Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

APR 19 2004

10 CFR 50, App E.

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

Gentlemen:

In the Matter of) Docket No. 50-390
Tennessee Valley Authority)

WATTS BAR NUCLEAR PLANT (WBN) - EMERGENCY PLAN IMPLEMENTING PROCEDURE (EPIP) REVISIONS

In accordance with the requirements of 10 CFR Part 50, Appendix E, Section V, the enclosure provides the EPIPs as listed below.

EPIP	Rev	Title	Effective Date
EPIP-1	22	Emergency Plan Classification Flowchart	4-16-2004
EPIP-13	11	Initial Dose Assessment for Radiological Emergencies	3-25-2004

There are no regulatory commitments in this letter. If you should have any questions, please contact me at (423) 365-1824.

Sincerely,

P. L. Pace
Manager, Site Licensing and Industry Affairs

Enclosure
cc: See Page 2

A045

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PLP:JES
Enclosure
cc (Enclosure):

NRC Resident Inspector (w/o Enclosure)
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Spring City, Tennessee 37381

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TENNESSEE VALLEY AUTHORITY

WATTS BAR NUCLEAR PLANT

EMERGENCY PLAN IMPLEMENTATING PROCEDURES

EPIP-1

EMERGENCY PLAN CLASSIFICATION FLOWCHART

Revision 22

Unit 0

NON-QUALITY RELATED

PREPARED BY: James F. Hagy
(Type Name)

SPONSORING ORGANIZATION: Emergency Planning

APPROVED BY: Frank L. Pavlechko

EFFECTIVE DATE: 04/16/2004

LEVEL OF USE: REFERENCE

REVISION LOG

Revision Number	Implementation Date	Description of Revision
0	04/13/90	New WBN-EPIP. Supersedes IP-1.
1	02/04/91	Revised to separate RCS leak and identified S/G tube leak initiating conditions. Clarified initiating condition in fire. Updated ODS telephone numbers.
2	11/28/91	Add initiation conditions. Clarify reference to Attachment 1 Definitions. Define Protected Area, Owner Controlled Area, and Vital Areas throughout procedures. Clarify NOUE declaration for Uncontrolled Shutdown.
3	03/04/92	Change all Technical Specification references to reflect new "Merit" Tech Specs and ODCM references.
4	02/10/93	Procedure revised to reflect the new methodology for development of Emergency Action Levels per: NUMARC/NESP-007, Rev. 3, 1/92, endorsed by REG GUIDE 1.101 Emergency Planning and Preparedness For Nuclear Power Reactors Rev. 3, 8/92.
5	09/15/93	Editorial (non-intent) and formal changes. Text changes made to EALs to meet review comments identified by the NRC.
6	01/01/94	Procedure revised to reflect new 10 CFR 20 changes.
7	05/27/94	Procedure revised to reflect changes to System 90 (Radmonitoring) and establish site perimeter monitoring points.
8	01/10/95	FPBM, EAL 1.3.4, CNTMT, Bypass, Loss (1), revised to eliminate potential for misclassification. Maps revised to reference north and wind direction. Table 7-2, Alert, Radiation Levels enhanced to provide Operators additional information.
9	4/28/98	Revised Revision Log to include page numbers. References added to the document. Fission Product Barrier Matrix revised to reflect information found in the EOP Set Point Verification Document (WBN-OS64-188). Reference to AOI-27 revised to AOI-30.2. Phone numbers to the National Weather Service changed due to their reorganization. Annunciator window references for the earthquake corrected to match Main Control Room alignment. All references to RM were changed to RE to make it consistent with site description documents. Tables in section seven revised to reflect the following: System 90 changes, monitor efficiencies, default flow rates, release time durations, and annual meteorological data enhancements.

Revision Number	Implementation Date	Pages Affected	Description of Revision
CN-1	09/28/95	10, 14, 26	The following non-intent enhancements were made: (CCP) Acronym added to the Fission Product Barrier Matrix in 1.2 RCS Barrier, (2. RCS Leakage LOCA), to enhance description. New SI reference number for Reactor Coolant System Water Inventory Balance identified in event 2.5 (RCS Unidentified Leakage) and 2.6 (RCS Identified Leakage). Area code and phone number in event 5.2 (Tornado) revised to new number.
CN-2	11/10/95	3, 6, 34	The following non-intent enhancements were made: Corresponding ERFDS system identifiers were added next to the rad monitors on Table 7-1; Table 7-1 was realigned to improve its usability; an enhanced description for RE-404 was provided in Note 3 of Table 7-1; the ERFDS Operators Manual was added to the Reference section.

REVISION LOG(Continued)

Revision Number	Implementation Date	Pages Affected	Description of Revision
CN-3	05/24/96	8, 11, 16, 19, 23, 24, 26, 29, 32, 34	The following non-intent enhancements were made: Due to revisions made to AOI-27, it was added back to the EALs in event 4.5 "Control Room Evacuation"; The Assessment Method on Table 7-1 was enhanced to correspond with the note at the top of the table. In addition, the reference to TI-30 was removed since this procedure will be terminated due to the enhancements being made to EPIP-16 and ERFDS. The word Projectile was added to the index and title reference to event 5.3 "Aircraft/Projectile Crash", to make it consistent with the EALs within it's classification.
10	3/15/99	All	The following non-intent enhancement were made: Software revised to Microsoft Word which re-formatted pages along with other enhancements; minor typographical errors corrected; two references revised - one added; SOS/ASOS replaced with SM/US; index page, effluent added to gaseous; vital area definition enhanced; spent fuel pit revised to pool on Table 7-2; SP revised to EAB in Event 7.1; TVA Load Dispatcher/Water Resources revised to River Systems Operations and revised ERFDS/P-2500 to ICS.
11	4/15/99	2, 34	Non intent change. Typo corrected. Changed >1.0 to >0.1.
11A	7/1/99	3,26	Corrected typo on phone number The remaining pages of this procedure are Rev 11 only page 3, and the fold out page for 26 have been changed.
12	9/30/99	All	Non intent change. Minor editorial\format changes made. Typographical errors corrected. Seismic windows revised to reflect DCN-50007 per ERPI Report 6695. (LTL) Lower toxicity limit replaced with (PEL) Permissible Exposure Limit. This revision is also part of the resolution to PER 99-009326-000.
13	12/08/99	All	Non-intent change. Revised page 33 for resolution of PER 99-015478-000. Minor editorial change to Event 5.1 step 1 of the Alert classification.
14	04/10/00	All (Pg.4 & 45)	Non-intend change. Revised page 45 for DCN 50484, stage 1 which moved 0-RE-90-101B, & -132B from ICS Screen 4RM2 to 4RM1. DCN also moved 1-RE-90-421B thru -424B and 0-RE-90-120 & -121 from ICS Screen 4RM1 to 4RM2. This revision allows all liquid radiation monitors to be observable on one ICS screen and all gaseous radiation monitors to be observed on a separate ICS screen.
15	08/17/00	All (Pg. 4, 11A & B)	Intent change. Revised CNTMT Rad Monitors (1-RE-90-271, 272, 273, & 274) readings to correspond with the new TI-RPS-162, "Response of the Primary Containment High Range Monitors" readings (Reference EDC-50600). This analysis resulted in a revision to the EALs 1.1.5 on the Barrier matrix page, 11b. This revision resolves action items from CORP PER 99-000038-000. This revision was also determined not to reduce the level of effectiveness of the procedure or REP.

REVISION LOG (Continued)

Revision Number	Implementation Date	Pages Affected	Description of Revision
16	3/30/01	All (Pg. 11 &14)	Plan effectiveness determinations reviews indicate the following revisions do not reduce the level of effectiveness of the procedure or REP: Intent change. Revised CNTMT Rad Monitors readings in the Barrier Matrix (1.3) to support new dose assessment methodology. Non intent change. Revised reference from annunciator alarm printer to annunciator monitor per DCN D-50301.
17	09/25//01	All Page 6, 11B	Plan effectiveness determinations reviews indicate the following revisions do not reduce the level of effectiveness of the procedure or REP: Intent change. Procedure revised to Non-Quality related per requirements of NQAP & pending revision to SPP-2.2. The coversheet and records section of the procedure was revised to reflect this change. Non-Intent change. Corrected typo on Barrier Matrix.
18	02/15/02	All 2, 11B, 44	Plan effectiveness determinations reviews indicate the following revisions do not reduce the level of effectiveness of the procedure or REP: Non-Intent change. Changes to the EALs in this revision consist of changing β-γ to gamma in Section 7.0 to ensure consistency with NUMARC/NESP-007, Reg Guide 1.101, and NEI 99-01 rev 4. Clarification to EAL 1.3.3 (containment isolation status also made per this reference.) This standardizes these issues with the other TVAN sites. These changes were approved by the State of Tennessee.
19	06/05/02	All 4, 7 &30	Plan effectiveness determinations on these change(s) indicate the following revisions do not reduce the level of effectiveness of the procedure or REP. Intent change(s): A revision to the Security Event (4.6) was made to incorporate change(s) resulting from the NEI to NRC (Mr. Bruce Boger) letter dated 12/18/01 requesting conformation for an EAL basis change to include response to a Credible Site Specific Threat. Table 4-3 was revised to incorporate this additional EAL. This meets the compliance of the NRC's 10/6/01 Safeguards Advisory on this matter. This represents an additional EAL and does not change existing criteria in the Security Event Basis. Revised 5.1 Interfacing documents by noting the termination of EPIP 9 with reference to EPIP 16.
20	07/09/02	ALL, pg. 2, 10, 13, 15, 20, 24, 30, 32, 39, 43	Plan effectiveness determinations on these change(s) indicate the following revisions do not reduce the level of effectiveness of the procedure or REP. Intent change(s): Reference to T/S 3.4.16 in Event 2.4 EAL 1(a) revised to correspond to levels in AOI-28. Credible Site-Specific was added to the definition pages. Removed reference to the definition in Table 4-3 SECURITY EVENTS to standardize with other TVAN sites.
21	03/03/2003	2, 15	Plan effectiveness determinations on these change(s) indicate the following revisions do not reduce the level of effectiveness of the procedure or REP. Non-intent change: Deleted reference to table which was deleted from AOI-28, Ref. WBPER 03-004004-000.
22	04/16/2004	4, 7, 45	Plan effectiveness determinations on these change(s) indicate the following revisions do not reduce the level of effectiveness of the procedure or REP. Intent change: Revised Table 7.1 in Section 7, "Radiological," to standardize the calculational methodology with SQN. This revision updates the site meteorology, removes allocation factors, and removes the joint frequency distribution factors which were in the previous table. Updated references.

1.0 PURPOSE[4]

This Procedure provides guidance in determining the classification and declaration of an emergency based on plant conditions.

2.0 RESPONSIBILITY[2,4]

The responsibility of declaring an Emergency based on the guidance within this procedure belongs to the Shift Manager/Site Emergency Director (SM/SED) or designated Unit Supervisor (US) when acting as the SM or the TSC Site Emergency Director (SED). These duties CAN NOT be delegated.

3.0 INSTRUCTIONS[4]

3.1 The criteria in WBN EPIP-1 are given for GUIDANCE ONLY: knowledge of actual plant conditions or the extent of the emergency may require that additional steps be taken. In all cases, this logic procedure should be combined with the sound judgment of the SM/SED and/or the TSC SED to arrive at a classification for a particular set of circumstances.

3.2 The Nuclear Power (NP) Radiological Emergency Plan (REP) will be activated when any one of the conditions listed in this logic is detected.

3.3 Classification Determination

3.3.1 To determine the classification of the emergency, review the Initiating Conditions of the Events described in this procedure with the known or suspected conditions and CARRY OUT the notifications and actions referenced.

3.3.2 If a Critical Safety Function (CSF) is listed as an Initiating Condition: the respective status tree criteria will be monitored and used to determine the Event classification for the modes listed on the classification flowchart.

3.3.3 The highest classification for which an Emergency Action level (EAL) currently exists shall be declared.

3.0 INSTRUCTIONS (continued)

3.3.4 After an Event classification, if the following investigation shows that Initiating Conditions were met that dictate a higher Event classification, the new event classification shall be declared at the clock time of the determination.

3.3.5 **IF** an EAL for a higher classification was exceeded but the present situation indicates a lower classification, the fact that the higher classification occurred SHALL be reported to the NRC and Central Emergency Control Center (CECC), but should not be declared.

3.3.6 **IF** the Parameter is indeterminate due to instrument malfunction and the existence of the condition **CAN NOT** be reasonably discounted (i.e., spurious or false alarm that can be substantiated within 15 minutes) the condition is considered **MET** and the SM/SED SHALL follow the indications provided until such time as the alarm is verified to be false.

3.3.7 **IF** an EAL was exceeded, but the emergency has been totally resolved (prior to declaration), the emergency condition that was appropriate **shall not** be declared but reported to the NRC and Operations Duty Specialist (ODS) at the same clock time.

3.3.8 The **ACCEPTABLE** time frame for notification to the Operation Duty Specialist (ODS) is considered to be five (5) minutes. This is the time period between declaration of the emergency and notifying the ODS.

4.0 RECORDS

4.1 Non-QA Records

None

5.0 REFERENCES

5.1 Interfacing References

BP-236, *Event Critique and Root Cause Analysis*

SPP 3.5, *Regulatory Reporting Requirements*

WBN-EPIP-2, *Unusual Event*

WBN-EPIP-3, *Alert*

WBN-EPIP-4, *Site Area Emergency*

WBN-EPIP-5, *General Emergency*

WBN-EPIP-9, *Loss of Meteorological Data (Canceled see EPIP-16)*

WBN-EPIP-13, *Initial Dose Assessment For Radiological Emergencies*

WBN-EPIP-14, *Radiological Control Response*

WBN-EPIP-16, *Termination of the Emergency and Recovery*

CECC-EPIP-9, *Emergency Environmental Radiological Monitoring Procedures*

1-SI-68-34, *Reactor Coolant System Water Inventory Balance*

5.2 Other Documents

10 CFR 50, *Domestic Licensing of Production and Utilization Facilities*

10 CFR 20, *Standards for Protection From Radiation*

REG GUIDE-1.101, *Emergency Planning and Preparedness For Nuclear Power Reactors endorsing NUMARC NESP-007 Methodology for Development of Emergency Action Levels.*

Site Technical Specifications (Tech Specs), Abnormal Operating Instructions (AOIs), Emergency Operating Procedures (EOPs), Set Point Verification documents, Chemistry Technical documents (CTDs), and the Final Safety Analysis Report (FSAR) are also referenced in Appendix C of the Radiological Emergency Plan.

ICS Operator's Manual

EPPOS #2, "NRC EP Position on Timeliness of Classification of Emergency Conditions

EPRI Report 6695 Guidelines for Nuclear Power Plant Response to Earthquakes.

EMERGENCY

PLAN

CLASSIFICATION

FLOWCHART [1,3,4,5]

FISSION PRODUCT BARRIER MATRIX (Modes 1-4)

1.1 Fuel Clad
1.2 RCS
1.3 Containment

1

SYSTEM DEGRADATION

2.1 Loss of Instrumentation
2.2 Loss of Function/Communication
2.3 Failure of Reactor Protection
2.4 Fuel Clad Degradation
2.5 RCS Unidentified Leakage
2.6 RCS Identified Leakage
2.7 Uncontrolled Cool Down
2.8 Turbine Failure
2.9 Technical Specification
2.10 Safety Limit

2

LOSS OF POWER

3.1 Loss of AC (Power Ops)
3.2 Loss of AC (Shutdown)
3.3 Loss of DC

3

HAZARDS and SED JUDGMENT

4.1 Fire
4.2 Explosion
Table 4-1
Figure 4-A
4.3 Flammable Gas
4.4 Toxic Gas
Table 4-2
Figure 4-B
4.5 Control Room Evacuation
4.6 Security
4.7 SED Judgment
Table 4-3

4

DESTRUCTIVE PHENOMENON

5.1 Earthquake
5.2 Tornado
5.3 Aircraft/Projectile Crash
Table 5-1
5.4 River Level High
5.5 River Level Low
5.6 Watercraft Crash
Figure 5-A

5

SHUTDOWN SYSTEM DEGRADATION

6.1 Loss of Shutdown Systems
6.2 Loss of AC (Shutdown)
6.3 Loss of DC (Shutdown)
6.4 Fuel Handling

6

RADIOLOGICAL

7.1 Gaseous Effluent
7.2 Liquid Effluent
Table 7-1
Figure 7-A
7.3 Radiation Levels
7.4 Fuel Handling
Table 7-2

7

DEFINITIONS/ACRONYMS

UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY and GENERAL EMERGENCY: (see SED Judgment 4.7).

BOMB: An explosive device (See EXPLOSION).

CIVIL DISTURBANCE: A group of twenty (20) or more persons violently protesting station operations or activities at the site.

CREDIBLE SITE-SPECIFIC -The determination is made by WBN senior plant management through use of information found in the Safeguards Contingency Plan.

CRITICAL-SAFETY FUNCTION (CSFs): A plant safety function required to prevent significant release of core radioactivity to the environment. There are six CSFs: Sub-criticality, Core Cooling, Heat Sink, Pressurized Thermal Shock, Integrity (Containment) and Inventory (RCS).

EVENT: Assessment of an EVENT commences when recognition is made that one or more of the conditions associated with the event exist. Implicit in this definition is the need for timely assessment, i.e. within 15 minutes.

EXCLUSION AREA BOUNDARY (EAB): The demarcation of the area surrounding the WBN units in which postulated FSAR accidents will not result in population doses exceeding the criteria of 10 CFR Part 100. Refer to Figure 7-A.

EXPLOSION: A rapid, violent, unconfined combustion, or a catastrophic failure of pressurized equipment that imparts energy of sufficient force to potentially damage permanent structures required for safe operation.

EXTORTION: An attempt to cause an action at the station by threat of force.

FAULTED: (Steam Generator) Existence of secondary side leakage (i.e., steam or feed line break) that results in an uncontrolled decrease in steam generator pressure or the steam generator being completely depressurized.

FIRE: Combustion characterized by heat and light. Source of smoke such as slipping drive belts or overheated electrical components do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

FLAMMABLE GAS: Combustible gases maintained at concentrations less than the **LOWER EXPLOSIVE LIMIT (LEL)** will not explode due to ignition.

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

INEFFECTIVE: The specified restoration action(s) does not result in a reduction in the level of severity of the RED PATH condition within 15 minutes from identification of the Core Cooling CSF Status Tree RED PATH. A reduction in the level of severity is an improvement in the applicable parameters, e.g., Increasing Trend in Reactor Vessel Water Level (Full RVLIS) and/or Decreasing Trend on Core Thermocouple Temperatures.

INITIATING CONDITIONS: Plant Parameters, radiation monitor readings or personnel observations that identify an Event for purposes of Emergency Plan Classification.

INTRUSION/INTRUDER: Suspected hostile individual present in a protected area without authorization.

ODCM: Offsite Dose Calculation Manual.

ORANGE PATH: Monitoring of one or more CSFs by FR-0 which indicates that the CSF(s) is under severe challenge.

PROJECTILE: An object ejected, thrown, or launched towards a plant structure. The source of the projectile may be onsite or offsite. Damage is sufficient to cause concern regarding the integrity of the affected structure or the operability or reliability of safety equipment contained therein.

PROTECTED AREA: Encompasses all owner controlled areas within the security protected area fence as shown on Figure 4-A.

RED PATH: Monitoring of one or more CSFs by the FR-0 which indicates that the CSF(s) is under extreme challenge; prompt operator action is required.

RUPTURED: (Steam Generator) Existence of primary to secondary leakage of a magnitude greater than charging pump capacity.

SABOTAGE: Deliberate damage, misalignment, or mis-operation of plant equipment with the intent to render the equipment inoperable.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) An automatic turbine runback > 15% thermal reactor power; (2) Electrical load rejection > 25% full electrical load; (3) Reactor Trip or (4) Safety Injection System Activation.

SITE PERIMETER (SP): Encompasses all owner controlled areas in the immediate site environs as shown on Figures 4-Aand 7-A.

STRIKE ACTION: A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on TVA. The STRIKE ACTION must threaten to interrupt normal plant operations.

TOXIC GAS: A gas that is dangerous to life or limb by reason of inhalation or skin contact (e.g., chlorine).

UNPLANNED: An event or action that is not the expected result of normal operations, testing, or maintenance. Events that result in corrective or mitigative actions being taken in accordance with abnormal or emergency procedures are UNPLANNED.

UNPLANNED: (With specific regard to radioactivity releases) A release of radioactivity is UNPLANNED if the release has not been authorized by a Discharge Permit (DP). Implicit in this definition are unintentional releases, unmonitored releases, or planned releases that exceed a condition specified on the DP, e.g., alarm setpoints, minimum dilution flow, minimum release times, maximum release rates, and/or discharge of incorrect tank.

VALID: An indication or report or condition is considered to be VALID when it is conclusively verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel. Implicit in this definition is the need for timely assessment, i.e., within 15 minutes.

VISIBLE DAMAGE: Damage to equipment that is readily observable without measurements, testing, or analyses. Damage is sufficient enough to cause concern regarding the continued operability or reliability of affected safety structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, and/or paint blistering. Surface blemishes (e.g., paint chipping, scratches) should NOT be included.

VITAL AREA: Is any area within the PROTECTED AREA which contains equipment, systems, devices, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

1.1 Fuel Clad Barrier

1. Critical Safety Function Status

LOSS	Potential LOSS
Core Cooling Red	Core Cooling Orange OR Heat Sink Red (RHR Not in Service)

-OR-

2. Primary Coolant Activity Level

LOSS	Potential LOSS
RCS sample activity is Greater Than 300 µCi/gm dose equivalent iodine-131	Not applicable

-OR-

3. Incore TCs Hi Quad Average

LOSS	Potential LOSS
Greater Than 1200°F	Greater Than 727°F

-OR-

4. Reactor Vessel Water Level

LOSS	Potential LOSS
Not Applicable	VALID RVLIS level <33% (No RCP running)

-OR-

5. Containment Radiation Monitors

LOSS	Potential LOSS
VALID reading increase of Greater Than: 74 R/hr On 1-RE-90-271 and 272 OR 59 R/hr On 1-RE-90-273 and 274	Not Applicable

-OR-

6. Site Emergency Director Judgment

Any condition that, in the Judgment of the SM/SED, Indicates Loss or Potential Loss of the Fuel Clad Barrier Comparable to the Conditions Listed Above.

1.2 RCS Barrier

1. Critical Safety Function Status

LOSS	Potential LOSS
Not Applicable	Pressurized Thermal Shock Red OR Heat Sink Red (RHR Not in Service)

-OR-

2. RCS Leakage/LOCA

LOSS	Potential LOSS
RCS Leak results in Loss of subcooling (<65°F Indicated), [85°F ADV]	Non Isolatable RCS Leak Exceeding The Capacity of One Charging Pump (CCP) In the Normal Charging Alignment. OR RCS Leakage Results In Entry Into E-1

-OR-

3. Steam Generator Tube Rupture

LOSS	Potential LOSS
SGTR that results in a safety injection actuation OR Entry into E-3	Not Applicable

-OR-

4. Reactor Vessel Water Level

LOSS	Potential LOSS
VALID RVLIS level <33% (No RCP Running)	Not Applicable

-OR-

5. Site Emergency Director Judgment

Any condition that, in the Judgment of the SM/SED, Indicates Loss or Potential Loss of the RCS Barrier Comparable to the Conditions Listed Above.

1.3 CNTMT Barrier

1. Critical Safety Function Status

LOSS	Potential LOSS
Not Applicable	Containment (FR-Z.1) Red OR Actions of FR-C.1 (Red Path) are INEFFECTIVE

-OR-

2. Containment Pressure/Hydrogen

LOSS	Potential LOSS
Rapid unexplained decrease following initial increase OR Containment pressure or Sump level Not increasing (with LOCA in progress)	Containment Hydrogen Increases to >4% by volume OR Pressure >2.8 PSIG (Phase B) with < One full train of Containment spray

-OR-

3. Containment Isolation Status

LOSS	Potential LOSS
Containment Isolation is Incomplete (when required) AND a Release Path to the Environment Exists	Not Applicable

-OR-

4. Containment Bypass

LOSS	Potential LOSS
RUPTURED S/G is also FAULTED outside CNTMT OR Prolonged (>4 Hours) Secondary Side release outside CNTMT from a S/G with a SGTL > T/S Limits	Unexplained VALID increase in area or ventilation RAD monitors in areas adjacent to CNTMT (with LOCA in progress)

-OR-

5. Significant Radioactivity in Containment

LOSS	Potential LOSS
Not Applicable	VALID Reading increase of Greater Than: 108 R/hr on 1-RE-90-271 and 1-RE-90-272 OR 86 R/hr on 1-RE-90-273 and 1-RE-90-274

-OR-

Site Emergency Director Judgment

Any condition that, in the Judgment of the SM/SED, Indicates Loss or Potential Loss of the CNTMT Barrier Comparable to the Conditions Listed Above.

Modes: 1, 2, 3, 4

INSTRUCTIONS

NOTE: A condition is considered to be MET if, in the judgment of the Site Emergency Director, the condition will be MET imminently (i.e., within 1 to 2 hours, in the absence of a viable success path). The classification shall be made a soon as this determination is made.

1. In the matrix to the left, review the **INITIATING CONDITIONS** in all columns and identify which, if any, **INITIATING CONDITIONS** are MET. Circle these **CONDITIONS**.
2. For each of the three barriers, identify if any **LOSS** or Potential **LOSS INITIATING CONDITIONS** have been MET.
3. If a CSF is listed as an **INITIATING CONDITION**; the respective status tree criteria will be monitored and used to determine the **EVENT** classification for the Modes listed on the classification flowchart.
4. Compare the barrier losses and potential losses to the **EVENTS** below and make the appropriate declaration.

FISSION PRODUCT BARRIER MATRIX U1

EVENTS

UNUSUAL EVENT	ALERT
Loss or Potential LOSS of Containment Barrier	Any LOSS or Potential LOSS of Fuel Clad barrier OR Any LOSS or Potential LOSS of RCS barrier
SITE AREA EMERGENCY	**GENERAL EMERGENCY**
LOSS or Potential LOSS of any two barriers	LOSS of any two barriers and Potential LOSS of third barrier

FISSION PRODUCT BARRIER MATRIX (Modes 1-4)

1.1 Fuel Clad
1.2 RCS
1.3 Containment

1

SYSTEM DEGRADATION

2.1 Loss of Instrumentation
2.2 Loss of Function/Communication
2.3 Failure of Reactor Protection
2.4 Fuel Clad Degradation
2.5 RCS Unidentified Leakage
2.6 RCS Identified Leakage
2.7 Uncontrolled Cool Down
2.8 Turbine Failure
2.9 Technical Specification
2.10 Safety Limit

2

LOSS OF POWER

3.1 Loss of AC (Power Ops)
3.2 Loss of AC (Shutdown)
3.3 Loss of DC

3

HAZARDS and SED JUDGMENT

4.1 Fire
4.2 Explosion
Table 4-1
Figure 4-A
4.3 Flammable Gas
4.4 Toxic Gas
Table 4-2
Figure 4-B
4.5 Control Room Evacuation
4.6 Security
4.7 SED Judgment
Table 4-3

4

DESTRUCTIVE PHENOMENON

5.1 Earthquake
5.2 Tornado
5.3 Aircraft/Projectile Crash
Table 5-1
5.4 River Level High
5.5 River Level Low
5.6 Watercraft Crash
Figure 5-A

5

SHUTDOWN SYSTEM DEGRADATION

6.1 Loss of Shutdown Systems
6.2 Loss of AC (Shutdown)
6.3 Loss of DC (Shutdown)
6.4 Fuel Handling

6

RADIOLOGICAL

7.1 Gaseous Effluent
7.2 Liquid Effluent
Table 7-1
Figure 7-A
7.3 Radiation Levels
7.4 Fuel Handling
Table 7-2

7

DEFINITIONS/ACRONYMS

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EVENT: Assessment of an EVENT commences when recognition is made that one or more of the conditions associated with the event exist. Implicit in this definition is the need for timely assessment, i.e. within 15 minutes.

EXCLUSION AREA BOUNDARY (EAB): The demarcation of the area surrounding the WBN units in which postulated FSAR accidents will not result in population doses exceeding the criteria of 10 CFR Part 100. Refer to Figure 7-A.

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EXTORTION: An attempt to cause an action at the station by threat of force.

FAULTED: (Steam Generator) Existence of secondary side leakage (i.e., steam or feed line break) that results in an uncontrolled decrease in steam generator pressure or the steam generator being completely depressurized.

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FLAMMABLE GAS: Combustible gases maintained at concentrations less than the **LOWER EXPLOSIVE LIMIT (LEL)** will not explode due to ignition.

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ODCM: Offsite Dose Calculation Manual.

ORANGE PATH: Monitoring of one or more CSFs by FR-0 which indicates that the CSF(s) is under severe challenge.

PROJECTILE: An object ejected, thrown, or launched towards a plant structure. The source of the projectile may be onsite or offsite. Damage is sufficient to cause concern regarding the integrity of the affected structure or the operability or reliability of safety equipment contained therein.

PROTECTED AREA: Encompasses all owner controlled areas within the security protected area fence as shown on Figure 4-A.

RED PATH: Monitoring of one or more CSFs by the FR-0 which indicates that the CSF(s) is under extreme challenge; prompt operator action is required.

RUPTURED: (Steam Generator) Existence of primary to secondary leakage of a magnitude greater than charging pump capacity.

SABOTAGE: Deliberate damage, misalignment, or mis-operation of plant equipment with the intent to render the equipment inoperable.

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VALID: An indication or report or condition is considered to be VALID when it is conclusively verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel. Implicit in this definition is the need for timely assessment, i.e., within 15 minutes.

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VITAL AREA: Is any area within the PROTECTED AREA which contains equipment, systems, devices, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

	2.1 Loss of Instrumentation		2.2 Loss of Function	
	Mode	Initiating/Condition	Mode	Initiating/Condition
GENERAL		*Refer to "Fission Product Barrier Matrix" and "Radiological Effluents" (Section 7)*		*Refer to "Fission Product Barrier Matrix"*
SITE	1,2 3,4	**Inability to monitor a SIGNIFICANT TRANSIENT in progress** *(1 and 2 and 3 and 4)* 1. Loss of most (>75%) of MCR annunciators (and Annunciator Monitor) or indications 2. **SIGNIFICANT TRANSIENT** in progress 3. Loss of ICS Computer and SPDS 4. Inability to directly monitor any of the following CSFs: Sub-criticality / PTS Core Cooling / Containment Heat Sink / Inventory	1,2 3,4	**Complete loss of function needed to achieve or maintain Hot Shutdown** *(1 or 2)* 1. CSF status tree indicates Core Cooling Red 2. CSF status tree indicates Heat Sink Red (RHR not in service) *Note: Also Refer to "Failure of Rx Protection" (2.3) and "Fission Product Barrier Matrix"*
ALERT	1,2 3,4	**UNPLANNED loss of most (>75%) MCR annunciators (and Annunciator Printer) or indications for >15 minutes with either a SIGNIFICANT TRANSIENT in progress or ICS computer and SPDS Unavailable** (1 and 2 and 3) 1. **UNPLANNED** loss of most (>75%) MCR annunciators (and Annunciator Monitor) or indications for >15 minutes. 2. SM/SED Judgment that increased surveillance is required to Safely operate the unit (beyond Shift compliment) 3. *(a or b)* a. **SIGNIFICANT TRANSIENT** in Progress b. Loss of ICS Computer and SPDS	4	**Complete loss of function needed to achieve Cold Shutdown when Shutdown required by Tech Specs** *(1 and 2 and 3)* 1. Shutdown is required 2. Loss of RHR capability 3. Loss of secondary heat sink and condenser
UNUSUAL EVENT	1,2 3,4	**UNPLANNED loss of most or All Safety System annunciators or indications in the Control Room for >15 Minutes** *(1 and 2 and 3)* 1. **UNPLANNED** loss of most (>75%) MCR annunciators (and Annunciator Monitor) or indications for >15 minutes. 2. SM/SED Judgment that increased surveillance is required to Safely operate the unit (beyond Shift compliment) 3. ICS Computer or SPDS is in service and capable of displaying data requested.	ALL	A. **Unplanned loss of all In-Plant Communication capability** *(1 and 2 and 3)* 1. **UNPLANNED** loss of EPABX (PAX) phones 2. **UNPLANNED** loss of all sound powered phones 3. **UNPLANNED** loss of all radios or B. **UNPLANNED loss of all Offsite Communication capability** *(1 and 2 and 3 and 4 and 5)* 1. **UNPLANNED** loss of all EPABX (PAX) phones 2. **UNPLANNED** loss of all Radio frequencies 3. **UNPLANNED** loss of all OPX (Microwave) system 4. **UNPLANNED** loss of all 1 FB-Bell lines 5. **UNPLANNED** loss of all FTS 2000 (NRC) system

	2.3 Failure of Rx Protection		2.4 Fuel Clad Degradation	
	Mode	Initiating/Condition	Mode	Initiating/Condition
GENERAL	1,2	**Loss of Core cooling capability and VALID Trip Signals did not result in a reduction of Rx power to <5% and decreasing** *(1 and 2)* 1. *(a or b)* a. CSF status tree indicates Core Cooling Red b. CSF status tree indicates Heat Sink Red 2. FR-S.1 entered and subsequent actions Did Not result in a Rx Power of <5% and decreasing		*Refer to "Fission Product Barrier Matrix"*
SITE	1,2	**Rx power Not <5% and decreasing after VALID Auto and Manual trip signals** *(1 and 2 and 3)* 1. **VALID** Rx Auto Trip signal received or required 2. Manual Rx Trip from the MCR was Not successful. 3. FR-S.1 has been entered.		*Refer to "Fission Product Barrier Matrix"*
ALERT	1,2	**Automatic Rx trip did not occur after VALID Trip signal and manual trip from MCR was successful** *(1 and 2)* 1. **VALID** Rx Auto Trip signal received or required 2. Manual Rx Trip from the MCR was successful and power is <5% and decreasing.		*Refer to "Fission Product Barrier Matrix"*
UNUSUAL EVENT		Not Applicable	1,2, 3,4, 5	**Reactor Coolant System specific activity exceeds LCO (Refer to WBN Tech. Spec. 3.4.16)** 1. Radiochemistry analysis indicates *(a or b)* a. Dose equivalent Iodine (I-131) >0.265 μCi/gm for >48 Hours or >21 μCi/gm. b. Specific activity >100/E μCi/gm

SYSTEM DEGRADATION U1

	2.5 RCS Unidentified Leakage		2.6 RCS Identified Leakage	
	Mode	Initiating/Condition	Mode	Initiating/Condition
GENERAL		*Refer to "Fission Product Barrier Matrix"*		*Refer to "Fission Product Barrier Matrix"*
SITE		*Refer to "Fission Product Barrier Matrix"*		*Refer to "Fission Product Barrier Matrix"*
ALERT		*Refer to "Fission Product Barrier Matrix"*		*Refer to "Fission Product Barrier Matrix"*
UNUSUAL EVENT	1,2 3,4, *5	**Unidentified <u>or</u> pressure boundary RCS leakage >10 GPM** 1. Unidentified or pressure boundary leakage (as defined by Tech. Spec.) >10 GPM as indicated below *(a or b)* a. 1-SI-68-32 results b. With RCS Temperature <u>and</u> PZR Level Stable, VCT Level Dropping at a Rate >10 GPM **Note: Applies to Mode 5 if RCS Pressurized*	1,2, 3,4, *5	**Identified RCS leakage >25 GPM** 1. Identified RCS leakage (as defined by Tech. Spec.) >25 GPM *(a or b)* a. 1-SI-68-32 results b. Level rise in excess of 25 GPM total into PRT, RCDT or CVCS Holdup Tank **Note: Applies to Mode 5 if RCS Pressurized*

SYSTEM DEGRADATION U1

2.7 Uncontrolled Cooldown

	Mode	Initiating/Condition
GENERAL		*Refer to "Fission Product Barrier Matrix"*
SITE		*Refer to "Fission Product Barrier Matrix"*
ALERT		*Refer to "Fission Product Barrier Matrix"*
UNUSUAL EVENT	1,2,3	**UNPLANNED rapid depressurization of the Main Steam System resulting in a rapid RCS cooldown <u>and</u> Safety Injection Initiation** *(1 and 2)* 1. Rapid depressurization of Main Steam System (<675 psig) 2. Safety Injection has initiated <u>or</u> is required

2.8 Turbine Failure

	Mode	Initiating/Condition
GENERAL		*Refer to "Fission Product Barrier Matrix"*
SITE		*Refer to "Fission Product Barrier Matrix"*
ALERT	1,2,3	**Turbine Failure has generated PROJECTILES that cause VISIBLE DAMAGE to any area containing Safety Related equipment** 1. Turbine **PROJECTILES** has resulted in **VISIBLE DAMAGE** in any of the following areas: Control Building Auxiliary Building Unit #1 Containment Diesel Generator Bldg. RWST Intake Pumping Station CST
UNUSUAL EVENT	1,2,3	**Turbine Failure results in Casing penetration** 1. Turbine Failure which results in penetration of the Turbine Casing <u>or</u> Damage to Main Generator Seals

	2.9 Technical Specification		2.10 Safety Limit	
	Mode	Initiating/Condition	Mode	Initiating/Condition
GENERAL		*Not Applicable*		*Not Applicable*
SITE		*Not Applicable*		*Not Applicable*
ALERT		*Not Applicable*		*Not Applicable*
UNUSUAL EVENT	1,2 3,4	**Inability to reach required Shutdown within Tech. Spec. limits** *(1 and 2)* 1. Any Tech. Spec. LCO Statement, requiring a Mode reduction, has been entered 2. The Unit has not been placed in the required Mode within the time prescribed by the LCO Action Statement	1,2, 3,4, 5	**Safety Limits have been Exceeded** *(1 or 2)* 1. The combination of thermal power, RCS temperature, and RCS pressure > safety limits as indicated by WBN Tech. Spec. Figure 2.1.1-1 "Reactor Core Safety Limits" 2. RCS/Pressurizer pressure exceeds safety limit (>2735 psig)

FISSION PRODUCT BARRIER MATRIX (Modes 1-4)

1.1 Fuel Clad
1.2 RCS
1.3 Containment

1

SYSTEM DEGRADATION

2.1 Loss of Instrumentation
2.2 Loss of Function/Communication
2.3 Failure of Reactor Protection
2.4 Fuel Clad Degradation
2.5 RCS Unidentified Leakage
2.6 RCS Identified Leakage
2.7 Uncontrolled Cool Down
2.8 Turbine Failure
2.9 Technical Specification
2.10 Safety Limit

2

LOSS OF POWER

3.1 Loss of AC (Power Ops)
3.2 Loss of AC (Shutdown)
3.3 Loss of DC

3

HAZARDS and SED JUDGMENT

4.1 Fire
4.2 Explosion
Table 4-1
Figure 4-A
4.3 Flammable Gas
4.4 Toxic Gas
Table 4-2
Figure 4-B
4.5 Control Room Evacuation
4.6 Security
4.7 SED Judgment
Table 4-3

4

DESTRUCTIVE PHENOMENON

5.1 Earthquake
5.2 Tornado
5.3 Aircraft/Projectile Crash
Table 5-1
5.4 River Level High
5.5 River Level Low
5.6 Watercraft Crash
Figure 5-A

5

SHUTDOWN SYSTEM DEGRADATION

6.1 Loss of Shutdown Systems
6.2 Loss of AC (Shutdown)
6.3 Loss of DC (Shutdown)
6.4 Fuel Handling

6

RADIOLOGICAL

7.1 Gaseous Effluent
7.2 Liquid Effluent
Table 7-1
Figure 7-A
7.3 Radiation Levels
7.4 Fuel Handling
Table 7-2

7

DEFINITIONS/ACRONYMS

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CIVIL DISTURBANCE: A group of twenty (20) or more persons violently protesting station operations or activities at the site.

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	3.1 Loss of AC (Power Ops)		3.2 Loss of AC (Shutdown)	
	Mode	Initiating/Condition	Mode	Initiating/Condition
GENERAL	1,2, 3,4	**Prolonged loss of Offsite and Onsite AC power** *(1 and 2)* 1. 1A and 1B 6.9KV Shutdown Bds de-energized for >15 minutes 2. *(a or b)* a. Core Cooling Red or Orange b. Restoration of Either 1A or 1B 6.9KV Shutdown Bds is not likely within 4 hours of loss.		*Not Applicable*
SITE	1,2, 3,4	**Loss of Offsite and Onsite AC Power > 15 minutes** 1. 1A and 1B 6.9KV Shutdown Bds de-energized for >15 minutes		*Not Applicable*
ALERT	1,2, 3,4	**Loss of Offsite Power for >15 minutes** *(1 and 2)* 1. C and D CSSTs not available for >15 minutes 2. 1A or 1B Diesel Generator not available	5,6, or De-fuel	**UNPLANNED loss of Offsite and Onsite AC power for >15 minutes** 1. 1A and 1B 6.9KV Shutdown Bds de-energized for >15 minutes *Also Refer to "Loss of Shutdown Systems" (6.1)*
UNUSUAL EVENT	1,2 3,4	**Loss of Offsite Power for >15 minutes** *(1 and 2)* 1. C and D CSSTs not available for >15 minutes 2. Each Diesel Generator is supplying power to its respective Shutdown Board	5,6, or De-fuel	**UNPLANNED loss of Offsite Power for >15 minutes** *(1 and 2)* 1. C and D CSSTs not available for >15 minutes 2. Either Diesel Generator is supplying power to its respective Shutdown Board

LOSS OF POWER U1

3.3 Loss of DC Power

	Mode	Initiating/Condition
GENERAL		*Refer to "Fission Product Barrier Matrix" and "Loss of Function" (2.2)*
SITE	1,2, 3,4	**Loss of All Vital DC Power for >15 minutes** 1. Voltage <105V DC on 125V DC Vital Battery Buses 1-I and 1-II and 1-III and 1-IV for >15 minutes *Also Refer to "Fission Product Barrier Matrix", "Loss of Function" (2.2), and "Loss of Instrumentation" (2.1)*
ALERT		*Also Refer to "Fission Product Barrier Matrix", "Loss of Function" (2.2), and "Loss of Instrumentation" (2.1)*
UNUSUAL EVENT	5,6, or De-fuel	**UNPLANNED Loss of the Required Train of DC power for >15 minutes** *(1 or 2)* 1. Voltage <105V DC on 125V DC Vital Battery Buses 1-I and 1-III for >15 minutes 2. Voltage <105V DC on 125V DC Vital Battery Buses 1-II and 1-IV for >15 minutes

FISSION PRODUCT BARRIER MATRIX (Modes 1-4)

1

1.1 Fuel Clad
1.2 RCS
1.3 Containment

SYSTEM DEGRADATION

2

2.1 Loss of Instrumentation
2.2 Loss of Function/Communication
2.3 Failure of Reactor Protection
2.4 Fuel Clad Degradation
2.5 RCS Unidentified Leakage
2.6 RCS Identified Leakage
2.7 Uncontrolled Cool Down
2.8 Turbine Failure
2.9 Technical Specification
2.10 Safety Limit

LOSS OF POWER

3

3.1 Loss of AC (Power Ops)
3.2 Loss of AC (Shutdown)
3.3 Loss of DC

HAZARDS and SED JUDGMENT

4

4.1 Fire
4.2 Explosion
Table 4-1
Figure 4-A
4.3 Flammable Gas
4.4 Toxic Gas
Table 4-2
Figure 4-B
4.5 Control Room Evacuation
4.6 Security
4.7 SED Judgment
Table 4-3

DESTRUCTIVE PHENOMENON

5

5.1 Earthquake
5.2 Tornado
5.3 Aircraft/Projectile Crash
Table 5-1
5.4 River Level High
5.5 River Level Low
5.6 Watercraft Crash
Figure 5-A

SHUTDOWN SYSTEM DEGRADATION

6

6.1 Loss of Shutdown Systems
6.2 Loss of AC (Shutdown)
6.3 Loss of DC (Shutdown)
6.4 Fuel Handling

RADIOLOGICAL

7

7.1 Gaseous Effluent
7.2 Liquid Effluent
Table 7-1
Figure 7-A
7.3 Radiation Levels
7.4 Fuel Handling
Table 7-2

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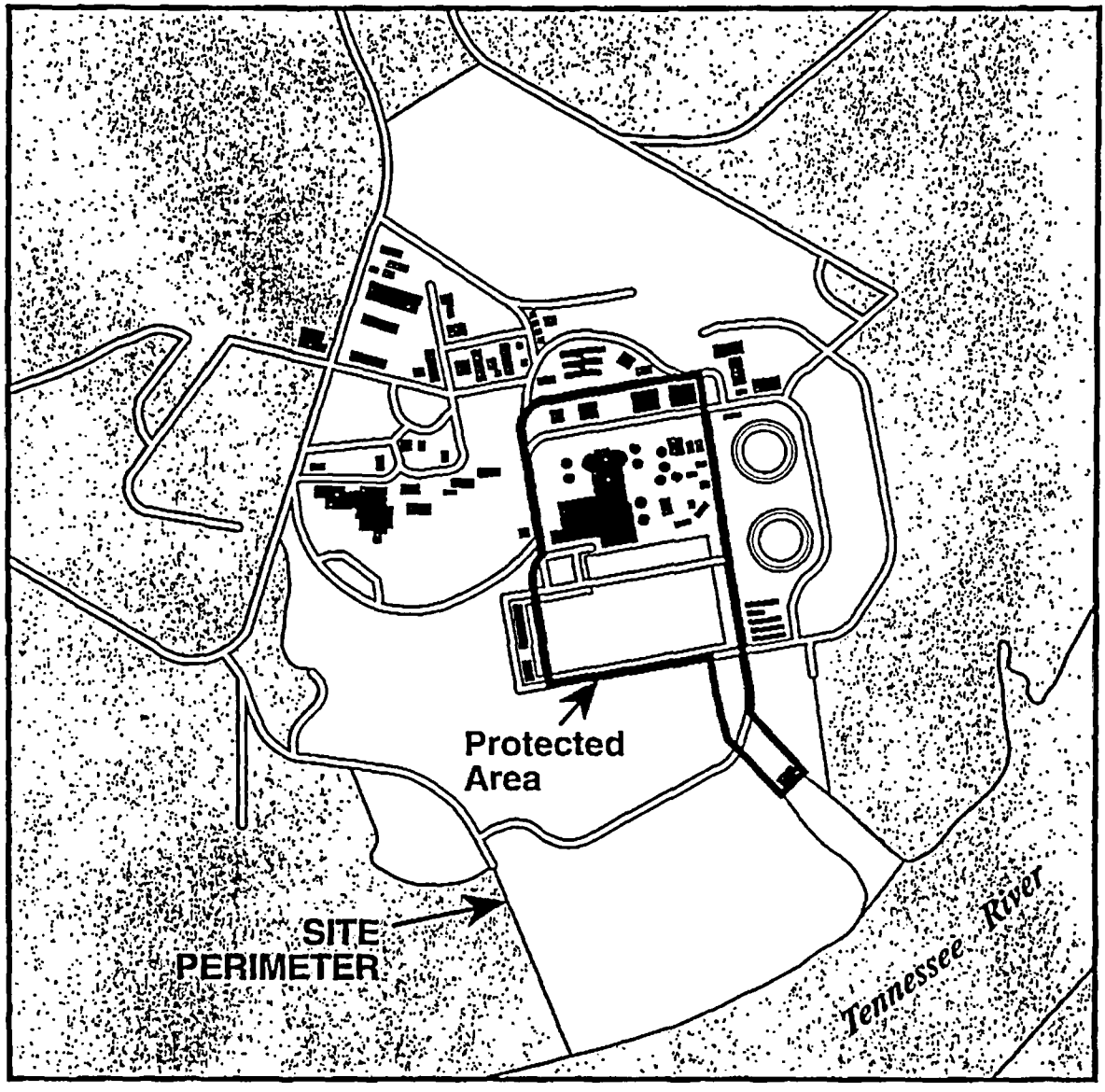
	4.1 FIRE		4.2 Explosions	
	Mode	Initiating/Condition	Mode	Initiating/Condition
GENERAL		*Refer to "Fission Product Barrier Matrix"*		*Refer to "Fission Product Barrier Matrix"*
SITE		*Refer to "Control Room Evacuation," (4.5) or Fission Product Barrier Matrix"*		*Refer to "Fission Product Barrier Matrix"*
ALERT	All	**FIRE in any of the areas listed in Table 4-1 that is affecting Safety Related equipment** *(1 and 2)* 1. FIRE in any of the areas listed in Table 4-1 2. (a or b) a. **VISIBLE DAMAGE** to permanent structure <u>or</u> Safety Related equipment in the specified area is observed due to the **FIRE** b. Control Room indication of degraded Safety System <u>or</u> component response due to the **FIRE**	All	**EXPLOSION in any of the areas listed in Table 4-1 that is affecting Safety Related equipment** *(1 and 2)* 1. **EXPLOSION** in any of the areas listed in Table 4-1 2. (a or b) a. An **EXPLOSION** has caused **VISIBLE DAMAGE** to Safety Related equipment b. Control Room indication of degraded Safety System <u>or</u> component response due to the **EXPLOSION** *Refer to "Security" (4.6)*
UNUSUAL EVENT	All	**FIRE in the PROTECTED AREA threatening any of the areas listed in Table 4-1 that is <u>Not</u> extinguished within 15 minutes from the Time of Control Room notification <u>or</u> verification of Control Room Alarm (Figure 4-A)**	All	**UNPLANNED EXPLOSION within the PROTECTED AREA resulting in VISIBLE DAMAGE to any permanent structure <u>or</u> equipment (Figure 4-A)** *Refer to "Security" (4.6)*

HAZARDS/SED JUDGMENT U1

TABLE 4-1
PLANT AREAS ASSOCIATED WITH FIRE AND EXPLOSION EALS

Unit #1 Reactor Building
Auxiliary Building
Control Building
Diesel Generator Building
CST
Additional Diesel Generator Building
Intake Pumping Station
Additional Equipment Buildings (Unit 1&2)
RWST

Figure 4-A
PROTECTED AREA/SITE PERIMETER



4.3 Flammable Gas

	Mode	Initiating/Condition
GENERAL		*Refer to "Fission Product Barrier Matrix"*
SITE		*Refer to "Fission Product Barrier Matrix"*
ALERT	All	**UNPLANNED release of Flammable Gas within a facility structure containing Safety Related equipment <u>or</u> associated with Power production** 1. Plant personnel report the average of three readings taken in a ~10ft triangular Area is >25% (LEL) Lower Explosive Limit, as indicated on the monitoring instrument within any building listed in Table 4-2.
UNUSUAL EVENT	All	**A. UNPLANNED release of Flammable Gas within the SITE PERIMETER** 1. Plant personnel report the average of three readings taken in a ~10ft Triangular Area is >25% (LEL) Lower Explosive Limit, as indicated on the monitoring instrument within the SITE PERIMETER (Refer to Figure 4-B) <u>OR</u> **B. Confirmed report by Local, County, <u>or</u> State Officials that a Large Offsite Flammable Gas release has occurred within One Mile of the Site with potential to enter the SITE PERIMETER in concentrations >25% of LEL Lower Explosive Limit (Refer to Figure 4-B)**

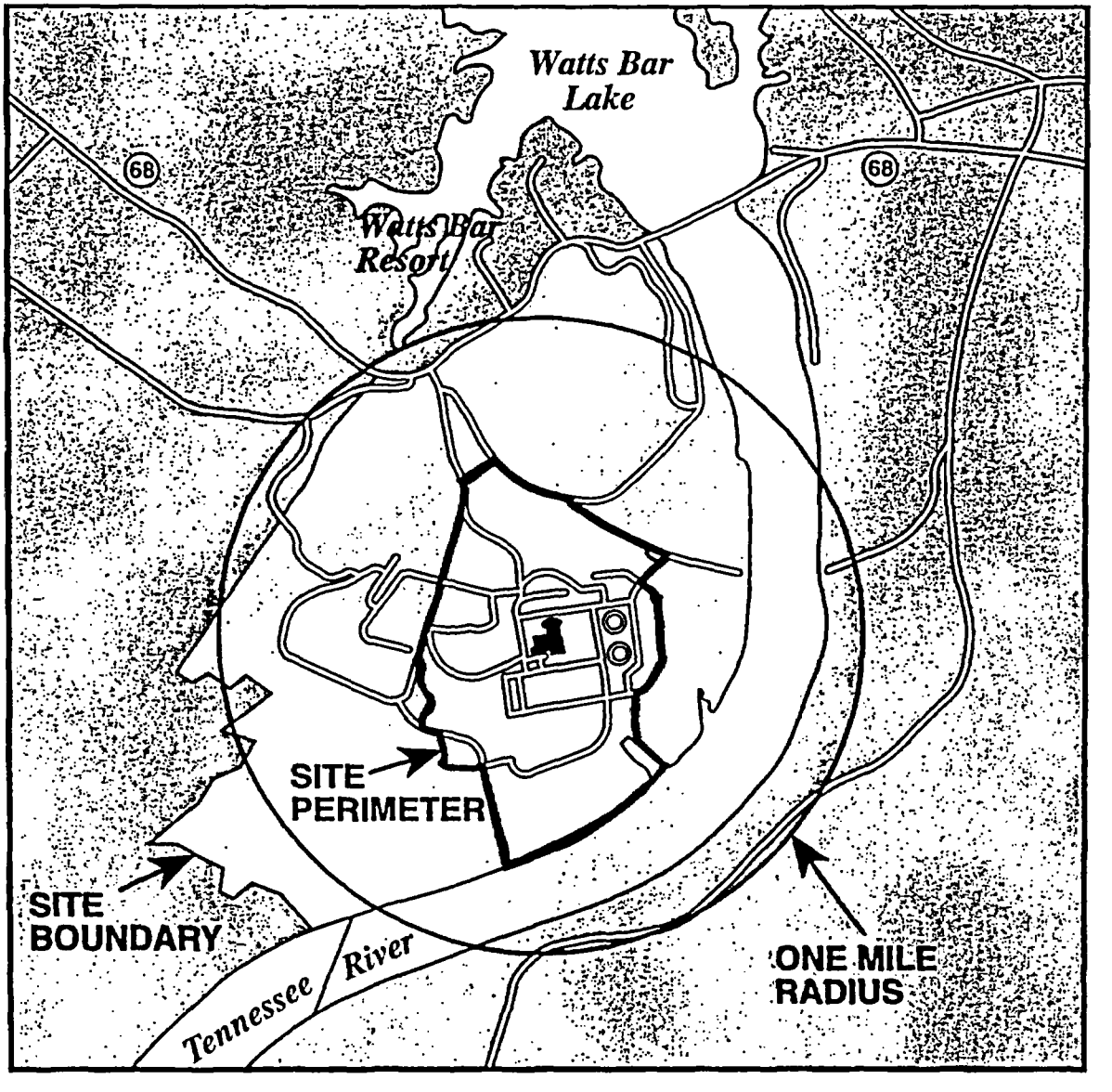
4.4 Toxic Gas

Mode	Initiating/Condition
	Refer to "Fission Product Barrier Matrix"
	Refer to "Fission Product Barrier Matrix"
All	**Release of TOXIC GAS within a facility structure which Prohibits Safe Operation of systems required to establish <u>or</u> maintain Cold S/D *(1 and 2 and 3)*** 1. Plant personnel report **TOXIC GAS** within any building listed in Table 4-2 2. *(a or b)* a. Plant personnel report Severe Adverse Health Reactions due to **TOXIC GAS** (i.e., burning eyes, nose, throat, dizziness) b. Sampling indications > **(PEL)** Permissible Exposure Limit 3. Plant personnel would be unable to perform actions necessary to establish and maintain Cold Shutdown while utilizing appropriate personnel protection equipment.
All	**A. Normal Operations impeded due to access restrictions caused by TOXIC GAS concentrations within a Facility Structure listed in Table 4-2** <u>OR</u> **B. Confirmed report by Local, County, <u>or</u> State Officials that a Large Offsite TOXIC GAS release has occurred within One Mile of the Site with potential to enter the Site Perimeter in concentrations >than the (PEL) Permissible Exposure Limit thus causing an Evacuation (Figure 4-B)**

TABLE 4-2
Plant Structures Associated With TOXIC or Flammable Gas EALs

Unit #1 & 2 Reactor Buildings
Auxiliary Building
Control Building
Diesel Generator Building
Additional Diesel Generator Building
Intake Pumping Station
Additional Equipment Bldgs (Unit 1&2)
CDWE Building
Turbine Building

Figure 4-B
ONE MILE RADIUS/SITE PERIMETER



4.5 Control Room Evacuation

	Mode	Initiating/Condition
GENERAL		*Refer to "Fission Product Barrier Matrix"*
SITE	All	**Evacuation of the Control Room has been initiated and Control of all necessary equipment Has Not been established within 15 minutes of manning the Auxiliary Control Room** *(1 and 2 and 3)* 1. (a or b) a. AOI-30.2 "Fire Safety Shutdown" entered b. AOI-27 "Main Control Room Inaccessibility" entered 2. SM/SED Orders Control Room evacuation 3. Control has Not been established at the Remote Shutdown Panel within 15 minutes of manning the Auxiliary Control Room and transfer of switches on Panels L11A and L11B
ALERT	All	**Evacuation of the Control Room is Required** *(1 and 2)* 1. (a or b) a. AOI-30.2 "Fire Safe Shutdown" entered b. AOI-27 "Main Control Room Inaccessibility" entered 2. SM/SED Orders Control Room evacuation
UNUSUAL EVENT		*Not Applicable*

4.6 Security

Mode	Initiating/Condition
All	**Security Event resulting in loss of Control of the Plant** 1. Hostile Armed Force has taken Control of the Plant, Control Room, or Remote shutdown capability
All	**Security Event has or is occurring which results in Actual or Likely Failures of Plant Functions needed to Protect the Public** 1. **VITAL AREA**, other than the Control Room, has been penetrated by a Hostile Armed Force
All	**Confirmed Security Event which indicates an Actual or Potential Substantial Degradation in the level of Safety of the Plant** *(1 or 2 or 3)* 1. **BOMB** discovered within a **VITAL AREA** 2. **CIVIL DISTURBANCE** ongoing within the **PROTECTED AREA** 3. **PROTECTED AREA** has been penetrated by a Hostile Armed Force *Refer to Figure 4-A For a Drawing of Protected Area and Site Perimeter*
All	**Confirmed Security Event which indicates a Potential Degradation in the level of Safety of the Plant** *(1 or 2)* 1. **BOMB** discovered within the **PROTECTED AREA** 2. Security Shift Supervisor reports one or more of the events listed in Table 4-3

.7 Emergency Director Judgment

	Mode	Initiating/Condition
GENERAL	All	Events are in progress or have occurred which involve Actual or Imminent Substantial Core Degradation or Melting With Potential for Loss of Containment Integrity. Releases can be reasonable expected to exceed EPA Plume Protective Action Guidelines Exposure Levels outside the EXCLUSION AREA BOUNDARY, Refer to Figure 7-A.
SITE	All	Events are in progress or have occurred which involve Actual or Likely Major Failures of Plant Functions needed for the Protection of the Public. Any releases are not expected to result in Exposure Levels which Exceed EPA Plume Protective Action Guidelines Exposure Levels outside the EXCLUSION AREA BOUNDARY, Refer to Figure 7-A.
ALERT	All	Events are in progress or have occurred which involve Actual or Potential Substantial Degradation of the Level of Safety of the Plant. Any releases are expected to be limited to small fractions of the EPA Plume Protective Action Guidelines Exposure Levels.
UNUSUAL EVENT	All	Unusual Events are in Progress or have occurred which indicate a Potential Degradation of the Level of Safety of the Plant. No releases of Radioactive Material requiring Offsite Response or Monitoring are expected unless further degradation of Safety Systems occurs.

HAZARDS/SED JUDGMENT U1

Table 4-3
SECURITY EVENTS

a. SABOTAGE/INTRUSION has occurred or is occurring within the PROTECTED AREA

b. HOSTAGE/EXTORTION Situation that Threatens to interrupt Plant Operations

c. CIVIL DISTURBANCE ongoing between the SITE PERIMETER and PROTECTED AREA

d. Hostile STRIKE ACTION within the PROTECTED AREA which threatens to interrupt Normal Plant Operations (Judgment Based on behavior of Strikers and/or Intelligence received)

e. A CREDIBLE SITE-SPECIFIC security threat notification.

FISSION PRODUCT BARRIER MATRIX (Modes 1-4)

1.1 Fuel Clad
1.2 RCS
1.3 Containment

1

SYSTEM DEGRADATION

2.1 Loss of Instrumentation
2.2 Loss of Function/Communication
2.3 Failure of Reactor Protection
2.4 Fuel Clad Degradation
2.5 RCS Unidentified Leakage
2.6 RCS Identified Leakage
2.7 Uncontrolled Cool Down
2.8 Turbine Failure
2.9 Technical Specification
2.10 Safety Limit

2

LOSS OF POWER

3.1 Loss of AC (Power Ops)
3.2 Loss of AC (Shutdown)
3.3 Loss of DC

3

HAZARDS and SED JUDGMENT

4.1 Fire
Explosion
Table 4-1
Figure 4-A
4.3 Flammable Gas
4.4 Toxic Gas
Table 4-2
Figure 4-B
4.5 Control Room Evacuation
4.6 Security
4.7 SED Judgment
Table 4-3

4

DESTRUCTIVE PHENOMENON

5.1 Earthquake
5.2 Tornado
5.3 Aircraft/Projectile Crash
Table 5-1
5.4 River Level High
5.5 River Level Low
5.6 Watercraft Crash
Figure 5-A

5

SHUTDOWN SYSTEM DEGRADATION

6.1 Loss of Shutdown Systems
6.2 Loss of AC (Shutdown)
6.3 Loss of DC (Shutdown)
6.4 Fuel Handling

6

RADIOLOGICAL

7.1 Gaseous Effluent
7.2 Liquid Effluent
Table 7-1
Figure 7-A
7.3 Radiation Levels
7.4 Fuel Handling
Table 7-2

7

DEFINITIONS/ACRONYMS

UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY and GENERAL EMERGENCY: (see SED Judgment 4.7).

BOMB: An explosive device (See EXPLOSION).

CIVIL DISTURBANCE: A group of twenty (20) or more persons violently protesting station operations or activities at the site.

CREDIBLE SITE-SPECIFIC -The determination is made by WBN senior plant management through use of information found in the Safeguards Contingency Plan.

CRITICAL-SAFETY FUNCTION (CSFs): A plant safety function required to prevent significant release of core radioactivity to the environment. There are six CSFs: Sub-criticality, Core Cooling, Heat Sink, Pressurized Thermal Shock, Integrity (Containment) and Inventory (RCS).

EVENT: Assessment of an EVENT commences when recognition is made that one or more of the conditions associated with the event exist. Implicit in this definition is the need for timely assessment, i.e. within 15 minutes.

EXCLUSION AREA BOUNDARY (EAB): The demarcation of the area surrounding the WBN units in which postulated FSAR accidents will not result in population doses exceeding the criteria of 10 CFR Part 100. Refer to Figure 7-A.

EXPLOSION: A rapid, violent, unconfined combustion, or a catastrophic failure of pressurized equipment that imparts energy of sufficient force to potentially damage permanent structures required for safe operation.

EXTORTION: An attempt to cause an action at the station by threat of force.

FAULTED: (Steam Generator) Existence of secondary side leakage (i.e., steam or feed line break) that results in an uncontrolled decrease in steam generator pressure or the steam generator being completely depressurized.

FIRE: Combustion characterized by heat and light. Source of smoke such as slipping drive belts or overheated electrical components do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

FLAMMABLE GAS: Combustible gases maintained at concentrations less than the LOWER EXPLOSIVE LIMIT (LEL) will not explode due to ignition.

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

INEFFECTIVE: The specified restoration action(s) does not result in a reduction in the level of severity of the RED PATH condition within 15 minutes from identification of the Core Cooling CSF Status Tree RED PATH. A reduction in the level of severity is an improvement in the applicable parameters, e.g., Increasing Trend in Reactor Vessel Water Level (Full RVLIS) and/or Decreasing Trend on Core Thermocouple Temperatures.

INITIATING CONDITIONS: Plant Parameters, radiation monitor readings or personnel observations that identify an Event for purposes of Emergency Plan Classification.

INTRUSION/INTRUDER: Suspected hostile individual present in a protected area without authorization.

ODCM: Offsite Dose Calculation Manual.

ORANGE PATH: Monitoring of one or more CSFs by FR-0 which indicates that the CSF(s) is under severe challenge.

PROJECTILE: An object ejected, thrown, or launched towards a plant structure. The source of the projectile may be onsite or offsite. Damage is sufficient to cause concern regarding the integrity of the affected structure or the operability or reliability of safety equipment contained therein.

PROTECTED AREA: Encompasses all owner controlled areas within the security protected area fence as shown on Figure 4-A.

RED PATH: Monitoring of one or more CSFs by the FR-0 which indicates that the CSF(s) is under extreme challenge; prompt operator action is required.

RUPTURED: (Steam Generator) Existence of primary to secondary leakage of a magnitude greater than charging pump capacity.

SABOTAGE: Deliberate damage, misalignment, or mis-operation of plant equipment with the intent to render the equipment inoperable.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) An automatic turbine runback > 15% thermal reactor power; (2) Electrical load rejection > 25% full electrical load; (3) Reactor Trip or (4) Safety Injection System Activation.

SITE PERIMETER (SP): Encompasses all owner controlled areas in the immediate site environs as shown on Figures 4-Aand 7-A.

STRIKE ACTION: A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on TVA. The STRIKE ACTION must threaten to interrupt normal plant operations.

TOXIC GAS: A gas that is dangerous to life or limb by reason of inhalation or skin contact (e.g., chlorine).

UNPLANNED: An event or action that is not the expected result of normal operations, testing, or maintenance. Events that result in corrective or mitigative actions being taken in accordance with abnormal or emergency procedures are UNPLANNED.

UNPLANNED: (With specific regard to radioactivity releases) A release of radioactivity is UNPLANNED if the release has not been authorized by a Discharge Permit (DP). Implicit in this definition are unintentional releases, unmonitored releases, or planned releases that exceed a condition specified on the DP, e.g., alarm setpoints, minimum dilution flow, minimum release times, maximum release rates, and/or discharge of incorrect tank.

VALID: An indication or report or condition is considered to be VALID when it is conclusively verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel. Implicit in this definition is the need for timely assessment, i.e., within 15 minutes.

VISIBLE DAMAGE: Damage to equipment that is readily observable without measurements, testing, or analyses. Damage is sufficient enough to cause concern regarding the continued operability or reliability of affected safety structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, and/or paint blistering. Surface blemishes (e.g., paint chipping, scratches) should NOT be included.

VITAL AREA: Is any area within the PROTECTED AREA which contains equipment, systems, devices, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

5.1 Earthquake

	Mode	Initiating/Condition
GENERAL		*Refer to "Fission Product Barrier Matrix"*
SITE		*Refer to "Fission Product Barrier Matrix"*
ALERT	All	**Earthquake detected by site seismic instrumentation** *(1 and 2)* 1. *(a and b)* a. Ann.166 D indicates "OBE Spectra Exceeded" b. Ann.166 E indicates "Seismic Recording Initiated" 2. *(a or b)* a. Ground motion sensed by Plant personnel b. National Earthquake Information Center at 1-(303) 273-8500 can confirm the event.
UNUSUAL EVENT	All	**Earthquake detected by site seismic instrumentation** *(1 and 2)* 1. Ann. 166 E indicator "Seismic Recording Initiated" 2. (a or b) a. Ground motion sensed by Plant personnel b. National Earthquake Information Center at 1-(303) 273-8500 can confirm the event.

5.2 Tornado

Mode	Initiating/Condition
	Refer to "Fission Product Barrier Matrix"
	Refer to "Fission Product Barrier Matrix"
All	**Tornado <u>or</u> High Winds strikes any structure listed in Table 5-1 and results in VISIBLE DAMAGE** *(1 and 2)* 1. Tornado or High Winds (Sustained >80 mph > one minute) strikes any structure listed in Table 5-1 2. *(a or b)* a. Confirmed report of any **VISIBLE DAMAGE** b. Control Room indications of degraded Safety System <u>or</u> component response due to event *Note: Site Met Data Instrumentation fails to 0 at >100 mph. National Weather Service Morristown 1-(423) 586-8400 can provide additional information if needed.*
All	**Tornado within the SITE PERIMETER** 1. Plant personnel report a Tornado has been sighted within the **SITE PERIMETER** (Refer to Figure 5-A)

5.3 Aircraft/Projectile Crash

	Mode	Initiating/Condition
GENERAL		*Refer to "Fission Product Barrier Matrix"*
SITE		*Refer to "Fission Product Barrier Matrix"*
ALERT	All	**Aircraft or PROJECTILE impacts (Strikes) any Plant structure listed in Table 5-1 resulting in VISIBLE DAMAGE** *(1 and 2)* 1. Plant personnel report aircraft or PROJECTILE has impacted any structure listed in Table 5-1 2. *(a or b)* a. Confirmed report of any **VISIBLE DAMAGE** b. Control Room indications of degraded Safety System or component response due to the event within the specified areas
UNUSUAL EVENT	All	**Aircraft crash or PROJECTILE impact within the SITE PERIMETER** 1. Plant personnel report a Aircraft Crash or **PROJECTILE** impact within the **SITE PERIMETER** (Refer to Figure 5-A)

Table 5-1
Plant Structures Associated With Tornado/Hi Wind and Aircraft EALs

Unit #1 and 2 Reactor Buildings
Auxiliary Building
Control Building
Diesel Generator Building
Additional Diesel Generator Building
Intake Pumping Station
Additional Equipment Buildings (Units 1 & 2)
CDWE Building
Turbine Building
RWST
CST

DESTRUCTIVE - PHENOMENON U1

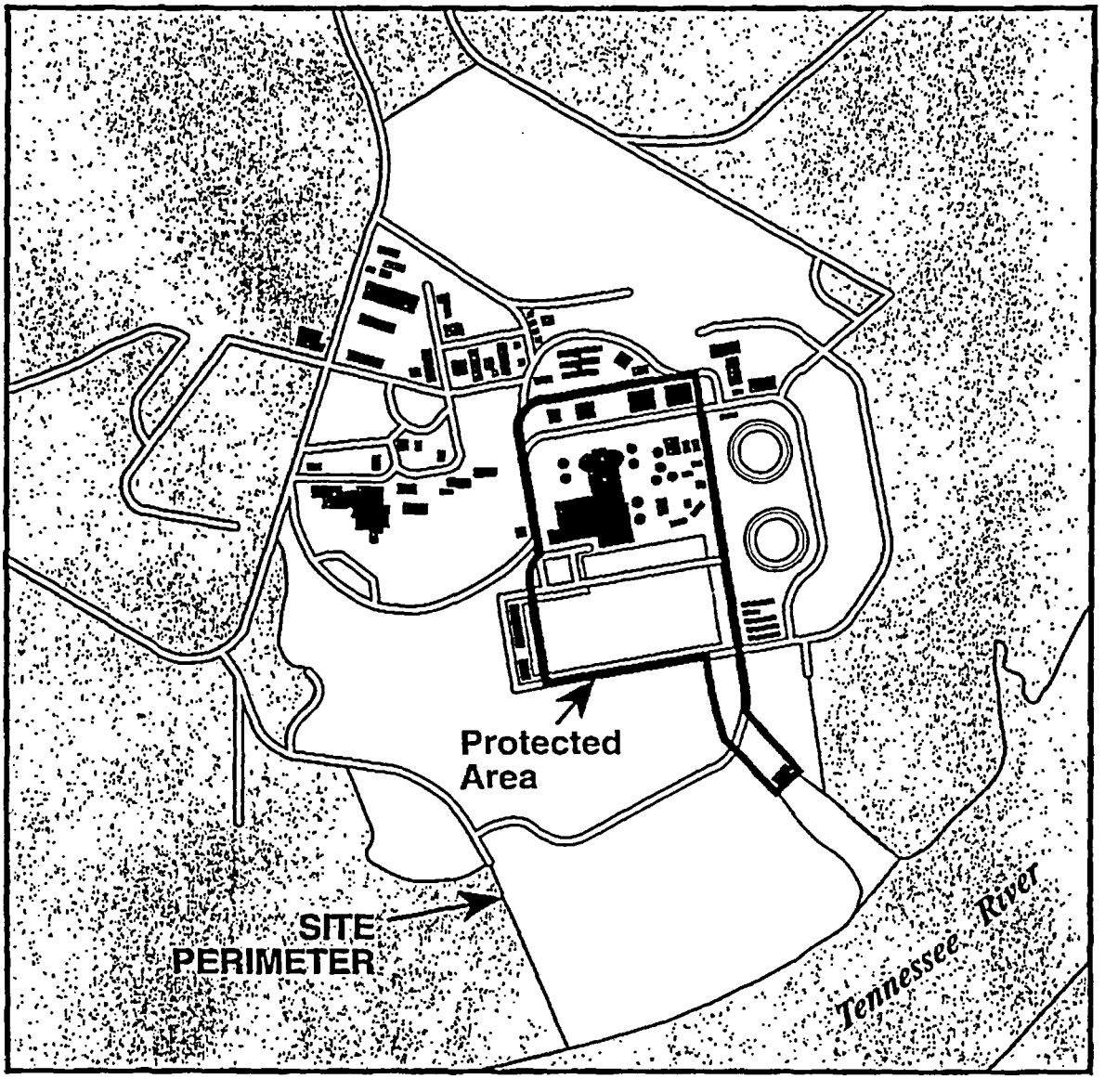
	5.4 River Level HIGH		5.5 River Level LOW	
	Mode	Initiating/Condition	Mode	Initiating/Condition
GENERAL		*Refer to "Fission Product Barrier Matrix"*		*Refer to "Fission Product Barrier Matrix"*
SITE		*Refer to "Fission Product Barrier Matrix"*		*Refer to "Fission Product Barrier Matrix"*
ALERT	All	**River Reservoir level is at Stage II Flood Warning** *(1 or 2)* 1. River Reservoir level >727 Ft 2. Stage II Flood Warning (AOI-7) has been issued by River Systems Operations	All	**River Reservoir level is <668 Ft (AOI-22) as reported by River Systems Operations**
UNUSUAL EVENT	All	**River Reservoir level is at Stage I Flood Warning** *(1 or 2 or 3)* 1. River Reservoir level >726.5 Ft from April 16 thru September 30 2. River Reservoir level >714.5 Ft from October 1 thru April 15 3. Stage I Flood Warning (AOI-7) has been issued by River Systems Operations	All	**River Reservoir level is ≤673 Ft (AOI-22) as reported by River Systems Operations**

DESTRUCTIVE PHENOMENON U1

5.6 Watercraft Crash

	Mode	Initiating/Condition
GENERAL		*Refer to "Fission Product Barrier Matrix"*
SITE		*Refer to "Fission Product Barrier Matrix"*
ALERT		*Refer to "Fission Product Barrier Matrix"*
UNUSUAL EVENT	All	**Watercraft Strikes the Intake Pumping Station resulting in a reduction of Essential Raw Cooling Water (ERCW) or Raw Cooling Water (RCW)** *(1 and 2)* 1. Plant personnel report a Watercraft has struck the Intake Pumping Station 2. (a or b or c) a. ERCW Supply Header Pressure Train A O-PI-67-18A is <15 psig b. ERCW Supply Header Pressure Train B O-PI-67-17A is <15 psig c. RCW Supply Header Pressure O-PI-24-22 is <15 psig

Figure 5-A
PROTECTED AREA/SITE PERIMETER



FISSION PRODUCT BARRIER MATRIX (Modes 1-4)

1.1 Fuel Clad
1.2 RCS
1.3 Containment

1

SYSTEM DEGRADATION

2.1 Loss of Instrumentation
2.2 Loss of Function/Communication
2.3 Failure of Reactor Protection
2.4 Fuel Clad Degradation
2.5 RCS Unidentified Leakage
2.6 RCS Identified Leakage
2.7 Uncontrolled Cool Down
2.8 Turbine Failure
2.9 Technical Specification
2.10 Safety Limit

2

LOSS OF POWER

3.1 Loss of AC (Power Ops)
3.2 Loss of AC (Shutdown)
3.3 Loss of DC

3

HAZARDS and SED JUDGMENT

4.1 Fire
4.2 Explosion
Table 4-1
Figure 4-A
4.3 Flammable Gas
4.4 Toxic Gas
Table 4-2
Figure 4-B
4.5 Control Room Evacuation
4.6 Security
4.7 SED Judgment
Table 4-3

4

DESTRUCTIVE PHENOMENON

5.1 Earthquake
5.2 Tornado
5.3 Aircraft/Projectile Crash
Table 5-1
5.4 River Level High
5.5 River Level Low
5.6 Watercraft Crash
Figure 5-A

5

SHUTDOWN SYSTEM DEGRADATION

6.1 Loss of Shutdown Systems
6.2 Loss of AC (Shutdown)
6.3 Loss of DC (Shutdown)
6.4 Fuel Handling

6

RADIOLOGICAL

7.1 Gaseous Effluent
7.2 Liquid Effluent
Table 7-1
Figure 7-A
7.3 Radiation Levels
7.4 Fuel Handling
Table 7-2

7

DEFINITIONS/ACRONYMS

UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY and GENERAL EMERGENCY: (see SED Judgment 4.7).

BOMB: An explosive device (See EXPLOSION).

CIVIL DISTURBANCE: A group of twenty (20) or more persons violently protesting station operations or activities at the site.

CREDIBLE SITE-SPECIFIC -The determination is made by WBN senior plant management through use of information found in the Safeguards Contingency Plan.

CRITICAL-SAFETY FUNCTION (CSFs): A plant safety function required to prevent significant release of core radioactivity to the environment. There are six CSFs: Sub-criticality, Core Cooling, Heat Sink, Pressurized Thermal Shock, Integrity (Containment) and Inventory (RCS).

EVENT: Assessment of an EVENT commences when recognition is made that one or more of the conditions associated with the event exist. Implicit in this definition is the need for timely assessment, i.e. within 15 minutes.

EXCLUSION AREA BOUNDARY (EAB): The demarcation of the area surrounding the WBN units in which postulated FSAR accidents will not result in population doses exceeding the criteria of 10 CFR Part 100. Refer to Figure 7-A.

EXPLOSION: A rapid, violent, unconfined combustion, or a catastrophic failure of pressurized equipment that imparts energy of sufficient force to potentially damage permanent structures required for safe operation.

EXTORTION: An attempt to cause an action at the station by threat of force.

FAULTED: (Steam Generator) Existence of secondary side leakage (i.e., steam or feed line break) that results in an uncontrolled decrease in steam generator pressure or the steam generator being completely depressurized.

FIRE: Combustion characterized by heat and light. Source of smoke such as slipping drive belts or overheated electrical components do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

FLAMMABLE GAS: Combustible gases maintained at concentrations less than the LOWER EXPLOSIVE LIMIT (LEL) will not explode due to ignition.

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

INEFFECTIVE: The specified restoration action(s) does not result in a reduction in the level of severity of the RED PATH condition within 15 minutes from identification of the Core Cooling CSF Status Tree RED PATH. A reduction in the level of severity is an improvement in the applicable parameters, e.g., Increasing Trend in Reactor Vessel Water Level (Full RVLIS) and/or Decreasing Trend on Core Thermocouple Temperatures.

INITIATING CONDITIONS: Plant Parameters, radiation monitor readings or personnel observations that identify an Event for purposes of Emergency Plan Classification.

INTRUSION/INTRUDER: Suspected hostile individual present in a protected area without authorization.

ODCM: Offsite Dose Calculation Manual.

ORANGE PATH: Monitoring of one or more CSFs by FR-0 which indicates that the CSF(s) is under severe challenge.

PROJECTILE: An object ejected, thrown, or launched towards a plant structure. The source of the projectile may be onsite or offsite. Damage is sufficient to cause concern regarding the integrity of the affected structure or the operability or reliability of safety equipment contained therein.

PROTECTED AREA: Encompasses all owner controlled areas within the security protected area fence as shown on Figure 4-A.

RED PATH: Monitoring of one or more CSFs by the FR-0 which indicates that the CSF(s) is under extreme challenge; prompt operator action is required.

RUPTURED: (Steam Generator) Existence of primary to secondary leakage of a magnitude greater than charging pump capacity.

SABOTAGE: Deliberate damage, misalignment, or mis-operation of plant equipment with the intent to render the equipment inoperable.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) An automatic turbine runback > 15% thermal reactor power; (2) Electrical load rejection > 25% full electrical load; (3) Reactor Trip or (4) Safety Injection System Activation.

SITE PERIMETER (SP): Encompasses all owner controlled areas in the immediate site environs as shown on Figures 4-Aand 7-A.

STRIKE ACTION: A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on TVA. The STRIKE ACTION must threaten to interrupt normal plant operations.

TOXIC GAS: A gas that is dangerous to life or limb by reason of inhalation or skin contact (e.g., chlorine).

UNPLANNED: An event or action that is not the expected result of normal operations, testing, or maintenance. Events that result in corrective or mitigative actions being taken in accordance with abnormal or emergency procedures are UNPLANNED.

UNPLANNED: (With specific regard to radioactivity releases) A release of radioactivity is UNPLANNED if the release has not been authorized by a Discharge Permit (DP). Implicit in this definition are unintentional releases, unmonitored releases, or planned releases that exceed a condition specified on the DP, e.g., alarm setpoints, minimum dilution flow, minimum release times, maximum release rates, and/or discharge of incorrect tank.

VALID: An indication or report or condition is considered to be VALID when it is conclusively verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel. Implicit in this definition is the need for timely assessment, i.e., within 15 minutes.

VISIBLE DAMAGE: Damage to equipment that is readily observable without measurements, testing, or analyses. Damage is sufficient enough to cause concern regarding the continued operability or reliability of affected safety structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, and/or paint blistering. Surface blemishes (e.g., paint chipping, scratches) should NOT be included.

VITAL AREA: Is any area within the PROTECTED AREA which contains equipment, systems, devices, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

	6.1 Loss of Shutdown Systems		6.2 Loss of AC (Shutdown)	
	Mode	Initiating/Condition	Mode	Initiating/Condition
GENERAL	5,6	Note: Additional information will be provided later pending NRC Guidance on Shutdown EALs *Refer to "Gaseous Effluents" (7.1)*		*Not Applicable*
SITE	5,6	**Loss of water level in the Rx vessel that has <u>or</u> will uncover fuel in the Rx vessel with CNTMT closure established** *(1 and 2 and 3 and 4 and 5)* 1. Loss of RHR capability 2. Rx vessel water level < el. 718' 3. Incore TCs (if available) indicate RCS temp. >200° F 4. RCS is vented/open to CNTMT 5. CNTMT closure is established *Note: If CNTMT open, refer to "Gaseous Effluents" (7.1)*		*Not Applicable*
ALERT	5,6	**Inability to maintain Unit in Cold Shutdown** *(1 and 2 and 3)* 1. RHR capability is <u>not</u> available for RCS Cooling 2. Incore TCs (if available) indicate RCS temp. >200° F 3. CNTMT closure is established	5,6 or De-Fuel	**UNPLANNED loss of Offsite <u>and</u> Onsite AC Power for >15 minutes** 1. 1A <u>and</u> 1B 6.9 KV Shutdown Bds de-energized for >15 minutes
UNUSUAL EVENT	5,6	Note: Additional information will be provided later pending NRC Guidance on Shutdown EALs	5,6 or De-Fuel	**UNPLANNED loss of All Offsite Power for >15 minutes** *(1 and 2)* 1. C <u>and</u> D CSSTS not available For >15 minutes. 2. Either Diesel Generator is supplying power to its respective Shutdown Board

SHUTDOWN SYSTEMS DEGRADATION U1

	6.3 Loss of DC (Shutdown)		6.4 Fuel Handling	
	Mode	Initiating/Condition	Mode	Initiating/Condition
GENERAL		Not Applicable		*Refer to "Gaseous Effluents" (7.1)*
SITE		Not Applicable		*Refer to "Gaseous Effluents" (7.1)*
ALERT		Not Applicable	All	**Major damage to Irradiated Fuel, or Loss of water level that has or will uncover Irradiated Fuel outside the Reactor Vessel** *(1 and 2)* 1. **VALID** alarm on O-RE-90-101 or O-RE-90-102 or O-RE-90-103 or 1-RE-90-130/131 or 1-RE-90-112 or 1-RE-90-400 or 2-RE-90-400 2. *(a or b)* a. Plant personnel report damage of Irradiated Fuel sufficient to rupture Fuel Rods b. Plant personnel report water level drop has or will exceed makeup capability such that Irradiated Fuel will be uncovered
UNUSUAL EVENT	5,6 or De-fuel	**UNPLANNED loss of the required Train of DC Power for >15 minutes** *(1 or 2)* 1. Voltage <105V DC on 125V DC Vital Battery Buses 1-I and 1-III for >15 minutes 2. Voltage <105V DC on 125V DC Vital Battery Buses 1-II and 1-IV for >15 minutes.	All	**UNPLANNED loss of water level in Spent Fuel Pool or Reactor Cavity or Transfer Canal with fuel remaining covered** *(1 and 2 and 3)* 1. Plant personnel report water level drop in Spent Fuel Pool or Reactor Cavity, or Transfer Canal 2. VALID alarm on O-RE-90-102 or O-RE-90-103 or 1-RE-90-59 or 1-RE-90-60 3. Fuel remains covered with water

FISSION PRODUCT BARRIER MATRIX (Modes 1-4)

1

SYSTEM DEGRADATION

2

LOSS OF POWER

3

HAZARDS and SED JUDGMENT

4

DESTRUCTIVE PHENOMENON

5

SHUTDOWN SYSTEM DEGRADATION

6

RADIOLOGICAL

7

DEFINITIONS/ACRONYMS

UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY and GENERAL EMERGENCY: (see SED Judgment 4.7).

BOMB: An explosive device (See EXPLOSION).

CIVIL DISTURBANCE: A group of twenty (20) or more persons violently protesting station operations or activities at the site.

CREDIBLE SITE-SPECIFIC -The determination is made by WBN senior plant management through use of information found in the Safeguards Contingency Plan.

CRITICAL-SAFETY FUNCTION (CSFs): A plant safety function required to prevent significant release of core radioactivity to the environment. There are six CSFs: Sub-criticality, Core Cooling, Heat Sink, Pressurized Thermal Shock, Integrity (Containment) and Inventory (RCS).

EVENT: Assessment of an EVENT commences when recognition is made that one or more of the conditions associated with the event exist. Implicit in this definition is the need for timely assessment, i.e. within 15 minutes.

EXCLUSION AREA BOUNDARY (EAB): The demarcation of the area surrounding the WBN units in which postulated FSAR accidents will not result in population doses exceeding the criteria of 10 CFR Part 100. Refer to Figure 7-A.

EXPLOSION: A rapid, violent, unconfined combustion, or a catastrophic failure of pressurized equipment that imparts energy of sufficient force to potentially damage permanent structures required for safe operation.

EXTORTION: An attempt to cause an action at the station by threat of force.

FAULTED: (Steam Generator) Existence of secondary side leakage (i.e., steam or feed line break) that results in an uncontrolled decrease in steam generator pressure or the steam generator being completely depressurized.

FIRE: Combustion characterized by heat and light. Source of smoke such as slipping drive belts or overheated electrical components do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

FLAMMABLE GAS: Combustible gases maintained at concentrations less than the **LOWER EXPLOSIVE LIMIT (LEL)** will not explode due to ignition.

HOSTAGE: A person(s) held as leverage against the station to ensure that demands will be met by the station.

INEFFECTIVE: The specified restoration action(s) does not result in a reduction in the level of severity of the RED PATH condition within 15 minutes from identification of the Core Cooling CSF Status Tree RED PATH. A reduction in the level of severity is an improvement in the applicable parameters, e.g., Increasing Trend in Reactor Vessel Water Level (Full RVLIS) and/or Decreasing Trend on Core Thermocouple Temperatures.

INITIATING CONDITIONS: Plant Parameters, radiation monitor readings or personnel observations that identify an Event for purposes of Emergency Plan Classification.

INTRUSION/INTRUDER: Suspected hostile individual present in a protected area without authorization.

ODCM: Offsite Dose Calculation Manual.

ORANGE PATH: Monitoring of one or more CSFs by FR-0 which indicates that the CSF(s) is under severe challenge.

PROJECTILE: An object ejected, thrown, or launched towards a plant structure. The source of the projectile may be onsite or offsite. Damage is sufficient to cause concern regarding the integrity of the affected structure or the operability or reliability of safety equipment contained therein.

PROTECTED AREA: Encompasses all owner controlled areas within the security protected area fence as shown on Figure 4-A.

RED PATH: Monitoring of one or more CSFs by the FR-0 which indicates that the CSF(s) is under extreme challenge; prompt operator action is required.

RUPTURED: (Steam Generator) Existence of primary to secondary leakage of a magnitude greater than charging pump capacity.

SABOTAGE: Deliberate damage, misalignment, or mis-operation of plant equipment with the intent to render the equipment inoperable.

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) An automatic turbine runback > 15% thermal reactor power; (2) Electrical load rejection > 25% full electrical load; (3) Reactor Trip or (4) Safety Injection System Activation.

SITE PERIMETER (SP): Encompasses all owner controlled areas in the immediate site environs as shown on Figures 4-Aand 7-A.

STRIKE ACTION: A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on TVA. The STRIKE ACTION must threaten to interrupt normal plant operations.

TOXIC GAS: A gas that is dangerous to life or limb by reason of inhalation or skin contact (e.g., chlorine).

UNPLANNED: An event or action that is not the expected result of normal operations, testing, or maintenance. Events that result in corrective or mitigative actions being taken in accordance with abnormal or emergency procedures are UNPLANNED.

UNPLANNED: (With specific regard to radioactivity releases) A release of radioactivity is UNPLANNED if the release has not been authorized by a Discharge Permit (DP). Implicit in this definition are unintentional releases, unmonitored releases, or planned releases that exceed a condition specified on the DP, e.g., alarm setpoints, minimum dilution flow, minimum release times, maximum release rates, and/or discharge of incorrect tank.

VALID: An indication or report or condition is considered to be VALID when it is conclusively verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel. Implicit in this definition is the need for timely assessment, i.e., within 15 minutes.

VISIBLE DAMAGE: Damage to equipment that is readily observable without measurements, testing, or analyses. Damage is sufficient enough to cause concern regarding the continued operability or reliability of affected safety structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, and/or paint blistering. Surface blemishes (e.g., paint chipping, scratches) should NOT be included.

VITAL AREA: Is any area within the PROTECTED AREA which contains equipment, systems, devices, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

	7.1 Gaseous Effluents		7.2 Liquid Effluents	
	Mode	Initiating/Condition	Mode	Initiating/Condition
GENERAL	All	**EAB dose resulting from an actual or imminent release of Gaseous Radioactivity that exceeds 1000 mrem TEDE or 5000 mrem Thyroid CDE for the actual or projected duration of the release** *(1 or 2 or 3)* 1. A **VALID** rad monitor reading exceeds the values under General in Table 7-1 for >15 minutes, unless assessment within this time period confirms that the **Criterion** is Not exceeded. 2. Field survey results indicate >1000 mrem/hr gamma or an I-131 concentration of 3.9E-6 μ Ci/cc at SP 3. EP dose assessment results indicate EAB dose >1000 mrem TEDE or >5000 mrem Thyroid CDE for the actual or projected duration of the release (Figure 7-A)		Not Applicable
SITE	All	**EAB dose resulting from an actual or imminent release of Gaseous Radioactivity that exceeds 100 mrem TEDE or 500 mrem Thyroid CDE for the actual or projected duration of the release** *(1 or 2 or 3)* 1. A **VALID** rad monitor reading exceeds the values under Site in Table 7-1 for >15 minutes, unless assessment within this time period confirms that the **Criterion** is Not exceeded 2. Field survey results indicate >100 mrem/hr gamma or an I-131 concentration of 3.9E-7 μ Ci/cc at SP 3. EP dose assessment results indicate EAB dose >100 mrem TEDE or >500 mrem Thyroid CDE for the actual or projected duration of the release (Figure 7-A)		Not Applicable
ALERT	All	**Any UNPLANNED release of Gaseous Radioactivity that exceeds 200 times the ODCM Limit for >15 minutes** *(1 or 2 or 3)* 1. A **VALID** rad monitor reading exceeds the values under Alert in Table 7-1 for >15 minutes, unless assessment within this time period confirms that the **Criterion** is Not exceeded 2. Field survey results indicate >10 mrem/hr gamma at SP >15 minutes 3. EP dose assessment results indicate EAB dose >10 mrem TEDE for the duration of the release (Figure 7-A)	All	**Any UNPLANNED release of Liquid Radioactivity that exceeds 200 times the ODCM Limit for >15 minutes** *(1 or 2)* 1. A **VALID** rad monitor reading exceeds the values under Alert in Table 7-1 for >15 minutes, unless assessment within this time period confirms that the **Criterion** is Not exceeded. 2. Sample results exceed 200 times the ODCM limit value for an unmonitored release of liquid radioactivity >15 minutes in duration
UNUSUAL EVENT	All	**Any UNPLANNED release of Gaseous Radioactivity that exceeds 2 times the ODCM Limit for >60 minutes** *(1 or 2 or 3)* 1. A **VALID** rad monitor reading exceeds the values under UE in Table 7-1 for >60 minutes, unless assessment within this time period confirms that the **Criterion** is Not exceeded 2. Field survey results indicate >0.1 mrem/hr gamma at SP for >60 minutes 3. EP dose assessment results indicate EAB dose >0.1 mrem TEDE for the duration of the release (Figure 7-A)	All	**Any UNPLANNED release of Liquid Radioactivity to the Environment that exceeds 2 times the ODCM Limit for >60 minutes** *(1 or 2)* 1. A **VALID** rad monitor reading exceeds the values under UE in Table 7-1 for >60 minutes, unless assessment within this time period confirms that the **Criterion** is Not exceeded. 2. Sample results exceed 2 times the ODCM limit value for an unmonitored release of liquid radioactivity >60 minutes in duration

TABLE 7-1
EFFLUENT RADIATION MONITOR EALS

NOTE: The values below, **if exceeded**, indicate the need to perform the specified assessment. If the assessment can not be completed within 15 minutes (60 minutes for UE), the declaration shall be made based on the **VALID** reading. As used here, the radiation monitor indications as displayed on **ICS** are the primary indicators. If **ICS** is unavailable, utilize the radiation monitor readings in the control room or local indication as necessary.

Monitor	ICS Screen	Units	UE	Alert	Site	General
Total Site (GAS)	EFF1	µCi/s [2]	2.59E+05	2.59E+07	3.32E+07	3.32E+08
U1 Shield Building 1-RE-90-400	EFF1	µCi/s	2.59E+05	2.59E+07	3.32E+07	3.32E+08
U2 Shield Building 2-RE-90-400	EFF1	µCi/s	2.59E+05	2.59E+07	3.32E+07	3.32E+08
Auxiliary Building 0-RE-90-101B	4RM1	cpm	6.22E+04	6.22E+06	7.99E+06	*****(1)
Service Building 0-RE-90-132B	4RM1	cpm	1.42E+06	*****(1)	*****(1)	*****(1)
U1 Condenser Vacuum Exhaust						
1-RE-90-404A	3PAM	µCi/cc[3]	1.22E+01	1.22E+03	1.56E+03	1.56E+04
1-RE-90-404B	3PAM	µCi/cc	1.22E+01	1.22E+03	1.56E+03	1.56E+04
S/G Discharge Monitors 1-RE-90-421 thru 424	4RM2	mR/hr[4]	NA	7.48E+02	9.59E+02	9.59E+03
Total Site (LIQUID)	N/A	µCi/ml[2]	1.01E-02	1.01E+00	N/A	N/A
0-RE-90-122	4RM2	cpm	1.00E+06	*****(1)	N/A	N/A
1-RE-90-120,121	4RM2	cpm	5.68E+05	*****(1)	N/A	N/A
0-RE-90-225	4RM2	cpm	9.92E+05	*****(1)	N/A	N/A
0-RE-90-212	4RM2	cpm	7.64E+03	7.64E+05	N/A	N/A
RELEASE DURATION	minutes		60	15	15	15
ASSESSMENT METHOD: ICS or radiation monitor (RM) readings in the MCR or local indication as necessary						

Notes: (1) Table values are calculated values. The ***** indicates the monitor is off scale, and other confirmatory data is required for event classification.

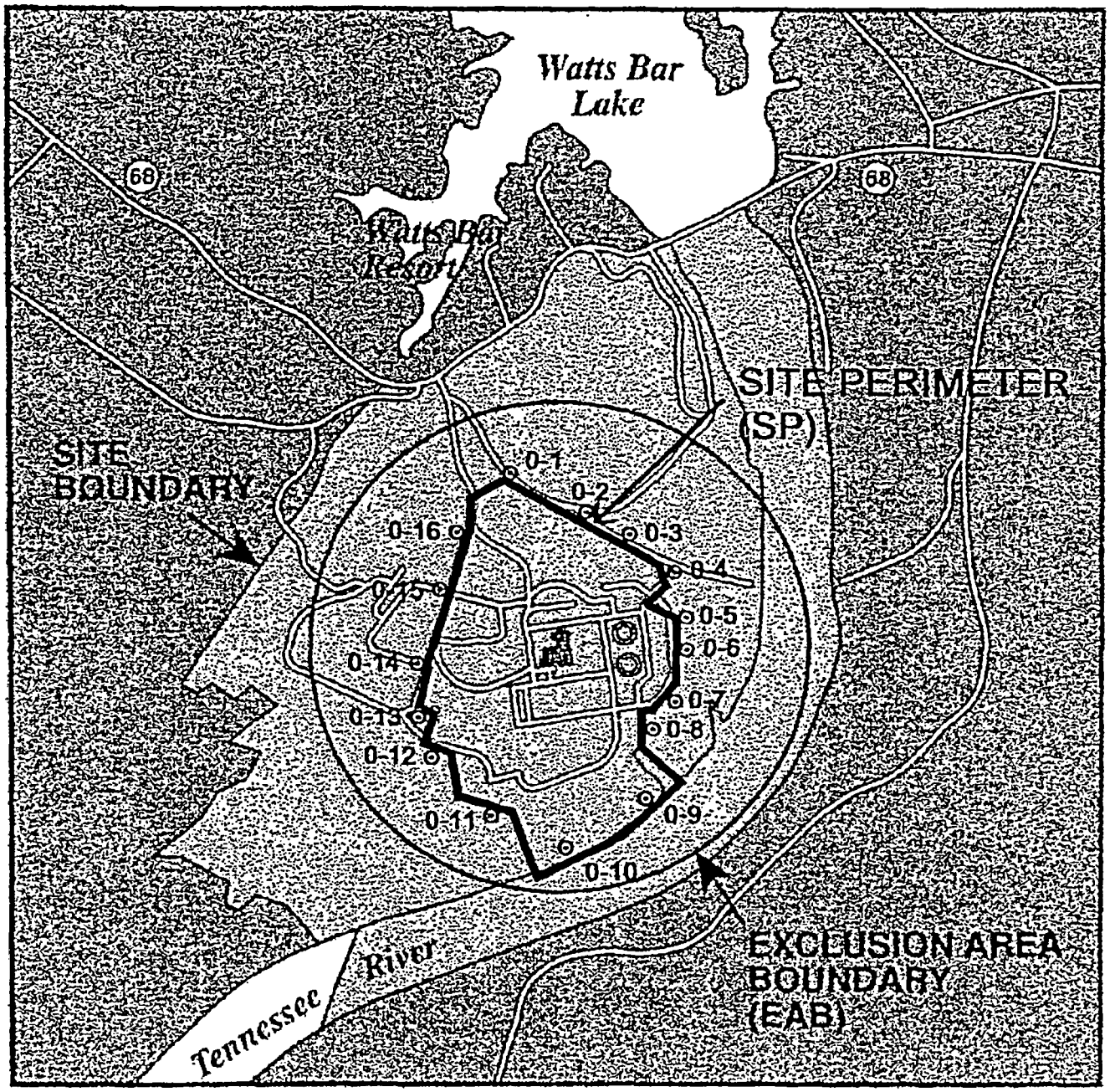
(2) In all cases, the total site EAL is the limiting value. Therefore, in the case where there are multiple release paths from the plant, it is the total release EAL (obtained from ICS or other analysis) that will determine whether an emergency classification is warranted.

(3) This eberline channel reads out in cpm in the **MCR**. Indications of a radioactivity release via this pathway would be S/G blowdown monitors or other indications of primary-to-secondary leakage such as S/G level increase or pressurizer level decrease. ICS calculates µCi/cc and has a visual indication of an alarm condition when the indications exceeds 12.2 µCi/cc. This channel was included in the table to provide a means to further assess a release detected by other indications and to provide a path for possible escalation.

(4) These unit values are based on flow rates through one [1] PORV of 970,000 lb/hr at 1,185 psig, 600°F. Before using these values, ensure a release to the environment is ongoing (e.g. PORV).

Figure 7-A
EXCLUSION AREA, SITE BOUNDARY and SITE PERIMETER

NOTE: The Site Boundary used here is consistent with the definition in the Offsite Dose Calculation Manual. Do Not confuse this boundary with the SITE PERIMETER defined in these EALs, or with other definitions of "Site Boundary."



Note: Numbered points are [SP] radiological survey point for all sectors.

7.3 Radiation Levels

	Mode	Initiating/Condition
GENERAL		*Refer to "Fission Product Barrier Matrix" or "Gaseous Effluents" (7.1)*
SITE		*Refer to "Fission Product Barrier Matrix" or "Gaseous Effluents" (7.1)*
ALERT	All	**UNPLANNED increases in Radiation levels within the Facility that impedes Safe Operations or establishment or maintenance of Cold Shutdown** *(1 or 2)* 1. **VALID** area Radiation Monitor readings or survey results exceed 15 mrem/hr in the Control Room or CAS 2. *(a and b)* a. **VALID** area radiation monitor readings exceed values listed in Table 7-2 b. Access restrictions impede operation of systems necessary for Safe Operation or the ability to establish Cold Shutdown *See UNUSUAL EVENT Note Below*
UNUSUAL EVENT	All	**UNPLANNED increase in Radiation levels within the Facility** 1. **VALID** area Radiation Monitor readings increase by a factor 1000 over normal levels *Note: In Either the **UE** or **ALERT** EAL, the SED must determine the cause of Increase in Radiation Levels and Review Other **INITIATING/CONDITIONS** for Applicability (e.g., a dose rate of 15 mrem/hr in the Control Room could be caused by a release associated with a DBA).*

7.4 Fuel Handling

Mode	Initiating/Condition
	Refer to "Gaseous Effluents" (7.1)
	Refer to "Gaseous Effluents" (7.1)
All	**Major damage to Irradiated Fuel, or Loss of water level that has or will uncover Irradiated Fuel outside the Reactor Vessel** *(1 and 2)* 1. VALID alarm on 0-RE-90-101 or 0-RE-90-102 or 0-RE-90-103 or 1-RE-90-130/131 or 1-RE-90-112 or 1-RE-90-400 or 2-RE-90-400 2. *(a or b)* a. Plant personnel report damage of Irradiated Fuel sufficient to rupture Fuel Rods b. Plant personnel report water level drop has or will exceed makeup capacity such that Irradiated Fuel will be uncovered
All	**UNPLANNED loss of water level in Spent Fuel Pool or Reactor Cavity or Transfer Canal with fuel remaining covered** *(1 and 2 and 3)* 1. Plant personnel report water level drop in Spent Fuel Pool, or Reactor Cavity, or Transfer Canal 2. **VALID** alarm on 0-RE-90-102 or 0-RE-90-103 or 1-RE-90-59 or 1-RE-90-60 3. Fuel remains covered with water.

Table 7-2

ALERT - RADIATION LEVELS

Monitor No.	Location Building and Elevation	Monitor Reading *
1&2 RE-90-1	Auxiliary El. 757.0 (spent fuel pool)	2.5×10^3 mR/hr
1-RE-90-2	Auxiliary El. 757.0 (personnel air lock)	2.5×10^0 R/hr
0-RE-90-3	Auxiliary El. 729.0 (waste pac. area)	2.5×10^3 mR/hr
0-RE-90-4	Auxiliary El. 713.0 (decon room)	1.5×10^3 mR/hr
0-RE-90-5	Auxiliary El. 737.0 (spt. fuel pool pmp. ar.)	1.5×10^3 mR/hr
1&2-RE-90-6	Auxiliary El. 737.0 (comp. cl. wtr. ht. ex. ar.)	1.5×10^3 mR/hr
1&2-RE-90-7	Auxiliary El. 713.0 (sample room)	2×10^3 mR/hr
1&2-RE-90-8	Auxiliary El. 713.0 (aux. feed pump area)	1.5×10^3 mR/hr
0-RE-90-9	Auxiliary El. 692.0 (wst. cond. evap. tk. ar.)	1.5×10^3 mR/hr
1&2-RE-90-10	Auxiliary El. 692.0 (cvcs area)	1.5×10^3 mR/hr
0-RE-90-11	Auxiliary El. 676.0 (ctmt. spry. & rhr pmp ar.)	1.5×10^3 mR/hr
1-RE-90-61	Auxiliary El. 736.0 (RB low. cmpt. inst. rm.)	2.5×10^3 mR/hr
0-RE-90-230	Turbine El. 685.0 (conden. demin.)	1.5×10^3 mR/hr
0-RE-90-231	Turbine El. 685.0 (conden. demin.)	1.5×10^3 mR/hr

Note: *These monitors read out in mR/hr. It is assumed that this is equivalent to mrem/hr.

SOURCE NOTES

Page 1 of 1

1. NIR-0551, DV-847100 F00012, and MC-850321 809004, MSC-00956, NCO 920030366.	Monitor readings and challenges to barriers are provided in EPIP-1, Section 1 in (1.1 Fuel Clad 1.1.5 and 1.3 CNTMT Barrier 1.3.5), Section 7 (7.1 Gaseous Effluents, 7.2 Liquid Effluents, Table 7-1, 7.3 Radiation Levels, 7.4 Fuel Handling and Table 7-2). Barriers are covered in Section 1, Fission Product Barrier Matrix. Monitor readings are also provided in EPIP-5, App. B, Note 3.
2. MC-84 0827 005 035A, MCS-2400	SED duties that can not be delegated. Section 2.0 Responsibility.
3. MC-8407 1900 3003, MSC-00701, NCO-920030222 CNTMT	Rad Monitors used in conjunction with a plant parameter to determine emergency classifications. Monitor readings are included with plant parameters for the purposes of emergency classifications. Section 1, Fission Product Barrier Matrix (1.1 Fuel Clad, 1.2 RCS, 1.3 Containment), Section 7 (7.1 Gaseous Effluent, 7.2 Liquid Effluent and 7.3 Radiation Levels and 7.4 Fuel Handling).
4. ANSI Standard N.18.7-1976 Subsection 5.3.9.3: 01 POI	EPIPs will contain the following elements.
5. MSC-02401, NCO-920030998	Chemistry detection of failed fuel.
6. EPPOS #2	Emergency Preparedness Position (EPPOS) on timeliness of classification of emergency conditions.

TENNESSEE VALLEY AUTHORITY

WATTS BAR NUCLEAR PLANT

EMERGENGY PLAN IMPLEMENTING PROCEDURE

EPIP-13

INITIAL DOSE ASSESSMENT FOR RADIOLOGICAL EMERGENCIES

Revision 11

Unit 0

PREPARED BY: James F. Hagy

SPONSORING ORGANIZATION: Emergency Planning

APPROVED BY: Frank L. Pavlechko

Effective Date: 03/25/2004

LEVEL OF USE: REFERENCE

NON-QUALITY RELATED

REVISION LOG

Revision Number	Implementation Date	Pages Affected	Description of Revision
8	12/16/2002	All	Plan effectiveness determination reviews indicate the following revisions do not reduce the level of effectiveness of the procedure or REP: Non Intent change. Renumbered instruction for inter-site consistency, formerly EPIP-16. For historical data, source notes, etc., see EPIP-16, Revision 14. Editorial revisions. Deleted source notes, renumbered sections, corrected Appendix references.
9	06/02/2003	2, 4, 6, 12, 24	Plan effectiveness determination reviews indicate the following revisions do not reduce the level of effectiveness of the procedure or REP: Non Intent change. Standardized record retention. Editorial corrections. Revised SQN Control Room access phone number.
10	02/20/2004	All	Intent change. Added steps in Appendix B to support Tritium (TPBAR's) in calculations. Modified TEDE/CDE factors to support infinite cloud methodology to be consistent with CECC EPIP-8. General editorial changes, remove extraneous formatting.
11	03/25/2004	2, 9	Plan effectiveness determination reviews indicate the following revisions do not reduce the level of effectiveness of the procedure or REP: Non Intent change. Deleted superfluous verbiage for WBN PER 33477.

TABLE of CONTENTS

1.0 PURPOSE

This Procedure provides initial guidance to support site activities concerning dose assessment for airborne release situation(s).

2.0 REFERENCES

2.1 Interfacing Documents

1. CECC EPIP-8, "Dose Assessment Staff Activities During Nuclear Plant Radiological Emergencies"
2. WBN FSAR
3. ICS User's Manual
4. EPIP-1, "Emergency Plan Classification Flowchart"

2.2 Other Documents

1. TVA NP Radiological Emergency Plan
2. NUREG-0654/FEMA REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants"
3. NUREG 1465, Accident Source Terms for Light-Water Nuclear Power Plants
4. NUREG 1228, Source Terms Estimated During Incident Response to Severe Nuclear Power Plant Accidents
5. Title 10, Code of Federal Regulations, Part 50, Appendix E
6. DCN 37910-A
7. EPA-400
8. Title 10, Code of Federal Regulations, Part 20
9. Letter, Eberline Instrument Co., to TVA (EEB820919007), 9/19/83 on (High Range Monitor Efficiencies)
10. EPIP-6, Activation and Operation of the Technical Support Center (TSC)
11. ODCM
12. NE Calculation Package, WBN TSR-008, WBNTSR-009, TI-RPS-162, WBN NAL 3-003R1, WBN APS 3-084
13. SPP-2.6, Computer Software Control
14. Watts Bar Nuclear Plant Environmental Data Station Manual.
15. Regulatory Guide 1.23, "Onsite Meteorological Programs."
16. American Nuclear Society Standard ANSI/ANS-3.11-2000, "Determining Meteorological Information at Nuclear Facilities."
17. Meteorological Data Print Program Users Manual.
18. Radiological Emergency Notification Directory (REND).
19. Watts Bar Nuclear Plant Nowcast Manual, October 1991.
20. ANSI N18.7-1976

2.3 Definitions/Acronyms

AIRBORNE RELEASE: Release of airborne radioactive material from the site into the environment.

CECC: Central Emergency Control Center.

EXCLUSION AREA BOUNDARY: The demarcation of the area (0.62 mile) surrounding the WBN units in which postulated FSAR accidents will not result in population doses exceeding the criteria of 10CFR Part 100. (See Figure A of this procedure).

ICS: Integrated Computer System.

PAG: Protective Action Guide. Specific levels of radiation dose control established by the Environment Protection Agency, (i.e., 1 REM TEDE, 5 REM Thyroid CDE).

RE/RM ICS references radiological elements (RE). The control room also has radiological monitors (RM) connected to these elements. For the purposes of this procedure these acronyms can be used interchangeably.

SITE BOUNDARY: The Site Boundary used here is consistent with the definition in the Offsite Dose Calculation Manual. (See Figure A of this procedure). The appropriate boundary between "onsite" and "offsite".

SITE PERIMETER (SP): An area encompassing owner controlled areas in the immediate site environment. Measurements are taken at the 16 identified radiological monitoring points along the Site Perimeter. (See Figure A of this procedure).

STABILITY CLASS: An index (A-G) to represent the degree of mixing in the atmosphere.

TEDE: Total Effective Dose Equivalent. The TEDE dose is equivalent to the sum of the plume EDE, the inhalation EDE, and the ground EDE.

THYROID CDE: Thyroid Committed Dose Equivalent.

X/Q: The release dilution ratio between concentrations (X) at reception point (e.g., SP) to the source strength (Q) at a given release point. This dilution ratio is incorporated into the tables for Appendix B.

3.0 GENERAL INSTRUCTIONS

3.1 The onshift Radiological Control Group (RADCON) is responsible for completing this procedure should the CECC/TSC not be activated. This procedure will be performed as directed by the SED/SM when a dose assessment is necessary.

3.2 For initial dose assessment activities, COMPLETE the instructions found in Appendix A, "ICS, Dose Assessment."

3.3 Should ICS dose assessment be unavailable use the backup calculation method in Appendix B for the Site Boundary and five mile zones.

4.0 RECORDS

4.1 Records of Classified Emergencies

The materials generated in support of key actions during an actual emergency are considered Lifetime retention Non-QA records. Materials shall be forwarded to the EP Manager who shall submit any records deemed necessary to demonstrate performance to the Corporate EP Manager for storage.

4.2 Drill and Exercise Records

The materials deemed necessary to demonstrate performance of key actions during drills are considered Non-QA records. These records shall be forwarded to the EP Manager who shall retain records deemed necessary to demonstrate six-year plan performance for six years. The EP Manager shall retain other records in this category for three years.

APPENDIX A - "ICS" DOSE ASSESSMENT

(Page 1 of 1)

NOTE 1: METDATA, wind direction, and EFF1 information are also available from the Dose Assessment screen. See example of ICS Dose Assessment screen below.

[1] ACCESS the main WBN menu screen from an ICS terminal.

[2] ACCESS the TSC menu from the main WBN menu screen.

[3] ACCESS the Dose Assessment screen (DOSE) from the TSC menu.

[4] SELECT the appropriate appendix on the EPIP-13 Dose Assessment Calculator program.

[5] CALCULATE the Dose Assessment and print the Appendix.

[6] IF ICS Dose Assessment is unavailable or the incident involves TPBAR's, THEN

REFER to the Appendix B of this procedure.

EPIP-13 Dose Assessment Calculator - Screen Example

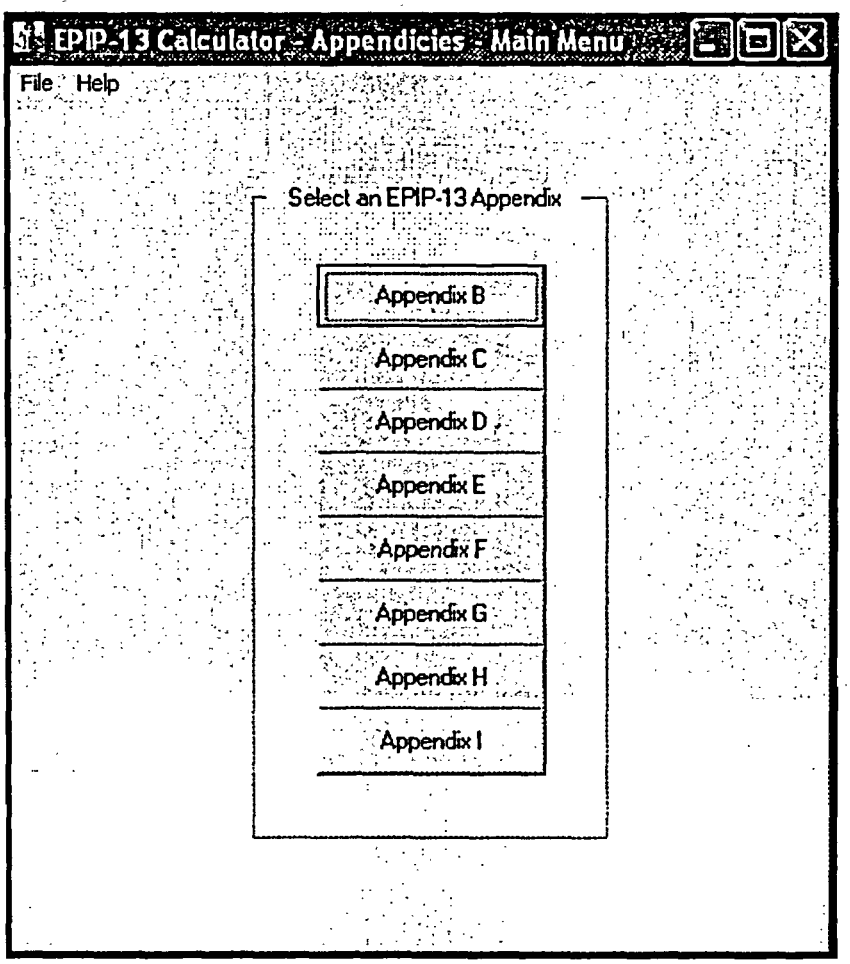
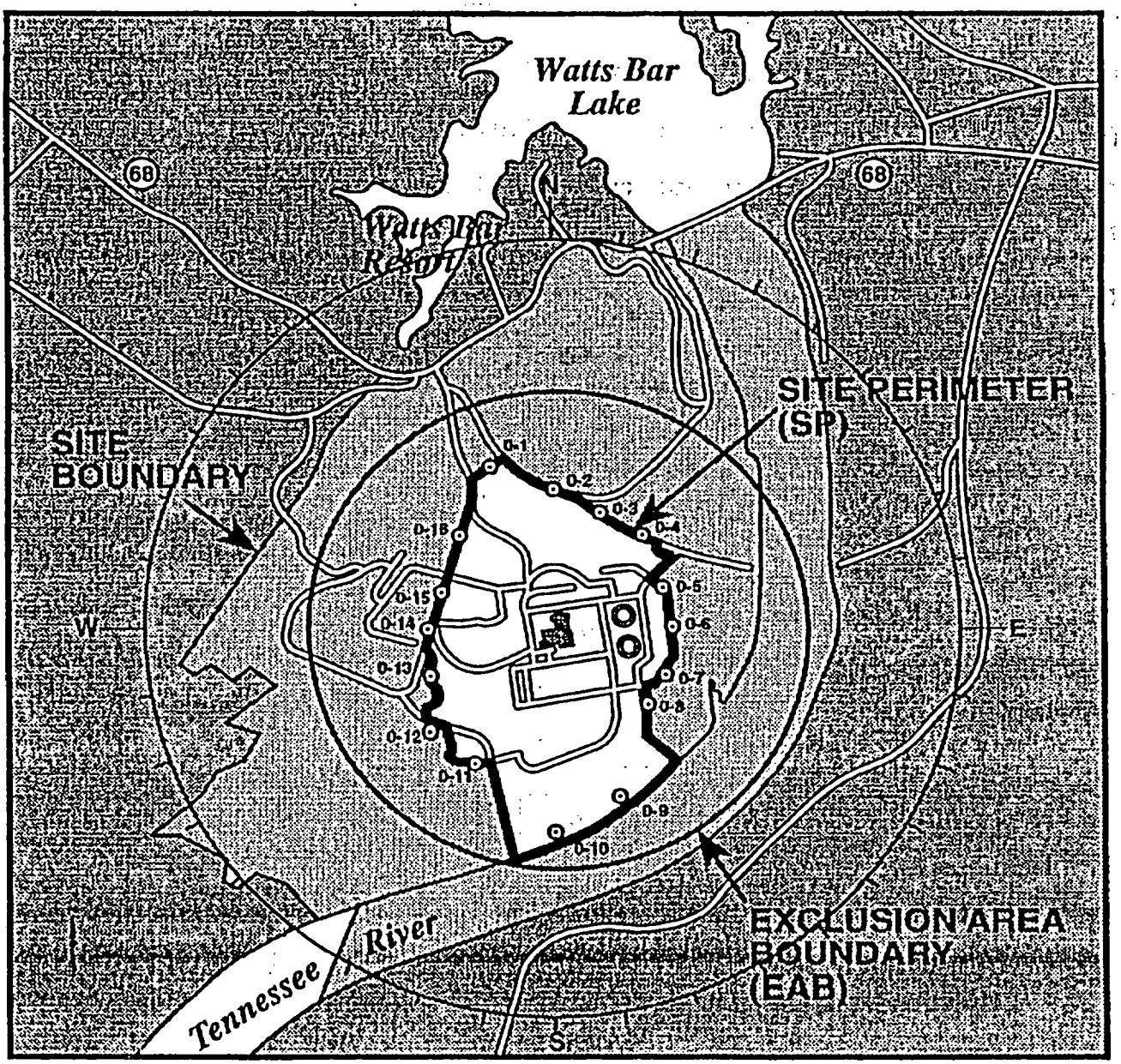


FIGURE A - SITE MAP
(Page 1 of 1)



APPENDIX B - MANUAL ASSESSMENT OF MONITORED GASEOUS RELEASES

(Page 1 of 8)

[1] IF the incident does not involve TPBAR, THEN

GO TO step [11].

[2] REQUEST Chemistry to obtain a sample of the appropriate gaseous release for tritium.

NOTE Appendix F may be referred to during periods when ICS is unavailable to obtain release flow rate.

[3] DETERMINE the flow rate for the release path.

[4] DETERMINE the tritium release rate by completing the following table.

A	B	C	D=AxBxC
Tritium Concentration µCi/cc	Release Flowrate scfm	Conversion factor to convert scfm to cc/s.	Tritium Release Rate µCi/s
		472 cc/s/scfm	

NOTE Appendix J may be referred to during periods when the Meteorological data is unavailable.

[5] OBTAIN Stability Class from the MET DATA screen on ICS or from SQN control room (843-7860) and CIRCLE the Stability Class in both tables below.

[6] IF the Stability Class cannot be obtained, THEN

DETERMINE the stability class by subtracting the 10 meter from the 46 meter temperatures and CIRCLE the stability class in both tables below.

A ≤ -1.24 B -1.11 to -1.23 C -.98 to -1.10 D -.33 to -.97 E .97 to -.32 F 2.59 to .98 G ≥ 2.6

[7] OBTAIN the wind speed in mph from the 46 meter height and CIRCLE the appropriate range for the wind speed in both tables below.

APPENDIX B - MANUAL ASSESSMENT OF MONITORED GASEOUS RELEASES

[8] CIRCLE the appropriate Tritium TEDE factors for each distance in the tables below based on the wind speed and stability class obtained in the above steps.

0.62 Mile Tritium TEDE Factors

Stability Class	<2.2 mph	>2.2 <=4.4 mph	>4.4 <=6.6 mph	>6.6 <=8.8 mph	>8.8 <=11 mph	>11 <=13.2 mph	>13.2 <=15.4 mph	>15.4 <=17.6 mph	>17.6 <=19.8 mph	>19.8 mph
A	2.5E-10	1.3E-10	8.3E-11	6.3E-11	5.0E-11	4.2E-11	3.6E-11	3.1E-11	2.8E-11	2.5E-11
B	1.2E-09	6.0E-10	4.0E-10	3.0E-10	2.4E-10	2.0E-10	1.7E-10	1.5E-10	1.3E-10	1.2E-10
C	3.5E-09	1.8E-09	1.2E-09	8.8E-10	7.0E-10	5.8E-10	5.0E-10	4.4E-10	3.9E-10	3.5E-10
D	1.0E-08	5.0E-09	3.3E-09	2.5E-09	2.0E-09	1.7E-09	1.4E-09	1.3E-09	1.1E-09	1.0E-09
E	1.7E-08	8.5E-09	5.7E-09	4.3E-09	3.4E-09	2.8E-09	2.4E-09	2.1E-09	1.9E-09	1.7E-09
F	3.3E-08	1.7E-08	1.1E-08	8.3E-09	6.6E-09	5.5E-09	4.7E-09	4.1E-09	3.7E-09	3.3E-09
G	7.0E-08	3.5E-08	2.3E-08	1.8E-08	1.4E-08	1.2E-08	1.0E-08	8.8E-09	7.8E-09	7.0E-09

5 Mile Tritium TEDE Factors

Stability Class	<2.2 mph	>2.2 <=4.4 mph	>4.4 <=6.6 mph	>6.6 <=8.8 mph	>8.8 <=11 mph	>11 <=13.2 mph	>13.2 <=15.4 mph	>15.4 <=17.6 mph	>17.6 <=19.8 mph	>19.8 mph
A	4.0E-11	2.0E-11	1.3E-11	1.0E-11	8.0E-12	6.7E-12	5.7E-12	5.0E-12	4.4E-12	4.0E-12
B	5.0E-11	2.5E-11	1.7E-11	1.3E-11	1.0E-11	8.3E-12	7.1E-12	6.3E-12	5.6E-12	5.0E-12
C	1.1E-10	5.5E-11	3.7E-11	2.8E-11	2.2E-11	1.8E-11	1.6E-11	1.4E-11	1.2E-11	1.1E-11
D	4.4E-10	2.2E-10	1.5E-10	1.1E-10	8.8E-11	7.3E-11	6.3E-11	5.5E-11	4.9E-11	4.4E-11
E	9.5E-10	4.8E-10	3.2E-10	2.4E-10	1.9E-10	1.6E-10	1.4E-10	1.2E-10	1.1E-10	9.5E-11
F	2.4E-09	1.2E-09	8.0E-10	6.0E-10	4.8E-10	4.0E-10	3.4E-10	3.0E-10	2.7E-10	2.4E-10
G	5.5E-09	2.8E-09	1.8E-09	1.4E-09	1.1E-09	9.2E-10	7.9E-10	6.9E-10	6.1E-10	5.5E-10

NOTE A duration of 4 hours should be used when the release duration is unknown.

[9] OBTAIN and RECORD the estimated duration of the release in hours from the SM.

[10] CALCULATE the Tritium TEDE dose at .62 and 5 by multiplying the Tritium release rate x TEDE factor x Release duration = Tritium TEDE Dose.

Tritium TEDE DOSES

Distance	Tritium Release Rate µCi/s	Tritium TEDE Factor	Release Duration hour(s)	Tritium TEDE Dose (REM)
0.62				
5.0				

Prepared by:_____

Date/Time:_____

APPENDIX B - MANUAL ASSESSMENT OF MONITORED GASEOUS RELEASES

(Page 3 of 8)

NOTE Appendix J may be referred to during periods when the Meteorological data is unavailable.

[11] OBTAIN Stability Class from the MET DATA screen on ICS or from the SQN control room (843-7860) and CIRCLE the Stability Class in both tables below.

[12] IF the Stability Class cannot be obtained, THEN

DETERMINE the stability class by subtracting the 10 meter from the 46 meter temperatures and CIRCLE the stability class in both tables below.

A ≤ -1.24 B -1.11 to -1.23 C -.98 to -1.10 D -.33 to -.97 E .97 to -.32 F 2.59 to .98 G ≥ 2.6

[13] OBTAIN the wind speed in mph from the 46 meter height and CIRCLE the appropriate range for the wind speed in both tables below.

[14] CIRCLE the appropriate Noble Gas TEDE factors for each distance in the tables below based on the wind speed and stability class obtained in the above steps.

0.62 Miles Noble Gas TEDE Factors

Stability Class	<2.2 mph	>2.2 <=4.4 mph	>4.4 <=6.6 mph	>6.6 <=8.8 mph	>8.8 <=11 mph	>11 <=13.2 mph	>13.2 <=15.4 mph	>15.4 <=17.6 mph	>17.6 <=19.8 mph	>19.8 mph
A	6.0E-10	3.0E-10	2.0E-10	1.5E-10	1.2E-10	1.0E-10	8.6E-11	7.5E-11	6.7E-11	6.0E-11
B	2.1E-09	1.1E-09	7.0E-10	5.3E-10	4.2E-10	3.5E-10	3.0E-10	2.6E-10	2.3E-10	2.1E-10
C	4.6E-09	2.3E-09	1.5E-09	1.2E-09	9.2E-10	7.7E-10	6.6E-10	5.8E-10	5.1E-10	4.6E-10
D	9.5E-09	4.8E-09	3.2E-09	2.4E-09	1.9E-09	1.6E-09	1.4E-09	1.2E-09	1.1E-09	9.5E-10
E	1.4E-08	7.0E-09	4.7E-09	3.5E-09	2.8E-09	2.3E-09	2.0E-09	1.8E-09	1.6E-09	1.4E-09
F	2.1E-08	1.1E-08	7.0E-09	5.3E-09	4.2E-09	3.5E-09	3.0E-09	2.6E-09	2.3E-09	2.1E-09
G	3.5E-08	1.8E-08	1.2E-08	8.8E-09	7.0E-09	5.8E-09	5.0E-09	4.4E-09	3.9E-09	3.5E-09

5 Miles Noble Gas TEDE Factors

Stability Class	<2.2 mph	>2.2 <=4.4 mph	>4.4 <=6.6 mph	>6.6 <=8.8 mph	>8.8 <=11 mph	>11 <=13.2 mph	>13.2 <=15.4 mph	>15.4 <=17.6 mph	>17.6 <=19.8 mph	>19.8 mph
A	9.5E-11	4.8E-11	3.2E-11	2.4E-11	1.9E-11	1.6E-11	1.4E-11	1.2E-11	1.1E-11	9.5E-12
B	1.5E-10	7.5E-11	5.0E-11	3.8E-11	3.0E-11	2.5E-11	2.1E-11	1.9E-11	1.7E-11	1.5E-11
C	2.8E-10	1.4E-10	9.3E-11	7.0E-11	5.6E-11	4.7E-11	4.0E-11	3.5E-11	3.1E-11	2.8E-11
D	9.5E-10	4.8E-10	3.2E-10	2.4E-10	1.9E-10	1.6E-10	1.4E-10	1.2E-10	1.1E-10	9.5E-11
E	1.8E-09	9.0E-10	6.0E-10	4.5E-10	3.6E-10	3.0E-10	2.6E-10	2.3E-10	2.0E-10	1.8E-10
F	3.5E-09	1.8E-09	1.2E-09	8.8E-10	7.0E-10	5.8E-10	5.0E-10	4.4E-10	3.9E-10	3.5E-10
G	6.5E-09	3.3E-09	2.2E-09	1.6E-09	1.3E-09	1.1E-09	9.3E-10	8.1E-10	7.2E-10	6.5E-10

APPENDIX B - MANUAL ASSESSMENT OF MONITORED GASEOUS RELEASES

NOTE RCS fuel damage should be used when the fuel damage is unknown.

[15] DETERMINE and CIRCLE the TEDE ratio based on the release path and type of fuel damage for both 0.62 and 5 mile distances using the table below.

NOTE The SM may be able to assist in determining the release paths and type of fuel damage.

Release Paths

Containment leak filtered
Containment leak unfiltered or SGTR below the water
Turbine, Reactor, or Auxiliary Building
SGTR above the water

Type of Fuel Damage

Normal reactor coolant system
Fuel clad gap
Core damage (fuel over temp)
Fuel melt

0.62 Mile TEDE Ratios

	RCS	Gap	Core Damage	Fuel Melt
CNTMT (filtered)	3.7	1.0	0.9	1.0
CNTMT (unfiltered) or SGTR (below)	7.4	9.0	5.3	11
Turbine, Reactor, or Auxiliary Building	17	32	16	37
SGTR (above)	95	221	111	263

5 Miles TEDE Ratios

	RCS	Gap	Core Damage	Fuel Melt
CNTMT (filtered)	1.8	1.0	1.0	1.0
CNTMT (unfiltered) or SGTR (below)	3.5	4.9	2.9	5.8
Turbine, Reactor, or Auxiliary Building	7.4	15	7.9	17
SGTR (above)	43	100	51	116

[16] IF ICS is unavailable, THEN

NOTIFY the SM that Appendix D must be performed by RADCON/Chemistry personnel in TSC.

[17] IF Radiation Monitor data is unavailable or the release is not monitored, THEN use Appendix C to determine the noble gas release rate.

APPENDIX B - MANUAL ASSESSMENT OF MONITORED GASEOUS RELEASES

[18] COMPLETE the following NG TEDE Dose table for both 0.62 and 5 mile as follows:

[a] OBTAIN and RECORD the Noble Gas release rate from ICS EFF1 or appropriate appendix.

[b] RECORD the NG TEDE Factors determined in step [14].

[c] RECORD the TEDE Ratios determined in step [15].

NOTE A duration of 4 hours should be used when the release duration is unknown.

[d] OBTAIN and RECORD the estimated duration of the release in hours from the SM or if the release is unmonitored use release duration associated with accident type from Appendix C.

[e] CALCULATE the TEDE dose at .62 and 5 by multiplying the NG release rate x TEDE Factor x TEDE Ratio x Release Duration = NG TEDE Dose.

Noble Gas TEDE DOSES

Distance	Noble Gas Release Rate µCi/s	Noble Gas TEDE Factor	TEDE Ratio	Release Duration hour(s)	Noble Gas TEDE Dose (REM)
0.62					
5.0					

[19] COMPLETE the following Total TEDE Dose table for both 0.62 and 5 mile as follows:

[a] OBTAIN and RECORD the tritium TEDE Dose (REM).

[b] OBTAIN and RECORD the noble gas TEDE Dose (REM).

[c] ADD the Tritium and Noble Gaseous TEDE Doses.

TOTAL TEDE DOSES

Distance	Tritium TEDE Dose (REM)	Noble Gas TEDE Dose (REM)	Total TEDE (REM)
0.62			
5.0			

Prepared by:_____

Date/Time:_____

APPENDIX B - MANUAL ASSESSMENT OF MONITORED GASEOUS RELEASES

NOTE Appendix J may be referred to during periods when the Meteorological data is unavailable.

[20] **OBTAIN** Stability Class from the MET DATA screen on ICS or from the SQN control room (843-7860) and **CIRCLE** the Stability Class in both tables below.

[21] **IF** the Stability Class cannot be obtained, **THEN**

DETERMINE the stability class by subtracting the 10 meter from the 46 meter temperatures and **CIRCLE** the stability class in both tables below.

A ≤ -1.24 **B** -1.11 to -1.23 **C** -.98 to -1.10 **D** -.33 to -.97 **E** .97 to -.32 **F** 2.59 to .98 **G** ≥ 2.6

[22] **OBTAIN** the wind speed in mph from the 46 meter height and **CIRCLE** the appropriate range for the wind speed in both tables below.

[23] **CIRCLE** the appropriate CDE Factors for each distance in the tables below based on the wind speed and stability class obtained in the above steps.

0.62 Miles CDE Factors

Stability Class	<2.2 mph	>2.2 <=4.4 mph	>4.4 <=6.6 mph	>6.6 <=8.8 mph	>8.8 <=11 mph	>11 <=13.2 mph	>13.2 <=15.4 mph	>15.4 <=17.6 mph	>17.6 <=19.8 mph	>19.8 mph
A	1.2E-05	6.0E-06	4.0E-06	3.0E-06	2.4E-06	2.0E-06	1.7E-06	1.5E-06	1.3E-06	1.2E-06
B	5.8E-05	2.9E-05	1.9E-05	1.5E-05	1.2E-05	9.7E-06	8.3E-06	7.3E-06	6.4E-06	5.8E-06
C	1.7E-04	8.5E-05	5.7E-05	4.3E-05	3.4E-05	2.8E-05	2.4E-05	2.1E-05	1.9E-05	1.7E-05
D	4.8E-04	2.4E-04	1.6E-04	1.2E-04	9.6E-05	8.0E-05	6.9E-05	6.0E-05	5.3E-05	4.8E-05
E	8.3E-04	4.2E-04	2.8E-04	2.1E-04	1.7E-04	1.4E-04	1.2E-04	1.0E-04	9.2E-05	8.3E-05
F	1.6E-03	8.0E-04	5.3E-04	4.0E-04	3.2E-04	2.7E-04	2.3E-04	2.0E-04	1.8E-04	1.6E-04
G	3.5E-03	1.8E-03	1.2E-03	8.8E-04	7.0E-04	5.8E-04	5.0E-04	4.4E-04	3.9E-04	3.5E-04

5 Miles CDE Factors

Stability Class	<2.2 mph	>2.2 <=4.4 mph	>4.4 <=6.6 mph	>6.6 <=8.8 mph	>8.8 <=11 mph	>11 <=13.2 mph	>13.2 <=15.4 mph	>15.4 <=17.6 mph	>17.6 <=19.8 mph	>19.8 mph
A	2.0E-06	1.0E-06	6.7E-07	5.0E-07	4.0E-07	3.3E-07	2.9E-07	2.5E-07	2.2E-07	2.0E-07
B	2.5E-06	1.3E-06	8.3E-07	6.3E-07	5.0E-07	4.2E-07	3.6E-07	3.1E-07	2.8E-07	2.5E-07
C	5.0E-06	2.5E-06	1.7E-06	1.3E-06	1.0E-06	8.3E-07	7.1E-07	6.3E-07	5.6E-07	5.0E-07
D	2.2E-05	1.1E-05	7.3E-06	5.5E-06	4.4E-06	3.7E-06	3.1E-06	2.8E-06	2.4E-06	2.2E-06
E	4.7E-05	2.4E-05	1.6E-05	1.2E-05	9.4E-06	7.8E-06	6.7E-06	5.9E-06	5.2E-06	4.7E-06
F	1.2E-04	6.0E-05	4.0E-05	3.0E-05	2.4E-05	2.0E-05	1.7E-05	1.5E-05	1.3E-05	1.2E-05
G	2.7E-04	1.4E-04	9.0E-05	6.8E-05	5.4E-05	4.5E-05	3.9E-05	3.4E-05	3.0E-05	2.7E-05

APPENDIX B - MANUAL ASSESSMENT OF MONITORED GASEOUS RELEASES

NOTE 1 RCS fuel damage should be used when the fuel damage is unknown.

NOTE 2 The SM may be able to assist in determining the release paths and type of fuel damage.

[24] DETERMINE and CIRCLE the Iodine to Noble Gas ratio based on the release path and type of fuel damage using the table below.

Release Paths

Containment leak filtered
Containment leak unfiltered or SGTR below the water
Turbine, Reactor, or Auxiliary Building
SGTR above the water

Type of Fuel Damage

Normal reactor coolant system
Fuel clad gap
Core damage (fuel over temp)
Fuel melt

Iodine to NG Ratios

	RCS	Gap	Core Damage	Fuel Melt
CNTMT (filtered)	1.7E-06	3.0E-05	1.2E-05	2.2E-05
CNTMT (unfiltered) or SGTR (below)	1.7E-04	3.0E-03	1.2E-03	2.2E-03
Turbine, Reactor, or Auxiliary Building	5.8E-04	1.0E-02	4.1E-03	7.7E-03
SGTR (above)	4.2E-03	8.0E-02	3.0E-02	5.5E-02

[25] IF ICS is unavailable, THEN

NOTIFY the SM that Appendix D must be performed by RADCON/Chemistry personnel in TSC.

[26] IF Radiation monitor data is unavailable or the release is not monitored, THEN
Use Appendix C to determine the noble gas release rate.

APPENDIX B - MANUAL ASSESSMENT OF MONITORED GASEOUS RELEASES

[24] COMPLETE the following CDE Dose table for both 0.62 and 5 mile as follows:

[a] OBTAIN and RECORD the Noble Gas release rate from ICS EFF1 or appropriate appendix.

[b] RECORD the CDE Factors determined in step [23].

[c] RECORD the Iodine to NG Ratios determined in step [24].

NOTE A duration of 4 hours should be used when the release duration is unknown.

[d] OBTAIN and RECORD the estimated duration of the release in hours from the SM or if the release is unmonitored use release duration associated with accident type from Appendix C.

[e] CALCULATE the CDE dose at .62 and 5 by multiplying the NG Release Rate x CDE Factor x Iodine to NG Ratio x Release Duration = CDE Dose.

CDE DOSES

Distance	Noble Gas Release Rate µCi/s	CDE Factor	Iodine to NG Ratio	Release Duration hour(s)	CDE Dose (REM)
0.62					
5.0					

Prepared by:_____

Date/Time:_____

APPENDIX C - UNMONITORED RELEASES BASED ON ACCIDENT TYPES

(Page 1 of 1)

Summary of Accident Types (Consult with SM to determine the Accident type to use.)	Duration of the Release (Hours)	Noble Gas Release Rates µCi/s
LOCA - 100% Fuel Melt(>1200F) RCS		
Containment Tech Spec allowed leakage (0.25%/24 hours)	24	1.16E+07
Containment Failure(100%/4 hours)	4	2.79E+10
LOCA - 100% Gap Activity RCS		
Containment Tech Spec allowed leakage(0.25%/24 hours)	24	6.34E+03
Containment Failure(100%/4 hours)	4	1.52E+07
LOCA - Normal RCS		
Containment Tech Spec allowed leakage(0.25%/24 hours)	24	3.40E+01
Containment Failure(100%/4 hours)	4	8.15E+04
SG Tube Rupture		
0-2 hours after the beginning of the release	2	3.87E+06
2-8 hours after the beginning of the release	6	2.14E+00
Fuel Handling - One Bundle Damaged		
Accident inside Containment with Purge fans on	2	1.89E+05
Accident outside Containment with ABGTS on	0.25	1.51E+06
Waste Gas Decay Tank Rupture		
Reg. guide 1.24 analysis	1	2.09E+07

APPENDIX D - NOBLE GAS RELEASE RATE EVALUATION

(Page 1 of 2)

NOTE 1:	If ICS is not functional and time is not available due to the ongoing emergency event, wait for the TSC to activate prior to proceeding in this appendix.

NOTE 2:	In columns A and B of this Appendix, the radiation monitor and panel number, along with the ICS or Eberline computer points necessary to obtain the data, are listed. Monitors indicating "offscale" (>10^6 cpm for monitors on panels 1 or 2-M-30) should be indicated as such.

[1] **OBTAIN** and **RECORD** the noble gas monitor readings on page 2 of this Appendix.

NOTE :	Flow rates that are less than the minimum value indicated should be reported as the minimum value.

[2] **RECORD** the effluent flow rate(s) on page 2 of this Appendix.

[3] **IF** flow instrumentation is inoperable, **THEN**

OBTAIN flow estimates using Appendix H.

[4] **CALCULATE** the noble gas release rates on page 2 of this Appendix.

[5] **SUM** the noble gas release rates, **AND**

RECORD the gaseous noble gas release rate total on page 2 of this Appendix.

[6] **TRANSFER** the gaseous noble gas release rate to Appendix G.

APPENDIX D - NOBLE GAS RELEASE RATE EVALUATION
(Page 2 of 2)

Release Point	Effluent Noble Gas Monitor Reading	Effluent Flow Rate (cfm)	Monitor Conversion Factor	Noble Gas Release Rate (µCi/s)	Monitor Read Date/Time
	A	B	C	D = AxBxC	
Aux. Bldg. Vent (0-M-12)	_____ cpm 0-RM-90-101B R0020A	_____ 0-PNL-90-L397[3] F2704A (Min.141,000 cfm)	1.82E-05[1]		____/____
Service Building Vent (0-M-12)	_____ cpm 0-RM-90-132B R0011A	_____ 0-PNL-90-L399[3] F2702A (Min.3,000 cfm)	1.82E-05[1]		____/____
U1 Shield Building Vent (1-M-30)	_____µCi/cc 1-RI-90-400 (EFF)	_____ 1-FI-90-400 (1-M-9) 1-PNL-90-L398 Y2203A (Min.3300 cfm)	472[2]	_____µCi/s 1-RI-90-400 (Low, Mid, High) R9101A	____/____
U2 Shield Building Vent (2-M-30)	_____µCi/cc 2-RI-90-400 (EFF)	_____ 2-FI-90-400 (2-M-9) 2-PNL-90-L398 F9015A (Min.3300 cfm)	472[2]	_____µCi/s 2-RI-90-400 (Low, Mid, High) R9102A	____/____
U1 Condenser Vacuum Exhaust (CVE) (0-M-12)	_____ cpm 1-RM-90-119 R0001A (low rng)	_____ 1-FE-2-256[3] F2700A (Min.21 cfm)	1.82E-05[1]		____/____
NOTE: If 1-RM-90-119 is onscale, stop here. If monitor is offscale, proceed to next row.					
U1 Condenser Vacuum Exhaust (CVE) (1-M-31)	_____ cpm 1-RM-90-450 (Data) Channel 13-01 R9061A	_____ 1-FE-2-256[3] F2700A (Min.21 cfm)	From table below		____/____
NOTE: If Channel 13-01 is onscale, stop here. If monitor is offscale, proceed to next row					
U1 Condenser Vacuum Exhaust (CVE) (1-M-31)	_____ cpm 1-RM-90-450 (Data) Channel 13-03 R9062A	_____ 1-FE-2-256[3] F2700A (Min.21 cfm)	From table below		____/____
			Total		

CVE Accident Monitor Calibration Factors x 472 cc/s/cfm for Various Times (T) Post-Accident

T = Hours	T=0	T=1	T=8	T=16	T=24	T=48	T=168
1-RM-90-450 (Channel 13-01)	5.48E-04	1.04E-03	2.75E-03	4.77E-03	1.60E-02	1.23E-02	1.81E-02
1-RM-90-450 (Channel 13-03)	9.44E-01	2.02	5.33	9.16	1.23E+01	2.23E+01	3.14E+01

1 The monitor Xe-133 efficiency multiplied by a conversion factor (472 cc/s/scfm).
2 Conversion factor of 472 cc/s/scfm.
3 No MCR indication (local indication only)

APPENDIX E - STEAM LINE RELEASE EVALUATION

(Page 1 of 2)

[1] **OBTAIN** and **RECORD** the steam line radiation monitor readings on page 2 of this Appendix.

[2] **DETERMINE** and **CIRCLE** the appropriate calibration factor listed on page 2 of this Appendix **AND**

RECORD the value on page 2 of this Appendix .

NOTE	Engineering may be consulted to determine the best estimate of steam flow during periods when ICS steam flow is unavailable.

[3] **OBTAIN** and **RECORD** the steam mass flow rates on page 2 of this Appendix.

[4] **CALCULATE** the steam line release rates on page 2 of this Appendix .

[5] **SUM** the release rates for the steam lines, and

RECORD the total steam line noble gas release rate on page 2 of this Appendix.

[6] **TRANSFER** the steam line noble gas release rate to Appendix G.

APPENDIX E - STEAM LINE RELEASE EVALUATION

(Page 2 of 2)

	Steam Line Radiation Monitor Reading	Calibration Factor (from table below)	Steam Mass Flow Rate[1]	Conversion Factor[2]	Release Rate
	(mR/hr)	(µCi/cc per mR/hr)	(lbm/hr)		(µCi/s)
	A	B	C	D	AxBxCxD
Steam Generator 1	RM-90-421B (1-M-30) RR-90-268 Pt.01 (1-M-31) R9055A			4.45	
Steam Generator 2	RM-90-422B (1-M-30) RR-90-268 Pt.02 (1-M-31) R9056A			4.45	
Steam Generator 3	RM-90-423B (1-M-30) RR-90-268 Pt.03 (1-M-31) R9057A			4.45	
Steam Generator 4	RM-90-424B (1-M-30) RR-90-268 Pt.04 (1-M-31) R9058A			4.45	
Auxiliary Feedwater Pump Turbine	RM-90-421B (1-M-30) or RM-90-424B (1-M-30)			4.45	
				Total	

1 This data is an internal ICS calculation.
2 4.45 = [cc(steam)/0.0283 g] x g/2.205E-3 lbm x hr/3600 sec

Main Steam Line Radiation Monitor Calibration Factors (CF)

Time After Shutdown (hrs)	Normal Spectrum Monitor Reading < 1000 mR/hr (µCi/cc per mR/hr)	DBA Spectrum Monitor Reading > 1000 mR/hr or Suspected Fuel Damage (µCi/cc per mR/hr)
0	3.00E-3	9.88E-5
1	5.13E-3	7.79E-4
2	6.11E-3	5.41E-3
4	7.76E-3	6.86E-3
8	1.09E-2	9.63E-3

APPENDIX F - USE OF GRAB SAMPLES FOR GASEOUS EFFLUENT EVALUATION

(Page 1 of 2)

[1] **IF** sampling analysis is required to determine the site release rates, **THEN**

REQUEST noble gas samples be obtained from applicable release points that have flow.

[2] **RECORD** sample date(s) and time(s) for applicable release point(s) on page 2 of this Appendix.

NOTE 1:	Flow rates that are less than the minimum value indicated should be reported as the minimum value.

NOTE 2:	Operations may be required to obtain flowrate for 1-FE-2-256, Condenser Vacuum Exhaust.

[3] **RECORD** the effluent flow rate(s) on page 2 of this Appendix.

[4] **IF** flow instrumentation is inoperable, **THEN**

OBTAIN flow estimates using Appendix H.

[5] **RECORD** the total noble gas concentration for applicable release point(s) on page 2 of this Appendix.

[6] **CALCULATE** the total noble gas release rate as indicated on page 2 of this Appendix .

[7] **SUM** the noble gas release rates, **AND**

RECORD the total gaseous noble gas release rate on page 2 of this Appendix.

[8] **TRANSFER** the gaseous noble gas release rate to Appendix G.

APPENDIX F - USE OF GRAB SAMPLES FOR GASEOUS EFFLUENT EVALUATION

(Page 2 of 2)

Release Point	Noble Gas Sample Date/Time	Flow Rates cfm	Total Noble Gas Concentration (µCi/cc)		Total Noble Gas Release Rate (µCi/s)
		A	B	C[1]	D = A x B x C
Auxiliary Building	_____/____	_____ 0-PNL-90-L397 EL 786, A8-V (Min.141,000 cfm)		472	
Service Building	_____/____	_____ 0-PNL-90-L399 SN EL 751, S-5 (Min. 3000 cfm)		472	
U1 Shield Building	_____/____	_____ 1-FI-90-400 1-PNL-90-L398 EL 729, AE-5 (Min. 3,300 cfm)		472	
U2 Shield Building	_____/____	_____ 2-FI-90-400 2-PNL-90-L398 EL 727, AE-11 (Min. 3,300 cfm)		472	
Condenser Vacuum Exhaust	_____/____	_____ (Min.21 cfm)		472	
				Total	

1 Conversion factor: 472 cc/s/scfm.

Performed by: _____ Date: _____

APPENDIX G - TOTAL SITE NOBLE GAS RELEASE RATE

(Page 1 of 1)

[1] **SUM** the values listed below to obtain the total site noble gas release rate.

[2] **IF** the **CECC** needs long term dose assessment **THEN**

COMPLETE and **TRANSMIT** Appendix I.

Total Site Noble Gas Release Rate

Gaseous Noble Gas Release Rate	_____ µCi/s
Steam Line and/or Auxiliary Feedwater Pump Turbine Noble Gas Release Rate	_____ µCi/s
Total Site Noble Gas Release Rate	_____ µCi/s

Performed by _____ Date _____

APPENDIX H - FLOW ESTIMATES

(Page 1 of 1)

NOTE: These values will be conservative.

[1] IF ventilation flow data is not readily obtainable, **THEN**

the maximum values in cfm from Appendix C of the REP or from DBA analysis (shown in parentheses below) may be used in the Total Flow Rate Column below.

Shield Building - Unit 1 (If 1-FI-90-400 [1-M-9] and 1-PNL-90-L398 are inoperable)			
Containment Purge air flow	(Record 14,000 per operating fan)	cfm	
EGTS air flow	(Record 8,000 if operating)	cfm	
ABGTS Fan A-A in operation.	(Record 9,900 if operating)	cfm	
PASF Ventilation	(Record 2200 if operating)	cfm	
	Total	cfm	(Max. 48,100)

Shield Building - Unit 2 (If 2-FI-90-400 [2-M-9] and 2-PNL-90-L398 are inoperable)			
ABGTS Fan B-B in operation	(Record 9,900 if operating)	cfm	(Max. 9,900)

Auxiliary Building (If 0-PNL-90-L397 [no MCR indication] is inoperable)		
Number of Auxiliary Building Exhaust Fans Operating x 84,000 [1-M-9]	cfm	
Number of Fuel Handling Area Exhaust Fans Operating x 60,000 [1-M-9]	cfm	
Total	cfm	(Max. 228,000)

Condenser Vacuum Exhaust - Unit 1 (If 1-FE-2-256 [no MCR indication] is inoperable)		
Obtain an estimate from Operations personnel (rotometer on pump)	cfm	(Max. 100)

Service Building Exhaust (If 0-PNL-L399 [no MCR indication] is inoperable)		
Enter 10,500 SCFM for Service Building Exhaust	cfm	(Max. 10,500)

APPENDIX I - CECC LONG TERM DOSE ASSESSMENT

(Page 1 of 1)

Iodine and Particulate Release Concentrations

[1] **IF** site iodine and particulate concentrations are required, **THEN**

REQUEST Chem Lab to obtain samples from applicable release points.

[2] **RECORD** the applicable information in the table below.

[3] **COMPLETE** and **TRANSMIT** Appendix I to the CECC.

Release Point	Flow Rate (cfm) A	I-131 Concentration (µCi/cc) B	Particulate Concentration (µCi/cc) C
Auxiliary Building			
Service Building			
U1 Shield Building			
U2 Shield Building			
Condenser Vacuum Exhaust			
Total			

Iodine and Particulate Release Fractions

Noble Gas Release Rate (µCi/s) (1) D	I-131 Release Rate (µCi/s) E = A * B * 472	I-131 Fraction E/D	Particulate Release Rate (µCi/s) F = A * C * 472	Particulate Fraction F/D

(1) From App. B or App. G

Performed by: _____ Date: _____

APPENDIX J - LOSS OF METEOROLOGICAL DATA

1.0 PURPOSE

This Appendix provides instructions to ensure appropriate actions are taken by the Shift Manager (SM) for Main Control Room outages of onsite meteorological data.

2.0 RESPONSIBILITY

Daily meteorological channel checks are performed by the SM to verify operability.

If an outage is detected, the SM shall take necessary actions to check backup displays, track the outage, and to initiate repair request.

Emergency Planning (EP) Field Support is responsible for operating the meteorological data system and for making the data signal available to the plant.

3.0 MINIMUM REQUIREMENTS

A. The Offsite Dose Calculation Manual (ODCM) requires that two of three wind speed channels, two of three wind direction channels, and one of three air temperature differences be operable at all times to support estimation of routine and accident doses. A special report to the NRC is to be prepared for outages of more than seven (7) days.

B. Emergency action level event (5.2 tornado) and protective action decision making of the Radiological Emergency Plan (REP) require use of meteorological data.

C. R.G. 1.23 "Onsite Meteorological Programs" and ANSI/ANS Standard 3.11-2000 "Determining Meteorological Information at Nuclear Facilities" require a 90 percent annual joint data recovery rate of valid wind speed, wind direction and temperature difference.

LOSS OF METEOROLOGICAL DATA

NOTE I&C should be contacted to fix any problem associated with the ICS display.

[1] **IF** Met data is unavailable in the Main Control Room or from the ICS Terminals in the TSC and OSC (METDATA), **THEN**

OBTAIN Met Data from the MET Tower using the CECC computer terminal in the TSC per Appendix J (page 3 of 4) of this Procedure.

[2] **IF** the minimum required data listed in Section 3.0 is not available from these methods, **THEN**

DECLARE the system inoperable and begin appropriate tracking, **AND**

NOTIFY EP Field Support (normal business hours or next working day, whichever is applicable) at x8450.

[3] **IF** specific Met data is still needed (i.e., EPIP-1, emergency action levels), **THEN**

the remaining steps for obtaining data should be used in the following order:

[a] **CALL** the SQN Control Room (843-7860) and request the needed meteorological information.

[b] **REQUEST** the Operations Duty Specialist (ODS) to page the duty CECC Meteorologist. The CECC Meteorologist has backup procedures to estimate missing data using established relationships between onsite data and other sources of data.

NOTE This information obtained in step [c] will be from the 10 meter elevation but is still usable.

[c] **CALL** the Morristown National Weather Service at 9-1-(423)-586-8400 and **REQUEST** the wind speed and wind direction.

[4] **DOCUMENT** the closure of any tracking initiated, **AFTER** notification that the Met Tower outage is completed.

APPENDIX J

(Page 3 of 4)

TSC CECC COMPUTER AND PRINTER USE

[1] **ENSURE** computer terminal is energized (switch is located in front). ☐

[2] **PRESS** the "Return" key twice (repeat step if necessary). ☐

[3] **TYPE** "WBMET" at the "Username" prompt **AND**

PRESS "Return". ☐

NOTE The printer will print the MET data and log off the computer.

[4] **TYPE** "TSC" at the "Password" prompt **AND**

PRESS "Return". ☐

[5] **REPEAT** step 2 through 4 for additional MET data as needed.

APPENDIX J
(Page 4 of 4)

EXAMPLE REPORT
WATTS BAR NUCLEAR PLANT
METEORLOGICAL DATA

DATE: 4-OCT-01 TIME: 11:30:48 (Central)
REF: 49 LOCATION: CECC COMPUTER

DESCRIPTION	INSTRUMENT	TS LIMIT	DATA (Last 15 min)
WIND SPEED	10m Elevation 46m Elevation 91m Elevation	Operable and Channel Check	3.5 mph 5.4 mph 6.3 mph
WIND DIRECTION	10m Elevation 46m Elevation 91m Elevation		233.7 deg 222.4 deg 219.3 deg
AIR Delta T	10 to 46m 10 to 91m 46 to 91m		1.1 F* 1.9 F* 0.9 F*

* To calculate Delta T, subtract the Lower elevation temperature value from the higher elevation temperature value (ex: (91m value) - (10m value)).

Performers Initials _____ SROs Initials _____