

50-272/311

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A001

SALEM GENERATING STATION  
EVENT CLASSIFICATION GUIDE TECHNICAL BASIS  
July 24, 2000

CHANGE PAGES FOR  
REVISION #05

PSE&G  
CONTROL  
COPY # SECG0101

The Table of Contents forms a general guide to the current revision of each section and attachment of the Salem ECG Technical Basis. The changes that are made in this TOC Revision #05 are shown below.

1. Check that your revision packet is complete.
2. Add the revised documents.
3. Remove and recycle the outdated material listed below.

ADD			REMOVE		
<u>Pages</u>	<u>Description</u>	<u>Rev.</u>	<u>Pages</u>	<u>Description</u>	<u>Rev.</u>
ALL	TOC	5	ALL	TOC	4
All	Section 2.0	1	All	Section 2.0	0
All	Section 3.3	3	All	Section 3.3	2
All	Section 8.2	2	All	Section 8.2	1

Summary of significant changes:

1. 2.2.1 - Defined Reactor Coolant System Leakage
2. 3.3.4.a - Listed specific main steam isolation valves that would constitute a containment bypass if any one of them failed to close on a faulted steam generator. Added clarification of why a steam generator tube rupture is not considered a containment bypass.
3. 8.2.1 - Changed Senior Nuclear Shift Supervisor to Operations Superintendent.

**SALEM ECG TECHNICAL BASIS  
TABLE OF CONTENTS/SIGNATURE PAGE**

**COPY #** SECG0101

<u>SECTION</u>	<u>TITLE</u>	<u>REV #</u>	<u>PAGES</u>	<u>DATE</u>
T.O.C.	<b>Table of Contents/Signature Page</b>	05	3	07/24/00
i	<b>Introduction and Usage</b>	00	3	01/21/97
ii	<b>Glossary of Acronyms &amp; Abbreviations</b>	00	6	01/21/97
1.0	<b>Fuel Clad Challenge</b>	01	4	12/29/99
2.0	<b>RCS Challenge</b>	02	2	07/24/00
3.0	<b>Fission Product Barriers (Table)</b>			
	3.1 Fuel Clad Barrier	01	20	12/29/99
	3.2 RCS Barrier	01	16	12/29/99
	3.3 Containment Barrier	03	25	07/24/00
4.0	<b>EC Discretion</b>	00	8	01/21/97
5.0	<b>Failure to Trip</b>	01	8	12/29/99
6.0	<b>Radiological Releases/Occurrences</b>			
	6.1 Gaseous Effluent Release	00	42	01/21/97
	6.2 Liquid Effluent Release	00	4	01/21/97
	6.3 In - Plant Radiation Occurrences	00	6	01/21/97
	6.4 Irradiated Fuel Event	00	10	01/21/97
7.0	<b>Electrical Power</b>			
	7.1 Loss of AC Power Capabilities	01	11	12/29/99
	7.2 Loss of DC Power Capabilities	00	8	01/21/97
8.0	<b>System Malfunctions</b>			
	8.1 Loss of Heat Removal Capability	01	10	12/29/99
	8.2 Loss of Overhead Annunciators	02	6	07/24/00
	8.3 Loss of Communications Capability	00	4	01/21/97
	8.4 Control Room Evacuation	00	4	01/21/97
	8.5 Technical Specifications	00	2	01/21/97
9.0	<b>Hazards - Internal/External</b>			
	9.1 Security Threats	00	8	01/21/97
	9.2 Fire	01	6	12/29/99
	9.3 Explosion	01	5	12/29/99
	9.4 Toxic/Flammable Gases	01	11	12/29/99
	9.5 Seismic Event	01	4	12/29/99
	9.6 High Winds	00	5	01/21/97
	9.7 Flooding	01	4	12/29/99
	9.8 Turbine Failure/Vehicle Crash/ Missile Impact	01	7	12/29/99
	9.9 River Level	00	4	01/21/97

**SALEM ECG TECHNICAL BASIS  
TABLE OF CONTENTS/SIGNATURE PAGE**

<u>SECTION</u>	<u>TITLE</u>	<u>REV #</u>	<u>PAGES</u>	<u>DATE</u>
10.0	<b>Reserved for future use</b>			

Licensing is responsible for the Reportable Action Level (Section 11)

11.0	<b>Reportable Action Levels (RALs)</b>			
11.1	Technical Specifications	00	8	01/21/97
11.2	Design Basis/ Unanalyzed Condition	01	7	03/13/97
11.3	Engineered Safety Features (ESF)	01	6	08/28/97
11.4	Personnel Safety/Overexposure	00	8	01/21/97
11.5	Environmental	00	3	01/21/97
11.6	After-the-Fact	00	1	01/21/97
11.7	Security/Emergency Response Capabilities	01	5	03/13/97
11.8	Public Interest	00	3	01/21/97
11.9	Accidental Criticality/ Special Nuclear Material / Rad Material Shipments - Releases	00	9	01/21/97
11.10	Voluntary Notifications	00	2	01/21/97

**SIGNATURE PAGE**

Prepared By: Ben Detwiler Rev D 07-17-00  
(If Editorial Revisions Only, Last Approved Revision) Date

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(If Applicable) Date

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NA  
Mtg. No. Salem Chairman

NA  
General Manager - Salem Operations

NA  
Date

NA  
Date

Effective Date of this Revision: 07/24/00  
Date

**2.0 RCS Challenge****2.1 RCS Leakage**

UNUSUAL EVENT - 2.1.1.a/2.1.1.b/2.1.1.c

IC RCS Leakage

EAL

PSE&G  
CONTROL  
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**Reactor Coolant System Pressure Boundary Leakage > 10 gpm**

OR

**Reactor Coolant System Unidentified Leakage > 10 gpm**

OR

**Reactor Coolant System Identified Leakage > 25 gpm**

MODE - 1, 2, 3, 4

**BASIS**

This EAL addresses plant conditions where Reactor Coolant System (RCS) leakage significantly exceeds limits imposed by Technical Specifications. **RCS leakage** is defined as any RCS leakage that is unisolable or affects Pressurizer level. A leak of such magnitude is consistent with an Unusual Event classification and should be declared immediately. Credit for the Technical Specification Action Statement time in deferring an Emergency Classification should only be given when the leakage exceeds Technical Specification limits but has not yet exceeded the Unusual Event threshold. These EALs are included as Unusual Events as they may be precursors to a more serious event. As such, it is considered to be a potential degradation of the level of safety of the plant. The unidentified or pressure boundary threshold value was chosen to be readily observable from the control room using normal indications. The identified leakage threshold value is set at a higher value due to its lesser significance compared to unidentified or pressure boundary leakage. Note that identified leakage includes Primary to Secondary leakage per Technical Specification definition.

**Barrier Analysis**

EAL - 2.1.1.a/2.1.1.b/2.1.1.c

Rev. 01

This event does not reach the threshold for the loss of the RCS Barrier, but does affect that barrier.

### **ESCALATION CRITERIA**

This event will be escalated to an Alert or higher classification based on a loss or potential loss of fission product barriers per EAL section 3.0.

### **DISCUSSION**

Utilizing the leak before break methodology, it is anticipated that there will be indication(s) of minor reactor coolant system boundary leakage prior to a fault escalating to a major leak or a system rupture. Detection of low levels of leakage while pressurized permits monitoring for catastrophic failure or rupture precursors.

### **DEVIATION**

None

### **REFERENCES**

NUMARC NESP-007, SU5  
EOP-TRIP-1  
EOP-LOCA-1  
Technical Specifications Definition 1.15.c  
Technical Specifications 3.4.6.2 - Unit 1  
Technical Specifications 3.4.7.2 - Unit 2

### 3.0 Fission Product Barriers

#### 3.3 Containment Barrier

##### 3.3.1 CRITICAL SAFETY FUNCTION STATUS

###### 3.3.1.a

IC Potential Loss of Containment Barrier = 1 POINT

EAL

PSE&G  
CONTROL  
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**CNTMT ENVIRONMENT RED PATH**

MODE - 1, 2, 3, 4

##### BASIS

Containment Environment RED Path, as verified by EOP-CFST-1, results from RCS barrier loss or a faulted S/G inside Containment and signifies that breach of the Primary Containment is imminent. For this condition, all Containment isolations, as well as automatic Containment Spray and CFCU "low speed" operation should be initiated before this threshold is reached.

##### Barrier Analysis

Containment Barrier has been potentially lost.

##### ESCALATION CRITERIA

This event will be classified and/or escalated based on the potential loss or loss of additional barriers per EAL Section 3.0.

##### DISCUSSION

Symptom based criteria from the Emergency Operating Procedures Critical Safety Function Tree (CFST) Monitoring are integrated into this EAL. The CFSTs are contained as a tab to the ECG. The intent of using confirmed CFST status in this EAL is to simplify the identification of the EAL threshold criteria monitored in the Control Room.

Although the yield strength of the Primary Containment may be much higher than 47 psig, for the purposes of event classification, the barrier is considered potentially lost at that value. Thus, this EAL is primarily a discriminator between a Site Area Emergency and a General

EAL - 3.3.1.a  
Rev. 03

Emergency, representing a potential loss of the third barrier. CFST status will not be used for event classification until the Control Room Staff has implemented the CFSTs.

**DEVIATION**

None

**REFERENCES**

NUMARC NESP-007, PC1  
EOP-CFST-1  
EOP-TRIP-1  
EOP-FRCE-1

### 3.0 Fission Product Barriers

#### 3.3 Containment Barrier

##### 3.3.1 CRITICAL SAFETY FUNCTION STATUS

###### 3.3.1.b

IC Potential Loss of Containment Barrier = 1 POINT

EAL

<b>CORE COOLING RED PATH for &gt; 15 minutes</b>
--

MODE - 1, 2, 3, 4

###### BASIS

Core Cooling RED Path, as verified by EOP-CFST-1, represents an imminent melt sequence which if not corrected could lead to Reactor Vessel failure and potential for Containment failure. The 15 minutes is used as a threshold for indicating that operator actions have not been effective in restoring core cooling.

###### Barrier Analysis

Fuel Clad Barrier has been lost, RCS and the Containment Barriers have been potentially lost.

###### ESCALATION CRITERIA

This event will be classified and/or escalated based on the loss of an additional barrier per EAL Section 3.0.

###### DISCUSSION

Symptom based criteria from the Emergency Operating Procedures Critical Safety Function Tree (CFST) Monitoring are integrated into this EAL. The CFSTs are contained as a tab to the ECG. The intent of using confirmed CFST status in this EAL is to simplify the identification of the EAL threshold criteria monitored in the Control Room.

Severe accident analysis has concluded that functional restoration procedures can arrest core degradation within the Reactor Vessel in a significant fraction of the scenarios, and that the

EAL - 3.3.1.b

Rev. 03

likelihood of Containment failure in these scenarios is small. It is appropriate, therefore, to allow a reasonable period of time for the functional restoration procedures to arrest the core melt sequence. It should be apparent within 15 minutes if the procedures will be effective. The Emergency Coordinator should make the classification as soon as it is determined that the procedures have been, or will be, ineffective. CFST status will not be used for event classification until the Control Room Staff has implemented the CFSTs.

**DEVIATION**

None

**REFERENCES**

NUMARC NESP-007, PC6  
EOP-CFST-1  
EOP-TRIP-1

### 3.0 Fission Product Barriers

#### 3.3 Containment Barrier

##### 3.3.2 CONTAINMENT PRESSURE

###### 3.3.2.a

IC Potential Loss of Containment Barrier = 1 POINT

EAL

Containment H<sub>2</sub> > 4 %

MODE - 1, 2, 3, 4

##### BASIS

Hydrogen gas can be present in the Containment at the threshold level only as a result of an inadequate core cooling accident, substantial zirc-water reaction, and a breach of the RCS. Containment H<sub>2</sub> level above 4% signifies that an explosive mixture may exist.

##### Barrier Analysis

Containment Barrier has been potentially lost.

##### ESCALATION CRITERIA

This event will be classified and/or escalated based on the potential loss or loss of additional barriers per EAL Section 3.0.

##### DISCUSSION

A 4% mixture of H<sub>2</sub> with normal Containment atmosphere represents the deflagration lower limit. Any subsequent ignition and burn of this level mixture releases a substantial amount of energy that must be absorbed by the Containment structure, which is already under stress due to the Loss of the RCS Barrier.

##### DEVIATION

None

EAL - 3.3.2.a  
Rev. 03

**REFERENCES**

NUMARC, NESP-007, PC2  
EOP-TRIP-1  
EOP-FRCE-1  
EOP-Setpoint Doc (T.18)

### 3.0 Fission Product Barriers

#### 3.3 Containment Barrier

##### 3.3.2 CONTAINMENT PRESSURE

###### 3.3.2.b

**IC** Potential Loss of Containment Barrier = 1 POINT

**EAL**

CNTMT Press. > 15 psig with EITHER one of the following:

- No CNTMT Spray AND < 5 CFCUs Running in "Low Speed"
- One CNTMT Spray Train I/S AND < 3 CFCUs Running in "Low Speed"

**MODE** - 1, 2, 3, 4

###### **BASIS**

Containment (CNTMT) pressure increase to > 15 psig (the CNTMT Spray initiation setpoint) indicates a major release of energy to the Containment. Failure of ALL Containment Spray with < 5 Containment Fan Coil Units (CFCUs) running in "low speed", or only one train of Containment Spray in service with < 3 CFCUs running in "low speed", indicates a condition where systems designed for containment heat removal and depressurization do not have the capacity to maintain Containment pressure below the structural design limit. The threshold value for available Containment Depressurization and Cooling Systems is based upon system design basis for maintaining Containment integrity.

###### **Barrier Analysis**

Containment Barrier has been potentially lost.

###### **ESCALATION CRITERIA**

This event will be classified and/or escalated based on the potential loss or loss of additional barriers per EAL Section 3.0.

EAL - 3.3.2.b  
Rev. 02

## **DISCUSSION**

The CFCUs and the Containment Spray system are redundant to each other in providing post accident cooling of the Containment atmosphere. With less than the minimum combination of sub-systems stated in the EAL threshold value, the ability to remove energy from the Containment atmosphere is severely impaired. Containment pressure > 15 psig with a loss of Containment Cooling and Depressurization systems represents a potential loss of the Containment barrier.

## **DEVIATION**

None

## **REFERENCES**

NUMARC, NESP-007, PC2  
EOP-TRIP-1  
EOP-FRCE-1  
EOP-Setpoint Doc (T.02)  
Technical Specification Section 3.6.2

### 3.0 Fission Product Barriers

#### 3.3 Containment Barrier

##### 3.3.2 CONTAINMENT PRESSURE

###### 3.3.2.c

IC Loss of Containment Barrier = 2 POINTS

###### EAL

**A Rapid Unexplained Containment Pressure Drop following an initial Rise to > 4 psig**

MODE - 1, 2, 3, 4

###### BASIS

Containment pressure increase to > 4 psig (the containment pressure Safety Injection initiation setpoint) indicates a major release of energy to the Containment. These releases can only be provided by a large release of either primary or secondary coolant into the Containment. For the cases that primary coolant provides the source of energy, a loss of the RCS barrier has also occurred. A rapid unexplained loss of Containment pressure following an initial pressure rise indicates a loss of Containment integrity.

**Unexplained** means that the pressure **drop** is not as a result of operator actions taken to reduce Containment pressure. The term **rapid** was added as an attempt to quantify the size of the Containment breach.

Emergency Coordinator judgment should be used to determine if this EAL applies for rapid, unexplained Containment pressure drops following initial rises to less than the 4 psig threshold.

###### Barrier Analysis

Containment Barrier has been lost.

###### ESCALATION CRITERIA

This event will be classified and/or escalated based on the potential loss or loss of additional barriers per EAL Section 3.0.

EAL - 3.3.2.c  
Rev. 02

## **DISCUSSION**

The threshold value of 4 psig was selected to be consistent with the Safety Injection and Adverse Containment criteria. For those cases where secondary coolant provides the source of energy, a faulted Steam Generator is possible. This requires actions in EOP-LOSC-1 to isolate the Main Steam lines to maintain intact Steam Generators for an RCS Heat Sink, minimize Containment Pressure, and to minimize RCS cooldown.

## **DEVIATION**

None

## **REFERENCES**

NUMARC NESP-007, PC2  
EOP-TRIP-1  
EOP-LOSC-1  
Technical Specification Table 3.3-4

### 3.0 Fission Product Barriers

#### 3.3 Containment Barrier

##### 3.3.3 CONTAINMENT ISOLATION

###### 3.3.3.a

IC Potential Loss of Containment Barrier = 1 POINT

###### EAL

CNTMT Sump Level > 78% (75% adverse)
--------------------------------------

MODE - 1, 2, 3, 4

###### BASIS

The Containment (CNTMT) Sump threshold of 78% (75% adverse) is based upon containment flooding concerns, and is consistent with the CFST level requiring implementation of EOP-FRCE-2. An indicated level greater than this value indicates that water has been introduced into the Containment from other sources. Potential flooding of critical system components and instrumentation required for responding to an accident or performing an orderly shutdown may be affected. Thus the Containment and associated systems may not be capable of performing their function as a fission product barrier.

###### Barrier Analysis

Containment Barrier has been potentially lost.

###### ESCALATION CRITERIA

This event will be classified and/or escalated based on the potential loss or loss of additional barriers per EAL Section 3.0.

###### DISCUSSION

Symptom based criteria from the Emergency Operating Procedures Critical Safety Function Tree (CFST) Monitoring are integrated into this EAL. The CFSTs are contained as a tab to the ECG. The intent of using CFST status in this EAL is to simplify the identification of the EAL threshold criteria monitored in the Control Room. The EAL threshold of >78% (75% adverse) CNTMT sump level is consistent with the CFST criteria.

EAL - 3.3.3.a

Rev. 03

**DEVIATION**

None

**REFERENCES**

NUMARC NESP-007, PC7  
EOP-TRIP-1  
EOP-FRCE-1  
EOP-FRCE-2  
EOP-Setpoint Doc (T.07, T.08)

### 3.0 Fission Product Barriers

#### 3.3 Containment Barrier

##### 3.3.3 CONTAINMENT ISOLATION

###### 3.3.3.b

IC Loss of Containment Barrier = 2 POINTS

EAL

Valid CNTMT  $\phi$ A,  $\phi$ B or CNTMT Vent Isol Signal

AND

Flow path from CNTMT to the environment

MODE - 1, 2, 3, 4

###### BASIS

A **valid** Containment (CNTMT) Isolation Signal represents a situation that requires closure of selected Containment Isolation valves to maintain containment integrity under abnormal conditions. The lines required to be isolated under these conditions connect potentially contaminated systems or Containment volume with systems outside the Containment.

Classification under this EAL is not required if manual closure attempts from Control Room are successful in the event that the automatic isolation signal fails. The term "**valid**" is defined as an actual condition which requires a CNTMT isolation due to instrumentation setpoints being exceeded.

The term "**to the environment**" is intended to include ANY **flow path** to the environment either directly or via systems which exhaust to the Plant Vent (e.g.; leakage to the Auxiliary Building ventilation system).

###### Barrier Analysis

Containment Barrier has been lost.

EAL - 3.3.3.b  
Rev. 02

## **ESCALATION CRITERIA**

This event will be classified and/or escalated based on the potential loss or loss of additional barriers per EAL Section 3.0.

## **DISCUSSION**

Technical Specification 3.6.3 "Containment Isolation Valves" was used to determine the signals required for Containment isolation. Any reference to Main Steam Isolation or Steam Generator Blowdown Isolation is covered under the Containment Bypass "potential loss" EAL.

## **DEVIATION**

None

## **REFERENCES**

NUMARC NESP-007, PC3  
EOP-TRIP-1  
OP-AR.ZZ-0003(Q)  
SGS Technical Specifications

### 3.0 Fission Product Barriers

#### 3.3 Containment Barrier

##### 3.3.4 RCS LINE BREAK/CONTAINMENT BYPASS

###### 3.3.4.a

IC Potential Loss of Containment Barrier = 1 POINT

###### EAL

**Unisolable, Faulted Steam Generator OUTSIDE of containment as indicated by S/G pressure dropping in an uncontrolled manner or completely depressurized**

**AND**

Affected S/G tubes are intact

MODE - 1, 2, 3, 4

###### BASIS

S/Gs, which have unisolable faults outside of containment, will require feed isolation and secondary side dryout in order to stop the resultant excessive RCS cooldown rate. This subsequent dryout will result in significant thermal stress and differential pressures across the tube sheet and greater risk of a SGTR on an already faulted S/G. As such, this event is considered to be a precursor to a more serious event and will lead to at least an Unusual Event classification.

This EAL excludes S/G depressurization events that are a direct result of EOP directed operator action. The term "**dropping in an uncontrolled manner or completely depressurized**" is defined consistent with the EOP definition of a Faulted S/G. "**Unisolable**" is defined as a condition where isolation is not possible from the Control Room such as a pipe rupture with no accessible isolation valves, a stuck open safety or relief valve, etc. (excluding minor valve leakage).

###### Barrier Analysis

Containment Barrier has been potentially lost.

EAL - 3.3.4.a  
Rev. 03

## ESCALATION CRITERIA

This event will be classified and/or escalated based on the potential loss or loss of additional barriers per EAL Section 3.0.

## DISCUSSION

This EAL was added to the Fission Product Barrier Table 3.0 as a Containment Bypass "Potential Loss" to ensure that all unisolable steam or feedwater break events, where the fault is outside of the Containment are at least classified as an Unusual Event. The "potential loss" category (1 point) was selected to ensure that further challenges to other Fission Product Barriers result in Emergency Classifications consistent with current philosophy.

The Containment Barrier section was selected since Technical Specifications Section 3.6.3 "Containment Isolation Valves" requires both Main Steam Isolation and Steam Generator Blowdown Isolation. Therefore, failure of any Main Steam Isolation valve to close upon demand and whose flowpath cannot be isolated by the closure of a valve from the Control Room represents a potential loss of containment integrity. Valves specifically included in this EAL as Main Steam Isolation valves are:

1. MS 167, MSIV
2. MS 7, MSIV drain
3. MS 18, MSIV Bypass
4. MS 10, SG PORV
5. GB 4, SG Blowdown

The Containment Bypass sub-section was selected based upon the leakage being non-radioactive steam or feedwater with concerns for RCS integrity appropriately classified under the RCS Barrier section.

Steam generator tube ruptures are not considered a potential loss of containment barrier by definition due to the limited radiation releases (below Tech Specs) assumed in the SGTR accident analysis based on plant design. A SGTR would, by itself, be a potential loss of the RCS barrier.

## DEVIATION

This EAL was added due to a Containment Bypass concern.

## REFERENCES

NUMARC NESP-007, PC7  
EOP-TRIP-1

EAL - 3.3.4.a  
Rev. 03

EOP-LOSC-1  
OP-AB.STM-0001 (Q)

EAL - 3.3.4.a  
Rev. 03

### 3.0 Fission Product Barriers

#### 3.3 Containment Barrier

##### 3.3.4 RCS LINE BREAK/CONTAINMENT BYPASS

###### 3.3.4.b

IC Loss of Containment Barrier = 2 POINTS

###### EAL

Primary to Secondary Leakage > Tech Spec Limits

AND

Prolonged, direct secondary leakage to the environment

MODE - 1, 2, 3, 4

###### BASIS

Primary to Secondary leakage greater than Technical Specifications along with indication of prolonged secondary side leakage outside the Containment indicates a Steam Generator (S/G) tube leak that is discharging directly to the environment. "Prolonged" is defined as an unisolable rupture (excluding minor valve leakage) of a steam or feed line outside of Containment, or a stuck open safety or relief valve on a secondary system connected to the steam side of the leaking S/G.

The term "direct secondary leakage to the environment" is intended to include all flow paths of contaminated secondary coolant to the environment either directly or via systems which exhaust to the Plant Vent (e.g.; leakage to the Auxiliary Building ventilation system) with the following exception: If the procedure in effect requires steaming the leaking S/G to the main condenser, the Condenser Air Ejector (R15) pathway is excluded from this EAL provided the release is both controlled and monitored.

For Steam Generator Tube Rupture (SGTR), this EAL is used in conjunction with the RCS Barrier SGTR EALs to ensure proper classification if the Ruptured S/G is also faulted outside of Containment.

EAL - 3.3.4.b  
Rev. 03

## **Barrier Analysis**

Containment Barrier has been lost.

### **ESCALATION CRITERIA**

This event will be classified and/or escalated based on the potential loss or loss of additional barriers per EAL Section 3.0.

### **DISCUSSION**

The primary intent of this EAL is to ensure, in conjunction with the RCS Barrier "Loss" SGTR EAL, that Ruptured S/Gs that are also faulted outside of Containment are classified as at least a Site Area Emergency. The threshold for establishing the bypass of Containment was intended to be a prolonged release of radioactivity from the Ruptured S/G directly to the environment.

The secondary purpose of this EAL is to classify S/G tube leak events, which exceed Technical Specification limits, but do not exceed the RCS Barrier SGTR thresholds. If a prolonged release occurs from a S/G during a leak, only an Unusual Event would be declared based on the "Loss" of the containment barrier.

### **DEVIATION**

None

### **REFERENCES**

NUMARC NESP-007, PC4

### 3.0 Fission Product Barriers

#### 3.3 Containment Barrier

##### 3.3.4 RCS LINE BREAK/CONTAINMENT BYPASS

###### 3.3.4.c

**IC** Loss of Containment Barrier = 2 POINTS

**EAL**

LOCA conditions

AND

CNTMT Press. OR Sump Level NOT rising as expected

**MODE** - 1, 2, 3, 4

**BASIS**

The threshold conditions require that a Loss of Coolant Accident (LOCA) is known to be occurring. Such events are accompanied by release of energy and inventory from the RCS to the Containment (CNTMT), and should result in pressure and sump level rise in the Containment. Failure of CNTMT Pressure or Sump Level indications to rise as expected following a known LOCA is an indication of a Containment Bypass situation.

##### **Barrier Analysis**

Containment and RCS Barriers have been lost.

##### **ESCALATION CRITERIA**

This event will be classified and/or escalated based on the potential loss or loss of the Fuel Clad Barrier per EAL Section 3.1.

**DISCUSSION**

EAL - 3.3.4.c  
Rev. 03

A LOCA is expected to result in CNTMT pressure rise to >4 psig. This leak rate should result in the accumulation of RCS inventory in the CNTMT Sump as well as a CNTMT SUMP PMP START OHA as the level rises. A lack of expected CNTMT Sump level response or CNTMT pressure not rising indicates that the Containment Barrier has been bypassed.

**DEVIATION**

None

**REFERENCES**

NUMARC NESP-007, PC2  
EOP-TRIP-1  
EOP-LOCA-6, LOCA Outside Containment  
OP-AR.ZZ-0003(Q)

### 3.0 Fission Product Barriers

#### 3.3 Containment Barrier

##### 3.3.5 CONTAINMENT RADIATION LEVELS

IC Potential Loss of Containment Barrier = 1 POINT

EAL

R44A or R44B > 2000 R/hr
--------------------------

MODE - 1, 2, 3, 4

##### BASIS

A Containment High Range Monitor (R44) reading in excess of 2000 R/hr indicates significant Fuel Clad damage, well in excess of that corresponding to a loss of the RCS and Fuel Clad barriers. The value corresponds to a release of approximately 20% of the gap region. Regardless of whether Containment is challenged, this amount of activity in Containment, if released, could have severe consequences and it is prudent to treat this as a potential loss of the Containment Barrier.

##### Barrier Analysis

Containment Barrier has been potentially lost, the Fuel Clad and RCS Barriers have been lost.

##### ESCALATION CRITERIA

N/A

##### DISCUSSION

This calculation is based upon a calculation of 20% Clad Damage as it relates to R44 measured Dose Rate values. This calculation was prepared by the Nuclear Fuels Group and is on file with Emergency Preparedness under file title DS1.6-00XX "Verification of Emergency Action Levels for Event Classification" date 1/26/95.

##### DEVIATION

None

EAL - 3.3.5  
Rev. 03

**REFERENCES**

NUMARC NESP-007, PC5

NUREG-1228 - Source Term Estimation During Incident Response to Severe Nuclear Power Plant Accidents

Calculation by Nuclear Fuels file title DS1.6-00XX "Verification of Emergency Action Levels for Event Classification

### 3.0 Fission Product Barriers

#### 3.3 Containment Barrier

##### 3.3.6 EMERGENCY COORDINATOR JUDGMENT

###### 3.3.6.a/ 3.3.6.b

IC Potential Loss (= 1 POINT) or Loss of Containment Barrier (= 2 POINTS)

###### EAL

ANY condition, in the opinion of the EC, that indicates EITHER a Potential Loss OR Loss of the Containment Barrier

MODE - 1, 2, 3, 4

###### BASIS

This EAL allows the Emergency Coordinator (EC) to address any factor not otherwise covered in the Fission Product Barrier Table to determine that the Containment barrier has been lost or potentially lost. A complete loss in the ability to monitor the Containment barrier should be considered a "Potential Loss" of that barrier

###### Barrier Analysis

Containment Barrier has been lost or potentially lost.

###### ESCALATION CRITERIA

This event will be classified and/or escalated based on the loss or potential loss of additional barriers per EAL Section 3.0.

###### DISCUSSION

None

###### DEVIATION

None

EAL - 3.3.6.a/ 3.3.6.b

Rev. 03

**REFERENCES**

NUMARC NESP-007, PC8

**8.0 System Malfunctions****8.2 Loss of Overhead Annunciators**

PSE&G  
CONTROL  
COPY #

SECG0101

**UNUSUAL EVENT - 8.2.1**

**IC** Unplanned Loss of Most or All Annunciation or Indication in the Control Room for Greater Than 15 minutes

**EAL**

**Unplanned loss of > 75% of Control Room Overhead Annunciators**

**AND**

**EITHER** one of the following:

- 15 minutes have elapsed since the loss of OHAs
- A **significant transient** is in progress

**MODE** - 1, 2, 3, 4

**BASIS**

A unplanned loss of most or all Control Room Overhead Annunciators without a plant transient in MODES 1, 2, 3, or 4 for greater than 15 minutes warrants a heightened awareness by Control Room Operators. Quantification of >75 is left to the discretion of the Operations Superintendent (OS), and is considered approximately 75%. It is not intended that a detailed count be performed, but that a rough approximation be used to determine the severity of the loss.

OP-AB.ANN-0001(Q) details increased monitoring and surveillance requirements as well as alternate indicators. 15 minutes is used as a threshold to exclude transient or momentary power losses. The 15 minutes clock starts when the annunciators have been lost, or are determined to have been lost. If upon time of discovery it is determined that the annunciators have been lost for at least 15 minutes prior to discovery, classification should be made under this EAL regardless of time required for restoration. If it is determined that the annunciators were lost for at least 15 minutes with the annunciators available at the time of discovery, classification is not required under this EAL, but a review of the "After The Fact" RAL should be completed.

**Unplanned** loss of annunciators excludes scheduled maintenance and testing activities.

EAL - 8.2.1

Rev. 02

A **significant transient** is left to the determination of the OS/EC, but as a minimum, plant transients for this EAL should include:

- Reactor Trips (Manual and Automatic)
- Load Rejections > 25% Thermal Power
- ECCS Injections
- Thermal Power Oscillation > 10%

#### **Barrier Analysis**

None

#### **ESCALATION CRITERIA**

This event will be escalated to an Alert if a transient is in progress or if alternate indications become unavailable and 15 minutes have elapsed since the loss of OHAs.

#### **DISCUSSION**

This EAL is not required in Modes 5 or 6 due to the limited number of safety systems required for operation.

In judging the severity of the annunciator loss, consideration should be given to those annunciators needed by the operating staff for operation in abnormal and emergency operating procedures.

For short term loss of OHAs with no transient (< 15 min.) reportable level (RAL) #11.7.1.c should be considered.

#### **DEVIATION**

An EAL threshold for declaring an UE has been added if a significant transient is in progress when the loss of annunciators occurs, as requested by the NJ-BNE. These two independent events occurring at the same time warrants an expeditious notification and not waiting the 15 minutes for the Unusual Event declaration.

#### **REFERENCES**

NUMARC NESP-007, SU3  
OP-AB.ANN-0001(Q)

## 8.0 System Malfunctions

### 8.2 Loss of Overhead Annunciators

#### ALERT - 8.2.2.a/8.2.2.b

**IC** Unplanned Loss of Most or All Control Room Annunciators and a Significant Transient is in Progress or Compensatory Indicators are Unavailable

#### EAL

Unplanned loss of > 75% of Control Room Overhead Annunciators

AND

EITHER one of the following:

- Alternate Indications are NOT AVAILABLE per OP-AB.ANN-0001 (Q)
- A **significant transient** is in progress

AND

15 minutes have elapsed since the loss of OHAs

**MODE** - 1, 2, 3, 4

#### BASIS

A unplanned loss of most or all Control Room Overhead annunciators without a plant transient in MODES 1, 2, 3, or 4 for greater than 15 minutes warrants a heightened awareness by Control Room Operators. Quantification of "most" is left to the discretion of the Operations Superintendent (OS), and is considered approximately 75%. It is not intended that a detailed count be performed, but that a rough approximation be used to determine the severity of the loss.

OP-AB.ANN-0001 (Q) details increased monitoring and surveillance requirements as well as alternate indicators. 15 minutes is used as a threshold to exclude transient or momentary power losses. The 15 minutes clock starts when the annunciators have been lost, or are determined to have been lost. If upon time of discovery it is determined that the annunciators have been lost for at least 15 minutes prior to discovery, classification must be made under this EAL regardless of time required for restoration. If it is determined that the annunciators were lost

EAL - 8.2.2.a/8.2.2.b

Rev. 02

for at least 15 minutes with the annunciators available at the time of discovery, classification is not required under this EAL, but a review of the "After The Fact" RAL should be completed.

**Unplanned** loss of annunciators excludes scheduled maintenance and testing activities.

A **significant transient** is left to the determination of the OS/EC; but, as a minimum, plant transients for this EAL should include:

- Reactor Trips (Manual and Automatic)
- Load Rejections > 25% Thermal Power
- ECCS Injections
- Thermal Power Oscillation > 10%

#### **Barrier Analysis**

None

#### **ESCALATION CRITERIA**

This event will be escalated to a Site Area Emergency with a failure of alternate indications and a plant transient in progress.

#### **DISCUSSION**

Without Control Room annunciators, it may be difficult to monitor conditions associated with normal plant operations. During a transient event such as those listed in the EAL, the difficulty becomes more acute.

This EAL is not required in Modes 5 or 6 due to the limited number of safety systems required for operation.

#### **DEVIATION**

None

#### **REFERENCES**

NUMARC NESP-007, SA4  
OP-AB.ANN-0001 (Q)

## 8.0 System Malfunctions

### 8.2 Loss of Overhead Annunciators

#### SITE AREA EMERGENCY - 8.2.3

**IC** Inability to Monitor a Significant Transient in Progress

**EAL**

Loss of > 75% of Control Room Overhead Annunciators

**AND**

A significant transient is in progress

**AND**

Alternate Indications are NOT AVAILABLE per OP-AB.ANN-0001 (Q)

**AND**

Control Room indications are NOT AVAILABLE to monitor ANY one of the following:

- RCS Status
- Reactivity Control
- ECCS
- Secondary Systems (SGs, AFW)
- Containment Parameters

**MODE** - 1, 2, 3, 4

**BASIS**

A loss (planned or unplanned) of most or all Control Room Overhead Annunciators with a plant transient in MODES 1, 2, 3, or 4 for any amount of time warrants a heightened awareness by Control Room Operators. Quantification of >75% left to the discretion of the Operations Superintendent (OS), and is considered approximately 75%. It is not intended that a detailed count be performed, but that a rough approximation be used to determine the severity of the loss.

EAL - 8.2.3  
Rev. 02

A **significant transient** is left to the determination of the OS/EC, but as a minimum, plant transients for this EAL should include:

- Reactor Trips (Manual and Automatic)
- Load Rejections > 25% Thermal Power
- ECCS Injection
- Thermal Power Oscillations  $\geq$  10%

The list of systems requiring Control Room monitoring ability (e.g.; RCS, Reactivity Control, ECCS, etc.) was included to ensure all safety functions (including the ability to shut down the reactor, maintain core cooling, maintain the RCS intact, provide for a heat sink, and maintain an intact Containment) can be determined by some form of Control Room instrumentation. OP-AB.ANN-0001 (Q), Loss of Overhead Annunciator System, details increased monitoring and surveillance requirements as well as alternate indicators.

### **Barrier Analysis**

None

### **ESCALATION CRITERIA**

This event would be escalated to a General Emergency based on the loss of Fission Product Barriers or abnormal radiological releases.

### **DISCUSSION**

Without Control Room Overhead Annunciators, it may be difficult to monitor conditions associated with normal plant operations. During significant transient events such as those listed in the EAL, the difficulty becomes more acute. Compounding these, a concurrent loss of Control Room backup monitoring will further hinder Operations staff decision making needed to respond to the transient.

### **DEVIATION**

None

### **REFERENCES**

NUMARC NESP-007, SS6  
OP-AB.ANN-0001 (Q)