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9.1	Emergency Public Information Emergency Response Organization Controlling Procedure	Revision 11
9.2	Reserved	
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9.5	Activation, Operation and Deactivation of the Penn Power Customer Account Services Department	Revision 7
<b>EPP/IP</b>	<b><u>10 Series - Corporate Response</u></b>	
10.1	Emergency Response Organization Corporate Support	Revision 3



**EPP/IMPLEMENTING PROCEDURES - EFFECTIVE INDEX****EPP/IP      ANNEXES**

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Annex B -	DELETED	
Annex C -	Major Injury Involving Radioactive Contamination For The Medical Center, Beaver	Revision 9
Annex D -	Procedure for Transferring Radiation Casualties to the Radiation Emergency Response Program (UPMC Presbyterian)	Revision 8
Annex E -	Reserved	

**RECOGNITION AND CLASSIFICATION**  
**OF EMERGENCY CONDITIONS**

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BVPS UNIT 1**

**EFFECTIVE INDEX**

Issue 8 Rev.	0	OSC Approved	3-12-87
	1	OSC Approved	8-13-87
	2	OSC Approved	10-8-87
	3	OSC Approved	2-9-88
	4	OSC Approved	2-9-89
	5	Non-Safety Related	3-15-89
	6	OSC Approved	4-18-89
	7	OSC Approved	4-12-90
Issue 9 Rev.	0	Non-Intent Revision	10-9-90
	1	OSC Approved	4-4-91
	2	Non-Intent Revision	12-29-92
	3	OSC Approved	1-27-93
Rev.	5	OSC Approved	12-9-93
	6	OSC Approved	10-7-94
	7	OSC Approved	7-22-98
	8	Non-Intent Revision	12-31-99
Rev.	0	OSC Approved	4-17-01
Rev.	1	Non-Intent Revision	12-12-01
Rev.	2	Simple Change	8-28-02
Rev.	3	Simple Change	11-8-02
Rev.	4	Simple Change	2-25-03

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- A. Purpose
- B. References
- C. Responsibilities
- D. Action Levels/Precautions
- E. Procedure
- F. Final Condition
- G. Attachments

**A. PURPOSE**

- 1.0 This procedure describes the immediate actions to be taken to recognize and classify an emergency condition.
- 2.0 This procedure identifies the four emergency classifications and emergency action levels.
- 3.0 Reporting requirements for non-emergency abnormal events are provided.

**B. REFERENCES**

- 1.0 Beaver Valley Power Station Emergency Preparedness Plan and Implementing Procedures.
- 2.0 Title 10, Code of Federal Regulations Part 50, Appendix E.
- 3.0 NUREG-0654/FEMA-REP-1, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants
- 4.0 Beaver Valley Power Station Operating Manual
- 5.0 NUMARC/NESP-007, Methodology for Development of Emergency Action Levels
- 6.0 ERS-SFL-91-041-REV 1 (U1/U2 Containment Monitor Readings due to LOCA's with various Source Terms).
- 7.0 Condition Report #992522
- 8.0 Condition Report #991327-1
- 9.0 Unit 1 Technical Specification Amendment 204 and Unit 2 Technical Specification Amendment 101.
- 10.0 EPPOS #2 "Emergency Preparedness Position (EPPOS) on Timeliness of Classification of Emergency Conditions".
- 11.0 NEI 99-02 "Regulatory Assessment Performance Indicator Guideline"
- 12.0 Condition Report #00-3939
- 13.0 Condition Report #99-1234
- 14.0 Condition Report #02-02125-02
- 15.0 Condition Report #02-05069
- 16.0 Unit 1 Technical Specification Amendment 244

- 17.0 Calculation Package No. ERS-ATL-93-021
- 18.0 ODCM Procedure 1/2-ODC-2.01
- 19.0 Calculation Package No. ERS-HHM-87-014
- 20.0 Calculation Package No. ERS-SFL-86-005
- 21.0 Calculation Package No. ERS-SFL-99-014
- 22.0 Condition Report #02-08649
- 23.0 Condition Report #02-09224

**C. RESPONSIBILITY**

The Emergency Director (Shift Manager, until properly relieved by a designated alternate) has the responsibility and authority for the performance of the actions prescribed in this procedure.

**D. ACTION LEVELS/PRECAUTIONS/GUIDANCE**

**1.0 ACTION LEVELS**

- 1.1 An off-normal event has occurred.
- 1.2 An action step in a plant operating or emergency operating procedure refers to this procedure for classification of the indicated plant condition.

**2.0 PRECAUTIONS**

- 2.1 The Emergency Director must review all applicable EALs to ensure that the event is properly classified since a given INDICATOR may be associated with more than one CRITERION. A particular INDICATOR omitted from the fission product barrier matrix may be addressed as an event-based EAL in one of the other tabs. Event-based EALs may escalate to the fission product barrier matrix. The Emergency Director may need to consider related events (*e.g., fire and explosion*) or the possible consequences of the event (*e.g., fire in an MCC resulting in loss of AC*) in classifying an event.
- 2.2 Continued surveillance and assessment of plant conditions are necessary to ensure that the emergency classification is appropriately revised as conditions change, or as more definitive information is obtained.
- 2.3 If there is any doubt with regard to assessment of a particular EAL, the EAL Basis Document (*i.e., Chapter 4 of the EPP*) entry for that EAL can be reviewed. Classifications shall be consistent with the fundamental definitions of the four emergency classifications (tabulated in Tab 4.7).

- 2.4 The Emergency Director shall take whatever mitigative or restoration actions are necessary to protect public health and safety. The Emergency Director shall not reject courses of action solely on the basis that the action would result in escalation of the emergency classification.

### 3.0 GUIDANCE

#### 3.1 Structure of the EALs

- 3.1.1 There are two types of Emergency Action Levels included in this procedure:

3.1.1.1 Barrier-Based EALs: These EALs address conditions that represent potential losses, or losses, of one or more of the Fuel Clad, RCS, or Containment fission product barriers. INDICATORS of these conditions include CRITICAL SAFETY FUNCTION status, fundamental indications such as subcooling or reactor vessel water level, or auxiliary indications such as containment radiation monitor readings. Classifications are based on the number of barriers lost or potentially lost.

3.1.1.2 Event-Based EALs: These EALs address discrete conditions or events that are generally precursors to fission product barrier degradation, or are otherwise degradations in the level of safety of the plant. Events may be external (*e.g., severe weather, earthquakes, loss of offsite power*) internal (*e.g., fires, explosions, instrumentation failure*) or may involve radioactivity releases.

- 3.1.2 The EALs are grouped by recognition category as follows:

Tab 1	Fission Product Barrier Matrix
Tab 2	System Degradation
Tab 3	Loss of Power
Tab 4	Hazards and ED Judgement
Tab 5	Destructive Phenomena
Tab 6	Shutdown Systems Degradation
Tab 7	Radiological

- 3.1.3 Each of the EAL tabs includes one or more columns that address one initiating condition (*e.g., fires*). Each column provides EALs for each of the four emergency classifications, as applicable. A notation adjacent to each EAL identifies the plant operating mode(s) for which the EAL is applicable.

- 3.1.4 Each EAL is comprised of a **CRITERION**, printed in bold type, and one or more **INDICATORS**. The purpose of each is as follows:
- 3.1.4.1 **CRITERION**: identifies the emergency condition and any numeric values which define that condition (*i.e., the basis of the declaration*) All classifications are based on an assessment (*i.e., determination that the condition is VALID*) by the Emergency Director that the **CRITERION** has been met or exceeded. Implicit in this protocol is the necessity for these assessments to be completed within 15 minutes (unless otherwise noted) of indications being available to Control Room operators that an Emergency Action Level (EAL) has been exceeded.
  - 3.1.4.2 **INDICATOR**: is available via instrumentation, calculations, procedure Entry (AOPs, EOPs, etc.), operator knowledge of plant conditions (pressure, temperatures, etc.) in the Control Room, or reports received from plant personnel, whichever is most limiting, or other evidence that the associated criterion may be exceeded. Upon occurrence of one or more indicators, the Emergency Director performs an assessment against the criterion. Depending on the particular condition, this assessment may be as simple as a review of the criterion, an instrument channel check, or a detailed calculation as in the case of a radioactivity release.
  - 3.1.4.3 Inherent in this protocol is the necessity for these assessments to be completed within 15 minutes (unless otherwise noted) of sufficient indications being available to Control Room operators that an Emergency Action Level (EAL) has been exceeded.
  - 3.1.4.4 The **INDICATORS** were selected with the objective of providing unambiguous guidance to assist with assessment of the **CRITERION**. There may be other **INDICATORS** not envisioned by the writers of this procedure that, in the judgment of the Emergency Director, correspond to the **CRITERION**. In these cases, the Emergency Director should base the declaration on engineering judgment, using the supplied **INDICATORS** as examples of the severity of the condition.



3.2 Common Plant Conditions

- 3.2.1 IF an event occurs such that both reactor units are affected, e.g., tornado, toxic gas offsite, etc., THEN the senior Shift Manager shall make the appropriate classification and assume the role of Emergency Director.
- 3.2.2 IF the common plant condition results in a higher emergency classification at one reactor unit, THEN the Shift Manager from that unit shall make the appropriate classification and assume the role of Emergency Director.

3.3 Mode Applicability

- 3.3.1 The plant operating mode that existed at the time that the event occurred, prior to any protective system or operator action initiated in response to the condition, is compared to the mode applicability of the EALs.
- 3.3.2 IF an event occurs, and a lower or higher plant operating mode is reached before the classification can be made, THEN the classification shall be based on the mode that existed at the time that the event occurred.
- 3.3.3 The fission product barrier matrix is applicable only to those events that occur at mode 4 or higher. An event that occurs in modes 5 or 6 shall not be classified using the fission product barrier matrix, even if mode 4 is entered due to subsequent heatup. In these cases, Tab 6, Shutdown Systems Degradation, shall be used for classification.

3.4 Transient Events

- 3.4.1 For some EALs the existence of the event, without regard to duration, is sufficient to warrant classification. In these cases, the appropriate emergency classification is declared as soon as the Emergency Director assessment concludes that the CRITERION is met.
- 3.4.2 Some EALs specify a duration of occurrence. For these EALs the classification is made when Emergency Director assessment concludes that the specified duration is exceeded or will be exceeded (*i.e., condition can not be reasonably rectified before the duration elapses*), whichever is sooner.

- 3.4.3 IF a plant condition meeting an EAL CRITERION is rectified before the specified duration time is exceeded, THEN the event is NOT classified by that EAL. Lower severity EALs, if any, shall be reviewed for possible applicability in these cases.
- 3.4.4 IF a plant condition meeting an EAL CRITERION is NOT classified at the time of occurrence, but is identified well after the condition has occurred (e.g., as a result of routine log or record review) AND the condition no longer exists, THEN an emergency shall NOT be declared. However, reporting under 10 CFR 50.72 may be required. Such a condition could occur, for example, if a followup evaluation of an abnormal condition uncovers evidence that the condition was more severe than earlier believed.
- 3.4.5 IF an emergency classification was warranted, but the plant condition has been rectified (such that the CRITERION is no longer met) prior to declaration and notification, THEN the following guidance applies:
- 3.4.5.1 For transient events that would have been declared as UNUSUAL EVENTS, no emergency is declared. However, the event shall be reported to those local, state, and Federal agencies designated to receive the initial notification form. These agencies shall be told that the UNUSUAL EVENT condition was rectified upon detection and no emergency is being declared.
- 3.4.5.2 For transient events that would have been declared as an ALERT, SITE AREA EMERGENCY, or GENERAL EMERGENCY, the event shall be declared and the emergency response organization activated. The EAL CRITERIA for these events has been set at a threshold that warrants declaration even if the initiating condition has been rectified. Termination can occur when the criteria of EPP/IP-6.2, *Termination of the Emergency and Recovery* can be satisfied.
- 3.5 Declaration Timing and Assessment
- Emergency conditions shall be classified as soon as the Emergency Director assessment of the INDICATORS shows that the CRITERION is met. IF the EAL specifies a duration, THEN the event shall be declared as soon as it is determined that the condition cannot be corrected within the specified period. In either case, the assessment time starts from the indications being available to Control Room operators that an Emergency Action Level (EAL) has been exceeded.

3.5.1 The assessment time is limited to 15 minutes, except as follows:

3.5.1.1 IF the EAL specifies a duration (*e.g., release exceeds 2x T/S for one hour*), THEN the assessment time runs concurrently with the required duration AND is the same length (*e.g., in this example, one hour*).

3.5.1.2 The assessment time and any required duration are NOT additive.

3.5.2 IF the assessment cannot be completed within the specified period, THEN the event must be declared on the basis of INDICATORS that cannot be reasonably discounted.

3.6 Bases

3.6.1 Chapter 4 of the BVPS EPP provides the bases for these EALs. The bases can be used for guidance to assist the Emergency Director in classifying events for which the classification is not immediately apparent.

3.7 Defined Terms

3.7.1 In the EALs, words written in bold uppercase letters are defined terms having specific meanings as they relate to this procedure. Definitions of these terms are provided on the reverse side of most pages in the EAL section of this procedure. Such terms shall be interpreted as provided in the definitions.

E. PROCEDURE

1.0 DETERMINE OPERATING MODE THAT EXISTED AT THE TIME THAT THE EVENT OCCURRED PRIOR TO ANY PROTECTION SYSTEM OR OPERATOR ACTION INITIATED IN RESPONSE TO THE EVENT.

2.0 DETERMINE IF THE CONDITION AFFECTS FISSION PRODUCT BARRIERS AND, IF SO, PROCEED TO TAB 1.

2.1 IF the condition involves any of the following AND the initial mode was 1-4 THEN proceed to Tab 1 and follow instructions provided AND continue with Step 2.2.

2.1.1 CSF status tree ORANGE PATH or RED PATH conditions

2.1.2 Core exit thermocouple readings above 719 F

- 2.1.3 Reactor vessel full range water level less than 40% (no RCPs)
  - 2.1.4 Elevated RCS activity >300  $\mu\text{Ci/gm}$
  - 2.1.5 Elevated Containment High Range Area Radiation Monitor reading
  - 2.1.6 RCS leakrate large enough to require a 2nd charging pump
  - 2.1.7 Loss of RCS subcooling
  - 2.1.8 Steam Generator Tube Rupture
  - 2.1.9 Containment bypass or loss of integrity
  - 2.1.10 Rise in containment pressure or hydrogen concentration
- 2.2 Consider other related event-based EALs. IF other EALs are applicable, THEN perform Steps 3.0 and 4.0 if necessary. Otherwise, go to Step 5.0
- 3.0 CATEGORIZE THE EVENT INTO ONE OF THE INITIATING CONDITIONS AND LOCATE THE TAB.
- 3.1 Locate one of the EAL indices provided at the start of each tab.
  - 3.2 Review the index to identify the tab that addresses the event that has occurred.
  - 3.3 Turn to the appropriate tab.

**NOTE:**

The assessment of an emergency condition shall be completed as soon as possible and within 15 minutes of the occurrence of one or more INDICATORS. IF the assessment cannot be completed within the specified period, THEN the event must be declared on the basis of INDICATORS that cannot be reasonably discounted.

**NOTE:**

IF the EAL specifies a duration (*e.g., release exceeds 2x T/S for one hour*), THEN the assessment time runs concurrently with the required duration AND is the same length.

4.0 ASSESS THE EVENT AND COMPARE TO THE EALS

- 4.1 Locate the EAL for the highest severity emergency classification that is applicable for the initiating condition and operating mode
- 4.2 Review the INDICATORs and CRITERION for that EAL
- 4.3 IF the specified INDICATORs are not observed, THEN:
  - 4.3.1 Proceed to the next lower severity EAL and re-perform step 4.2 & 4.3.
  - 4.3.2 IF none of the EALs for an initiating condition are met, THEN re-perform steps 3.0 and 4.0 for related initiating conditions.
  - 4.3.3 IF the actions above do not identify an applicable EAL, THEN review the observed conditions against Tab 4.7, Hazards and Emergency Director Judgment.
  - 4.3.4 IF, after performing the above, no EAL is identified, THEN proceed to step 6.0.
- 4.4 IF the specified INDICATORs are observed, THEN:
  - 4.4.1 Perform necessary assessments to validate the instrument readings and/or confirm reported observations.
  - 4.4.2 Initiate any sampling, inspections, or dose assessments specified by the EAL.

**NOTE:**

IF the CRITERION specifies an event or condition duration, THEN the classification shall be made as soon as the duration is exceeded, OR when it is apparent that the duration will be exceeded, whichever is earlier.

- 4.4.3 Compare the results of the assessments to the CRITERION.

**NOTE**

A given INDICATOR may apply to more than one CRITERION. The Emergency Director shall review other related EALs for applicability.

- 4.5 IF the assessment concludes that the CRITERION is met, THEN the classification shall be made. Proceed to Step 5.0
- 4.6 IF the assessment concludes that the CRITERION is not met, THEN re-perform steps 3.0 and 4.0 for other related initiating conditions as applicable.
- 4.7 IF no classification results from the above, THEN proceed to step 6.0.

**NOTE:**

The declaration of the emergency classification shall be made as soon as the Emergency Director has assessed that the EAL has been met OR will be met, AND within 15 minutes of occurrence of the INDICATOR. Once the emergency is classified, notifications to state and local governments shall be completed within 15 minutes of the declaration.

5.0 DECLARE THE EMERGENCY CLASSIFICATION AND TRANSITION TO RESPONSE PROCEDURES

- 5.1 IF an UNUSUAL EVENT is declared, THEN proceed to EPP/I-2
- 5.2 IF an ALERT is declared, THEN proceed to EPP/I-3
- 5.3 IF a SITE AREA EMERGENCY is declared, THEN proceed to EPP/I-4
- 5.4 IF a GENERAL EMERGENCY is declared, THEN proceed to EPP/I-5

**NOTE:**

The step below is implemented only if an emergency classification is NOT made. IF a classification is made, THEN the transition indicated in step 5.0 should have been made.

6.0 EVALUATE THE NEED FOR AND MAKE NON-EMERGENCY NOTIFICATIONS

- 6.1 IF the abnormal condition is reportable to the NRC pursuant to 10 CFR 50.72 and 1/2-ADM-2202, THEN perform the following:
  - 6.1.1 Complete the NRC Reactor Plant Event Notification Worksheet (located on the Regulatory Affairs web page).

6.1.2 Notify First Energy Communications of the event and provide the information on the NRC Reactor Plant Event Notification Worksheet.

6.2 IF directed by station management, THEN make courtesy calls to the following state and local agencies on a timely basis consistent with normal working hours.

6.2.1 BCEMA

6.2.2 PEMA

6.2.3 CCEMA

6.2.4 HCOES

**F. FINAL CONDITIONS**

1.0 For emergency events, the transition to the appropriate response procedure has been made and actions pursuant to that procedure are in progress.

2.0 For non-emergency events, required notifications have been completed.

**G. ATTACHMENTS**

1.0 Tabs for Classification of Emergency Conditions

**H. FIGURES**

1.0 Figures are identified on the EAL indices

## FISSION PRODUCT BARRIER MATRIX (Modes 1-4)

- 1.1 Fuel Clad (RCS activity, corecooling, heat sink)
- 1.2 RCS (*Integrity, SGTR, heat sink*)
- 1.3 Containment (*CNMT Red Path, CNMT bypass*)

1

## SYSTEM DEGRADATION

- 2.1 Loss of Instrumentation
- 2.2 Loss of Function/Comm's
- 2.3 Failure of Rx Prot.-ATWS
- 2.4 Fuel Clad Degradation
- 2.5 RCS Unident Leakage
- 2.6 RCS Ident. Leakage
- 2.7 Technical Specification S/D
- 2.8 Safety Limit Exceeded
- 2.9 Turbine Failure
- 2.10 Stm/Feed Line Break

2

## LOSS OF POWER

- 3.1 Loss of AC (Power Ops) (*Modes 1-4*)
- 3.2 Loss of AC (Shutdown) (*Modes 5 & 6*)
- 3.3 Loss of DC

3

## HAZARDS and ED JUDGEMENT

- 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/Figure 4-C
- 4.5 Control Room Evacuation
- 4.6 Security
- 4.7 ED Judgement
- Table 4-3/Table 4-4

4

## DESTRUCTIVE PHENOMENA

- 5.1 Earthquake
- 5.2 Tornado/High Winds
- Table 5-1
- Figure 5-A
- 5.3 Aircraft Crash/Projectile
- 5.4 River Level High
- 5.5 River Level Low
- 5.6 Watercraft Crash (RW/SWS Loss)

5

## SHUTDOWN SYSTEM DEGRADATION

- 6.1 Loss of Shutdown Systems
- 6.2 RCS Inventory-Shutdown
- 6.3 Loss of AC (Shutdown) (*Modes 5 & 6*)
- 6.4 Loss of DC (Shutdown) (*Modes 5 & 6*)
- 6.5 Fuel Handling (*All Modes*)
- 6.6 Inadvertent Criticality

6

## RADIOLOGICAL

- 7.1 Gaseous Effluent
- 7.2 Liquid Effluent
- Table 7-1
- Figure 7-A
- 7.3 Radiation Levels
- 7.4 Fuel Handling (*All Modes*)
- Table 7-2

7



## DEFINITIONS/ACRONYMS

**ALERT, UNUSUAL EVENT, GENERAL EMERGENCY, SITE AREA EMERGENCY:** See EAL 4.7

**BOMB:** A fused explosive device.

**CIVIL DISTURBANCE:** A group of ten (10) or more persons violently protesting station operations or activities at the site.

Each **CRITERION** identifies the emergency condition and any numeric values which define that condition (*i.e., the basis of the declaration*). All classifications are based on an assessment (*i.e., determination that the condition is VALID*) by the Emergency Director that the **CRITERION** has been met or exceeded. Implicit in this protocol is the necessity for these assessments to be completed within 15 minutes (unless otherwise noted) of indications being available to Control Room operators that an Emergency Action Level (EAL) has been exceeded.

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

**EXCLUSION AREA BOUNDARY (EAB):** A boundary surrounding the BVPS units beyond which the postulated UFSAR 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, systems or components

**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 rupture*) that results in an uncontrolled decrease in steam generator pressure or the steam generator being completely depressurized.

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

**HOSTAGE:** A person or object held as leverage against the station to ensure that demands will be met by the station

**INDICATOR(s):** Are available via instrumentation, calculations, procedure Entry (AOPs, EOPs, etc.), operator knowledge of plant conditions (pressure, temperatures, etc.) in the Control Room, or reports received from plant personnel, whichever is most limiting, or other evidence that the associated criterion may be exceeded. Inherent in this protocol is the necessity for these assessments to be completed with 15 minutes (unless otherwise noted) of sufficient indications being available to Control Room Operators that an Emergency Action Level (EAL) has been exceeded.

**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 TERMINUS. A reduction in the level of severity is an improvement in the applicable parameters (e.g., increasing trend in reactor vessel water level (RVLIS full range) and/or decreasing trend on core thermocouple temperatures).

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

**LOWER EXPLOSIVE LIMIT (LEL):** Concentration level below which combustible gases will not explode due to ignition.

**LCO, LIMITING CONDITION FOR OPERATION:** as specified in the BVPS Technical Specifications, the minimum functional performance level for equipment required for safe shutdown.

**ORANGE PATH:** Monitoring of one or more CSFs by the EOPs which indicates that a CSF 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. Potential for damage is sufficient to cause concern regarding the integrity of the affected structure or the operability or reliability of safety equipment contained therein.

The **PROTECTED AREA** encompasses all owner controlled areas within the security perimeter fence as shown on Figure 4-A.

**RED PATH:** Monitoring of one or more CSFs by the EOPs which indicates that a CSF is under extreme challenge.

**RUPTURED:** (Steam Generator) Existence of primary to secondary leakage of a magnitude sufficient to require or cause a reactor trip and safety injection.

**SABOTAGE:** Deliberate damage, mis-alignment, or mis-operation of plant equipment with the intent to render the equipment unavailable.

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

The **SITE PERIMETER** encompasses all owner controlled areas in the immediate site environs as shown on Figure 4-A.

**STRIKE ACTION:** A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on the BVPS or one of its vendors. The STRIKE ACTION must threaten to interrupt normal plant operations to be considered.

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

**UNPLANNED:** An event or action is UNPLANNED if it 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.

With specific regard to radioactivity releases, a release of radioactivity is UNPLANNED if it has not been authorized by a Radioactive Waste Discharge Authorization (RWDA). Implicit in this definition are unintentional releases, unmonitored releases, or planned releases that exceed a condition specified on the RWDA (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, such that doubt related to the indicator's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment (*i.e., within 15 minutes*).

**VISIBLE DAMAGE:** Damage to equipment or structure that is readily observable without measurements, testing, or analyses. Damage is sufficient 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, 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, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation

Modes: 1,2,3,4  
INSTRUCTIONS

NOTE: An INDICATOR is considered to be MET if the stated threshold has been, or is, reached or exceeded, on the basis of confirmed observation or VALID instrument readings. The Emergency Director must use judgement when classifying parameters that may be transitory (e.g., containment pressure).

NOTE: The INDICATOR should be considered MET if the parameter is indeterminate due to instruments that are not available or out of range and the existence of the condition can not be reasonably discounted.

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

1. In the matrix to the left, review the LOSS INDICATORS in each barrier column. If one or more INDICATORS are met, check the LOSS block at the bottom of the column.
2. If no LOSS is identified for a particular barrier, review the potential LOSS INDICATORS for that barrier. If one or more INDICATORS are met, check the potential LOSS block at the bottom of the barrier column.
3. Compare the blocks checked to the CRITERIA below and make the appropriate declaration.

## CRITERIA

## GENERAL EMERGENCY

LOSS of any Two (2) barriers and Potential LOSS of third barrier.

OR  
LOSS of all three (3) barriers.

## SITE AREA EMERGENCY

LOSS or Potential LOSS of any Two (2) barriers.

OR  
LOSS of one (1) barrier and a Potential LOSS of a second barrier.

## ALERT

Any LOSS or Potential LOSS of Fuel Clad barrier.

OR  
Any LOSS or Potential LOSS of RCS barrier.

## UNUSUAL EVENT

LOSS or Potential LOSS of CNMT barrier.

## SEE ALSO EAL'S:

- 2.4 Fuel Clad Degradation (RCS Specific Activity >LCO)  
2.5 RCS Unidentified or Pressure Boundary Leakage  
2.6 RCS Identified Leakage

## 1.1 Fuel Clad Barrier

## 1.1.1 Critical Safety Function Status

LOSS	Potential LOSS
Core Cooling CSF RED PATH	Core Cooling CSF ORANGE PATH <u>OR</u> Heat Sink CSF RED PATH

-OR-

## 1.1.2 Five Hottest CETCs

LOSS	Potential LOSS
Greater than 1200 F	Greater than 719 F

-OR-

## 1.1.3 Reactor Vessel Water Level

LOSS	Potential LOSS
Not Applicable	RVLIS Full Range <40% (no RCPs running)

-OR-

## 1.1.4 Primary Coolant Activity Level

LOSS	Potential LOSS
RCS activity >300 $\mu$ Ci/gm dose equivalent Iodine-131	Not Applicable

-OR-

## 1.1.5 Letdown Monitor Indication

LOSS	Potential LOSS
RM-CH101 A or B VALID reading greater than 3.5E5 cpm with letdown unisolated	Not Applicable

-OR-

## 1.1.6 Containment Radiation Monitors

LOSS	Potential LOSS
VALID reading exceeds:	Not applicable
Time After S/D, hrs	RM-219A/B R/hr
0-0.5	250
0.5-4	140
4-12	74
12-24	42
RM-201* mR/hr	1500
	800
	380
	200

-OR-

## 1.1.7 Emergency Director Judgement

Any condition that, in the judgement of the SM/ED, indicates loss or potential loss of the Fuel Clad barrier comparable to the indicators listed above.

LOSS ☐ Potential LOSS ☐

## 1.2 RCS Barrier

## 1.2.1 Critical Safety Function Status

LOSS	Potential LOSS
Not applicable	RCS Integrity CSF RED PATH <u>OR</u> Heat Sink CSF RED PATH

-OR-

## 1.2.2 Reactor Vessel Water Level

LOSS	Potential LOSS
RVLIS Full Range <40% (no RCPs running)	Not Applicable

-OR-

## 1.2.3 RCS Leak Rate

LOSS	Potential LOSS
RCS leak results in loss of RCS subcooling	Unisolable RCS leak that requires an additional charging pump be started with letdown isolated. <u>OR</u> RCS leak causes safety injection actuation indicated by direct entry into EOP E-1 required by EOP E-0

-OR-

## 1.2.4 Primary to Secondary Leak

LOSS	Potential LOSS
SGTR that results in a safety injection actuation <u>OR</u> Entry into E-3 required by EOPs	Not Applicable

-OR-

## 1.2.5 Containment Radiation Monitors

LOSS	Potential LOSS
+VALID reading above background exceeds:	Not Applicable
Time After S/D, hrs	RM-202 mR/hr
0-0.5	35
0.5-4	20
4-12	11
12-24	6
RM-201* mR/hr	0.5
	0.3
	0.1
	N/A

+ Readings based on T/S RCS activity

\* Due to streaming thru airlock

-OR-

## 1.2.6 Emergency Director Judgement

Any condition that, in the judgement of the SM/ED, indicates loss or potential loss of the RCS barrier comparable to the indicators listed above.

LOSS ☐ Potential LOSS ☐

## 1.3 CNMT Barrier

## 1.3.1 Critical Safety Function Status

LOSS	Potential LOSS
Not Applicable	CNMT CSF RED PATH <u>OR</u> Actions of FR-C.1 (RED PATH) are INEFFECTIVE

-OR-

## 1.3.2 Containment Pressure / Hydrogen Conc.

LOSS	Potential LOSS
Rapid unexplained drop in CNMT pressure following initial rise <u>OR</u> CNMT pressure or sump level response NOT consistent with LOCA conditions	CNMT pressure >45 PSIG <u>OR</u> CNMT H2 rises >4% <u>OR</u> CNMT pressure >8 PSIG with less than one full train of CNMT spray

-OR-

## 1.3.3 Containment Isolation Status

LOSS	Potential LOSS
CNMT isolation is incomplete creating a direct release path to the environment when required	Not Applicable

-OR-

## 1.3.4 Containment Bypass

LOSS	Potential LOSS
RUPTURED S/G is also FAULTED Outside of CNMT <u>OR</u> P-to-S leakrate > T/S with approx. 4-8 hr. steam release from affected S/G via nonisolable MSSV, SGADV, or from MSLB outside of CNMT	Unexplained VALID rise in reading on area or ventilation monitors in contiguous areas with known LOCA <u>OR</u> Hi-Hi Alarm on RM-RW-100A,B,C, or D <u>AND</u> affected HX is <u>NOT</u> isolated

-OR-

## 1.3.5 Significant Radioactivity in Containment

LOSS	Potential LOSS
Not applicable	VALID reading exceeds:
	Time After RM-219A/B S/D, hrs
	0-0.5
	0.5-4
	4-12
	12-24
	RM-201* mR/hr
	1.5E4
	5.2E3
	2.2E3
	1.0E3

-OR-

## 1.3.6 Emergency Director Judgement

Any condition that, in the judgement of the SM/ED, indicates loss or potential loss of the Containment barrier comparable to the indicators listed above.

LOSS ☐ Potential LOSS ☐

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## FISSION PRODUCT BARRIER MATRIX (Modes 1-4)

- 1.1 Fuel Clad (RCS activity, corecooling, heat sink)
- 1.2 RCS (*Integrity, SGTR, heat sink*)
- 1.3 Containment (*CNMT Red Path, CNMT bypass*)

1

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## SYSTEM DEGRADATION

- |                              |                                 |                          |
|------------------------------|---------------------------------|--------------------------|
| 2.1 Loss of Instrumentation  | 2.5 RCS Unident Leakage         | 2.9 Turbine Failure      |
| 2.2 Loss of Function/Comm's  | 2.6 RCS Ident. Leakage          | 2.10 Stm/Feed Line Break |
| 2.3 Failure of Rx Prot.-ATWS | 2.7 Technical Specification S/D |                          |
| 2.4 Fuel Clad Degradation    | 2.8 Safety Limit Exceeded       |                          |

2

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## LOSS OF POWER

- 3.1 Loss of AC (Power Ops) (*Modes 1-4*)
- 3.2 Loss of AC (Shutdown) (*Modes 5 & 6*)
- 3.3 Loss of DC

3

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## HAZARDS and ED JUDGEMENT

- |               |                       |                             |
|---------------|-----------------------|-----------------------------|
| 4.1 Fire      | 4.3 Flammable Gas     | 4.5 Control Room Evacuation |
| 4.2 Explosion | 4.4 Toxic Gas         | 4.6 Security                |
| Table 4-1     | Table 4-2             | 4.7 ED Judgement            |
| Figure 4-A    | Figure 4-B/Figure 4-C | Table 4-3/Table 4-4         |

4

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## DESTRUCTIVE PHENOMENA

- |                        |                                    |
|------------------------|------------------------------------|
| 5.1 Earthquake         | 5.3 Aircraft Crash/Projectile      |
| 5.2 Tornado/High Winds | 5.4 River Level High               |
| Table 5-1              | 5.5 River Level Low                |
| Figure 5-A             | 5.6 Watercraft Crash (RW/SWS Loss) |

5

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## SHUTDOWN SYSTEM DEGRADATION

- |                              |  |
|------------------------------|--|
| 6.1 Loss of Shutdown Systems | 6.3 Loss of AC (Shutdown) ( <i>Modes 5 &amp; 6</i> ) |
| 6.2 RCS Inventory-Shutdown   | 6.4 Loss of DC (Shutdown) ( <i>Modes 5 &amp; 6</i> ) |
|                              | 6.5 Fuel Handling ( <i>All Modes</i> )               |
|                              | 6.6 Inadvertent Criticality                          |

6

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## RADIOLOGICAL

- |                      |  |
|----------------------|--|
| 7.1 Gaseous Effluent | 7.3 Radiation Levels                   |
| 7.2 Liquid Effluent  | 7.4 Fuel Handling ( <i>All Modes</i> ) |
| Table 7-1            | Table 7-2                              |
| Figure 7-A           |  |

7

2 - System  
Degradation

GENERAL  
SITE AREA  
ALERT  
UNUSUAL EVENT

2.1 Loss of Instrumentation	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix" and Tab 7 "Radiological Effluents"
1 2 3 4	<p>Inability to monitor a <b>SIGNIFICANT TRANSIENT</b> in progress [1 and 2 and 3 and 4]</p> <p>1. Loss of most (&gt;75%) annunciators or indications</p> <p>2. <b>SIGNIFICANT TRANSIENT</b> in progress</p> <p>3. Loss of SER and SPDS</p> <p>4. Inability to directly monitor any of the following CSFs:</p> <p>Subcriticality                      Vessel Integrity Core Cooling                      Containment Heat Sink</p>
1 2 3 4	<p>UNPLANNED loss of most annunciators or indications for &gt;15 minutes with either a <b>SIGNIFICANT TRANSIENT</b> in progress or a loss of non-alarming compensatory indications [1 and 2 and 3]</p> <p>1. UNPLANNED loss of most (&gt;75%) annunciators or indications for &gt;15 minutes</p> <p>2. SM judgement that additional personnel (beyond normal shift complement) are required to monitor the safe operation of the unit</p> <p>3. [a or b]</p> <p>a. <b>SIGNIFICANT TRANSIENT</b> in progress</p> <p>b. Loss of SER and SPDS</p>
1 2 3 4	<p>UNPLANNED loss of most annunciators or indications for &gt;15 minutes [1 and 2]</p> <p>1. UNPLANNED loss of most (&gt;75%) annunciators or indications for &gt;15 minutes</p> <p>2. SM judgement that additional personnel (beyond normal shift complement) are required to monitor the safe operation of the unit</p>

2.2 Loss of Function	
Mode	Criterion / Indicator
1 2 3 4	<p>Inability to cool the core [1 or 2]</p> <p>1. Actions of FR-C.1 (RED PATH) are <b>INEFFECTIVE</b></p> <p>2. [a and b]</p> <p>a. Five hottest core exit thermocouples &gt;1200 F; or five hottest core exit thermocouples &gt;719 F with NO RCPs running and RVLIS full range level &lt;40%</p> <p>b. Actions taken have NOT resulted in a rising trend in RVLIS full range level or a dropping trend in core exit thermocouple temperatures within 15 minutes of initiation of restoration actions</p>
1 2 3 4	<p>Loss of function needed to achieve or maintain hot shutdown [1 or 2]</p> <p>1. Ops personnel report a CSF status tree RED PATH terminus for core cooling or heat sink exists</p> <p>2. Five hottest core exit thermocouples &gt;1200 F; or five hottest core exit thermocouples &gt;719 F with NO RCPs running and RVLIS full range level &lt;40%</p> <p>Also Refer to Tab 2.3 "Failure of Reactor Protection" and Tab 1 "Fission Product Barrier Matrix"</p>
1 2 3 4	<p>Complete loss of function needed to achieve Cold Shutdown when Shutdown required by Tech Specs [1 and 2 and 3]</p> <p>1. Loss of decay heat removal capability (RHR, CCR or RPRW) / (RHS, CCP, SWS)</p> <p>2. Inability to remove heat via the condenser</p> <p>3. Shutdown to mode 5 required by T/S</p>
ALL	<p>UNPLANNED Loss of communications [1 or 2]</p> <p>1. In-plant [a and b and c]</p> <p>a. UNPLANNED Loss of All Pax Phones</p> <p>b. UNPLANNED Loss of All Gaitronics (Page/Party)</p> <p>c. UNPLANNED Loss of All Radios (Handie-Talkies)</p> <p>2. Offsite [a and b and c]</p> <p>a. UNPLANNED Loss of ENS</p> <p>b. UNPLANNED Loss of Bell Lines</p> <p>c. UNPLANNED Loss of Radios to Offsite</p>

2.3 Failure of Rx Protection	
Mode	Criterion / Indicator
1 2	<p>Reactor power &gt;5% after VALID trip signal(s) and loss of core cooling capability [1 and 2]</p> <p>1. Ops personnel report FR-S 1 has been entered and subsequent actions do NOT result in reduction of power to &lt;5% and decreasing</p> <p>2. [a or b]</p> <p>a. Ops personnel report CSF status tree RED PATH terminus exists for core cooling or heat sink</p> <p>b. Five hottest core exit thermocouples &gt;1200 F; or five hottest core exit thermocouples &gt;719 F with NO RCPs running and RVLIS full range level &lt;40%</p>
1 2	<p>Reactor trip failure after VALID Trip signal(s) with reactor power &gt;5% and attempts to cause a manual trip from the control room are unsuccessful.</p> <p>1. Ops personnel report FR-S 1 has been entered and manual reactor trip from control room did NOT result in reduction of power to &lt;5% and decreasing</p>
1 2	<p>Automatic reactor trip did not occur after VALID trip signal and manual trip from control room was successful [1 and 2]</p> <p>1. VALID reactor trip signal received or required.</p> <p>2. Manual reactor trip from control room was successful and power is &lt;5% and decreasing</p>
	Not Applicable

2.4 Fuel Clad Degradation	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
1 2 3 4 5	<p>Reactor coolant system specific activity exceeds LCO (refer to BVPS technical specification 3.4.8) [1 or 2]</p> <p>1. VALID high alarm on RM-CH-101A or B reactor coolant letdown monitor</p> <p>2. Radiochemistry analysis exceeds Technical Specification 3 4 8.</p>

GENERAL  
SITE AREA  
ALERT  
UNUSUAL EVENT

SYSTEM DEGRADATION - U1  
2.1, 2.2, 2.3, 2.4

2.5 RCS Unidentified Leakage	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
1 2 3 4 5*	<p>Unidentified or pressure boundary RCS leakage &gt;10 GPM</p> <ol style="list-style-type: none"> <li>1. Unidentified or pressure boundary leakage (as defined by Technical Specifications) &gt;10 GPM as indicated below [a or b] <ol style="list-style-type: none"> <li>a. OST 1 6 2 results</li> <li>b. With RCS temp. and PZR level stable, VCT level dropping at a rate &gt;10 GPM (&gt;1%/min indicated on LI-CH-115 with no VCT makeup in progress)</li> </ol> </li> </ol> <p>*Applies to Mode 5 if RCS Pressurized</p>

2.6 RCS Identified Leakage	
Mode	Criterion / Indicator
	<i>Refer to Tab 1 "Fission Product Barrier Matrix"</i>
	<i>Refer to Tab 1 "Fission Product Barrier Matrix"</i>
	<i>Refer to Tab 1 "Fission Product Barrier Matrix"</i>
1 2 3 4 5*	<b>Identified RCS leakage &gt;25 GPM</b>  1. Identified RCS leakage (as defined by Technical Specifications) >25 GPM as indicated below [ <i>a or b or c</i> ]  a. OST 1.6.2 or 1.6.2A Results  b. UNPLANNED level rise in excess of 25 GPM total into PRT, DG-TK-1, and DG-TK-2  c. Indication of Steam Generator Tube leakage >25 GPM
<i>*Applies to Mode 5 if RCS Pressurized</i>	

2.7 Technical Specification	
Mode	Criterion / Indicator
	<i>Not Applicable</i>
	<i>Not Applicable</i>
	<i>Refer to Tab 2.2, "Loss of Function"</i>
1 2 3 4	<b>Inability to Reach Required Shutdown Mode Within Technical Specification Time Limits [1 and 2]</b>  1. A Technical Specification action 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 action statement

2.8 Safety Limit	
Mode	Criterion / Indicator
	<i>Not Applicable</i>
	<i>Not Applicable</i>
	<i>Not Applicable</i>
1 2 3 4 5	<p><b>Safety Limit Has Been Exceeded</b> [1 or 2]</p> <ol style="list-style-type: none"> <li>1. Technical Specification 2.1.1 specifies the safety limits for the reactor core which are applicable in Modes 1 and 2.</li> <li>2. Technical Specification 2.1.2 specifies the safety limit for the Reactor Coolant System pressure which is applicable in Modes 1, 2, 3, 4 and 5.</li> </ol>

GENERAL	2.9 Turbine Failure		2.10 Steam/Feed Line Break
	Mode	Criterion / Indicator	
		Refer to Tab 1 "Fission Product Barrier Matrix"	
SITE AREA		Refer to Tab 1 "Fission Product Barrier Matrix"	Refer to Tab 1 "Fission Product Barrier Matrix"
ALERT	1 2 3	Turbine failure generated missiles cause penetration of a missile shield wall of any area containing safety related equipment  1. Plant personnel report missiles generated by turbine failure with casing penetration also results in a through-wall penetration of a missile shield wall listed in Table 2-1	Refer to Tab 1 "Fission Product Barrier Matrix"
UNUSUAL EVENT	1 2 3	Turbine failure results in casing penetration  1. Plant personnel report a turbine failure which results in penetration of the turbine casing or damage to main generator seals with evidence of significant hydrogen or seal oil leakage	UNPLANNED rapid depressurization of the Main Steam System resulting in a rapid RCS cooldown and Safety Injection actuation [1 and 2]  1. Ops personnel report rapid depressurization of Main Steam System that causes SLI (<500 psig)  2. Ops personnel report Safety Injection has actuated

Table 2-1  
Plant Areas Associated With Shield Wall Penetration EAL

Control Room	Cable Tray Mezz
Electrical Switchgear	Containment
Safeguards	Primary Aux. Building
Diesel Generator Bldg	1WT-TK-10

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## FISSION PRODUCT BARRIER MATRIX (Modes 1-4)

- 1.1 Fuel Clad (RCS activity, corecooling, heat sink)
- 1.2 RCS (*Integrity, SGTR, heat sink*)
- 1.3 Containment (*CNMT Red Path, CNMT bypass*)

1

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## SYSTEM DEGRADATION

- |                              |                                 |                          |
|------------------------------|---------------------------------|--------------------------|
| 2.1 Loss of Instrumentation  | 2.5 RCS Unident Leakage         | 2.9 Turbine Failure      |
| 2.2 Loss of Function/Comm's  | 2.6 RCS Ident. Leakage          | 2.10 Stm/Feed Line Break |
| 2.3 Failure of Rx Prot.-ATWS | 2.7 Technical Specification S/D |                          |
| 2.4 Fuel Clad Degradation    | 2.8 Safety Limit Exceeded       |                          |

2

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## LOSS OF POWER

- 3.1 Loss of AC (Power Ops) (*Modes 1-4*)
- 3.2 Loss of AC (Shutdown) (*Modes 5 & 6*)
- 3.3 Loss of DC

3

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## HAZARDS and ED JUDGEMENT

- |               |                       |                             |
|---------------|-----------------------|-----------------------------|
| 4.1 Fire      | 4.3 Flammable Gas     | 4.5 Control Room Evacuation |
| 4.2 Explosion | 4.4 Toxic Gas         | 4.6 Security                |
| Table 4-1     | Table 4-2             | 4.7 ED Judgement            |
| Figure 4-A    | Figure 4-B/Figure 4-C | Table 4-3/Table 4-4         |

4

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## DESTRUCTIVE PHENOMENA

- |                        |                                    |
|------------------------|------------------------------------|
| 5.1 Earthquake         | 5.3 Aircraft Crash/Projectile      |
| 5.2 Tornado/High Winds | 5.4 River Level High               |
| Table 5-1              | 5.5 River Level Low                |
| Figure 5-A             | 5.6 Watercraft Crash (RW/SWS Loss) |

5

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## SHUTDOWN SYSTEM DEGRADATION

- |                              |  |
|------------------------------|--|
| 6.1 Loss of Shutdown Systems | 6.3 Loss of AC (Shutdown) ( <i>Modes 5 &amp; 6</i> ) |
| 6.2 RCS Inventory-Shutdown   | 6.4 Loss of DC (Shutdown) ( <i>Modes 5 &amp; 6</i> ) |
|                              | 6.5 Fuel Handling ( <i>All Modes</i> )               |
|                              | 6.6 Inadvertent Criucality                           |

6

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## RADIOLOGICAL

- |                      |  |
|----------------------|--|
| 7.1 Gaseous Effluent | 7.3 Radiation Levels                   |
| 7.2 Liquid Effluent  | 7.4 Fuel Handling ( <i>All Modes</i> ) |
| Table 7-1            | Table 7-2                              |
| Figure 7-A           |  |

7

UNUSUAL EVENT	ALERT	SITE AREA	GENERAL	3.1	Loss of AC (Power Ops)
				Mode	Criterion / Indicator
				1 2 3 4	<p>Prolonged loss of offsite <u>and</u> onsite AC power [1 and 2]</p> <ol style="list-style-type: none"> <li>AE <u>and</u> DF 4KV emergency buses <u>NOT</u> energized from Unit 1 sources for &gt;15 minutes</li> <li>[a or b or c] <ol style="list-style-type: none"> <li>Ops personnel report CSF status tree RED PATH <u>or</u> ORANGE PATH terminus exists for core cooling</li> <li>Restoration of either AE <u>or</u> DF 4KV emergency bus is NOT likely from any source within 3 hours of loss</li> <li>Five hottest core exit thermocouples &gt;1200 F <u>or</u> five hottest core exit thermocouples &gt;719 F with no RCPs running and RVLIS full range &lt;40%</li> </ol> </li> </ol>
				1 2 3 4	<p>Loss of offsite <u>and</u> onsite AC power for &gt;15 minutes</p> <ol style="list-style-type: none"> <li>AE and DF 4KV emergency buses <u>NOT</u> energized from Unit 1 sources for &gt;15 minutes</li> </ol>
UNUSUAL EVENT	ALERT	SITE AREA	GENERAL	3.2	Loss of AC (Shutdown)
				Mode	Criterion / Indicator
				5 6 De-fuel	<p>Refer to Tab 6 "Shutdown System Degradation"</p> <p>UNPLANNED loss of offsite <u>and</u> onsite AC power for &gt;15 minutes</p> <ol style="list-style-type: none"> <li>AE <u>and</u> DF 4KV emergency buses <u>NOT</u> energized from Unit 1 sources for &gt;15 minutes</li> </ol> <p>Also Refer to Tab 6 "Shutdown System Degradation"</p>
				5 6 De-fuel	<p>UNPLANNED loss of offsite power supply for &gt;15 minutes [1 and 2]</p> <ol style="list-style-type: none"> <li>Offsite power supply to AE and DF 4KV buses unavailable for &gt;15 minutes.</li> <li>Each diesel generator is supplying power to its respective emergency bus</li> </ol>
UNUSUAL EVENT	ALERT	SITE AREA	GENERAL	3.3	Loss of DC Power
				Mode	Criterion / Indicator
				1 2 3 4	<p>Refer to Tab 1 "Fission Product Barrier Matrix" and Tab 2.2 "Loss of Function", and Tab 6.1 "Loss of Shutdown Systems"</p> <p>Loss of all vital DC power for &gt;15 minutes</p> <ol style="list-style-type: none"> <li>Voltage &lt;110.4 VDC on DC buses 1-1 <u>and</u> 1-2 <u>and</u> 1-3 <u>and</u> 1-4 for &gt;15 minutes</li> </ol> <p>Also Refer to Tab 1 "Fission Product Barrier Matrix", Tab 2.2 "Loss of Function", and Tab 2.1 "Loss of Instrumentation" and Tab 6.1 "Loss of Shutdown Systems"</p>
				1 2 3 4	<p>Refer to Tab 1 "Fission Product Barrier Matrix", Tab 2.2 "Loss of Function", and Tab 2.1 "Loss of Instrumentation" and Tab 6.1 "Loss of Shutdown Systems"</p> <p>UNPLANNED loss of one train of DC power for &gt;15 minutes [1 or 2]</p> <ol style="list-style-type: none"> <li>Voltage &lt;110.4 VDC on DC Buses 1-1 <u>and</u> 1-3 for &gt;15 minutes</li> <li>Voltage &lt;110.4 VDC on DC Buses 1-2 <u>and</u> 1-4 for &gt;15 minutes</li> </ol> <p>Refer to Tab 6.4 "Loss of DC (Shutdown)" for modes 5, 6, and defueled</p>



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## FISSION PRODUCT BARRIER MATRIX (Modes 1-4)

- 1.1 Fuel Clad (RCS activity, corecooling, heat sink)
- 1.2 RCS (*Integrity, SGTR, heat sink*)
- 1.3 Containment (*CNMT Red Path, CNMT bypass*)

**1**

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## SYSTEM DEGRADATION

- |                              |                                 |                          |
|------------------------------|---------------------------------|--------------------------|
| 2.1 Loss of Instrumentation  | 2.5 RCS Unident Leakage         | 2.9 Turbine Failure      |
| 2.2 Loss of Function/Comm's  | 2.6 RCS Ident. Leakage          | 2.10 Stm/Feed Line Break |
| 2.3 Failure of Rx Prot.-ATWS | 2.7 Technical Specification S/D |                          |
| 2.4 Fuel Clad Degradation    | 2.8 Safety Limit Exceeded       |                          |

**2**

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## LOSS OF POWER

- 3.1 Loss of AC (Power Ops) (*Modes 1-4*)
- 3.2 Loss of AC (Shutdown) (*Modes 5 & 6*)
- 3.3 Loss of DC

**3**

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## HAZARDS and ED JUDGEMENT

- |               |                       |                             |
|---------------|-----------------------|-----------------------------|
| 4.1 Fire      | 4.3 Flammable Gas     | 4.5 Control Room Evacuation |
| 4.2 Explosion | 4.4 Toxic Gas         | 4.6 Security                |
| Table 4-1     | Table 4-2             | 4.7 ED Judgement            |
| Figure 4-A    | Figure 4-B/Figure 4-C | Table 4-3/Table 4-4         |

**4**

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## DESTRUCTIVE PHENOMENA

- |                        |                                    |
|------------------------|------------------------------------|
| 5.1 Earthquake         | 5.3 Aircraft Crash/Projectile      |
| 5.2 Tornado/High Winds | 5.4 River Level High               |
| Table 5-1              | 5.5 River Level Low                |
| Figure 5-A             | 5.6 Watercraft Crash (RW/SWS Loss) |

**5**

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## SHUTDOWN SYSTEM DEGRADATION

- |                              |  |
|------------------------------|--|
| 6.1 Loss of Shutdown Systems | 6.3 Loss of AC (Shutdown) ( <i>Modes 5 &amp; 6</i> ) |
| 6.2 RCS Inventory-Shutdown   | 6.4 Loss of DC (Shutdown) ( <i>Modes 5 &amp; 6</i> ) |
|                              | 6.5 Fuel Handling ( <i>All Modes</i> )               |
|                              | 6.6 Inadvertent Criticality                          |

**6**

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## RADIOLOGICAL

- |                      |  |
|----------------------|--|
| 7.1 Gaseous Effluent | 7.3 Radiation Levels                   |
| 7.2 Liquid Effluent  | 7.4 Fuel Handling ( <i>All Modes</i> ) |
| Table 7-1            | Table 7-2                              |
| Figure 7-A           |  |

**7**

GENERAL

SITE AREA

ALERT

UNUSUAL EVENT

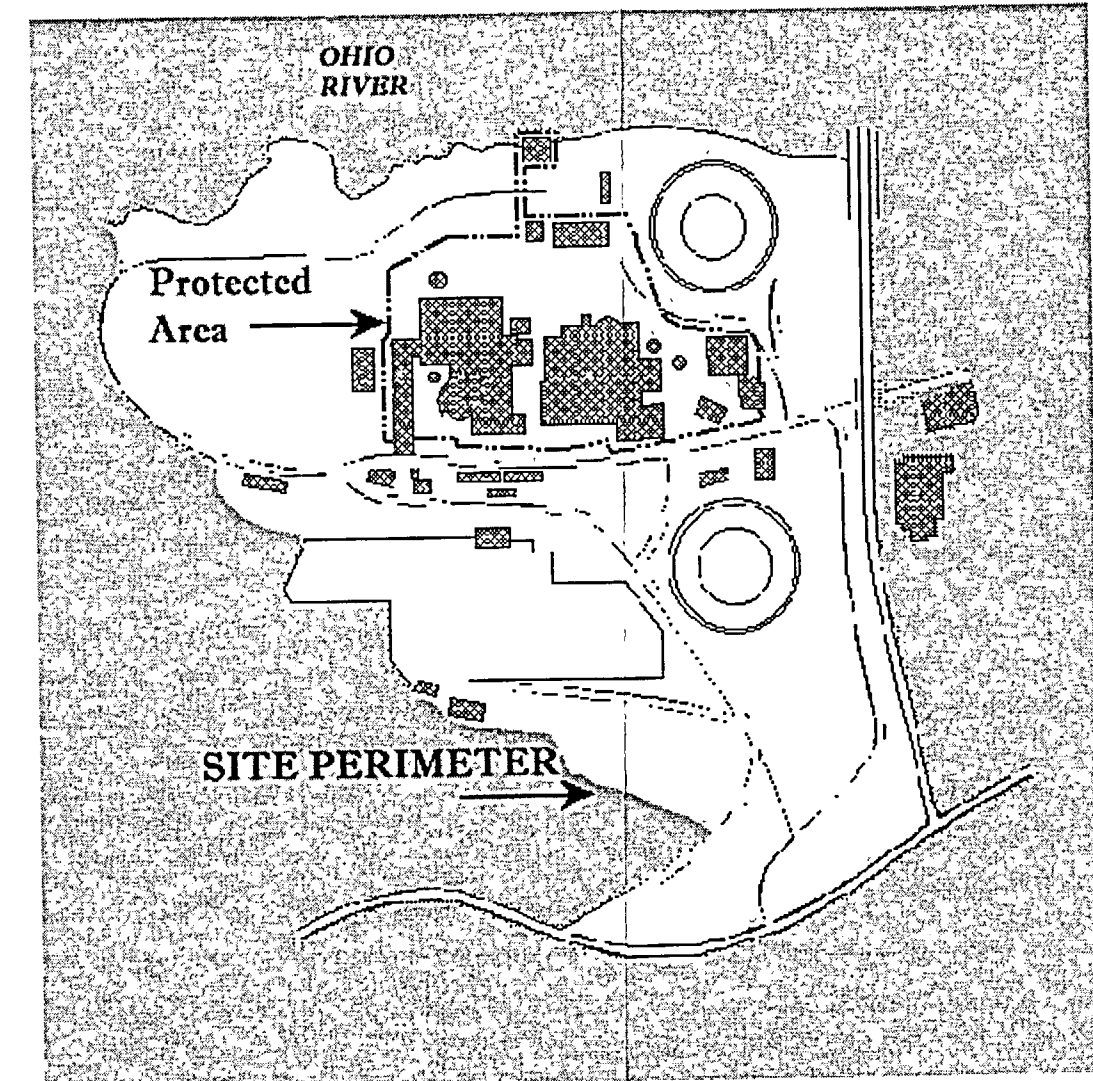
4.1 Fire							
Mode	Criterion / Indicator						
1 2 3 4	<p>FIRE in the control room, cable tray mezzanine, <u>or</u> process control room resulting in an evacuation of the control room per 1.56C.4 "Alternate Safe Shutdown" <u>and</u> loss of any required equipment results in an uncontrolled RCS Heatup [1 and 2 and 3]</p> <p>1. 1.56C.4 "Alternate Safe Shutdown" entered</p> <p>2. Ops personnel report inability to operate at least one of each of the following components of the available train</p> <table><tr><td>Charging pump</td><td>AFW pump</td><td>Diesel generator</td></tr><tr><td>RPRW pump</td><td>BIP</td><td>Steam relief path</td></tr></table> <p>3. Uncontrolled RCS heatup lasting longer than 15 minutes</p>	Charging pump	AFW pump	Diesel generator	RPRW pump	BIP	Steam relief path
Charging pump	AFW pump	Diesel generator					
RPRW pump	BIP	Steam relief path					
1 2 3 4	<p>FIRE in the control room, cable tray mezzanine, <u>or</u> process control room resulting in an evacuation of the control room per 1.56C.4 "Alternate Safe Shutdown"</p> <p>1. 1.56C.4 "Alternate Safe Shutdown" entered</p>						
All	<p>FIRE in any of the areas listed in Table 4-1 that is affecting safety related equipment [1 and 2]</p> <p>1. FIRE in any of the listed areas in Table 4-1</p> <p>2. [a or b]</p> <p>a. Ops personnel report <b>VISIBLE DAMAGE</b> to permanent structure <u>or</u> equipment in listed area due to <b>FIRE</b></p> <p>b. Control room indication of degraded system <u>or</u> component (within listed areas) response due to <b>FIRE</b></p>						
All	<p>FIRE in <u>or</u> adjacent to those areas listed in Table 4-1 not extinguished within 15 minutes from the time of control room notification <u>or</u> verification of control room alarm</p>						

4.2	Explosions
Mode	Criterion / Indicator
	<p>Refer to Tab 4.1 "Fire" or Tab 1 "Fission Product Barrier Matrix"</p>
	<p>Refer to Tab 4.1 "Fire" or Tab 1 "Fission Product Barrier Matrix"</p>
All	<p>EXPLOSION in any of the areas listed in Table 4-1 that is affecting safety related equipment [1 and 2]</p> <p>1. EXPLOSION in any of the listed areas in Table 4-1</p> <p>2. [a or b]</p> <p>a. Ops personnel report <b>VISIBLE DAMAGE</b> to permanent structure or equipment in listed area</p> <p>b. Control room indication of degraded system or component (within listed areas) response due to <b>EXPLOSION</b></p> <p>Refer to Tab 4.6 "Security"</p>
All	<p>UNPLANNED EXPLOSION in or adjacent to those areas listed in Table 4-1</p> <p>1. UNPLANNED EXPLOSION in or adjacent to any of the listed areas in Table 4-1</p> <p>Refer to Tab 4.1 "Fire" or Tab 1 "Fission Product Barrier Matrix"</p> <p>Refer to Tab 4.6 "Security"</p>

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

Control Room	Diesel Gen. Room	Containment Building
Cable Tray Mezz.	Intake Str Cubicles	Prim. Auxiliary Building
Process Cntrol Rm	U1/U2 CV3 Cable Tunnel	Safeguards Building
Relay Room	AE/DF Switchgear	Demin Water (1WT-TK-10)
Rod Drive/MG Rm	Fuel Building	CO2 Storage/PG Pump Rm
RWST (1QS-TK-1)	RW Valve Pit	D/G Fuel Oil

Figure 4-A  
PROTECTED AREA / SITE PERIMETER



GENERAL	4.3 Flammable Gas	
	Mode	Criterion / Indicator
		Refer to Tab 4.1 "Fire", Tab 4.2 "Explosion", or Tab 1 "Fission Product Barrier Matrix"
SITE AREA		Refer to Tab 4.1 "Fire", Tab 4.2 "Explosion", or Tab 1 "Fission Product Barrier Matrix"
ALERT	All	Release of flammable gas within, or contiguous to, a VITAL AREA which jeopardizes operation of systems required to maintain safe operations or to establish or maintain cold shutdown (Mode 5).  1. Report or detection of a flammable gas within, or contiguous to, a VITAL AREA in concentrations greater than explosive concentrations.
UNUSUAL EVENT	All	Release of flammable gas affecting the PROTECTED AREA deemed detrimental to the safe operation of the plant. (1 or 2)  1. (a and b) a. Report or detection of flammable gas that could enter the SITE PERIMETER in amounts that can affect normal operation of the plant (Refer to Figure 4-A). b. Normal operation of the plant is impeded due to access restrictions implemented by the Control Room within the PROTECTED AREA (Refer to Figure 4-A).  2. Report by local, county or State officials for a potential evacuation of site personnel based on an offsite event.

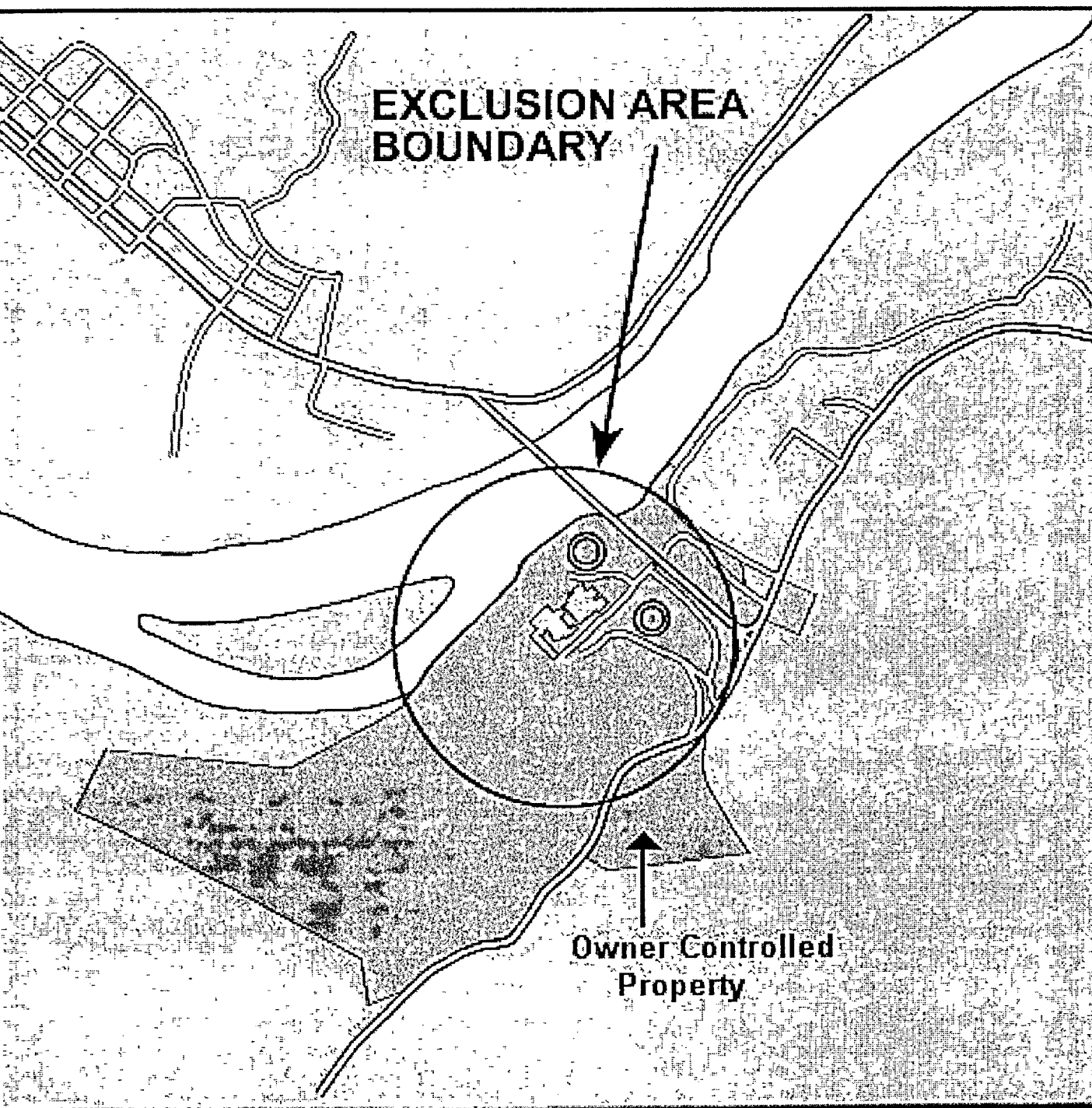
4.4 Toxic Gas	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
All	Release of TOXIC GAS within, or contiguous to, a VITAL AREA which jeopardizes operation of systems required to maintain safe operations or to establish or maintain cold shutdown (Mode 5). (1 and 2)  1. Report or detection of a TOXIC GAS within, or contiguous to, a VITAL AREA or an area required for continued safe operation in concentrations that will be life threatening to plant personnel.  2. Plant personnel would be unable to perform actions necessary for continued safe operation or to establish and maintain cold shutdown (Mode 5) while utilizing appropriate personnel protection equipment.
All	Release of TOXIC GAS affecting the PROTECTED AREA deemed detrimental to the safe operation of the plant. (1 or 2)  1. (a and b) a. Report or detection of TOXIC GAS that could enter the SITE PERIMETER in amounts that can affect normal operation of the plant (Refer to Figure 4-A). b. Normal operation of the plant is impeded due to access restrictions implemented by the Control Room within the PROTECTED AREA (Refer to Figure 4-A)  2. Report by local, county or State officials for a potential evacuation of site personnel based on an offsite event.  Refer to AOP 1/2 44A.1 "Chlorine/toxic Gas Release", Attachment 3 for a list of chemicals stored, produced, or transported near BVPS and their toxicity limits.

TABLE 4-2 HAS BEEN DELETED

FIGURE 4-B HAS BEEN DELETED

Figure 4-C

**EXCLUSION AREA BOUNDARY**



GENERAL	4.5 Control Room Evacuation	
	Mode	Criterion / Indicator
		Refer to Tab 4.1 "FIRE"
	SITE AREA	
	All	Evacuation of the control room has been initiated <u>and</u> control of all necessary equipment has not been established within 15 minutes of manning the Shutdown Panel [1 and 2]  1. AOP 1.33.1 "Control Room Inaccessibility" has been entered  2. Inability to transfer and operate any single component listed in Table 4-3 within 15 minutes of manning the shutdown panel  <i>Also refer to Tab 4.1 "Fire"</i>
ALERT	All	Evacuation of the control room is required  1. AOP 1.33.1 "Control Room Inaccessibility" has been entered
	UNUSUAL EVENT	
		Not Applicable

4.6 Security	
Mode	Criterion / Indicator
All	Security event resulting in loss of control of the systems necessary to establish or maintain cold shutdown [1 or 2]  1. Hostile armed force has taken control of the control room <u>or</u> the remote shutdown panel  2. Hostile armed force has taken control of plant equipment such that Ops personnel report the inability to operate equipment necessary to maintain the following functions [a or b or c]  a Subcriticality b. Core cooling c. Heat Sink
All	Security event has <u>or</u> is occurring which results in actual <u>or</u> likely failures of plant functions needed to protect the public [1 or 2]  1. VITAL AREA, other than the control room, has been penetrated by a hostile armed force  2. Suspected BOMB detonates within a VITAL AREA
All	Credible Security event which indicates an actual <u>or</u> 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  <i>Refer to Figure 4-A for a drawing of the PROTECTED AREA</i>
All	Credible 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 4-4  <i>Refer to Figure 4-A for a drawing of the PROTECTED AREA</i>

4.7 Emergency Director Judgement	
Mode	Criterion / Indicator
All	Events are in process <u>or</u> have occurred which involve actual <u>or</u> imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA protective action guidelines exposure levels outside the EXCLUSION AREA BOUNDARY. (Refer to Figure 4-C on preceding page.)
All	Events are in process <u>or</u> have occurred which involve actual <u>or</u> 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 protective action guideline exposure levels outside the EXCLUSION AREA BOUNDARY. (Refer to Figure 4-C on preceding page.)
All	Events are in process <u>or</u> have occurred which involve an actual <u>or</u> potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA protective action guideline exposure levels.
All	Unusual events are in process <u>or</u> have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response <u>or</u> monitoring are expected unless further degradation of safety systems occurs.

GENERAL	SITE AREA	ALERT	UNUSUAL EVENT
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Table 4-3  
EQUIPMENT REQUIRED AT  
SHUTDOWN PANEL

One Auxiliary Feedwater Pump  
One Atmospheric Steam Dump  
One Charging Pump  
One Boric Acid Pump  
1FCV-CH-122

Table 4-4  
SECURITY EVENTS

- a. SABOTAGE/INTRUSION has or is Occurring Within the PROTECTED AREA (Figure 4-A)
- b. HOSTAGE/EXTORTION Situation That Threatens to Interrupt Plant Operations
- c. CIVIL DISTURBANCE Ongoing Between the SITE PERIMETER and PROTECTED AREA (Figure 4-A)
- d. Hostile STRIKE ACTION Within the PROTECTED AREA Which Threatens to Interrupt Normal Plant Operations (Judgement Based on Behavior of Strikers and/or Intelligence Received) (Figure 4-A)
- e. A credible site-specific security threat notification.

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## FISSION PRODUCT BARRIER MATRIX (Modes 1-4)

- 1.1 Fuel Clad (RCS activity, corecooling, heat sink)
- 1.2 RCS (*Integrity, SGTR, heat sink*)
- 1.3 Containment (*CNMT Red Path, CNMT bypass*)

**1**

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## SYSTEM DEGRADATION

- |                              |                                 |                          |
|------------------------------|---------------------------------|--------------------------|
| 2.1 Loss of Instrumentation  | 2.5 RCS Unident Leakage         | 2.9 Turbine Failure      |
| 2.2 Loss of Function/Comm's  | 2.6 RCS Ident. Leakage          | 2.10 Stm/Feed Line Break |
| 2.3 Failure of Rx Prot.-ATWS | 2.7 Technical Specification S/D |                          |
| 2.4 Fuel Clad Degradation    | 2.8 Safety Limit Exceeded       |                          |

**2**

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## LOSS OF POWER

- 3.1 Loss of AC (Power Ops) (*Modes 1-4*)
- 3.2 Loss of AC (Shutdown) (*Modes 5 & 6*)
- 3.3 Loss of DC

**3**

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## HAZARDS and ED JUDGEMENT

- |               |                       |                             |
|---------------|-----------------------|-----------------------------|
| 4.1 Fire      | 4.3 Flammable Gas     | 4.5 Control Room Evacuation |
| 4.2 Explosion | 4.4 Toxic Gas         | 4.6 Security                |
| Table 4-1     | Table 4-2             | 4.7 ED Judgement            |
| Figure 4-A    | Figure 4-B/Figure 4-C | Table 4-3/Table 4-4         |

**4**

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## DESTRUCTIVE PHENOMENA

- |                        |                                    |
|------------------------|------------------------------------|
| 5.1 Earthquake         | 5.3 Aircraft Crash/Projectile      |
| 5.2 Tornado/High Winds | 5.4 River Level High               |
| Table 5-1              | 5.5 River Level Low                |
| Figure 5-A             | 5.6 Watercraft Crash (RW/SWS Loss) |

**5**

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## SHUTDOWN SYSTEM DEGRADATION

- |                              |  |
|------------------------------|--|
| 6.1 Loss of Shutdown Systems | 6.3 Loss of AC (Shutdown) ( <i>Modes 5 &amp; 6</i> ) |
| 6.2 RCS Inventory-Shutdown   | 6.4 Loss of DC (Shutdown) ( <i>Modes 5 &amp; 6</i> ) |
|                              | 6.5 Fuel Handling ( <i>All Modes</i> )               |
|                              | 6.6 Inadvertent Criticality                          |

**6**

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## RADIOLOGICAL

- |                      |  |
|----------------------|--|
| 7.1 Gaseous Effluent | 7.3 Radiation Levels                   |
| 7.2 Liquid Effluent  | 7.4 Fuel Handling ( <i>All Modes</i> ) |
| Table 7-1            | Table 7-2                              |
| Figure 7-A           |  |

**7**

GENERAL	5.1 Earthquake	
	Mode	Criterion / Indicator
		Refer to Tab 1 "Fission Product Barrier Matrix"
SITE AREA		Refer to Tab 1 "Fission Product Barrier Matrix"
ALERT	All	Earthquake greater than 0.06g acceleration occurs  1. Analysis of Accelerograph Recording System data indicate ground acceleration >0.06g in accordance with AOP 1/2 75 3 "Acts of Nature - Earthquake"
UNUSUAL EVENT	All	Earthquake detected by site seismic instrumentation, >0.01g acceleration [1 and 2]  1. Ann. A11-59 "Seismic Accelerograph Operation" indicates initiation of the Accelerograph Recording System 2. [a or b]  a. Ground motion sensed by plant personnel b. Unit 2 reports seismic event detected on unit instrumentation

5.2 Tornado	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
All	Tornado or high wind strikes any structure listed in Table 5-1 and results in structural damage [1 and 2]  1. Tornado or high wind strikes any structure listed in Table 5-1  2. [a or b]  a. Confirmed report of any <b>VISIBLE DAMAGE</b> to specified structures b. Control room indications of degraded safety system or component response within listed structures due to event
All	Tornado within the <b>SITE PERIMETER</b>  1. Plant personnel report a tornado has been sighted within the <b>SITE PERIMETER</b> (refer to Figure 5-A)

Figure 5-A  
Site Perimeter

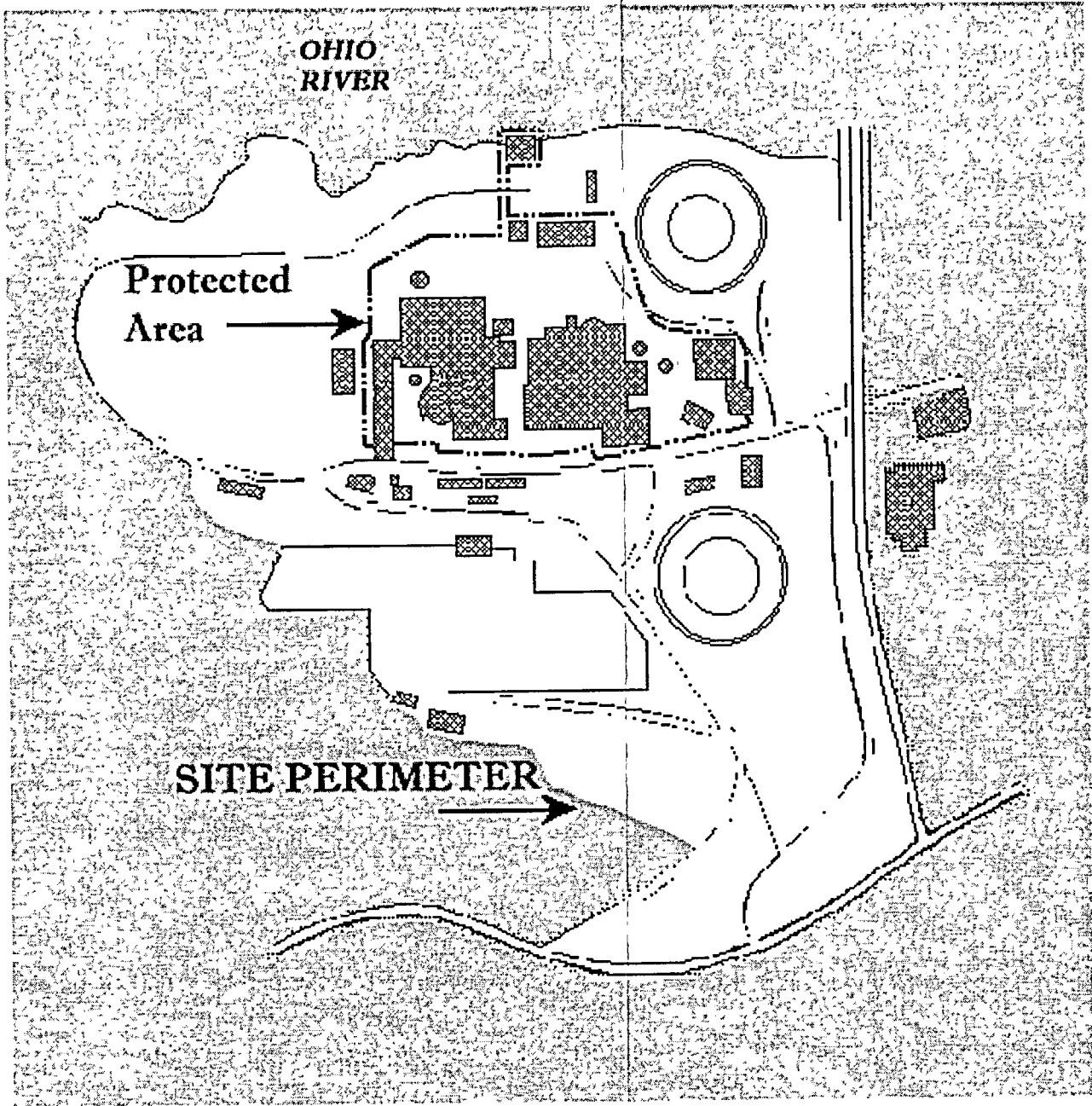


Table 5-1

Plant Structures Associated With  
Tornado/Hi Wind and Aircraft EALs

- Containment Building
- Safeguards Building
- Primary Aux. Building
- Fuel Handling Building
- RWST (1QS-TK-1)
- CO2 Storage/PG Pp Rm
- Service Building (incl. FW Reg Vlv Rm)
- Diesel Generator Building
- Main Intake Structure
- Demin. Water Sto. (1WT-TK-10)



5.3 Aircraft/Projectile Crash	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
ALL	Aircraft or PROJECTILE impacts (strikes) any plant structure listed in Table 5-1 resulting in structural damage [1 and 2]  1. Plant personnel report aircraft or PROJECTILE has impacted any structure listed in Table 5-1 on previous page  2. [a or b] a Confirmed report of any VISIBLE DAMAGE to specified structures b Control Room indications of degraded safety system or component response (within listed structures) due to event
ALL	Aircraft crash or PROJECTILE impact within the SITE PERIMETER  1. Plant personnel report aircraft crash or PROJECTILE impact within the SITE PERIMETER (refer to Figure 5-A on previous page)

5.4 River Level HIGH	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
ALL	River water level > 705 Ft mean sea level [1 or 2]  1 1LR-CW-101, if accessible, indicates >705 mean sea level  2. National Weather Bureau (412-262-1882) or Montgomery Lock (724-643-8400) reports Montgomery Lower Pool Lower Gauge Reading >52.48 Ft  <i>Note Mean Sea Level = Lower Gauge Reading + 652.52 Ft</i>
ALL	River water level >700 Ft Mean Sea Level [1 or 2]  1. 1LR-CW-101 indicates > 700 Ft Mean Sea Level  2 National Weather Bureau (412-262-1882) or Montgomery Lock (724-643-8400) reports Montgomery Lower Pool Lower Gauge Reading >47.48 Ft  <i>Note: Mean Sea Level = Lower Gauge Reading + 652.52 Ft</i>

5.5 River Level LOW	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
ALL	River water level <650 Ft Mean Sea Level [1 or 2]  1. 1LR-CW-101 indicates < 650 Ft Mean Sea Level  2. National Weather Bureau (412-262-1882) or Montgomery Lock (724-643-8400) Reports Montgomery Lower Pool Lower Gauge Reading <-2.52  <i>Note: Mean Sea Level = Lower Gauge Reading + 652.52 Ft</i>
ALL	River water level < 654' Ft Mean Sea Level [1 or 2]  1. 1LR-CW-101 indicates < 654 Ft Mean Sea Level  2. National Weather Bureau (412-262-1882) or Montgomery Lock (724-643-8400) Reports Montgomery Lower Pool Lower Gauge Reading <+1.48 Ft  <i>Note: Mean Sea Level = Lower Gauge Reading + 652.52 Ft</i>

5.6 Watercraft Crash	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
ALL	Watercraft strikes primary intake structure and results in a reduction of Reactor Plant or Turbine Plant River Water Flow [1 and 2]  1. Plant personnel report a watercraft has struck the primary intake structure  2. [a or b] a. RPRW flow reduction indicated by sustained pressure reduction to <20 psig on IPI-RW-113A and/or 113B b. TPRW flow reduction indicated by sustained pressure reduction (Ann A6-118 "RAW Water Pump Disch Press Low" <15 psig)



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**FISSION PRODUCT BARRIER MATRIX (Modes 1-4)**

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- 1.1 Fuel Clad (RCS activity, corecooling, heat sink)  
1.2 RCS (*Integrity, SGTR, heat sink*)  
1.3 Containment (*CNMT Red Path, CNMT bypass*)

**1**

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**SYSTEM DEGRADATION**

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- |                              |                                 |                          |
|------------------------------|---------------------------------|--------------------------|
| 2.1 Loss of Instrumentation  | 2.5 RCS Unident Leakage         | 2.9 Turbine Failure      |
| 2.2 Loss of Function/Comm's  | 2.6 RCS Ident. Leakage          | 2.10 Stm/Feed Line Break |
| 2.3 Failure of Rx Prot.-ATWS | 2.7 Technical Specification S/D |                          |
| 2.4 Fuel Clad Degradation    | 2.8 Safety Limit Exceeded       |                          |

**2**

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**LOSS OF POWER**

---

- 3.1 Loss of AC (Power Ops) (*Modes 1-4*)  
3.2 Loss of AC (Shutdown) (*Modes 5 & 6*)  
3.3 Loss of DC

**3**

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**HAZARDS and ED JUDGEMENT**

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- |               |                       |                             |
|---------------|-----------------------|-----------------------------|
| 4.1 Fire      | 4.3 Flammable Gas     | 4.5 Control Room Evacuation |
| 4.2 Explosion | 4.4 Toxic Gas         | 4.6 Security                |
| Table 4-1     | Table 4-2             | 4.7 ED Judgement            |
| Figure 4-A    | Figure 4-B/Figure 4-C | Table 4-3/Table 4-4         |

**4**

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**DESTRUCTIVE PHENOMENA**

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- |                        |                                    |
|------------------------|------------------------------------|
| 5.1 Earthquake         | 5.3 Aircraft Crash/Projectile      |
| 5.2 Tornado/High Winds | 5.4 River Level High               |
| Table 5-1              | 5.5 River Level Low                |
| Figure 5-A             | 5.6 Watercraft Crash (RW/SWS Loss) |

**5**

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**SHUTDOWN SYSTEM DEGRADATION**

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- |                              |  |
|------------------------------|--|
| 6.1 Loss of Shutdown Systems | 6.3 Loss of AC (Shutdown) ( <i>Modes 5 &amp; 6</i> ) |
| 6.2 RCS Inventory-Shutdown   | 6.4 Loss of DC (Shutdown) ( <i>Modes 5 &amp; 6</i> ) |
|                              | 6.5 Fuel Handling ( <i>All Modes</i> )               |
|                              | 6.6 Inadvertent Criticality                          |

**6**

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**RADIOLOGICAL**

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- |                      |  |
|----------------------|--|
| 7.1 Gaseous Effluent | 7.3 Radiation Levels                   |
| 7.2 Liquid Effluent  | 7.4 Fuel Handling ( <i>All Modes</i> ) |
| Table 7-1            | Table 7-2                              |
| Figure 7-A           |  |

**7**

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GENERAL

SITE AREA

ALERT

UNUSUAL EVENT

6.1 Loss of Shutdown Systems	
Mode	Criterion / Indicator
	Refer to Tab 7.1 "Gaseous Effluents"
	Refer to Tab 7.1 "Gaseous Effluents"
5 6	Inability to maintain unit in cold shutdown [1 and 2]  1. UNPLANNED Loss of RHR or CCR or RPRW  2. [a or b or c] a. Core exit thermocouples (CETC) (if available) indicate the temperature has increased >10 F and has exceeded 200F. b. (w/ RHR in service) RHR inlet temperature has increased >10 F and has exceeded 200 F. c. (w/o CETCs or RHR), loss has exceeded 30 minutes or there is evidence of boiling in the Rx vessel.
5 6	UNPLANNED loss of any function needed for cold shutdown that results in a core exit temperature increase of more than 10 F [1 and 2]  1. UNPLANNED Loss of RHR or CCR or RPRW  2. [a or b or c] a. Core exit thermocouples (CETC) (if available) indicate the temperature has increased >10F b. (W/ RHR in service) RHR inlet temperature has increased >10 F c. (w/o CETCs or RHR), loss has exceeded 15 minutes

6.2 RCS Inventory - Shutdown	
Mode	Criterion / Indicator
	Refer to Tab 7.1 "Gaseous Effluents"
5 6	Loss of water level in the reactor vessel that has or will uncover fuel in the reactor vessel. [1 and 2]  1. [a or b] a. Loss of RHR or CCR or RPRW b. Loss of RCS Inventory with inadequate makeup  2. [a and b] a. Ops personnel report LI-1RC-480, or LI-1RC-482C RCS level instrumentation (if available) in the Control Room indicates a level drop to 0 inches b. Other confirmed indications of fuel uncover
	Not Applicable
5 6	Loss of Reactor Coolant System Inventory with inadequate make-up [1 and 2]  1. Ops personnel report LI-1RC-480, or LI-1RC-482C RCS level instrumentation in the Control Room indicates a level drop to less than 14.5 inches  2. Ops personnel report inability to make-up RCS inventory

6.3 Loss of AC (Shutdown)	
Mode	Criterion / Indicator
	Refer to Tab 7.1 "Gaseous Effluents"
	Refer to Tab 7.1 "Gaseous Effluents"
5 6 De-Fuel	UNPLANNED loss of offsite and onsite AC power for >15 minutes]  1. AE and DF 4KV emergency buses not energized from Unit 1 sources for >15 minutes  Also refer to Tab 6.1 "Loss of Shutdown Systems"
5 6 De-Fuel	UNPLANNED loss of all offsite power supply for >15 minutes [1 and 2]  1. Offsite power supply to AE and DF 4KV buses unavailable for >15 minutes.  2. Either diesel generator is supplying power to its respective emergency bus

6.4 Loss of DC (Shutdown)	
Mode	Criterion / Indicator
	Refer to Tab 7.1 "Gaseous Effluents"
	Refer to Tab 7.1 "Gaseous Effluents"
	Refer to Tab 6.1 "Loss of Shutdown Systems"
5 6 De-Fuel	UNPLANNED loss of the required train of DC power for >15 minutes [1 or 2]  1. Voltage <110.4 VDC on DC buses 1-1 and 1-3 for >15 minutes if train A is the priority train 2. Voltage <110.4 VDC on DC buses 1-2 and 1-4 for >15 minutes if train B is the priority train

EPP/1-1a  
Att 1

GENERAL

SITE AREA

ALERT

UNUSUAL EVENT

SHUTDOWN SYSTEMS DEGRADATION - U1

6.1, 6.2, 6.3, 6.4

Revision 4

GENERAL	6.5 Fuel Handling		6.6 Inadvertent Criticality	
	Mode	Criterion / Indicator	Mode	Criterion / Indicator
		Refer to Tab 7.1 Gaseous Effluents"		Refer to Tab 7.1 Gaseous Effluents"
		Refer to Tab 7.1 Gaseous Effluents"		Refer to Tab 7.1 Gaseous Effluents"
SITE AREA				
ALERT	ALL	Major damage to irradiated fuel; <u>or</u> loss of water level that has <u>or</u> will uncover irradiated fuel outside the reactor vessel [1 and 2] 1. VALID Hi-Hi alarm on RM-RM-203 <u>or</u> RM-RM-207 <u>or</u> RM-VS-103 A/B <u>or</u> RM-VS-104 A/B 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 <u>or</u> will exceed available makeup capacity such that irradiated fuel will be uncovered  Refer to Tab 6 2 for In-vessel Uncovery		Inadvertent reactor criticality 1. Nuclear instrumentation indicate unanticipated sustained positive startup rate  3 4 5 6
	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 <u>or</u> reactor cavity, <u>or</u> transfer canal 2. VALID Hi-Hi alarm on RM-RM-203 <u>or</u> RM-RM-207 3. Fuel remains covered with water		Not Applicable
UNUSUAL EVENT				

INTENTIONALLY BLANK

**FISSION PRODUCT BARRIER MATRIX (Modes 1-4)**

- 1.1 Fuel Clad (RCS activity, corecooling, heat sink)  
 1.2 RCS (*Integrity, SGTR, heat sink*)  
 1.3 Containment (*CNMT Red Path, CNMT bypass*)

**1****SYSTEM DEGRADATION**

- 2.1 Loss of Instrumentation    2.5 RCS Unident Leakage    2.9 Turbine Failure  
 2.2 Loss of Function/Comm's    2.6 RCS Ident. Leakage    2.10 Stm/Feed Line Break  
 2.3 Failure of Rx Prot.-ATWS    2.7 Technical Specification S/D  
 2.4 Fuel Clad Degradation    2.8 Safety Limit Exceeded

**2****LOSS OF POWER**

- 3.1 Loss of AC (Power Ops) (*Modes 1-4*)  
 3.2 Loss of AC (Shutdown) (*Modes 5 & 6*)  
 3.3 Loss of DC

**3****HAZARDS and ED JUDGEMENT**

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

**4****DESTRUCTIVE PHENOMENA**

- 5.1 Earthquake    5.3 Aircraft Crash/Projectile  
 5.2 Tornado/High Winds    5.4 River Level High  
 Table 5-1    5.5 River Level Low  
 Figure 5-A    5.6 Watercraft Crash (RW/SWS Loss)

**5****SHUTDOWN SYSTEM DEGRADATION**

- 6.1 Loss of Shutdown Systems    6.3 Loss of AC (Shutdown) (*Modes 5 & 6*)  
 6.2 RCS Inventory-Shutdown    6.4 Loss of DC (Shutdown) (*Modes 5 & 6*)  
    6.5 Fuel Handling (*All Modes*)  
    6.6 Inadvertent Criticality

**6****RADIOLOGICAL**

- 7.1 Gaseous Effluent    7.3 Radiation Levels  
 7.2 Liquid Effluent    7.4 Fuel Handling (*All Modes*)  
 Table 7-1    Table 7-2  
 Figure 7-A

**7**

7.1	Gaseous Effluents
Mode	Criterion / Indicator
All	EAB dose resulting from an actual or imminent Release of gaseous radioactivity that exceeds 1000 mR TEDE or 5000 mR child thyroid CDE for the actual or projected duration of the release [1 or 2 or 3] 1. A VALID gas effluent rad monitor reading exceeds the values in Column 4 of Table 7-1 for >15 minutes, unless dose projections within this time period confirms that the CRITERION is NOT exceeded 2. Field survey results indicate EAB dose >1000 mR β-γ for the actual or projected duration of the release 3. EPP dose projection results indicate EAB dose >1000 mR TEDE or >5000 mR child thyroid CDE for the actual or projected duration of the release
All	EAB dose resulting from an actual or imminent release of gaseous radioactivity that exceeds 100 mR TEDE or 500 mR child thyroid CDE for the actual or projected duration of the release [1 or 2 or 3] 1. A VALID gas effluent rad monitor reading exceeds the values in Column 3 of Table 7-1 for >15 minutes, unless dose projections within this time period confirms that the CRITERION is NOT exceeded 2. Field survey results indicate EAB dose >100 mR β-γ for the actual or projected duration of the release 3. EPP dose projection results indicate EAB dose >100 mR TEDE or >500 mR child thyroid CDE for the actual or projected duration of the release
All	Any UNPLANNED release of gaseous radioactivity that exceeds 200 times Technical Specification 6.8.6a/Offsite Dose Calculation Manual Limit for 15 minutes [1 or 2 or 3] 1. A VALID gas effluent rad monitor reading exceeds the values in Column 2 of Table 7-1 for >15 minutes, unless dose projections within this time period confirms that the CRITERION is NOT exceeded 2. Field survey results indicate >10 mR/hr β-γ at the EAB for >15 minutes 3. EPP dose projection results indicate EAB dose >10 mR TEDE for the duration of the release
All	Any UNPLANNED release of gaseous radioactivity that exceeds 2 times Technical Specification 6.8.6a/Offsite Dose Calculation Manual Limit for 60 minutes [1 or 2 or 3] 1. A VALID gas effluent rad monitor reading exceeds the values in Column 1 of Table 7-1 for >60 minutes, unless dose projections within this time period confirms that the CRITERION is NOT exceeded 2. Field survey results indicate >0.1 mR/hr β-γ at the EAB for >60 minutes 3. EPP dose projection results indicate EAB dose >0.1 mR TEDE for the duration of the release

7.2	Liquid Effluents
Mode	Criterion / Indicator
	Not Applicable
	Not Applicable
All	Any UNPLANNED release of liquid radioactivity that exceeds 200 times Technical Specifications 6.8.6a/Offsite Dose Calculation Manual Limit for 15 minutes [1 or 2] 1. A VALID liquid effluent rad monitor reading exceeds the values in Column 2 of Table 7-1 for >15 minutes, unless dose projections within this time period confirms that the CRITERION is NOT exceeded 2. Sample results exceed 200 times the Technical Specification 6.8.6a/Offsite Dose Calculation Manual Limit for an unmonitored release of liquid radioactivity >15 minutes in duration
All	Any UNPLANNED release of liquid radioactivity to the environment that exceeds 2 times Technical Specification 6.8.6a/Offsite Dose Calculation Manual Limit for 60 minutes [1 or 2] 1. A VALID liquid effluent rad monitor reading exceeds the values in Column 1 of Table 7-1 for >60 minutes, unless dose projections within this time period confirms that the CRITERION is NOT exceeded 2. Sample results exceed 2 times Technical Specification 6.8.6a/Offsite Dose Calculation Manual Limit for an unmonitored release of liquid radioactivity >60 minutes in duration

TABLE 7-1 EFFLUENT RADIATION MONITOR EAL'S					EPP/I-1a Attachment 1			
<i>NOTE: The values below, if exceeded, indicate the need to perform the specified dose projection/assessment, as listed at the bottom of each column. If the assessment can not be completed within 15 minutes (60 minutes per UE), the declaration shall be made based on the VALID reading.</i>								
<i>* NOTE: These monitors have the ability to divert or terminate effluent flow. Ensure that a release is in progress prior to using the EAL.</i>								
	Column 1 UE		Column 2 Alert		Column 3 Site		Column 4 General	
<b>If a RWDA (Batch Release) is Applicable</b>	<b>2x the ODCM Limit</b>		<b>200x the ODCM Limit</b>					
* RM-1LW-104	7.06E+5	cpm	n/a	cpm	n/a	cpm	n/a	cpm
* RM-1LW-116	n/a	cpm	n/a	cpm	n/a	cpm	n/a	cpm
RM-1VS-101B (RBC Purge)	2.40E+03	cpm	2.40E+05	cpm	n/a	cpm	n/a	cpm
RM-1VS-109 Channel 5 (RBC Purge)	2.86E+03	cpm	2.86E+05	cpm	n/a	cpm	n/a	cpm
RM-1VS-110 Channel 5 (RBC Purge)	1.33E+04	cpm	n/a	cpm	n/a	cpm	n/a	cpm
* RM-1GW-108B (GWDT)	7.86E+05	cpm	n/a	cpm	n/a	cpm	n/a	cpm
RM-1GW-109 Channel 5 (GWDT)	n/a	cpm	n/a	cpm	n/a	cpm	n/a	cpm
<b>For All Other Unplanned Releases</b>	<b>2x the ODCM Limit</b>		<b>200x the ODCM Limit</b>					
<b>Auxiliary Building Ventilation System (also called Ventilation Vent)</b>								
RM-1VS-101B	6.00E+03	cpm	6.00E+05	cpm	n/a	cpm	n/a	cpm
RM-1VS-109 Channel 5	2.94E+03	cpm	2.94E+05	cpm	6.01E+05	cpm	n/a	cpm
RM-1VS-109 Channel 7	n/a	cpm	n/a	cpm	6.69E+01	cpm	6.69E+02	cpm
RM-1VS-109 Channel 9	n/a	cpm	n/a	cpm	n/a	cpm	1.32E+01	cpm
RM-1VS-111 HR (SA-9)	n/a	cpm	n/a	cpm	n/a	cpm	n/a	cpm
RM-1VS-111 LR (SA-10)	n/a	cpm	n/a	cpm	7.32E+03	cpm	7.32E+04	cpm
<b>Reactor Building/SLCRS Vent System (also called Elevated Release)</b>								
RM-1VS-107B	1.29E+04	cpm	n/a	cpm	n/a	cpm	n/a	cpm
RM-1VS-110 Channel 5	6.76E+03	cpm	6.76E+05	cpm	9.08E+05	cpm	n/a	cpm
RM-1VS-110 Channel 7	n/a	cpm	n/a	cpm	7.98E+01	cpm	7.98E+02	cpm
RM-1VS-110 Channel 9	n/a	cpm	n/a	cpm	n/a	cpm	2.28E+02	cpm
RM-1VS-112 HR (SA-9)	n/a	cpm	n/a	cpm	n/a	cpm	1.53E+01	cpm
RM-1VS-112 LR (SA-10)	n/a	cpm	n/a	cpm	1.19E+04	cpm	1.19E+05	cpm
<b>Gaseous Waste/Process Vent System</b>								
* RM-1GW-108B	n/a	cpm	n/a	cpm	n/a	cpm	n/a	cpm
RM-1GW-109 Channel 5	n/a	cpm	n/a	cpm	n/a	cpm	n/a	cpm
RM-1GW-109 Channel 7	4.80E+03	cpm	4.80E+05	cpm	7.90E+05	cpm	n/a	cpm
RM-1GW-109 Channel 9	n/a	cpm	n/a	cpm	1.83E+04	cpm	1.83E+05	cpm
RM-1GW-110 HR (SA-9)	n/a	cpm	n/a	cpm	1.59E+04	cpm	1.59E+05	cpm
RM-1GW-110 LR (SA-10)	n/a	cpm	n/a	cpm	n/a	cpm	n/a	cpm
<b>Main Steam Reliefs</b>								
RM-1MS-101	n/a	cpm	n/a	cpm	n/a	cpm	8.00E+01	cpm
<b>Liquid Effluent Pathways</b>								
* RM-1LW-104	7.06E+5	cpm	n/a	cpm	n/a	cpm	n/a	cpm
* RM-1LW-116	n/a	cpm	n/a	cpm	n/a	cpm	n/a	cpm
RM-1RW-100	5.14E+04	cpm	n/a	cpm	n/a	cpm	n/a	cpm
* RM-1DA-100	2.44E+04	cpm	n/a	cpm	n/a	cpm	n/a	cpm
<b>Minimum Release Duration</b>		60 minutes		15 minutes		15 minutes		15 minutes
<b>Assessment Method for Gaseous Release</b>		1/2-HPP-03.06.012 1/2-HPP-03.06.013		1/2-HPP-03.06.012 1/2-HPP-03.06.013 EPP/IP-2.6.x		EPP/IP-2.6.x		EPP/IP-2.6.x
<b>Assessment Method for Liquid Release</b>		EPP/IP-2.7 EPP/IP-2.7.1		EPP/IP-2.7 EPP/IP-2.7.1				

GENERAL  
SITE AREA  
ALERT  
UNUSUAL EVENT

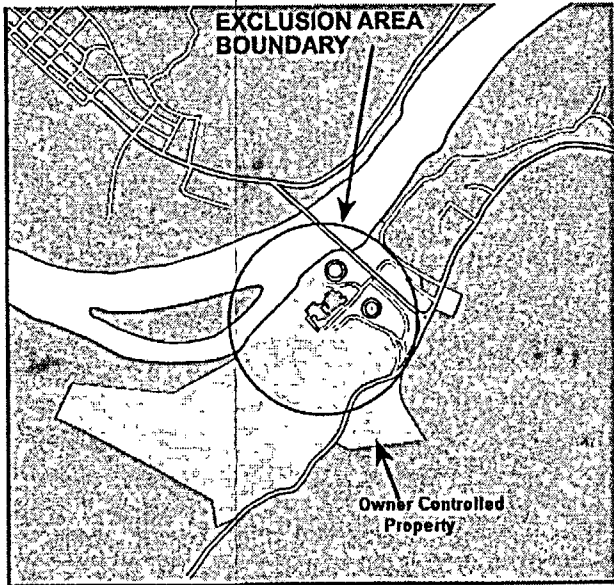
7.3 Radiation Levels	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix" or Tab 7.1 "Gaseous Effluents"
	Refer to Tab 1 "Fission Product Barrier Matrix" or Tab 7.1 "Gaseous Effluents"
All	<p>UNPLANNED increases in radiation levels within the facility that impedes safe operations <u>or</u> establishment <u>or</u> maintenance of cold shutdown [1 or 2]</p> <p>1. VALID area radiation monitor readings <u>or</u> survey results exceed 15 mR/hr in the Control Room or PAF (on U2 DRMS) for &gt;15 minutes</p> <p>2. [a and b]</p> <p>a. VALID area radiation monitor readings or survey results exceed values listed in Table 7-2</p> <p>b. Access restrictions impede operation of systems necessary for safe operation or the ability to establish or maintain cold shutdown See Note Below</p>
All	<p>UNPLANNED increase in radiation levels within the facility</p> <p>1. VALID area radiation monitor readings increase by a factor of 1000 over normal levels for &gt;15 minutes</p> <p>Note: In either the UE or ALERT EAL, the ED must determine the cause of increase in radiation levels and review other CRITERIA/INDICATORS for applicability (e.g., a dose rate of 15 mR/hr in the Control Room could be caused by a release associated with a more significant event)</p>

7.4 Fuel Handling	
Mode	Criterion / Indicator
	Refer to Tab 7.1 "Gaseous Effluents"
	Refer to Tab 7.1 "Gaseous Effluents"
All	<p>Major damage to irradiated fuel; <u>or</u> loss of water level that has <u>or</u> will uncover irradiated fuel outside the reactor vessel [1 and 2]</p> <p>1. VALID Hi-Hi alarm on RM-RM-203 <u>or</u> RM-RM-207 <u>or</u> RM-VS-103 A/B <u>or</u> RM-VS-104 A/B</p> <p>2. [a or b]</p> <p>a. Plant personnel report damage of irradiated fuel sufficient to rupture fuel rods</p> <p>b. Plant personnel report water level drop has <u>or</u> will exceed available makeup capacity such that irradiated fuel will be uncovered</p> <p>Refer to Tab 6 "Shutdown Systems" for In-vessel Uncovery</p>
ALL	<p>UNPLANNED loss of water level in spent fuel pool or reactor cavity or transfer canal with fuel remaining covered [1 and 2 and 3]</p> <p>1. Plant personnel report water level drop in spent fuel pool <u>or</u> reactor cavity, <u>or</u> transfer canal</p> <p>2. VALID Hi-Hi alarm on RM-RM-203 <u>or</u> RM-RM-207 <u>or</u></p> <p>3. Fuel remains covered with water</p>

Table 7-2  
Areas Associated With EAL 7.3

LOCATION	INDICATOR	READING
Chem Sample Panel (735' PAB)	RM-RM-212	>100 mR/hr general area
PASS Sample Pnl (735' PAB)	Survey Results	>100 mR/hr general area
Manual Valve Chg. Pump Discharge (722' PAB)	Survey Results	>100 mR/hr general area
Safeguards 752' Valves 1HY-110, 1HY-111, 1HY-196, 1HY-197	Survey Results	>100 mR/hr general area
767' PAB SA9/SA10 Gas Monitors	Survey Results	>100 mR/hr general area
752' PAB SPING Monitor	RM-RM-210	>100 mR/hr general area
752' Safeguards Valves IRS-157, IRS-159	Survey Results	>100 mR/hr general area
735' West Cable Vault Valves, 1IA-90, 1HY-101, 1HY-102, 1HY-103, 1HY-104	Survey Results	>100 mR/hr general area
735' Safeguards (1QSS, AFW)	Survey Results	>100 mR/hr general area
Main Steam Valve Room (752' Safeguards)	Survey Results	>100 mR/hr general area
A Penetrations (722' Safeguards)	Survey Results	>5 R/hr general area
East Cable Vault (735' Safeguards)	Survey Results	>100 mR/hr general area
Normal 4kV Switchgear	Survey Results	>100 mR/hr general area
Process Instrm. Room	Survey Results	>100 mR/hr general area
AE/DF Switchgear	Survey Results	>100 mR/hr general area
EDG 1-1, 1-2	Survey Results	>100 mR/hr general area

Figure 7-A  
EXCLUSION AREA  
BOUNDARY



**RECOGNITION AND CLASSIFICATION**  
**OF EMERGENCY CONDITIONS**

CONTROLLED  
BVPS UNIT 2

**EFFECTIVE INDEX**

Issue 8 Rev.	0	OSC Approved	3-12-87
	1	OSC Approved	8-13-87
	2	OSC Approved	10-8-87
	3	OSC Approved	2-9-88
	4	OSC Approved	2-9-89
	5	Non-Safety Related	3-15-89
	6	OSC Approved	4-18-89
	7	OSC Approved	4-12-90
Issue 9 Rev.	0	Non-Intent Revision	10-9-90
	1	OSC Approved	4-4-91
	2	Non-Intent Revision	12-29-92
	3	OSC Approved	1-27-93
Rev.	5	OSC Approved	12-9-93
	6	OSC Approved	10-7-94
	7	OSC Approved	7-22-98
	8	Non-Intent Revision	12-31-99
Rev.	0	OSC Approved	4-17-01
Rev.	1	Non-Intent Revision	12-12-01
Rev.	2	Simple Change	8-28-02
Rev.	3	Simple Change	11-8-02
Rev.	4	Simple Change	2-25-03



**TABLE OF CONTENTS**

- A. Purpose
- B. References
- C. Responsibilities
- D. Action Levels/Precautions
- E. Procedure
- F. Final Condition
- G. Attachments

A. PURPOSE

- 1.0 This procedure describes the immediate actions to be taken to recognize and classify an emergency condition.
- 2.0 This procedure identifies the four emergency classifications and emergency action levels.
- 3.0 Reporting requirements for non-emergency abnormal events are provided.

B. REFERENCES

- 1.0 Beaver Valley Power Station Emergency Preparedness Plan and Implementing Procedures.
- 2.0 Title 10, Code of Federal Regulations Part 50, Appendix E.
- 3.0 NUREG-0654/FEMA-REP-1, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants
- 4.0 Beaver Valley Power Station Operating Manual
- 5.0 NUMARC/NESP-007, Methodology for Development of Emergency Action Levels
- 6.0 ERS-SFL-91-041-REV 1 (U1/U2 Containment Monitor Readings due to LOCA's with various Source Terms).
- 7.0 Condition Report #992522
- 8.0 Condition Report #991327-1
- 9.0 Unit 1 Technical Specification Amendment 204 and Unit 2 Technical Specification Amendment 101.
- 10.0 EPPOS #2 "Emergency Preparedness Position (EPPOS) on Timeliness of Classification of Emergency Conditions".
- 11.0 NEI 99-02 "Regulatory Assessment Performance Indicator Guideline"
- 12.0 Condition Report #00-3939

- 13.0 Condition Report #99-1234
- 14.0 Condition Report #02-02125-02
- 15.0 Calculation Package No. ERS-ATL-93-021
- 16.0 Calculation Package No. ERS-HHM-87-014
- 17.0 Calculation Package No. ERS-SFL-86-005
- 18.0 Calculation Package No. ERS-SFL-99-014
- 19.0 Condition Report #02-08649
- 20.0 Condition Report #02-09224

**C. RESPONSIBILITY**

The Emergency Director (Shift Manager, until properly relieved by a designated alternate) has the responsibility and authority for the performance of the actions prescribed in this procedure.

**D. ACTION LEVELS/PRECAUTIONS/GUIDANCE**

**1.0 ACTION LEVELS**

- 1.1 An off-normal event has occurred.
- 1.2 An action step in a plant operating or emergency operating procedure refers to this procedure for classification of the indicated plant condition.

**2.0 PRECAUTIONS**

- 2.1 The Emergency Director must review all applicable EALs to ensure that the event is properly classified since a given INDICATOR may be associated with more than one CRITERION. A particular INDICATOR omitted from the fission product barrier matrix may be addressed as an event-based EAL in one of the other tabs. Event-based EALs may escalate to the fission product barrier matrix. The Emergency Director may need to consider related events (*e.g., fire and explosion*) or the possible consequences of the event (*e.g., fire in an MCC resulting in loss of AC*) in classifying an event.
- 2.2 Continued surveillance and assessment of plant conditions are necessary to ensure that the emergency classification is appropriately revised as conditions change, or as more definitive information is obtained.

- 2.3 If there is any doubt with regard to assessment of a particular EAL, the EAL Basis Document (*i.e.*, *Chapter 4 of the EPP*) entry for that EAL can be reviewed. Classifications shall be consistent with the fundamental definitions of the four emergency classifications (tabulated in Tab 4.7).
- 2.4 The Emergency Director shall take whatever mitigative or restoration actions are necessary to protect public health and safety. The Emergency Director shall not reject courses of action solely on the basis that the action would result in escalation of the emergency classification.

### 3.0 GUIDANCE

#### 3.1 Structure of the EALs

- 3.1.1 There are two types of Emergency Action Levels included in this procedure:

3.1.1.1 Barrier-Based EALs: These EALs address conditions that represent potential losses, or losses, of one or more of the Fuel Clad, RCS, or Containment fission product barriers. INDICATORS of these conditions include CRITICAL SAFETY FUNCTION status, fundamental indications such as subcooling or reactor vessel water level, or auxiliary indications such as containment radiation monitor readings. Classifications are based on the number of barriers lost or potentially lost.

3.1.1.2 Event-Based EALs: These EALs address discrete conditions or events that are generally precursors to fission product barrier degradation, or are otherwise degradations in the level of safety of the plant. Events may be external (*e.g.*, *severe weather, earthquakes, loss of offsite power*) internal (*e.g.*, *fires, explosions, instrumentation failure*) or may involve radioactivity releases.

3.1.2 The EALs are grouped by recognition category as follows:

Tab 1	Fission Product Barrier Matrix
Tab 2	System Degradation
Tab 3	Loss of Power
Tab 4	Hazards and ED Judgement
Tab 5	Destructive Phenomena
Tab 6	Shutdown Systems Degradation
Tab 7	Radiological

3.1.3 Each of the EAL tabs includes one or more columns that address one initiating condition (*e.g., fires*). Each column provides EALs for each of the four emergency classifications, as applicable. A notation adjacent to each EAL identifies the plant operating mode(s) for which the EAL is applicable.

3.1.4 Each EAL is comprised of a CRITERION, printed in bold type, and one or more INDICATORS. The purpose of each is as follows:

3.1.4.1 **CRITERION:** identifies the emergency condition and any numeric values which define that condition (*i.e., the basis of the declaration*). All classifications are based on an assessment (*i.e., determination that the condition is VALID*) by the Emergency Director that the CRITERION has been met or exceeded. Implicit in this protocol is the necessity for these assessments to be completed within 15 minutes (unless otherwise noted) of indications being available to Control Room operators that an Emergency Action Level (EAL) has been exceeded.

3.1.4.2 **INDICATOR:** is available via instrumentation, calculations, procedure Entry (AOPs, EOPs, etc.), operator knowledge of plant conditions (pressure, temperatures, etc.) in the Control Room, or reports received from plant personnel, whichever is most limiting, or other evidence that the associated criterion may be exceeded. Upon occurrence of one or more indicators, the Emergency Director performs an assessment against the criterion. Depending on the particular condition, this assessment may be as simple as a review of the criterion, an instrument channel check, or a detailed calculation as in the case of a radioactivity release.

3.1.4.3 Inherent in this protocol is the necessity for these assessments to be completed within 15 minutes (unless otherwise noted) of sufficient indications being available to Control Room operators that an Emergency Action Level (EAL) has been exceeded.

3.1.4.4 The INDICATORS were selected with the objective of providing unambiguous guidance to assist with assessment of the CRITERION. There may be other INDICATORS not envisioned by the writers of this procedure that, in the judgment of the Emergency Director, correspond to the CRITERION. In these cases, the Emergency Director should base the declaration on engineering judgment, using the supplied INDICATORS as examples of the severity of the condition.

### 3.2 Common Plant Conditions

3.2.1 IF an event occurs such that both reactor units are affected, e.g., tornado, toxic gas offsite, etc., THEN the senior Shift Manager shall make the appropriate classification and assume the role of Emergency Director.

3.2.2 IF the common plant condition results in a higher emergency classification at one reactor unit, THEN the Shift Manager from that unit shall make the appropriate classification and assume the role of Emergency Director.

### 3.3 Mode Applicability

3.3.1 The plant operating mode that existed at the time that the event occurred, prior to any protective system or operator action initiated in response to the condition, is compared to the mode applicability of the EALs.

3.3.2 IF an event occurs, and a lower or higher plant operating mode is reached before the classification can be made, THEN the classification shall be based on the mode that existed at the time that the event occurred.

- 3.3.3 The fission product barrier matrix is applicable only to those events that occur at mode 4 or higher. An event that occurs in modes 5 or 6 shall not be classified using the fission product barrier matrix, even if mode 4 is entered due to subsequent heatup. In these cases, Tab 6, Shutdown Systems Degradation, shall be used for classification.

3.4 Transient Events.

- 3.4.1 For some EALs the existence of the event, without regard to duration, is sufficient to warrant classification. In these cases, the appropriate emergency classification is declared as soon as the Emergency Director assessment concludes that the CRITERION is met.
- 3.4.2 Some EALs specify a duration of occurrence. For these EALs the classification is made when Emergency Director assessment concludes that the specified duration is exceeded or will be exceeded (*i.e., condition can not be reasonably rectified before the duration elapses*), whichever is sooner.
- 3.4.3 IF a plant condition meeting an EAL CRITERION is rectified before the specified duration time is exceeded, THEN the event is NOT classified by that EAL. Lower severity EALs, if any, shall be reviewed for possible applicability in these cases.
- 3.4.4 IF a plant condition meeting an EAL CRITERION is NOT classified at the time of occurrence, but is identified well after the condition has occurred (e.g., as a result of routine log or record review) AND the condition no longer exists, THEN an emergency shall NOT be declared. However, reporting under 10 CFR 50.72 may be required. Such a condition could occur, for example, if a followup evaluation of an abnormal condition uncovers evidence that the condition was more severe than earlier believed.

3.4.5 IF an emergency classification was warranted, but the plant condition has been rectified (such that the CRITERION is no longer met) prior to declaration and notification, THEN the following guidance applies:

3.4.5.1 For transient events that would have been declared as UNUSUAL EVENTS, no emergency is declared. However, the event shall be reported to those local, state, and Federal agencies designated to receive the initial notification form. These agencies shall be told that the UNUSUAL EVENT condition was rectified upon detection and no emergency is being declared.

3.4.5.2 For transient events that would have been declared as an ALERT, SITE AREA EMERGENCY, or GENERAL EMERGENCY, the event shall be declared and the emergency response organization activated. The EAL CRITERIA for these events has been set at a threshold that warrants declaration even if the initiating condition has been rectified. Termination can occur when the criteria of EPP/IP-6.2, *Termination of the Emergency and Recovery* can be satisfied.

### 3.5 Declaration Timing and Assessment

Emergency conditions shall be classified as soon as the Emergency Director assessment of the INDICATORS shows that the CRITERION is met. IF the EAL specifies a duration, THEN the event shall be declared as soon as it is determined that the condition cannot be corrected within the specified period. In either case, the assessment time starts from the indications being available to Control Room operators that an Emergency Action Level (EAL) has been exceeded.

3.5.1 The assessment time is limited to 15 minutes, except as follows:

3.5.1.1 IF the EAL specifies a duration (e.g., *release exceeds 2x T/S for one hour*), THEN the assessment time runs concurrently with the required duration AND is the same length (e.g., *in this example, one hour*).

3.5.1.2 The assessment time and any required duration are NOT additive.



- 3.5.2 IF the assessment cannot be completed within the specified period, THEN the event must be declared on the basis of INDICATORS that cannot be reasonably discounted.

3.6 Bases

- 3.6.1 Chapter 4 of the BVPS EPP provides the bases for these EALs. The bases can be used for guidance to assist the Emergency Director in classifying events for which the classification is not immediately apparent.

3.7 Defined Terms

- 3.7.1 In the EALs, words written in bold uppercase letters are defined terms having specific meanings as they relate to this procedure. Definitions of these terms are provided on the reverse side of most pages in the EAL section of this procedure. Such terms shall be interpreted as provided in the definitions.

**E. PROCEDURE**

- 1.0 DETERMINE OPERATING MODE THAT EXISTED AT THE TIME THAT THE EVENT OCCURRED PRIOR TO ANY PROTECTION SYSTEM OR OPERATOR ACTION INITIATED IN RESPONSE TO THE EVENT.
- 2.0 DETERMINE IF THE CONDITION AFFECTS FISSION PRODUCT BARRIERS AND, IF SO, PROCEED TO TAB 1.
- 2.1 IF the condition involves any of the following AND the initial mode was 1-4 THEN proceed to Tab 1 and follow instructions provided AND continue with Step 2.2.
- 2.1.1 CSF status tree ORANGE PATH or RED PATH conditions
  - 2.1.2 Core exit thermocouple readings above 729 F
  - 2.1.3 Reactor vessel full range water level less than 40% (no RCPs)
  - 2.1.4 Elevated RCS activity >300  $\mu\text{Ci/gm}$
  - 2.1.5 Elevated Containment High Range Area Radiation Monitor reading
  - 2.1.6 RCS leakrate large enough to require a 2nd charging pump
  - 2.1.7 Loss of RCS subcooling
  - 2.1.8 Steam Generator Tube Rupture
  - 2.1.9 Containment bypass or loss of integrity
  - 2.1.10 Rise in containment pressure or hydrogen concentration

- 2.2 Consider other related event-based EALs. IF other EALs are applicable, THEN perform Steps 3.0 and 4.0 if necessary. Otherwise, go to Step 5.0
- 3.0 CATEGORIZE THE EVENT INTO ONE OF THE INITIATING CONDITIONS AND LOCATE THE TAB.
- 3.1 Locate one of the EAL indices provided at the start of each tab.
- 3.2 Review the index to identify the tab that addresses the event that has occurred.
- 3.3 Turn to the appropriate tab.

**NOTE:**

The assessment of an emergency condition shall be completed as soon as possible and within 15 minutes of the occurrence of one or more INDICATORS. IF the assessment cannot be completed within the specified period, THEN the event must be declared on the basis of INDICATORS that cannot be reasonably discounted.

**NOTE:**

IF the EAL specifies a duration (e.g., *release exceeds 2x T/S for one hour*), THEN the assessment time runs concurrently with the required duration AND is the same length.

- 4.0 ASSESS THE EVENT AND COMPARE TO THE EALS
- 4.1 Locate the EAL for the highest severity emergency classification that is applicable for the initiating condition and operating mode
- 4.2 Review the INDICATORS and CRITERION for that EAL
- 4.3 IF the specified INDICATORS are not observed, THEN:
- 4.3.1 Proceed to the next lower severity EAL and re-perform step 4.2 & 4.3.
- 4.3.2 IF none of the EALs for an initiating condition are met, THEN re-perform steps 3.0 and 4.0 for related initiating conditions.

4.3.3 IF the actions above do not identify an applicable EAL, THEN review the observed conditions against Tab 4.7, Hazards and Emergency Director Judgment.

4.3.4 IF, after performing the above, no EAL is identified, THEN proceed to step 6.0.

4.4 IF the specified INDICATORS are observed, THEN:

4.4.1 Perform necessary assessments to validate the instrument readings and/or confirm reported observations.

4.4.2 Initiate any sampling, inspections, or dose assessments specified by the EAL.

**NOTE:**

IF the CRITERION specifies an event or condition duration, THEN the classification shall be made as soon as the duration is exceeded, OR when it is apparent that the duration will be exceeded, whichever is earlier.

4.4.3 Compare the results of the assessments to the CRITERION.

**NOTE:**

A given INDICATOR may apply to more than one CRITERION. The Emergency Director shall review other related EALs for applicability.

4.5 IF the assessment concludes that the CRITERION is met, THEN the classification shall be made. Proceed to Step 5.0

4.6 IF the assessment concludes that the CRITERION is not met, THEN re-perform steps 3.0 and 4.0 for other related initiating conditions as applicable.

- 4.7 IF no classification results from the above, THEN proceed to step 6.0.

**NOTE**

The declaration of the emergency classification shall be made as soon as the Emergency Director has assessed that the EAL has been met OR will be met, AND within 15 minutes of occurrence of the INDICATOR. Once the emergency is classified, notifications to state and local governments shall be completed within 15 minutes of the declaration.

5.0 DECLARE THE EMERGENCY CLASSIFICATION AND TRANSITION TO RESPONSE PROCEDURES

- 5.1 IF an UNUSUAL EVENT is declared, THEN proceed to EPP/I-2
- 5.2 IF an ALERT is declared, THEN proceed to EPP/I-3
- 5.3 IF a SITE AREA EMERGENCY is declared, THEN proceed to EPP/I-4
- 5.4 IF a GENERAL EMERGENCY is declared, THEN proceed to EPP/I-5

**NOTE**

The step below is implemented only if an emergency classification is NOT made. IF a classification is made, THEN the transition indicated in step 5.0 should have been made.

6.0 EVALUATE THE NEED FOR AND MAKE NON-EMERGENCY NOTIFICATIONS

- 6.1 IF the abnormal condition is reportable to the NRC pursuant to 10 CFR 50.72 and 1/2-ADM-2202, THEN perform the following:
- 6.1.1 Complete the NRC Reactor Plant Event Notification Worksheet (located on the Regulatory Affairs web page).
- 6.1.2 Notify First Energy Communications of the event and provide the information on the NRC Reactor Plant Event Notification Worksheet.

- 6.2 IF directed by station management, THEN make courtesy calls to the following state and local agencies on a timely basis consistent with normal working hours.

- 6.2.1 BCEMA
- 6.2.2 PEMA
- 6.2.3 CCCEMA
- 6.2.4 HCOES

**F. FINAL CONDITIONS**

- 1.0 For emergency events, the transition to the appropriate response procedure has been made and actions pursuant to that procedure are in progress.
- 2.0 For non-emergency events, required notifications have been completed.

**G. ATTACHMENTS**

- 1.0 Tabs for Classification of Emergency Conditions

**H. FIGURES**

- 1.0 Figures are identified on the EAL indices

## FISSION PRODUCT BARRIER MATRIX (Modes 1-4)

- 1.1 Fuel Clad (RCS activity, corecooling, heat sink)
- 1.2 RCS (*Integrity, SGTR, heat sink*)
- 1.3 Containment (*CNMT Red Path, CNMT bypass*)

1

## SYSTEM DEGRADATION

- 2.1 Loss of Instrumentation
- 2.2 Loss of Function/Comm's
- 2.3 Failure of Rx Prot.-ATWS
- 2.4 Fuel Clad Degradation
- 2.5 RCS Unident Leakage
- 2.6 RCS Ident. Leakage
- 2.7 Technical Specification S/D
- 2.8 Safety Limit Exceeded
- 2.9 Turbine Failure
- 2.10 Stm/Feed Line Break

2

## LOSS OF POWER

- 3.1 Loss of AC (Power Ops) (*Modes 1-4*)
- 3.2 Loss of AC (Shutdown) (*Modes 5 & 6*)
- 3.3 Loss of DC

3

## HAZARDS and ED JUDGEMENT

- 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/Figure 4-C
- 4.5 Control Room Evacuation
- 4.6 Security
- 4.7 ED Judgement
- Table 4-3/Table 4-4

4

## DESTRUCTIVE PHENOMENA

- 5.1 Earthquake
- 5.2 Tornado/High Winds
- Table 5-1
- Figure 5-A
- 5.3 Aircraft Crash/Projectile
- 5.4 River Level High
- 5.5 River Level Low
- 5.6 Watercraft Crash (RW/SWS Loss)

5

## SHUTDOWN SYSTEM DEGRADATION

- 6.1 Loss of Shutdown Systems
- 6.2 RCS Inventory-Shutdown
- 6.3 Loss of AC (Shutdown) (*Modes 5 & 6*)
- 6.4 Loss of DC (Shutdown) (*Modes 5 & 6*)
- 6.5 Fuel Handling (*All Modes*)
- 6.6 Inadvertent Criticality

6

## RADIOLOGICAL

- 7.1 Gaseous Effluent
- 7.2 Liquid Effluent
- Table 7-1
- Figure 7-A
- 7.3 Radiation Levels
- 7.4 Fuel Handling (*All Modes*)
- Table 7-2

7

Modes: 1,2,3,4  
INSTRUCTIONS

NOTE: An INDICATOR is considered to be MET if the stated threshold has been, or is, reached or exceeded, on the basis of confirmed observation or VALID instrument readings. The Emergency Director must use judgement when classifying parameters that may be transitory (e.g., containment pressure).

NOTE: The INDICATOR should be considered MET if the parameter is indeterminate due to instruments that are not available or out of range and the existence of the condition can not be reasonably discounted.

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

1. In the matrix to the left, review the LOSS INDICATORS in each barrier column. If one or more INDICATORS are met, check the LOSS block at the bottom of the column.
2. If no LOSS is identified for a particular barrier, review the potential LOSS INDICATORS for that barrier. If one or more INDICATORS are met, check the potential LOSS block at the bottom of the barrier column.
3. Compare the blocks checked to the CRITERIA below and make the appropriate declaration.

## CRITERIA

## GENERAL EMERGENCY

LOSS of any Two (2) barriers and Potential loss of third barrier.  
OR  
LOSS of all three (3) barriers.

## SITE AREA EMERGENCY

LOSS or Potential LOSS of any two (2) barriers.  
OR  
LOSS of one (1) barrier and a Potential LOSS of a second barrier.

## ALERT

Any LOSS or Potential LOSS of Fuel Clad barrier.  
OR  
Any LOSS or Potential LOSS of RCS barrier.

## UNUSUAL EVENT

LOSS or Potential Loss of CNMT barrier.

## SEE ALSO EAL'S:

- 2.4 Fuel Clad Degradation (RCS Specific Activity >LCO)
- 2.5 RCS Unidentified or Pressure Boundry Leakage > 10 gpm
- 2.6 RCS Identified Leakage > 25 gpm.

## 1.1 Fuel Clad Barrier

## 1.1.1 Critical Safety Function Status

LOSS	Potential LOSS
Core Cooling CSF RED PATH	Core Cooling CSF ORANGE PATH <u>OR</u> Heat Sink CSF RED PATH

-OR-

## 1.1.2 Three Max CETCs

LOSS	Potential LOSS
Greater than 1200F	Greater than 729F

-OR-

## 1.1.3 Reactor Vessel Water Level

LOSS	Potential LOSS
Not Applicable	RVLIS Full Range <40% (no RCPs running)

-OR-

## 1.1.4 Primary Coolant Activity Level

LOSS	Potential LOSS
RCS activity >300μCi/gm dose equivalent Iodine-131	Not Applicable

-OR-

## 1.1.5 Letdown Monitor Indication

LOSS	Potential LOSS
2CHS-RQ101 A/B [3051] VALID reading greater than 300μCi/ml with letdown unisolated	Not Applicable

-OR-

## 1.1.6 Containment Radiation Monitors

LOSS	Potential LOSS
VALID reading exceeds:	Not Applicable
2RMR-RQ206 Time After 2RMR RQ207 2RMR-RQ202* S/D, hrs R/hr mR/hr 0-0.5 340 1100 0.5-4 190 560 4-12 120 280 12-24 60 130	
* Due to streaming thru airlock 2RMR-RQ202 = chn 3020 2RMR-RQ206 = chn 1029 2RMR-RQ207 = chn 1030	

-OR-

## 1.1.7 Emergency Director Judgement

Any condition that, in the judgement of the SM/ED, indicates loss or potential loss of the Fuel Clad barrier comparable to the indicators listed above

LOSS ☐Potential LOSS ☐

## 1.2 RCS Barrier

## 1.2.1 Critical Safety Function Status

LOSS	Potential LOSS
Not Applicable	RCS Integrity CSF RED PATH <u>OR</u> Heat Sink CSF RED PATH

-OR-

## 1.2.2 Reactor Vessel Water Level

LOSS	Potential LOSS
RVLIS Full Range <40% (no RCPs running)	Not Applicable

-OR-

## 1.2.3 RCS Leak Rate

LOSS	Potential LOSS
RCS leak results in loss of RCS subcooling	Unsolable RCS leak that requires an additional charging pump be started with letdown isolated. <u>OR</u> RCS leak causes safety injection actuation indicated by direct entry into EOP E-1 required by EOP E-0

-OR-

## 1.2.4 Primary to Secondary Leak

LOSS	Potential LOSS
SGTR that results in a safety injection actuation <u>OR</u> Entry into E-3 required by EOPs	Not Applicable

-OR-

## 1.2.5 Containment Radiation Monitors

LOSS	Potential LOSS
+VALID reading above background exceeds:	Not Applicable
Time After 2RMR RQ201 2RMR-RQ202* S/D, hrs mR/hr mR/hr 0-0.5 130 10 0.5-4 80 0.5 4-12 40 0.3 12-24 25 N/A	
* Due to streaming thru airlock 2RMR-RQ201 = chn 1026 2RMR RQ202 = chn 3020	
+Readings based on T/S RCS Activity	

-OR-

## 1.2.6 Emergency Director Judgement

Any condition that, in the judgement of the SM/ED, indicates loss or potential loss of the RCS barrier comparable to the indicators listed above.

LOSS ☐Potential LOSS ☐

## 1.3 CNMT Barrier

## 1.3.1 Critical Safety Function Status

LOSS	Potential LOSS
Not Applicable	CNMT CSF RED PATH <u>OR</u> Actions of FR-C.1 (RED PATH) are INEFFECTIVE

-OR-

## 1.3.2 Containment Pressure / Hydrogen Conc.

LOSS	Potential LOSS
Rapid unexplained drop in CNMT pressure following initial rise <u>OR</u> CNMT pressure or sump level response NOT consistent with LOCA conditions	CNMT pressure >45 PSIG <u>OR</u> CNMT H2 rises >4% <u>OR</u> CNMT pressure >8 PSIG with less than one full train of CNMT spray

-OR-

## 1.3.3 Containment Isolation Status

LOSS	Potential LOSS
CNMT isolation is incomplete creating a direct release path to the environment when required	Not Applicable

-OR-

## 1.3.4 Containment Bypass

LOSS	Potential LOSS
RUPTURED S/G is also FAULTED Outside of CNMT <u>OR</u> P-to-S leakrate >T/S with approx. 4-8 hr. steam release from affected S/G via nonisolable MSSV, SGADV, or from MSLB outside of CNMT	Unexplained VALID rise in reading on area or ventilation monitors in contiguous areas with known LOCA <u>OR</u> HIGH Alarm on 2SWS-RQ100A,B,C, or D <u>AND</u> affected HX is NOT isolated

-OR-

## 1.3.5 Significant Radioactivity in Containment

LOSS	Potential LOSS
Not Applicable	VALID reading exceeds:
* Due to streaming thru airlock 2RMR-RQ202 = chn 3020 2RMR-RQ206 = chn 1029 2RMR-RQ207 = chn 1030	
2RMR-RQ206 Time After 2RMR RQ207 2RMR RQ202* S/D, hrs R/hr mR/hr 0-0.5 2.0E4 7.0E4 0.5-4 7.0E3 2.3E4 4-12 2.9E3 9.0E3 12-24 1.4E3 3.8E3	

-OR-

## 1.3.6 Emergency Director Judgement

Any condition that, in the judgement of the SM/ED, indicates loss or potential loss of the Containment barrier comparable to the indicators listed above.

LOSS ☐Potential LOSS ☐

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**FISSION PRODUCT BARRIER MATRIX (Modes 1-4)**

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- 1.1 Fuel Clad (RCS activity, corecooling, heat sink)  
1.2 RCS (*Integrity, SGTR, heat sink*)  
1.3 Containment (*CNMT Red Path, CNMT bypass*)

**1**

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**SYSTEM DEGRADATION**

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- |                              |                                 |                          |
|------------------------------|---------------------------------|--------------------------|
| 2.1 Loss of Instrumentation  | 2.5 RCS Unident Leakage         | 2.9 Turbine Failure      |
| 2.2 Loss of Function/Comm's  | 2.6 RCS Ident. Leakage          | 2.10 Stm/Feed Line Break |
| 2.3 Failure of Rx Prot.-ATWS | 2.7 Technical Specification S/D |                          |
| 2.4 Fuel Clad Degradation    | 2.8 Safety Limit Exceeded       |                          |

**2**

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**LOSS OF POWER**

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- 3.1 Loss of AC (Power Ops) (*Modes 1-4*)  
3.2 Loss of AC (Shutdown) (*Modes 5 & 6*)  
3.3 Loss of DC

**3**

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**HAZARDS and ED JUDGEMENT**

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- |               |                       |                             |
|---------------|-----------------------|-----------------------------|
| 4.1 Fire      | 4.3 Flammable Gas     | 4.5 Control Room Evacuation |
| 4.2 Explosion | 4.4 Toxic Gas         | 4.6 Security                |
| Table 4-1     | Table 4-2             | 4.7 ED Judgement            |
| Figure 4-A    | Figure 4-B/Figure 4-C | Table 4-3/Table 4-4         |

**4**

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**DESTRUCTIVE PHENOMENA**

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- |                        |                                    |
|------------------------|------------------------------------|
| 5.1 Earthquake         | 5.3 Aircraft Crash/Projectile      |
| 5.2 Tornado/High Winds | 5.4 River Level High               |
| Table 5-1              | 5.5 River Level Low                |
| Figure 5-A             | 5.6 Watercraft Crash (RW/SWS Loss) |

**5**

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**SHUTDOWN SYSTEM DEGRADATION**

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- |                              |  |
|------------------------------|--|
| 6.1 Loss of Shutdown Systems | 6.3 Loss of AC (Shutdown) ( <i>Modes 5 &amp; 6</i> ) |
| 6.2 RCS Inventory-Shutdown   | 6.4 Loss of DC (Shutdown) ( <i>Modes 5 &amp; 6</i> ) |
|                              | 6.5 Fuel Handling ( <i>All Modes</i> )               |
|                              | 6.6 Inadvertent Criticality                          |

**6**

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**RADIOLOGICAL**

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- |                      |  |
|----------------------|--|
| 7.1 Gaseous Effluent | 7.3 Radiation Levels                   |
| 7.2 Liquid Effluent  | 7.4 Fuel Handling ( <i>All Modes</i> ) |
| Table 7-1            | Table 7-2                              |
| Figure 7-A           |  |

**7**

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## GENERAL

## SITE AREA

## ALERT

## UNUSUAL EVENT

2.1 Loss of Instrumentation	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix" and Tab 7 "Radiological Effluents"
1 2 3 4	<p>Inability to monitor a <b>SIGNIFICANT TRANSIENT</b> in progress [1 and 2 and 3]</p> <ol style="list-style-type: none"><li>Loss of most (&gt;75%) annunciators <u>or</u> indications</li><li><b>SIGNIFICANT TRANSIENT</b> in progress</li><li>Inability to directly monitor any of the following CSFs:  Subcriticality      Vessel Integrity Core Cooling      Containment Heat Sink</li></ol>
1 2 3 4	<p><b>UNPLANNED</b> loss of most annunciators <u>or</u> indications for &gt;15 minutes with either a <b>SIGNIFICANT TRANSIENT</b> in progress <u>or</u> a loss of non-alarming compensatory indications [1 and 2 and 3]</p> <ol style="list-style-type: none"><li><b>UNPLANNED</b> loss of most (&gt;75%) annunciators <u>or</u> indications for &gt;15 minutes</li><li>SM judgement that additional personnel (beyond normal shift complement) are required to monitor the safe operation of the unit</li><li>[a or b]<ol style="list-style-type: none"><li><b>SIGNIFICANT TRANSIENT</b> in progress</li><li>Loss of SPDS</li></ol></li></ol>
1 2 3 4	<p><b>UNPLANNED</b> loss of most annunciators <u>or</u> indications for &gt;15 minutes [1 and 2]</p> <ol style="list-style-type: none"><li><b>UNPLANNED</b> loss of most (&gt;75%) annunciators <u>or</u> indications for &gt;15 minutes</li><li>SM judgement that additional personnel (beyond normal shift complement) are required to monitor the safe operation of the unit</li></ol>

2.2 Loss of Function	
Mode	Criterion / Indicator
1 2 3 4	<p>Inability to cool the core [1 or 2]</p> <ol style="list-style-type: none"><li>Actions of FR-C.1 (RED PATH) are <b>INEFFECTIVE</b></li><li>[a and b]<ol style="list-style-type: none"><li>Three max core exit thermocouples &gt;1200 F; or three max core exit thermocouples &gt;729 F with NO RCPs running <u>and</u> RVLIS full range level &lt;40%</li><li>Actions taken have NOT resulted in a rising trend in RVLIS full range level <u>or</u> a dropping trend in core exit thermocouple temperatures within 15 minutes of initiation of restoration actions</li></ol></li></ol>
1 2 3 4	<p>Loss of function needed to achieve <u>or</u> maintain hot shutdown [1 or 2]</p> <ol style="list-style-type: none"><li>Ops personnel report a CSF status tree <b>RED PATH</b> terminus for core cooling or heat sink exists</li><li>Three max core exit thermocouples &gt;1200 F; <u>or</u> three max core exit thermocouples &gt;729 F with NO RCPs running <u>and</u> RVLIS full range level &lt;40%</li></ol> <p>Also Refer to Tab 2.3 "Failure of Reactor Protection" and Tab 1 "Fission Product Barrier Matrix"</p>
1 2 3 4	<p>Complete loss of function needed to achieve Cold Shutdown when Shutdown required by Tech Specs [1 and 2 and 3]</p> <ol style="list-style-type: none"><li>Loss of decay heat removal capability (RHR, CCR, or RPRW) / (RHS, CCP, SWS)</li><li>Inability to remove heat via the condenser</li><li>Shutdown to mode 5 required by T/S</li></ol>
ALL	<p><b>UNPLANNED</b> Loss of communications [1 or 2]</p> <ol style="list-style-type: none"><li>In-plant [a and b and c]<ol style="list-style-type: none"><li><b>UNPLANNED</b> Loss of All Pax Phones</li><li><b>UNPLANNED</b> Loss of All Gaitronics (Page/Party)</li><li><b>UNPLANNED</b> Loss of All Radios (Handie-Talkies)</li></ol></li><li>Offsite [a and b and c]<ol style="list-style-type: none"><li><b>UNPLANNED</b> Loss of ENS</li><li><b>UNPLANNED</b> Loss of Bell Lines</li><li><b>UNPLANNED</b> Loss of Radios to Offsite</li></ol></li></ol>

2.3 Failure of Rx Protection	
Mode	Criterion / Indicator
1 2	<p>Reactor power &gt;5% after <b>VALID</b> trip signal(s) <u>and</u> loss of core cooling capability [1 and 2]</p> <ol style="list-style-type: none"><li>Ops personnel report FR-S.1 has been entered <u>and</u> subsequent actions do NOT result in reduction of power to &lt;5% and decreasing</li><li>[a or b]<ol style="list-style-type: none"><li>Ops personnel report CSF status tree <b>RED PATH</b> terminus exists for core cooling or heat sink</li><li>Three max core exit thermocouples &gt;1200 F; or three max core exit thermocouples &gt;729 F with NO RCPs running <u>and</u> RVLIS full range level &lt;40%</li></ol></li></ol>
1 2	<p>Reactor trip failure after <b>VALID</b> Trip signal(s) with reactor power &gt;5% and attempts to cause a manual trip from the control room are unsuccessful.</p> <ol style="list-style-type: none"><li>Ops personnel report FR-S.1 has been entered <u>and</u> manual reactor trip from control room did NOT result in reduction of power to &lt;5% and decreasing</li></ol>
1 2	<p>Automatic reactor trip did not occur after <b>VALID</b> trip signal and manual trip from control room was successful [1 and 2]</p> <ol style="list-style-type: none"><li><b>VALID</b> reactor trip signal received or required.</li><li>Manual reactor trip from control room was successful and power is &lt;5% and decreasing</li></ol>
	Not Applicable

2.4 Fuel Clad Degradation	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
1 2 3 4 5	<p>Reactor coolant system specific activity exceeds LCO (refer to BVPS technical specification 3.4.8) [1 or 2]</p> <ol style="list-style-type: none"><li><b>VALID</b> high alarm on 2CHS-RQ101A/B [3051] reactor coolant letdown monitor</li><li>Radiochemistry analysis exceeds Technical Specification 3.4.8</li></ol>

EPP/1-1b  
Att 1

## GENERAL

## SITE AREA

## ALERT

## UNUSUAL EVENT

## SYSTEM DEGRADATION - U2

## 2.1, 2.2, 2.3, 2.4

GENERAL

SITE AREA

ALERT

UNUSUAL EVENT

2.5 RCS Unidentified Leakage	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
1 2 3 4 5*	Unidentified or pressure boundary RCS leakage >10 GPM  1. Unidentified or pressure boundary leakage (as defined by Technical Specifications) >10 GPM as indicated below [a or b]  a. OST 2 6.2A results  b. With RCS temp. and PZR level stable, VCT level dropping at a rate >10 GPM (>1%/min indicated on 2CHS-LI-115 with no VCT makeup in progress)  *Applies to Mode 5 if RCS Pressurized

2.6 RCS Identified Leakage	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
1 2 3 4 5*	Identified RCS leakage >25 GPM  1. Identified RCS leakage (as defined by Technical Specifications) >25 GPM as indicated below [a or b or c]  a. OST 2 6.2 or 2 6.2A Results b. UNPLANNED level rise in excess of 25 GPM total into PRT, 2DGS-TK-21, and 2DGS-TK-22 c. Indication of Steam Generator Tube leakage >25 GPM  *Applies to Mode 5 if RCS Pressurized

2.7 Technical Specification	
Mode	Criterion / Indicator
	Not Applicable
	Not Applicable
	Refer to Tab 2.2, "Loss of Function"
1 2 3 4	Inability to Reach Required Shutdown Mode Within Technical Specification Time Limits [1 and 2]  1. A Technical Specification action 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 action statement

2.8 Safety Limit	
Mode	Criterion / Indicator
	Not Applicable
	Not Applicable
	Not Applicable
1 2 3 4 5	Safety Limit Has Been Exceeded [1 or 2]  1. Technical Specification 2 1.1 specifies the safety limits for the reactor core which are applicable in Modes 1 and 2.  2. Technical Specification 2 1.2 specifies the safety limit for the Reactor Coolant System pressure which is applicable in Modes 1, 2, 3, 4 and 5

EPP/1-1b  
Att 1

GENERAL

SITE AREA

ALERT

UNUSUAL EVENT

SYSTEM DEGRADATION - U2

2.5, 2.6, 2.7, 2.8

Revision 4

GENERAL

SITE AREA

ALERT

UNUSUAL EVENT

2.9 Turbine Failure	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
1 2 3	Turbine failure generated missiles cause penetration of a missile shield wall of any area containing safety related equipment  1. Plant personnel report missiles generated by turbine failure with casing penetration also results in a through-wall penetration of a missile shield wall listed in Table 2-1
1 2 3	Turbine failure results in casing penetration  1. Plant personnel report a turbine failure which results in penetration of the turbine casing or damage to main generator seals with evidence of significant hydrogen or seal oil leakage

2.10 Steam/Feed Line Break	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
1 2 3 4	UNPLANNED rapid depressurization of the Main Steam System resulting in a rapid RCS cooldown and Safety Injection actuation [1 and 2]  1. Ops personnel report rapid depressurization of Main Steam System that causes SLI (<500 psig)  2. Ops personnel report Safety Injection has actuated

Table 2-1  
Plant Areas Associated With Shield Wall Penetration EAL

Diesel Generator Bldg.	Service Bldg 745' and 760'
Electrical Switchgear 730'	Containment
Main Steam Valve Room	Primary Aux. Building
2FWE-TK210	

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## FISSION PRODUCT BARRIER MATRIX (Modes 1-4)

- 1.1 Fuel Clad (RCS activity, corecooling, heat sink)
- 1.2 RCS (*Integrity, SGTR, heat sink*)
- 1.3 Containment (*CNMT Red Path, CNMT bypass*)

**1**

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## SYSTEM DEGRADATION

- |                              |                                 |                          |
|------------------------------|---------------------------------|--------------------------|
| 2.1 Loss of Instrumentation  | 2.5 RCS Unident Leakage         | 2.9 Turbine Failure      |
| 2.2 Loss of Function/Comm's  | 2.6 RCS Ident. Leakage          | 2.10 Stm/Feed Line Break |
| 2.3 Failure of Rx Prot.-ATWS | 2.7 Technical Specification S/D |                          |
| 2.4 Fuel Clad Degradation    | 2.8 Safety Limit Exceeded       |                          |

**2**

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## LOSS OF POWER

- 3.1 Loss of AC (Power Ops) (*Modes 1-4*)
- 3.2 Loss of AC (Shutdown) (*Modes 5 & 6*)
- 3.3 Loss of DC

**3**

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## HAZARDS and ED JUDGEMENT

- |               |                       |                             |
|---------------|-----------------------|-----------------------------|
| 4.1 Fire      | 4.3 Flammable Gas     | 4.5 Control Room Evacuation |
| 4.2 Explosion | 4.4 Toxic Gas         | 4.6 Security                |
| Table 4-1     | Table 4-2             | 4.7 ED Judgement            |
| Figure 4-A    | Figure 4-B/Figure 4-C | Table 4-3/Table 4-4         |

**4**

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## DESTRUCTIVE PHENOMENA

- |                        |                                    |
|------------------------|------------------------------------|
| 5.1 Earthquake         | 5.3 Aircraft Crash/Projectile      |
| 5.2 Tornado/High Winds | 5.4 River Level High               |
| Table 5-1              | 5.5 River Level Low                |
| Figure 5-A             | 5.6 Watercraft Crash (RW/SWS Loss) |

**5**

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## SHUTDOWN SYSTEM DEGRADATION

- |                              |  |
|------------------------------|--|
| 6.1 Loss of Shutdown Systems | 6.3 Loss of AC (Shutdown) ( <i>Modes 5 &amp; 6</i> ) |
| 6.2 RCS Inventory-Shutdown   | 6.4 Loss of DC (Shutdown) ( <i>Modes 5 &amp; 6</i> ) |
|                              | 6.5 Fuel Handling ( <i>All Modes</i> )               |
|                              | 6.6 Inadvertent Criticality                          |

**6**

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## RADIOLOGICAL

- |                      |  |
|----------------------|--|
| 7.1 Gaseous Effluent | 7.3 Radiation Levels                   |
| 7.2 Liquid Effluent  | 7.4 Fuel Handling ( <i>All Modes</i> ) |
| Table 7-1            | Table 7-2                              |
| Figure 7-A           |  |

**7**

GENERAL		SITE AREA		ALERT		UNUSUAL EVENT	
3.1 Loss of AC (Power Ops)		3.2 Loss of AC (Shutdown)		3.3 Loss of DC Power		GENERAL	
Mode	Criterion / Indicator	Mode	Criterion / Indicator	Mode	Criterion / Indicator	Mode	Criterion / Indicator
1 2 3 4	<p>Prolonged loss of offsite <u>and</u> onsite AC power [1 and 2]</p> <p>1. AE <u>and</u> DF 4KV emergency buses <u>NOT</u> energized from Unit 2 sources for &gt;15 minutes</p> <p>2. [a or b or c]</p> <p>a. Ops personnel report CSF status tree RED PATH <u>or</u> ORANGE PATH terminus exists for core cooling</p> <p>b. Restoration of either AE <u>or</u> DF 4KV emergency bus is NOT likely from any source within 4 hours of loss</p> <p>c. Three max core exit thermocouples &gt;1200 F <u>or</u> three max core exit thermocouples &gt;729 F with no RCPs running and RVLIS full range &lt;40%</p>		<p>Refer to Tab 6 "Shutdown System Degradation"</p>		<p>Refer to Tab 1 "Fission Product Barrier Matrix" and Tab 2.2 "Loss of Function", and Tab 6.1 "Loss of Shutdown Systems"</p>		
1 2 3 4	<p>Loss of offsite <u>and</u> onsite AC power for &gt;15 minutes</p> <p>1. AE <u>and</u> DF 4KV emergency buses <u>NOT</u> energized from Unit 2 sources for &gt;15 minutes</p>		<p>Refer to Tab 6 "Shutdown System Degradation"</p>	1 2 3 4	<p>Loss of all vital DC power for &gt;15 minutes</p> <p>1. Voltage &lt;110.4 VDC on DC buses 2-1 <u>and</u> 2-2 <u>and</u> 2-3 <u>and</u> 2-4 for &gt;15 minutes</p> <p>Also Refer to Tab 1 "Fission Product Barrier Matrix", Tab 2.2 "Loss of Function", and Tab 2.1 "Loss of Instrumentation" and Tab 6.1 "Loss of Shutdown Systems"</p>		
1 2 3 4	<p>AC power to emergency buses reduced to a single source of power such that any additional failure will result in the de-energization of both buses [1 and 2]</p> <p>1. Either AE <u>or</u> DF 4KV emergency bus is de-energized for &gt;15 minutes</p> <p>2. The energized AE <u>or</u> DF 4KV emergency bus has only one source of power [a or b]</p> <p>a. Emergency diesel generator</p> <p>b. 2A <u>or</u> 2D 4KV normal bus</p>	5 6 De-fuel	<p>UNPLANNED loss of offsite <u>and</u> onsite AC power for &gt;15 minutes</p> <p>1. AE <u>and</u> DF 4KV emergency buses <u>NOT</u> energized from Unit 2 sources for &gt;15 minutes</p> <p>Also Refer to Tab 6 "Shutdown System Degradation"</p>		<p>Refer to Tab 1 "Fission Product Barrier Matrix", Tab 2.2 "Loss of Function", and Tab 2.1 "Loss of Instrumentation" and Tab 6.1 "Loss of Shutdown Systems"</p>		
1 2 3 4	<p>Loss of offsite power supply for &gt;15 minutes [1 and 2]</p> <p>1. Offsite power supply to AE and DF 4KV buses unavailable for &gt;15 minutes</p> <p>2. Each diesel generator is supplying power to its respective emergency bus</p>	5 6 De-fuel	<p>UNPLANNED loss of offsite power supply for &gt;15 minutes [1 and 2]</p> <p>1. Offsite power supply to AE and DF 4KV buses unavailable for &gt;15 minutes</p> <p>2. Either diesel generator is supplying power to its respective emergency bus</p>	1 2 3 4	<p>UNPLANNED loss of one train of DC power for &gt;15 minutes [1 or 2]</p> <p>1. Voltage &lt;110.4 VDC on DC Buses 2-1 <u>and</u> 2-3 for &gt;15 minutes</p> <p>2. Voltage &lt;110.4 VDC on DC buses 2-2 <u>and</u> 2-4 for &gt;15 minutes</p> <p>Refer to Tab 6.4 "Loss of DC (Shutdown)" for modes 5, 6, and defueled</p>		
UNUSUAL EVENT		UNUSUAL EVENT		ALERT		SITE AREA	

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## FISSION PRODUCT BARRIER MATRIX (Modes 1-4)

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- 1.1 Fuel Clad (RCS activity, corecooling, heat sink)
- 1.2 RCS (*Integrity, SGTR, heat sink*)
- 1.3 Containment (*CNMT Red Path, CNMT bypass*)

1

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## SYSTEM DEGRADATION

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- |                              |                                 |                          |
|------------------------------|---------------------------------|--------------------------|
| 2.1 Loss of Instrumentation  | 2.5 RCS Unident Leakage         | 2.9 Turbine Failure      |
| 2.2 Loss of Function/Comm's  | 2.6 RCS Ident. Leakage          | 2.10 Stm/Feed Line Break |
| 2.3 Failure of Rx Prot.-ATWS | 2.7 Technical Specification S/D |                          |
| 2.4 Fuel Clad Degradation    | 2.8 Safety Limit Exceeded       |                          |

2

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## LOSS OF POWER

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- 3.1 Loss of AC (Power Ops) (*Modes 1-4*)
- 3.2 Loss of AC (Shutdown) (*Modes 5 & 6*)
- 3.3 Loss of DC

3

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## HAZARDS and ED JUDGEMENT

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- |               |                       |                             |
|---------------|-----------------------|-----------------------------|
| 4.1 Fire      | 4.3 Flammable Gas     | 4.5 Control Room Evacuation |
| 4.2 Explosion | 4.4 Toxic Gas         | 4.6 Security                |
| Table 4-1     | Table 4-2             | 4.7 ED Judgement            |
| Figure 4-A    | Figure 4-B/Figure 4-C | Table 4-3/Table 4-4         |

4

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## DESTRUCTIVE PHENOMENA

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- |                        |                                    |
|------------------------|------------------------------------|
| 5.1 Earthquake         | 5.3 Aircraft Crash/Projectile      |
| 5.2 Tornado/High Winds | 5.4 River Level High               |
| Table 5-1              | 5.5 River Level Low                |
| Figure 5-A             | 5.6 Watercraft Crash (RW/SWS Loss) |

5

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## SHUTDOWN SYSTEM DEGRADATION

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- |                              |  |
|------------------------------|--|
| 6.1 Loss of Shutdown Systems | 6.3 Loss of AC (Shutdown) ( <i>Modes 5 &amp; 6</i> ) |
| 6.2 RCS Inventory-Shutdown   | 6.4 Loss of DC (Shutdown) ( <i>Modes 5 &amp; 6</i> ) |
|                              | 6.5 Fuel Handling ( <i>All Modes</i> )               |
|                              | 6.6 Inadvertent Criticality                          |

6

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## RADIOLOGICAL

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- |                      |  |
|----------------------|--|
| 7.1 Gaseous Effluent | 7.3 Radiation Levels                   |
| 7.2 Liquid Effluent  | 7.4 Fuel Handling ( <i>All Modes</i> ) |
| Table 7-1            | Table 7-2                              |
| Figure 7-A           |  |

7

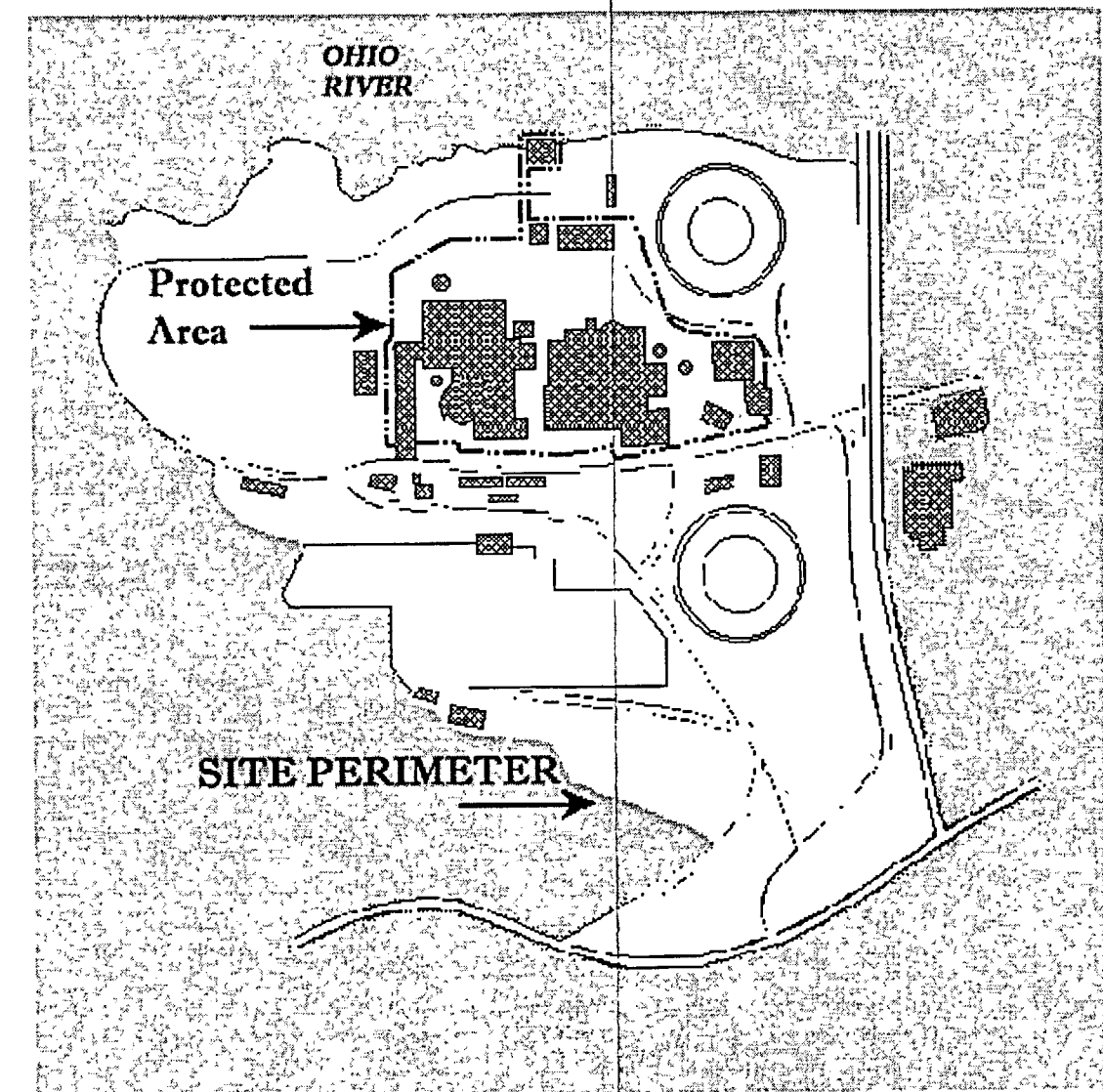
4.1 Fire	
Mode	Criterion / Indicator
1 2 3 4	<p><b>FIRE</b> in the Instrument and Relay Room (CB-1), Cable Spreading Room (CB-2), Control Room (CB-3), West Communications Room (CB-6), or Cable Tunnel (CB-1) resulting in an evacuation of the control room per 2.56C.4 "Alternate Safe Shutdown" <u>and</u> loss of any required equipment results in an uncontrolled RCS Heatup [1 and 2 and 3]</p> <p>1. 2.56C.4 "Alternate Safe Shutdown" entered</p> <p>2. Ops personnel report inability to operate any of the following equipment required by 2.56C.4 "Alternate Safe Shutdown"</p> <p>2CHS-P21A 2SWS-P21A 2FWE-P23A &amp; 2FWE-P22 EGS-EG2-1 Black DG Alternate S/D Panel 2SAS-C21A 2CCP-P21A 2RHS-P21A</p> <p>3. Uncontrolled RCS heatup lasting longer than 15 minutes</p>
1 2 3 4	<p><b>FIRE</b> in the Instrument and Relay Room (CB-1), Cable Spreading Room (CB-2), Control Room (CB-3), West Communications Room (CB-6), or Cable Tunnel (CB-1) resulting in an evacuation of the control room per 2.56C.4 "Alternate Safe Shutdown"</p> <p>1. 2.56C 4 "Alternate Safe Shutdown" entered</p>
All	<p><b>FIRE</b> in any of the areas listed in Table 4-1 that is affecting safety related equipment [1 and 2]</p> <p>1. <b>FIRE</b> in any of the listed areas in Table 4-1</p> <p>2. [a or b]</p> <p>a Ops personnel report <b>VISIBLE DAMAGE</b> to permanent structure <u>or</u> equipment in listed area due to <b>FIRE</b></p> <p>b. Control room indication of degraded system <u>or</u> component (within listed areas) response due to <b>FIRE</b></p>
All	<p><b>FIRE</b> in <u>or</u> adjacent to those areas listed in Table 4-1 not extinguished within 15 minutes from the time of control room notification <u>or</u> verification of control room alarm</p>

4.2 Explosions	
Mode	Criterion / Indicator
	<p>Refer to Tab 4.1 "Fire" or Tab 1 "Fission Product Barrier Matrix"</p>
	<p>Refer to Tab 4.1 "Fire" or Tab 1 "Fission Product Barrier Matrix"</p>
All	<p><b>EXPLOSION</b> in any of the areas listed in Table 4-1 that is affecting safety related equipment [1 and 2]</p> <p>1. <b>EXPLOSION</b> in any of the listed areas in Table 4-1</p> <p>2. [a or b]</p> <p>a. Ops personnel report <b>VISIBLE DAMAGE</b> to permanent structure <u>or</u> equipment in listed area</p> <p>b. Control room indication of degraded system <u>or</u> component (within listed areas) response due to <b>EXPLOSION</b></p> <p>Refer to Tab 4.6 "Security"</p>
All	<p><b>UNPLANNED EXPLOSION</b> in <u>or</u> adjacent to those areas listed in Table 4-1</p> <p>1. <b>UNPLANNED EXPLOSION</b> in <u>or</u> adjacent to any of the listed areas in Table 4-1</p> <p>Refer to Tab 4.1, "Fire" or Tab 1 "Fission Product Barrier Matrix"</p> <p>Refer to Tab 4.6 "Security"</p>

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

Control Room	Diesel Gen. Bldgs	Containment Building
Inst & Relay Rm 707	Intake Str Cubicles	Prim. Auxiliary Building
Emerg. Switchgear	U1/U2 Cable Tunnel (CV-3)	Rod Control Cable Vault Bldg.
Relay Room	Safeguards Building	Cable Spreading Room 725
Main Steam Vlv Rm	Fuel Building	West Communications Room 707
Penetrations Area	Service Building	ERF Substa & ERF DG Bldg
Cable Tunnel 712	Cable Tunnel 735	RWST 2QSS-TK21

Figure 4-A  
PROTECTED AREA/SITE PERIMETER



GENERAL	4.3 Flammable Gas	
	Mode	Criterion / Indicator
		Refer to Tab 4.1 "Fire", Tab 4.2 "Explosion", or Tab 1 "Fission Product Barrier Matrix"
		Refer to Tab 4.1 "Fire", Tab 4.2 "Explosion", or Tab 1 "Fission Product Barrier Matrix"
		Refer to Tab 4.1 "Fire", Tab 4.2 "Explosion", or Tab 1 "Fission Product Barrier Matrix"
SITE AREA		
ALERT	All	Release of flammable gas within, or contiguous to, a VITAL AREA which jeopardizes operation of systems required to maintain safe operations or to establish or maintain cold shutdown (Mode 5).  1. Report or detection of a flammable gas within, or contiguous to, a VITAL AREA in concentrations greater than explosive concentrations.
	All	Release of flammable gas affecting the PROTECTED AREA deemed detrimental to the safe operation of the plant. (1 or 2)  1. (a and b) a. Report or detection of flammable gas that could enter the SITE PERIMETER in amounts that can affect normal operation of the plant (Refer to Figure 4-A). b. Normal operation of the plant is impeded due to access restrictions implemented by the Control Room within the PROTECTED AREA (Refer to Figure 4-A).  2. Report by local, county or State officials for a potential evacuation of site personnel based on an offsite event.
UNUSUAL EVENT		

4.4 Toxic Gas	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
All	Release of TOXIC GAS within, or contiguous to, a VITAL AREA which jeopardizes operation of systems required to maintain safe operations or to establish or maintain cold shutdown (Mode 5). (1 and 2)  1. Report or detection of a TOXIC GAS within, or contiguous to, a VITAL AREA or an area required for continued safe operation in concentrations that will be life threatening to plant personnel.  2. Plant personnel would be unable to perform actions necessary for continued safe operation or to establish and maintain cold shutdown (Mode 5) while utilizing appropriate personnel protection equipment.
All	Release of TOXIC GAS affecting the PROTECTED AREA deemed detrimental to the safe operation of the plant. (1 or 2) 1. (a and b) a. Report or detection of TOXIC GAS that could enter the SITE PERIMETER in amounts that can affect normal operation of the plant (Refer to Figure 4-A). b. Normal operation of the plant is impeded due to access restrictions implemented by the Control Room within the PROTECTED AREA (Refer to Figure 4-A). 2. Report by local, county or State officials for a potential evacuation of site personnel based on an offsite event.  Refer to AOP 1/2 44A.1 "Chlorine/toxic Gas Release", Attachment 3 for a list of chemicals stored, produced, or transported near BVPS and their toxicity limits.

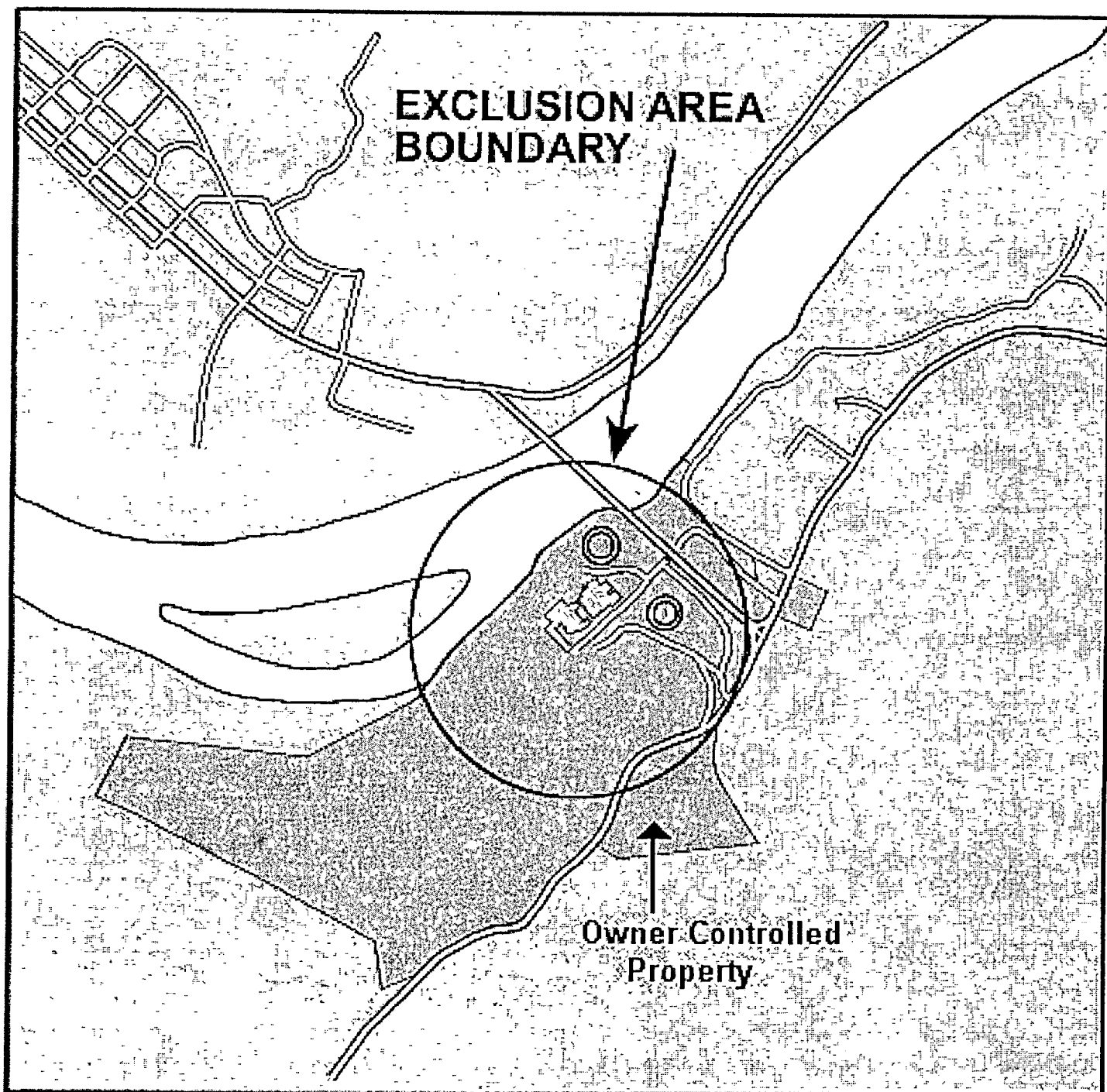
TABLE 4.2 HAS BEEN DELETED

FIGURE 4-B HAS BEEN DELETED



**Figure 4-C**

**EXCLUSION AREA BOUNDARY**



GENERAL	4.5 Control Room Evacuation	
	Mode	Criterion / Indicator
		Refer to Tab 4.1 "FIRE"
	All	Evacuation of the control room has been initiated <u>and</u> control of all necessary equipment has not been established within 15 minutes of manning the Shutdown Panel [1 and 2]  1. AOP 2.33.1A "Control Room Inaccessibility" has been entered  2. Inability to transfer and operate any single component listed in Table 4-3 within 15 minutes of manning the shutdown panel  <i>Also refer to Tab 4.1 "Fire"</i>
	All	Evacuation of the control room is required  1. AOP 2.33.1A "Control Room Inaccessibility" has been entered
UNUSUAL EVENT		Not Applicable

GENERAL	4.6 Security	
	Mode	Criterion / Indicator
	All	Security event resulting in loss of control of the systems necessary to establish or maintain cold shutdown [1 or 2]  1. Hostile armed force has taken control of the control room <u>or</u> the remote shutdown panel  2. Hostile armed force has taken control of plant equipment such that Ops personnel report the inability to operate equipment necessary to maintain the following functions [a or b or c]:  a. Subcriticality b. Core cooling c. Heat Sink
	All	Security event <u>has or is</u> occurring which results in actual or likely failures of plant functions needed to protect the public [1 or 2]  1. VITAL AREA, other than the control room, has been penetrated by a hostile armed force  2. Suspected BOMB detonates within a VITAL AREA
	All	Credible Security event which indicates an actual <u>or</u> 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  <i>Refer to Figure 4-A for a drawing of the PROTECTED AREA</i>
UNUSUAL EVENT		Credible 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 4-4  <i>Refer to Figure 4-A for a drawing of the PROTECTED AREA</i>

GENERAL	4.7 Emergency Director Judgement	
	Mode	Criterion / Indicator
	All	Events are in process <u>or</u> have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA protective action guidelines exposure levels outside the EXCLUSION AREA BOUNDARY. (Refer to Figure 4-C on preceding page.)
	All	Events are in process <u>or</u> have occurred which involve actual <u>or</u> 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 protective action guideline exposure levels outside the EXCLUSION AREA BOUNDARY. (Refer to Figure 4-C on preceding page.)
	All	Events are in process <u>or</u> have occurred which involve an actual <u>or</u> potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA protective action guideline exposure levels.
UNUSUAL EVENT		Unusual events are in process <u>or</u> have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response <u>or</u> monitoring are expected unless further degradation of safety systems occurs.

Table 4-3  
EQUIPMENT REQUIRED AT  
SHUTDOWN PANEL

One Auxiliary Feedwater Pump  
One Atmospheric Steam Dump  
One Charging Pump  
One Boric Acid Pump and Boration Valve  
2CHS\*FCV122

Table 4-4  
SECURITY EVENTS

- SABOTAGE/INTRUSION has or is Occurring Within the PROTECTED AREA (Figure 4-A)
- HOSTAGE/EXTORTION Situation That Threatens to Interrupt Plant Operations
- CIVIL DISTURBANCE Ongoing Between the SITE PERIMETER and PROTECTED AREA (Figure 4-A)
- Hostile STRIKE ACTION Within the PROTECTED AREA Which Threatens to Interrupt Normal Plant Operations (Judgement Based on Behavior of Strikers and/or Intelligence Received) (Figure 4-A)
- A credible site-specific security threat notification

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## FISSION PRODUCT BARRIER MATRIX (Modes 1-4)

- 1.1 Fuel Clad (RCS activity, corecooling, heat sink)
- 1.2 RCS (*Integrity, SGTR, heat sink*)
- 1.3 Containment (*CNMT Red Path, CNMT bypass*)

1

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## SYSTEM DEGRADATION

- 2.1 Loss of Instrumentation
- 2.2 Loss of Function/Comm's
- 2.3 Failure of Rx Prot.-ATWS
- 2.4 Fuel Clad Degradation
- 2.5 RCS Unident Leakage
- 2.6 RCS Ident. Leakage
- 2.7 Technical Specification S/D
- 2.8 Safety Limit Exceeded
- 2.9 Turbine Failure
- 2.10 Stm/Feed Line Break

2

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## LOSS OF POWER

- 3.1 Loss of AC (Power Ops) (*Modes 1-4*)
- 3.2 Loss of AC (Shutdown) (*Modes 5 & 6*)
- 3.3 Loss of DC

3

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## HAZARDS and ED JUDGEMENT

- 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/Figure 4-C
- 4.5 Control Room Evacuation
- 4.6 Security
- 4.7 ED Judgement
- Table 4-3/Table 4-4

4

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## DESTRUCTIVE PHENOMENA

- 5.1 Earthquake
- 5.2 Tornado/High Winds
- Table 5-1
- Figure 5-A
- 5.3 Aircraft Crash/Projectile
- 5.4 River Level High
- 5.5 River Level Low
- 5.6 Watercraft Crash (RW/SWS Loss)

5

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## SHUTDOWN SYSTEM DEGRADATION

- 6.1 Loss of Shutdown Systems
- 6.2 RCS Inventory-Shutdown
- 6.3 Loss of AC (Shutdown) (*Modes 5 & 6*)
- 6.4 Loss of DC (Shutdown) (*Modes 5 & 6*)
- 6.5 Fuel Handling (*All Modes*)
- 6.6 Inadvertent Criticality

6

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## RADIOLOGICAL

- 7.1 Gaseous Effluent
- 7.2 Liquid Effluent
- Table 7-1
- Figure 7-A
- 7.3 Radiation Levels
- 7.4 Fuel Handling (*All Modes*)
- Table 7-2

7

GENERAL

SITE AREA

ALERT

UNUSUAL EVENT

5.1 Earthquake	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
All	<p>Earthquake greater than 0.06g acceleration occurs [1 and 2]</p> <ol style="list-style-type: none"><li>A seismic event has occurred as indicated by Ann A10-5H "Init of Seismic Exceed Preset and/or Spectral Accelerations"</li><li>[a and b]<ol style="list-style-type: none"><li>One or more alarm lamps and horn energized on the Seismic Warning panel [2ERS-ANN-1]</li><li>Review of the printout on 2ERS-RSA-1 Response Spectrum Analyzer reveals an acceleration &gt;0.06g has occurred (see 2OM-45.4F "Seismic Instrumentation Central Control Cabinet [2ERS-CCC-1] Running")</li></ol></li></ol> <p>Also refer to AOP 1/2 75 3 "Acts of Nature-Earthquake"</p>
All	<p>Earthquake detected by site seismic instrumentation &gt;0.01g acceleration [1 and 2]</p> <ol style="list-style-type: none"><li>Ann A10-5H "Init of Seismic Exceed Preset and/or Spectral Accelerations" indicates initiation of the Accelerograph Recording System</li><li>[a or b]<ol style="list-style-type: none"><li>Ground motion sensed by plant personnel</li><li>Unit 1 reports seismic event detected on unit instrumentation</li></ol></li></ol>

5.2 Tornado	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
All	<p>Tornado or high wind strikes any structure listed in Table 5-1 and results in structural damage [1 and 2]</p> <ol style="list-style-type: none"><li>Tornado or high wind strikes any structure listed in Table 5-1</li><li>[a or b]<ol style="list-style-type: none"><li>Confirmed report of any <b>VISIBLE DAMAGE</b> to specified structures</li><li>Control room indications of degraded safety system or component response within listed structures due to event</li></ol></li></ol>
All	<p>Tornado within the SITE PERIMETER</p> <ol style="list-style-type: none"><li>Plant personnel report a tornado has been sighted within the <b>SITE PERIMETER</b> (refer to Figure 5-A)</li></ol>

Figure 5-A  
Site Perimeter

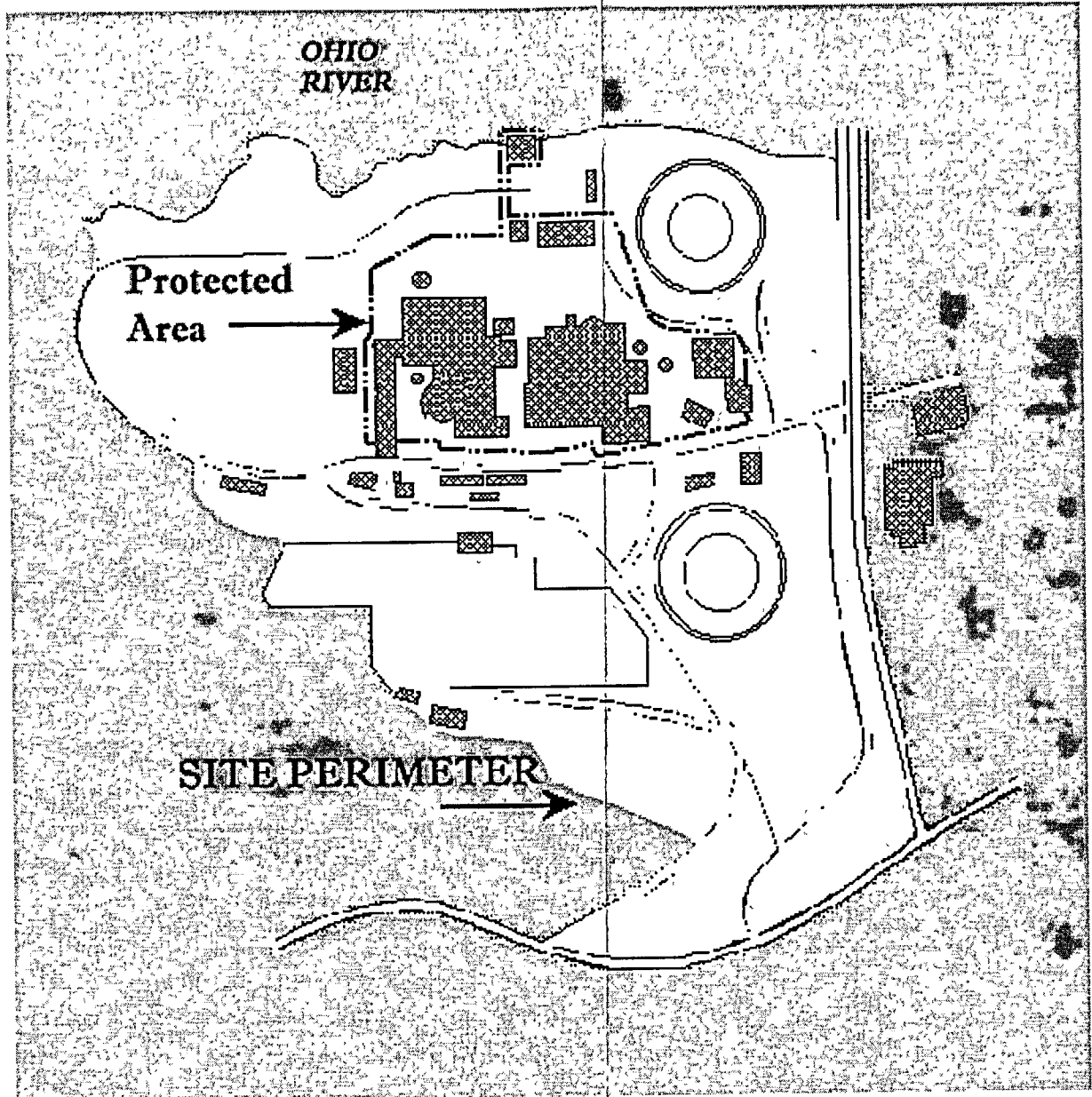


Table 5-1  
Plant Structures Associated With  
Tornado/Hi Wind and Aircraft EALs

Containment Building	Control Bldg
Safeguards Building	Cable Vault and Rod Control Bldg
Primary Aux. Building	Main Steam Valve Room
Fuel Handling Building	Main Intake Structure
RWST (2QSS-TK21)	Demin. Water Sto. (2FWE-TK-210)
24 ton CO2 unit	Diesel Generator Building
Service Building (incl. FW Reg Vlv Rm)	

GENERAL

SITE AREA

ALERT

UNUSUAL EVENT

5.3 Aircraft/Projectile Crash	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
ALL	Aircraft or PROJECTILE impacts (strikes) any plant structure listed in Table 5-1 resulting in structural damage [1 and 2]  1. Plant personnel report aircraft or PROJECTILE has impacted any structure listed in Table 5-1 on previous page  2. [a or b] a. Confirmed report of any VISIBLE DAMAGE to specified structures b. Control Room indications of degraded safety system or component response (within listed structures) due to event
ALL	Aircraft crash or PROJECTILE impact within the SITE PERIMETER  1 Plant personnel report aircraft crash or PROJECTILE impact within the SITE PERIMETER (refer to Figure 5-A on previous page)

5.4 River Level HIGH	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
ALL	River water level > 705 Ft mean sea level [1 or 2]  1. 1LR-CW-101, if accessible, indicates >705 mean sea level  2. National Weather Bureau (412-262-1882) or Montgomery Lock (724-643-8400) reports Montgomery Lower Pool Lower Gauge Reading >52.48 Ft  <i>Note Mean Sea Level = Lower Gauge Reading + 652.52 Ft</i>
ALL	River water level >700 Ft Mean Sea Level [1 or 2]  1 1LR-CW-101 indicates > 700 Ft Mean Sea Level  2. National Weather Bureau (412-262-1882) or Montgomery Lock (724-643-8400) reports Montgomery Lower Pool Lower Gauge Reading >47.48 Ft  <i>Note Mean Sea Level = Lower Gauge Reading + 652.52 Ft</i>

5.5 River Level LOW	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
ALL	River water level < 650 Ft Mean Sea Level [1 or 2]  1. 1LR-CW-101 indicates <650 Ft Mean Sea Level  2. National Weather Bureau (412-262-1882) or Montgomery Lock (724-643-8400) Reports Montgomery Lower Pool Lower Gauge Reading < -2.52 Ft  <i>Note Mean Sea Level = Lower Gauge Reading + 652.52 Ft</i>
ALL	River water level < 654' Ft Mean Sea Level [1 or 2]  1. 1LR-CW-101 indicates < 654 Ft Mean Sea Level  2. National Weather Bureau (412-262-1882) or Montgomery Lock (724-643-8400) Reports Montgomery Lower Pool Lower Gauge Reading <+1.48 Ft  <i>Note: Mean Sea Level = Lower Gauge Reading + 652.52 Ft</i>

5.6 Watercraft Crash	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
	Refer to Tab 1 "Fission Product Barrier Matrix"
ALL	Watercraft strikes primary intake structure and results in a reduction of Service Water flow [1 and 2]  1. Plant personnel report a watercraft has struck the primary intake structure  2. SWS flow reduction indicated by sustained pressure reduction to <30 psig on 2SWS-PI-113A and/or 113B  <i>Refer to AOP 2.30.1 "Loss of Service Water"</i>

EPP/1-1b  
Att 1

GENERAL

SITE AREA

ALERT

UNUSUAL EVENT

5.3, 5.4, 5.5, 5.6

DESTRUCTIVE PHENOMENA - U2

Revision 4

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**FISSION PRODUCT BARRIER MATRIX (Modes 1-4)**

---

- 1.1 Fuel Clad (RCS activity, corecooling, heat sink)  
1.2 RCS (*Integrity, SGTR, heat sink*)  
1.3 Containment (*CNMT Red Path, CNMT bypass*)

**1**

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**SYSTEM DEGRADATION**

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- |                              |                                 |                          |
|------------------------------|---------------------------------|--------------------------|
| 2.1 Loss of Instrumentation  | 2.5 RCS Unident Leakage         | 2.9 Turbine Failure      |
| 2.2 Loss of Function/Comm's  | 2.6 RCS Ident. Leakage          | 2.10 Stm/Feed Line Break |
| 2.3 Failure of Rx Prot.-ATWS | 2.7 Technical Specification S/D |                          |
| 2.4 Fuel Clad Degradation    | 2.8 Safety Limit Exceeded       |                          |

**2**

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**LOSS OF POWER**

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- 3.1 Loss of AC (Power Ops) (*Modes 1-4*)  
3.2 Loss of AC (Shutdown) (*Modes 5 & 6*)  
3.3 Loss of DC

**3**

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**HAZARDS and ED JUDGEMENT**

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- |               |                       |                             |
|---------------|-----------------------|-----------------------------|
| 4.1 Fire      | 4.3 Flammable Gas     | 4.5 Control Room Evacuation |
| 4.2 Explosion | 4.4 Toxic Gas         | 4.6 Security                |
| Table 4-1     | Table 4-2             | 4.7 ED Judgement            |
| Figure 4-A    | Figure 4-B/Figure 4-C | Table 4-3/Table 4-4         |

**4**

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**DESTRUCTIVE PHENOMENA**

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- |                        |                                    |
|------------------------|------------------------------------|
| 5.1 Earthquake         | 5.3 Aircraft Crash/Projectile      |
| 5.2 Tornado/High Winds | 5.4 River Level High               |
| Table 5-1              | 5.5 River Level Low                |
| Figure 5-A             | 5.6 Watercraft Crash (RW/SWS Loss) |

**5**

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**SHUTDOWN SYSTEM DEGRADATION**

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- |                              |  |
|------------------------------|--|
| 6.1 Loss of Shutdown Systems | 6.3 Loss of AC (Shutdown) ( <i>Modes 5 &amp; 6</i> ) |
| 6.2 RCS Inventory-Shutdown   | 6.4 Loss of DC (Shutdown) ( <i>Modes 5 &amp; 6</i> ) |
|                              | 6.5 Fuel Handling ( <i>All Modes</i> )               |
|                              | 6.6 Inadvertent Criticality                          |

**6**

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**RADIOLOGICAL**

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- |                      |  |
|----------------------|--|
| 7.1 Gaseous Effluent | 7.3 Radiation Levels                   |
| 7.2 Liquid Effluent  | 7.4 Fuel Handling ( <i>All Modes</i> ) |
| Table 7-1            | Table 7-2                              |
| Figure 7-A           |  |

**7**

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GENERAL

SITE AREA

ALERT

UNUSUAL EVENT

6.1 Loss of Shutdown Systems	
Mode	Criterion / Indicator
	Refer to Tab 7.1 "Gaseous Effluents"
	Refer to Tab 7.1 "Gaseous Effluents"
5 6	Inability to maintain unit in cold shutdown [1 and 2]  1. UNPLANNED Loss of RHS <u>or</u> CCP <u>or</u> SWS  2. [a or b or c] a. Core exit thermocouples (CETC) (if available) indicate the temperature has increased >10 F <u>and</u> has exceeded 200F. b. (w/RHS in service) RHS inlet temperature has increased >10 F <u>and</u> has exceeded 200 F. c. (w/o CETCs or RHS), loss has exceeded 30 minutes or there is evidence of boiling in the Rx vessel.
5 6	UNPLANNED loss of any function needed for cold shutdown that results in a core exit temperature increase of more than 10 F [1 and 2]  1. UNPLANNED Loss of RHS <u>or</u> CCP <u>or</u> SWS  2. [a or b or c] a. Core exit thermocouples (CETC) (if available) indicate the temperature has increased >10 F b. (W/RHS in service) RHS inlet temperature has increased >10 F c. (w/o CETCs or RHS), loss has exceeded 15 minutes

6.2 RCS Inventory - Shutdown	
Mode	Criterion / Indicator
	Refer to Tab 7.1 "Gaseous Effluents"
5 6	Loss of water level in the reactor vessel that has <u>or</u> will uncover fuel in the reactor vessel [1 and 2]  1. [a or b] a. Loss of RHS <u>or</u> CCP <u>or</u> SWS b. Loss of RCS Inventory with inadequate makeup  2. [a and b] a. Ops personnel report 2RCS-LI-102, LR-102 RCS level instrumentation (if available) in the Control Room indicates a level drop to 0 inches b. Other confirmed indications of fuel uncover
	Not Applicable
5 6	Loss of Reactor Coolant System Inventory with inadequate make-up [1 and 2]  1. Ops personnel report 2RCS-LI-102, LR-102 RCS level instrumentation in the Control Room indicates a level drop to less than 14.5 inches  2. Ops personnel report inability to make-up RCS inventory

6.3 Loss of AC (Shutdown)	
Mode	Criterion / Indicator
	Refer to Tab 7.1 "Gaseous Effluents"
	Refer to Tab 7.1 "Gaseous Effluents"
5 6 De-Fuel	UNPLANNED loss of offsite <u>and</u> onsite AC power for >15 minutes  1. AE <u>and</u> DF 4KV emergency buses not energized from Unit 2 sources for >15 minutes  Also refer to Tab 6.1 "Loss of Shutdown Systems"
5 6 De-Fuel	UNPLANNED loss of all offsite power supply for >15 minutes [1 and 2]  1. Offsite power supply to AE and DF 4KV buses unavailable for >15 minutes.  2. Either diesel generator is supplying power to its respective emergency bus

6.4 Loss of DC (Shutdown)	
Mode	Criterion / Indicator
	Refer to Tab 7.1 "Gaseous Effluents"
	Refer to Tab 7.1 "Gaseous Effluents"
	Refer to Tab 6.1 "Loss of Shutdown Systems"
5 6 De-Fuel	UNPLANNED loss of the required train of DC power for >15 minutes [1 or 2]  1. Voltage <110 4 VDC on DC buses 2-1 <u>and</u> 2-3 for >15 minutes if train A is the priority train 2. Voltage <110 4 VDC on DC buses 2-2 <u>and</u> 2-4 for >15 minutes if train B is the priority train

EPP/7-1b  
Att 1

GENERAL

SITE AREA

ALERT

UNUSUAL EVENT

SHUTDOWN SYSTEMS DEGRADATION - U2

6.1, 6.2, 6.3, 6.4

GENERAL  
SITE AREA  
ALERT  
UNUSUAL EVENT

6.5 Fuel Handling	
Mode	Criterion / Indicator
	Refer to Tab 7.1 "Gaseous Effluents"
	Refer to Tab 7.1 "Gaseous Effluents"
ALL	<p>Major damage to irradiated fuel; <u>or</u> loss of water level that has <u>or</u> will uncover irradiated fuel outside the reactor vessel [1 and 2]</p> <p>1. VALID HIGH alarm on 2RMF-RQ202 [1031], 2HVR-RQ104A/B [1024, 1028], 2RMF-RQ301A/B [1032, 2032], <u>or</u> 2RMR-RQ203 [1025]</p> <p>2. [a or b]</p> <p>a. Plant personnel report damage of irradiated fuel sufficient to rupture fuel rods</p> <p>b. Plant personnel report water level drop has <u>or</u> will exceed available makeup capacity such that irradiated fuel will be uncovered</p> <p>Refer to Tab 6.2 for In-vessel Uncovery</p>
ALL	<p>UNPLANNED loss of water level in spent fuel pool or reactor cavity or transfer canal with fuel remaining covered [1 and 2 and 3]</p> <p>1. Plant personnel report water level drop in spent fuel pool <u>or</u> reactor cavity, <u>or</u> transfer canal</p> <p>2. VALID HIGH alarm on 2RMR-RQ203 [1025] <u>or</u> 2RMF-RQ-202 [1031]</p> <p>3. Fuel remains covered with water</p>

6.6 Inadvertent Criticality	
Mode	Criterion / Indicator
	Refer to Tab 7.1 "Gaseous Effluents"
	Refer to Tab 7.1 "Gaseous Effluents"
3 4 5 6	<p>Inadvertent reactor criticality</p> <p>1. Nuclear instrumentation indicate unanticipated sustained positive startup rate</p>
	Not Applicable

INTENTIONALLY BLANK



**FISSION PRODUCT BARRIER MATRIX (Modes 1-4)**

- 1.1 Fuel Clad (RCS activity, corecooling, heat sink)  
 1.2 RCS (*Integrity, SGTR, heat sink*)  
 1.3 Containment (*CNMT Red Path, CNMT bypass*)

**1****SYSTEM DEGRADATION**

- 2.1 Loss of Instrumentation    2.5 RCS Unident Leakage    2.9 Turbine Failure  
 2.2 Loss of Function/Comm's    2.6 RCS Ident. Leakage    2.10 Stm/Feed Line Break  
 2.3 Failure of Rx Prot.-ATWS    2.7 Technical Specification S/D  
 2.4 Fuel Clad Degradation    2.8 Safety Limit Exceeded

**2****LOSS OF POWER**

- 3.1 Loss of AC (Power Ops) (*Modes 1-4*)  
 3.2 Loss of AC (Shutdown) (*Modes 5 & 6*)  
 3.3 Loss of DC

**3****HAZARDS and ED JUDGEMENT**

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

**4****DESTRUCTIVE PHENOMENA**

- 5.1 Earthquake                      5.3 Aircraft Crash/Projectile  
 5.2 Tornado/High Winds              5.4 River Level High  
 Table 5-1                      5.5 River Level Low  
 Figure 5-A                      5.6 Watercraft Crash (RW/SWS Loss)

**5****SHUTDOWN SYSTEM DEGRADATION**

- 6.1 Loss of Shutdown Systems              6.3 Loss of AC (Shutdown) (*Modes 5 & 6*)  
 6.2 RCS Inventory-Shutdown              6.4 Loss of DC (Shutdown) (*Modes 5 & 6*)  
     6.5 Fuel Handling (*All Modes*)  
     6.6 Inadvertent Criticality

**6****RADIOLOGICAL**

- 7.1 Gaseous Effluent                      7.3 Radiation Levels  
 7.2 Liquid Effluent                      7.4 Fuel Handling (*All Modes*)  
 Table 7-1                      Table 7-2  
 Figure 7-A

**7**

GENERAL

SITE AREA

ALERT

UNUSUAL EVENT

7.1 Gaseous Effluents	
Mode	Criterion / Indicator
All	EAB dose resulting from an actual or imminent Release of gaseous radioactivity that exceeds 1000 mR TEDE or 5000 mR child thyroid CDE for the actual or projected duration of the release [1 or 2 or 3] 1. A VALID gas effluent rad monitor reading exceeds the values in Column 4 of Table 7-1 for >15 minutes, unless dose projections within this time period confirms that the CRITERION is NOT exceeded 2. Field survey results indicate EAB dose >1000 mR β-γ for the actual or projected duration of the release 3. EPP dose projection results indicate EAB dose >1000 mR TEDE or >5000 mR child thyroid CDE for the actual or projected duration of the release
All	EAB dose resulting from an actual or imminent release of gaseous radioactivity that exceeds 100 mR TEDE or 500 mR child thyroid CDE for the actual or projected duration of the release [1 or 2 or 3] 1. A VALID gas effluent rad monitor reading exceeds the values in Column 3 of Table 7-1 for >15 minutes, unless dose projections within this time period confirms that the CRITERION is NOT exceeded 2. Field survey results indicate EAB dose >100 mR β-γ for the actual or projected duration of the release 3. EPP dose projection results indicate EAB dose >100 mR TEDE or >500 mR child thyroid CDE for the actual or projected duration of the release
All	Any UNPLANNED release of gaseous radioactivity that exceeds 200 times Technical Specification 6.8.6a/Offsite Dose Calculation Manual Limit for 15 minutes [1 or 2 or 3] 1. A VALID gas effluent rad monitor reading exceeds the values in Column 2 of Table 7-1 for >15 minutes, unless dose projections within this time period confirms that the CRITERION is NOT exceeded 2. Field survey results indicate >10 mR/hr β-γ at the EAB for >15 minutes 3. EPP dose projection results indicate EAB dose >10 mR TEDE for the duration of the release
All	Any UNPLANNED release of gaseous radioactivity that exceeds 2 times Technical Specification 6.8.6a/Offsite Dose Calculation Manual Limit for 60 minutes [1 or 2 or 3] 1. A VALID gas effluent rad monitor reading exceeds the values in Column 1 of Table 7-1 for >60 minutes, unless dose projections within this time period confirms that the CRITERION is NOT exceeded 2. Field survey results indicate >0.1 mR/hr β-γ at the EAB for >60 minutes 3. EPP dose projection results indicate EAB dose >0.1 mR TEDE for the duration of the release

7.2 Liquid Effluents	
Mode	Criterion / Indicator
	Not Applicable
	Not Applicable
All	Any UNPLANNED release of liquid radioactivity that exceeds 200 times Technical Specification 6.8.6a/Offsite Dose Calculation Manual Limit for 15 minutes [1 or 2] 1. A VALID liquid effluent rad monitor reading exceeds the values in Column 2 of Table 7-1 for >15 minutes, unless dose projections within this time period confirms that the CRITERION is NOT exceeded 2. Sample results exceed 200 times Technical Specification 6.8.6a/Offsite Dose Calculation Manual Limit for an unmonitored release of liquid radioactivity >15 minutes in duration
	Any UNPLANNED release of liquid radioactivity to the environment that exceeds 2 times Technical Specification 6.8.6a/Offsite Dose Calculation Manual Limit for 60 minutes [1 or 2] 1. A VALID liquid effluent rad monitor reading exceeds the values in Column 1 of Table 7-1 for >60 minutes, unless dose projections within this time period confirms that the CRITERION is NOT exceeded 2. Sample results exceed 2 times the Technical Specification 6.8.6a/Offsite Dose Calculation Manual Limit 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 dose projection/assessment, as listed at the bottom of each column. If the assessment can not be completed within 15 minutes (60 minutes for UE), the declaration shall be made based on the VALID reading.

\* NOTE: These monitors have the ability to divert or terminate effluent flow. Ensure that a release is in progress prior to using the EAL's

	Column 1 UE		Column 2 Alert		Column 3 Site		Column 4 General	
If a RWDA (Batch Release) is Applicable	2x the ODCM Limit		200x the ODCM Limit					
* 2SGC-RQ100 [1065]	2.28E-03	uCi/ml	n/a	uCi/ml	n/a	uCi/ml	n/a	uCi/ml
2HVS-RQ101B [2039] RBC Purge	1.48E-04	uCi/cc	1.48E-02	uCi/cc	n/a	uCi/cc	n/a	uCi/cc
2HVS-RQ109B LR [2040] RBC Purge	6.36E-04	uCi/cc	6.36E-02	uCi/cc	n/a	uCi/cc	n/a	uCi/cc
2HVS-RQ109B Eff [5040] RBC Purge	2.26E+03	uCi/sec	2.26E+05	uCi/sec	n/a	uCi/sec	n/a	uCi/sec
* RM-1GW-108B (GWST)	7.86E+05	cpm	n/a	cpm	n/a	cpm	n/a	cpm
RM-1GW-109 Channel 5 (GWST)	n/a	cpm	n/a	cpm	n/a	cpm	n/a	cpm
For All Other Unplanned Releases	2x the ODCM Limit		200x the ODCM Limit					
SLCRS Unfiltered Pathway (also called Ventilation Vent) 2HVS-RQ101B [2039]	6.02E-04	uCi/cc	6.02E-02	uCi/cc	1.72E-01	uCi/cc	n/a	uCi/cc
SLCRS Filtered Pathway (also called Elevated Release) 2HVS-RQ109B LR [2040]	2.12E-04	uCi/cc	2.12E-02	uCi/cc	n/a	uCi/cc	n/a	uCi/cc
2HVS-RQ109B MR [3040]	n/a	uCi/cc	n/a	uCi/cc	3.88E-02	uCi/cc	3.88E-01	uCi/cc
2HVS-RQ109B HR [4040]	n/a	uCi/cc	n/a	uCi/cc	3.88E-02	uCi/cc	3.94E-01	uCi/cc
2HVS-RQ109B Eff [5040]	5.88E+03	uCi/sec	5.88E+05	uCi/sec	1.04E+06	uCi/sec	1.04E+07	uCi/sec
Decontamination Building Vent * 2RMQ-RQ301B [2033]	6.30E-03	uCi/cc	n/a	uCi/cc	n/a	uCi/cc	n/a	uCi/cc
Waste Gas Storage Vault Vent * 2RMQ-RQ303B [2037]	5.16E-02	uCi/cc	n/a	uCi/cc	n/a	uCi/cc	n/a	uCi/cc
Condensate Polishing Building Vent * 2HVL-RQ112B [2013]	3.22E-03	uCi/cc	3.22E-01	uCi/cc	n/a	uCi/cc	n/a	uCi/cc
Main Steam Reliefs 2MSS-RQ101A/101B/101C [1005/3005/5005]	n/a	uCi/cc	n/a	uCi/cc	1.77E-01	uCi/cc	1.77E-01	uCi/cc
2MSS-RQ101A/101B/101C Eff [2005/4005/6005]	n/a	uCi/sec	n/a	uCi/sec	5.10E+05	uCi/sec	5.10E+06	uCi/sec
Liquid Effluent Pathways * 2SGC-RQ100 [1065]	2.28E-03	uCi/ml	n/a	uCi/ml	n/a	uCi/ml	n/a	uCi/ml
2SWS-RQ101 [1068]	8.59E-05	uCi/ml	8.59E-03	uCi/ml	n/a	uCi/ml	n/a	uCi/ml
2SWS-RQ102 [1067]	8.59E-05	uCi/ml	8.59E-03	uCi/ml	n/a	uCi/ml	n/a	uCi/ml

7.1, 7.2, Table 7-1 RADIOLOGICAL / FUEL HANDLING - U2

GENERAL

SITE AREA

ALERT

UNUSUAL EVENT

7.3 Radiation Levels	
Mode	Criterion / Indicator
	Refer to Tab 1 "Fission Product Barrier Matrix" or Tab 7.1 "Gaseous Effluents"
	Refer to Tab 1 "Fission Product Barrier Matrix" or Tab 7.1 "Gaseous Effluents"
All	<p>UNPLANNED increases in radiation levels within the facility that impedes safe operations or establishment or maintenance of cold shutdown [1 or 2]</p> <ol style="list-style-type: none"><li>VALID area radiation monitor readings or survey results exceed 15 mR/hr in the Control Room 2RMC-RQ201/202 [1069/1072] or PAF 2RMS-RQ223 [1071] for &gt;15 minutes</li><li>[a and b]<ol style="list-style-type: none"><li>VALID area radiation monitor readings or survey results exceed values listed in Table 7-2</li><li>Access restrictions impede operation of systems necessary for safe operation or the ability to establish or maintain cold shutdown</li></ol></li></ol> <p>See Note Below</p>
All	<p>UNPLANNED increase in radiation levels within the facility</p> <ol style="list-style-type: none"><li>VALID area radiation monitor readings increase by a factor of 1000 over normal levels for &gt;15 minutes</li></ol> <p>Note In either the UE or ALERT EAL, the ED must determine the cause of increase in radiation levels and review other CRITERIA/INDICATORS for applicability (e.g., a dose rate of 15 mR/hr in the Control Room could be caused by a release associated with a more significant event)</p>

7.4 Fuel Handling	
Mode	Criterion / Indicator
	Refer to Tab 7.1 "Gaseous Effluents"
	Refer to Tab 7.1 "Gaseous Effluents"
All	<p>Major damage to irradiated fuel; or loss of water level that has or will uncover irradiated fuel outside the reactor vessel [1 and 2]</p> <ol style="list-style-type: none"><li>VALID HIGH alarm on 2RMR-RQ203 [1025] or 2RMF-RQ202 [1031] or 2RMF-RQ301 A/B [1032/2032] or 2HVR-RQ104A/B [1024/1028]</li><li>[a or b]<ol style="list-style-type: none"><li>Plant personnel report damage of irradiated fuel sufficient to rupture fuel rods</li><li>Plant personnel report water level drop has or will exceed available makeup capacity such that irradiated fuel will be uncovered</li></ol></li></ol> <p>Refer to Tab 6 "Shutdown Systems" for In-vessel Uncovery</p>
All	<p>UNPLANNED loss of water level in spent fuel pool or reactor cavity or transfer canal with fuel remaining covered [1 and 2 and 3]</p> <ol style="list-style-type: none"><li>Plant personnel report water level drop in spent fuel pool or reactor cavity, or transfer canal</li><li>VALID HIGH alarm on 2RMR-RQ203 [1025] or 2RMF-RQ202 [1031]</li><li>Fuel remains covered with water</li></ol>

Table 7-2  
Areas Associated With EAL 7.3

LOCATION	INDICATOR	READING
730' Service Bldg (H2 Analyzers)	Survey Results	>100 mR/hr general area
PASS Cubicle (735' PAB)	RMP-RQ-204 [1050]	>100 mR/hr general area
Chem Sample Panel (718' PAB)	RMP-RQ-210 [1059]	>100 mR/hr general area
737' Safeguards (H2 Control System Operations)	RMP-RQ-205A,B [1049]	>100 mR/hr general area
741' Safeguards (Safe Shutdown Valves)	Survey Results	>100 mR/hr general area
738' Cable Vault (RHR Suction Valves)	Survey Results	>100 mR/hr general area
773' PAB (WRGM Sampling)	Survey Results	>100 mR/hr general area
788' Main Steam & Cable Vault	Survey Results	>100 mR/hr general area
Alternate Shutdown Panel Room	Survey Results	>100 mR/hr general area
West Cable Vault (730')	Survey Results	>100 mR/hr general area
A Penetrations (713')	Survey Results	>5 R/hr general area
C&D Penetrations (718')	Survey Results	>100 mR/hr general area
Cable Vault (755')	Survey Results	>100 mR/hr general area
CNMT Instr Air Room (773')	Survey Results	>100 mR/hr general area
AE/DF Switchgear	Survey Results	>100 mR/hr general area
Turbine Bldg 735' West	Survey Results	>100 mR/hr general area
EDG 2-1, 2-2	Survey Results	>5 R/hr general area

Figure 7-A  
EXCLUSION AREA  
BOUNDARY