 10 miles:

7a. _____ FIC^c x 2.10 x 10^{-2} x _____ $TCFI^g$ = _____

7b. (1 - _____ FIC^c) x 1.50 x 10^{-2} x _____ $TCFNG^i$ = _____

7c. _____ (line 7a) + _____ (line 7b) = _____

8. $\frac{Du}{Q}$ for additional location No. 1

8a. _____ FIC^c x _____ $DUOQI^f$ x _____ $TCFI^g$ = _____

8b. (1 - _____ FIC^c) x _____ $DUOQNG^h$ x _____ $TCFNG^i$ = _____

8c. _____ (line 8a) + _____ (line 8b) = _____

9. $\frac{Du}{Q}$ for additional location No. 2

9a. _____ FIC^c x _____ $DUOQI^f$ x _____ $TCFI^g$ = _____

9b. (1 - _____ FIC^c) x _____ $DUOQNG^h$ x _____ $TCFNG^i$ = _____

9c. _____ (line 9a) + _____ (line 9b) = _____

10. $\frac{Du}{Q}$ for additional location No. 3

10a. _____ FIC^c x _____ $DUOQI^f$ x _____ $TCFI^g$ = _____

10b. (1 - _____ FIC^c) x _____ $DUOQNG^h$ x _____ $TCFNG^i$ = _____

10c. _____ (line 10a) + _____ (line 10b) = _____

11a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

11b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 3) + _____ $\frac{m^1}{sec}$ = _____

11c. _____ (line 11a) + _____ (line 11b)

= $\frac{\text{_____}}{\text{_____}}$ $\frac{mrem}{hr}$ at site boundary

ATTACHMENT III, CALCULATION SHEET III (continued)

12a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____(line 2) = _____

12b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 4)÷ _____ $\frac{m^l}{sec}$ = _____

12c. _____ (line 12a) + _____ (line 12b)

= | _____ | $\frac{mrem}{hr}$ at point of max $\frac{Du}{Q}$ for offgas stack release

13a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____(line 2) = _____

13b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 5)÷ _____ $\frac{m^l}{sec}$ = _____

13c. _____ (line 13a) + _____ (line 13b)

= | _____ | $\frac{mrem}{hr}$ at 2 miles

14a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____(line 2) = _____

14b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 6)÷ _____ $\frac{m^l}{sec}$ = _____

14c. _____ (line 14a) + _____ (line 14b)

= | _____ | $\frac{mrem}{hr}$ at 5 miles

15a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____(line 2) = _____

15b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 7)÷ _____ $\frac{m^l}{sec}$ = _____

15c. _____ (line 15a) + _____ (line 15b)

= | _____ | $\frac{mrem}{hr}$ at 10 miles

ATTACHMENT III, CALCULATION SHEET III (continued)

16a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____(line 2) = _____

16b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 8)÷ _____ $\frac{m^l}{sec}$ = _____

16c. _____ (line 16a) + _____ (line 16b)

= $\left|\frac{\text{_____}}{\text{_____}}\right|$ $\frac{mrem}{hr}$ at additional location No. 1

17a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____(line 2) = _____

17b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 9)÷ _____ $\frac{m^l}{sec}$ = _____

17c. _____ (line 17a) + _____ (line 17b)

= $\left|\frac{\text{_____}}{\text{_____}}\right|$ $\frac{mrem}{hr}$ at additional location No. 2

18a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____(line 2)= _____

18b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 10) ÷ _____ $\frac{m^l}{sec}$ = _____

18c. _____ (line 18a) + _____ (line 18b)

= $\left|\frac{\text{_____}}{\text{_____}}\right|$ $\frac{mrem}{hr}$ at additional location No. 3

NOTES:

[a]Reactor building stack release rate from Summary Table, Section II, line 2.

[b]Turbine building roof exhaust release rate from Summary Table, Section II, line 4.

[c]Iodine activity to noble gas activity ratio-obtain from Data Summary Sheet Section IID, line 3b. If unknown use 0.3 unless Standby Gas Treatment is in operation (See Data Summary Sheet, Section II.D, line 1) then use 0.003.

[d]Obtain iodine dose factor (DFI) for time after shutdown (Summary Table, Section I, line 2) from Figure 3.

[e]Obtain noble gas dose factor (DFNG) for time after shutdown (Summary Table, Section I, line 2) from Figure 4.

ATTACHMENT III, CALCULATION SHEET III (continued)

[f] Obtain $\frac{Du}{Q}$ for iodine (DUOQI) from Figure 5 using the appropriate distance from Summary Table, Section III, line 1.

[g] Obtain time correction factor for iodine (TCFI) from Figure 6 using time after shutdown (Summary Table, Section I, line 2).

[h] Obtain $\frac{Du}{Q}$ for noble gas (DUOQNG) from Figure 7 using the appropriate distance from Summary Table, Section III, line 2.

[i] Obtain the noble gas time correction factor (TCFNG) from Figure 8 using time after shutdown (Summary Table, Section I, line 2).

[j] Obtain appropriate $\frac{X}{Q}$ for ground level release from Summary Table, Section III, line 2.

[k] Obtain offgas stack release rate from Summary Table, Section II, line 3.

[l] Obtain wind speed from Summary Table, Section I, line 5.

[m] Iodine activity to noble gas activity ratio, obtain from Data Summary Sheet, Section II D, line 3a. If unknown use 0.3.

E. Whole body dose - Results for Summary Table Section III, line 5.

1. _____ $\frac{mrem}{hr}$ (from Section IID, line 11c) x _____ hr[a]

   = | _____ | mrem at site boundary

2. _____ $\frac{mrem}{hr}$ (from Section IID, line 12c) x _____ hr[a]

   = | _____ | mrem at point of max X/Q for offgas stack release

3. _____ $\frac{mrem}{hr}$ (from Section IID, line 13c) x _____ hr[a]

   = | _____ | mrem at 2 miles

4. _____ $\frac{mrem}{hr}$ (from Section IID, line 14c) x _____ hr[a]

   = | _____ | mrem at 5 miles

ATTACHMENT III, CALCULATION SHEET III (continued)

5. _____ $\frac{mrem}{hr}$ (from Section IID, line 15c) x _____ hr[a]

= | _____ | mrem at 10 miles
| _____ |

6. _____ $\frac{mrem}{hr}$ (from Section IID, line 16c) x _____ hr[a]

= | _____ | mrem at additional location No. 1
| _____ |

7. _____ $\frac{mrem}{hr}$ (from Section IID, line 17c) x _____ hr[a]

= | _____ | mrem at additional location No. 2
| _____ |

8. _____ $\frac{mrem}{hr}$ (from Section IID, line 18c) x _____ hr[a]

= | _____ | mrem at additional location No. 3
| _____ |

NOTE:

[a]Obtain exposure time from Summary Table, Section II, line 1.

F. Thyroid Dose Commitment - Result for Summary Table, Section III, line 6.

1. (_____ $\frac{Ci^a}{sec}$ + _____ $\frac{Ci^b}{sec}$) x _____ FIG[d] = _____ $\frac{Ci}{sec}$

2. _____ $\frac{Ci^c}{sec}$ x _____ FIE[e] _____ $\frac{Ci}{sec}$

3a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IIB, line 1) = _____ $\frac{Ci}{m^3}$

3b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IIC, line 1) = _____ $\frac{Ci}{m^3}$

3c. _____ (line 3a) + _____ (line 3b) = _____ $\frac{Ci}{m^3}$

ATTACHMENT III, CALCULATION SHEET III (continued)

4a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IIB, line 2) = _____ $\frac{Ci}{m^3}$

4b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IIC, line 2) = _____ $\frac{Ci}{m^3}$

4c. _____ (line 4a) + _____ (line 4b) = _____ $\frac{Ci}{m^3}$

5a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IIB, line 3) = _____ $\frac{Ci}{m^3}$

5b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IIC, line 3) = _____ $\frac{Ci}{m^3}$

5c. _____ (line 5a) + _____ (line 5b) = _____ $\frac{Ci}{m^3}$

6a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IIB, line 4) = _____ $\frac{Ci}{m^3}$

6b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IIC, line 4) = _____ $\frac{Ci}{m^3}$

6c. _____ (line 6a) + _____ (line 6b) = _____ $\frac{Ci}{m^3}$

7a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IIB, line 5) = _____ $\frac{Ci}{m^3}$

7b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{Ci}{m^3}$ (Sect. IIC, line 5) = _____ $\frac{Ci}{m^3}$ $\frac{sec}{}$

7c. _____ (line 7a) + _____ (line 7b) = _____ $\frac{Ci}{m^3}$

8a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IIB, line 6) = _____ $\frac{Ci}{m^3}$

8b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IIC, line 6) = _____ $\frac{Ci}{m^3}$

8c. _____ (line 8a) + _____ (line 8b) = _____ $\frac{Ci}{m^3}$

ATTACHMENT III, CALCULATION SHEET III (continued)

9a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IIB, line 7) = _____ $\frac{Ci}{m^3}$

9b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IIC, line 7) = _____ $\frac{Ci}{m^3}$

9c. _____ (line 9a) + _____ (line 9b) = _____ $\frac{Ci}{m^3}$

10a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IIB, line 8) = _____ $\frac{Ci}{m^3}$

10b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IIC, line 8) = _____ $\frac{Ci}{m^3}$

10c. _____ (line 10a) + _____ (line 10b) = _____ $\frac{Ci}{m^3}$

11. _____ $\frac{Ci}{m^3}$ (line 3c) x _____ hrs x 3.8×10^8

x _____ $TCFI^f$ = $\left|\frac{\quad}{\quad}\right|$ mrem at site boundary

12. _____ $\frac{Ci}{m^3}$ (line 4c) x _____ hrs x 3.8×10^8

x _____ $TCFI^f$ = $\left|\frac{\quad}{\quad}\right|$ mrem at point of max X/Q

13. _____ $\frac{Ci}{m^3}$ (line 5c) x _____ hrs x 3.8×10^8

x _____ $TCFI^f$ = $\left|\frac{\quad}{\quad}\right|$ mrem at 2 miles

14. _____ $\frac{Ci}{m^3}$ (line 6c) x _____ hrs x 3.8×10^8

x _____ $TCFI^f$ = $\left|\frac{\quad}{\quad}\right|$ mrem at 5 miles

15. _____ $\frac{Ci}{m^3}$ (line 7c) x _____ hrs x 3.8×10^8

x _____ $TCFI^f$ = $\left|\frac{\quad}{\quad}\right|$ mrem at 10 miles

ATTACHMENT III, CALCULATION SHEET III (continued)

16. _____ $\frac{Ci}{m^3}$ (line 8c) x _____ hr^g x 3.8×10^8

x _____ $TCFI^f$ = | _____ | mrem at additional location No. 1

17. _____ $\frac{Ci}{m^3}$ (line 9c) x _____ hr^g x 3.8×10^8

x _____ $TCFI^f$ = | _____ | mrem at additional location No. 2

18. _____ $\frac{Ci}{m^3}$ (line 10c) x _____ hr^g x 3.8×10^8

x _____ $TCFI^f$ = | _____ | mrem at additional location No. 3

NOTES:

[a]Reactor building stack release rate from Summary Table, Section II, line 2.

[b]Turbine building roof exhaust release rate from Summary Table, Section II, line 4.

[c]Offgas stack release rate from Summary Table, Section II, line 3.

[d]Iodine activity fraction for ground level release, obtain from Data Summary Sheet Section IID, line 3a. If unknown use 0.3.

[e]Iodine activity fraction for elevated release-obtain from Data Summary Sheet Section IID, line 3b. If unknown use 0.3 unless Standby Gas Treatment (see Data Summary Sheet, Section II.D, line 1) is in operation then use 0.003.

[f]Obtain TCFI from Figure 9 using time after shutdown (Summary Table, Section I, line 2).

[g]Obtain exposure time from Summary Table, Section II, line 1.

G. Plume width - The following are the plume widths to be placed in the Summary Table, Section III, line 7.

Point of maximum X/Q for Offgas Stack release	2mi	5mi	10mi
470 (0.29)	3200 (2.0)	6200 (3.9)	11000 (meters) (6.8) (miles)

NOTE:

Obtain remaining plume widths from Figure 10 using the appropriate distances from Summary Table, Section III, line 1.

ATTACHMENT III, CALCULATION SHEET III (continued)

H. Plume arrival time - Results for Summary Table Section III, line 8.

1. $2.78 \times 10^{-4} \times$ _____ $m^a \div$ _____ $\frac{m^b}{sec} =$ [ ] hr to Site Boundary

2. 0.111 divided by _____ $\frac{m^b}{sec} =$ [ ] hr to point of max X/Q for offgas stack release

3. 0.894 divided by _____ $\frac{m^b}{sec} =$ [ ] hr to 2 miles

4. 2.23 divided by _____ $\frac{m^b}{sec} =$ [ ] hr to 5 miles

5 4.47 divided by _____ $\frac{m^b}{sec} =$ [ ] hr to 10 miles

6. $2.78 \times 10^{-4} \times$ _____ $m^a \div$ _____ $\frac{m^b}{sec} =$ [ ] hr to additional location No.1

7. $2.78 \times 10^{-4} \times$ _____ $m^a \div$ _____ $\frac{m^b}{sec} =$ [ ] hr to additional location No.2

8. $2.78 \times 10^{-4} \times$ _____ $m^a \div$ _____ $\frac{m^b}{sec} =$ [ ] hr to additional location No.3

NOTES:

[a]Obtain appropriate distance from Summary Table, Section III, line 1.

[b]Obtain wind speed from Summary Table, Section I, line 5.

ATTACHMENT III, CALCULATION SHEET III (continued)

III. Dose information for atmospheric stability class C

A. Variable distance and Xu/Q values.

1. Obtain distance to site boundary and Xu/Q for ground level and elevated releases from following table using the down wind direction from Summary Table, Section I, line 4.

Distance _____ m

$\frac{Xu}{Q}$ (Ground Level Rel.) _____ $\frac{1}{m^2}$

$\frac{Xu}{Q}$ (Elevated Rel.) _____ $\frac{1}{m^2}$

Down Wind Direction deg.	Distance to Site Bdy, meters	$\frac{Xu}{Q}$, $\frac{1}{m^2}$ Ground Level Rel.	Elevated Rel.
0 - 11.25	1200	3.2 x 10-5	1.3 x 10-5
11.25 - 33.75	1600	2.0 x 10-5	1.1 x 10-5
33.75 - 56.25	700	8.2 x 10-5	7.5 x 10-6
56.25 - 78.75	610	1.0 x 10-4	5.0 x 10-6
78.75 - 101.25	490	1.5 x 10-4	2.0 x 10-6
101.25 - 123.75	450	1.8 x 10-4	1.2 x 10-6
123.75 - 146.25	480	1.5 x 10-4	1.8 x 10-6
146.25 - 168.75	500	1.4 x 10-4	2.4 x 10-6
168.75 - 191.25	460	1.7 x 10-4	1.4 x 10-6
191.25 - 213.75	500	1.4 x 10-4	2.4 x 10-6
213.75 - 236.25	630	1.0 x 10-4	5.4 x 10-6
236.25 - 258.75	720	7.8 x 10-5	7.6 x 10-6
258.75 - 281.25	670	8.8 x 10-5	6.7 x 10-6
281.25 - 303.75	730	7.8 x 10-5	7.8 x 10-6
303.75 - 326.25	980	4.6 x 10-5	1.2 x 10-5
326.25 - 348.75	1300	2.8 x 10-5	1.2 x 10-5
348.75 - 360.00	1200	3.2 x 10-5	1.3 x 10-5

2. Distance to point of maximum $\frac{Xu}{Q}$ for offgas stack release = 1200m.

ATTACHMENT III, CALCULATION SHEET III (continued)

B. Normalized concentration, Ground level release - Results for Summary Table, Section III, line 2.

1. _____ $\frac{1}{m^2}$[a] ÷ _____ m/sec[b] = $\frac{\text{_____}}{\text{_____}}$ $\frac{sec}{m^3}$ at site boundary

2. 3.2×10^{-5} ÷ _____ m/sec[b] = $\frac{\text{_____}}{\text{_____}}$ $\frac{sec}{m^3}$ at point of max X/Q for offgas release

3. 6.0×10^{-6} ÷ _____ m/sec[b] = $\frac{\text{_____}}{\text{_____}}$ $\frac{sec}{m^3}$ at 2 miles

4. 1.2×10^{-6} ÷ _____ m/sec[b] = $\frac{\text{_____}}{\text{_____}}$ $\frac{sec}{m^3}$ at 5 miles

5. 3.7×10^{-7} ÷ _____ m/sec[b] = $\frac{\text{_____}}{\text{_____}}$ $\frac{sec}{m^3}$ at 10 miles

6. _____ $\frac{1}{m^2}$[c] ÷ _____ m/sec[b] = $\frac{\text{_____}}{\text{_____}}$ $\frac{sec}{m^3}$ at additional location No. 1

7. _____ $\frac{1}{m^2}$[c] ÷ _____ m/sec[b] = $\frac{\text{_____}}{\text{_____}}$ $\frac{sec}{m^3}$ at additional location No. 2

8. _____ $\frac{1}{m^2}$[c] ÷ _____ m/sec[b] = $\frac{\text{_____}}{\text{_____}}$ $\frac{sec}{m^3}$ at additional location No. 3

NOTE:

[a]Obtain $\frac{Xu}{Q}$ for ground level release from Section III, Subsection A, line 1.

[b]Obtain wind speed from Summary Table Section I, line 5.

[c]Obtain ground level release $\frac{Xu}{Q}$ for additional locations using Figure 11 and appropriate distance from Summary Table, Section III, line 1.

ATTACHMENT III, CALCULATION SHEET III (continued)

C. Normalized concentration, Elevated release - Results for Summary Table, Section III, line 3.

1. _____ $\frac{1}{m^2}$[a] ÷ _____ m/sec[b] = $\left|\frac{\text{sec}}{m^3}\right.$ _____ at site boundary

2. 3.3×10^{-5} ÷ _____ m/sec[b] = $\left|\frac{\text{sec}}{m^3}\right.$ _____ at point of max X/Q for offgas stick release

3. 5.1×10^{-6} ÷ _____ m/sec[b] = $\left|\frac{\text{sec}}{m^3}\right.$ _____ at 2 miles

4. 1.2×10^{-6} ÷ _____ m/sec[b] = $\left|\frac{\text{sec}}{m^3}\right.$ _____ at 5 miles

5. 3.7×10^{-7} ÷ _____ m/sec[b] = $\left|\frac{\text{sec}}{m^3}\right.$ _____ at 10 miles

6. _____ $\frac{1}{m^2}$[c] ÷ _____ m/sec[b] = $\left|\frac{\text{sec}}{m^3}\right.$ _____ at additional location No. 1

7. _____ $\frac{1}{m^2}$[c] ÷ _____ m/sec[b] = $\left|\frac{\text{sec}}{m^3}\right.$ _____ at additional location No. 2

8. _____ $\frac{1}{m^2}$[c] ÷ _____ m/sec[b] = $\left|\frac{\text{sec}}{m^3}\right.$ _____ at additional location No. 3

NOTE:

[a]Obtain $\frac{Xu}{Q}$ for elevated release from Section III, Subsection A, line 4.

[b]Obtain wind speed from Summary Table, Section I, line 5.

[c]Obtain elevated release $\frac{Xu}{Q}$ for additional locations using Figure 12 and appropriate distances from Summary Table, Section III, line 1.

D. Whole body dose rate - Results for Summary Table, Section III, line 4.

1. _____ $\frac{Ci}{sec}$[a] + _____ $\frac{Ci}{sec}$[b] = _____ $\frac{Ci}{sec}$

2a. _____ FI[m] x _____ DFI[d] = _____

2b. (1 - _____ FI[m]) x _____ DFNG[e] = _____

2c. _____ (line 2a) + _____ (line 2b) = _____

ATTACHMENT III, CALCULATION SHEET III (continued)

3. $\frac{Du}{Q}$ for site boundary:

3a. _____ FI^c x _____ $DUOQI^f$ x _____ $TCFI^g$ = _____

3b. (1 - _____ FI^c) X _____ $DUOQNG^h$ x _____ $TCFNG^i$ = _____

3c. _____ (line 3a) + _____ (line 3b) = _____

4. $\frac{Du}{Q}$ for location of maximum $\frac{Xu}{Q}$ for offgas stack release:

4a. _____ FI^c x 12.0 x _____ $TCFI^g$ = _____

4b. (1 - _____ FI^c) x 8.50 x _____ $TCFNG^i$ = _____

4c. _____ (line 4a) + _____ (line 4b) = _____

5. $\frac{Du}{Q}$ for 2 miles:

5a. _____ FI^c x 8.30 x _____ $TCFI^g$ = _____

5b.(1 - _____ FI^c) x 5.90 x _____ $TCFNG^i$ = _____

5c. _____ (line 5a) + _____ (line 5b) = _____

6. $\frac{Du}{Q}$ for 5 miles

6a. _____ FI^c x 1.85 x _____ $TCFI^g$ = _____

6b.(1 - _____ FI^c) x 1.30 x _____ $TCFNG^i$ = _____

6c. _____ (line 6a) + _____ (line 6b) = _____

7. $\frac{Du}{Q}$ for 10 miles

7a. _____ FI^c x 0.440x _____ $TCFI^g$ = _____

7b.(1 - _____ FI^c) x 0.320 x _____ $TCFNG^i$ = _____

7c. _____ (line 7a) + _____ (line 7b) = _____

ATTACHMENT III, CALCULATION SHEET III (continued)

8. $\frac{Du}{Q}$ for additional location No. 1:

8a._____ FIC^c x _____ $DUOQI^f$ x _____ $TCFI^g$ = _____

8b.(1 -_____ FIC^c) X _____ $DUOQNG^h$ x _____ $TCFNG^i$ = _____

8c._____(line 8a) + _____ (line 8b) = _____

9. $\frac{Du}{Q}$ for additional location No. 2:

9a._____ FIC^c x _____ $DUOQI^f$ x _____ $TCFI^g$ = _____

9b.(1 -_____ FIC^c) X _____ $DUOQNG^h$ x _____ $TCFNG^i$ = _____

9c._____(line 9a) + _____ (line 9b) = _____

10. $\frac{Du}{Q}$ for additional location No. 3:

10a._____ FIC^c x _____ $DUOQI^f$ x _____ $TCFI^g$ = _____

10b.(1 -_____ FIC^c) X _____ $DUOQNG^h$ x _____ $TCFNG^i$ = _____

10c._____(line 10a) + _____ (line 10b) = _____

11a._____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

11b._____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 3c) ÷ _____ $\frac{m^1}{sec}$ = _____

11c._____ (line 11a) + _____ (line 11b)

.= _____ / _____ $\frac{mrem}{hr}$ at site boundary

12a._____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

12b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 4c) ÷ _____ $\frac{m^1}{sec}$ = _____

12c. _____ (line 12a) + _____ (line 12b)

= _____ / _____ $\frac{mrem}{hr}$ at point of max $\frac{Xu}{Q}$

ATTACHMENT III, CALCULATION SHEET III (continued)

13a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

13b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 5c) ÷ _____ $\frac{m^l}{sec}$ = _____

13c. _____ (line 13a) + _____ (line 13b)

= $\left|\frac{\text{_____}}{\text{_____}}\right|\frac{mrem}{hr}$ at 2 miles

14a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

14b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 6) ÷ _____ $\frac{m^l}{sec}$ = _____

14c. _____ (line 14a) + _____ (line 14b)

= $\left|\frac{\text{_____}}{\text{_____}}\right|\frac{mrem}{hr}$ at 5 miles

15a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

15b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 7c) ÷ _____ $\frac{m^l}{sec}$ = _____

15c. _____ (line 15a) + _____ (line 15b)

= $\left|\frac{\text{_____}}{\text{_____}}\right|\frac{mrem}{hr}$ at 10 miles

16a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

16b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 8c) ÷ _____ $\frac{m^l}{sec}$ = _____

16c. _____ (line 16a) + _____ (line 16b)

= $\left|\frac{\text{_____}}{\text{_____}}\right|\frac{mrem}{hr}$ at additional location No. 1

17a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

ATTACHMENT III, CALCULATION SHEET III (continued)

17b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 9c) ÷ _____ $\frac{m^1}{sec}$ = _____

17c. _____ (line 17a) + _____ (line 17b) = _____

= $\left|\frac{\text{_____}}{\text{_____}}\right| \frac{mrem}{hr}$ at additional location No. 2

18a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

18b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 10c) ÷ _____ $\frac{m^1}{sec}$ = _____

18c. _____ (line 18a) + _____ (line 18b)

= $\left|\frac{\text{_____}}{\text{_____}}\right| \frac{mrem}{hr}$ at additional location No. 3

NOTES:

[a]Reactor building stack release rate from Summary Table, Section II, line 2.

[b]Turbine building roof exhaust release rate from Summary Table, Section II, line 4.

[c]Iodine activity to noble gas activity ratio-obtain from Data Summary Sheet Section IID, line 3b. If unknown use 0.3 unless Standby Gas Treatment is in operation (See Data Summary Sheet, Section II.D, line 1) then use 0.003.

[d]Obtain iodine dose factor (DFI) for time after shutdown (Summary Table, Section I, line 2) from Figure 3.

[e]Obtain noble gas dose factor (DFNG) for time after shutdown (Summary Table, Section I, line 2) from Figure 4.

[f]Obtain $\frac{Du}{Q}$ for iodine (DUOQI) from Figure 13 using the appropriate distance from Summary Table, Section III, line 1.

[g]Obtain time correction factor for iodine (TCFI) from Figure 6 using time after shutdown (Summary Table, Section I, line 2).

[h]Obtain $\frac{Du}{Q}$ for noble gas (DUOQNG) from Figure 14 using the appropriate distance from Summary Table, Section III, line 1.

ATTACHMENT III, CALCULATION SHEET III (continued)

[i]Obtain the noble gas time correction factor (TCFNG) from Figure 8 using time after shutdown (Summary Table, Section I, line 2).

[j]Obtain appropriate $\frac{X}{Q}$ for ground level release from Summary Table, Section III, line 2.

[k]Obtain offgas stack release rate from Summary Table, Section II, line 3.

[l]Obtain wind speed from Summary Table, Section I, line 5.

[m]Iodine activity to noble gas activity ratio - obtain from Data Summary Sheet, Section IID, line 3a. If unknown use 0.3.

E. Whole body dose - Results for Summary Table Section III, line 5.

1. _____ $\frac{mrem}{hr}$ (from Section IIID, line 11C) x _____ hr[a]

   = | _____ | mrem at site boundary

2. _____ $\frac{mrem}{hr}$ (from Section IIID, line 12C) x _____ hr[a]

   = | _____ | mrem at point of max X/Q for offgas stack release

3. _____ $\frac{mrem}{hr}$ (from Section IIID, line 13C) x _____ hr[a]

   = | _____ | mrem at 2 miles

4. _____ $\frac{mrem}{hr}$ (from Section IIID, line 14C) x _____ hr[a]

   = | _____ | mrem at 5 miles

5. _____ $\frac{mrem}{hr}$ (from Section IIID, line 15C) x _____ hr[a]

   = | _____ | mrem at 10 miles

6. _____ $\frac{mrem}{hr}$ (from Section IIID, line 16C) x _____ hr[a]

   = | _____ | mrem at additional location No. 1

ATTACHMENT III, CALCULATION SHEET III (continued)

7. _____ $\frac{mrem}{hr}$ (from Section IIID, line 17C) x _____ hr[a]

= | _____ | mrem at additional location No. 2
| _____ |

8. _____ $\frac{mrem}{hr}$ (from Section IIID, line 18C) x _____ hr[a]

= | _____ | mrem at additional location No. 3
| _____ |

NOTE:

[a]Obtain exposure time from Summary Table, Section II, line 1.

F. Thyroid Dose Commitment - Result for Summary Table, Section III, line 6.

1. (_____ $\frac{Ci^a}{sec}$ + _____ $\frac{Ci^b}{sec}$) x _____ FIG[d] = _____ $\frac{Ci}{sec}$

2. _____ $\frac{Ci^c}{sec}$ x _____ FIE[e] _____ $\frac{Ci}{sec}$

3a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IIIB, line 1) = _____ $\frac{Ci}{m^3}$

3b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IIIC, line 1) = _____ $\frac{Ci}{m^3}$

3c. _____ (line 3a) + _____ (line 3b) = _____ $\frac{Ci}{m^3}$

4a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IIIB, line 2) = _____ $\frac{Ci}{m^3}$

4b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IIIC, line 2) = _____ $\frac{Ci}{m^3}$

4c. _____ (line 4a) + _____ (line 4b) = _____ $\frac{Ci}{m^3}$

5a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IIIB, line 3) = _____ $\frac{Ci}{m^3}$

5b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IIIC, line 3) = _____ $\frac{Ci}{m^3}$

5c. _____ (line 5a) + _____ (line 5b) = _____ $\frac{Ci}{m^3}$

ATTACHMENT III, CALCULATION SHEET III (continued)

6a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IIIB, line 4) = _____ $\frac{Ci}{m^3}$

6b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IIIC, line 4) = _____ $\frac{Ci}{m^3}$

6c. _____ (line 6a) + _____ (line 6b) = _____ $\frac{Ci}{m^3}$

7a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IIIB, line 5) = _____ $\frac{Ci}{m^3}$

7b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IIIC, line 5) = _____ $\frac{Ci}{m^3}$

7c. _____ (line 7a) + _____ (line 7b) = _____ $\frac{Ci}{m^3}$

8a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IIIB, line 6) = _____ $\frac{Ci}{m^3}$

8b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IIIC, line 6) = _____ $\frac{Ci}{m^3}$

8c. _____ (line 8a) + _____ (line 8b) = _____ $\frac{Ci}{m^3}$

9a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IIIB, line 7) = _____ $\frac{Ci}{m^3}$

9b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IIIC, line 7) = _____ $\frac{Ci}{m^3}$

9c. _____ (line 9a) + _____ (line 9b) = _____ $\frac{Ci}{m^3}$

10a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IIIB, line 8) = _____ $\frac{Ci}{m^3}$

10b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IIIC, line 8) = _____ $\frac{Ci}{m^3}$

10c. _____ (line 10c) + _____ (line 10c) + _____ $\frac{Ci}{m^3}$

11. _____ $\frac{Ci}{m^3}$ (line 3c) x _____ hr^9 x 3.8×10^8

x _____ $TCFI^f$ = $\frac{\text{_____}}{\text{_____}}$ mrem at site boundary

12. _____ $\frac{Ci}{m^3}$ (line 4c) x _____ hr^9 x 3.8×10^8

x _____ $TCFI^f$ = $\frac{\text{_____}}{\text{_____}}$ mrem at point of max X/Q

ATTACHMENT III, CALCULATION SHEET III (continued)

13. _____ $\frac{Ci}{m^3}$ (line 5c) x _____ hr^9 x 3.8×10^8

x _____ $TCFI^f$ = | _____ | mrem at 2 miles

14. _____ $\frac{Ci}{m^3}$ (line 6c) x _____ hr^9 x 3.8×10^8

x _____ $TCFI^f$ = | _____ | mrem at 5 miles

ATTACHMENT III, CALCULATION SHEET III (continued)

15. _____ $\frac{Ci}{m^3}$ (line 7c) x _____ hr^g x 3.8×10^8

x _____ $TCFI^f$ = $\frac{\text{_____}}{\text{_____}}$ mrem at 10 miles

16. _____ $\frac{Ci}{m^3}$ (line 8c) x _____ hr^g x 3.8×10^8

x _____ $TCFI^f$ = $\frac{\text{_____}}{\text{_____}}$ mrem at additional location No. 1

17. _____ $\frac{Ci}{m^3}$ (line 9c) x _____ hr^g x 3.8×10^8

x _____ $TCFI^f$ = $\frac{\text{_____}}{\text{_____}}$ mrem at additional location No. 2

18. _____ $\frac{Ci}{m^3}$ (line 10c) x _____ hr^g x 3.8×10^8

x _____ $TCFI^f$ = $\frac{\text{_____}}{\text{_____}}$ mrem at additional location No. 3

NOTES:

[a]Reactor building stack release rate from Summary Table, Section II, line 2.

[b]Turbine building roof exhaust release rate from Summary Table, Section II, line 4.

[c]Offgas stack release rate from Summary Table, Section II, line 3.

[d]Iodine activity fraction for ground level release, - obtain from Data Summary Sheet Section IID, line 3a. If unknown use 0.3.

[e]Iodine activity fraction for elevated release - obtain from Data Summary Sheet Section IID, line 3b. If unknown use 0.3 unless Standby Gas Treatment (see Data Summary Sheet, Section II.D, line 1) is in operation then use 0.003.

[f]Obtain TCFI from Figure 9 using time after shutdown (Summary Table, Section I, line 2).

[g]Obtain exposure time from Summary Table, Section II, line 1.

ATTACHMENT III, CALCULATION SHEET III (continued)

G. Plume width - The following are the plume widths to be placed in the Summary Table, Section III, line 7.

Point of maximum X/Q for Offgas Stack release	2mi	5mi	10mi
720 meters (0.45)	1900 (1.2)	2700 (1.7)	6600 (meters) (4.1)(miles)

NOTE:

Obtain remaining plume widths from Figure 15 using the appropriate distances from Summary Table, Section III, line 1.

H. Plume arrival time - Results for Summary Table Section III, line 8.

1. $2.78 \times 10^{-4} \times$ _____ $m^a \div$ _____ $\frac{m^b}{sec}$ = |___| hr to Site Boundary

2. 0.333 divided by _____ $\frac{m^b}{sec}$ = |___| hr to point of max X/Q for offgas stack release

3. 0.894 divided by _____ $\frac{m^b}{sec}$ = |___| hr to 2 miles

4. 2.23 divided by _____ $\frac{m^b}{sec}$ = |___| hr to 5 miles

5. 4.47 divided by _____ $\frac{m^b}{sec}$ = |___| hr to 10 miles

6. $2.78 \times 10^{-4} \times$ _____ $m^a \div$ _____ $\frac{m^b}{sec}$ = |___| hr to additional location No. 1

7. $2.78 \times 10^{-4} \times$ _____ $m^a \div$ _____ $\frac{m^b}{sec}$ = |___| hr to additional location No. 2

8. $2.78 \times 10^{-4} \times$ _____ $m^a \div$ _____ $\frac{m^b}{sec}$ = |___| hr to additional location No. 3

NOTES:

[a]Obtain appropriate distance from Summary Table, Section III, line 1.

[b]Obtain wind speed from Summary Table, Section I, line 5.

ATTACHMENT III, CALCULATION SHEET III (continued)

IV. Dose information for atmospheric stability class DE

A. Variable distance and Xu/Q values.

1. Obtain distance to site boundary and Xu/Q for ground level and elevated releases from following table using the down wind direction from Summary Table, Section I, line 4.

Distance _____ m

$\frac{Xu}{Q}$ (Ground Level Rel.) _____ $\frac{1}{m^2}$

$\frac{Xu}{Q}$ (Elevated Rel.) _____ $\frac{1}{m^2}$

Down Wind Direction deg.	Distance to Site Bdy, meters	$\frac{Xu}{Q}$, $\frac{1}{m^2}$ Ground Level Rel.	Elevated Rel.
0 - 11.25	1200	1.5 x 10-4	3.4 x 10-7
11.25 - 33.75	1600	9.5 x 10-5	1.6 x 10-6
33.75 - 56.25	700	3.5 x 10-4	1.8 x 10-9
56.25 - 78.75	610	4.4 x 10-4	8.0 x 10-10
78.75 - 101.25	490	6.1 x 10-4	2.1 x 10-10
101.25 - 123.75	450	7.3 x 10-4	1.6 x 10-11
123.75 - 146.25	480	6.4 x 10-4	1.6 x 10-10
146.25 - 168.75	500	6.0 x 10-4	2.6 x 10-10
168.75 - 191.25	460	6.9 x 10-4	6.5 x 10-11
191.25 - 213.75	500	6.0 x 10-4	2.6 x 10-10
213.75 - 236.25	630	4.3 x 10-4	9.0 x 10-10
236.25 - 258.75	720	3.4 x 10-4	2.6 x 10-9
258.75 - 281.25	670	3.7 x 10-4	1.2 x 10-9
281.25 - 303.75	730	3.3 x 10-4	3.0 x 10-9
303.75 - 326.25	980	2.1 x 10-4	6.8 x 10-8
326.25 - 348.75	1300	1.3 x 10-4	6.0 x 10-7
348.75 - 360.00	1200	1.5 x 10-4	3.4 x 10-7

2. Distance to point of maximum $\frac{Xu}{Q}$ for offgas stack release = 4000m.

ATTACHMENT III, CALCULATION SHEET III (continued)

B. Normalized concentration, Ground level release - Results for Summary Table, Section III, line 2.

1. _____ $\frac{1^a}{m^2}$ ÷ _____ m/sec[b] = _____ $\frac{sec}{m^3}$ at site boundary

2. 2.2×10^{-5} ÷ _____ m/sec[b] = _____ $\frac{sec}{m^3}$ at point of max X/Q for offgas release

3. 3.1×10^{-6} ÷ _____ m/sec[b] = _____ $\frac{sec}{m^3}$ at 2 miles

4. 7.2×10^{-6} ÷ _____ m/sec[b] = _____ $\frac{sec}{m^3}$ at 5 miles

5. 2.4×10^{-7} ÷ _____ m/sec[b] = _____ $\frac{sec}{m^3}$ at 10 miles

6. _____ $\frac{1^c}{m^2}$ ÷ _____ m/sec[b] = _____ $\frac{sec}{m^3}$ at additional location No. 1

7. _____ $\frac{1^c}{m^2}$ ÷ _____ m/sec[b] = _____ $\frac{sec}{m^3}$ at additional location No. 2

8. _____ $\frac{1^c}{m^2}$ ÷ _____ m/sec[b] = _____ $\frac{sec}{m^3}$ at additional location No. 3

NOTE:

[a]Obtain $\frac{Xu}{Q}$ for ground level release from Section IV, Subsection A, line 1.

[b]Obtain wind speed from Summary Table Section I, line 5.

[c]Obtain ground level release $\frac{Xu}{Q}$ for additional locations using Figure 16 and appropriate distance from Summary Table, Section III, line 1.

C. Normalized concentration, Elevated release - Results for Summary Table, Section III, line 3.

1. _____ $\frac{1^a}{m^2}$ ÷ _____ m/sec[b] = _____ $\frac{sec}{m^3}$ at site boundary

ATTACHMENT III, CALCULATION SHEET III (continued)

2. 7.0×10^{-6} ÷ _____ m/sec^b = _____ $\frac{sec}{m^3}$ at point of max X/Q for offgas stack release

3. 6.6×10^{-6} ÷ _____ m/sec^b = _____ $\frac{sec}{m^3}$ at 2 miles

4. 4.7×10^{-6} ÷ _____ m/sec^b = _____ $\frac{sec}{m^3}$ at 5 miles

5. 2.0×10^{-6} ÷ _____ m/sec^b = _____ $\frac{sec}{m^3}$ at 10 miles

6. _____ $\frac{1^c}{m^2}$ ÷ _____ m/sec^b = _____ $\frac{sec}{m^3}$ at additional location No. 1

7. _____ $\frac{1^c}{m^2}$ ÷ _____ m/sec^b = _____ $\frac{sec}{m^3}$ at additional location No. 2

8. _____ $\frac{1^c}{m^2}$ ÷ _____ m/sec^b = _____ $\frac{sec}{m^3}$ at additional location No. 3

NOTE:

[a]Obtain $\frac{Xu}{Q}$ for elevated release from Section IV, Subsection A, line 1.

[b]Obtain wind speed from Summary Table, Section I, line 5.

[c]Obtain elevated release $\frac{Xu}{Q}$ for additional locations using Figure 17 and appropriate distances from Summary Table, Section III, line 1.

D. Whole body dose rate - Results for Summary Table, Section III, line 4.

1. _____ $\frac{Cia}{sec}$ + _____ $\frac{Cib}{sec}$ = _____ $\frac{Ci}{sec}$

2a. _____ FI^m x _____ DFI^d = _____

2b. (1 - _____ FI^m x _____ $DFNG^e$ = _____

2c. _____ (line 2a) + _____ (line 2b) = _____

ATTACHMENT III, CALCULATION SHEET III (continued)

3. $\frac{Du}{Q}$ for site boundary:

3a._____ FI[c] x _____DUOQI[f] x _____ TCFI[g] = _____

3b.(1 -_____FI[c]) x _____DUOQNG[h] x _____TCFNG[i] = _____

3c._____ (line 3a) + _____ (line 3b) = _____

4. $\frac{Du}{Q}$ for location of maximum $\frac{X_w}{Q}$ for offgas stack release:

4a._____ FI[c] x 11.0 x _____ TCFI[g] = _____

4b.(1 -_____FI[c]) x 7.2 x _____ TCFNG[i] = _____

4c._____ (line 4a) + _____ (line 4b) = _____

5. $\frac{Du}{Q}$ for 2 miles:

5a._____ FI[c] x 11.1 x _____ TCFI[g] = _____

5b.(1 - _____FI[c]) x 8.0 x _____ TCFNG[i] = _____

5c._____ (line 5a) + _____ (line 5b) = _____

6. $\frac{Du}{Q}$ for 5 miles

6a._____ FI[c] x 7.4 x _____ TCFI[g] = _____

6b.(1 - _____FI[c]) x 4.1 x _____ TCFNG[i] = _____

6c._____ (line 6a) + _____ (line 6b) = _____

7. $\frac{Du}{Q}$ for 10 miles

7a._____ FI[c] x 2.6 x _____ TCFI[g] = _____

7b.(1 - _____FI[c]) x 1.85 x _____ TCFNG[i] = _____

7c._____ (line 7a) + _____ (line 7b) = _____

ATTACHMENT III, CALCULATION SHEET III (continued)

8. $\frac{Du}{Q}$ for additional location No. 1:

8a._____ FIC x _____DUOQI[f] x _____ TCFI[g] = _____

8b.(1 - _____FIC) X _____DUOQNG[h] x _____TCFNG[i] = _____

8c._____ (line 8a) + _____ (line 8b) = _____

9. $\frac{Du}{Q}$ for additional location No. 2:

9a._____ FIC x _____DUOQI[f] x _____ TCFI[g] = _____

9b.(1 -_____FIC) X _____DUOQNG[h] x _____TCFNG[i] = _____

9c._____ (line 9a) + _____ (line 9b) = _____

10. $\frac{Du}{Q}$ for additional location No. 3:

10a._____ FIC x _____DUOQI[f] x _____ TCFI[g] = _____

10b.(1 -_____FIC) X _____DUOQNG[h] x _____TCFNG[i] = _____

10c._____ (line 10a) + _____ (line 10b) = _____

11a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

11b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 3) ÷ _____ $\frac{m^1}{sec}$ = _____

11c. _____ (line 11a) + _____ (line 11b)

= $\left|\frac{\text{\_\_\_\_\_}}{\text{\_\_\_\_\_}}\right| \frac{mrem}{hr}$ at site boundary

12a._____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

12b._____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 4) ÷ _____ $\frac{m^1}{sec}$ = _____

12c._____ (line 12a) + _____ (line 12b)

= $\left|\frac{\text{\_\_\_\_\_}}{\text{\_\_\_\_\_}}\right| \frac{mrem}{hr}$ at point of max $\frac{Xu}{Q}$

ATTACHMENT III, CALCULATION SHEET III (continued)

13a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

13b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 5) ÷ _____ $\frac{m^l}{sec}$ = _____

13c. _____ (line 13a) ÷ _____ (line 13b)

= $\left|\frac{\text{_____}}{\text{_____}}\right| \frac{mrem}{hr}$ at 2 miles

14a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

14b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 6) ÷ _____ $\frac{m^l}{sec}$ = _____

14c. _____ (line 14a) ÷ _____ (line 14b)

= $\left|\frac{\text{_____}}{\text{_____}}\right| \frac{mrem}{hr}$ at 5 miles

15a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

15b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 7) ÷ _____ $\frac{m^l}{sec}$ = _____

15c. _____ (line 15a) ÷ _____ (line 15b)

= $\left|\frac{\text{_____}}{\text{_____}}\right| \frac{mrem}{hr}$ at 10 miles

16a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

16b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 8) ÷ _____ $\frac{m^l}{sec}$ = _____

16c. _____ (line 16a) ÷ _____ (line 16b)

= $\left|\frac{\text{_____}}{\text{_____}}\right| \frac{mrem}{hr}$ at additional location No. 1

ATTACHMENT III, CALCULATION SHEET III (continued)

17a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^3}{m^3}$ x _____ (line 2) = _____

17b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 9) ÷ _____ $\frac{m^1}{sec}$ = _____

17c. _____ (line 17a) ÷ _____ (line 17b)

= $\left|\frac{\text{_____}}{\text{_____}}\right| \frac{mrem}{hr}$ at additional location No. 2

18a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^3}{m^3}$ x _____ (line 2) = _____

18b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 10) ÷ _____ $\frac{m^1}{sec}$ = _____

18c. _____ (line 18a) ÷ _____ (line 18b)

= $\left|\frac{\text{_____}}{\text{_____}}\right| \frac{mrem}{hr}$ at additional location No. 3

NOTES:

[a]Reactor building stack release rate from Summary Table, Section II, line 2.

[b]Turbine building roof exhaust release rate from Summary Table, Section II, line 4.

[c]Iodine activity to noble gas activity ratio - obtain from Data Sumary Sheet Section IID, line 3b. If unknown use 0.3 unless Standby Gas Treatment is in operation (See Data Summary Sheet, Section II.D, line 1) then use 0.003.

[d]Obtain iodine dose factor (DFI) for time after shutdown (Summary Table, Section I, line 2) from Figure 3.

[e]Obtain noble gas dose factor (DFNG) for time after shutdown (Summary Table, Section I, line 2) from Figure 4.

[f]Obtain $\frac{Du}{Q}$ for iodine (DUOQI) from Figure 18 using the appropriate distance from Summary Table, Section III, line 1.

[g]Obtain time correction factor for iodine (TCFI) from Figure 6 using time after shutdown (Summary Table, Section I, line 2).

[h]Obtain $\frac{Du}{Q}$ for noble gas (DUOQNG) from Figure 19 using the appropriate distance from Summary Table, Section III, line 1.

ATTACHMENT III, CALCULATION SHEET III (continued)

[i]Obtain the noble gas time correction factor (TCFNG) from Figure 8 using time after shutdown (Summary Table, Section I, line 2).

[j]Obtain appropriate $\frac{X}{Q}$ for ground level release from Summary Table, Section III, line 2.

[k]Obtain offgas stack release rate from Summary Table, Section II, line 3.

[l]Obtain wind speed from Summary Table, Section I, line 5.

[m]Iodine activity to noble gas activity ratio - obtain from Data Summary Sheet Section IID, line 3a. If unknown use 0.3.

E. Whole body dose - Results for Summary Table Section III, line 5.

1. _____ $\frac{mrem}{hr}$ (from Section IVD, line 11C) x _____ hr[a]

   = | _____ | mrem at site boundary

2. _____ $\frac{mrem}{hr}$ (from Section IVD, line 12C) x _____ hr[a]

   = | _____ | mrem at point of max X/Q for offgas stack release

3. _____ $\frac{mrem}{hr}$ (from Section IVD, line 13C) x _____ hr[a]

   = | _____ | mrem at 2 miles

4. _____ $\frac{mrem}{hr}$ (from Section IVD, line 14C) x _____ hr[a]

   = | _____ | mrem at 5 miles

5. _____ $\frac{mrem}{hr}$ (from Section IVD, line 15C) x _____ hr[a]

   = | _____ | mrem at 10 miles

6. _____ $\frac{mrem}{hr}$ (from Section IVD, line 16C) x _____ hr[a]

   = | _____ | mrem at additional location No. 1

ATTACHMENT III, CALCULATION SHEET III (continued)

7. _____ $\frac{mrem}{hr}$ (from Section IVD, line 17C) x _____ hr[a]

= | _____ | mrem at additional location No. 2

8. _____ $\frac{mrem}{hr}$ (from Section IVD, line 18C) x _____ hr[a]

= | _____ | mrem at additional location No. 3

NOTE:

[a]Obtain exposure time from Summary Table, Section II, line 1.

F. Thyroid Dose Commitment - Result for Summary Table, Section III, line 6.

1. (_____ $\frac{Ci}{sec}$[a] + _____ $\frac{Ci}{sec}$[b]) x _____ FIG[d] = _____ $\frac{Ci}{sec}$

2. _____ $\frac{Ci}{sec}$[c] x _____ FIE[e] _____ $\frac{Ci}{sec}$

3a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IVB, line 1) = _____ $\frac{Ci}{m^3}$

3b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IVB, line 1) = _____ $\frac{Ci}{m^3}$

3c. _____ (line 3a) + _____ (line 3b) = _____ $\frac{Ci}{m^3}$

4a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IVB, line 2) = _____ $\frac{Ci}{m^3}$

4b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IVB, line 2) = _____ $\frac{Ci}{m^3}$

4c. _____ (line 4a) + _____ (line 4b) = _____ $\frac{Ci}{m^3}$

5a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IVB, line 3) = _____ $\frac{Ci}{m^3}$

5b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IVB, line 3) = _____ $\frac{Ci}{m^3}$

5c. _____ (line 5a) + _____ (line 5b) = _____ $\frac{Ci}{m^3}$

ATTACHMENT III, CALCULATION SHEET III (continued)

6a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IVB, line 4) = _____ $\frac{Ci}{m^3}$

6b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IVB, line 4) = _____ $\frac{Ci}{m^3}$

6c. _____ (line 6a) + _____ (line 6b) = _____ $\frac{Ci}{m^3}$

7a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IVB, line 5) = _____ $\frac{Ci}{m^3}$

7b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IVB, line 5) = _____ $\frac{Ci}{m^3}$

7c. _____ (line 7a) + _____ (line 7b) = _____ $\frac{Ci}{m^3}$

8a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IVB, line 6) = _____ $\frac{Ci}{m^3}$

8b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IVB, line 6) = _____ $\frac{Ci}{m^3}$

8c. _____ (line 8a) + _____ (line 8b) = _____ $\frac{Ci}{m^3}$

9a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IVB, line 7) = _____ $\frac{Ci}{m^3}$

9b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IVB, line 7) = _____ $\frac{Ci}{m^3}$

9c. _____ (line 9a) + _____ (line 9b) = _____ $\frac{Ci}{m^3}$

10a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. IVB, line 8) = _____ $\frac{Ci}{m^3}$

10b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. IVB, line 8) = _____ $\frac{Ci}{m^3}$

10c. _____ (line 10a) + _____ (line 10b) = _____ $\frac{Ci}{m^3}$

11. _____ $\frac{Ci}{m^3}$ (line 3) x _____ hr^9 x 3.8×10^8

x _____ $TCFI^f$ = $\frac{\text{_____}}{\text{_____}}$ mrem at site boundary

12. _____ $\frac{Ci}{m^3}$ (line 4) x _____ hr^9 x 3.8×10^8

x _____ $TCFI^f$ = $\frac{\text{_____}}{\text{_____}}$ mrem at point of max X/Q

ATTACHMENT III, CALCULATION SHEET III (continued)

13. _____ $\frac{Ci}{m^3}$ (line 5) x _____ hr^g x 3.8×10^8

x _____ $TCFI^f$ = $\frac{\text{[ ]}}{\text{[ ]}}$ mrem at 2 miles

14. _____ $\frac{Ci}{m^3}$ (line 6) x _____ hr^g x 3.8×10^8

x _____ $TCFI^f$ = $\frac{\text{[ ]}}{\text{[ ]}}$ mrem at 5 miles

15. _____ $\frac{Ci}{m^3}$ (line 7) x _____ hr^g x 3.8×10^8

x _____ $TCFI^f$ = $\frac{\text{[ ]}}{\text{[ ]}}$ mrem at 10 miles

16. _____ $\frac{Ci}{m^3}$ (line 8) x _____ hr^g x 3.8×10^8

x _____ $TCFI^f$ = $\frac{\text{[ ]}}{\text{[ ]}}$ mrem at additional location No. 1

17. _____ $\frac{Ci}{m^3}$ (line 9) x _____ hr^g x 3.8×10^8

x _____ $TCFI^f$ = $\frac{\text{[ ]}}{\text{[ ]}}$ mrem at additional location No. 2

18. _____ $\frac{Ci}{m^3}$ (line 10)x _____ hr^g x 3.8×10^8

x _____ $TCFI^f$ = $\frac{\text{[ ]}}{\text{[ ]}}$ mrem at additional location No. 3

NOTES:

[a]Reactor building stack release rate from Summary Table, Section II, line 2.

[b]Turbine building roof exhaust release rate from Summary Table, Section II, line 4.

[c]Offgas stack release rate from Summary Table, Section II, line 3.

[d]Iodine activity fraction for ground level release - obtain from Data Summary Sheet Section IID, line 3a. If unknown use 0.3.

[e]Iodine activity fraction for elevated release - obtain from Data Summary Sheet Section IID, line 3b. If unknown use 0.3 unless Standby Gas Treatment (see Data Summary Sheet, Section II.D, line 1) is in operation then use 0.003.

ATTACHMENT III, CALCULATION SHEET III (continued)

[f]Obtain TCFI from Figure 9 using time after shutdown (Summary Table, Section I, line 2).

[g]Obtain exposure time from Summary Table, Section II, line 1.

G. Plume width - The following are the plume widths to be placed in the Summary Table, Section III, line 7.

Point of maximum X/Q for Offgas Stack release	2mi	5mi	10mi
1400 (0.87)	1100 (0.68)	2400 (1.5)	4300 (meters) (2.7)(miles)

NOTE:

Obtain remaining plume widths from Figure 20 using the appropriate distances from Summary Table, Section III, line 1.

H. Plume arrival time - Results for Summary Table Section III, line 8.

1. $2.78 \times 10^{-4} \times$ _____ $m^a \div$ _____ $\frac{m^b}{sec}$ = |___| hr to Site Boundary

2. 1.11 divided by _____ $\frac{m^b}{sec}$ = |___| hr to point of max X/Q for offgas stack release

3. 0.894 divided by _____ $\frac{m^b}{sec}$ = |___| hr to 2 miles

4. 2.23 divided by _____ $\frac{m^b}{sec}$ = |___| hr to 5 miles

5. 4.47 divided by _____ $\frac{m^b}{sec}$ = |___| hr to 10 miles

6. $2.78 \times 10^{-4} \times$ _____ $m^a \div$ _____ $\frac{m^b}{sec}$ = |___| hr to additional location No. 1

7. $2.78 \times 10^{-4} \times$ _____ $m^a \div$ _____ $\frac{m^b}{sec}$ = |___| hr to additional location No. 2

8. $2.78 \times 10^{-4} \times$ _____ $m^a \div$ _____ $\frac{m^b}{sec}$ = |___| hr to additional location No. 3

NOTES:

[a]Obtain appropriate distance from Summary Table, Section III, line 1.

[b]Obtain wind speed from Summary Table, Section I, line 5.

ATTACHMENT III, CALCULATION SHEET III (continued)

V.. Dose information for atmospheric stability class FG

A. Variable distance and Xu/Q values.

1. Obtain distance to site boundary and Xu/Q for ground level and elevated releases from following table using the down wind direction from Summary Table, Section I, line 4.

Distance _____ m $\frac{Xu}{Q}$ (Ground Level Rel.) _____ $\frac{1}{m^2}$

$\frac{Xu}{Q}$ (Elevated Rel.) _____ $\frac{1}{m^2}$

Down Wind Direction deg.	Distance to Site Bdy, meters	$\frac{Xu}{Q}$, $\frac{1}{m^2}$ Ground Level Rel.	Elevated Rel.
0 - 11.25	1200	9.5×10^{-4}	0.0
11.25 - 33.75	1600	6.2×10^{-4}	0.0
33.75 - 56.25	700	2.1×10^{-3}	0.0
56.25 - 78.75	610	2.6×10^{-3}	0.0
78.75 - 101.25	490	3.6×10^{-3}	0.0
101.25 - 123.75	450	4.1×10^{-3}	0.0
123.75 - 146.25	480	3.7×10^{-3}	0.0
146.25 - 168.75	500	3.5×10^{-3}	0.0
168.75 - 191.25	460	3.9×10^{-3}	0.0
191.25 - 213.75	500	3.5×10^{-3}	0.0
213.75 - 236.25	630	2.5×10^{-3}	0.0
236.25 - 258.75	720	2.0×10^{-3}	0.0
258.75 - 281.25	670	2.2×10^{-3}	0.0
281.25 - 303.75	730	2.0×10^{-3}	0.0
303.75 - 326.25	980	1.2×10^{-3}	0.0
326.25 - 348.75	1300	8.3×10^{-4}	0.0
348.75 - 360.00	1200	9.5×10^{-4}	0.0

2. Distance to point of maximum $\frac{Xu}{Q}$ for offgas stack release = 16090m.

ATTACHMENT III, CALCULATION SHEET III (continued)

B. Normalized concentration, Ground level release - Results for Summary Table, Section III, line 2.

1. _____ $\frac{1}{m^2}$[a] ÷ _____ m/sec[b] = _____ / _____ $\frac{sec}{m^3}$ at site boundary

2. 2.0×10^{-5} ÷ _____ m/sec[b] = _____ / _____ $\frac{sec}{m^3}$ at point of max X/Q for offgas release

3. 2.1×10^{-4} ÷ _____ m/sec[b] = _____ / _____ $\frac{sec}{m^3}$ at 2 miles

4. 5.5×10^{-5} ÷ _____ m/sec[b] = _____ / _____ $\frac{sec}{m^3}$ at 5 miles

5. 2.0×10^{-5} ÷ _____ m/sec[b] = _____ / _____ $\frac{sec}{m^3}$ at 10 miles

6. _____ $\frac{1}{m^2}$[c] ÷ _____ m/sec[b] = _____ / _____ $\frac{sec}{m^3}$ at additional location No. 1

7. _____ $\frac{1}{m^2}$[c] ÷ _____ m/sec[b] = _____ / _____ $\frac{sec}{m^3}$ at additional location No. 2

8. _____ $\frac{1}{m^2}$[c] ÷ _____ m/sec[b] = _____ / _____ $\frac{sec}{m^3}$ at additional location No. 3

NOTE:

[a]Obtain $\frac{Xu}{Q}$ for ground level release from Section V, Subsection A, line 1.

[b]Obtain wind speed from Summary Table Section I, line 5.

[c]Obtain ground level release $\frac{Xu}{Q}$ for additional locations using Figure 21 and appropriate distance from Summary Table, Section III, line 1.

ATTACHMENT III, CALCULATION SHEET III (continued)

C. Normalized concentration, Elevated release - Results for Summary Table, Section III, line 3.

1. _____ $\frac{1^a}{m^2}$ ÷ _____ m/sec[b] = $\left|\frac{\text{sec}}{m^3}\right.$ at site boundary

2. 1.7×10^{-4} ÷ _____ m/sec[b] = $\left|\frac{\text{sec}}{m^3}\right.$ at point of max X/Q for offgas stack release

3. 1.7×10^{-11} ÷ _____ m/sec[b] = $\left|\frac{\text{sec}}{m^3}\right.$ at 2 miles

4. 2.2×10^{-7} ÷ _____ m/sec[b] = $\left|\frac{\text{sec}}{m^3}\right.$ at 5 miles

5. 1.7×10^{-6} ÷ _____ m/sec[b] = $\left|\frac{\text{sec}}{m^3}\right.$ at 10 miles

6. _____ $\frac{1^c}{m^2}$ ÷ _____ m/sec[b] = $\left|\frac{\text{sec}}{m^3}\right.$ at additional location No. 1

7. _____ $\frac{1^c}{m^2}$ ÷ _____ m/sec[b] = $\left|\frac{\text{sec}}{m^3}\right.$ at additional location No. 2

8. _____ $\frac{1^c}{m^2}$ ÷ _____ m/sec[b] = $\left|\frac{\text{sec}}{m^3}\right.$ at additional location No. 3

NOTE:

[a]Obtain $\frac{Xu}{Q}$ for elevated release from Section V, Subsection A, line 1.

[b]Obtain wind speed from Summary Table, Section I, line 5.

[c]Obtain elevated release $\frac{Xu}{Q}$ for additional locations using Figure 22 and appropriate distances from Summary Table, Section III, line 1.

D. Whole body dose rate - Results for Summary Table, Section III, line 4.

1. _____ $\frac{Ci^a}{sec}$ + _____ $\frac{Ci^b}{sec}$ = _____ $\frac{Ci}{sec}$

2a. _____ FI[m] x _____ DFI[d] = _____

2b. (1 - _____ FI[m]) x _____ DFNG[e] = _____

2c. _____ (line 2a) + _____ (line 2b) = _____

ATTACHMENT III, CALCULATION SHEET III (continued)

3. $\frac{Du}{Q}$ for site boundary:

3a. _____ FIC x _____ DUOQI[f] x _____ TCFI[g] = _____

3b. (1 - _____ FIC) X _____ DUOQNG[h] x _____ TCFNG[i] = _____

3c. _____ (line 3a) + _____ (line 3b) = _____

4. $\frac{Du}{Q}$ for location of maximum $\frac{Xu}{Q}$

4a. _____ FIC x 4.2 x _____ TCFI[g] = _____

4b. (1 - _____ FIC) x 3.0 x _____ TCFNG[i] = _____

4c. _____ (line 4a) + _____ (line 4b) = _____

5. $\frac{Du}{Q}$ for 2 miles:

5a. _____ FIC x 6.8 x _____ TCFI[g] = _____

5b. (1 - _____ FIC) x 4.8 x _____ TCFNG[i] = _____

5c. _____ (line 5a) + _____ (line 5b) = _____

6. $\frac{Du}{Q}$ for 5 miles

6a. _____ FIC x 5.3 x _____ TCFI[g] = _____

6b. (1 - _____ FIC) x 3.7 x _____ TCFNG[i] = _____

6c. _____ (line 6a) + _____ (line 6b) = _____

7. $\frac{Du}{Q}$ for 10 miles

7a. _____ FIC x 4.2 x _____ TCFI[g] = _____

7b. (1 - _____ FIC) x 3.0 x _____ TCFNG[i] = _____

7c. _____ (line 7a) + _____ (line 7b) = _____

8. $\frac{Du}{Q}$ for additional location No. 1

8a. _____ FIC x _____ DUOQI[f] x _____ TCFI[g] = _____

8b. (1 - _____ FIC) X _____ DUOQNG[h] x _____ TCFNG[i] = _____

8c. _____ (line 8a) + _____ (line 8b) = _____

ATTACHMENT III, CALCULATION SHEET III (continued)

9. $\frac{Du}{Q}$ for additional location No. 2

9a. _____ FIC x _____ DUOQI[f] x _____ TCFI[g] = _____

9b. (1 - _____ FIC) X _____ DUOQNG[h] x _____ TCFNG[i] = _____

9c. _____ (line 9a) + _____ (line 9b) = _____

10. $\frac{Du}{Q}$ for additional location No. 3

10a. _____ FIC x _____ DUOQI[f] x _____ TCFI[g] = _____

10b. (1 - _____ FIC) X _____ DUOQNG[h] x _____ TCFNG[i] = _____

10c. _____ (line 10a) + _____ (line 10b) = _____

11a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

11b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 3c) ÷ _____ $\frac{m^l}{sec}$ = _____

11c. _____ (line 11a) ÷ _____ (line 11b)

= $\frac{\text{_____}}{\text{_____}}$ $\frac{mrem}{hr}$ at site boundary

12a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

12b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 4c) ÷ _____ $\frac{m^l}{sec}$ = _____

12c. _____ (line 12a) ÷ _____ (line 12b)

= $\frac{\text{_____}}{\text{_____}}$ $\frac{mrem}{hr}$ at point of max $\frac{Xu}{Q}$

13a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

13b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 5c) ÷ _____ $\frac{m^l}{sec}$ = _____

13c. _____ (line 13a) ÷ _____ (line 13b)

= $\frac{\text{_____}}{\text{_____}}$ $\frac{mrem}{hr}$ at 2 miles

ATTACHMENT III, CALCULATION SHEET III (continued)

14a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

14b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 6c) ÷ _____ $\frac{m^l}{sec}$ = _____

14c. _____ (line 14a) + _____ (line 14b)

= $\left|\frac{\text{_____}}{\text{_____}}\right| \frac{mrem}{hr}$ at 5 miles

15a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

15b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 7c) ÷ _____ $\frac{m^l}{sec}$ = _____

15c. _____ (line 15a) + _____ (line 15b)

= $\left|\frac{\text{_____}}{\text{_____}}\right| \frac{mrem}{hr}$ at 10 miles

16a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

16b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 8c) ÷ _____ $\frac{m^l}{sec}$ = _____

16c. _____ (line 16a) + _____ (line 16b)

= $\left|\frac{\text{_____}}{\text{_____}}\right| \frac{mrem}{hr}$ at additional location No. 1

17a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

17b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 9c) ÷ _____ $\frac{m^l}{sec}$ = _____

17c. _____ (line 17a) + _____ (line 17b)

= $\left|\frac{\text{_____}}{\text{_____}}\right| \frac{mrem}{hr}$ at additional location No. 2

ATTACHMENT III, CALCULATION SHEET III (continued)

18a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec^j}{m^3}$ x _____ (line 2) = _____

18b. _____ $\frac{Ci^k}{sec}$ x _____ $\frac{Du}{Q}$ (line 10c) ÷ _____ $\frac{m^l}{sec}$ = _____

18c. _____ (line 18a) + _____ (line 18b)

= $\left|\frac{\text{\_\_\_\_\_}}{\text{\_\_\_\_\_}}\right| \frac{mrem}{hr}$ at additional location No. 3

NOTES:

[a]Reactor building stack release rate from Summary Table, Section II, line 2.

[b]Turbine building roof exhaust release rate from Summary Table, Section II, line 4.

[c]Iodine activity to noble gas activity ratio - obtain from Data Summary Sheet, Section IID, lie 3b. If unknown use 0.3 unless Standby Gas Treatment is in operation (See Data Summary Sheet, Section II.D, line 1) then use 0.003.

[d]Obtain iodine dose factor (DFI) for time after shutdown (Summary Table, Section I, line 2) from Figure 3.

[e]Obtain noble gas dose factor (DFNG) for time after shutdown (Summary Table, Section I, line 2) from Figure 4.

[f]Obtain $\frac{Du}{Q}$ for iodine (DUOQI) from Figure 23 using the appropriate distance from Summary Table, Section III, line 1.

[g]Obtain time correction factor for iodine (TCFI) from Figure 6 using time after shutdown (Summary Table, Section I, line 2).

[h]Obtain $\frac{Du}{Q}$ for noble gas (DUOQNG) from Figure 24 using the appropriate distance from Summary Table, Section III, line 1.

[i]Obtain the noble gas time correction factor (TCFNG) from Figure 8 using time after shutdown (Summary Table, Section I, line 2).

[j]Obtain appropriate $\frac{X}{Q}$ for ground level release from Summary Table, Section III, line 2.

[k]Obtain offgas stack release rate from Summary Table, Section II, line 3.

[l]Obtain wind speed from Summary Table, Section I, line 5.

[m]Iodine activity to noble gas activity ratio-obtain from Data Summary Sheet Section IID, line 3a. If unknown use 0.3.

ATTACHMENT III, CALCULATION SHEET III (continued)

E. Whole body dose - Results for Summary Table Section III, line 5.

1. _____ $\frac{mrem}{hr}$ (from Section VD, line 11C) x _____ hr^a

   = [_____] mrem at site boundary

2. _____ $\frac{mrem}{hr}$ (from Section VD, line 12C) x _____ hr^a

   = [_____] mrem at point of max X/Q

3. _____ $\frac{mrem}{hr}$ (from Section VD, line 13C) x _____ hr^a

   = [_____] mrem at 2 miles

4. _____ $\frac{mrem}{hr}$ (from Section VD, line 14C) x _____ hr^a

   = [_____] mrem at 5 miles

5. _____ $\frac{mrem}{hr}$ (from Section VD, line 15C) x _____ hr^a

   = [_____] mrem at 10 miles

6. _____ $\frac{mrem}{hr}$ (from Section VD, line 16C) x _____ hr^a

   = [_____] mrem at additional location No. 1

7. _____ $\frac{mrem}{hr}$ (from Section VD, line 17C) x _____ hr^a

   = [_____] mrem at additional location No. 2

8. _____ $\frac{mrem}{hr}$ (from Section VD, line 18C) x _____ hr^a

   = [_____] mrem at additional location No. 3

ATTACHMENT III, CALCULATION SHEET III (continued)

NOTE:

[a]Obtain exposure time from Summary Table, Section II, line 1.

F. Thyroid Dose Commitment - Result for Summary Table, Section III, line 6.

1. (_____ $\frac{Ci}{sec}$[a] + _____ $\frac{Ci}{sec}$[b]) x _____ FIG[d] = _____ $\frac{Ci}{sec}$

2. _____ $\frac{Ci}{sec}$[c] x _____ FIE[e] _____ $\frac{Ci}{sec}$

3a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. VB, line 1) = _____ $\frac{Ci}{m^3}$

3b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. VC, line 1) = _____ $\frac{Ci}{m^3}$

3c. _____(line 3a) + _____ (line 3b) = _____ $\frac{Ci}{m^3}$

4a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. VB, line 2) = _____ $\frac{Ci}{m^3}$

4b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. VC, line 2) = _____ $\frac{Ci}{m^3}$

4c. _____(line 4a) + _____ (line 4b) = _____ $\frac{Ci}{m^3}$

5a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. VB, line 3) = _____ $\frac{Ci}{m^3}$

5b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. VC, line 3) = _____ $\frac{Ci}{m^3}$

5c. _____(line 5a) + _____ (line 5b) = _____ $\frac{Ci}{m^3}$

6a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. VB, line 4) = _____ $\frac{Ci}{m^3}$

6b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. VC, line 4) = _____ $\frac{Ci}{m^3}$

6c. _____(line 6a) + _____ (line 6b) = _____ $\frac{Ci}{m^3}$

ATTACHMENT III, CALCULATION SHEET III (continued)

7a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. VB, line 5) = _____ $\frac{Ci}{m^3}$

7b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. VC, line 5) = _____ $\frac{Ci}{m^3}$

7c. _____ (line 7a) + _____ (line 7b) = _____ $\frac{Ci}{m^3}$

8a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. VB, line 6) = _____ $\frac{Ci}{m^3}$

8b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. VC, line 6) = _____ $\frac{Ci}{m^3}$

8c. _____ (line 8a) + _____ (line 8b) = _____ $\frac{Ci}{m^3}$

9a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. VB, line 7) = _____ $\frac{Ci}{m^3}$

9b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. VC, line 7) = _____ $\frac{Ci}{m^3}$

9c. _____ (line 9a) + _____ (line 9b) = _____ $\frac{Ci}{m^3}$

10a. _____ $\frac{Ci}{sec}$ (line 1) x _____ $\frac{sec}{m^3}$ (Sect. VB, line 8) = _____ $\frac{Ci}{m^3}$

10b. _____ $\frac{Ci}{sec}$ (line 2) x _____ $\frac{sec}{m^3}$ (Sect. VC, line 8) = _____ $\frac{Ci}{m^3}$

10c. _____ (line 10a)+ _____ (line 10b) = _____ $\frac{Ci}{m^3}$

11. _____ $\frac{Ci}{m^3}$ (line 3c)x _____ hr^q x 3.8×10^8

x _____ $TCFI^f$ = $\left|\frac{\text{_____}}{\text{_____}}\right|$ mrem at site boundary

12. _____ $\frac{Ci}{m^3}$ (line 4c)x _____ hr^q x 3.8×10^8

x _____ $TCFI^f$ = $\left|\frac{\text{_____}}{\text{_____}}\right|$ mrem at point of max X/Q

ATTACHMENT III, CALCULATION SHEET III (continued)

13. _____ $\frac{Ci}{m^3}$ (line 5c) x _____ hr^q x 3.8×10^8

x _____ $TCFI^f$ = | _____ | mrem at 2 miles

14. _____ $\frac{Ci}{m^3}$ (line 6c) x _____ hr^q x 3.8×10^8

x _____ $TCFI^f$ = | _____ | mrem at 5 miles

15. _____ $\frac{Ci}{m^3}$ (line 7c) x _____ hr^q x 3.8×10^8

x _____ $TCFI^f$ = | _____ | mrem at 10 miles

16. _____ $\frac{Ci}{m^3}$ (line 8c) x _____ hr^q x 3.8×10^8

x _____ $TCFI^f$ = | _____ | mrem at additional location No. 1

17. _____ $\frac{Ci}{m^3}$ (line 9c) x _____ hr^q x 3.8×10^8

x _____ $TCFI^f$ = | _____ | mrem at additional location No. 2

18. _____ $\frac{Ci}{m^3}$ (line 10c) x _____ hr^q x 3.8×10^8

x _____ $TCFI^f$ = | _____ | mrem at additional location No. 3

NOTES:

[a]Reactor building stack release rate from Summary Table, Section II, line 2.

[b]Turbine building roof exhaust release rate from Summary Table, Section II, line 4.

[c]Offgas stack release rate from Summary Table, Section II, line 3.

[d]Iodine activity fraction for ground level release - obtain from Data Summary Sheet Section IID, line 3a. If unknown use 0.3.

ATTACHMENT III, CALCULATION SHEET III (continued)

[e] Iodine activity fraction for elevated release - obtain from Data Summary Sheet Section IID, line 3b. If unknown use 0.3 unless Standby Gas Treatment (see Data Summary Sheet, Section II.D, line 1) is in operation then use 0.003.

[f] Obtain TCFI from Figure 19 using time after shutdown (Summary Table, Section I, line 2).

[g] Obtain exposure time from Summary Table, Section II, line 1.

G. Plume width - The following are the plume widths to be placed in the Summary Table, Section III, line 7.

Point of maximum X/Q for Offgas Stack release	2mi	5mi	10mi
2000 (1.2)	530 (0.33)	970 (0.60)	2000 (meters) (1.2)(miles)

NOTE:

Obtain remaining plume widths from Figure 25 using the appropriate distances from Summary Table, Section III, line 1.

H. Plume arrival time - Results for Summary Table Section III, line 8.

1. $2.78 \times 10^{-4} \times$ _____ $m^a \div$ _____ $\frac{m^b}{sec}$ = |____| hr to Site Boundary

2. 4.47 divided by _____ $\frac{m^b}{sec}$ = |____| hr to point of max X/Q for offgas stack release

3. 0.894 divided by _____ $\frac{m^b}{sec}$ = |____| hr to 2 miles

4. 2.23 divided by _____ $\frac{m^b}{sec}$ = |____| hr to 5 miles

5. 4.47 divided by _____ $\frac{m^b}{sec}$ = |____| hr to 10 miles

6. $2.78 \times 10^{-4} \times$ _____ $m^a \div$ _____ $\frac{m^b}{sec}$ = |____| hr to additional location No. 1

ATTACHMENT III, CALCULATION SHEET III (continued)

7. $2.78 \times 10^{-4} \times$ _____ $m^a \div$ _____ $\frac{m^b}{sec} =$ [ ] hr to additional location No. 2

8. $2.78 \times 10^{-4} \times$ _____ $m^a \div$ _____ $\frac{m^b}{sec} =$ [ ] hr to additional location No. 3

NOTES:

[a]Obtain appropriate distance from Summary Table, Section III, line 1.

[b]Obtain wind speed from Summary Table, Section I, line 5.

ATTACHMENT III, CALCULATION SHEET IV

RELEASE RATE FROM FIELD MEASUREMENT

1. _____ FI[a] x _____ DUOQI[b] x _____ TCFI[c]

   ÷ (1 - _____ FI[a]) x _____ DUOQNG[d] x _____ TCFNG[e]

   = _____ $\frac{Du}{Q}$

2. _____ mR/hr[f] x _____ $\frac{m^g}{sec}$ ÷ _____ $\frac{Du}{Q}$ (line 1)

   = _____ / _____ $\frac{Ci}{sec}$ * Minimum Total Release Rate

* Assumes measurement taken in plume centerline

NOTES:

[a] Iodine activity to noble gas activity ratio. If unknown use 0.3 unless Standby Gas Treatment is in operation (Data Summary Sheet, Section II.D, line 1) then use 0.003.

[b] Obtain $\frac{Du}{Q}$ for iodine (DUOQI) from Figure 5 for atmospheric stability class AB, Figure 13 for class C, Figure 18 for class DE, or Figure 23 for class FG (see Summary Table, Section I, line 6). Use the distance from the release point that the exposure rate measurement was made (Data Summary Sheet, Section III, line 2).

[c] Obtain time correction factor for iodine (TCFI) from Figure 9 using the time of field measurement after shutdown (Data Summary Sheet, Section III, line 1).

[d] Obtain $\frac{Du}{Q}$ for noble gas (DUOQNG) from Figure 7 for atmospheric stability class AB, Figure 14 for class C, Figure 19 for class DE, or Figure 24 for class FG (see Summary Table, Section I, line 6). Use the distance from the release point that the exposure rate measurement was made (Data Summary Sheet, Section III, line 2).

[e] Obtain time correction factor for noble gas (TCFNG) from Figure 8 using the time of the field measurement after shutdown (Data Summary Sheet, Section III, line 1).

[f] Obtain exposure rate from Data Summary Sheet, Section III, line 3.

[g] Obtain wind speed from Summary Table, Section I, line 5.

ATTACHMENT IV, FIGURES

This attachment contains all the figures referenced in this procedure.

FIGURE 1

$\frac{Xu}{Q}$ for Ground Level Release - Class AB

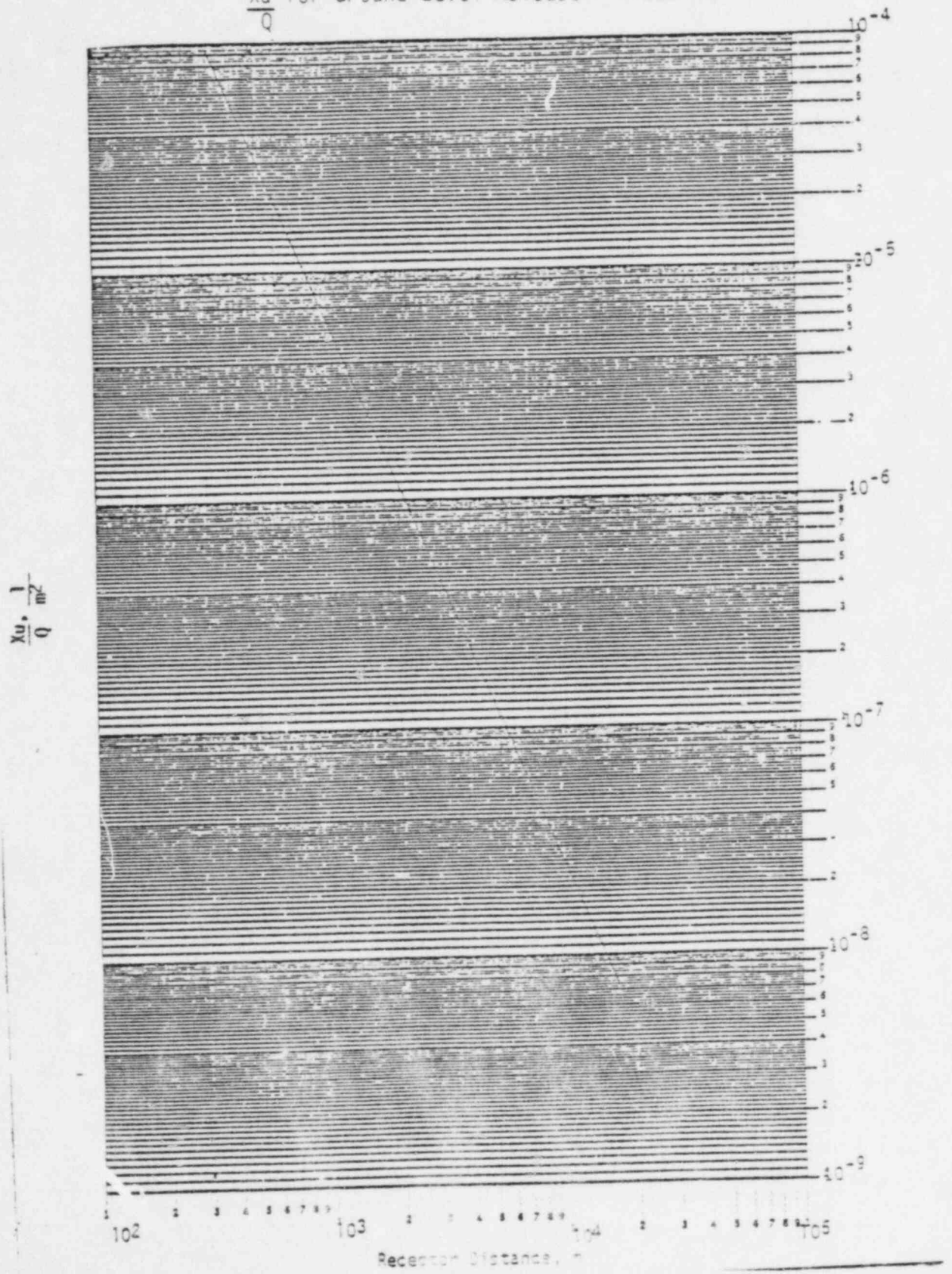


FIGURE 2

$\frac{Xu}{Q}$ for Elevated Release - Class AB

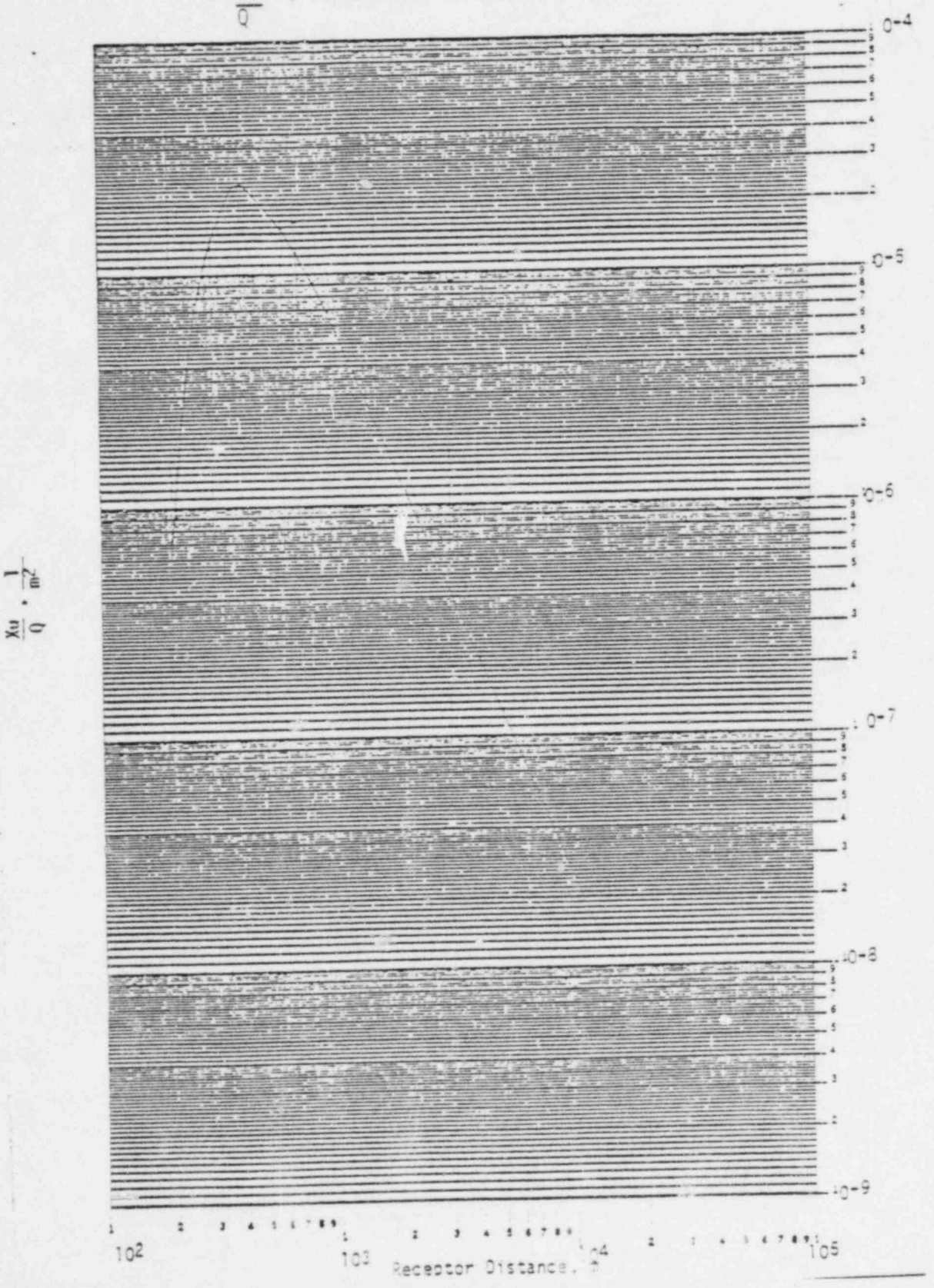


FIGURE 3

Whole Body Dose Conversion Factor - Iodine

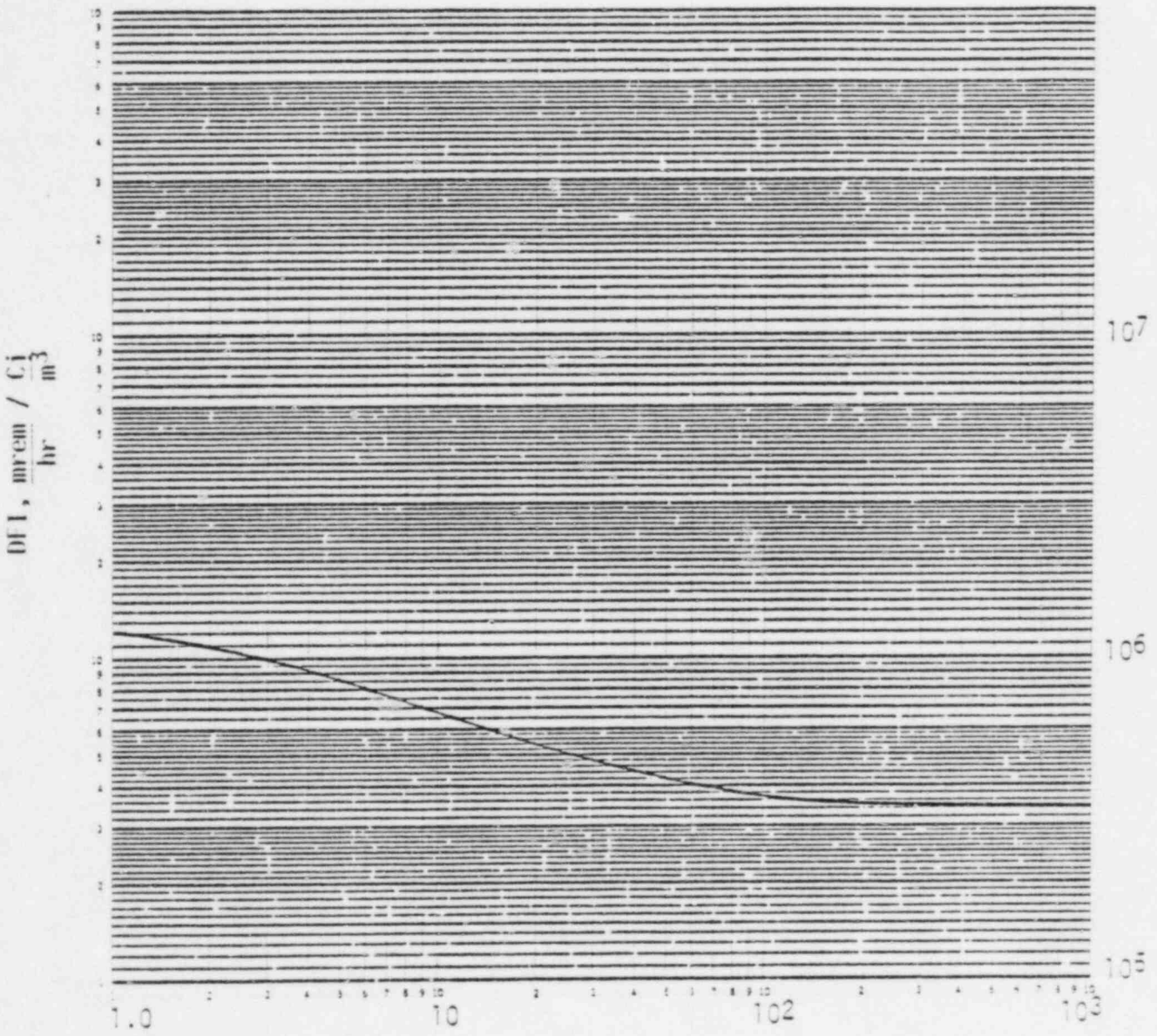


FIGURE 4

Whole Body Dose Conversion Factor - Noble Gas

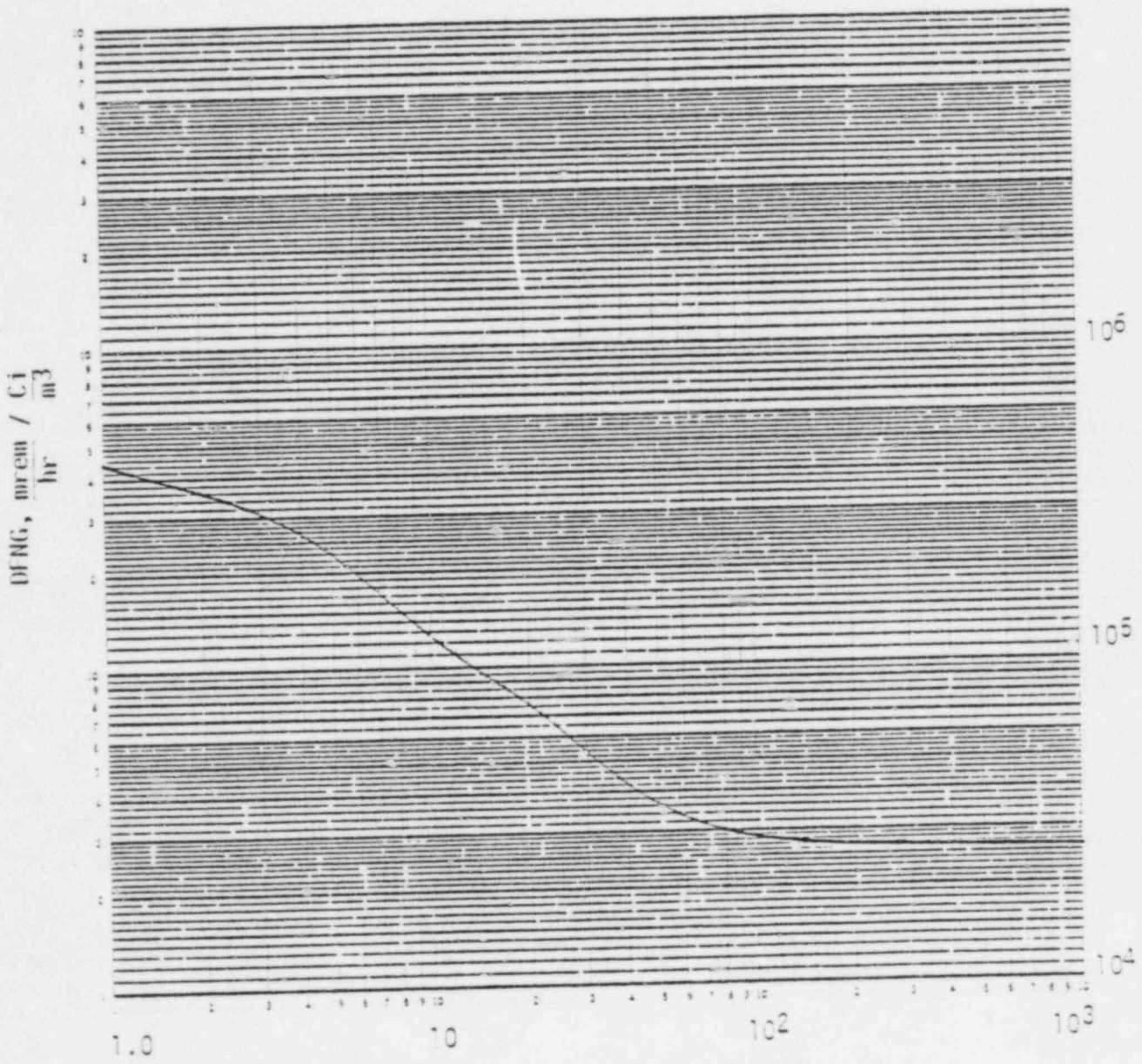


FIGURE 5

$\frac{Du}{Q}$ for Iodine - Class AB

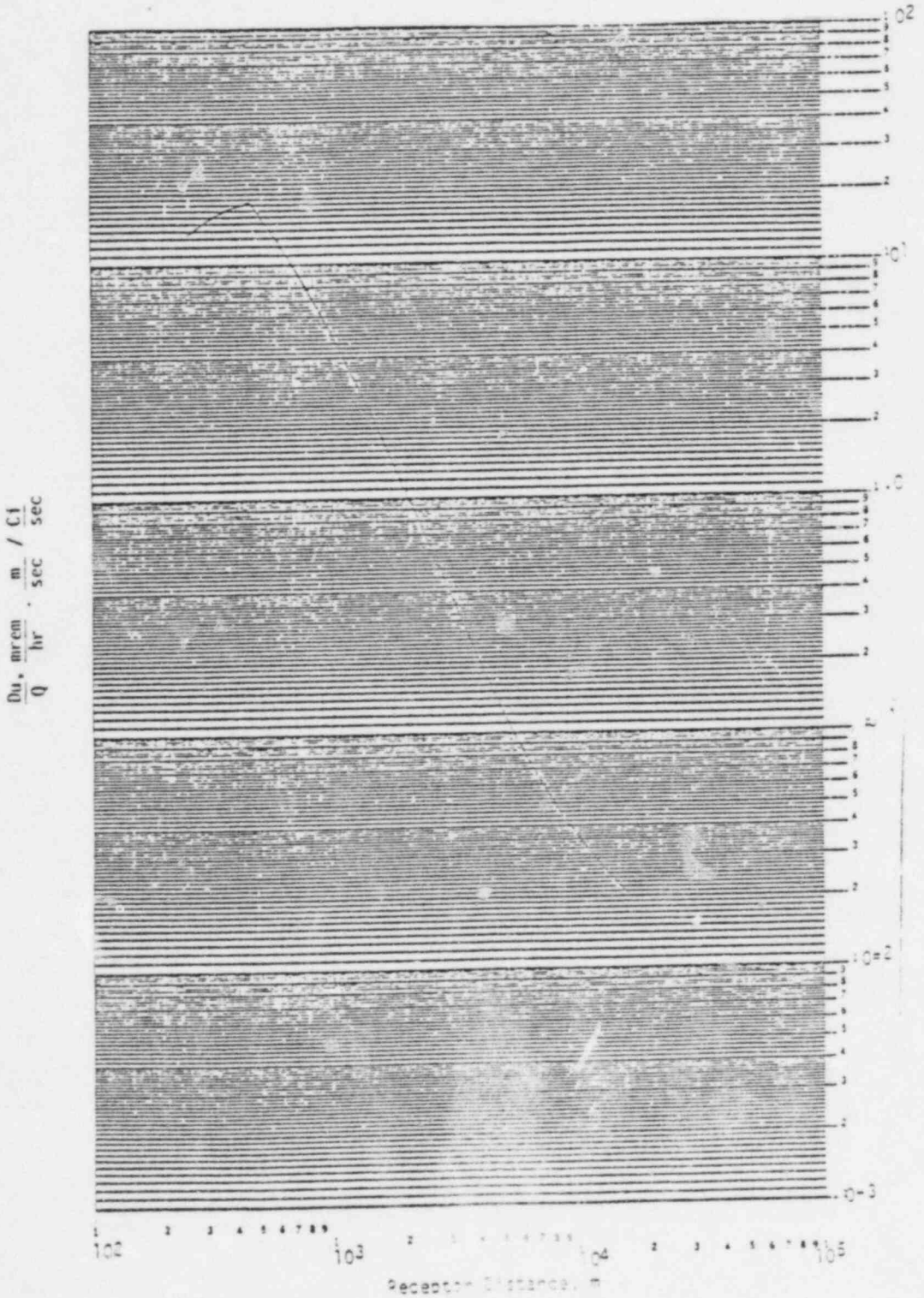


FIGURE 6

Time Correction Factor - Iodine

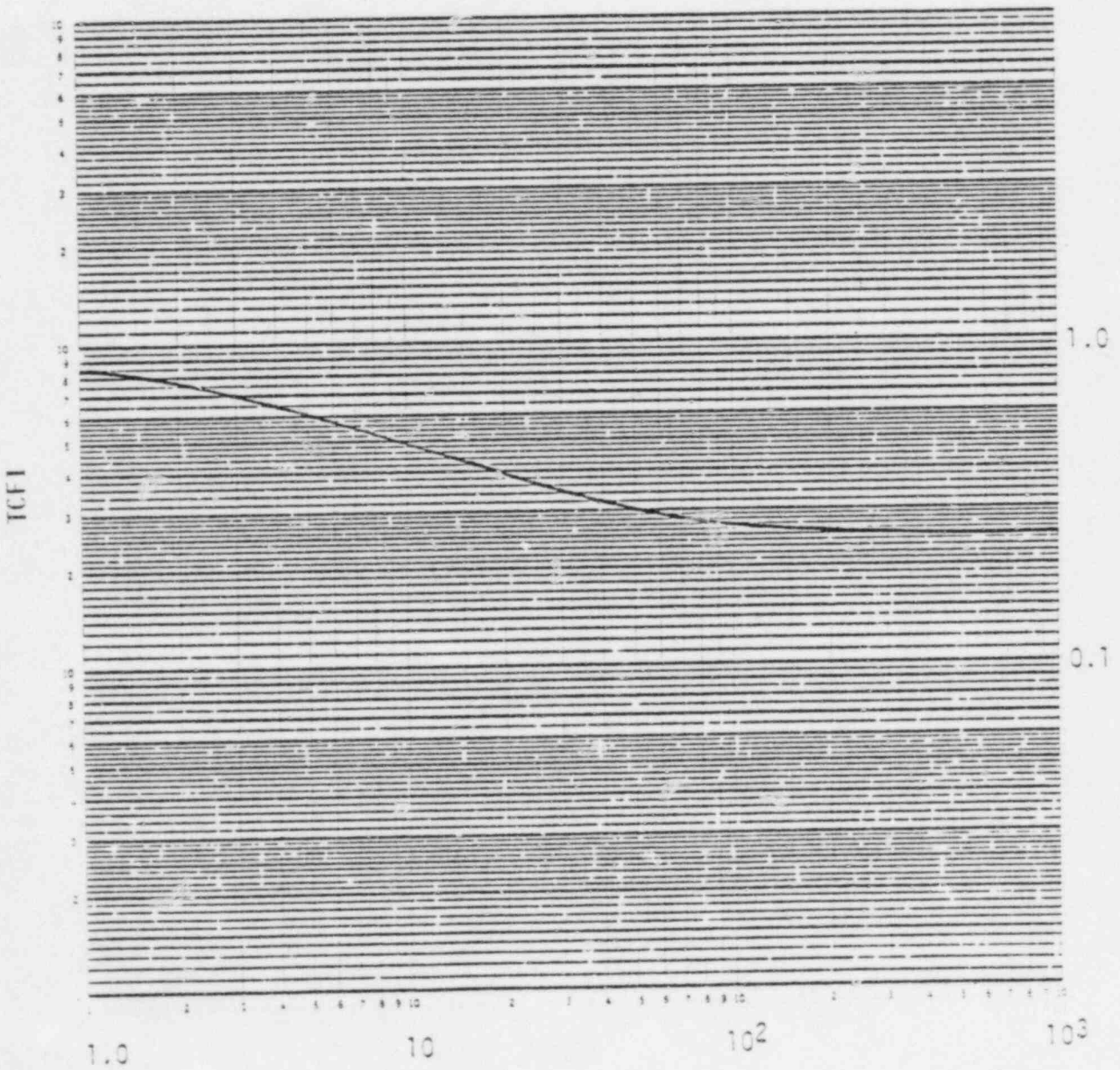


FIGURE 7

$\frac{Du}{Q}$ for Noble Gas - Class AB

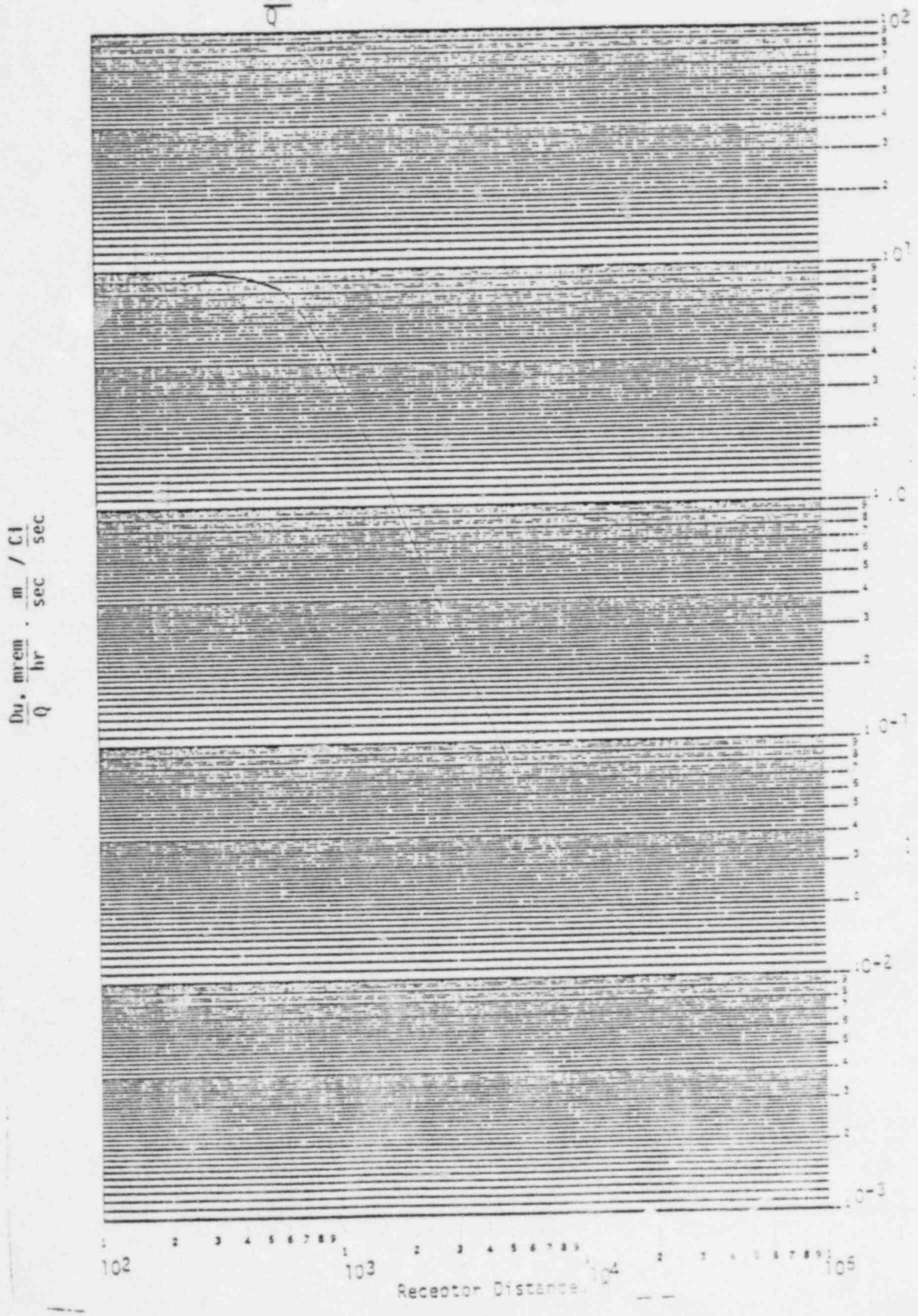


FIGURE 8

Time Correction Factor - Noble Gas

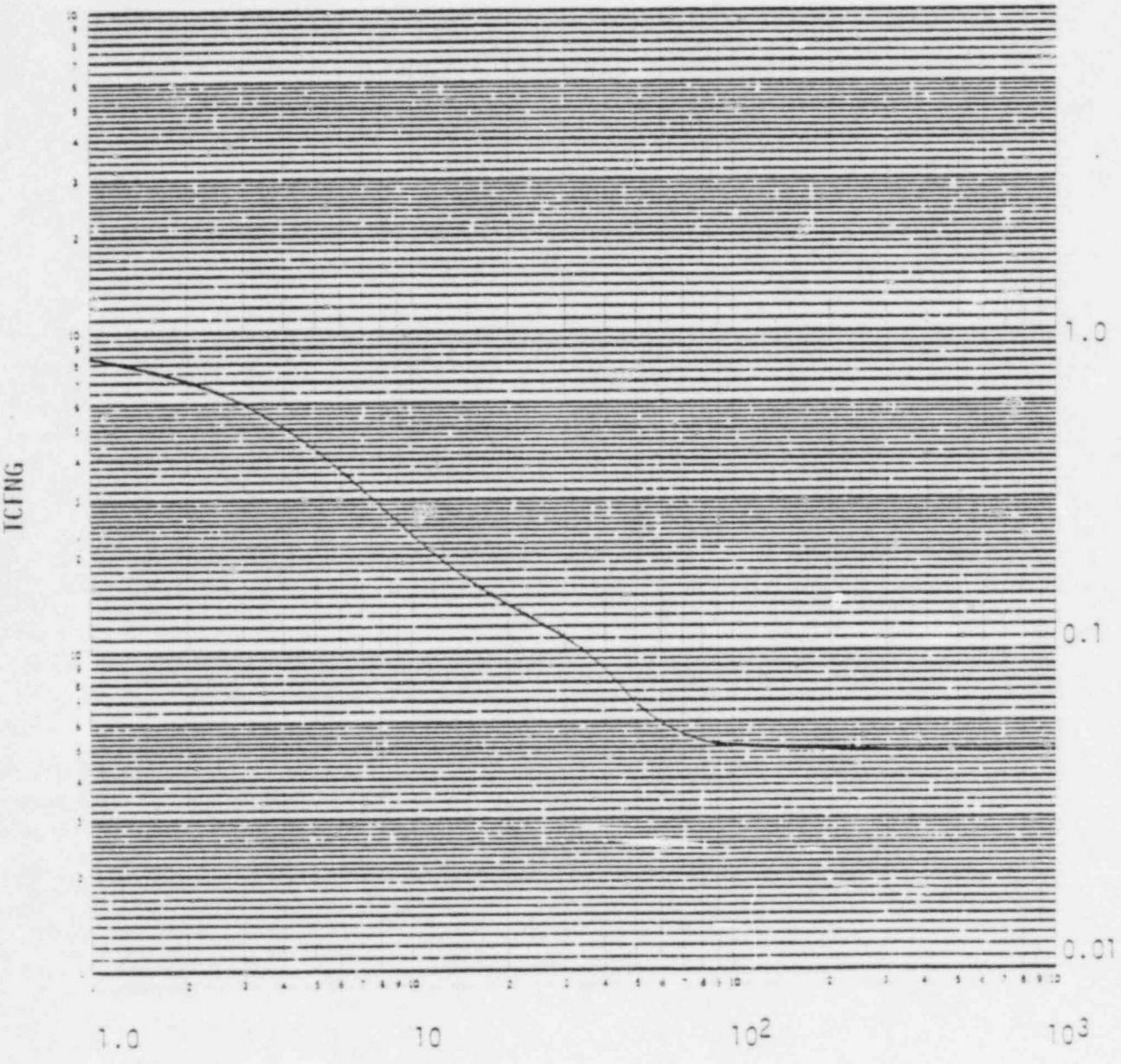


FIGURE 9

Time Correction Factor for Thyroid Dose - Iodine

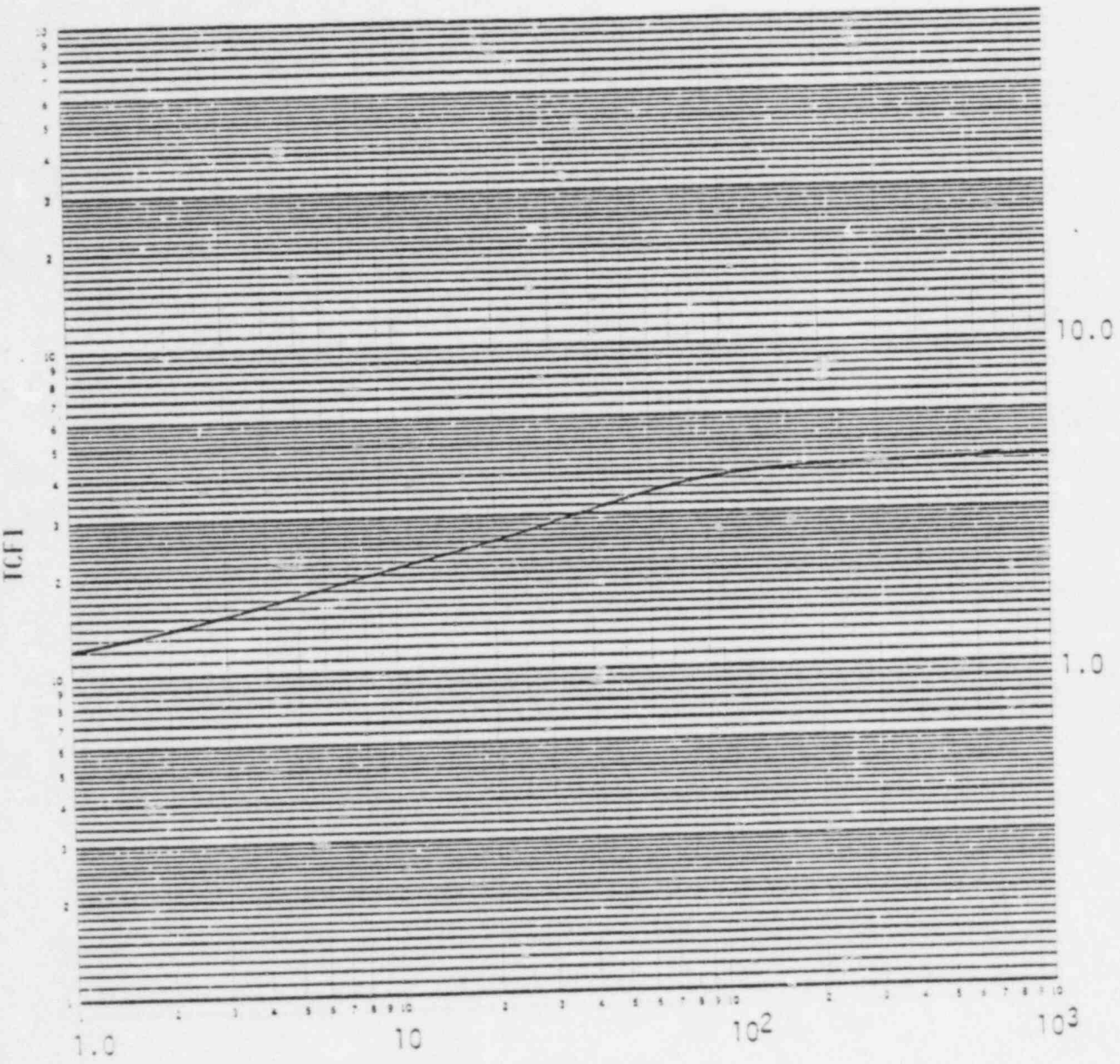


FIGURE 10

Plume Width - Class AB

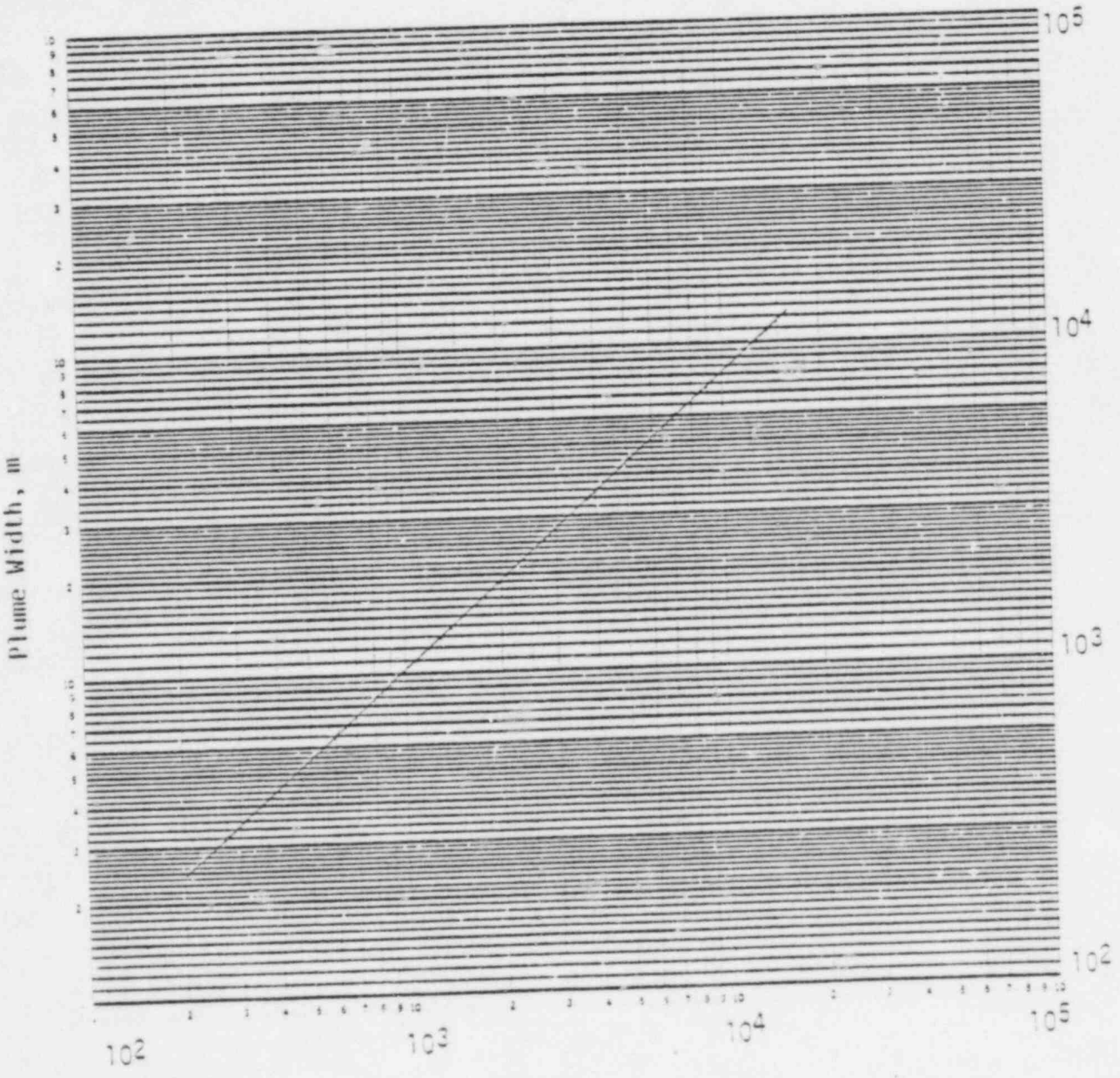


FIGURE 11

$\frac{Xu}{Q}$ for Ground Level Release - Class C

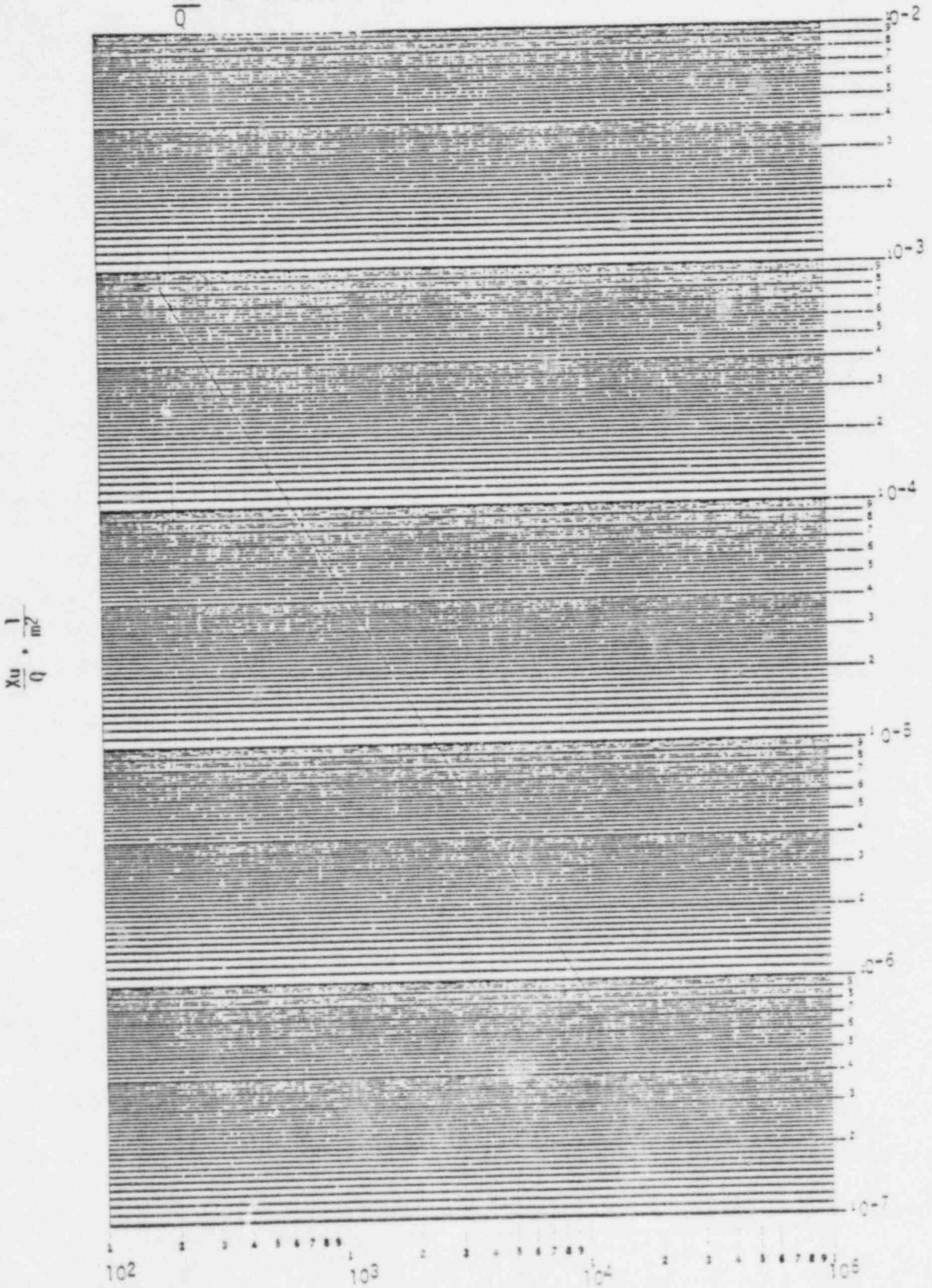


FIGURE 12

$\frac{Xu}{Q}$ for Elevated Release - Class C

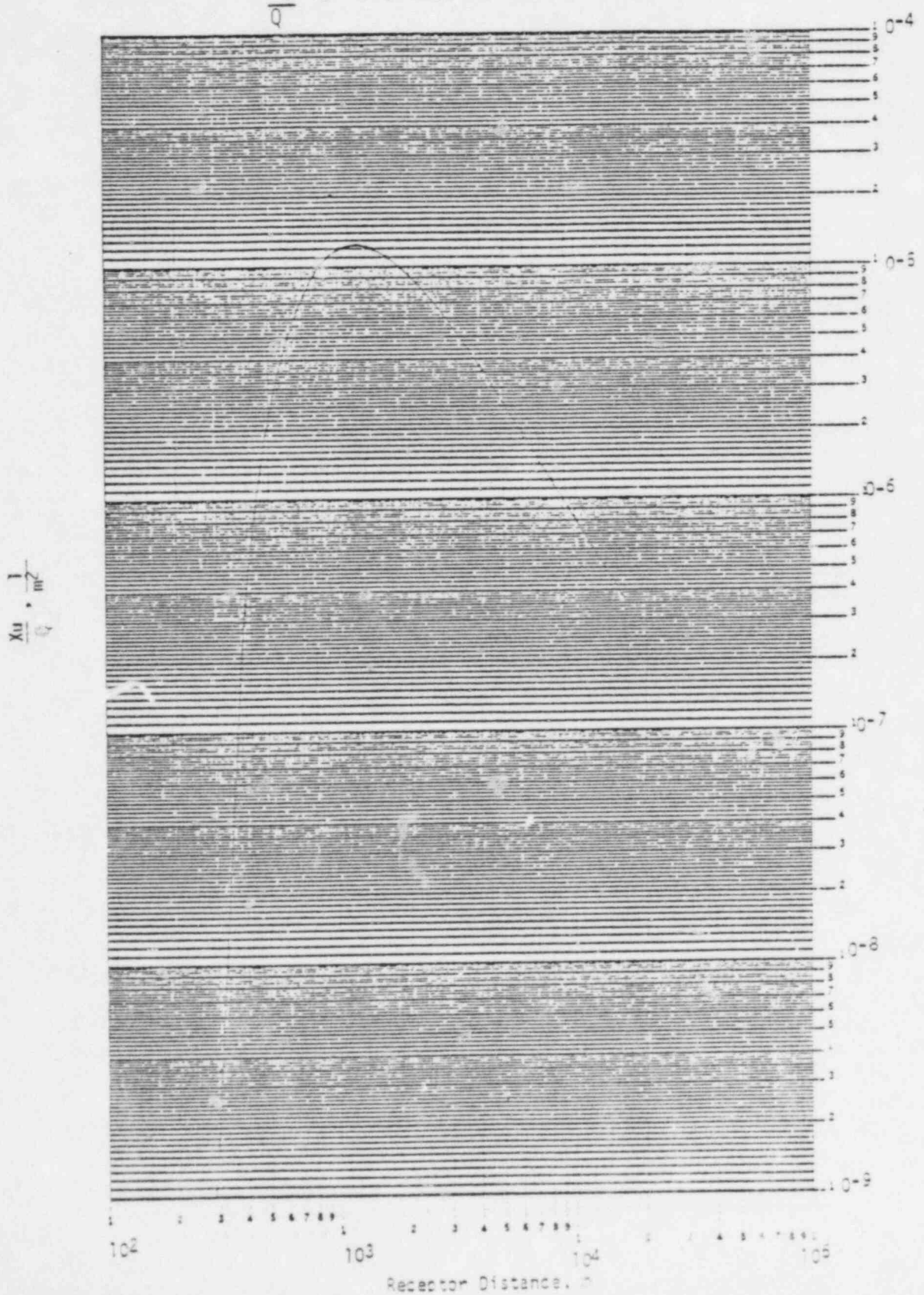


FIGURE 13

$\frac{Du}{Q}$ for Iodine - Class C

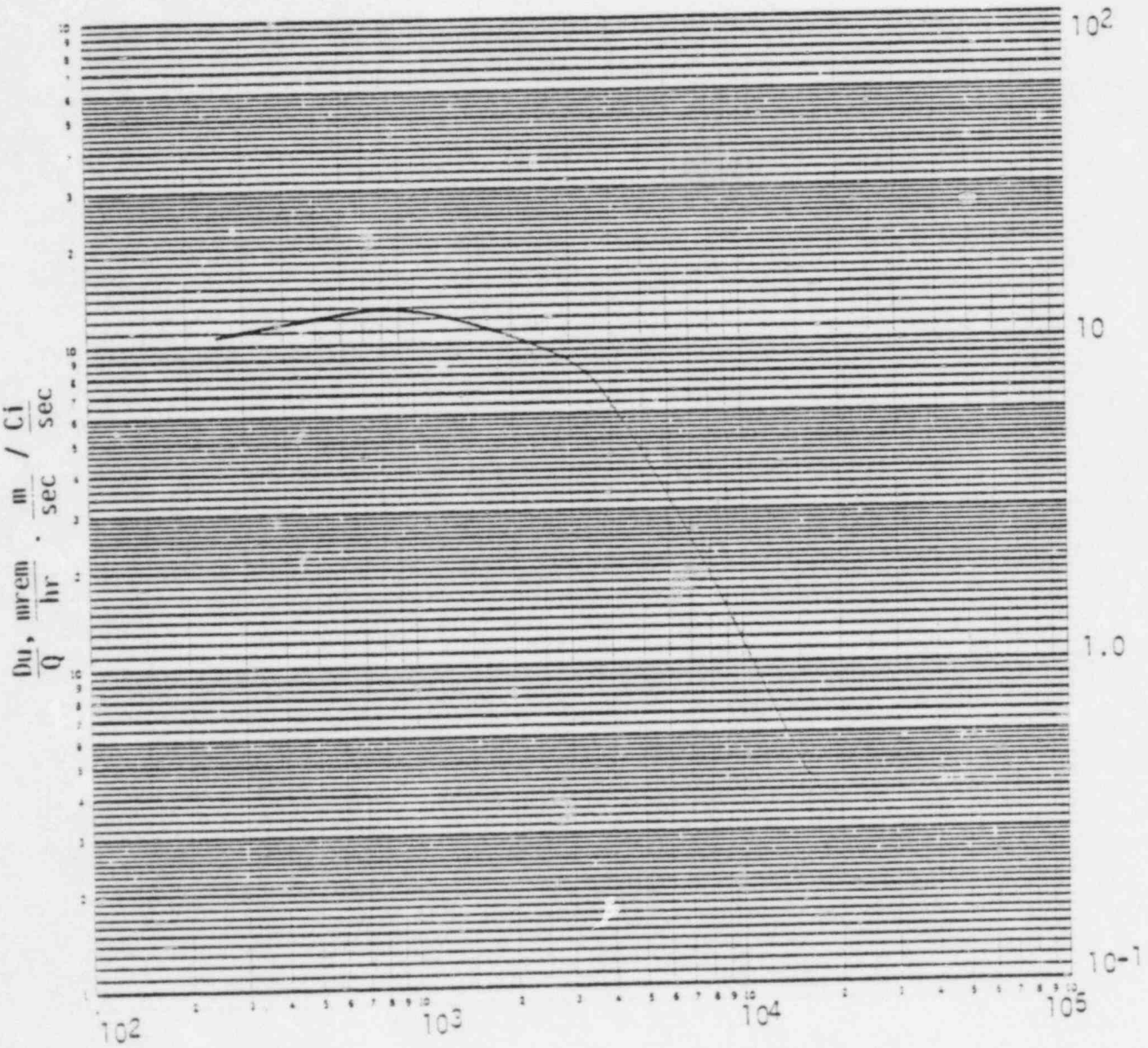


FIGURE 14

$\frac{Du}{Q}$ for Noble Gas - Class C

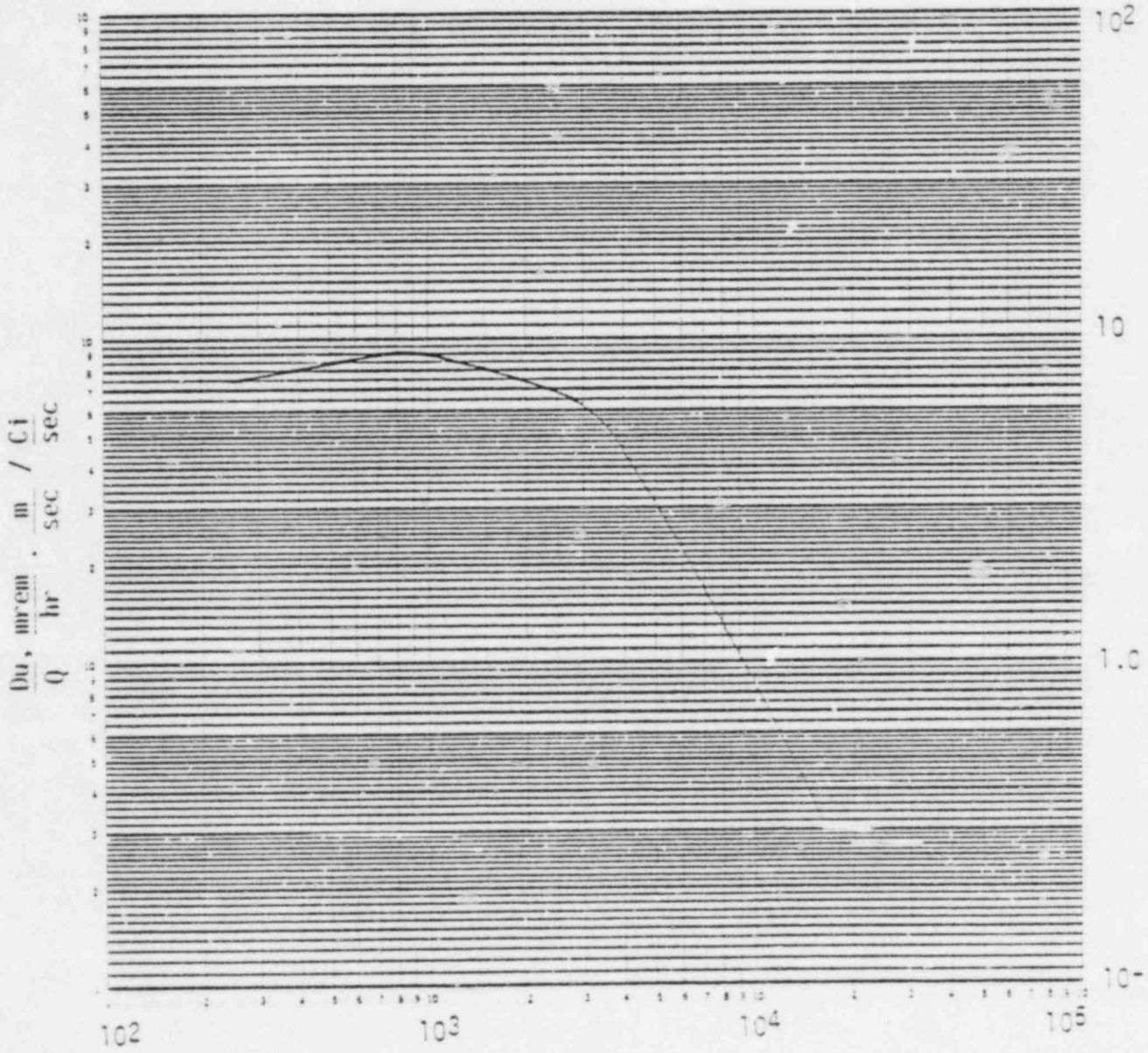


FIGURE 15

Plume Width - Class C

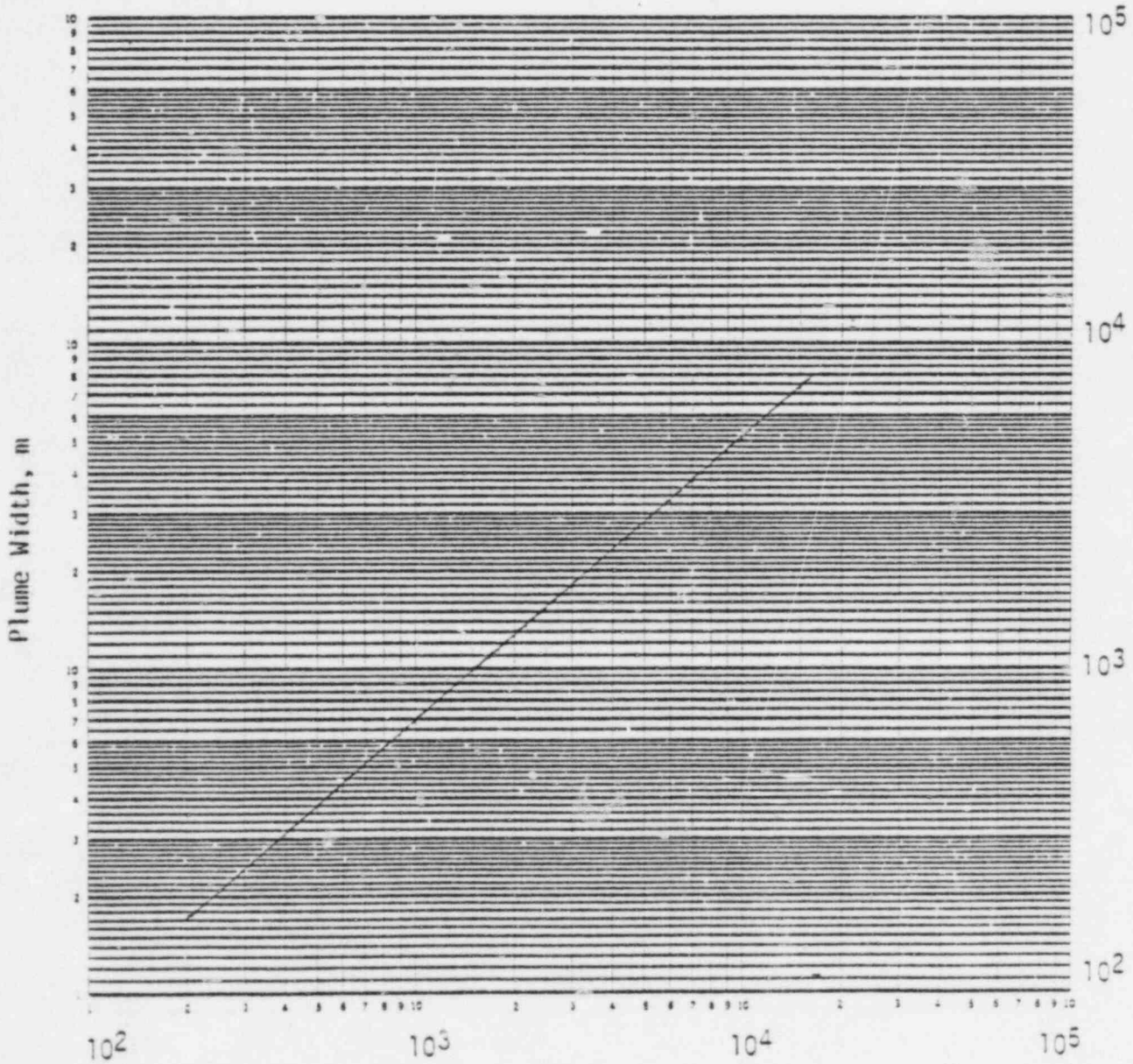


FIGURE 16

$\frac{Xu}{Q}$ for Ground Level Release - Class DE

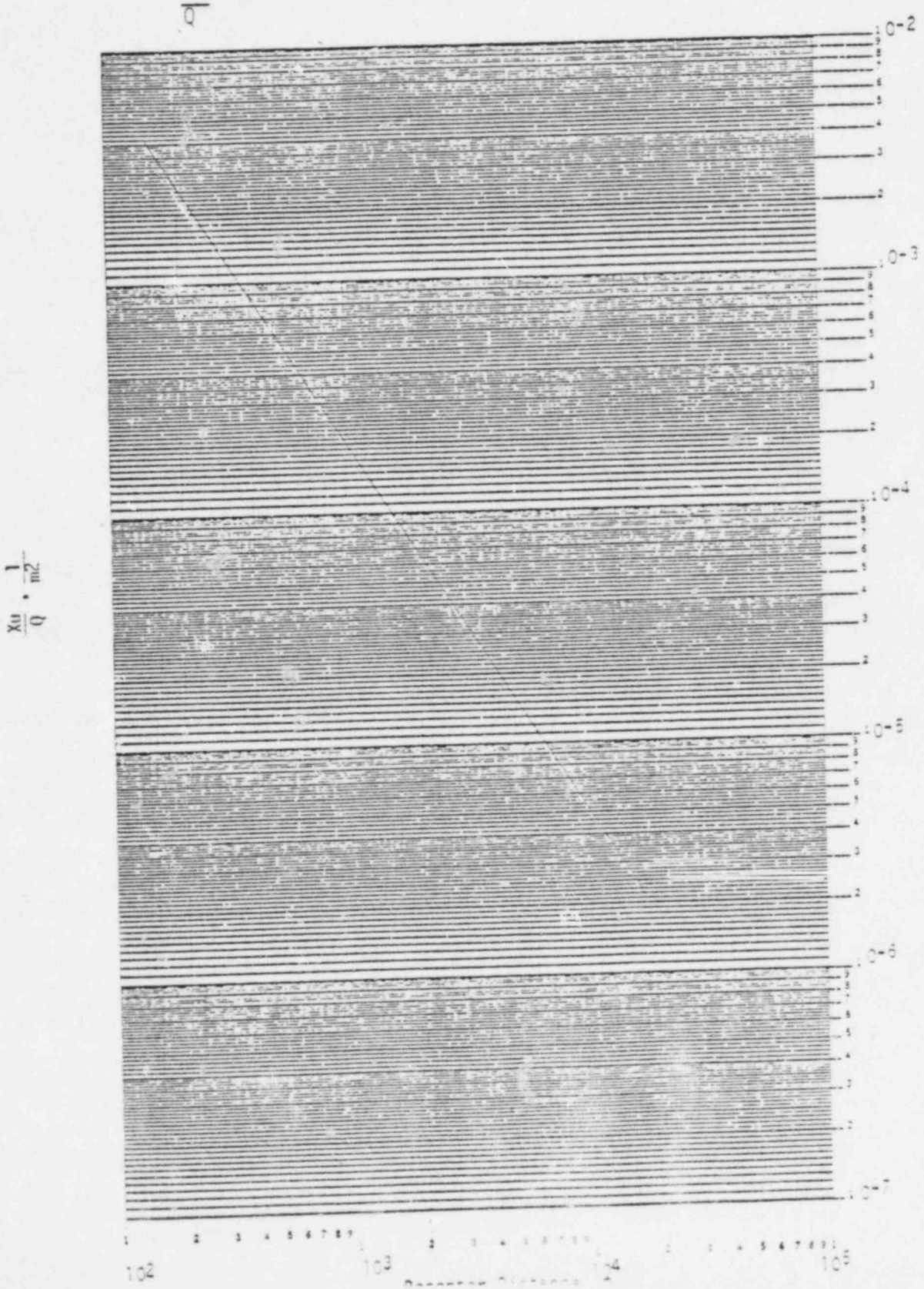


FIGURE 17

$\frac{Xu}{Q}$ for Elevated Release - Class DE

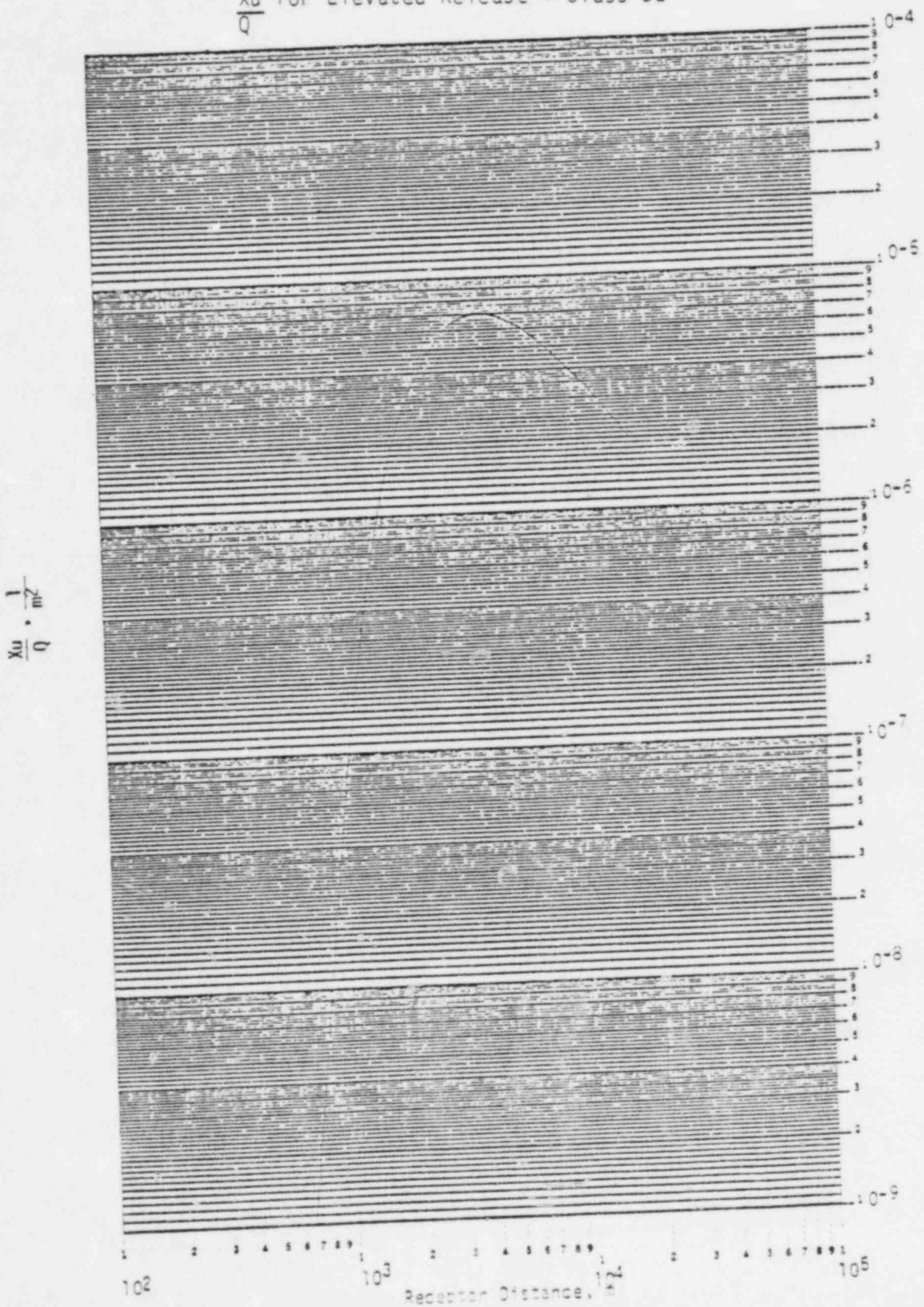


FIGURE 18

$\frac{Du}{Q}$ for Iodine - Class DE

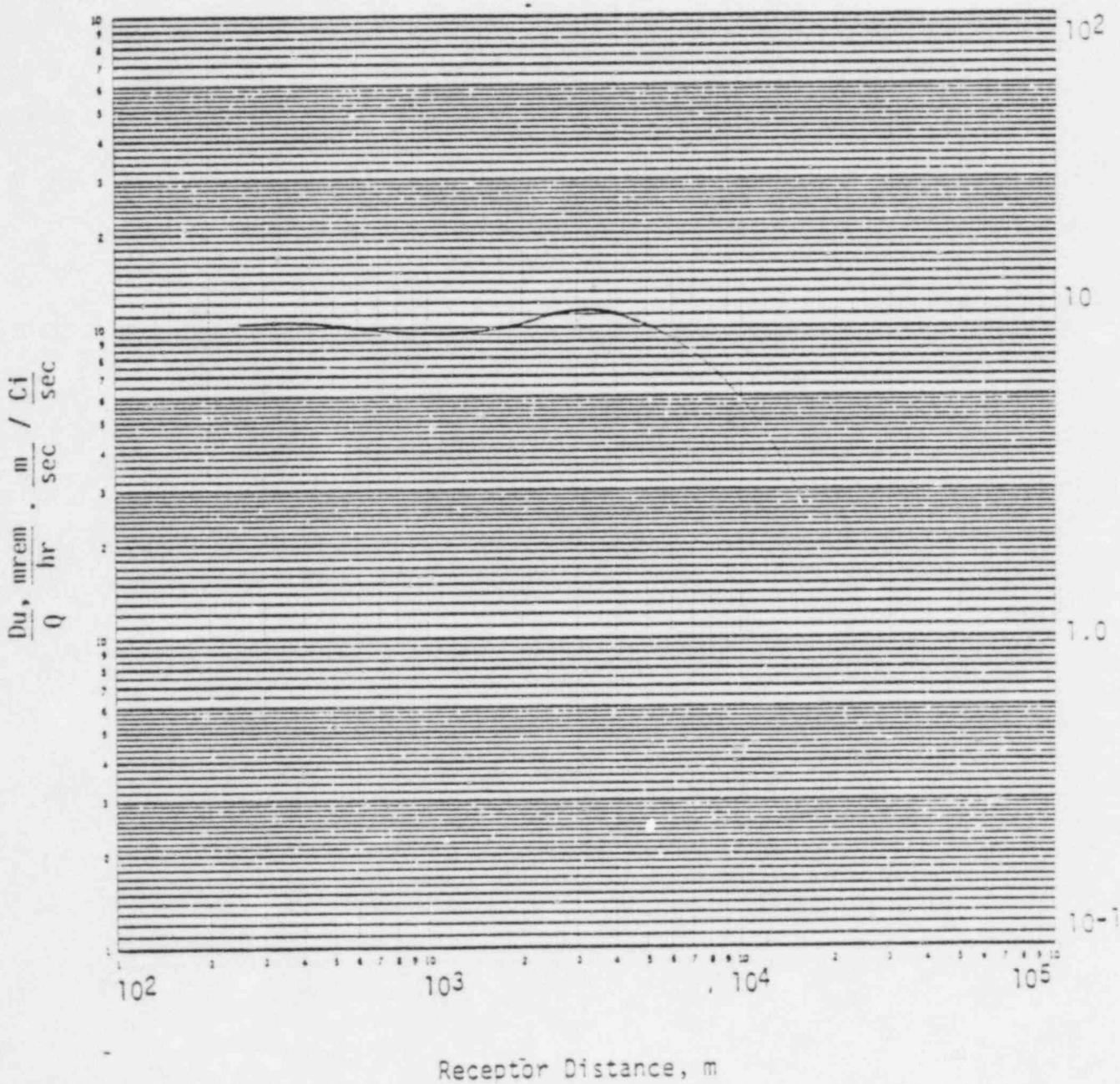


FIGURE 19

$\frac{Du}{Q}$ for Noble Gas - Class DE

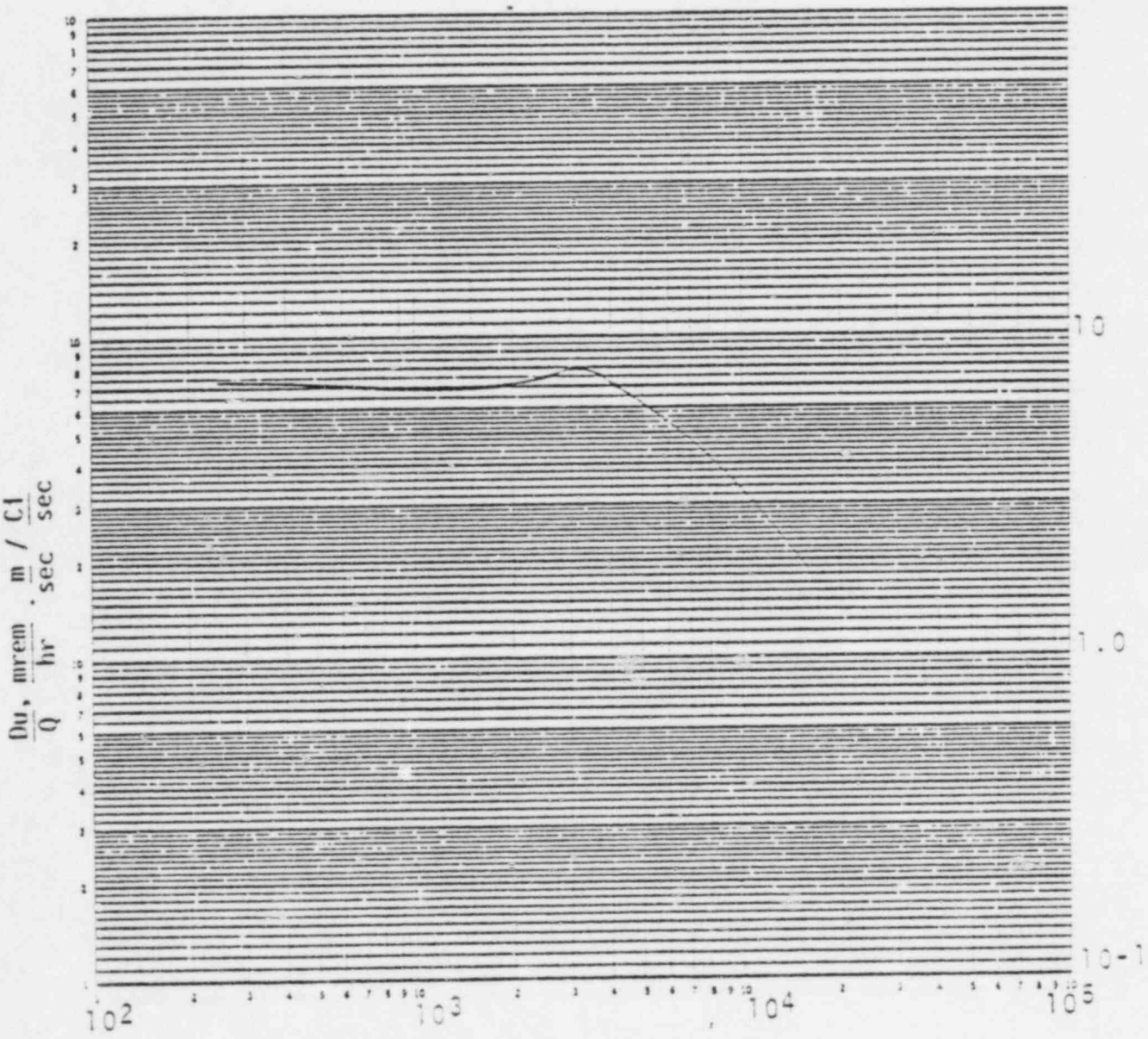


FIGURE 20

Plume Width - Class DE

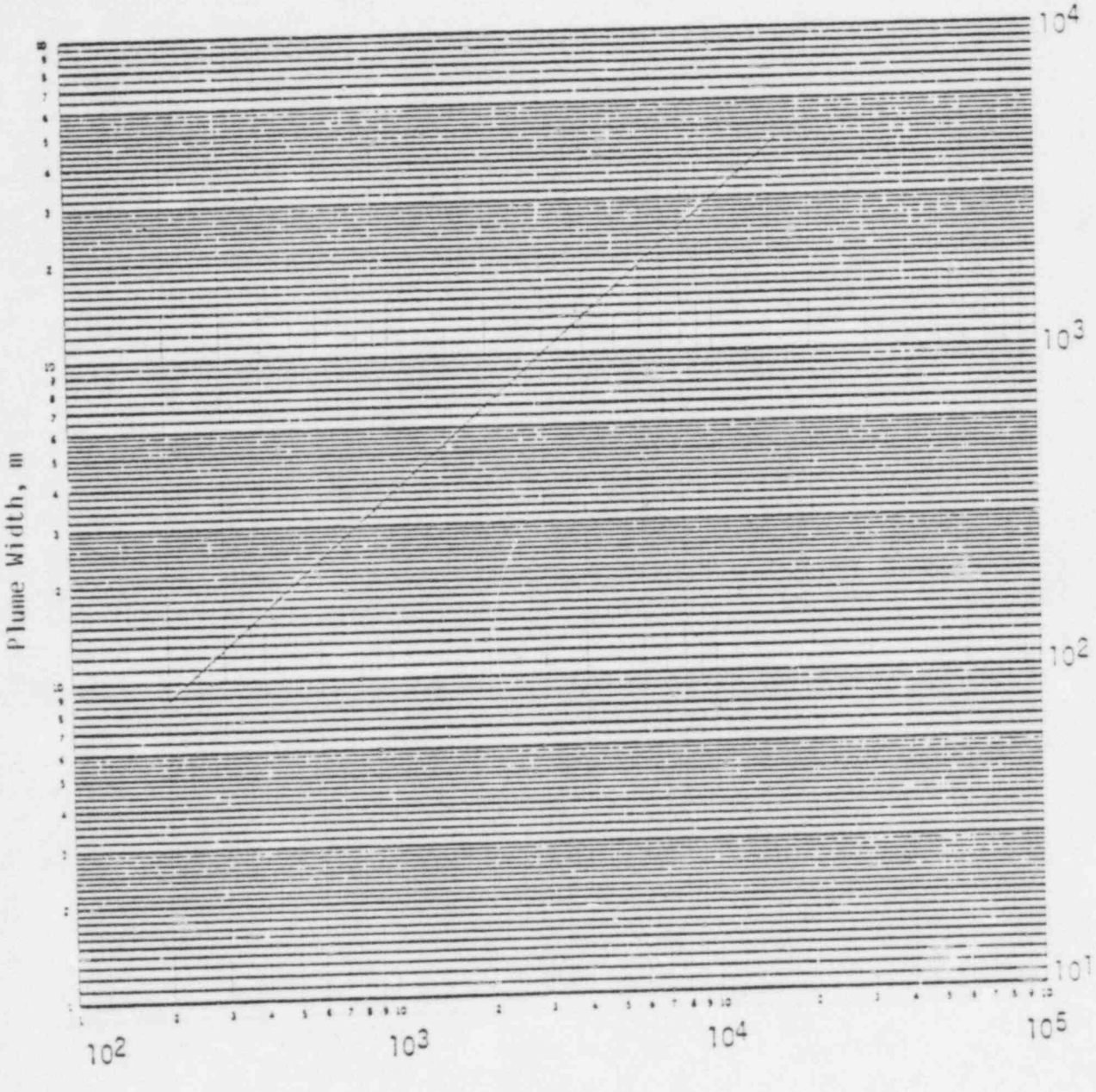


FIGURE 21

$\frac{Xu}{Q}$ for Ground Level Release - Class FG

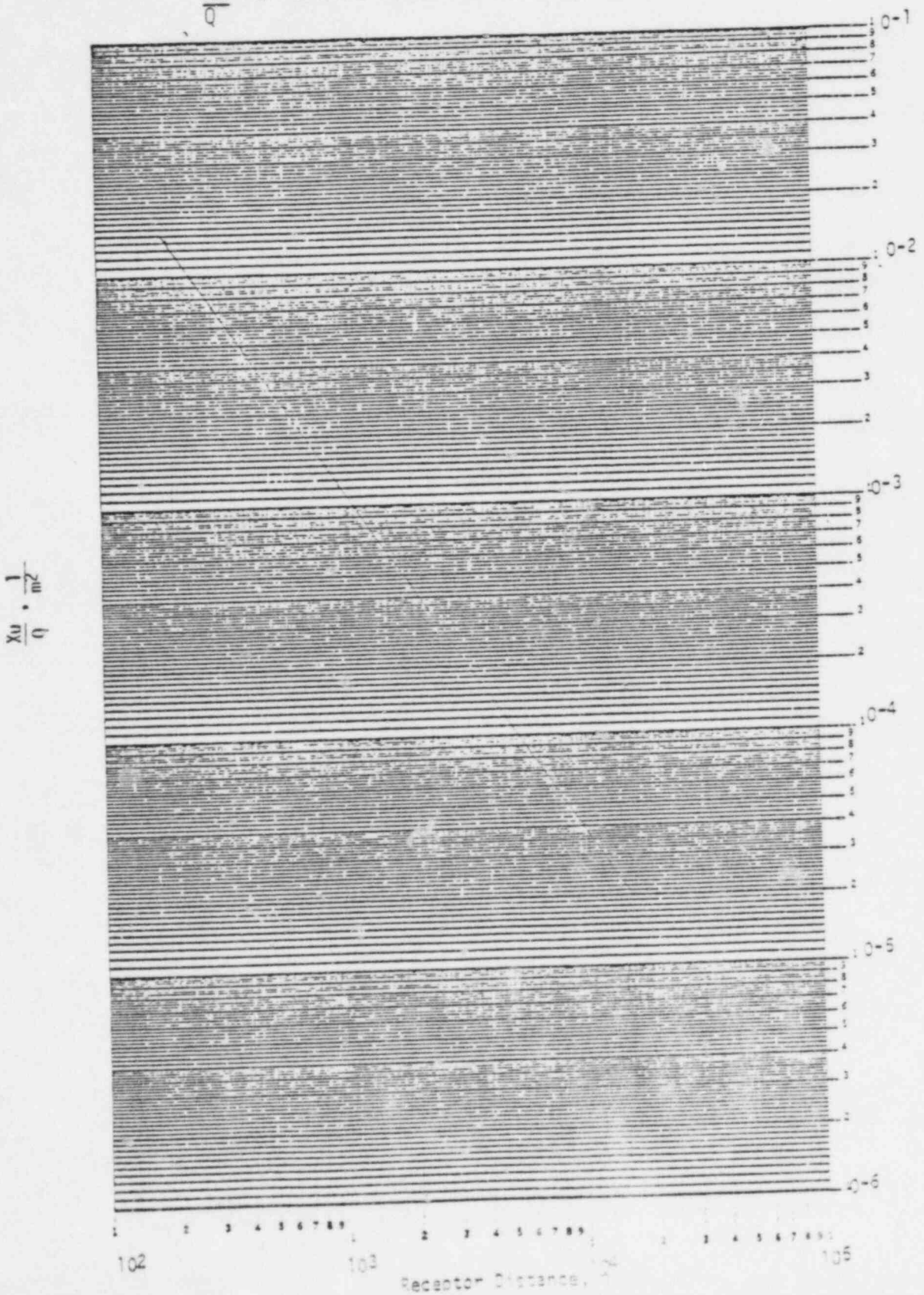


FIGURE 22

$\frac{Xu}{Q}$ for Elevated Release - Class FG

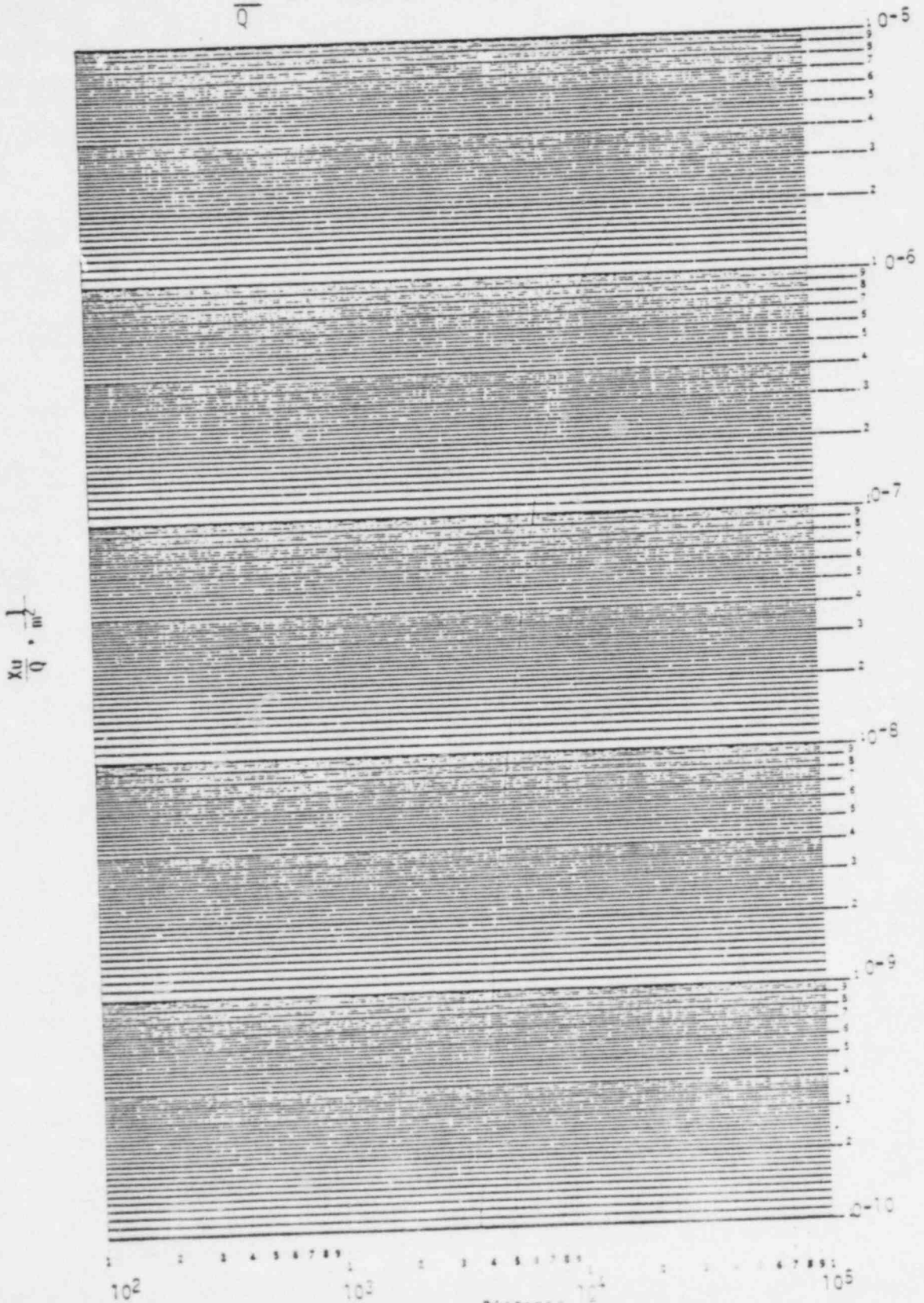


FIGURE 23

$\frac{Du}{Q}$ for Iodine - Class FG

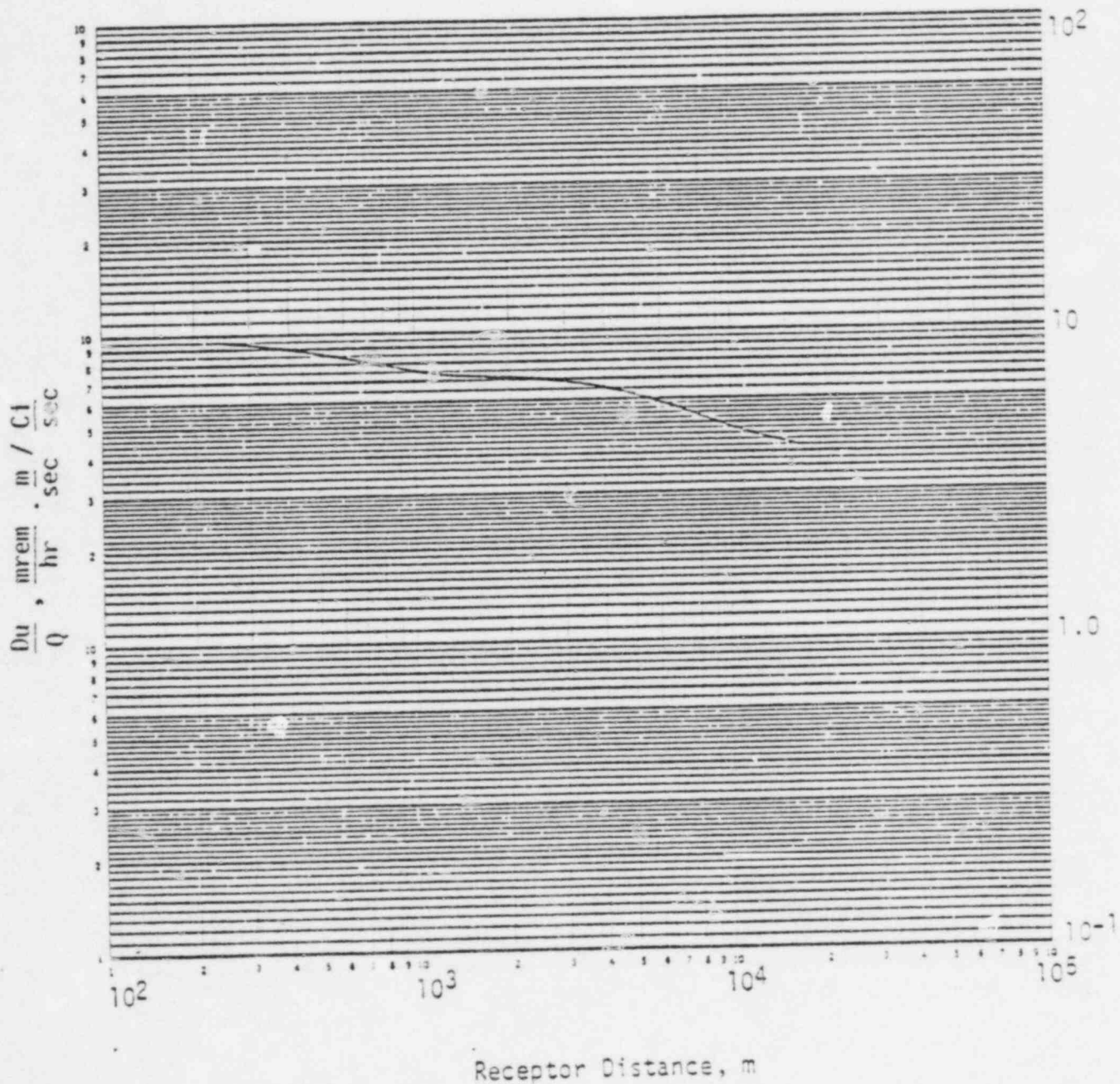


FIGURE 24

$\frac{Du}{Q}$ for Noble Gas - Class FG

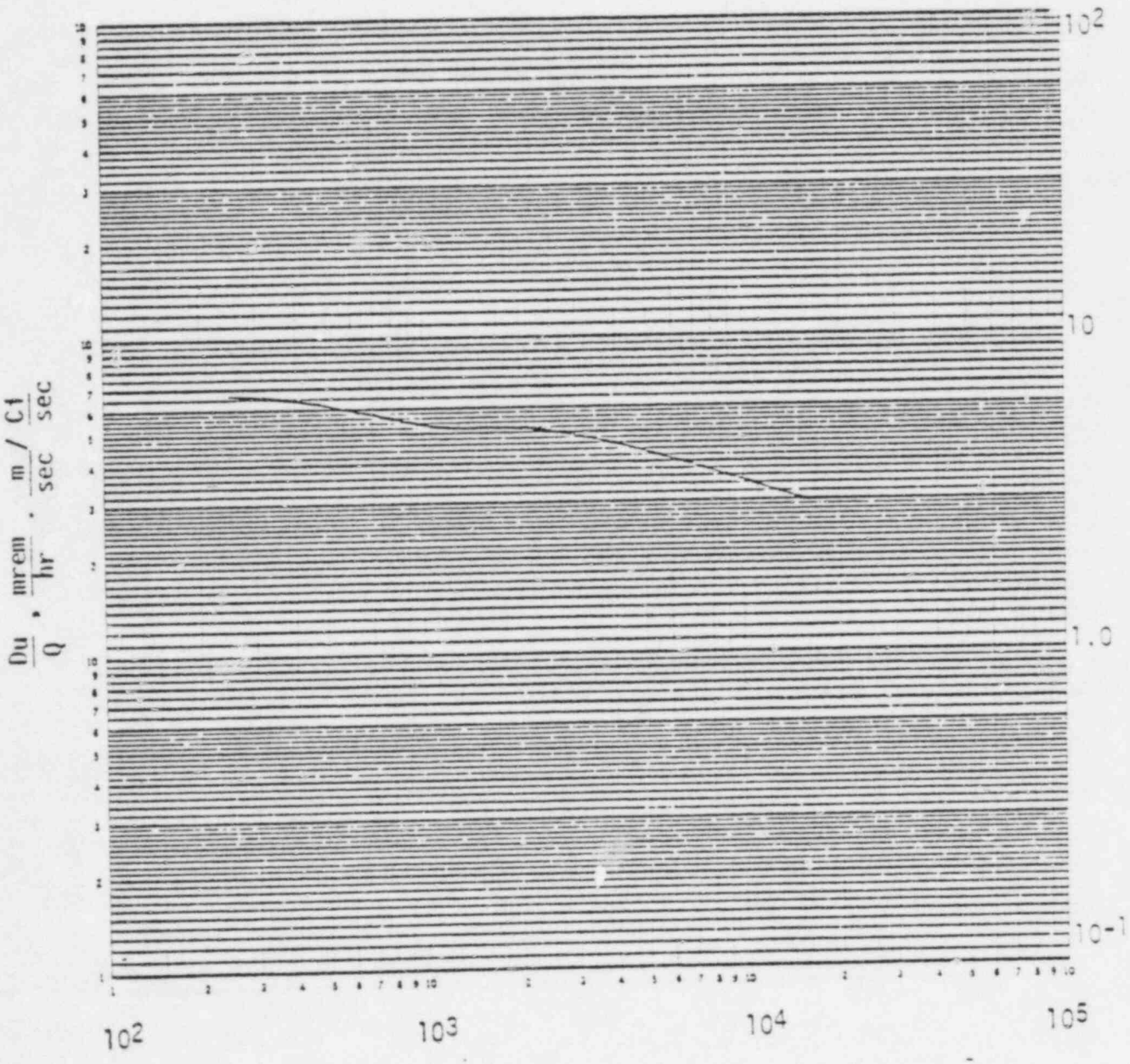


FIGURE 25

Plume Width - Class FG

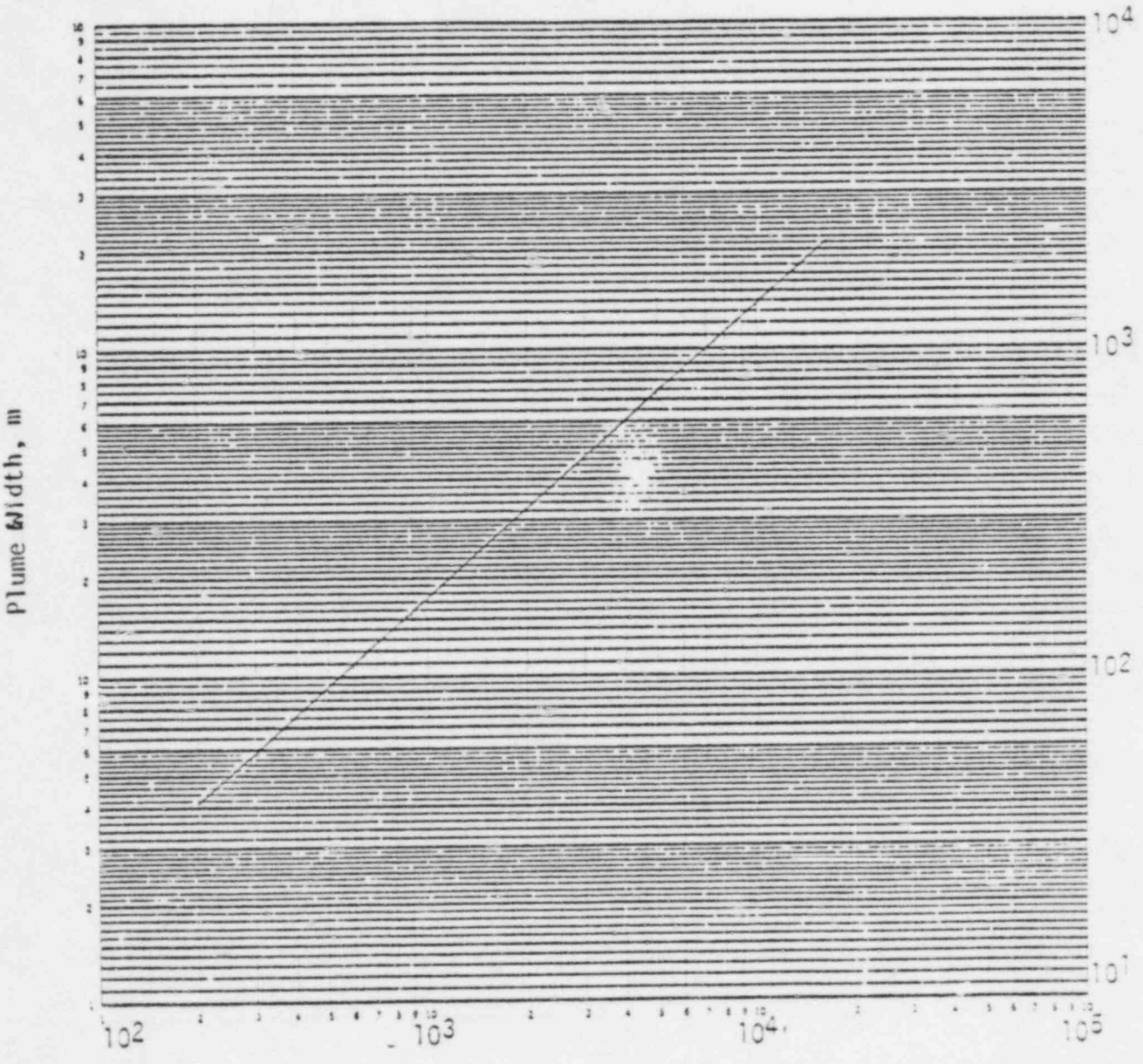
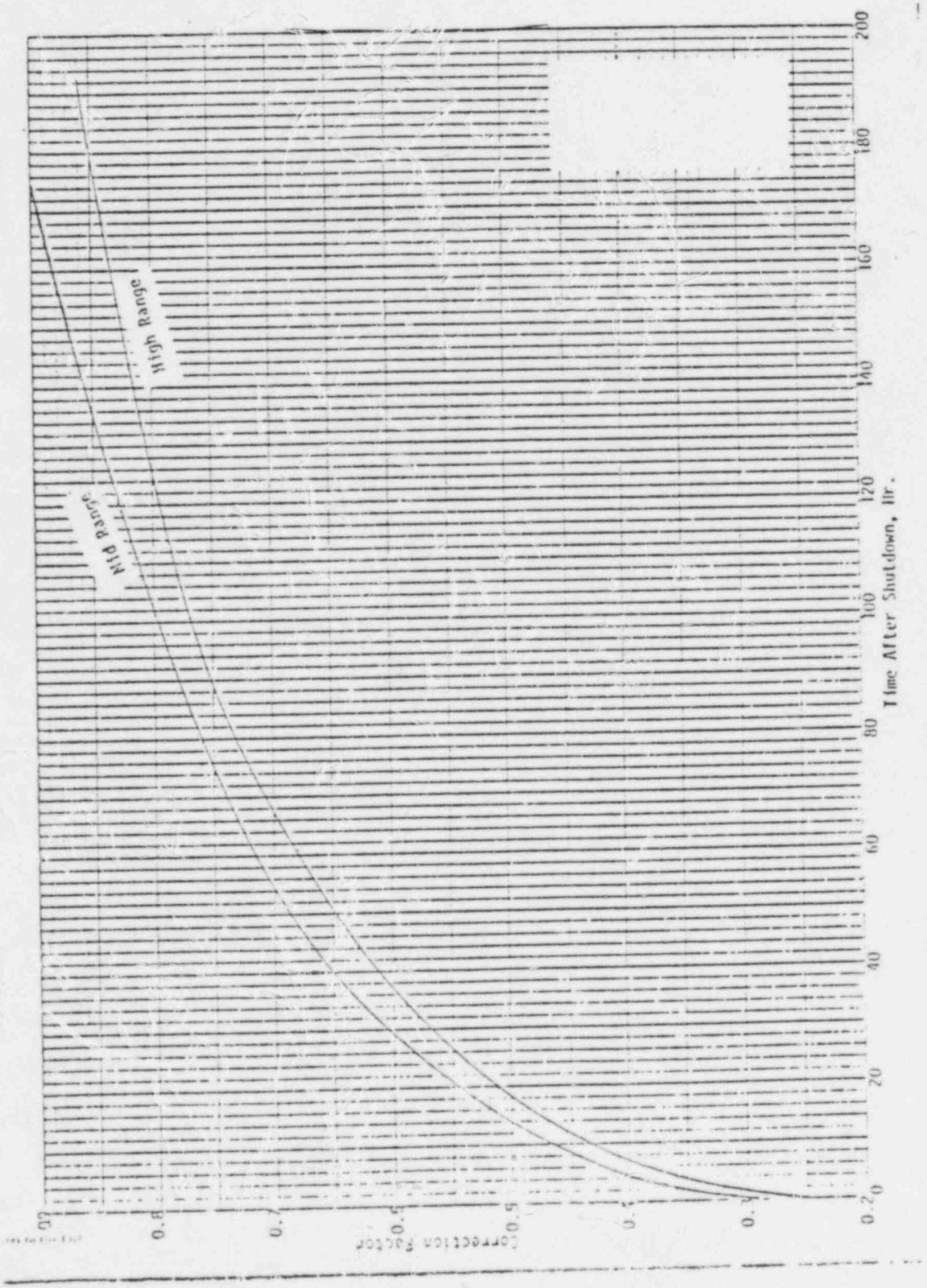


FIGURE 26

Monitor Response Correction Factor



1.0 PURPOSE

This procedure defines the requirements for emergency preparedness communications systems checks to be conducted on a periodic basis as defined in 10CFR50 Appendix E.

2.0 APPLICABILITY

This procedure applies to the emergency communications systems that are installed at both the DAEC and at the IE Tower which are associated with emergency preparedness response efforts.

3.0 RESPONSIBILITIES

3.1 Emergency Planning Coordinator

3.1.1 Ensure communications checks are performed as assigned in Section 4.0

3.1.2 Verify satisfactory completion of the communications checks conducted on a periodic basis, as defined in Attachments 1 through 4.

3.2 STA Coordinator

3.2.1 Verify that emergency preparedness communications systems checks are completed as assigned.

3.2.2 Coordinate with the Emergency Planning Coordinator, as required, to insure satisfactory completion of the communications systems checks.

3.3 Security Supervisor

3.3.1 Verify that emergency preparedness communications systems checks are completed as assigned.

4.0 INSTRUCTIONS

4.1 The following communications systems shall be checked and verified operable at the specified frequency.

4.1.1 Completion of monthly communications checks shall be documented on Attachments 1 and 2.

The following systems or circuits are included:

a) NRC ENS
b) NRC HPN

c) PBX and Centrix connections to:
   (1) Office of Disaster Services
   (2) Linn County Sheriff
   (3) Benton County Sheriff

4.1.2 Completion of the quarterly communications checks shall be documented on Attachment 3, "Quarterly DAEC Emergency Communications Checks".

The following systems or circuits are included:

4.1.2.1 Dedicated telephone circuits between:
   (a) Control Room and
       Technical Support Center
       Access Control
       Security Control Point
       Emergency Operations Facility
   (b) Technical Support Center and
       Control Room
       Access Control
       Security Control Point
       Emergency Operations Facility
   (c) Access Control and
       Control Room
       Technical Support Center
       Security Control Point
   (d) Security Control Point and
       Control Room
       Technical Support Center
       Access Control

4.1.2.2 Operations Radio between:
   (a) Control Room (base station)
   (b) Technical Support Center (console)
   (c) Access Control (console)
   (d) Site Boundary (portable radio)

4.1.2.3 Security/Radiological Survey Radio between:
   (a) Ten (10) mile radius (portable radio)
   (b) Technical Support Center (console)
   (c) Emergency Operation Facility (console)
   (d) Security Control Point (base station)

4.1.2.4 Check operability and inventory the following equipment:
   (a) Six Button Phones in the Control Room (2)
   (b) Headset in the Control Room (1)
   (c) Twenty Button Phones in the TSC (8)

(d) Headsets in the TSC (5)
(e) Operations Radios in the SCP (4)
(f) Security/Radiological Porta-Mobiles in the SCP (2)
(g) Magnetic Mount Antennas in the SCP (2)
(h) Antenna Adapters in the SCP (2)

NOTE

The head sets in the TSC are located in the cabinet in the Communications Room.

4.1.3 Completion of the annual communications checks shall be documented on Attachment 4, "Annual IE Tower Emergency Communications Checks".

4.1.3.1 Centrix connections to:
(a) FEMA
(b) DOE
(c) Linn County Civil Defense
(d) Benton County Civil Defense

4.2 Communications checks should be conducted as follows:

4.2.1 Montnly - first full calendar week

4.2.2 Quarterly - first full calendar week during January, April, July and October

4.2.3 Annual - first full calendar week during October.

4.3 A message similar to that shown on Attachment 5, "Example Communications Check Message Format", should be used when conducting communications systems checks external to IELP.

4.4 The Emergency Planning Coordinator shall ensure that all of the communications checks are performed.

4.4.1 The communications checks identified on Attachment 1, "Monthly DAEC Emergency Communications Checks", should be completed as follows:

a) Items 1 through 3a - STA

b) Items 3b through 7 - Security

NOTE

The IWAS Phone check should be initiated by the Office of Disaster Services on the first working Monday of every month.

4.4.2 The communications checks identified on Attachments 2 through 4 shall be completed as directed by the Emergency Planning Coordinator.

4.5 The Emergency Planning Coordinator shall review all documentation associated with the communications checks.

4.6 Acceptance Criteria

4.6.1 All required communications checks shall be made and satisfactorily completed.

4.6.2 In the event that a call cannot be completed

a. Contact the party by another means and inform them of the problem. Make sure the party understands no problem exists at the DAEC and their response is not required.

b. Determine the cause of the problem, if possible, and rectify it as soon as possible.

c. If the problem cannot be readily resolved, attach a note clearly stating which phone was being used, who and what number (if any) was being called, who was placing the call and any other pertinent information to the EPIP checklist in use.

4.6.3 After completing the communications checks, forward the checklist and comments to the Emergency Planning Coordinator.

5.0 REFERENCE

5.1 10 CFR 50, Appendix E
5.2 NUREG 0654, Rev. 1

6.0 ATTACHMENTS

6.1 Monthly DAEC Emergency Communications Checks
6.2 Monthly IE Tower Emergency Communications Checks
6.3 Quarterly DAEC Emergency Communications Checks
6.4 Annual IE Tower Emergency Communications Checks
6.5 Example Communications Check Message Format

Approved by: _____ Date 5/6/83
Emergency Planning Coordinator

Approved by: _____ Date _____
Security Supervisor

Approved by: David Mankin Date 5/11/83
STA Coordinator

Reviewed by: Hugh Thague Date 5/13/83
ALARA Coordinator

Reviewed by: B C York Date 5/16/83
Operations Committee Chairman

Approved by: B C York for Date 5/16/83
Plant Superintendent - Nuclear

ATTACHMENT 1
Monthly DAEC Emergency Communications Checks

Communication Circuit	Initiated By (Name)	Received By (Name)	Time	Date
1. NRC ENS				
a) Control Room				
b) Technical Support Center(TSC)				
2. NRC HPN				
a) Access Control Dial 22(Bethesda)				
b) TSC Dial 22 (Bethesda)				
c) TSC Dial 23 (Region III-During Regular Business Hours Only)				
d) Security Control Point Dial 22 (Bethesda)				
3. COMMERCIAL TELEPHONES				
a) NRC-Bethesda (202)951-0550 or (301)427-4056 or (301)492-7000				
b) Office of Disaster Services (515)281-3231 or (515)281-3561				
c) Linn Co. Sheriff 398-3911				
d) Benton Co. Sheriff 1-472-4777 or 1-472-2337				
4. POINT TO POINT RADIOS				
a) Linn County Sheriff				
b) Benton County Sheriff				
c) Iowa Highway Patrol				
5. IWAS PHONE-Initiated by the Office of Disaster Services				
6. NWS FIRST ORDER STATION, Cedar Rapids Flight Service (During Regular Business Hours only) 364-7127				
7. NWS FORECASTING STATION Des Moines (515) 284-4496				

COMMENTS:

REVIEWED BY _____ DATE _____
Security Supervisor

REVIEWED BY _____ DATE _____
STA Coordinator

REVIEWED BY _____ DATE _____
Emergency Planning Coordinator

ATTACHMENT 2

Monthly IE TOWER Emergency Communications Checks

Communication Circuit	Initiated By (initials)	Received By (Name)	Time	Date
Centrex				
NRC Region III (312)932-2500				
NRC Bethesda (202)951-0550				
or (301)427-4056				
or (301)492-7000				
Office of Disaster Services (515)281-3231				
or (515)281-3561				
Linn County Sheriff 398-3911				
ıton County Sheriff 1-472-4777				
or 1-472-2337				
NRC ENS				
Emergency Operations Facility				
NRC HPN - Bethesda Dial 22				
NRC HPN - Region III Dial 23				
NWS First Order Station Cedar Rapids Flight Service (During Regular Business Hours only) 364-7127				
NWS Forecasting Station(515)284-4496				

COMMENTS:

CONDUCTED BY _____ DATE _____

REVIEWED BY _____ DATE _____
Emergency Planning Coordinator

ATTACHMENT 3

Quarterly DAEC Emergency Communications Checks

Communication Circuit	Initiated By (initials)	Received By (Name)	Time	Date	Remarks
Control Room Dedicated Circuits					
TSC					
Access Control					
Security Control Point					
EOF					
Back Panel Circuit to TSC					
Intercom					
Operability Check and Inventory					
(1) Headset					
(2) Six Button Phones					
TSC Dedicated Circuits					
Control Room					
Control Room (back panel)					
Access Control					
Security Control Pt.					
TSC to EOF					
EOF to TSC					
Intercom					
Operability Check and Inventory					
(5) Headsets					
(8) Twenty Button Phones					
Access Control Dedicated Circuits					
Control Room					
TSC					
Security Control Pt.					
Intercom					
Security Control Pt. Dedicated Circuits					
Control Room					
TSC					
Access Control					
Intercom					

Continued on next page

ATTACHMENT 3 (continued)

Quarterly DAEC Emergency Communications Checks

Communication Circuit	Initiated By (initials)	Received By (Name)	Time	Date	Remarks
Operations Radio (TSC)					
Secondary Alarm Station					
Security Control Point					
Site Boundary					
Operability Check and Inventory					
(4) Hand Held Radios					
Security/Health Physics Radio (TSC)					
EOF					
Security Control Point					
10 mile radius					
Operability Check and Inventory					
(2) Porta Mobile Radios					
(2) Magnetic Mount Antennas					
(2) Antenna Adapters					

COMMENTS:

CONDUCTED BY _____ DATE _____

REVIEWED BY _____ DATE _____
Emergency Planning Coordinator

ATTACHMENT 4

Annual IE Tower Emergency Communications Checks

Communication Circuit	Initiated By (initials)	Received By (Name)	Time	Date
Centrex				
FEMA (816)374-5912				
DOE (312)972-4800 or (312)972-5731				
Linn County CD 363-2671				
Benton County CD 1-472-4519				

COMMENTS:

CONDUCTED BY _____ DATE _____

REVIEWED BY _____ DATE _____
Emergency Planning Coordinator

ATTACHMENT 5

EXAMPLE COMMUNICATIONS CHECK

MESSAGE FORMAT

This is _____ (Name), _____ (Title)

from _____ (DAEC or IELP)

The purpose of this call is simply to check operability of this communication system.

An emergency situation does not - I repeat - does not exist at the DAEC.

NOTE

Advise the individual who answered the call that this check is being done monthly, quarterly, or yearly, as the case may be, to comply with NRC regulations. Obtain his or her name, advise it is simply for documentation purposes, thank him and end the conversation courteously.