Northern States Power Company

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Director of Nuclear Reactor Regulation
U S Nuclear Regulatory Commission
Washington, DC 20555

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
Docket Nos. 50-282 License Nos. DPR-42
50-306 60

EMERGENCY RESPONSE PLAN
IMPLEMENTING PROCEDURES

Furnished with this letter are ten copies of revisions to the Prairie Island Plant Emergency Plan Implementing Procedures.

The revisions include the following procedures:

TABLE OF CONTENTS REV 3
F3-5 EMERGENCY NOTIFICATION REV 2
F3-6 ACTIVATION AND OPERATION OF TECHNICAL SUPPORT CENTER REV 1
F3-7 ACTIVATION AND OPERATION OF OPERATIONAL SUPPORT CENTER REV 1
F3-12 EMERGENCY EXPOSURE CONTROL REV 1
F3-13 OFFSITE DOSE CALCULATION REV 1
F3-14 ONSITE RADIOLOGICAL MONITORING REV 1
F3-20 MANUAL DETERMINATION OF RADIOACTIVE RELEASE CONCENTRATIONS REV 1
F3-21 ESTABLISHMENT OF A SECONDARY ACCESS CONTROL POINT REV 2
F3-23 EMERGENCY SAMPLING REV 1

For reasons of vacy and plan effectiveness, we have deleted telephone numbers and ... contained in these procedures.

L. O. Mayer

L O Mayer, PE
Manager of Nuclear Support Services

LOM/GDH/bp
Enclc

cc J G Keppler (w/attachment) (3)
NRC Resident Inspector (w/o attachment)
G Charnoff (w/o attachment)

PRAIRIE ISLAND NUCLEAR GENERATING PLANT NORTHERN STATES POWER COMPANY	EMERGENCY PLAN IMPLEMENTING PROCEDURES Number: TABLE OF CONTENTS Rev: 3 Retention Time: History Copy 5 Years
Reviewed by: E Watt Supt Rad Prot	TITLE: EMERGENCY PLAN IMPLEMENTING PROCEDURES TABLE OF CONTENTS

PRAIRIE ISLAND NUCLEAR GENERATING PLANT NORTHERN STATES POWER COMPANY	EMERGENCY PLAN IMPLEMENTING PROCEDURES Number: F3-5 Rev: 2 Retention Time: History Copy 5 Years
Reviewed by: E J Watt Supt Rad Prot Approved by: F. P. Tierney Jr Plant Manager OC#: 10/29/81	TITLE: EMERGENCY NOTIFICATIONS

1.0 PURPOSE

This instruction delineates the notification procedures to be used during emergency conditions, defines the various emergency communications systems available at the plant, (primary and backup), and provides the necessary operating instructions for their proper use.

2.0 APPLICABILITY

This instruction shall apply to all Radiological Emergency Coordinators, Shift Supervisors, Emergency Directors and Shift Emergency Communicators.

3.0 PRECAUTIONS

3.1 Always speak in a clear, distinct voice.

3.2 Make messages as short and concise as possible.

3.3 Always have the information repeated if it was not completely understood.

4.0 PROCEDURE

4.1 Shift Emergency Communicator (SEC) Responsibilities:

4.1.1 Completing the "Emergency Notification Report Form", Figure 1, with assistance from the Emergency Director or Shift Supervisor.

4.1.2 Initiate and complete the notifications of state, local, and NSP personnel as listed in the Emergency Notification Call List, Figure 3, using the following format:

NOTE: State and local authorities shall be notified within 15 minutes of declaration of the emergency class.

(1) For those notifications made by telephone, make the call as follows:

(a) Contact each organization or individual listed.

(b) When the party answers, read the text of the Emergency Notification Report Form.

(c) Note the name of the individual contacted and the time of the contact.

(d) Proceed to the next party on the call-list.

(e) If a party can not be contacted in two attempts, bypass that party and proceed down the list. After the other notifications are complete, re-attempt to contact any bypassed parties. If a party still can not be reached, consider other backup communication channels or such action as dispatching a courier, relay through another party,etc.

(f) When the parties call back for verification or further information, note the time and the name of the individuals.

NOTE:	If a party not specified on the call list requests information from plant personnel, refer the party to the NSP Communications Department, either at the EOF or HQEC. See Attachment B for phone numbers.

(2) For the notification of the Wisconsin authorities made by NAWAS, proceed as follows:

(a) Pick up the NAWAS set, press the talk button and say:

"THIS IS PRAIRIE ISLAND NUCLEAR PLANT CALLING WISCONSIN WARNING CENTER ONE, WEST CENTRAL WARNING CENTER AND PIERCE COUNTY WARNING CENTER, ACKNOWLEDGE".

(b) When warning center one, west central warning center and Pierce County warning centers acknowledge, press the talk switch and say:

" PRAIRIE ISLAND NUCLEAR POWER PLANT IS EXPERIENCING A (N) (pick correct class):

NOTIFICATION OF UNUSUAL EVENT, or
ALERT, or
SITE EMERGENCY, or
GENERAL EMERGENCY

RELAY THIS INFORMATION TO EMERGENCY GOVERNMENT IMMEDIATELY".

NOTE:	(a)	If area or county warning centers do not acknowledge, WISCONSIN warning centers I, II, or III will ring on the circuit and relay the message to appropriate warning centers.
	(b)	Duty officers and emergency government officials at state and local agencies will initiate response in accordance with current plans and procedures.
	(c)	Wisconsin authorities (Wisconsin Warning Centers I, West Central Warning Center, and Pierce County Warning Center will call back for a verification and will request further information. At this time, the SEC shall read those authorities the information as listed on the Emergency Notification Report Form, Figure 1.

4.1.3 Augment the plant emergency organization as follows:

(a) If a Notification of Unusual Event has been declared, notify and augment the plant staff as required by the Shift Supervisor.

or

(b) If an Alert, Site, or General Emergency, has been declared, initiate the Notification of the emergency organization, using the Emergency Organization Call List, Figure 4.

4.1.4 Contact local offsite support (fire, ambulance, police, etc.) as deemed necessary by the Emergency Director and/or Shift Supervisors. See Attachment A for local support telephone numbers.

NOTE:	This responsibility to contact local support services shall be coordinated with the Emergency Director and/or Shift Supervisor.

4.1.5 In the event of a reclassification of the emergency (i.e., escalation, de-escalation, or termination of the emergency classification), complete the EMERGENCY CLASSIFICATION CHANGE report, figure 2, and notify the state and local agencies of the reclassification.

NOTE:	When the Near-site EOF is activated and has assumed control of offsite activities, all communication with the offsite authorities will be handled by EOF personnel.

4.1.6 As the TSC is activated, backup communicators shall assist the duty SEC in his communication functions, as necessary.

NOTE:	A backup communicator shall assume control of the plant phone system (operator's switchboard) and screen and/or direct incoming calls as appropriate.

4.1.7 When the TSC is activated, ensure that communications with the Westinghouse Emergency Response Team are established. Westinghouse Emergency Response Team numbers are listed in Attachment A.

NOTE:	A backup communicator or an individual designated by the Emergency Director should assume this responsibility.

4.1.8 Perform the necessary notifications of additional personnel and/or agencies as directed by the Emergency Director, Shift Supervisors, or individual Emergency Operating Center Coordinators.

4.2 Radiological Emergency Coordinator (REC) Responsibilities:

4.2.1 Complete the Emergency Notification Followup Report Form, Figure 5.

NOTE:	This form does not need to be completed in its entirety prior to transmitting data to offsite authorities.

4.2.2 Periodically update the Minnesota Department of Health and the Wisconsin Division of Radiation Protection with the information as recorded on Figure 5, the "Emergency Notification Followup Report Form".

4.2.3

NOTE:	When the Near-site EOF is activated, updates to the Minnesota Department of Health and Wisconsin Division of Radiation Protection will be handled by EOF personnel.

Periodically, update the NRC with the information as recorded on Figure 5, the "Emergency Notification Followup Report Form". The Health Physics Network (HPN) should be used for the NRC notification.

Figure 1

INITIAL EMERGENCY NOTIFICATION REPORT

Verify that the organization/person called is correct prior to relaying emergency information.

THIS IS _____ (Name), SHIFT EMERGENCY COMMUNICATOR AT THE PRAIRIE ISLAND NUCLEAR GENERATING PLANT.

WE HAVE DECLARED A (N) _____ (Emergency Class) AT _____ (Time) HOURS.

Pick one of the following:

|__| WE HAVE NOT HAD A RADIOACTIVE RELEASE.

|__| WE HAVE HAD A (N) _____ (Liquid or Airborne) RADIOACTIVE RELEASE.

If a radioactive release is occurring, give meteorological conditions; if NOT, go to Protective Action recommendations.

ATMOSPHERIC CONDITIONS AT THE PRESENT TIME ARE AS FOLLOWS:
WIND DIRECTION IS FROM THE _____ (Direction) AT _____ (Speed) MPH.

THE AFFECTED SECTOR (S) IS (ARE) _____ (List sector(s) by letter designated)

Protective Action Recommendation (Pick one)
THE PROTECTIVE ACTION RECOMMENDED AT THIS TIME IS:

|__| NONE

|__| SHELTER OUT TO _____ (Distance) MILES

|__| EVACUATE OUT TO _____ (Distance) MILES

Give a brief description of the emergency.

_____

_____

_____

PLEASE RELAY THIS INFORMATION TO YOUR EMERGENCY ORGANIZATION PERSONNEL.

Emergency Director Approval _____ (Name/Date)

Emergency Communicator _____ (Name/Date)

FIGURE 2

EMERGENCY CLASSIFICATION CHANGE

Verify that the organization/person called is correct prior to relaying emergency information.

THIS IS _____, SHIFT EMERGENCY COMMUNICATOR AT
(Name)

THE PRAIRIE ISLAND NUCLEAR GENERATING PLANT.

WE HAVE RE-CLASSIFIED THE EVENT AND |__| Escalated

|__| De-Escalated

TO a(N) |__| Event May Be Terminated

|__| Unusual Event

|__| Alert

|__| Site Area Emergency

|__| General Emergency

at _____ hours
(time)

Give a brief description of the emergency:

_____

_____

_____

PLEASE RELAY THIS INFORMATION TO YOUR EMERGENCY ORGANIZATION PERSONNEL.

Emergency Director _____
(Name/Date)

Shift Emergency Communicator _____
(Name/Date)

EP-20-A,24

Figure 3

EMERGENCY NOTIFICATION CALL LIST

GENERAL INSTRUCTIONS

(a) Some of the below listed individuals may be on site when the emergency is declared and should not require addition notification.

(b) Offsite authorities shall call back for a verification. If no verification is recieved, within 30 minutes, contact that authority again.

(c) If the primary notification method results in an unsuccessful contact attempt, use the alternate or backup communication channels available. See Attachment A for backup communication channels.

1. NOTIFY THE MINNESOTA DIVISION OF EMERGENCY SERVICES (DES) BY TELEPHONE AT , DAY OR NIGHT ASK FOR THE DUTY OFFICER.

Contact Person	Time	SEC Initial	Verification SEC Initial

2. NOTIFY WISCONSIN VIA NAWAS:

	Time	SEC Initial	Verification SEC Initial
Warning Center I			
West Central Warning Center			
Pierce County Warning Center			

3. NOTIFY THE MINNESOTA LOCAL AUTHORITIES BY TELEPHONE:

(a) GOODHUE COUNTY SHERIFF AT

Contact	Time	SEC Initial	Verification SEC Initial

(b) DAKOTA COUNTY SHERIFF AT

Contact	Time	SEC Initial	Verification SEC Initial

4. NOTIFY THE DESIGNATED EMERGENCY DIRECTOR (PLANT MANAGER OR HIS DISIGNEE) BY TELEPHONE - PAGER #

Time	SEC Initial	Verification SEC Initial

5. NOTIFY THE NSP SYSTEM DISPATCHER USING THE DISPATCHER HOTLINE.

Time/SEC Initial

6. NOTIFY THE NRC RESIDENT INSPECTORS BY TELEPHONE:

(a) Time /SEC Initial

(b) Time /SEC Initial

7. NOTIFY THE LOCAL RESIDENTS AROUND PRAIRIE ISLAND USING THE RADIO ALERT SYSTEM (CODE 01).

Time /SEC Initial

NOTE: The Radio Alert System may also be activated at this time to alert Civil Defense Personnel (CODE 04) and Plant Personnel (CODE 06).

8. NOTIFY THE NSP RED WING SERVICE CENTER BY TELEPHONE AT AND REQUEST THE NSP ON-CALL TROUBLE SHOOTER REPORT TO THE NSP RED WING SERVICE CENTER TO OPEN UP THE FACILITIES FOR THE RAD SURVEY TEAMS.

Time/SEC Initial

NOTE: This contact is ONLY necessary during offshift hours AND during an Alert, Site, or General Emergency.

9. Verify that the Control Room has established notification of the NRC via the ENS Network.

Time/SEC Initial

CALL LIST COMPLETE

Date/Time

SHIFT EMERGENCY COMMUNICATOR

Figure 4

EMERGENCY ORGANIZATION CALL LIST

GENERAL INSTRUCTIONS

(1) Call one individual on the EOF Coordinator List.

(2) Activate the onsite Emergency Organization as follows:

(a) Activate the Radio Alert System (Code 06 for plant personnel).

NOTE: RA following the phone number indicates RADIO ALERT holder.

(b) Proceed down call list and call by phone those individuals who do not have a Radio Alert System.

(c) Attempt to contact, by phone, those individuals who were notified by the Radio Alert System, as time permits.

EOF COORDINATOR (call one individual)

( )
( )
( )
( )
( )
( )
( )
( )
( )
( )
( )

PLANT MANAGEMENT (OC MEMBERS)

PLANT MANAGER		( )
PLT. SUPT. ENGR. & RAD PROT.	RA	( )
PLT. SUPT. OPER. & MAINT.	RA	( )
SUPT. RAD PROT.		( )
SUPT. MAINT.	RA	( )
SUPT. OPER. ENGR.	RA	( )
SUPT. OPER.	RA	( )
SUPT. QUALITY ENGR.	RA	( )
SUPT. TECH. ENGR.	RA	( )
SUPT. NUC. ENGR.		( )

RADIATION PROTECTION GROUP

RAD. PROT. SPEC.	RA	( )
RAD. PROT. SPEC.	RA	( )

RAD PROT. SPEC.		( )
RAD. PROT. COOR.	RA	( )
RAD. PROT. SPEC.		( )
RAD. PROT. SPEC.	RA	( )
RAD. PROT. SUPV.	RA	( )
TRAINING INSTRUCTOR	RA	( )
RADIO-CHEMISTRY SUPV.	RA	( )
RAD. PROT. SPEC.	RA	( )
RAD. PROT. SPEC.	RA	( )
RAD. PROT. SPEC.		( )
RAD. PROT. COORD.	RA	( )
RAD. PROT. SPEC.		( )
RAD. PROT. SPEC.	RA	( )
RAD. PROT. SPEC		( )
RAD. PROT. SPEC.		( )
QUALITY SPEC.	RA	( )
RAD. PROT. SPEC.		( )
RAD. PROT. SPEC.	RA	( )
RAD. PROT. SPEC.		( )
RAD. PROT. SPEC.		( )
SENIOR PROD. ENG.	RA	( )

MAINTENANCE/ELECTRICIANS

MAINT. SUPV.	RA	( )
MAINT. SUPV.	RA	( )
MAINT. SUPV.	RA	( )
MAINT. SUPV.	RA	( )
CHIEF STATION ELECT.	RA	( )
STATION ELECT.		( )
STATION ELECT.		( )

I & C GROUP

I & C SUPV.	RA	( )
I & C COORD.		( )
I & C COORD.		( )

ENGINEERS

SENIOR PROD. ENGR.	( )
OPS ENGR. GROUP	

EMERGENCY ORGANIZATION CALL-UP COMPLETE _____/_____
Date/Time

SHIFT EMERGENCY COMMUNICATOR _____

Figure 5

EMERGENCY NOTIFICATION FOLLOWUP REPORT FORM*

Date: _____

Time: _____ AM/PM

1. Location of incident: Prairie Island

2. Date/time of incident: _____

3. Class of emergency: _____

4. Type of actual or projected release:

   ( ) airborne
   ( ) waterborne
   ( ) surface spill

   Estimated duration: _____ hours

5. Estimated quantity of radioactive material released or being released: _____ curies

   Height of release: ( ) ground level
   ( ) 60 meters (Rx Bldg Vent)

6. Chemical and physical form of released material: _____

   _____

   Relative quantity: _____ % Noble Gases _____ μCi/cc
   _____ % Iodines _____ μCi/cc
   _____ % Particulates _____ μCi/cc

7. Meteorological Conditions: Wind Velocity _____ mph
   Wind Direction (frm): ____ degrees Temperature _____ °C
   Atmospheric Stability Class _____ Form of Preceipitation _____

8. Actual or projected dose rates at site boundary: W.B. _____ mrem/hr
   Thyroid _____ mrem/hr
   Projected integrated dose at site boundary: W.B. _____ mrem
   Thyroid _____ mrem

* Complete as much of the form as information available or time allows. All blanks need not be filled to make a followup report.

		Wholebody	Thyroid	Sectors Affected
9. Projected dose rates:	2 miles	___mrem/hr	____mrem/hr	_____
	5 miles	___mrem/hr	____mrem/hr	_____
	10 miles	___mrem/hr	____mrem/hr	_____
Projected integrated dose at:	2 miles	___mrem	_____ mrem	_____
	5 miles	___mrem	_____ mrem	_____
	10 miles	___mrem	_____mrem	_____

10. Estimate of any surface radioactive contamination: _____dpm/100 cm^2

11. Emergency response actions underway: _____

_____

_____

12. Recommended emergency actions, including protective actions:

_____

_____

_____

13. Request for any needed onsite support by offsite organizations:

_____

_____

14. Prognosis for worsening or termination of event based on plant information.

_____

_____

Completed By: _____

ATTACHMENT A

SUPPLEMENTAL CALL LIST

WESTINGHOUSE

General Instructions:

Inform one Westinghouse contact, using the list in the order shown. Be prepared to discuss as many facts as are available at the time of the call and identify a cognizant individual to provide continuing communications and updates to Westinghouse.

	Title	Name	Office	Home	HHL
1.	Operating Plant Service Manager 1st Alternate 2nd Alternate				
2.	Service Response Manager 1st Alternate 2nd Alternate				
3.	Emergency Response Director				
4.	Emergency Response Deputy Director				
5.	Emergency News Communications				

NOTE: Unless indicated otherwise, all phone numbers are area code . Where an area code other than is shown, it applies to the office, home, and HHL numbers.

MINNESOTA STATE AGENCIES

	Home	Office
Division of Emergency Services (DES)		
Primary:		
Alternate:	Relay Message thru Goodhue County Sheriff or NSP System Dispatcher	
Departmnet of Health		

WISCONSIN STATE AGENCIES

	Home	Office
Division of Emergency Government (DEG)		
Primary:		NAWAS
Alternate:		
Division of Health, Radiation Prot. Section		
(, Chief Rad Prot.)		

MINNESOTA LOCAL AUTHORITIES

GOODHUE COUNTY

Goodhue County Sheriff
Primary:
Alternate:
Goodhue County Civil Defense Director
Red Wing Civil Defense Director
Red Wing Police Department
Red Wing Fire Department
St. John's Hospital, Red Wing
Ambulance Service, Red Wing

DAKOTA COUNTY

Dakota County Sheriff
Primary:
Alternate:
Dakota County Emergency Services

WISCONSIN REGIONAL AND LOCAL AUTHORITIES

REGIONAL

West Central Warning Center
Primary: NAWAS
Alternate:

PIERCE COUNTY

Pierce County Sheriff
Primary: NAWAS
Alternate:
Backup:
Pierce County Civil Defense Director
Ellsworth Police Department

PRAIRIE ISLAND RESIDENTS

Primary: RADIO ALERT (CODE 01)
Alternate:

NSP PERSONNEL	Home	Office
SYSTEM DISPATCHER		
Primary:		Dispatch Hotline
Alternates:		Radio Phone

CORPORATE OFFICE

NSP POWER PRODUCTION

DISTRICT OFFICE

NSP Red Wing Service Center (Primary Contact)
Secondary Contact

MONTICELLO NUCLEAR GENERATING PLANT

Shift Supervisor Office

NUCLEAR REGULATORY COMMISSION (NRC)

NRC Operations Center (Washington)
Primary: ENS Network
Alternate:

NRC Region III Office
NRC Health Physics Network (HPN)
NRC Operations Center
Region III Office

OTHER PERSONNEL AND AGENCIES

Department of Energy (Radiological Assistance) DAY
Night

Chicago, Milwaukee, St. Paul and Pacific Railroad (Dispatcher - LaCrosse, WI)

Burlington, Northern Incorporated Railroad (Dispatcher, Cicero, ILL.)

U.S. Coast Guard, Hastings Detachment (St. Louis Office)

American Nuclear Insurers (ANI)

ATTACHMENT B

NSP EMERGENCY OPERATING CENTER PHONE NUMBERS

A. TSC Office Telephone Lines

1. NRC Office

(a)
(b)

2. Westinghouse and NSP Engineers

(a)
(b)
(c)

3. Emergency Director

(a)
(b)
(c)
(d)
(e) 3 Point Auto Ring (TSC - EOF - Red Wing EOC)

B. TSC Command Center Telephone Lines

1. Radiological Emergency Coordinator

(a)
(b)
(c)
(d)
(e)
(f) 3 Point Auto Ring (TSC - EOF - State EOC)

2. Communication Area

(a)
(b)
(c)
(d)
(e) 2 Point Auto Ring (TSC - EOF)

C. EOF Command Center Direct Dial Lines

1.
2.
3.

D. EOF Office Telephone Lines

1. Radiation Protection Support Supervisor

   (a)

2. Records/Communications Coordinator/Logistics Coordinator

   (a)

3. State and Local Government

   (a)

4. Nuclear regulatory Commission

   (a)

5. Emergency/Recovery Manager

   (a)
   (b)

6. EOF Coordinator

   (a)

7. Offsite Survey Teams

   (a)
   (b)

8. EOF Media Liaison

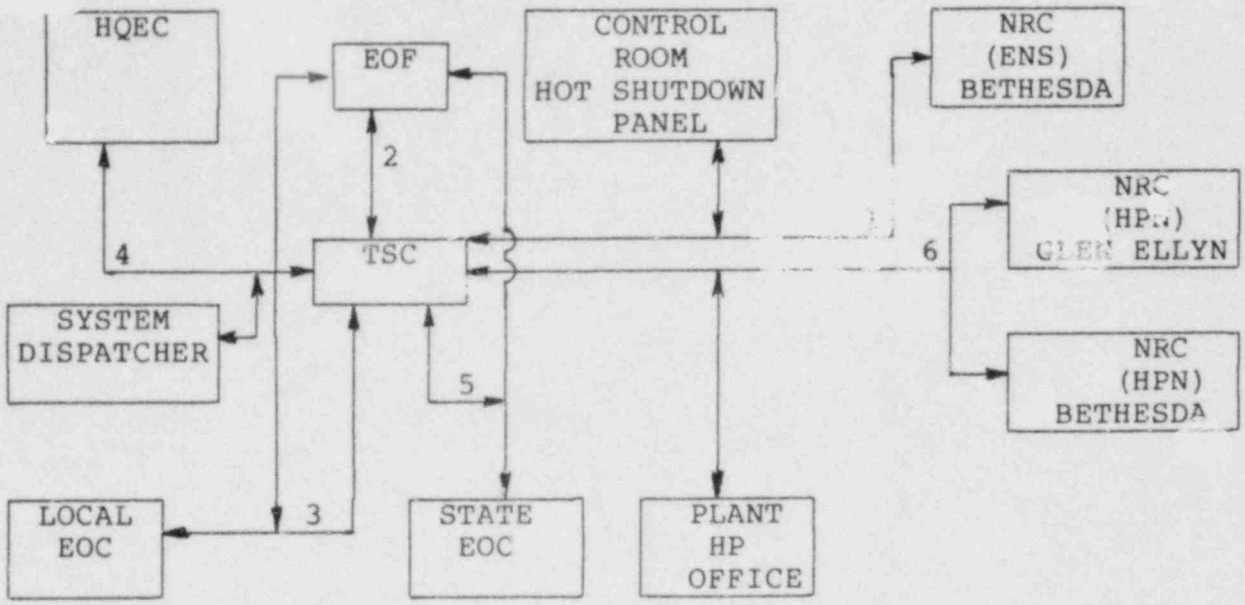
   (a)

E. HQEC Extensions

1.
2.
3.
4.

ATTACHMENT C

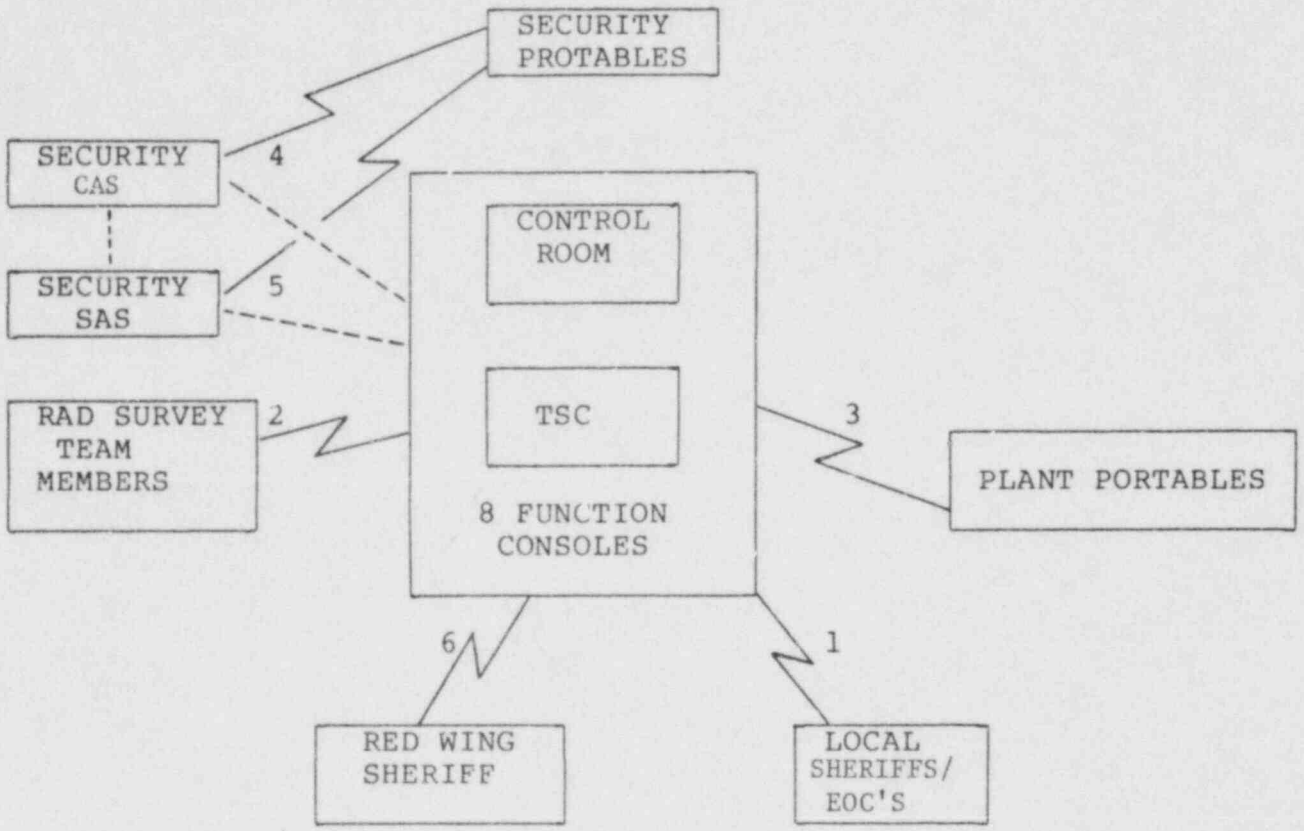
PRAIRIE ISLAND HOTLINE NETWORK



Number	Name	Station
1	Emergency Notification System (ENS)	Primary means for reporting emergencies and other significant events to the NRC Headquarters in Bethesda, Maryland. ENS phones are located in the Control Room, TSC, and at the Hot Shutdown Panels.
2.	TSC - EOF	2 point auto ring between the TSC and EOF. Either station can activate the circuit.
3.	TSC - EOF - Red Wing EOC	3 point auto ring between the TSC, EOF, and Red Wing EOC. Each station can activate the circuit.
4.	TSC - System Dispatcher -HQEC	3 point auto ring between the TSC, System Dispatcher, and HQEC. Each station can activate the circuit.
5.	TSC - EOF - State EOC	3 point auto ring between the TSC, EOF, and State EOC. Each station can activate the circuit.
6.	Health Physics Network (HPN)	Multiple station line between the TSC, Plant HP Office, NRC Glen Ellyn, and other utilities. This is a two digit ring telephone.

ATTACHMENT D

PRAIRIE ISLAND RADIO NETWORK

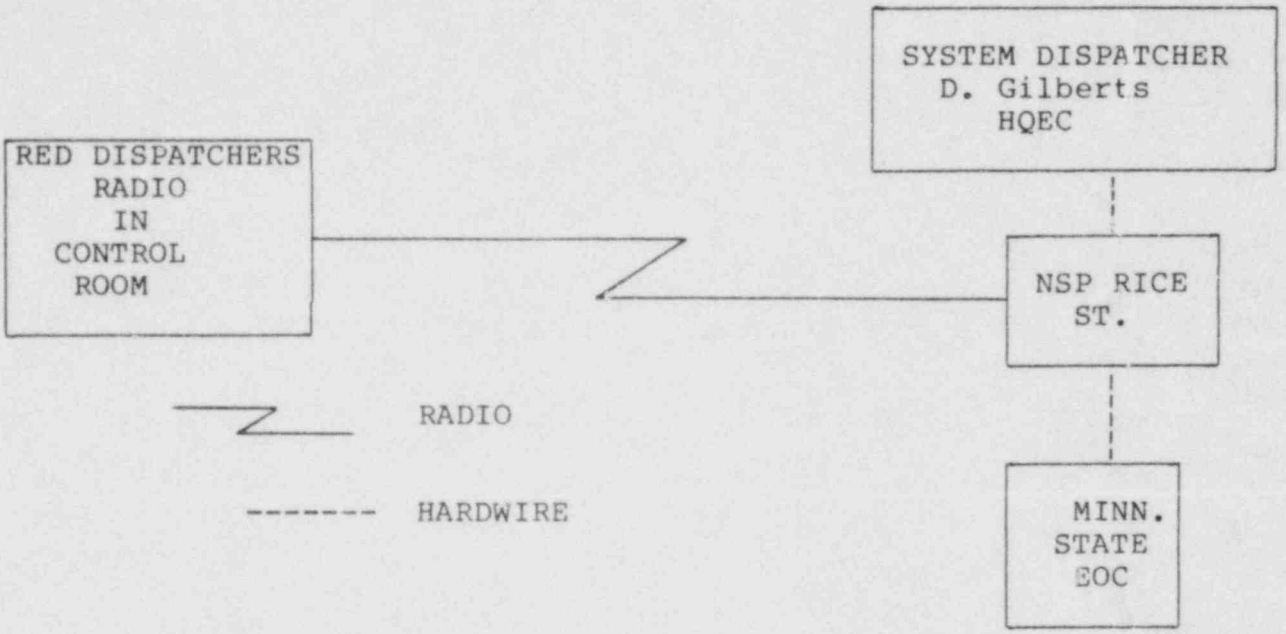


Radiowave

Hardwire

ATTACHMENT E

LOW BAND PAGING SYSTEM



PROCEDURE

1. To contact the System Dispatcher:

   Lift the handset, push the push-to-talk switch and say:

   "PRAIRIE ISLAND TO SYSTEM DISPATCHER."

2. To contact the Minn. State EOC (See Note f):

   Lift the handset, push the push-to-talk switch and say:

   "PRAIRIE ISLAND TO EMERGENCY OPERATIONS CENTER."

NOTES:
(a) The System Dispatcher can activate the Receiver at the plant.
(b) The plant can activate the Receiver at the System Dispatcher and the HQEC (when connected).
(c) The State can activate the Prairie Island Receiver.
(d) Each station can monitor each channel.
(e) The HQEC can activate the receiver at the plant.
(f) The State EOC must first be manned and the Radio Phone activated by the Duty Officer.

ATTACHMENT F

Radio Alert (RA) System

The Radio Alert (RA) System is a one-way radio transmission system from the plant to the reciever. The transmitter is located in the onsite Technical Support Center with recievers installed in the homes and/or offices of the following three groups.

1. Local Residents
2. Civil Defense
3. Prairie Island Emergency Organization Personnel

The transmitter unit consists of: (a) message recorder; (b) message transmitter; (c) microphone; (d) telephone answering unit; (e) telephone; and (f) code selector.

When the RA System is activated, a tone will be heard by the reciever. The pre-recorded message will then be automatically played three times by the Alert Radio Message Unit. Upon completion of the transmission, the pre-recorded tape is then placed into the telephone answering unit. If an individual is not home when the unit is activated, a red light on the receiver will indicate that a message has been transmitted via the Radio Alert System. That individual may then call the number indicated on his receiver ( ) and then pre-recorded tape will play the message over the phone.

The microphone will allow plant personnel to transmit messages which are not detailed and pre-recorded.

The code numbers for the various receiver groups are:

1. Local Residents - 01
2. Civil Defense - 04
3. Prairie Island Emergency Organization Personnel - 06

The following details some of the various specific operating instructions:

A. To Record the Message Cassette:

(1) Make sure that the remote control unit 'Mike Enable' & 'Transmit Enable' key switches are both off (Green).

(2) Set tape unit selector switch to 'Record Announcement' - insert microphone in tape unit mike jack.

(3) Press tape unit 'Start' switch and record 45 second prepared messages.

(4) When recording the message, speak slowly and clearly about 3 inches from the microphone.

(5) Set tape unit selector switch to 'Check Announcement' - press 'Start' switch and listen to recording. (Adjust volume to desired level with tape unit 'Monitor Volume' Control) - if satisfactory, proceed.

B. To Test Entire Alert Sequence:

(1) Insert proper recorded cassette in tape unit.

(2) Set tape unit selector switch to 'Answer'.

(3) Set up desired group code on encoder - Press 'P' (Page) button. (Tones will be heard on the remote control unit. Adjust its volume control to the desired level).

(4) 18 seconds after the 2nd tone is heard, the 45 second recorded message will be heard 3 times. Then the unit will shut off.

C. To Transmit an Alert Message:

(1) Insert the proper recorded message cassette into the tape unit.

(2) Set the tape unit selector switch to 'Answer'.

(3) Turn the remote control unit 'Transmit Enable' key switch on. (Red 'XMIT' lamp will light).

(4) Set up desired group code on encoder - press 'P' (Page) button. (If other groups are to be alerted to recieve the same message, enter the next code or codes as soon as the preceeding tones have finished).

The rest of the sequence is automatic - several seconds after the last tone has been transmitted, the 45 second recorded message will be transmitted 3 times - then the system will shut off.

(5) Now, remove the message cassette from the tape unit and insert it into the telephone answering unit.

D. To Send a Live Microphone Transmission:

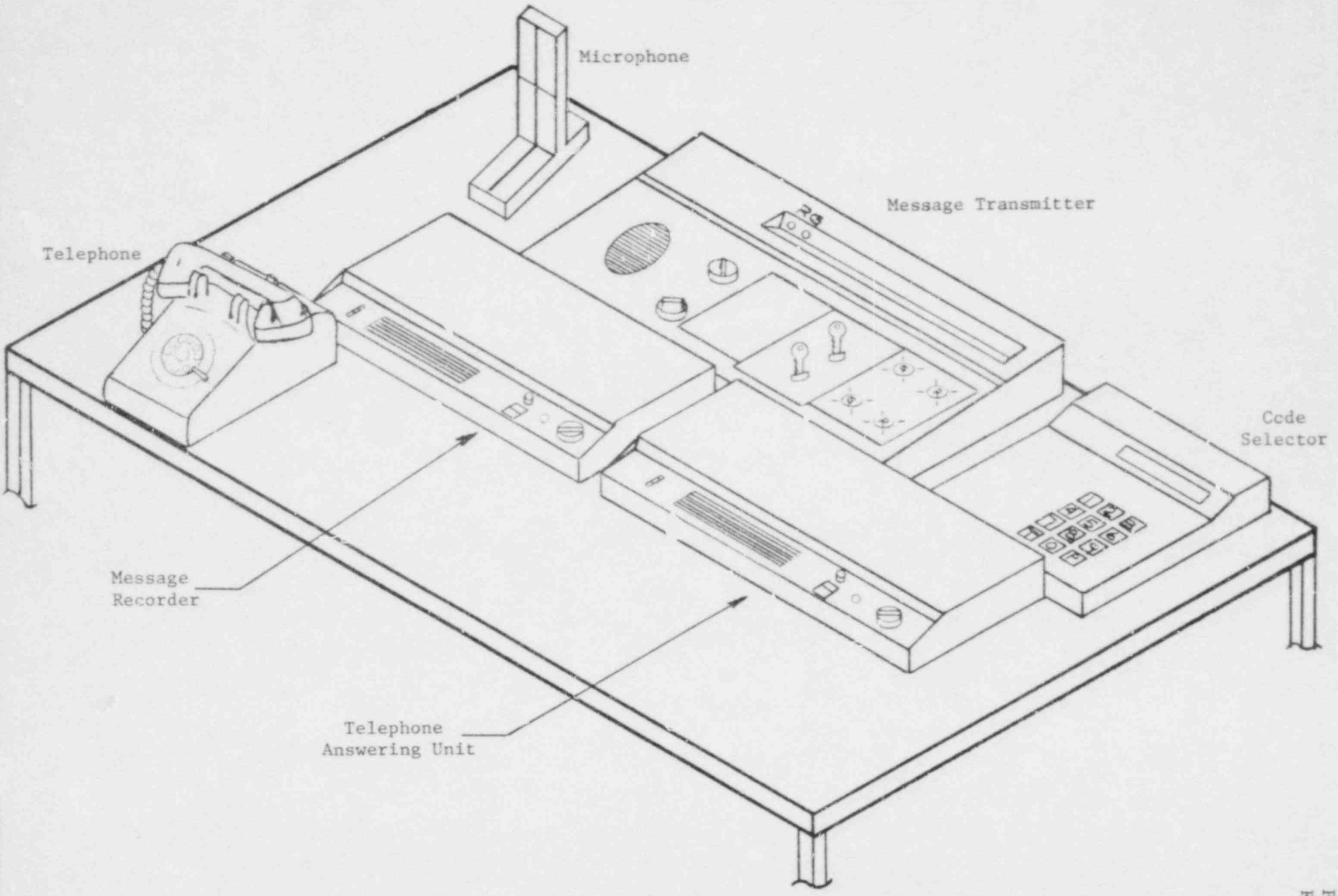
(1) Turn the remote control unit 'Mike Enable' & 'Transmit Enable' key switches both on. (Red lamps will light).

(2) Press 'Transmit' paddle on microphone and transmit desired message.

NOTE: (1) Any message sequence, recorded or live, can be aborted at any time simply by turning the remote control unit 'Transmit Enable' key switch off. (Green 'Test' lamp will light).

(2) None of the volume controls on any of the units affect the volume of the transmitted message. They are for your convenience in monitoring the message.

(3) In case the automatic alert sequence has been inadvertantly started without a tape in the message unit, simply press the blue 'Reset' button on the alert radio message unit - insert the proper tape message, and start the sequence over.



MOTOROLA RADIO ALERT SYSTEM

PRAIRIE ISLAND NUCLEAR GENERATING PLANT NORTHERN STATES POWER COMPANY	EMERGENCY PLAN IMPLEMENTING PROCEDURES Number: F3-6 Rev: 1 Retention Time: History Copy 5 Years
Reviewed by: E P Watt Supt Rad Prot Approved by: F. P. Tierney Plant Manager OC#: 10/29/81	TITLE: ACTIVATION AND OPERATION OF TECHNICAL SUPPORT CENTER

1.0 PURPOSE

The third floor of the Administration Building (First Floor Office Annex), is designated as the onsite Technical Support Center (TSC) and will be used by plant management, technical and engineering groups, and NRC representatives as a center outside the main control room from which support for emergency operating conditions can be provided The TSC shall be activated when an Alert, Site, or General Emergency is declared or whenever it is deemed necessary by the Shift Supervisor or the Emergency Director.

The purpose of this instruction is to describe the activation, staffing and monitoring requirements of the Technical Support Center.

2.0 APPLICABILITY

This instruction shall apply to all Shift Supervisors, Emergency Directors and all members of the technical staff.

3.0 PRECAUTIONS

(1) All unnecessary personnel shall be evacuated from the Tech Support Center when the Tech Support Center has been activated.

(2) Monitoring of the Tech Support Center for direct radiation and airborne radioactive materials (particulate and iodine) shall be performed to ensure the habitability of the Technical Support Center.

(3) Protective actions for individuals located in the Technical Support Center shall be taken at the prescribed levels of direct radiation or airborne radioactivity.

4.0 PROCEDURE

4.1 Activation & Operation of TSC

4.1.1 Activation of the Technical Support Center will occur whenever an Alert, Site or General Emergency is declared or whenever deemed necessary by the Shift Supervisor or the Emergency Director. Activation of the TSC may occur during normal work hours or during off-shift work hours:

(a) During normal work hours, the Technical Support Center shall automatically be activated whenever an Alert, Site or General Emergency is declared or whenever instructions to report to the TSC are received over the plant public address system. All members of the Operations Committee on site shall report to the TSC.

OR (b) If activation of the Technical Support Center occurs during the off duty hours of the plant technical staff, the Emergency Director shall designated by the Shift Emergency Communicator (SEC) to contact all Operations Committee members in accordance with F3-5.

4.1.2 All non-essential personnel in the TSC area, when the TSC has been activated, shall evacuate to the designated assembly area.

4.1.3 The Technical Support Center Coordinator shall:

(a) Designate an individual to establish monitoring of the TSC environment and take appropriate protective actions as specified in Section 4.2

(b) Ensure that communications have been established between all on site emergency operating centers.

(c) Perform or designate an individual to perform a TSC personnel accountability check, and assist the Emergency Director in the overall plant personnel accountability check, in accordance with F3-10.

(d) Establish appropriate office space in the TSC for all emergency organization personnel (NSP and non-NSP representatives). See Figure 2.

(e) Interface with the non-NSP representatives located in the Technical Support Center and lend assistance where necessary.

(f) Inform the Radiological Emergency Coordinator of any significant changes in radiation levels or airborne activity.

(g) Establish a routine sampling and monitoring program by the Radiation Protection Group, as conditions permit.

(h) Control the use of emergency equipment in the TSC emergency locker (protective clothing, respiratory equipment, dosimeters, potassium iodide pills, etc.).

(i) Conduct periodic briefings to update all personnel in the TSC of the current plant status.

(j) Update the TSC Status boards as necessary.

4.1.4 Additional personnel should be notified and requested to report to the Technical Support Center as deemed necessary.

4.1.5 As the emergency proceeds from the initial phase, (the period immediately following the emergency initiation) into the recovery phase, all Protective Actions for radiological hazards in the Technical Support Center shall be consistent with the plant Radiation Protection Program.

4.1.6 The Technical Support Center shall remain activated until the emergency situation has been terminated or as otherwise directed by the Emergency Director.

4.2 Radiological Monitoring

4.2.1 Verify proper operation of the VAMP in the Technical Support Center:

(1) Verify the VAMP in the Tech Support Center.

(2) Verify or plug the VAMP in.

(3) Verify the white power light is on.

(4) If the VAMP fails (power loss, incorrect reading, etc.), contact the Radiation Protection Group for additional radiation monitors.

4.2.2 The CAM is in a hot standby condition with the electronics energized and the blower, chart, and filter paper off.

(1) Turn the blowers switch to the ON position (located next to the recorder) to start the blower, strip chart recorder, and the filter paper drive.

(2) Adjust the blower flow rate to 3 SCFM using the toggle switch located on the right side of the CAM.

(3) Verify the CAM is in operation (i.e., verify the blower, filter, strip charts are operating; meters are on scale, etc.).

(4) If the CAM fails to operate properly, contact the Radiation Protection Group for additional sampling.

4.2.3 Routinely monitor the VAMP and the CAM for direct radiation levels and airborne particulate and iodine activity.

4.2.4 Take the following Protective Actions based on readings from the VAMP or CAM.

(1) VAMP

(a) at about 15mR/hr - consider evacuating all non-essential personnel from the Tech Support Center

- issue dosimeters to all personnel and record the readings on the Emergency Center Activation Exposure Record (Figure 3) and evacuate personnel without TLD's.

(b) at 1 R/hr - evacuation to the Control Room is recommended.

(2) CAM - particulate

(a) $< 1 \times 10^{-9}$ μCi/cc - no protective action necessary

(b) $> 1 \times 10^{-9}$ but $< 1 \times 10^{-6}$ µCi/cc - respiratory protection required. Evacuate all unnecessary personnel.

(c) $> 1 \times 10^{-6}$ µCi/cc - evacuation to the Control Room is recommended.

(3) CAM - Iodine (See Figure 1)

(a) at 40 MPC hours - evacuate all unnecessary personnel

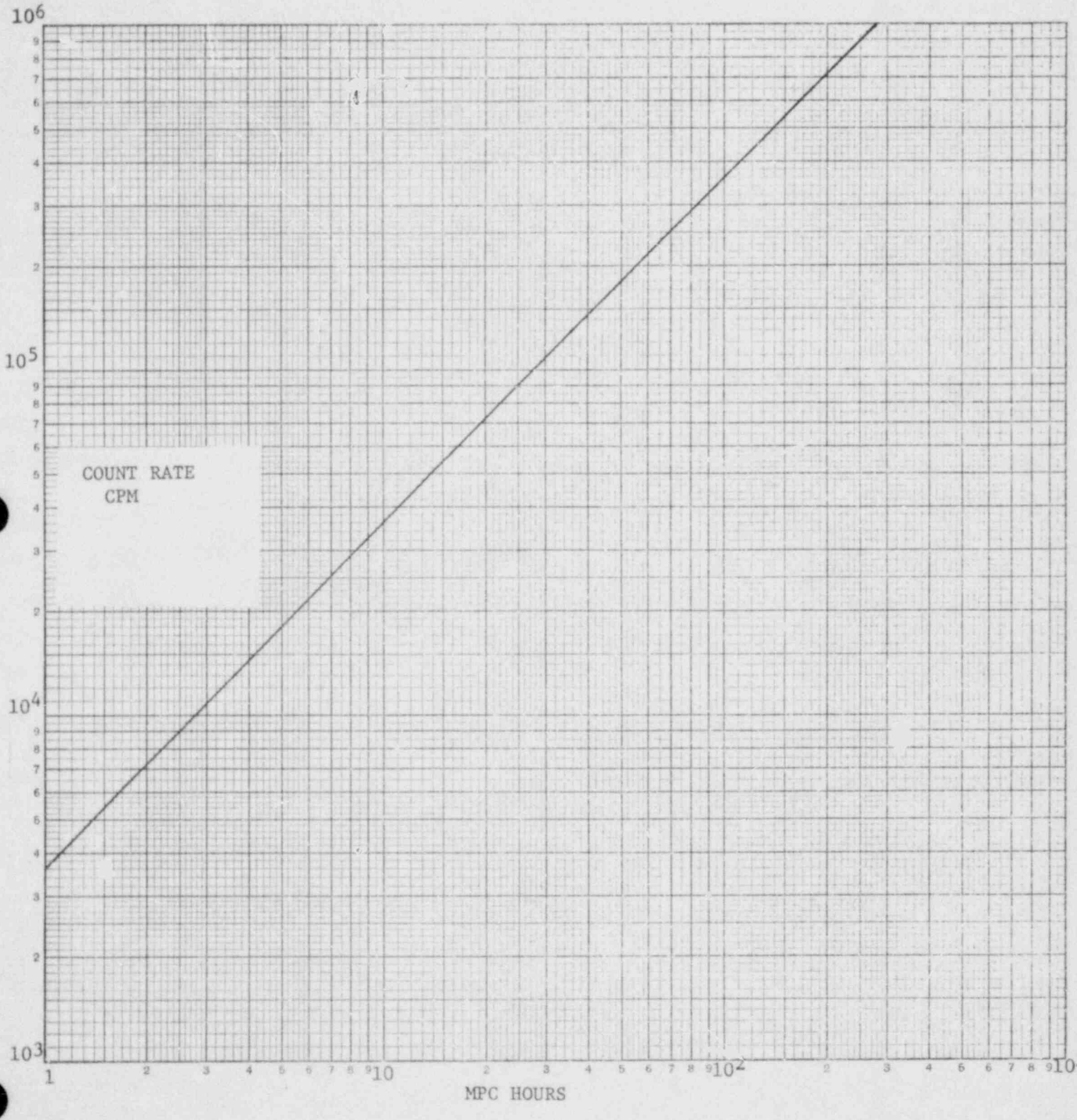
(b) at 200 MPC hours - evacuation to the Control Room is recommended.

NOTE: The Radiological Emergency Coordinator (REC) will recommend the use of potassium iodide pills (thyroid blocking agent) if the project thyroid exposure approaches 10 Rem, which is equivalent to approximately 3000 MPC hours.

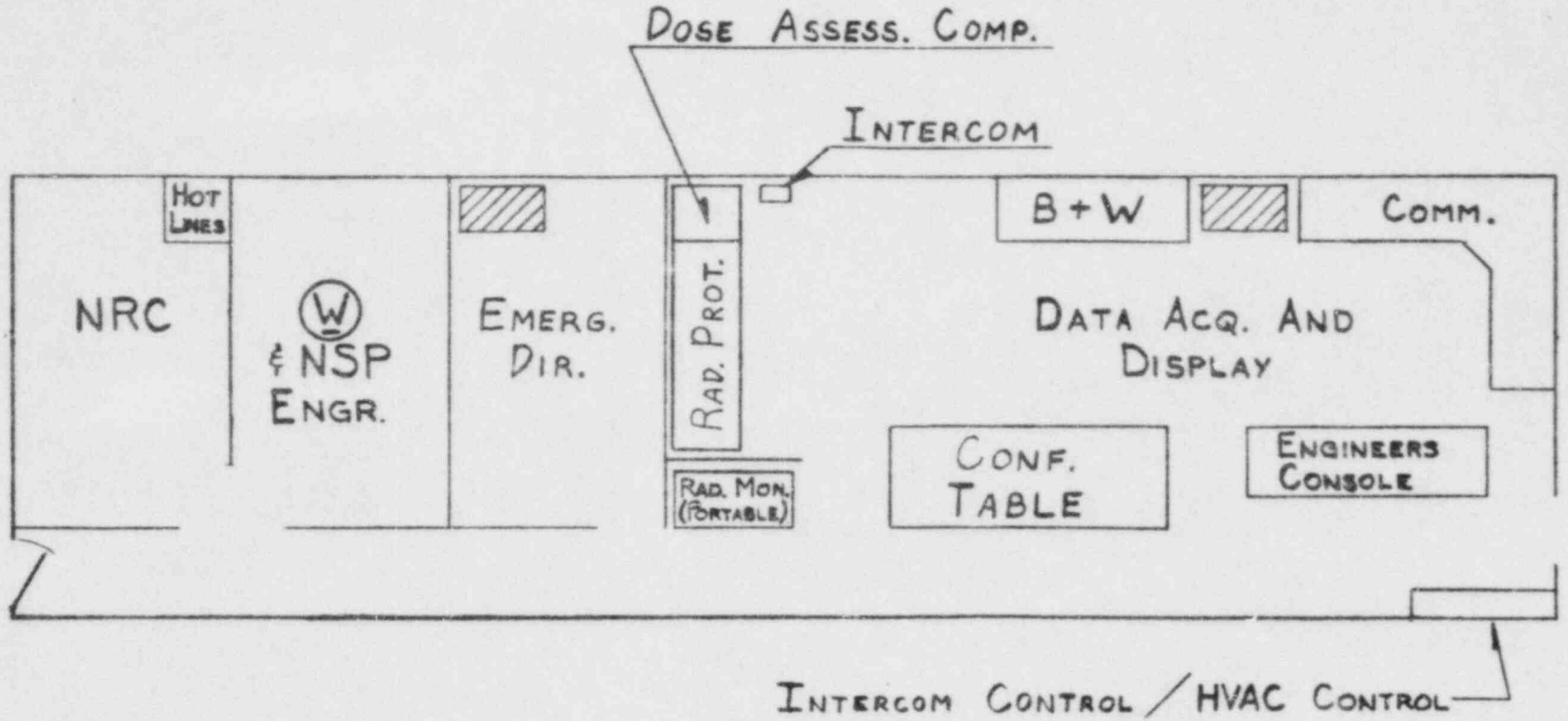
FIGURE 1

DETERMINATION OF MPC HOURS VS. INTEGRATED

COUNT RATE



NOTES: (1) Based on I-131, MPC = 9×10^{-9} µCi/cc.
(2) Curve valid only for initial period following CAM startup (0-6 hours).
(3) Curve is <u>not</u> valid if silver zeolite absorber is changed.



	⚠ J.T.	DWN: R.T.	TECH. SUPPORT CENTER LAYOUT
	9-9-81	11-5-80	

FIGURE 2

FIGURE 3

EMERGENCY CENTER ACTIVATION EXPOSURE RECORDS

DATE:____________________ CENTER:__________________________

NAME	TLD NO.	DOSIMETER READINGS		NET
		IN	OUT	

PRAIRIE ISLAND NUCLEAR GENERATING PLANT NORTHERN STATES POWER COMPANY	EMERGENCY PLAN IMPLEMENTING PROCEDURES Number: F3-7 Rev: 1 Retention Time: History Copy 5 Years
Reviewed by: E J Watt Supt Rad Prot Approved by: F. P. Tremaglio Plant Manager OC#: 10/29/81	TITLE: ACTIVATION AND OPERATION OF OPERATIONAL SUPPORT CENTER

1.0 PURPOSE

The Operational Support Center (OSC) is located in the Plant Operating Records Room adjacent to the Control Room. The OSC provides a central location to assemble the necessary operators, Radiation Survey Teams, I & C Supervisor and Coordinators, Chief Station Electrician, and back electricians, and Maintenance Supervisors, to support the operations of the plant during emergency conditions, without causing undue congestion in the Control Room. The Operational Support Center SHALL be activated whenever an Alert, Site or Genergal Emergency is declared.

The purpose of this Instruction is to describe the activation, staffing and monitoring requirements of the Operational Support Center.

2.0 APPLICABILITY

This Instruction SHALL apply to all plant personnel.

3.0 PRECAUTIONS

(a) Only those personnel designated by this Instruction or as requested by plant Supervisors, shall assemble in the Operational Support Center. All other personnel in Records Room SHALL evacuate to the designated assembly point.

(b) All personnel assigned to the OSC SHALL remain in the OSC unless specifically directed to report elsewhere. DO NOT congregate in the Control Room.

(c) Monitoring of the Operational Support Center for direct radiation levels SHALL be performed to ensure continued habitability of the Operational Support Center.

4.0 PROCEDURE

4.1 Activation and Operation of the OSC

4.1.1 The Operational Support Center shall be activated whenever an Alert, Site or General Emergency is declared. Activation may occur during normal work hours or during off-shit work hours:

(a) During normal work hours, the Operational Support Center shall automatically be activated whenever an Alert, Site or General Emergency is declared. The following personnel SHAIL report to the Operational Support Center:

(1) Operations personnel onsite, but not assigned to the on-shift crew.

(2) Maintenance Supervisors

(3) Chief Station Electrician and backup electricians

(4) I & C Supervisor and Coordinators

(5) Radiation Survey Teams (unless directed otherwise by the Emergency Director or Radiological Emergency Coordinator).

(6) Anyone as requested by their supervisor or the Emergency Director.

(b) If activation occurs during off-shift work hours, the Shift Supervisor or Emergency Director shall direct the Shift Emergency Communicator (SEC) to notify, in accordance with F3-5, the following personnel to establish an initial compliment of support personnel to assist in the emergency:

(1) Maintenance Supervisors

(2) I & C Supervisor and I & C Coordinators

(3) Chief Electrician and backup Electricians

(4) Radiation Survey Team Members

(5) Extra operations personnel considered necessary by the Shift Supervisor to respond to the emergency condition.

4.1.2 All non-essential personnel in the Records Room when the OSC is activated, SHALL evacuate to the designated assembly point.

4.1.3 Additional personnel may augment the Operational Support Center staff as deemed necessary.

4.1.4 The Operational Support Center SHALL remain activated until the emergency situation has been terminated or as otherwise directed by the Emergency Director.

4.1.5 The Operational Support Center Coordinator shall:

(a) Designate an individual to establish monitoring of OSC environment for direct radiation and take protective actions as specified in in Section 4.2.

(b) Designate an individual to act as communications person for the Operational Support Center and ensure that communications have been established between the Control Room and the Technical Support Center.

(c) Perform or designate an individual to perform an OSC personnel accountability check and inform the Emergency Director of all personnel present for overall plant personnel accountability (See procedure F3-10).

(d) Inform the Radiological Emergency Coordinator (REC) of any significant changes in radiation levels.

(e) Establish a routine sampling and monitoring program by the Radiation Protection Group as conditions permit.

(f) Control the use of equipment stored in the emergency locker (protective clothing, respiratory equipment, dosimeters, etc.).

(g) Conduct periodic briefings to update all personnel in the OSC of the current plant status.

(h) Control the use of food preparation in the OSC until directed by the REC.

4.2 Radiological Monitoring

4.2.1 Verify proper operation of the VAMP in the Operational Support Center:

(a) Obtain the VAMP from the OSC Emergency Locker.

(b) Plug the VAMP in and verify the white power light is on.

(c) If the VAMP fails (power loss, incorrect reading, etc.) contact the Radiation Protection Group for additional radiation monitors.

4.2.2 The CAM is in a hot standby condition in the back of the Control Room, with the electronics energized and the blower, chart, and filter paper off.

(a) Turn the blower switch (located next to the recorder) to the ON position to start the blower, strip chart recorder, and the filter paper.

(b) Adjust the blower flow rate to 3 SCFM using the toggle switch located on the right side of the CAM.

(c) Verify the CAM is in operation (i.e., verify the blower, filter, and strip charts are operating, meters are on scale, etc.).

(d) If the CAM fails to operate properly contact the Radiation Protection Group for additional sampling.

4.2.3 Continuously monitor the VAMP and the CAM for direct radiation levels and airborne particulate and iodine activity.

4.2.4 Take the following Protective Actions based on reading from the VAMP or CAM.

(a) VAMP

(1) At about 15 mR/hr - consider evacuating all nonessential personel to a low dose rate area such as the Instrument Shop.

- issue dosimeters to all personnel and record readings on the Emergency Center Activation Exposure Records (Figure 2).

(2) CAM - Particulate

(a) $<1x10^{-9}$ µCi/cc - no protective action necessary.

$>1x10^{-9}$ but $<1x10^{-6}$ µCi/cc - consider evacuation of unnecessary personnel.

$>1x10^{-6}$ µCi/cc - evacuation to the Control Room is recommended.

(3) CAM - iodine (See Figure 1)

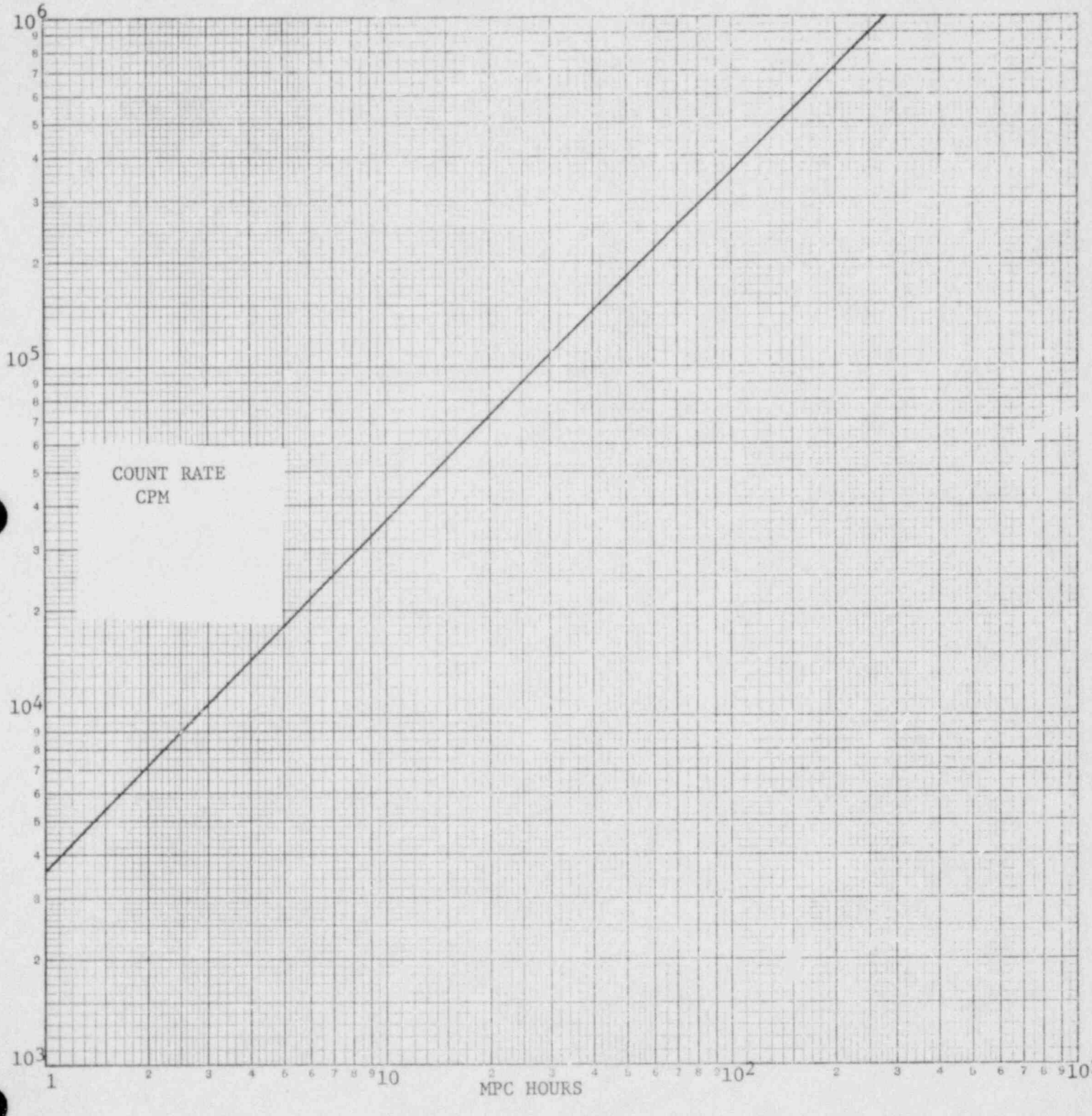
(a) at about 40 MPC hours - evacuate unnecessary personnel.

(b) at about 3000 MPC hours - consider use of potassium iodide pills (thyroid blocking agent).

FIGURE 1

DETERMINATION OF MPC HOURS VS. INTEGRATED

COUNT RATE



NOTES: (1) Based on I-131, MPC = 9×10^{-9} µCi/cc.
(2) Curve valid only for initial period following CAM startup (0-6 hours).
(3) Curve is <u>not</u> valid for silver zeolite absorber is changed.

FIGURE 2

EMERGENCY CENTER ACTIVATION EXPOSURE RECORDS

DATE:____________________ CENTER:__________________________

NAME	TLD NO.	DOSIMETER READINGS		NET
		IN	OUT	

PRAIRIE ISLAND NUCLEAR GENERATING PLANT NORTHERN STATES POWER COMPANY	EMERGENCY PLAN IMPLEMENTING PROCEDURES Number: F3-12 Rev: 1 Retention Time: History Copy 5 Years
Reviewed by: E J Watt Supt Rad Prot Approved by: F. P. Tremaine Plant Manager OC#: 10/29/81	TITLE: EMERGENCY EXPOSURE CONTROL

1.0 PURPOSE

This procedure provides guidance and criteria for the authorization of personnel exposures in excess of the 10 CFR 20 limits or administrative limits during an emergency. It also delineates the procedures for follow up action following a planned or unplanned excessive exposure.

This instruction will delineate the responsibilities of the Emergency Director and Radiation Protection Group in carrying out a program of exposure control under adverse conditions.

NOTE: The radiological controls specified in this procedure are applicable only when there is indications of fuel damage. Normal radiological control practices should be used if there is no fuel damage.

2.0 APPLICABILITY

This instruction shall apply to the Emergency Director, Shift Supervisor and Radiation Protection Group.

3.0 PRECAUTIONS

(1) Appropriate dosimetry equipment, which is capable of measuring the anticipated maximum exposure, shall be worn.

(2) Extremity exposure shall be controlled through the use of extremity TLD badges.

(3) An individual shall be allowed only one excessive exposure in a lifetime.

(4) Women of children bearing age will will be advised not to receive an excessive exposure.

(5) Internal exposure should be controlled through the use of respiratory equipment to every extent practical.

(6) All personnel who may or have exceeded the normal exposure limits shall be made aware of the effects of siginificant radiation exposure and must undergo a medical evaluation of the exposure.

(7) The Emergency Director is the sole individual allowed to authorize radiation exposure in excess of normal guidelines. The Radiological Emergency Coordinator will make recommendations to the Emergency Director.

(8) Whole body exposure should be limited to about 75 Rem for life saving activities.

(9) Volunteers above the age of 45 are recommended.

(10) Extremity Exposure should be limited to 300 Rems for life saving activities.

4.0 GENERAL DISCUSSION

The exposure of all personnel during emergency conditions shall be maintained as low as reasonably achievable (ALARA), and should be maintained less than the administrative limits of the Operations Manual, Section F2, Radiation Safety, and/or less than the 10 CFR 20 exposure limits.

During emergency conditions, normal exposure practices may have to be waived to protect equipment and/or life. The Emergency Director has the authority to authorize exposure above the normal exposure guidelines. The Radiation Protection Group shall assist the Emergency Director in exposure control.

5.0 PROCEDURE

In the event of a planned exposure in excess of the normal limits, the following procedure shall be followed. If necessary, the Emergency Director may verbally authorize increased exposure when time is a limiting factor and documentation shall be completed as a follow up.

(A) The Emergency Director shall authorize all exposure in excess of 10 CFR 20 limits. Whole body exposure should be limited to 25 Rem for search and rescue missions and vital plant operation. Whole body exposures for life savings missions should be limited to 75 Rem.

5.2 The Emergency Director (or his designee) shall complete Part I of the Emergency Exposure Authorization Form (Figure 2).

5.3 The individual(s) shall complete Part II of the Exposure Authorization Form (Figure 2).

5.4 The individual(s) shall be briefed on the expected radiation levels to be encountered based on actual measured readings or expected values. Use procedure F3-25, Re-Entry.

5.5 The individual(s) shall be briefed on the expected effects of high exposure. See Figure 2.

5.6 The individual(s) shall be instructed to use all ALARA concepts available.

5.7 The Radiation Protection shall issue dosimetry (TLD's, dosimeters, extremity badges) and survey meters (as applicable) to all individuals as necessary.

5.8 The Radiation Protection Group shall designate the required protective clothing and respiratory protection.

NOTE: If the use of SCBA lengthens the time required to complete the mission, it may be ALARA to not wear the respiratory protection and thereby accept a higher internal exposure, and keep the overall exposure lower. Thyroid Blocking Agents may be considered.

5.9 When the mission (emergency exposure) is completed, the Radiation Protection Group shall:

(A) Restrict the individual(s) from further exposure until the exposure evaluation is completed.

(B) Complete an exposure evaluation of each individual based on dosimetry results, measured dose rates, airborne activity measurements, whole body counts, and stay times in the area.

(C) Complete Part III of the Exposure Authorization Form.

5.10 If the dose equivalent exceeds 12 Rem whole body, 60 Rem skin, or 150 Rem extremity the details of the exposure shall be evaluated by a physician.

5.11 If the dose equivalent exceeds 25 Rem whole body, 150 Rem skin, or 300 Rem extremity, the individual shall be examined by a physician and appropriate tests completed.

NOTE: For purposes of this procedure, the dose equivalent is exposure received from external and internal sources.

5.12 The Emergency Director shall be informed of all results including the medical evaluation if necessary.

5.13 The Radiological Emergency Coordinator will complete Part IV of the Exposure Authorization Form.

NOTE: 10CFR 20 requires NRC notification of all overexposures.

5.14 A Secondary Access Control Point should be established in accordance with F3-21 "Establishment of a Secondary Access Control Point" wherever a site evacuation is necessary.

5.15 All entries into the Aux Building will be controlled by the Radiation Protection Group through the Operational Support Center (OSC).

5.16 The Radiation Protection Specialist (RPS) stationed at the Secondary Access Control Point will write Radiation Work Permits (RWP) for all entries made beyond the Secondary Access Control Point except for Aux Building RWP's; which will be written by the RPS in OSC. RWP numbers will start at 5000 for the Secondary Access Control Point and 6000 for the RWP's issued in the OSC.

5.17 An RPS should accompany all entries made into areas where the radiological conditions are unknown.

5.18 All normal dosimetry will be issued at the Secondary Access Point with the exception of initial accident dosimetry.

5.19 Initial accident dosimetry will be issued in the OSC and TSC for all personnel if the dose rate exceeds about 15mR/hr. Dosimeter readings are recorded on the Emergency Center Activation Exposure Record and forwarded to the Secondary Access Control Point.

5.20 When an individual approaches his maximum allowable exposure limit, his Access Control Card (RP-133) will be marked "NO FURTHER EXPOSURE". Only the Emergency Director can authorize additional exposure.

6.0 Documentation of Exposure

6.1 Issuing TLD's

(1) The RPS will have temporary personnel complete a NRC-4 and NRC-5 forms as defined in Section II C.3 of the Radiation Protection Manual.

(2) The RPS will issue consecutively numbered TLD's starting at number 1100.

(3) The RPS will put the assigned number on the TLD and the Access Control Card and complete the appropriate sections of the TLD Assignment Sheets (RP-100).

(4) The RPS will calculate the individuals available quarterly exposure and record on the top line of the Access Control Card.

(a) When calculating the available quarterly exposure, the RPS should ensure the individual will not exceed 5(N-18).

(b) An individual will be limited to 300 mRem if he dosen't have quarterly exposure history available.

(c) An individual will be limited to 1000 mRem if his quarterly exposure history is available but his lifetime exposure is unavailable.

(d) An individual will be limited to 3000 mRem in the quarter if all exposure history is available.

(5) If the individual is reporting to the OSC, the RPS at Secondary Access Control should complete a Timekeepers Worksheet (RP-112) and have the individual take it with him to OSC.

(6) The RPS in the OSC should issue a Timekeepers Worksheet for each individual who enters the Aux Building.

(7) If the NSP Computer is available, the individual's personal and exposure data will be added to the computer exposure system as per Section II D of the Radiation Protection Manual.

(8) If the computer is not available, the individual's data will be added to the Emergency Exposure Record as per Attachment A.

(9) An "X" will be placed behind the TLD number, on the TLD of anyone who is issued a TLD who has already been issued a TLD for the month when the orginial TLD is unavailable.

6.2 Recording Exposure

(1) After each entry into the controlled area, the RPS will read and record the dosimeter readings. The lowest range dosimeter on scale should be the reading for exposure records. The RPS will then calculate the new available quarterly exposure and record on the next line of the Access Control Card.

(2) Low range dosimeter readings will be logged in mR and high range dosimeters in R. The lowest range dosimeter shall be logged on the top and the highest range on the bottom.

(3) At the end of each shift, the RPS will record the exposures from the cards and enter in the computer as per Section II D of the Radiation Protection Manual.

(4) If the computer is not available, the RPS will add the exposure to the Emergency Weekly Exposure Record as per Attachment A.

(5) The RPS will limit each individuals exposure to 3 Rems and lifetime exposure to 5(N-18) unless the Emergency Director authorizes higher exposure.

(6) The RPS will add the exposures from the Emergency Center Activation Exposure Records to the computer system or the manual system of Attachment A.

(7) If an individual has recieved his maximum allowable exposure, the RPS will mark the individuals Access Control Card "NO FURTHER EXPOSURE" and place the card in the normal card use file. Authorization by the Emergency Director will be issued prior to allowing any further exposure.

ATTACHMENT A

A. Adding Individuals

(1) The RPS will record the following information on the Emergency Weekly Exposure Record (Figure 3).

(a) The individuals name, TLD number, lifetime permissible exposure and accumulated quarterly exposure.

(b) The lifetime permissible exposure is equal to 5(N-18) minus lifetime exposure. This number should be equal to the number in block 13C of the NRC-4 form.

B. Adding Daily Exposure

(1) The exposure total for the day is placed in the upper half of the block for the day.

(2) The exposure for the day is added to the previous quarterly exposure (lower half of previous days column number 3) to give the new accumulated quarterly exposure which is recorded in the lower half of the daily column number 3.

(3) New forms are started at the beginning of each week. The quarterly exposure total from column number 4 is placed in column number 2 for the new week. The previous weeks total exposure is subtracted from the previous weeks lifetime permissible - column no 1 - and the resultant place in column number 1 for the new week. The weekly total can also be added to the previous weeks dose for the quarter - column number 2 - to yeild the accumulated for quarter, which should be equal to the number in column number 4.

(4) The RPS shall save all exposure paper work for further reference and microfilming.

FIGURE 1

CRITERIA FOR EMEGENCY EXPOSURES

	WHOLE BODY	EXTREMITY	THYROID
Saving Human Life	75 Rem	300 Rem	NO LIMIT*
Protection of Health and Safety of Public (Secure vital equipment)	25 Rem	100 Rem	125 rem
Medical Treatment, First Aid, Ambulance Service and Decon. Personnel	3 Rem		7.5 rem

*No upper thyroid is specified for life saving activities since complete loss of thyroid function may be considered an acceptable risk for saving life. However, thyroid exposure should be minimized to the extent feasible by the use of respiratory protection and/or thyroid blocking agents.

FIGURE 2
EMERGENCY EXPOSURE AUTHORIZATION FORM

PART I

1. Name of Individual to Receive Exposure: _____
   _____
   Soc. Sec. No: _____
2. Individual TLD Number: _____
   Employer/Department: _____
3. Task(s) to be Performed: _____
   _____
4. Date of Authorization: _____
   Authorized Limit: _____
5. Conditions:
   _____ Individual is a volunteer or professional resuce person
   _____ Individual is broadly familiar with radiological consequences of exposure
   _____ Woman capable of reproduction has been advised not to take part. (Reg. Guide 8.13)
   _____ Individual has not received an emergency exposure before
   _____ Dose rates in area known/measureable
   _____ Saving Human Life
   _____ Protection of Health and Safety of the Public
   _____ Protection of Property or Medical/Decontamination
6. Emergency Director: _____
   (Signature)

PART II

EFFECTS OF ACUTE EXPOSURE

Acute Dose (Rem)	Probable Effect
0-25	(a) No detectable clinical effects (b) Some reduced fertility at upper range
25-100	(a) Slight transient blood changes (b) Fatigue but no serious disability (c) Reduced to marked reduction in fertility across the range
100-200	(a) Vomiting and nausea in 25% (b) Marked changes in blood (c) Sterility for period of time (weeks)
200-300	(a) Nausea and vomiting for one day in all cases (b) Fatigue and malaise for 2 weeks (c) Full recovery in 3 months (d) Sterility for approximately one year

FIGURE 2 (CON'T.)
EMERGENCY EXPOSURE AUTHORIZATION FORM

PART II (CON'T)

I have been briefed in the radiological consequences of the proposed emergency exposure, and I have volunteered to perform the emergency measures during which I will receive the emergency exposure.

7. Signature: _____
   Date: _____

PART III (Attach exposure evaluation)

1. Dose equivalent assigned for entry: _____

2. TLD/Dosimeter Results: _____

3. Bioassay Results: _____

4. Medical Evaluation/Action: _____

   Doctor Report Attached: YES/NO

5. Rad Prot. Specialist _____
   Date: _____

PART IV

1. Disposition (Allow additional exposure, restricted access, etc.) _____

2. Radiological Emergency Coordinator: _____
   Date: _____

NOTE: 10CFR 20 requires notification of all overexposures.

FIGURE 3

EMERGENCY WEEKLY EXPOSURE RECORD

DATE:_____ TO:_____

NAME	TLD#	1 Permissible 5(n-18)-Lifetime Accumulated	2 Dose for Qtr.	3 Daily/Accumulated for Quarter							4 QTR. TOT.
				S	M	T	W	T	F	S	

The quarterly exposure limit is 3000 mRem in accident situations.

PRAIRIE ISLAND NUCLEAR GENERATING PLANT NORTHERN STATES POWER COMPANY	EMERGENCY PLAN IMPLEMENTING PROCEDURES Number: F3-13 Rev: 1 Retention Time: History Copy 5 Years
Reviewed by: E J Watt Supt Rad Prot Approved by: F. P. Tierney Jr. Plant Manager OC#: 10/29/81	TITLE: OFFSITE DOSE CALCULATION

1.0 PURPOSE

The projected offsite dose rates at various distances from the plant shall be calculated during an emergency involving a release or a potential release to the environment.

The projected offsite dose rates will be used by plant management and offsite officials as a basis for determining protective actions such as sheltering or evacuation when the Protective Action Guides (PAG's) are exceeded.

This Instruction shall describe the method to obtain the required information and to calculate the projected offsite dose rates at various distances from the plant, by two methods:

a. computer method, and

b. hand calculation method when the computer or meteorological tower is unavailable.

2.0 APPLICABILITY

This Instruction shall apply to the Radiation Protection Supervisory Staff.

3.0 REQUIRED EQUIPMENT

(1) Radiation Monitoring System
(2) Meteorological Equipment at the Met Tower
(3) Apple Computer System

4.0 PRECAUTIONS

(1) Use care when reading log scales on the radiation monitors and their calibration curves.

(2) Use care when working with exponents.

(3) Use a calculator whenever possible and check all calculations.

(4) Inform the Emergency Director and Supt. Radiation Protection of all projected dose rate calculations.

5.0 PROCEDURE

5.1 Computer Method

5.1.1 When it has been determined that a release to the atmosphere has occurred or there is a potential for a release to the atmosphere, the Shift Supervisor or Emergency Director shall designate the Radiological Emergency Coordinator (REC) responsible for projecting offsite dose rates.

5.1.2 Determine the exact flow path and the release rate from the plant.

Aux Bldg Special	5000 cfm/stack
SFP Special	5000 cfm/stack
Steam Dump	4000 cfm
PORV's	2500 cfm
SG Safeties	5500 cfm
Air Ejector	0-20 cfm (from Control Room flow indicator)

5.1.3 Determine the concentration of activity being released from the plant by either of the following methods:

(1) Radiation Monitors: If no sample and analysis has been done, the release concentration may be determined by obtaining the count rate from the affected radiation monitor on the release path (e.g. R-15, R-22, etc.). Use this count rate and the respective calibration curve to determine the release concentration in μCi/cc.

(2) Manual Determination: The activity being released via the steam headers, the air ejectors, or the shield building vent may be determined manually, in accordance with procedure, F3-20, "Manual Determination of Radioactive Release Concentrations."

(3) Sample Analysis: If the Radiation Protection Group is available, sample analysis on the release path may be used to determine the isotopes for both the noble gas and the iodines being released.

5.1.4 Obtain the required Meteorological data from the offsite dose projection computer and printer located in the Technical Support Center.

NOTE: (1) The met data prints out at 15 minute intervals.

(2) The required Met Tower data is:

Wind speed, mph at 40′ elevation

Wind direction, degrees at 40′ elevation

Temperature difference ΔT, ^{o}C between the 140′ & 40′ elevation

(3) If the Met Tower is not available, in the TSC, the wind speed and wind direction may be obtained from the Control Room Instrumentation, or an individual may be dispatched to the Met to relay data to the TSC.

(4) The ΔT from the Met Tower is normally used for atmospheric stability class determination. See Figure 4 for alternate stability class determination methods.

5.1.5 The Radiological Emergency Coordinator shall perform all projected offsite dose rate calculations on the Apple computer in the Technical Support Center.

NOTE: The computer will calculate the projected offsite dose rates to the whole body and the skin and the dose to the thyroid (if iodine is released) out to a distance of 10 miles from the plant. Results will be displayed on the monitor and on the printer (if a printer output is requested).

(1) Insert or insure that the floppy disk labeled PI-V107 is inserted into the Apple disk drive. Close the disk door.

(2) Insure that the computer and the monitor are plugged into 115 VAC.

(3) Turn the monitor "ON" (on-off pushbutton) and the Apple computer "ON" (rocker switch on rear, near AC cord receptacle).

NOTE: The "IN USE" lite on the disk will illuminate for approximately 15 seconds. The "POWER" lite on the computer will illuminate and remain on.

(4) The computer may be in one of two modes, as denoted by the character to the left of the cursor. If there are no characters on the screen, or the cursor is not present, push "RESET". The three characters are:

a) Asterisk (*): This indicates that the computer is in machine language mode.

Then: push "RESET"
type "RUN DOSE"
push "RETURN"

b) Square Bracket (]): This indicates that the computer has been loaded with basic language.

Then: type: "RUN DOSE"
push: "RETURN"

(5) If a printout of the projected offsite dose rates is required, verify the printer is plugged in and turned on.

(6) The computer will now display a series of questions on the monitor screen (with the required input format, such as mph, μCi/cc, CFM, etc.) which the operator must answer by inputting the data into the computer. The end of each response is signalled by pressing "RETURN"

NOTE: (a) Responses in any other units or form will yield invalid results. In most instances, no checking is done for input format other than a check for numeric information when requested.

NOTE: (b) If a response is in alphanumeric notation or contains illegal characters, the computer will print the word "RE-ENTER" and allow the data to be re-inputed.

(7) The computer will ask for the isotopes and the concentration of each isotope being released. Enter the isotope in a format similar to the example for each of the isotopes identified. After the isotope is entered, a check is made to insure that data for that isotope has been previously stored. Upon completion of the isotope list, type "END".

NOTE: If the projected offsite dose rates are based on the radiation monitor readings or steam header activity, enter only the isotope, Xe-133. Sample analysis will allow entry of more isotopes. See isotope list, Figure 1. If no noble gases are to be entered, type "NO".

(8) The computer will also ask for the iodine isotope released and its activity. Enter all idoine isotopes and their respective activities. At the completion of the iodine list, type "END".

NOTE: If the projected offsite dose rates are based on the radiation monitor readings or steam header activity, no iodine isotopes shall be entered. Then type "NO" for the first iodine isotope requested. Sample analysis for iodine will allow entry of one or more isotopes. See isotope list for iodine, Figure 1.

(9) The computer will compute the projected offsite dose rates for the whole body and the skin and the dose to the thyroid at various distances from the plant. This information will be displayed on the monitor and on the printer (when requested).

(10) To repeat the projected offsite dose calculations, type "RUN DOSE" and "RETURN".

5.1.6 Report all results to the Emergency Director on a periodic basis. Inform the Emergency Director immediately of any significant projected offsite dose rates.

5.1.7 Continue to calculate the projected offsite dose rates at approximately 15 minute intervals, as per this Instruction, until the emergency situation is terminated or until such time as determined by the Emergency Director or his designee.

5.1.8 The Radiological Emergency Coordinator shall notify the offsite officials of all projected offsite dose rates on a periodic basis or when requested.

5.2 Hand Calculation Method

5.2.1 Centerline Whole Body Dose Rates, $D_{\frac{C}{L}}$

NOTE: Use Dose Rate Calculation Worksheets, Figure 2 and 3.

(1) Obtain the following Meterological Data and insert on Figure 2.

(a) Wind Speed (40´ Elevation)
(b) Wind Direction (40´ Elevation)
(c) ΔT (^{o}C)

(2) Using the ΔT obtained from the Met Tower, determine the atmosphere stability class and insert on Figure 2.

NOTE: See Figure 4 for stability class determination using the Met Tower ΔT or alternate stability class determination methods when the Met Tower is unvailable.

(3) Using Figure 5, determine the values for χU/Q for that Stability Class, at various distance from the plant, beginning at the site boundary (0.5 miles), out to the 10 mile boundary. List χU/Q values on Figure 2.

(4) Determine each release path of gases and assume a release rate (R) of noble gases from the plant or estimate a potential release rate. Use the following known values. Insert those values on the calculation Worksheet Attachment, Figure 3:

Aux Building Special	4,000 cfm per stock
Containment Purge	40,000 cfm
Containment In-Service Purge	4,000 cfm
SFP Special	5,000 cfm
Sheild Building Vent	200 cfm
Steam Dump	4,000 cfm
PORV's	2,500 cfm
SG Safeties	5,500 cfm
Air Ejector	0-20 cfm (from Control Room flow indicator)

NOTE: Use One (1) Worksheet Attachment for each known release path.

(5) Determine the release concentration of Noble Gases being released from the plant for each release path, using either of the following methods, and insert those values on the appropriate calculation Worksheet Attachment, Figure 3:

(a) Obtain the count rate from the applicable Rad Monitor. Refer to Calibration Curve to obtain the release concentration in μCi/cc.

(b) If the applicable Rad Monitor is out of service, determine the release concentration in accordance with F3-20, "Manual Determination of Radioactive Release Concentrations".

(c) If Grab Samples have been obtained on the Release Path, use the individual Isotopes obtained from the analysis.

NOTE:	When using the Rad Monitor Reading or the Manual Determination Method (F3-20) to determine the release concentrations, the release concentration result is Xe-133 equivalent.

(6) For each Release Path, complete the calculation Worksheet Attachment Figure 1, as follows:

(a) Multiply each Isotope release concentration, Ci (μCi/cc) times its respective Whole Body dose factor, K_i.

(b) Sum the K_iC_i column.

(c) Multiply the ΣK_iC_i obtained in (b) times the Released Rate (R) in CFM.

(d) Transfer $R\Sigma K_iC_i$ to the Dose Rate Calculation Worksheet, Figure 2.

(7) When all the results from each Worksheet Attachment has been transferred to Figure 2, total the results to obtained $\sum_i [R_i \sum_i (K_iC_i)]$.

(8) Calculate the Centerline Whole Body Dose Rate as follows (use Calculation Worksheet, Figure 2):

$$D \text{ mRem/hr} = 0.12035 \frac{(\chi \bar{U}/Q)}{\bar{U}} \sum_i [R_i \sum_i (K_iC_i)]$$

NOTE:	Complete the Dose Rate Calculation for each distance indicated, from the Plant Site (0.5 miles) out to the 10 mile boundary or as otherwise directed by the REC.

5.2.2 Whole Body Dose Rates Off Centerline

(1) To calculate the Whole Body Dose Rate at any point off the Centerline, the Centerline Dose Rate must first be calculated in accordance with 5.2.1.

(2) Determine the Horizontal Dispersion Coefficient, σy (meters), at the desired distance downwind from the Plant Site for the given Stability Class.

(3) Determine the crosswind distance, Y (meters), where the dose rate is to be determined.

(4) Calculate the dose rate (mRem/hr) off the Centerline, as follows:

$$D_{point} = D_{\mathcal{L}} \exp \left[-1/2 \left(\frac{Y}{\sigma Y}\right)2\right]$$

Where $D_{\mathcal{L}}$ = Centerline Dose Rate (mRem/hr) at a given Downwind Distance as determined by Section 5.2.1.

Y = Croswind Distance off the Centerline (meters).

σy = Horizontal Dispersion Coefficient at a given Downwind Distance for the particular Stability Class (meters).

| NOTE: 1 Mile = 1.6094 Km |

5.2.3 Calculating Thyroid Dose

(1) When sample analysis indicates that iodine has been released, determine the total amount of iodine released, in μCi.

(2) Using Figure 5, determine a value for $\chi\overline{U}/Q$ (m^{-2}) based on a Downwind Distance and the known Stability Class.

(3) Obtain the ground level wind speed, $\overline{U}$, in mps.

| NOTE: mph x 0.447 = mps |

(4) Determine the Thyroid Dose Factors, R_i, from the following table:

Nuclide	R_i mRem/yr / Ci/m3
I-131	1.62 E07
I-132	5.87 E05
I-133	4.39 E06
I-134	2.50 E04
I-135	1.36 E06

(5) Calculate the Offsite Dose from Iodine (mRem) as follows:

$$D\ (mRem) = 3.17 \times 10^{-8} \frac{\chi \bar{U}/Q}{\bar{U}} \sum_i R_i q_i$$

Where: 3.17×10^{-8} = conversion factor (year/sec)

$\chi U/Q$ = (m^{-2} determined from Figure 5, as a function of Downwind Distance and Stability Class

$\bar{U}$ = Wind speed mps [mps = mph x 0.447]

R_i = Thyroid Dose factor (mRem/yr/μCi/m^3]

q_i = quantity of Iodine released (μCi)

5.2.4 Off-Site Ground Plant Dsposition of Radioiodine

(1) Determine mean wind direction. This determines applicable sectors.

(2) Determine distance from the plant site to point of interest in kilometers. This is the R value. (Convert miles to km if necessary using 1.609 km/mile factor.)

(3) Determine deposition rate, D, from Figure 7 for R chosen.

(4) Determine fraction of release, F, from Figure 8 for R chosen.

(5) Determine amount of release, Q, in microcuries.

(6) Find desposition in (dpm/100 sq. cm) at R using the following: $d = 28.26[DFQ/R]$

where d - is the deposition of radioiodine onto ground at location R (in km) from the release point. The desposition occurs in the mean wind direction downwind from the release point. The value of R determines the sector location. Equation (1) assumes that the desposition in a given sector is uniform across the sector at a given R value. Units are microcuries/m^2.

D - is the acceptable value of relative deposition rate (meters^{-1} as a function of distance from the source. The relative deposition rate is the deposition rate per unit downwind distance (Ci/sec per meter) divided by the source strength (Ci/sec), and represents a plume depletion factor due to dry deposition of elemental radioiodines. This factor is obtained from Figure 7.

F - is the acceptable value of the fraction of the release transported into the sector in question as located by the value for R and determined according to the distribution of wind direction. This factor is obtained from Figure 8.

Q - is the total (elemental and nonelemental) radioiodine release per event in units of microcuries.

R - is the distance in kilometers downwind from the release point where the deposition value is to be determined.

28.26 - is a factor which (1) accounts for only elemental radioiodine, (2) converts 22.5 degrees to radians, (3) allows R to be entered in equation (1) as km, and (4) converts $\mu Ci/m^2$ to $dpm/100\ cm^2$.

5.3 Total Population Exposure Estimate

(1) Obtain the Dose (D) to the Offsite Population.

(2) If sheltering is the recommended protective action in effect, obtain the sheltering factor (SF). See F3-8.

(3) From the Population Distribution Map, obtain the number of persons in the Plume Pathway (P)

(4) Calculate the Total Population Exposure (TPE) as follows:

$$TPE = D \times SF \times P$$

where TPE = Total Population Exposure
D = Dose to the Offsite Population (Rem)
SF = Sheltering Factor
P = Population in Plume Pathway

FIGURE 1

LIST OF ISOTOPES IN LIBRARY

Noble Gases	Iodine
Kr-83m	I-131
Kr-85m	I-132
Kr-85	I-133
Kr-87	I-134
Kr-88	I-135
Kr-89	
Kr-90	
Xe-131m	
Xe-133m	
Xe-133	
Xe-135m	
Xe-135	
Xe-137	
Xe-138	
Ar-41	

FIGURE 2

DOSE RATE CALCULATION WORKSHEET

DATE _____ TIME _____

MET DATA: WIND SPEED $\bar{U}$ = _____ MPH

WIND DIRECTION _____ DEG. SECTOR _____

ΔT _____ °C STABILITY CLASS _____

DISTANCE	$\chi\bar{U}/Q$	DISTANCE	$\chi\bar{U}/Q$
0.5		5.0	
1.0		6.0	
1.5		7.0	
2.0		8.0	
3.0		9.0	
4.0		10.0	

$R_i \Sigma_i K_i C_i$ (TRANSFER RESULTS FROM WORKSHEET ATTACHMENTS)

$R_1 \Sigma_i K_i C_i$ = _____ $R_4 \Sigma_i K_i C_i$ = _____

$R_2 \Sigma_i K_i C_i$ = _____ $R_5 \Sigma_i K_i C_i$ = _____

$R_3 \Sigma_i K_i C_i$ = _____ $R_6 \Sigma_i K_i C_i$ = _____

TOTAL $\Sigma_i [R_i \Sigma_i K_i C_i]$ = _____

CALCUALTE DOSE RATE AS FOLLOWS:

$$D_{\text{CL}} = 0.12035 \frac{(\chi\bar{U}/Q)}{\bar{U}} \Sigma_i [R_i \Sigma_i (K_i C_i)]$$

$$D_{\text{CL}} = 0.12035 \frac{(\quad)}{(\quad)} (\quad)$$

DISTANCE	D_{CL} (mR/hr)	DISTANCE	D_{CL} (mR/hr)
0.5		5.0	
1.0		6.0	
1.5		7.0	
2.0		8.0	
3.0		9.0	
4.0		10.0	

CALCULATIONS:

COMPLETED BY

FIGURE 3

CALCULATION WORKSHEET ATTACHMENT

RELEASE PATH _____

RELEASE RATE R = _____ CFM

ISOTOPE	K_i WHOLE BODY DOSE FACTOR	C_i µCi/cc	K_iC_i
Kr-83m	7.56E-2		
Kr-85m	1.17E3		
Kr-85	1.61E1		
Kr-87	5.92E3		
Kr-88	[illegible]7E4		
Kr-89	1.66E4		
Kr-90	1.56E4		
Xe-131m	9.15E1		
Xe-133m	2.[illegible]1E2		
Xe-133	[illegible].94E2		
Xe-135m	3.12E3		
Xe-135	1.81E3		
Xe-137	1.42E3		
Xe-138	8.83E3		
Ar-41	8.84E3		

$\Sigma K_i C_i$ = _____

$R\Sigma K_i C_i$ = _____

FIGURE 4

STABILITY CLASS DETERMINATION

(1) Using the Met Tower ΔT (^{o}C), determine the atmospheric Stability Class from the following table:

Class	^{o}C (140′ - 40′
A	< -0.58
B	-0.58 to -0.52
C	-0.51 to -0.46
D	-0.45 to -0.15
E	-0.14 to 0.46
F	>0.47

NOTE: If the Met Tower data is not available in the TSC, a courier may be dispatched to the Met Tower and information transferred from the Met Tower to the TSC by phone or radio.

(2) When the Met Tower is not available, an Atmospheric Stability Class Determination may be obtained by using the Wind Speed and the Daytime or Nighttime Atmospheric Conditions, from the following table.

RELATION OF TURBULENCE TYPES TO WEATHER CONDITIONS

A - EXTREMELY UNSTABLE CONDITIONS

B - MODERATELY UNSTABLE CONDITIONS

C - SLIGHTLY UNSTABLE CONDITIONS

D - NEUTRAL CONDITONS*

E - SLIGHTLY STABLE CONDITIONS

F - MODERATELY STABLE CONDITIONS

	Daytime Isolation**			Nighttime Conditions	
Surface Wind Speed, M/sec (mph)	Strong	Moderate	Slight	thin overcast or ≥ 4/8 cloudiness	≤ 3/8 cloudiness
< 2 (< 4.5)	A	A-B	B		
2 (4.5)	A-B	B	C	E	F
4 (9.0)	B	B-C	C	D	E
6 (13.5)	C	C-D	D	D	D
> 6 (> 13.5)	C	D	D	D	D

FIGURE 4 (Cont'd)

* Applicable to heavy overcast, day or night

** The degree of cloudiness is defined as that fraction of the sky above the local apparent horizon which is covered by clouds.

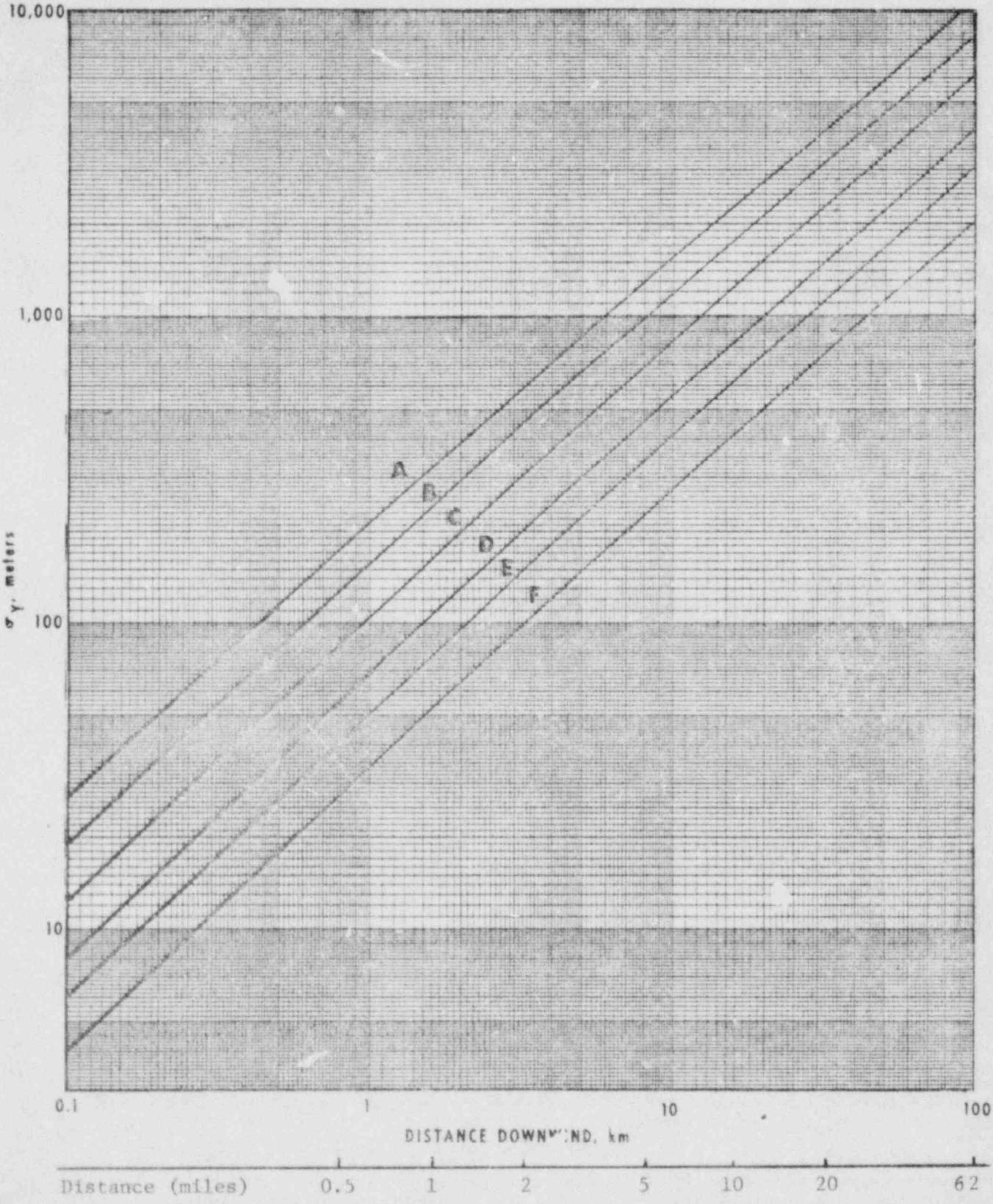
EP-#23-A,30

TYPICAL VALUES FOR $X\bar{U}/Q$ AS A FUNCTION OF
ATMOSPHERIC STABILITY CLASS AND DOWNWIND DISTANCE

DOWNWIND DISTANCE (Miles)	$X\bar{U}/Q$ (m^{-2}) AS PER STABILITY CLASS					
	A	B	C	D	E	F
0.5	6.8E-6	2.6E-5	8E-5	2.2E-4	4E-4	9E-4
1.0	1.2E-6	5.4E-6	2.1E-5	6.8E-5	1.3E-4	2.8E-4
1.5	9.0E-7	2.9E-6	1.1E-5	4.0E-5	8.0E-5	1.7E-4
2.0	6.2E-7	1.5E-6	5.4E-6	2.2E-5	4.5E-5	9.5E-5
3.0	4.5E-7	7.5E-7	2.6E-6	1.2E-5	2.6E-5	5.5E-5
4.0	3.6E-7	4.9E-7	1.7E-6	8E-6	1.8E-5	3.8E-5
5.0	2.9E-7	3.8E-7	1.1E-6	5.9E-6	1.2E-5	2.9E-5
6.0	2.5E-7	3.1E-7	7.9E-7	4.2E-6	9.8E-6	2.2E-5
7.0	2.3E-7	2.8E-7	5.8E-7	3.3E-6	7.7E-6	1.9E-5
8.0	1.9E-7	2.5E-7	4.5E-7	2.8E-6	6.2E-6	1.7E-5
9.0	1.7E-7	2.3E-7	3.6E-7	2.2E-6	5.2E-6	1.4E-5
10.0	1.6E-7	2.1E-7	3.2E-7	1.9E-6	4.5E-6	1.2E-5

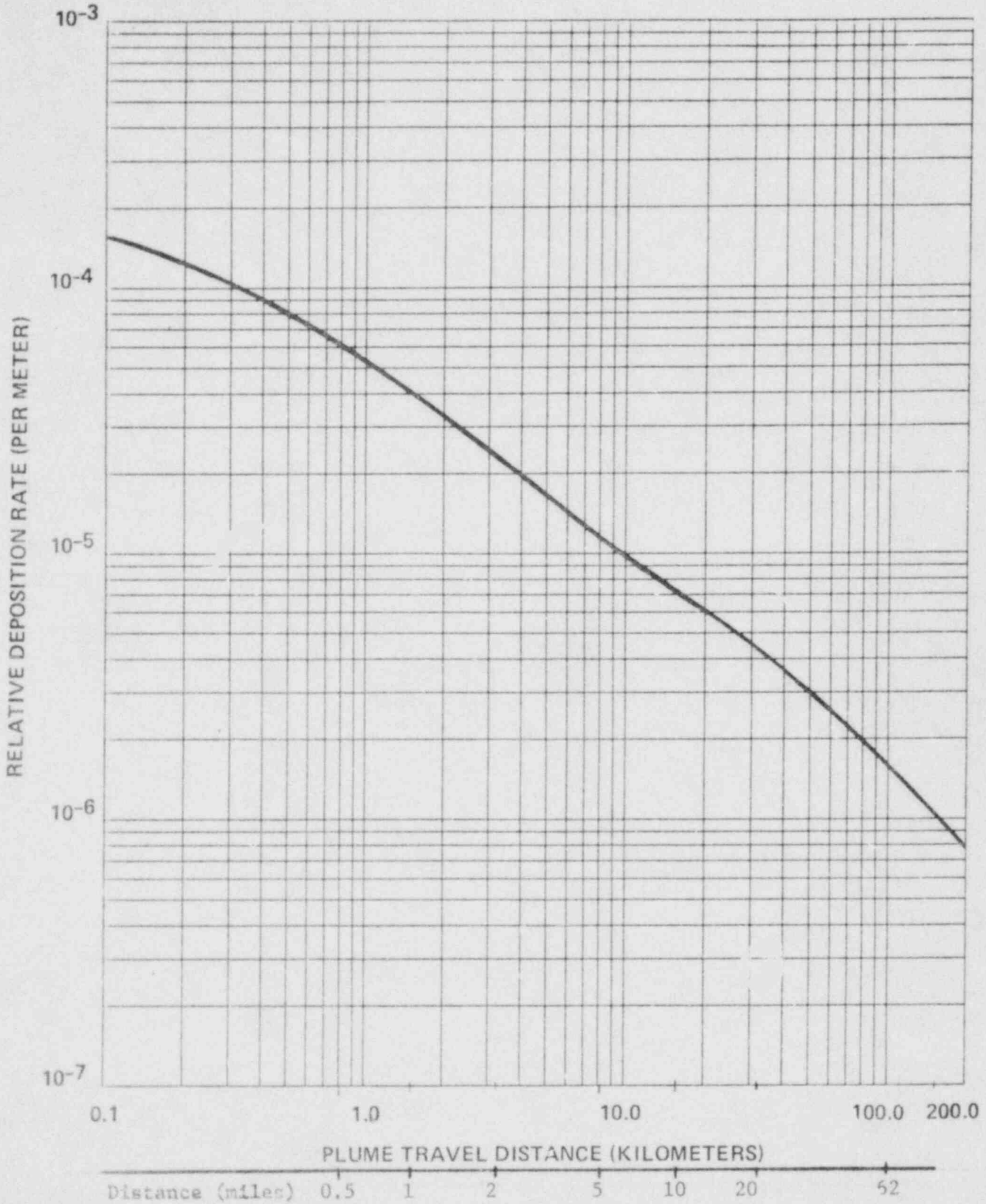
FIGURE 5

FIGURE 6



Horizontal dispersion coefficient as a function of downwind distance from the source.

FIGURE 7



Relative Deposition for Ground Level Releases (All Atmospheric Stability Classes)

FIGURE 8

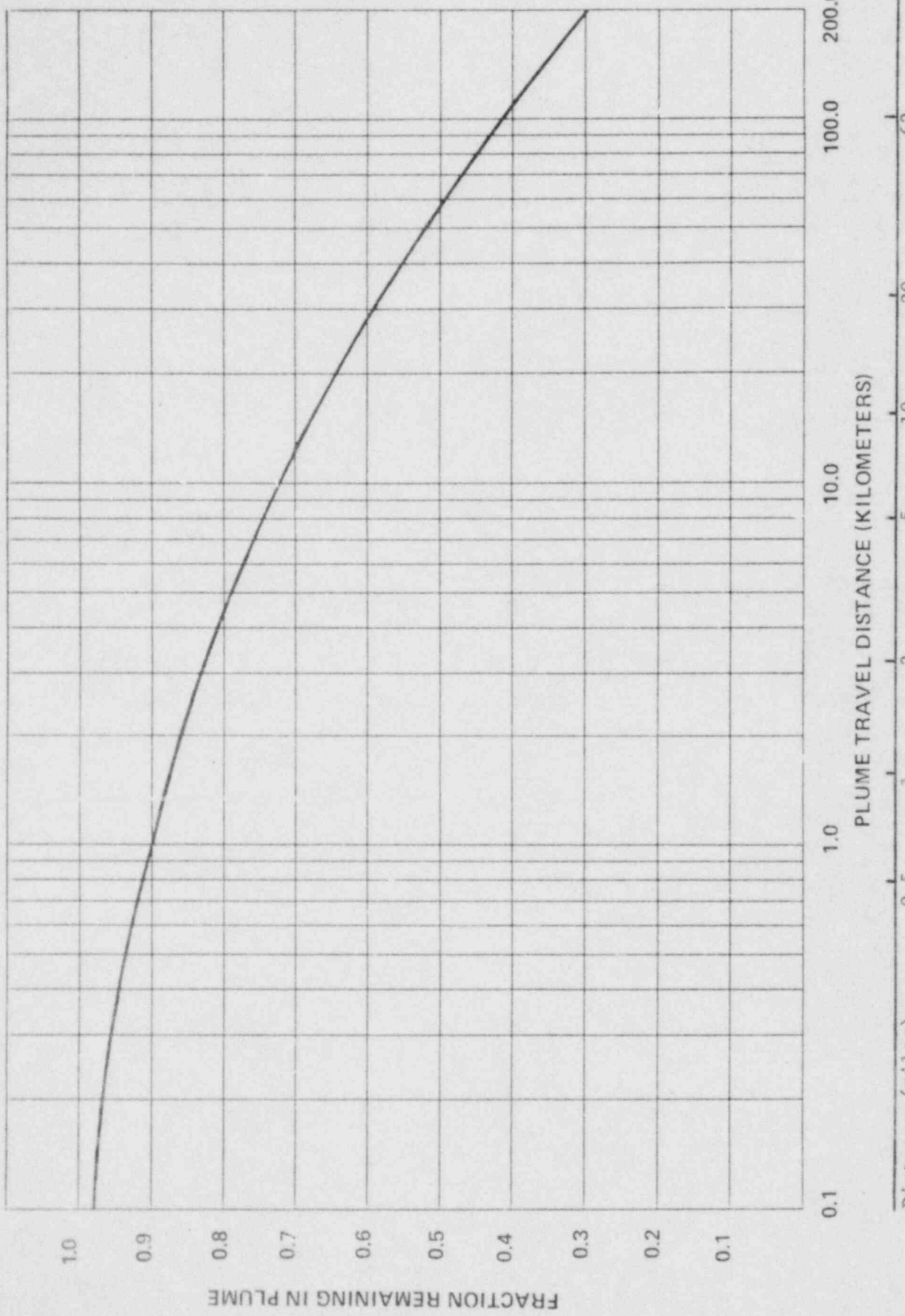


Figure 3. Plume Depletion Effect for Ground Level Releases (All Atmospheric Stability Classes)

PRAIRIE ISLAND NUCLEAR GENERATING PLANT NORTHERN STATES POWER COMPANY	EMERGENCY PLAN IMPLEMENTING PROCEDURES Number: F3-14 Rev: 1 Retention Time: History Copy 5 Years
Reviewed by: E J Watt Supt Rad Prot Approved by: F. P. Tremayne Plant Manager OC#: 10/29/81	TITLE: ONSITE RADIOLOGICAL MONITORING

1.0 PURPOSE

The purpose of this instruction is to delineate the responsibilities of the onsite Radiation Survey Team in radiation exposure control (inplant and out of plant), contamination control, respiratory protection control, and food and water control.

The Radiation Survey Team will be available onsite within 30 minutes after the emergency has been declared to augment the shift Radiation Protection Specialist. The Radiological Emergency Coordinator (REC) will direct the onsite response actions of the Radiation Survey Team. Additional Radiation Protection personnel will assume onsite responsibilities when they are relieved of offsite sampling responsibilities by sister plant personnel.

2.0 APPLICABILITY

This instruction is applicable to all Prairie Island Radiation Protection Group members.

3.0 PRECAUTIONS

(1) The Radiologcal Emergency Coordinator shall control all radiological exposures (internal and external) occuring onsite as per F3-12 "EMERGENCY EXPOSURE CONTROL".

(2) Radiological conditions may be such that a secondary access control point is necessary. See procedure F3-21, "ESTABLISHMENT OF A SECONDARY ACCESS CONTROL POINT."

4.0 PROCEDURE

The Emergency Director shall direct the Radiological Emergency Coordinator (REC) to assume responsibility for onsite radiological controls in the following areas:

4.1 Radiation Exposure Control

A. Upon activation of the onsite emergecny organization, the onsite Radiation Survey Team shall perform radiation surveys (Beta and Gamma) in various onsite areas of the plant (inplant and off plant) on a routine basis or a job specific basis ensuring that no unexpected radiation levels are encountered by emergency response personnel.

NOTE: Calculated radiation levels following a design basis accident are contained in F3-25, "RE-ENTRY".

B. The Radiation Survey Team shall perform Beta-Gamma radiation surveys as follows:

(1) Energize instrument, observing proper precautions for cold weather (Figure 2) when conducting out of plant surveys.

NOTE: All instruments should be response checked prior to use.

(2) Allow the instruments to stabilize and complete any specific instructions for the instrument.

(3) Turn the instrument to the highest range and scale down until a reading is observed.

(4) Open the probe window and scan the area for a Beta-Gamma reading. This is the "Window Open" reading.

(5) Close the probe window and scan the area for a Gamma reading. This is the "Window Closed" reading.

(6) Calculate the Gamma and Beta dose reading as follows:

Gamma (mRem/hr) = Window Closed Reading
Beta (mRem/hr) = CF times (window open reading-window closed reading)
Where CF = Beta correction factor for instrument. If none is available, use five (5).

NOTE: The Beta dose rate is reported in mRem/hr assuming a quality factor of 1.

C. Record survey results (Beta-Gamma) on survey maps and report results to REC.

D. The REC shall review all survey results and advise the Emergency Director of significant radiation levels.

E. Survey results shall be reviewed prior to any entry into any areas of high radiation levels.

F. The REC shall control all radiation exposure in accordance with F3-12 "EMERGENCY EXPOSURE CONTROL".

G. The Radiation Survey Team should post all areas of high radiation and implement any further controls restricting entry to the area.

H. The Radiation Survey Team shall specify the dosimetry necessary for entry into high radiation areas of the plant and write RWP's for entry.

4.2 Contamination Control

A. Upon activation, the onsite Radiation Survey Team shall perform Beta-Gamma Contamination Surveys in various areas of the plant on a routine basis or a job specific basis ensuring that contamination is controlled within the limits of Figure 1.

B. The Radiation Survey Team shall perform surveys for loose surface Contamination (Beta-Gamma) via smear samples on the suspected area. The smear samples shall be counted using the various equipment available.

C. Survey results shall be recorded on floor plans and routed to the REC for review.

D. The Radiation Survey Team should post all areas exceeding the limits of Figure 1 and implement any controls required to restrict entry into the area.

E. Survey results shall be reviewed prior to any entry into an area of high contamination.

F. The Secondary Access Control Point RPS should specify all protective clothing requirements for entry into highly contaminated areas of the plant.

G. The Secondary Access Control Point RPS shall ensure that all personnel are properly monitored prior to departure into an uncontrolled area of the plant. See F3-19 "PERSONNEL AND EQUIPMENT MONITORING AND DECONTAMINATION" for requirements.

H. All equipment and vehicles exiting the controlled area of the plant shall be surveyed by the Radiation Survey Team for loose and fixed surface contamination as determined by the REC. See F3-19, "PERSONNEL AND EQUIPMENT MONITORING AND DECONTAMINATION" for requirements.

I. Any necessary decontamination shall be performed in accordance with F3-19, "PERSONNEL AND EQUIPMENT MONITORING AND DECONTAMINATION".

4.3 Respiratory Protection Program

During an emergency situation, it may become necessary to expose personnel to airborne activity levels in excess of establish limits resulting in some internal exposure. Communication difficulties, large number of people and possible large areas of high airborne activity may negate the use of respiratory protection equipment. In addition, personnel may be exposed to airborne activity from an unexpected source. The Radiological Emergency Coordinator shall institute a whole body count/bioassay program for all personnel suspected as having been exposed to airborne activity significantly above MPC concentration. This may or may not be coordinated with a Thyro-Block distribution program.

A. The Radiation Survey Team should collect routine and/or job specific airborne samples (particulate, iodine, and gas) to determine respiratory equipment requirements.

B. The airborne samples should be collected and analyzed in accordance with F3-15, "RESPONSIBLITIES OF SURVEY TEAMS DURING AIRBORNE RELEASES", if the count room and mobile trailer are not available.

NOTE:	In case of station blackout, the OSC locker contains a battery powered air sampler.

C. The Secondary Access Control Point RPS should specify the respiratory protection requirements for entry into any area of high airborne activity.

NOTE:	It may be such that a respirator would cause additional work time resulting in a higher whole body dose. It may be beneficial not to wear a respirator, thereby, accepting a higher internal dose with a lower whole body dose. In coordination with this, Thyroid-blocking agents could be used as a dose reduction method.

D. The REC shall implement a whole body counting program for personnel who have or may have exceeded the normal MPC hour limits (40 in a week or 260 in a quarter).

NOTE:	If the Prairie Island whole body counter is not available, the REC shall make arrangements for a mobile whole body counter or direct the use of Monticello facilities.

E. The REC should evaluate whole body count results and determine if any further evaluation is necessary such as urinalysis and/or fecal analysis.

F. All whole body count results shall be filed for future evaluation in cases where other followup actions are required.

NOTE:	Whole body count results exceeding 25% body burden require the calculation of the resultant whole body exposure which shall be added to the individual's exposure history.

4.4 Food and Water Control

The Radiological Emergency Coordinator shall control the use of all food and water onsite, following a plant evacuation when large areas of the plant site could possibly be contaminated to significant levels.

A. Food

(1) Following a plant evacuation, the Radiation Survey Team should restrict entry into food storage and preparation areas of the plant. These areas (lunchrooms, records room, etc.) should be posted as such.

(2) The Radiation Survey Team should perform contamination surveys in these areas and ensure that the areas are free of detectable contamination, defined as:

(a) 100 dpm/100cm^2 Beta-Gamma

(3) Additionally, some random items of food should be analyzed for low level contamination using the Gamma Spectrometer system.

(4) The REC should review the survey results and take the following appropriate action:

(a) release the food for use
(b) dispose of the foods as radioactive waste
(c) restrict entry into food storage areas until the area has been deconned to acceptable levels

B. Water

(1) The REC should control the use of all water supplies used for human consumption.

(2) The Radiation Survey Team should periodically sample and analyze the potable water system for contamination. Sample results shall be reported to the REC.

(3) In addition, the Radiation Survey Team should control the use of all drinking utensils and coffee pots.

(4) The REC should evaluate the plant conditions and sample results and release the potable water system for unrestricted use when it is deemed safe.

FIGURE 1

CONTAMINATION LIMITS

	NORMAL	EMERGENCY GUIDELINES		
		BODY	ITEMS DIRECTLY ASSOCIATED WITH BODY	ITEMS NOT DIRECTLY ASSOCIATED WITH BODY
REMOVABLE $dpm/100cm^2$				
β-γ	100		1100	2200
α	10		110	220
FIXED	100cpm	100cpm	0.75 mr/hr	1.5 mr/hr

NOTES: (1) "Items Not Directly with the Body" may include floors, roads, vehicles, truck, or trailer beds, or tires, etc.

(2) "Items Directly associated with the Body" may include desks, chairs, high traffic area floors, equipment being handled by hands.

EP-#23,B-12

FIGURE 2

COLD WEATHER OPERATION

(1) If outside temperature is greater than 32°F (0°C), instrument use is unlimited.

(2) If outside temperature is between 32°F (0°C) and 0°F (-18°C), any instrument should be used for no more than 5 minutes.

(3) If outside temperature is between 0°F (-18°C) and -20°F (-28°C), any instrument should be used for no more than 2 minutes.

(4) If the outside temperature is below -20°F (-28°C), no instrument should be used unless special batteries (alkaline or Ni-CD) are in instruments and this would increase the temperature range to -40°F (-40°C). The instrument should only be used for very short times (less than 30 seconds).

PRAIRIE ISLAND NUCLEAR GENERATING PLANT NORTHERN STATES POWER COMPANY	EMERGENCY PLAN IMPLEMENTING PROCEDURES Number: F3-20 Rev: 1 Retention Time: History Copy 5 Years
Reviewed by: [signature] Supt Rad Prot Approved by: [signature] Plant Manager OC#: 10/29/81	TITLE: MANUAL DETERMINATION OF RADIOACTIVE RELEASE CONCENTRATIONS

1.0 PURPOSE

The purpose of this procedure is to determine the concentration and flow rate of radionuclides being released via various effluent pathways:

a. Steam Release Headers
b. Air Ejectors
or c. Shield Building Vent Stack

when the associated radiation monitors are off-scale or out of service Personnel shall use all available ALARA concepts to maintain radiation exposure within the guidelines of F3-12, "EMERGENCY EXPOSURE CONTROL".

NOTE: The radiological controls specified in this procedure are applicable only when there are indications of fuel damage. Normal radiological control practices should be used if there is no fuel damage indications.

2.0 APPLICABILITY

This Instruction SHALL apply to the Radiation Protection Group, the Shift Supervisors and the Emergency Directors.

3.0 PRECAUTIONS

(1) The safety of the personnel performing the evolutions in this procedure is the first priority.

(2) If, for any reason, the survey equipment should fail to function properly or go off scale, all personnel SHALL return to a safe area.

(3) Periodically check dosimeters and if an individual reaches the maximum authorized exposure, immediately return to a safe area.

4.0 AVAILABLE EQUIPMENT

(1) TLD's and extremity badges
(2) Dosimeters
(3) Survey meters
(4) Survey sheets
(5) Anti-C's
(6) Scott Air Paks

> NOTE: Wearing a Scott Air Pak usually increases work times significantly, thereby resulting in a larger whole body dose. It may be beneficial to not wear a Scott Air Pak, thereby, receiving a higher internal exposure with a resultant lower whole body dose. Thyroid Blocking agents may be considered.

5.0 PROCEDURE

> NOTE: When the sampling operation requires entry into an area of unknown radiological conditions or high radiation areas, the operation should be formed and completed in the same manner as a Re-entry mission (R-25) as deemed by the REC.

5.1 Determining Steam Release Activity

5.1.1 Proceed to the Operational Support Center, when the Shift Supervisor or Emergency Director, or Radiological Emergency Coordinator (REC) determines that radioactivity has been released via the Steam Headers.

5.1.2 Verify that each individual has the proper dosimetry and will not exceed any exposure limits as defined in F3-12 "EMERGENCY EXPOSURE CONTROL".

> NOTE: The respiratory protection, protective clothing, and entry routes of this procedure are not required for Notification of Unusual Event, Alert and some Site Emergency classifications. The REC will define the radiological precautions based on the type of accident and accident conditions.

5.1.3 Don a full set of Anti-C's and a Scott Air Pak IIa as defined by the REC.

5.1.4 Obtain a survey meter, Teletector preferred and a seven series key from the S.S. or have the guards open D-3 diesel room door if necessary.

5.1.5 Proceed to enter the Aux Building as defined by the REC. If high radiation levels exist, entry should be made via D-3 if a Unit I accident and via normal Access Control if a Unit II accident.

5.1.6 Continuously monitor the radiation levels and record the results or report to the Radiological Emergency Coordinator.

5.1.7 Upon entry into the Aux Building or at a specified location activate the Scott Air Pak.

5.1.8 Proceed to the AM-2 remote monitor located by the BCMS Panels.

5.1.9 Turn the selector switch to the appropiate steamline and record the dose rate or report to the REC at extension 333.

5.1.10 If the AM-2 is not operational, notify the REC at extension 333.

5.1.11 Exit the Aux Building and remove protective clothing at the Aux Building exit door.

5.1.12 The REC shall record the survey results in Figure 1, calculate and record the release concentration, (C) and average flow rate (R) as per the following steps:

(a) Obtain and record (Figure 1) the Dose Rate Concentration Coversion Factor (IDE) by applying the time since shutdown to Figure 2,3,or 4.

(b) Calculate and record (Figure 1) the release concentration (C) in μCi/cc Xe-133 equivalent by multiplying the dose rate in mR/hr times the Dose Rate Concentration Coversion Factor - IDE-(μCi/cc/mR/hr).

(c) Determine the time in minutes that the main steam atmospheric dump, the power operated relief valves, and/or the main steam relief safeties were open.

NOTE:	The time that each valve stack is above 230°F is equal to the valve open time. Computer points T0501A, T0502A, T0503A, T0504A, and T0505A are for #11 (21) SG safeties; T0506A is for #11 (21) SG PORV; T0507A and T0508A are for the steam dumps #11 (21) SG. Computer points T0521A, T0522A, T0523A, T0524A, and T0525A are for #12 (22) SG safeties; T0526A is for #12 (22) SG PROV; and T0527A and T0528A are for #12 (22) SG dumps. The steam dump does not have to be timed if the affect SG's MSIV is shut.

(d) Determine the average discharge flow rate (Figure 1) by multiplying the value flow rate, times the number of valves open, times the minutes the valve was open, and divided by sixty.

5.1.13 The release concentration (C) and the average flow rate (R) are used to determine the offsite dose rates as per F3-13, "OFFSITE DOSE CALCULATIONS".

5.2 Determining Shield Building Stack Gas, Particulate and Iodine Activity

The purpose of this procedure is to provide instructions for manually determining the concentration of radioactive gases, particulate, and iodine activity in the Shield Building Exhaust Stack.

The Shield Building Exhaust Stack particulate and iodine activity is determined by counting the filter and absorbers on the High Range Stack Gas Monitors 1/2 R-50. The Shield Building Stack gas activity is determined from the readings on 1/2 R-22 and 1/2 R-50 or by determining the dose rate on 1/2 R-50 sample chambers.

5.1.2 If 1/2 R-50 or 1/2 R-22 are operable and on scale determine the release concentration as follows:

(a) Determine and record (Figure 1) the Unit I and Unit II Shield Building Stack count rate and/or dose rate and apply to the appropriate calibration curves (Figure 5 or 6) to obtain the release activity in μCi/cc Xe-133 equivalent.

5.2.2 If 1/2 R-22 or 1/2 R-50 are not operational determine the dose rate as follows:

(a) Obtain protective clothing, surgeons gloves, and respirators as directed by the REC.

(b) Obtain the appropriate dosimetry (include finger rings if filters are to be changed) and verify that each individual will not exceed exposure limits as defined in F3-12, "EMERGENCY EXPOSURE CONTROL".

(c) Obtain the necessary dose rate indicating device, either;

(1) Teletector or
(2) Cutie Pie or
(3) RO-2A or
(4) PIC -6A

and observe the gas chamber survey points of Figure 7.

(d) Proceed to 1R-50 (Unit I Shield Building Stack Monitor) vaults while observing the dose rate.

(e) Determine and record the dose rate at the prescribed survey point and the background dose rate outside the vault.

(f) If directed, change the silver zeolite absorber (AgZ) and particulate filter on the low flow rate section of the sampler. Surgeons gloves should be worn if the filters are hot.

NOTE:	If the AgZ absorber dose rate is high enough to prevent changing the absorber - about 100R/hr on contact - the activity on the absorber can be determined by obtaining the 12" dose rate while the absorber is installed in the holder. The activity (μCi) would be equal to the dose rate in mR/hr times 3.5×10^2.

(g) Exit the vault and check the dose rate on the AgZ absorber. If the dose rate is less than 1 mR/hr, change the filter and absorber on the high flow rate section of the sampler.

(h) Record the time and sampler flow rate, place the filters and absorbers in poly bags and into the shielded cart.

(i) Proceed to 2R-50 and repeat steps e through h on 2R-50.

(j) Transfer the filters and absorbers to the hot cell area and determine the count rate with a RM-14-pancake probe frisker on contact or at one foot from the AgZ absorber or the dose rate at one foot if the count rate at one foot is off scale.

(k) Report the sample times, (on and off), flow rates, gas chamber and background dose rates, and AgZ absorber activity to the Rec at extension 333.

(l) Make arrangements to have the samples taken to the counting facility.

(m) Return the shielded cart or a spare to the 1R-50 Vault.

(n) The REC will determine and record the following on Figure 1 for each vent path:

(i) Gas chamber dose rate

(ii) Gas concentration (Figure 5,6,or 8) in μCi/cc

(iii) AgZ Absorber flow rate in cc/min

(iv) Agz Absorber time on-time off; total time in minutes

(v) AgZ Absorber total flow in cc's

(vi) AgZ Absorber count - dose rate

(vii) AgZ Absorber total activity in μCi

(viii) Stack Discharge Flow Rate in cfm

(ix) Total Activity (I-131) released.

(o) The stack radioactive gas and iodine concentrations and release rates will be used to determine the offsite dose as per F3-13 "OFFSITE DOSE CALCULATION".

5.3 Determining Air Ejector Discharge Gas Activity

The purpose of this procedure is to provide detailed instructions for determining the concentration of radioactive gas in the Air Ejector discharge.

If 1-R-15 or 2-R-15 Air Ejector Monitor becomes saturated with high level gas, or becomes inoperable, the air ejector gas activity is determined by obtaining a dose rate indication on the air ejector discharge pipe on the outlet of the Air Ejector Monitor R-15.

The source of radiation in the Turbine Building will be the direct radiation from equipment in the Aux Building and mainly from the top of the containments shining on the Turbine Building. Therefore, if you stay as close as possible to the wall between the Aux Building abd Turbine Building you will take advantage of the shielding provided by the wall and Aux Building roof.

5.3.1 Obtain the appropriate protective clothing and respiratory protection as defined by the REC.

5.3.2 Obtain the appropriate dosimetry and verify that each individual will not exceed exposure limits of F3-12, "EMERGENCY EXPOSURE CONTROL".

5.3.3 Obtain the necessary survey meters:

(a) RM-14 with pancake probe and
(b) Telector or
(c) Cutie Pie or
(d) RO-2A or
(e) PIC -6A Figure 12

and observe the Air Ejector Discharge Survey Point of Figure 7.

5.3.4 Proceed to the Air Ejector Discharge Monitor by going down the stairway by the OSC and then to the affected units Air Ejector Monitor.

5.3.5 Determine and record the Air Ejector Discharge flow rate and the dose rate.

5.3.6 Report the sample time, flow rate, and dose rates to the REC at extension 333. The REC will give directions for further sampling.

5.3.7 The REC will determine and record the following on Figure 1:

(a) Dose-count rate on survey point
(b) Gas Concentration in μCi/cc Xe-133 equivalent from Figures 13 and 14.

5.3.8 The release gas concentration and flow rate will be used to determine the offsite dose rates as per F3-13, "OFFSITE DOSE CALCULATIONS".

FIGURE 1
ACTIVITY RELEASE RATES-CONCENTRATIONS

DATE_____ TIME_____

I. STEAM RELEASE HEADERS Loop_____

A. CONCENTRATION (C)

1. Dose rate _____mr/hr

2. Dose rate conversion factor, IDE (Fig. 2,3,or 4) _____ $\frac{\mu C/cc}{mr/hr}$

3. Release concentration C = _____ IDE X _____True dose rate

C = _____µC/cc

B. FLOW RATE (R)

1. Steam dumps = 4000 cfm; PORV = 2500 cfm; Safeties = 5500 cfm

2. Flow rate (R) = $\frac{\text{Flow rate (cfm) X No. of vlvs open X time vlvs open (min)}}{60}$

$$R = \frac{\text{(cfm)X (\#vlvs)X (min)}}{60}$$

R = _____cfm

II. SHIELD BUILDING STACK

A. GAS CONCENTRATION (C)

1. Dose-count rate: Unit 1 _____mr/hr-cpm Unit 2 _____mr/hr-cpm

Concentration (Fig. 5,6, or 8) C = Unit 1 _____ Unit 2 _____µC/cc

B. IODINE CONCENTRATION (C)

1. Sample times Unit 1 ON_____ OFF _____ Unit 2 ON _____ OFF _____

2. AgZ Count-Dose Rate Unit 1 _____ Unit 2 _____ cpm-mr/hr

3. AgZ Activity (Fig. 9,10, or 11) Unit 1 _____ Unit 2 _____ µC

4. AgZ Total Flow (Flow rate X Time) Unit 1 _____ Unit 2 _____ cc's

5. Stack Concentration (Act. ÷ Total Flow) Unit 1 _____ Unit 2 _____ µC/cc

6. Total Iodine Released = Con. (Step 5) X Disc Flow (Step C) X 28320 X min.

$$\text{I-131 µCi} = \frac{\text{X X 28320 X}}{\text{(Step5)(Disc Step C) (min release time)}} =$$

C. STACK FLOW RATE (R)

1. Stack Discharge Flow Rate: Unit 1 _____ Unit 2 _____ cfm

2. Aux Building Special 4400 cfm, SFP Special 5000

III. AIR EJECTOR DISCHARGE

A. GAS CONCENTRATION (C)

1. Dose-Count Rate _____mr/hr-cpm

2. Gas Concentration (Fig. 13 or 14) C = _____ _____ µC/cc

B. FLOW RATE (R)

1. Flow Rate _____ cfm

FIGURE 2

DOSE RATE CONCENTRATION

CONVERSION FACTOR

IDE vs TIME

for

GAP RELEASE

(0 - 24 HOURS)

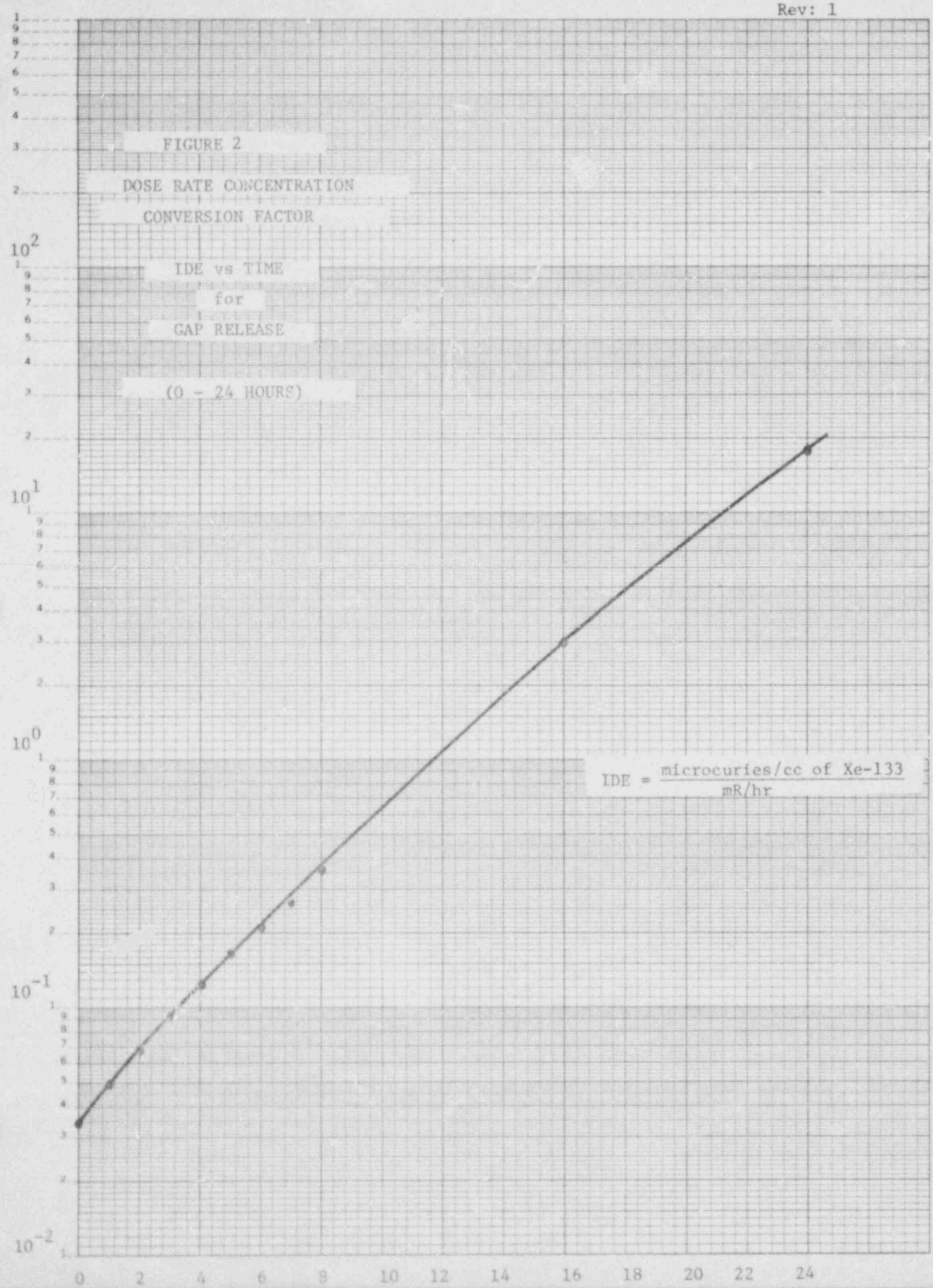


FIGURE 3

DOSE RATE CONCENTRATION

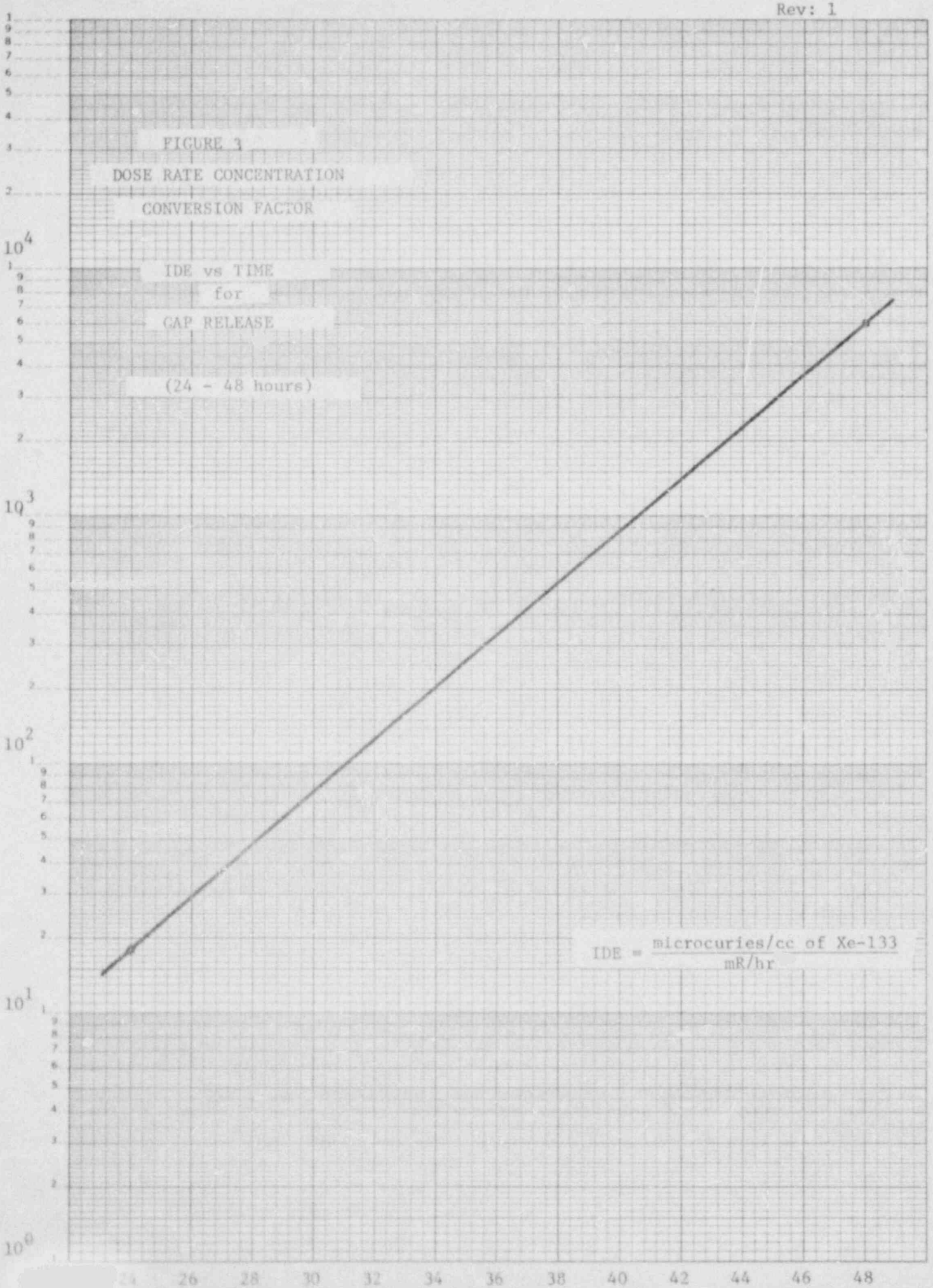
CONVERSION FACTOR

IDE vs TIME

for

GAP RELEASE

(24 - 48 hours)



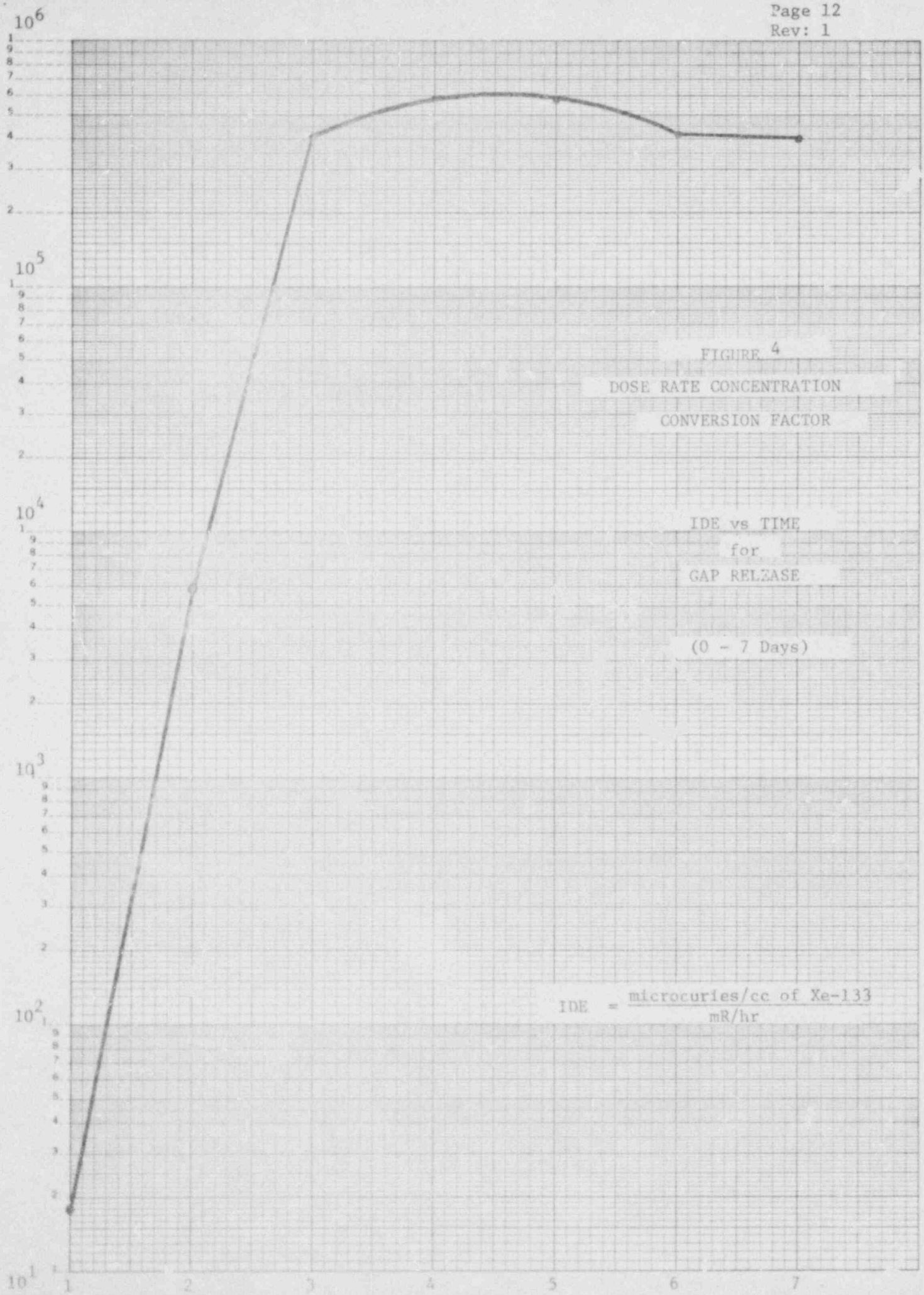


FIGURE 4

DOSE RATE CONCENTRATION

CONVERSION FACTOR

IDE vs TIME

for

GAP RELEASE

(0 - 7 Days)

$$\text{IDE} = \frac{\text{microcuries/cc of Xe-133}}{\text{mR/hr}}$$

FIGURE 5
1/2 R-22 CALIBRATION CURVE

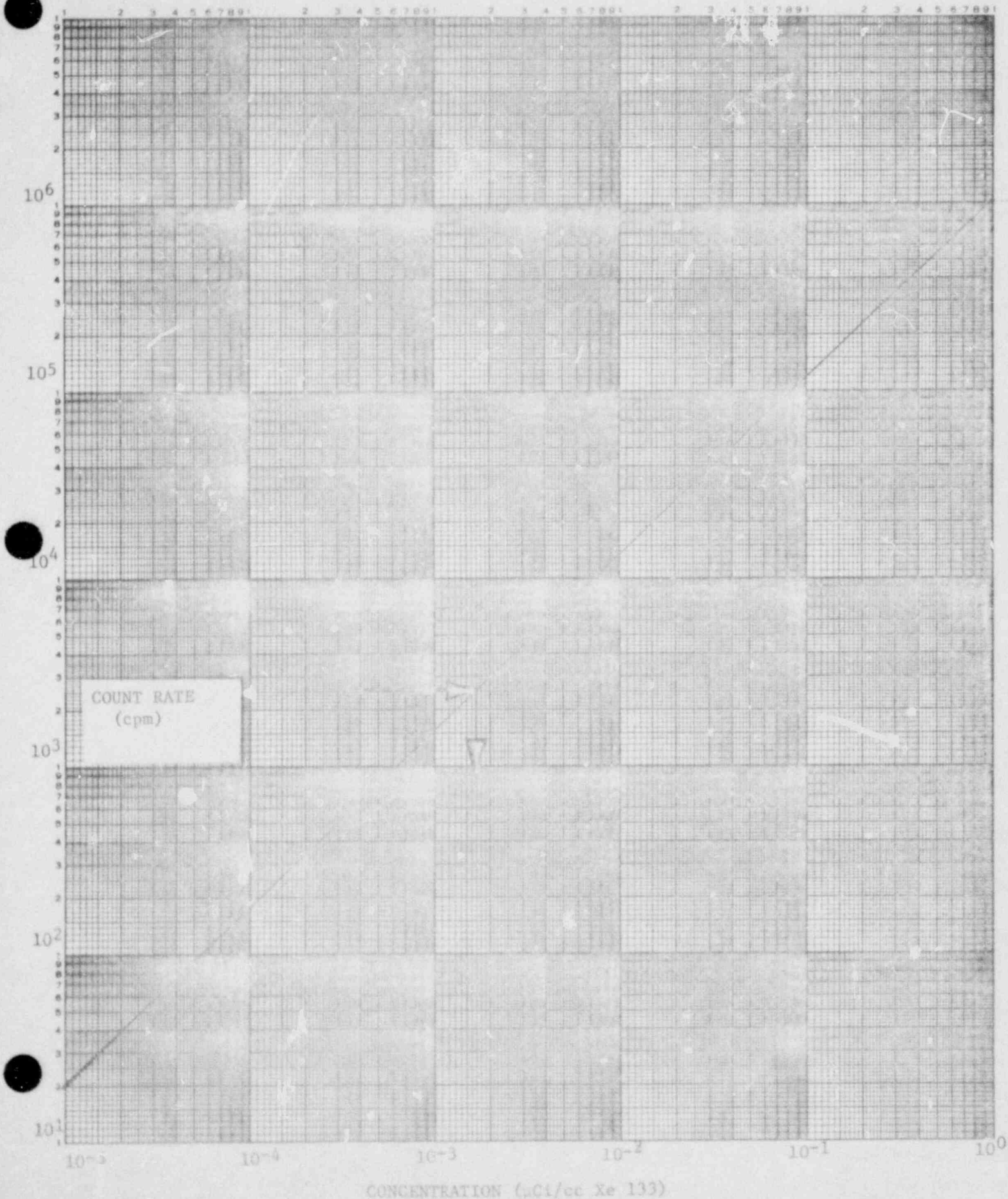


FIGURE 6

1/2 R-50 CALIBRATION CURVE

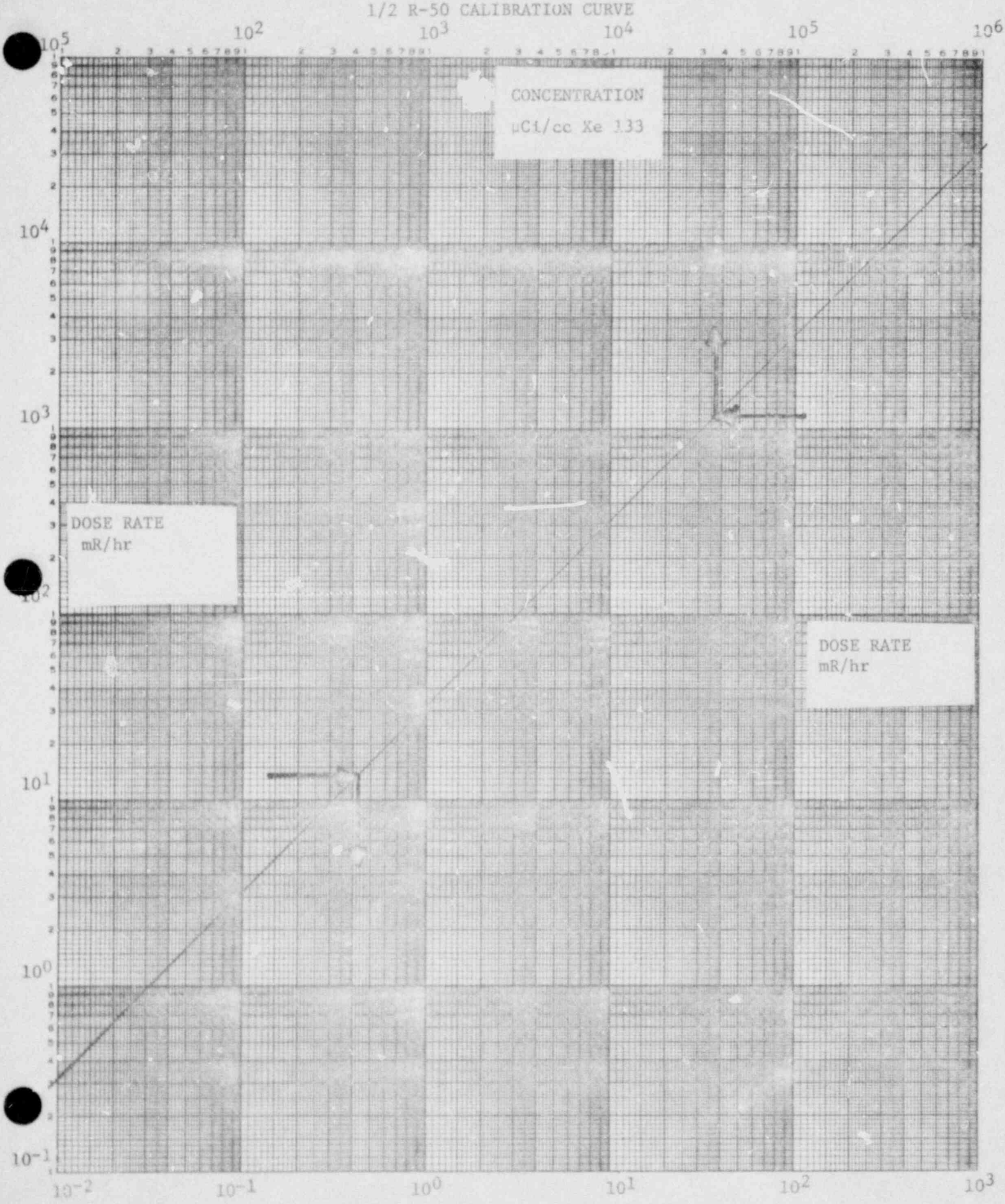
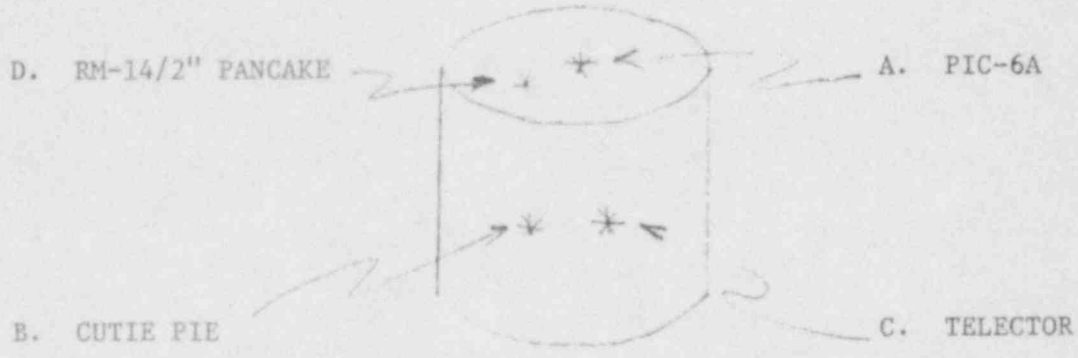


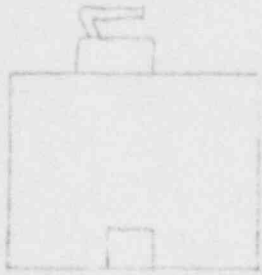
FIGURE 7

SHIELD BUILDING STACK MONITOR SAMPLE CHAMBER

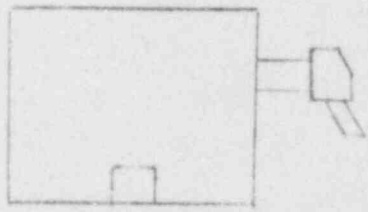
MONITOR POINTS



A. PIC-6A - Setting on top at designated spot with window open.

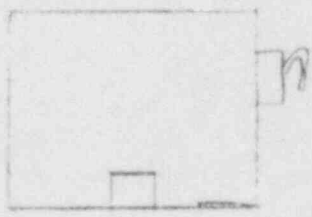


B. CUTIE PIE - Probe perpendicular to side of container, window off, at designated point.



C. TELETECTOR - End of probe perpendicular to chamber, window off, at designated point.

D. RO-2A - Bottom of meter against side, window open.



NOTE: Telector at 6" also perpendicular to chamber as shown.

FIGURE 8
PROTABLE METER VERSE STACK GAS CHAMBER ACTIVITY

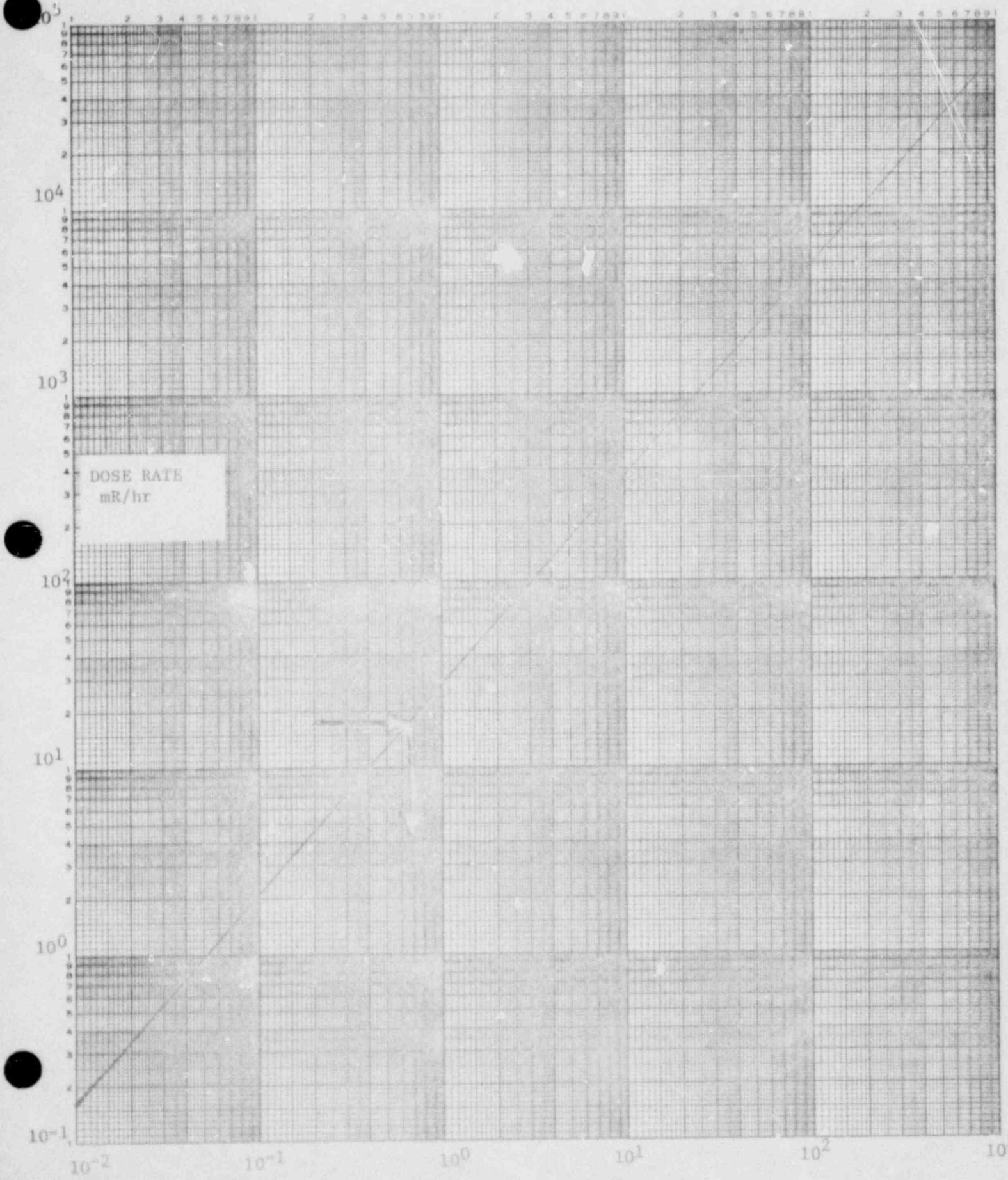


FIGURE 9
GROSS IODINE CURVE USING RM-14 WITH 2" GM
PANCAKE PROBE WITH SILVER ZEOLITE ABSORBER

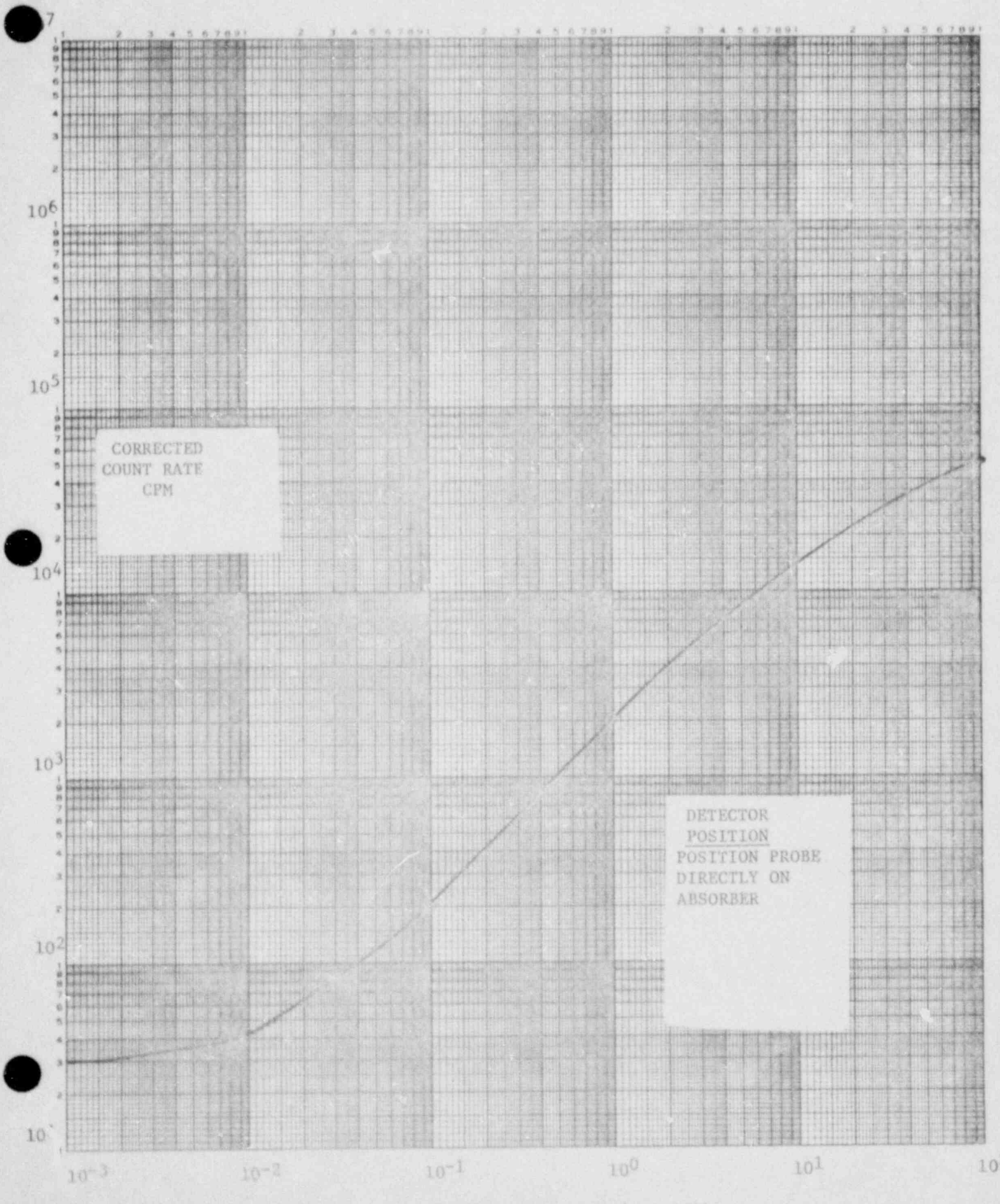


FIGURE 10
IODINE ABSORBER ACTIVITY VERSUS COUNT RATE
RM-14-PANCAKE PROBE AT 12"

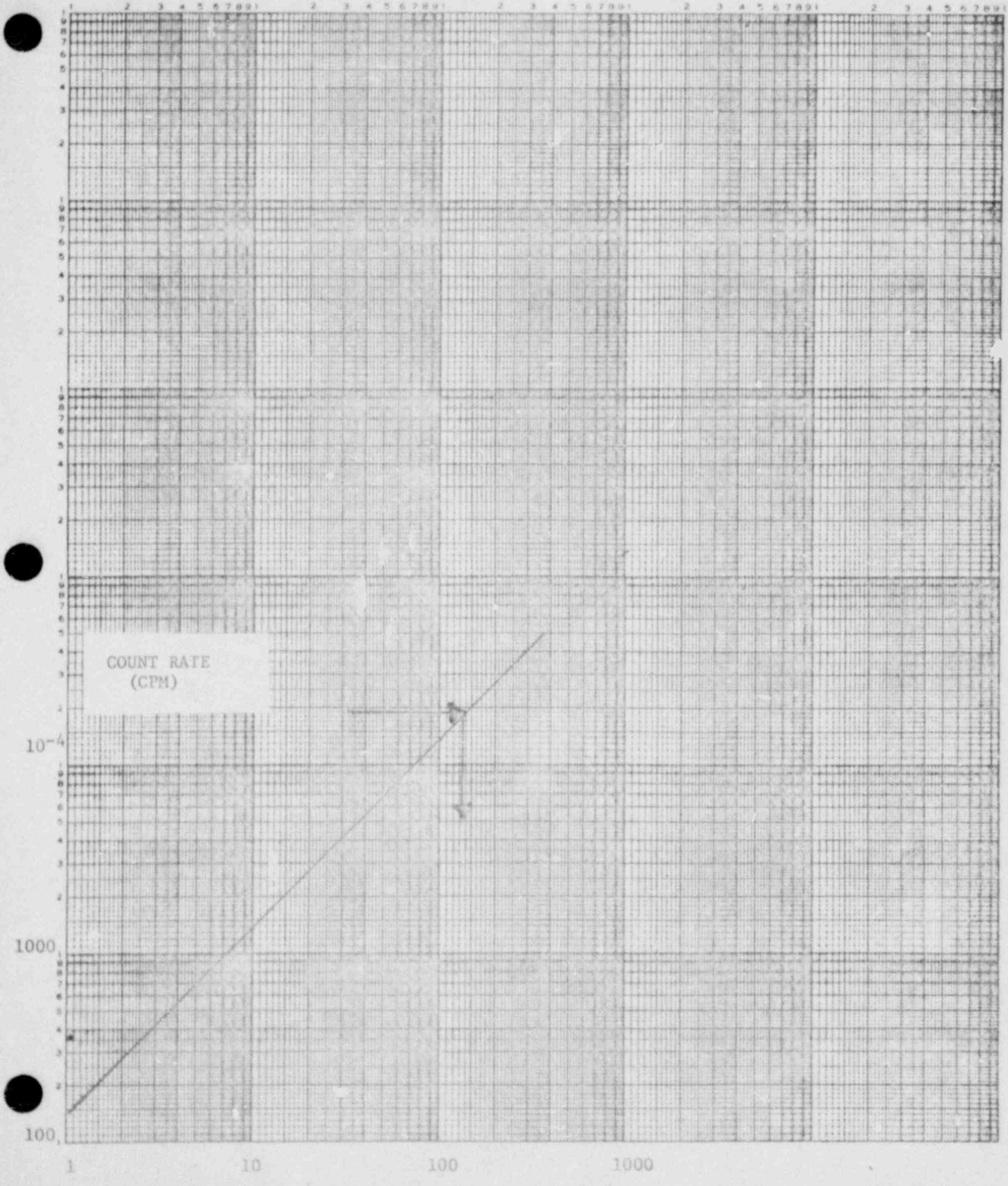


FIGURE 11
IODINE ABSORBER ACTIVITY VERSUS DOSE RATE
DOSE RATE METER AT 12"

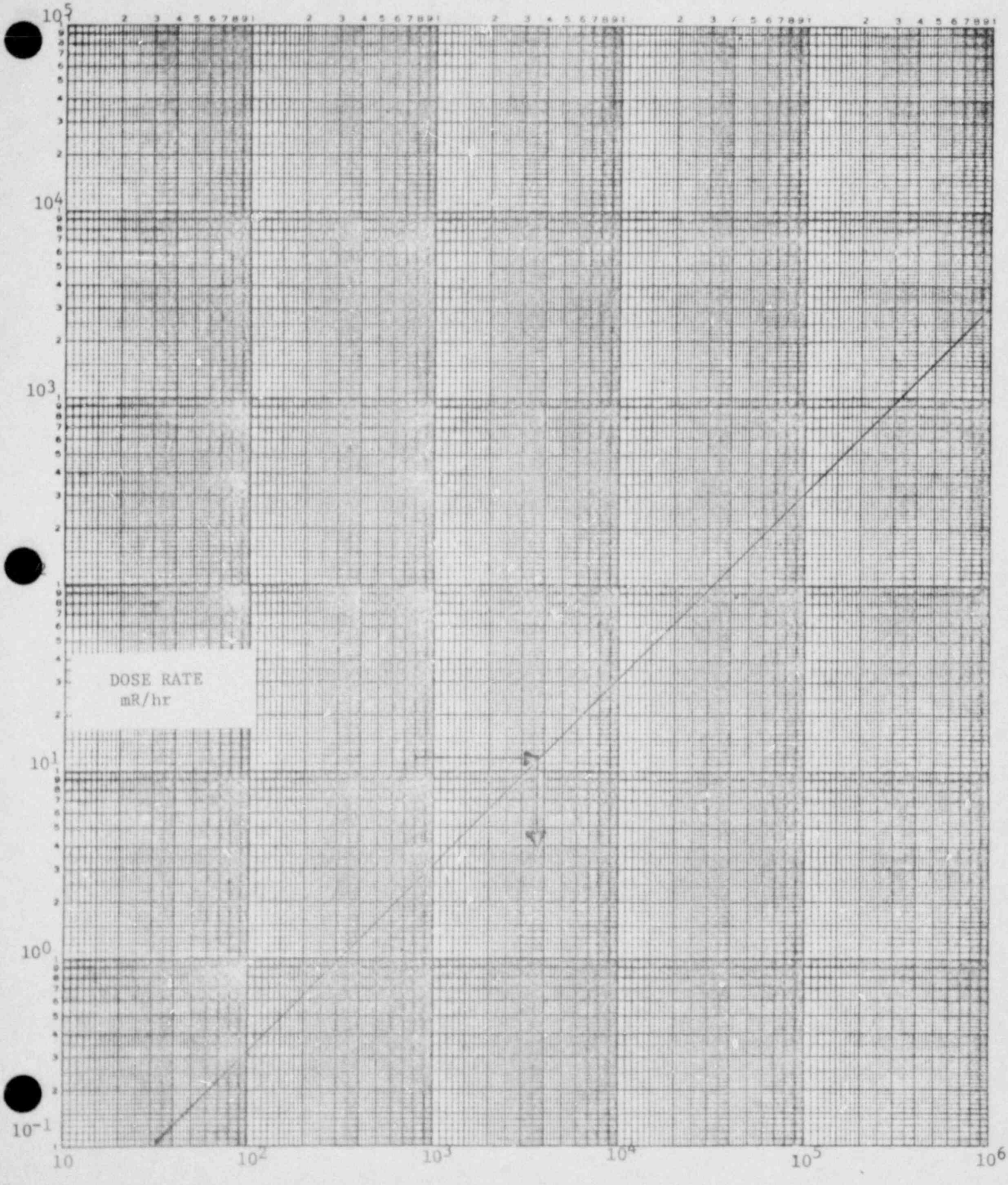
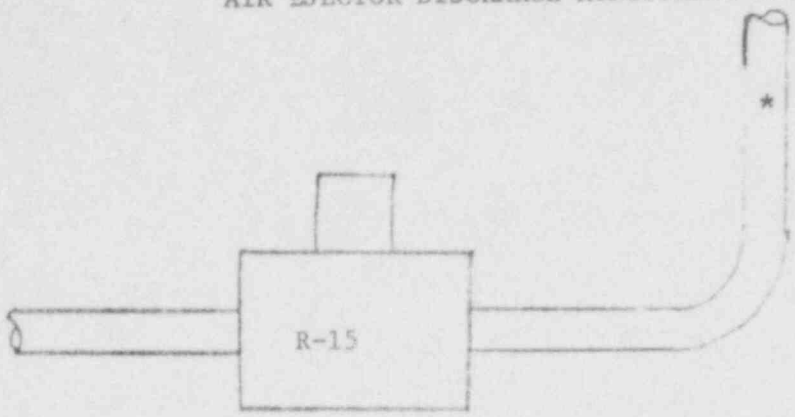


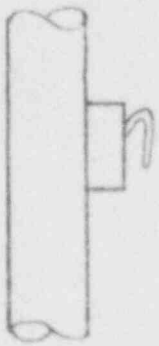
FIGURE 12

AIR EJECTOR DISCHARGE MONITORING POINTS



PIC-6A

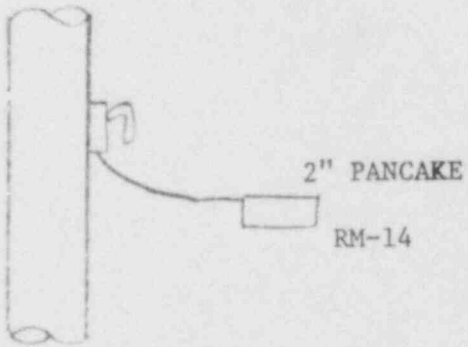
Place open window of meter in direct contact with the discharge pipe.



PIC-6A or RO-2A

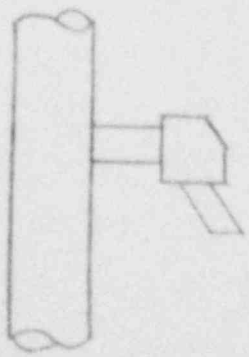
RM-14/2" PANCAKE

Place probe in direct contact with discharge pipe.



CUTIE PIE

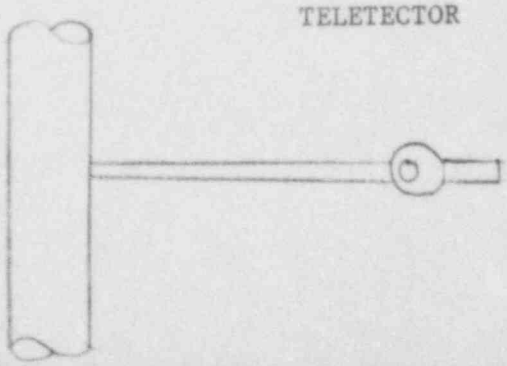
Place open window directly on pipe.



CUTIE PIE

TELETECTOR

Place open window on end of probe in direct contact with pipe.



TELETECTOR

FIGURE 13
AIR EJECTOR GAS CONCENTRATION VERSUS COUNT RATE
RM-14 WITH PANCAKE PROBE

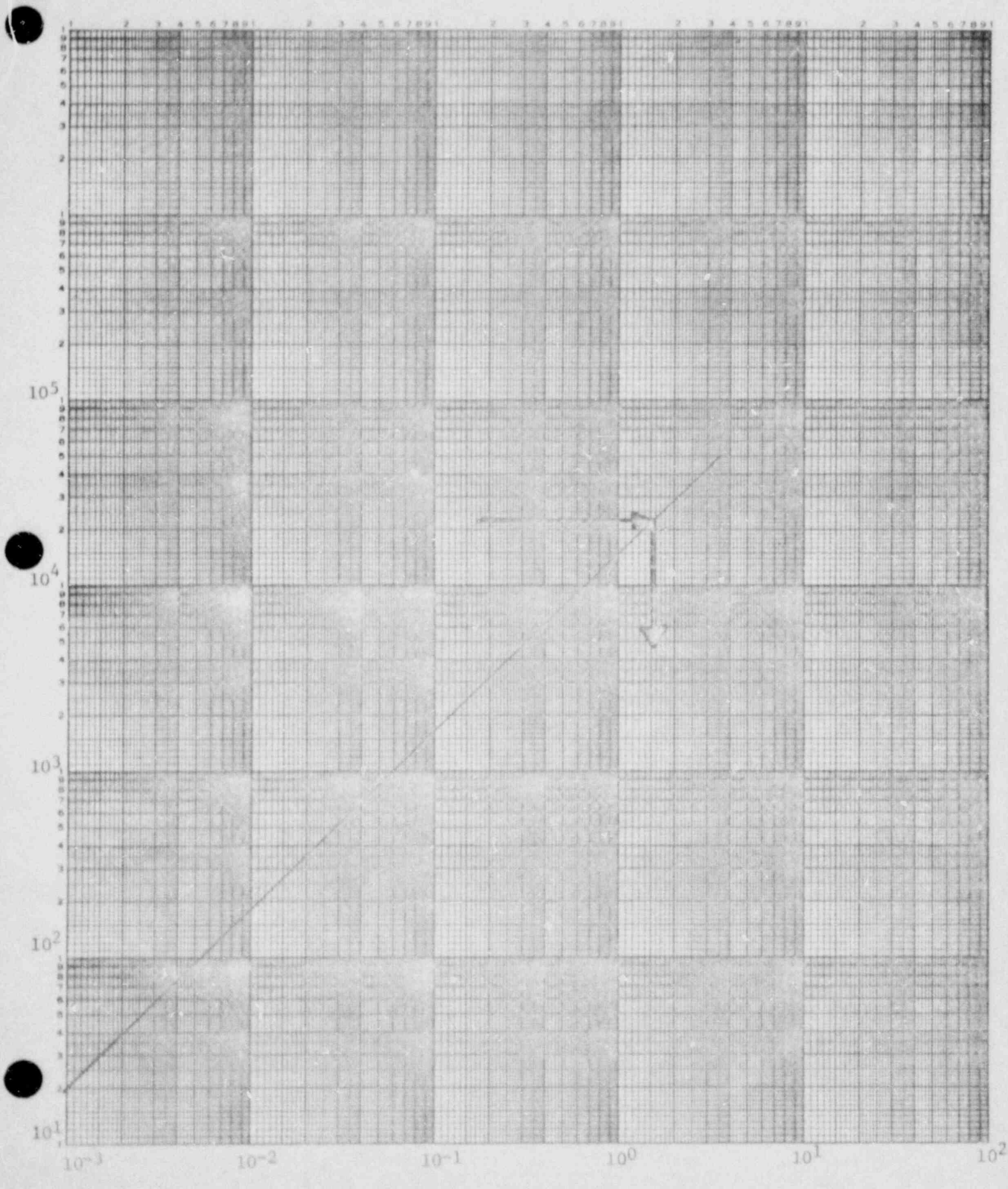
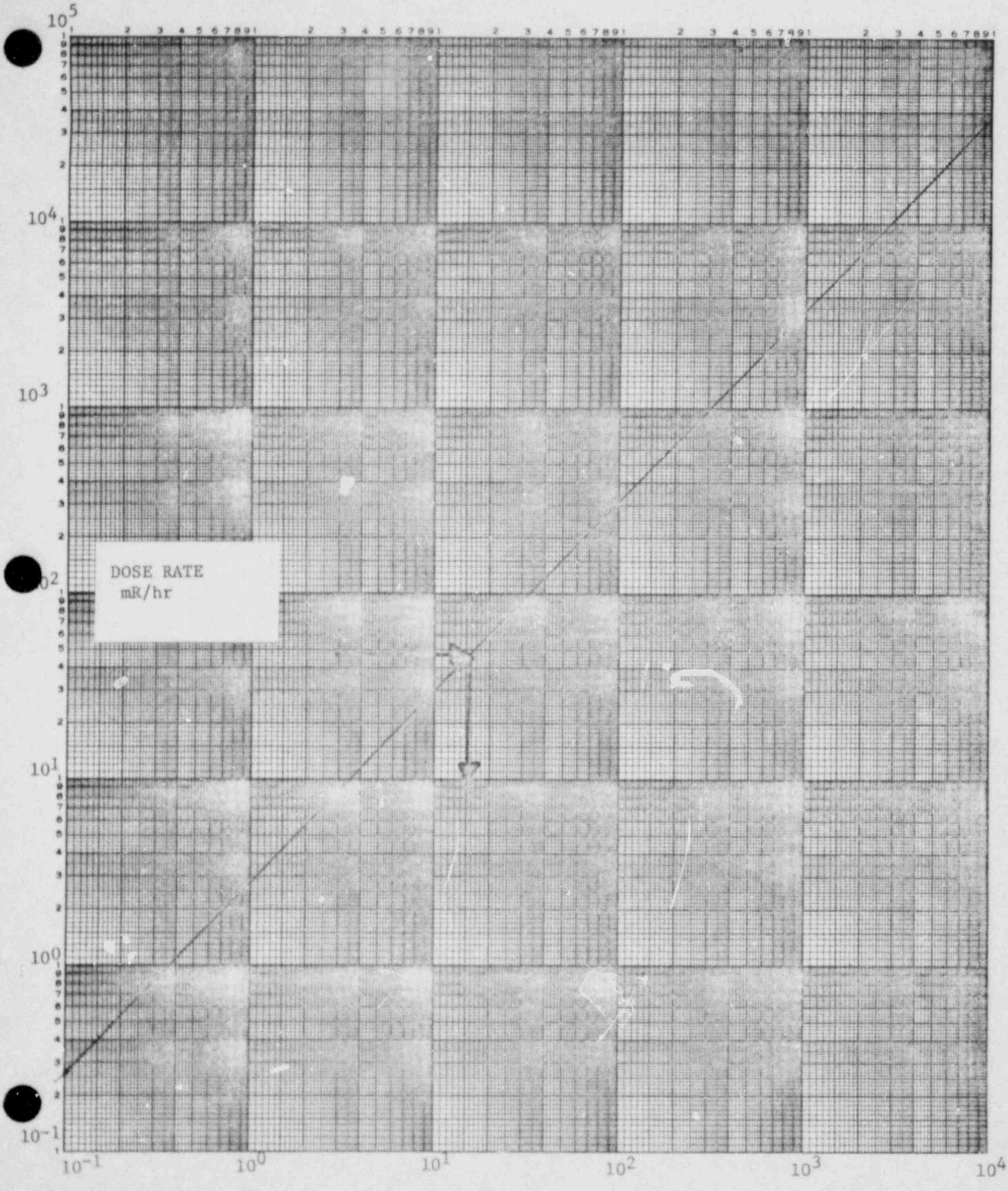


FIGURE 14
AIR EJECTOR GAS CONCENTRATION VERSUS DOSE RATE
SURVEY METER ON CONTACT



PRAIRIE ISLAND NUCLEAR GENERATING PLANT NORTHERN STATES POWER COMPANY	EMERGENCY PLAN IMPLEMENTING PROCEDURES Number: F3-21 Rev: 2 Retention Time: History Copy 5 Years
Reviewed by: E.L. Watt Supt. Rad Prot Approved by: F.L. Tierney Jr Plant Manager OC#: 10/29/81	TITLE: ESTABLISHMENT OF A SECONDARY ACCESS CONTROL POINT

1.0 PURPOSE

During an emergency condition, a secondary Access Control point (established in the Guard House or at a designated area further from the plant) for exposure control purpose may become necessary, due to:

(a) Evacuation of the normal Access Control point due to high radiation levels, high contamination levels, and/or high radioactive airborne levels.

OR (b) Abnormal radiation levels, contamination levels, and/or high airborne problems throughout the plant site in non-controlled areas.

This instruction shall establish the procedure to establish a secondary access control point ensuriung that all personnel are properly badged with TLD badges and dosimeters when the normal Access Control point has been evacuated.

2.0 APPLICABILITY

This instruction shall apply to all plant personnel.

3.0 PRECAUTIONS

(1) All exposure shall be recorded properly ensuring that it is recorded on the individual's record.

(2) Any individual approaching the administrative limits shall be reported to the Radiological Emergency Coordinator (REC).

(3) All personnel shall have completed and have signed a Form 4 prior to entry into the plant's controlled area which could result in exposure exceeding 300 millirem.

4.0 PROCEDURE

4.1 The Radiation Survey Teams should routinely monitor the radiation levels and airborne levels throughout the plant as the emergency progresses.

4.2 All survey results shall be reported and/or routed to the Radiological Emergency Coordinator for review.

4.3 When recommended by the Radiological Emergency Coordinator, the Emergency Director shall direct the establishment of a secondary Access Control point at the Guard House (or at a designated area further from the plant) when:

(a) Access Control has been lost due to high radiation levels, high contamination levels, and/or high airborne activity levels.

OR (b) High radiation levels contamination levels and/or high airborne activity levels exist throughout the plant in non-controlled areas.

4.4 If time and radiation conditions allow, transfer all TLD badges, dosimeters (low and high range), dosimeter chargers, TLD issue forms, exposure forms and entry cards from the normal Access Control point to the designated Secondary Access Control Point. If not, transfer the Secondary Access Control Point Supplies from the Training Building Emergency Locker (Figure 1).

4.5 Radiation Protection Group personnel shall maintain exposure control at the Secondary Access Control Point on a continuous basis (twenty-four hours per day)

4.6 Request assistance from the Security Force in establishing and maintaining the Secondary Access Control Point.

4.7 Issuance of TLD's and dosimeters shall be in accordance with F3-12, Emergency Exposure Control, and the Radiation Protection Manual.

NOTES:

(a) With the possibility of high radiation areas existing, all personnel shall complete an exposure history, NRC Form 4, prior to entry into a Controlled Area,.which could result in exposure exceeding 300 millirem.

(b) The type of dosimetry issued will be determined by initial survey results and/or expected radiation levels.

4.8 Entry cards shall be issued and all exposure shall be recorded on the individual's card.

4.9 The Radiation Protection Group shall periodically obtain a current exposure summary. Any exposure at or near the administrative limits shall be reported to the Radiological Emergency Coordinator.

4.10 The Secondary Access Control Point shall remain at the Guard House or at the designated area further away from the plant until, as otherwise directed, by the Radiological Emergency Coordinator and/or the Emergency Director.

FIGURE 1

Secondary Access Control Point Equipment

(1) About 100 TLD's

(2) About 100 0-5R Dosimeters

(3) About 50 0-1R Dosimeters

(4) About 100 0-200mr Dosimeters

(5) Dosimeter charger/spare battery

(6) TLD issue forms

(7) NRC Form 4 & 5's

(8) Monticello & Prairie Island Exposure Log Book

(9) Pens

(10) RWP's (RP-109)

(11) Access Control Cards

(12) Laundry marker

(13) Marking pen (fine point)

(14) Timekeepers Worksheet (RP-112)

PRAIRIE ISLAND NUCLEAR GENERATING PLANT NORTHERN STATES POWER COMPANY	EMERGENCY PLAN IMPLEMENTING PROCEDURES Number: F3-23 Rev: 1 Retention Time: History Copy 5 Years
Reviewed by: E Watt Supt Rad Prot Approved by: F. P. Tierney Jr Plant Manager OC#: 10/29/81	TITLE: EMERGENCY SAMPLING

1.0 PURPOSE

The most important difference between Post-Accident Sampling and routine sampling is the possibility that very high post-accident exposure rates may be present in the sampling areas. This procedure is written on the basis of not exceeding the exposure limits prescribed in 10CFR20.101. This procedure is intended to be a guideline since each accident would pose its own peculiar set of circumstances. The precautions, however, should apply to any situation.

The Radiological Controls specified in this procedure are applicable only when there are indications of fuel damage. Normal Radiological Control practices should be used if there is no fuel damage indications.

2.0 APPLICABILITY

This instruction is applicable to all Radiation Protection Group personnel.

3.0 PRECAUTIONS

3.1 The safety of the personnel performing the evolutions in this procedure is the first priority.

3.2 Any entry made initially in a post-accident situation shall be made with two individuals.

3.3 If, for any reason, the monitoring equipment should fail to function properly or go off scale, the evolution shall be aborted and the personnel shall return to a safe area.

3.4 If an individual reaches the limiting exposure set by the Emergency Director, abort the entry and return to a safe area.

4.0 PROCEDURE

This instruction delineates the steps which shall be completed prior to obtaining a liquid reactor coolant sample or containment air sample in accordance with the applicable procedure.

4.1 The Team members designated to make the sampling entry shall assemble in the Hot Cell Room, 695′ level of the Administration Building or area specified by the REC.

4.2 The designated Radiation Survey Team Members shall check the computer exposure printout to obtain their current quarterly whole body exposure. They shall then determine their allowable quarterly whole body exposure.

> NOTE: Additional exposure may be authorized by the Emergency Director as per F3-12, Emergency Exposure Control.

4.3 Each member of the entry team shall verify he has his TLD. He shall then place a finger ring TLD on each hand and place the designated dosimetry on his person in proximity to his TLD. Log all dosimeter readings and your allowable exposure prior to entry.

4.4 Each member shall don the required protective clothing and respiratory protection equipment specified by the RWP for the entry.

4.5 Proceed to the Auxiliary/Turbine Building interface as follows:

(a) If the accident has occurred in UNIT I, obtain a seven (7) series key from the Shift Supervisor or request the guards to open D3 Room door, if necessary. Take a high dose rate indicating instrument along with the rolling sample transporter and proceed to the D-3 door on 695′ level, Unit II Turbine Building.

(b) If the accident has occurred in UNIT II, take a high dose rate indicating instrument along with the rolling sample transporter and proceed to Access Control.

4.6 Prior to entry into the Auxiliary Building:

(a) For a reactor coolant sample, verify with the Technical Support Center that safety injection and containment isolation has been reset so as to allow operation of the sampling system containment isolation valves if loop B is to be sampled. If RHR is in service, this will not be necessary. Also, obtain area monitor readings on R3 (Hot Lab) and on R6 (Hot Sample Room).

(b) For a Containment Atmosphere Sample, check containment pressure from the Control Room. If the gas analyzer is not available, a portable AC Sample Pump (located in OSC) is required if containment pressure is less than 1 psi greater than the Aux Building Pressure.

4.7 Leave the rolling sample transporter at the Turbine Building/Auxiliary Building interface and carry the shielded carrier. Activate designated respiratory protection equipment and proceed into the Auxiliary Building by either of two routes, depending on affected units.

UNIT I AFFECTED: Enter the D3 room and then enter the Auxiliary Building,695' level. Proceed to 715' level Auxiliary Building 2 by way of stairs adjacent to Unit 2 RWST. Once on 715' level Auxiliary Building 2, proceed to either:

a. Unit 1 Post LOCA Panels for Containment Gas sample, or

b. Hot Lab via the Count Room door for a Reactor Coolant sample.

UNIT II AFFECTED: Enter Auxiliary Building 715' level, Unit 1 and proceed to either:

a. Unit 2 Post LOCA Panels for a Containment Gas Sample, or

b. Hot Lab via the Hot Lab fire door for a Reactor Coolant sample:

NOTE: Expected radiation levels projected from the worst case accident assuming major safety system failure and significant core damage are contained in F3-25, Re-entry.

4.8 Monitor continuously, with the high range dose rate indicating device and record the dose rates on survey sheets.

4.9 Obtain the liquid reactor coolant sample or containment gas sample in accordance with the applicable operating procedure:

(a) C39.1 - Reactor Coolant Sample

NOTE: PA5, Post-Accident Hydrogen, Radio-gas, and Liquid sampling procedure, contained in the Chemistry Manual may be used in place of C39.1.

(b) C39.4 - Containment Gas Sample

4.10 When sample is obtained, carry the shielded carrier rapidly to the Turbine Building/Auxiliary Building interface and place into the rolling sample transporter. At this point or at the designated area, remove protective clothing and respiratory protection equipment.

4.11 Proceed to the Hot Cell Room. Place the shielded carrier containing the reactor coolant sample in the shielded work area. Dilute the liquid sample and analyze in accordance with the Post Accident Sampling Procedures in the Chemistry Manual. Transport the containment gas sample and/or the diluted coolant sample to the counting facility for analysis in accordance with Section 5.0 of the Count Room Manual. Attach the required sample identification and sample times required for analysis prior to transporting to counting facility.

4.12 Report to Radiological Emergency Coordinator for:

(a) Evaluation of observed survey results
(b) Evaluation of internal exposure
(c) Evaluation of radiation exposure by dosimeter, TLD, and finger ring TLD

4.13 All exposure in excess of normal limits shall be evaluated accordance with F3-12, Emergency Exposure Control.