ENERGY NORTHWEST

INTEROFFICE MEMORANDUM

DATE: June 03, 2002

TO: Distribution RMMOSL

FROM: Procedure Control, Administrative Services, (927A)

SUBJECT: **PLANT PROCEDURES MANUAL - VOLUME 13**
Distribution Package: 2002-302

REFERENCE:
The following Procedure(s) have been revised/approved and are to be inserted in your controlled copy of the Manual and the superseded revisions are to be removed and destroyed

Procedure	Rev.	Title/Comments
13.5.1	15	Localized and Protected Area Evacuation
13.11.12	23	EOF Engineering Manager and Staff Duties
13.13.3	14	Intermediate Phase Mudac Operations

Also included in the package are EDITORIAL CHANGES, please replace the pages located in your controlled manual with the attached pages:

Procedure	Rev.	Pages
13.10.4	24	pages 1 & 7
13.14.4	39	pages 18 & 20

To verify receipt or cancellation of the subject Procedure(s), please sign, date and **return this receipt to Procedure Control, MD 927A** within TEN (10) WORKING DAYS of the date of this IOM.

Energy Northwest
Procedure Control (Mail Drop 927A)
PO Box 968
Richland, WA 99352

87

Date _____ Signature of Manual Holder _____ Controlled Copy Number

A045

DISTRIBUTION - VOLUME 13

Control Copy	Location	Mail Drop
2	*Control Room (501) **(IOM to CRS)**	927A
3	*Shift Manager (501)	927A
5	Licensed Training (PSF Rm. 249)	1050
6	*Simulator (PSF Rm. 235)	1050
12	PEC Library	PEC
25	Bruce Bond	911
26	Region IV, NRC	----
28	Region IV, NRC	----
30	EOF Support Engineering Library	1050
31	*TSC Emergency Response	927A
35	NRC Resident Inspector	----
52	State of Washington, Military Department	----
55	Federal Emergency Mgmt. Agency	----
57	Benton County Dept of Emerg. Mgmt.	----
58	*WNP-2 Security **(SAS-CR) (13.1.1, 13.4.1, 13.5.1, 13.5.3, 13.5.5, 13.10.8, 13.11.10, 13.12.19, 13.13.4)**	927A
59	*WNP-2 Security **(CAS-AAP) (13.1.1, 13.4.1, 13.5.1, 13.5.3, 13.5.5, 13.10.8, 13.11.10, 13.12.19, 13.13.4)**	927A
60	WNP-2 Security	988A
63	Emergency Training	PE30
64	*Radwaste Control Room (467)	927A
66	*Simulator, Shift Manager (PSF Rm. 235)	1050
68	*Remote Shutdown Room (467) **(13.1.1, 13.2.1, 13.2.2, 13.4.1, 13.5.1, 13.10.1, 13.10.9)**	927A
75	Dept. of Health Radiation Protection	----
78	*Control Room - (501) STA's Desk	927A
83	*MUDAC	1020
86	*Simulator - STA's Desk	1034
87	Document Control Desk, NRC	----
++90	*Joint Information Center (J. Ittner)	PE30
94	*EOF	1050
97	*EOF	1050
114	EP Manager	PE30
127-130 (4)	Licensed Training (PSF Rm. 248)	1050
132	Licensed Training (PSF Rm. 248)	1050
134-136 (3)	*MUDAC Field Team Kits **(13.9.1, 13.9.5, 13.9.8, 13.13.4, 13.14.4)**	1050
++137	*MPF Field Team Kits **(13.7.5, 13.9.1, 13.9.5, 13.9.8, 13.13.4, 13.14.4)** (J. Ittner)	PE30
142	Hanford UDAC	----
146	FEMA RX Liaison	----
155	*Maintenance Library (Memo to Veena)	927A
160	*OSC Emergency Support	927A
161	Equipment Operator Training	1050
164	Oregon State Dept. of Energy	----
218	U.S. Nuclear Regulatory Commission	----
219-221 (3)	Licensed Training (PSF Rm. 248)	1050
223	Franklin County Emergency Management	----

++ **Procedure Control assures delivery is arranged/made to J. Ittner**

* Level 1 File

13.5.1

ENERGY NORTHWEST		USE CURRENT REVISION
COLUMBIA GENERATING STATION PLANT PROCEDURES MANUAL		
PROCEDURE NUMBER *13.5.1	APPROVED BY JEW - Revision 15	DATE 06/03/02
VOLUME NAME EMERGENCY PLAN IMPLEMENTING PROCEDURE		
SECTION EVACUATION AND ACCOUNTABILITY		
TITLE LOCALIZED AND PROTECTED AREA EVACUATIONS		

TABLE OF CONTENTS

1.0 PURPOSE

This procedure provides direction for conducting localized evacuations within the Protected Area and evacuation of non-essential personnel from the Protected Area in the case of a Site Area Emergency or General Emergency or as other conditions warrant.

2.0 REFERENCES

2.1 FSAR, Chapter 13.3, Emergency Plan, Section 5

2.2 PPM 13.5.3, Evacuation of Exclusion Area and/or Nearby Facilities

2.3 PPM 13.5.5, Personnel Accountability/Search and Rescue

2.4 PPM 13.7.5, Offsite Assembly Area Operations

2.5 Public Address Emergency Message Format - Localized Evacuation, 968-26048

2.6 Public Address Emergency Message Format - Protected Area Evacuation, 968-26050

2.7 Emergency Center Acccountability Log (968-25691)

3.0 DISCUSSION

3.1 The principle consideration when contemplating an evacuation is the safety of plant personnel. A localized evacuation is the orderly withdrawal of personnel from a selected area within the Protected Area. A localized evacuation will be announced using the alerting tone followed by an instructional message. A Protected Area evacuation is the orderly withdrawal of all personnel, except those required to respond to the emergency situation, from the Protected Area. A Protected Area evacuation will be announced using the alerting tone followed by an instructional message.

3.2 The Emergency Director (ED) is responsible for determining what type of evacuation is to be conducted. The decision to evacuate personnel should be based on the course of action which presents the minimum risk to employees. Some examples of conditions which make offsite evacuation NOT advisable include, but are not limited to:

- An ongoing security threat within the Protected Area (consult with the Security Shift Supervisor to aid in determining the safest course of action).

- Inclement weather (e.g., high winds or hazardous road conditions may preclude a safe evacuation of plant personnel).

- Radiological hazards exist (determine which action would result in lowest dose to evacuating personnel).

- Other hazards exist which might subject evacuees to a higher risk to personnel safety than not evacuating.

If the need for a Protected Area evacuation is indicated, but the decision is made to retain personnel onsite due to safety concerns, plant personnel will assemble at the Yakima Building, 441' conference room or other areas as specified.

3.3 The area selected for a localized evacuation should have well-defined boundaries (e.g., Radwaste Building, 422' Reactor Building, 501' Turbine Building, etc.). The assembly area for localized evacuations will be the onsite Yakima Building conference room or other areas as specified.

Normally, Protected Area evacuations will be conducted at a Site Area or General Emergency, or when other conditions warrant. Personnel Accountability will be established for those personnel remaining onsite within 30 minutes of the declaration of the Protected Area evacuation. Protected area evacuees may assemble at the Kootenai Building Health Physics Center or the Energy Northwest Office Complex (ENOC) assembly area after leaving the plant and, if required, radiological monitoring and decontamination will be performed.

For localized evacuations that may be conducted without being in a declared emergency condition, the decision to evacuate is the responsibility of the Control Room Supervisor/Shift Manager (CRS/SM).

3.4 When a Protected Area evacuation is ordered, personnel accountability actions of PPM 13.5.5 will be implemented.

4.0 PROCEDURE

4.1 CRS/Shift Manager/Emergency Director Responsibilities for Localized Evacuations

If conditions exist requiring localized evacuation, initiate localized evacuation by performing steps on form 968-26048, Public Address Emergency Message Format - Localized Evacuation.

4.2 Emergency Director Responsibilities for Protected Area Evacuation:

4.2.1 Determine if any of the extenuating conditions listed below, or other conditions which might preclude safe evacuation, are present:

1. An ongoing security threat within the Protected Area (consult with the Security Shift Supervisor to aid in determining the safest course of action).

2. Inclement weather (e.g., high winds or hazardous road conditions may preclude a safe evacuation of plant personnel).

3. Radiological hazards exist (determine which action would result in lowest dose to evacuating personnel).

4. Other hazards exist which might subject evacuees to a higher risk to personnel safety than not evacuating.

4.2.2 If it is determined that a "safe" evacuation is possible, initiate Protected Area evacuation when a Site Area Emergency or General Emergency is declared, or in response to any of the following conditions:

1. General area radiation levels outside of a Radiologically Controlled Area exceed 5 mrem/hr indicating a loss of control of radioactive material and the threat cannot be confined to a well-defined area.

2. Unidentified airborne radioactivity exceeds 0.3 DAC (0.3 DAC equates to approximately 750 ccpm on a 40 ft^3 air sample in the field) which is attributed to a loss of control of radioactive material.

3. An uncontrolled toxic gas leak (originating either onsite or offsite) where the hazard is not confined to a localized area.

4.2.3 Determine if any areas of the plant should be avoided during the evacuation.

4.2.4 Determine, if necessary, any other special protective measures which should be taken by plant evacuees.

4.2.5 Determine the appropriate evacuation route and assembly area in accordance with the table below:

Condition A: The wind direction is away from the Protected Area Access Point (PAAP), the west parking lots, and the Kootenai Building (wind from any direction other than between 20° and 90°). Wind directions and a site map showing Condition A evacuation route and assembly area are presented in Attachment 5.2.

Condition B: The wind direction is toward the PAAP, the west parking lots, and the Kootenai Building (wind from between 20° and 90°). Wind directions and a site map showing Condition B evacuation route and assembly area are presented in Attachment 5.3.

Parameter	Condition A	Condition B
Evacuation Route	Out PAAP parking lot to Kootenai Building by any available means.	Out PAAP parking lot, north around plant to ENOC assembly area by any available means.
Assembly Area	Kootenai Building (Health Physics Center)	Energy Northwest Office Complex assembly area

4.2.6 Ensure evacuees sign in on the Emergency Center Acccountability Log (968-25691). Direct the Security Supervisor to instruct the evacuees to standby until released by the Manpower Scheduler.

4.2.7 If a security event or other unforeseen condition prevents or alters implementation of these preplanned evacuation plans, designate alternate exit point(s) and assembly area(s), and revise the public address announcements accordingly.

4.2.8 Perform steps on form 968-26050, Public Address Emergency Message Format - Protected Area Evacuation, for evacuation of the Protected Area using Condition A or Condition B routing.

- If the PA announcement is made from the Control Room, use the PA system override switch for announcements. Return the switch to the normal position when done.

- If the EOF Manager is the Emergency Director, coordinate with the TSC Manager to make PA announcements using the PA microphone in the TSC.

4.2.9 Direct the Radiation Protection Manager provide Health Physics coverage at the designated plant exit location portal monitors and at the Protected Area exit point.

4.2.10 Consider the need to implement PPM 13.5.3 actions for evacuation of the Exclusion Area/Nearby Facilities.

4.3 Security Supervisor Responsibilities

4.3.1 The preferred method of site exit uses the normal exit protocol. If desired, the gate between the egress turnstiles at the Protected Area Access Point (PAAP) can be opened to expedite personnel exit.

4.3.2 If the gate between the turnstiles is opened, log personnel offsite as quickly as possible, using the Personnel Accountability Log for System Outages.

4.4 Radiation Protection Manager Responsibilities

4.4.1 Dispatch HP technicians to the portal monitors at the designated plant exit location to provide instructions to evacuating personnel as outlined below, and assist in personnel monitoring as necessary.

a. If personnel were in a contaminated area, remove protective clothing (if not already removed), and perform personnel monitoring at Access Control. If contamination is found, contact the RPM at the TSC at Ext. 2852 for further instructions.

b. If personnel alarm the exit portal monitors, direct personnel to the appropriate assembly area for monitoring and decontamination.

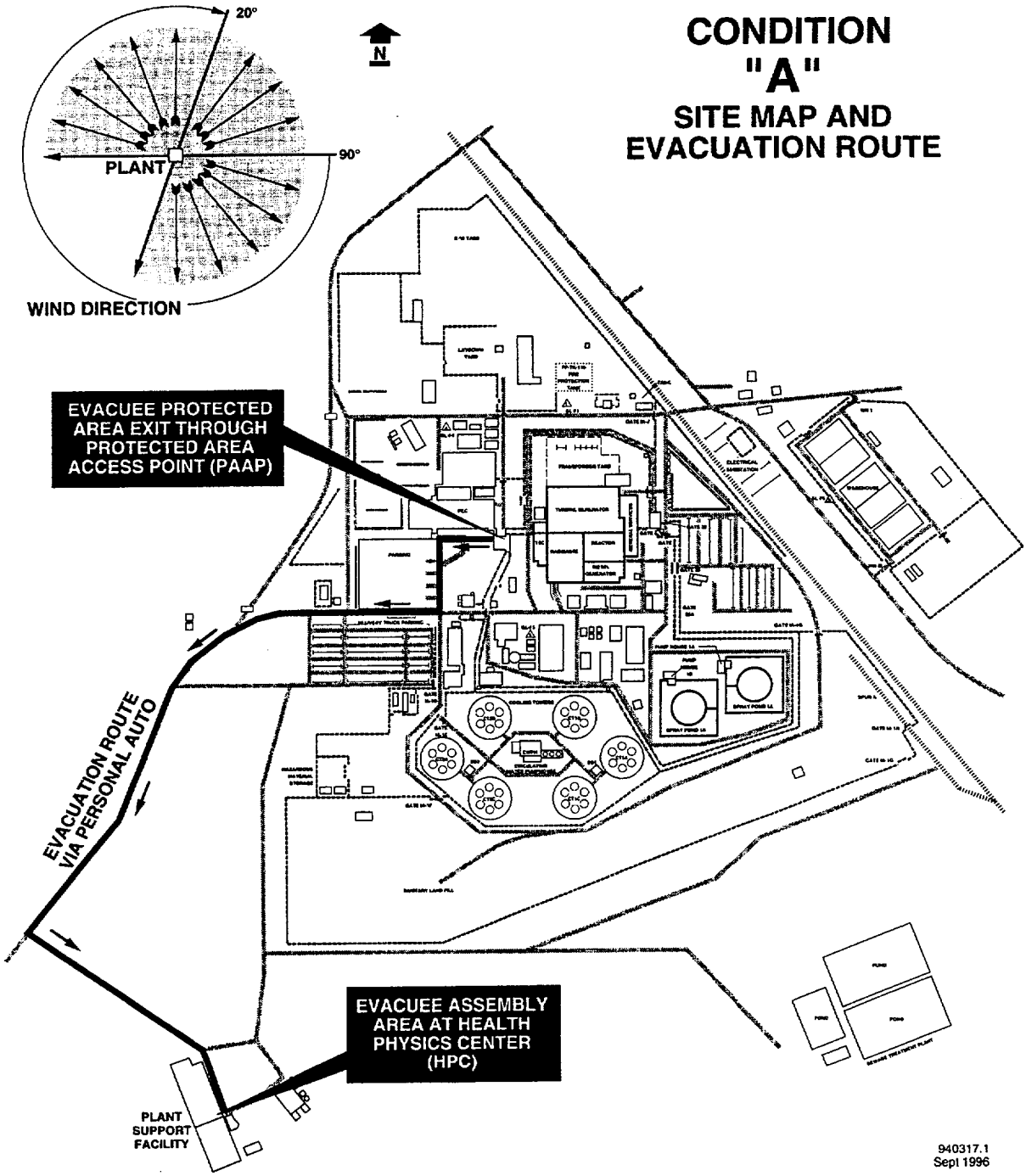
4.4.2 Inform the Radiological Emergency Manager (REM) if personnel or vehicle monitoring or decontamination is necessary for evacuating personnel.

4.5 Radiological Emergency Manager Responsibilities

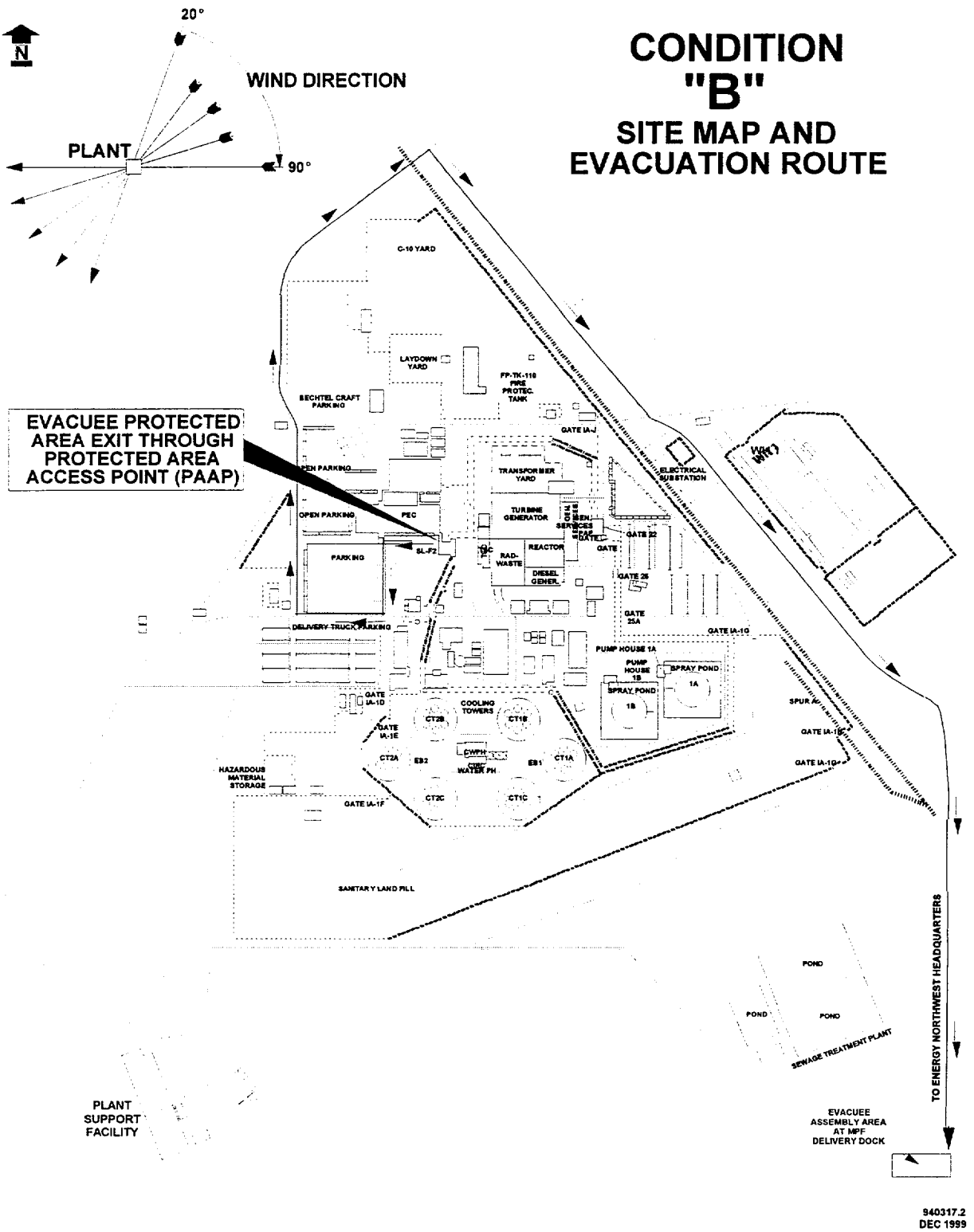
Implement the actions of PPM 13.7.5 as necessary to conduct offsite assembly area monitoring and decontamination operations at the ENOC assembly area if that is the designated assembly area (Condition B Evacuation).

5.0 ATTACHMENTS

5.1 Condition A Site Map and Evacuation Route
5.2 Condition B Site Map and Evacuation Route



Attachment 5.2



Attachment 5.3

DATE: 06/03/02

EDITORIAL

13.10.4

13.10.4

ENERGY NORTHWEST		USE CURRENT REVISION
COLUMBIA GENERATING STATION PLANT PROCEDURES MANUAL		
PROCEDURE NUMBER *13.10.4	APPROVED BY DWC - Revision 24	DATE 04/26/01
VOLUME NAME EMERGENCY PLAN IMPLEMENTING PROCEDURES		
SECTION PLANT EMERGENCY FACILITIES		
TITLE RADIATION PROTECTION MANAGER DUTIES		

TABLE OF CONTENTS

- Request for exposure limits above 5 rem TEDE is approved by the Emergency Director. The Emergency Director may verbally delegate this responsibility to the RPM or REM as applicable.

- If an Emergency Exposure Request is authorized, follow guidance in PPM 13.2.1.

3.1.23 As necessary, request augmenting Health Physics personnel to support plant radiological assessment and protection measures via the Plant Admin Manager, or Site Support Manager/Manpower Scheduler, as appropriate.

3.1.24 Assess the need to recommend radiological protection, respiratory protection, sheltering or evacuation for personnel within the Protected Area.

3.1.25 Periodically, contact the Security Supervisor in the Central Alarm Station (CAS) to determine any habitability concerns. Ensure the Security Supervisor is kept informed of radiological conditions and protective actions for Security Force personnel.

3.1.26 As requested, provide periodic TSC update briefings on radiological concerns. Refer to the Radiation Protection Manager's portion of the Technical Support Center (TSC) Briefing Guidelines (Form 968-25860), located in the TSC.

3.1.27 When plant conditions make it necessary, periodically direct that:

a. Plant areas where food is stored or consumed be surveyed.

b. Plant drinking water samples be collected and analyzed.

3.1.28 When the recovery phase is entered, provide Radiation Protection and ALARA assistance with developing plans and procedures.

a. As required, direct appropriate staff to perform whole body counting and internal dose assessment.

3.1.29 Refer incoming media calls to the Joint Information Center.

13.11.12

ENERGY NORTHWEST		USE CURRENT REVISION
COLUMBIA GENERATING STATION PLANT PROCEDURES MANUAL		
PROCEDURE NUMBER *13.11.12	APPROVED BY JEW - Revision 23	DATE 06/03/02
VOLUME NAME EMERGENCY PLAN IMPLEMENTING PROCEDURES		
SECTION EMERGENCY OPERATIONS FACILITY		
TITLE EOF ENGINEERING MANAGER AND STAFF DUTIES		

TABLE OF CONTENTS

1.0 PURPOSE

This procedure provides instructions and guidance for activities of the EOF Engineering Manager and staff during an emergency.

2.0 REFERENCES

2.1 FSAR, Chapter 13.3, Emergency Plan, Sections 2, 3, and 6

2.2 OER SIL324R6, BWR Emergency Support Program

2.3 Work Release Order C-0875

2.4 Plant Data Information System (PDIS) Users Manual

2.5 PPM 9.3.22, Core Damage Assessment Based on PASS Sample

2.6 PPM 13.2.2, Determining Protective Action Recommendations

2.7 PPM 13.13.2, Emergency Event Termination and Recovery Operations

2.8 PPM 13.13.4, After Action Reporting

2.9 Tech Memo 2117, Core Thermal or Reactor Engineer

2.10 Emergency Response Log, 968-23895

3.0 RESPONSIBILITIES

3.1 The EOF Engineering Manager is responsible for overall direction and supervision of the EOF engineering staff in parameter trending, system operations assessment and trouble shooting. The manager is also responsible for coordinating engineering support from contractors or vendors with the TSC.

3.2 The EOF Engineering Manager should determine the makeup of the engineering staff to support accident assessment and evaluation activities appropriate for the emergency conditions. These activities may include:

- Evaluation of plant conditions to gain understanding of the emergency event
- Investigation of events not understood or that deviate from the expected

- Assessment of events or transients which may adversely affect accident mitigation efforts
- Assisting the TSC in the analysis of potential system or component failures
- Development of contingency plans for the TSC to recover failed safety equipment or maintain operating equipment
- General trending of critical plant parameters, assessment of inoperable systems or components and problem solving
- Assignment of engineering resources to respond to the State Emergency Operations Center (EOC)
- Calculating core damage

3.3 The manager (or designee) will ensure the necessary technical information is provided for the INPO Nuclear Network releases and that the technical accuracy of those releases is verified. The Engineering Manager or designee will approve INPO Nuclear Network releases being made by Energy Northwest.

3.4 The EOF Engineering Manager is the primary interface for coordination of the GE BWR Emergency Support Program. The GE Emergency Response Team will report to the EOF, and may be used in the plant as required. When in the plant, the TSC Technical Manager acts as the primary interface for coordination of the Response Team members.

4.0 PROCEDURE

4.1 Upon notification of an Alert, Site Area or General Emergency, or if so directed, proceed to the EOF and sign in on the Sign-In board.

4.2 Obtain your procedure book from the wall rack and your supply drawer from the EOF supply cabinet. There is also a binder containing a Level 1 copy of PPM 9.3.22 located in, or in the vicinity of, the procedure book wall rack.

4.3 Based on the situation and the prognosis, call out additional engineering staff as required. The Emergency Phone Directory contains the home phone numbers of all ERO personnel under the ERO Phone List section.

4.4 As requested, support the TSC in analyzing plant information.

4.5 Direct your staff to maintain a chronology of significant items on a log similar to Emergency Response Log, Form No. 968-23895.

4.6 Provide the EOF Manager and the Radiological Emergency Manager (REM):

- Information on plant conditions that might affect Protective Action Recommendations.
- Plant status and analysis of events throughout the emergency.

4.7 During a Site Area or General Emergency, coordinate with the TSC to determine if technical support from contractors or vendors should be requested, and make appropriate recommendations to the EOF Manager.

4.8 Review information or documents received by information network, facsimile, or other means and announce any pertinent information to your staff.

4.9 Coordinate core damage assessment information with the TSC Technical Manager. Notify the EOF Manager and REM of core damage assessment results and any indications that could lead to fuel damage.

4.10 Coordinate activities of contractors, consultants, and vendors summoned for technical support.

4.11 If emergency support from GE Nuclear Energy is desired at Site Area Emergency, provide the Security Operations Center Duty Officer at GE your name, telephone number, an alternate number for use in the event of a facility evacuation, the name of the utility, and the name of the affected plant. Refer to the Emergency Phone Directory for the number. The following responsibilities may be delegated by the EOF Engineering Manager to the Site Support Manager, or other organizations as appropriate.

4.11.1 When the GE Emergency Support Program Duty Manager returns your call, be prepared to indicate the nature of the request and define the scope of assistance desired from GE, such as:

- Dedicated phone communications with the GE Technical Support Center in San Jose;
- Dispatch of local GE service personnel to the site at General Emergency, to establish dedicated telephone communications with San Jose;
- Dispatch of GE team of technical personnel to the site at General Emergency. A 24 hour response time is anticipated.

4.11.2 Provide instructions to the GE Emergency Support Program Duty Manager that describe the site admission procedures, and identify the conduct expected of local GE nuclear service personnel and the Emergency Response Team while at the site.

4.11.3 Provide the GE Technical Support Center in San Jose the name and telephone number of the Site Support Manager responsible for coordination of Response Team arrival. Provide the following information:

- Identify the landing location for aircraft on which the Emergency Response Team will arrive;
- Indicate whether local transportation and escort for the Emergency Response Team to minimize delays in arriving at the EOF is available.

4.12 Direct the Site Support Manager to coordinate the transportation and housing of offsite technical resource personnel as necessary.

4.13 Coordinate with the Site Support Manager to arrange for an Energy Northwest representative and a relief to respond to the State EOC at Site Area Emergency or higher.

4.14 When required, direct your staff in preparation of plant recovery operation plans and procedures. Refer to PPM 13.13.2, Recovery Planning section.

4.15 When requested by the INPO Network Coordinator, review the Nuclear Network emergency bulletins for technical accuracy and approve for release.

4.16 Refer all calls from the media to the Joint Information Center.

4.17 Upon shift change, turn over Emergency Response Logs and fully brief relief as to responsibilities, duties and current status of work being performed.

4.18 Upon shift change or termination of the emergency:

4.18.1 Prepare an individual After Action Report. Refer to PPM 13.13.4.

4.18.2 Collect the individual After Action Reports prepared by staff personnel.

4.18.3 Deliver all After Action Reports and Logs to the EOF Manager.

5.0 ATTACHMENTS

5.1 Core Damage Assessment

5.2 State/County Technical Liaison

5.3 Energy Northwest Representatives to State and County EOCs

5.4 EOF Engineering Staff

5.5 INPO Network Coordinator

5.6 EOF Engineering Manager Briefing Guidelines

CORE DAMAGE ASSESSMENT

PLANT PARAMETERS

1. ____ % Core Damage Actual? _____ Potential? _____

2. Basis for core damage assessment:

   a) Hydrogen: %H2_____

   b) Radiation monitor: Reading:_____

3) Check with the TSC Technical Manager for concurrence.

   Technical Manager Agreed _____ Disagreed _____

4. Comments: _____

_____

_____

_____

_____

_____
Engineering Manager

Date _____

Time _____

Attachment 5.1

Duties of: STATE/COUNTY TECHNICAL LIAISON

Assignment Location: Emergency Operations Facility (EOF)

Report To: EOF Engineering Manager

RESPONSIBILITIES:

1. Review Plant Status updates and other technical data on plant emergency conditions.

2. Establish contact with the Energy Northwest Representatives at the State EOC and the Benton and Franklin County EOCs and keep them advised on current plant conditions or other relevant technical information and questions. Provide the following information:

   - Radiological release status
   - Plant status
   - Meteorological data
   - Protective Action Recommendations made by Energy Northwest
   - Emergency classification and the Emergency Action Level

   NOTE: The phone numbers for the Energy Northwest Representatives at the State EOC and Benton and Franklin County EOCs are listed in the Offsite Agency Phone Numbers section of the Emergency Phone Directory located in the EOF bookcase. The County Representatives are listed under the County extension numbers. For the State Representative, call the number listed for the EOC and ask for the Energy Northwest Representative (obtain a specific number from that individual when you have established communication). Ensure both of these individuals have the phone number at which you can be reached. The Benton and Franklin County representatives may also be contacted on the 300 Dial-up line. Refer to the aid attached to the phone or the Emergency Phone Directory for the number.

3. If the Nuclear Engineer, Department of Health, State EOC contacts you prior to arrival of the Energy Northwest State EOC Representative, verify the individual's identity, (by calling back to the EOC or checking information against an assignment list), then provide desired technical information that is available.

4. Refer all calls from the media to the Joint Information Center.

5. Upon shift change, brief your relief on responsibilities, duties, and current status of work being performed.

6. Upon shift change or termination of the emergency:

   a. Prepare an individual After Action Report. Refer to PPM 13.13.4.
   b. Deliver all After Action Reports, and all logs to the Engineering Manager.

Attachment 5.2

ENERGY NORTHWEST REPRESENTATIVES AT STATE/COUNTY EMERGENCY OPERATIONS CENTERS

Duties of: Energy Northwest Representatives at State/County Emergency Operations Centers

Assigned Location: State/County Emergency Operations Center (EOC)

Report To: State/County Technical Liaison

Activation Level: Alert, or Higher Classification

Responsibilities

1. Benton and Franklin County Representatives: Upon notification, proceed to the Benton or Franklin County EOC and sign in on any roster boards that identifies your position.

2. State Representative: Upon notification, respond to the EOF. When dispatched at Site Area Emergency, proceed to the State EOC and sign in on any roster boards that identifies your position.

3. Obtain the Energy Northwest reference material stored at the EOC and set up the designated work area.

4. Determine what phone is designated for your use, and establish communications with the staff at the EOF. Contact is normally the State/County Technical Liaison, on the 300 dialup phone to obtain plant emergency status information.

5. Utilize established EOC logs and message forms for a record of actions taken, but maintain copies for submission with your Energy Northwest After Action Report. Refer to PPM 13.13.4.

6. Verify pertinent emergency data posted on EOC data displays and maintain any essential data displays you are assigned responsibility for.

NOTE: As an Energy Northwest representative at a State/County EOC, you should observe the requirements of EOC procedures. Be cooperative to information requests, but if the authority of persons requesting information is not known, you may request the Offsite Agency Coordinator to authorize release of Energy Northwest information.

ENERGY NORTHWEST REPRESENTATIVE AT STATE/COUNTY EMERGENCY OPERATIONS CENTERS (Contd.)

7. Utilize information obtained from the EOF staff to update key EOC staff members, or provide explanations where appropriate of Energy Northwest actions and recommendations, or provide EOC (but not media) briefings, as requested, in as nontechnical and acronym-free terminology as possible on topics such as:

   a. Meteorological and radiological conditions

   b. Plant conditions prognosis

   c. Energy Northwest emergency responses

   d. Emergency classification and protective action recommendations

   e. Other topics as requested by the EOC Director

8. Assist the EOC staff members with interpretation or confirmation of emergency information received from other sources, be alert for EOC use of unverified data, and resolve any EOC data conflicts where possible.

9. Monitor the EOC Protective Action Decision implementation, and inform the State and County Technical Liaison immediately if it appears that actions being taken may vary from those recommended by Energy Northwest.

10. Inform the EOF staff, (State and County Technical Liaison) of emergency actions being directed by the EOC staff, and the current status of supporting organization assistance.

11. Refer any requests for media information, briefings or interviews to the Joint Information Center.

12. Brief your relief on items of note that happened during your shift and on status of ongoing work.

13. Upon shift change or termination of the emergency:

    a. Prepare an individual After Action Report. Refer to PPM 13.13.4.

    b. Deliver After Action Reports, logs, or other pertinent documentation to the Engineering Manager.

Duties of: EOF ENGINEERING STAFF

Assignment Location: Emergency Operations Facility (EOF)

Report To: EOF Engineering Manager

RESPONSIBILITIES:

Computer Systems PDIS Analyst

NOTE: The responsibility for ERDS activation resides with the Plant/NRC Liaison in the TSC. The on-call Emergency Planner or the PDIS Analyst in the EOF should activate ERDS if not already accomplished. Refer to PPM 13.10.6, Attachment 4.1.

1) If necessary, boot up the PC at the work station. Log onto the LAN using your USERID and password:

2) Start PDIS by double-clicking on the appropriate PDIS icon on the Windows desktop.

3) Access RSTAT by pulling down the EOP menu from the PDIS menu bar. Select Rad Status to obtain key radiation monitor data, meteorological, and effluent data.

   - Other PDIS pulldown menus may be selected to view other plant parameters or trends as desired.

4) Assess the plant status through use of the PDIS and keep the Engineering Manager and staff advised on plant systems parameters.

5) Perform any PDIS required trouble shooting. Call repair personnel to perform trouble shooting and repair, as appropriate.

6) Refer all calls from the media to the Joint Information Center.

7) Upon shift change, brief your relief on responsibilities, duties, and current status of work being performed.

Duties of: EOF ENGINEERING STAFF (Contd.)

8) Upon shift change or termination of the emergency:

   a. Prepare an individual After Action Report. Refer to PPM 13.13.4.

   b. Deliver all After Action Reports, and all logs to the Engineering Manager.

Radiation Detection Systems Engineer

1) If necessary, boot up the PC at the work station using your LAN user ID and password.

2) Initiate PDIS by double clicking on the appropriate icon. Use the PDIS Simulator icon for drills and exercises, and use the PDIS Plant icon for actual emergencies.

3) Monitor radiation status displays for radiation detection system status trends and radiation trends in the plant.

4) Interface with dose assessment and core damage staff. Provide information on radiation values in the plant to dose assessment personnel on MUDAC.

5) Provide updates to the REM and EOF Engineering Manager on equipment status or failures that have the potential to affect initiation or termination of radioactive releases to the environment.

6) Inform the REM and EOF Engineering Manager of major developments in the plant such as changes to fuel clad barriers.

7) Attend and participate in periodic briefings with EOF staff.

Technical Staff

1) Monitor plant status information on EOF Status Boards and PDIS displays.

2) Analyze plant conditions and project trends in area of expertise, or provide advice and technical support assistance to EOF and TSC staff members as appropriate.

3) Assess plant conditions to determine if protective actions are necessary.

4) Conduct core damage assessment using Tech Memo 2117.

5) Complete Attachment 5.1, Core Damage Assessment, and forward to the Engineering Manager.

6) Brief any responding technical support personnel from contractor, architect/engineers, consultants, vendors, and other technical support on the status of the reactor and other plant systems.

7) When directed, provide input to the EOF staff on preparation of plant reentry/recovery procedures.

8) Provide other assistance as directed.

9) Refer all calls from the media to the Joint Information Center.

10) Upon shift change, brief your relief on responsibilities, duties and current status of work being performed.

11) Upon shift change or termination of the emergency:

   a. Prepare an individual After Action Report. Refer to PPM 13.13.4.

   b. Deliver all After Action Reports, and all logs to the Engineering Manager.

Duties of: INPO NETWORK COORDINATOR

Assignment Location: Emergency Operations Facility (EOF)

Report To: EOF Engineering Manager

RESPONSIBILITIES:

1. On arrival at the EOF, sign in on staffing board and report your availability to the Engineering Manager.

2. Set up equipment for preparation and transmittal of information to INPO.

   Instructions for operation of the INPO Network are located near the INPO Network work station.

3. Utilize communication equipment located in the EOF to access the network. If equipment is inoperable or cannot be accessed, inform the Engineering Manager.

4. If the network or the computer is not working, contact INPO using alternate communication methods, such as fax or fill in the information contained in this Attachament for verbal transfer to INPO.

5. Prepare Nuclear Network emergency bulletins in accordance with the format on Page 2 of this attachment.

6. Request that the Engineering Manager or designee review the bulletins for technical accuracy prior to approval and transmittal.

7. Request that the Engineering Manager or designee approve the bulletins for release.

8. Request that the Public Information Officer (PIO) review the bulletin prior to transmittal. This review is to ensure that the information provided to INPO is consistent with that provided to the media and to coordinate the timing of the releases.

9. Transmit the bulletin to INPO and retain hard copy for records.

FORMAT FOR NUCLEAR NETWORK INFORMATION BULLETIN

NT Topic (specified by INPO)

(IF THIS IS A DRILL - SO NOTE AT THE BEGINNING AND END OF TRANSMISSION)

GENERAL INFORMATION

Utility . . . . . Energy Northwest

Plant . . . . . Columbia Generating Station

Location . . . . . Richland, Washington

Date . . . . . _____

Classification . . . . . _____

Time . . . . . _____

Release No. . . . . _____

SUBJECT:

MESSAGE:

INFORMATION CONTACT:

PHONE:

Approved By:_____ Date:_____ Time:_____

EOF ENGINEERING MANAGER BRIEFING GUIDELINES

NOTE: Items listed below are suggested topics for routine update briefings. Items actually selected should be based on existing or projected plant conditions.

Engineering Manager Update Items:

1. Reactor conditions, core cooling systems operations status.
2. Containment status, current trends, event prognosis.
3. Review of accident mitigation objectives, priorities and strategies.
4. Status of engineering evaluations in progress.
5. Engineering support being provided to EOF or TSC by offsite agencies.
6. Problem areas needing resolution.
7. NRC counterpart status report (if present).
8. Core Damage Assessment

Comments:

_____

_____

_____

_____

_____

Attachment 5.6

13.13.3

ENERGY NORTHWEST		USE CURRENT REVISION
COLUMBIA GENERATING STATION PLANT PROCEDURES MANUAL		
PROCEDURE NUMBER *13.13.3	APPROVED BY JEW - Revision 14	DATE 06/03/02
VOLUME NAME EMERGENCY PLAN IMPLEMENTING PROCEDURES		
SECTION REENTRY/RECOVERY		
TITLE INTERMEDIATE PHASE MUDAC OPERATIONS		

TABLE OF CONTENTS

TABLE OF CONTENTS (contd.)

1.0 PURPOSE

This procedure describes MUDAC operations for the intermediate phase of emergency response. This procedure provides direction for evaluating post accident radiological conditions and for developing recommendations that lead to protection of the public from chronic radiation exposure and return of population to unaffected areas.

2.0 REFERENCES

2.1 FSAR, Chapter 13.3, Columbia Generating Station Emergency Plan

2.2 Washington State Fixed Nuclear Facility Emergency Response Plan

2.3 Radiological Emergency Response Plan and Procedures (WA DOH documents)

2.4 Oregon Columbia Generating Station Emergency Response Plan

2.5 Oregon State Health Division Response Procedures for Radiation Emergencies

2.6 PPM 13.2.1, Emergency Exposure Levels/Protective Action Guides

2.7 PPM 13.2.2, Determining Protective Action Recommendations

2.8 PPM 13.8.1, Emergency Dose Projection System Operations

2.9 PPM 13.9.1, Environmental Field Monitoring Operations

2.10 PPM 13.9.5, Environmental Sample Collection

2.11 EPA 400-R-92-001, Manual of Protective Action Guides and Protective Guides and Protective Actions for Nuclear Incidents, October 1991.

2.12 Cooper, J., Goevelinger, N., "A Methodology to Allow the Rapid Development of Post-Plume Protective Action Recommendations for the Ingestion Pathway", Lessons Learned from the 1991 Trojan Nuclear Plant Post-Emergency Exercise, 2nd Edition, April 1993; Oregon Department of Energy, Oregon State Health Division, Columbia County Oregon Emergency Services.

2.13 Intermediate Phase Duties Checklist, Part 1, Transfer of Leadership, 968-25975

2.14 Intermediate Phase Duties Checklist, Part 2, Dose Assessment Coordinator, 968-25978

2.15 Intermediate Phase Duties Checklist, Part 3, Dose Assessor, 968-25980

2.16 Intermediate Phase Duties Checklist, Part 4, Field Team Coordinator, 968-25981

2.17 Berkey, J., Cowley, R., DOH White Paper "Defining the Methodology for Developing a Food Control Area Boundary for Radiological Emergencies", August 2001.

3.0 DISCUSSION

During the intermediate phase, offsite activities focus on relocation and return, and ingestion (food control) concerns. The Washington State staff in the EOF should at this time assume leadership from Energy Northwest for MUDAC and EOF offsite operations in the following roles; a Washington State Health Liaison, a Washington State Dose Assessment Coordinator, a Washington State Field Team Coordinator, a Washington State Dose Assessor, and a Protective Actions Decision Group (PADG) Chairperson. The PADG Chairperson is normally the Dose Assessment Coordinator but may be any individual appointed by the PADG. If the State of Oregon is affected, then a representative(s) from the State of Oregon may respond to the EOF and assist in this process for the State of Oregon.

The first objective of field monitoring is to determine not only contaminated areas but also those areas not affected by plume deposition. Existing field data may provide verification of unaffected upwind areas. Allowing displaced people to return to their homes is a high priority. As soon as field data verifies the clearly unaffected, evacuated, or sheltered areas, the MUDAC may issue an initial Return PAR.

An Isopleth Survey Plan provides the blueprint to obtain data to characterize "clean" or unaffected areas, the Relocation Area and the Food Control Area. The amount of time required to complete the field team monitoring depends on extent of the land area affected, the number of available field teams and the levels of contamination. When the data acquisition from the Isopleth Survey Plan is complete and has been plotted on a map, several actions occur concurrently in the MUDAC; a Relocation isopleth is drawn (if applicable), a Revised Return PAR may be developed, approved and issued. The food control isopleth is calculated and/or projected. The Interim sampling plan is drawn up and initiated while the Food Control PAR is developed, approved and issued, and the recommendation may also be made to reopen affected transportation corridors.

After the Relocation Boundary and Food Control Boundary are decided by the county and received in the MUDAC, the Sampling Plan is developed to verify the food control boundary and identify via laboratory analyses, quantitative levels of radionuclides, if any, in milk, pasture, agricultural crops and products, water and/or soil. The laboratory analyses provide the technical basis for agricultural embargoes, total population dose assessment and reduction of the food control boundary. The Sampling Plan is a living document which may be revised and added to obtain the level of comprehensive coverage desired.

4.0 DEFINITIONS

4.1 Relocation Area - is a geographical area where ground deposition levels would expose a resident to greater than 2 rem during the first year following the accident; greater than 0.5 rem during the second year; or more than 5 rem TEDE over 50 years. (This is synonymous with the Environmental Protection Agencies "Restricted Zone" as defined in EPA-400-R-92-001.) Access to the Relocation Area is controlled. Residents not previously evacuated from these areas are relocated if their calculated dose will exceed these guidelines.

- Relocation Area = Relocation Isopleth + buffer

4.2 Food Control Area - A geographical area in which food control measures may be implemented. Measures are enacted due to potential or actual contamination of food products above State intervention levels. The food control area includes the relocation area, if a relocation decision is appropriate.

- Food Control Area = Food Control Isopleth + buffer

4.3 Food Control Isopleth - The calculated and/or projected isopleth used to determine the food control area.

4.4 20 microR/hr Isopleth - A measurable reference isopleth used to calculate the Food Control Isopleth.

4.5 Relocation Isopleth - The measured isodose line used to determine the relocation area.

4.6 Relocation Boundary - A geo-political designation which defines and surrounds the Relocation area and includes a buffer area. Residents will be relocated from this area to avoid chronic radiation exposure.

4.7 Food Control Boundary - A geo-political designation which defines and surrounds the Food Control area, where food control measures may be implemented.

4.8 Protective Action Decision Group (PADG) - Technical group of Dose Assessment experts assigned by Washington State, DOE-RL and when applicable, State of Oregon. The PADG Chairperson is normally the Dose Assessment Coordinator.

4.9 Radioactive Hot Spot(s) - Areas radioactively contaminated to levels exceeding relocation or food control limits that are outside of the already established Relocation or Food Control Areas.

5.0 PREREQUISITES

MUDAC operations officially enter the intermediate phase when the plant has stabilized to the point that no further release that could approach accepted plume exposure Protective Action Guides (PAGs) is expected and plant conditions will have no further impact on offsite protective action decisions.

6.0 PRECAUTIONS AND LIMITATIONS

None

7.0 PROCEDURE

NOTE: The Checklist for Intermediate Phase MUDAC Activities may be used as deemed necessary to track the actions that have been accomplished. It is a controlled form.

7.1 Transfer of MUDAC Leadership

7.1.1 The transfer of MUDAC Leadership occurs after the radiological conditions move from the plume (early release) to the ingestion pathway (intermediate phase) and the Emergency Operations Facility (EOF) Manager verifies the following conditions:

a. Plant conditions stabilize, and 1) no further release threat exists that could exceed the plume exposure PAGs, and 2) Plant conditions will no longer have an effect on offsite protective action decision making.

b. The plume has dispersed and it no longer poses a threat that could approach the plume exposure PAGs.

7.1.2 Energy Northwest formally transfers lead offsite responsibility to the State of Washington when:

a. The Radiological Emergency Manager (REM) has provided documentation and status for all previously issued Protective Actions Recommendations (PARS) to the Washington State Dose Assessment Coordinator, and

b. The REM briefs and turns over leadership responsibility to the Washington State Dose Assessment Coordinator for all MUDAC activities, and

c. The REM assures continued Energy Northwest technical, administrative, and field monitoring support for ingestion pathway actions, and

d. The REM and the EOF Manager brief and turn over leadership responsibility to the State Health Liaison for all offsite activities.

7.1.3 Energy Northwest assumes a support role with continued availability of qualified MUDAC staff. The REM is the EOF Manager's representative for offsite radiological matters and for coordination with onsite activities. If the ingestion pathway threat involves the State of Oregon, a representative from Oregon may join the Protective Action Decision Group in MUDAC and participate in development of protective action recommendations.

7.1.4 The State Health Liaison and EOF Manager brief the EOF staff on the transfer of leadership.

7.1.5 The State Health Liaison or EOF Manager notifies the State and affected County Emergency Operations Centers (EOCs) when the transfer of leadership occurs.

7.1.6 The State Health Liaison coordinates requesting the following resources:

a. Washington State Agriculture Representative be dispatched to MUDAC, if not already present.

b. FRMAC (Federal Radiological Monitoring and Assessment Center) assets, in accordance with DOH procedures, if not previously requested.

7.1.7 The Field Team Coordinator contacts the Washington State Lab Liaison at the Public Health Lab (206-361-2891) to verify contact with all sample laboratories to:

a. Confirm contact phone and fax numbers.

b. Provide alternate lab locations or addresses.

c. Review the expected distribution of sample analysis data.

7.1.8 The Field Team Coordinator or designee coordinates sample transfer operations from the field and transfer locations to laboratories. Consider logistics for all parties involved as well as radiological and weather conditions.

7.2 Initial Return Protective Action Recommendations (PARs) for Radiologically Unaffected Areas

7.2.1 The PADG evaluates the feasibility of recommending the release of clearly unaffected areas previously evacuated or sheltered.

Consider the following:

a. Other available meteorological data: US DOE Hanford site; Richland Airport; Pasco Airport, etc.

b. Available upwind field team monitoring data.

c. Initial return should be considered only if sufficient data is available to verify unaffected areas. The Initial Return PAR should be initiated only when sufficient data supports the recommendations.

d. Discontinue sheltering.

e. Open air space and Columbia River corridors using the Reopening of the Transportation Corridor Recommendation, Attachment 8.8.

f. Status of roads in areas marked for the initial return and roads that may be used for access to return areas.

7.2.2 The PADG completes and concurs with the Initial Return PAR, Attachment 8.1.

7.2.3 The Dose Assessment Coordinator approves the Initial Return PAR.

7.2.4 The Dose Assessment Coordinator briefs the State Health Liaison the REM, and the affected state and county representatives.

7.2.5 The Dose Assessment Coordinator or State Health Liaison will conduct periodic briefings of the facility staff, including PAR disposition, utilizing guidance contained in Update Briefing Guide, Attachment 8.12.

7.2.6 The State Health Liaison ensures transmission of the Initial Return PAR to the State/County Emergency Centers and the Joint Information Center, and verifies receipt of the PAR package.

7.2.7 If incorrect information is issued, a written correction shall be distributed to all of the original recipients, and receipt of the correction verified.

7.3 Isopleth Survey Plan Development

7.3.1 The PADG assisted by the Field Team Coordinator, develops the "Isopleth Survey Plan" (Attachment 8.2). The plan designates the geographical areas where field teams will monitor to identify the 500 microR/hr (gross) and 20 microR/hr (gross) isopleths. Refer to Attachment 8.13 for hot spot management.

Consider the following:

a. Obtain a dose projection map depicting the 10 μR (net) and 500 μR (gross) line ground shine exposure lines per PPM 13.8.1, Attachment 5.1.

b. Projected and actual field team monitoring data of plume travel paths.

c. The number of available field teams and their present locations and mission.

d. Minimize the number of teams assigned to monitor known contaminated areas.

e. Laboratory analysis of plume air samples.

7.3.2 The Dose Assessment Coordinator reviews and approves the Isopleth Survey Plan.

7.3.3 The Dose Assessment Coordinator provides the Isopleth Survey Plan to the Field Team Coordinator for implementation.

7.3.4 The Dose Assessment Coordinator briefs the State Health Liaison and the REM.

7.4 Isopleth Survey Plan Implementation

7.4.1 The Field Team Coordinator assigns and directs the field teams to specified areas to identify gross 500 microR/hr and gross 20 microR/hr isopleths. The readings should be based on waist high, closed window readings. The Field Team Coordinator needs to consider the following points when making assignments:

a. Keep the number of teams assigned to determine the relocation area to a reasonable minimum because of contamination.

b. The Field Team(s) assigned to locate the 500 microR/hr isopleth should not be the same Team(s) assigned to locate the 20 microR/hr isopleth. If resources permit, teams should be instructed to approach the assigned isopleth until the 500 microR/hr or 20 microR/hr reading is registered, then retreat to lower contamination levels to begin the next survey track.

NOTE: Transmit and receive field team and sampling locations using latitude and longitude readings. Use map grid coordinates when Global Positioning System (GPS) is not available. Supplement location descriptions with geo-political landmarks to clarify locations.

c. The Field Teams and Field Team Dispatcher will use the Isopleth Survey Log, Attachment 8.6, to document field team data.

7.4.2 The Field Team Coordinator ensures that field team data is plotted properly on the map(s) and verifies any questionable information. Ensure that background readings are noted when plotting data.

7.4.3 The Field Team Coordinator will update the PADG on field data and information from evacuated areas not yet released for return.

7.5 Constructing the Relocation Area Isopleth

7.5.1 The Field Team Coordinator ensures incoming isopleth field data points are plotted and labeled on the appropriate map. The Field Team Coordinator may request additional monitoring in areas of uncertainty or where data is lacking.

7.5.2 The emergency dose assessor plots the 500 μR/hr field team isopleth survey data points on the map using Street Atlas. Refer to Attachment 8.14.

7.5.3 Once sufficient points are plotted, the Dose Assessor or designee draws the isopleth(s) connecting the relocation area (500 microR/hr) data points. Consider the guidelines contained in Attachment 8.13 for hot spot management.

a. The Dose Assessor adds an appropriate buffer zone considering wind, stability class, quantity of field team data available, etc., to form the Relocation Area.

b. The Dose Assessor or designee prepares a map of the Relocation Area for transmission with the Relocation Area PAR paperwork and the associated Revised Return PAR.

7.6 Relocation Area PAR

7.6.1 The PADG prepares a Relocation Area PAR, Attachment 8.4, based on the measured data points, the plotted relocation isopleth and the added buffer zone.

Consider the following:

a. The gamma exposure rate will decrease rapidly if deposited material includes a significant fraction of short-lived radionuclides.

b. Until additional radiological data is available, the relocation isopleth plus buffer zone represents a conservative relocation area and serves as the basis for affected County EOC to determine and the State EOC to endorse the Relocation Boundary.

c. It is essential to complete this task in a timely manner.

d. A relocation area prohibits immediate residency, but may allow local industry and possibly interstate commerce.

7.6.2 The Dose Assessment Coordinator reviews and approves the Relocation PAR package, Attachment 8.4, and attaches the relocation map as prepared in Section 7.5.

7.6.3 The Dose Assessment Coordinator briefs the State Health Liaison the REM, and the affected state and county representatives.

7.6.4 The State Health Liaison ensures transmission of the Relocation PAR to the State/County Emergency Centers, the Laboratory Liaison at the Public Health Laboratory, the Joint Information Center, and the FRMAC (if activated), with receipt verification.

7.6.5 If incorrect information is issued, a written correction shall be distributed to all of the original recipients, and receipt of the correction verified.

7.7 Revised Return PAR

7.7.1 The Dose Assessment Coordinator initiates the Revised Return PAR, Attachment 8.3, based on Relocation Area determination. It is recommended that this PAR be sent with the Relocation PAR paperwork, when the return recommendation is based upon the Relocation PAR map. Refer to Attachment 8.13 for hot spot management guidelines.

7.7.2 The PADG determines those geographic areas that were previously evacuated which exhibit a verified dose of less than 2 rem for the first year.

7.7.3 The PADG completes a Revised Return PAR, Attachment 8.3, and provides a written description of the area(s) released for return in terms of geographic landmarks. If applicable, check "map attached" box. (This means a map is not always required).

7.7.4 The Dose Assessment Coordinator reviews and approves the Revised Return PAR.

7.7.5 The Dose Assessment Coordinator briefs the State Health Liaison the REM, and the affected state and county representatives.

7.7.6 The State Health Liaison ensures the transmission of the Revised Return PAR package to the State/County Emergency Centers and the Joint Information Center and verifies receipt of the PAR package.

7.7.7 If incorrect information is issued, a written correction shall be distributed to all of the original recipients, and receipt of the correction verified.

7.8 Constructing the Food Control Isopleth

7.8.1 The Dose Assessor constructs the Food Control Isopleth as follows:

a. The emergency dose assessor plots the 20 μR/hr field team isopleth survey data points on the map using Street Atlas. Refer to Attachment 8.14.

b. Draw an isopleth connecting the 20 microR/hr data points when sufficient points are plotted on the ingestion map. Consider the hot spot management guidance in Attachment 8.13 when performing this step.

c. Construct a minimum of five to seven radial lines originating from the accident release site (more frequently for complex patterns), and extend the lines through the 20 microR/hr isopleth.

d. Determine d_1 as the distance from the source (point of release) to the intersect of the Relocation Isopleth (500 microR/hr) and d_2 as the distance from the source to the intersect of the 20 microR/hr isopleth.

NOTE: The following reference to values of d_3 in Attachment 8.5 is only valid for the initial calculation based on the default Food Control Boundary (FCA) value of 0.4 microR/hour. Subsequent calculations will be based on laboratory analysis and may vary significantly from the default.

e. Determine the value of d_3 using the values contained in Attachment 8.5. Skip to step 7.8.1.h. Otherwise, continue with step 7.8.1.f.

f. Alternately, determine the value of "x" using equation 1 (see equations for calculating the Food Control area) and proceed to Step 7.8.1.g.

g. Using Equation 2, calculate the location of the Food Control isopleth points. Use this calculated point as the center line point. Then using the same value of "x," calculate the location for each of the remaining radial lines using their respective d_1, d_2 distances.

h. Plot and draw the food control area isodose rate line.

i. For areas within the State of Washington, add an appropriate buffer area considering EDPS and the quantity of field team data available, etc. For areas within the State of Oregon, do not specify any additional buffer areas.

j. The Dose Assessor prepares a map of the Food Control Area (Isopleth plus buffer zone).

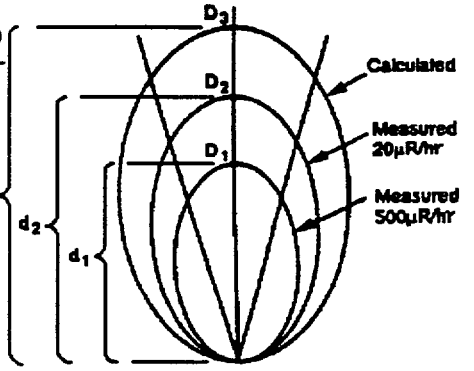
k. The Dose Assessor labels the FCA map with a specific dose rate prior to sending the map to the State and Counties EOCs.

ALTERNATE METHOD

Equations for Calculating the Food Control Area

Equation 1: $x = \dfrac{\ln ((D_2-10)/D_1)}{\ln (d_1/d_2)}$

Equation 2: $d_3 = d_2 \left[\dfrac{D_3}{D_2-10}\right]^{-\frac{1}{x}d_3}$



Where:
D_1 = Dose rate (500 microR/hr)
d_1 = Distance from source to D_1
D_2 = Dose rate (20 microR/hr)
d_2 = Distance from source to D_2
D_3 = Dose rate (0.4 microR/hr)
d_3 = Distance from source to D_3
x = Constant related to atmospheric conditions

7.9 Food Control Area PAR

7.9.1 The Dose Assessment Coordinator initiates the preparation of a Food Control Area PAR based on the recommended food control isopleth developed by the Dose Assessor.

7.9.2 The PADG prepares Food Control Area PAR paperwork using Attachment 8.7 and attaches the Food Control Isopleth map developed in Section 7.8.1.

7.9.3 The Dose Assessment Coordinator reviews and approves the PAR package.

7.9.4 The Dose Assessment Coordinator briefs the State Health Liaison the REM, and the affected state and county representatives.

7.9.5 The State Health Liaison ensures transmission of the Food Control Area PAR paperwork to the State/County Emergency Centers, the Laboratory Liaison at the Public Health Laboratory, the Joint Information Center, and the FRMAC (if activated), with receipt verification.

7.9.6 The State Health Liaison informs the EOF of PAR disposition.

7.9.7 If incorrect information is issued, a written correction shall be distributed to all of the original recipients, and receipt of the correction verified.

7.10 Re-opening Transportation Corridor Recommendation

7.10.1 The PADG determines what transportation corridors are located entirely or partially within the recommended relocation area.

7.10.2 The PADG evaluates available radiological data from along the corridors.

7.10.3 The Field Team Coordinator obtains additional radiological data from the field teams, if necessary to adequately assess the situation.

7.10.4 The PADG assesses the situation and recommends action(s) to facilitate transportation corridor use, e.g., additional field sampling if more data is needed, restricting only portions of the corridor to traffic flow, etc.

7.10.5 The PADG completes a Reopening Transportation Corridor Recommendation (Attachment 8.8) and considers the following:

a. Release all transportation corridors in unaffected areas.

b. Reopen the airspace (if closed) and river to unrestricted use once the plume has dissipated. Contact the REM for this information, if needed.

c. Other than the river and airspace, do not reopen any transportation corridor for restricted or unconditional use until the Dose Assessment Coordinator has issued the Relocation PAR.

d. Be aware that the Relocation Boundary set by the county may include transportation corridors not previously identified in the Relocation Area determined by MUDAC.

e. Reopen a transportation corridor to unrestricted use only when the recommended relocation area does not encompass any part of the transportation corridor.

f. Boats docked or moored within the recommended relocation area should be surveyed prior to leaving. If contamination is found, the field team member conducting the survey should contact the Field Team Coordinator for further instructions.

7.10.6 The Dose Assessment Coordinator reviews and approves the reopening of the Transportation Corridor Recommendation, Attachment 8.8.

7.10.7 The Dose Assessment Coordinator briefs the State Health Liaison the REM, and the affected state and county representatives.

7.10.8 The State Health Liaison ensures transmission of the Transportation Corridor PAR to the State/County Emergency Centers and the Joint Information Center, and verifies receipt of the PAR package.

7.10.9 If incorrect information is issued, a written correction shall be distributed to all of the original recipients, and receipt of the correction verified.

7.11 Interim Sampling Plan

The Field Team Coordinator determines and assigns the Interim Sampling Plan, Attachment 8.9, when the Monitoring Plan is complete and the Relocation and Food control PARs have been issued, but not yet decided upon. This is an opportunity to obtain additional data to get an overall "thumb-nail sketch" of the affected area, isolated "hot spots", areas of concern, areas upwind, or areas where data has yet to be collected. The Interim Sampling Plan does not require a PAR. Obtain input from the Washington State Department of Agriculture and/or County Agriculture Representatives.

The Interim Sampling plan is a broad based, generalized information sweep. This plan relies on the field teams to carry out any of the following requests from MUDAC:

- General Area dose rates
- General deposition readings
- Hot spots and other areas of concern
- Deposition in soil
- Deposition on pasture grass
- Clean Area Survey (Negative data)
- Collection and replacement of environmental thermoluminescent dosimeters (TLDs)
- Collection of air samples in areas where re-suspension is suspected
- Surveys/smears of contaminated road and rail surfaces, and vehicle filters
- Collection of samples, e.g. "Hot" samples, etc.
- Other duties as requested

7.11.1 The Field Team Coordinator directs a field team to obtain a soil and/or vegetation sample from a highly contaminated location for source term evaluation.

7.11.2 The Field Team Coordinator arranges distributions to appropriate laboratories with the Laboratory Liaison.

7.11.3 The Field Team Coordinator or designee coordinates sample transfer operations from the field and transfer locations to laboratories.

a. Sample transfer locations may vary due to radiological conditions and sampling locations. (Consider Emergency Worker Assistance Centers (EWACs) and other easily accessible locations.)

b. Ensure the area reads background and that no contamination is present.

7.11.4 The Field Team Coordinator assigns the field teams to geographical areas to obtain general dose rate and deposition readings, and to take soil, vegetation and air samples as appropriate.

7.11.5 The Field Team Coordinator instructs the teams to report their data every hour, or as appropriate.

7.12 Detailed Sampling Plan

7.12.1 The second phase of the sampling plan is more formal and is developed after the relocation and food control boundaries are approved. The PADG with the assistance of the Washington State Department of Agriculture and the Field Team Coordinator develop the Detailed Sampling Plan, Attachment 8.10.

a. The Washington State Department of Agriculture agents and/or the County Extension Agents provide information on crops in harvest and farm locations inside and outside the Food Control Boundary.

b. The DOH Drinking Water staff provides locations of any potentially affected open drinking water supplies to the PADG.

c. The Field Team Coordinator will assign sampling points nearest to the Food Control boundary, working in toward the center and outward from the boundary to verify clean areas and appropriate boundary placement.

d. The Field Team Coordinator notifies the Laboratory Liaison of the estimated time of arrival and the number of samples for analysis.

e. The Field Team Coordinator or WA dose assessment staff is the point of contact for all in-coming laboratory analyses.

7.12.2 The PADG with the assistance of the Washington State Department of Agriculture and the Field Team Coordinator establish the sample collection priorities and locations.

Considering the following:

a. Begin sampling of foodstuffs and open sources of drinking water supplies as soon as possible following passage of the plume.

b. Begin routine milk monitoring 12 to 18 hours after plume passage.

c. Sample and monitor the most perishable crops first.

d. Sample harvested food ready for market before other foodstuffs and crops requiring harvest within 30 days.

e. Sampling of above ground crops should have priority over root crops.

7.12.3 The Field Team Coordinator and PADG should select broad based, general monitoring and/or sampling locations.

7.12.4 The Field Team Coordinator or designee records the coordinates of these sampling locations for the Detailed Sampling Plan, Attachment 8.10.

7.12.5 The PADG reviews and assembles the pages of the Detailed Sampling Plan for completeness and presents it to the Dose Assessment Coordinator.

7.12.6 The Dose Assessment Coordinator reviews the Detailed Sampling Plan with the PADG to ensure it adequately addresses all credible short-term potential direct exposure and ingestion pathways.

7.12.7 The Dose Assessment Coordinator approves and signs the Detailed Sampling Plan.

7.12.8 The Dose Assessment Coordinator provides the approved Detailed Sampling Plan to the Field Team Coordinator for implementation in accordance with Step 7.13.

7.12.9 The Dose Assessment Coordinator briefs the State Health Liaison the REM, and the affected state and county representatives.

7.12.10 The State Health Liaison should ensure that a copy of the Detailed Sampling Plan is transmitted to the Health Physicist (HP) at the State EOC, the DOH Laboratory Liaison, the FRMAC Liaison (if applicable), and the County EOCs with receipt verification.

7.12.11 The PADG, with Department of Agriculture assistance, updates the sampling plan as needed:

a. Incorporates appropriate feedback received from the HP at the State EOC; the DOH Laboratory Liaison; the Dose Analyst at the Oregon EOC; the FRMAC Liaison (if applicable); and County EOCs, into the Detailed Sampling Plan.

b. Provides updates and revisions as approved to the Field Team Coordinator for immediate implementation.

c. Periodically updates the plan to accommodate unexpected data results, meteorological conditions.

d. Provides copies of periodic revisions to the DOH Laboratory Liaison; the HP at the State EOC; the Dose Analyst at the Oregon EOC; the FRMAC Liaison (if applicable); and county EOCs. Incorporate appropriate feedback from these agencies into revisions of the Detailed Sampling Plan.

7.13 Detailed Sampling Plan Implementation

7.13.1 To implement the "Sampling Plan" the Field Team Coordinator performs the following:

a. Assigns and dispatches field teams to selected monitoring and/or sampling locations. Instruct field teams to collect specified samples from assigned locations and call in their information.

b. Confirms the arrangements made for transporting samples from transfer locations to laboratories using one or more of the following:

- Washington State Patrol
- Local Sheriff's office
- National Guard
- FRMAC
- others, as available

c. Reviews personnel and equipment resources available for monitoring, sampling, and analysis. Advise the Dose Assessment Coordinator of any needs.

7.13.2 The Field Team Dispatcher or designee logs the field team data on a Sample Data and Analysis Summary (Attachment 8.11) as follows; the sample tag number, the field team designation, the location in grid coordinates plus any other designation. Also check the sample type, recording only one type of sample per line. Record the time that the sample was taken, the area dose rate and the deposition reading.

7.13.3 The Field Team Coordinator plots the sample location using sequentially numbered color discs and marks the correlating disc number on the Sample Data and Analysis Summary (Attachment 8.11) in the first column on the same line with the sample information.

7.13.4 The Field Team Coordinator and PADG identify locations for boundary adjustments based on dose rates or where additional sampling is necessary.

7.13.5 The PADG initiates revised PARs when appropriate. (See Relocation, Return and Food Control PARs.)

7.13.6 The Field Team Coordinator briefs the PADG on the results of the field team dose rate and deposition data.

7.13.7 If incorrect information is issued, a written correction shall be distributed to all of the original recipients, and receipt of the correction verified.

7.14 Revising the Relocation Area Based Upon Laboratory Analysis Data

The Relocation Area was initially determined using field team readings. Once sufficient lab results from soil samples are available, MUDAC must reevaluate the affected area. Once the initial Relocation Area has been established, evaluation of laboratory analysis of ground deposition in and around the Relocation Area can be done to assess the actual isotopic mix of the deposition. This mix is used to more accurately determine the area where the public may be exposed to levels exceeding EPA PAGs and revise the Relocation Area.

The PADG reviews the results of laboratory analyses of ground deposition samples from in and around the Relocation Area for consistency and to determine if they have an adequate number of samples to assure confidence in the revised the Relocation Area.

7.14.1 Enter isotopic concentration for each deposition sample (in pCi/m2 units) into the "GROUNDSHINE" excel spread sheet (column B, rows 11 through 23). Results should be read from the "Without Weathering" table, cell G-56.

7.14.2 Groundshine calculation results will be entered on the Sample Data and Analysis Summary form, Attachment 8.11, as time permits. If any exposures are greater than or equal to the first year PAGs, consider the need for relocation of residents, pets, or livestock. If any exposures are greater than or equal to the second year or 50 year PAGs, consider possible mitigation actions.

7.14.3 Record 'Sample Number', location, and mR/hr value from cell G-56 for each sample on Attachment 8.16.

7.14.4 Use the most restrictive (lowest) mR/hr value from the table as the new Relocation Area isodose line.

7.14.5 The Field Team Dispatcher should dispatch field teams into the Relocation Area to identify the locations for the new isodose line and to report the locations of these points back to the Field Team Coordinator.

7.14.6 The Field Team Coordinator ensures incoming isopleth field data points are plotted and labeled on the appropriate map. The Field Team Coordinator may request additional monitoring in areas of uncertainty or where data is lacking.

7.14.7 The emergency dose assessor plots the revised field team isopleth survey data points on the map using Street Atlas. Refer to Attachment 8.14.

7.14.8 Once sufficient points are plotted, the Dose Assessor or designee draws the isopleth(s) connecting the revised relocation area data points. Consider the guidelines contained in Attachment 8.13 for hot spot management.

a. The Dose Assessor does not need to add a buffer zone to form the Relocation Area since no weathering was considered in determining the revised value.

b. The Dose Assessor or designee prepares a map of the Relocation Area for transmission with the Relocation Area PAR paperwork and the associated Revised Return PAR.

7.14.9 The Dose Assessment Coordinator reviews and approves the Relocation PAR package, Attachment 8.4, and attaches the relocation map as prepared in Section 7.5.

7.14.10 The Dose Assessment Coordinator briefs the State Health Liaison, the REM, and the affected state and county representatives.

7.14.11 The State Health Liaison ensures transmission of the Relocation PAR to the State/County Emergency Centers, the Laboratory Liaison at the Public Health Laboratory, the Joint Information Center and the FRMAC (if activated), with receipt verification.

7.14.12 If incorrect information is issued, a written correction shall be distributed to all of the original recipients, and receipt of the correction verified.

7.15 Revising the Food Control Area Based Upon laboratory Analysis Data

The Food Control Area was initially determined using field team readings. Once sufficeint lab results from samples of milk and food are available, MUDAC must reevaluate the affected area.

The largest contributors in the Food Control lab results will probably be from four isotopes: I-131, Cs-134 & Cs-137 (grouped together), and Sr-90. (Sr-90 results may not be immediately available from the laboratory.) Concentrations of other isotopes will be calculated by the labs and reported to MUDAC but the Dose Assessors primary focus should be on these four isotopes.

Ratios for all isotopes are determined by dividing the lab result by the corresponding Derived Intervention Level (refer to Attachment 8.15). If any one of the ratios for a specific sample is ≥ 1, interdiction of all food in that area should continue. The ratios of Washington State DILs are used independently except as indicated in Attachment 8.15.

7.15.1 Distribution of lab sample analyses data is as follows:

a. Original to the WA State Dose Assessor

b. Copy to WA State Dose Assessment Coordinator

c. Copy to the WA State Field Team Coordinator

d. Other copies as needed or requested

e. If time allows, the MUDAC staff should consolidate lab sample analysis data and the field team sample data on the Sample Data and Analysis Summary Form, Attachment 8.11.

7.15.2 The Dose Assessor reviews laboratory analyses of samples and identifies samples with activities above the affected state's Derived Intervention Levels found in the Department of Health Procedures for that state.

7.15.3 The dose Assessor also reviews the laboratory analyses for the uniformity of the isotopic mix. If the results are not uniform, take these results into consideration to define the Food Control Area.

7.15.4 The Field Team Coordinator posts the Limiting DIL Ratio for each sample on an ingestion EPZ map. Use different colored symbols to identify less that 1.0 and greater than or equal to 1.0, e.g., less than 1.0 = green dot and greater than or equal to 1.0 = red dot. Identify dot with map disk number.

7.15.5 The State Health Liaison verifies that the data is received by radiological counterparts at the State Emergency Centers.

7.15.6 The Field Team Coordinator and PADG identify locations for boundary adjustments based on sample results, or where additional sampling is necessary.

7.15.7 The PADG prepares PARs to refine, i.e., relax or rescind, existing ingestion PADs as necessary, based on sampling results.

7.15.8 If incorrect information is issued, a written correction shall be distributed to all of the original recipients and receipt of the correction verified.

8.0 ATTACHMENTS

8.1 Initial Return Protective Action Recommendation

8.2 Isopleth Survey Plan

8.3 Revised Return Protective Action Recommendation

8.4 Relocation Area Protective Action Recommendation

8.5 Determining the Value of d (3)

8.6 Isopleth Survey Log

8.7 Food Control Area Protective Action Recommendation

8.8 Reopening of the Transportation Corridor Recommendation

8.9 Interim Sampling Plan

8.10 Detailed Sampling Plan

8.11 Sample and Data Analysis Summary

8.12 Update Briefing Guide

8.13 Hot Spot Management And Control

8.14 Plotting and Transmitting Ingestion Data Points

8.15 Washington State Derived Intervention Levels (DILs)

8.16 Revised Relocation Area Data Worksheet

INITIAL RETURN
PROTECTIVE ACTION RECOMMENDATION Date _____

The following areas have been evacuated/sheltered. Time _____

Section 1		Section 2		Section 3		Section 4	
evacuated	sheltered	evacuated	sheltered	evacuated	sheltered	evacuated	sheltered
☐ 0 - 2 miles ☐ 2 - 10 miles	☐ 0 - 2 miles ☐ 2 - 10 miles	☐ 0 - 2 miles ☐ 2 - 10 miles ☐ Schools	☐ 0 - 2 miles ☐ 2 - 10 miles ☐ Schools	☐ 0 - 2 miles ☐ 3A ☐ 3B ☐ 3C	☐ 0 - 2 miles ☐ 3A ☐ 3B ☐ 3C	☐ 0 - 2 miles ☐ 2 - 10 miles	☐ 0 - 2 miles ☐ 2 - 10 miles

☐ No change at this time

The Protective Action Decision Group Recommends the Following Actions:

☐ SECTION 1	RETURN	DISCONTINUE SHELTERING
0 - 2 MILES	☐	☐
2 - 10 MILES	☐	☐
Ringold Fishing Area	☐	☐
Wahluke Hunting Area	☐	☐

☐ SECTION 2	RETURN	DISCONTINUE SHELTERING
0 - 2 MILES	☐	☐
2 - 10 MILES	☐	☐
Schools	☐	☐

☐ SECTION 3	RETURN	DISCONTINUE SHELTERING
0 - 2 MILES	☐	☐
3A	☐	☐
3B	☐	☐
3C	☐	☐
Horn Rapids Recreational Area and ORV Park	☐	☐

☐ SECTION 4	RETURN	DISCONTINUE SHELTERING
0 - 2 MILES	☐	☐
2 - 10 MILES	☐	☐

☐ Map attached

Approved by: (signature)
PADG Chairperson/Dose Assessment Coordinator _____

Concurred by: (signature)
WA State Health Liaison _____

Attachment 8.1

ISOPLETH SURVEY PLAN

Date:_____ Time:_____ Page ____ of ____

Field Team	GENERAL LOCATION: Grid/landmarks /Latitude & Longitude	Instructions

Monplan.2

APPROVED:_____ ____/____ DISPATCHED:_____ ____/____

PADG Chairperson/Dose Assessment Coordinator Date/Time FIELD TEAM COORDINATOR Date / Time

Attachment 8.2

REVISED RETURN
PROTECTIVE ACTION RECOMMENDATION Date: _____

The following areas are still evacuated: Time: _____

Section 1	Section 2	Section 3	Section 4
☐ 0 - 2 miles ☐ 2 - 10 miles	☐ 0 - 2 miles ☐ 2 - 10 miles ☐ Schools	☐ 0 - 2 miles ☐ 3A ☐ 3B ☐ 3C	☐ 0 - 2 miles ☐ 2 - 10 miles

☐ No change at this time

The Protective Action Decision Group recommends the following actions:

☐ SECTION 1: RETURN
☐ 0 - 2 miles ☐ 2 - 10 miles
☐ OTHER_____

☐ SECTION 2: RETURN
☐ 0 - 2 miles ☐ 2 - 10 miles ☐ Schools
☐ OTHER_____

☐ SECTION 3: RETURN
☐ 0 - 2 miles ☐ 3A
☐ 3B
☐ 3C
☐ OTHER_____

☐ SECTION 4: RETURN
☐ 0 - 2 miles ☐ 2 - 10 miles
☐ OTHER_____

Approved by: (signature)
PADG Chairperson/Dose Assessment Coordinator_____

Concurred by: (signature)
WA State Health Liaison _____

Map attached ☐

RELOCATION AREA
PROTECTIVE ACTION RECOMMENDATION

Date _____

☐ Initial ☐ Revised Time _____

☐ Establish/Revise (circle one) the relocation area boundary in accordance with the attached map.

☐ Relocate persons not yet evacuated from the relocation area.

☐ Change the status of those already evacuated from the Relocation Area to relocation status.

☐ Establish access control points around the Relocation Area and limit access to Emergency workers, residents with radiation protection escorts, and persons with temporary Emergency worker status.

Initial PAR Monitoring and Decontamination

☐ Establish monitoring stations at appropriate locations, (e.g., Access Control Points and Emergency Worker/Assistance Centers).

Revised PAR Monitoring and Decontamination

☐ Establish monitoring stations at access control points, and send those requiring decontamination to an Emergency Worker/Assistance Center.

☐ Have all monitoring and decontamination conducted at Emergency Worker/Assistance Centers.

☐ Establish monitoring and decontamination stations at access control points to the Relocation Area.

Initial PAR Dose Tracking

☐ Establish Dose tracking at appropriate locations for any persons entering the relocation area, (e.g. Access Control Points and Emergency Worker/Assistance Centers).

Revised PAR Dose Tracking

☐ Establish Dose tracking at Emergency Worker/Assistance Centers.

☐ Establish dose tracking at access control points.

Other:

☐ Cancel PAR for administering KI to emergency workers.

☐ Terminate the relocation PAR.

Approved by:
PADG Chairperson/Dose Assessment Coordinator _____

Concurred by:
WA State Health Liaison _____

Attachment 8.4

DETERMINING THE VALUE OF d(3)

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
5.0	5.5	5.9
5.0	6.0	7.0
5.0	6.5	8.1
5.0	7.0	9.2
5.0	7.5	10.5
5.0	8.0	11.8
5.0	8.5	13.2
5.0	9.0	14.6
5.0	9.5	16.1
5.0	10.0	17.7
5.0	10.5	19.3
5.0	11.0	21.0
5.0	11.5	22.8
5.0	12.0	24.7
5.0	12.5	26.6
5.0	13.0	28.5
5.0	13.5	30.6
5.0	14.0	32.7
5.0	14.5	34.8
5.0	15.0	37.0
5.0	15.5	39.3
5.0	16.0	41.7
5.0	16.5	44.1
5.0	17.0	46.5
5.0	17.5	49.1
5.0	18.0	51.6
5.0	18.5	54.3
5.0	19.0	57.0
5.0	19.5	59.8
5.0	20.0	62.6
5.0	20.5	65.5
5.0	21.0	68.4
5.0	21.5	71.4
5.0	22.0	74.5
5.0	22.5	77.6
5.0	23.0	80.7
5.0	23.5	84.0
5.0	24.0	87.2
5.0	24.5	90.6

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
5.5	6.0	6.4
5.5	6.5	7.5
5.5	7.0	8.5
5.5	7.5	9.7
5.5	8.0	10.9
5.5	8.5	12.2
5.5	9.0	13.5
5.5	9.5	14.9
5.5	10.0	16.4
5.5	10.5	17.9
5.5	11.0	19.5
5.5	11.5	21.1
5.5	12.0	22.8
5.5	12.5	24.6
5.5	13.0	26.4
5.5	13.5	28.3
5.5	14.0	30.2
5.5	14.5	32.2
5.5	15.0	34.2
5.5	15.5	36.4
5.5	16.0	38.5
5.5	16.5	40.7
5.5	17.0	43.0
5.5	17.5	45.4
5.5	18.0	47.7
5.5	18.5	50.2
5.5	19.0	52.7
5.5	19.5	55.2
5.5	20.0	57.9
5.5	20.5	60.5
5.5	21.0	63.2
5.5	21.5	66.0
5.5	22.0	68.8
5.5	22.5	71.7
5.5	23.0	74.6
5.5	23.5	77.6
5.5	24.0	80.7
5.5	24.5	83.8
5.5	25.0	86.9

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
6.0	6.5	6.9
6.0	7.0	7.9
6.0	7.5	9.0
6.0	8.0	10.1
6.0	8.5	11.3
6.0	9.0	12.6
6.0	9.5	13.9
6.0	10.0	15.2
6.0	10.5	16.6
6.0	11.0	18.1
6.0	11.5	19.6
6.0	12.0	21.2
6.0	12.5	22.9
6.0	13.0	24.6
6.0	13.5	26.3
6.0	14.0	28.1
6.0	14.5	30.0
6.0	15.0	31.9
6.0	15.5	33.8
6.0	16.0	35.9
6.0	16.5	37.9
6.0	17.0	40.1
6.0	17.5	42.2
6.0	18.0	44.4
6.0	18.5	46.7
6.0	19.0	49.1
6.0	19.5	51.4
6.0	20.0	53.9
6.0	20.5	56.3
6.0	21.0	58.9
6.0	21.5	61.4
6.0	22.0	64.1
6.0	22.5	66.8
6.0	23.0	69.5
6.0	23.5	72.3
6.0	24.0	75.1
6.0	24.5	78.0
6.0	25.0	80.9
6.0	25.5	83.9

DETERMINING THE VALUE OF d(3)

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
6.5	7.0	7.4
6.5	7.5	8.4
6.5	8.0	9.5
6.5	8.5	10.6
6.5	9.0	11.8
6.5	9.5	13.0
6.5	10.0	14.3
6.5	10.5	15.6
6.5	11.0	17.0
6.5	11.5	18.4
6.5	12.0	19.9
6.5	12.5	21.4
6.5	13.0	23.0
6.5	13.5	24.6
6.5	14.0	26.3
6.5	14.5	28.1
6.5	15.0	29.8
6.5	15.5	31.7
6.5	16.0	33.6
6.5	16.5	35.5
6.5	17.0	37.5
6.5	17.5	39.5
6.5	18.0	41.6
6.5	18.5	43.7
6.5	19.0	45.9
6.5	19.5	48.2
6.5	20.0	50.4
6.5	20.5	52.7
6.5	21.0	55.1
6.5	21.5	57.5
6.5	22.0	60.0
6.5	22.5	62.5
6.5	23.0	65.1
6.5	23.5	67.7
6.5	24.0	70.3
6.5	24.5	73.0
6.5	25.0	75.7
6.5	25.5	78.5
6.5	26.0	81.4

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
7.0	7.5	7.9
7.0	8.0	8.9
7.0	8.5	10.0
7.0	9.0	11.1
7.0	9.5	12.2
7.0	10.0	13.4
7.0	10.5	14.7
7.0	11.0	16.0
7.0	11.5	17.3
7.0	12.0	18.7
7.0	12.5	20.1
7.0	13.0	21.6
7.0	13.5	23.2
7.0	14.0	24.8
7.0	14.5	26.4
7.0	15.0	28.1
7.0	15.5	29.8
7.0	16.0	31.6
7.0	16.5	33.4
7.0	17.0	35.3
7.0	17.5	37.2
7.0	18.0	39.2
7.0	18.5	41.2
7.0	19.0	43.2
7.0	19.5	45.3
7.0	20.0	47.4
7.0	20.5	49.6
7.0	21.0	51.9
7.0	21.5	54.1
7.0	22.0	56.4
7.0	22.5	58.8
7.0	23.0	61.2
7.0	23.5	63.7
7.0	24.0	66.1
7.0	24.5	68.7
7.0	25.0	71.3
7.0	25.5	73.9
7.0	26.0	76.5
7.0	26.5	79.2

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
7.5	8.0	8.4
7.5	8.5	9.4
7.5	9.0	10.5
7.5	9.5	11.5
7.5	10.0	12.7
7.5	10.5	13.8
7.5	11.0	15.1
7.5	11.5	16.3
7.5	12.0	17.7
7.5	12.5	19.0
7.5	13.0	20.4
7.5	13.5	21.9
7.5	14.0	23.4
7.5	14.5	24.9
7.5	15.0	26.5
7.5	15.5	28.2
7.5	16.0	29.8
7.5	16.5	31.6
7.5	17.0	33.3
7.5	17.5	35.1
7.5	18.0	37.0
7.5	18.5	38.9
7.5	19.0	40.8
7.5	19.5	42.8
7.5	20.0	44.8
7.5	20.5	46.9
7.5	21.0	49.0
7.5	21.5	51.1
7.5	22.0	53.3
7.5	22.5	55.6
7.5	23.0	57.8
7.5	23.5	60.1
7.5	24.0	62.5
7.5	24.5	64.9
7.5	25.0	67.3
7.5	25.5	69.8
7.5	26.0	72.3
7.5	26.5	74.9
7.5	27.0	77.5

DETERMINING THE VALUE OF d(3)

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
8.0	8.5	8.9
8.0	9.0	9.9
8.0	9.5	10.9
8.0	10.0	12.0
8.0	10.5	13.1
8.0	11.0	14.3
8.0	11.5	15.5
8.0	12.0	16.8
8.0	12.5	18.0
8.0	13.0	19.4
8.0	13.5	20.8
8.0	14.0	22.2
8.0	14.5	23.7
8.0	15.0	25.2
8.0	15.5	26.7
8.0	16.0	28.3
8.0	16.5	29.9
8.0	17.0	31.6
8.0	17.5	33.3
8.0	18.0	35.1
8.0	18.5	36.9
8.0	19.0	38.7
8.0	19.5	40.6
8.0	20.0	42.5
8.0	20.5	44.5
8.0	21.0	46.5
8.0	21.5	48.5
8.0	22.0	50.6
8.0	22.5	52.7
8.0	23.0	54.8
8.0	23.5	57.0
8.0	24.0	59.3
8.0	24.5	61.5
8.0	25.0	63.8
8.0	25.5	66.2
8.0	26.0	68.6
8.0	26.5	71.0
8.0	27.0	73.5
8.0	27.5	76.0

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
8.5	9.0	9.4
8.5	9.5	10.4
8.5	10.0	11.4
8.5	10.5	12.5
8.5	11.0	13.6
8.5	11.5	14.7
8.5	12.0	15.9
8.5	12.5	17.2
8.5	13.0	18.4
8.5	13.5	19.8
8.5	14.0	21.1
8.5	14.5	22.5
8.5	15.0	23.9
8.5	15.5	25.4
8.5	16.0	26.9
8.5	16.5	28.5
8.5	17.0	30.1
8.5	17.5	31.7
8.5	18.0	33.4
8.5	18.5	35.1
8.5	19.0	36.8
8.5	19.5	38.6
8.5	20.0	40.4
8.5	20.5	42.3
8.5	21.0	44.2
8.5	21.5	46.1
8.5	22.0	48.1
8.5	22.5	50.1
8.5	23.0	52.2
8.5	23.5	54.3
8.5	24.0	56.4
8.5	24.5	58.5
8.5	25.0	60.7
8.5	25.5	63.0
8.5	26.0	65.2
8.5	26.5	67.5
8.5	27.0	69.9
8.5	27.5	72.3
8.5	28.0	74.7

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
9.0	9.5	9.9
9.0	10.0	10.9
9.0	10.5	11.9
9.0	11.0	13.0
9.0	11.5	14.1
9.0	12.0	15.2
9.0	12.5	16.4
9.0	13.0	17.6
9.0	13.5	18.8
9.0	14.0	20.1
9.0	14.5	21.5
9.0	15.0	22.8
9.0	15.5	24.2
9.0	16.0	25.7
9.0	16.5	27.2
9.0	17.0	28.7
9.0	17.5	30.2
9.0	18.0	31.8
9.0	18.5	33.5
9.0	19.0	35.1
9.0	19.5	36.8
9.0	20.0	38.6
9.0	20.5	40.4
9.0	21.0	42.2
9.0	21.5	44.0
9.0	22.0	45.9
9.0	22.5	47.8
9.0	23.0	49.8
9.0	23.5	51.8
9.0	24.0	53.8
9.0	24.5	55.9
9.0	25.0	57.9
9.0	25.5	60.1
9.0	26.0	62.2
9.0	26.5	64.4
9.0	27.0	66.7
9.0	27.5	68.9
9.0	28.0	71.2
9.0	28.5	73.6

DETERMINING THE VALUE OF d(3)

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
9.5	10.0	10.4
9.5	10.5	11.4
9.5	11.0	12.4
9.5	11.5	13.5
9.5	12.0	14.5
9.5	12.5	15.7
9.5	13.0	16.8
9.5	13.5	18.0
9.5	14.0	19.3
9.5	14.5	20.5
9.5	15.0	21.8
9.5	15.5	23.2
9.5	16.0	24.6
9.5	16.5	26.0
9.5	17.0	27.4
9.5	17.5	28.9
9.5	18.0	30.5
9.5	18.5	32.0
9.5	19.0	33.6
9.5	19.5	35.2
9.5	20.0	36.9
9.5	20.5	38.6
9.5	21.0	40.3
9.5	21.5	42.1
9.5	22.0	43.9
9.5	22.5	45.7
9.5	23.0	47.6
9.5	23.5	49.5
9.5	24.0	51.4
9.5	24.5	53.4
9.5	25.0	55.4
9.5	25.5	57.5
9.5	26.0	59.5
9.5	26.5	61.6
9.5	27.0	63.8
9.5	27.5	65.9
9.5	28.0	68.1
9.5	28.5	70.4
9.5	29.0	72.6

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
10.0	10.5	10.9
10.0	11.0	11.9
10.0	11.5	12.9
10.0	12.0	13.9
10.0	12.5	15.0
10.0	13.0	16.1
10.0	13.5	17.3
10.0	14.0	18.5
10.0	14.5	19.7
10.0	15.0	20.9
10.0	15.5	22.2
10.0	16.0	23.6
10.0	16.5	24.9
10.0	17.0	26.3
10.0	17.5	27.7
10.0	18.0	29.2
10.0	18.5	30.7
10.0	19.0	32.2
10.0	19.5	33.8
10.0	20.0	35.4
10.0	20.5	37.0
10.0	21.0	38.7
10.0	21.5	40.4
10.0	22.0	42.1
10.0	22.5	43.8
10.0	23.0	45.6
10.0	23.5	47.5
10.0	24.0	49.3
10.0	24.5	51.2
10.0	25.0	53.1
10.0	25.5	55.1
10.0	26.0	57.1
10.0	26.5	59.1
10.0	27.0	61.1
10.0	27.5	63.2
10.0	28.0	65.3
10.0	28.5	67.5
10.0	29.0	69.6
10.0	29.5	71.8

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
10.5	11.0	11.4
10.5	11.5	12.4
10.5	12.0	13.4
10.5	12.5	14.4
10.5	13.0	15.5
10.5	13.5	16.6
10.5	14.0	17.7
10.5	14.5	18.9
10.5	15.0	20.1
10.5	15.5	21.4
10.5	16.0	22.6
10.5	16.5	23.9
10.5	17.0	25.3
10.5	17.5	26.6
10.5	18.0	28.0
10.5	18.5	29.5
10.5	19.0	31.0
10.5	19.5	32.5
10.5	20.0	34.0
10.5	20.5	35.5
10.5	21.0	37.1
10.5	21.5	38.8
10.5	22.0	40.4
10.5	22.5	42.1
10.5	23.0	43.8
10.5	23.5	45.6
10.5	24.0	47.4
10.5	24.5	49.2
10.5	25.0	51.0
10.5	25.5	52.9
10.5	26.0	54.8
10.5	26.5	56.8
10.5	27.0	58.7
10.5	27.5	60.7
10.5	28.0	62.8
10.5	28.5	64.8
10.5	29.0	66.9
10.5	29.5	69.0
10.5	30.0	71.2

DETERMINING THE VALUE OF d(3)

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
11.0	11.5	11.9
11.0	12.0	12.9
11.0	12.5	13.9
11.0	13.0	14.9
11.0	13.5	16.0
11.0	14.0	17.1
11.0	14.5	18.2
11.0	15.0	19.4
11.0	15.5	20.6
11.0	16.0	21.8
11.0	16.5	23.0
11.0	17.0	24.3
11.0	17.5	25.6
11.0	18.0	27.0
11.0	18.5	28.4
11.0	19.0	29.8
11.0	19.5	31.2
11.0	20.0	32.7
11.0	20.5	34.2
11.0	21.0	35.8
11.0	21.5	37.3
11.0	22.0	38.9
11.0	22.5	40.5
11.0	23.0	42.2
11.0	23.5	43.9
11.0	24.0	45.6
11.0	24.5	47.3
11.0	25.0	49.1
11.0	25.5	50.9
11.0	26.0	52.8
11.0	26.5	54.6
11.0	27.0	56.5
11.0	27.5	58.4
11.0	28.0	60.4
11.0	28.5	62.4
11.0	29.0	64.4
11.0	29.5	66.4
11.0	30.0	68.5
11.0	30.5	70.6

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
11.5	12.0	12.4
11.5	12.5	13.4
11.5	13.0	14.4
11.5	13.5	15.4
11.5	14.0	16.5
11.5	14.5	17.5
11.5	15.0	18.7
11.5	15.5	19.8
11.5	16.0	21.0
11.5	16.5	22.2
11.5	17.0	23.4
11.5	17.5	24.7
11.5	18.0	26.0
11.5	18.5	27.4
11.5	19.0	28.7
11.5	19.5	30.1
11.5	20.0	31.5
11.5	20.5	33.0
11.5	21.0	34.5
11.5	21.5	36.0
11.5	22.0	37.5
11.5	22.5	39.1
11.5	23.0	40.7
11.5	23.5	42.3
11.5	24.0	44.0
11.5	24.5	45.6
11.5	25.0	47.4
11.5	25.5	49.1
11.5	26.0	50.9
11.5	26.5	52.7
11.5	27.0	54.5
11.5	27.5	56.3
11.5	28.0	58.2
11.5	28.5	60.1
11.5	29.0	62.1
11.5	29.5	64.0
11.5	30.0	66.0
11.5	30.5	68.1
11.5	31.0	70.1

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
12.0	12.5	12.9
12.0	13.0	13.9
12.0	13.5	14.9
12.0	14.0	15.9
12.0	14.5	16.9
12.0	15.0	18.0
12.0	15.5	19.1
12.0	16.0	20.3
12.0	16.5	21.4
12.0	17.0	22.6
12.0	17.5	23.9
12.0	18.0	25.1
12.0	18.5	26.4
12.0	19.0	27.7
12.0	19.5	29.1
12.0	20.0	30.4
12.0	20.5	31.9
12.0	21.0	33.3
12.0	21.5	34.7
12.0	22.0	36.2
12.0	22.5	37.7
12.0	23.0	39.3
12.0	23.5	40.9
12.0	24.0	42.5
12.0	24.5	44.1
12.0	25.0	45.7
12.0	25.5	47.4
12.0	26.0	49.1
12.0	26.5	50.9
12.0	27.0	52.6
12.0	27.5	54.4
12.0	28.0	56.2
12.0	28.5	58.1
12.0	29.0	59.9
12.0	29.5	61.8
12.0	30.0	63.8
12.0	30.5	65.7
12.0	31.0	67.7
12.0	31.5	69.7

DETERMINING THE VALUE OF d(3)

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
12.5	13.0	13.4
12.5	13.5	14.4
12.5	14.0	15.4
12.5	14.5	16.4
12.5	15.0	17.4
12.5	15.5	18.5
12.5	16.0	19.6
12.5	16.5	20.7
12.5	17.0	21.9
12.5	17.5	23.1
12.5	18.0	24.3
12.5	18.5	25.5
12.5	19.0	26.8
12.5	19.5	28.1
12.5	20.0	29.4
12.5	20.5	30.8
12.5	21.0	32.2
12.5	21.5	33.6
12.5	22.0	35.0
12.5	22.5	36.5
12.5	23.0	38.0
12.5	23.5	39.5
12.5	24.0	41.1
12.5	24.5	42.6
12.5	25.0	44.2
12.5	25.5	45.8
12.5	26.0	47.5
12.5	26.5	49.2
12.5	27.0	50.9
12.5	27.5	52.6
12.5	28.0	54.4
12.5	28.5	56.2
12.5	29.0	58.0
12.5	29.5	59.8
12.5	30.0	61.7
12.5	30.5	63.5
12.5	31.0	65.5
12.5	31.5	67.4
12.5	32.0	69.4

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
13.0	13.5	13.9
13.0	14.0	14.9
13.0	14.5	15.9
13.0	15.0	16.9
13.0	15.5	17.9
13.0	16.0	19.0
13.0	16.5	20.1
13.0	17.0	21.2
13.0	17.5	22.3
13.0	18.0	23.5
13.0	18.5	24.7
13.0	19.0	26.0
13.0	19.5	27.2
13.0	20.0	28.5
13.0	20.5	29.8
13.0	21.0	31.2
13.0	21.5	32.5
13.0	22.0	33.9
13.0	22.5	35.3
13.0	23.0	36.8
13.0	23.5	38.3
13.0	24.0	39.7
13.0	24.5	41.3
13.0	25.0	42.8
13.0	25.5	44.4
13.0	26.0	46.0
13.0	26.5	47.6
13.0	27.0	49.3
13.0	27.5	50.9
13.0	28.0	52.6
13.0	28.5	54.4
13.0	29.0	56.1
13.0	29.5	57.9
13.0	30.0	59.7
13.0	30.5	61.5
13.0	31.0	63.4
13.0	31.5	65.2
13.0	32.0	67.1
13.0	32.5	69.1

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
13.5	14.0	14.4
13.5	14.5	15.4
13.5	15.0	16.4
13.5	15.5	17.4
13.5	16.0	18.4
13.5	16.5	19.5
13.5	17.0	20.6
13.5	17.5	21.7
13.5	18.0	22.8
13.5	18.5	24.0
13.5	19.0	25.2
13.5	19.5	26.4
13.5	20.0	27.6
13.5	20.5	28.9
13.5	21.0	30.2
13.5	21.5	31.5
13.5	22.0	32.9
13.5	22.5	34.3
13.5	23.0	35.7
13.5	23.5	37.1
13.5	24.0	38.5
13.5	24.5	40.0
13.5	25.0	41.5
13.5	25.5	43.0
13.5	26.0	44.6
13.5	26.5	46.2
13.5	27.0	47.8
13.5	27.5	49.4
13.5	28.0	51.0
13.5	28.5	52.7
13.5	29.0	54.4
13.5	29.5	56.1
13.5	30.0	57.9
13.5	30.5	59.6
13.5	31.0	61.4
13.5	31.5	63.3
13.5	32.0	65.1
13.5	32.5	67.0
13.5	33.0	68.9

DETERMINING THE VALUE OF d(3)

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
14.0	14.5	14.9
14.0	15.0	15.9
14.0	15.5	16.9
14.0	16.0	17.9
14.0	16.5	18.9
14.0	17.0	19.9
14.0	17.5	21.0
14.0	18.0	22.1
14.0	18.5	23.3
14.0	19.0	24.4
14.0	19.5	25.6
14.0	20.0	26.8
14.0	20.5	28.1
14.0	21.0	29.3
14.0	21.5	30.6
14.0	22.0	31.9
14.0	22.5	33.2
14.0	23.0	34.6
14.0	23.5	36.0
14.0	24.0	37.4
14.0	24.5	38.8
14.0	25.0	40.3
14.0	25.5	41.8
14.0	26.0	43.3
14.0	26.5	44.8
14.0	27.0	46.4
14.0	27.5	47.9
14.0	28.0	49.5
14.0	28.5	51.2
14.0	29.0	52.8
14.0	29.5	54.5
14.0	30.0	56.2
14.0	30.5	57.9
14.0	31.0	59.6
14.0	31.5	61.4
14.0	32.0	63.2
14.0	32.5	65.0
14.0	33.0	66.8
14.0	33.5	68.7

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
14.5	15.0	15.4
14.5	15.5	16.4
14.5	16.0	17.3
14.5	16.5	18.4
14.5	17.0	19.4
14.5	17.5	20.4
14.5	18.0	21.5
14.5	18.5	22.6
14.5	19.0	23.7
14.5	19.5	24.9
14.5	20.0	26.1
14.5	20.5	27.3
14.5	21.0	28.5
14.5	21.5	29.7
14.5	22.0	31.0
14.5	22.5	32.3
14.5	23.0	33.6
14.5	23.5	35.0
14.5	24.0	36.3
14.5	24.5	37.7
14.5	25.0	39.1
14.5	25.5	40.6
14.5	26.0	42.0
14.5	26.5	43.5
14.5	27.0	45.0
14.5	27.5	46.6
14.5	28.0	48.1
14.5	28.5	49.7
14.5	29.0	51.3
14.5	29.5	52.9
14.5	30.0	54.6
14.5	30.5	56.2
14.5	31.0	57.9
14.5	31.5	59.6
14.5	32.0	61.4
14.5	32.5	63.1
14.5	33.0	64.9
14.5	33.5	66.7
14.5	34.0	68.6

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
15.0	15.5	15.9
15.0	16.0	16.9
15.0	16.5	17.8
15.0	17.0	18.8
15.0	17.5	19.9
15.0	18.0	20.9
15.0	18.5	22.0
15.0	19.0	23.1
15.0	19.5	24.2
15.0	20.0	25.3
15.0	20.5	26.5
15.0	21.0	27.7
15.0	21.5	28.9
15.0	22.0	30.1
15.0	22.5	31.4
15.0	23.0	32.7
15.0	23.5	34.0
15.0	24.0	35.3
15.0	24.5	36.7
15.0	25.0	38.1
15.0	25.5	39.5
15.0	26.0	40.9
15.0	26.5	42.3
15.0	27.0	43.8
15.0	27.5	45.3
15.0	28.0	46.8
15.0	28.5	48.3
15.0	29.0	49.9
15.0	29.5	51.5
15.0	30.0	53.1
15.0	30.5	54.7
15.0	31.0	56.3
15.0	31.5	58.0
15.0	32.0	59.7
15.0	32.5	61.4
15.0	33.0	63.1
15.0	33.5	64.9
15.0	34.0	66.7
15.0	34.5	68.5

DETERMINING THE VALUE OF d(3)

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
15.5	16.0	16.4
15.5	16.5	17.4
15.5	17.0	18.3
15.5	17.5	19.3
15.5	18.0	20.4
15.5	18.5	21.4
15.5	19.0	22.5
15.5	19.5	23.6
15.5	20.0	24.7
15.5	20.5	25.8
15.5	21.0	27.0
15.5	21.5	28.1
15.5	22.0	29.3
15.5	22.5	30.6
15.5	23.0	31.8
15.5	23.5	33.1
15.5	24.0	34.4
15.5	24.5	35.7
15.5	25.0	37.0
15.5	25.5	38.4
15.5	26.0	39.8
15.5	26.5	41.2
15.5	27.0	42.6
15.5	27.5	44.1
15.5	28.0	45.5
15.5	28.5	47.0
15.5	29.0	48.6
15.5	29.5	50.1
15.5	30.0	51.7
15.5	30.5	53.2
15.5	31.0	54.8
15.5	31.5	56.5
15.5	32.0	58.1
15.5	32.5	59.8
15.5	33.0	61.5
15.5	33.5	63.2
15.5	34.0	64.9
15.5	34.5	66.6
15.5	35.0	68.4

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
16.0	16.5	16.9
16.0	17.0	17.9
16.0	17.5	18.8
16.0	18.0	19.8
16.0	18.5	20.8
16.0	19.0	21.9
16.0	19.5	22.9
16.0	20.0	24.0
16.0	20.5	25.1
16.0	21.0	26.3
16.0	21.5	27.4
16.0	22.0	28.6
16.0	22.5	29.8
16.0	23.0	31.0
16.0	23.5	32.2
16.0	24.0	33.5
16.0	24.5	34.8
16.0	25.0	36.1
16.0	25.5	37.4
16.0	26.0	38.8
16.0	26.5	40.1
16.0	27.0	41.5
16.0	27.5	42.9
16.0	28.0	44.4
16.0	28.5	45.8
16.0	29.0	47.3
16.0	29.5	48.8
16.0	30.0	50.3
16.0	30.5	51.9
16.0	31.0	53.4
16.0	31.5	55.0
16.0	32.0	56.6
16.0	32.5	58.2
16.0	33.0	59.9
16.0	33.5	61.5
16.0	34.0	63.2
16.0	34.5	64.9
16.0	35.0	66.6
16.0	35.5	68.4

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
16.5	17.0	17.4
16.5	17.5	18.4
16.5	18.0	19.3
16.5	18.5	20.3
16.5	19.0	21.3
16.5	19.5	22.4
16.5	20.0	23.4
16.5	20.5	24.5
16.5	21.0	25.6
16.5	21.5	26.7
16.5	22.0	27.9
16.5	22.5	29.0
16.5	23.0	30.2
16.5	23.5	31.4
16.5	24.0	32.7
16.5	24.5	33.9
16.5	25.0	35.2
16.5	25.5	36.5
16.5	26.0	37.8
16.5	26.5	39.1
16.5	27.0	40.5
16.5	27.5	41.9
16.5	28.0	43.3
16.5	28.5	44.7
16.5	29.0	46.1
16.5	29.5	47.6
16.5	30.0	49.1
16.5	30.5	50.6
16.5	31.0	52.1
16.5	31.5	53.6
16.5	32.0	55.2
16.5	32.5	56.8
16.5	33.0	58.4
16.5	33.5	60.0
16.5	34.0	61.6
16.5	34.5	63.3
16.5	35.0	65.0
16.5	35.5	66.7
16.5	36.0	68.4

DETERMINING THE VALUE OF d(3)

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
17.0	17.5	17.9
17.0	18.0	18.9
17.0	18.5	19.8
17.0	19.0	20.8
17.0	19.5	21.8
17.0	20.0	22.9
17.0	20.5	23.9
17.0	21.0	25.0
17.0	21.5	26.1
17.0	22.0	27.2
17.0	22.5	28.3
17.0	23.0	29.5
17.0	23.5	30.7
17.0	24.0	31.9
17.0	24.5	33.1
17.0	25.0	34.3
17.0	25.5	35.6
17.0	26.0	36.9
17.0	26.5	38.2
17.0	27.0	39.5
17.0	27.5	40.9
17.0	28.0	42.2
17.0	28.5	43.6
17.0	29.0	45.0
17.0	29.5	46.4
17.0	30.0	47.9
17.0	30.5	49.3
17.0	31.0	50.8
17.0	31.5	52.3
17.0	32.0	53.8
17.0	32.5	55.4
17.0	33.0	57.0
17.0	33.5	58.5
17.0	34.0	60.1
17.0	34.5	61.8
17.0	35.0	63.4
17.0	35.5	65.1
17.0	36.0	66.7
17.0	36.5	68.4

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
17.5	18.0	18.4
17.5	18.5	19.4
17.5	19.0	20.3
17.5	19.5	21.3
17.5	20.0	22.3
17.5	20.5	23.4
17.5	21.0	24.4
17.5	21.5	25.5
17.5	22.0	26.6
17.5	22.5	27.7
17.5	23.0	28.8
17.5	23.5	30.0
17.5	24.0	31.1
17.5	24.5	32.3
17.5	25.0	33.5
17.5	25.5	34.8
17.5	26.0	36.0
17.5	26.5	37.3
17.5	27.0	38.6
17.5	27.5	39.9
17.5	28.0	41.2
17.5	28.5	42.6
17.5	29.0	43.9
17.5	29.5	45.3
17.5	30.0	46.7
17.5	30.5	48.2
17.5	31.0	49.6
17.5	31.5	51.1
17.5	32.0	52.6
17.5	32.5	54.1
17.5	33.0	55.6
17.5	33.5	57.2
17.5	34.0	58.7
17.5	34.5	60.3
17.5	35.0	61.9
17.5	35.5	63.5
17.5	36.0	65.2
17.5	36.5	66.8
17.5	37.0	68.5

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
18.0	18.5	18.9
18.0	19.0	19.9
18.0	19.5	20.8
18.0	20.0	21.8
18.0	20.5	22.8
18.0	21.0	23.8
18.0	21.5	24.9
18.0	22.0	25.9
18.0	22.5	27.0
18.0	23.0	28.1
18.0	23.5	29.3
18.0	24.0	30.4
18.0	24.5	31.6
18.0	25.0	32.8
18.0	25.5	34.0
18.0	26.0	35.2
18.0	26.5	36.4
18.0	27.0	37.7
18.0	27.5	39.0
18.0	28.0	40.3
18.0	28.5	41.6
18.0	29.0	42.9
18.0	29.5	44.3
18.0	30.0	45.7
18.0	30.5	47.1
18.0	31.0	48.5
18.0	31.5	49.9
18.0	32.0	51.4
18.0	32.5	52.8
18.0	33.0	54.3
18.0	33.5	55.8
18.0	34.0	57.4
18.0	34.5	58.9
18.0	35.0	60.5
18.0	35.5	62.1
18.0	36.0	63.7
18.0	36.5	65.3
18.0	37.0	66.9
18.0	37.5	68.6

DETERMINING THE VALUE OF d(3)

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
18.5	19.0	19.4
18.5	19.5	20.4
18.5	20.0	21.3
18.5	20.5	22.3
18.5	21.0	23.3
18.5	21.5	24.3
18.5	22.0	25.4
18.5	22.5	26.4
18.5	23.0	27.5
18.5	23.5	28.6
18.5	24.0	29.7
18.5	24.5	30.9
18.5	25.0	32.0
18.5	25.5	33.2
18.5	26.0	34.4
18.5	26.5	35.6
18.5	27.0	36.9
18.5	27.5	38.1
18.5	28.0	39.4
18.5	28.5	40.7
18.5	29.0	42.0
18.5	29.5	43.3
18.5	30.0	44.7
18.5	30.5	46.0
18.5	31.0	47.4
18.5	31.5	48.8
18.5	32.0	50.2
18.5	32.5	51.7
18.5	33.0	53.1
18.5	33.5	54.6
18.5	34.0	56.1
18.5	34.5	57.6
18.5	35.0	59.1
18.5	35.5	60.7
18.5	36.0	62.3
18.5	36.5	63.8
18.5	37.0	65.4
18.5	37.5	67.1
18.5	38.0	68.7

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
19.0	19.5	19.9
19.0	20.0	20.9
19.0	20.5	21.8
19.0	21.0	22.8
19.0	21.5	23.8
19.0	22.0	24.8
19.0	22.5	25.9
19.0	23.0	26.9
19.0	23.5	28.0
19.0	24.0	29.1
19.0	24.5	30.2
19.0	25.0	31.3
19.0	25.5	32.5
19.0	26.0	33.7
19.0	26.5	34.8
19.0	27.0	36.1
19.0	27.5	37.3
19.0	28.0	38.5
19.0	28.5	39.8
19.0	29.0	41.1
19.0	29.5	42.4
19.0	30.0	43.7
19.0	30.5	45.0
19.0	31.0	46.4
19.0	31.5	47.7
19.0	32.0	49.1
19.0	32.5	50.5
19.0	33.0	52.0
19.0	33.5	53.4
19.0	34.0	54.9
19.0	34.5	56.4
19.0	35.0	57.9
19.0	35.5	59.4
19.0	36.0	60.9
19.0	36.5	62.5
19.0	37.0	64.0
19.0	37.5	65.6
19.0	38.0	67.2
19.0	38.5	68.8

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
19.5	20.0	20.4
19.5	20.5	21.4
19.5	21.0	22.3
19.5	21.5	23.3
19.5	22.0	24.3
19.5	22.5	25.3
19.5	23.0	26.3
19.5	23.5	27.4
19.5	24.0	28.5
19.5	24.5	29.6
19.5	25.0	30.7
19.5	25.5	31.8
19.5	26.0	32.9
19.5	26.5	34.1
19.5	27.0	35.3
19.5	27.5	36.5
19.5	28.0	37.7
19.5	28.5	38.9
19.5	29.0	40.2
19.5	29.5	41.5
19.5	30.0	42.8
19.5	30.5	44.1
19.5	31.0	45.4
19.5	31.5	46.7
19.5	32.0	48.1
19.5	32.5	49.5
19.5	33.0	50.9
19.5	33.5	52.3
19.5	34.0	53.7
19.5	34.5	55.2
19.5	35.0	56.6
19.5	35.5	58.1
19.5	36.0	59.6
19.5	36.5	61.1
19.5	37.0	62.7
19.5	37.5	64.2
19.5	38.0	65.8
19.5	38.5	67.4
19.5	39.0	69.0

DETERMINING THE VALUE OF d(3)

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
20.0	20.5	20.9
20.0	21.0	21.9
20.0	21.5	22.8
20.0	22.0	23.8
20.0	22.5	24.8
20.0	23.0	25.8
20.0	23.5	26.8
20.0	24.0	27.9
20.0	24.5	29.0
20.0	25.0	30.0
20.0	25.5	31.1
20.0	26.0	32.3
20.0	26.5	33.4
20.0	27.0	34.6
20.0	27.5	35.7
20.0	28.0	36.9
20.0	28.5	38.1
20.0	29.0	39.4
20.0	29.5	40.6
20.0	30.0	41.9
20.0	30.5	43.2
20.0	31.0	44.5
20.0	31.5	45.8
20.0	32.0	47.1
20.0	32.5	48.5
20.0	33.0	49.8
20.0	33.5	51.2
20.0	34.0	52.6
20.0	34.5	54.0
20.0	35.0	55.5
20.0	35.5	56.9
20.0	36.0	58.4
20.0	36.5	59.9
20.0	37.0	61.4
20.0	37.5	62.9
20.0	38.0	64.4
20.0	38.5	66.0
20.0	39.0	67.6
20.0	39.5	69.2

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
20.5	21.0	21.4
20.5	21.5	22.4
20.5	22.0	23.3
20.5	22.5	24.3
20.5	23.0	25.3
20.5	23.5	26.3
20.5	24.0	27.3
20.5	24.5	28.4
20.5	25.0	29.4
20.5	25.5	30.5
20.5	26.0	31.6
20.5	26.5	32.7
20.5	27.0	33.9
20.5	27.5	35.0
20.5	28.0	36.2
20.5	28.5	37.4
20.5	29.0	38.6
20.5	29.5	39.8
20.5	30.0	41.0
20.5	30.5	42.3
20.5	31.0	43.6
20.5	31.5	44.9
20.5	32.0	46.2
20.5	32.5	47.5
20.5	33.0	48.8
20.5	33.5	50.2
20.5	34.0	51.6
20.5	34.5	52.9
20.5	35.0	54.4
20.5	35.5	55.8
20.5	36.0	57.2
20.5	36.5	58.7
20.5	37.0	60.1
20.5	37.5	61.6
20.5	38.0	63.1
20.5	38.5	64.7
20.5	39.0	66.2
20.5	39.5	67.8
20.5	40.0	69.3

(d1)	(d2)	(d3)
500 uR/hr	20 uR/hr	0.4 uR/hr
21.0	21.5	21.9
21.0	22.0	22.9
21.0	22.5	23.8
21.0	23.0	24.8
21.0	23.5	25.8
21.0	24.0	26.8
21.0	24.5	27.8
21.0	25.0	28.9
21.0	25.5	29.9
21.0	26.0	31.0
21.0	26.5	32.1
21.0	27.0	33.2
21.0	27.5	34.3
21.0	28.0	35.5
21.0	28.5	36.6
21.0	29.0	37.8
21.0	29.5	39.0
21.0	30.0	40.2
21.0	30.5	41.5
21.0	31.0	42.7
21.0	31.5	44.0
21.0	32.0	45.3
21.0	32.5	46.6
21.0	33.0	47.9
21.0	33.5	49.2
21.0	34.0	50.5
21.0	34.5	51.9
21.0	35.0	53.3
21.0	35.5	54.7
21.0	36.0	56.1
21.0	36.5	57.5
21.0	37.0	59.0
21.0	37.5	60.4
21.0	38.0	61.9
21.0	38.5	63.4
21.0	39.0	64.9
21.0	39.5	66.4
21.0	40.0	68.0
21.0	40.5	69.5

PROCEDURE NUMBER	REVISION	PAGE
13.13.3	14	41 of 56

Attachment 8.6

ISOPLETH S VEY LOG

Page ____ of ____

LOCATION (Grid coordinates/Landmarks)		TIME 24 hr. clock	LAT/LONG		μR/hr @ 1 meter	REMARKS Indicate environmental, special conditions, or other pertinent data
Field Team Number	Location					

Field Team Dispatcher Date_____

FOOD CONTROL AREA
PROTECTIVE ACTION RECOMMENDATION

☐ Washington ☐ Oregon

☐ Establish or reduce the Food Control Area boundary in accordance with the attached map.

☐ Establish or modify food control points around the Food Control Area.

☐ Restrict Agricultural products from leaving the food control boundary until they are sampled and determined to be below protective action guidelines.

☐ Advise farms and dairies to place or maintain all milk producing animals and livestock on stored feed and covered water.

☐ Advise residents within the food control boundary to:

☐ 1. Drink only bottled water or water from covered sources.

☐ 2. Not consume milk or produce from their family farm or garden until monitoring can be done.

☐ Rescind the Food Control PAR.

Other:

_____

_____

_____

_____

Approved by: PADG Chairperson/Dose Assessment Coordinator _____

Concurred by: WA State Health Liaison _____

Concurred by: OR Senior State Official _____
(only if Oregon box above is checked)

Attachment 8.7

REOPENING OF THE TRANSPORTATION CORRIDOR RECOMMENDATION

Date _____ Time _____

The following modifications to the existing Transportation Corridor PAR are recommended to the State of Washington:

Airspace

☐ Reopen all airspace to unrestricted use, if applicable. Confer with the REM for this information, as needed.

Columbia River

☐ Reopen the Columbia River to unrestricted use.

☐ Reopen the Columbia River to restricted use, as follows:

☐ Commercial or private boats moored within the relocation zone are surveyed prior to leaving and any contamination found is less than 1,000 dpm/100cm^2, if applicable.

☐ Commercial ships and private boats are advised to navigate the river through the relocation area without docking or disembarking.

☐ Other:_____
_____
_____
_____

Highways

☐ Reopen the following highways to unrestricted use:

☐ Reopen the following highways to restricted use:_____
_____
_____
_____

☐ Barricade and post all exits within the relocation area to prohibit stopping or exiting to secondary roads.

Approved by: PADG Chairperson/Dose Assessment Coordinator _____

Concurred by: WA State Health Liaison _____

Attachment 8.8

INTERIM SAMPLING PLAN

Date:Time:Date _____ Time _____

Field Team Name	GENERAL LOCATION: Grid Coordinates geographical landmarks Latitude & Longitude	Sampling Instructions General: General Area dose rates, general deposition readings, deposition in soil, deposition on pasture grass, re-suspension, hot spots and other areas of concern.

Dispatched:_____ _____/_____
Field Team Coordinator Date / Time

Attachment 8.9

Revision #:_____ DETAILED SAMPLING PLAN

Date:_____ Time:_____ Page _____ of _____

Field Team Name	SPECIFIC LOCATION: (Street Address, Grid Coordinates, landmarks, Latitude & Longitude)	Sample Types						Priority
		Grass	Soil	Water	Milk	Air	Other	

Approved:_____ Dispatched:_____ _____/_____

PADG Chairperson Field Team Coordinator Date / Time

Concurred by:_____ Concurred by:_____

WA State Health Liaison OR Senior State Official (If Oregon locations included.)

Attachment 8.10

PROCEDURE NUMBER	REVISION	PAGE
13.13.3	14	46 of 56

Attachment 8.11

SAMPLE DATA AND ANALYSIS SUMMARY

DATE:_____ Page ___ of ___

Map* disk #	Sample ID#	Field Team Name	LOCATION: Grid/landmarks Latitude & Longitude	Sample Types					TIME (Military) Sample Collected	General Area γ Dose Rate (μR/hr)	β,γ Ground Deposition (cpm) (optional)	Ingestion Dose Analysis Limiting DIL Ratio		Relocation Dose Analysis "Groundshine" (REM)		
				Grass	Soil	Water	Milk	Other				Nuclide	DIL Ratio	1st yr	2nd yr	50 yrs

* EOF use only

SDAS.FORM(6/94)

UPDATE BRIEFING GUIDE

A. FREQUENCY

If at all possible, the briefings should be conducted at least every 30 minutes by the Washington State PADG Representative, especially during the most active stages of the event. Then regular briefing intervals should be established and announced.

B. ATTENDANCE

The MUDAC staff members listed below should be requested to provide a short status report on their activities or pertinent events in their areas of responsibility, as applicable.

C. ATTENDEES

- Washington State PADG Representative
- Energy Northwest PADG Representative
- Dept of Energy PADG Representative
- Oregon PADG Representative
- Dose Projection Health Physicist
- Field Team Coordinator

HOT SPOT MANAGEMENT AND CONTROL

If after defining the Relocation Area (RA) boundary and/or the Food Control Area (FCA) boundary, radioactively contaminated areas meeting the definition in 4.9 of this document will be controlled as RA or FCA hot spots. Modification of the 500 microR/hr or FCA isopleth boundaries to incorporate hot spots is the preferred control method. Controlled areas do not have to be gaussian footprints and should evolve and be modified in a strictly empirical manner by grid surveys/samples.

During the Intermediate Phase, the normal field team survey procedure is to monitor readings continuously, at no less than one-half mile increments.

It is recommended that location of all hot spots be completed before beginning individual hot spot area reductions.

For each hot spot, overlay a one mile grid centered on the hot spot:

a. Transfer a 16 by 16 grid (for each square mile) to an appropriate scale map
b. Have the field teams post the area for RA or FCA, as appropriate.
c. Posting density and control should be determined by ease of access by the public.
d. Develop a field control system to manage the elimination of clean areas of approximately 100 meters square by detailed survey.
e. Concentrate hot spot reduction priorities to developed or easily accessible areas. Consider transportation corridors a high priority.

For each hot spot, develop short and long term recommendations for return to use:

a. Perform a detailed sample analysis of each hot spot.
b. Consider whether removal, decay in place, or burial is recommended for the area

For hot spots less than one mile apart, develop the grid pattern to avoid duplicate surveys to eliminate clean areas.

PLOTTING AND TRANSMITTING INGESTION DATA POINTS AND ISOPLETHS

1.0 Start MUDAC 1 computer.

2.0 Log onto the LAN using your own user ID & password.

3.0 Go to "Start" then "Programs" then "Microsoft Office" and select "Excel".

4.0 On a blank spread sheet, type in the latitude, longitude and the radiation readings as they are received from the environmental field teams.

The readings should be in microR.

EXAMPLE:

46 27.673N	119 20.574W	500 microR
46 27.113N	119 20.02W	20 microR
46 26.55N	119 21.553W	20 microR
46 23.1N	119 10.5W	500 microR
46 34.1N	119 22.75W	20 microR

Note the latitude and longitude is written as the field teams transmit it to you; i.e., degrees, then a space, then minutes followed by direction.

5.0 When finished typing in the data from the field team:

1) Save the Excel file:

a. Go to "File", select "Save As"

b. In "FILE NAME" type the date and the sequence number of the data. Example: 1-23-991

c. In "SAVE AS TYPE:" select "TEXT (TAB DELIMITED)"

d. Save the file to the "\INGEST" local subdirectory

2) Close Excel.

6.0 Open the mapping program by double clicking "Street Atlas USA 6.0" on the desktop.

7.0 Overlay the Excel file on the map.

1) Go to "FILE" and select "IMPORT LAT/LON FILE"

2) Select the text file you saved above in the "\INGEST" local subdirectory

3) The Field Team LAT/LON data will appear on the map as blue flags. The radiation data will be printed on the map next to the flags.

8.0 Draw the 500 microR isopleth

1) Click on the pencil symbol in the tool bar at the top of the page. A toolbar will appear on the screen.

2) Click and hold the left mouse button down on the symbol in the drawing toolbar that looks like an open triangle.

3) Move the mouse to the first point on the outer boundary 500 microR points and release the left mouse button.

4) Move the mouse to each of the other 500 microR outer boundary points (in sequence) and click once.

5) When finished clicking on each of the outer boundary points, double click, using the left mouse button.

6) Label each isopleth by clicking once on the "Draw Map Note" icon in the drawing toolbox (the icon is a small document with a tail on the lower left side). In the "Map Note Properties" box; type in the name of the isopleth; i.e., 500 microR Isopleth. Set the text to "Very Small" and click on "OK".

7) With the left mouse button, click and hold on the icon, drag the icon to the desired location on the map and release the mouse button.

9.0 Construct the relocation isopleth.

1) Draw an appropriate buffer zone around the 500 microR zone considering wind, stability class, quality of Field Team data, etc., to form the relocation area.

10.0 Print the relocation isopleth

1) Go to "FILE" then select "PRINT CURRENT MAP".

2) Type in the map name; e.g., February 23, 1999 RELOCATION ISOPLETH.

3) Set the scale to approximately 1 inch = 13 miles.

4) Click on "Low Detail".

5) Click on "Print".

6) Give the map to the Dose Assessment Coordinator. The PADG will determine if the isopleth needs to be adjusted.

11.0 Save the relocation isopleth drawing

1) Go to "FILE" and select "SAVE AS"

2) In "FILE NAME" type "LOC" then the month and year.
Example: LOCFEB99

3) The "SAVE AS TYPE" will be "STREET ATLAS USA 6.0 (*.sa6)"

12.0 Minimize the Street Atlas USA program

NOTE: the Dose Assessment Coordinator will prepare the Revised Return PAR and the Relocation Area PAR. When the Coordinator faxes the PARs and the map you provide, email the map to Benton and Franklin County EOCs.

13.0 Call the Benton County EOC (628-0303 or 628-2600) and the Franklin County EOC (545-3546). Let the EOCs know you are sending the isopleth information via email.

14.0 OPEN Outlook

15.0 If you have an existing profile in Outlook, enter your user name. Otherwise, create a new profile:

Close Outlook.
Access the V:\Exchange folder in My Computer.
Double click the "makeprof.bat" file.
Close My Computer.
Open Outlook.
Select OK on the "name cannot be matched" window.
Verify that the Microsoft Exchange server is Server97.

Type your last name ONLY.
Select "check name".
Select the correct name.
Verify that the name and server are both underlined.
Select Apply, and then OK.

16.0 Mail the STREET ATLAS file you created above (*.sa6) to the Benton County EOC and Franklin County EOC.

Benton County:

ops@bces.wa.gov
ag@bces.wa.gov
facility@bces.wa.gov

Franklin County:

eoc@co.franklin.wa.us

Attach the *.sa6 file with the isopleth data.

Write a short note in the email explaining what the file is, who sent it, and a phone number you can be reached at. Include your Energy Northwest email address in the note.

17.0 Construct the food control isopleth

1) If the Relocation Isopleth is still on the map, go to "FILE" and select "NEW". Answer "OK" if the question "Do you want to clear your draw objects" appears on screen.

18.0 Overlay the Excel file on the map

1) Go to "FILE" and select "IMPORT LAT/LON FILE"

2) Select the text file you saved in the "\INGEST" local subdirectory

3) The Field Team LAT/LON data will appear on the map as blue flags. The radiation data will be printed on the map next to the flags.

4) Click on the pencil symbol in the tool bar at the top of the page. A toolbar will appear on the screen.

5) Click and hold the left mouse button down on the symbol in the drawing toolbar that looks like an open triangle.

6) Move the mouse to the first point on the outer boundary 20 mircoR points and release the left mouse button.

7) Move the mouse to each of the other 20 microR outer boundary points (in sequence) and click once.

8) When finished clicking on each of the outer boundary points, double click, using the left mouse button.

19.0 Calculate the Food Control Isopleth

1) Draw a line from Columbia Generating Station to the farthest point on the 20 microR footprint.

2) Click and hold the left mouse button down on the symbol in the drawing toolbar that looks like an open triangle.

3) Move the mouse to the plant and release the left mouse button.

4) Move the mouse to the farthest point on the footprint and click the left button.

5) Draw two additional lines, one to each side of the first line, to the edge of the footprint.

6) Determine the distance of the three lines by placing the mouse on each line and clicking the right mouse button. From the menu that appears, select "Properties". That selection will indicate the distance in miles the radial lines extend from the plant.

7) Refer to Attachment 8.5 to determine d3. Note that this applies only to the initial calculations using default values.

8) Extend the radial lines drawn previously to the d3 distances.

9) Draw the Food Control Isopleth using the d3 distances.

WASHINGTON STATE DERIVED INTERVENTION LEVELS (DILs)

Radionuclide	FOOD/MILK DILs[A] (pCi/Kg, pCi/l)	Bq/Kg, Bq/l)
I-131	4,600	170
Cs group (sum) (Cs-134 + 137)	32,000	1,200
Sr-90	4,300	160
Ru-103	180,000*	6,800*
Ru-106	12,000*	450*
Pu-Am group (sum) (Pu-238 + Pu-239 + AM-241)	54	2
Sr-89	38,000	1,400
Y-91	32,000	1.200
Zr-95	110,000	4,000
Nb-95	320,000	12,000
Te-132	120,000	4,400
I-129	1,500	56
I-133	190,000	7,200
Ba-140	186,000	6,900
Ce-141	194,000	7,200
Ce-144	13,500	500
Np-237	110	4
Np-239	750,000	28,000
Pu-241	3,200	120
Cm-242	510	19
CM-244	54	2

A Values from "Accidental Radioactive Contamination of Human Food and Animal Feeds: Recommendations for State and Local Agencies," FDA, August 13, 1998 unless otherwise indicated.

* partition and sum

WASHINGTON STATE DERIVED INTERVENTION LEVELS (DILs)

Radionuclide	FOOD/MILK DILs[A] (pCi/l)	Bq/l)
I-131	100	4
Cs 134	80	3
Cs-137	120	4
Sr-90	40	1
Ru-103	1800	67
Ru-106	200	7.4
U (all)	13	0.5
All alpha emitters (excluding Rn & U)	15	0.55
Sr-89	580	21
Y-91	570	21
Zr-95	1400	52
Nb-95	2100	78
Te-132	580	21
I-133	550	20
Ba-140	580	21
Ce-141	1800	67
Ce-144	260	9.6
Ra-226 + Ra-228	5	0.18

[B] 40 CFR 141, "National Primary Drinking Water Regulations," EPA, 7/1/99

REVISED RELOCATION AREA DATA WORKSHEET

Sample Number	Location	mR/hr value		
		1st yr (G-56)	2nd yr (E-56)	50 yr (F-56)
	Most restrictive values from above:			

Attachment 8.16

DATE: 06/03/02

EDITORIAL

13.14.4

Passport Work Item: FPSYS108

Locations:

- Kit 1FA - 441′ elevation, Turbine Building Fire Brigade Station 1
- Kit 2FA - Building 62, Fire Brigade Station 2
- Kit 3FA - 501′ elevation, Turbine Building Corridor
- Kit 6FB - 441′ elevation, Cowlitz Building (17) Lobby

Monthly (and after use):

- Inventory contents and ensure minimum quantities are present
- Check physical condition of contents and replace items, as necessary

NOTE: It is acceptable to take inventory credit for clamshells and stretchers at each location for either Type A or B kit inventory requirements.

Passport Work Item: FPSYS108

Locations:

- Kit 1FB - 441′ elevation, Turbine Building, Fire Brigade Station 1
- Kit 2FB - Building 62, Fire Brigade Station 2
- Kit 3FB - 501' elevation, Turbine Building Corridor
- Kit 4FB - 467' elevation, Radwaste Control Room
- Kit 5FB - 441' elevation, Operations Staff Area
- Kit 6FB - 441' elevation, Cowlitz Building (bldg. 17) Lobby

Monthly (and after use):

- Inventory contents and ensure that minimum quantities are present.
- Check physical condition of contents and replace items, as necessary.
- Verify oxygen cylinder is full (needle in green band). If low, replace with a full one.
- Perform operational check on penlights, (if dim or not working and a disposable type, replace).

NOTE: It is acceptable to take inventory credit for clamshells and stretchers at each location for either Type A or B kit inventory requirements.

Passport Work Items: QTRLY INST KIT 1IK
QTRLY INST KIT 2IK
QTRLY INST KIT 3IK
QTRLY INST KIT 4IK

PTL Item: Radio Checks, R149793

Locations:

- Kit 1IK - Field Team Cabinet Number 1, Kootenai Building Health Physics Center
- Kit 2IK - Field Team Cabinet Number 2, Kootenai Building Health Physics Center
- Kit 3IK - Field Team Cabinet Number 3, Kootenai Building Health Physics Center
- Kit 4IK - ENOC, Cabinet Number 4, MPF, 1st Floor, Outside Room 201

Quarterly (and if used or if seal not intact):

- Inventory contents and ensure minimum quantities are present.
- Check physical condition of contents and replace, as necessary.
- Ensure portable instrument calibration dates will not be exceeded prior to the next quarterly check. Replace with fresh calibrated instruments as needed.
- Perform operational checks:
    - Portable instruments (battery check)
    - Calculator
    - Battery lantern
    - Flashlight
- Ensure expiration dates will not be exceeded prior to the next quarterly check:
    - Iodine tablets
- Inventory field team radio batteries and check operability.