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RADIOLOGICAL DOSE EVALUATION

1.0 GENERAL

The purpose of this procedure is to provide a method to quickly estimate (1) X/Q using meteorological overlays, (2) thyroid and whole body dose using X/Q and (3) ground deposition using an approximation of D/Q.

2.0 REFERENCES

2.1 U. S. NRC Regulatory Guide 1.109, Calculation of Annual Doses to Man from Routine Release of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I, Revision 1," October 1977.

2.2 U. S. EPA, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents," EPA-520/1-75-001, September 1975. See Appendix D "Technical Bases for Methods that Estimate the Projected Thyroid Dose and Projected Whole Body Gamma Dose from Exposure to Airborne Radioiodines and Radioactive Noble Gases."

2.3 U. S. NRC Regulatory Guide 1.4, "Assumptions used for Evaluating the Potential Radiological Consequences of a Loss-of Coolant Accident for Pressurized Water Reactors," Revision 2, June 1976.

2.4 TID 14844, "Calculation of Distance Factors for Power and Test Reactor Sites," March 23, 1962.

3.0 PRECAUTIONS & LIMITATIONS

3.1 Ensure that all PBNP maps to be used by this procedure and their corresponding meteorological overlays are based on the same scale.

3.2 This procedure will be accomplished in the technical support center by a person designated by the Shift Supervisor or the Technical Support Manager. It will usually be done in conjunction with the Chemistry/Health Physics Supervisor when available.

3.3 This procedure will also be accomplished in the ESC by a person designated by the RadCon/Waste Manager.

3.4 Wind speed and wind direction must be average values obtained from the analog recorders in the control room.

NOTE: DO NOT USE INSTANTANEOUS VALUES.

3.5 If the radiological release duration is unknown, assume a duration of 8 hours.

3.6 If the meteorological parameters cannot be obtained from the control room, obtain the data from the following priority backup list.

3 6.1 Kewaunee Nuclear Power Plant.

3.6.2 National Weather Service in Green Bay. Ask for Two Rivers Coast Guard information, if available.

4.0 INITIAL CONDITIONS

4.1 A release of airborne radioactivity has occurred or a release is anticipated.

4.2 An emergency or potential emergency condition is anticipated to have offsite dose consequences.

5.0 PROCEDURE

5.1 Determination of X/Q, Atmospheric Dispersion Factor

5.1.1 Obtain the following information from the indicated source and enter this data in the appropriate space on form EPIP-07 (attached).

Source	Data
EPIP-04	(a) wind speed in-mph
EPIP-04	(b) wind direction
EPIP-04	(c) time of reactor shutdown
EPIP-04	(d) time of release to containment
EPIP-04	(e) time of release from the plant
Health Physics or Operating logs or projected estimate EPIP 1.3 results	(f) duration or expected duration of the release in-hours (see note)
	(g) gross Xe-133 equivalent release rate in Ci/sec

NOTE: IF RELEASE DURATION IS UNKNOWN, ASSUME 8 HOURS.

5.1.2 Determine stability class by use of the $\sigma\theta$ chart recorder in the control room and Attachment 1.4-1. Enter the stability class (h) on form EPIP-07.

5.1.3 Backup stability class determination. Visually check cloud cover and incoming solar radiation. With this information, use Attachment 1.4-3 to ascertain the appropriate stability class. Enter the stability class (h), on form EPIP-07.

NOTE: IF INCOMING SOLAR RADIATION IS STRONG AND WINDS ARE FROM THE EAST OR SOUTHEAST, IT IS A POSSIBILITY THE WIND IS PRODUCED BY A LAKE EFFECT. CALL THE GREEN BAY NATIONAL WEATHER SERVICE FOR AID IN THIS DETERMINATION. IF A LAKE BREEZE IS SUSPECTED, OFFSITE SURVEY TEAMS MUST BE REMINDED TO PAY CLOSE ATTENTION TO WIND DIRECTION.

5.1.4 Place the overlay corresponding to the stability class on the map. Using the plant location as a pivot point, align the centerline of the overlay to the downwind direction from the plant.

NOTE: THE "TICK" MARKS ON THE CENTERLINE OF THE OVERLAYS ARE ONE MILE APART.

5.1.5 Determine the distance (i) to the dose projection location if different from the standard centerline distances listed on form EPIP-07. Note the location description, sector, and distance on form EPIP-07.

Enter the Xu/Q value (j) for the distances of site boundary, two miles, five miles, and ten miles on EPIP-07. The Xu/Q values (j) can be obtained from the overlay in the table in the lower righthand corner of the overlay. If a possible location other than the standard specified location is on a line, enter the Xu/Q (j) value for that line from the overlay on form EPIP-07. If the location is not on a line, move to the next inner-most line (toward the centerline) and enter the Xu/Q (j) value for that line on form EPIP-07.

Example:

Class "C" Xu/Q for 5 miles equals 1.21×10^{-6} m^{-2}

5.1.5 Calculate the X/Q value from the Xu/Q value by using the equation:

$$\frac{X}{Q}\ \frac{sec.}{m^3} = \frac{2.24(sec./m)}{(hrs./mi)} \times \frac{Xu/Q\ (m^{-2})}{Wind\ Speed\ (mi/hr.)}$$

Enter the X/Q values on form EPIP-07.

5.2 Whole Body Dose Estimate

NOTE: IF THE NOBLE GAS SOURCE TERM IS DETERMINED BY GRAB SAMPLE RESULTS WHICH GIVES AN INVENTORY OF SPECIFIC NUCLIDES, THEN A CONSERVATIVE WHOLE BODY DOSE ESTIMATE CAN BE MADE BY COMPLETING FORM EPIP-09.

5.2.1 Enter the gross Xe-133 equivalent release rate (g) on form EPIP-08 from form EPIP-07.

5.2.2 Enter the expected inhalation period, EIP, in hours (f) on form EPIP-08 from form EPIP-07.

5.2.3 Calculate the projected whole body dose on form EPIP-08 by using the equation:

$$D(\text{Rem}) = X/Q\ (\text{sec/m}^3)^{(k)} \times Q\ (\text{Ci/sec})^{(g)} \times Kr\ (\text{Rem m}^3/\text{Ci - Hrs}) \times EIP\ (\text{Hrs})$$

where:

D = whole body dose (Rem)

X/Q = atmospheric dispersion coefficient determined in Step 5.1.5 (sec/m^3) (k)

Q = release rate (Ci/sec) (g)

Kr = Dose Factor ($\frac{\text{rem m}^3}{\text{Ci hrs}}$) Attachment 1.4-2

EIP = Expected Inhalation (Exposure) Period (Hours) (f)

5.3 Thyroid Dose Estimate

5.3.1 Calculate the projected thryoid dose by using the whole body dose calculated in Section 5.2 of this procedure.

5.3.2 Record the projected whole body dose on form EPIP-08 in Section 2.

5.3.3 Choose the appropriate figure based upon the type of accident which has occurred.

a. Loss of Coolant Accident (LOCA) - Figure 1.4-1.

b. Gap Activity Accident - Figure 1.4-4.

c. Fuel Handling Accident - Figure 1.4-4.

d. Steam Generator Tube Rupture - Figure 1.4-5.

NOTE: IF THE TYPE OF ACCIDENT IS UNKNOWN, USE THE LOCA FIGURES.

5.3.4 Obtain the ratio factor that relates the whole body dose to a thyroid dose from the figure chosen with the corresponding appropriate time after the accident and record on form EPIP-08, Section 2.

5.3.5 Calculate the projected thyroid dose my multiplying the whole body dose by the ratio factor obtained in Step 5.3.4 on form EPIP-08, Section 2.

5.4 Radionuclide Ground Deposition Estimation

NOTE: FORM EPIP-10 CAN BE COMPLETED ONLY IF IODINE GRAB SAMPLE RESULTS OR PARTICULATE RELEASE RATES ARE AVAILABLE. IF FORM EPIP-10 CANNOT BE COMPLETED, PROCEED WITH STEP 5.4.5 OF THIS SECTION.

5.4.1 Enter the Xe-133 equivalent release rate or the specific particulate release rate on form EPIP-10 from grab sample results or from environmental monitoring results.

5.4.2 Enter the duration of release expected inhalation period (f) from form EPIP-07 on form EPIP-10.

5.4.3 Enter the value of X/Q (k) on form EPIP-10 as determined in Step 5.1.5.

5.4.4 Complete Section 2 of form EPIP-10 to calculate the ground deposition using the equation:

$$\text{Dep } (\mu Ci/m^2) = F \times .05 \text{ (m/sec)} \times 3600 \text{ (sec/hr)} \times 10^6 \text{ } (\mu Ci/Ci) \times X/Q \text{ (sec/m}^3\text{)} \times Q \text{ (Ci/sec)} \times EIP \text{ (hrs)}$$

$$\text{Dep} = F \times 1.8 \times 10^8 \times \underset{(k)}{X/Q} \times \underset{(g)}{Q} \times \underset{(f)}{EIP}$$

Dep = ground deposition ($\mu Ci/m^3$)

X/Q = atmospheric dispersion factor from Step 5.1.5 (sec/m^3) (k)

Q = radionuclide release rate (Ci/sec) (g)

EIP = estimated release duration (hrs) (f)

F = fraction of isotope subject to deposition (unitless)

3600 = conversion (sec/hr)

10^6 = conversion ($\mu Ci/Ci$)

0.05 = assumed deposition velocity (m/sec)

5.4.5 Complete form EPIP-11 from available data and calculations just performed.

5.4.6 Enter the date and time of these calculations and sign form EPIP-11.

5.4.7 Forward completed attachments to the Technical Support Manager for review. The Technical Support Manager will relay results to the Site Manager.

5.5 Population Exposure

5.5.1 Calculate projected population exposure by using form EPIP-10a.

5.5.2 Enter from EPIP-08 whole body dose from center line on form EPIP-10a.

5.5.3 Enter population figures from Figure 1.4-6. Use population number corresponding to the quadrant and distance categories for dose.

5.5.4 Total population dose from each radius to find total population dose.

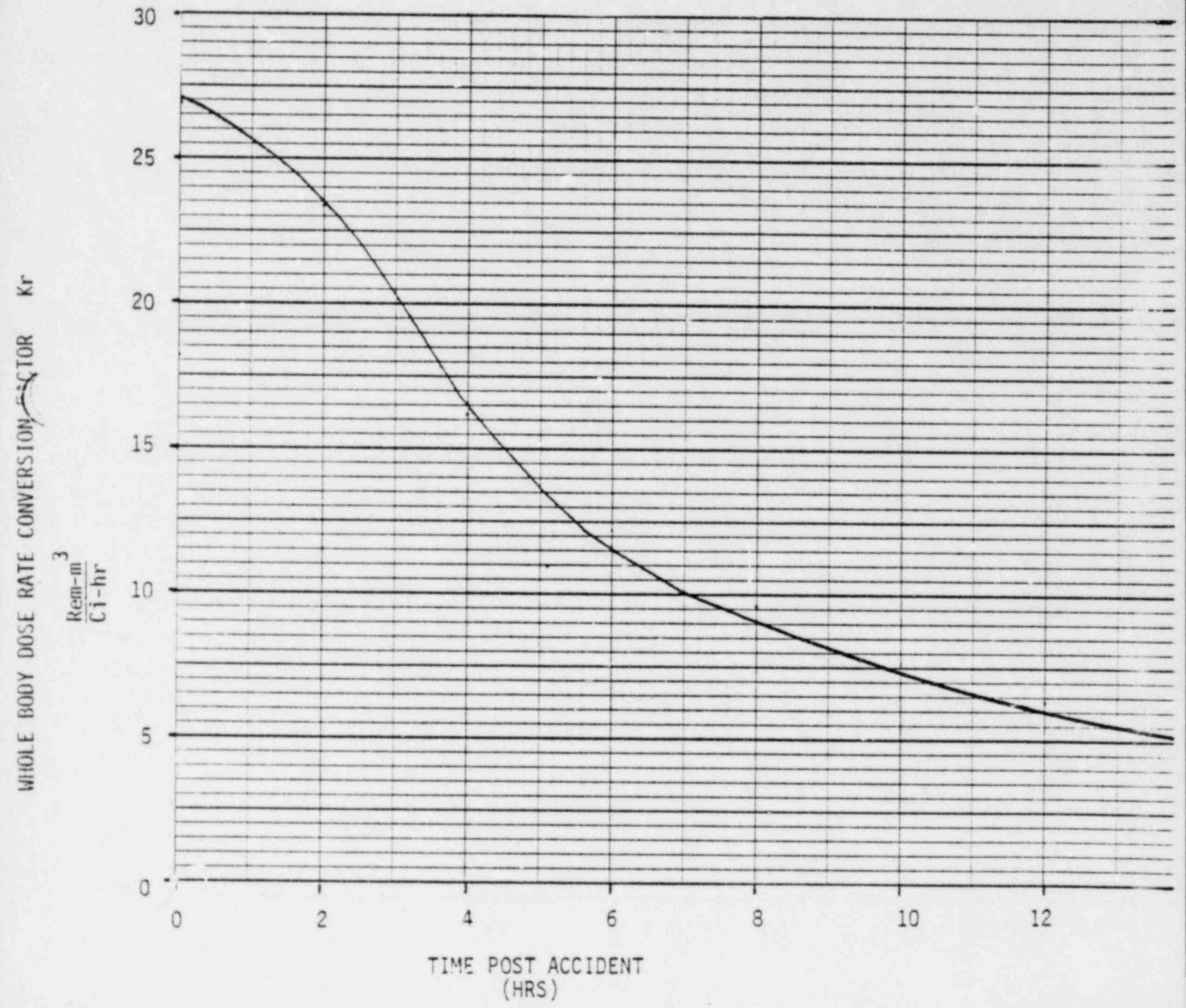
ATTACHMENT 1.4-1

CLASSIFICATION OF ATMOSPHERIC STABILITY BY SIGMA THETA

Stability Classification	Pasquill Categories	$\sigma\theta$ (degrees)
Extremely unstable	A	$\sigma\theta \geqq 22.5$
Moderately unstable	B	$22.5 > \sigma\theta \geqq 17.5$
Slightly unstable	C	$17.5 > \sigma\theta \geqq 12.5$
Neutral	D	$12.5 > \sigma\theta \geqq 7.5$
Slightly stable	E	$7.5 > \sigma\theta \geqq 3.8$
Moderately stable	F	$3.8 > \sigma\theta \geqq 2.1$
Extremely stable	G	$2.1 > \sigma\theta$

ATTACHMENT 1.4-2

WHOLE BODY DOSE RATE CONVERSION FACTORS



ATTACHMENT 1.4-3

BACKUP DETERMINATION OF ATMOSPHERIC STABILITY CLASS

Surface Wind Speed, (at 50 meters) mph	Day			Night	
	Incoming Solar Radiation			Thinly Overcast	
	Strong	Moderate	Slight	> 1/2 low cloud	< 1/2 cloud
< 4	A	A-B	B		
4-7	A-B	B	C	E	F
7-11	B	B-C	C	D	E
11-13	C	C-D	D	D	D
>13	C	D	D	D	D

The neutral class D, should be assumed for overcast conditions during day or night.

"Strong" incoming solar radiation corresponds to a solar altitude greater than 60° with clear skies; "slight" incoming solar radiation corresponds to a solar altitude from 15°-35° with clear skies. Cloudiness will decrease incoming solar radiation and should be considered along with solar altitude when determining solar radiation. Incoming radiation that would be strong with clear skies can be expected to reduce to moderate with broken (5/8 to 7/8 cloud cover) middle clouds and to slight with broken low clouds. Night refers to the period from one hour before sunset to one hour after sunrise.

EMERGENCY PLANNING ZONE POPULATION DATA

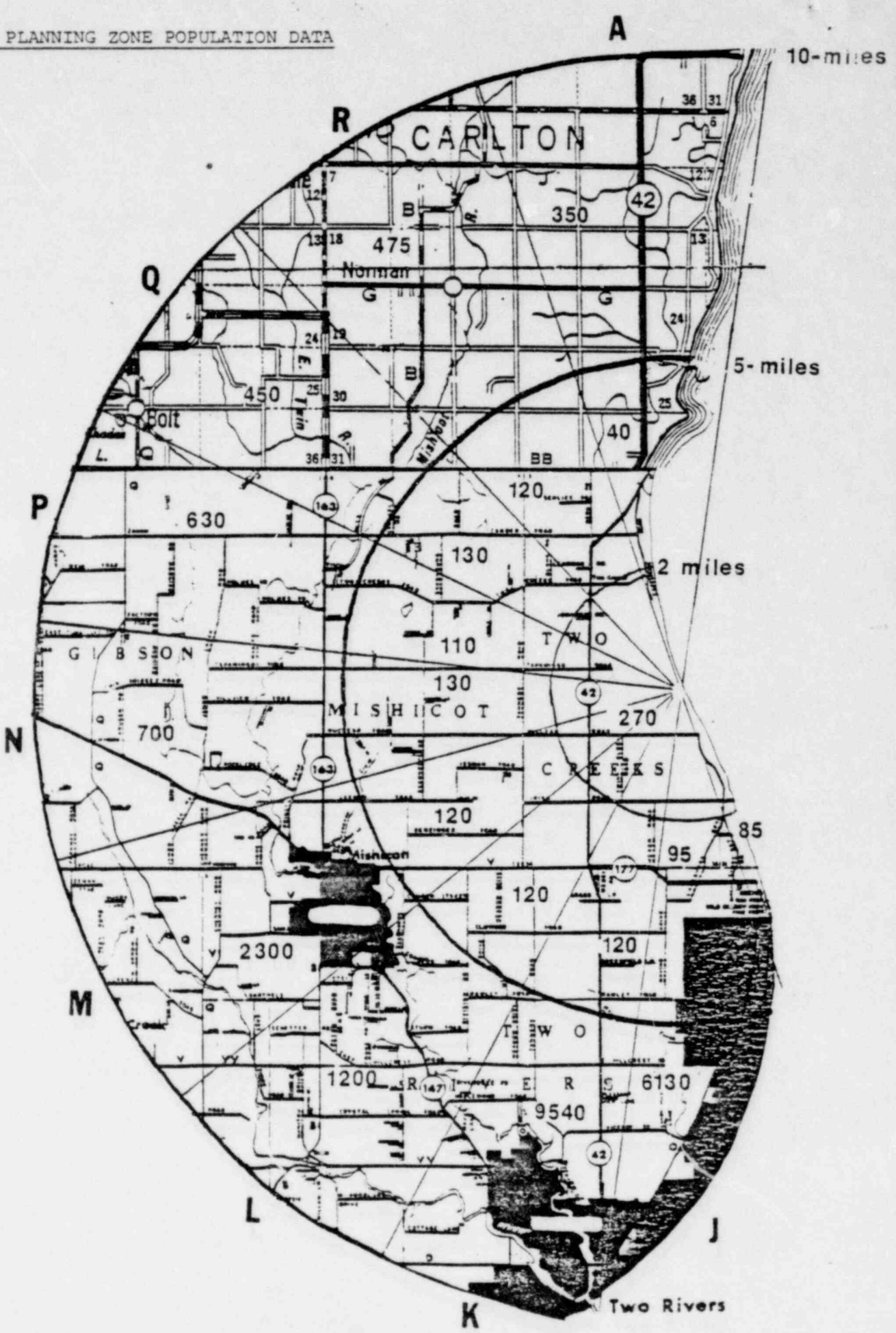
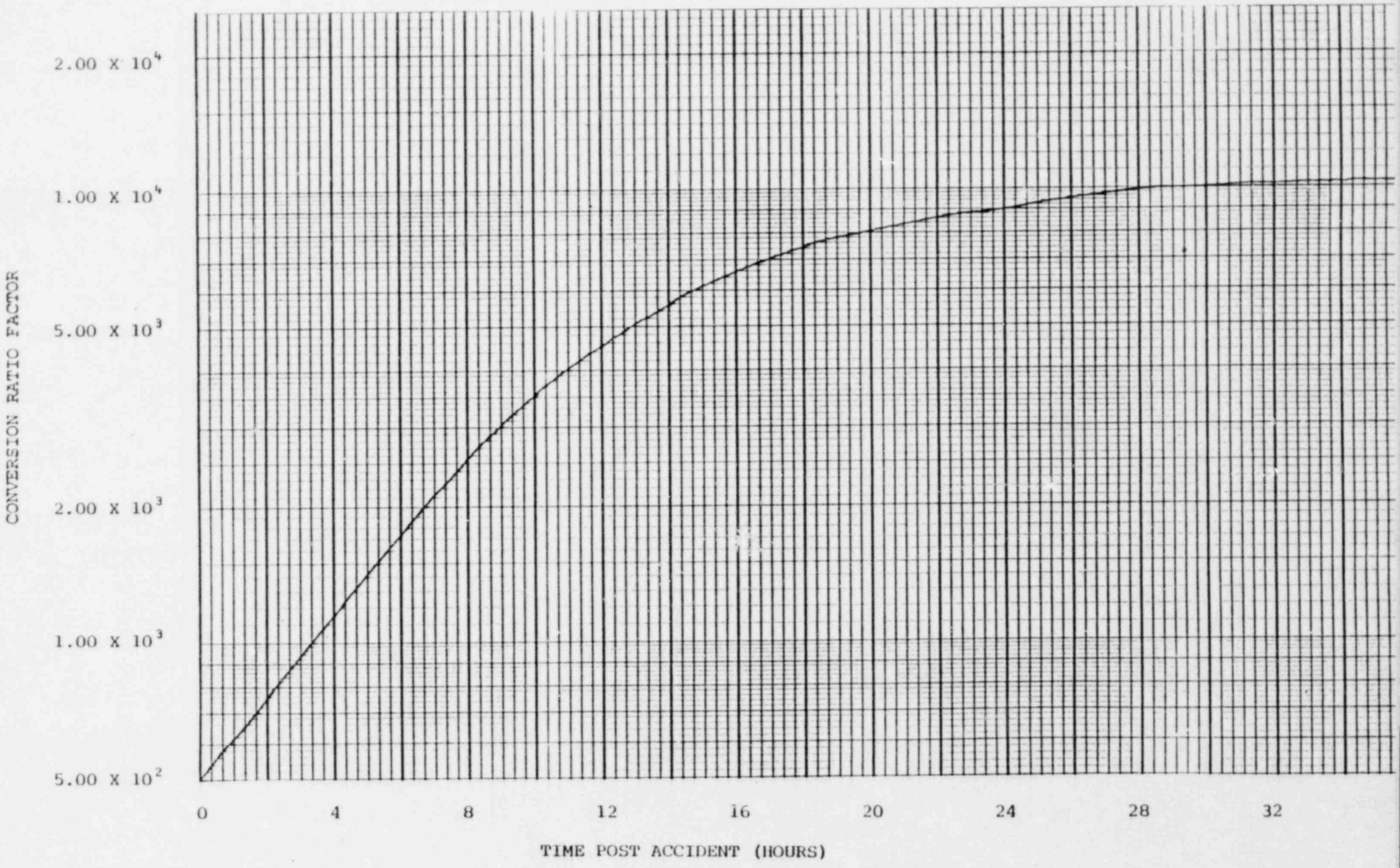


FIGURE 1.4-1

THYROID DOSE RATIO FACTOR LOSS OF COOLANT ACCIDENT



FIGURES 1.4-2 AND 1.4-3 HAVE BEEN DELETED

FIGURE 1.4-4
THYROID DOSE CONVERSION FACTOR
FUEL HANDLING ACCIDENT
OR GAP ACTIVITY ACCIDENT

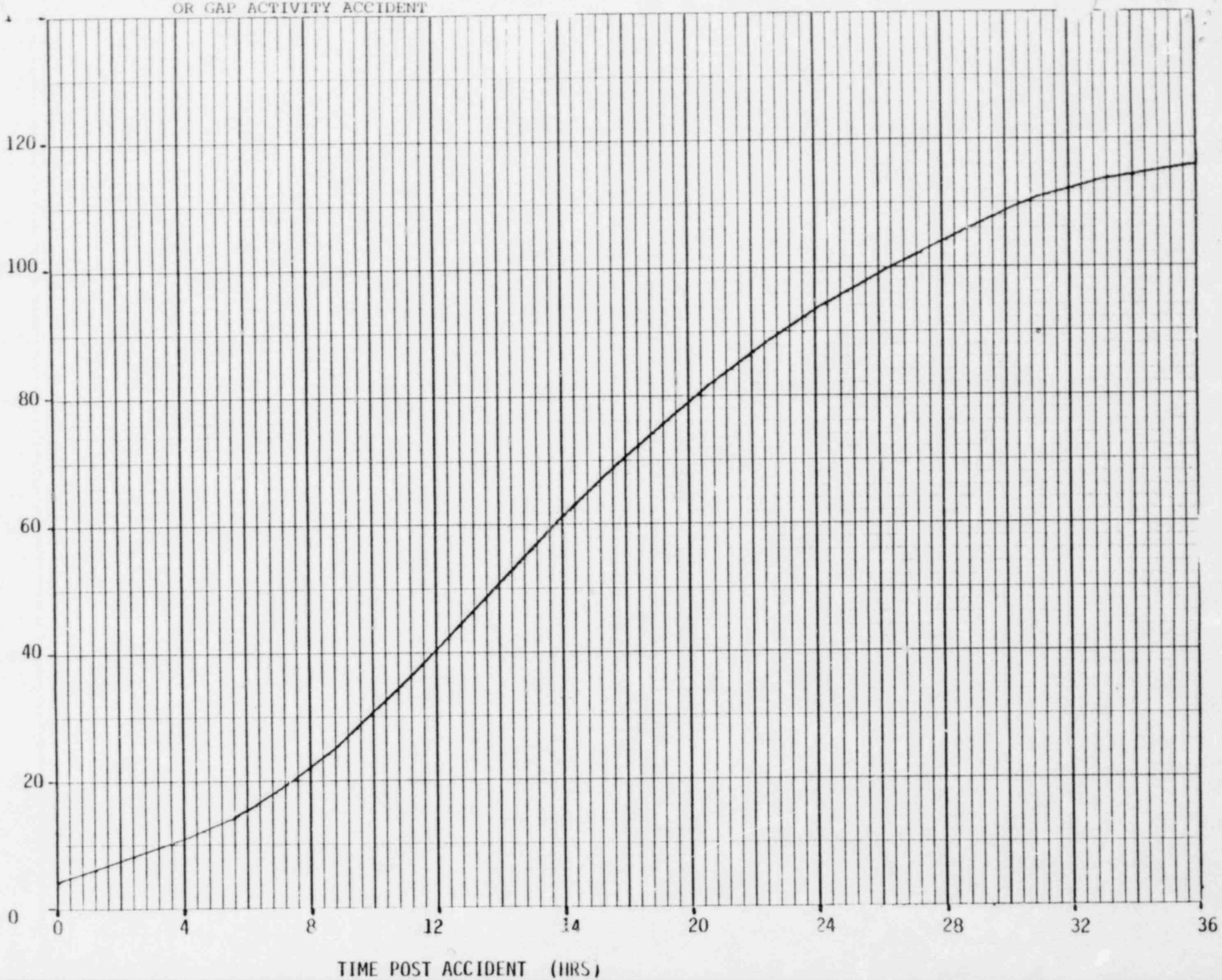
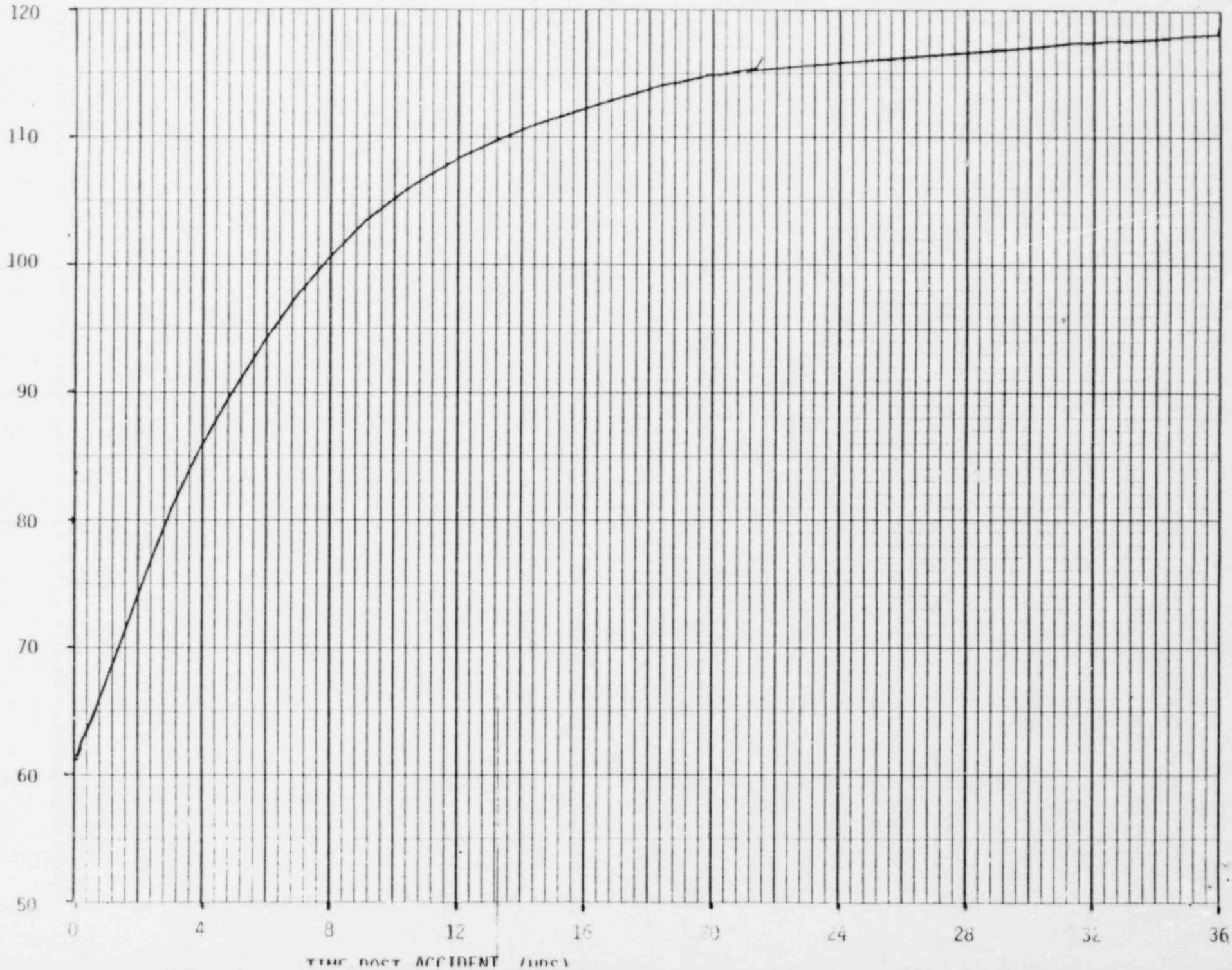


FIGURE 1.4-5
THYROID DOSE RATIO FACTOR
STEAM GENERATOR TUBE RUPTURE



EPIP 1.8
MINOR
Revision 1
05-28-82

EMERGENCY OFF-SITE DOSE ESTIMATIONS

1.0 GENERAL

The purpose of this procedure is to permit the expeditious classification of an accident or event based on estimated off-site doses. The procedure provides a methodology to quickly estimate (1) stack release rates (source terms) and (2) off-site whole body and thyroid doses.

2.0 REFERENCES

2.1 U. S. NRC Regulatory Guide 1.109, Calculation of Annual Dose to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR 50 Appendix I, Revision 1, October, 1977

2.2 U. S. EPA "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents," EPA-520/1-75-001, September 1975, Appendix D

2.3 TID 14844 "Calculation of Distance Factors for Power and Test Reactor Sites," March 23, 1982

2.4 EDS Report to Wisconsin Electric Power Company concerning NUREG-0578, March 7, 1980.

2.5 Point Beach Nuclear Plant, Final Facility Description & Safety Analysis Report (FFDSAR)

3.0 PRECAUTIONS & LIMITATIONS

3.1 This procedure is primarily intended for use in the control room by a person designated by the Shift Supervisor such as the Duty Technical Advisor.

3.2 This procedure is to be used only for immediate initial dose projections. The initial dose projections are to be refined using EPIP 1.3 and 1.4 once more data becomes available, i.e., meteorological data, air samples, and off-site survey dose measurements.

3.3 It is recognized that the RadCon/Waste Manager, in conjunction with the Chemistry & Health Physics Supervisor, is ultimately responsible for off-site dose assessments. However, the initial projections will normally be done by the Shift Supervisor or assigned designee for purposes of classifying the event or accident because of augmentation time.

4.0 INITIAL CONDITIONS

4.1 An emergency or potential condition is anticipated to have off-site dose consequences.

4.2 A release of airborne radioactivity has occurred, or a release is anticipated, requiring a conservative estimate of the off-site dose consequences.

5.0 PROCEDURE

5.1 Calculation of Xe-133 Equivalent Release Rates (Source Terms)

5.1.1 Airborne effluents may be discharged from PBNP through the following vent stacks:

a. Auxiliary building vent (ABVNT)

b. Drumming area vent (DAVNT)

c. Unit 1 containment purge vent (Cont. 1)

d. Unit 2 containment purge vent (Cont. 2)

e. Gas stripper building vent (GSBVNT)

f. Combined air ejector decay duct (CAE)

g. Main steam safety valves and atmospheric dump valves

5.1.2 The source terms (vent release rate in Ci/second) may be estimated by using any of the following monitoring systems.

a. Low range operational stack monitors (designed to monitor low-level releases).

b. Eberline RMS II radiation monitoring system (designed to monitor high-level releases).

c. Contact readings using a hand-held survey meter (to be used when other monitor systems are non-operable).

5.1.3 The decision as to which monitoring system is to be used to estimate the source terms is dependent on the level of release and the operability of the monitor.

5.1.4 Meter readings are to be entered in the appropriate column on EPIP-34. If meter readings are "off-scale" or "inoperable," enter the appropriate comment in the meter reading column on EPIP-34. A source term estimate must be made for each vent which is exhibiting readings above normal operating readings.

5.1.5 Direct contact readings using a hand-held survey meter are required under the following conditions:

a. Meter readings from the low range monitoring system or the RMS II system are not available.

b. A steam generator tube rupture has occurred necessitating a hand-held meter reading at the main steam header.

5.1.6 Direct contact readings using a hand-held survey meter are not to be initiated until the following conditions are accomplished:

a. An evaluation of the radiological hazards must be completed prior to any attempt to enter the auxiliary building or facade to take survey readings on any stack or vent.

b. Before the surveys are done, the proper survey meter and the most direct and desirable route to the stack to be monitored must be chosen.

c. The surveys will be accomplished under the direction of the Health Physics Supervisor. The surveys must be approved by the Site Manager, Duty & Call Health Physics Supervisor, and the Duty Shift Supervisor.

5.1.7 For surveying the main steam safety valves and atmospheric dump valves, the reading will be taken in contact with the centerline of the main steam header, three feet from the main steam line. The survey probe is to be shielded with a minimum of 0.25 inches of lead on the side of the probe facing the main steam line and the containment.

5.1.8 The following data must be obtained from the Shift Supervisor in order to estimate release rates from the main steam header:

a. Estimated flow rate of steam through the main steam header in lbs/hr.

b. Specific volume of the steam in ft^3/lb. At 1000 psia, specific volume of 0.486 ft^3/lb. At 500 psia, specific volume is 0.928 ft^3/lb.

Enter this data on the appropriate column in Section 3.0 of EPIP-34.

5.1.9 Sum the values on EPIP-34, Section 4.0, to determine the gross Xe-133 equivalent release rate.

5.2 Whole Body Dose Projections

5.2.1 Off-site whole body doses may be calculated at the site boundary using the following equation:

$$D\left(\frac{REM}{HR}\right) = X/Q \times Q \times Kr$$

Where:

D = whole body dose rate (Rem/hr)
X/Q = atmospheric dispersion coefficient (sec/m^3)
Q = gross Xe-133 equivalent release rate (Ci/sec.)

$$Kr = \text{Dose Factor } \frac{(rem\text{-}m^3)}{Ci\text{-}hrs}$$

Projected off-site doses may be calculated by entering the total Xe-133 equivalent release rate calculated on EPIP-34 in the appropriate column on EPIP-35 and multiplying the variables in the equations.

5.2.3 Enter the expected exposure period in the appropriate column on EPIP-35. (A dose per hour is calculated by entering an exposure period of one (1) hour.)

NOTE: THE X/Q VALUES LISTED ON EPIP-35 ARE ESTIMATED BASED ON CALCULATED ACCIDENT METEROLOGY FOR 0-2 HRS. AS GIVEN IN THE FFDSAR. IF REAL TIME METEOROLOGICAL DATA IS AVAILABLE, X/Q VALUES CAN BE CALCULATED AS OUTLINED IN EPIP 1.4 SECTION 5.1. REFINEMENT OF THE PROJECTED OFF-SITE DOSES MAY BE ACCOMPLISHED BY SUBSTITUTING THE REAL TIME X/Q CALCULATED VALUE FOR THE ESTIMATED X/Q ON EPIP-35.

5.3 Thyroid Dose Projection

5.3.1 Calculate the projected thyroid dose at the site boundary on Section 2.0 of EPIP-35 by using the following equation:

Thyroid Dose = Whole Body Dose x Conversion Factor

5.3.2 The conversion factor is dependent on the type of accident which has occurred. Conversion factors are tabulated for the following accidents:

a. Loss of coolant accident (LOCA)

b. Gap activity accident

c. Fuel handling accident

d. Steam generator tube rupture

5.3.3 Choose the appropriate type accident and calculate the thyroid dose in Section 2.0 of EPIP-35 by multiplying the whole body dose calculated in Sectin 1.0 by the conversion factor.

NOTE: IF THE TYPE OF ACCIDENT IS NOT KNOWN, USE THE LOSS OF COOLANT CONVERSION FACTOR.

5.4 Classification of the Event Based on Estimated Off-Site Doses

5.4.1 The event is to be classified as a Site Emergency if the projected off-site doses meet any of the following criteria:

a. Effluent monitors detect levels corresponding to any of the following doses at or beyond the site boundary:

(1) >50 mR/hr whole body for ½ hour

(2) >250 mR/hr for ½ hour for the thyroid

(3) >500 mR/hr whole body for 2 minutes

(4) >2500 mR/hr to the thyroid for 2 minutes

b. Any of the above dose rates are projected, based on plant parameters.

5.4.2 The event is to be classified as a General Emergency if the projected off-site doses meet any of the following criteria:

a. Effluent monitors detect levels corresponding to any of the following doses at or beyond the site boundary:

(1) 1 R/hr whole body

(2) 5 R/hr thyroid

b. Either of above dose rates are projected based on plant parameters.

5.5 Protective Action Recommendation

5.5.1 Due to the conservative nature of the calculations in this procedure, use EPIP 1.4 to calculate dose projections for protective action recommendations unless it is apparent there is no time to use EPIP 1.4.

5.5.2 Enter dose rates and release duration estimate on EPIP-35. If duration of release is unknown, use a release duration of 8 hours.

5.5.3 Recommend one of the following offsite protective actions based on results of EPIP-35 calculations.

Whole Body Dose

a. >0.1 R - Advise State to have population to seek shelter

b. >1 R - Tell State to consider evacuation of women and children.

c. >5 R - Advise State to evacuate public in affected area and all people within 2 miles of the plant.

Thyroid Dose

a. >5 R - Advise State to have public seek shelter and consider evacuation of women and children.

b. >25 R - Advise State to evacuate public in affected area and all people within 2 miles of the plant.

ESTIMATED POPULATION DOSE

Complete using calculations from EPIP-08 and population figures from corresponding sectors and distances from Attachment 1.4-6.

Calculated Population Dose

Population Dose (man Rem) = Dose (Rem) X Population

Two mile radius _____ X _____ = _____

Five mile _____ X _____ = _____

Ten mile _____ X _____ = _____

Total Dose _____

COMPLETED BY _____ TIME/DATE _____

OFFSITE AGENCY EMERGENCY CALL LIST

FEDERAL AGENCIES:

1. United States Nuclear Regulatory Commission

Name	Frequency	Telephone Number	Person Notified	Time Notified	Initials
NRC Operations Center	All hours	Red Phone or 1-202/951-0550			
NRC Office of Inspection and Enforcement, Region III	All hours (Ask for Duty Officer)	1-312/932-2500			

NRC Resident Inspectors:	Plant Ext.	Home
a. W. G. Guldemond		
b. R. L. Hague		

2. United States Department of Energy

me	Frequency	Telephone Number	Person Notified	Time Notified	Initials
Chicago Operations Center, Region V (Radiological Assistance Team)	Weekdays (8AM-5PM)	1-312/972-4800			
	All other hours	1-312/972-5731			

3. United States Coast Guard

Name	Frequency	Telephone Number	Person Notified	Time Notified	Initials
USCG, Sturgeon Bay	All hours	1-743-3366			
USCG, Two Rivers	All hours	793-1304			

'ATE AGENCIES:

1. State of Wisconsin

Name	Frequency	Telephone Number	Person Notified	Time Notified	Initials
Wisconsin Dept. of Health and Social Services, Section of Radiation Protection	Weekdays (9AM-5PM)	1-608/266-7464			
Lawrence J. McDonnell, Chief Section of Radiation Protection		Home phone			
Wisconsin Division of Emergency Government	All hours	1-608/266-3232 or NAWAS			
Wisconsin State Patrol	All hours	1-921-0448 1-921-0442 or NAWAS			

'UNTY AGENCIES:

1. Manitowoc County

Name	Frequency	Telephone Number	Person Notified	Time Notified	Initials
Manitowoc County Sheriff, County Traffic	All hours	683-4200 or NAWAS			

2. Kewaunee County

Name	Frequency	Telephone Number	Person Notified	Time Notified	Initials
Kewaunee County Dispatcher	All Hours	1-388-3100 or NAWAS			

PRIVATE AGENCIES:

Name	Frequency	Telephone Number	Person Notified	Time Notified	Initials
Kewaunee Nuclear Power Plant	All hours	793-2229			

'IVATE AGENCIES: (Cont'd)

Name	Frequency	Telephone Number	Person Notified	Time Notified	Initials
Institute of Nuclear Power Operations	All hours	1-404/953-0904			
American Nuclear Insurers	All hours	1-203/677-7305			
Westinghouse Electric Corp. Field Serv. Mgr. (R. Grimm)	Office Home Hot Line	1-412/256-3820			
Stone & Webster Engineering Corp.	All hours	1-617/973-0008			
Bechtel Power Corporation	All hours	1-415/768-3840			

FIRE AND MEDICAL AGENCIES

1. Fire Emergency

Name	Frequency	Telephone Number	Person Notified	Time Notified	Initials
Two Creeks Fire Department	All hours	684-0133 (Emergency line)			

2. Medical Assistance

Name	Frequency	Telephone Number	Person Notified	Time Notified	Initials
Doctors Clinic, Ltd. S. Lawrence Kaner, M.D. Stephen L. Weld, M.D.		793-2281			
University Hospital, Madison					
Emergency Room	All hours	1-608/262-2398			
Frank C. Larson, M.D.		1-608/262-2718			
Robert F. Schilling, M.D.		1-608/262-3188			
Robert R. Radtke, Ph.D. (Health Physicist)		1-608/262-8769			

RE AND MEDICAL AGENCIES: (Cont'd)

Name	Frequency	Telephone Number	Person Notified	Time Notified	Initials
Two Rivers Emergency Vehicle	All hours	793-1151 or 1152	_____	_____	_____
Community Hospital, Two Rivers	All hours	793-1178	_____	_____	_____

POINT BEACH NUCLEAR PLANT

CALCULATION OF Xe-133 EQUIVALENT RELEASE RATES

1.0 LOW RANGE OPERATIONAL VENT STACK READINGS

	Flow Rate (CFM)	Meter Reading (CPM)		Conversion Factor $\frac{\text{Curies}}{\text{sec-cpm}}$		Release Rate (Curies/sec)
Auxiliary Building	61400	_____	X	5.8×10^{-9}	=	_____
Drumming Area	43100	_____	X	1.2×10^{-8}	=	_____
Unit 1 Containment Purge	12500	_____	X	2.1×10^{-6}	=	_____
	25000	_____	X	4.2×10^{-6}	=	_____
Unit 2 Containment Purge	12500	_____	X	2.1×10^{-6}	=	_____
	25000	_____	X	4.2×10^{-6}	=	_____
Gas Stripper Building	13000	_____	X		=	_____
Combined Air Ejector	25	_____	X	7.8×10^{-9}	=	_____

2.0 EBERLINE RMS-11 VENT STACK READOUTS

	Flow Rate (CFM)	Meter Reading (R/hr)		Conversion Factor $\frac{\text{Curies}}{\text{sec-R/hr}}$		Release Rate (Curies/sec)
Auxiliary Building	61400	_____	X	3.0×10^{3}	=	_____
Drumming Area	43100	_____	X	2.2×10^{3}	=	_____
Unit 1 Containment Purge	12500	_____	X	1.6×10^{4}	=	_____
	25000	_____	X	3.2×10^{4}	=	_____
Unit 2 Containment Purge	12500	_____	X	1.6×10^{4}	=	_____
	25000	_____	X	3.2×10^{4}	=	_____
Gas Stripper Building	13000	_____	X	6.2×10^{2}	=	_____
Combined Air Ejector	25	_____	X	3.6	=	_____

3.0 PLANT EFFLUENT VENT STACK CONTACT READINGS

	Flow Rate (CFM)	Meter Reading (R/hr)		Conversion Factor $\frac{\text{Curies-hr}}{\text{sec-R}}$		Release Rate (Curies/sec)
Auxiliary Building	61400	_____	X	3.0×10^{2}	=	_____
Drumming Area	43100	_____	X	2.3×10^{2}	=	_____
Unit 1 Containment	12500	_____	X	8.0×10^{1}	=	_____
	25000	_____	X	1.6×10^{2}	=	_____
Unit 2 Containment	12500	_____	X	8.0×10^{1}	=	_____
	25000	_____	X	1.6×10^{2}	=	_____
Gas Stripper Building	13000	_____	X	8.0×10^{4}	=	_____
Combined Air Ejector	25	_____	X	1.6×10^{2}	=	_____

	Estimated Steam Release (lb/hr)	X	Specific Volume (ft^3/lbm)	X	Conversion Factor $\frac{\text{hr-cm}^3}{\text{sec-ft}^3}$	X	Meter Reading (R/hr)	X	Conversion Factor $\frac{\text{Curies-hr}}{\text{cm}^3\text{-R}}$	=	Release Rate Ci/sec
Main Steam Header	_____	X	_____	X	7.86	X	_____	X	8.0×10^{-1}	=	_____

Assume 1000 psia steam which will give a conservative specific volume. At 1000 psia specific volume = .446 ft^3/lbm. Steam generator safety valve rating is 8.33×10^5 lb/hr. Atmospheric relief valve capacity is 3.3×10^4 lb/hr with both valves open.

4.0 ESTIMATE OF GROSS Xe-133 EQUIVALENT RELEASE RATES

Vent	Xe-133 Equivalent Release Rate (Curies/sec)
Auxiliary Building	
Drumming Area	
Unit 1 Containment Purge	
Unit 2 Containment Purge	
Gas Stripper Building	
Combined Air Ejector Decay Duct	
Main Steam Header	
TOTAL	

Completed By _____ Date _____ Time _____

POINT BEACH NUCLEAR PLANT

DOSE CALCULATIONS

1.0 ESTIMATION OF SITE BOUNDARY WHOLE BODY DOSES RATES

X/Q (sec/m^3)	X	Release Rate (Ci/sec)	X	Dose Conversion Factor $\frac{(REMS\text{-}m^3)}{Ci\text{-}hr}$	=	Whole Body Dose Rate (REMS/hr)
2.6×10^{-4}	X	_____	X	26.9	=	_____

2.0 ESTIMATION OF SITE BOUNDARY THYROID DOSES RATES

	Type of Accident	Conversion Factor		Whole Body Dose Rate (R/hr)		Thyroid Dose Rate (Rem/hr)
1.	Loss of Coolant (LOCA)	5.02×10^2	X	_____	=	_____
2.	Gap Activity Accident	4.84	X	_____	=	_____
3.	Fuel Handling Accident	4.84	X	_____	=	_____
4.	Steam Generator Accident	6.25	X	_____	=	_____

3.0 PROTECTIVE ACTION DOSE DETERMINATION NOTE: USE ONLY IF TIME IS LIMITED.

Whole Body Dose Rate		Release Duration Estimate		Whole Body Dose
_____	X	_____	=	_____
Thyroid Dose Rate	X	Release Duration	=	Thyroid Dose
_____	X	_____	=	_____

Completed By _____ Date _____ Time _____