10 CFR 50, Appendix E

Progress Energy

Serial: RNP-RA/04-0034

MAR 0 4 2004

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23

TRANSMITTAL OF EMERGENCY PROCEDURE REVISIONS

Ladies and Gentlemen:

In accordance with 10 CFR 50.4(b)(5) and Appendix E to 10 CFR 50, Progress Energy Carolinas, Inc. (PEC), formerly known as Carolina Power and Light Company, is transmitting revisions to H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, Emergency Implementing Procedures. The procedure revisions and effective dates are listed in the attachment to this letter.

A description of each procedure change is provided on the "Summary of Changes" page included within each emergency procedure. Please replace the superseded procedures with the enclosed revisions.

If you have any questions concerning this matter, please contact me.

Sincerely,

C. T. Baucom
Supervisor – Licensing/Regulatory Programs

CTB/cac

Attachment

Enclosures

c: L. A. Reyes, NRC, Region II
NRC Resident Inspector, HBRSEP
C. P. Patel, NRC, NRR (w/o Attachment and Enclosures)

Progress Energy Carolinas, Inc.
Robinson Nuclear Plant
3581 West Entrance Road
Hartsville, SC 29550

A045

Procedure Revisions and Effective Dates

Procedure	Revision No.	Effective Date
EPEOF-03, "Administrative and Logistics Manager"	10	02/17/04
EPEOF-05, "Radiological Control Manager"	7	02/17/04
EPRAD-01, "Environmental Monitoring"	13	02/17/04
EPTSC-04, "Radiological Control Director"	8	02/17/04
EPNOT-03, "EOF Public Information Emergency Communicator"	6	03/02/04
EPPRO-04, "EP Performance Indicators"	5	03/02/04
EPRAD-03, "Dose Projections"	14	03/02/04
EPTSC-00, "Activation and Operation of the Technical Support Center"	4	03/02/04
EPTSC-09, DELETED – Remove tab and procedure from books	N/A	03/02/04

Progress Energy

R
Reference
Use

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 2
PART 5

EPEOF-03

ADMINISTRATIVE AND LOGISTICS MANAGER

REVISION 10

SUMMARY OF CHANGES
PRR 116606

STEP	REVISION COMMENTS
Entire Procedure	Re-formatted procedure to comply with AP-007. Re-placed CP&L with Progress Energy
Step 3.4.1	Added a step to coordinate access and fitness for duty activities with the Emergency Security Team Leader (ESTL).
Step 3.4.2	Revised step to request assistance from the ESTL for assigning an Evacuation Assembly Area Leader.
Step 8.14.1	Added note to indicate that "coordination of meals for the JIC staff will be performed by JIC administrative staff. "
Attachment 10.11	Re-located quick start guide to the attachment section. Added a step to coordinate access and fitness for duty activities with the Emergency Security Team Leader (ESTL).

TABLE OF CONTENTS

SECTION PAGE

1.0 PURPOSE

This procedure describes the functional responsibilities and procedure steps for the Administrative & Logistics Manager (A&LM).

2.0 REFERENCES

As per EPEOF-00.

3.0 RESPONSIBILITIES

3.1 Plan, schedule and expedite emergency logistical support (including operability, locating, ordering, receiving of equipment, screening, orientation, badging, transportation and lodging of support personnel) as well as accountability of Emergency Response personnel in the Technical Support Center (TSC), Emergency Operations Facility (EOF), and the Operations Support Center (OSC).

3.2 Establish cost control/accounting system as needed.

3.3 Determine the need for additional contracts, facilities and services.

3.4 Provide technical and administrative direction to the Emergency Security Team Leader (ESTL) and Support Services.

3.4.1 Coordinate access and fitness for duty activities with security personnel.

3.4.2 Request assistance from the ESTL for assigning an individual as Evacuation Assembly Area Leader (EAAL), as needed.

3.5 Serve as a liaison between the Emergency Response Manager (ERM) and the Legal Department.

3.6 Ensure claims processing by Progress Energy and contractor insurance personnel.

4.0 PREREQUISITES

As Per EPEOF-00

5.0 PRECAUTIONS AND LIMITATIONS

As Per EPEOF-00

6.0 SPECIAL TOOLS AND EQUIPMENT

N/A

7.0 ACCEPTANCE CRITERIA

N/A

8.0 INSTRUCTIONS

8.1 Determine staffing requirements and shift change assignments. Utilize Attachments10.2, Emergency Operations Facility (EOF) Four Day Work Schedule, and 10.6, Technical Support Center (TSC) Four Day Work Schedule.

8.2 For evacuations:

8.2.1 In conjunction with the ERM and County Emergency Management officials, determine the appropriate shelter location(s) for non-essential personnel.

1. Identify appropriate evacuation route(s).
2. Coordinate Health Physics support.
3. Provide evacuation vehicles (if necessary).
4. Assign an individual from the TSC or EOF to provide assembled evacuees with plant status, shelter location and travel information, relief shift times and a reminder to refer questions concerning plant activities to the Company Spokesperson.
5. Release non-essential personnel as soon as possible.

8.2.2 Notify the State and Counties regarding evacuation of personnel to their homes or shelter areas (if county shelters are open). Notifications to State or County agencies may be made by (in order of preference):

1. State/County Emergency Communicator (dedicated line)
2. Assistant ERM (Bell line)
3. ESTL (via radio)

8.3 Update the Emergency Security Team Leader (ESTL) on plant status as the Emergency progresses.

8.4 Notify the ESTL of the names and affiliations of individuals requested to report to the plant and where they will report.

8.5 Provide a list of incoming personnel to State and County agencies to facilitate access to the plant after traffic control is established.

8.6 Initiate the Florence Staging Area, if required. Refer to the ERO Telephone Directory for the telephone number.

8.7 Provide safe routes for personnel reporting to the plant.

8.8 Coordinate request for use of government facilities through the State of South Carolina.

8.9 Direct requests for materials or parts to the Unit 1 issue counter, Bulk Warehouse or Unit 2 stockroom.

8.10 Direct clerical support requests to the Manager, Site Support Services or designee.

8.11 Direct requests for installation, maintenance and operation of communications facilities to the Information Technology personnel or the Help Desk. Refer to the ERO Telephone Directory for telephone numbers.

8.12 Ensure planned exposure control for personnel under your supervision in accordance with EPOSC-04, Emergency Work Control.

8.13 Determine the need for and utilize the Institute of Nuclear Power Operations (INPO) Resource Book to request additional resources from neighboring utilities.

8.14 Arrange for food, drinks, snacks for Emergency Response Organization (ERO) augmentees.

8.14.1 Determine number of personnel in each facility (TSC, EOF, OSC, Control Room, Joint Information Center).

NOTE: Coordination of meals for the JIC staff will be performed by administrative personnel in the JIC. Payment arrangements for JIC meals will be coordinated through the A&LM.

1. For training exercises include Controller/Evaluator and Simulator staff.

2. Orders should be placed at least 2 hours before meals to allow for vendor preparation and delivery.

8.15 Arrange for hotels, motels for personnel as required.

8.16 Upon notification that teams are deployed, set-up state/NRC support rooms per Attachment 10.3, EOF NRC Support Room Recommended Layout and Attachment 10.10, TSC NRC Support Room Recommended Layout.

8.17 Perform personnel accountability of people reporting to the EOF and for the other emergency response facilities, as requested.

9.0 RECORDS

Records generated as result of the performance of this procedure should be forwarded to the EP staff for retention.

10.0 ATTACHMENTS

10.1 Emergency Operations Facility (EOF) Sign In Roster

10.2 Emergency Operations Facility (EOF) Four Day Work Schedule

10.3 EOF NRC Support Room Recommended Layout

10.4 Emergency Operations Facility (EOF) Emergency Supply List

10.5 Technical Support Center (TSC) Sign-In Roster

10.6 Technical Support Center (TSC) Four Day Work Schedule

10.7 Accident Assessment Room Recommended Layout

10.8 Support Services Room Recommended Layout

10.9 Environmental & Radiological Control (E&RC) Support Room Recommended Layout

10.10 TSC NRC Support Room Recommended Layout

10.11 Administrative and Logistics Manager (A&LM) Quick Start Guide

ATTACHMENT 10.1
Page 1 of 1

EMERGENCY OPERATIONS FACILITY (EOF) SIGN IN ROSTER

NOTE: The positions listed below are recommended for activation purposes, however, partial activation should be considered in order to relieve the Control Room or TSC as soon as practical.

	NAME (PLEASE PRINT) / TIME
_____EMERG. RESPONSE MGR. (B1-75)	_____/_____
_____ASST. EMERG. RESP. MGR.	_____/_____
_____EMERGENCY COMMUNICATOR*	_____/_____
_____PLANT OPERATIONS ADVISOR	_____/_____
_____DOSE PROJECTION LEADER (B1-45)	_____/_____
_____ENVIRON. MON. LEADER (B1-75)	_____/_____

****

EOF POSITIONS LISTED BELOW ARE NOT REQUIRED FOR INITIAL EOF ACTIVATION.

****

_____TECHNICAL ANALYSIS MGR.	_____/_____
_____ADMIN. & LOGISTICS MGR.	_____/_____
_____RADIOLOGICAL CONTROL MGR.	_____/_____
_____ERM ADMIN. ASSISTANT	_____/_____
_____SEOC REPRESENTATIVE	_____/_____
_____DARLINGTON EOC REPRESENTATIVE	_____/_____
_____CHESTERFIELD EOC REPRESENTATIVE	_____/_____
_____LEE EOC REPRESENTATIVE	_____/_____
_____STATE/COUNTY COMMUNICATOR*	_____/_____
_____PUBLIC INFORMATION COMMUNICATOR*	_____/_____
_____FACILITY ADMINISTRATIVE ASSISTANTS (2)	_____/_____
	_____/_____

OVERFLOW

ERO POSITION	
_____	_____/_____
_____	_____/_____
_____	_____/_____
_____	_____/_____
_____	_____/_____

* Of the 3 Communicator positions (TSC and EOF), 1 additional person is required in 45 minutes and 2 additional personnel are required in 75 minutes.

ATTACHMENT 10.2
Page 1 of 5

EMERGENCY OPERATIONS FACILITY (EOF) FOUR DAY WORK SCHEDULE

Position	Shift	Time*	Date / /	Date / /	Date / /	Date / /
Emergency Response Manager			Name	Name	Name	Name
	1					
	2					
	3					
Assistant Emergency Response Manager			Name	Name	Name	Name
	1					
	2					
	3					
Emergency Communicator			Name	Name	Name	Name
	1					
	2					
	3					
Plant Operations Advisor			Name	Name	Name	Name
	1					
	2					
	3					
Dose Projection Leader			Name	Name	Name	Name
	1					
	2					
	3					

* Shift times may vary - i.e., (2) 12-hour shifts, (3) 8-hour shifts
If (2) 12-hour shifts - use shift 1-shift 2 boxes
If (3) 8-hour shifts - use shift 1-shift 2 and shift 3 boxes

EMERGENCY OPERATIONS FACILITY (EOF) FOUR DAY WORK SCHEDULE

Position	Shift	Time*	Date / /	Date / /	Date / /	Date / /
Facility Administrative Assistant			Name	Name	Name	Name
	1					
	2					
	3					
Facility Administrative Assistant			Name	Name	Name	Name
	1					
	2					
	3					
Environmental Monitoring Leader			Name	Name	Name	Name
	1					
	2					
	3					
Technical Analysis Manager			Name	Name	Name	Name
	1					
	2					
	3					
Administrative & Logistics Manager			Name	Name	Name	Name
	1					
	2					
	3					
Radiological Control Manager			Name	Name	Name	Name
	1					
	2					
	3					

* Shift times may vary - I.e., (2) 12-hour shifts, (3) 8-hour shifts
If (2) 12-hour shifts - use shift 1-shift 2 boxes
If (3) 8-hour shifts - use shift 1-shift 2 and shift 3 boxes

EMERGENCY OPERATIONS FACILITY (EOF) FOUR DAY WORK SCHEDULE

Position	Shift	Time*	Date / /	Date / /	Date / /	Date / /
ERM Administrative Assistant			Name	Name	Name	Name
	1					
	2					
	3					
SEOC Representative			Name	Name	Name	Name
	1					
	2					
	3					
Darlington EOC Representative			Name	Name	Name	Name
	1					
	2					
	3					

* Shift times may vary - i.e., (2) 12-hour shifts, (3) 8-hour shifts
If (2) 12-hour shifts - use shift 1-shift 2 boxes
If (3) 8-hour shifts - use shift 1-shift 2 and shift 3 boxes

ATTACHMENT 10.2
Page 4 of 5

EMERGENCY OPERATIONS FACILITY (EOF) FOUR DAY WORK SCHEDULE

Position	Shift	Time*	Date / /	Date / /	Date / /	Date / /
Chesterfield EOC Representative			Name	Name	Name	Name
	1					
	2					
	3					
Lee EOC Representative			Name	Name	Name	Name
	1					
	2					
	3					
State/County Communicator			Name	Name	Name	Name
	1					
	2					
	3					
Public Information Communicator			Name	Name	Name	Name
	1					
	2					
	3					

* Shift times may vary - i.e., (2) 12-hour shifts, (3) 8-hour shifts
If (2) 12-hour shifts - use shift 1-shift 2 boxes
If (3) 8-hour shifts - use shift 1-shift 2 and shift 3 boxes

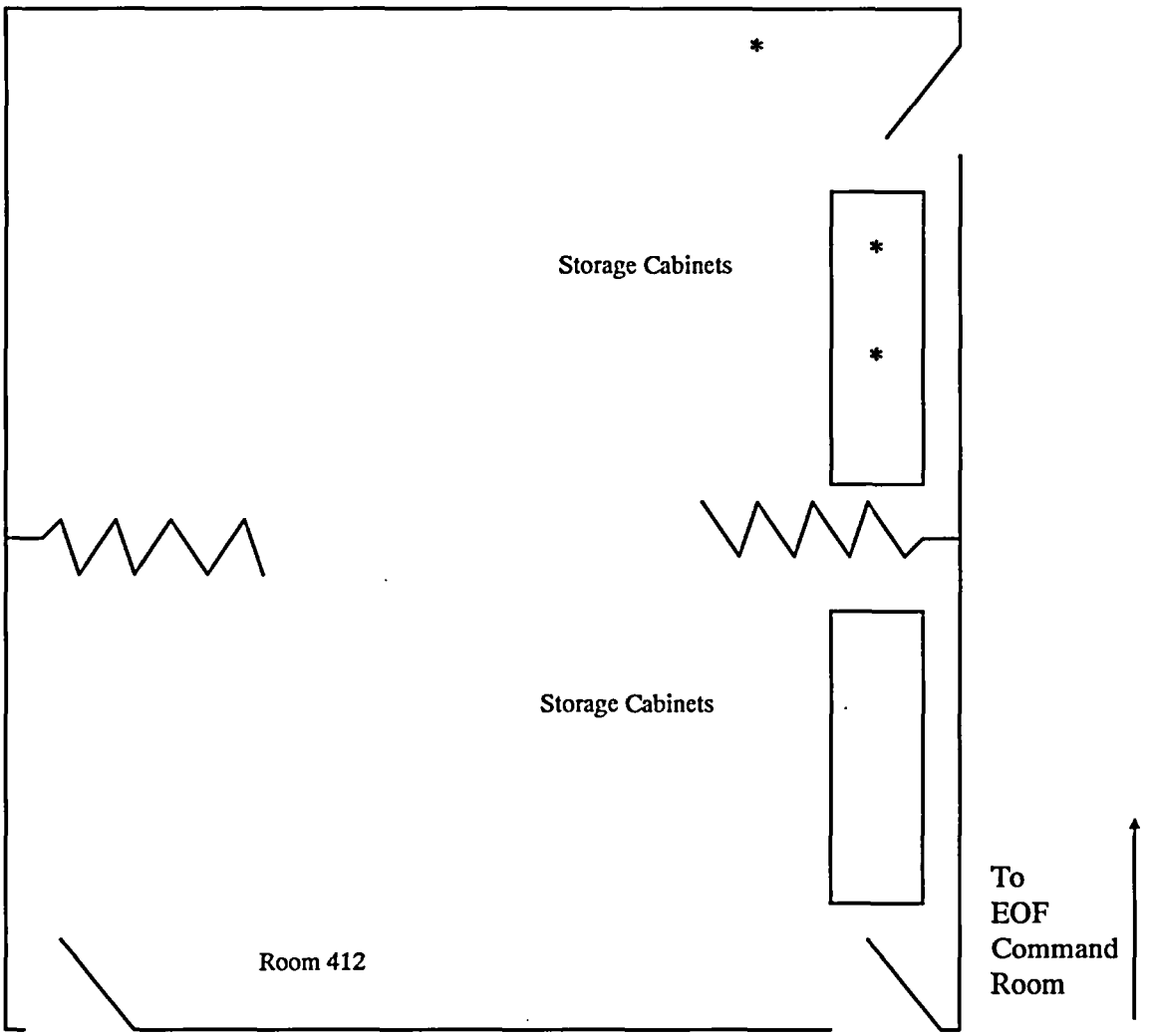
EMERGENCY OPERATIONS FACILITY (EOF) FOUR DAY WORK SCHEDULE

Position	Shift	Time*	Date / /	Date / /	Date / /	Date / /
Others:	[illegible]	[illegible]	Name	Name	Name	Name
	1					
	2					
	3					
	[illegible]	[illegible]	Name	Name	Name	Name
	1					
	2					
	3					
	[illegible]	[illegible]	Name	Name	Name	Name
	1					
	2					
	3					
	[illegible]	[illegible]	Name	Name	Name	Name
	1					
	2					
	3					

* Shift times may vary - i.e., (2) 12-hour shifts, (3) 8-hour shifts
If (2) 12-hour shifts - use shift 1-shift 2 boxes
If (3) 8-hour shifts - use shift 1-shift 2 and shift 3 boxes

ATTACHMENT 10.3
Page 1 of 1

EOF NRC SUPPORT ROOM RECOMMENDED LAYOUT



* NRC ETS Phones

To TSC Command Room

ATTACHMENT 10.4
Page 1 of 1

EMERGENCY OPERATIONS FACILITY (EOF) EMERGENCY SUPPLY LIST

	SUPPLIES	EOF LOCATION
1.	Telecopier	Room 434
2.	Xerox Machine	Copy Room 411
3.	Emergency Kit	EOF/TSC Mech. Room
4.	Clock	On Wall
5.	Emergency Resources Manual (INPO)	A&LM
6.	Maps	
	a. 10 mile EPZ	Room 434
	b. 50 mile EPZ	Room 434
	c. Topo Map of Plant Environments	Room 434
7.	Mechanical Systems Drawings	Training Library
8.	Electrical Systems Drawings	Training Library
9.	FSAR	Training Library
10.	System Descriptions	Training Library
11.	Technical Specifications	Training Library
12.	Emergency Plans	
	a. Corporate Plan and Procedures	Room 434
	b. Plant Plan and Procedures	Training Library
	c. State and Local Plans	Room 434
13.	Emergency Notification Phone Lists	Emergency Phone Book
14.	Progress Energy Emergency Organization Chart	Room 434

ATTACHMENT 10.5
Page 1 of 2

TECHNICAL SUPPORT CENTER (TSC) SIGN IN ROSTER

NOTE:	The positions listed below are recommended for activation purposes, however, partial activation should be considered in order to relieve the Control Room as soon as possible.

	NAME (PLEASE PRINT) / TIME
_____SITE EMERGENCY COORDINATOR (B1-75)	_____/_____
_____RADIOLOGICAL CONTROL DIRECTOR	_____/_____
_____PLANT OPERATIONS DIRECTOR	_____/_____
_____REACTOR ENGINEER (B1-45)	_____/_____
_____ELECTRICAL ENGINEER (B1-75)	_____/_____
_____MECHANICAL ENGINEER (B1-75)	_____/_____
_____EMERGENCY REPAIR DIRECTOR	_____/_____
_____ERFIS MAINTENANCE	_____/_____
_____EMERGENCY SECURITY TEAM LEADER	_____/_____
_____TECHNICAL ANALYSIS DIRECTOR	_____/_____
_____NRC COMMUNICATOR*	_____/_____

****

TSC POSITIONS LISTED BELOW ARE NOT REQUIRED FOR INITIAL TSC ACTIVATION.

****

_____SEC ADMINISTRATIVE ASSISTANT	_____/_____
_____SUPPORT SVS. COORDINATOR	_____/_____
_____FACILITY ADMINISTRATIVE ASSISTANT(S)	(1) _____/_____
	(2) _____/_____

*Of the 3 Communicator positions (TSC and EOF), 1 additional person is required in 45 minutes and 2 additional personnel are required in 75 minutes.

ATTACHMENT 10.5
Page 2 of 2

TECHNICAL SUPPORT CENTER (TSC) SIGN IN ROSTER

	ERO POSITION	NAME (PLEASE PRINT) / TIME
		/
		/
		/
		/
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ATTACHMENT 10.6
Page 1 of 4

TECHNICAL SUPPORT CENTER (TSC) FOUR DAY WORK SCHEDULE

Position	Shift	Time*	Date / /	Date / /	Date / /	Date / /
Site Emergency Coordinator	[illegible]	[illegible]	Name	Name	Name	Name
	1					
	2					
	3					
Radiological Control Director	[illegible]	[illegible]	Name	Name	Name	Name
	1					
	2					
	3					
Plant Operations Director	[illegible]	[illegible]	Name	Name	Name	Name
	1					
	2					
	3					
Reactor Engineer	[illegible]	[illegible]	Name	Name	Name	Name
	1					
	2					
	3					

* Shift times may vary - i.e., (2) 12-hour shifts, (3) 8-hour shifts
If (2) 12-hour shifts - use shift 1-shift 2 boxes
If (3) 8-hour shifts - use shift 1-shift 2 and shift 3 boxes

TECHNICAL SUPPORT CENTER (TSC) FOUR DAY WORK SCHEDULE

Position	Shift	Time*	Date / /	Date / /	Date / /	Date / /
Facility Administrative Assistants (2)	[illegible]	[illegible]	Name	Name	Name	Name
	1					
	2					
	3					
	1					
	2					
	3					
Electrical Engineer	[illegible]	[illegible]	Name	Name	Name	Name
	1					
	2					
	3					
Mechanical Engineer	[illegible]	[illegible]	Name	Name	Name	Name
	1					
	2					
	3					
Emergency Repair Director	[illegible]	[illegible]	Name	Name	Name	Name
	1					
	2					
	3					
ERFIS Maintenance	[illegible]	[illegible]	Name	Name	Name	Name
	1					
	2					
	3					

* Shift times may vary - i.e., (2) 12-hour shifts, (3) 8-hour shifts
If (2) 12-hour shifts - use shift 1-shift 2 boxes
If (3) 8-hour shifts - use shift 1-shift 2 and shift 3 boxes

ATTACHMENT 10.6
Page 3 of 4

TECHNICAL SUPPORT CENTER (TSC) FOUR DAY WORK SCHEDULE

Position	Shift	Time*	Date / /	Date / /	Date / /	Date / /
Emergency Security Team Leader	[illegible]	[illegible]	Name	Name	Name	Name
	1					
	2					
	3					
Technical Analysis Director	[illegible]	[illegible]	Name	Name	Name	Name
	1					
	2					
	3					
NRC Communicator	[illegible]	[illegible]	Name	Name	Name	Name
	1					
	2					
	3					
SEC Administrative Assistant	[illegible]	[illegible]	Name	Name	Name	Name
	1					
	2					
	3					
Support Svs. Coordinator	[illegible]	[illegible]	Name	Name	Name	Name
	1					
	2					
	3					

* Shift times may vary - I.e., (2) 12-hour shifts, (3) 8-hour shifts
If (2) 12-hour shifts - use shift 1-shift 2 boxes
If (3) 8-hour shifts - use shift 1-shift 2 and shift 3 boxes

ATTACHMENT 10.6
Page 4 of 4

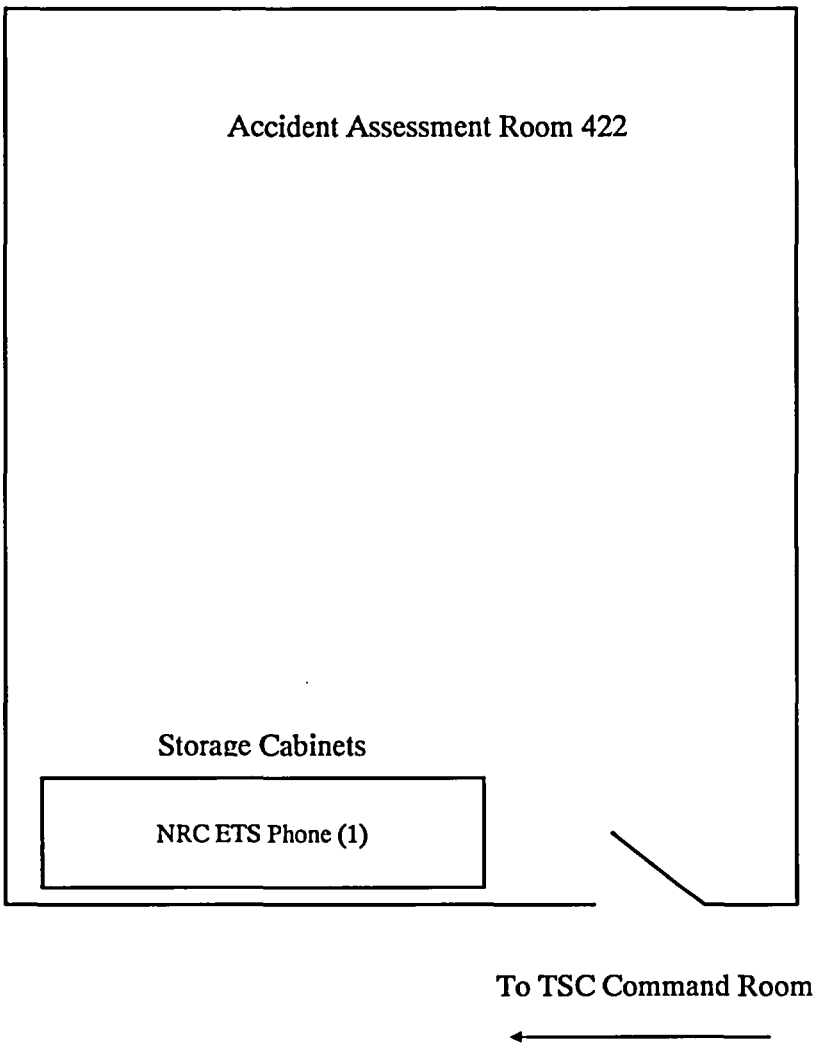
TECHNICAL SUPPORT CENTER (TSC) FOUR DAY WORK SCHEDULE

Position	Shift	Time*	Date / /	Date / /	Date / /	Date / /
Others:			Name	Name	Name	Name
	1					
	2					
	3					
			Name	Name	Name	Name
	1					
	2					
	3					
			Name	Name	Name	Name
	1					
	2					
	3					
			Name	Name	Name	Name
	1					
	2					
	3					
			Name	Name	Name	Name
	1					
	2					
	3					

* Shift times may vary - i.e., (2) 12-hour shifts, (3) 8-hour shifts
If (2) 12-hour shifts - use shift 1-shift 2 boxes
If (3) 8-hour shifts - use shift 1-shift 2 and shift 3 boxes

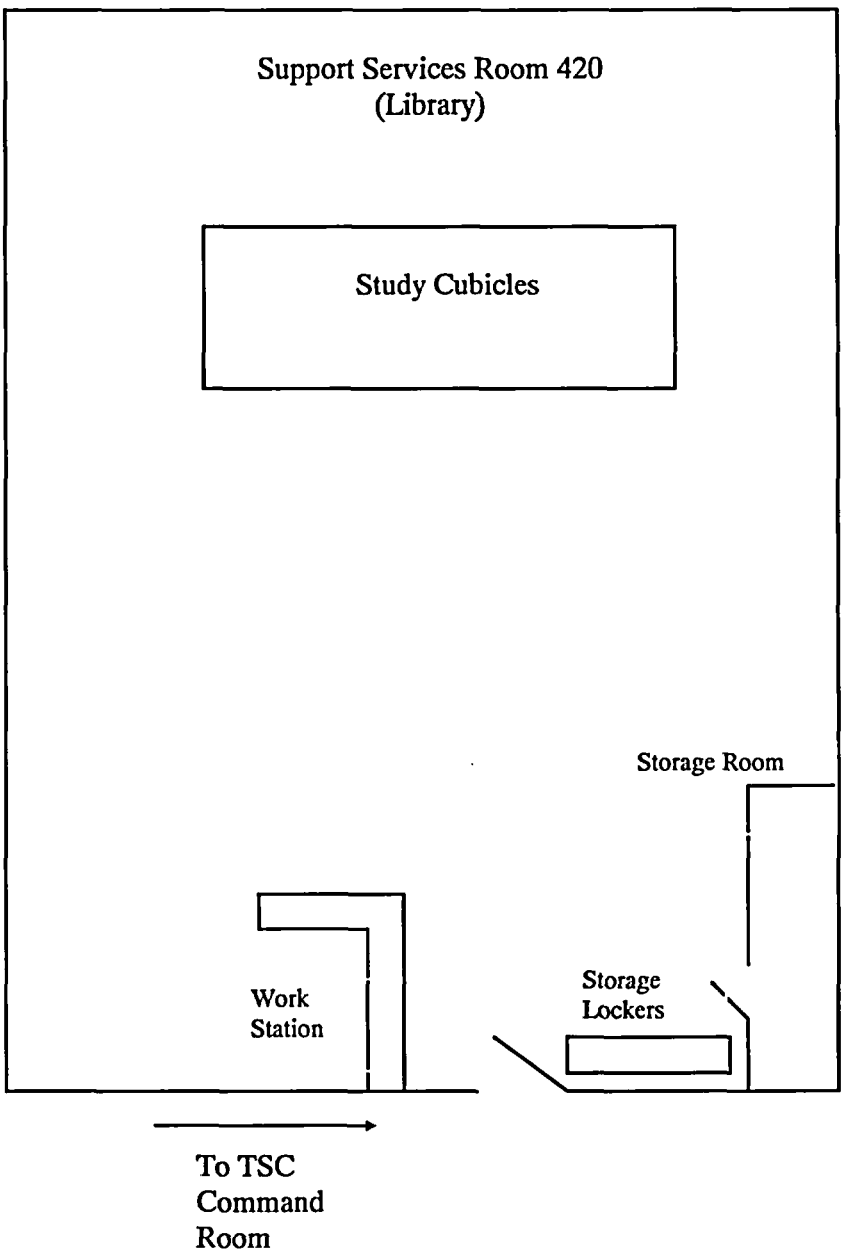
ATTACHMENT 10.7
Page 1 of 1

ACCIDENT ASSESSMENT ROOM RECOMMENDED LAYOUT



ATTACHMENT 10.8
Page 1 of 1

SUPPORT SERVICES ROOM RECOMMENDED LAYOUT



ATTACHMENT 10.9
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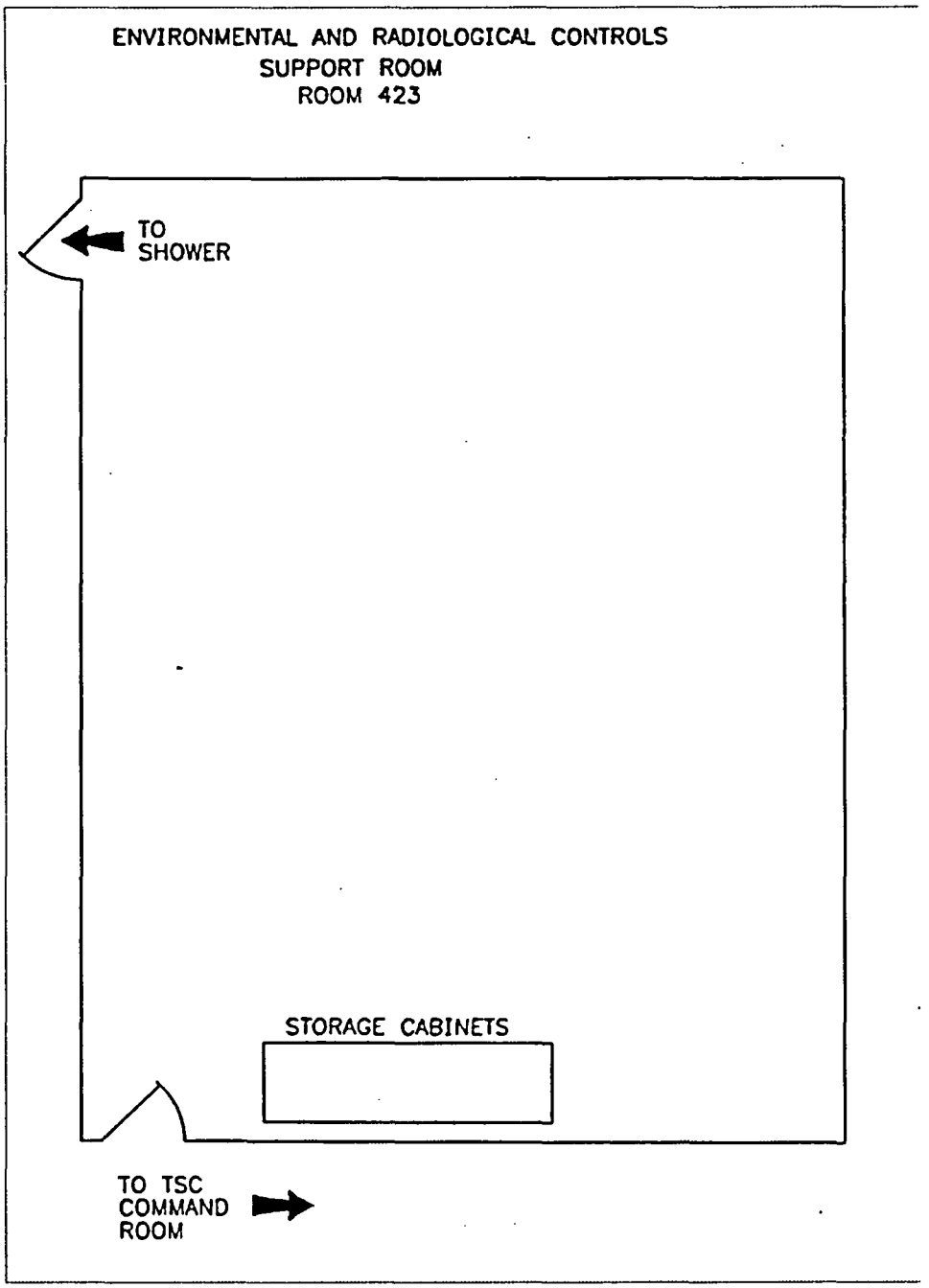
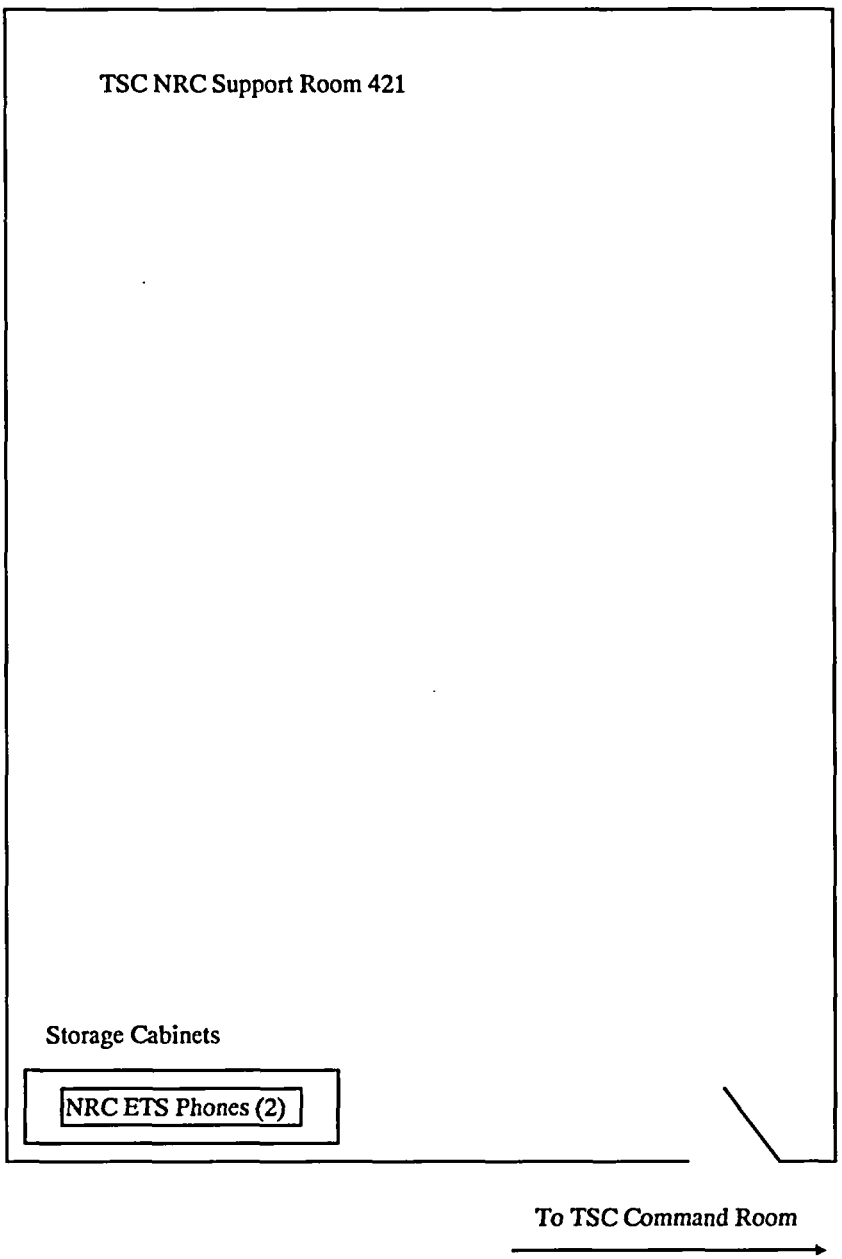
ENVIRONMENTAL & RADIOLOGICAL CONTROL SUPPORT ROOM
RECOMMENDED LAYOUT



ATTACHMENT 10.10
Page 1 of 1

TSC NRC SUPPORT ROOM
RECOMMENDED LAYOUT



ATTACHMENT 10.11
Page 1 of 1

ADMINISTRATIVE AND LOGISTICS MANAGER (A&LM) QUICK START GUIDE

NOTE: Blanks are provided for place keeping √'s only, logs are the official record.

This is a summary level guide and does not replace the procedure steps.

1. Sign-in on the facility sign-in board. Ensure copiers, fax machines, computers, phones are operable. _____

2. If Dialogic was used for callout, upon arrival at the Facility, notify Dialogic. _____

3. Track EOF/TSC augmentation using Attachment 10.1, EOF Sign-in Roster and Attachment 10.5, TSC Sign-in Roster. _____

4. Assign an A&LM staff member to report to the TSC to verify set-up of the Accident Assessment Room, Support Services Room and the Environmental & Radiation Control (E&RC) Room Recommended Layout per Attachment 10.7, Attachment 10.8 and Attachment 10.9. _____

5. Contact the Operations Support Center (OSC) Leader to track OSC augmentation. _____

6. Coordinate access and fitness for duty activities with the ESTL. _____

7. Request assistance from the ESTL for assigning an individual as Evacuation Assembly Area Leader. _____

8. At time of EOF activation, synchronize clocks with the Emergency Response Facility Information System (ERFIS). _____

9. Establish an EOF overflow facility, if required. _____

10. Ensure that appropriate access controls (e.g., doors locked, guard stationed) for the EOF/TSC have been instituted. _____

11. Receive plant status briefing. Conduct briefing as appropriate with staff located in the EOF and TSC. _____

12. Notify the Emergency Response Manager as to readiness to activate.

13. Refer to procedure steps. _____

Progress Energy

R
Reference
Use

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 2

PART 5

EPEOF-05

RADIOLOGICAL CONTROL MANAGER

REVISION 7

SUMMARY OF CHANGES
PRR 116604

STEP #	REVISION COMMENTS
Entire Procedure	Re-formatted to comply with AP-007 procedure format
Step 8.5.3.3.e	Deleted step for managing "facility habitability".
Quick Start Guide	Moved quick start guide to Attachments Deleted sentence 2 of Step 9 to "assess eating/drinking conditions for EOF/TSC..."

TABLE OF CONTENTS

1.0 PURPOSE

This procedure describes the functional responsibilities and procedure steps for the Radiological Control Manager (RCM).

2.0 REFERENCES

2.1 As per EPEOF-00.

3.0 RESPONSIBILITIES

3.1 Manage the radiological control activities in the Emergency Operations Facility (EOF).

3.2 Maintain awareness of meteorology, dose projections, environmental monitoring, and offsite radiological consequences.

3.3 Recommend protective actions to the Emergency Response Manager (ERM).

> **NOTE:** Sector boundaries are defined by the county/state officials and are represented by landmarks familiar to the public, thus appearing odd-shaped and protruding into the geometric 2-mile, 5-mile and 10-mile radii. Protective Action Recommendations (PARs) for a specific sector should be developed and made based on the requirement for the radius number it defines. PARs intended for the 2-mile radius apply only to those sectors which end in 0 (zero). PARs intended for the 5-mile radius only apply to those sectors, which end in 1. PARS intended for the 10-mile radius apply only to those sectors, which end in 2. (AR #48223)

3.4 Serve as liaison between the EOF and the Radiological Control Director (RCD) in the Technical Support Center (TSC) and corporate radiation control personnel.

3.5 Conduct ALARA review of engineering review and tasks proposed by the emergency organization.

4.0 PREREQUISITES

As per EPEOF-00.

5.0 PRECAUTIONS AND LIMITATIONS

As per EPEOF-00.

6.0 SPECIAL TOOLS AND EQUIPMENT

N/A

7.0 ACCEPTANCE CRITERIA

As per EPEOF-00.

8.0 INSTRUCTIONS

8.1 Upon notification, determine if conditions exist which would prevent immediate occupancy of the EOF and require personnel to report to the Alternate Assembly Area at the Darlington County Emergency Operations Center, 1625 Harry Byrd Highway (Highway 151), Darlington, SC.

8.2 Assess Radiological Control (RC) staff availability. The RC staff includes the Environmental Monitoring Team Leader (Enmon TL), the Dose Projection Team Leader (DPTL), the Environmental Monitoring Teams (Enmon Teams) and the Dose Projection Team (DPT).

8.3 Manage RC activities in the EOF to include:

8.3.1 Source term assessments,

8.3.2 Dose projection calculations,

8.3.3 Offsite radiological consequences (Enmon Teams),

8.3.4 Meteorological data (request each 1-hour, 3-hour, 24-hour, and 3 day forecast).

8.4 Assist with notifications to various state and county agencies regarding evacuation and sheltering.

8.5 Determine the need and availability of offsite assistance.

8.6 Ensure that necessary information is posted on displays and status boards. Including:

8.6.1 Offsite radiological status,

8.6.2 Protective Action Recommendations (PARs), and

8.6.3 10 mile emergency planning zone (EPZ) map,

8.7 Direct issuance of dosimetry as necessary.

8.8 Determine evacuation routes of personnel to and from the plant. All personnel not needed to mitigate the accident or casualty will be evacuated as Zone A-0 evacuees. If decontamination of personnel and vehicles is not currently being conducted at the plant, then decontamination will occur as for other Zone A-0 evacuees.

8.9 Based on plant data, dose projections and meteorology, determine the need for protective sheltering or evacuation, including appropriate routes. Utilize Attachment 10.2, Protective Action Recommendations, initially to determine prioritization.

NOTE: Sector boundaries are defined by the county/state officials and are represented by landmarks familiar to the public, thus appearing odd-shaped and protruding into the geometric 2-mile, 5-mile and 10-mile radii. Protective Action Recommendations (PARs) for a specific sector should be developed and made based on the requirement for the radius number it defines. PARs intended for the 2-mile radius apply only to those sectors which end in 0 (zero). PARs intended for the 5-mile radius only apply to those sectors, which end in 1. PARS intended for the 10-mile radius apply only to those sectors, which end in 2. (AR #48223)

8.10 Implement EPRAD-03, Dose Projections. This function is delegable to the Dose Projection Team Leader (DPTL). Confer with the DPTL to evaluate results and recommend protective actions. Consider the following:

8.10.1 Plume travel time for evacuation purposes (close-in sheltering vs. evacuation if the plume is already in route or if there will be a short term high dose period),

8.10.2 Evacuation times vs. plume dose duration, and

8.10.3 Hot spots resulting from plume deposition.

8.11 Utilize EPCLA-01, Emergency Control and the Protective Action Guides to assist in developing protective action recommendations.

8.12 Determine protective action recommendations (PARs) and recommend to the ERM.

8.12.1 PARs should be developed and notification of PARS should be initiated in $\leq$ 15 minutes of a General Emergency classification.

8.12.2 **IF** the event conditions (radiological or meteorological) change resulting in revised PARs, **THEN** the $\leq$ 15 minute timeliness standard is applicable.

8.12.3 **IF** field dose data result in a change in PARs, **THEN** the $\leq$ 15 minute time standard for PAR development applies from the time the field data is obtained **not** from the time the dose projection is completed. (AR #48774)

8.13 **IF** the dose projection is > 1 Rem Total Effective Dose Equivalent or 5 Rem Committed Dose Equivalent to the thyroid, **THEN** verify calculation of doses beyond the site boundary per EPRAD-03, Dose Projections.

8.14 Notify the DPTL of the status of Phase "A" isolation.

8.15 Obtain offsite radiological data from the Environmental Monitoring Team Leader (Enmon TL). Compare with results from the state and other offsite radiological data. Evaluate abnormal results.

8.16 Periodically confer with the Department of Health & Environmental Control (DHEC) regarding dose projections and environmental monitoring data.

8.17 Compare offsite monitoring results and dose projections against the Emergency Action Levels (EALs) to determine if the results warrant a change in emergency classification. Inform the Emergency Response Manager (ERM).

8.18 As requested by state officials, arrange for analysis of environmental samples by the Brunswick or Harris Plants or the Harris Energy & Environmental Center and for whole body counting and bioassay of affected offsite personnel.

8.19 Consider the administration of potassium iodide (KI) to the Environmental Monitoring (Enmon) Teams if the expected thyroid Committed Dose Equivalent will exceed 25 Rem.

8.19.1 **IF** radioiodine sample analysis results indicate air activity greater than 8.7E-07 μCi/cc I-131, **THEN** potassium iodide should be considered for affected workers. Exposure to radioiodine in this concentration will result in a thyroid dose of approximately 1 Rem for one hour of exposure.

8.20 Inform the ERM to recommend KI administration to the offsite agencies.

8.21 Review and approve the Dosimeter Correction Factor (DCF) Worksheet from EPEOF-06 prepared by the Dose Projections Team Leader (DPTL). The Dosimeter Correction Factor is always **ONE** unless:

8.21.1 A General Emergency has been declared, **AND**

8.21.2 All recommended off-site evacuations are complete, **AND**

8.21.3 A release is in progress.

8.21.4 **IF** all three conditions are true, **THEN** the exposure limit for the EnMon Teams shall be reduced by the Dosimeter Correction Factor (DCF) to account for internal dose.

8.22 Route the DCF form to the ERM for approval.

8.23 Approve exposure extensions.

8.24 Review PLP-021, "Chemical Storage, Inventory, Spill and Hazard Communication Program", for items to consider in the event of a chemical spill or accident.

8.24.1 Contact the Environmental Compliance Unit to determine reportability.

8.24.2 Ensure the settling pond is isolated from the discharge canal for spills directed toward storm drains.

8.25 Coordinate shift change with the Administration & Logistics Manager (ALM).

8.26 Develop recovery strategy.

9.0 RECORDS

9.1 Documentation generated as a result of the performance of this procedure should be forwarded to Emergency Preparedness for retention per EPPRO-01.

10.0 ATTACHMENTS

10.1 Protective Action Recommendations

10.2 Radiological Control Manager (RCM) Quick Start Guide

Attachment 10.1
Page 1 of 1

PROTECTIVE ACTION RECOMMENDATIONS

DETERMINATION OF AFFECTED ZONES BASED ON WIND DIRECTION
(EVACUATION TIME IN MINUTES)

WIND FROM	AFFECTED ZONES	WINTER WEEKDAY, FAIR WEATHER	WINTER WEEKNIGHT FAIR WEATHER	SUMMER WEEKDAY FAIR WEATHER	WINTER WEEKDAY, ADVERSE WEATHER
North (338° - 022°)	A-0, B-1, B-2, C-1, C-2, D-1, D-2	225	180	210	295
Northeast (023° - 067°)	A-0, C-1, D-1, D-2, E-2	225	180	210	295
East (068° - 112°)	A-0, D-1, D-2, E-1, E-2	225	180	210	295
Southeast (113° - 157°)	A-0, A-1, A-2, D-2, E-1, E-2	225	180	210	295
South (158° - 202°)	A-0, A-1, A-2, B-1, B-2, E-1, E-2	225	180	210	295
Southwest (203° - 247°)	A-0, A-1, A-2, B-1, B-2	225	180	210	295
West (248° - 292°)	A-0, B-1, B-2, C-1, C-2	225	180	210	295
Northwest (293° - 337°)	A-0, B-1, B-2, C-1, C-2, D-2	225	180	210	295
ALL ZONES (10 MILE RADIUS)		240	180	215	315

RADIOLOGICAL CONTROL MANAGER (RCM) QUICK START GUIDE

NOTE: Blanks are provided for place-keeping ✓s only; logs are the official record. This is a summary level guide and does not replace the procedure steps.

1. Sign-in on the facility sign-in board. Log on the Electronic Display System (EDS). _____
2. If dialogic was used for callout, upon arrival at the Facility, notify Dialogic. _____
3. Obtain briefing from Radiological Control Director (RCD) in the Technical Support Center (TSC) or the relieving RCM. _____
4. Assess radiological control staff availability. Notify additional resources if necessary. Brief radiological control staff. _____
5. Obtain a briefing on the cause of the emergency. _____
6. Review Emergency Action Level (EAL)/Protective Action Recommendation (PAR) status. _____
7. Obtain wind direction (degrees blowing from/to). _____
8. Determine the source term. _____
9. Check alignment of TSC/EOF ventilation through HEPA system (R-38). _____
10. Prompt dispatch of Environmental Monitoring Teams (Enmon Teams) downwind and verify locations. _____
11. Request updates from the Enmon Team Leader and the Dose Projection Team Leader (DPTL) every 30 minutes. _____
12. Establish contact with the Department of Health & Environmental Control. Refer to the ERO Telephone Directory. _____
13. Refer to procedure steps. _____

Progress Energy

R
Reference
Use

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 2

PART 5

EPRAD-01

ENVIRONMENTAL MONITORING

REVISION 13

SUMMARY OF CHANGES
PRR 117769

STEP	REVISION COMMENTS
Step 8.1.3.1.9.i Bullet 3	Editorial Correction: Revised redundant step "Open window radiation level at approximately six inches above ground" to "Closed window radiation level at approximately six inches above ground".

TABLE OF CONTENTS

8.1.1 PURPOSE

1. This procedure provides instructions for Radiological Assessment and Consequences. This procedure addresses in-plant/on-site monitoring and emergency off-site environmental monitoring.

8.1.2 RESPONSIBILITIES

1. The Environmental Monitoring Team Leader (EMTL) is responsible for the direction and completion of the applicable requirements of this procedure by the Environmental Monitoring Teams.

2. The Radiological Control Director (RCD) and the Environmental & Radiation Control (E&RC) Lead are responsible for the direction and completion of the applicable requirements of this procedure by the Radiation Monitoring Teams.

8.1.3 INSTRUCTIONS

8.1.3.1 Environmental Monitoring

1. The Emergency Environmental Monitoring teams shall report to the Emergency Operations Facility/Technical Support Center at the declaration of an Alert or higher emergency classification.

   a. Report to Room 420, the Training Building Library. Other areas may be used for mustering, as necessary, to expedite team dispatch.

2. Immediate dispatch of the Emergency Environmental Monitoring Teams should be performed as soon as the need arises.

   a. Activation of any facility need not be a precursor for team dispatch.

NOTE: Emergency Exposure limits are outlined in EPOSC-04, Emergency Work Control.

3. Obtain a briefing from the Site Emergency Coordinator (SEC) **OR** Radiological Control Manager (RCM) **OR**, RCD **OR** EMTL regarding the following:

   a. Required monitoring data (plume tracking, dose projection confirmation, expanded environmental monitoring, etc.)

   b. Anticipated levels of radiation

8.1.3.1 **Environmental Monitoring** (Continued)

c. Suggested routes/sample points,

d. Required protective gear

e. Required dosimetry, TLD, and

f. Exposure limits allowed.

4. Obtain necessary calibrated monitoring and support equipment from designated areas:

   a. Environmental Monitoring emergency monitoring kits are located in the mechanical equipment room in the EOF/TSC.

      – The Environmental Monitoring team will ensure that R-38 ventilation has been switched from "Auto" to "Hand".

   b. The portable emergency generators are located in the auto maintenance facility (Building 440 east of the GET Bldg.)

5. Emergency Environmental Monitoring off site should proceed as follows:

   a. Obtain survey vehicles and emergency kits as needed.

   b. Verify gas is available for survey vehicles and emergency generators.

   c. Make quick visual check of the Emergency kit inventory.

      – Verify calibration dates on survey instruments and air samplers.

      – Battery check instruments

8.1.3.1 **Environmental Monitoring** (Continued)

6. Verify radio communications with the EMTL via channel 1-A. Range of the Environmental radios is approximately 20 miles.

   a. Turn radio on using the "Vol-Off" knob.

   b. "SLF-t S t" for self test will appear, when finished a beep will be heard.

   c. Verify channel 1-A is indicated. IF not, THEN press the up or down arrows until the 1-A appears.

   d. To talk, key the radio, wait for the tone, then speak.

7. Issue dosimetry to each team member. Record TLD and SRPD numbers on Attachment 8.1.5.2, Personnel Dose Data.

8. Test start emergency generators to ensure proper operation.

   – Start outside building to avoid carbon monoxide hazard.

9. Load air samplers with Iodine Cartridge(Silver Zeolite) and a particulate filter. The rough surface of the filter paper should face the open side of the filter.

   – Charcoal iodine cartridge may be used in drills/exercises.

10. Load emergency kits and generators into survey vehicle(s).

    a. The Potassium Iodide (KI) for the remote facility emergency kit is located in the locked cabinet with the laptop computers.

    b. For an actual radiological event, retrieve the KI from the locked cabinet and place in the emergency kit.

CAUTION

Prior to entering the plume, vehicle ventilation should be turned to the recirculation mode or turned off to minimize personnel exposure and internal contamination of the vehicle.

11. Locate the plume or confirm off-site doses as follows.

    a. Obtain current information from the EMTL.

        - Wind direction
        - Initial survey location
        - Expected radiation levels
        - Protective equipment required

    b. Travel downwind to initial survey location observing the compass heading.

    c. Maintain contact with EMTL at least every 30 minutes via radio or phone.

        - Attachment 8.1.5.6, Communications Log, may be used to document communications.
        - If desired, the EMTL may maintain all communications records.

8.1.3.1 **Environmental Monitoring** (Continued)

d. At each designated location, travel at a right angle to the reported wind direction using the most convenient roadway.

NOTE: A micro-Rem survey instrument or equivalent may be required to detect small releases.

- Travel into the plume, observing odometer and compass readings that coincide with the entrance, maximum, and exit radiation levels as indicated by survey meter.
- Maintain survey instruments on and near a window or windshield.
- Drive slowly to ensure accurate readings and locations.
- Report readings greater than or equal to 0.2 mRem/hr to the EMTL.

e. Repeat survey traveling in the opposite direction.

f. Proceed to the location of the maximum dose rate and collect, as a minimum, a 20 ft^3 air sample. **{RNP RA/01-0164; NRC Amendment No. 192: PASS Elimination}.**

NOTE: The sample period is based on collecting sufficient volume to attain the sensitivity necessary to detect the radioactive concentration. A ten (10) minute air sample at 2 scfm flow rate provides sufficient volume to meet the requirement to measure/detect 1.0E-07 µCi/cc for radioiodines when using the appropriate curve. **{RNP RA/01-0164; NRC Amendment No. 192: PASS Elimination}**

g. Place the air sampler so that the exhaust does not stir up loose contamination which would interfere with obtaining a representative sample.

h. Note the sample start and stop times to the nearest whole minute.

- If no suitable timing device is available, contact the EMTL for "marks" on start and stop times.

NOTE: If NO significant difference is noted in the open window and closed window readings, this indicates that the plume is overhead. If there is a significant difference this indicates that the plume is at ground level.

i. While the air sample is being drawn, perform the following:

- Closed window radiation level at approximately waist level (1 meter from ground).
- Open window radiation level at approximately waist level (1 meter from ground).
- Closed window radiation level at approximately six inches above ground.
- Open window radiation level at approximately six inches above ground.
- Record dose rates in the Radiation Levels section on Attachment 8.1.5.1, Environmental Data.

j. Periodically read dosimeters **AND** report any off-scale readings to the EMTL immediately.

k. Proceed to a location outside the plume.

l. Remove the particulate filter and iodine cartridge from the air sampler and place in separate, clean plastic bags.

- Use tweezers or gloves to prevent cross contamination.
- Mark the bags with sample start/stop times, sample flow rate, activity in ccpm, ambient radiation levels, date, location, volume, and initials of team member.

8.1.3.1 Environmental Monitoring (Continued)

m. Conduct a field estimate of the airborne iodine activity **AND** the airborne particulate activity using a frisker type instrument with pancake probe (such as LM-177/44-9 combination) as follows:

- Move to a relatively low background area then measure **AND** note the background radiation levels.
- Measure the initial activity of the iodine cartridge by placing the probe on contact with each side of the bag **AND** note the highest reading.
- Determine the corrected counts per minute (ccpm) of the iodine cartridge by subtracting the background reading from the initial sample reading.
- Record the ccpm in the blank for the initial cartridge reading on Attachment 8.1.5.1.

NOTE: If the activity of the second measurement is within 25% of the initial measurement for the iodine cartridge, then it should be presumed that radioiodines are present, pending isotopic analysis.

- Wait for five minutes to allow the cartridge to off-gas.
- Repeat the measurement process for the iodine cartridge on contact with each side of the bag
- Record the ccpm in the blank for the final cartridge reading on Attachment 8.1.5.1.

n. Repeat the measurement process for the particulate filter.

- Record the ccpm values for initial particulate reading and the final particulate reading on Attachment 8.1.5.1 as appropriate.

o. Report field estimates (marked with an asterisk *) from Attachment 8.1.5.1 to the EMTL for entry into the dose projections program.

8.1.3.1 **Environmental Monitoring** (Continued)

p. Determine the estimated radioiodine airborne activity (estimated I-131) in µCi/cc using the highest calculated sample activity (ccpm) and the calculated sample volume from the chart on Attachment 8.1.5.3, Iodine Activity with a Frisker **AND** record the results in µCi/cc in the Airborne Levels section of Attachment 8.1.5.1.

q. Report estimated I-131 activity of 8.7 E-07 µCi/cc or greater to the EMTL to aid in evaluation of field protective action considerations for team members.

r. Determine the estimated particulate activity in µCi/cc using the highest calculated sample activity (ccpm) and the calculated sample volume from the chart on Attachment 8.1.5.4, Particulate Activity with a Frisker **AND** record the results in µCi/cc in the Airborne Levels section of Attachment 8.1.5.1.

s. After appropriate samples are collected, return the samples to the site or other designated location for further analysis as directed by the EMTL.

t. Perform expanded environmental monitoring as assigned by the EMTL.

- Place additional environmental TLDs as directed by the EMTL. Environmental Monitoring Procedures contain locations for TLDs and routine monitoring. Attachment 8.1.5.7 contains the log sheet for TLD locations.

12. Collect Environmental samples as directed by the EMTL.

a. Attachment 8.1.5.5, Collection of Environmental Samples establishes the method for collecting various liquid, soil, and vegetation samples.

b. Environmental samples will be collected as conditions permit.

c. Additional sampling instructions, where required, should be requested from the EMTL.

8.1.3.1 **Environmental Monitoring** (Continued)

d. All samples collected should be labeled as follows:

- sample type,
- location,
- date and time,
- activity upon collection,
- initials and team designation of sample collector.

e. Deliver samples to the designated location as directed by the EMTL.

- Ensure samples are properly labeled and the sample container is not externally contaminated. Sample may be placed in another "clean" bag/container.

- Brief the sample recipient/courier on the radiological conditions of the samples.

8.1.3.2 **In-Plant/On-site Radiological Monitoring**

1. Obtain necessary calibrated monitoring and support equipment from designated areas.

   a. Radiation monitoring equipment for in-plant/on-site monitoring is located in the OSC storage location.

   b. Communications equipment available for use includes radios, cell phones, and the public address system.

2. For Damage Control Teams entries, observe the following:

   a. Use surveying and sampling practices as per the normal health physic practices.

      - Normal plant maps may be used for documentation of all surveys and air samples.

   b. Under emergency conditions, monitor radiation levels continuously while proceeding to the requested locations.

      - Document any unanticipated high radiation levels incurred while in route.

8.1.3.2 **In-Plant/On-site Radiological Monitoring** (Continued)

c. Report any unanticipated high radiation levels incurred, while in route, to the E&RC Lead.

d. Samples are to be counted in the Chemistry Lab if available.

- Assure adequate integrity of sample containers and strict handling to avoid contamination of the facilities.
- All samples of greater than 2 Rem/hr will be handled as Very High Level Radioactive Samples (EPRAD-02, Processing Very High Level Radioactive Samples).
- If Robinson facilities are not available consider:
  - The use of other Progress Energy sites, or
  - Request State/Federal assistance through the State of South Carolina.

3. Habitability will meet the following criteria unless other wise directed by the RCD.

   a. Less than 5 mRem/hr direct radiation,

   b. Less than 1000 dpm/100cm^2 contamination,

   c. Less than 0.25 DAC airborne.

4. Perform surveys as per normal health physics practices in all areas which must remain habitable. Attachment 8.1.5.7 contains a log sheet for area TLD locations. Consideration should be given to placing TLDS in the following areas:

   a. OSC

   b. TSC

   c. EOF

   d. Assembly Areas

   e. Machine Shops

   f. Counting Room

   g. Administrative Building

8.1.3.2 **In-Plant/On-site Radiological Monitoring** (Continued)

5. As emergency facilities become inhabited, provisions for personnel monitoring at ingress/egress points must be set up in concert with Security Access Control.

   a. See EPSPA-00, Site Protective Actions, for details on Access Control.

8.1.4 **RECORDS**

1. Forward documentation generated during an emergency or drill/exercise to the Emergency Preparedness Staff.

   – Attachments/documentation generated during an emergency will be maintained in the plant vault as vital records.

   – Attachments/documentation generated during a drill/exercise may be maintained in the EP files.

8.1.5 **ATTACHMENTS**

8.1.5.1 Environmental Data

8.1.5.2 Personnel Dose Data

8.1.5.3 Iodine Activity With a Frisker

8.1.5.4 Particulate Activity With a Frisker

8.1.5.5 Collection of Environmental Samples

8.1.5.6 Communications Log

8.1.5.7 Area Dosimetry Log Sheet

ENVIRONMENTAL DATA

Date: _____ Log Page _____ of _____

FIELD TEAM DATA

Team ID: _____ Team Members: _____

Survey Instrument Model/Serial #: _____ Survey Instrument Model/Serial #: _____

Air Sampler Model/Serial #: _____ Frisker Model/Serial #: _____

RADIATION LEVELS

Instrument Used: _____		Dose Rates (mrem/hr)			
Time	**Location/Coordinates (degrees/miles)**	**1 Meter* Closed Window**	**1 Meter Open Window**	**6 Inch* Closed Window**	**6 Inch Open Window**

AIRBORNE LEVELS

Time	Location/Coordinates (degrees/miles)	Sample Volume* (Minutes x Flow Rate)	Initial Cartridge (ccpm) / Initial Particulate (ccpm)	Final Cartridge (ccpm)* / Final Particulate (ccpm)	Cartridge** (µCi/cc) / Particulate (µCi/cc)
		*	C	*	
			P		
		*	C	*	
			P		
		*	C	*	
			P		
		*	C	*	
			P		
		*	C	*	
			P		

*Report closed window (gamma dose rate) readings and iodine cartridge results in **ccpm** to the EMTL for entry into the Dose Projections Program.

Report estimated I-131 activity of **8.7E-07 µCi/cc or greater to the EMTL to aid in evaluation of field protective action considerations.

PERSONNEL DOSE DATA

NAME	EMT#	TLD #	SRPD#	INITIAL DOSIMETER READING (mRem)	FINAL DOSIMETER READING (mRem)

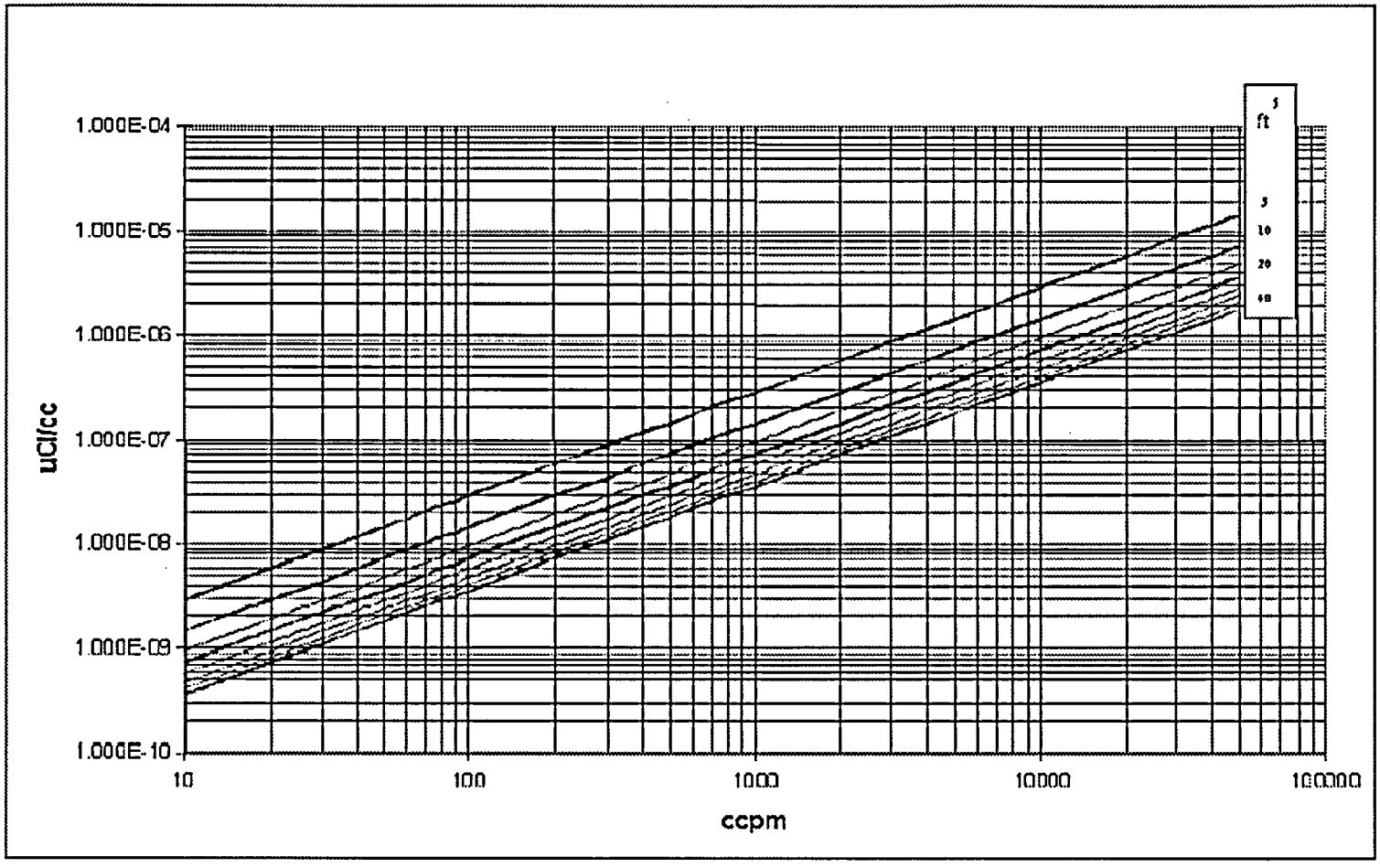
ATTACHMENT 8.1.5.3
Page 1 of 2

IODINE ACTIVITY WITH A FRISKER

CCPM	TOTAL VOLUME (CUBIC FEET)										
	10	12	15	20	25	30	40	50	60	70	80
50	6.5E-08	5.4E-08	4.4E-08	3.3E-08	2.6E-08	2.2E-08	1.6E-08	1.3E-08	1.1E-08	9.3E-09	8.2E-09
100	1.3E-07	1.1E-07	8.7E-08	6.5E-08	5.2E-08	4.4E-08	3.3E-08	2.6E-08	2.2E-08	1.9E-08	1.6E-08
200	2.6E-07	2.2E-07	1.7E-07	1.3E-07	1.0E-07	8.7E-08	6.5E-08	5.2E-08	4.4E-08	3.7E-08	3.3E-08
300	3.9E-07	3.3E-07	2.6E-07	2.0E-07	1.6E-07	1.3E-07	9.8E-08	7.8E-08	6.5E-08	5.6E-08	4.9E-08
400	5.2E-07	4.4E-07	3.5E-07	2.6E-07	2.1E-07	1.7E-07	1.3E-07	1.0E-07	8.7E-08	7.5E-08	6.5E-08
500	6.5E-07	5.4E-07	4.4E-07	3.3E-07	2.6E-07	2.2E-07	1.6E-07	1.3E-07	1.1E-07	9.3E-08	8.2E-08
600	7.8E-07	6.5E-07	5.2E-07	3.9E-07	3.1E-07	2.6E-07	2.0E-07	1.6E-07	1.3E-07	1.1E-07	9.8E-08
700	9.2E-07	7.6E-07	6.1E-07	4.6E-07	3.7E-07	3.1E-07	2.3E-07	1.8E-07	1.5E-07	1.3E-07	1.1E-07
800	1.0E-06	8.7E-07	7.0E-07	5.2E-07	4.2E-07	3.5E-07	2.6E-07	2.1E-07	1.7E-07	1.5E-07	1.3E-07
900	1.2E-06	9.8E-07	7.8E-07	5.9E-07	4.7E-07	3.9E-07	2.9E-07	2.4E-07	2.0E-07	1.7E-07	1.5E-07
1000	1.3E-06	1.1E-06	8.7E-07	6.5E-07	5.2E-07	4.4E-07	3.3E-07	2.6E-07	2.2E-07	1.9E-07	1.6E-07
1500	2.0E-06	1.6E-06	1.3E-06	9.8E-07	7.8E-07	6.5E-07	4.9E-07	3.9E-07	3.3E-07	2.8E-07	2.5E-07
2000	2.6E-06	2.2E-06	1.7E-06	1.3E-06	1.0E-06	8.7E-07	6.5E-07	5.2E-07	4.4E-07	3.7E-07	3.3E-07
2500	3.3E-06	2.7E-06	2.2E-06	1.6E-06	1.3E-06	1.1E-06	8.2E-07	6.5E-07	5.4E-07	4.7E-07	4.1E-07
3000	3.9E-06	3.3E-06	2.6E-06	2.0E-06	1.6E-06	1.3E-06	9.8E-07	7.8E-07	6.5E-07	5.6E-07	4.9E-07
3500	4.6E-06	3.8E-06	3.1E-06	2.3E-06	1.8E-06	1.5E-06	1.1E-06	9.2E-07	7.6E-07	6.5E-07	5.7E-07
4000	5.2E-06	4.4E-06	3.5E-06	2.6E-06	2.1E-06	1.7E-06	1.3E-06	1.0E-06	8.7E-07	7.5E-07	6.5E-07
5000	6.5E-06	5.4E-06	4.4E-06	3.3E-06	2.6E-06	2.2E-06	1.6E-06	1.3E-06	1.1E-06	9.3E-07	8.2E-07
6000	7.8E-06	6.5E-06	5.2E-06	3.9E-06	3.1E-06	2.6E-06	2.0E-06	1.6E-06	1.3E-06	1.1E-06	9.8E-07
7000	9.2E-06	7.6E-06	6.1E-06	4.6E-06	3.7E-06	3.1E-06	2.3E-06	1.8E-06	1.5E-06	1.3E-06	1.1E-06
8000	1.0E-05	8.7E-06	7.0E-06	5.2E-06	4.2E-06	3.5E-06	2.6E-06	2.1E-06	1.7E-06	1.5E-06	1.3E-06
9000	1.2E-05	9.8E-06	7.8E-06	5.9E-06	4.7E-06	3.9E-06	2.9E-06	2.4E-06	2.0E-06	1.7E-06	1.5E-06
10000	1.3E-05	1.1E-05	8.7E-06	6.5E-06	5.2E-06	4.4E-06	3.3E-06	2.6E-06	2.2E-06	1.9E-06	1.6E-06
15000	2.0E-05	1.6E-05	1.3E-05	9.8E-06	7.8E-06	6.5E-06	4.9E-06	3.9E-06	3.3E-06	2.8E-06	2.5E-06
20000	2.6E-05	2.2E-05	1.7E-05	1.3E-05	1.0E-05	8.7E-06	6.5E-06	5.2E-06	4.4E-06	3.7E-06	3.3E-06
25000	3.3E-05	2.7E-05	2.2E-05	1.6E-05	1.3E-05	1.1E-05	8.2E-06	6.5E-06	5.4E-06	4.7E-06	4.1E-06
30000	3.9E-05	3.3E-05	2.6E-05	2.0E-05	1.6E-05	1.3E-05	9.8E-06	7.8E-06	6.5E-06	5.6E-06	4.9E-06
35000	4.6E-05	3.8E-05	3.1E-05	2.3E-05	1.8E-05	1.5E-05	1.1E-05	9.2E-06	7.6E-06	6.5E-06	5.7E-06
40000	5.2E-05	4.4E-05	3.5E-05	2.6E-05	2.1E-05	1.7E-05	1.3E-05	1.0E-05	8.7E-06	7.5E-06	6.5E-06
50000	6.5E-05	5.4E-05	4.4E-05	3.3E-05	2.6E-05	2.2E-05	1.6E-05	1.3E-05	1.1E-05	9.3E-06	8.2E-06

Estimated I-131 activity in air versus corrected counts per minute (CCPM) using Ludlum 177 with pancake probe. The average detector efficiency (DE) is 0.0015. Cartridge collection efficiency (CCE) is 0.90. The formula for calculating I-131 activity is $\mu Ci/cc = \frac{CCPM}{Volume\ (cc) \times DE. \times CCE \times 2.22\ E6\ (DPM/\mu Ci)}$

IODINE ACTIVITY WITH A FRISKER



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ATTACHMENT 8.1.5.4
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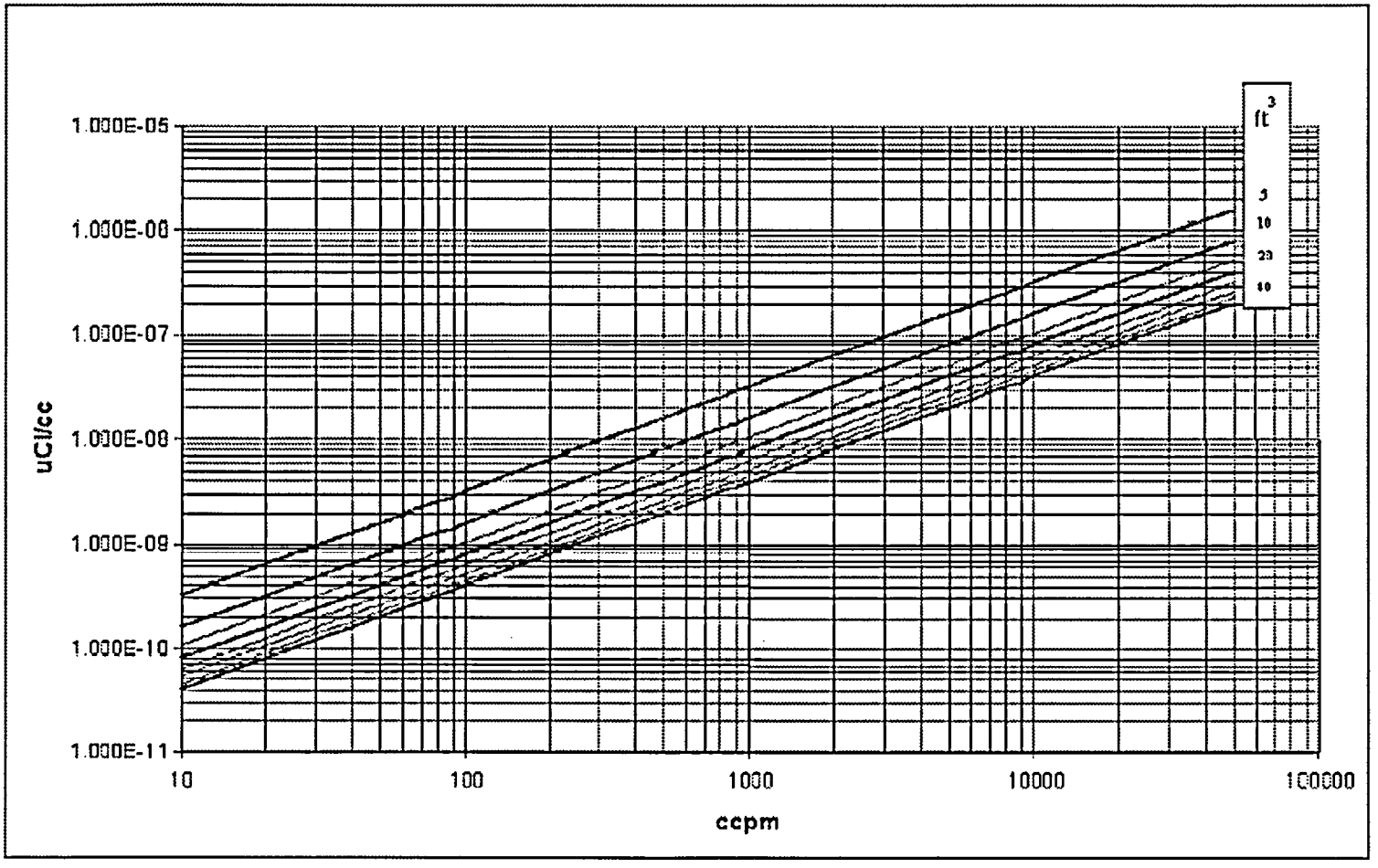
PARTICULATE ACTIVITY WITH A FRISKER

CCPM	TOTAL VOLUME (CUBIC FEET)										
	10	12	15	20	25	30	40	50	60	70	80
50	8.4E-10	7.0E-10	5.6E-10	4.2E-10	3.3E-10	2.8E-10	2.1E-10	1.7E-10	1.4E-10	1.2E-10	1.0E-10
100	1.7E-09	1.4E-09	1.1E-09	8.4E-10	6.7E-10	5.6E-10	4.2E-10	3.3E-10	2.8E-10	2.4E-10	2.1E-10
200	3.3E-09	2.8E-09	2.2E-09	1.7E-09	1.3E-09	1.1E-09	8.4E-10	6.7E-10	5.6E-10	4.8E-10	4.2E-10
300	5.0E-09	4.2E-09	3.3E-09	2.5E-09	2.0E-09	1.7E-09	1.3E-09	1.0E-09	8.4E-10	7.2E-10	6.3E-10
400	6.7E-09	5.6E-09	4.5E-09	3.3E-09	2.7E-09	2.2E-09	1.7E-09	1.3E-09	1.1E-09	9.6E-10	8.4E-10
500	8.4E-09	7.0E-09	5.6E-09	4.2E-09	3.3E-09	2.8E-09	2.1E-09	1.7E-09	1.4E-09	1.2E-09	1.0E-09
600	1.0E-08	8.4E-09	6.7E-09	5.0E-09	4.0E-09	3.3E-09	2.5E-09	2.0E-09	1.7E-09	1.4E-09	1.3E-09
700	1.2E-08	9.8E-09	7.8E-09	5.9E-09	4.7E-09	3.9E-09	2.9E-09	2.3E-09	2.0E-09	1.7E-09	1.5E-09
800	1.3E-08	1.1E-08	8.9E-09	6.7E-09	5.4E-09	4.5E-09	3.3E-09	2.7E-09	2.2E-09	1.9E-09	1.7E-09
900	1.5E-08	1.3E-08	1.0E-08	7.5E-09	6.0E-09	5.0E-09	3.8E-09	3.0E-09	2.5E-09	2.2E-09	1.9E-09
1000	1.7E-08	1.4E-08	1.1E-08	8.4E-09	6.7E-09	5.6E-09	4.2E-09	3.3E-09	2.8E-09	2.4E-09	2.1E-09
1500	2.5E-08	2.1E-08	1.7E-08	1.3E-08	1.0E-08	8.4E-09	6.3E-09	5.0E-09	4.2E-09	3.6E-09	3.1E-09
2000	3.3E-08	2.8E-08	2.2E-08	1.7E-08	1.3E-08	1.1E-08	8.4E-09	6.7E-09	5.6E-09	4.8E-09	4.2E-09
2500	4.2E-08	3.5E-08	2.8E-08	2.1E-08	1.7E-08	1.4E-08	1.0E-08	8.4E-09	7.0E-09	6.0E-09	5.2E-09
3000	5.0E-08	4.2E-08	3.3E-08	2.5E-08	2.0E-08	1.7E-08	1.3E-08	1.0E-08	8.4E-09	7.2E-09	6.3E-09
3500	5.9E-08	4.9E-08	3.9E-08	2.9E-08	2.3E-08	2.0E-08	1.5E-08	1.2E-08	9.8E-09	8.4E-09	7.3E-09
4000	6.7E-08	5.6E-08	4.5E-08	3.3E-08	2.7E-08	2.2E-08	1.7E-08	1.3E-08	1.1E-08	9.6E-09	8.4E-09
5000	8.4E-08	7.0E-08	5.6E-08	4.2E-08	3.3E-08	2.8E-08	2.1E-08	1.7E-08	1.4E-08	1.2E-08	1.0E-08
6000	1.0E-07	8.4E-08	6.7E-08	5.0E-08	4.0E-08	3.3E-08	2.5E-08	2.0E-08	1.7E-08	1.4E-08	1.3E-08
7000	1.2E-07	9.8E-08	7.8E-08	5.9E-08	4.7E-08	3.9E-08	2.9E-08	2.3E-08	2.0E-08	1.7E-08	1.5E-08
8000	1.3E-07	1.1E-07	8.9E-08	6.7E-08	5.4E-08	4.5E-08	3.3E-08	2.7E-08	2.2E-08	1.9E-08	1.7E-08
9000	1.5E-07	1.3E-07	1.0E-07	7.5E-08	6.0E-08	5.0E-08	3.8E-08	3.0E-08	2.5E-08	2.2E-08	1.9E-08
10000	1.7E-07	1.4E-07	1.1E-07	8.4E-08	6.7E-08	5.6E-08	4.2E-08	3.3E-08	2.8E-08	2.4E-08	2.1E-08
15000	2.5E-07	2.1E-07	1.7E-07	1.3E-07	1.0E-07	8.4E-08	6.3E-08	5.0E-08	4.2E-08	3.6E-08	3.1E-08
20000	3.3E-07	2.8E-07	2.2E-07	1.7E-07	1.3E-07	1.1E-07	8.4E-08	6.7E-08	5.6E-08	4.8E-08	4.2E-08
25000	4.2E-07	3.5E-07	2.8E-07	2.1E-07	1.7E-07	1.4E-07	1.0E-07	8.4E-08	7.0E-08	6.0E-08	5.2E-08
30000	5.0E-07	4.2E-07	3.3E-07	2.5E-07	2.0E-07	1.7E-07	1.3E-07	1.0E-07	8.4E-08	7.2E-08	6.3E-08
35000	5.9E-07	4.9E-07	3.9E-07	2.9E-07	2.3E-07	2.0E-07	1.5E-07	1.2E-07	9.8E-08	8.4E-08	7.3E-08
40000	6.7E-07	5.6E-07	4.5E-07	3.3E-07	2.7E-07	2.2E-07	1.7E-07	1.3E-07	1.1E-07	9.6E-08	8.4E-08
50000	8.4E-07	7.0E-07	5.6E-07	4.2E-07	3.3E-07	2.8E-07	2.1E-07	1.7E-07	1.4E-07	1.2E-07	1.0E-07

Estimated particulate activity versus corrected counts per minute (CCPM) using Ludlum 177 with pancake probe. The average detector efficiency (DE) is 0.10. Filter collection efficiency (FCE) is 0.95. The formula for calculating particulate activity is μCi/cc = $\frac{\text{CCPM}}{\text{Volume (cc) x DE. x FCE x 2.22 E6 (dpm/}\mu\text{Ci)}}$

PARTICULATE ACTIVITY WITH A FRISKER



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COLLECTION OF ENVIRONMENTAL SAMPLES

SAMPLE TYPE	PRECAUTIONS	METHODS AND GUIDELINES
SOIL	1. Assume **ALL** samples are contaminated and handle using techniques to prevent cross-contamination. 2. Do not seal the container of soil **UNTIL** the sample is delivered to the sample control point for transport/analysis. This will permit radon gases to off-gas.	1. **When possible, select an open, level area for sampling.** Avoid areas that are shielded by buildings, trees, bushes, or dense vegetation. Avoid areas that show evidence of erosion water runoff or poor drainage. 2. Clear an area 5" x 5" of rocks, litter, and non-soil items. 3. Using a scoop or trowel, evenly dig out enough soil (including any vegetation) from the 5" x 5" area to a depth of 1" (~5 cm). This should yield a sample of ~400 ml. 4. Place soil in container. 5. Label sample container.
POTABLE WATER	1. Assume **ALL** samples are contaminated and handle using techniques to prevent cross-contamination.	1. Collect at least 1-gallon sample of drinking water. 2. Flush sample lines and rinse sample container before filling. 3. Cap and label sample container.
SURFACE WATER	1. Assume **ALL** samples are contaminated and handle using techniques to prevent cross-contamination.	1. Surface water samples from the plant cooling water and discharge structures may be collected from the automatic samples (SW 40 & 41, refer to EMP-001, Attachment 11.1, for sample location.) 2. If samplers are out-of-service, obtain a grab sample from boat, bridge, or shore. **Note:** More specific sampling instructions will be provided by the EMT Leader. 3. If possible collect 1-gallon sample and secure tightly. 4. Label sample container.

COLLECTION OF ENVIRONMENTAL SAMPLES

SAMPLE TYPE	PRECAUTIONS	METHODS AND GUIDELINES
SNOW & ICE	1. Assume **ALL** samples are contaminated and handle using techniques to prevent cross-contamination.	1. Obtain the equivalent of 500 ml liquid of snow or ice samples for analysis. This may require collection in 4-liter sample containers. 2. Label the sample container.
VEGETATION & CROPS	1. Assume **ALL** samples are contaminated and handle using techniques to prevent cross-contamination.	1. Obtain small bag (~12"x12") samples of broad leaf vegetables and/or other vegetation as directed by the EMT Leader. 2. **IF** milk is to be collected, **THEN** collect 1000 gram samples of pasture grass as close to the roots as possible without including dirt in the sample. 3. If possible, tree leaves should be sampled from outermost part of tree. 4. Large, leafy vegetation is better than small. 5. Ground covers should be selected from open areas. 6. Label the sample container.
MILK	1. Assume **ALL** samples are contaminated and handle using techniques to prevent cross-contamination.	1. Sampling should begin the day after an atmospheric release of radioactive material and every 2 days thereafter until levels of I-131 return to normal. Note: Peak Iodine(I-131) activity is expected on Day 3 following the release. 2. If available, collect at minimum a 1-gallon sample from a thoroughly mixed tank **OR** from a single milk cow. 3. Collect approximately 1000 grams of pasture grass and/or feed whenever milk samples are collected. 4. Label the sample containers.

ATTACHMENT 8.1.5.6
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COMMUNICATIONS LOG

Location: _____ Device: _____
Include Telephone # or Radio Call Sign

Date: _____

Time	Call From	Call To	Remarks (include data transmitted and decisions or recommendations made)

This log is to be routed to the Radiological Control Manager.

ATTACHMENT 8.1.5.7
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AREA DOSIMETRY LOG SHEET

Location	Dosimeter #	Time/Date of Placement	Time/Date of Retrieval	Comments

Progress Energy	R Reference Use

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 2

PART 5

EPTSC-04

RADIOLOGICAL CONTROL DIRECTOR

REVISION 8

SUMMARY OF CHANGES
PRR 98820

SECTION	REVISION COMMENTS
All	Changed layout to match the AP-007 layout
Step 8.4.4	Deleted the phrase "as decided by the RCM and ERM" and added step concerning eating and drinking restrictions.
Step 8.8	Added step to determine the frequency for conduct of habitability surveys and to direct the RC Technician to communicate the habitability results. (NCR 106839)
Att 10.1	Moved Quick Start Guide to an Attachment.

TABLE OF CONTENTS

1.0 PURPOSE

This procedure describes the functional responsibilities and procedure steps for the Radiological Control Director (RCD).

2.0 REFERENCES

2.1 As per EPTSC-00.

3.0 RESPONSIBILITIES

3.1 Manage the radiological control activities in the Technical Support Center (TSC).

3.2 Monitor meteorology, onsite radiological consequences, and dose projections.

3.3 Liaison with the Radiological Control Manager (RCM) in the Emergency Operations Facility (EOF).

3.4 To protect security officers during performance of their duties, inform the Emergency Security Team Leader of changing radiological conditions.

3.5 Ensure that the radiation exposure for off-site emergency personnel is documented as occupational dose. This applies only for those personnel who are assigned emergency responsibilities within the 1400 foot boundary from the centerline of the reactor. (AR #82619).

4.0 PREREQUISITES

As per EPTSC-00.

5.0 PRECAUTIONS AND LIMITATIONS

As per EPTSC-00.

6.0 SPECIAL TOOLS AND EQUIPMENT

N/A

7.0 ACCEPTANCE CRITERIA

As per EPTSC-00.

8.0 INSTRUCTIONS

> **NOTE:** The Radiation Control (RC) Technician on shift will report to the Superintendent-Shift Operations and support Operations during an emergency. The technician will continue reporting to the SSO after activation of the Operations Support Center (OSC) unless higher priority actions are required as deemed necessary by the OSC Leader.

8.1 Advise the E&RC Team Lead (either E&RC Supervisor or "lead" technician) of monitoring locations and sample collection points in the plant, collection of required data and assessment of radiological conditions at these points.

8.2 Request in-plant samples to assess plant/fuel conditions.

8.3 E&RC activities should be tracked as a single line item entry on the TSC Mission Status Board. The status of the E&RC activities will be tracked/monitored on the E&RC Personnel Status Board in the OSC and documented in the RCD logs. (AR #87927)

8.4 Report to the Site Emergency Coordinator (SEC) regarding:

8.4.1 Radiological monitoring and assessment

8.4.2 Radiation exposure control

8.4.3 Team direction & supporting missions

8.4.4 Emergency facility habitability

- TSC/EOF Building eating, drinking, and smoking restrictions will be determined for the entire facility by the RCD. The RCD will promptly communicate the status to the RCM.

8.5 Liaison with Offsite Radiation Control (RC) personnel and the RCM in the EOF.

8.6 Inform the ESTL of changing radiological conditions for security members in the field.

8.7 Advise the Environmental & Radiation Control (E&RC) Team Supervisor or Lead person regarding:

8.7.1 Prioritizing tasks

8.7.2 Determining protective gear and dosimetry

8.7.3 Development of precautions for the reentry team briefing

8.7.4 Deviations from a full set of anti-contamination clothing

8.7.5 Changes to requirements for protective equipment.

8.8 Determine the frequency for conduct of habitability surveys in the TSC/EOF.

8.8.1 Direct the RC Technician to communicate the habitability conditions in the TSC/EOF by manipulating the lighted facility boards and posting signs as conditions dictate. (NCR 106839)

8.9 Determine the need for on-site protective sheltering or evacuation, along with routes (to and from the plant) based on plant data, dose projections and meteorology.

8.9.1 Recommend site evacuation assembly location.

1. Monitor personnel at access points as required.

8.10 Consult the Dose Projection Team Leader (DPTL) in the EOF to determine affected zones in the 10 mile Emergency Planning Zone (EPZ). Assign priorities as necessary.

8.11 Contaminated, injured personnel should be treated on site if possible.

8.12 Direct sampling activities, as necessary, to assist in accident assessment.**{RNP RA/01-0164; NRC Amendment No. 192}**

8.13 Notify the RCM regarding Phase "A" Isolation.

8.14 Provide guidance to the E&RC Team Supervisor or Lead Person for establishing personnel and vehicle decontamination areas when required.

8.14.1 Determine if an alternate means of transporting personnel from the plant is needed.

8.14.2 Based on wind direction and magnitude of release, determine an appropriate area to set up for vehicle decon.

8.14.3 Determine the proper method of decon and area setup (i.e., masslin wipe down, wash down with soap and water, water supply, water containment, decon supplies, etc.)

8.14.4 Determine release limits.

8.14.5 Consider personnel transport in Progress Energy vehicle(s), and deferring vehicle decon until part of the recovery effort.

8.14.6 If radiation levels on site prohibit adequate decontamination or monitoring these functions may be performed at county operated locations.

1. Inform county emergency management officials if this contingency must be used.

8.15 Coordinate with the State and the Nuclear Regulatory Commission (NRC) as required.

8.16 Ensure exposure control and that Special Radiation Work Permits (RWPs) are issued as necessary. Approve exposure extensions.

8.17 Ensure that necessary information is posted on displays and status boards. Including:

8.17.1 Onsite radiological status

8.17.2 Protective Action Recommendations (PARs)

8.17.3 10 mile emergency planning zone (EPZ) map

8.17.4 TSC Habitability Status.

8.18 Recommend the administration of Potassium Iodide (KI) to Progress Energy personnel and contract employees when the actual or projected Committed Dose Equivalent (CDE) to the thyroid is 25 Rem or greater. Use the guidelines in Attachment 10.1 for determining thyroid dose.

8.18.1 If radiodiodine sample analysis results indicate air activity greater than 8.7E-07 μCi/cc I-131, then potassium iodide should be considered for affected workers. Exposure to radioiodine in this concentration will result in a thyroid dose of approximately 1 Rem for one hour of exposure. (AR #88078)

8.18.2 Determine if KI is required for personnel in buildings designed to maintain habitability such as the Control Room and TSC/EOF building.

8.19 Regulatory limits shall be observed for planned radiation exposures to emergency workers unless the Plant General Manager (PGM), the Radiological Control Director (RCD) or the Site Emergency Coordinator (SEC) authorizes the individual to exceed 5 Rem TEDE in a year.

8.19.1 Document radiation exposure for off-site emergency personnel who are assigned emergency responsibilities within the 1400 foot boundary as occupational dose. (AR #82619)

8.20 Follow these Emergency Worker Dose Guidelines:

NOTE: In all cases, it is the responsibility of each individual, to maintain the total effective dose equivalent ALARA.

Declared pregnant women shall not participate in these actions.

Internal exposures shall be minimized by respiratory protection and contamination controlled by the use of protective clothing.

Entry into High Radiation Areas shall not be permitted unless instrumentation capable of measuring the anticipated radiation levels is provided.

Entry into a High Radiation Area shall require wearing a self-reading dosimeter capable of measuring the expected exposure to be received.

Entry into Radiation Fields of > 100 Rem/hr. shall not be permitted unless specifically authorized by the PGM or RCD. In their absence the SEC shall authorize.

8.20.1 Repair/Reentry efforts may require individuals to enter a hazardous area to protect valuable installations, or to make the facility more secure against events which could lead to radioactivity releases (i.e., assessment actions or entry of damage repair parties who are to repair valve leaks or add iodine-fixing chemicals to spilled liquids).

1. In such instances, planned dose to emergency workers shall not exceed 10 Rem TEDE to the whole body, 30 Rem to the lens of the eye, or 100 Rem to any other organ including skin and extremities.

8.20.2 Lifesaving Actions or Protection of Large Population efforts may require personnel to search for and remove injured persons or entry to prevent conditions that would probably injure numbers of people, a planned dose shall not exceed 25 Rem TEDE to the whole body, 75 Rem to the lens of the eye, or 250 Rem to any other organ including skin and body extremities. This applies to:

1. The removal of injured persons if the saving of life is possible.

2. Entry to prevent conditions that, if left uncorrected, could lead to damage or releases that would probably injure numbers of people on or offsite.

3. Justifiable dose limits for situations in which the collective dose avoided by the emergency operation is significantly larger than that incurred by the workers involved.

8.20.3 Actions requiring a dose > 25 Rem shall consider the following in addition:

1. Rescue personnel shall be volunteers and shall be instructed about the risks involved. Refer to EPOSC-04, Emergency Work Control.

2. Volunteers above the age of 45 shall be selected when possible for the purpose of avoiding unnecessary genetic effects.

8.21 Review PLP-021, "Chemical Storage, Inventory, Spill and Hazard Communication Program", for items to consider in the event of a chemical spill or accident.

NOTE: Contact numbers for the Environmental Compliance Unit are listed in the Emergency Response Organization Phone Book.

8.21.1 Contact the Environmental Compliance Unit to determine reportability.

8.21.2 Ensure the settling pond is isolated from the discharge canal for spills directed toward storm drains.

8.22 Develop recovery strategy.

9.0 RECORDS

As per EPTSC-00.

10.0 ATTACHMENTS

10.1 Guidelines for Potassium Iodide Administration

10.2 Radiological Control Director (RCD) Quick Start Guide

ATTACHMENT 10.1
Page 1 of 1

GUIDELINES FOR POTASSIUM IODIDE ADMINISTRATION

The following formula can be used to determine the concentration of I-131 that will yield a committed dose equivalent of 25 Rem to the thyroid. The following guidance should be used for considering the administration of KI to on-site personnel. (AR #88078)

Given:

Per ICRP 23, Reference Man breathes 20 liters/minute. During a 24-hour period, Reference Man breathes 2.88E+07 cc (20 lpm x 1440 minutes x 1000 cc).

Per 10 CFR 20 Appendix B, Table 1, Occupational Values, the Inhalation annual limit on intake (ALI) for I-131 is 50 μCi which yields a committed lifetime dose equivalent of 50 Rem to the thyroid.

$$Rem_{thyroid} = (\mu Ci/cc\ I\text{-}131)(2.88E{+}07cc)(Rem/\mu Ci)$$

$$= 8.68e\text{-}07\ \mu Ci/cc\ I\text{-}131\ \textit{or}\ 8.7e\text{-}07\ \mu Ci/cc\ I\text{-}131$$

This value is based on the assumption that the individual is exposed to this concentration for a 24 hour period. An exposure to this concentration for one hour would result in a thyroid dose of ~1.041 Rem.

Guidelines and precautions for issuance of KI are contained in EPSPA-03, Administration of Potassium Iodide.

ATTACHMENT 10.2
Page 1 of 1

RADIOLOGICAL CONTROL DIRECTOR (RCD) QUICK START GUIDE

NOTE: Blanks are provided for place keeping √s only, logs are the official record. This is a summary level guide and does not replace the procedure steps.

1. Sign-in on the facility sign-in board, log on Electronic Display System (EDS). _____
2. If dialogic was utilized for callout, upon arrival at the Technical Support Center (TSC), notify Dialogic. _____
3. Obtain a briefing on Plant Status. _____
4. Determine if contaminated individuals have been released from the plant. _____
5. Obtain wind direction (degrees blowing from). Request 1 hour, 3 hour, and 3 day weather forecasts. _____
6. Coordinate with the Radiological Control Manager (RCM) in the Emergency Operations Facility (EOF). _____
7. Determine the E&RC staff available in the emergency facilities, request additional resources as needed. _____
8. Track E&RC activities as a single line item entry on the TSC Mission Status Board. (AR #87927) _____
9. Request updates on the E&RC Team status every 30 minutes from an available E&RC Supervisor or assigned "lead" person. _____
10. Determine status of habitability for the TSC/EOF and for the OSC (from the OSC Leader). _____
11. Notify the SEC of readiness to activate. _____
12. Refer to procedure steps. _____

Progress Energy	R Reference Use

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 2

PART 5

EPNOT-03

EOF PUBLIC INFORMATION EMERGENCY COMMUNICATOR

REVISION 6

SUMMARY OF CHANGES
PRR 101483

SECTION	REVISION COMMENTS
All	Changed layout to match the AP-007 layout
Step 8.11	Added step to provide a copy of approved press releases to the NRC Site Response Team for review (NCR #106381) and re-numbered subsequent steps.
Attachment 10.2	Moved the quick start guide to a new attachment.

TABLE OF CONTENTS

1.0 PURPOSE

To provide instructions for notifications by the Public Information Emergency Communicator to the Joint Information Center (JIC).

2.0 REFERENCES

2.1 As per EPNOT-00.

3.0 RESPONSIBILITIES

3.1 Formulate press releases and obtain approval from the Emergency Response Manager (ERM).

3.2 Accurately transmit information to the Joint Information Center.

4.0 PREREQUISITES

4.1 As per EPNOT-00.

5.0 PRECAUTIONS AND LIMITATIONS

5.1 As per EPNOT-00.

6.0 SPECIAL TOOLS AND EQUIPMENT

N/A

7.0 ACCEPTANCE CRITERIA

7.1 As per EPNOT-00.

8.0 INSTRUCTIONS

8.1 **REVIEW** previous Emergency Notification Forms **AND** any press releases.

8.2 **NOTIFY** the EOF Emergency Communicator when you are ready to assume position duties.

8.3 **ESTABLISH** contact with the Joint Information Center Director when the facility is being manned for activation **AND ESTABLISH** that the PI-EC will control press release numbering.

> **NOTE:** Attachment 10.1, Press Release Flowchart, describes the process for coordination of press release initiation, approval, and distribution.

8.4 **TRANSMIT** copies of Emergency Notification Forms **AND** requested plant information, if not available to the JIC Staff on the Electronic Display System (EDS).

8.4.1 Hard copies of Emergency Notification Forms for faxing may be obtained from the Emergency Communications Staff.

8.5 Once the EOF has been activated, releases should be available to the media following:

8.5.1 A change in emergency classification, **OR**

8.5.2 A radiological release as a result of the emergency, **OR**

8.5.3 Other significant events provided to the offsite agencies via an Emergency Notification Form.

8.6 Example press releases (read only format) for use as templates are available in the Emergency Press Release Public Folder.

8.7 Completed draft press releases should be placed in the Draft Press Releases Public Folder.

8.7.1 Hard copies printed for approval should be controlled by marking them "draft" either by word processing or pen and ink.

8.8 **OBTAIN** approvals for press releases.

8.8.1 The Emergency Response Manager (ERM) must approve the technical content of press releases. Any changes of technical content, after initial approval must be approved by the ERM.

8.8.2 The Company Spokesperson should approve non-technical content of the press release.

1. Prior to JIC activation, non-technical content of press releases should be approved by Site Communications or Corporate Communications personnel, time permitting.

8.8.3 Press releases which are entirely non-technical may be formulated by JIC staff and approved by the Company Spokesperson.

1. These include facility activation and press briefing times.

8.9 Press releases, which must be faxed to the JIC for approval, should be clearly marked "DRAFT" in the time slot of the release.

8.10 Coordinate with JIC Director to ensure approved press releases are placed in the Approved Press Releases Public Folder.

8.11 Provide a copy of approved press releases to the NRC Site Response Team (when staffed) for review by the Director of Site Operations or designee. (NCR #106381)

8.12 Obtain responses for questions from JIC staff.

8.12.1 Keep the EOF Emergency Communicator informed of issues associated with media questions.

1. Upon event or drill termination, ensure JIC personnel are informed.

9.0 **RECORDS**

9.1 As per EPNOT-00.

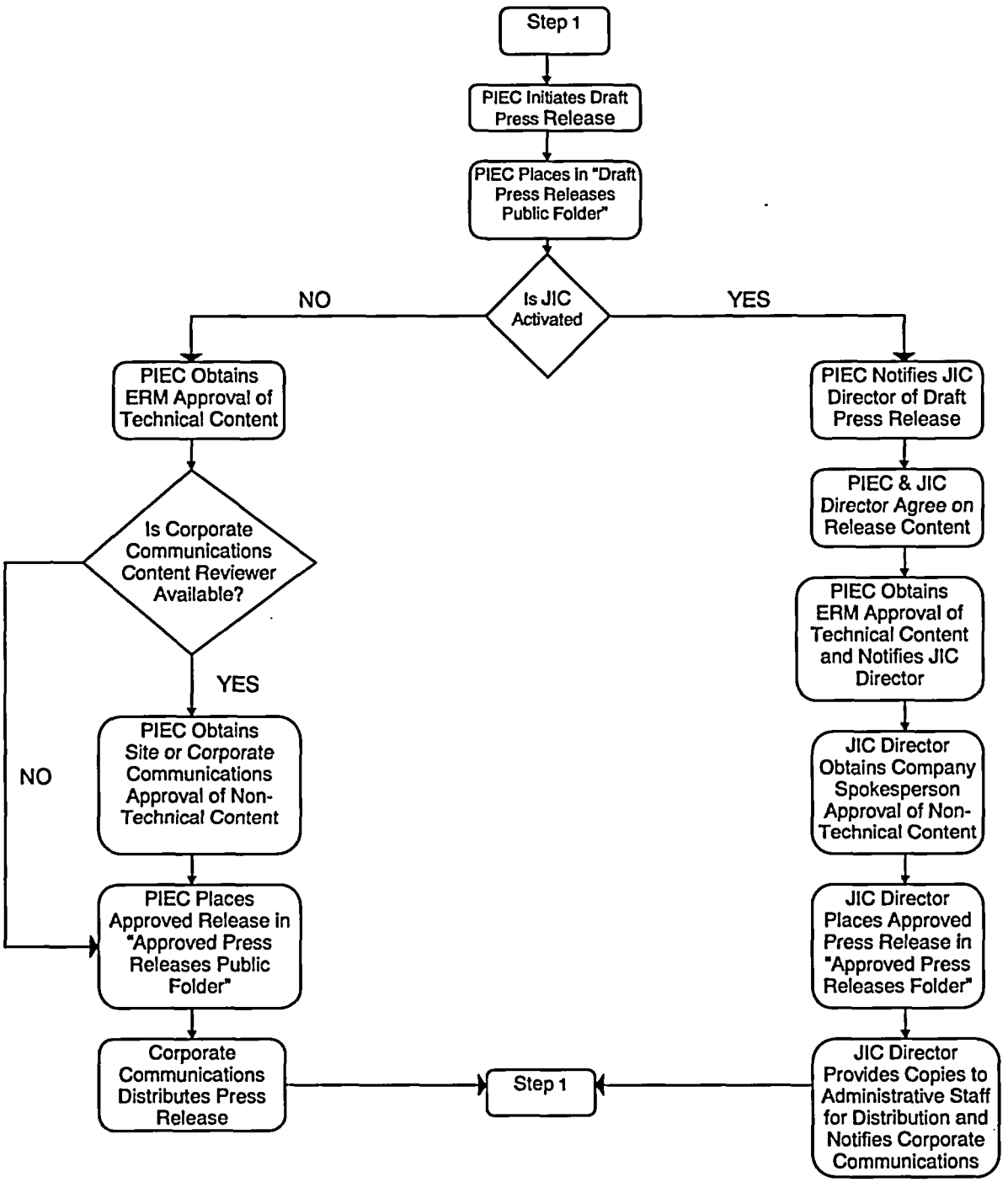
10.0 **ATTACHMENTS**

10.1 Press Release Flow Chart

10.2 Public Information Emergency Communicator Quick Start Guide

ATTACHMENT 10.1
Page 1 of 1

PRESS RELEASE FLOW CHART



ATTACHMENT 10.2
Page 1 of 1

PUBLIC INFORMATION EMERGENCY COMMUNICATOR QUICK START GUIDE

NOTE: Blanks are provided for place keeping √'s only, logs are the official record. This is a summary level guide and does not replace the procedure steps.

1. Check equipment status. _____
2. Log on to the LAN network and access the news release folders. _____
3. Review previous emergency notifications and NRC notifications. _____
4. Notify EOF Emergency Communicator when ready to assume duties. _____
5. Refer to procedure. _____

Progress Energy

R
Reference
Use

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 2

PART 5

EPPRO-04

EP PERFORMANCE INDICATORS

REVISION 5

SUMMARY OF CHANGES
117119

STEP #	REVISION COMMENTS
Entire Procedure	Reformatted to comply with AP-007 format.
Old Attachment 8.1.6.12	Deleted attachment 8.1.6.12 PI&R – Training Feedback
Attachment 10.2	Changed title from Program Objective Demonstration to Drill Objective Performance . Added statement to indicate that the indicator applies to full scale drills and to indicate that data will be blank, if no drills occur during the period. Changes made to reflect common EP performance indicators for RNP, BNP, HNP, and CR3.
Attachment 10.3	Changed the title from Staffing Depth Maintenance to Staffing Depth.
Attachment 10.4	Changed "quarterly beeper drill" to "ERO Notification and Beeper Drill" to reflect EPPRO-02 changes
Attachment 10.6	Clarified equipment availability to reflect common EP performance indicators for RNP, BNP, HNP, and CR3.
Attachment 10.7	Changed title to Offsite Communications Availability and changed the titles of the EPPRO-02 surveillances.
Attachment 10.9	Changed title to Offsite EP Performance and changed acceptance criteria to reflect common EP performance indicators for RNP, BNP, HNP, and CR3.
Attachment 10.11	Revised indicator for corrective action average age to reflect common EP performance indicators for RNP, BNP, HNP, and CR3

TABLE OF CONTENTS

SECTION PAGE

1.0 PURPOSE

1.1 This procedure provides a consistent methodology for the collection, calculation and review of EP program Performance Indicator (PI) data. This is not an Emergency Plan implementing procedure.

1.2 This procedure provides guidance for preparation of information as required to support the NRC Inspection and Oversight Program and the requirements of 10CFR50.54(t).

1.3 This procedure establishes responsibilities associated with the implementation of the Performance Indicator program.

2.0 REFERENCES

2.1 As per EPPRO-00

3.0 RESPONSIBILITIES

3.1 The Emergency Preparedness Supervisor is responsible to :

3.1.1 Provide on-going monitoring and day-to-day oversight for EP Performance indicators.

3.1.2 Approve NRC Performance Indicator data elements prior to transmittal to the Licensing organization and assure timely transmittal.

3.1.3 Evaluate PI trends and initiate the appropriate Corrective Action Program (CAP) activities.

3.1.4 Assure the retention or retrievability of applicable records and documents that support PI data development.

3.2 Data Providers are responsible for

3.2.1 Serving as the primary point of contact and subject matter expert for assigned Performance Indicators;

3.2.2 Collecting and analyzing source documents to provide oversight and monitoring of assigned Performance Indicators; and

3.2.3 Initiating applicable attachments for documenting Performance Indicator data.

4.0 PREREQUISITES

N/A

5.0 PRECAUTIONS AND LIMITATIONS

N/A

6.0 SPECIAL TOOLS AND EQUIPMENT

N/A

7.0 ACCEPTANCE CRITERIA

N/A

8.0 INSTRUCTIONS

NOTE: Site Performance Indicator colors of green, yellow and red correspond to NRC/NEI 99-02 performance indicator colors of green, white, and yellow, respectively.

8.1 Key Performance Indicators (KPIs) - Risk Significant Indicators

The NRC and NEI have jointly developed a standard set of Cornerstone NRC Performance Indicators, for monitoring EP program performance by all licensees. NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," defines the three EP Cornerstone Performance Indicators as:

8.1.1 Drill/Exercise Performance

The percentage of all drill, exercise, and actual opportunities when presented with opportunities for classification of emergencies, notification of offsite authorities and development of protective action recommendations that were performed timely and accurately during the previous eight quarters.

8.1.2 Emergency Response Organization (ERO) Drill Participation

The percentage of key ERO members (as defined within NEI 99-02) that have participated in a drill, exercise, or actual event during the previous eight quarters, as measured on the last calendar day of the quarter. Robinson specific positions are listed on Attachment 10.12.

8.1 (Continued)

8.1.3 Alert and Notification System (ANS) Reliability

8.1.4 The percentage of ANS sirens that are capable of performing their function, as measured by periodic siren testing, in the previous 12 months. Periodic tests are the regularly scheduled tests that are conducted to actually test the ability of the sirens to perform their function (e.g. silent, growl, full volume test). The data compiled for each month is provided to Licensing by Attachment 10.8 and a data sheet from REG-NGGC-0009. A computer data base provides the rolling calculation that takes into account the previous 12 months.

8.1.5 Second Tier EP Performance Indicators

Other Performance Indicators have been developed to monitor additional aspects of the EP program and provide management additional feedback on important areas of performance. The monthly input for the NRC performance indicators are included in this section.

1. ERO Performance
   a. Classification Performance (Attachment 10.1)
   b. Notification Performance (Attachment 10.1)
   c. PAR Performance (Attachment 10.1)
2. Drill Objective Performance
3. ERO Readiness:
   a. Staffing Depth (Attachment 10.3).
   b. Staffing Activation Response (Attachment 10.4)
   c. Participation (Attachment 10.5)

8.1.5 (Continued)

4. Facilities and Equipment:

   a. Emergency Response Facility Availability (Attachment 10.6)

   b. Offsite Communications Availability (Attachment 10.7)

   c. Siren System Operability (Attachment 10.8)

5. Procedure Quality:

   Procedure quality concerns will be addressed in the Problem Identification and Resolution (PI&R) process in the Corrective Action Program Status.

6. Offsite Emergency Preparedness

   a. Offsite EP Performance (Attachment 10.9).

   b. State and Local Agency Interface Status (Attachment 10.10)

7. Problem Identification and Resolution (PI&R) process

   a. Corrective Action Program Status (Attachment 10.11)

   b. Drill and Exercise corrective actions (Attachment 10.11)

8.2 PI Tracking and Reporting

8.2.1 EP Second Tier Performance Indicators

8.2.2 NRC Performance Indicators (REG-NGGC-0009)

8.3 Data Collection, Calculation and Reporting

8.3.1 Performance Indicator data collection shall be performed on a monthly basis.

1. Performance indicator data provided to the NRC, or utilized in assessing the need for 10CFR50.54(t) reviews, shall be based on end of calendar quarter calculations.

2. Performance Indicator reports generated from other than end of quarter calculations shall be for management trending use only.

8.3.2 Methods of collecting raw data used in PI calculation are provided in the attachments of this procedure.

8.3.3 Significant changes to the monthly data which may result in adverse changes to the NRC PI quarterly data should be noted in the analysis portion of the monthly report for the affected indicator.

8.3.4 Problem Identification and Resolution

1. EP Program performance indicator issues are addressed through the Corrective Action Program. Items which are potentially adverse to program quality are classified, documented and tracked in accordance with CAP-NGGC-0200.

2. A Nuclear Condition Report (NCR) should be generated for any of the following conditions:

   - Three (3) consecutive months with downward trending data points
   - Any two consecutive data points that fall within the yellow indicator.
   - Any one data point that falls within the red indicator.

9.0 RECORDS

Records for generated from the performance of EPPRO-04 will be retained by the EP staff for a period of 24 months.

10.0 ATTACHMENTS

10.1 ERO Performance – Classification, Notification, and PAR Performance

10.2 ERO Performance - Drill Objective Performance

10.3 ERO Readiness – Staffing Depth

10.4 ERO Readiness – Staffing Activation Response

10.5 ERO Readiness – Participation

10.6 Facilities and Equipment – Emergency Response Facility Availability

10.7 Facilities and Equipment – Offsite Communications Availability

10.8 Facilities and Equipment – Alert and Notification System Operability

10.9 Offsite EP Performance

10.10 Offsite EP – State and Local Agency Interface

10.11 PI&R – Corrective Action Program Status

10.12 ERO Key Member Matrix

ERO PERFORMANCE - CLASSIFICATION, NOTIFICATION AND PAR

Purpose

This indicator monitors timely and accurate performance in drills, exercises and actual events when presented with opportunities for classification of emergencies, notification of offsite authorities and development and notification of protective action recommendations (PARs).

Definition

The percentage of pre-identified drill, exercise, and actual opportunities that were performed timely and accurately during the reporting period. Pre-identified opportunities are:

- Actual declared events and those scheduled exercises (drills) that EP coordinates and develops the scenarios with Licensed Operator Continuing Training.
- Pre-identified simulator sessions that use the same scenarios as above when qualified SSOs fill the SSO/SEC position.
- Evaluated simulator sessions involving EAL classification and notification activities when qualified SSOs fill the SSO/SEC position. (AR #85114)
- Unannounced Fire Drills where the scenario results in an EAL classification.
- If other drill, exercises, and tabletops that meet the NEI 99-02 performance criteria are pre-identified by memo, then each additional pre-identified opportunity must be counted in the DEP statistics.
- Opportunities are:
  - Each expected classification or upgrade in classification.
  - Each PAR developed.
  - Each initial notification of an emergency class declaration.
  - Each initial notification of PARs or change to PARs.
- An initial notification form completed appropriate to the event to include:
  - Class of emergency
  - EAL number
  - Description of emergency
  - Wind speed and direction
  - Whether offsite protection measures are necessary
  - Potentially affected population and areas
  - Whether a release is taking place
  - Date and time of declaration of emergency
  - Whether the event is a drill or actual event
  - Plant identification

ERO PERFORMANCE - CLASSIFICATION, NOTIFICATION AND PAR

Expectations are:

- Classifications should be made in ≤ 15 minutes per EPCLA-02.
- Off-site notification contact should be made in ≤ 15 minutes per EPNOT-01.
- PARs should be developed and notification initiated in ≤ 15 minutes of a General Emergency classification. If the event conditions change, either radiological or meteorological, resulting in revised PARs, then the ≤ 15 minute standard is applicable. The 15 minute time standard for PAR development applies once field data is obtained not from the time the dose projection is completed.

Green - ≥ 95%
Yellow - ≥ 90% < 95%
Red - < 90%

Documentation

Information is gathered from Emergency Notification Forms generated from the ERFIS computer and/or the manual Emergency Notification Forms. ERO Performance is tracked on Attachment 10.1 worksheets or equivalent, as applicable.

Data from the Attachment 10.1 worksheets is collated monthly on data sheets contained in REG-NGGC-0009.

Notes

Errors on the ENF that do not affect the content or intent of the message do not count as an error. Examples include:

- Typographical errors that do not change the meaning of the information.
- Information left blank instead of "none" or "N/A".

ATTACHMENT 10.1
Page 3 of 4

ERO PERFORMANCE - CLASSIFICATION, NOTIFICATION AND PAR
ERO PERFORMANCE INDICATOR WORK SHEET

Date: _____ Page ___ of ___

Sections 1 and 2 to be completed by the evaluator.

Section 1

Actual Emergency ☐	Simulator Evaluation ☐	Exercise/Drill ☐
Scenario # _____		
Name of SEC:		
Evaluator Name:		

Section 2

ACTIVITY	UE	ALERT	SAE	GE
Record the time indications are available that an EAL has been exceeded.				
Check the expected event declaration				
Was the expected event declaration made? (yes or no)				
Record the time the event was declared.				
Record the time the Emergency Notification Form was approved.				
Record the time of first voice contact after ENF approval				
Were the correct initial protective action recommendations made?				
Were the State and Counties notified of the PARs within 15 minutes?				
Record the time conditions were available that resulted in a change in the PARS?				
Record the time the Emergency Notification Form with the change in PARs was approved.				
Record the time of first voice contact after ENF approval.				
Were the State and Counties notified of the change in PARs within 15 minutes?				

Comments: _____

Section 3 to be completed by EP staff.

Section 3

Classification(s) Expected: UE ☐	Alert ☐	SAE ☐	GE ☐	
Classification(s) Declared: UE ☐	Alert ☐	SAE ☐	GE ☐	
Classification Opportunities:		Successes:		
Notification Opportunities:		Successes:		
PAR Development Opportunities:		Successes:		
PAR Notification Opportunities:		Successes:		

Comments: _____

Prepared by: _____
Reviewed by: _____

ERO PERFORMANCE - CLASSIFICATION, NOTIFICATION AND PAR

Standard: Timely and accurate EAL classifications, notifications, and PARs are performed during actual events, evaluated simulator scenarios with an EAL classification, and EP drills/exercises. Timely is defined as ≤ 15 minutes.

Method of Data Collection: The evaluator will complete Sections 1 and 2 of the attached ERO Performance Tracking Form.

Opportunities: are to be as defined by the activities included in the examination evaluation guide and presence of conditions during the examination as follows (opportunities cannot be excluded due to poor performance):

- Each expected classification should be included.
- Notification includes notifications made to the state and/or local government authorities for **initial** emergency classification, upgrade of emergency class, initial PARs and changes in PARs (periodic follow-up notifications and briefings when the classification or PARs have not changed are not included).
- PAR includes the initial PAR and any PAR change.

Timely:

- Classifications are made consistent with the goal of 15 minutes once plant parameters reach an Emergency Action Level (EAL).
- Offsite state/county notifications are initiated within 15 minutes of event classification. Refer to EPNOT-01.
  - Communicating the event with an Emergency Communicator present/simulated.
  - Completion of the Emergency Notification Form to include initiation of the Fax with adequate time allotted for an EC (Simulated EC activities) to have completed steps as outlined above when EC not present/simulated.
- PARs are developed and notification initiated within 15 minutes of a General Emergency classification, or change in conditions resulting in revised PARs.

Accurate (numbers in parenthesis indicate Emergency Notification Form line numbers):

- Classifications are performed and declared in accordance with EPCLA-01 and the EALs.
- Notifications
  - Event declaration notifications, as a minimum, contain indication of Drill or Actual (1), Plant site/unit (2), correct event classification level (5), declaration time & date (6), Emergency description (7), Emergency Release status (10), Wind Speed & direction (14) and PARs (or None) (15).
  - Notifications that include PARs must provide the correct Sector information for Evacuation and Sheltering (15).
  - The cumulative effect of multiple omissions or errors in other areas of the notification needs to be evaluated for impact on overall accuracy.
- PARs are appropriate to the event and meteorological conditions as specified in EPCLA-01.

Copies of the completed Emergency Notification Form(s), completed Persons and Agencies Alerted Form(s) if applicable, and any completed Communications Checklist(s) if applicable, are to be attached to the ERO Performance Tracking Form. Route the completed forms to the Emergency Preparedness Group.

Disposition: Once completed and forwarded to Emergency Preparedness, the data collected on the form will be used to track RNP monthly plant key performance indicators and the NRC quarterly cornerstone performance indicators.

Remediation for Unsatisfactory performance: Unsatisfactory performance during evaluated scenarios on the RNP simulator conducted by the RNP Training Section will be identified in an NCR and remediated in accordance with Training Program Procedures.

ATTACHMENT 10.2
Page 1 of 1

ERO PERFORMANCE - DRILL OBJECTIVE PERFORMANCE

Reporting month _____

Total number of required drill objectives	
Drill objectives not met	
Drill objectives met	
Percentage of successful drill objectives	

Total number of required drill objectives - required Drill objectives not met = Drill objectives met

$$\% \text{ Program Objectives Performance} = \frac{\text{Drill objectives met}}{\text{Total required drill objectives}} \times 100$$

Purpose

This indicator monitors the performance of drill and exercise objectives when presented with opportunities for their demonstration.

Definition

The percentage of pre-identified drill and exercise objectives that were performed successfully.

A program objective does not require a drill involving all of the emergency response facilities to be counted in this indicator. A drill is of appropriate scope if it reasonably simulates the interaction or conditions necessary to fully demonstrate the program objective.

A program objective demonstrated by more than one facility is counted as an opportunity for each of the facilities (for example, command and control would present four opportunities for a drill involving the TSC, OSC, EOF, and JIC).

Green - ≥ 90% of drill objectives
Yellow - ≥ 80% < 90% of drill objectives
Red - < 80% of drill objectives

Documentation

The drill / exercise objectives are stated in pre-drill information. Objective demonstration is documented in the drill / exercise critiques.

Notes

ATTACHMENT 10.3
Page 1 of 1

ERO READINESS - STAFFING DEPTH

Purpose

This indicator reflects the ability to maintain a fully staffed ERO for a prolonged response by measuring the ERO staffing depth for all positions.

Definition

ERO depth is required to assure 24-7 coverage for emergencies requiring full staffing of the ERFs. A minimum of four personnel per position assures sufficient depth to allow for unavailability due to vacation or illness. ERO positions filled by pools of personnel are not included in this indicator.

Green - No position less than four deep for greater than 4 months.
Yellow - Any position filled less than four deep for greater than 4 months.
Red -Any 2 positions filled less than four deep for greater than 4 months.

Documentation

Reporting month _____

Emergency Response Organization Team Roster applicable on the last day of the calendar month.

Vacant Position	Date Open	Date Filled	Months Open

Notes

ATTACHMENT 10.4
Page 1 of 1

ERO READINESS - STAFFING ACTIVATION RESPONSE

Purpose

This indicator reflects the ability to contact ERO members for augmentation of the on-shift ERO.

Definition

This indicator measures the ability to contact ERO members for augmentation of the on-shift ERO per Table 5.3.2-1 of PLP-007.

Use the quarterly beeper test documents to determine

a. number expected to respond

b. number that received the code.

Green - ≥ 90% of on-call personnel issued a beeper responded and all Table B-1 positions filled.
Yellow - - ≥ 80% < 90% of on-call personnel issued a beeper responded or one (1) Table B-1 position not filled.
Red - < 80% of on-call personnel issued a beeper responded or greater than one (>1) Table B-1 position(s) not filled.

Documentation

Reporting month _____

The ERO Notification and Beeper Drill results per EPPRO-02.

Previous Quarter	Previous Quarter	Previous Quarter	Current Quarter
(end of quarter value)	(end of quarter value)	(end of quarter value)	(end of quarter value)
Date _____	Date _____	Date _____	Date _____
% on-all with beeper responded: _____	% on-all with beeper responded: _____	% on-all with beeper responded: _____	% on-all with beeper responded: _____
Table B-1 positions filled (all, 1 not, >1 not): ____	Table B-1 positions filled (all, 1 not, >1 not): ____	Table B-1 positions filled (all, 1 not, >1 not): ____	Table B-1 positions filled (all, 1 not, >1 not): ____

Notes

ERO READINESS - PARTICIPATION

Purpose

This indicator monitors the opportunities that key ERO members have been provided to gain proficiency as an integrated organization. It measures the percentage of those personnel who were participants, coach/mentors, evaluators or controllers in proficiency-enhancing drill/exercise opportunities or in actual events.

Definition

The percentage of key ERO members (per Attachment 10.12) who were participants, coach/mentors, evaluators or controllers in proficiency-enhancing drill/exercise opportunities or in actual events during the reporting period.

Green - ≥ 90%
Yellow - ≥80% < 90%
Red - < 80%

Key Members are as follows:

Control Room
- Site Emergency Coordinator

Technical Support Center
- Site Emergency Coordinator
- Plant Operations Director
- Radiological Control Director
- Technical Analysis Director
- NRC Emergency Communicator

Emergency Operations Facility
- Emergency Response Manager
- Radiological Control Manager
- Emergency Communicator

Operational Support Center
- Operational Support Center Leader

Documentation

ERO Drill Rosters
ERO Database
Self-assessments of the drill cycles
Data sheets are contained in REG-NGGC-0009.

ERO READINESS - PARTICIPATION

Notes

Personnel are given credit for the ERO position for which they hold during a drill. Personnel holding multiple ERO positions must participate in a drill for each position they are qualified for. (CR25154)

Data Collection Method

The data and documentation for this indicator is obtained by performing the following steps.

Open in Microsoft Access, folder V:\\Access Databases\Shared\EP\ERO.mdb

From this folder, open file EROdata.mdb.

Select Reports

Right click on "rptAllQualifiedKPIPositions.

Right click on "Print Preview."

When accessing "rptAllQualifiedKPIPositions," the database will ask for the first day of last year, then the last day of this year. These dates must be entered as mm/dd/yyyy and are checking the database for individuals who are currently qualified as a "Key" position.

From the "Print Preview" screen, print the report.

This report will indicate all ERO members who are qualified one or more ERO positions defined in NEI 99-02 as a "Key" position (reference Attachment 10.12).

The other half of the data is obtained from Microsoft Excel by performing the following steps.

ERO READINESS - PARTICIPATION

NOTE: for the following steps, the examples will be based on the month of June 2001 indicator being calculated on the 2nd of July 2001.

Open in Microsoft Excel, folder V:\\Emergency Preparedness\Performance Indicators\ERO Performance

From this folder, open the file for the previous month. Remember the previous month may be two months ago depending on the date the indicator is being calculated. For example if this is July2, 2001, then open the file titled "NRC KPI Info Tables May 2001.xls". You would be calculating the indicator for the month of June 2001.

Save this file as "NRC KPI Info Tables {month being calculated and year} June 2001.xls".

After the file has been saved, from the pull-down menu, select "view," then "Headers and Footers." This opens a "Page Setup" window.

From the "Page Setup" window, select the "Header?Footer"tab, and then select "Custom Header.." This will open the "Header" window.

In the "Center Section" of the window, scroll down and update the month for the indicator being calculated (June), and the dates for the previous eight quarters then select "Ok."

Select "Ok" to close the "Page Setup" window.

Determine if any drills conducted during the month being calculated were credited as "Drill, Exercise, Performance (DEP) drills. This information may be obtained from the Supervisor-EP.

If DEP drills were conducted during the month being calculated, then enter in the spreadsheet the most recent dates for those who signed the training report. Key ERO positions may receive credit for the positions of participant (P), controller ©, or evaluator (E) only (not mentor/coach). Ensure the individual gets credit only for the ERO position they signed on the training report. For those ERO members who you are adding new dates, ensure the Role column is updated with a P, C, or E to indicate their level of participation. Finally update the Comments column to indicate where you can verify the participation (i.e. training reports, ENFs)

ERO READINESS - PARTICIPATION

After entering the participation dates, verify all of the dates on the spreadsheet fall within the previous eight quarters period. Any date that is prior to the previous eight quarters must be removed and replaced with the text "None" for the Drill Date and "N/A" in the Role column.

Print the spreadsheet. Count the number of qualified individuals and verify the number agrees with the total in the Total Qualified cell.

Count the drill dates for both the Drill Date and Simulator Evaluation Date columns and add the values. Verify the number agrees with the total in the Total Participated cell.

Count the number of qualified individuals from the Access report agrees with the total number of individuals in the Excel spreadsheet, then sign and date the bottom of the Excel spreadsheet.

REG-NGGC-009, "NRC Performance Indicators", contains the data sheets for this indicator. Print the attachment for "Emergency Response Organization Drill Participation." This attachment is where you document the Total number of Key ERO Members from the Excel spreadsheet and the total number of Key ERO members who have participated within the previous eight months also from the spreadsheet.

Attach to the REG-NGGC-009 form the Access database report, the Excel Spreadsheet, and the pages from EPPRO-04 describing the ERO Readiness-Participation.

ATTACHMENT 10.6
Page 1 of 1

FACILITIES AND EQUIPMENT - EMERGENCY RESPONSE FACILITY AVAILABILITY

Purpose

This indicator measures the ability to maintain plant Emergency Facilities (TSC and EOF only) including equipment in a state of readiness to support emergency response activities.

Definition

The measure of time, in percent, that the TSC and EOF are fully functional and available to support emergency response activities, as measured on a calendar month basis.

Availability includes the following key capabilities:
Habitability (Ventilation & pressure control)
Electrical Power (as supplied from any source)

Out of service is defined as the time of discovery until operability is restored. Status is a 12 month rolling average.

Green - ≥99% ERF availability for the calendar month.
Yellow < 99% and ≥95% ERF availability for the calendar month.
Red <95% ERF availability for the calendar month.

Documentation

Reporting month _____

Hours Em. Response Facility available _____
Hours in the calendar month _____ x 100 = _____ % available

Autolog, Work order/request queries
Facility walkdowns can all be used to determine actual hours available

Notes

ATTACHMENT 10.8
Page 1 of 1

FACILITIES AND EQUIPMENT – OFFSITE COMMUNICATIONS AVAILABILITY

Purpose

This indicator reflects the ability to maintain plant components and ERF equipment needed to support emergency response activities.

Definition

This indicator reflects the operability of the key offsite communications systems to state and local governments: Selective Signaling and ESSX phones

This indicator is a ratio of hours each system is unavailable vs. total annual hours that the system is available for use.

$$\% = \frac{\text{hours of unavailability}}{\text{annual hours of availability}}$$

The time of unavailability is defined as the time of discovery until operability is restored. A system is considered unavailable if one or more lines of the system are out of service.

Green - No individual problem greater than 14 days to resolve and repetitive within 184 days.
Yellow - No two (2) individual problems greater than 21 days to resolve and repetitive within 184 days.
Red – Greater than 2 individual problems greater than 28 days to resolve and repetitive within 184 days.

Documentation

Reporting month _____

The following EPPRO-02 Surveillance test results are screened for equipment problems:

Selective Signaling System Communications Drill
NRC ETS, ESSX, & SSS Phone Operational Checks
OffSite Selective Signaling Phone Test

Equipment/Repetitive Problem	Date discovered	Date resolved	Total days

Notes

FACILITIES AND EQUIPMENT – ALERT AND NOTIFICATION SYSTEM

Purpose

This indicator monitors the reliability of the offsite Alert and Notification System (ANS) – Siren System. It provides the percentage of the sirens that are capable of performing their safety function.

Definition

The percentage of ANS sirens that are capable of performing their function, as measured by periodic siren testing. Periodic tests are the regularly scheduled tests conducted to actually test the ability of the sirens to perform their function (e.g., silent, growl, full volume test).

Documentation

Records from the silent, growl and full volume tests. Data from these records are compiled to determine ANS operability percentages.

Green - ≥ 96%
Yellow - ≥94% < 96%
Red - < 94%

Data sheets are contained in REG-NGGC-0009

Notes

A failure of sensing equipment that does not result in the siren being inoperable (e.g., rotation sensor) will not count as a siren failure if the siren is verified functional by local observation.

ATTACHMENT 10.9
Page 1 of 1
OFFSITE EP PERFORMANCE

Previous Quarter	Previous Quarter	Previous Quarter	Current Quarter
Deficiencies _____	Deficiencies _____	Deficiencies _____	Deficiencies _____
ARCA _____	ARCA _____	ARCA _____	ARCA _____

Purpose
This indicator measures the performance of the off site ERO by tracking total offsite: Deficiencies, Areas Requiring Corrective Actions (ARCAs), and NAS Issues. This indicator applies to Deficiencies and/or ARCAs received during FEMA evaluated exercises with fixed nuclear facilities. This indicator applies to ARCAs received by state agencies and the affected risk/host counties.

Definition
If there is no RNP exercise during the period, then the value remains the same as the previous period.

Green: Less than or equal to (< 4) ARCAs

Yellow: >4 but $\leq$ 7 ARCAs

Red: Any FEMA Deficiency or > 7 total ARCAs

Documentation
FEMA reports from the biennial graded exercise and MS-1 drills provide this information.

Notes
Agencies from Darlington, Lee, Chesterfield and Florence Counties and the State of South Carolina are considered for this indicator.

Data Collection Method
This data is obtained from the State EMD Area 4 Coordinator.

ATTACHMENT 10.10
Page 1 of 2

OFFSITE EP - STATE AND LOCAL AGENCY INTERFACE STATUS

Purpose
This indicator measures the effectiveness of the interface with the offsite agencies.

Definition
The color codes for this indicator are based on an average rating from the feedback forms completed and returned by the offsite agencies. If feedback is not measured during the quarter, the value remains the same as the previous quarter.

Green - Overall rating ≥ 4 (meeting expectations)
Yellow - Overall rating ≥ 2 or < 4 (meets some expectations)
Red - Overall rating < 2 (below expectations)

The offsite agencies consist of:

South Carolina Emergency Management Division (EMD) and Department of Health and Environmental Control (DHEC)
Lee County
Darlington County
Chesterfield County
Florence County (Florence County is the host county for evacuations.)

Documentation
The Offsite Survey.

Notes

Data Collection Method
Page of this attachment is given to the above off-site agencies then averaged.

OFFSITE EP - STATE AND LOCAL AGENCY INTERFACE STATUS

SURVEY

Rate the following questions A through E, 1 being the lowest and 5 the highest, for satisfaction of the interface with H.B. Robinson?

A.	Does H. B. Robinson meet your classroom training needs?	1 2 3 4 5
B.	Are equipment problems resolved in a timely fashion?	1 2 3 4 5
C.	Are drills effective in meeting the needs of your agency?	1 2 3 4 5
D.	Are problems identified in the quarterly meetings resolved in an efficient manner?	1 2 3 4 5
E.	What is your comfort level in communicating with the EP staff at H. B. Robinson?	1 2 3 4 5

Comments:

Agency represented _____

By _____/_____
Name Date

Please return this sheet to the EP Supervisor at the Robinson Site.

ATTACHMENT 10.11
Page 1 of 3

PI&R - CORRECTIVE ACTION PROGRAM STATUS

Purpose

This indicator monitors corrective action identification and completion for timely problem resolution assigned to EP staff members for significant adverse and adverse conditions. This indicator also monitors the ability of the Emergency Response Organization to fix problems that are identified in the corrective action program. This indicator includes significant and adverse corrective actions (CA).

Definition

Corrective Action identification and resolution per the CAP program (CAP-NGGC-0200) assigned to EP staff members for significant adverse and adverse conditions.

Green - Average age of significant adverse investigations $\leq$ 21 days
Yellow - Average age of significant adverse investigations > 21 days and $\leq$ 23 days
Red - Average age of significant adverse investigations > 23 days

Green - Average age of significant adverse CAPRs $\leq$ 90 days
Yellow - Average age of significant adverse CAPRs > 90 days and $\leq$ 99 days
Red - Average age of significant adverse CAPRs > 99 days

Green - Average age of adverse investigations $\leq$ 30 days
Yellow - Average age of adverse investigations > 30 days and $\leq$ 33 days
Red - Average age of adverse investigations > 33 days

Green - Average age of corrective actions $\leq$ 120 days
Yellow - Average age of corrective actions $\leq$ 150 days
Red - Average age of corrective actions > 150 days

Month/Year _____

Indicator	Average Age	Color (circle one)	Trend (circle one)
Significant Adverse Investigations	days	Green Yellow Red	— ↓ ↑
Significant Adverse CAPRs	days	Green Yellow Red	— ↓ ↑
Adverse Investigations	days	Green Yellow Red	— ↓ ↑
Corrective Actions	days	Green Yellow Red	— ↓ ↑

PI&R - CORRECTIVE ACTION PROGRAM STATUS

Documentation

Information to support this performance indicator is obtained from Business Objects KPI Reports generated for end of month data. These reports automatically print on the first business day following the end of the month.

1. Review the reports to ensure that items attributed to EP are identified in the report.

2. Select the following report: "Average Age of Priority 1 Evaluations"
   - Enter the average age of the open significant adverse investigations on Attachment 10.11.
   - If no open significant adverse investigations are found, then enter NA in the table on Attachment 10.11.

3. Select the following report: "Average Age of Open CAPRs"
   - Enter the average age of the open significant adverse CAPRs on Attachment 10.11.
   - If no open significant adverse CAPRs are found, then enter NA in the table on Attachment 10.11.

4. Select the following report: "Average Age of Priority 2 Evaluations"
   - Enter the average age of the open adverse investigations on Attachment 10.11.
   - If no open adverse investigations are found, then enter NA in the table on Attachment 10.11.

5. Select the following report: "Average Age of Open Priority 1 & Priority 2 Corrective Actions"
   - Enter the average age of the open priority 1 and 2 corrective actions on Attachment 10.11.
   - If no open priority 1 and 2 corrective actions are found, then enter NA in the table on Attachment 10.11.

6. Compare the average age for each of the categories to the performance indicator criteria and circle the appropriate color in the designated column on Attachment 10.11.

7. Determine if a trend exists by comparing the current month's data with the previous month's data.
   - If the performance indicator average age is the same as the previous month, then circle — in the trend column on Attachment 10.11.
   - If the performance indicator average age is increasing from the previous month, then circle ↓ in the trend column on Attachment 10.11.
   - If the performance indicator average age is decreasing from the previous month, then circle ↑ in the trend column on Attachment 10.11.

The printed Business Objects reports should be maintained with Attachment 10.11 as supporting documentation.

Notes

ERO KEY MEMBER MATRIX

NEI 99-02 Definition of KEY ERO Members	HBR ERO position fulfilling this definition	Basis	DEP type drill required to receive credit for participation?	Comments
Control Room Shift Manager (Emergency Director) – Supervision of reactor operations, responsible for classification, notification, and determination of protective action recommendations	Control Room – Site Emergency Coordinator (CR - SEC)	The CR – SEC has the responsibility of overall command and control in the CR and has the responsibility to notify the state and local authorities within the required time.	Yes	Reference PLP-007, "Robinson Emergency Plan," Sections 5.3 and 5.4. Because the CR-SEC has responsibility for both of these tasks, they will only be counted once in the participation indicator.
Control Room Shift Communicator – provides initial offsite (state/local) notification		The CR-SEC compiles the data and approves the ENF		
Technical Support Center Senior Manager – Management of plant operations/corporate resources	Technical Support Center - Site Emergency Coordinator (TSC - SEC)	The TSC – SEC has the responsibility for all events being conducted outside the Control Room and within the Protected Area. The TSC-SEC is the lead position for the TSC.	Yes	Reference PLP-007, "Robinson Emergency Plan," Section 5.3.

ERO KEY MEMBER MATRIX

Technical Support Center Key Operations Support	Plant Operations Director (POD)	The POD is either a currently licensed or previously licensed SRO. They are the link between the Control Room and the TSC. They are an advisor to the TSC – SEC.	Yes	Reference PLP-007, "Robinson Emergency Plan," Section 5.3.
Technical Support Center Key Radiological Controls – Radiological effluent and environs monitoring, assessment and dose projections	Radiological Control Director (RCD)	The RCD is responsible for Key Radiological Controls – Radiological effluent and environs monitoring, assessment and dose projections within the Protected Area.	Yes	Reference PLP-007, "Robinson Emergency Plan," Section 5.3.
Technical Support Center Key TSC Communicator – provides offsite (state/local) notification	NRC Emergency Communicator (NRC – EC)	The communicator to an offsite agency within the TSC is to the NRC by the NRC Emergency Communicator. An Operator or someone in Operations Training who would be familiar with the operation of the plant staffs this position.	Yes	Reference PLP-007, "Robinson Emergency Plan," Section 5.3.

ERO KEY MEMBER MATRIX

Technical Support Center Key Technical Support	Technical Analysis Director (TAD)	The TAD advises the TSC – SEC and has a staff of Engineers who are the Accident Assessment Team (Electrical, Mechanical, and Reactor)	Yes	Reference PLP-007, "Robinson Emergency Plan," Section 5.3.
Emergency Operations Facility Senior Manager – Management of corporate resources	Emergency Response Manager (ERM)	The Emergency Response Manager is standing in for the Plant Vice-President during declared events. This individual has overall plant responsibility and the remainder of the company at their disposal if requested through corporate.	Yes	Reference PLP-007, "Robinson Emergency Plan," Section 5.3.
Emergency Operations Facility Key Protective Measures – Radiological effluent and environs monitoring, assessment, and dose projections	Radiological Control Manager (RCM)	The RCM has the overall responsibility to advise the ERM of radiological conditions. The RCM has the DPTL and the EMTL working for them.	Yes	Reference PLP-007, "Robinson Emergency Plan," Section 5.3.

ERO KEY MEMBER MATRIX

Emergency Operations Facility Key EOF Communicator – provides offsite (state/local) notification	Emergency Communicator (EC)	In the EOF, the EC is responsible for accurate and timely completion of the notification form and notification to the offsite agencies within the required time.	Yes	Reference PLP-007, "Robinson Emergency Plan," Section 5.3.
Operational Support Center Key OSC Operations Manager	Operational Support Center Leader (OSCL)	The OSCL is responsible for coordination and activation of Damage Control and Search and Rescue missions.	No	Reference PLP-007, "Robinson Emergency Plan," Section 5.3.

Progress Energy	R Reference Use

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 2

PART 5

EPRAD-03

DOSE PROJECTIONS

REVISION 14

SUMMARY OF CHANGES
PRR 116784

STEP #	REVISION COMMENTS
Entire Procedure	Changed procedure layout to conform with AP-007 requirements.
Step 8.2.12.3 Step 8.3.3.3.5 Step 8.3.3.4.5 Step 8.3.3.5.2 Bullet 8	Changed default value for release duration from 1 hour to 2 hours
Section 8.5 (new)	Manual calculation of dose projections results (NCR #93300)
Attachment 10.18	New attachment for calculating and recording dose projection results.

TABLE OF CONTENTS

1.0 PURPOSE

This procedure provides instruction for performing dose projections in case of possible offsite emergencies from a release of airborne radioactivity.

2.0 REFERENCES

As per EPRAD-00.

3.0 RESPONSIBILITIES

3.1 Operations personnel under the direction of the Site Emergency Coordinator are responsible for performing the Control Room portion of this procedure until the Dose Projection Team is activated.

3.2 The Radiological Control Manager or the Dose Projection Team Leader is responsible for calculating the TEDE and the thyroid CDE, to be used by the Radiological Control Manager and the Emergency Response Manager in determining and evaluating possible off-site consequences from a release of airborne radioactivity.

4.0 PREREQUISITES

As per EPRAD-00.

5.0 PRECAUTIONS AND LIMITATIONS

5.1 Radiation Monitors that are out of service shall not be used for dose projections. Verification of ERFIS data shall be accomplished by comparing the Control Room readouts in the event the RMS/ERFIS interface multiplexer is in alarm.

5.2 When manually entering data in HBRDOSE do not leave blank spaces between characters, (e.g., use 3,000,000 or 3E6 NOT 3 E6).

5.3 Additionally, this section contains several Attachments to assist the user that are not specifically referenced in the body of the section.

6.0 SPECIAL TOOLS AND EQUIPMENT

N/A

7.0 ACCEPTANCE CRITERIA

N/A

8.0 INSTRUCTIONS

8.1 Accessing the Dose Projection Computer Program

> **NOTE:** This section represents a systematic approach to access the dose projection computer program. Steps must be followed in order and you must be logged into EDS with an event declared. Any problems in accessing the program must be promptly reported to Information Technology personnel for resolution.

8.1.1 **IF** the ERFIS terminal to be used is initially aligned to the site LAN, **THEN** align the terminal to the ERFIS system.

> **NOTE:** The following error messages may occur indicating the inability to link with the ERFIS host:
>
> If initially in ERFIS during the failure, an **"ERR11 COMMUNICATIONS TIMED OUT !!!"** message will appear on the top line of the man-machine interface and the EDS icon in the upper right corner will turn red.
>
> If initially on the site LAN during the failure, error text will appear and a log-in prompt.

8.1.2 **IF** the ERFIS terminal was in the site LAN at the time of the failure and error text and a login prompt are displayed, **THEN** proceed to Step 8.1.5 for "local mode" operations.

8.1.3 **IF** the ERFIS terminal to be used is aligned and linked to ERFIS, **THEN** type the turn on code "hbrdose" in the man-machine interface **OR SELECT** the EP Menu from the Main Menu and **SELECT** HBRDOSE.

8.1.3.1 **IF** the dose projection program is accessed, **THEN** proceed to Section 8.2, Use of the Dose Projection Program in the Control Room.

8.1.3.2 **IF** the dose projection program is not accessed, **THEN** proceed to the next step.

8.1.4 **IF** the ERFIS terminal to be used is aligned but **NOT** linked to ERFIS, **THEN** dose projection **MAY** still be used, however, radiological and meteorological data must be manually entered.

8.1.4.1 **TYPE** the turn on code "hbrdose" in the man-machine interface.

8.1.4.2 **NOTIFY** Information Technology personnel of problems as soon as practical.

8.1.4.3 **IF** the dose projection program is accessed, **THEN** proceed to Section 8.2, Use of the Dose Projection Program in the Control Room.

8.1.4.4 **IF** the dose projection program is **NOT** accessed, **THEN** proceed to the next step.

8.1.5 **IF** the ERFIS terminal to be used **CAN NOT** be aligned to ERFIS, **THEN** continue in this section to configure the ERFIS terminal for "local mode."

NOTE: As long as the ERFIS terminal has power, the following sub-steps should align the terminal to perform dose projection in "local mode". This method will require manual entry of radiological and meteorological data.

8.1.5.1 **REBOOT** the ERFIS terminal by depressing CTRL, ALT, SHIFT, DEL (numeric keypad delete must be used) simultaneously. The computer may take up to 10 seconds to respond to this key sequence.

8.1.5.2 **CHOOSE** ERFIS/EDS from the System Commander.

8.1.5.3 **IF** a grey **QNX** window appears, **THEN** press the right mouse button to get the menu, choose "exit," and confirm the exit choice. Otherwise, skip this step and proceed to the next step.

NOTE: The login and password prompts are case sensitive and must be entered in lower case.

8.1.5.4 **WHEN** the cursor is displayed, possibly after various system messages, **THEN** press "ENTER" if the login prompt is not displayed. A "Login" prompt should appear.

8.1.5.5 At the login prompt, **TYPE** "hbrdose" and press "Enter."

8.1.5.6 At the password prompt, **TYPE** "hbrdose" and press "Enter." HBRDOSE will automatically start after this step.

8.1.5 (Continued)

8.1.5.7 Do not attempt to print or make electronic notifications in "local mode," as this will further degrade execution of the program.

8.1.5.8 **IF** "local mode" worked, **THEN GO TO** Section 8.2, "Use of the Dose Projection Program in the Control Room".

8.1.6 **CONTACT** Information Technology personnel for instructions to return the ERFIS terminal to normal when dose projections are complete.

8.1.7 **IF** "local mode" did not work on the initial ERFIS terminal, **THEN REPEAT** Step 8.1.5 on another ERFIS terminal, and request that Information Technology personnel immediately bring a computer to the Control Room with a current version of the dose projection program installed.

8.1.7.1 Information Technology personnel will provide instructions on accessing the program.

8.1.7.2 Proceed to Section 8.2, "Use of the Dose Projection Program in the Control Room."

8.2 Use of the Dose Projection Program in the Control Room

8.2.1 With the mouse, left click the Projection menu item.

8.2.2 Left click the Control RM menu item.

NOTE: Within each release pathway, the left mouse button can be used to move the cursor to the desired field. Depressing the left mouse button will also select or deselect any of the monitors.

8.2.3 CONTAINMENT ⇒ ENVIRONMENT Group

8.2.3.1 **IF NO** monitor in the CONTAINMENT⇒ENVIRONMENT group is in alarm, **THEN VERIFY** that none of the check boxes are selected. You can deselect any monitor by pressing the left mouse button on the desired monitor. Go to Step 8.2.4.

NOTE: When performing the following step be aware that R-2 values are displayed in units of mR/hr while R-32 A&B values are displayed in R/hr.

8.2.3.2 **IF** R-32A **OR** R-32B **OR** R-2 are in alarm, **THEN SELECT** the alarming monitor that has the highest radiation level **AND GO TO** Step 8.2.3.5.

8.2.3.3 **IF** R-12 is in alarm and is aligned to the CV, **THEN** select R-12 **AND GO TO** Step 8.2.3.5.

8.2.3.4 **IF** R-12 is in alarm **AND** is aligned to the plant vent, **THEN GO TO** Step 8.2.3.5.

8.2.3.5 **IF** a bad quality code **OR** no data is being displayed for the selected monitor, **THEN** manually enter the reading from the radiation monitor drawer.

NOTE: The default CV release flow of 1.5 CFM is based on the CV design leak rate at design basis CV pressure.

8.2.3.6 **IF** containment integrity is maintained, **THEN GO TO** Step 8.2.4.

8.2.3.7 **IF** containment integrity is **NOT** maintained, **THEN** enter the leak rate escaping through an unmonitored pathway in the FLOW field (next to R-32A).

8.2.4 PLANT VENT STACK Group

8.2.4.1 **IF NO** monitors in the PLANT VENT STACK group are in alarm, **THEN** GO TO Step 8.2.5.

8.2.4.2 **IF** R-14E is above 50 cpm, **THEN** select R-14E **AND GO TO** Step 8.2.4.6.

8.2.4.3 **IF** R-14D is above 12 cpm, **THEN** select R-14D **AND GO TO** Step 8.2.4.6.

8.2.4.4 **IF** R-14C is in alarm, **THEN** select R-14C **AND GO TO** Step 8.2.4.6.

8.2.4.5 **IF** R-21 is in alarm, **THEN** select R-21.

8.2.4.6 **IF** a bad quality code **OR** no data is being displayed for the selected monitor, **THEN** manually enter the reading from the radiation monitor drawer.

8.2.4.7 **IF** R-21 was selected, **THEN GO TO** Step 8.2.5.

8.2.4.8 **IF** a good quality code is provided for stack flow, **THEN GO TO** Step 8.2.4.9.

8.2.4.9 **SELECT** the operating ventilation units.

8.2.4.10 **IF** R-12 is **NOT** in alarm, **THEN GO TO** Step 8.2.6.

8.2.4.11 **IF** R-12 is aligned to the CV, **THEN GO TO** Step 8.2.6.

8.2.4.12 **IF** R-14C **OR** R-14D **OR** R-14E were selected in Step 8.2.4 **THEN GO TO** Step 8.2.6.

8.2.4 (Continued)

8.2.4.13 **IF** R-21 was selected in Step 1.2.4 **AND** HVE-15 is the only release pathway, **THEN GO TO** Step 8.2.6.

8.2.4.14 **SELECT** R-12.

8.2.4.15 **IF** a bad quality code **OR** no data is being displayed for R-12, **THEN** manually enter the reading from the radiation monitor drawer.

NOTE: The groups of HVE units in the PLANT VENT STACK group or Attachment 10.8, Flow Rates, can be used to determine the following flow rate.

8.2.4.16 **SELECT** the plant vent stack flow field **AND ENTER** the determined flow rate through the plant vent stack.

8.2.5 LOWER FHB ⇒ ENVIRONMENT Group

8.2.5.1 **IF NO** monitors in the Lower FHB ⇒ ENVIRONMENT group are in alarm, **THEN GO TO** Step 8.2.6.

8.2.5.2 **IF** R-20 is in alarm **AND** has **NOT** failed high, **THEN SELECT** R-20 **AND GO TO** Step 8.2.5.4.

8.2.5.3 **IF** R-20 has failed high, **THEN SELECT** R-30.

8.2.5.4 **IF** a bad quality code **OR** no data is being displayed for the selected monitor, **THEN** manually enter the reading from the radiation monitor drawer.

8.2.6 SECONDARY RELEASE

8.2.6.1 **IF NO** R-31 monitors are reading greater than one mRem/hr, **THEN GO TO** Step 8.2.7.

8.2.6.2 **IF** steam/water is escaping from a Main Steam Line through a faulted Main Steam System outside containment **AND** the affected radiation monitor is reading greater than one mRem/hr, **THEN GO TO** step 8.2.6.4.

8.2.6.3 **IF NO** PORVs **AND NO** SRVs are open, **THEN GO TO** Step 8.2.6.6.

8.2.6.4 Select PORV/SRV.

8.2.6 (Continued)

8.2.6.5 **IF** a bad quality code **OR NO** data is being displayed for the selected monitor, **THEN** manually enter the reading from the radiation monitor drawer.

8.2.6.6 **IF** the release is due to a Main Steam System fault as described in Step 8.2.6.2, **THEN** using the Main Steam indications on the RTGB and Attachment 10.8 to compare flow rates, **ENTER** the PORV and SRV combination that would produce the same flow rate as the fault, in the fields below the monitor(s) in alarm, **AND GO TO** Step 8.2.6.9.

8.2.6.7 **IF** the PORV on the Main Steam Line(s) that has the monitor(s) in alarm are open, **THEN ENTER** 1 in the PORV field below the monitor(s)in alarm.

8.2.6.8 **IF** any SRV(s) on the Main Steam Line(s) that has(have) the monitor(s) in alarm are open, **THEN** enter the number open in the SRV field below the monitor(s) in alarm.

8.2.6.9 **IF** a bad quality code **OR** no data is being displayed in the SG Press field(s) below the monitor(s) in alarm, **THEN** manually enter the correct pressure as obtained from control room readouts.

8.2.7 STEAM ⇒ CONDENSER

8.2.7.1 **IF** R-15 is **NOT** in alarm, **THEN GO TO** Step 8.2.8.

8.2.7.2 **IF** R-14C **OR** R-14D **OR** R-14E were **NOT** selected in the Plant Vent Stack group **OR** R-12 was **NOT** selected in Step 8.2.5.6, **THEN SELECT** Steam ⇒ Condenser.

8.2.7.3 **IF** R-15 is in alarm **AND** has **NOT** failed high, **THEN SELECT** STEAM⇒CONDENSER **AND GO TO** Step 8.2.7.5.

8.2.7.4 **IF** a bad quality code **OR** no data is being displayed for R-15, **THEN** manually enter the reading from the radiation monitor drawer.

8.2.7 (Continued)

8.2.7.5 **IF** only one vacuum pump is running, **THEN SELECT** 310 CFM flow **AND GO TO** Step 8.2.7.7.

8.2.7.6 **IF** two vacuum pumps are running, **THEN SELECT** 610 CFM flow.

8.2.7.7 Left click the Done button.

8.2.8 SPECTRUM DETERMINATION

8.2.8.1 **IF** the incident does **NOT** involve the reactor (i.e. spent fuel, waste gas, old spent fuel), **THEN GO TO** Step 8.2.8.6.

NOTE: The core uncovery time will be the time that a RED status occurs on the CORE COOLING critical safety function status tree until the tree conditions return to yellow status (core covered and core exit thermocouples < 700^0 F). This determination can be performed on the TV monitor or on the manual board.

8.2.8.2 **IF** the incident involves the reactor **AND** the core has **NOT** been uncovered, **THEN GO TO** Step 8.2.8.5.

8.2.8.3 Select the time that the core has been uncovered:

1. < 30 minutes
2. 0.5 - 1.8 hours (30 minutes - 1 hour 48 minutes)
3. > 1.8 hours (1 hour 48 minutes)

8.2.8.4 **GO TO** Step 8.2.9.

8.2.8.5 **IF** the incident involves mechanical damage to fuel in the reactor, **THEN** select '< 30 minutes' **AND GO TO** Step 8.2.9.

8.2.8.6 **IF** the incident involves a Waste Gas Decay Tank, **THEN SELECT** Waste Gas **AND GO TO** Step 8.2.9.

8.2.8 (Continued)

NOTE: Spent fuel that is being shipped or is in preparation for shipment should be classified as OLD SPENT FUEL. Assume that the spent fuel has been out of the reactor core for less than three years if the true time is unknown.

8.2.8.7 **IF** the incident is a fuel handling accident **AND** involves spent fuel that has been out of the reactor core for less than three years, **THEN SELECT** Spent Fuel **AND GO TO** Step 8.2.9.

8.2.8.8 **IF** the incident is a fuel handling accident **AND** involves spent fuel that has been out of the reactor core for more than three years, **THEN SELECT** Old Spent Fuel.

8.2.9 FILTRATION/CV SPRAYS/PARTITIONING

NOTE: Attachment 10.5, Accident Mitigation Systems, of this procedure describes if Filtration/CV Sprays/Partitioning are "Effective" or "Not Effective".

8.2.9.1 **IF** Filtration **OR** CV Sprays **OR** Partitioning are effective, **THEN SELECT** Effective **AND GO TO** Step 8.2.10.

8.2.9.2 **IF** Filtration **OR** CV Sprays **OR** Partitioning are **NOT** effective, **THEN SELECT** Not Effective **AND GO TO** Step 8.2.10.

8.2.10 METEOROLOGY

CAUTION

If direct access to the meteorological tower has failed, the data will appear colored red in the input fields. DO NOT USE THIS DATA.

8.2.10.1 **IF** meteorological data with a good quality code is being displayed, **THEN GO TO** Step 8.2.11.

8.2.10.2 **IF** a bad quality code **OR** no data is being displayed for meteorological data, **THEN** left click the REFRESH button to make a second attempt to acquire meteorological data from ERFIS.

8.2.10 (Continued)

8.2.10.3 **IF** the computer makes the connection to the meteorological tower **AND** the meteorological data is properly updated (in accordance with Caution Statement above), **THEN GO TO** Step 8.2.11.

8.2.10.4 **IF** meteorological data is **NOT** available from the control room computer, **THEN** manually update the meteorological data.

8.2.10.5 Call the Progress Energy offsite meteorological contact (See the ERO Phone Book for number).

8.2.10.6 **IF** meteorological data is available from the Progress Energy offsite meteorological contact, **THEN** manually update the meteorological data **AND GO TO** Step 8.2.10.11.

NOTE: If the Florence Airport or the National Weather Service office is called, the only information that can be obtained is the wind direction, wind speed, and ambient temperature. Stability factor must be obtained from Step 8.2.10.11 of this procedure. If wind speed and direction are only supplied for one point enter these values in both the elevated and ground fields. Do not enter wind gust as the wind speed, and if no Delta T is supplied do not enter one.

8.2.10.7 Call the Florence Airport: (See the ERO Phone Book for numbers)

8.2.10.8 **IF** meteorological data is available from the Florence Airport, **THEN** manually update the meteorological data **AND GO TO** Step 8.2.10.11

8.2.10.9 Call the National Weather Service office in Columbia, South Carolina: (See the ERO Phone Book for numbers)

8.2.10.10 **IF** meteorological data is available from the National Weather Service, **THEN** manually update the meteorological data.

8.2.10 (Continued)

8.2.10.11 **IF** there is no stability class data available, **THEN** make an estimate of the current Atmospheric Stability Class by visual observation, using the following table:

	Rain, Day or Night	Sunny Day	Cloudy Day	Cloudy Night	Clear Night
light wind or calm (< 11.5 mph)	D	B	C	E	F
moderately strong wind(11.5 mph)	D	C	D	D	D

8.2.10.12 Enter the stability class in the appropriate field.

8.2.10.13 Left click the Shutdown time field.

8.2.11 REACTOR SHUTDOWN TIME

8.2.11.1 **IF** the reactor is **NOT** shutdown, **THEN GO TO** Step 8.2.12.

8.2.11.2 **IF** the reactor is shutdown **AND** the shutdown time is not displayed **OR** is not correct, **THEN** manually enter the date and time of shutdown in the space provided.

8.2.12 RELEASE DURATION

NOTE: The estimated release duration should be from the start of the release until the projected time that the release should stop. This can be determined by estimating the completion of a damage control mission, performance of a repair to stop the release, or the estimated time until the RCS, CV Sump, or Steam Generator is below 200° F.

8.2.12.1 **IF** the release duration is known, **THEN** manually enter the release duration in the field provided **AND GO TO** Step 8.2.12.4.

8.2.12.2 **IF** the release duration is unknown **AND** an estimate is available, **THEN** enter the estimated time in the field provided **AND GO TO** Step 8.2.12.4.

8.2.12 (Continued)

8.2.12.3 **IF** the release duration is unknown **AND** no estimate is available, **THEN** enter 2 in the field provided **AND GO TO** Step 8.2.13.

8.2.12.4 Left click the Done button.

8.2.12.5 The dose projection will be given on the screen.

8.2.13 Using the information supplied **NOTIFY** the government officials as per the requirements of EPNOT-01.

8.3 Use Of The Dose Projection Program By The Dose Projection Team

8.3.1 **ACCESS** the software using Section 8.1 of this procedure **AND RETURN** to Step 8.3.2.

8.3.2 The main menu screen will appear. The items in this menu can be accessed by clicking the left button on any of these items. Six menu topics are available for use. They are listed here along with the section in this procedure which explains their use.

Projection	8.3.3
Contingency	8.3.4
Int Phase	8.3.5
Graphics	8.3.6
Utilities	8.3.7
Exit	8.3.8

8.3 (Continued)

NOTE: The Dose Projection Program should be used to calculate the "Total Dose" from the start of the release until the projected end. To do so conservatively, the Dose Projection Team may decide to use the estimated peak release rate throughout the release period. If no information is available, the current release rate should be considered constant throughout the release period.

8.3.3 PROJECTION

This menu item should be used to perform early phase dose projections based on plant radiation monitors, plant samples, or environmental samples.

8.3.3.1 Control Room

This function should be used by control room personnel. Its use is described in Step 8.2 of this procedure.

8.3.3.2 RMS

This function should be used by the dose projection team to perform dose projections when adequate data is available from the plant effluent monitors. The following steps are for guidance and are not required to be performed in entirety or in the order in which they are given.

1. The first screen that will appear when this menu option is selected is the ROBINSON EFFLUENT MONITORS screen. The following items should be considered when using this screen:

NOTE: Attachment 10.12, RMS Monitored Systems can be used to determine the relationship between radiation monitors and effluent pathways.

- Quality codes will be displayed on this screen as indicated in Attachment 10.3, Quality Codes of this procedure.

- Dose projections for more than one release pathway can be performed using this program. The monitors are grouped on this screen according to the release pathway that they monitor. Therefore, only one monitor from each group can be selected each time the dose projection program is executed.

8.3.3 (Continued)

2. The Containment to Environment release path is a valid release path in most situations even when no containment leakage has been identified. The 1.5 cfm flow is the design basis release rate when the CV is pressurized to design basis pressure. If containment leakage is into the Auxiliary Building and the release is monitored by a stack monitor, a dose projection using the containment monitors is not necessary.

NOTE: If a projection is made using R-12 aligned to the plant vent it will be based on a ground level release pathway instead of a mixed mode release.

- R-12 is usually lined up to the containment atmosphere. If a dose projection is performed using R-12, ensure that it aligned the way that it is being used.

- R-12 can be used to perform a dose projection when it is aligned to the plant vent. In order to accomplish this the R-12 plant vent flowrate must be manually entered into the containment monitors flowrate field. If this is performed, then it can not be accomplished at the same time that a dose projection is being performed based on containment leakage. For this reason, if a projection is needed based on both release paths, they must be performed separately and manually added together.

3. The flow rate for the R-14 monitors will be automatically updated by ERFIS to reflect the plant vent stack when ERFIS is available.R-21 has a default flow rate which is equivalent to the flow of HVE-15. This default value should normally be used, because this is the effluent volume that this detector is monitoring.

4. R-20 and R-30 have a default flow rate which is equivalent to the flow of HVE-14.

8.3.3 (Continued)

5. R-31A, 31B, and 31C should not normally be used if they are below 1 mRem/hr. However, if they are, they must be background corrected and manually entered. Obtain the latest valid normal reading from the weekly background/alarm setpoint check or other source (Attachment 10.11, Typical RMS Data, may be used) and subtract the normal reading from the control room readout and enter this value.

   - If a release is due to a faulted steam line, a dose projection can be performed by selecting the number of SRV's and PORV that would approximate the release (use Attachment 10.8, Flow Rates). The UNKNOWN MIX under the CONTINGENCY menu can be used to perform a dose projection under this condition using Attachment 10.7, Source Term Determination, Part E.

NOTE: If a dose projection is performed using R-15 and the release is due to a break in the line between the condenser vacuum pumps and the plant vent stack, the projection will be based on a mixed mode release, instead of a ground level release.

6. The program will allow you to perform dose projections using the R-15 monitor and the plant vent monitors at the same time. However, this should only be done under the following circumstances:

   - R-15 is above background **AND** the line from the condenser vacuum pumps to the plant vent is allowing leakage, **OR**

   - R-15 is above background **AND NEITHER** R-14C, R-14D, R-14E, **NOR** R-12 when it is aligned to the plant vent, are being used for a dose projection.

7. Once selections have been made on this screen, **THEN SELECT** the DONE field.

8.3.3 (Continued)

8.3.3.3 The SPECTRUM DETERMINATION screen is the next screen that will appear. Several characteristics of the incident must be entered on this screen in order to identify the source term.

NOTE: Only one of the following conditions can exist for each execution of the Dose Projection Program. If more than one of the following conditions exist, the projection should be executed more than once using the appropriate effluent monitors to accurately quantify the effluent.

1. **IF** the incident involves the reactor, **THEN SELECT** the time that the reactor core has been uncovered using the guidelines in Attachment 10.4, Core Uncovery Time Determination.

2. **IF** the incident involves Spent Fuel, regardless of the location, **THEN IDENTIFY** whether the fuel is Spent Fuel or Old Spent Fuel. Old Spent Fuel is fuel that has <u>not</u> been in the reactor while critical for three years or more.

3. **IF** the incident involves a Waste Gas Decay Tank, **THEN SELECT** the Waste Gas option.

NOTE: The estimated release duration should be from the start of the release until the projected time that the release should stop. This can be determined by estimating the completion of a damage control mission, performance of a repair to stop the release, or the estimated time until the RCS, CV Sump, or Steam Generator is below 200° F.

4. **DETERMINE** the Release Duration **AND ENTER** the value in the appropriate field.

5. **IF** an estimate of the time is not known, **THEN ENTER** two hours until better information is available.

8.3.3 (Continued)

NOTE: A Plant Operations Advisor, the Accident Assessment Team, or the Shift Technical Advisor should be consulted to determine whether these mitigation systems are operable.

6. **DETERMINE** the effectiveness of Filtration/CV Sprays/Partitioning using the guidelines in Attachment 10.5, Accident Mitigation Systems, to make this determination.

7. **ENTER** the meteorology data. **IF** the quality codes are bad or questionable, **THEN UPDATE** meteorology data using Attachment 10.6, Obtaining and Updating Meteorological Data for guidance.

8. **IF** the reactor is shutdown, **THEN ENTER** the shutdown date and time in the appropriate fields. Otherwise, these fields can be left as they appear.

9. Click on the DONE field when all of the information on this screen has been entered.

8.3.3.4 PLANT SAMPLE

This function is for use by the dose projection team to perform dose projections based on plant samples of the effluent stream. It should be used as needed by the dose projection team. The screen that will appear when this menu option is selected should be completed with the help of the following guidelines.

1. **ENTER** the activity of each nuclide that is listed on the screen that is available from the plant sample analysis.

2. **IDENTIFY** the release height of the effluent.

   - **SELECT** mixed if the release is through the plant vent regardless of the wind speed.

   - **SELECT** ground if the release is by any other pathway, or if the pathway is unknown.

8.3.3 (Continued)

3. **ENTER** the time from sample to release to correct the sample activity for any radioactive decay that has occurred in the sample effluent between the time the sample was collected and the time of the release. DO NOT enter a value in this field unless you wish to decay correct the effluent stream.

4. **ENTER** the flow rate in cfm of the effluent stream. Care should be taken to understand where the sample was obtained, and ensure that the FLOW field data corresponds with the flow of the sampled air with no further dilution. A flow rate can be manually entered using the flow rates in Attachment 10.8, Flow Rates, as a reference, or a flow can be selected by selecting the FLOWS field.

NOTE: The estimated release duration should be from the start of the release until the projected time that the release should stop. This can be determined by estimating the completion of a damage control mission, performance of a repair to stop the release, or the estimated time until the RCS, CV Sump, or Steam Generator is below 200° F.

5. **ENTER** the release duration in the appropriate field. **IF** the release duration is unknown, **THEN ENTER** a default of two hours.

6. **ENTER** the meteorology data in the appropriate fields.

7. **IF** the reactor is shutdown, **THEN ENTER** the shutdown date and time in the appropriate fields.

8. Click on the DONE field when all of the information on this screen has been entered.

8.3.3 (Continued)

8.3.3.5 ENVIRONMENTAL SAMPLE

This function is for use by the dose projection team to perform dose projections based on environmental samples. It should be used as needed by the dose projection team. The screen that will appear when this menu option is selected is titled as the ENVIRONMENTAL MONITORING TEAM. It should be completed with the help of the following guidelines.

NOTE: Protective action recommendations are required to be made within 15 minutes of obtaining environmental sample results. (AR #48774)

1. **ENTER** the closed window dose rate (in mRem/hr) that is obtained at a height of approximately one meter above the ground. The value should be obtained from the Environmental Monitoring Team Leader and should reflect the most recent data that is available from near the centerline of the plume.
2. For the air sample dose rate. **SELECT** the CART field **AND ENTER** data in the appropriate fields using the following guidance:
   - **ENTER** the sample volume in cubic feet.
   - **SELECT** whether count rate or dose rate will be entered.
   - **ENTER** the count rate or dose rate on contact with the iodine cartridge. This data should be obtained from the Environmental Monitoring Team Leader and should reflect the most recent data that is available from the centerline of the plume.
   - **SELECT** the DONE field and the program will calculate the Thyroid Committed Dose Rate. (This calculation is based on Attachments in EPRAD-01, Environmental Monitoring.)
   - **SELECT** the CANCEL field to exit this window or click the mouse outside of the window.
   - **ENTER** the downwind distance from the plant stack to the sample collection location.
   - **ENTER** the direction from the plant that the sample was collected in degrees.

8.3.3.5 (Continued)

- **ENTER** the release duration in the appropriate field. **IF** the release duration is unknown, **THEN ENTER** a default of two hours.
- **IDENTIFY** the release height of the effluent.
  a. **SELECT** mixed if the release is through the plant vent regardless of the wind speed.
  b. **SELECT** ground if the release is by any other pathway, or if the pathway is unknown.
- **ENTER** the meteorology data in the appropriate fields.
- **IF** the reactor is shutdown, **THEN ENTER** the shutdown date and time in the appropriate fields.

3. The DONE field should be selected when all of the information on this screen has been entered.

8.3.4 CONTINGENCY

Contingency calculations are typically "what if" types of calculations that allow the Dose Projection Team to make predictions of off-site dose based on a projected event. However, they can be used to make actual dose projections.

8.3.4.1 KNOWN MIX

This function allows the user to input the isotopic analysis of the release in order to perform a dose projection. The screen that will appear when this menu option is selected should be completed with the help of the following guidelines.

1. **ENTER** the activity of each nuclide that is listed on the screen which could be in a postulated release.
2. **IDENTIFY** the release height of the effluent.
   - **SELECT** mixed if the release is through the plant vent regardless of the wind speed.
   - **SELECT** ground if the release is by any other pathway, or if the pathway is unknown.
3. **ENTER** the time from when the isotopic activities were determined until the release could begin. This is not required and should only be entered when it is expected that the activity has decayed since the sample was pulled.

8.3.4 (Continued)

4. **ENTER** the number of Curies that could be released using Attachment 10.7, Source Term Determination.

5. **ENTER** the meteorology data in the appropriate fields.

6. **IF** the reactor is shutdown, **THEN ENTER** the shutdown date and time in the appropriate fields.

7. The DONE field should be selected when all of the information on this screen has been entered

8.3.4.2 UNKNOWN MIX

This function allows the user to project what the offsite dose to the public would be due to a release if the total activity of the release is known but the isotopic abundances are not known. The screen that will appear when this menu option is selected should be completed with the help of the following guidelines.

NOTE: Only one of the following conditions can exist for each execution of the Dose Projection Program. If more than one of the following conditions exist, execute the projection more than once using the appropriate effluent monitors to accurately quantify the effluent.

1. **IF** the incident involves the reactor core, **ENTER** the time that the reactor core has been uncovered or could be uncovered. Use Attachment 10.4, Core Uncovery Time Determination, to help make this determination.

   - **IF** the incident involves Spent Fuel, regardless of the location, **IDENTIFY** whether the fuel is Spent Fuel or Old Spent Fuel. Old Spent Fuel is fuel that has not been in the reactor while critical for three years or more.
   - **IF** the incident involves a Waste Gas Decay Tank, **THEN SELECT** the Waste Gas option.
   - **ENTER** the number of Curies that could be released using Attachment 10.7, Source Term Determination, to help determine this value.

8.3.4 (Continued)

- **IDENTIFY** the release height of the effluent.
  a. **SELECT** mixed if the release is through the plant vent regardless of the wind speed.
  b. **SELECT** ground if the release is by any other pathway, or if the pathway is unknown.
- **DETERMINE** the effectiveness of Filtration/CV Sprays/Partitioning using the guidelines in Attachment 10.5, Accident Mitigation Systems, to make this determination.
- **ENTER** the meteorology data in the appropriate fields.
- **IF** the reactor is shutdown, **THEN ENTER** the shutdown date and time in the appropriate fields.

2. The DONE field should be selected when all of the information on this screen has been entered.

8.3.4.3 DEFAULTS

This function allows the user to hypothesize what the offsite dose to the public would be due to a postulated release if plant conditions are unknown. A default should only be used when neither the total activity nor the isotopic analysis of the potential release are known. The screen that will appear when this menu option is selected should be completed with the help of the following guidelines.

CAUTION

Calculated dose using defaults are EXTREMELY conservative and may assume all of the core activity is released, depending on the spectrum determination.

1. **IF** the incident involves the reactor core, **ENTER** the time that the reactor core has been uncovered or could be uncovered. Use Attachment 10.4, Core Uncovery Time Determination, to help make this determination.
   - **IF** the incident involves Spent Fuel, regardless of the location, **IDENTIFY** whether the fuel is Spent Fuel or Old Spent Fuel. Old Spent Fuel is fuel that has not been in the reactor while critical for three years or more.
   - **IF** the incident involves a Waste Gas Decay Tank, **THEN SELECT** the Waste Gas option.

8.3.4 (Continued)

- **ENTER** the number of Curies that could be released using Attachment 10.7, Source Term Determination, to help determine this value.
- **IDENTIFY** the release height of the effluent.
  a. **SELECT** mixed if the release is through the plant vent regardless of the wind speed.
  b. **SELECT** ground if the release is by any other pathway, or if the pathway is unknown.
- **DETERMINE** the effectiveness of Filtration/CV Sprays/Partitioning using the guidelines in Attachment 10.5, Accident Mitigation Systems, to make this determination.
- **ENTER** the meteorology data in the appropriate fields.
- **IF** the plant has shutdown, **THEN ENTER** the shutdown date and time in the appropriate fields.

2. The DONE field should be selected when all of the information on this screen has been entered.

8.3.5 INTERMEDIATE PHASE

Intermediate phase calculations are used during the intermediate phase of an emergency to project the one year, two year, and fifty year committed dose to the public due to exposure from contamination deposited on the ground. The calculations are based on environmental data.

8.3.5.1 DOSE RATE

This function is used to calculate the projected doses using dose rate data from environmental monitoring teams. The screen that will appear when this menu option is selected should be completed with the help of the following guidelines.

1. **DETERMINE** if weathering (radioactive decay) should be considered when performing this function.
2. **IF** weathering should be considered, **THEN SELECT** the UTILITIES function from the main menu **AND FOLLOW** the guidelines in Step 8.3.7 of this procedure.

8.3.5 (Continued)

NOTE: If no data has been entered under the "Sample" then the "Average Spectrum" choice will not appear, and only the Default Spectrum can be used.

3. **ENTER** the closed window dose rate in mRem/hr taken at approximately one meter from the ground in the 1 meter dose rate field.
4. **ENTER** the straight line distance in miles or fractions of miles from the plant vent that the sample was taken.
5. **ENTER** the bearing in degrees from the plant for the sample location.
6. **DETERMINE** if the Default Spectrum or the Average Spectrum should be used to perform the projection. The Average Spectrum should be selected if adequate data has been entered in the SAMPLE screen.
7. **SELECT** the DONE field when complete and the dose will be given.

8.3.5.2 SAMPLE

This function is used to calculate the projected dose using isotopic analysis of samples collected by environmental monitoring teams. The screen that will appear when this menu option is selected should be completed with the help of the following guidelines.

1. **DETERMINE** if weathering (radioactive decay) should be considered when performing this function.
2. **IF** weathering should be considered, **THEN SELECT** the UTILITIES function from the main menu **AND FOLLOW** the guidelines in Step 8.3.7 of this procedure.
3. **ENTER** the isotopic activity of each nuclide that is present in the sample that is listed on the screen. These activities should be entered in units of pCi/m^2. The nuclides that are listed on this screen are the only ones in RNP's anticipated source term that have a long enough half-life to contribute significant dose.
4. **ENTER** the sample identification number. This will normally be our radiochemistry form number.

8.3.5 (Continued)

5. **DETERMINE** if the sample should be added to the sample data base from which the average deposition is calculated. Choosing this option will also include the sample in the average spectrum function of the DOSE RATE option.
6. **ENTER** the straight line distance in miles or fractions of miles from the plant vent that the sample was taken.
7. **ENTER** the direction in degrees from the plant for the sample location.
8. **SELECT** the DONE field when complete and the dose will be given.

8.3.6 GRAPHICS

This menu item provides a graphic display of the 10 mile and 50 mile Emergency Planning Zones. It should be used as an aid by the Dose Projection Team to help with Protection Action Recommendations, and determining the adequacy of the environmental monitoring efforts.

NOTE: The latest graphics of the 10 MILE ISOPHLETHS and the 10 MILE PARs are automatically saved to a disk file. They can be printed using the Microsoft Paintbrush program.

8.3.6.1 10 MILE ISOPLETHS

This function provides a display of the isopleths within the 10 mile Emergency Planning Zone where the TEDE and Thyroid CDE limits are exceeded. If isopleths do not appear the EPA PAGs are not exceeded by the latest dose projection.

8.3.6.2 10 MILE PARS

This function displays the evacuation Protective Action Recommendations for the 10 Mile Emergency Planning Zone. This display consist of a five mile radius with a two mile keyhole superimposed on the map. The two mile keyhole applies to only the two mile sector (A0). Any of the five mile sectors (A1, B1, C1, D1, and E1) that are intersected by the five mile radius keyhole should be evacuated. If the dose at the centerline of the plume exceeds the EPA PAGs at any distance five miles or beyond, then the radius of the keyhole is extended to ten miles. Any of the ten mile sectors (A2, B2, C2, D2, and E2) which are intersected by the ten mile keyhole should be evacuated.

8.3.6 (Continued)

8.3.6.3 10 MILE EMT POINTS

This function provides a method to enter and display Environmental Monitoring Team Data in the 10 mile EPZ.

1. **CLICK** the mouse on the map location were the sample was taken.
2. **ENTER** the closed window dose rate taken at approximately one meter above the ground. **USE** units of mRem/hr **AND DEPRESS** the enter key when complete.
3. The computer will update the sample point with a color coded circle depending on the dose rate recorded at the location. These color codes are given in the upper right hand corner of the screen.

8.3.6.4 50 MILE INT PHASE

8.3.6.5 This function provides a method to enter Environmental Monitoring Team Data in the 50 mile EPZ, and calculate and display the 1, 2, and 50 year committed doses along with the skin dose.

1. **CLICK** the mouse on the map location were the sample was taken.
2. **ENTER** the closed window dose rate taken at approximately one meter above the ground. **USE** units of mRem/hr **AND DEPRESS** the enter key when complete.
3. The computer will update the sample point with a color code that represents if the program is above the EPA limits, above normal background, at background level. It will also calculate the 1, 2, and 50 year committed doses along with the skin dose.

8.3.7 UTILITIES

This menu item is provided to assist the Dose Projection Team. These functions can be used at any time they are needed while using the program.

8.3.7.1 WEATHERING

This function is used when performing an Intermediate Phase Dose Projection to account for reductions in the source term due to weathering and radioactive decay.

8.3.7 (Continued)

8.3.7.2 PRINTING SETUP

This function can be used to configure printing from this application. The user can configure custom printers and enable or disable the automatic printing of dose projection screens.

8.3.7.3 DISTANCES

This function allows the user to adjust the distances from the plant that dose projections are calculated. This is done by identifying the maximum distance from the plant and the increment between each distance that is desired. This function is especially useful in determining distances close in to the site or beyond 10 miles.

8.3.7.4 NOTIFICATION

This function will saves the on-screen dose projection information to a storage file linked to automatic entry of the dose projection into the Emergency Notification Form.

8.3.7.5 MANUAL SCREEN PRINT

Use this menu item to print the currently displayed dialog or screen. The printout will be directed to the default printer for the workstation unless a custom printer has been selected.

8.3.8 EXIT

8.3.8.1 This menu item will exit the dose projection program when it is selected.

8.4 Interpretation Of The Dose Projection Summary Table

This summary table appears on the screen after the dose projection calculation has been completed.

8.4.1 The first column at the top of this table is the distance from the plant. These distances default to Site Boundary, 2 Miles, 5 Miles, and 10 Miles. The distance along the centerline of the plume is identified in the Max row.

8.4.2 The second column at the top of this table is the TEDE in mRem. This will give the value that is entered on the Notification Form in the appropriate location.

8.4.3 The third column at the top of this table is the Thyroid CDE in mRem. This will give the value that is entered on the Notification Form in the appropriate location.

8.4 (Continued)

8.4.4 The next three columns give the Effective Dose Equivalent due to Immersion in the plume, the Committed Effective Dose Equivalent due to inhalation, and the Effective Dose Equivalent due to ground deposition. These columns are provided for information only.

8.4.5 The final column at the top of the table gives the X/Q value in s/m^3. This value should be provided to the State and Federal Emergency Response Officials when requested. For stability classes E, F, and G in MIXED MODE RELEASES, the X/Q is extremely small at the site boundary when compared with the other X/Q values.

8.4.6 The Dose Projection Summary Table also contains the Dose Projection Meteorology Data.

8.4.7 The reactor shutdown time is also found on this table.

8.4.8 The Projection Time which the Notification Form refers to is listed on the table as the Calculation Time.

NOTE: The following two steps are very important for proper correlation between the dose projections performed by HBR's Dose Projection Team and the projections performed by State personnel. The Xe-133 Equivalent Release and the I-131 Equivalent Release values are used by South Carolina Department of Health and Environmental Control for input into their dose assessment program.

8.4.9 The Xe-133 Equivalent Release is provided on this table and it is the value that should be entered as the Noble Gas Activity on the Notification Form. If any results are questionable, then Attachment 10.17 should be used to calculate this value.

8.4.10 The I-131 Equivalent Release is provided on this table and it is the value that should be entered as the Iodine Activity on the Notification Form. If any results are questionable, then Attachment 10.17 should be used to calculate this value.

8.4.11 The Dosimeter Correction Factor that is provided on this table should only be used when the Radiological Control Manager has directed that a Dosimeter Correction Factor is necessary, and there is not adequate data to calculate one using environmental data.

NOTE: The Emergency Action Level provided by the dose projection program is for **INFORMATION ONLY.** All Emergency Classifications shall be made by using the EAL procedures.

8.4.12 Emergency Action Levels

If an Emergency Action Level due to a dose projection is exceeded, the output screen will indicate the appropriate classification. Evaluate the EAL Flow Charts and compare the dose calculation against the EAL's to determine the Emergency Classification. **NOTIFY** the RCM of all Emergency Action Levels that the program recommends.

8.4.13 HBRDOSE/RASCAL

Attachment 10.16, HBRDOSE/RASCAL Comparison Matrix can be used to discuss differences in plant dose projections and those performed using the NRC's RASCAL program.

8.5 Manual Calculation of Dose Projection Results

This section provides instructions for performing and documenting manual dose projection calculations.

8.5.1 **IF** ERFIS is unavailable, **THEN DETERMINE** the atmospheric stability class, wind direction, and wind speed using Attachment 10.6.

NOTE: This manual dose calculation conservatively assumes all releases are ground level releases.

8.5.2 **RECORD** the meteorological data in the appropriate columns of Attachment 10.18, Manual Dose Projection Work Sheet.

8.5.2.1 **IF** the meteorological data source indicates a stability class of "G", **THEN ENTER** stability class "F" in the appropriate column.

8.5.3 **DETERMINE** the site boundary X/Q from Table 1 of Attachment 10.18, Manual Dose Projection Work Sheet.

8.5.4 **RECORD** the selected site boundary X/Q in the appropriate column of Attachment 10.18, Manual Dose Projection Work Sheet.

8.5.5 **CALCULATE** the source term (Q) in Ci using Attachment 10.7, Source Term Determination.

NOTE: The Curie values entered are the actual Curies of an assumed mix and not dose equivalent Xe-133 or I-131 Curies.

8.5.6 **RECORD** the noble gas and iodine source term values in the appropriate column of Attachment 10.18, Manual Dose Projection Work Sheet.

8.5.7 **DETERMINE** the Dose Conversion Factor (DCF) as follows:

8.5.7.1 **IF** the nuclide mix of the source term is unknown, **THEN DETERMINE** the time from reactor shutdown to release **AND RECORD** in the space provided in Attachment 10.18, Table 3.

8.5.7.2 **SELECT** the applicable dose conversion factors corresponding to the time from reactor shutdown to release from Table 3 of Attachment 10.18, Manual Dose Projection Work Sheet.

8.5.7 (Continued)

8.5.7.3 **IF** the nuclide mix of the source term is known, **THEN DETERMINE** the time from SAMPLE to release **AND RECORD** in the space provided in Attachment 10.18, Table 2.

8.5.7.4 **CALCULATE** the TOTAL DCF using Table 2 of Attachment 10.18, Manual Dose Projection Work Sheet.

8.5.7.5 **RECORD** the value in the appropriate column of Attachment 10.18, Manual Dose Projection Work Sheet.

8.5.8 **MULTIPLY** the values in Columns 4, 5, and 6 to obtain the centerline TEDE and Thyroid CDE at the site boundary **AND RECORD** in the appropriate columns of Attachment 10.18, Manual Dose Projection Work Sheet.

8.5.9 **CALCULATE** the doses downwind at 2, 5, and 10 miles from the site boundary using the extrapolation factors (Column 9) in Table 1 of Attachment 10.18, Manual Dose Projection Work Sheet

8.5.9.1 **MULTIPLY** the dose calculated in step 8.5.8 by the extrapolation factors for the 2, 5, and 10-mile distances.

8.5.9.2 **RECORD** the doses in the appropriate column of Attachment 10.18, Manual Dose Projection Work Sheet.

8.5.10 **SUBMIT** Attachment 10.18 to the Dose Projection Team Leader **AND** the Radiological Control Manager for review/approval.

9.0 RECORDS

Records generated as a result of the performance of this procedure shall be submitted to Emergency Preparedness for retention in the plant vault.

10.0 **ATTACHMENTS**

10.1 Definitions and Abbreviations

10.2 General Information

10.3 Quality Codes

10.4 Core Uncovery Time Determination

10.5 Accident Mitigation Systems

10.6 Obtaining and Updating Meteorological Data

10.7 Source Term Determination

10.8 Flow Rates

10.9 Detector Sensitivities

10.10 Measuring Radiation Level on Main Steam Lines

10.11 Typical RMS Values

10.12 RMS Monitored Systems

10.13 Weather Service Data

10.14 Onsite Meteorological Data

10.15 Meteorological Forecast Form

10.16 HBRDOSE/RASCAL Comparison Matrix

10.17 Manual Calculation of Curies Released

10.18 Manual Dose Projection Work Sheet

DEFINITIONS/ABBREVIATIONS

Definitions:

Atmosphere Dispersion Factor (X/Q) - the fraction of activity released that will reach the point of interest (sec/m^3).

Committed Dose Equivalent- The dose equivalent to organs or tissue of reference that will be received from an intake of radioactive material by an individual during the 50 year period following the intake.

Committed Effective Dose Equivalent - The sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to these organs or tissues.

Core Uncovery Time - The time that inadequate core cooing occurs until the time that adequate core cooling is restored. (See Attachment 10.4).

Early Phase - The period at the beginning of a nuclear incident when immediate decisions for effective use of protective actions are required, and must be based primarily on predictions of radiological conditions in the environment. This phase may last from hours to days. For the purpose of dose projection, it is assumed to last for four days.

Effective Dose Equivalent - The sum of the products of the dose equivalent to each organ and a weighting factor, where the weighting factor is the ratio of the risk of mortality from delayed health effects arising from irradiation of a particular organ or tissue to the total risk of mortality from delayed health effects when the whole body is irradiated uniformly to the same dose. This unit is considered equivalent to be the Deep Dose Equivalent for the purposes of dose projections because the external exposures are considered to be uniform across the whole body.

DEFINITIONS/ABBREVIATIONS

Intermediate Phase - The period beginning after the incident source and releases have been brought under control and reliable environmental measurements are available for use as a basis for decisions on additional protective actions and extending until these protective actions are terminated. This phase may overlap the early and late phases and may last from weeks to many months. For the purpose of dose projection, it is assumed to last for one year.

Late Phase - The period beginning when recovery action designed to reduce radiation levels in the environment to permanently acceptable levels are commenced, and ending when all recovery actions have been completed. This period may extend from months to years (also referred to as the recovery phase).

Release Duration - The period of time from the beginning of the release until the end of the release or the projected end of the release. This can be determined by estimating the completion of a damage control mission, performance of a repair to stop the release, or the estimated time until the RCS, CV Sump, or Steam Generator temperature is below 200° F.

Release Rate (Q) - The term in the dose projection which describes the amount of activity that is being released. This is recorded in Curies per second. The total curies released may be calculated from the release rate (Q) and the release duration in seconds.

Total Effective Dose Equivalent - The sum of the deep-dose equivalent (for external exposures) and the committed effective dose equivalent(for internal exposures).

Weathering/Weathering Factor - The fraction of radioactivity remaining after being affected by average weather conditions for a specified period of time.

Abbreviations:

1. ALARA - As Low As is Reasonably Achievable
2. BSEP - Brunswick Steam Electric Plant
3. CDE - Committed Dose Equivalent
4. CFM - Cubic Feet per Minute
5. CPM - Counts Per Minute
6. CV - Containment Vessel
7. EAL - Emergency Action Level
8. EMT - Environmental Monitoring Team
9. EOF - Emergency Operations Facility
10. ERFIS - Emergency Response Facility Information System
11. ERO - Emergency Response Organization
12. GPM - Gallons Per Minute
13. HNP - Harris Nuclear Project
14. LAN - Local Area Network
15. LOCA - Loss Of Coolant Accident

DEFINITIONS/ABBREVIATIONS

16. PORV - Power Operated Relief Valve
17. RCS - Reactor Coolant System
18. RMS - Radiation Monitoring System
19. SDS - Satellite Display System
20. SRO - Senior Reactor Operator
21. SRV - Safety Relief Valve
22. STA - Shift Technical Advisor
23. TEDE - Total Effective Dose Equivalent

GENERAL INFORMATION

Backup Capability:

If ERFIS or a computer with the dose projection program are not available, contact computer support personnel and request that they provide a computer with the current revision of the dose projection software installed on it.

R-14 C, D, and E operate as follows:

R-14C is the Normal range Noble Gas monitor.
R-14D is the Intermediate range Noble Gas monitor.
R-14E is the High range Noble Gas monitor.
R-14D and R-14E normally read between 10 and 11 CPM.
R-14C when increasing will reach its predetermined alarm setpoint. Further increase will cause R-14C to reach its predetermined swap-over setpoint. When the swap-over setpoint is reached, R-14C will fail to 1 Meg (1M) which also will cause R-14D and R-14E to activate and start providing intermediate and high range noble gas readings. If R-14C is reading 1 Meg, this SHOULD NOT be used as a valid reading and RMS data SHOULD BE obtained from R-14D and R-14E.

Special attention should be paid to the quality code of the data on the program. Quality code color schemes are given in Attachment 10.3.

In order to select an item when performing the dose projection press the space bar. Pressing the space bar will also deselect the item if it had already been selected.

The help menu may be accessed at any time while using the dose projection program. This can be accomplished by pressing the F1function key. The function can be exited by clicking the mouse on the EXIT field or by pressing the F1 key.

Messages are displayed at the bottom of each screen to describe the function that the cursor is on.

Attachments 10.14, Onsite Meteorological Data, and 10.15, Meteorological Forecast Form, can be used to record weather conditions and forecast.

ATTACHMENT 10.3
Page 1 of 1
QUALITY CODES

Color of Data	Meaning	Action
Red Stars	Computer Entered Bad Data	**Do Not** Use This Data
Green	Computer Entered Good Data Normal Level	This Data May Be Used
Yellow	Computer Entered Good Data Alert Level	This Data May Be Used
Red	Computer Entered Good Data Alarm Level	This Data May Be Used
White	Manually Entered Data	This Data May Be Used

CORE UNCOVERY TIME DETERMINATION

NOTE: The time determination below is based upon the core level and temperature that the core cooling is insufficient to prevent the cladding from overheating and failing. This basis is conservative for all fuel damage scenarios which result from core uncovery. This time can be determined by consulting a SRO or RO with access to plant data.

- Core uncovery time is defined for dose projection purposes to be the point in time that inadequate core cooling occurs until the time that adequate core cooling is restored. For the purposes of dose projection core uncovery time will be the time that a RED status occurs on the CORE COOLING critical safety function status tree until the tree conditions return to YELLOW status (core covered and core exit thermocouples < 700° F).

- There are other possible accidents that may result in fuel damage. These events could be initiated by core flow blockage from debris or by localized melting from a rod ejection accident, pump failures, etc. as analyzed by the UFSAR. In this case, judgment may be applied using the bases information for CORE UNCOVERY TIME DETERMINATION above to most closely describe the fuel damage situation. In general choice of "uncovery < 30 min", corresponding to a release of 100% of the gap activity will conservatively account for most mechanical and miscellaneous fuel damage situations.

ACCIDENT MITIGATION SYSTEMS

The capability to take credit for accident release mitigation systems is built into the dose projection program. Credit is given one of three ways, charcoal filtration, containment sprays, and water partitioning in the steam generator.

NOTE: It is important to note that if the release is mitigated by **ANY** of the following: Charcoal Filtration, CV Sprays, or Partitioning, then assume mitigating effects are **EFFECTIVE** unless information is known to be otherwise. Only if the release pathway is direct to the environment without mitigation, should **NOT EFFECTIVE** be selected.

Filtration

Various fans can be aligned to cleanup effluent from leaking systems. When the release is passing through any one of the following fans, filtration can be considered effective. The general area(s) where the fan draws a suction is listed in parenthesis.

- HVE-1A or HVE-1B (Containment Purge)
- HVE-3 or HVE-4 (Containment Air, In pre-purge mode)
- HVE-5A or HVE-5B (Auxiliary Building Exhaust)
- HVE-15A (Spent Fuel Pit during refueling)

The CV Spray System

The CV Spray System is designed to remove radioiodine from containment in the event a radioactive release (typically a LOCA) occurs inside containment. If such a release occurs and the CV Spray System (with NaOH added) is operating, then the CV Sprays are considered effective.

Water Partitioning

Occurs during a release through the steam generators (e.g., a tube leak or tube rupture) and level in the affected steam generator is above the top of the tubes. Partitioning is effective for removing iodines and some particulates when the steam generator level is greater than 10% on the Narrow Range Steam Generator Level Indicator.

OBTAINING AND UPDATING METEOROLOGICAL DATA

In the manual data entry mode, meteorological data may not be available from ERFIS. Determine wind direction, wind speed, and atmospheric stability class using one of six methods listed in preferred order of use.

NOTE: Meteorological data will normally display a green value and an "OK" quality code. If the values are displayed in white, or the quality code is "BAD", DO NOT USE THIS DATA.

1. If operable, use the data from control room readouts to obtain the atmospheric stability class, wind speed, and wind direction.

OR

2. Call the Progress Energy offsite meteorological center (See ERO Phone Book for number).

OR

NOTE: If The Florence Airport or the National Weather Service office is called, the only information that can be obtained is the wind direction, wind speed, and ambient temperature. Stability factor must be obtained from Step 5 of this Attachment. If wind speed and direction are only supplied for one point enter these values in both the elevated and ground fields. Do not enter wind gust as the wind speed, and if no Delta T is supplied do not enter one.

3. Call the Florence Airport for Weather Information (See ERO Phone Book for number).

OR

OBTAINING AND UPDATING METEOROLOGICAL DATA

4. Call the National Weather Service office in Columbia, South Carolina, for daily weather information or in Wilmington, North Carolina, for severe weather information. Use Attachment 10.13 to document this: (See ERO Phone Book for number)

OR

5. If there is no stability class data readily available, a general estimate of the current Atmospheric Stability Class can be made by visual observation, using the following table:

	Rain, Day or Night	Sunny Day	Cloudy Day	Cloudy Night	Clear Night
light wind or calm (< 11.5 mph)	D	B	C	E	F
moderately strong wind (≥ 11.5 mph)	D	C	D	D	D

OR

6. A manual method may be used to acquire data from the meteorological tower. The following method may be used to manually obtain this data:

   A. Obtain the Meteorological Tower Building key from E&RC or Plant Security.

   B. Locate the Met Tower recorder inside the building.

   C. Locate the Upper Display key on the recorder.

   D. Depress the Upper Display key one or more times until the Upper Display is placed in manual control. "MAN" will be displayed in the Lower Display of the recorder.

   E. Locate the Channel Up (CH Up) and Channel Down (CH Down) keys on the recorder.

   F. Using the Channel Up (CH Up) and Channel Down (CH Down) keys, scroll through the recorder channels to obtain the necessary information required on the "Manual Meteorological Collection Data Sheet" included in this attachment.

   G. Using the Differential Temperature values obtained from the recorder, determine the Stability Class as per the table included in this attachment.

OBTAINING AND UPDATING METEOROLOGICAL DATA

EXAMPLE OF RECORDER CHANNEL SELECTIONS

CH 01	LT1 - Lower Temperature #1 (ambient temperature)
CH 02	DT1 - Differential Temperature #1
CH 03	DT2 - Differential Temperature #2
CH 04	LWS - Lower Wind Speed
CH 05	LWD - Lower Wind Direction
CH 06	UWS - Upper Wind Speed
CH 07	UWD - Upper Wind Direction
CH 08	DPT - Dew Point

MANUAL METEOROLOGICAL COLLECTION DATA SHEET

WIND SPEED

UPPER WIND SPEED _____ MPH

LOWER WIND SPEED _____ MPH

WIND DIRECTION

UPPER WIND DIRECTION _____ DEGREES

LOWER WIND DIRECTION _____ DEGREES

AMBIENT TEMPERATURE

TEMPERATURE _____ °F

DIFFERENTIAL TEMPERATURE

DT1 = _____ °C/100M

DT2 = _____ °C/100M

STABILITY CLASS

$\frac{DT1 + DT2}{2}$ = _____ °C/100M

OBTAINING AND UPDATING METEOROLOGICAL DATA

STABILITY CLASS (circle one)	DIFFERENTIAL TEMP °C/100M
A	<-1.9
B	-1.9 TO -1.7
C	-1.7 TO -1.5
D	-1.5 TO -0.5
E	-0.5 TO +1.5
F	+1.5 TO +4.0
G	>+4.0

SOURCE TERM DETERMINATION

Part A - Determination of Curies in Containment Atmosphere

This calculation can be performed by obtaining the activity in the containment from the RCD or E&RC Team Lead, or by calculating it using the radiation monitor data and their sensitivities. When calculations are performed utilizing radiation levels obtained from R-2, consideration should be given to background correcting the radiation level.

1) Containment atmospheric activity:

   - As determined by sampling CV atmosphere: _____ µCi/cc
   - Calculation of atmospheric activity from a CV radiation monitor:

Monitor	Reading		Sensitivity*		CV Activity
R-12	_____cpm	/	_____cpm/(µCi/cc)	=	_____µCi/cc
R-2	_____mRem/hr	/	_____(mRem/hr)/(µCi/cc)	=	_____µCi/cc
R-32A/B	_____rem/hr	/	_____(rem/hr)/(µCi/cc)	=	_____µCi/cc

2) Equation for determining curies in containment:

   Curies in containment[1] = (CV activity [µCi/cc]) (5.7 x 10^4 [Ci-cc/µCi])
   = (_____[µCi/cc]) (5.7 x 10^4 [Ci-cc/µCi])
   = _____ Ci

*This value can be determined by referencing Attachment 10.9, Table 2. Ensure that the sensitivity that corresponds to the correct accident and shutdown time are used.

[1] Containment volume as calculated per Calculation RNP-C/CONT-1002, Determination of Containment Heat Sink, is 2.013 x 10^6 cubic feet (5.7 x 10^{10} cc). The value of 5.7 x 10^4 is used to account for µCi to Ci conversion.

SOURCE TERM DETERMINATION

Part B - Determination of Curies in the Reactor Coolant System (RCS)

Obtain the RCS activity from the RCD or the E&RC Team Lead to perform this calculation.

1) RCS activity: _____ µCi/ml

2) Equation for determining curies in the RCS:

Curies in RCS = (RCS activity [µCi/ml]) (2.65×10^2 Ci-ml/µCi)

= (_____[µCi/ml]) (2.65×10^2 Ci-ml/µCi)

= _____ Ci

Part C - Determination of Sump Source Term

Obtain the sump activity and the sump volume from the RCD or the E&RC Lead in the OSC to perform this calculation.

1) Quantity of liquid in sump _____ gal

2) Sump activity _____ µCi/cc

3) Equation for determining curies in sump:

Curies in the sump =

(volume of liquid in sump [gal]) (activity of sump [µCi/ml]) (3.79×10^{-3})

= (_____ [gal]) (_____[µCi/ml]) (3.79×10^{-3} Ci-ml/µCi-gal)

= _____ Ci

Part D - Determination of Primary to Secondary Leakage Source Term

Obtain the primary to secondary leak rate and RCS activity in order to perform this calculation.

1) Primary to Secondary Leakage _____ gal/min

2) Source Term (Ci)= (Leakrate gal/min)(6.3E-5)(RCS Activity µCi/cc)) (hrs)(3600 sec/hr)

= (_____ gpm)(6.3E-5)(_____ µCi/cc) (hrs)(3600 sec/hr)

= (_____ Ci/sec)(_____ hrs)(3600 sec/hr) (hrs)(3600 sec/hr)

= _____ Ci

SOURCE TERM DETERMINATION

Part E - Determination of Source Term Released Due To Secondary Leakage

Determine the leakrate from the PORV or SRVs using Attachment 10.8. If the leak is due to a faulted Main Steam System obtain an estimate of the leakrate can be obtained from the Accident Assessment Team.

1) Secondary Leakrate _____ cc/sec

2) Source Term (Ci) =

$$\frac{\text{\_\_\_\_\_ mRem/hr (R-31 Rad Level)} \times \text{\_\_\_\_\_ hr (Duration)} \times \text{\_\_\_\_\_ cc/sec (Leakrate)} \times 3.6\text{E-}03 \text{ Ci-sec/}\mu\text{Ci-hr}}{\text{\_\_\_\_\_ (mRem/hr)/(}\mu\text{Ci/cc) *R-31 Sensitivity}} = \text{\_\_\_\_\_ Ci}$$

*This value can be determined by referencing Attachment 10.9, Table 2. Ensure that the sensitivity that corresponds to the correct accident and shutdown time are used.

Part F - Determination of Source Term Released Through Main Steam Using Direct Survey

Request that the RCD dispatch a member of the plant monitoring team with an extendable probe survey instrument to a location one level below the Main Steam lines as indicated by Attachment 10.10. The probe should be extended to a position adjacent to the low point of each steam line (or as directed by the Dose Projection Team Leader or RCD) to determine the contact dose rate. The status (open/closed) of the PORV and SRVs on the monitored lines should also be noted.

1) Contact radiation level on Steam Line: _____ mRem/hr

2) Flow Rate: _____ cc*/sec (Attachment 10.8 or Accident Assessment Team)

3) Detector Sensitivity from Attachment 10.9, Table 1: _____ (mRem/hr)/(μCi/cc*)

4) Source Term (Ci) =

$$\frac{\text{\_\_\_\_\_ mRem/hr (Rad Level)} \times \text{\_\_\_\_\_ hr (Duration)} \times \text{\_\_\_\_\_ cc*/sec (Flow Rate)} \times 3.6\text{E-}03 \text{ Ci-sec/}\mu\text{Ci-hr}}{\text{\_\_\_\_\_ (mRem/hr)/(}\mu\text{Ci/cc*) Detector Sensitivity}} = \text{\_\_\_\_\_ Ci}$$

*Substitute ml for cc when calculations are performed for water filled main steam lines.

SOURCE TERM DETERMINATION

Part G - Determination of Source Term Released Plant Vent Stack

Request that the RCD dispatch a member of the plant monitoring team with an extendable probe survey instrument to obtain a contact radiation level on the side of the plant stack (an instrument with a remote probe can also be used). The measurement should be made inside the shielded orifice which is approximately 4 feet above the Auxiliary Building roof on the south side of the stack.

1) Contact radiation level on Plant Vent Stack: _____ mRem/hr

2) Release rate = (Use Attachment 10.8)

   = (Stack Flow Rate [cfm]) (28320 [cc/ft^3]) (60 [min/hr])

   = (_____ cfm) (28320 cc/ft^3) (60 min/hr)

   = _____ cc/hr

3) Detector Sensitivity from Attachment 10.9, Table 1: _____ (mRem/hr)/(µCi/cc)

4) Source Term (Ci) =

$$\frac{\text{Rad Level}\ \_\_\_\_\ \text{mRem/hr} \times \text{Duration}\ \_\_\_\_\ \text{hr} \times \text{Release Rate}\ \_\_\_\_\ \text{cc/hr} \times 1E\text{-}06\ \text{Ci}/\mu\text{Ci}}{\text{Sensitivity}\ \_\_\_\_\ (\text{mRem/hr})/(\mu\text{Ci/cc})}$$

= _____ Ci

SOURCE TERM DETERMINATION

FOR MANUAL DOSE PROJECTION CALCULATION ONLY

RADIOIODINE SOURCE TERM ESTIMATE

1) Identify release path (SGTR, Plant Vent, etc): _____

2) Enter the Source Term in Curies as determined in Parts A – G, as applicable. _____ Ci

3) Determine the Iodine/Noble Gas ratio using the following chart:

Iodine/Noble Gas Ratio (Circle the most appropriate value)		
1.	LOCAN/SGTRN (0-3 hours post shutdown)	**1**
2.	LOCAN/SGTRN (>3 hours post shutdown)	**10**
3.	LOCAG/SGTRG (released from fuel)	**0.5**
4.	LOCAC/SGTRC (released from fuel)	**0.2**
5.	FHA (ratio at pool/cavity water surface)	**1E-03**
6.	WGDTR (ratio at tank release)	**1E-04**

4) Multiply the source term from Step 2 by the appropriate Iodine/Noble Gas Ratio. _____ Ci

5) Iodine Decontamination Factors – Enter DF for each removal mechanism that exists and multiply together to obtain Total DF:

Partitioning (LOCA/SGTR: water flashing): Default DF= **5**	_____
Plateout (LOCA/SGTR in containment or OTSG): Default DF = **3**	_____
CV Sprays: Default DF = **10** for 0-2 hrs spray time **100** for > 2 hrs spray time	_____
SGTR via Condenser or Air Ejector: Default DF = **1000**	_____
CV/Aux Bldg HVAC Filters: Default DF = **20**	_____
Total DF	_____

6) Divide the source term as determined in Step 4 by the Total DF to obtain the radioiodine source term. _____ Ci

N = Normal RCS, G = Gap Release, C = Core Damage

FLOW RATES

R-11, R-12, R-14

HVE-2A/B ..... 4.4×10^4 cfm

HVE-2A/B and HVE-15/15A..... 5.5×10^4 cfm

HVE-2A/B and HVE-1A/B ..... 6.2×10^4 cfm

HVE-2A/B and HVE-1A/B & HVE-15/15A ..... 7.2×10^4 cfm

R-15, Air Ejector - Noble Gas

Flow Rate = 3.10×10^2 cfm (for one vacuum pump running)

Flow Rate = 6.10×10^2 cfm (for two vacuum pumps running)

R-20, R-30, Fuel Building Basement Exhaust - Low and High Range Noble Gas

Flow Rate = 1.0×10^4 cfm

R-21, Fuel Building UPPER Level Exhaust

Flow Rate = 1.34×10^4 cfm

R-31A, R-31B, R-31C - Steam-Line Monitors (at 800 psi)

PORV (100% lift)..... 1.92E06 cc/sec (4.57E05 lbm/hr)

PORV and 1 SRV ..... 4.00E06 cc/sec (9.51E05 lbm/hr)

PORV and 2 SRV ..... 6.11E06 cc/sec (1.45E06 lbm/hr)

PORV and 3 SRV ..... 9.19E06 cc/sec (2.19E06 lbm/hr)

FLOW RATES

R-31A, R-31B, R-31C - Steam-Line Monitors (Filled with Water)

PORV (100% lift) ..... 7.32E04 ml/sec

PORV AND 1 SRV ..... 1.56EO5 ml/sec

PORV AND 2 SRV ..... 2.42EO5 ml/sec

PORV AND 3 SRV ..... 3.68EO5 ml/sec

R-2, R-32A, R-32B - Containment Radiation Monitors

Containment isolated with no discharge via plant vent ..... 1.5 CFM[1]

Containment vented via plant vent ..... 2500 CFM

[1] Design basis leakage for containment at 0.1% containment volume per day.

STEAM LINE FLOW RATE CALCULATION FOR A DRY STEAM GENERATOR

1.0

1. RCS Leak Rate (RCS_{LR}) _____ gpm
2. RCS Temperature _____ °F
3. RCS Pressure _____ psig
4. S/G Pressure _____ psig
5. S/G Temp _____ °F

2.0 1. From the Steam Tables determine the specific volume of RCS Fluid (RCS_{SV}) at conditions in 1.0 _____ ft^3/lb

2. From the Steam Tables determine the specific volume of S/G Fluid (SG_{SV}) at condition in 1.0 _____ ft^3/lb

3.0 Determine the RCS Mass Release Rate (RCS_{MRR}) into S/G by using the following formula:

$$\frac{RCS_{LR}\ (gal/min)}{(7.48\ gal/ft^3)\ (RCS_{SV}\ ft^3/lb)} = lb/min$$

$$\frac{(\_\_\_\_RCS_{LR}\ gal/min)}{(7.48\ gal/ft^3)\ (\_\_\_\_\_RCS_{SV}\ ft^3/lb)} = \_\_\_\_\_\ lb/min$$

4.0 Determine the steam flow rate using the following formula:

$$RCS_{MRR}\ (lb/min)\ SG_{SV}\ (ft^3/lb)\ \frac{(472\ cc/sec)}{ft^3/min} = cc/sec$$

$$\frac{(\_\_\_\_\_)}{RCS_{MRR}\ (lb/min)}\ \frac{(\_\_\_\_\_)}{SG_{SV}\ (ft^3/lb)}\ \frac{(472\ cc/sec)}{ft^3/min} = \frac{\_\_\_\_\_}{cc/sec}$$

5.0 Performed by: _____

Verified by: _____

CONVERSION OF STEAM MASS FLOW RATE TO VOLUMETRIC FLOW RATE[1]

1. Obtain and record the steam mass flow rate in lbs/hr from the Accident Assessment Team.

   _____ lbs/hr [1]

2. Obtain and record the main steam pressure in psig.

   _____ psig

3. Use the figure on the following page to determine the specific volume (cc/lb) for the pressure determined in step 2.

   _____ cc/lb [2]

4. Determine the volumetric flow rate using the following formula:

   (lbs/hr) (1 hr/3600 sec) (cc/lb) = cc/sec

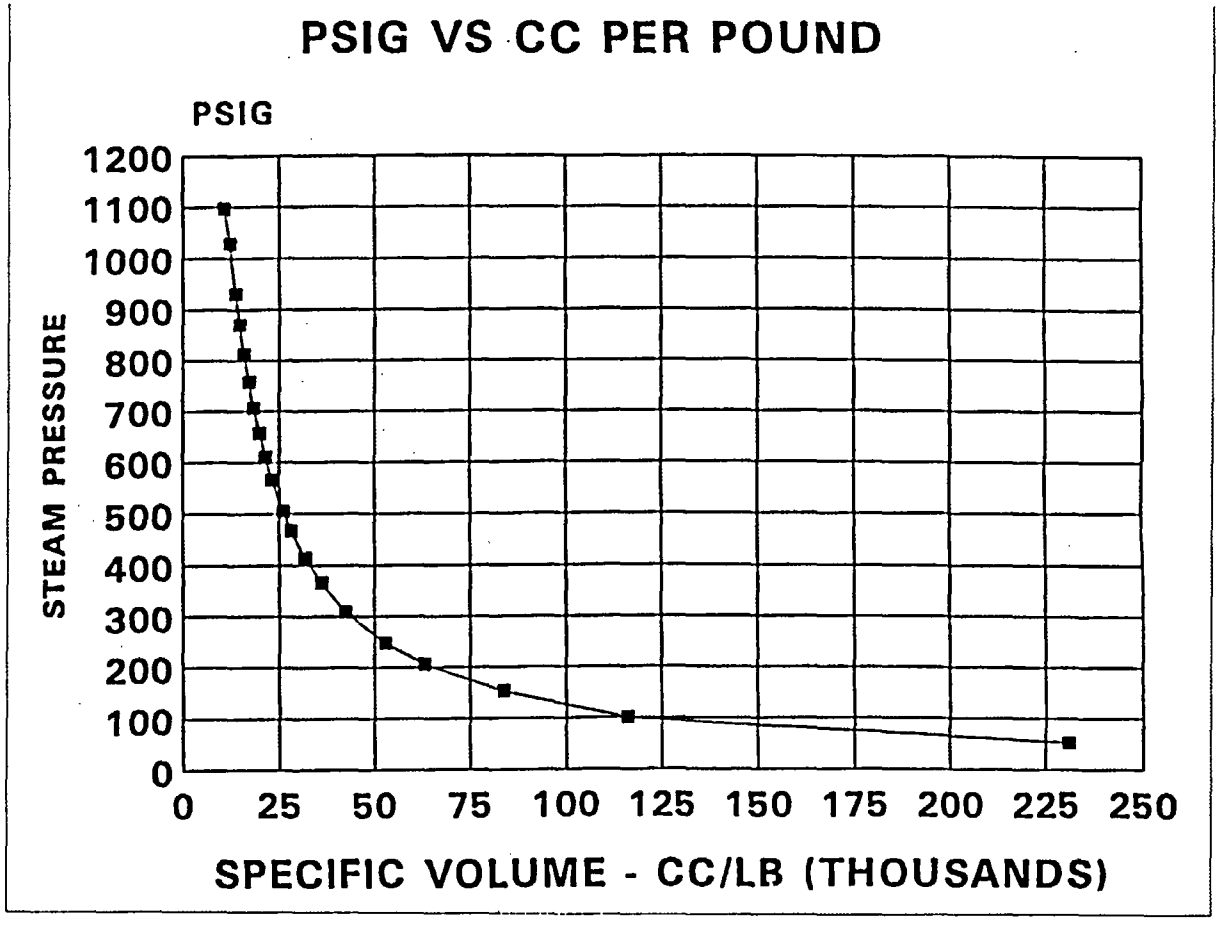
   (_____ lb/hr) (1 hr/3600 sec) (_____ cc/lb) = _____ cc/sec
   [1] [2]

Performed by: _____ _____/_____
Date Time

Verified by: _____ _____/_____
Date Time

[1] For use with R-31 readings under any conditions.

STEAM PRESSURE VS SPECIFIC VOLUME



ATTACHMENT 10.9
Page 1 of 5
DETECTOR SENSITIVITIES

Determine the appropriate accident scenario classification (1-10) utilizing the following table.

ACCIDENT SCENARIO	PLANT CONDITIONS	FILTRATION/PARTITIONING/SPRAYS
1	Core not uncovered	Effective or Not Effective
2	Core uncovered <30 minutes	Effective
3	Core uncovered <30 minutes	Not Effective
4	Core uncovered 0.5 - 1.8 hours	Effective
5	Core uncovered 0.5 - 1.8 hours	Not Effective
6	Core uncovered > 1.8 hours	Effective
7	Core uncovered > 1.8 hours	Not Effective
8	New Spent Fuel	Effective or Not Effective
9	Old Spent Fuel	Effective or Not Effective
10	Waste Gas Decay Tank	Effective or Not Effective

Determine the sensitivity of the appropriate detector using the following tables and accident scenarios. (The sensitivities in Table 1 below are based on nuclide mixes at reactor shutdown). Table 2 provides detector efficiencies(sensitivities) for eight (8) designated accident categories and time steps for each accident sequence.

Table 1

ACCIDENT SCENARIO	PLANT VENT STACK(mRem/hr)/(µCi/cc)	STEAM FILLEDMAIN STEAM LINE(mRem/hr)/(µCi/cc)	WATER FILLED MAIN STEAM LINE(mRem/hr)/(µCi/ml)
1	3.28E+02	1.49E+01	4.51E+00
2	1.42E+03	7.11E+01	2.15E+01
3	2.63E+03	9.66E+01	2.35E+01
4	1.40E+03	7.08E+01	2.16E+01
5	1.98E+03	7.94E+01	2.09E+01
6	1.40E+03	7.08E+01	2.15E+01
7	2.20E+03	8.24E+01	2.06E+01
8	2.80E+03	N/A	N/A
9	5.44E+00	N/A	N/A
10	2.48E-01	N/A	N/A

DETECTOR SENSITIVITIES

Table 2: Summary of Detector Sensitivities(Efficiencies) for Designated Accident Scenarios

Accident Time step	R-14C cpm per uCi/cc	R-14D cpm per uCi/cc	R-14E cpm per uCi/cc	R-12 cpm per uCi/cc	R-20 cpm per uCi/cc	R-21 cpm per uCi/cc	R-15 cpm per uCi/cc	R-2 mR/hr per uCi/cc	R-30 mR/hr per uCi/cc	R-31A,B,C mR/hr per uCi/cc	R-32A R/hr per uCi/cc	R-32B R/hr per uCi/cc
Accident 1 Normal RCS												
t=0	1.50E+07	3.94E+03	2.58E+00	3.03E+07	3.17E+07	3.25E+07	4.42E+05	9.2E+03	6.1E+01	1.1E+01	9.2E+00	9.2E+00
t=0.5	1.41E+07	3.71E+03	2.43E+00	2.76E+07	2.90E+07	2.97E+07	3.54E+05	6.9E+03	3.6E+01	6.3E+00	6.9E+00	6.9E+00
t=1	1.38E+07	3.63E+03	2.38E+00	2.68E+07	2.81E+07	2.87E+07	3.23E+05	6.2E+03	2.9E+01	4.9E+00	6.2E+00	6.2E+00
t=2	1.36E+07	3.57E+03	2.34E+00	2.61E+07	2.74E+07	2.80E+07	2.97E+05	5.4E+03	2.0E+01	3.4E+00	5.4E+00	5.4E+00
t=4	1.33E+07	3.50E+03	2.29E+00	2.54E+07	2.66E+07	2.73E+07	2.64E+05	5.0E+03	1.5E+01	2.5E+00	5.0E+00	5.0E+00
t=8	1.31E+07	3.43E+03	2.25E+00	2.47E+07	2.59E+07	2.65E+07	2.20E+05	4.3E+03	8.4E+00	1.3E+00	4.3E+00	4.3E+00
t=16	1.29E+07	3.38E+03	2.21E+00	2.41E+07	2.53E+07	2.59E+07	1.73E+05	4.0E+03	4.5E+00	6.6E-01	4.0E+00	4.0E+00
t=32	1.29E+07	3.40E+03	2.23E+00	2.41E+07	2.53E+07	2.59E+07	1.36E+05	3.8E+03	3.3E+00	5.0E-01	3.8E+00	3.8E+00
Accident 2 Core uncovered < 30 minutes/ mechanical damage with sprays/filtration effective												
t=0	3.26E+07	8.59E+03	5.62E+00	6.42E+07	6.74E+07	6.90E+07	3.41E+06	4.2E+04	4.0E+02	7.2E+01	4.2E+01	4.2E+01
t=0.5	3.10E+07	8.16E+03	5.34E+00	5.33E+07	5.60E+07	5.73E+07	3.70E+06	3.3E+04	3.0E+02	5.4E+01	3.3E+01	3.3E+01
t=1	3.04E+07	8.00E+03	5.24E+00	4.84E+07	5.08E+07	5.20E+07	3.87E+06	2.8E+04	2.5E+02	4.4E+01	2.8E+01	2.8E+01
t=2	3.01E+07	7.91E+03	5.18E+00	4.44E+07	4.66E+07	4.77E+07	4.07E+06	2.4E+04	2.0E+02	3.6E+01	2.4E+01	2.4E+01
t=4	2.98E+07	7.85E+03	5.14E+00	4.02E+07	4.22E+07	4.32E+07	4.33E+06	1.9E+04	1.4E+02	2.5E+01	1.9E+01	1.9E+01
t=8	2.96E+07	7.78E+03	5.10E+00	3.53E+07	3.70E+07	3.79E+07	4.63E+06	1.3E+04	8.0E+01	1.3E+01	1.3E+01	1.3E+01
t=16	2.94E+07	7.73E+03	5.06E+00	3.05E+07	3.20E+07	3.27E+07	4.90E+06	9.0E+03	3.6E+01	4.7E+00	9.0E+00	9.0E+00
t=32	2.92E+07	7.69E+03	5.04E+00	2.67E+07	2.80E+07	2.87E+07	5.11E+06	7.7E+03	2.0E+01	1.8E+00	7.7E+00	7.7E+00

Detector sensitivities derived from Calculation No. RNP-M/MECH 1746.

DETECTOR SENSITIVITIES

Table 2: Summary of Detector Sensitivities(Efficiencies) for Designated Accident Scenarios

Accident Time step	R-14C cpm per uCi/cc	R-14D cpm per uCi/cc	R-14E cpm per uCi/cc	R-12 cpm per uCi/cc	R-20 cpm per uCi/cc	R-21 cpm per uCi/cc	R-15 cpm per uCi/cc	R-2 mR/hr per uCi/cc	R-30 mR/hr per uCi/cc	R-31A,B,C mR/hr per uCi/cc	R-32A R/hr per uCi/cc	R-32B R/hr per uCi/cc
Accident 3 Core uncovered < 30 minutes/ mechanical damage with sprays/filtration NOT effective												
t=0	1.55E+07	4.08E+03	2.67E+00	7.03E+07	7.38E+07	7.55E+07	1.62E+06	7.3E+04	7.4E+02	1.3E+02	7.3E+01	7.3E+01
t=0.5	1.34E+07	3.53E+03	2.31E+00	6.60E+07	6.93E+07	7.09E+07	1.60E+06	6.7E+04	6.8E+02	1.2E+02	6.7E+01	6.7E+01
t=1	1.30E+07	3.42E+03	2.24E+00	6.39E+07	6.71E+07	6.86E+07	1.65E+06	6.2E+04	6.2E+02	1.1E+02	6.2E+01	6.2E+01
t=2	1.32E+07	3.47E+03	2.27E+00	6.15E+07	6.45E+07	6.60E+07	1.79E+06	5.4E+04	5.3E+02	9.1E+01	5.4E+01	5.4E+01
t=4	1.37E+07	3.59E+03	2.35E+00	5.82E+07	6.11E+07	6.25E+07	1.98E+06	4.4E+04	4.2E+02	7.2E+01	4.4E+01	4.4E+01
t=8	1.42E+07	3.72E+03	2.44E+00	5.38E+07	5.65E+07	5.78E+07	2.21E+06	3.4E+04	3.2E+02	5.4E+01	3.4E+01	3.4E+01
t=16	1.50E+07	3.95E+03	2.59E+00	4.81E+07	5.05E+07	5.17E+07	2.50E+06	2.5E+04	2.3E+02	3.8E+01	2.5E+01	2.5E+01
t=32	1.63E+07	4.28E+03	2.81E+00	4.10E+07	4.30E+07	4.40E+07	2.84E+06	1.9E+04	1.6E+02	2.5E+01	1.9E+01	1.9E+01
Accident 4 Core uncovered 0.5 < 1.8 hours with sprays/filtration effective												
t=0	3.32E+07	8.74E+03	5.72E+00	6.40E+07	6.71E+07	6.87E+07	3.47E+06	4.2E+04	4.0E+02	7.2E+01	4.2E+01	4.2E+01
t=0.5	3.17E+07	8.34E+03	5.46E+00	5.28E+07	5.54E+07	5.67E+07	3.78E+06	3.3E+04	3.0E+02	5.4E+01	3.3E+01	3.3E+01
t=1	3.11E+07	8.18E+03	5.35E+00	4.78E+07	5.01E+07	5.13E+07	3.96E+06	2.8E+04	2.5E+02	4.4E+01	2.8E+01	2.8E+01
t=2	3.07E+07	8.07E+03	5.29E+00	4.37E+07	4.59E+07	4.70E+07	4.16E+06	2.4E+04	2.0E+02	3.6E+01	2.4E+01	2.4E+01
t=4	3.04E+07	7.99E+03	5.23E+00	3.95E+07	4.14E+07	4.24E+07	4.41E+06	1.9E+04	1.4E+02	2.5E+01	1.9E+01	1.9E+01
t=8	3.01E+07	7.92E+03	5.18E+00	3.46E+07	3.63E+07	3.72E+07	4.71E+06	1.3E+04	8.0E+01	1.3E+01	1.3E+01	1.3E+01
t=16	2.98E+07	7.84E+03	5.14E+00	2.99E+07	3.13E+07	3.21E+07	4.97E+06	9.0E+03	3.6E+01	4.7E+00	9.0E+00	9.0E+00
t=32	2.96E+07	7.79E+03	5.10E+00	2.63E+07	2.76E+07	2.82E+07	5.17E+06	7.7E+03	2.0E+01	1.8E+00	7.7E+00	7.7E+00

Detector sensitivities derived from Calculation No. RNP-M/MECH 1746, (EC 49849, Set-Point, Declaration Evaluation for EP)

DETECTOR SENSITIVITIES

Table 2: Summary of Detector Sensitivities(Efficiencies) for Designated Accident Scenarios

Accident Time step	R-14C cpm per uCi/cc	R-14D cpm per uCi/cc	R-14E cpm per uCi/cc	R-12 cpm per uCi/cc	R-20 cpm per uCi/cc	R-21 cpm per uCi/cc	R-15 cpm per uCi/cc	R-2 mR/hr per uCi/cc	R-30 mR/hr per uCi/cc	R-31A,B,C mR/hr per uCi/cc	R-32A R/hr per uCi/cc	R-32B R/hr per uCi/cc
Accident 5 Core uncovered 0.5 < 1.8 hours with sprays/filtration NOT effective												
t=0	2.26E+07	5.94E+03	3.89E+00	6.67E+07	7.00E+07	7.16E+07	2.36E+06	5.9E+04	5.9E+02	1.0E+02	5.9E+01	5.9E+01
t=0.5	2.03E+07	5.33E+03	3.49E+00	5.97E+07	6.26E+07	6.41E+07	2.42E+06	5.3E+04	5.2E+02	9.0E+01	5.3E+01	5.3E+01
t=1	1.97E+07	5.18E+03	3.39E+00	5.64E+07	5.92E+07	6.06E+07	2.51E+06	4.8E+04	4.7E+02	8.1E+01	4.8E+01	4.8E+01
t=2	1.97E+07	5.19E+03	3.40E+00	5.32E+07	5.58E+07	5.71E+07	2.67E+06	4.1E+04	4.0E+02	6.8E+01	4.1E+01	4.1E+01
t=4	2.00E+07	5.26E+03	3.44E+00	4.93E+07	5.18E+07	5.30E+07	2.90E+06	3.3E+04	3.0E+02	5.2E+01	3.3E+01	3.3E+01
t=8	2.03E+07	5.34E+03	3.50E+00	4.45E+07	4.67E+07	4.78E+07	3.18E+06	2.4E+04	2.1E+02	3.5E+01	2.4E+01	2.4E+01
t=16	2.09E+07	5.49E+03	3.60E+00	3.90E+07	4.09E+07	4.19E+07	3.48E+06	1.8E+04	1.4E+02	2.2E+01	1.8E+01	1.8E+01
t=32	2.18E+07	5.72E+03	3.75E+00	3.32E+07	3.49E+07	3.57E+07	3.80E+06	1.3E+04	8.9E+01	1.4E+01	1.3E+01	1.3E+01
Accident 6 Core uncovered > 1.8 hours with sprays/filtration effective												
t=0	3.29E+07	8.64E+03	5.66E+00	6.38E+07	6.70E+07	6.85E+07	3.43E+06	4.2E+04	4.0E+02	7.2E+01	4.2E+01	4.2E+01
t=0.5	3.13E+07	8.22E+03	5.38E+00	5.28E+07	5.54E+07	5.66E+07	3.73E+06	3.3E+04	3.0E+02	5.4E+01	3.3E+01	3.3E+01
t=1	3.06E+07	8.06E+03	5.27E+00	4.78E+07	5.01E+07	5.13E+07	3.90E+06	2.8E+04	2.5E+02	4.4E+01	2.8E+01	2.8E+01
t=2	3.02E+07	7.95E+03	5.21E+00	4.37E+07	4.59E+07	4.70E+07	4.10E+06	2.4E+04	2.0E+02	3.6E+01	2.4E+01	2.4E+01
t=4	2.99E+07	7.88E+03	5.16E+00	3.95E+07	4.15E+07	4.24E+07	4.35E+06	1.9E+04	1.4E+02	2.5E+01	1.9E+01	1.9E+01
t=8	2.97E+07	7.80E+03	5.11E+00	3.46E+07	3.64E+07	3.72E+07	4.64E+06	1.3E+04	8.0E+01	1.3E+01	1.3E+01	1.3E+01
t=16	2.94E+07	7.73E+03	5.06E+00	2.99E+07	3.14E+07	3.21E+07	4.90E+06	9.0E+03	3.6E+01	4.7E+00	9.0E+00	9.0E+00
t=32	2.92E+07	7.68E+03	5.03E+00	2.62E+07	2.75E+07	2.82E+07	5.10E+06	7.7E+03	2.0E+01	1.8E+00	7.7E+00	7.7E+00

Detector sensitivities derived from Calculation No. RNP-M/MECH 1746, (EC 49849, Set-Point, Declaration Evaluation for EP).

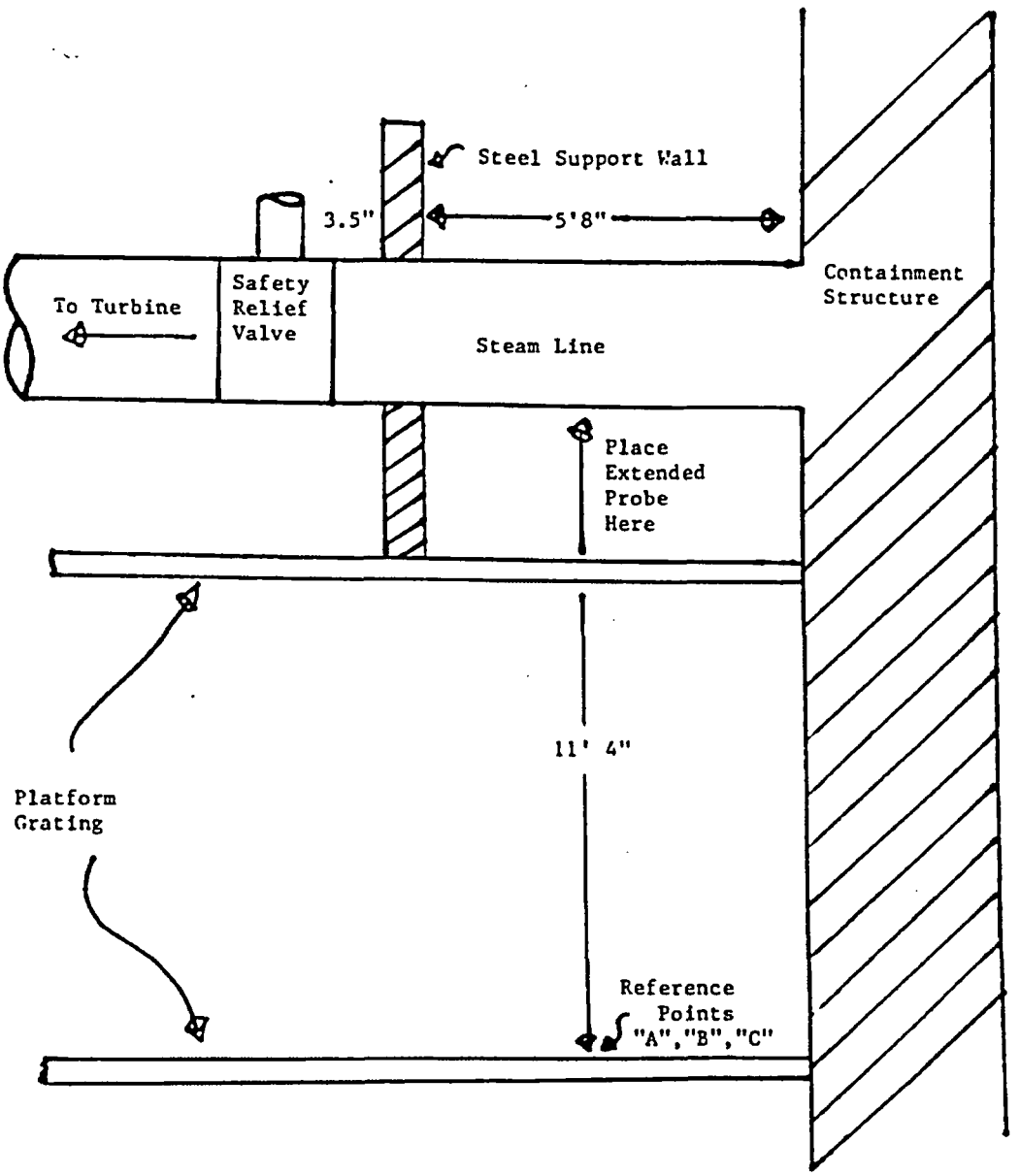
DETECTOR SENSITIVITIES

Table 2: Summary of Detector Sensitivities(Efficiencies) for Designated Accident Scenarios

Accident Time step	R-14C cpm per uCi/cc	R-14D cpm per uCi/cc	R-14E cpm per uCi/cc	R-12 cpm per uCi/cc	R-20 cpm per uCi/cc	R-21 cpm per uCi/cc	R-15 cpm per uCi/cc	R-2 mR/hr per uCi/cc	R-30 mR/hr per uCi/cc	R-31A,B,C mR/hr per uCi/cc	R-32A R/hr per uCi/cc	R-32B R/hr per uCi/cc
Accident 7 Core uncovered > 1.8 hours with sprays/filtration NOT effective												
t=0	1.75E+07	4.60E+03	3.01E+00	6.32E+07	6.63E+07	6.78E+07	1.83E+06	6.6E+04	6.6E+02	1.1E+02	6.6E+01	6.6E+01
t=0.5	1.51E+07	3.98E+03	2.60E+00	5.70E+07	5.98E+07	6.12E+07	1.80E+06	6.0E+04	5.6E+02	1.0E+02	6.0E+01	6.0E+01
t=1	1.45E+07	3.82E+03	2.50E+00	5.40E+07	5.67E+07	5.80E+07	1.85E+06	5.5E+04	5.1E+02	9.4E+01	5.5E+01	5.5E+01
t=2	1.45E+07	3.81E+03	2.49E+00	5.09E+07	5.34E+07	5.46E+07	1.96E+06	4.8E+04	4.7E+02	8.0E+01	4.8E+01	4.8E+01
t=4	1.46E+07	3.84E+03	2.51E+00	4.70E+07	4.93E+07	5.04E+07	2.12E+06	3.8E+04	3.7E+02	6.3E+01	3.8E+01	3.8E+01
t=8	1.47E+07	3.88E+03	2.54E+00	4.22E+07	4.43E+07	4.53E+07	2.31E+06	2.9E+04	2.6E+02	4.5E+01	2.9E+01	2.9E+01
t=16	1.51E+07	3.98E+03	2.61E+00	3.67E+07	3.85E+07	3.94E+07	2.53E+06	2.1E+04	1.7E+02	3.0E+01	2.1E+01	2.1E+01
t=32	1.59E+07	4.17E+03	2.73E+00	3.08E+07	3.23E+07	3.30E+07	2.77E+06	1.6E+04	1.2E+02	1.9E+01	1.6E+01	1.6E+01
Accident 8 Spent Fuel Assembly (Gap)												
t=0	3.26E+07	8.59E+03	5.62E+00	6.42E+07	6.74E+07	6.90E+07	N/A	4.2E+04	4.0E+02	N/A	4.2E+01	4.2E+01
t=0.5	3.10E+07	8.16E+03	5.35E+00	5.33E+07	5.60E+07	5.73E+07	N/A	3.3E+04	3.0E+02	N/A	3.3E+01	3.3E+01
t=1	3.04E+07	8.00E+03	5.24E+00	4.84E+07	5.08E+07	5.20E+07	N/A	2.8E+04	2.5E+02	N/A	2.8E+01	2.8E+01
t=2	3.01E+07	7.91E+03	5.18E+00	4.44E+07	4.66E+07	4.77E+07	N/A	2.4E+04	2.0E+02	N/A	2.4E+01	2.4E+01
t=4	2.98E+07	7.85E+03	5.14E+00	4.02E+07	4.22E+07	4.32E+07	N/A	1.9E+04	1.4E+02	N/A	1.9E+01	1.9E+01
t=8	2.96E+07	7.78E+03	5.10E+00	3.53E+07	3.70E+07	3.79E+07	N/A	1.3E+04	8.0E+01	N/A	1.3E+01	1.3E+01
t=16	2.94E+07	7.73E+03	5.06E+00	3.05E+07	3.20E+07	3.27E+07	N/A	9.0E+03	3.6E+01	N/A	9.0E+00	9.0E+00
t=32	2.92E+07	7.69E+03	5.04E+00	2.67E+07	2.80E+07	2.87E+07	N/A	7.7E+03	2.0E+01	N/A	7.7E+00	7.7E+00

Detector sensitivities derived from Calculation No. RNP-M/MECH 1746, (EC 49849, Set-Point, Declaration Evaluation for EP)

MEASURING RADIATION LEVEL ON MAIN STEAM LINES



TYPICAL RMS VALUES

The background and alarm setpoint for radiation monitors should be obtained from the control room or other current sources if they are needed to perform dose projections. The following two tables provide the typical values for the background and alarm setpoints for radiation monitors, however **these values should not be used for performing dose projections unless no other data is available.** Table 1 contains all of the radiation monitors that are used for dose projections, while Table 2 contains other monitors that may be of interest to the dose projection team.

TABLE 1:

RADIATION MONITOR	CHANNEL DESCRIPTION	TYPICAL* BKG/SETPOINT	SCALE
R2	CV LOW RANGE AREA	~ 10 / 100 mR/HR	0.1 - 10,000 mR/HR
R12	CV AIR GAS	~ 1 K / 2.2 K CPM = 1.8 times BKG	10 -10,000,000 CPM
R14C	PLANT VENT GAS LOW Default 1 M in high range.	30-60/~10,000 CPM switch to high range ~ 700 k CPM	10 - 1,000,000 CPM or 10 M at monitor all R-14 channels
R14D	PLANT VENT GAS MID Default 10 in low range	10-11 / 130 CPM	10 - 1,000,000 CPM
R14E	PLANT VENT GAS HIGH Default 10 in low range	10-11 / BKG + 17 CPM	10 - 1,000,000 CPM
R15	CONDENSER AIR EJECTOR	10-15 /100+BKG CPM	10 - 1,000,000 CPM
R20	LOWER FUEL HANDLING BUILDING low range	10-40 / 9,800 CPM	10 -10,000,000 CPM
R21	UPPER FUEL HANDLING FUEL HANDLING	10-25 / 9,730 CPM	10 -10,000,000 CPM
R30	LOWER FUEL HANDLING BUILDING high range	~ 0.5 / 18+BKG mR/HR	1 - 100,000 mR/HR
R31A	MAIN STEAM LINE A	~ 0.3 / 12 mR/HR	1 - 100,000 mR/HR
R31B	MAIN STEAM LINE B	~ 0.4 / 12 mR/HR	1 - 100,000 mR/HR
R31C	MAIN STEAM LINE C	~ 0.6 / 12 mR/HR	1 - 100,000 mR/HR
R32A	CV HIGH RANGE	<1/ 10&1,000 R/HR	1-10,000,000 R/HR
R32B	CV HIGH RANGE	<1/ 10&1,000 R/HR	1-10,000,000 R/HR

* A printscreen can be performed on either the EDS terminal or ERFIS at the onset of an accident to provide more current backgrounds for monitors that are not yet being effected by the accident.

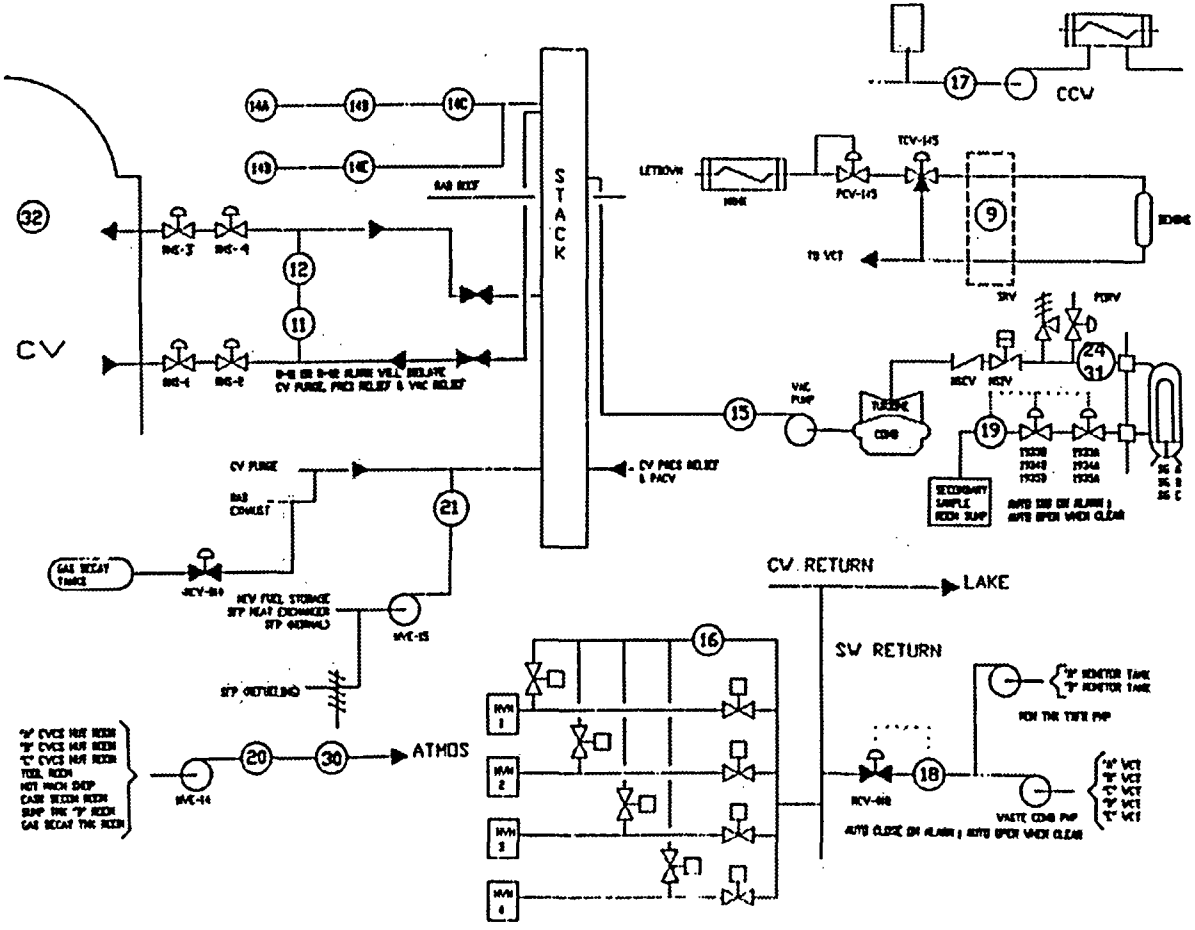
TYPICAL RMS VALUES

TABLE 2:

RADIATION MONITOR	CHANNEL DESCRIPTION	TYPICAL BKG/SETPOINT	SCALE
R1	CONTROL ROOM AREA	<1 / 2.5 mR/HR	0.1 - 10,000 mR/HR
R3	PASS PANEL AREA	0.1-0.3/ 20 mR/HR	0.1 - 10,000 mR/HR
R4	CHARGING PUMP AREA	~4 / 50 mR/HR	0.1 - 10,000 mR/HR
R5	SPENT FUEL BLDG. AREA	<1 / 50 mR/HR	0.1 - 10,000 mR/HR
R6	SAMPLING ROOM AREA	<1 / 50 mR/HR	0.1 - 10,000 mR/HR
R7	IN-CORE INSTRUMENT AREA	~4 / 200 mR/HR	0.1 - 10,000 mR/HR
R8	DRUMMING ROOM	1-2 / 50 mR/HR	0.1 - 10,000 mR/HR
R9	LETDOWN LINE AREA	10-40/ 3000 mR/HR	1 - 100,000 mR/HR
R11	CV AIR PARTICULATE	~20 K / 3.6E4 CPM = 1.8 times BKG	10 - 1,000,000 CPM
R14A	PLANT VENT PARTICULATE	~500 / 2E6 CPM	10 - 1,000,000 CPM
R14B	PLANT VENT IODINE	~10 / 90,000 CPM	10 - 1,000,000 CPM
R16	HVH COOLING WATER	~300 / 1,900 CPM	10 - 1,000,000 CPM
R17	COMPONENT COOLING WATER	~300 / 830 CPM	10 - 1,000,000 CPM
R18	LIQUID WASTE DISPOSAL	~18,500/ VARIES	10 - 1,000,000 CPM
R19A	SG "A" BLOWDOWN	<2,000/ ~10 K CPM	10 -10,000,000 CPM
R19B	SG "B" BLOWDOWN	<1,000/ ~8 K CPM	10 -10,000,000 CPM
R19C	SG "C" BLOWDOWN	<2,000/ ~10 K CPM	10 -10,000,000 CPM
R22P	E&RC BLDG. PARTICULATE	~300 / 10,000 CPM	1 - 1,000,000 CPM
R22I	E&RC BUILDING IODINE	~15 / 300 CPM	1 - 1,000,000 CPM
R22NG	E&RC BUILDING NG	~40 / 1,000 CPM	1 - 1,000,000 CPM
R23P	RADWASTE BLDG. PART.	~60 / 9,700 CPM	1 - 1,000,000 CPM
R23I	RADWASTE BLDG. IODINE	<10 / 1090 CPM	1 - 1,000,000 CPM
R24A	N-16 MAIN STEAM LINE A	1/5 GPD	1 - 150 GPD
R24B	N-16 MAIN STEAM LINE B	1/5 GPD	1 - 150 GPD
R24C	N-16 MAIN STEAM LINE C	1/5 GPD	1 - 150 GPD
R23NG	RADWASTE BLDG. NG	~20 / 387 CPM	1 - 1,000,000 CPM
R33	MONITOR BLDG. AREA	<1 / 10 mR/HR	1 - 100,000 mR/HR
R37	COND. POLISHER	~100 /18,500 CPM	10 -10,000,000 CPM
R38P	EOF PARTICULATE	~900 / 32,000 CPM	10 - 1,000,000 CPM
R38I	EOF IODINE	~10 / 802 CPM	10 - 1,000,000 CPM
R38NG	EOF NOBLE GAS	~25 / 935 CPM	10 - 1,000,000 CPM

ATTACHMENT 10.12
Page 1 of 1

RMS MONITORED SYSTEMS



Reference – System Description, SD-019, Radiation Monitoring System

ATTACHMENT 10.13
Page 1 of 1
WEATHER SERVICE DATA

1. Call the Weather Service at the Florence Airport, Columbia, South Carolina or Wilmington, North Carolina. Ask for the forecaster on duty and identify yourself. The following script may be used, "This is (your name) at the Progress Energy H. B. Robinson Nuclear Plant. This is an emergency (or emergency drill). May I have the last hour surface weather observation from Florence, South Carolina?" If the last hour data is not available from Florence, then request the last hour surface weather observation from Columbia. The following data should be obtained:

   1-Hour Forecast

   - Station for which data is given _____
   - Wind Speed (MPH) _____
   - Cloud Cover (in tenths of total) _____
   - Cloud Ceiling (feet above ground) _____
   - Wind Direction (from N,S,E,W,etc.) _____
   - Wind Direction Trends (steady, shifting, variable) _____
   - Precipitation Activity _____
   - Probability of Precipitation _____

2. Also, obtain a 3-hour forecast for Florence from the meteorologist on duty.

   3-Hour Forecast

   - Station for which data is given _____
   - Wind Speed (MPH) _____
   - Cloud Cover (in tenths of total) _____
   - Cloud Ceiling (feet above ground) _____
   - Wind Direction (from N,S,E,W,etc.) _____
   - Wind Direction Trends (steady, shifting, variable) _____
   - Precipitation Activity _____
   - Probability of Precipitation _____

3. Other Information: _____
   _____
   _____
   _____
   _____

Date: _____ Time: _____ Name: _____

ATTACHMENT 10.14
Page 1 of 1

ONSITE METEOROLOGICAL DATA

Date: _____

Time	_____	_____	_____	_____
Ground Wind Speed (mph)	_____	_____	_____	_____
Elevated Wind Speed (mph)	_____	_____	_____	_____
Ground Wind Dir. (From)	_____	_____	_____	_____
Elevated Wind Dir. (From)	_____	_____	_____	_____
AMB Temp. (°F)	_____	_____	_____	_____
ΔT (°C/100m)	_____	_____	_____	_____
Stability Class	_____	_____	_____	_____

Time	_____	_____	_____	_____
Ground Wind Speed (mph)	_____	_____	_____	_____
Elevated Wind Speed (mph)	_____	_____	_____	_____
Ground Wind Dir. (From)	_____	_____	_____	_____
Elevated Wind Dir. (From)	_____	_____	_____	_____
AMB Temp. (°F)	_____	_____	_____	_____
ΔT (°C/100m)	_____	_____	_____	_____
Stability Class	_____	_____	_____	_____

ATTACHMENT 10.15
Page 1 of 1

METEOROLOGICAL FORECAST FORM

Date: _____ Time Issued: _____

Issued By: _____ Received By: _____

Forecast Location: _____

A) Next 1 Hour

1) Wind Direction: Sector _____ Deg. _____

2) Winds Should Remain (Steady; Shifting; Variable)
2a) Variation Should Be _____ Deg.

3) Wind Velocity: _____ to _____ (MPH)

4) Stability Class _____

5) Precipitation Activity Will Be (None, Scattered, Steady)

6) Precipitation Type (Rain, Rainshowers, Thunderstorms, Ice, Snow)

7) Precipitation Intensity (Light, Moderate, Severe)

B) Next 3 Hours:

_____

_____

C) Next 3 Days:

_____

_____

_____

D) Remarks: _____

_____

_____

_____

HBRDOSE/RASCAL COMPARISON MATRIX

	HBRDOSE	RASCAL	DIFFERENCES/COMMENTS	EFFECTS
EPA 400 Dose factors	Yes	Partial	See Note 1	HBRDOSE will give higher ground exposure doses. Rascal will give higher external doses. TEDE may be affected in either direction.
Reg Guide 1.145 X/Qs	Yes	No	RASCAL uses a single equation with non site-specific wake factors. Also, probably doesn't use plume meander default. RASCAL cap on Sigma z is 500 m. R.G. 1.145 shows 3000 m.	RASCAL generally will use higher X/Q values, especially for ground level releases at closer distances. When using default cap on Sigma z, Rascal will calculate higher doses during unstable met conditions.
Deposition	No	Yes	RASCAL calculates deposition as a separate dose quantity, which does not affect TEDE.	NONE
Depletion	No	No		NONE
Wet Deposition	No	Yes	RASCAL uses a mass balance for wet deposition.	RASCAL immersion and inhalation doses will be lower than HBRDOSE. RASCAL ground doses will be higher.
Finite Model	Yes	Yes	RASCAL converts to a semi-infinite model at Sigma y = 400 m. HBRDOSE uses Sigma y = 500 m. RASCAL uses horizontal dispersion coefficient only in determining plume size. HBRDOSE uses average Sigma.	Conversion point of finite model, semi-infinite model will cause negligible difference. RASCAL use of Sigma y instead of an average sigma as described in "Meteorology and Atomic Energy" may cause a big difference in the calculated gamma dose for non-isotropic plumes.
Decay for TAS	Yes	Yes		NONE
Downwind Decay	No	No		NONE

HBRDOSE/RASCAL COMPARISON MATRIX

	HBRDOSE	RASCAL	DIFFERENCES/COMMENTS	EFFECTS
Daughter Ingrowth	No	Yes	RASCAL calculates ingrowth of daughter decay products.	HBRDOSE may underestimate doses, particularly inhalation doses.
Source Term	RTM-96	NUREG-1228	Different isotopes, RASCAL can dynamically calculate spectrum based on particular accident sequence.	During LOCA sequences, Spent Fuel accidents, or Waste Gas Decay Tank rupture, there should be little difference. Other sequences may cause large differences.
Uses monitor reading for source term	Yes	Yes	RASCAL calculates source term based on user defined parameters and the maximum expected readings for core-damage states. NRC will probably be doing worst case analysis based on specific accident and PRA instead of actual release.	NRC predicted dose may be higher. PGN should consider a method of providing gross noble gas, iodine, and particulate release rates to the NRC. THE EQUIVALENT RELEASE RATES VALUES CALCULATED BY HBRDOSE SHOULD NOT BE REPORTED TO THE NRC.
Source term based on EMT samples	Yes	Yes	HBRDOSE uses gross (cpm or mRem/hr) inputs. RASCAL requires isotopic analysis.	NRC results will not be available for several hours, but may be more accurate.
Intermediate Phase Calculations	Yes	Yes	The FMDose module in RASCAL 3.01 computes doses, derived intervention levels (DILs), and emergency worker turn-back guidance for identified measurement locations.	NONE

Note 1:Dose factors for thyroid are identical between the two models. For external dose, RASCAL includes the contribution of short lived daughters in the external dose factors, which EPA-400 does not do. Similarly, RASCAL includes short lived daughter products in the inhalation and ground exposure dose factors. The most obvious result of this is that some of the noble gases (i.e. Kr-88), are included in inhalation and ground exposure dose in RASCAL. Ground exposure dose factors are calculated in RASCAL assuming a 0.3 cm/s deposition rate and further correction factor of 0.5 to account for rough ground. EPA-400 dose factors assume a deposition velocity of 1 cm/s for iodines and 0.1 cm/s for particulates with no correction factor.

MANUAL CALCULATION OF CURIES RELEASED (FOR DOSE PROJECTION TEAM USE)

Use this manual calculation for stability classes E, F, and G in MIXED MODE RELEASES when X/Q is extremely small at the site boundary when compared with the other X/Q values.

The Xenon Dose Equivalent and the Iodine Dose Equivalent are the source term values used by South Carolina Department of Health and Environmental Control for input into their dose assessment program.

Use the following formula, and the data from the most reasonable distance, to calculate **Q** in Curies.

$$Q = [3600(D)] / [(1000)(X/Q)(DCF)]$$

where:

Q = the calculated Dose Equivalent source term in Curies,
3600 converts the release from Ci/sec to Curies
1000 = millirem - rem conversion
D = EDE (immersion) or thyroid CDE in mRem, both from the dose projection program printout,
X/Q = the dispersion factor (from the same distance as the dose, **D**),
DCF = the dose conversion factor (Rem per uCi - cm^{-3} - hr); 20 for Xenon-133 dose equivalent **or** 1.3 E +06 for Iodine-131 dose equivalent.

$$Q = [3600(D)] / [(1000)(X/Q)(DCF)]$$
$$Q = [3.6(D)] / [(X/Q)(DCF)]$$

Q(Xe) = [3.6( )] /[( )(20)] = Curies Xe-133 Dose Equivalent

Q(I) = [3.6( )] / [( ) (1.3E+06)] = Curies Iodine Dose Equivalent

ATTACHMENT 10.18
Page 1 of 5
Manual Dose Projection Worksheet

1	2	3	4	5	6	7	8
Stability Class*	Wind Direction (Wind from)	Wind Speed (enter units)	Site Boundary X/Q (sec/m^3) From Table 1	Q (Ci)	DCF $\frac{Rem/sec}{Ci/m^3}$	Dose (Rem) Columns 4 x 5 x 6	Location (mi)
				NG:	TEDE:	TEDE:	S/B 0.265
				IODINE:	THYROID:	THYROID:	

Comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

9

Extrap. Factors

	TEDE:	2 mi
	THYROID:	
	TEDE:	5 mi
	THYROID:	
	TEDE:	10 mi
	THYROID:	

Projection Date: _____ Projection Time: _____

Performed by: _____ Reviewed by: _____

Approved by: _____

* - For Stability Class F or G, use Stability Class F.

Table 1: Site Boundary X/Q

Part 1: Site Boundary X/Q (sec/m^3)

Windspeed MPH	Windspeed m/s	A	B	C	D	E	F
1	0.4	8.39E-05	2.35E-04	5.40E-04	1.40E-03	2.70E-03	6.42E-03
2	0.9	4.19E-05	1.18E-04	2.70E-04	7.00E-04	1.35E-03	3.21E-03
3	1.3	2.80E-05	7.85E-05	1.80E-04	4.66E-04	9.00E-04	2.14E-03
4	1.8	2.10E-05	5.88E-05	1.35E-04	3.50E-04	6.75E-04	1.61E-03
5	2.2	1.68E-05	4.71E-05	1.08E-04	2.80E-04	5.40E-04	1.28E-03
6	2.7	1.40E-05	3.92E-05	9.00E-05	2.33E-04	4.50E-04	1.07E-03
7	3.1	1.20E-05	3.36E-05	7.71E-05	2.00E-04	3.86E-04	9.18E-04
8	3.6	1.05E-05	2.94E-05	6.75E-05	1.75E-04	3.37E-04	8.03E-04
9	4.0	9.32E-06	2.62E-05	6.00E-05	1.55E-04	3.00E-04	7.14E-04
10	4.5	8.39E-06	2.35E-05	5.40E-05	1.40E-04	2.70E-04	6.42E-04
11	4.9	7.63E-06	2.14E-05	4.91E-05	1.27E-04	2.45E-04	5.84E-04
12	5.4	6.99E-06	1.96E-05	4.50E-05	1.17E-04	2.25E-04	5.35E-04
13	5.8	6.45E-06	1.81E-05	4.15E-05	1.08E-04	2.08E-04	4.94E-04
14	6.3	5.99E-06	1.68E-05	3.86E-05	1.00E-04	1.93E-04	4.59E-04
15	6.7	5.59E-06	1.57E-05	3.60E-05	9.33E-05	1.80E-04	4.28E-04
16	7.2	5.24E-06	1.47E-05	3.38E-05	8.75E-05	1.69E-04	4.02E-04
17	7.6	4.94E-06	1.38E-06	3.18E-05	8.23E-05	1.59E-04	3.78E-04
18	8.0	4.66E-06	1.31E-05	3.00E-05	7.77E-05	1.50E-04	3.57E-04
19	8.5	4.42E-06	1.24E-05	2.84E-05	7.37E-05	1.42E-04	3.38E-04
20	8.9	4.19E-06	1.18E-05	2.70E-05	7.00E-05	1.35E-04	3.21E-04
21	9.4	4.00E-06	1.12E-05	2.57E-05	6.66E-05	1.29E-04	3.06E-04
22	9.8	3.81E-06	1.07E-05	2.45E-05	6.36E-05	1.23E-04	2.92E-04
23	10.3	3.65E-06	1.02E-05	2.35E-05	6.08E-05	1.17E-04	2.79E-04
24	10.7	3.50E-06	9.81E-06	2.25E-05	5.83E-05	1.12E-04	2.68E-04
25	11.2	3.36E-06	9.41E-06	2.16E-05	5.60E-05	1.08E-04	2.57E-04
26	11.6	3.23E-06	9.05E-06	2.08E-05	5.38E-05	1.04E-04	2.47E-04
27	12.1	3.11E-06	8.72E-06	2.00E-05	5.18E-05	1.00E-04	2.38E-04
28	12.5	3.00E-06	8.41E-06	1.93E-05	5.00E-05	9.64E-05	2.29E-04
29	13.0	2.89E-06	8.12E-06	1.86E-05	4.83E-05	9.31E-05	2.22E-04
30	13.4	2.80E-06	7.85E-06	1.80E-05	4.66E-05	2.14E-04	5.35E-04

Table 1: Site Boundary X/Q

Part 2: Extrapolation Factors

MILES	A	B	C	D	E	F
1	2.67E-02	6.84E-02	8.68E-02	1.08E-01	1.12E-01	1.08E-01
2	1.43E-02	1.72E-02	2.47E-02	3.70E-02	3.99E-02	3.95E-02
3	9.89E-03	7.65E-03	1.18E-02	2.01E-02	2.25E-02	2.27E-02
4	7.63E-03	4.30E-03	7.02E-03	1.31E-02	1.51E-02	1.55E-02
5	6.23E-03	2.95E-03	4.68E-03	9.40E-03	1.11E-02	1.16E-02
6	5.29E-03	2.50E-03	3.36E-03	7.19E-03	8.70E-03	9.20E-03
7	4.60E-03	2.17E-03	2.54E-03	5.73E-03	7.08E-03	7.57E-03
8	4.08E-03	1.93E-03	2.00E-03	4.71E-03	5.93E-03	6.40E-03
9	3.67E-03	1.73E-03	1.61E-03	3.97E-03	5.07E-03	5.52E-03
10	3.33E-03	1.58E-03	1.33E-03	3.40E-03	4.41E-03	4.84E-03

Manual Dose Projection Worksheet

Table 2: Dose Conversion Worksheet (Known Mix)

Sample Time: _____ Release Time: _____ Difference (t) _____ (hr)

1	2	3	4	5	6	7	8
Nuclide	Sample Concentration	λ (hr^{-1})	$e^{-\lambda t}$	Release Concentration	Fraction of Mix	Nuclide Dose Conversion Factor	Adjusted DCF
Kr-85M		0.158				2.35E-02	
Kr-85		7.4E-06				3.11E-04	
Kr-87		0.878				1.33E-01	
Kr-88		0.248				3.42E-01	
Kr-89		13.075				3.00E+01	
Xe-131M		0.002				1.24E-03	
Xe-133M		0.013				4.28E-03	
Xe-133		0.005				4.94E-03	
Xe-135M		2.665				6.33E-02	
Xe-135		0.076				3.58E-02	
Xe-137		10.662				2.83E-02	
Xe-138		2.376				1.86E-01	
			(NG) SUM =			TOTAL (NG) DCF =	

1	2	3	4	5	6	7	8
Nuclide	Sample Concentration	λ (hr^{-1})	$e^{-\lambda t}$	Release Concentration	Fraction of Mix	Nuclide Dose Conversion Factor	Adjusted DCF
I-130		5.64E-02				108	
I-131		3.59E-03				951	
I-132		3.07E-01				11	
I-133		3.41E-02				226	
I-134		7.97E-01				3	
I-135		1.04E-01				46	
			(I) SUM =			TOTAL (I) DCF =	

Table 3: Dose Conversion Factors for Unknown Mix
(Rem/sec) / (Ci/m^3)

Reactor Shutdown Time: _____ Release Time: _____ Difference: _____ hrs

Time from Reactor Shutdown to Release (hrs)	TEDE DCFs	THYROID DCFs
0	1.16E-01	171
0.5	9.89E-02	189
1	9.03E-02	215
2	7.86E-02	244
5	5.50E-02	318
8	3.94E-02	363
12	2.64E-02	415
24	1.36E-02	522
72	5.28E-03	800

PATCH T

Progress Energy	I Information Use

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 2

PART 5

EPTSC-00

ACTIVATION AND OPERATION OF THE TECHNICAL SUPPORT CENTER

REVISION 4

SUMMARY OF CHANGES
PRR 102622 & 93201

SECTION	REVISION COMMENTS
All	Incorporated EPTSC-09 (EPTSC-09 deleted)
Cover	Changed use to Information
8.2.2	Clarified the wording for TSC activations and incorporated actions upon arrival from other step.
8.2.3	Changed AND to OR
8.2.7	Changed Supervisors to Directors
8.2.14	Changed "effected" to "affected"
8.3.1	Clarified wording on setting-up a relief schedule
8.4	Added NOTE to ensure all events have been reviewed and deactivation is possible.
Att 10.1	Moved Quick Start Guide to an Attachment & removed step to call Dialogic.

TABLE OF CONTENTS

SECTION PAGE

1.0 PURPOSE

This procedure provides instructions for activation, operation and deactivation of the Technical Support Center (TSC).

2.0 REFERENCES

2.1 PLP-007, Robinson Emergency Plan

2.2 NUREG-0654, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants

2.3 Code of Federal Regulations, 10CFR50, Appendix E

2.4 EPA 400-R92-001, Manual for Protective Action Guides and Protective Actions for Nuclear Incidents

2.5 CR 9200167

2.6 Westinghouse Owners Group Document, Core Damage Assessment Methodology, November 1984, Revision 2.0.

2.7 H. B. Robinson Steam Electric Plant Unit 2, Updated Final Safety Analysis Report, Amendment 4.0, July 1986.

2.8 Babcock and Wilcox Radiochemistry for Accident Assessment, Babcock and Wilcox, April 1983.

2.9 Grove Engineering Inc. Microshield, Gamma Radiation Shielding, Version 2.0.

2.10 H. B. Robinson Steam Electric Plant, SRO - Advanced Transient and Accident Analysis, Attachment 7, 8, 10, and 11.

2.11 H. B. Robinson Steam Electric Plant, Origen II Source Term Computer Run.

2.12 U. S. NRC, NUREG 0956, Reassessment of the Technical Basis for Estimating Source Term, July 1986.

2.13 CRC Applied Engineering Tables, 2nd Ed., Page 46, Properties of Gases.

2.14 Inadequate Core Cooling Monitor, H. B. Robinson, Unit 2, System Description.

2.15 Siemens Report, "H. B. Robinson Unit 2 Radiological Assessment of Postulated Accidents".

2.16 H. B. Robinson Station Blackout Coping Analysis Report.

3.0 RESPONSIBILITIES

See individual support procedures.

4.0 PREREQUISITES

The ERO Facilities have been activated.

5.0 PRECAUTIONS AND LIMITATIONS

N/A

6.0 SPECIAL TOOLS AND EQUIPMENT

See individual support procedures.

7.0 ACCEPTANCE CRITERIA

N/A

8.0 INSTRUCTIONS

8.1 Support Procedures

8.1.1 EPTSC-01, Site Emergency Coordinator

8.1.2 EPTSC-02, Plant Operations Director

8.1.3 EPTSC-03, Emergency Repair Director

8.1.4 EPTSC-04, Radiological Control Director

8.1.5 EPTSC-05, deleted

8.1.6 EPTSC-06, Emergency Security Team Leader

8.1.7 EPTSC-07, Damage Assessment

8.1.8 EPTSC-08, Technical Analysis Director

8.1.9 EPTSC-09, deleted (incorporated into EPTSC-00)

8.2 Activation

8.2.1 TSC activation is required following declaration of an Alert or higher emergency classification level. Earlier activation is at the discretion of the SEC **OR** the Shift Superintendent of Operations (SSO).

8.2.2 The TSC Emergency Response Organization (ERO) shall be notified to activate the TSC using any combination of public address (PA), beeper, NREC, **OR** Dialogic.

1. Refer to EPNOT-00, Notification and Emergency Communications for details.

8.2.3 The TSC shall be activated within 60 to 75 minutes following declaration of an ALERT or higher emergency classification **OR** upon beeper request for activation to support non-emergency events, i.e. weather related activations, increases in the National Terror Threat Level, etc.

1. All personnel responding from off-site shall make a Fitness-For-Duty affirmation prior to their initial entry into the Protected Area **OR** the TSC/EOF Facilities Building, for each event.

2. Sign in on the Security Roster

3. Sign in on the TSC Org. Chart in the TSC **AND** announce your name and title.

8.2.4 Dynamic situations which arise in an emergency condition may require that steps be performed out of sequence **OR** alternate methods be devised to accomplish the intent of the step.

1. Deviations which do not violate license requirements may be approved by the SEC or Emergency Response Manager (ERM)

2. Deviations which violate license requirements shall be implemented per 10CFR50.54 (x, y, and z). Time permitting, SEC **OR** ERM approval shall also be obtained.

3. Deviations are reportable to the NRC within one hour.

8.2.5 In order to relieve the Control Room of NRC communication activities, the SEC **AND** the NRC Emergency Communicator can assume and conduct communication activities from the TSC prior to facility activation.

8.2.6 ERO members shall verify operability of equipment and availability of reference materials **AND** forms necessary. Report deficiencies to the Administrative and Logistics Manager (ALM) in the Emergency Operations Facility (EOF).

8.2.7 Determine the need for additional resources **AND** report these to ALM in the EOF.

8.2.8 Emergency Response Organization (ERO) Team Leaders/Directors shall verify their readiness to the position they report to.

8.2.9 Leaders/Directors shall verify readiness of staff personnel.

8.2.10 Activate the TSC.

1. Notify onsite/offsite locations.

8.2.11 Each position with a specific procedure to direct their activities shall initiate a written **OR** electronic log of significant emergency response activities. Generally speaking, logs for teams will be maintained by the team leader.

1. Log your name **AND** the date prior to entry of activities for that shift.

2. Logs shall include communications, key decisions, **AND** data collected **OR** transmitted in support of those decisions.

3. For convenience, log books are available for positions required to maintain a log. Scraps of paper, napkins, etc are **not** appropriate for the final version of logs. Final versions of logs should be maintained current.

8.2.12 Receive plant status briefing from the SEC-Control Room (CR). Participate in the initial briefing by providing status information regarding your emergency response area.

1. Brief facility members.

8.2.13 Establish a schedule for subsequent TSC facility briefings.

1. Communicate times to subordinates.

8.2.14 The SEC **OR** the ERM shall authorize affected emergency response personnel to exceed the Technical Specification Limits for extended overtime utilizing PLP-015, Program For Nuclear Power Plant Staff Working Hours.

8.3 Turnover

8.3.1 **UPON** determination that a shift change is necessary, **THEN** the Administrative and Logistics Manager (A&LM) in the EOF will coordinate the shift change schedule(s).

1. Each ERO member shall have a relief individual.

2. Team Leaders/Directors will notify the relief shift personnel under their leadership.

3. Relief times should be staggered to promote continuity of response.

8.3.2 Each ERO member shall brief their relief on specific activities or events currently in progress **AND** any event that took place on their shift that is significant to the control or recovery of the plant/public interest.

8.3.3 Review log **AND** other documentation. Log the name of oncoming personnel, the date **AND** the time of turnover in the log/documentation.

8.3.4 Relief staff shall sign-in on the organization chart board, announce name **AND** position title to TSC staff.

8.4 Deactivation

NOTE: A review of the EAL charts and actions taken should be performed to ensure all events have been addressed AND the site is ready for deactivation.

8.4.1 Determine the need to deactivate facilities.

1. Consult with the ERM **AND** offsite agencies which have activated.

8.4.2 Notify offsite/onsite/industry contacts of the deactivation time.

8.4.3 Evaluate condition of equipment/supplies. Report deficiencies to the A&LM in the EOF.

8.4.4 Record the deactivation time, your name, **AND** the date on the log/documentation.

8.4.5 Provide these materials to the Emergency Preparedness group.

1. Training exercise records should be provided to the Lead Facility Controller.

9.0 RECORDS

All forms or documents created by this or any support procedure shall be sent to the Emergency Preparedness Group.

10.0 ATTACHMENTS

10.1 Technical Support Center (TSC) Organization Chart

10.2 Technical Support Center (TSC) Command Room Recommended Layout

ATTACHMENT 10.1
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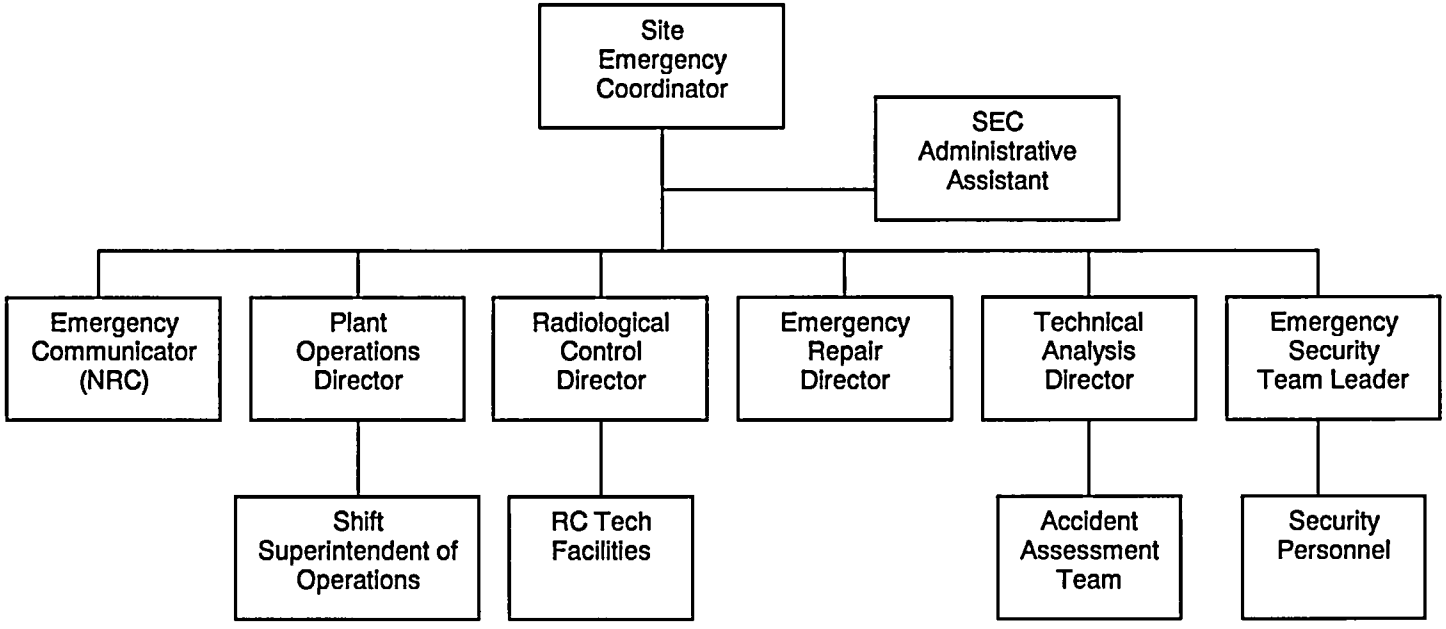
TECHNICAL SUPPORT CENTER (TSC) ORGANIZATION



ATTACHMENT 10.2
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TECHNICAL SUPPORT CENTER (TSC)
COMMAND ROOM RECOMMENDED LAYOUT