DISTRIBUTION - VOLUME 13 – EMERGENCY PREPAREDNESS PROCEDURES
Distribution Date: 12/21/17 LMB **Filed By:** _____

Procedure Number	Revision
13.2.1	022/001
13.2.2	020/001
13.10.17	005/001

Procedure Number	Revision

Procedure Number	Revision

TO: ENERGY NORTHWEST EXTERNAL CONTROLLED COPY PROCEDURE HOLDERS

The following documents have been revised and are to be inserted into your controlled copy manual and the superseded revisions removed and destroyed. No receipt acknowledgement is required for the listed document(s).

Should you have questions on this distribution please contact Kim Saenz, Records and Information Supervisor at (509)377-2492 or KDSaenz@energy-northwest.com.

Distribution Date: 12/21/17 LMB

Procedure Number	Revision
13.2.1	022/001
13.2.2	020/001
13.10.17	005/001

Procedure Number	Revision

Procedure Number	Revision

EXTERNAL DISTRIBUTION

Copy #	Location	Procedures
26	Region IV – US Nuclear Regulatory Commission	All
28	Region IV – US Nuclear Regulatory Commission	All
52	State of Washington, Military Department	All
55	Federal Emergency Management Agency (FEMA)	All
57	Benton County – Department of Emergency Management	All
75	Department of Health Radiation Protection	All
87	Document Control Desk – NRC	All
142	Hanford EOC/SMT	All
164	Oregon State Department of Energy	All
223	Franklin County Emergency Management	All

A x 45
NRR

DISTRIBUTION - VOLUME 13 – EMERGENCY PREPAREDNESS PROCEDURES

Distribution Date: 12/21/17 LMB **Filed By:** _____

Procedure Number	Revision
13.2.1	022/001
13.2.2	020/001
13.10.17	005/001

Procedure Number	Revision

Procedure Number	Revision

224	Washington State Department of Health – Office of Radiation Protection	All

NOTE: PPM 13.1.1 is printed in color, single sided, on 11" x 17" paper, folded, 3-hold punched, stapled on the top & distributed by Document Control.

NOTE: Distribution of the PPM 13.1.1 wall flow charts is controlled by PPM 13.1.1A and distribution is performed by EP.

Verify Revision Information Prior To Use	Initials	
	Date	

Number: 13.2.1	Use Category: REFERENCE	Major Rev: 022 Minor Rev: 001 Page: 1 of 18
Title: Emergency Exposure Levels / Protective Action Guides		

PLANT PROCEDURES MANUAL	PCN #: N/A
13.2.1	Effective Date: 12/21/17

DESCRIPTION OF CHANGES

Justification (required for major revision)
Clarification was required associated with the guidance for the issuance of Potassium Iodide. The procedure mentioned a name brand no longer in use at the site. The change supports the generic use of the term thyroid blocking agent instead of a name brand. Additionally, the most recent KI received requires a dose of two tablets (65mg) each instead of the previous one tablet (130mg). Lastly, there was nothing in the procedure that addressed the basis for the number of KI doses required during an emergency. Additional editorial changes were also completed. The changes are associated with AR-CR 00320600

Page(s)	Description (including summary, reason, initiating document, if applicable)
7	Section 4.2.1.b. and 4.2.2.b., added Security Communications Center.
8	Section 4.2.5.b changed (State and County) to (State, Counties, and DOE-RL) for notification consistency.
8	REFERENCES. The reference section was revised to be consistent with SWP-PRO-03
12	Attachment 7.3 Step B. Changed 6. to Security Communication Center and Sweeper/Roadblock Kits in Protected Area Access Point (PAAP). Added 7. Central Alarm Station. This was provided for clarification.
12	Added the following: The amount of thyroid blocking agent (KI) maintained was determined as follows: Identify the number of responding ERO personnel, double that number to represent two shifts, and multiply by 10 (10 day maximum dosage) to determine number of doses required. NOTE: Number of dose boxes is dependent upon the number of doses contained in a box or package.
12	Attachment 7.3. Step C. changed THYRO BLOCK to thyroid blocking. Changed the first sentence to ...contains either 130mg or 65mg of potassium iodide (KI). Change was made to support the receipt of a KI product that is dispensed in 65mg tablets.
13	Modified Attachment 7.3. Step D.3. as follows: Only the TSC Manager and EOF Manager (or the Shift Manager acting as Emergency Director) can authorize the use of a thyroid blocking agent (KI). The TSC Manager and EOF Manager (or the Shift Manager acting as Emergency Director) SHALL establish the extent and duration of the thyroid blocking agent (KI) usage, based on radiological conditions and the advice of the Radiation Protection Manager or Radiological Emergency Manager, as appropriate. Removed reference to THYRO BLOCK, added thyroid blocking agent. Changes were made for clarification and consistency.

13-15	Changed Attachment 7.3, Steps E.1., and E.10., to read (State, Counties, and DOE-RL) from (State and County) for notification consistency.
16	Changed Attachment 7.3, 1. Bullet 4 to read thyroid blocking agent. Removed name brand THYRO BLOCK, for consistency purposes.
16	Changed Attachment 7.3, 1. Bullet 4, sub-bullet 1, to read The recommended KI dosage is 130mg daily (one 130mg or two 65mg tablets), for a period not to exceed 10 days.
17	MR001: Added note to attachment 7.4 to clarify that emergency exposures are for nonpregnant adults only.

TABLE OF CONTENTS

1.0 PURPOSE

This procedure outlines the authority and process for exceeding annual administrative exposure holdpoints and implementing EPA-400 limits for emergency worker Protective Action Guides (PAGs). Additionally, it provides guidance for administration of potassium iodide (KI) and authorization of Emergency Exposures above EPA-400 limits during emergency situations. {R-1599}

2.0 DISCUSSION

2.1 Precautions and Limitations

2.1.1 If respiratory protection equipment is not prescribed, administer potassium iodide (KI) as outlined in Attachment 7.3. {2.1}

2.2 Emergency Exposure Controls

2.2.1 Refer to Attachment 7.1, Federal Personnel Dose Limits (10 CFR 20) for normal worker dose limits.

2.2.2 Declaration of an Alert or higher emergency classification automatically waives Energy Northwest administrative exposure hold points.

2.2.3 Only pressure-demand self-contained breathing apparatus should be used for entries into atmospheres immediately-dangerous-to-life-or-health (IDLH), or into areas where the level of hazard has not been assessed because of the existence of unusual conditions, or because of unanticipated releases of radioactive material.

Airborne radioactivity surveys should be performed as soon as possible in order to evaluate the use of other respiratory protection equipment in accordance with GEN-RPP-05 and GEN-RPP-10.

2.2.4 The Emergency Director has the authority and responsibility for approving emergency worker exposures above the 10 CFR 20 occupational limit of 5 rem. He may delegate this authority and responsibility by teleconference.

3.0 RESPONSIBILITIES

3.1 The Emergency Director is responsible for the following:

3.1.1 Approving emergency exposures greater the 10 CFR 20 Limits (delegable).

3.1.2 Concurring with the issuance of Potassium Iodide (KI) for workers within the Protected Area and instructing emergency workers outside the Protected Area to self-administer KI.

3.2 The TSC Manager is responsible for the following:

3.2.1 Concurring with the issuance of Potassium Iodide (KI) for workers within the Protected Area and instructing emergency workers to self-administer KI.

3.2.2 Recommending (and authorizing, if delegated) Emergency Exposures for workers within the Protected Area;

3.3 The Radiation Protection Manager is responsible for the following:

3.3.1 Recommending issuance of Potassium Iodide (KI) for workers within the Protected Area;

3.3.2 Recommending (and authorizing if delegated) Emergency Exposures for workers within the Protected Area;

3.4 The Radiological Emergency Manager is responsible for the following:

3.4.1 Recommending issuance of Potassium Iodide (KI) for workers outside the Protected Area;

3.4.2 Recommending (and authorizing, if delegated) Emergency Exposures for workers outside the Protected Area;

4.0 PROCEDURE

4.1 Emergency Worker PAGs

NOTE: It is the responsibility of the Radiation Protection Manager (for workers within the Protected Area), and Radiological Emergency Manager (for Energy Northwest emergency workers and field team members at any location outside of the Protected Area) to ensure appropriate Emergency Worker Protective Action Guidelines are followed.

When implementing emergency authorized exposure guides, prompt, sound judgment and flexibility of action are crucial to the success of any type of emergency action.

4.1.1 Refer to Attachment 7.2, EPA 400 Protective Action Guides for Emergency Workers before authorizing emergency worker exposures in excess of 5 rem.

4.1.2 Evaluate alternatives prior to granting authorization to exceed 10 CFR 20 occupational limits. Consideration of approving additional exposure beyond 5 rem should include the following:

- The presence of conditions that prevent the rotation of workers or other commonly used dose reduction methods.

- The exposure of workers that is incurred for the protection of large populations may be justified for situations in which the collective dose avoided by the emergency operation is significantly larger than incurred by the workers involved.

4.1.3 Document the request and justification for the Emergency Exposure on Attachment 7.4, Emergency Exposure Request.

4.1.4 Following completion of the Emergency Exposure Request, submit the request to the Emergency Director or designee for concurrence signature.

4.1.5 Caution personnel to maximize efforts to remain below emergency worker limits.

4.2 Administration of Potassium Iodide (KI)

4.2.1 Shift Manager Duties (as Emergency Director)

a. Refer to Attachment 7.3, Guidance for Administering Potassium Iodide (KI).

b. When action conditions are reached, recommend self-administration of KI to shift workers within the Protected Area. Consider emergency workers in the Control Room, Central Alarm Station, Security Communication Center, or any other Protected Area location deemed necessary.

4.2.2 Radiation Protection Manager Duties

a. Refer to Attachment 7.3, Guidance for Administering Potassium Iodide (KI).

b. When action conditions are reached, advise the TSC Manager that KI be recommended for affected emergency workers within the Protected Area. Consider emergency workers in the Control Room, Central Alarm Station, Security Communications Center, Technical Support Center / Operations Support Center and any other Protected Area location deemed necessary.

4.2.3 TSC Manager Duties

a. When advised by the RPM that the threshold for KI administration is met for Protected Area emergency workers, advise the appropriate centers to recommend self-administration of KI by emergency workers.

4.2.4 Radiological Emergency Manager Duties

a. Refer to Attachment 7.3, Guidance for Administering Potassium Iodide (KI).

b. When action conditions are reached, advise the EOF Manager that KI be recommended for affected emergency workers outside of the Protected Area. Consider all emergency workers within the Plume Exposure Emergency Planning Zone (EPZ). Note that the threshold for KI is different for Washington State emergency workers.

4.2.5 EOF Manager Duties as Emergency Director

a. When advised by the REM that the threshold for KI administration for Energy Northwest emergency workers outside the Protected Area is met, recommend affected Energy Northwest workers outside of the Protected Area to self-administer KI

b. Complete a CNF (form 24075 or electronic equivalent) and initiate a Crash call to notify offsite authorities (State, Counties, and DOE-RL) that the State criteria for recommending KI has been met.

5.0 REFERENCES

5.1 10 CFR 50.47(b)(11) {R-1599}

5.2 FSAR, Chapter 13.3, Emergency Plan, Section 5

5.3 10 CFR 20, Standards for Protection Against Radiation

5.4 United States Environmental Protection Agency, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents," EPA 400, May 1992

5.5 Letter No. G02-93-125, Supply System [Energy Northwest] to NRC, Dated May 27, 1993 {2.1}

5.6 GEN -RPP-05, Respiratory Program Description

5.7 GEN-RPP-07, Personnel Exposure Limits and Monitoring Requirements

5.8 GEN-RPP-10, Use of Respiratory Protection Equipment

5.9 PPM 13.2.2, Determining Protective Action Recommendations

5.10 PPM 13.13.3, Intermediate Phase MUDAC Operations

5.11 State of Washington - Department of Health, "Response Procedures for Radiation Emergencies," June 1993

5.12 Letter No. G02-93-125, Supply System [Energy Northwest] to NRC, Dated May 27, 1993 {2.1}

6.0 DOCUMENTATION

All logs, forms and records completed as the result of implementing this procedure during an actual declared event shall be retained as permanent plant records. Transmit documents to the Permanent Plant File under DIC 2304.2.

A sub-set of documents generated during drills shall be maintained in the Emergency Preparedness Department files, as necessary, to support completion of drill/exercise commitments.

7.0 ATTACHMENTS

7.1 Federal Personnel Dose Limits (10 CFR 20)

7.2 EPA 400 Protective Action Guides For Emergency Workers

7.3 Guidance for Administering Potassium Iodide (KI)

7.4 Emergency Exposure Request

7.5 Risks Associated with Emergency Exposures

FEDERAL PERSONNEL DOSE LIMITS (10 CFR 20)

Dose Limits for Adults, Embryo/Fetus, Minors, Members of the Public, and PSEs.

The licensee shall control the occupational dose to individual adults (20.1201), dose to an embryo/fetus during the entire pregnancy for declared pregnant women (20.1208), doses to minors (20.1207), individual members of the public (20.1301), and exposures necessary due to an exceptional situation constituting a planned special exposures (20.1206). The following dose limits apply:

- The total effective dose equivalent (TEDE) for adult workers shall be limited to 5 rem (5,000 mrem) per year.
- The total organ dose equivalent (TODE) for adult workers shall be limited to 50 rem (50,000 mrem) per year.
- The lens dose equivalent (LDE) for adult workers shall be limited to 15 rem (15,000 mrem) per year.
- The shallow dose equivalent (SDE) to the skin or to any extremity for adult workers shall be limited to 50 rem (50,000 mrem) per year.
- Hot particle exposure limits are the same as the shallow dose equivalent (SDE) limit to the skin (50 rem/yr), but will not be added to skin dose(s) from sources other than hot particles, nor are hot particles exposures from different particles summed unless the different particles result in doses to the same area (within 1 cm) of the skin.
- The dose to the embryo/fetus during the entire pregnancy, due to occupational exposure of a declared pregnant woman, shall not exceed 0.5 rem (500 mrem) TEDE. If the embryo/fetus has accumulated 0.5 rem or greater during the time between conception and declaration, the embryo/fetus shall be limited to 0.05 rem (50 mrem) for the remainder of the pregnancy.
- The annual occupational dose limits for minors are 10 percent of the annual dose limits specified for adult workers.
- Individual members of the general public shall be limited to 0.1 rem per year (100 mrem) TEDE from licensed operations.

END

EPA 400 PROTECTIVE ACTION GUIDES FOR EMERGENCY WORKERS

DOSE LIMIT (TEDE)+	ACTIVITY	PROTECTIVE ACTIONS
5 rem	ALL	
10 rem	PROTECTING VALUABLE PROPERTY	Lower dose not practicable
25 rem	LIFE-SAVING OR PROTECTION OF LARGE POPULATIONS	Lower dose not practicable
>25 rem	LIFE-SAVING OR PROTECTION OF LARGE POPULATIONS	Only on a voluntary basis to persons fully aware of the risks involved.

Refer to Attachment 7.3 for information concerning the administration of Potassium Iodide (KI).

\+ Sum of external effective dose equivalent and committed effective dose equivalent to nonpregnant adults from exposure and intake during an emergency situation. Workers performing services during emergencies should limit dose to the lens of the eye to three times the listed value and doses to any other organ (including skin and body extremities) to ten times the listed value. These limits apply to all doses from an incident, except those received in an unrestricted area as members of the public during the intermediate phase of the incident.

END

GUIDANCE FOR ADMINISTERING POTASSIUM IODIDE (KI)

A. Purpose

This attachment provides guidelines for recommending administration of potassium iodide (KI) to all emergency workers both on and offsite as a thyroid-blocking agent to provide protection against airborne radioiodine.

B. Location of KI Supplies

1. Control Room
2. Technical Support Center / Operations Support Center
3. In-plant Emergency Equipment Cabinets
4. Emergency Operations Facility
5. Field Team Kits
6. Security Communication Center and Sweeper/Roadblock Kits in Protected Area Access Point (PAAP)
7. Central Alarm Station

The amount of thyroid blocking agent (KI) maintained was determined as follows:

Identify the number of responding ERO personnel, double that number to represent two shifts, and multiply by 10 (10 day maximum dosage) to determine number of doses required. NOTE: Number of dose boxes is dependent upon the number of doses contained in a box or package.

C. Discussion

Each thryoid blocking tablet contains either 130 mg or 65 mg of potassium iodide (KI). Certain forms of iodine help the thyroid gland work. The thyroid can "store" or hold only a certain amount of iodine. In a radiation emergency, radioactive iodine may be released in the air where it may be breathed or swallowed. It may enter the thyroid gland and damage it by overexposure. When potassium iodide is administered, it saturates the thyroid gland, thereby reducing the chance that harmful radioactive iodine will enter the thyroid gland.

Possible side effects include skin rashes, swelling of the salivary glands, and "iodism", (metallic tastes, burning mouth and throat, sore teeth and gums, symptoms of a head cold, and sometimes upset stomach and diarrhea). A few people have an allergic reaction with more serious symptoms. These could be fever and joint pains, or swelling of parts of the face and body and at times, severe shortness of breath that requires immediate medical attention. Taking iodine may rarely cause overactivity of the thyroid gland, underactivity of the thyroid

gland, or enlargement of the thyroid gland (goiter). The only people who should not take potassium iodide are people who know they are allergic to iodine. One may take potassium iodide even if you are taking medicine for a thyroid problem (for example, a thyroid hormone or anti-thyroid drug). Pregnant and nursing women can also take this drug.

D. Precautions

1. Potassium iodide should not be used by people allergic to iodine. In case of overdose or allergic reaction, refer the individual to medical personnel.

2. Doses recommended by these guidelines should be followed by all applicable personnel to avoid overdoses or insufficient protection.

3. Only the TSC Manager and EOF Manager (or the Shift Manager acting as Emergency Director) can authorize the use of a thyroid blocking agent (KI). The TSC Manager and EOF Manager (or the Shift Manager acting as Emergency Director) SHALL establish the extent and duration of the thyroid blocking agent (KI) usage, based on radiological conditions and the advice of the Radiation Protection Manager or Radiological Emergency Manager, as appropriate.

E. Determination of KI Use

NOTE: If airborne Iodine concentrations have not been analyzed, consider plant conditions including the potential for unmonitored/unfiltered releases from the reactor coolant pressure boundary to occupied, or potentially occupied spaces.

In the event of a release involving radioiodine, the TSC Manager, in consultation with the Radiation Protection Manager, will issue instructions concerning the use of potassium iodide by in-plant emergency workers. The EOF Manager, in consultation with the Radiological Emergency Manager, will issue instructions to Energy Northwest environmental field teams and emergency workers in the Exclusion Area concerning the use of potassium iodide. The Emergency Director will notify offsite agencies (State, Counties, and DOE-RL) that the State of Washington's criteria for administration of KI to Washington field teams has been met.

CAUTION

The following criteria for recommending KI for emergency workers applies to Washington State emergency workers only and not to Energy Northwest personnel. The Energy Northwest criterion for dose is significantly higher and is presented later in steps E.2 and E.4 of this Attachment.

1. The EOF Manager, in consultation with the Radiological Emergency Manager, should notify the offsite agencies (State, Counties, and DOE-RL) authorities that the Washington State criteria for administering KI based on the following criteria have been met:

- Projected or actual 250 mrem/hr to the Thyroid at 1.2 miles, OR
- Air sample results > 1.4×10^{-7} µCi/cc I-131 at 1.2 miles, OR
- Unfiltered or unmonitored release from a nuclear power plant

2. The TSC Manager, or the Shift Manager acting as the Emergency Director, in consultation with the Radiation Protection Manager, should recommend that emergency workers in any affected Protected Area location take KI:

   If the projected thyroid CDE is 25 rem or more based on local air sampling and / or plant conditions. (See note.) 25 rem CDE is 1000 DAC hours and is equivalent to an intake of approximately 25 microCuries of Iodine-131.

NOTE: If airborne Iodine concentrations have not been analyzed, consider plant conditions including the potential for unmonitored / unfiltered releases from the reactor coolant boundary to occupied or potentially occupied spaces.

3. As directed by the Radiation Protection Manager, personnel within the Protected Area shall use appropriate respiratory protection, and/or KI for thyroid protection.

CAUTION

The following criteria for recommending KI for emergency workers applies to Energy Northwest emergency workers only and not to Washington State personnel. The Washington State criteria for dose is significantly less and is presented in step E.1 of this Attachment.

4. The EOF Manager, in consultation with the Radiological Emergency Manager, should recommend that Energy Northwest emergency workers at affected locations outside the Protected Area (Security personnel, environmental field teams, etc.) take KI:

   - If the projected thyroid CDE is 25 rem or more at 1.2 miles
   - 25 rem CDE thyroid is 1000 DAC-hours and is equivalent to an intake of approximately 25 µCi Iodine-131

5. Determine the radiological conditions in occupied areas using the following methods, as applicable:

   - Dose rate surveys
   - Air samples
   - Continuous Air Monitor (CAM) readings
   - Area Radiation Monitor readings

- Plant effluent process monitor readings
- Offsite dose projection data

6. Determine if nonessential personnel could be evacuated from affected areas to prevent potential, large thyroid doses.

7. Based on actual (or potential) radiological conditions, determine the projected thyroid dose to personnel in occupied, affected areas.

NOTE:	The FDA's Bureau of Radiological Health and Drugs Bulletin Volume XVI, Number 7, recommends issuance of KI to individuals projected to receive a thyroid dose of 25 rem CDE or more.

8. If the projected dose to affected personnel has been exceeded, or is projected to exceed 25 rem CDE thyroid, the RPM should recommend to the TSC Manager or the REM should recommend to the EOF Manager that KI be administered (to affected personnel only).

NOTE:	To be most effective, potassium iodide must be taken immediately prior to, or within a few hours after exposure to high concentrations of radioiodine.

9. If the TSC Manager or EOF Manager (or Shift Manager as Emergency Director) is advised to recommend administration of KI to affected personnel, refer to Section F of this Attachment.

10. The EOF Manager should notify offsite authorities (State, Counties, and DOE-RL) when the State criteria for recommending KI has been met.

NOTE:	The use of potassium iodide is strictly voluntary.

F. KI Issuance Instructions

CAUTION

Prior to issuing Potassium Iodide, personnel should be cautioned to NOT participate if they know that they are allergic to iodine.

1. Issue KI to affected individuals as follows:

   - Question personnel to determine if they know if they are allergic to iodine, and if so, DO NOT issue KI to those individuals.

- Determine if individuals will voluntarily participate (by taking KI) as directed.
- For participating individuals, issue one package of potassium iodide (KI) tablets to each individual whose thyroid dose is projected to exceed 25 rem CDE.
- Provide a thyroid blocking agent (KI) information pamphlet to all individuals issued KI and ensure personnel are aware of the following information:
  - The recommended KI dosage is 130 mg daily (one 130mg or two 65mg tablets), for a period not to exceed 10 days
  - Do not exceed the recommended dosage
  - Begin taking KI when advised to do so by the TSC Manager or Emergency Director.
  - To be most effective, KI should be taken shortly before, or immediately after, exposure to radioiodine, however, the initial administration will still have substantial benefit if it is taken three or four hours after exposure
  - If side effects are experienced, stop taking KI, notify your supervisor and obtain medical attention
- Using the Personnel Accountability Log or other appropriate log, record the following information:
  - The name of the individuals contacted
  - Whether the individual participated in KI administration
  - The date and time the individual began using KI

2. Upon completion of KI issuance to affected personnel, the RPM should inform the TSC Manager and the REM should inform the EOF Manager of any individuals that decline to use KI.

3. Return all completed Personnel Accountability Logs or other logs used to issue KI to the RPM and REM.

4. When directed, personnel should discontinue taking KI and return the unused portion to the Plant for proper disposal.

5. The Personnel Accountability Logs or other logs used to issue KI should be completed by indicating the date individuals discontinued KI use.

END

Attachment 7.3, Guidance for Administering Potassium Iodide (KI)

EMERGENCY EXPOSURE REQUEST

NOTE: EPA 400 Protective Action Guides for Emergency Workers (Attachment 7.2) limits exposure to non-pregnant adults during emergency situations. A "Declared Pregnant Woman" is not eligible to receive increased exposure for emergency response.

TASK / JUSTIFICATION FOR INCREASED EXPOSURE:

_____

_____

_____

_____

_____

Exposure Limit for This Individual: _____

INDIVIDUAL INFORMATION:

Name: _____ Date: _____

Declared Pregnant Woman: (Y/N) _____

I have received instructions in the measures to be taken, the radiological conditions, and have been advised of the associated risks (risks outlined in Procedure 13.2.1 Attachment 7.5) involved.

Individual to receive increased exposure: _____
(Signature required if expected to exceed GT TEDE 25 REM)

COGNIZANT EMERGENCY MANAGER (RPM or REM)

All evaluations are complete, documented and attached, if necessary:

_____ Date: _____

APPROVAL:

Emergency Director or Designee:

_____ Date: _____

END

RISKS ASSOCIATED WITH EMERGENCY EXPOSURES

Health effects associated with whole body absorbed doses received within a few hours[a]

Dose in rad (≈ Rem DDE)	Percent of population affected by prodromal[b] effects (e.g. reddening of skin, loss of appetite, nausea, fatigue, diarrhea)	Dose in rad (≈ Rem DDE)	Early fatalities (percent affected)
50 rad	2 %	140 rad	5 %
100 rad	15 %	200 rad	15 %
150 rad	50 %	300 rad	50 %
200 rad	85 %	400 rad	85 %
250 rad	98 %	460 rad	95 %

Approximate cancer risk to average individuals from 25 Rem TEDE received promptly

Age at exposure (years)	Risk of premature death (deaths per 1000 persons exposed)	Average years of life lost if premature death occurs (years)
20 to 30	9.1	24
30 to 40	7.2	19
40 to 50	5.3	15
50 to 60	3.5	11

[a] Risks will be lower for extended exposure periods.

[b] Forewarning symptoms of more serious health effects associated with large doses of radiation.

[c] The early death threshold (lowest observed dose at which a fatality has been observed) is 150 Rem. Values assume no medical treatment; supportive medical treatment may increase the dose at which these frequencies occur by approximately 50 percent.

Other Potential Effects:

1. Exposure of 50 Rad to the Thyroid Gland may result in damage and benign (non-cancerous) tumors.

2. When a person is exposed to around 100 rads, the blood's lymphocyte cell count will be reduced, leaving the victim more susceptible to infection. This is the threshold level for short term observable symptoms due to exposures.

3. At exposures of 200 rads or higher loss of hair quickly in clumps occurs.

4. Exposure of > 200 rads may damage to the intestinal tract lining and cause nausea, bloody vomiting or diarrhea.

5. Since central nervous system and brain cells do not reproduce, they won't be damaged directly unless the exposure is 5,000 rads or greater. NOTE: Death is certain at doses >2000 rads.

END

Attachment 7.5, Risks Associated with Emergency Exposures

Verify Revision Information Prior To Use	Initials	
	Date	

Number: 13.2.2	Use Category: REFERENCE	Major Rev: 020 Minor Rev: 001 Page: 1 of 17
Title: Determining Protective Action Recommendations		

PLANT PROCEDURES MANUAL	PCN#: N/A
 13.2.2	Effective Date: 12/21/17

DESCRIPTION OF CHANGES

Justification (required for major revision)
Addition of Monitor and Prepare for Protective Action Recommendations

Page(s)	**Description (including summary, reason, initiating document, if applicable)**
Page 4	2.2.1 Definition of Evacuation 2.2.2 Definition of Shelter in Place 2.2.3 Definition of Monitor and Prepare
Page 14	Attachment 7.1, added Monitor and Prepare to flowchart
Page 16	Revised Note 4 for "Shelter In Place" from "Shelter" New Note 5 "Monitor and Prepare, Renumbered notes 6, 7 and 8
Page 4,8, 10	**Minor Rev 01**: Corrected several references from Note 5 to Note 6 (References weren't revised when new Note 5 was added in Rev 20). Steps 2.2, 4.2.1.b & c, 4.4.1
Page 10	**Minor Rev 01:** Corrected Title of "Fission Product Barrier Threshold Matrix" in step 4.4.1

TABLE OF CONTENTS

1.0 PURPOSE

The purpose of this procedure is to provide instructions and guidance for the formulation of offsite Protective Action Recommendations (PARs) based on plant or radiological conditions and determining onsite protective action decisions. {R-1595}, {R-1596}

2.0 DISCUSSION

2.1 The responsibility for making PARs resides with the individual who has the responsibility of the Emergency Director. If the ERO is manned, The Emergency Director (ED) should obtain input from the Radiological Emergency Manager (REM) in the EOF for offsite PARs, and from the Radiation Protection Manager (RPM) in the TSC for recommendations for onsite protective actions, if possible.

2.2 PARs are based on plant or radiological conditions.

Recommendations for sections impacted are based on the following;

- Plant Conditions – use attachment 7.1 note 6 "Downwind Section" table to define/select the downwind section(s) impacted.
- Radiological Conditions – use dose projection program to define/select the downwind section(s) impacted.

2.2.1 Evacuation - A type of protective action in which instructions are given to evacuation and control of access to an affected area can be the most effective protective action for reducing the dose to the public. However, constraints such as severe weather conditions, obstruction of roads and limited time may impact the benefits of evacuation.

2.2.2 Shelter In Place (SIP) - A type of protective action in which instructions are given to members of the public to remain indoors, turn off heating or air conditioning (as appropriate for the region and season), close windows, monitor communication channels, and prepare to evacuate. Shelter in Place should be given to those sections where impediments to Evacuation exist or if a controlled release due to controlled venting of the primary containment is being performed.

2.2.3 Monitor and Prepare- A type of precautionary action intended to advise the public within the EPZ that a serious emergency at the nuclear power plant exits and that it should monitor the situation and prepare for the possibility of Evacuation, Shelter in Place, or other protective actions. Monitor and Prepare should be given to the 2 to 10 miles sections that are not affected by the downwind plume.

2.3 Additional EPZ sections should not be recommended for evacuation unless conditions make it necessary to do so. Expanding the evacuation zone when conditions do not require this action could present a greater hazard to evacuees than allowing them to remain in place. Needless evacuation also reduces the effectiveness of the offsite resources used to accommodate the evacuation.

2.4 Changes in wind direction may indicate that if a release begins, it would affect different downwind section(s). If there are indications that containment may fail, a new PAR for new section(s) should be issued. If a radiological assessment shows that an ongoing release or ongoing containment source term is not sufficient to cause exposures in excess of EPA protective action guidelines, the PAR should not be expanded based only on changes in wind direction.

2.5 Industrial Development Complex personnel are evacuated at the Site Area Emergency classification per PPM 13.5.1.

2.6 There are precautionary offsite protective actions that are recommended automatically at the Site Area Emergency and General Emergency classifications. These are specified under the Site Area Emergency and General Emergency boxes on the Classification Notification Form (CNF) (Form 24075). If there are PARs in addition to those that are automatic, they are addressed for the General Emergency in box # 6. Implementation of protective actions for offsite areas within the 10 mile EPZ is the responsibility of Benton and Franklin Counties and DOE-RL officials.

2.7 The protective actions outlined in this procedure are limited to actions for minimizing the exposure of the public within the 10 mile EPZ to external and internal radiation exposure from plume passage or inhalation of the radioactive plume and actions to determine PARs beyond the 10 mile EPZ. Other protective actions for minimizing public exposure via the ingestion pathway will be determined and implemented by Energy Northwest and Washington State.

2.8 Plant and offsite officials should continue assessment actions based on additional plant information, dose projections, and field monitoring results. After performing the initial early evacuation actions near the plant, licensee and offsite officials should modify their protective action recommendations as necessary based on field monitoring and dose projections, which indicate that EPA protective action guide doses may be exceeded in areas beyond those that have been evacuated. On the basis of this information, plant and offsite officials may expand the evacuations to encompass other areas in the plume EPZ and, for the worst case accidents; protective actions may be required beyond the plume EPZ.

2.9 Once a PAR is made for evacuation of a 10 mile EPZ section and action has been taken by an agency to implement that recommendation as a Protective Action Decision (PAD), do not replace the evacuation PAR with a sheltering PAR. {5.1.2}

3.0 RESPONSIBILITIES

3.1 The Emergency Director is responsible for:

3.1.1 Determining and making offsite Protective Action Recommendations (PARs);

3.1.2 Ensuring PARs are transmitted to the appropriate Offsite Authorities.

3.2 The Radiation Protection Manager (RPM) is responsible for:

3.2.1 Assess offsite doses and make recommendations concerning protective actions to the TSC Manager until the Radiological Emergency Manager at the EOF takes over this function.

3.3 The Radiological Emergency Manager (REM) is responsible for:

3.3.1 Managing radiological dose assessment and field monitoring activities.

3.3.2 Assists in development of PARs and, during the late phases of the response, coordinates this activity with the States of Washington and Oregon and the US DOE and provides offsite radiological PARs to the EOF Manager.

4.0 PROCEDURE

NOTE: Protective actions are not required at the Unusual Event or Alert emergency classification levels.

4.1 Automatic PARs at a Site Area Emergency **OR** a General Emergency

RECOMMEND evacuation of the following areas for SAE or GE classifications:

- Columbia River
- Ringold Fishing Area
- Wahluke Hunting Area
- Schools in EPZ
- Horn Rapids Recreation Area/ORV Park

4.2 Initial PARs for General Emergency Classifications

NOTE: Do not delay recommending offsite protective actions for areas within the EPZ, while waiting for field monitoring results to verify the accuracy of the dose projection results.

4.2.1 **REFER** to Attachment 7.1, Decision Guide for Offsite Protective Action Recommendations at a GE, to ensure appropriate PAR is determined.

a. IF a dose projection has been made, and indicate either;
≥1000 mRem TEDE or ≥5000 mRem CDE Thyroid (PAGs),
THEN **DETERMINE** appropriate downwind section(s) based on the dose projection program output.

b. IF a dose projection has been made, and indicate both;
<1000 mRem TEDE and <5000 mRem CDE Thyroid (PAGs),
THEN **DETERMINE** the appropriate downwind section(s) based on attachment 7.1 note 6 "Downwind Section" table.

c. IF NO dose projection has been made,
THEN **DETERMINE** the appropriate downwind section(s) based on attachment 7.1 note 6 "Downwind Section" table.

4.2.2 **INDICATE** the PAR on the Classification Notification Form, Form 24075, (CNF).

4.2.3 IF there is to be a Controlled Release (such as containment venting),
THEN **DISCUSS** activity with offsite authorities to inform them of the intent to vent the containment.

4.2.4 WHEN aware of circumstances such as severe weather, or concurrent emergencies that may impact specific areas for which PARs are being proposed,
THEN **INFORM** the Benton and Franklin County EOCs which sections are most affected (so that routes to be taken or avoided may be identified), or provide other special considerations in the notification to offsite agencies.

4.2.5 **COMPLETE** the appropriate parts of the CNF, and
PERFORM the required notifications in accordance with PPM 13.4.1, Emergency Notifications.

4.2.6 The EOF Manager should **ENSURE** the status of PARs is tracked.

4.2.7 **CONTINUE** event assessment after making the initial PAR for the General Emergency classification based on:

- available plant data,
- meteorological data
- dose projections
- field monitoring data

4.3 Updating Offsite PARs Based on Projected Doses or Offsite Field Monitoring Data

NOTE:	Do not delay recommending offsite protective actions for areas within the EPZ, while waiting for field monitoring results to verify the accuracy of the dose projection results.

4.3.1 **OBTAIN** AND **REVIEW** applicable offsite dose projection and/or survey data.

4.3.2 **DETERMINE** if the dose projection or survey data indicates either;
≥1000 mRem TEDE or ≥5000 mRem CDE Thyroid (PAGs).

a. IF review of dose projections or survey results indicate the limit has been exceeded in any sections not already evacuated, and evacuation is determined to be warranted, THEN **ISSUE** a new PAR for additional affected section(s).

b. IF dose projections or survey results indicate a PAG may be exceeded beyond 10 miles,
THEN **REFER** to step 4.5.

4.3.3 WHEN aware of circumstances such as severe weather, or concurrent emergencies that may impact specific areas for which PARs are being proposed,
THEN **INFORM** the Benton and Franklin County EOCs which sections are most affected (so that routes to be taken or avoided may be identified), or provide other special considerations in the notification to offsite agencies.

4.3.4 IF any of the above actions result in a change to established PARs;
COMPLETE the appropriate parts of the CNF.
PERFORM the required notifications in accordance with PPM 13.4.1, Emergency Notifications.

4.3.5 The EOF Manager should **ENSURE** the status of PARs is tracked.

4.4 Updating Offsite PARs Based on Change of Wind Direction with No PAG exceeded

4.4.1 **ISSUE** a new PAR **ONLY** if the following conditions are met:

- The change in wind direction affects a downwind section (see Attachment 7.1, note 6, for Downwind Sections) for which an Evacuation PAR has **NOT** been issued.

  AND

- Containment Radiation Monitor reading GT 14,000 R/hr.

  AND

- LOSS **OR** POTENTIAL LOSS of Primary Containment as indicated by the Fission Product Barrier Threshold Matrix in PPM 13.1.1, Classifying the Emergency.

4.4.2 WHEN aware of circumstances such as severe weather, or concurrent emergencies that may impact specific areas for which PARs are being proposed,
THEN **INFORM** the Benton and Franklin County EOCs which sections are most affected (so that routes to be taken or avoided may be identified), or provide other special considerations in the notification to offsite agencies.

4.4.3 IF any of the above actions result in a change to established PARs;
COMPLETE the appropriate parts of the CNF, and
PERFORM the required notifications in accordance with PPM 13.4.1, Emergency Notifications.

4.4.4 The EOF Manager should **ENSURE** the status of PARs is tracked.

4.5 PARs Beyond 10 Miles

4.5.1 **CONSIDER** plume PARs beyond 10 miles if dose projections indicate either; ≥1000 mRem TEDE or ≥5000 mRem CDE Thyroid (PAGs), may be exceeded beyond 10 miles. {5.1.1}

NOTE: If downwind field monitoring data is not available, base PAR on dose projection results.

- **For the Control Room, (Shift Manager as Emergency Director)**:
  a. IF dose projections exceed PAGs beyond 10 miles,
  THEN **OBTAIN** downwind field monitoring data to verify dose projection results.
  b. **USE** dose projection program 50 mile map to determine extent (distance) of the GE plume.
     1. **Determine** the distance to the leading edge of the GE portion of the plume, then round up to the next whole mile.
     2. **Select** the extended quadrant section(s).
  c. **MAKE** Evacuation PAR to include the previously affected downwind section(s) and to the additional extent (distance beyond 10 miles) indicated for the extended quadrant section(s).
  d. **COMPLETE** the appropriate parts of the CNF, and
  PERFORM the required notifications in accordance with PPM 13.4.1, Emergency Notifications.

- **For the EOF or TSC, (EOF Manager or TSC Manager as Emergency Director)**:
  a. IF dose projections exceed PAGs beyond 10 miles,
  THEN **OBTAIN** downwind field monitoring data to verify dose projection results.
  b. **USE** dose projection program 50 mile map to determine area encompassed by the GE plume.
     1. **Determine** the distance to the leading edge of the GE portion of the plume, then round up to the next whole mile.
     2. **Select** geo-political boundaries such as roads, rivers and county lines (that encompass the GE portion of the plume) to define the boundaries of the PAR beyond 10 miles.
  c. **MAKE** Evacuation PAR to include the previously affected downwind section(s) and to the additional area indicated by the geo-political boundaries beyond 10 miles.
  d. **COMPLETE** the appropriate parts of the CNF, and
  PERFORM the required notifications in accordance with PPM 13.4.1, Emergency Notifications.
  e. The EOF Manager should **ENSURE** the status of PARs is tracked.

5.0 REFERENCES

5.1 Regulatory / Licensing Documents

5.1.1 Federal Emergency Management Agency, Area Requiring Corrective Action, ARCA S873 {5.1.1}

5.1.2 NRC Regulatory Issues Summary (RIS) 2003-12, Clarification of NRC Guidance for Modifying Protective Actions {5.1.2}

5.1.3 Columbia Generating Station Physical Security Plan {R-1123}

5.1.4 10 CFR 73.55(a), Requirements for Physical Protection of Licensed Activities in Nuclear Power Reactors Against Radiological Sabotage {R-1124}

5.1.5 10 CFR 47(b)(10) {R-1595}, {R-1596}

5.1.6 NRC RIS 2005-08, Endorsement of Nuclear Energy Institute (NEI) Guidance "Range of Protective Action for Nuclear Power Plant Incidents"

5.1.7 EP-01, Emergency Plan

5.1.8 NUREG-0654/FEMA-REP-1, Rev. 1, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, Supplement 3

5.1.9 10 CFR 20, Standards for Protection Against Radiation

5.1.10 EPA 400, U. S. Environmental Protection Agency, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents", May 1992

5.1.11 Evacuation Time Estimates for Plume Exposure Pathway Emergency Planning Zone, Columbia Generating Station, October 2012

5.2 Procedures

5.2.1 State of Washington - Department of Health, "Response Procedures for Radiation Emergencies"

5.2.2 PPM 13.1.1, Classifying The Emergency

5.2.3 PPM 13.2.1, Emergency Exposure Levels/Protective Action Guides

5.2.4 PPM 13.4.1, Emergency Notifications

5.2.5 PPM 13.5.1, Evacuation

5.2.6 PPM 13.8.1, Emergency Dose Projection System Operations

5.2.7 PPM 13.13.3, Intermediate Phase MUDAC Operations

5.3 Forms

5.3.1 Classification Notification Form (CNF), 24075

6.0 DOCUMENTATION

6.1 All logs, forms and records completed as the result of implementing this procedure during an actual declared event shall be retained as permanent plant records. Transmit documents to the Permanent Plant File under DIC 2304.2.

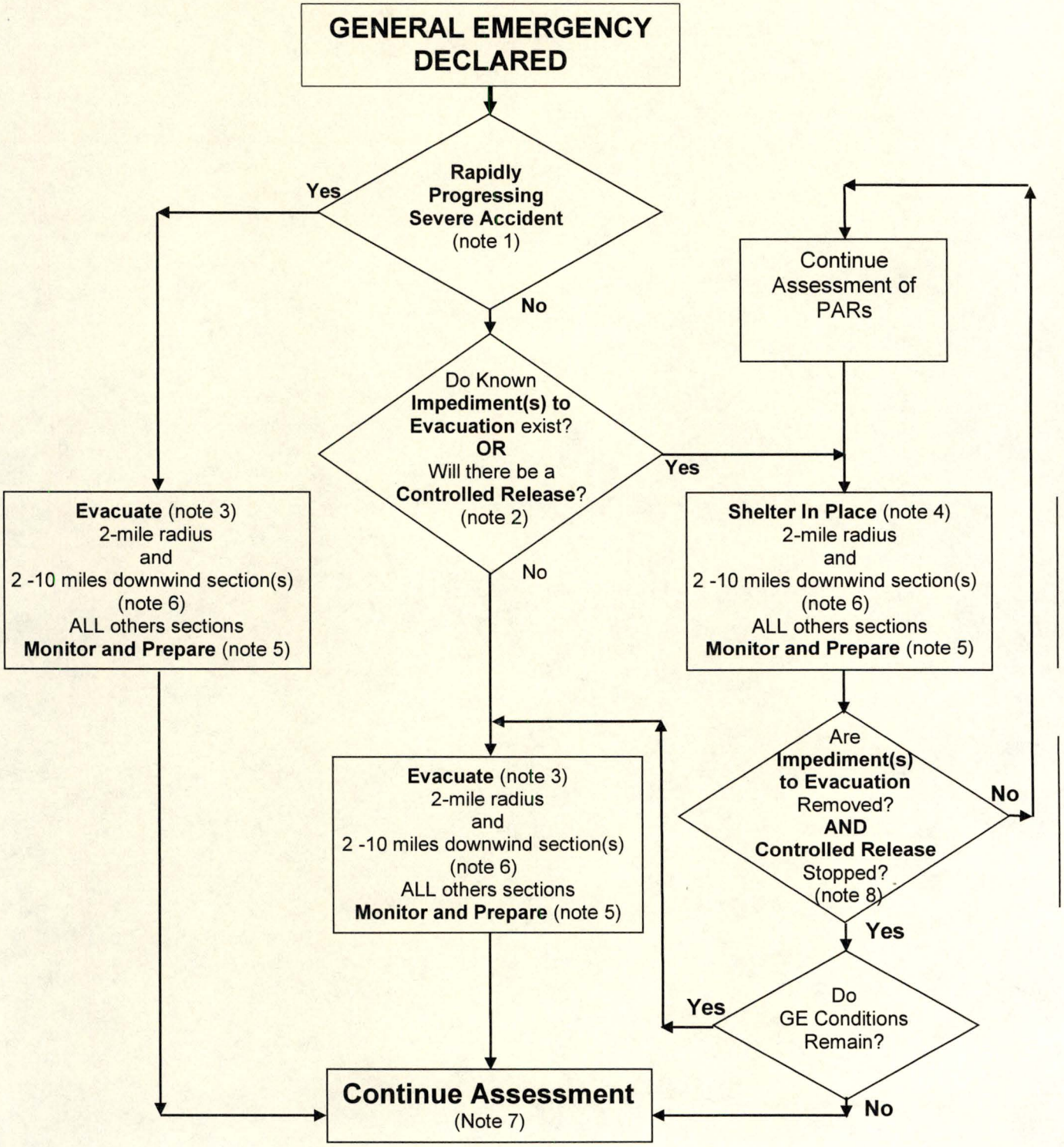
6.2 A sub-set of documents generated during drills shall be maintained in the Emergency Preparedness Department files, as necessary, to support completion of drill/exercise commitments.

7.0 ATTACHMENTS

7.1 Decision Guide for Offsite Protective Action Recommendations at a GE

7.2 PAGs for the Early Phase of a Nuclear Incident

DECISION GUIDE FOR OFFSITE PROTECTIVE ACTION RECOMMENDATIONS AT A GE



Attachment 7.1, Decision Guide for Offsite Protective Action Recommendations at a GE

Note 1: **Rapidly Progressing Severe Accident**
A rapidly progressing severe incident is a General Emergency (GE) with rapid loss of containment integrity (emergency action levels indicate containment barrier loss) and loss of ability to cool the core. This path is used for scenarios in which containment integrity can be determined as bypassed or immediately lost during a GE with core damage.

If this scenario cannot be immediately confirmed, assume it is not taking place and answer "no" to this decision block.

A rapidly progressing severe incident may be defined as:

1. The PAR is the first after a GE has been declared.
   AND
2. There is loss of the containment barrier per the Emergency Action Levels
   AND
3. EITHER of the following:
   a. Containment Radiation Monitor CMS-RIS-27E and CMS-RIS-27F reading GT 14,000 R/Hr.
      OR
   b. A significant radiological release (greater than PAGs at 1.2 miles) in about an hour.

Note 2: Known **Impediment(s) to Evacuation** or **Controlled Release**

- If the General Emergency is due to Hostile Action, then this would be considered an **Impediment to Evacuation**. This impediment is effective until the Off-Site Incident Commander has determined that conditions are safe for evacuations to proceed and communicated this to CGS Emergency Director.

- If notified by OROs prior to beginning the PAR determination that; adverse weather, earthquake, wildfire, etc... would preclude the safe or timely evacuation of the public at the time of the emergency, then that condition constitutes a known **Impediment to Evacuation**.

- **Controlled Release**, Primary Containment venting that is performed to prevent containment failure and can be terminated within one hour. Controlled means that the release was initiated by Operator Action and can be terminated by Operator Action.

Note 3: **Evacuate**; Evacuation and control of access to an affected area can be the most effective protective action for reducing the dose to the public unless circumstances as discussed in note 2 exist.

Note 4: **Shelter In Place** (SIP); Shelter in Place should be given to those sections where impediments to evacuation exist or if a controlled release due to controlled venting of the primary containment is being performed. Given that a decision could be made to Shelter in Place for a short duration release (containment venting), it should be recognized that Shelter in Place is a temporary measure and does not provide long-term protection from airborne radioactive materials. It loses effectiveness as interior air equalizes in concentration with the outside environment. Therefore, any recommendation for the public to Shelter in Place should be followed by additional instructions at the appropriate time.

Note 5: **Monitor and Prepare**; The instruction to monitor and prepare is intended to engage the population within the plume exposure pathway emergency planning zone, inform them of the emergency, and advise them that they should monitor the situation and prepare for the possibility of Evacuation, Shelter in Place, or other protective actions. Monitor and Prepare should be given to the 2 to 10 miles sections that are not are not affected by the downwind plume.

Note 6: **Downwind Section(s)**

Sections for the surrounding 10-mile EPZ are divided into 4 - 90° sections. Determining which section(s) that are impacted may be performed by:

- Using dose projections software, or
- Using the following table.

Downwind Sections	
Wind Direction (from)	Sections Impacted
012° to 079°	3
080° to 124°	3, 4
125° to 146°	4
147° to 214°	1, 4
215° to 259°	1
260° to 304°	1, 2
305° to 326°	2
327° to 011°	2, 3

Note 7: **Continue Assessments**

Radiological and meteorological assessments should be continued and evacuation considered for any areas where dose projections or field measurements indicate that PAGs may be exceeded.

Note 8: Are **Impediment(s) to Evacuation** Removed? And **Controlled Release** Stopped? Both actions must be yes if either condition had occurred earlier (note 2) or the condition is not applicable.

END

PAGS FOR THE EARLY PHASE OF A NUCLEAR INCIDENT

From EPA 400, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents

PROTECTIVE ACTION	PAG (projected dose)	COMMENTS
Evacuation (or sheltering[1])	1 - 5 Rem TEDE OR 5 - 25 Rem CDE thyroid OR 50 - 500 Rem skin	Evacuation (or, for some situations, sheltering[1]) should normally be initiated at the lowest level of the range.

[1] Sheltering may be the preferred protective action when it will provide protection equal to or greater than evacuation, based on consideration of factors such as source term characteristics, and temporal or other site-specific conditions.

Evacuation vs. Sheltering

Because of the higher risk associated with evacuation of some special groups in the population (e.g. those who are not readily mobile), sheltering may be the preferred alternative for such groups as a protective action at projected doses up to 5 Rem TEDE. In addition, under unusually hazardous environmental conditions, use of sheltering at projected doses up to 5 Rem to the general population (and up to 10 Rem to special groups) may be justified.

While Offsite Officials will determine when the use of Sheltering is appropriate, the CGS Emergency Director will consider these principles when deciding to recommend to Evacuate or Shelter in accordance with this procedure.

END

Verify Revision Information Prior To Use	Initials	
	Date	

Number: 13.10.17	Use Category: REFERENCE	Major Rev: 005 Minor Rev: 001 Page: 1 of 12
Title: TSC Ventilation Radiation Monitor System Operations		

PLANT PROCEDURES MANUAL	PCN#: N/A
13.10.17	Effective Date: 12/21/17

DESCRIPTION OF CHANGES

Justification (required for major revision)
This is a major revision to incorporate user comments to clarify the sequence of time stamp placement and stopping the chart recorder, TSC-RR-1. Removed the previous section 5.2 for placing the unit into standby as there is no clear guidance when this would be necessary, nor actions on how or when to return from standby to operation. (AR-CR 00315758)

Page(s)	Description (including summary, reason, initiating document, if applicable)
7	This revision deleted previous Section 5.2 to place unit in standby. The other sections, steps were re-sequenced.
7	This revision clarified Step 5.2.1 guidance to place the switch to stop position and added that the audible alarm will actuate.
8	This revision adds guidance, (Steps 5.2.3.a-c), for stopping the recorder, TSC-RR-1. This action must be performed after placing the time stamp in Step 5.2.2.
6	Minor Rev 1 Revised the Caution statement on page 10 to clarify which alarms may activate during unit startup.
7	Minor Rev 1 Revised referenced AR in French brackets to actual reference number "6.1".

TABLE OF CONTENTS

1.0 PURPOSE

This procedure provides instructions for operating the Technical Support Center (TSC) Ventilation System Radiation Monitoring System TSC-CP-RAD/1.

2.0 DISCUSSION

The TSC Ventilation System Radiation Monitoring System continuously monitors and provides alarms for elevated airborne contamination levels in the TSC during an emergency.

TSC-RIS-1A is the TSC Airborne Particulate Radiation Monitor, TSC-RIS-1B is the TSC Airborne Radiation Monitor for Iodine and TSC-RIS-1C is the TSC Airborne Radiation Monitor for Noble gas.

Chemistry Calculation CH-98-002 provides the Setpoint information for these monitors. The setpoint value is selected to allow operating margin between the calculated limit and actual setpoint. The value in the calculation is based the requirement for posting areas above 0.3 DAC as an airborne radiation area. This will provide a High and Hi-Hi alarm set points equivalent to 0.3 DAC and 1.0 DAC, respectively, for a condition which affects TSC habitability.

3.0 RESPONSIBILITIES

The OSC Health Physics Technician assigned to perform TSC Habitability functions is responsible for performing tasks controlled by this procedure.

4.0 PRECAUTIONS AND LIMITATIONS

4.1 TSC-CP-RAD/1 audible alarm is loud. Hearing PPE should be worn while working at this panel.

4.2 During Start-up and Operation of the TSC-CP-RAD/1 unit, the "FAIL" alarm may actuate (e.g., low flow, low counts, high voltage etc.).

4.3 The photomultiplier tubes are light sensitive and can easily be damaged from normal light intensities with high voltage to the detector. Do not remove the shield plug/filter housings potentially exposing the detector assemblies to light.

4.4 Air Handling Unit fan motors can start and stop at any time. Be aware of rotating equipment located behind equipment guards and shrouds.

4.5 During initial start-up phase, the RIS LOW COUNTS indicating lamps may illuminate for up to 30 minutes due to low down scale indication.

5.0 PROCEDURE

NOTE: Attachments 8.1, 8.2, and 8.3 provide pictures of panels with locations of switches called out.

5.1 To Start Up the System

5.1.1 **PROCEED** to TSC-CP-RAD/1 TSC Radiation Monitoring System Equipment Rack, located in the TSC Mechanical Equipment Room. See Attachment 8.1.

5.1.2 **ENSURE** TSC-RIS-1A, 1B, and 1C "POWER" and "HIGH VOLTAGE" are OFF (pushbuttons not depressed) and indicator lamps of each are not illuminated.

5.1.3 **ENSURE** that the iodine charcoal cartridge and particulate filter are in place and in satisfactory condition per the following substeps:

a. **OPEN** the lower front panel to access the front of the detector housing.

NOTE: A small radioactive "keep alive" source is located inside the sample holder assembly, under the cartridge. Use care not to dislodge the source when removing and replacing charcoal filter cartridges.

b. **REMOVE** the IODINE shield plug/filter holder assembly AND **CHECK** that the charcoal cartridge is in place and in good condition. Replace if necessary.

c. **REPLACE** the IODINE shield plug/filter holder assembly.

d. **CLOSE** the lower front panel to access.

e. **PROCEED** to the back of TSC-CP-RAD/1 cabinet.

f. **OPEN** the back panel door to access the back of the detector housing.

g. **REMOVE** the PARTICULATE shield plug/filter holder assembly AND **CHECK** that the particulate filter is in place and in good condition. Replace if necessary.

h. **REPLACE** the PARTICULATE shield plug/filter holder assembly.

i. **CLOSE** the back panel door.

5.1.4 **PROCEED** to power panel PP-TSC1, located on the wall behind TSC-CP-RAD/1. See Attachment 8.2.

5.1.5 **OPEN** the panel door on PP-TSC1.

CAUTION

System Startup may cause audible alarm and "fail" light(s) to come in (and then eventually clear). Hearing PPE should be worn while working at this panel due to the audible alarm potential.

5.1.6 **ENSURE** that PP-TSC1 Breaker 11 is ON.

5.1.7 **CLOSE** panel door on PP-TSC1.

5.1.8 **RETURN** to TSC Radiation Monitoring System Equipment Rack TSC-CP-RAD/1.

5.1.9 **ENSURE** the Sample Pump is operating as per the following substeps:

NOTE: TSC-RMS-FN/21 rotates to the left (CCW) to the RUN position; STOP position is to the right (CW). This is reverse operating from most switches.

a. IF TSC-FN-21 is not already running (Green STOP lamp illuminated), THEN **PLACE** TSC-RMS-FN/21 switch in the RUN position

NOTE: It takes 30-40 seconds to see proper flow indication for TSC-FN-21.

b. **ENSURE** the Red RUN lamp is illuminated.

5.1.10 Startup TSC-RIS-1A, 1B, and 1C as follows:

a. **DEPRESS** the "OFF-PWR" pushbutton (bottom switch) on each RIS and ensure that each red Power LED is illuminated.

b. **DEPRESS** the "OFF-HV" pushbutton (second switch up from the bottom) on each RIS and ensure that each red High Voltage LED is illuminated.

c. **MARK** down the start time. _____

5.1.11 **OPEN** the soft key access cover located on front door of the recorder below TSC-RR-1 LCD Display. See Attachment 8.3.

5.1.12 **PRESS** the "Start" soft key on TSC-RR-1 and verify the green LED (record) light illuminates.

5.1.13 **PLACE** a start time stamp on recorder TSC-RR-1 as follows:

a. **PRESS** FUNC (display the FUNC key menu),

b. **PRESS** the Message soft key.

c. **PRESS** the 1-10 soft key.

d. **PRESS** the 4 soft key **START TSC RAD MONITOR SYSTEM,** to mark the graph on the recorder.

e. **CLOSE** the soft key access cover.

5.1.14 **WAIT** approximately 30 minutes after TSC-RIS-1A, 1B, and 1C started to conduct response check of the RIS's. {6.1}

5.1.15 Perform a response check of each channel of TSC-RIS-1A, 1B, and 1C as follows:

a. **DEPRESS** the "NOR-CS" push button and hold down until the appropriate meter reaches steady reading, or alarm sounds.

NOTE: The following Steps are to be performed upon the termination of a declared emergency or EP drill unless directed otherwise by the RPM.

5.2 To Shutdown the System

CAUTION

Powering down, turning off the High Voltage, or Low Flow for the RIS units may cause the alarm to actuate. Hearing PPE should be worn while working at this panel.

NOTE: TSC-RMS-FN/21 rotates to the left (CCW) to the RUN position; STOP position is to the right (CW). This is reverse operating from most switches.

5.2.1 **PLACE** TSC-RMS-FN/21, fan switch in the STOP position. The LOW FLOW light will illuminate and audible alarm will actuate (actuation may be delayed 20-30 seconds).

5.2.2 **PLACE** a stop time stamp on recorder TSC-RR-1 as follows:

a. If closed, **OPEN** the soft key access cover. See Attachment 8.3.

b. **PRESS** FUNC (display the FUNC key menu),

c. **PRESS** the Message soft key,

d. **PRESS** the 1-10 soft key,

NOTE: To get the 5 soft key, you must use the fifth soft key, (to the right), to display the 5-8 soft keys.

e. **PRESS** the 5 soft key, **STOP TSC RAD MONITOR SYSTEM,** to mark the graph on the recorder.

5.2.3 **STOP** the recorder TSC-RR-1 as follows:

a. **PRESS** the "stop" soft key.

NOTE: Yes / No option should be default highlighted to Yes.

b. When the Y/N window comes up on screen, with yes highlighted, **PRESS** Enter AND **VERIFY** the red LED (stop record) illuminates.

c. **CLOSE** the soft key access cover.

5.2.4 **PRESS** to release the "OFF-HV" pushbutton (second switch up from the bottom) on each RIS and ensure that each red High Voltage LED is no longer illuminated.

5.2.5 **PRESS** to release the "OFF-PWR" pushbutton (bottom switch) on each RIS and ensure that each red Power LED is no longer illuminated.

5.2.6 **CHECK** the Iodine Cartridge and Filter Paper to determine need for replacement by repeating sections in step 5.1.3.

5.2.7 **OPEN** panel door on PP-TSC1.

5.2.8 **ENSURE** that PP-TSC1 Breaker 11 is OFF

5.2.9 **CLOSE** panel door on PP-TSC1.

6.0 REFERENCES

6.1 CR 00211042 TSC Ventilation Procedure PPM 13.10.17 needs to be updated

6.2 PPM 13.10.4, Radiation Protection Manager Duties

6.3 PPM 13.10.9, Operations Support Center Manager and Staff Duties

6.4 SOP-HVAC/TSC-OPS, Technical Support Center HVAC System Operation

6.5 Radiation Protection Manager Checklist, Form # 26514

6.6 OSC HP Technician Checklist, Form # 26526

6.7 Chemistry Calculation CH-98-002 Set point information

7.0 DOCUMENTATION

Actions controlled by this procedure are documented in accordance with ERO Position Specific Checklist which outline document generation and retention.

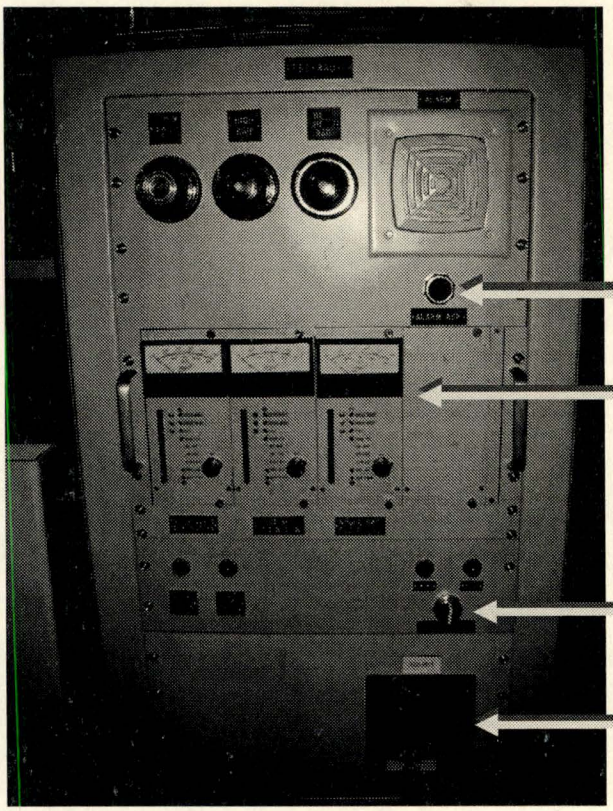
8.0 ATTACHMENTS

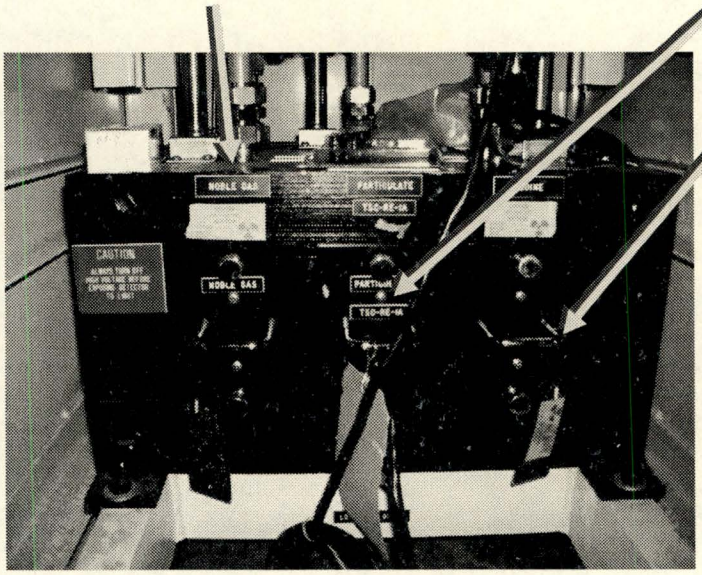
8.1 TSC-CP-RAD/1

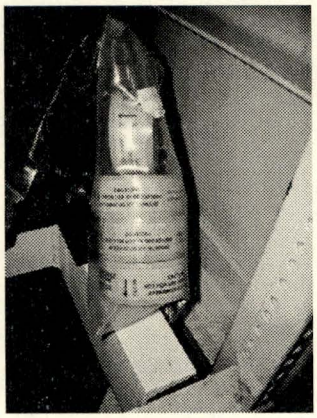
8.2 E-PP-TSC1

8.3 TSC-RR-1

TSC-CP-RAD/1



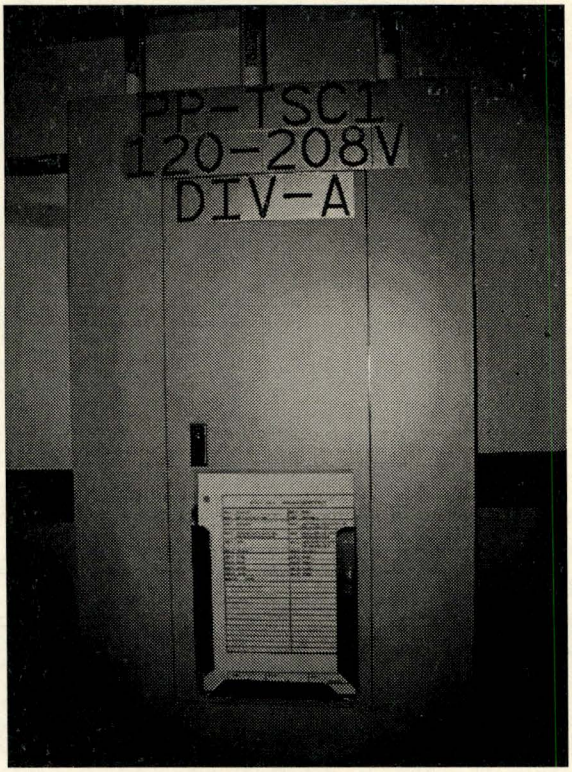




END

Attachment 8.1, TSC-CP-RAD/1

E-PP-TSC1



Breaker 11

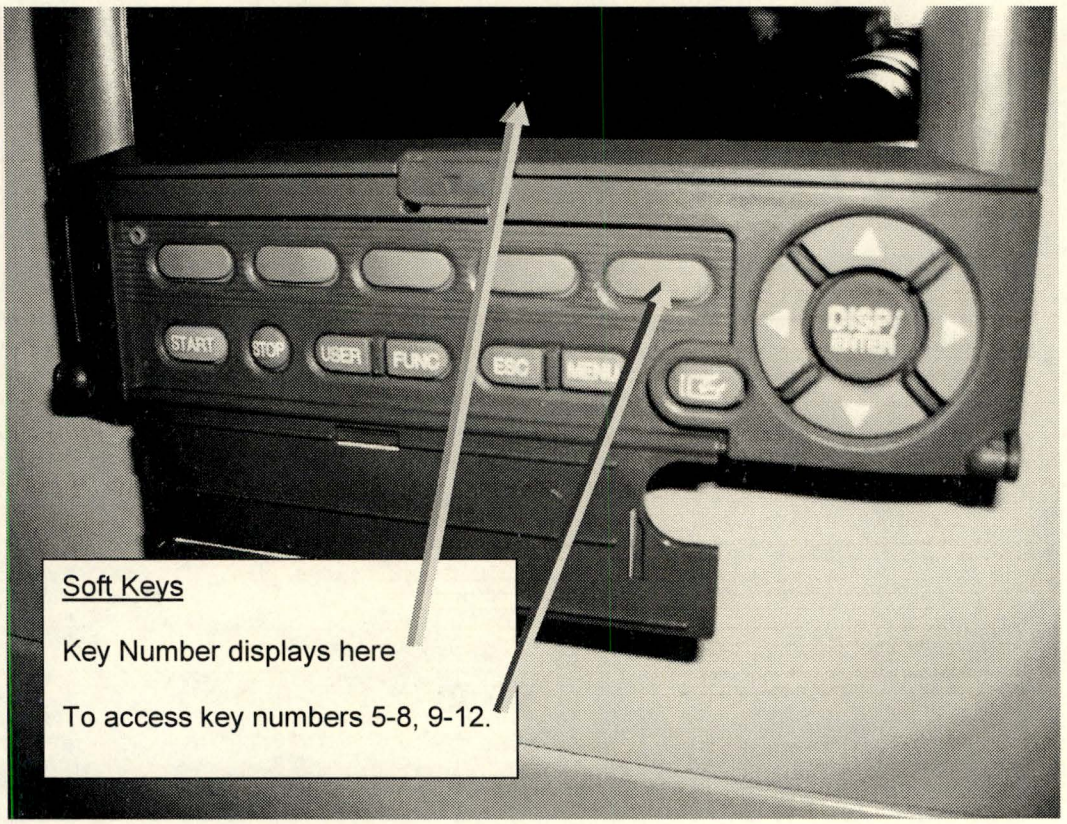
END

Attachment 8.2, E-PP-TSC1

TSC-RR-1

Soft Key Access Panel

Open here



END

Attachment 8.3, TSC-RR-1