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SALEM GENERATING STATION
EVENT CLASSIFICATION GUIDE TECHNICAL BASIS
February 27, 2003

CHANGE PAGES FOR
REVISION #16

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 #16 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 Remove and recycle the outdated material listed below.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		
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SALEM ECG TECHNICAL BASIS
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REVISION SUMMARY

Biennial Review Performed: Yes No

Added EP03-001 reference under REFERENCES that address removal of the PASS system from the FSAR in EAL basis 3.1.2 and 3.1.5

SIGNATURE PAGE

Prepared By: William Detwiler 02/20/2003
Date

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Manager - Quality Assurance
(If Applicable) Date

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NA N/A
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Date Date

Effective Date of this Revision: 02/27/03
Date

3.0 Fission Product Barriers

PSE&G
CONTROL

COPY # SECG0101

3.1 Fuel Clad Barrier

3.1.1 CRITICAL SAFETY STATUS

3.1.1.a

IC Potential Loss of Fuel Clad Barrier = 3 POINTS

EAL

CORE COOLING PURPLE PATH

MODE - 1, 2, 3, 4

BASIS

Core Cooling PURPLE Path, as verified by EOP-CFST-1, indicates that subcooling has been lost and that some clad damage may occur.

Barrier Analysis

Fuel Clad 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. CFST status will not be used for event classification until the Control Room Staff has implemented the CFSTs.

DEVIATION

Salem Generating Station replaced the CFST "Orange Path" color designation with "Purple Path" due to the limitations imposed by the SPDS CRT's color gun configuration.

EAL - 3.1.1.a
Rev. 02

REFERENCES

NUMARC NESP-007, FC1
EOP-CFST-1
EOP-TRIP-1

3.0 Fission Product Barriers

3.1 Fuel Clad Barrier

3.1.1 CRITICAL SAFETY FUNCTION STATUS

3.1.1.b

IC Potential Loss of Fuel Clad Barrier =3 POINTS

EAL

HEAT SINK RED PATH

MODE - 1, 2, 3, 4

BASIS

Heat Sink RED Path, as verified by EOP-CFST-1, indicates that Steam Generator dryout could occur. A loss of Heat Sink poses an extreme challenge to the Fuel Clad. A barrier loss classification should not be made if the Heat Sink RED Path is the result of procedurally required Auxiliary Feedwater flow control.

Barrier Analysis

Fuel Clad and RCS Barriers have 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. CFST status will not be used for event classification until the Control Room Staff has implemented the CFSTs.

EAL - 3.1.1.b
Rev. 02

DEVIATION

None

REFERENCES

NUMARC NESP-007, FC1

EOP-CFST-1

EOP-TRIP-1

FRHS-1

3.0 Fission Product Barriers

3.1 Fuel Clad Barrier

3.1.1 CRITICAL SAFETY FUNCTION STATUS

3.1.1.c

IC Loss of Fuel Clad Barrier =4 POINTS

EAL

CORE COOLING RED PATH

MODE - 1, 2, 3, 4

BASIS

Core Cooling RED Path, as verified by EOP-CFST-1, is definitive indication that the heat transfer from the fuel to the coolant has degraded leading to a fuel clad heatup, significant superheating and core uncover.

Barrier Analysis

Fuel Clad Barrier has been lost and the Primary 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. CFST status will not be used for event classification until the Control Room Staff has implemented the CFSTs.

EAL - 3.1.1.c
Rev. 02

DEVIATION

None

REFERENCES

NUMARC NESP-007, FC1

EOP-CFST-1

EOP-TRIP-1

FRCC-1

3.0 Fission Product Barriers

3.1 Fuel Clad Barrier

3.1.2 PRIMARY COOLANT IODINE CONCENTRATION

IC Loss of Fuel Clad Barrier = 4 POINTS

EAL

Reactor Coolant Activity > 300 $\mu\text{Ci/gm}$ Dose Equivalent I-131

MODE - 1, 2, 3, 4

BASIS

A reactor coolant sample activity of greater than 300 $\mu\text{Ci/gm}$ Dose Equivalent Iodine-131 (DEI-131) was determined to indicate significant clad heating or mechanical stress and is indicative of the loss of the fuel clad barrier. This concentration is well above that expected for iodine spikes and corresponds to approximately 2.5% clad damage.

Barrier Analysis

Fuel Clad 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 actual value of 300 $\mu\text{Ci/gm}$ Dose Equivalent Iodine-131 (DEI-131) was determined based upon an engineering calculation which is not included with this EAL. This calculation was prepared by the Nuclear Fuels Group and is on file with Emergency Preparedness under file title DS1.6-0098 "Verification of Emergency Action Levels for Event Classification" date 1/26/95.

DEVIATION

None

EAL - 3.1.2
Rev. 02

REFERENCES

NUMARC NESP-007, FC2

Reg. Guide 1.109, Table E-9

SGS-USFAR, Table 11.1-1

SGS-USFAR, Table 11.1-7

OP-AB.RC-0002(Q)

Calculation by Nuclear Fuels Group file title DS1.6-0098 "Verification of Emergency Action Levels for Event Classification" date 1/26/95.

EP03-001

3.0 Fission Product Barriers

3.1 Fuel Clad Barrier

3.1.3 CORE EXIT THERMOCOUPLES (CETS)

3.1.3.a

IC Potential Loss of Fuel Clad Barrier = 3 POINTS

EAL

5 or more CETS > 700 °F

MODE - 1, 2, 3, 4,

BASIS

The threshold value chosen is from the EOP-CFST-1 Core Cooling Status Tree and indicates a loss of core subcooling which could lead to clad damage.

Barrier Analysis

Fuel Clad Barrier has been potentially lost.

ESCALATION CRITERIA

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

DISCUSSION

Symptom based criteria from the EOP Critical Safety Function Tree (CFST) monitoring are integrated into this EAL. The CFSTs are contained as a tab to the ECG. Use of Core Exit Thermocouple (CET) temperature to indicate loss of subcooling is equivalent to the CFST Core Cooling status codes.

DEVIATION

Salem Generating Station replaced the CFST "Orange Path" color designation with "Purple Path" due to the limitations imposed by the SPDS CRT's color gun configuration.

EAL - 3.1.3.a
Rev. 02

REFERENCES

NUMARC NESP-007, FC3
EOP-CFST-1
EOP-TRIP-1
EOP-Setpoint Doc (G.03)

3.0 Fission Product Barriers

3.1 Fuel Clad Barrier

3.1.3 CORE EXIT THERMOCOUPLES (CETS)

3.1.3.b

IC Loss of Fuel Clad Barrier =4 POINTS

EAL

5 or more CETs > 1200 °F

MODE - 1, 2, 3, 4

BASIS

Five Core Exit Thermocouple (CET) temperatures >1200 °F indicates a significant superheating of the reactor coolant.

Barrier Analysis

Fuel Clad 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

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 EAL threshold of >1200 °F is equivalent to CFST Core Cooling RED Path.

DEVIATION

None

EAL - 3.1.3.b
Rev. 02

REFERENCES

NUMARC NESP-007, FC3
EOP-CFST-1
EOP-TRIP-1
EOP-Setpoint Doc (G.04)

3.0 Fission Product Barriers

3.1 Fuel Clad Barrier

3.1.4 RX VESSEL LEVEL INDICATION SYSTEM (RVLIS)

3.1.4.a

IC Potential Loss of Fuel Clad Barrier = 3 POINTS

EAL

RVLIS Full Range < 39%

MODE - 1, 2, 3, 4

BASIS

The threshold value of RVLIS Full Range < 39% is chosen from the EOP-CFST-1 Core Cooling Status Tree. This value approximates the "Top of Active Fuel" which is a water level at which clad damage may be expected to occur.

Barrier Analysis

Fuel Clad Barrier has been potentially lost.

ESCALATION CRITERIA

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

DISCUSSION

Symptom based criteria from the EOP Critical Safety Function Tree (CSFT) monitoring are integrated into this EAL. The CFSTs are contained as a tab to the ECG. Use of RVLIS to indicate reactor vessel water level is more specific than the CFST Core Cooling status codes. Full Range RVLIS indicates reactor vessel water level with no RCPs running. The intent of this EAL is to provide a RVLIS level which approximates core uncover. The actual RVLIS level which indicates "Top of Active Fuel" is somewhat higher than 39%; however, 39% was adopted to be consistent with the CFST value.

EAL - 3.1.4.a
Rev. 02

DEVIATION

Salem Generating Station replaced the CFST "Orange Path" color designation with "Purple Path" due to the limitations imposed by the SPDS CRT's color gun configuration.

REFERENCES

NUMARC NESP-007, FC4
EOP-CFST-1
EOP-TRIP-1
EOP-Setpoint Doc (G.03)

3.0 Fission Product Barriers

3.1 Fuel Clad Barrier

3.1.4 RX VESSEL LEVEL INDICATION SYSTEM (RVLIS)

3.1.4.b

IC Potential Loss of Fuel Clad Barrier = 3 POINTS

EAL

RVLIS Dynamic Range Indicates ANY one of the following:

- 4 RCPs I/S < 44%
- 3 RCPs I/S < 30%
- 2 RCPs I/S < 20%
- 1 RCP I/S < 13%

MODE - 1, 2, 3, 4

BASIS

The threshold values for RVLIS Dynamic Range levels with various combinations of RCPs is chosen from the EOP-CFST-1 Core Cooling Status Tree. These values correspond to a 50% void fraction which may result in clad damage.

Barrier Analysis

Fuel Clad Barrier has been potentially lost.

ESCALATION CRITERIA

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

DISCUSSION

Symptom based criteria from the EOP Critical Safety Function Tree (CSFT) monitoring are integrated into this EAL. The CFSTs are contained as a tab to the ECG. Use of RVLIS to indicate reactor vessel water level is more specific than the CFST Core Cooling Purple Path

EAL - 3.1.4.b
Rev. 02

status codes. Dynamic Range RVLIS indicates reactor vessel water level when at least 1 RCP is running. The intent of this EAL is to provide a RVLIS level which approximates a 50% RCS void fraction. With this void fraction, a loss of all operating RCPs could lead to core uncover.

DEVIATION

Salem Generating Station replaced the CFST "Orange Path" color designation with "Purple Path" due to the limitations imposed by the SPDS CRT's color gun configuration.

REFERENCES

NUMARC NESP-007, FC4
EOP-CFST-1
EOP-TRIP-1
EOP-Setpoint Doc (L.01)

3.0 Fission Product Barriers

3.1 Fuel Clad Barrier

3.1.5 CONTAINMENT RADIATION LEVELS

IC Loss of Fuel Clad Barrier = 4 POINTS

EAL

R44A or R44B > 300 R/hr

MODE - 1, 2, 3, 4

BASIS

The reading of 300 R/hr on the containment high range monitor (R44A or R44B) indicates the loss of the Fuel Clad fission product barrier. The reading was calculated assuming an instantaneous release of the Reactor Coolant volume into the Primary Containment at an RCS Activity of 300 $\mu\text{Ci/gm}$ Dose Equivalent Iodine 131. This value is much larger than Technical Specification allowed Iodine spikes and corresponds to fuel clad damage of approximately 2.5%.

Barrier Analysis

Fuel Clad and RCS Barriers have been lost.

ESCALATION CRITERIA

This event will be classified and/or escalated based upon the loss or potential loss of the Primary Containment barrier per EAL Section 3.0

DISCUSSION

This calculation is based upon a concentration of 300 $\mu\text{Ci/gm}$ Dose Equivalent Iodine 131 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 DS1.6-0098 "Verification of Emergency Action Levels for Event Classification" date 1/26/95.

DEVIATION

None

REFERENCES

NUMARC NESP-007, FC5

Calculation by Nuclear Fuels file title DS1.6-0098 "Verification of Emergency Action Levels for Event Classification

EP03-001

3.0 Fission Product Barriers

3.1 Fuel Clad Barrier

3.1.6 EMERGENCY COORDINATOR JUDGMENT

3.1.6.a/ 3.1.6.b

IC Potential Loss (= 3 POINTS) or Loss of Fuel Clad Barrier (= 4 POINTS)

EAL

ANY condition, in the opinion of the EC, that indicates EITHER a Potential Loss OR Loss of the Fuel Clad 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 Fuel Clad barrier has been lost or potentially lost. A complete loss in the ability to monitor the Fuel Clad barrier should be considered a "Potential Loss" of that barrier.

Barrier Analysis

The Fuel Clad 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

REFERENCES

NUMARC NESP-007, FC7