Watts Bar Nuclear Plant, Post Office Box 2000 Spring City, Tennessee 37381

September 9, 2016

10 CFR 50.4
10 CFR 50, Appendix E, Section V
10 CFR 50.54(q)(5)
10 CFR 72.4
10 CFR 72.44(f)

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Watts Bar Nuclear Plant, Unit 1 & Unit 2
Facility Operating License No. NPF-90
NRC Docket No. 50-390, 50-391

Subject: **Emergency Plan Implementing Procedure Revision**

In accordance with the requirements of 10 CFR Part 50, Appendix E, Section V, 10 CFR 50.54(q)(5), and 10 CFR 72.44(f), the enclosures provide the Emergency Plan Implementing Procedure (EPIP) associated Screening Evaluation Forms of the 10 CFR 50.54(q) analysis.

EPIP	Revision	Title	Effective Date
14	0026	Radiological Control Response	8/19/2016
15	0018	Emergency Exposure Guidelines	8/19/2016

There are no regulatory commitments in this letter. Please direct all questions concerning this matter to Thomas Detchemendy, Emergency Preparedness Manager, at (423) 365-3232.

Respectfully,

Paul Simmons
Site Vice President
Watts Bar Nuclear Plant

Enclosures:

1. Emergency Plan Implementing Procedure Revision - Screening Evaluation Form, EPIP-14, Revision 0026
2. Emergency Plan Implementing Procedure Revision - Screening Evaluation Form, EPIP-15, Revision 0018

cc:

NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Watts Bar Nuclear Plant
NRC Project Manager - Watts Bar Nuclear Plant
EDMS

bcc (w/o Enclosure):

G. Arent
T. F. Detchemendy
W. H. Lee
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NSRB Support

ENCLOSURE 1

WATTS BAR NUCLEAR PLANT, UNIT 0

EPIP Screening Evaluation Form

EPIP-14, Radiological Control Response, Revision 0026

EPDP-17, Attachment 2
Screening Evaluation Form

Evaluation No.: WBN-2016-012

Activity Description and References: **BLOCK 1**

Activity is Revision 26 to EPIP-14, which replaced cancelled reference RCI-120 with correct reference title NPG-SPP-05.2.5 TEDE ALARA Evaluations (CRs 1189908, 1190967) and added Appendix H back into procedure since it was mistakenly removed in last revision (CR 1190967)
These revisions provide update of references and reinstate material previously contained in this procedure which was inadvertently removed. This change is therefore editorial and administrative in nature.

Activity Scope: **BLOCK 2**

☒ The activity is a change to the radiological emergency plan (includes EPIPs or any other document describing the programmatic methods for maintaining preparedness or responding to an emergency). *[Go to Block 3]*

☐ The activity is not a change to the radiological emergency plan. *[Go to Block 5]*

Change Type: **BLOCK 3**

☒ The change is editorial or typographical. *[Go to Block 7]*

☐ The change is not editorial or typographical. *[Go to Block 4]*

Conformance: **BLOCK 4**

☐ The change conforms to an activity that has prior approval.

Record the prior approved activity:
[Go to Block 7]

☐ The change does not conform to an activity that has prior approval. *[Go to Block 5]*

Planning Standard Impact Determination (Check All Applicable): **BLOCK 5**

☐ 50.47(b)(1) – Assignment of Responsibility (Organization Control)

☐ 50.47(b)(2) – Onsite Emergency Organization

☐ 50.47(b)(3) – Emergency Response Support and Resources

☐ 50.47(b)(4) – Emergency Classification System *

☐ 50.47(b)(5) – Notification Methods and Procedures *

☐ 50.47(b)(6) – Emergency Communications

☐ 50.47(b)(7) – Public Education and Information

EPDP-17, Attachment 2
Screening Evaluation Form

Evaluation No.: WBN-2016-012

- ☐ 50.47(b)(8) – Emergency Facility and Equipment
- ☐ 50.47(b)(9) – Accident Assessment *
- ☐ 50.47(b)(10) – Protective Response *
- ☐ 50.47(b)(11) – Radiological Exposure Control
- ☐ 50.47(b)(12) – Medical and Public Health Support
- ☐ 50.47(b)(13) – Recovery and Reentry Planning and Post-Accident Operations
- ☐ 50.47(b)(14) – Drills and Exercises
- ☐ 50.47(b)(15) – Emergency Responder Training
- ☐ 50.47(b)(16) – Emergency Plan Maintenance
- ☐ 72.44(f) – Independent Spent Fuel Storage Installation (ISFSI)

[If any Planning Standards impacted, go to Block 7. If none are impacted, go to Block 6].

** Denotes Risk Significant Planning Standard*

Commitment Impact Determination: **BLOCK 6**

- ☐ The activity involves a site specific EP commitment.

  Record the Commitment or Commitment reference:
  [Go to Block 7]

- ☐ The activity does not involve a site specific EP commitment. *[Go to Block 7]*

Screening Evaluation Results: **BLOCK 7**

- ☒ The activity can be implemented without performing a 50.54(q) reduction in effectiveness evaluation.
- ☐ The activity cannot be implemented without performing a 50.54(q) reduction in effectiveness evaluation.

Approvals:

Preparer Name: Michael R. White	Preparer Signature:	Date: 8/16/16
Reviewer Name: Thomas F. Detchemendy	Reviewer Signature:	Date: 8/18/2016

Watts Bar Nuclear Plant

Unit 0

Emergency Plan Implementing Procedure

EPIP-14

Radiological Control Response

Revision 0026

Quality Related

Level of Use: Reference Use

Effective Date: 08-19-2016

Responsible Organization: REP, Radiological Emer. Prep.

Prepared By: Michael R White

Approved By: Thomas F. Detchemendy

Revision Log

Revision or Change Number	Effective Date	Affected Page Numbers	Description of Revision/Change
Rev 19	08/13/2004	2, 5, 25	Revised response time and minimum staffing in accordance with NRC SER Accession Number ML041810056.
Rev 20	11/30/06	2, 5, 18, 25	Plan effectiveness determinations on these changes indicate the following revisions do not reduce the level of effectiveness of the procedure or REP. Annual Review. Revised Appendix G to clarify Radiation Protection staffing requirements consistent with the statement in Section 9.2.1 of NP-REP for the deployment of additional sampling teams in accordance with PER 107664. Added Developmental References 10 and 11. Added Quality Related designation to cover page & Quality Related subsection to Records section (PER 1203).
Rev 21	10/12/2007	2-27	Plan effectiveness determinations on these changes indicate the following revisions do not reduce the level of effectiveness of the procedure or REP. Changed "Rad Con" to Radiation Protection Group - (RP)
Rev 22	06/23/2010	All	This procedure has been converted from Word 95 to new template format using Rev 21. Section 3.7.F- Removed Chemistry Count Room Supervisor as this position is no longer active. (PER 226531) Appendix B - revised alternate OSC location to elevation 729' Outage Control Center. Appendix E- updated the KI instructions. (PER 224129)

Revision Log

Revision or Change Number	Effective Date	Affected Page Numbers	Description of Revision/Change
Rev 23	09/23/13	17	Section 4.1, added applicable appendices to QA records section. PER 724038
Rev 24	01/23/14	21	Revised Appendix C to include Unit-2 Radiation Monitor information from WBNTSR115 Rev 007 (PER 728019-003).
Rev 25	09/21/15	22	Revised Appendix C to include Unit-2 Radiation Monitors for upper and lower containment 2-RE-90-112 and 2-RE-90-106 (CR 973512).
Rev 26	08/19/16	6,28 28	Replaced cancelled reference RCI-120 with correct reference title NPG-SPP-05.2.5 TEDE ALARA Evaluations (CRs 1189908, 1190967) Added Appendix H back into procedure since it was mistakenly removed in last revision (CR 1190967)

Table of Contents

1.0 PURPOSE

This Procedure describes the actions and responsibilities of the Watts Bar Radiation Protection Group (RP) Section in the event of a radiological emergency.

2.0 REFERENCES

2.1 Interfacing Documents

- CECC-EPIP-9, "Emergency Radiological Monitoring Procedures"
- EPIP-6, "Activation and Operation of the Technical Support Center (TSC)"
- EPIP-7, "Activation and Operation of the Operations Support Center (OSC)"
- EPIP-8, " Personnel Accountability and Evacuation"
- EPIP-10, "Medical Emergency Response"
- EPIP-11 "Security and Access Control"
- EPIP-12, "Emergency Equipment and Supplies"
- EPIP-13, " Initial Dose Assessment for Radiological Emergencies "
- EPIP-15, "Emergency Exposure Guidelines"
- EPIP-16, "Termination of the Emergency and Recovery "
- NRC Information Notice 90-08, Kr-85 Hazards from Decayed Fuel

2.2 Developmental Documents

- CFR 50.72 Immediate Notification Requirements for Operating Nuclear Power Reactors
- 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
- RCI-101, Radiation Contamination, and Airborne Surveys
- NPG-SPP-05.2.5 TEDE ALARA Evaluations
- RCI-130, Personnel Monitor Alarm Response and Personnel Decontamination
- ANSI -N18.7-1976
- 10-CFR 20 Standards for Protection Against Radiation
- EPA 400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents
- TVA letter to NRC dated May 13, 2004, Watts Bar Nuclear Plant (WBN) Unit 1 - Radiological Emergency Plan (REP) Proposed change - Response to NRC Request for Information (TAC No. MB 9130) (T04 040513 808)
- NRC letter to TVA dated June 24, 2004. Safety Evaluation of the Tennessee Valley Authority Proposed Radiological Emergency Plan Changes for the Watts Bar Nuclear Plant, Unit 1 (TAC No. MB9130)

3.0 INSTRUCTIONS

3.1 General Instructions

A. The response to radiological emergencies by Radiation Protection Group (RP) personnel will depend upon the type and magnitude of the existing emergency condition. This can range from a minimal response requiring one or two people to a total manpower mobilization. In addition, it should be noted radiological problems may not be associated with a given emergency [as defined in the Radiological Emergency Plan (REP)]. Natural phenomena, security threats, or other events not involving radiological problems could be the cause for the emergency status.

B. **IF** an ALERT, SITE AREA EMERGENCY, or GENERAL EMERGENCY is classified, RP is required to assemble a specific number of personnel as described below.

1. During normal and off shifts, an ALERT will be announced over the public address system and the emergency pagers will be activated. (In the event of a SITE AREA EMERGENCY or GENERAL EMERGENCY, the offsite sirens will be activated by the state.)

2. The RP Lab will be contacted by the SM/SED, or designee. The Radiation Protection Shift Supervisor (RPSS) will determine the number of RP personnel currently onsite and will ensure at least a total of seven **(7)** additional are available onsite within approximately 90 minutes.

3.2 Precautions and Limitations

During a radiological emergency, Radiation Protection procedures will normally be utilized to cover most situations. Since the magnitude of the problem(s) may be more severe, it is imperative that all requirements for entry into affected plant areas be met. This section summarizes items that will need to be addressed prior to entry into the affected areas and during recovery operations.

A. Plant accidents involving core damage may produce excessive dose rates and airborne activity concentrations within plant areas. Radiological precautions must be followed under these conditions until available data indicates otherwise.

B. These precautions could include the following:

1. The use of respiratory equipment.
2. Issuance of KI.
3. Multiple layers of protective clothing.
4. The use of electronic dosimeters, multiple dosimetry and extremity dosimetry as appropriate.
5. The use of RWP (911) for drills and (3911) for actual emergencies should be utilized to cover the entry team(s).
6. Personnel will be instructed to monitor their dosimetry frequently to prevent overexposure.

C. If core damage is suspected or if for any other reason elevated airborne activity concentrations are present, then appropriate respiratory protection will be required. Initial entry will probably require the use of respiratory equipment, since iodine's may be present in significant quantities.

CAUTION

IF spent fuel damage is involved, be aware of the potential for significant skin doses from Kr-85. After spent fuel has decayed greater than 190 days, Kr-85 is the predominant gaseous nuclide. Consequently, the dose to the skin could be approximately 150 times the whole body dose.

3.2 Precautions and Limitations (continued)

D. The respiratory guidelines in Appendix H will be considered during emergency incidents.

E. Special precautions must be taken when obtaining samples. Smears may have significant dose rates (in the REM/hr range). High airborne activity could result in significant activity concentrations being collected onto the filter media. **FOLLOW** standard RP procedures, should samples be considered radiological hazards.

F. **ENSURE** all electronic dosimeters are properly processed for each worker. **MAKE** arrangements to have primary dosimetry read as soon as possible. **IF** possible, **RESTRICT** repetitive entries of workers. **SUBSTITUTE** other qualified personnel for team members, on reentry's, to distribute exposures. Employee's remaining allowable dose shall be verified by RP prior to entry into plant areas.

G. **IF** plant conditions are such that radiological conditions are changing rapidly, it may not be possible to use previous data in order to determine protective requirements. This factor must be considered prior to allowing survey teams into affected plant areas.

H. The **"Buddy System"** shall be utilized for initial entries into any area where radiological conditions are not known or any area where radiological conditions could be changing due to plant conditions. At least one person of the buddy system must be qualified in Radiation Protection procedures. Monitoring teams should maintain communication capabilities with the OSC or RP Lab.

I. **Habitability** surveys of OSC, TSC, and assembly areas shall be performed as necessary.

J. Advanced Radiation Worker **(ARW)** trained REP responders will respond (upon request) to the Radiation Protection Shift Supervisor during a radiological emergency and provide support and surveillance as needed during the initial phase.

3.3 Response Classification Guidelines

3.3.1 NOTIFICATION OF UNUSUAL EVENT

A. No offsite radiological problems are postulated during a NOTIFICATION OF UNUSUAL EVENT.

B. This emergency classification requires a notification to the state of Tennessee Emergency Management Agency (TEMA).This classification has minor on no impact on RP.

C. RP will follow standard practices and procedures during response work.

3.3.2 ALERT

A. A limited radiological release is possible during an ALERT situation. Onsite emergency facilities will be activated and offsite agencies contacted.

B. **IF** the assembly alarm is activated, RP personnel shall secure work in a safe manner and report to the 713' RP Lab for assembly and accountability.

C. RP Technicians will be dispatched to survey assembly and accountability areas as necessary.

D. It should be noted that an ALERT classification may require the evacuation of a certain plant area and/or building. RP shall ensure these areas are properly posted and arrangements made with Nuclear Site Security to restrict all unauthorized access to the affected area(s).

E. RP personnel will assist in the development of all recovery plans as necessary. Recommendations will be made to keep exposures As Low As Reasonably Achievable (ALARA) and to approve recovery activities.

F. An offsite survey team may be dispatched from SQN, if coverage is necessary. Site RPSS will contact SQN RP Lab as soon as possible for assistance (Refer to CECC EPIP-9).

G. Verify that Security has distributed emergency dosimetry packages to all offsite responders (EMS, Fire, or LLEA) and to any TVA Security personnel in the OCA and Protected Area whose duties do not allow dosimetry issue at the RCA. Dosimetry packs are maintained at the site access portal.

3.3.3 SITE AREA EMERGENCY

A. During a SITE AREA EMERGENCY, there may be releases to the environment requiring RP response.

B. A SITE AREA EMERGENCY may require the evacuation of a plant building or buildings.

C. Personnel will be notified to assemble for accountability. RP shall secure work in a safe manner and proceed to the 713' RP Lab for assembly and accountability.

D. Accountability will be made in accordance with EPIP-8. Information shall be gathered describing the emergency situation; RP representatives shall be sent to the assembly areas to determine if any workers were in the affected plant areas at the time of the event. These people shall be separated from other plant workers and personnel contamination surveys initiated for affected personnel.

E. As reports become available regarding the details of the emergency, RP personnel shall prepare all necessary equipment needed and ready a survey team(s) for entry into the affected area(s).

F. Upon notification from the Technical Support Center (TSC), survey team(s) may be dispatched from the OSC to various areas of the plant. It should be noted that depending on the type of accident, initial survey(s) may not be performed until hours or days after an event. In this case, procedures may be developed describing the reentry steps to be followed.

G. A site boundary survey may be required. The details of the survey shall be coordinated with the TSC. The environmental monitoring van (REP van) should be utilized while performing these surveys.

H. An additional environmental monitoring van may be dispatched from SQN, if coverage is necessary. Site RPSS will contact the SQN RP Lab as soon as possible for assistance. (**REFER TO** CECC EPIP-9.)

I. Precautions may be required to prevent personnel overexposures. These exposures could result directly from radiation emitted from the plume and/or due to submersion in the plume. [**REFER TO** Section 3.6, Issuance of Potassium Iodide (KI)]

3.3.3 SITE AREA EMERGENCY (continued)

J. **RECORD** all survey results. All findings shall be reported to the TSC or Central Emergency Control Center (CECC) (if activated). If results indicate offsite contamination, the survey areas may need to be extended. **OBTAIN** further instructions and **PERFORM** required surveillance(s).

K. Additional manpower support and equipment may be obtained from other TVA nuclear facilities.

L. Verify that Security has distributed emergency dosimetry packages to all offsite responders (EMS, Fire, or LLEA) and to any TVA Security personnel in the Owner controlled area (OCA) and Protected Area whose duties do not allow dosimetry issue at the RCA.

3.3.4 GENERAL EMERGENCY

A. During a GENERAL EMERGENCY, there may be radiation releases to the environment requiring RP response. These releases may require the implementation of evacuation procedures.

B. The actions described under SITE AREA EMERGENCY will be applicable to a GENERAL EMERGENCY condition as well.

C. During a GENERAL EMERGENCY, conditions in the RP Lab may be such that evacuation is warranted. If this situation develops, REFER TO Appendix B.

D. All subsequent offsite activities will be coordinated with offsite support agency survey teams to make the best use of available manpower. **REPORT** all survey results to the TSC or CECC (if activated) so recommendations to the proper agencies can be made to initiate any required protective actions.

E. Verify that Security has distributed emergency dosimetry packages to all offsite responders (EMS, Fire, or LLEA) and to any TVA Security personnel in the OCA and Protected Area whose duties do not allow dosimetry issue at the RCA.

3.4 Duties of RP Personnel Assigned to the TSC

A. The TSC is activated during an ALERT, SITE AREA EMERGENCY, or GENERAL EMERGENCY, and may be activated during a NOTIFICATION OF UNUSUAL EVENT.

B. The RP Manager is the designated RP TSC Manager. Approved alternates rotate this Emergency Response Organization (ERO) duty. Additional, suitably trained and qualified personnel are listed on the ERO call list. The duty RPSS may serve as the TSC representative during the initial stages of an emergency until relieved by a duly qualified individual

C. The responsibilities and duties of the TSC RP Manager are summarized in EPIP-6.

3.5 Duties of RP Personnel Assigned to the RP Lab.

A. The RP Shift Supervisor (RPSS) or qualified designee is responsible for managing the activities of the 713' Lab. Appendix A of this procedure can be used as a guide by the RPSS during REP activities.

B. Survey teams are dispatched from the OSC staging areas. The RPSS is responsible for ensuring survey teams are properly equipped, protected and are aware of any special precautions, plant conditions, or requirements.

C. The RPSS will ensure all entries are properly coordinated and approved by the OSC manager.

D. The RPSS is responsible for ensuring adequate numbers of RP personnel are available to support emergency activities. When an Alert or higher emergency has been declared, ensure seven **(7)** additional RP personnel have responded to the OSC. For a summary of minimal assignments during emergency see Appendix G of this Procedure.

E. The RPSS is responsible for preparing and designating an onsite RP monitoring team. Team members will prepare the REP van(s) in accordance with CECC-EPIP-9. For additional offsite monitoring, the RPSS may request assistance from SQN.

F. The RPSS will dispatch survey teams to assembly areas, the OSC, and TSC to evaluate radiological conditions and monitor radiation levels as conditions change. These survey teams will be responsible for monitoring contamination levels (both on personnel and floor/equipment areas) and implementing corrective actions (e.g., decontamination or zoning) as necessary.

G. The RPSS will monitor the 713' Lab for habitability and will coordinate evacuation activities to the alternate lab location (Appendix B) if required.

H. The RPSS may use PEDS to track radiological conditions in the plant (Appendix C)

3.6 Issuance of Potassium Iodide (KI)

A. IF the TSC RP Manager has reason to believe a person's projected cumulative dose to the thyroid from inhalation of radioactive iodine could exceed 10 Rem, the exposed person should be administered potassium iodide (KI) as a prophylactic. Anyone authorized by the TSC RP manager to administer KI shall be familiar with the Food and Drug Administration's approved KI package insert and ensure each recipient is similarly informed. KI recipients will acknowledge their understanding of the consequences of taking or refusing KI by signing Appendix F, Potassium Iodide (KI) Issue Report. The initial dose of KI should not be delayed and those who begin therapy should continue the 10-day course of KI unless their thyroid dose is determined not to have exceeded 10 rem. An adequate supply of KI tablets are stored in the OSC staging area cabinets. **FOLLOW** dosage schedules as outlined on the package insert (Appendix E).

B. Projected cumulative doses to the thyroid from inhalation of radioactive iodine can be determined using Appendix D, "Occupational Dose from Inhalation of Iodine-131."

C. KI is stored in the Emergency Supply cabinet (OSC staging area). KI has an approved shelf life with the expiration date listed on each tablet package. Expiration date verification and necessary inventories are performed using EPIP-12.

D. A copy of the Food and Drug Administration approved package insert shall accompany the issuance of KI. Dosage schedules and other pertinent information are outlined on the package insert and should be followed closely (Appendix E).

E. The issuing agent shall complete Appendix F, Potassium Iodide (KI) Issue Report, when KI is issued. A copy of this report will be sent to the TSC RP Manager in a timely manner.

3.7 Radioiodine Sampling

CAUTIONS

1) **RCI-101 should be referenced for hazards associated with Silver Zeolite cartridge use.**
2) **Sample cartridges may exhibit high dose rates after sampling during accident conditions. Exercise good ALARA practices when handling, storing, and disposing of these cartridges.**

A. During accident conditions, noble gas concentrations may be present in significant quantities. The collection of these noble gases on charcoal cartridges during iodine sampling will interfere with subsequent iodine analysis. Silver zeolite (AgZ) cartridges are provided for use during periods of high noble gas concentrations.

B. Radioiodine samples should be collected at 30 liters per minute (LPM) for daily or weekly samples. Grab samples may be collected at 30 or 60 LPM based upon the type of air sampler used and the conditions in the sample location.

C. Radioiodine sample volumes of less than 900 liters may be performed if it is known or suspected that dose rates on the AgZ cartridges will exceed 10 mrem/hr. During these instances, sample duration's may be reduced to 5 minutes. Sample duration's less than 5 minutes may be used for ALARA purposes but shall be pre-approved by the RPSS.

D. Upon completion of sampling activities, the air sample should be returned to the RP Lab for analysis as soon as possible. A radiation survey of the sample head shall be performed to determine the contact dose rate. The results of this survey shall determine any special handling or packaging requirements during analysis.

3.7 Radioiodine Sampling (continued)

E. IF the iodine sample activity is ≥ 1 mrem/hr., a contact dose rate should be taken by using a Ludlum 14-C or equivalent GM survey instrument with the beta window CLOSED. The radioiodine air activity can be approximated by using the following formula:

$$\mu Ci/ml = \frac{[\text{Average of the Front and Back Contact Dose Rate (mrem/hr) X 5.1 E-3}]}{\text{Volume (liters)}}$$

F. Radioiodine cartridges with contact gamma dose rates greater than or equal to 100 mrem/hr shall not be delivered to the Chemistry Lab without prior approval of the RPSS.

G. RP personnel shall inform Chemistry personnel of the contact dose rates of the samples. RP personnel should provide radiological coverage during handling, analysis and disposal if samples read greater than 100 mrem/hr. The RPSS will approve disposal methods and location for all samples reading greater than 100 mrem/hr.

H. Gamma analysis results shall be reported to the RPSS as soon as possible.

I. Accident related radioiodine samples should be documented and analyzed in accordance with RCI-101 or CECC-EPIP-9 as appropriate.

3.8 Personnel Decontamination and Facilities

A. RCI-130 describes the procedures to be used for personnel decontamination.

B. Contaminated personnel are normally decontaminated at the 713' elevation decon facility. This facility is equipped with a wash sink, shower, and all necessary supplies. These supplies normally include various decontamination agents and soaps, towels, clean clothing, and other miscellaneous supplies.

C. Grossly contaminated personnel with injuries are normally treated at the 713' elevation prior to transfer to an offsite medical facility **unless** the injury requires immediate transportation. (REFER TO EPIP-10).

D. Contaminated personnel requiring offsite medical attention are transported to Rhea County Medical Center [Dayton] or Starr Regional Medical Center [Athens]). The hospitals have personnel that have been trained in the handling and care of contaminated patients. Watts Bar maintains a supply cabinet at each hospital's Emergency Room which contains posting materials and various other supplies. Refer to EPIP-10 for guidance on transporting contaminated and radiation injuries to REACTs in Oak Ridge or Erlanger Medical Center in Chattanooga.

4.0 RECORDS

4.1 QA Records

The following records are QA records when completed during actual radiological emergencies.

Appendix F: Potassium Iodide (KI) Issue Report

4.2 Non- QA Records

[1] Emergency Records

The records generated due to declaration of an emergency classification are considered Lifetime Retention records. These records shall be forwarded to the WBN EP Manager. The records necessary to demonstrate performance are then submitted to the Corporate EP Manager for storage.

[2] Drill and Exercise Records

The records deemed necessary to demonstrate performance of key actions during drills are considered Non-QA records. These records shall be forwarded to the WBN EP Manager. The WBN EP Manager shall retain records necessary to demonstrate six-year plan requirements for six years. The WBN EP Manager shall retain other records in this category for three years (eight years starting the after the next HAB Drill).

Appendix A
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RP Shift Supervisor Checklist

Upon activation of the OSC and TSC, the RPSS can use the following checklist as a guide to complete actions.

[1] **INITIATE** immediate requested actions (dose assessments) by the Main Control Room (MCR). ☐

[2] **IF** activation is ALERT or higher, ensure seven **(7)** additional ANSI Qualified RP personnel have responded to the emergency page. Follow FFD directions for call in of unscheduled work per EPIP-7. ☐

[3] **CONTACT** SQN to dispatch Offsite survey team per CECC-EPIP-9 if needed. ☐

[4] **DISPATCH** RP personnel to the REP Van to initiate radiological monitoring per CECC-EPIP-9. ☐

[5] **INITIATE** CECC-EPIP-9, as requested by the SM, TSC or CECC. ☐

[6] **IF** the following 2 conditions are met, go to the TSC and perform TSC RP Manager's functions until relieved. (Ref. EPIP-6)

RPSS functions can be performed from the TSC. ☐

TSC RP Manager is not in the TSC. ☐

[7] **IF** Assembly Alarm has been activated, dispatch RP personnel to assembly areas (as needed) per EPIP-8 to survey assembly areas. ☐

[8] **DISPATCH** RP personnel for search and rescue teams into the plant (as needed) per EPIP-8. ☐

[9] **ASSIGN** RP personnel to survey for radiological habitability in the MCR, TSC and OSC throughout the REP activation. ☐

[10] **DIRECT** radiological field monitoring teams until relieved by TSC RP Manager or the CECC. ☐

[11] **IF** evacuation of the RP Lab is required, REFER TO Appendix B of this procedure for alternate locations. ☐

Appendix B
(Page 1 of 1)

Alternate RP LAB/OSC Location

The location of the Alternate RP Lab/OSC will depend on in-plant radiological conditions. The TSC RP Manager, after consultation with the SED, will make the decision on location transfer. Possible locations that will be considered are:

- **Alternate** OSC elevation 729' Outage Control Center
- **Relay Room** 755' level next to the Control Room and the TSC
- **Staging Area**, PSO building (by the old fossil plant).

Essential equipment will be moved to the alternate RP Lab if conditions warrant the evacuation of the 713' Lab. Reference EPIP-12 Appendix E, for suggested equipment.

Appendix C
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Radiological Conditions Tracking

RP personnel should PEDS to assist in tracking in-plant radiological conditions. Key radiation monitoring information can be found in the following TSC Mimics or system group:

- 4RM1 In-plant radiation monitors
- 4RM2 In-plant radiation monitors
- EFF1 Radiation monitors associated with the plant's release paths
- Group - System Group Menu - SYS-90-RAD MON

Should PEDS not be available, then the worksheets of this appendix can be utilized to track in-plant radiological conditions.

SELECTED KEY IN-PLANT RADIATION MONITORS

DESCRIPTION O-M-12	IDENTIFIER	BACKGROUND READING	UPDATED READINGS, CPM, mR/Hr., or R/Hr.			
			Date Time	Date Time	Date Time	Date Time
Spent Fuel Pit Area (El. 757)	1&2-RE-90-1					
Upper Containment RB (El. 757)	1&2-RE-90-2					
Spent Fuel Pool Skimmer Filter Area Monitor (El. 737)	0-RE-90-5					
CCW Heat Exchangers (El. 737)	1&2-RE-90-6					
Hot Sample Room (El. 713)	1&2-RE-90-7					
AFW Pump Area (El. 713)	1&2-RE-90-8					
Waste Condensate Tanks (El. 692)	0-RE-90-9					
CVCS Board Area (El. 692)	1&2-RE-90-10					
CS & RHR Pump Area (El. 676)	0-RE-90-11					
RB Low Compt Inst Rm (El. 736)	1&2-RE-90-61					

Appendix C
(Page 2 of 2)

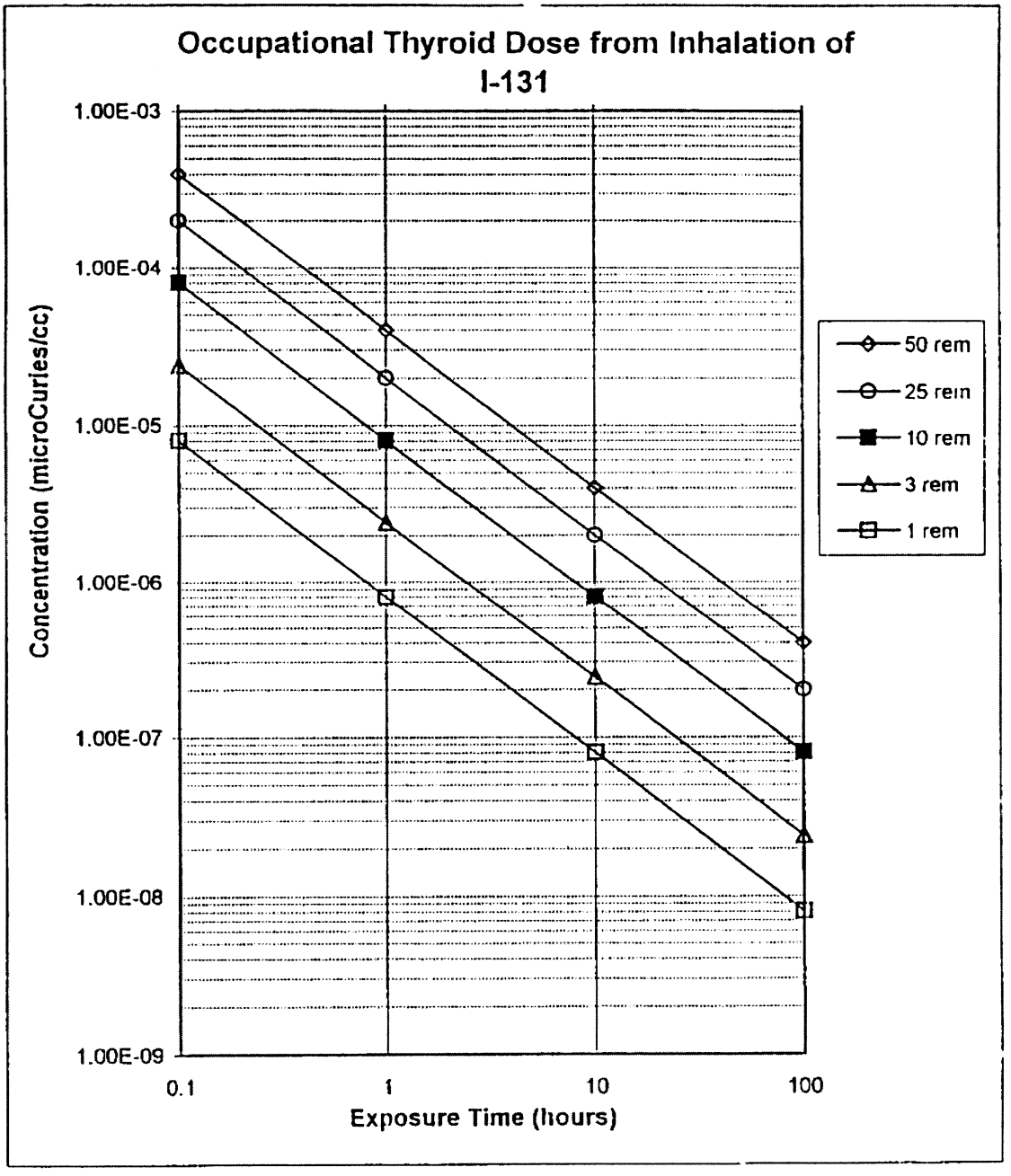
Radiological Conditions Tracking

SELECTED KEY IN-PLANT RADIATION MONITORS

DESCRIPTION	IDENTIFIER	BACKGROUND READING	UPDATED READINGS, CPM mR/Hr., or R/Hr.			
			Date Time	Date Time	Date Time	Date Time
Inside RB-Upper Containment (Located in AB, El. 737)	1-RE-90-112					
Inside RB-Lower Containment (Located in AB, El. 737)	1-RE-90-106					
Condensate Demin (TB, El. 685)	0-RE-90-230 0-RE-90-231					
Inside RB-Upper Containment (Located in AB, El. 737)	2-RE-90-112					
Inside RB-Lower Containment (Located in AB, El. 737)	2-RE-90-106					
(Space for additional monitors)						

Appendix D
(Page 1 of 1)

Occupational Dose from Inhalation of Iodine-131



Appendix E
(Page 1 of 2)
Potassium Iodide (KI) Administration Instructions

Consumer Package Insert

IOSAT™

(Potassium Iodide Tablets USP, 130 mg)
(Abbreviated KI)

Take potassium iodide (KI) only when public officials tell you. In a nuclear radiation emergency, radioactive iodine could be released into the air. KI protects only the thyroid gland from uptake of radioactive iodine. Therefore, KI should be used along with other emergency measures that will be recommended to you by public officials. If you are told to take this medicine, take it 1 time every 24 hours. Do not take it more often. More KI will not help you. Too much KI may increase the chances of side effects. Do not take this medicine if you know you are allergic to iodine (see SIDE EFFECTS below).

DESCRIPTION

Each white, round, cross-scored—the name IOSAT stamped on one side—tablet contains 130 mg of potassium iodide.

INDICATIONS

IOSAT (Potassium iodide tablets, USP) is a thyroid blocking medicine that is used in a nuclear radiation emergency only.

DIRECTIONS FOR USE

Use only as directed by public officials if a nuclear radiation emergency happens.

Dose:

Adults over 18 years	1 tablet (whole or crushed) every day (130 mg)
Children over 12 years to 18 years who weigh at least 150 pounds	1 tablet (whole or crushed) every day (130mg)
Children over 12 years to 18 years who weigh less than 150 pounds	½ tablet (whole or crushed) or 4 teaspoonfuls every day (65mg)
Children over 3 years to 12 years	½ tablet (whole or crushed) or 4 teaspoonfuls every day (65mg)
Children over 1 month	2 teaspoonfuls every day (32.5 mg)
Babies at birth to 1 month	1 teaspoonful every day (16.25 mg)

Tablets can be crushed and mixed in many liquids. To take the tablet in liquid solution, use dosing directions under **Making a Potassium Iodide Liquid Mixture.**

Take KI every day (every 24 hours) as directed by public officials. Do not take more than 1 dose in 24 hours. More will not help you. Too much medicine may increase the chances of side effects.

Making a Potassium Iodide Liquid Mixture:

1. Put one 130 mg KI tablet into a small bowl and grind it into a fine powder using the back of a metal teaspoon against the inside of the bowl. The powder should not have any large pieces.
2. Add 4 teaspoonfuls of water to the crushed KI powder in the bowl and mix until the KI powder is dissolved in the water.
3. Take the KI water mixture solution made in step 2 and mix it with 4 teaspoonfuls of low fat white or chocolate milk, orange juice, flat soda, raspberry syrup, or infant formula.
4. The KI liquid mixture will keep for up to 7 days in the refrigerator. It is recommended that the KI liquid mixture be prepared weekly. Throw away unused portions.

The amount of KI (130 mg tablet) in the drink when mixed as described above is 16.25 mg per teaspoonful. The number of teaspoonfuls of the drink to give your child depends on your child's age as described in the following table:

Child's Age	Give your child this amount in teaspoonfuls
Over 12 to 18 years who weigh less than 150 pounds	4 teaspoonfuls will give you a 65mg dose
Over 3 to 12 years old	4 teaspoonfuls will give you a 65mg dose
Over 1 month to 3 years old	2 teaspoonfuls will give you a 32.5mg dose
Birth to 1 month	1 teaspoonful will give you a 16.25mg dose

Note: This is the amount to give your child for one single dose in **teaspoonfuls** (not tablespoonfuls). You should give your child one dose each day as recommended by the public officials.

Pregnant or breastfeeding women or babies under 1 month of age: Take as directed above and call a doctor as soon as possible. Repeat dosing should be avoided. It is recommended that thyroid function be checked in babies less than 1 month of age that take KI. Women who are pregnant or breastfeeding should also be checked by a doctor if repeat dosing is necessary. Although these precautions should be taken, the benefits of short-term use of KI to block uptake of radioactive iodine by the thyroid gland far exceed its chances of side effects.

Patients with thyroid disease: If you have a nodular thyroid condition such as multinodular goiter with heart disease, you should not take KI. Patients with other thyroid conditions may take KI as directed above, but call a doctor if you need to take KI for more than a few days.

WARNING

People who are allergic to iodine, have dermatitis herpetiformis or hypocomplementemic vasculitis, or have nodular thyroid disease with heart disease should not take KI. Keep out of the reach of children. In case of an allergic reaction (difficulty breathing, speaking or swallowing; wheezing; shortness of breath or swelling of the mouth or throat), call 911 or get medical care right away. In case of overdose, get medical help or call a Poison Control Center right away.

HOW POTASSIUM IODIDE WORKS

Certain forms of iodine help your thyroid gland work right. Most people get the iodine they need from foods like iodized salt or fish. The thyroid can "store" or hold only a certain amount of iodine.

In a nuclear radiation emergency, radioactive iodine may be released in the air. This material may be breathed or swallowed. It may enter the thyroid gland and damage it. The damage would probably not show itself for years. Children are most likely to have thyroid damage.

If you take KI, it will block or reduce the chances that radioactive iodine will enter your thyroid gland.

WHO SHOULD NOT TAKE POTASSIUM IODIDE

People should avoid KI if they are allergic to iodine, have dermatitis herpetiformis or hypocomplementemic vasculitis, or have nodular thyroid disease with heart disease, because these conditions may increase the chances of side effects to iodine.

HOW AND WHEN TO TAKE POTASSIUM IODIDE

KI should be taken as soon as possible after public officials tell you. If you are told to repeat the dose, you should take the second dose 24 hours after the first dose. Do not take it sooner. More KI will not help you because the thyroid can "hold" only certain amounts of iodine. Taking more than 1 dose per day will increase the chances of side effects. The public officials will tell you how many days to take KI. You should take KI until the chances of major exposure to radioactive iodine by breathing or swallowing stops.

SIDE EFFECTS

Short-term use of KI at the recommended dose is safe. You should not take this drug for longer than you are told.

Possible side effects include: swelling of the salivary glands, nausea, vomiting, diarrhea, stomach ache, fever, headache, metallic taste, and allergic reactions. Allergic reactions can include

- skin rashes such as hives
- swelling of various parts of the body such as the face, lips, tongue, throat, hands or feet
- fever with joint pain
- trouble breathing, speaking or swallowing
- wheezing or shortness of breath

Get medical attention right away if you have trouble breathing, speaking or swallowing; wheezing; shortness of breath; or swelling of the mouth, tongue or throat.

(continued)

Appendix E
(Page 2 of 2)

Potassium Iodide (KI) Administration Instructions

Taking iodide, in rare cases, may cause overactivity of the thyroid gland, underactivity of the thyroid gland, or enlargement of the thyroid gland (goiter). Symptoms of an overactive thyroid gland may include an irregular heart beat and chest pain. Patients with thyroid disease are more likely to get these side effects. Babies under 1 month of age are more likely to get an underactive thyroid gland (hypothyroidism)

WHAT TO DO IF SIDE EFFECTS OCCUR

Stop taking KI and call a doctor if you have one or more of the following symptoms:

- swelling of the face, hands or feet
- fever and joint pain
- skin rash

Stop taking KI and get medical help right away if you have one or more of the following symptoms:

- trouble breathing, speaking or swallowing
- shortness of breath or wheezing
- swelling of the lips, tongue or throat
- irregular heart beat or chest pain

HOW SUPPLIED

Potassium iodide tablets, USP. Packages of 14 tablets. Each white, round, cross-scored tablet contains 130 mg potassium iodide. Store at 20-25° C (68-77° F). Keep dry and foil intact.

Distributed by:
ANBEX INC.
530 Morris Ave.
Springfield, NJ 07081
www.anbex.com

SH905-1

Drug Facts

Active Ingredients (in each tablet)	***Purpose***
Potassium iodide 130mg	Thyroid blocking

Use helps prevent radioactive iodine from getting into the thyroid gland during a nuclear radiation emergency. Use along with other emergency measures recommended by public officials.

Warnings

Allergy alert: Iodine may cause an allergic reaction with one or more of the following symptoms

- shortness of breath or wheezing
- swelling
- skin rash
- trouble breathing, speaking or swallowing
- fever and joint pain

Do not use if you have

- ever had an allergic reaction to iodine
- nodular thyroid disease with heart disease
- hypocomplementemic vasculitis
- dermatitis herpetiformis

Stop use and ask a doctor if you have

- allergic reaction. Get medical help right away if you have trouble breathing, speaking or swallowing, shortness of breath, wheezing, swelling of the mouth, tongue or throat, or rash
- irregular heart or chest pain. Get medical help right away
- swelling of the hands or feet, fever or joint pain

Keep out of reach of children. In case of overdose, get medical help or contact a Poison Control Center right away.

Directions

- use as directed by public officials in the event of a nuclear radiation emergency
- do not take more than 1 dose in 24 hours
- tablets can be whole or crushed and mixed in milk, baby formula, water, orange juice, flat soda like cola, or raspberry syrup

The liquid mixture should be given to infants, young children, and others who cannot swallow tablets; see consumer package insert on how to make a liquid mixture.

Adults over 18 years	1 tablet (whole or crushed) daily (130mg)
children over 12 years to 18 years who weigh at least 150 pounds	1 tablet (whole or crushed) daily (130mg)
children over 12 years to 18 years who weigh less than 150 pounds	½ tablet (whole or crushed) daily (65mg)
children over 3 years to 12 years	½ tablet (whole or crushed) daily (65mg)
children over 1 month to 3 years	32.5mg daily as directed in the consumer package insert
Babies at birth to 1 month	16.25mg daily as directed in the consumer package insert

If pregnant, breastfeeding, have a baby up to 1 month of age, or have thyroid disease (except nodular thyroid disease with heart disease), take as directed above and contact a doctor as soon as possible

Other information

- store at 20-25° C (68-77°F)
- keep dry and foil intact
- protect from light
- **do not throw away consumer package insert**

Inactive ingredients ..... magnesium stearate, microcrystalline cellulose, silica gel, sodium thiosulfate

Questions or comments? ***Call toll free 1-866-463-6754***

Distributed by: **ANBEX INC.**
530 Morris Ave.
Springfield, NJ 07081
www.anbex.com

3 51803 21845 2

IOSAT™

INDICATIONS:
THYROID BLOCKING IN A RADIATION EMERGENCY ONLY.

IOSAT

(Potassium Iodide Tablets, U.S.P., 130mg) Pronounced (eye-TASS-e-um-EYE-oh-dyed) • 14 tablets per package

NDC 51803-001-01

Appendix F
(Page 1 of 1)

Potassium Iodide (KI) Issue Report

ISSUED TO SIGNATURE	EMPLOYEE ID NUMBER	KNOWN ALLERGY TO IODINE? (If yes, do not issue)	PACKAGE INSERT PROVIDED	TIME OF INITIAL KI DOSE	DATE OF INITIAL KI DOSE	ISSUED BY

AUTHORIZED BY:_____ TITLE:_____

Route to Emergency Preparedness Manager.

Appendix G
(Page 1 of 1)

RP Emergency Staffing Functions/Times

	Major Task	On Shift	90 minutes	Minimum Qualifications
A.	In-Plant Surveys	1 + 1*	1	ARW$^{\Delta}$
B.	Radiation Protection:*	2** + 2*	2	ARW$^{\Delta}$
	1. Access Control 2. HP Coverage for Repair Corrective Action, Search and Rescue, First Aid and Fire fighting 3. Personnel Monitoring 4. Dosimetry			
C.	Onsite (Out-of-Plant)	1**	1	ARW$^{\Delta}$
D.	Offsite Surveys	2***	2 $\oplus$	RP Tech***
E	Senior Health Physics Expertise	1****		RPSS

(1) See Developmental References 10 and 11 for bases.

* May be provided by Shift personnel assigned other functions.

** May be provided by task specific trained personnel.

*** Driver may be other than a RP Tech if enough RP Techs. are not available.

**** Radiation Protection Shift Supervisor (RPSS) may report to TSC if able to manage the RP Lab from there.

Δ Advanced Radiation Worker (ARW) qualified

$\oplus$ Additional teams can be dispatched from other facilities (for example, the SQN Monitoring Van.) At least one additional team can be deployed within approximately one hour of notification.

Appendix H
(Page 1 of 1)

Emergency Respirator Issue Guidelines

NOTE

THESE GUIDELINES ARE RECOMMENDATIONS ONLY, SUBJECT TO THE JUDGEMENT OF RP AND EMERGENCY MANAGEMENT PERSONNEL. THESE GUIDELINES ARE APPLICABLE ONLY TO PROTECTION FROM AIRBORNE RADIOACTIVE MATERIAL AND DO NOT APPLY TO RESPIRATORS/SCBAs ISSUED FOR PROTECTION FROM INDUSTRIAL OR CHEMICAL HAZARDS OR ATMOSPHERES IMMEDIATELY HAZARDOUS TO LIFE OR HEALTH.

TASKS TO SAVE A LIFE OR PREVENT SIGNIFICANT DAMAGE TO PLANT	**Respirator/SCBA not required to enter airborne radioactivity areas provided resulting internal dose plus external dose will not result in TEDE exceeding NRC dose limits or, if approved by the SED, doses up to the TVA emergency dose limits (i.e., up to 25 rem/10 rem) (this can include uptakes > 1 ALI)**
HIGH PRIORITY TASKS (priority 1 or 2)	**• Respirator/SCBA not required to enter airborne areas if the following are true:**
NOTE: IF INDIVIDUAL'S TOTAL INTAKE FOR THE YEAR TO DATE EXCEEDS 200 DAC-HRS., DOSE RESULTING FROM ALL INTAKES FOR THE YEAR TO DATE MUST BE ASSESSED IN DETERMINING THE TEDE.	**• Individual's internal dose plus external dose will not result in TEDE exceeding NRC annual dose limit; and** **• Delays or hindrances caused by issuing or wearing respirators/SCBAs will jeopardize the success or timeliness of the task; or** **• Use of a respirator/SCBA will result in a higher TEDE to the responding individuals.**
LOW or MID PRIORITY TASKS	**Use NPG-SPP-05.2.5 for respirator issue guidance.**

NOTE

Protective requirements may be revised at the discretion of the TSC RP Manager as sample data becomes available.

ENCLOSURE 2

WATTS BAR NUCLEAR PLANT, UNIT 0

EPIP Screening Evaluation Form

EPIP-15, Emergency Exposure Guidelines, Revision 0018

EPDP-17, Attachment 2
Screening Evaluation Form

Evaluation No.: WBN-2016-013

Activity Description and References: **BLOCK 1**

Activity is EPIP-15 Revision 18, which:
Replaced cancelled reference RCI-120 with new correct reference NPG-SPP-05.2.5 TEDE ALARA Evaluations (CRs 1190968, 1189908). This revision updates the name and procedure designator of a referenced procedure to be correct and current. The revision is editorial as it does not add or delete any steps and does not change the intent of the procedure.

Activity Scope: **BLOCK 2**

☒ The activity is a change to the radiological emergency plan (includes EPIPs or any other document describing the programmatic methods for maintaining preparedness or responding to an emergency). *[Go to Block 3]*

☐ The activity is not a change to the radiological emergency plan. *[Go to Block 5]*

Change Type: **BLOCK 3**

☒ The change is editorial or typographical. *[Go to Block 7]*

☐ The change is not editorial or typographical. *[Go to Block 4]*

Conformance: **BLOCK 4**

☐ The change conforms to an activity that has prior approval.

Record the prior approved activity:
[Go to Block 7]

☐ The change does not conform to an activity that has prior approval. *[Go to Block 5]*

Planning Standard Impact Determination (Check All Applicable): **BLOCK 5**

☐ 50.47(b)(1) – Assignment of Responsibility (Organization Control)

☐ 50.47(b)(2) – Onsite Emergency Organization

☐ 50.47(b)(3) – Emergency Response Support and Resources

☐ 50.47(b)(4) – Emergency Classification System *

☐ 50.47(b)(5) – Notification Methods and Procedures *

☐ 50.47(b)(6) – Emergency Communications

☐ 50.47(b)(7) – Public Education and Information

☐ 50.47(b)(8) – Emergency Facility and Equipment

- ☐ 50.47(b)(9) – Accident Assessment *
- ☐ 50.47(b)(10) – Protective Response *
- ☐ 50.47(b)(11) – Radiological Exposure Control
- ☐ 50.47(b)(12) – Medical and Public Health Support
- ☐ 50.47(b)(13) – Recovery and Reentry Planning and Post-Accident Operations
- ☐ 50.47(b)(14) – Drills and Exercises
- ☐ 50.47(b)(15) – Emergency Responder Training
- ☐ 50.47(b)(16) – Emergency Plan Maintenance
- ☐ 72.44(f) – Independent Spent Fuel Storage Installation (ISFSI)

[If any Planning Standards impacted, go to Block 7. If none are impacted, go to Block 6].

** Denotes Risk Significant Planning Standard*

Commitment Impact Determination: **BLOCK 6**

- ☐ The activity involves a site specific EP commitment.

  Record the Commitment or Commitment reference:
  [Go to Block 7]

- ☐ The activity does not involve a site specific EP commitment. *[Go to Block 7]*

Screening Evaluation Results: **BLOCK 7**

- ☒ The activity can be implemented without performing a 50.54(q) reduction in effectiveness evaluation.
- ☐ The activity cannot be implemented without performing a 50.54(q) reduction in effectiveness evaluation.

Approvals:

Preparer Name: Allen M. Phillips	Preparer Signature:	Date: 08/16/2016
Reviewer Name: Michael R. White	Reviewer Signature:	Date: 08/16/2016

Watts Bar Nuclear Plant

Unit 0

Emergency Plan Implementing Procedure

EPIP-15

Emergency Exposure Guidelines

Revision 0018

Quality Related

Level of Use: Reference Use

Effective Date: 08-19-2016

Responsible Organization: REP, Radiological Emer. Prep.

Prepared By: Michael R White

Approved By: Thomas F. Detchemendy

Revision Log

Revision or Change Number	Effective Date	Affected Page Numbers	Description of Revision/Change
Rev 12	05/06/2004	2, 4, 5	Plan effectiveness determinations on these changes indicate the following revisions do not reduce the level of effectiveness of the procedure or REP. Non-intent changes. Corrected reference. Editorial corrections.
Rev 13	10/12/2007	2, 5, 8, 10, 11, 13, 14	Plan effectiveness determinations on these changes indicate the following revisions do not reduce the level of effectiveness of the procedure or REP. Non-intent changes. Changed "RadCon" to Radiation Protection Group- (RP)
Rev 14	8/24/2010	All	This procedure has been converted from Word 95 to new template format using Rev 13. Changed Rad to Rem throughout the procedure to conform to the guidance found in EPA-400-R-92-001. This is a corrective action of PER 214744
Rev 15	05/25/12	Cover sheet	Changed the cover sheet to indicate the procedure is Quality Related. (PER 542890)
Rev 16	09/23/13	2, 8	Section 4.1, added applicable appendices to QA records section. PER 724038
Rev 17	09/21/15	15	Removed the respirator evaluation chart as this evaluation is performed in accordance with RCI-120 TEDE ALARA Evaluation, using a 15% inefficiency factor. CR 1077091
Rev 18	08/19/16	4,14	Replaced cancelled reference RCI-120 with new correct reference NPG-SPP-05.2.5 TEDE ALARA Evaluations (CRs 1190968, 1189908)

Table of Contents

1.0 PURPOSE

This Procedure provides guidance for planning occupational exposures under emergency conditions consistent with EPA-400-R-92-001, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents." These limits apply only to emergency exposure authorizations and not to spontaneous reactions by individuals attempting to mitigate an emergency situation.

2.0 REFERENCES

2.1 Performance References

- NPG- SPP-05.1, Radiological Controls
- EPIP-10, Medical Emergency Response
- NPG-SPP-05.2.5, TEDE ALARA Evaluation

2.2 Developmental References

- ICRP Publication 26, "Recommendation of the International Commission on Radiological Protection"
- ICRP Publication 28, "The Principles and General Procedures for Handling Emergency and Accidental Exposures of Workers"
- TVA NP Radiological Emergency Plan
- EPA 400-R-92-001, and subsequent revisions, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents"
- NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants"
- Title 10, Code of Federal Regulations, Parts 20 and 50
- ANSI Standard N.18.7-1976
- ANSI Standard N.13.11

3.0 INSTRUCTIONS

NOTE

Specific definitions as used in this procedure are contained in Appendix D.

A. The **Site Emergency Director (SED)** is the **only** individual responsible for authorizing Emergency dose limits in excess of TVA Administrative dose limits and 10 CFR 20.1201. Appendix A and B **shall** be used to provide written authorization.

NOTE

As defined by the emergency situation, this approval may be relayed verbally and documented later.

B. The Radiation Protection (RP) Group is responsible for completing Appendix B page 4 of 4, "Authorization to Exceed Occupational Dose Limits," obtaining the Site Emergency Director's approval and will perform radiological surveys or other assessments to estimate the radiation doses.

C. In all cases, the site RP Manager shall be informed of any emergency exposure immediately so that a determination of the total quarterly exposure can be made. Based on the results of the determination, the worker may be restricted from further dose.

3.1 EXPOSURE LIMITATIONS

3.1.1 ACTIONS FOR LIFE SAVING OR PROTECTION OF THE PUBLIC

A. For immediate activities up to **25 Rem** which are necessary to:

1. **Save** Human Life.

   For lifesaving operations situations may occur in which a dose in **excess** of **25 Rem** would be required. It is not possible to prejudge the risk that one person should be allowed to take to save the life of another. However, persons undertaking an emergency mission in which the dose would **exceed 25 Rem** to the whole body should do so only on a voluntary basis and with full awareness of the risks involved.

2. **Restore** equipment necessary to maintain critical safety functions or to establish and maintain a safe shutdown,

3. **Prevent** or **Mitigate** a release of radioactivity to the environment for which off-site protective measures may be required. For these activities, the TEDE of personnel directly involved shall not exceed **25 Rem.** This limit is applicable only if actions establishing adequate or equivalent protection, with less dose, are not readily available.

B. Limit for lens of eye is **75 Rem**, or three (3) times the TEDE value.

C. Limit for any other organ (including skin and body extremities) is **250 Rem**, or ten (10) times the TEDE value.

3.1.2 ACTIONS FOR IMMEDIATE REPAIR OR TO PREVENT THE FAILURE OF EQUIPMENT

A. For activities performed on an immediate basis to **prevent** the failure of equipment necessary to protect the public health and safety, the TEDE of personnel directly involved shall not exceed **10 Rem**. This limit is applicable only if actions establishing adequate or equivalent protection, with a less dose consequence, are not readily available.

B. Limit for lens of eye of **30 Rem**, three (3) times the TEDE limit.

C. Limit for any other organ (including skin and body extremities) of **100 Rem**, or ten (10) times the TEDE limit.

3.1.3 INTERNAL EXPOSURE (EMERGENCY WORKERS)

A. Guidelines for internal exposure controls of WBN emergency workers are provided in Appendix C.

3.1.4 POST-EXPOSURE EVALUATIONS

A. Personnel receiving emergency or accident exposures should be restricted from further occupational exposure pending the outcome of exposure evaluations and, if necessary, medical surveillance.

B. An exposure evaluation shall be performed to determine the individual dose. RP shall conduct post exposure dose assessments for exposed individuals, with particular attention to determining the adequacy of administrative dosimeter correction factors for TEDE doses resulting from internal and external exposures. This evaluation should be based on observed area dose rates, airborne activity measurements, and dosimetry results. The evaluation shall be documented in an appropriate format and filed with the individual's exposure records. Appropriate reports shall be submitted to RP and the US NRC.

C. Any exposures above **5 Rem** TEDE shall be reported to a TVA physician or designee. It is the responsibility of the physician to determine appropriate medical evaluations and required care. Cross reference guidance is in EPIP-10.

3.1.5 EMERGENCY DOSE EXTENSIONS

A. In REP emergency situations, planned doses to radiological workers can be extended beyond the TVA administrative limits to the 10 CFR 20 regulatory limits.

3.1.6 ADDITIONAL INSTRUCTIONS

A. Refer to Appendix A and B of this procedure.

4.0 RECORDS

4.1 QA Records

The following records are QA records when completed during actual radiological emergencies.

Appendix B: General Instructions for Emergency Exposures

4.2 Non-QA Records

A. Emergency Records

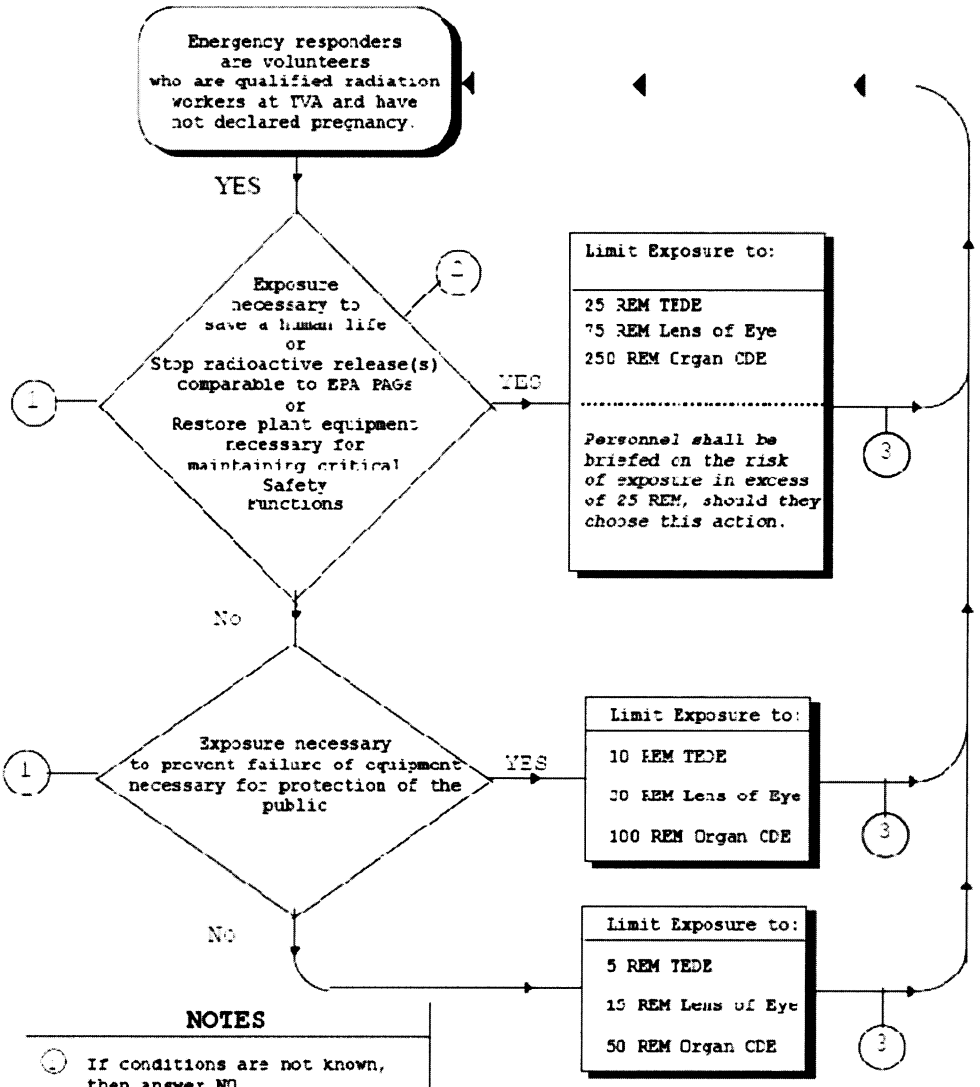
The records generated due to declaration of an emergency classification are considered Lifetime Retention records. These records shall be forwarded to the WBN EP Manager. The records necessary to demonstrate performance are then submitted to the Corporate EP Manager for storage.

B. Drill and Exercise Records

The records deemed necessary to demonstrate performance of key actions during drills are considered Non-QA records. These records shall be forwarded to the WBN EP Manager. The WBN EP Manager shall retain records necessary to demonstrate six-year plan requirements for six years. The WBN EP Manager shall retain other records in this category for three years (eight years starting the after the next HAB Drill).

Appendix A
(Page 1 of 1)

Watts Bar Emergency Exposure Reference



Appendix B
(Page 1 of 4)

General Instructions For Emergency Exposures

A. These (**emergency**) limits are in excess of 10 CFR 20 limits. These limits apply only to planned exposures and not to spontaneous reactions by individuals attempting to mitigate the accident.

B. Emergency exposure limits apply only to TVA personnel, who are qualified as radiation workers at the plant and have been issued dosimetry.

C. Personnel who have received previous accident or emergency exposure in excess of **25 Rem** TEDE shall not participate in further emergency exposure situations.

D. Personnel who have declared pregnancy in accordance with other site procedures, shall not participate in emergency exposure situations.

E. Receipt of emergency dose limits shall be on a voluntary basis. Other factors being equal, older volunteers should be selected first.

F. Personnel receiving emergency exposures, in excess of **25 Rem**, shall be informed of the risks involved, including the numerical levels of dose at which acute effects of radiation will be incurred, and numerical estimates of the risk of delayed effects. EPA tables are provided following these general instructions for this purpose.

G. Personnel shall not enter any area where dose rates are unknown or unmeasurable with instruments and dosimetry immediately available.

H. Internal exposure should be minimized by the use of respiratory protection equipment. Respirator Issue Guidelines are given in Appendix C. Protective clothing should be used to minimize personal contamination.

I. The dose of personnel authorized to receive emergency exposures shall be monitored and recorded as provided for in the Site RP procedures.

J. The exposure of personnel during emergency operations shall be maintained as low as reasonably achievable (ALARA).

Appendix B
(Page 2 of 4)

K. The dose limits specified in this procedure are intended as upper limits for guidance during emergency situations, and planned doses for rescue and emergency repairs. Recovery operations **shall not** exceed these limits.

L. If a projected dose to the thyroid is expected to exceed **10 Rem** during a radiological emergency, Potassium Iodide (KI) should be issued in accordance with EPIP-14 to on-site personnel as a protective measure. The SED shall be informed prior to issuance.

M. The RP Group will prepare Appendix B page 4 of 4, Authorization to Exceed Occupational Dose Limits and obtain the Site Emergency Director's approval.

N. Following the exposure, these individuals must be removed from areas where they can receive additional dose.

NOTES

1) Until isotopic assessments of airborne radioactivity are available, an administrative correction factor of 2 should be used to estimate TEDE exposures in airborne activity areas:

   Estimated TEDE = dosimeter reading x 2

2) The above value corresponds to the ratio of external (measured) dose to estimated TEDE dose, in accordance with default values in the TVA's Dose Assessment model. When accident specific nuclide assessments are available, more definitive dose assessments should be performed to adjust the correction factors.

Appendix B
(Page 3 of 4)

EPA Emergency Exposure Risk Information
(for personnel briefing on emergency exposures of 25 Rem TEDE)

- Approximate Cancer Risk to Average Individuals from 25 Rem Effective Dose Equivalent Delivered Promptly.

Age at Exposure (years)	Risk of Premature Death (deaths per 1,000 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

NOTE

Tables referenced from the Environmental Protection Agency's "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents," (EPA-400), May 1992, page 2-12.

- Health Effects Associated with Whole Body Absorbed Doses Received Within a Few Hours.

Whole Body Absorbed Dose (rad)	Early Fatalities[2] (percent)	Whole Body Absorbed Dose (rad)	Prodromal Effects[3] (percent)
140	5	50	2
200	15	100	15
300	50	150	50
400	85	200	85
460	95	250	98

[1] Risks will be lower for protracted exposure periods.

[2] Supportive medical treatment may increase the dose at which these frequencies occur by approximately 50 percent.

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

Appendix B
(Page 4 of 4)

Authorization To Exceed Occupational Dose Limits Form

The persons listed below are authorized to exceed the TVA dose limits for the whole body and extremities during the evaluation or mitigation of an emergency situation. Emergency limits are in excess of 10 CFR 20.1201 limits.

The persons listed below acknowledge they have volunteered for this assignment, and have been briefed on the emergency situation, and have been made aware of possible consequences of the estimated radiation dose(s).

Hand carry or FAX to the TSC for SED Signature

	NAME	EMPLOYEE ID#	SIGNATURE	DOSE LIMIT (REM)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

RP Survey No. (If Applicable): _____

Emergency Location(s) _____

Estimated Doses _____

Remarks: _____

_____

Prepared by: sign and date _____

Authorized by: sign and date _____

Site Emergency Director

Hand carry or FAX to the OSC after SED signs.

Appendix C
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Emergency Respirator Issue Guidelines

NOTE

THESE GUIDELINES ARE RECOMMENDATIONS ONLY, SUBJECT TO THE JUDGEMENT OF RP AND EMERGENCY MANAGEMENT PERSONNEL. THESE GUIDELINES ARE APPLICABLE ONLY TO PROTECTION FROM AIRBORNE RADIOACTIVE MATERIAL AND DO NOT APPLY TO RESPIRATORS/SCBA'S ISSUED FOR PROTECTION FROM INDUSTRIAL OR CHEMICAL HAZARDS OR ATMOSPHERES IMMEDIATELY HAZARDOUS TO LIFE OR HEALTH.

TASKS TO SAVE A LIFE OR PREVENT SIGNIFICANT DAMAGE TO PLANT	**Respirator/SCBA not required to enter airborne radioactivity areas provided resulting internal dose plus external dose will not result in TEDE exceeding NRC dose limits or, if approved by the SED, doses up to the TVA emergency dose limits (i.e., up to 25 Rem/10 Rem) (this can include uptakes > 1 ALI)**
HIGH PRIORITY TASKS (priority 1 or 2)	**• Respirator/SCBA not required to enter airborne areas if the following are true:**
NOTE: IF INDIVIDUAL'S TOTAL INTAKE FOR THE YEAR TO DATE EXCEEDS 200 DAC-HRS., DOSE RESULTING FROM ALL INTAKES FOR THE YEAR TO DATE MUST BE ASSESSED IN DETERMINING THE TEDE.	**• Individual's internal dose plus external dose will not result in TEDE exceeding NRC annual dose limit; and** **• Delays or hindrances caused by issuing or wearing respirators/SCBAs will jeopardize the success or timeliness of the task; or** **• Use of a respirator/SCBA will result in a higher TEDE to the responding individuals.**
LOW or MID PRIORITY TASKS	**Use NPG-SPP-05.2.5 for respirator issue guidance.**

NOTE

Protective requirements may be revised at the discretion of the TSC RP Manager as sample data becomes available.

Appendix D
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Definitions

Accident Exposure - Exposure to radiation or radioactive materials that results from an unexpected event. Accident exposure refers to the immediate consequences of the unexpected event and the immediate corrective/mitigative actions of personnel present at the scene where the event occurred. Accident exposures are not controlled by the Radiological Emergency Plan (REP), and may be reportable to the NRC under 10 CFR 20 and/or 10 CFR 50.72.

CDE - Committed Dose Equivalent

CEDE - Committed Effective Dose Equivalent

DAC - Derived Air Concentration

DDE - Deep Dose Equivalent

Emergency Exposure - Exposure to radiation or radioactive materials that is the result of actions taken in response to an emergency condition classified and declared pursuant to the Watts Bar Radiological Emergency Plan (REP). Emergency exposure refers to radiation exposure caused by those assessments, corrective, and mitigative actions that are required on an immediate basis to protect human lives, or to prevent or minimize the collective exposure of large populations. Such activities are directed by the Control Room or by the TSC.

LDE - Eye Dose Equivalent

Life Saving Action - Those actions related to the search and rescue of injured persons.

Planned Special Exposure (PSE) - As defined in 10 CFR 20, an infrequent exposure to radiation, separate from and in addition to the annual dose limits. PSEs might be warranted in the recovery phase. However, it is unlikely that the PSE requirements could be met during the initial phases of the emergency.

RAD/REM - For purposes of this implementing procedure, radiation exposure as expressed in units of R/hr and subunits, thereof, is equivalent to dose (Rad) and dose equivalent (Rem) based on ANSI-N 13.11 development and terminology. Any acute dose greater than 10 Rem is generally denoted in units of Rad, since that level is considered as the accident range of personnel exposure. Any dose less than that level is considered the protective range of personnel exposure. For purposes of this procedure the assumption of 1 Rad = 1 Rem is assumed for all levels of exposure.

SDE - Shallow Dose Equivalent

TEDE - Total Effective Dose Equivalent