

**Final Submittal**  
**CATAWBA OCTOBER 2004**

**EXAM 50-413, 414/2004-301**  
**OCTOBER 4 - 8, 2004 &**  
**OCTOBER 13, 2004 (WRITTEN)**

1. Final RO/SRO Written Examination References

**Catawba RO Exam Reference Package - FINAL**

**Sorted by Question:**

Ques\_311.1 - Steam Tables  
Ques\_526.1 - COLR CNEI-0400-24 page 25  
Ques\_912.1 -ECA-1.1 Encl 5 page 69  
Ques\_1142 - Steam Tables  
Ques\_1160 - Tech Spec 3.6.4  
Ques\_1160 - Tech Spec 3.6.5

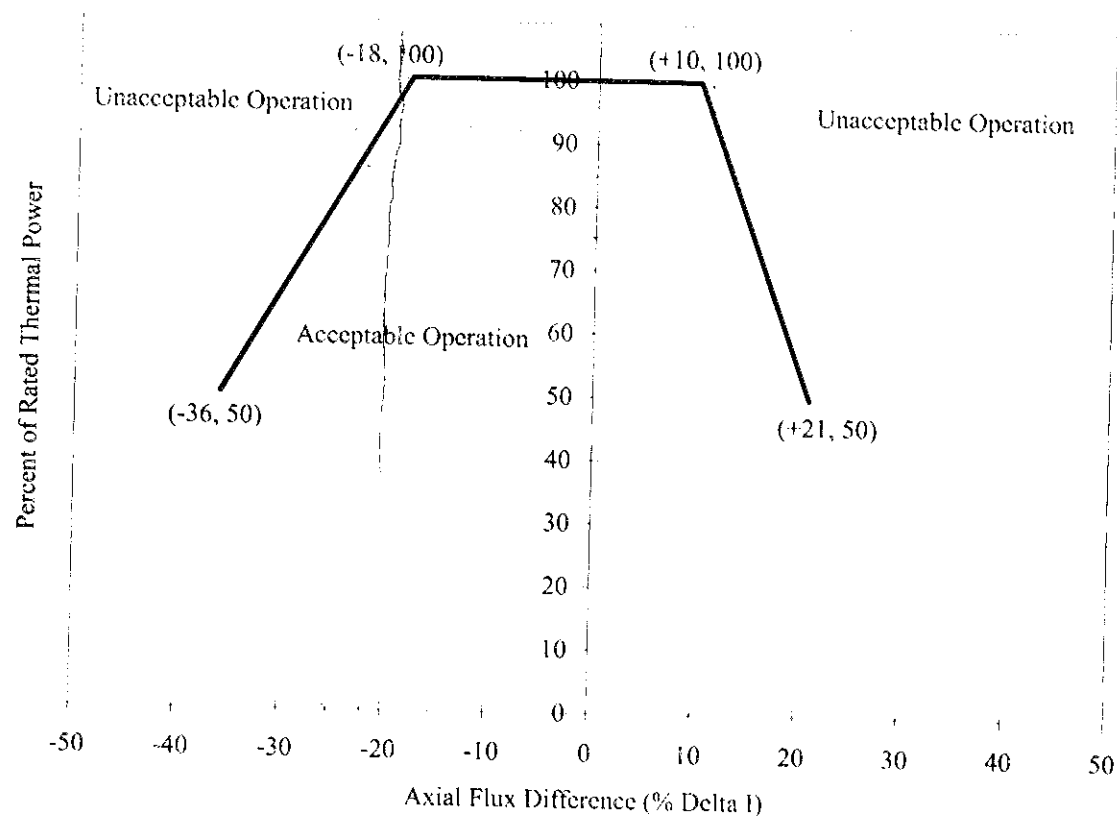
**Sorted by Reference:**

COLR CNEI-0400-24 page 25  
ECA-1.1 Encl 5 page 69  
Steam Tables  
Tech Spec 3.6.4  
Tech Spec 3.6.5

### Catawba 2 Cycle 13 Core Operating Limits Report

Figure 6

Percent of Rated Thermal Power Versus Percent Axial Flux Difference Limits



**NOTE:** Compliance with Technical Specification 3.2.1 may require more restrictive AFD limits. Refer to the Unit 2 ROD manual for operational AFD limits.

<p>Duke Power Company Catawba Nuclear Station</p> <p><b>Loss of Emergency Coolant Recirculation</b></p> <p><b>Continuous Use</b></p>	Procedure No. <b>EP/ 1/A/5000/ECA-1.1</b>
	Revision No. <b>022</b>
	Electronic Reference No. <b>CP0094DF</b>
<p><b>PERFORMANCE</b></p> <p>***** UNCONTROLLED FOR PRINT *****</p> <p><b>(ISSUED) - PDF Format</b></p>	

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

18. **Verify S/I termination criteria as follows:**

a. Verify RVLIS indication is adequate as follows:

- \_\_\_ • **IF** all NC pumps are off, **THEN** verify "REACTOR VESSEL LR LEVEL" - GREATER THAN 61%.
- \_\_\_ • **IF** one NC pump is on, **THEN** verify "REACTOR VESSEL D/P" - GREATER THAN REQUIRED D/P FROM TABLE BELOW:

RVLIS TRAIN	Required "REACTOR VESSEL D/P"			
	OPERATING NC PUMP			
	A	B	C	D
A	35%	14%	14%	14%
B	14%	14%	35%	14%

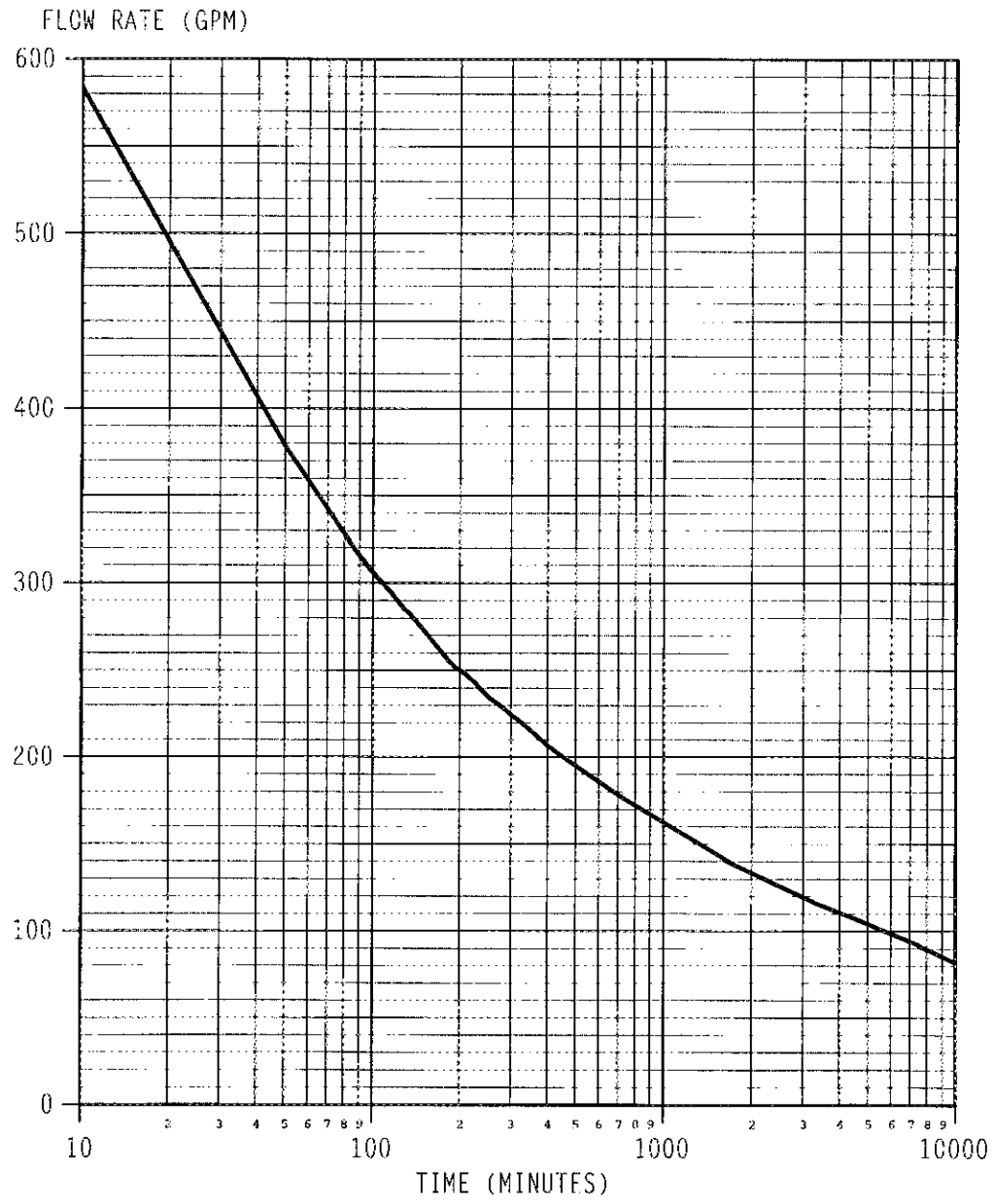
\_\_\_ b. NC subcooling based on core exit T/Cs - GREATER THAN 50°F.

\_\_\_ a. **GO TO** Step 25.

b. Perform the following:

- \_\_\_ 1) Determine minimum S/I flow required. **REFER TO** Enclosure 5 (Minimum S/I Flowrate Versus Time After Trip).
- \_\_\_ 2) Stop S/I pumps as required to obtain the following:
  - \_\_\_ • Minimize S/I flow
  - \_\_\_ • Maintain S/I flow greater than or equal to the flow required by Enclosure 5 (Minimum S/I Flowrate Versus Time After Trip).
- \_\_\_ 3) **GO TO** Step 25.

S/I FLOW REQUIRED TO MATCH DECAY HEAT



3.6 CONTAINMENT SYSTEMS

3.6.4 Containment Pressure

LCO 3.6.4 Containment pressure shall be  $\geq -0.1$  psig and  $\leq +0.3$  psig.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Containment pressure not within limits.	A.1 Restore containment pressure to within limits.	1 hour
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
	<u>AND</u> B.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.6.4.1 Verify containment pressure is within limits.	12 hours





3.6 CONTAINMENT SYSTEMS

3.6.5 Containment Air Temperature

LCO 3.6.5 Containment average air temperature shall be:

- a.  $\geq 75^{\circ}\text{F}$  and  $\leq 100^{\circ}\text{F}$  for the containment upper compartment, and
- b.  $\geq 100^{\circ}\text{F}$  and  $\leq 120^{\circ}\text{F}$  for the containment lower compartment.

-----NOTE-----

The minimum containment average air temperature in MODES 2, 3, and 4 may be reduced to 60°F.

-----

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Containment average air temperature not within limits.	A.1 Restore containment average air temperature to within limits.	8 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
	<u>AND</u> B.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.6.5.1 Verify containment upper compartment average air temperature is within limits.	24 hours
SR 3.6.5.2 Verify containment lower compartment average air temperature is within limits.	24 hours

**SRO Exam Reference Package – FINAL Version**

**References Sorted by Question Number:**

Ques\_093.3 - Revised Databook Figures 57 & 58; Steam Tables  
Ques\_618.1 - Steam Tables; Data Book Curves 57, 58  
Ques\_705.1 - Tech Spec 3.8.1  
Ques\_1143 - FR-P.1 step 18 page 20  
Ques\_1190.1 - RP/0/A/5000/01  
Ques\_1195 - Tech Spec 3.4.16 and AP-18  
Ques\_1206.1 - RP/0/A/5000/01

**References Sorted by Title:**

Revised Databook Figures 57 & 58; - Ques\_093.3, Ques\_618.1  
Steam Tables - Ques\_093.3, Ques\_618.1  
Tech Spec 3.8.1 – Ques\_705.1  
FR-P.1 step 18 page 20 - Ques\_1143  
RP/0/A/5000/01 - Ques\_1190, Ques\_1206.1  
Tech Spec 3.4.16 - Ques\_1195  
AP-18 - Ques\_1195

AP-18 - Ques\_1195  
FR-P.1 Step 18 page 20 - Ques\_1143  
Revised Databook Figures 57 & 58; - Ques\_093.3, Ques\_618.1  
RP/0/A/5000/01 - Ques\_1190, Ques\_1206.1  
Steam Tables - Ques\_093.3, Ques\_618.1  
Tech Spec 3.4.16 - Ques\_1195  
Tech Spec 3.8.1 – Ques\_705.1, Ques\_1190

Duke Power Company Catawba Nuclear Station	Procedure No. <b>AP/1/A/5500/018</b>
<b>High Activity in Reactor Coolant</b>	Revision No. <b>012</b>
<b>Continuous Use</b>	Electronic Reference No. CN005CEM
<b>PERFORMANCE</b>	
***** UNCONTROLLED FOR PRINT *****	
<b>(ISSUED) - PDF Format</b>	

**A. Purpose**

- To verify proper response in the event of high activity in the NC System.

**B. Symptoms**

- Primary sample results indicate increasing activity level
- NC filter area monitors alarm - LIT:
  - 1RAD-3, D/3 "1EMF 18 568 KK - 56 NC FILTER 1A"
  - 1RAD-3, D/4 "1EMF 19 568 KK,LL - 56 NC FILTER 1B"
- 1RAD-3, E/4 "1EMF 48 NC SAMPLE LINE REACTOR COOLANT" - LIT.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

**C. Operator Actions**

1. **Notify Primary Chemistry to sample and perform an isotopic analysis (total activity) of the NC System to determine source of high activity:**

- Crud burst
- Failed fuel
- Contaminated (inoperable) EMF.

2. **Verify "LETDN HX OTLT TEMP" - LESS THAN 136°F.**

**Perform the following:**

- a. Ensure 1NV-153A (Letdn Hx Otlf 3-Way Valve) - IN "VCT" POSITION.
- b. Determine and correct cause of letdown heat exchanger high temperature.
- c. **WHEN** "LETDN HX OTLT TEMP" is less than 136°F, **THEN RETURN TO** Step 2.
- d. **GO TO** Step 5.

3. **Ensure at least one of the following mixed bed demineralizers is in service as follows:**

- NV-353 & 364 (Mixed Bed Demin 1A Iso) - OPEN

OR

- NV-368 & 379 (Mixed Bed Demin 1B Iso) - OPEN.

4. **Ensure 1NV-153A (Letdn Hx Otlf 3-Way Valve) - IN "DEMIN" POSITION.**

5. **Notify Radwaste Chemistry to ensure VCT purge to WG System - IN SERVICE.**

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

6. **WHEN** notified by Primary Chemistry the cause of the high activity in reactor coolant, **THEN** perform one of the following:

- • **IF** the cause of high activity is due to crud burst, **THEN** coordinate and perform any recommendations by Primary Chemistry for any follow up actions.
- • **IF** the cause of high activity is due to contaminated EMF, **THEN** notify Radiation Protection.
- • **IF** the cause of high activity is due to failed fuel, **THEN** notify the Reactor Group Duty Engineer for further guidance.

7. **IF AT ANY TIME** letdown flow is increased to greater than 80 GPM, **THEN** perform the following:

- a. Determine current NC Dose Equivalent Iodine concentration (DEI). (OAC Point C1P0097)
- b. Verify DEI specific activity - LESS THAN LIMITS SPECIFIED BY COMPENSATORY ACTION FOR NC SYSTEM SPECIFIC ACTIVITY.
- c. Notify Primary Chemistry that lower DEI limits are in effect due to NV letdown flow greater than 80 GPM.
- 8. **Ensure compliance with Tech Spec 3.4.16 (RCS Specific Activity).**
- b. **Ensure compliance with Tech Spec 3.4.16 (RCS Specific Activity).**

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

9. **Determine required notifications:**

- • **REFER TO** RP/0/A/5000/001  
(Classification Of Emergency)
- • **REFER TO** RP/0/B/5000/13 (NRC  
Notification Requirements).

— 10. **Determine long term plant status.**  
**RETURN TO** procedure in effect.

**END**



<p style="text-align: center;">Duke Power Company Catawba Nuclear Station</p>	<p>Procedure No. <b>RP0/A/5000/001</b></p>
<p><b>Classification of Emergency</b></p>	<p>Revision No. <b>015</b></p>
<p style="text-align: center;"><b>Multiple Use</b></p>	<p>Electronic Reference No. CN005GNK</p>
<p><b>PERFORMANCE</b></p>	
<p>***** UNCONTROLLED FOR PRINT *****</p>	
<p style="text-align: center;"><b>(ISSUED) - PDF Format</b></p>	

## Classification of Emergency

### 1. Symptoms

#### 1.1 Notification of Unusual Event

- 1.1.1 Events are in process or have occurred which indicate a potential degradation of the level of safety of the plant.
- 1.1.2 No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety occurs.

#### 1.2 Alert

- 1.2.1 Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant.
- 1.2.2 Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

#### 1.3 Site Area Emergency

- 1.3.1 Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public.
- 1.3.2 Any releases are not expected to exceed EPA Protective Action Guideline exposure levels except near the site boundary.

#### 1.4 General Emergency

- 1.4.1 Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity.
- 1.4.2 Releases can be reasonably expected to exceed EPA Protective Action Guidelines exposure levels offsite for more than the immediate site area.

### 2. Immediate Actions

- \_\_\_\_\_ 2.1 Determine operating mode that existed at the time the event occurred prior to any protection system or operator action initiated in response of the event.
- \_\_\_\_\_ 2.2 **IF** the plant was in Mode 1-4 and a valid condition affects fission product barriers, proceed to Enclosure 4.1.

- \_\_\_\_\_ 2.3 **IF** a General Emergency is **NOT** declared in Step 2.2 **OR** the condition does not affect fission product barriers, review the listing of enclosures to determine if the event is applicable to one the categories shown.
- \_\_\_\_\_ 2.4 Compare actual plant conditions to the Emergency Action Levels listed, then declare the appropriate Emergency Class as indicated.
- \_\_\_\_\_ 2.5 Implement the applicable Emergency Response Procedure (RP) for that classification and continue with subsequent steps of this procedure.

Notification of Unusual Event	RP/0/A/5000/002
Alert	RP/0/A/5000/003
Site Area Emergency	RP/0/A/5000/004
General Emergency	RP/0/A/5000/005

### 3. Subsequent Actions

- \_\_\_\_\_ 3.1 To escalate, de-escalate, or terminate the Emergency, compare plant conditions to the Initiating Conditions of Enclosures 4.1 through 4.7.
- \_\_\_\_\_ 3.2 Refer to enclosure 4.9, Emergency Declaration Guidelines, as needed.

### 4. Enclosures

- 4.1 Fission Product Barrier Matrix
- 4.2 System Malfunctions
- 4.3 Abnormal Rad Levels/Radiological Effluent
- 4.4 Loss of Shutdown Functions
- 4.5 Loss of Power
- 4.6 Fires/Explosions and Security Events
- 4.7 Natural Disasters, Hazards and Other conditions Affecting Plant Safety
- 4.8 Definitions/Acronyms
- 4.9 Emergency Declaration Guidelines
- 4.10 Radiation Monitor Reading for Enclosure 4.3 EALs

**Enclosure 4.1**

**Fission Barrier Matrix**

Use EALs to determine Fission Product Barrier status (Intact, Potential Loss, or Loss). Add points for all 3 barriers. Classify according to the table below.

Note 1: This table is only applicable in Modes 1-4.

Note 2: Also, an event (or multiple events) could occur which results in the conclusion that exceeding the Loss or Potential Loss thresholds is IMMINENT (i.e., within 1-3 hours). In this IMMINENT LOSS situation, use judgement and classify as if the thresholds are exceeded.

Note 3: When determining Fission Product Barrier status, the Fuel Clad Barrier should be considered to be lost or potentially lost if the conditions for the Fuel Clad Barrier loss or potential loss EALs were met previously during the event, even if the conditions do not currently exist.

Note 4: Critical Safety Function (CSF) indications are not meant to include transient alarm conditions which may appear during the start-up of engineered safeguards equipment. A CSF condition is satisfied when the alarmed state is valid and sustained. The STA should be consulted to affirm that a CSF has been validated and the appropriate functional restoration procedure has been implemented prior to the CSF being used as a basis to classify an emergency.

EAL #	Unusual Event	EAL #	Alert	EAL #	Site Area Emergency	EAL #	General Emergency
4.1.U.1	Potential Loss of Containment	4.1.A.1	Loss <u>OR</u> Potential Loss of Nuclear Coolant System	4.1.S.1	Loss <u>OR</u> Potential Loss of Both Nuclear Coolant System <u>AND</u> Fuel Clad	4.1.G.1	Loss of All Three Barriers
4.1.U.2	Loss of Containment	4.1.A.2	Loss <u>OR</u> Potential Loss of Fuel Clad	4.1.S.2	Loss <u>AND</u> Potential Loss Combinations of Both Nuclear Coolant System <u>AND</u> Fuel Clad	4.1.G.2	Loss of Any Two Barriers <u>AND</u> Potential Loss of the Third
		4.1.A.3	Potential Loss of Containment <u>AND</u> Loss <u>OR</u> Potential Loss of Any Other Barrier	4.1.S.3	Loss of Containment <u>AND</u> Loss <u>OR</u> Potential Loss of Any Other Barrier		

Enclosure 4.1

Fission Barrier Matrix

NOTE: If a barrier is affected, it has a single point value based on a "potential loss" or a "loss". "Not Applicable" is included in the table as a place holder only, and has no point value assigned.

Barrier	Points (1-5)	Potential Loss (X)	Loss (X)	Total Points	Classification
Containment		1	3	1 - 3	Unusual Event
NCS		4	5	4 - 6	Alert
Fuel Clad		4	5	7 - 10	Site Area Emergency
Total Points				11 - 13	General Emergency

1. Compare plant conditions against the Fission Barrier Matrix on pages 3 through 6 of 6.
2. Determine the "potential loss" or "loss" status for each barrier (Containment, NCS and Fuel Clad) based on the EAL symptom description.
3. For each barrier, write the highest single point value applicable for the barrier in the "Points" column and mark the appropriate "loss" column.
4. Add the points in the "Points" column and record the sum as "Total Points".
5. Determine the classification level based on the number of "Total Points".
6. In the table on page 1 of 6, under the "classification" column, select the event number (e.g. 4.1.A.1 for Loss of Nuclear Coolant System) that best fits the loss of barrier descriptions.
7. Using the number (e.g. 4.1.A.1) select the preprinted notification form and complete the required information for Emergency Coordinator approval and transmittal.

Enclosure 4.1  
Fission Barrier Matrix

4.1.C CONTAINMENT BARRIER	4.1.N NCS BARRIER	4.1.F FUEL CLAD BARRIER
POTENTIAL LOSS - (1 Point)   LOSS - (3 Points)	POTENTIAL LOSS - (4 Points)   LOSS - (5 Points)	POTENTIAL LOSS - (4 Points)   LOSS - (5 Points)
<b>1. Critical Safety Function Status</b> <ul style="list-style-type: none"> <li>Containment-RED • Not applicable</li> <li>Core cooling-RED Path is indicated for &gt;15 minutes</li> </ul> <b>2. Containment Conditions</b> <ul style="list-style-type: none"> <li>Containment Pressure &gt; 15 PSIG • Rapid unexplained decrease in containment pressure following initial increase</li> <li>H2 concentration &gt; 9% • Containment pressure greater than 3 psig with less than one full train of NS and a VX-CARF operating.</li> </ul>	<b>1. Critical Safety Function Status</b> <ul style="list-style-type: none"> <li>NCS Integrity-Red • Not applicable</li> <li>Heat Sink-Red</li> </ul> <b>2. NCS Leak Rate</b> <ul style="list-style-type: none"> <li>Unisolable leak exceeding the capacity of one charging pump in the normal charging mode with letdown isolated.</li> <li>GREATER THAN available makeup capacity as indicated by a loss of NCS subcooling.</li> </ul>	<b>1. Critical Safety Function Status</b> <ul style="list-style-type: none"> <li>Core Cooling-Orange • Core Cooling-Red</li> <li>Heat Sink-Red</li> </ul> <b>2. Primary Coolant Activity Level</b> <ul style="list-style-type: none"> <li>Not applicable • Coolant Activity GREATER THAN 300 µCi/cc Dose Equivalent Iodine (DEI) I-131</li> </ul>

CONTINUED

CONTINUED

CONTINUED

**Enclosure 4.1**  
**Fission Barrier Matrix**

4.1.C CONTAINMENT BARRIER POTENTIAL LOSS - (1 Point) LOSS - (3 Points)	4.1.N NCS BARRIER POTENTIAL LOSS - (4 Points) LOSS - (5 Points)	4.1.F FUEL CLAD BARRIER POTENTIAL LOSS - (4 Points) LOSS - (5 Points)
<p><b>3. Containment Isolation Valves Status After Containment Isolation Actuation</b></p> <ul style="list-style-type: none"> <li>Not applicable</li> <li>Containment isolation is incomplete and a release path from containment exists</li> </ul> <p><b>4. SG Secondary Side Release With Primary-to-Secondary Leakage</b></p> <ul style="list-style-type: none"> <li>Not applicable</li> <li>Release of secondary side to the environment with primary to secondary leakage GREATER THAN Tech Spec allowable</li> </ul>	<p><b>3. SG Tube Rupture</b></p> <ul style="list-style-type: none"> <li>Primary-to-Secondary leak rate exceeds the capacity of one charging pump in the normal charging mode with letdown isolated.</li> <li>Indication that a SG is ruptured and has a Non-Isolable secondary line fault</li> <li>Indication that a SG is ruptured and a prolonged release of contaminated secondary coolant is occurring from the affected SG to the environment</li> </ul> <p><b>4. Containment Radiation Monitoring</b></p> <ul style="list-style-type: none"> <li>Not applicable</li> <li>Not applicable</li> </ul>	<p><b>3. Containment Radiation Monitoring</b></p> <ul style="list-style-type: none"> <li>Not applicable</li> <li>Containment radiation monitor 53 A or 53 B reading &gt;117 R/hr</li> </ul> <p><b>4. Emergency Coordinator/EOF Director Judgement</b></p> <ul style="list-style-type: none"> <li>Any condition, including inability to monitor the barrier, that in the opinion of the Emergency Coordinator/EOF Director indicates LOSS or POTENTIAL LOSS of the fuel clad barrier.</li> </ul>

CONTINUED

CONTINUED

END

**Enclosure 4.1  
Fission Barrier Matrix**

4.1.C CONTAINMENT BARRIER POTENTIAL LOSS - (1 Point) LOSS - (3 Points)	4.1.N NCS BARRIER POTENTIAL LOSS - (4 Points) LOSS - (5 Points)	4.1.F FUEL CLAD BARRIER POTENTIAL LOSS - (4 Points) LOSS - (5 Points)
<p><b>5. Significant Radioactive Inventory In Containment</b></p> <ul style="list-style-type: none"> <li>Containment Rad. Monitor EMF53A or 53B Reading @ time since shutdown: &gt; 470 R/hr @ 0 - 0.5 hr &gt; 170 R/hr @ 0.5 - 2 hr &gt; 125 R/hr @ 2 - 4 hr &gt; 90 R/hr @ 4 - 8 hr &gt; 53 R/hr @ &gt; 8 hr</li> </ul> <p><b>6. Emergency Coordinator /EOF Director Judgement</b></p> <ul style="list-style-type: none"> <li>Any condition, including inability to monitor the barrier, that in the opinion of the Emergency Coordinator/EOF Director indicates <b>LOSS</b> or <b>POTENTIAL LOSS</b> of the containment barrier.</li> </ul> <p style="text-align: right;"><b>END</b></p>	<p><b>5. Emergency Coordinator/EOF Director Judgement</b></p> <ul style="list-style-type: none"> <li>Any condition, including inability to monitor the barrier, that in the opinion of the Emergency Coordinator /EOF Director indicates <b>LOSS</b> or <b>POTENTIAL LOSS</b> of the NCS barrier.</li> </ul> <p style="text-align: right;"><b>END</b></p>	



**Enclosure 4.2**  
**System Malfunctions**

RP/0/A/5000/001  
Page 1 of 2

UNUSUAL EVENT

4.2.U.1 Inability to Reach Required Shutdown Within Technical Specification Limits.

**OPERATING MODE:** 1, 2, 3, 4

4.2.U.1-1 Plant is not brought to required operating mode within Technical Specifications LCO Action Statement Time.

4.2.U.2 Unplanned Loss of Most or All Safety System Annunciation or Indication in the Control Room for Greater Than 15 Minutes.

**OPERATING MODE:** 1, 2, 3, 4

4.2.U.2-1 The following conditions exist:

Unplanned loss of most (>50%) annunciators associated with safety systems for greater than 15 minutes.

AND

In the opinion of the Operations Shift Manager/Emergency Coordinator/EOF Director, the loss of the annunciators or indicators requires additional personnel (beyond normal shift compliment) to safely operate the unit.

CONTINUED

ALERT

4.2.A.1 Unplanned Loss of Most or All Safety System Annunciation or Indication in Control Room With Either (1) a Significant Transient in Progress, or (2) Compensatory Non-Alarming Indicators Unavailable.

**OPERATING MODE:** 1, 2, 3, 4

4.2.A.1-1 The following conditions exist:

Unplanned loss of most (>50%) annunciators associated with safety systems for greater than 15 minutes.

AND

In the opinion of the Operations Shift Manager/Emergency Coordinator/EOF Director, the loss of the annunciators or indicators requires additional personnel (beyond normal shift compliment) to safely operate the unit.

AND

**EITHER of the following:**

- A significant plant transient is in progress
- Loss of the OAC.

END

SITE AREA EMERGENCY

4.2.S.1 Inability to Monitor a Significant Transient in Progress.

**OPERATING MODE:** 1, 2, 3, 4

4.2.S.1-1 The following conditions exist:

Loss of most (>50%) Annunciators associated with safety systems.

AND

A significant plant transient is in progress.

AND

Loss of the OAC.

AND

Inability to provide manual monitoring of any of the following Critical Safety Functions:

- subcriticality
- core cooling
- heat sink
- containment.

END

GENERAL EMERGENCY

**Enclosure 4.2**  
**System Malfunctions**  
**ALERT**

RP/0/A/5000/001  
Page 2 of 2

SITE AREA EMERGENCY      GENERAL EMERGENCY

UNUSUAL EVENT

4.2.U.3 Fuel Clad Degradation.

OPERATING MODE: 1, 2, 3\*

4.2.U.3-1 Dose Equivalent I-131 greater than the Technical Specifications allowable limit. (\*Mode 3 with TAV >500° F)

4.2.U.4 Reactor Coolant System (NCS) Leakage.

OPERATING MODE: 1, 2, 3, 4

4.2.U.4-1 Unidentified leakage  $\geq$  10 gpm.

4.2.U.4-2 Pressure boundary leakage  $\geq$  10 gpm.

4.2.U.4-3 Identified leakage  $\geq$  25 gpm

4.2.U.5 Unplanned Loss of All Onsite or Offsite Communications.

OPERATING MODE: ALL

4.2.U.5-1 Loss of all onsite communications capability (internal phone system, PA system, onsite radio system) affecting the ability to perform routine operations.

4.2.U.5-2 Loss of all offsite communications capability (Selective Signaling, NRC ETS lines, offsite radio system, commercial phone system) affecting the ability to communicate with offsite authorities.

END

Enclosure 4.3

RP/0/A/5000/001  
Page 1 of 5

Abnormal Rad Levels/Radiological Effluent

<u>UNUSUAL EVENT</u>		<u>ALERT</u>	<u>SITE AREA EMERGENCY</u>	<u>GENERAL EMERGENCY</u>
4.3.U.1	Any Unplanned Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds Two Times the SLC Limits for 60 Minutes or Longer.	Any Unplanned Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds 200 Times the SLC limits for 15 Minutes or Longer.	4.3.S.1 Boundary Dose Resulting from an Actual or Imminent Release of Radioactivity Exceeds 100 mRem TEDE or 500 mRem CDE Adult Thyroid for the Actual or Projected Duration of the Release.	4.3.G.1 Boundary Dose Resulting from an Actual or Imminent Release of Radioactivity that Exceeds 1000 mRem TEDE or 5000 mRem CDE Adult Thyroid for the Actual or Projected Duration of the Release.
<b>OPERATING MODE: ALL</b>		<b>OPERATING MODE: ALL</b>	<b>OPERATING MODE: ALL</b>	<b>OPERATING MODE: ALL</b>
4.3.U.1-1	A valid Trip 2 alarm on radiation monitor EMF-49L or EMF-57 for $\geq 60$ minutes or will likely continue for $\geq 60$ minutes which indicates that the release may have exceeded the initiating condition and indicates the need to assess the release with procedure HP/0/B/1009/014.	A valid indication on radiation monitor EMF-49L or EMF-57 of $\geq 1.2E+05$ cpm for $\geq 15$ minutes or will likely continue for $\geq 15$ minutes, which indicates that the release may have exceeded the initiating condition and indicates the need to assess the release with procedure HP/0/B/1009/014.	4.3.S.1-1 A valid indication on radiation monitor EMF-36L of $\geq 2.7E+06$ cpm sustained for $\geq 15$ minutes.	4.3.G.1-1 A valid indication on radiation monitor EMF-36H of $\geq 8.3E+03$ cpm sustained for $\geq 15$ minutes.
4.3.U.1-2	A valid indication on radiation monitor EMF-36L of $\geq 3.00E+04$ cpm for $\geq 60$ minutes or will likely continue for $\geq 60$ minutes, which indicates that the release may have exceeded the initiating condition and indicates the need to assess the release with procedure SH/0/B/2005/001.	HP/0/B/1009/014.	4.3.S.1-2 Dose assessment team calculations indicate dose consequences greater than 100 mRem TEDE or 500 mRem CDE Adult Thyroid at the site boundary.	4.3.G.1-2 Dose assessment team calculations indicate dose consequences greater than 1000 mRem TEDE or 5000 mRem CDE Adult Thyroid at the site boundary.
<b>(Continued)</b>		<b>(Continued)</b>	<b>(Continued)</b>	<b>(Continued)</b>

Enclosure 4.3

Abnormal Rad Levels/Radiological Effluent

UNUSUAL EVENT

4.3.U.1-3 Gaseous effluent being released exceeds two times SLC 16.1.1-6 for  $\geq 60$  minutes as determined by RP procedure.

4.3.U.1-4 Liquid effluent being released exceeds two times SLC 16.1.1-1 for  $\geq 60$  minutes as determined by RP procedure.

Note: If the monitor reading is sustained for the time period indicated in the EAL AND the required assessments (procedure calculations) cannot be completed within this time period, declaration must be made based on the valid radiation monitor reading.

(Continued)

ALERT

4.3.A.1-2 A valid indication on radiation monitor EMF-36L of  $\geq 5.4E+05$  opm for  $\geq 15$  minutes or will likely continue for  $\geq 15$  minutes, which indicates that the release may have exceeded the initiating condition and indicates the need to assess the release with procedure SH/0/B/2005/001.

4.3.A.1-3 Gaseous effluent being released exceeds 200 times the level of SLC 16.1.1-6 for  $\geq 15$  minutes as determined by RP procedure.

4.3.A.1-4 Liquid effluent being released exceeds 200 times the level of SLC 16.1.1-1 for  $\geq 15$  minutes as determined by RP procedure.

Note: If the monitor reading is sustained for the time period indicated in the EAL AND the required assessments (procedure calculations) cannot be completed within this time period, declaration must be made based on the valid radiation monitor reading.  
(Continued)

SITE AREA EMERGENCY

4.3.S.1-3 Analysis of field survey results or field survey samples indicates dose consequences greater than 100 mRem TEDE or 500 mRem CDE Adult Thyroid at the site boundary.

Note 1: These EMF readings are calculated based on average annual meteorology, site boundary dose rate, and design unit vent flow rate. Calculations by the dose assessment team use actual meteorology, release duration, and unit vent flow rate. Therefore, these EMF readings should not be used if dose assessment team calculations are available.

Note 2: If dose assessment team calculations cannot be completed in 15 minutes, then valid monitor reading should be used for emergency classification.

END

GENERAL EMERGENCY

4.3.G.1-3 Analysis of field survey results or field survey samples indicates dose consequences greater than 1000 mRem TEDE or 5000 mRem CDE Adult Thyroid at the site boundary.

Note 1: These EMF readings are calculated based on average annual meteorology, site boundary dose rate, and design unit vent flow rate. Calculations by the dose assessment team use actual meteorology, release duration, and unit vent flow rate. Therefore, these EMF readings should not be used if dose assessment team calculations are available.

Note 2: If dose assessment team calculations cannot be completed in 15 minutes, then valid monitor reading should be used for emergency classification.

END

**Enclosure 4.3**  
**Abnormal Rad Levels/Radiological Effluent**

RP/0/A/5000/001  
 Page 3 of 5

UNUSUAL EVENT

4.3.U.2 Unexpected Increase in Plant Radiation or Airborne Concentration.

OPERATING MODE: ALL

4.3.U.2-1 Indication of uncontrolled water level decrease of greater than 6 inches in the reactor refueling cavity with all irradiated fuel assemblies remaining covered by water.

4.3.U.2-2 Uncontrolled water level decrease of greater than 6 inches in the spent fuel pool and fuel transfer canal with all irradiated fuel assemblies remaining covered by water.

4.3.U.2-3 Unplanned valid area EMF reading increases by a factor of 1000 over normal levels as shown in Enclosure 4.10.

END

ALERT

4.3.A.2 Major Damage to Irradiated Fuel or Loss of Water Level that Has or Will Result in the Uncovering of Irradiated Fuel Outside the Reactor Vessel.

OPERATING MODE: ALL  
 4.3.A.2-1 An unplanned valid trip II alarm on any of the following radiation monitors:

Spent Fuel Building Refueling Bridge  
 1EMF-15  
 2EMF-4

Spent Fuel Pool Ventilation  
 1EMF-42  
 2EMF-42

Reactor Building Refueling Bridge (applies to Mode 6 and No Mode Only)  
 1EMF-17  
 2EMF-2

Containment Noble Gas Monitor (Applies to Mode 6 and No Mode Only)  
 1EMF-39  
 2EMF-39

(Continued)

SITE AREA EMERGENCY

GENERAL EMERGENCY

**Enclosure 4.3**  
**Abnormal Rad Levels/Radiological Effluent**

RP/0/A/5000/001  
Page 4 of 5

UNUSUAL EVENT

ALERT

SITE AREA EMERGENCY

GENERAL EMERGENCY

4.3.A.2-2 Plant personnel report that water level drop in reactor refueling cavity, spent fuel pool, or fuel transfer canal has or will exceed makeup capacity such that any irradiated fuel will become uncovered.

4.3.A.2-3 NC system wide range level <95% after initiation of NC system make-up.

AND

Any irradiated fuel assembly not capable of being lowered into spent fuel pool or reactor vessel.

4.3.A.2-4 Spent Fuel Pool or Fuel Transfer Canal level decrease of >2 feet after initiation of makeup.

AND

Any irradiated fuel assembly not capable of being fully lowered into the spent fuel pool racks or transfer canal fuel transfer system basket.

(Continued)

**Enclosure 4.3**  
**Abnormal Rad Levels/Radiological Effluent**

RP/0/A/5000/001  
Page 5 of 5

UNUSUAL EVENT

ALERT

SITE AREA EMERGENCY

GENERAL EMERGENCY

- 4.3.A.3 Release of Radioactive Material or Increases in Radiation Levels Within the Facility That Impedes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown.

**OPERATING MODE: ALL**

- 4.3.A.3-1 Valid reading on EMF-12 greater than 15 mR/hr in the Control Room.

- 4.3.A.3-2 Valid indication of radiation levels greater than 15 mR/hr in the Central Alarm Station (CAS) or Secondary Alarm Station (SAS).

- 4.3.A.3-3 Valid radiation monitor reading exceeds the levels shown in Enclosure 4.10.

END

**Enclosure 4.4**  
**Loss of Shutdown Functions**

RP/0/A/5000/001  
Page 1 of 3

UNUSUAL EVENT

END

ALERT

4.4.A.1 Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Trip Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Trip Was Successful.

SITE AREA EMERGENCY

4.4.S.1 Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Trip Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Trip Was NOT Successful.

GENERAL EMERGENCY

4.4.G.1 Failure of the Reactor Protection System to Complete an Automatic Trip and Manual Trip was NOT Successful and There is Indication of an Extreme Challenge to the Ability to Cool the Core.

OPERATING MODE: 1, 2, 3

OPERATING MODE: 1

OPERATING MODE: 1

4.4.A.1-1 The following conditions exist:

Valid reactor trip signal received or required and automatic reactor trip was not successful.

AND

Manual reactor trip from the control room is successful and reactor power is less than 5% and decreasing.

(Continued)

4.4.G.1-1 The following conditions exist:

Valid reactor trip signal received or required and automatic reactor trip was not successful.

AND

Manual reactor trip from the control room was not successful in reducing reactor power to less than 5% and decreasing.

AND

(Continued)  
Either of the following conditions exist:

- Core Cooling CSF-RED
- Heat Sink CSF-RED.

END



Enclosure 4.4

Loss of Shutdown Functions

UNUSUAL EVENT

ALERT

SITE AREA EMERGENCY

GENERAL EMERGENCY

4.4.A.2 Inability to Maintain Plant in Cold Shutdown.

4.4.S.2 Complete Loss of Function Needed to Achieve or Maintain Hot Shutdown.

OPERATING MODE: 5, 6

OPERATING MODE: 1, 2, 3, 4

4.4.A.2-1 Total loss of ND and/or RN and/or KC.

4.4.S.2-1 Subcriticality CSF-RED.

AND

4.4.S.2-2 Heat Sink CSF-RED.

One of the following:

4.4.S.3 Loss of Water Level in the Reactor Vessel That Has or Will Uncover Fuel in the Reactor Vessel.

- Inability to maintain reactor coolant temperature below 200°F

- Uncontrolled reactor coolant temperature rise to >180°F.

OPERATING MODE: 5, 6

4.4.S.3-1 Failure of heat sink causes loss of cold shutdown conditions.

AND

END

Lower range Reactor Vessel Level Indication System (RVLIS) decreasing after initiation of NC system makeup.

4.4.S.3-2 Failure of heat sink causes loss of cold shutdown conditions.

AND

Reactor Coolant (NC) system mid or wide range level less than 11% and decreasing after initiation of NC system makeup.

(Continued)

**Enclosure 4.4**  
**Loss of Shutdown Functions**

RP/0/A/5000/001  
Page 3 of 3

UNUSUAL EVENT

ALERT

SITE AREA EMERGENCY

GENERAL EMERGENCY

4.4.S.3-3 Failure of heat sink causes loss of cold shutdown conditions.

AND

Either train ultrasonic level indication less than 7.25% and decreasing after initiation of NC system makeup.

END

**Enclosure 4.5**

**Loss of Power**

UNUSUAL EVENT

4.5.U.1 Loss of All Offsite Power to Essential Buses for Greater Than 15 Minutes.

**OPERATING MODE:** 1, 2, 3, 4

4.5.U.1-1 The following conditions exist:

Loss of offsite power to essential buses ETA and ETB for greater than 15 minutes.

**AND**

Both emergency diesel generators are supplying power to their respective essential buses.

**OPERATING MODE:** 5, 6, No Mode

(Continued)

ALERT

4.5.A.1 Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Buses During Cold Shutdown Or Refueling Mode.

**OPERATING MODE:** 5, 6, No Mode

4.5.A.1-1 Loss of all offsite and onsite AC power as indicated by:

Loss of power on essential buses ETA and ETB.

**AND**

Failure to restore power to at least one essential bus within 15 minutes.

(Continued)

SITE AREA EMERGENCY

4.5.S.1 Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Buses.

**OPERATING MODE:** 1, 2, 3, 4

4.5.S.1-1 Loss of all offsite and onsite AC power as indicated by:

Loss of power on essential buses ETA and ETB.

**AND**

Failure to restore power to at least one essential bus within 15 minutes.

4.5.S.2 Loss of All Vital DC Power.

**OPERATING MODE:** 1, 2, 3, 4

(Continued)

GENERAL EMERGENCY

4.5.G.1 Prolonged Loss of All (Offsite and Onsite) AC Power.

**OPERATING MODE:** 1, 2, 3, 4

4.5.G.1-1 Prolonged loss of all offsite and onsite AC power as indicated by:

Loss of power on essential buses ETA and ETB for greater than 15 minutes.

**AND**

Standby Shutdown Facility (SSF) fails to supply NC pump seal injection OR CA supply to Steam Generators.

**AND**

At least one of the following conditions exist:

- Restoration of at least one essential bus within 4 hours is *NOT* likely

(Continued)

**Enclosure 4.5  
Loss of Power**

GENERAL EMERGENCY

SITE AREA EMERGENCY

ALERT

UNUSUAL EVENT

- Indication of continuing degradation of core cooling based on Fission Product Barrier monitoring.

4.5.S.2-1 The following conditions exist:  
**Unplanned** loss of both unit related busses: EBA and EBD both <112 VDC, and EBB and EBC both <109 VDC.

4.5.A.2 AC power to essential busses reduced to a single power source for greater than 15 minutes such that an additional single failure could result in station blackout.

4.5.U.1-2 The following conditions exist:  
Loss of offsite power to essential busses ETA and ETB for greater than 15 minutes.

**END**

**AND**

**OPERATING MODE: 1, 2, 3, 4**

4.5.A.2-1 The following condition exists:  
AC power capability has been degraded to one essential bus powered from a single power source for > 15 min. due to the loss of all but one of:

4.5.A.2-1 The following condition exists:  
AC power capability has been degraded to one essential bus powered from a single power source for > 15 min. due to the loss of all but one of:

4.5.U.2 **Unplanned Loss of Required DC Power During Cold Shutdown or Refueling Mode for Greater than 15 Minutes.**

**END**

**AND**

**OPERATING MODE: 5, 6**

4.5.U.2-1 The following conditions exist:  
**Unplanned** loss of both unit related busses: EBA and EBD both <112 VDC, and EBB and EBC both <109 VDC.

4.5.U.2-1 The following conditions exist:  
**Unplanned** loss of both unit related busses: EBA and EBD both <112 VDC, and EBB and EBC both <109 VDC.

4.5.U.2-1 The following conditions exist:  
Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

**END**

**AND**

**OPERATING MODE: 5, 6**

Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

**END**

**AND**

**OPERATING MODE: 5, 6**

Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

**END**

**AND**

**OPERATING MODE: 5, 6**

Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

**END**

**AND**

**OPERATING MODE: 5, 6**

Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

**END**

**AND**

**OPERATING MODE: 5, 6**

Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

**Enclosure 4.6**

**Fire/Explosion and Security Events**

UNUSUAL EVENT

4.6.U.1 Fire Within Protected Area Boundary Not Extinguished Within 15 Minutes of Detection OR Explosion Within the Protected Area Boundary.

**OPERATING MODE:** ALL

4.6.U.1-1 Fire in any of the following areas not extinguished within 15 minutes of control room notification or verification of a control room fire alarm.

- Reactor Building
- Auxiliary Building
- Diesel Generator Rooms
- Control Room
- RN Pumphouse
- SSF
- CAS
- SAS
- Doghouses
- FWST
- Turbine Building
- Service Building
- Interim Radwaste Building
- Equipment Staging Building.
- Monitor Tank Building

(Continued)

ALERT

4.6.A.1 Fire or Explosion Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown.

**OPERATING MODE:** 1, 2, 3, 4, 5, 6

4.6.A.1-1 The following conditions exist: (Non-security events)

**Fire or explosion** in any of the following areas:

- Reactor Building
- Auxiliary Building
- Diesel Generator Rooms
- Control Room
- RN Pumphouse
- SSF
- CAS
- SAS
- FWST
- Doghouses (Applies in Mode 1, 2, 3, 4 only).

AND

**One of the following:**

- Affected safety system parameter indications show degraded performance

(Continued)

SITE AREA EMERGENCY

4.6.S.1 Security Event in a Plant Vital Area.

**OPERATING MODE:** ALL

4.6.S.1-1 Intrusion into any of the following plant areas by a hostile force:

- Reactor Building
- Auxiliary Building
- Diesel Generator Rooms
- Control Room
- RN Pumphouse
- SSF
- Doghouses
- CAS
- SAS.

4.6.S.1-2 Security confirmed **bomb** discovered/explored in a vital area.

4.6.S.1-3 Security confirmed **sabotage** in a plant vital area.

END

GENERAL EMERGENCY

4.6.G.1 Security Event Resulting in Loss Of Ability to Reach and Maintain Cold Shutdown.

**OPERATING MODE:** ALL

4.6.G.1-1 Loss of physical control of the control room due to security event.

4.6.G.1-2 Loss of physical control of the SSF and ASP due to security event.

END

**Enclosure 4.6**  
**Fire/Explosion and Security Events**

RP/0/A/5000/001  
Page 2 of 3

UNUSUAL EVENT

4.6.U.1-2 Report by plant personnel of an unanticipated explosion within protected area boundary resulting in visible damage to permanent structure or equipment.

4.6.U.2 **Confirmed Security Event Which Indicates a Potential Degradation in the Level of Safety of the Plant.**

**OPERATING MODE: All**

4.6.U.2-1 Security confirmed bomb device discovered within plant Protected Area and outside Vital Areas.

4.6.U.2-2 Hostage situation/extortion

4.6.U.2-3 A violent civil disturbance within the owner controlled area.

4.6.U.2-4 A credible terrorist threat as determined by security.

END

SITE AREA EMERGENCY

GENERAL EMERGENCY

ALERT

- Plant personnel report visible damage to permanent structures or equipment within the specified area required to establish or maintain safe shutdown within the specifications.

Note: Only one train of a system needs to be affected or damaged in order to satisfy this condition.

4.6.A.2 **Fire or Explosion Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown.**

**OPERATING MODE: No Mode**

4.6.A.2-1 The following conditions exist: (Non-security events)

**Fire or explosion** in any of the following areas:

- Spent Fuel Pool
- Auxiliary Building.
- RN Pumphouse

**AND**

**One of the following:**

- Spent Fuel Pool level and/or temperature show degraded performance

(Continued)

UNUSUAL EVENT

**Enclosure 4.6  
Fire/Explosion and Security Events**

RP/0/A/5000/001  
Page 3 of 3

ALERT

SITE AREA EMERGENCY

GENERAL EMERGENCY

- Plant personnel report visible damage to permanent structures or equipment supporting spent fuel pool cooling.

4.6.A.3 Security Event in a Plant Protected Area.

OPERATING MODE: ALL

4.6.A.3-1 Intrusion into plant Protected Area by a hostile force.

END

**Enclosure 4.7**  
**Natural Disasters, Hazards, and Other Conditions Affecting Plant Safety**

RP/0/A/5000/001  
Page 1 of 4

UNUSUAL EVENT

ALERT

SITE AREA EMERGENCY

GENERAL EMERGENCY

4.7.U.1 Natural and Destructive Phenomena Affecting the Protected Area.

4.7.A.1 Natural and Destructive Phenomena Affecting the Plant Vital Area.

4.7.S.1 Control Room Evacuation Has Been Initiated and Plant Control Cannot Be Established.

4.7.G.1 Other Conditions Existing Which in the Judgement of the Emergency Coordinator/EOF Director Warrant Declaration of General Emergency.

**OPERATING MODE: ALL**

**OPERATING MODE: ALL**

**OPERATING MODE: ALL**

4.7.U.1-1 Tremor felt and valid alarm on the "strong motion accelerometer".

4.7.A.1-1 Valid "OBE Exceeded" Alarm on IAD-4,B/8

4.7.S.1-1 The following conditions exist:

**OPERATING MODE: ALL**

4.7.U.1-2 Tremor felt and valid alarm on the "Peak shock annunciator".

4.7.A.1-2 Tornado or high winds:

Control Room evacuation has been initiated per AP/1(2)/A/5500/017

4.7.G.1-1 Other conditions exist which in the Judgement of the Emergency Coordinator/EOF Director indicate:

4.7.U.1-3 Report by plant personnel of tornado striking within protected area boundary.

**AND**

(1) actual or imminent substantial core degradation with potential for loss of containment

4.7.U.1-4 Vehicle crash into plant structures or systems within protected area boundary.

Control of the plant cannot be established from the ASP or the SSF within 15 minutes.

**OR**

4.7.U.1-5 Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

4.7.S.2 Other Conditions Existing Which in the Judgement of the Emergency Coordinator/EOF Director Warrant Declaration of Site Area Emergency.

(2) potential for uncontrolled radionuclide releases. These releases can reasonably be expected to exceed Environmental Protection Agency Protective Action Guideline levels outside the site boundary.

(Continued)

**OR**

sustained winds  $\geq$  74 mph for > 15 minutes.

**OPERATING MODE: ALL**

4.7.S.2-1 Other conditions exist which in the Judgement of the Emergency Coordinator/EOF Director indicate actual or likely major failures of plant functions needed for protection of the public.

**END**

(Continued)

**END**



**Enclosure 4.7**  
**Natural Disasters, Hazards, And Other Conditions Affecting Plant Safety**

GENERAL EMERGENCY

SITE AREA EMERGENCY

ALERT

UNUSUAL EVENT

**4.7.U.2** Release of Toxic or Flammable Gases Deemed Detrimental to Safe Operation of the Plant.

**OPERATING MODE:** ALL

**4.7.U.2-1** Report or detection of toxic or flammable gases that could enter within the site area boundary in amounts that can affect safe operation of the plant.

**4.7.U.2-2** Report by Local, County or State Officials for potential evacuation of site personnel based on offsite event.

**4.7.U.3** Other Conditions Existing Which in the Judgement of the Emergency Coordinator/EOF Director Warrant Declaration of an Unusual Event.

**OPERATING MODE:** ALL

**4.7.U.3-1** Other conditions exist which in the judgement of the Emergency Coordinator/EOF Director indicate a potential degradation of the level of safety of the plant.

**4.7.A.1-3** Turbine failure generated missiles, vehicle crashes or other catastrophic events causing visible structural damage on any of the following plant structures:

- Reactor Building
- Auxiliary Building
- FWST
- Diesel Generator Rooms
- Control Room
- RN Pumphouse
- SSF
- Doghouses
- CAS
- SAS

(Continued)

**END**

**Enclosure 4.7**  
**Natural Disasters, Hazards, And Other Conditions Affecting Plant Safety**

RP/0/A/5000/001  
Page 3 of 4

UNUSUAL EVENT

GENERAL EMERGENCY

SITE AREA EMERGENCY

ALERT

- 4.7.A.2 Release of Toxic or Flammable Gases Within a Facility Structure Which Jeopardizes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown.

OPERATING MODE: ALL

- 4.7.A.2-1 Report or detection of toxic gases within a Facility Structure in concentrations that will be life threatening to plant personnel.

- 4.7.A.2-2 Report or detection of flammable gases within a Facility Structure in concentrations that will affect the safe operation of the plant.

Structures for the above EALs:

- Reactor Building
- Auxiliary Building
- Diesel Generator Rooms
- Control Room
- RN Pumphouse
- SSF
- CAS
- SAS

(Continued)

**Enclosure 4.7**  
**Natural Disasters, Hazards, And Other Conditions Affecting Plant Safety**

RP/0/A/5000/001  
Page 4 of 4

UNUSUAL EVENT

ALERT

SITE AREA EMERGENCY

GENERAL EMERGENCY

4.7.A.3 Control Room Evacuation  
Has Been Initiated.

OPERATING MODE: ALL

4.7.A.3-1 Control Room evacuation has  
been initiated per  
AP/1(2)/A/5500/017.

4.7.A.4 Other Conditions Existing  
Which in the Judgement of  
the Emergency  
Coordinator/EOF Director  
Warrant Declaration of an  
Alert.

OPERATING MODE: ALL

4.7.A.4-1 Other conditions exist which  
in the Judgement of the  
Emergency Coordinator/EOF  
Director indicate that plant  
safety systems may be  
degraded and that increased  
monitoring of plant functions  
is warranted.

END

Definitions/Acronyms

**ALERT**- Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA protective action guideline exposure levels.

**ALL** (As relates to Operating Mode Applicability) - Modes 1,2,3,4,5,6 and No Mode (Defueled)

**BOMB**- A fused explosive device.

**CARF** - Containment Air Return Fan.

**CIVIL DISTURBANCE** - A group of ten (10) or more people violently protesting station operations or activities at the site. A civil disturbance is considered to be violent when force has been used in an attempt to injure site personnel or damage plant property.

**CREDIBLE THREAT** - A threat should be considered credible when:

- Physical evidence supporting the threat exists.
- Information independent (law enforcement) from the actual threat message exists that supports the threat.
- A specific group or organization claims responsibility for the threat.

**EPA PAG** - Environmental Protection Agency Protective Action Guidelines for exposure to a release of radioactive material.

**EXPLOSION** - A rapid, violent unconfined combustion, or a catastrophic failure of pressurized equipment (e.g., a steamline or feedwater line break) that imparts energy sufficient to potentially damage or creates shrapnel to actually damage permanent structures, systems or components. An electrical breaker flash that creates shrapnel and results in damage to other components beyond scorching should also be considered.

**EXTORTION** - An attempt to cause an action at the site by threat of force.

**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 flames is preferred but is NOT required if large quantities of smoke and heat are observed. An electrical breaker flash that creates high temperatures for a short duration and merely localized scorching to that breaker and its compartment should be considered a fire.

**FUNCTIONAL** - A component is fully capable of meeting its design function. It would be declared **INOPERABLE** if unable to meet Technical Specifications.

**GENERAL EMERGENCY**- Events are in process or 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 guideline exposure levels outside the Site Boundary.

Definitions/Acronyms

**HOSTAGE** - A person or object held as leverage against the site to ensure demands will be met by the site.

**HOSTILE FORCE** - One of more individuals present in a protected area without authorization that may have or have threatened to use force in an attempt to injure site personnel or damage plant property.

**IMMINENT** - Expected to occur within 1-3 hours.

**INOPERABLE** - A component does not meet Technical Specifications. The component may be functional, capable of meeting its design.

**INABILITY TO DIRECTLY MONITOR** - Operational Aid Computer data points are unavailable or gauges/panel indications are not readily available to the operator.

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

**LOSS** - A component is **INOPERABLE** and not **FUNCTIONAL**.

**PROLONGED** - a duration beyond normal limits, defined as "greater than 15 minutes" or as determined by the judgement of the emergency Coordinator.

**PROTECTED AREA** - Encompasses all owner controlled areas within the security perimeter fence.

**RUPTURED** (As relates to 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, misalignment, or misoperation 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, (5) Thermal power oscillations >10%.

**SITE AREA EMERGENCY** - Events are in process or have occurred which involve actual or likely major failures of plant functions needed for the protection of the public. Any releases are **NOT** expected to result in exposure levels which exceed EPA protective action guideline exposure levels outside the Site Boundary.

**SITE BOUNDARY** - That area, including the protected area, in which Duke Power Company has the authority to control all activities, including exclusion or removal of personnel and property.

**SLC** - Selected Licensee Commitments.

**SECURITY EVENT** - A security related emergency situation for which prompt response by the Security Force, immediate action by plant personnel, and/or assistance from offsite agencies may be required to apprehend intruders and mitigate the effects of or prevent radiological sabotage.

**SUSTAINED** - A duration of time long enough to confirm that the CSF is valid (not momentary).

**TERMINATION** - Exiting the emergency condition.

**TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE)** - The sum of external dose exposure to radioactive plume, to radionuclides deposited on the ground by the plume, and the internal exposure inhaled radionuclides deposited in the body.

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

**UNCONTROLLED** - Event is not the result of planned actions by the plant staff.

**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.

**UNUSUAL EVENT**- Events are in process or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

**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 instrumentation, or (3) by direct observation by plant personnel such that doubt related to the instrument's operability, the condition's existence or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

**VIOLENT** - Force has been used in an attempt to injure site personnel or damage plant property.

**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 structure, system, or component. Example damage: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering.

**VITAL AREA** - Areas within the PROTECTED AREA that house equipment important for nuclear safety. Access to a VITAL AREA is allowed only if an individual has been authorized to be in that area.

THE FOLLOWING GUIDANCE IS TO BE USED BY THE EMERGENCY COORDINATOR IN ASSESSING EMERGENCY CONDITIONS.

- The Emergency Coordinator shall review all applicable initiating events to ensure proper classification.
- The BASIS Document (located in Section D of the Catawba Nuclear Site Emergency Plan) is available for review if any questions arise over proper classification.
- Emergencies are declared for the site. If an event results in multiple emergency action levels on a unit or different emergency action levels on each unit, then the emergency declaration shall be based on the higher classification. Information relating to the unit with the lesser classification will be noted as additional information on the Emergency Notification Form (ENF).
- If an event occurs, and a lower or higher plant operating mode is reached before the classification can be made, the classification shall be based on the mode that existed at the time the event occurred.
- The fission product barrier matrix is applicable only to those events that occur at (Mode 1-4) hot shutdown or higher. An event that is recognized at cold shutdown or lower (Mode 5 or 6) shall not be classified using the fission product barrier matrix. Reference would be made to the other enclosures that provide emergency action levels for specific events (e.g. severe weather, fire, security).
- If a transient event should occur, the following guidance is provided.
  1. Some emergency action levels specify that a condition exist for a specific duration prior to declaration.
    - a. For these EALs, the classification is made when the Emergency Coordinator assessment concludes that the specified duration is exceeded or will be exceeded (i.e. condition cannot be reasonably corrected before the duration elapses), whichever is sooner.
    - b. If a plant condition exceeding EAL criteria is corrected before the specified duration time is exceeded, the event is **NOT** classified by that EAL. Lower Severity EALs, if any, shall be reviewed for possible applicability in these cases.
  2. If a plant condition exceeding EAL criteria is not recognized 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, an emergency shall **NOT** be declared. Reporting under 10CFR50.72 may be required. Such a condition could occur, for example, if a follow-up evaluation of an abnormal condition uncovers evidence that the condition was more severe than earlier believed.

**Enclosure 4.9**  
**Emergency Declaration Guidelines**

RP/0/A/5000/001  
Page 2 of 2

3. If an emergency classification is warranted, but the plant condition is corrected prior to declaration and notification, the Emergency Coordinator must consider the potential that the initiating condition (e.g. Failure of Reactor Protection System or earthquake) may have caused plant damage that warrants augmenting the on-shift personnel via activation of the Emergency Response Organization. The following action shall be taken:
  - a. For UNUSUAL EVENTS, the condition shall be declared and notifications made. The event may be terminated in the same notification or in a follow-up notification.
  - b. For ALERT, SITE AREA EMERGENCY, and GENERAL EMERGENCY, the event shall be declared and the emergency response organization activated.

**DETERMINATION OF "EVENT TIME" (TIME THE 15 MINUTE CLOCK STARTS)**

1. If plant conditions require implementation of EP/1 or 2/A/5000/E-0 (Reactor Trip or Safety Injection), increased emphasis shall be given to evaluation of plant conditions for determination of EAL(s) when "kickout" of the diagnostic procedure occurs. "Event Time" is the time at which the EAL(s) is determined.
2. If plant conditions do not require implementation of EP/1 or 2/A/5000/E-0 (Reactor Trip or Safety Injection), and conditions of a specific EAL are met, the "Event Time" is the time at which the EAL(s) is determined.
3. The time the event is classified shall be entered on the emergency notification form.

**MOMENTARY ENTRY INTO A HIGHER CLASSIFICATION**

If, while in an emergency classification, the specified EALs of a higher classification are met momentarily, and in the judgment of the Emergency Coordinator are not likely to recur, the entry into the higher classification must be acknowledged. Acknowledgment is performed as follows:

If this condition occurs prior to the initial notification to the emergency response organization and off site agencies, the initial message should note that the site is currently in the lower classification, but had momentarily met the criteria for the higher classification. It should also be noted that plant conditions have improved and stabilized to the point that the criteria for the higher classification are not expected to be repeated.



Enclosure 4.10

RP/0/A/5000/001  
Page 1 of 1

Radiation Monitor Readings for Enclosure 4.3

Note: These values are not intended to apply to anticipated temporary increases due to planned events (e.g. incore detector movement, radwaste container movement, depleted resin transfers, etc.)

Detector	Elevation	Column	Identifier	Unusual Event mRad/hr	Alert mRad/hr
1EMF-1	522'	FF, 57	Auxiliary Building Corridor	500	5000
1EMF-3	543'	GG, 55	Unit 1 Charging Pump Area	100	5000
1EMF-4	543'	GG, 59	Unit 2 Charging Pump Area	100	5000
1EMF-7	560'	NN, 55	Unit 1 Auxiliary Building Corridor	1500	5000
1EMF-8	560'	NN, 59	Unit 2 Auxiliary Building Corridor	500	5000
1EMF-9	577'	LL, 55	Unit 1 Aux. Building Filter Hatch	100	5000
1EMF-10	577'	LL, 58	Unit 2 Aux. Building Filter Hatch	100	5000
1EMF-22	594'	KK, 53	Containment Purge Filter Area	100	5000
2EMF-9	594'	KK, 61	Containment Purge Filter Area	100	5000

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.16 RCS Specific Activity

LCO 3.4.16 The specific activity of the reactor coolant shall be within limits.

APPLICABILITY: MODES 1 and 2,  
MODE 3 with RCS average temperature ( $T_{avg}$ )  $\geq$  500°F.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. DOSE EQUIVALENT I-131 > 1.0 $\mu$ Ci/gm.	-----Note----- LCO 3.0.4 is not applicable.	
	A.1 Verify DOSE EQUIVALENT I-131 within the acceptable region of Figure 3.4.16-1.  <u>AND</u> A.2 Restore DOSE EQUIVALENT I-131 to within limit.	Once per 4 hours  48 hours
B. Gross specific activity of the reactor coolant not within limit.	B.1 Be in MODE 3 with $T_{avg}$ < 500°F.	6 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. Required Action and associated Completion Time of Condition A not met.</p> <p><u>OR</u></p> <p>DOSE EQUIVALENT I-131 in the unacceptable region of Figure 3.4.16-1.</p>	<p>C.1 Be in MODE 3 with <math>T_{avg} &lt; 500^{\circ}F</math>.</p>	<p>6 hours</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.4.16.1 Verify reactor coolant gross specific activity <math>\leq 100/\bar{E}</math> <math>\mu Ci/gm</math>.</p>	<p>7 days</p>
<p>SR 3.4.16.2 -----NOTE----- Only required to be performed in MODE 1. ----- Verify reactor coolant DOSE EQUIVALENT I-131 specific activity <math>\leq 1.0 \mu Ci/gm</math>.</p>	<p>14 days</p> <p><u>AND</u></p> <p>Between 2 and 6 hours after a THERMAL POWER change of <math>\geq 15\%</math> RTP within a 1 hour period</p>

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.4.16.3 -----NOTE-----            Not required to be performed until 31 days after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for <math>\geq 48</math> hours.</p> <hr/> <p>Determine <math>\bar{E}</math> from a sample taken in MODE 1 after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for <math>\geq 48</math> hours.</p>	<p>184 days</p>

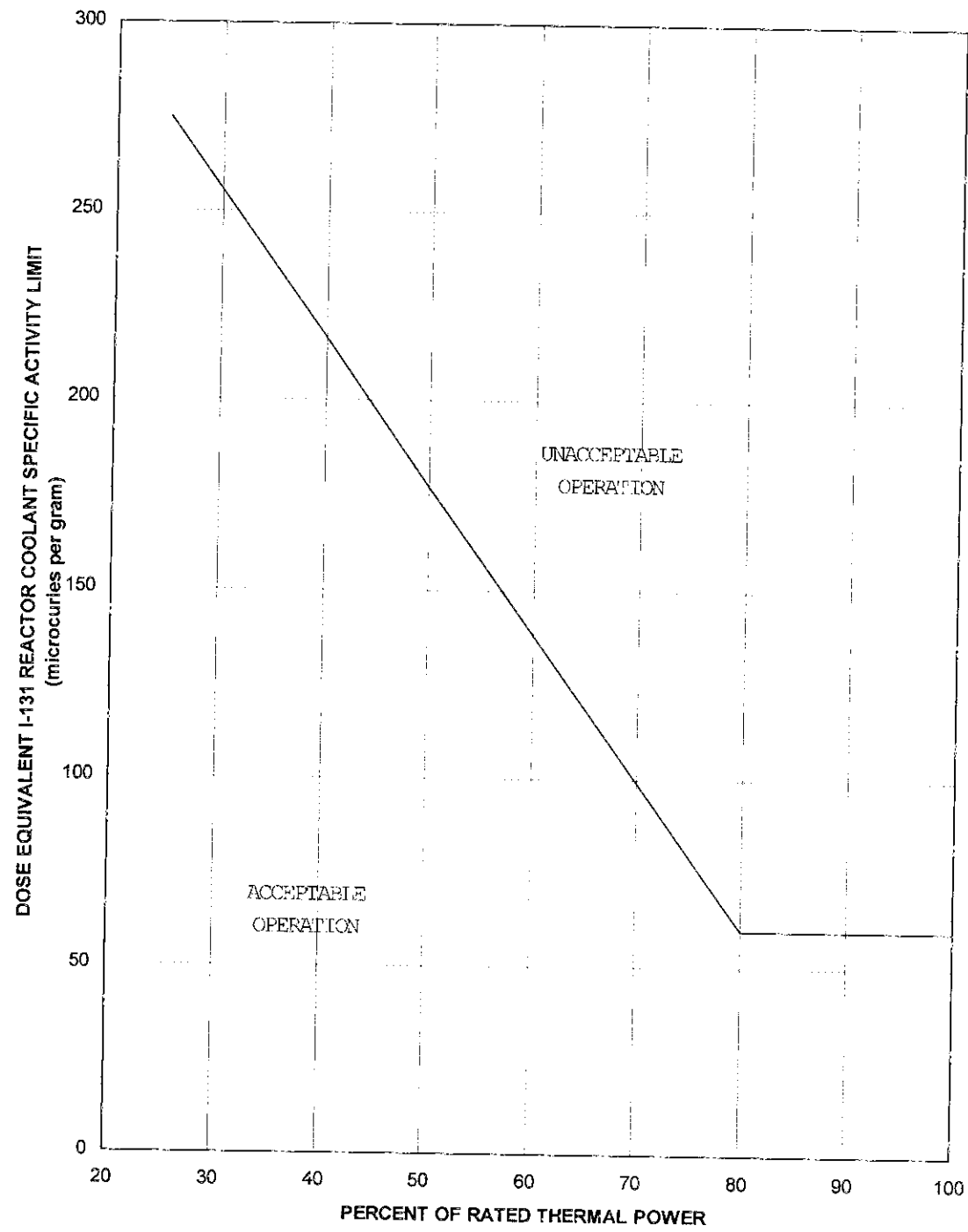


Figure 3.4.16-1 (page 1 of 1)  
Reactor Coolant DOSE EQUIVALENT I-131 Specific Activity  
Limit Versus Percent of RATED THERMAL POWER

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources—Operating

LCO 3.8.1 The following AC electrical sources shall be OPERABLE\*:

- a. Two qualified circuits between the offsite transmission network and the Onsite Essential Auxiliary Power System; and
- b. Two diesel generators (DGs) capable of supplying the Onsite Essential Auxiliary Power Systems;

AND

The automatic load sequencers for Train A and Train B shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One offsite circuit inoperable.	A.1 Perform SR 3.8.1.1 for OPERABLE offsite circuit.	1 hour <u>AND</u> Once per 8 hours thereafter
	A.2 Declare required feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable.	24 hours from discovery of no offsite power to one train concurrent with inoperability of redundant required feature(s)
	<u>AND</u>	
		(continued)

\*For each Unit, the Completion Time that the 'A' EDG can be inoperable as specified by Required Action B.4 may be extended beyond the "72 hours and 6 days from discovery of failure to meet the LCO" up to 168 hours as part of the NSW system upgrades. System upgrades include maintenance and modification activities associated with replacement of portions of the train 'A' NSW piping via modification CE-71424. Upon completion of the pipe replacement and system restoration this footnote is no longer applicable.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3 Restore offsite circuit to OPERABLE status.	72 hours <u>AND</u> 6 days from discovery of failure to meet LCO
B. One DG inoperable.	<p>B.1 Perform SR 3.8.1.1 for the offsite circuit(s).</p> <p><u>AND</u></p> <p>B.2 Declare required feature(s) supported by the inoperable DG inoperable when its required redundant feature(s) is inoperable.</p> <p><u>AND</u></p> <p>B.3.1 Determine OPERABLE DG is not inoperable due to common cause failure.</p> <p><u>OR</u></p> <p>B.3.2 Perform SR 3.8.1.2 for OPERABLE DG.</p> <p><u>AND</u></p>	<p>1 hour</p> <p><u>AND</u></p> <p>Once per 8 hours thereafter</p> <p>4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s)</p> <p>24 hours</p> <p>24 hours</p> <p>(continued)</p>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.4 Restore DG to OPERABLE status.	72 hours*  AND  6 days* from discovery of failure to meet LCO
C. Two offsite circuits inoperable.	C.1 Declare required feature(s) inoperable when its redundant required feature(s) is inoperable.	12 hours from discovery of Condition C concurrent with inoperability of redundant required features
	AND C.2 Restore one offsite circuit to OPERABLE status.	24 hours

(continued)

\*For each Unit, the Completion Time that the 'A' EDG can be inoperable as specified by Required Action B.4 may be extended beyond the "72 hours and 6 days from discovery of failure to meet the LCO" up to 168 hours as part of the NSW system upgrades. System upgrades include maintenance and modification activities associated with replacement of portions of the train 'A' NSW piping via modification CE-71424. Upon completion of the pipe replacement and system restoration this footnote is no longer applicable.



ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>D. One offsite circuit inoperable.</p> <p><u>AND</u></p> <p>One DG inoperable.</p>	<p>-----NOTE-----</p> <p>Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems—Operating," when Condition D is entered with no AC power source to any train.</p> <hr/> <p>D.1 Restore offsite circuit to OPERABLE status.</p> <p><u>OR</u></p> <p>D.2 Restore DG to OPERABLE status.</p>	<p>12 hours</p> <p>12 hours</p>
<p>E. Two DGs inoperable.</p>	<p>E.1 Restore one DG to OPERABLE status.</p>	<p>2 hours</p>
<p>F. One automatic load sequencer inoperable.</p>	<p>F.1 Restore automatic load sequencer to OPERABLE status.</p>	<p>12 hours</p>
<p>G. Required Action and associated Completion Time of Condition A, B, C, D, E, or F not met.</p>	<p>G.1 Be in MODE 3.</p> <p><u>AND</u></p> <p>G.2 Be in MODE 5.</p>	<p>6 hours</p> <p>36 hours</p>
<p>H. Three or more AC sources inoperable.</p>	<p>H.1 Enter LCO 3.0.3.</p>	<p>Immediately</p>

**SURVEILLANCE REQUIREMENTS**

SURVEILLANCE	FREQUENCY
SR 3.8.1.1 Verify correct breaker alignment and indicated power availability for each offsite circuit.	7 days
SR 3.8.1.2 -----NOTES----- 1. Performance of SR 3.8.1.7 satisfies this SR. 2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. 3. A modified DG start involving idling and gradual acceleration to synchronous speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met. ----- Verify each DG starts from standby conditions and achieves steady state voltage $\geq 3740$ V and $\leq 4580$ V, and frequency $\geq 58.8$ Hz and $\leq 61.2$ Hz.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.8.1.3</p> <p style="text-align: center;">-----NOTES-----</p> <ol style="list-style-type: none"> <li>1. DG loadings may include gradual loading as recommended by the manufacturer.</li> <li>2. Momentary transients outside the load range do not invalidate this test.</li> <li>3. This Surveillance shall be conducted on only one DG at a time.</li> <li>4. This SR shall be preceded by and immediately follow without shutdown a successful performance of SR 3.8.1.2 or SR 3.8.1.7.</li> </ol> <p style="text-align: center;">-----</p> <p>Verify each DG is synchronized and loaded and operates for <math>\geq 60</math> minutes at a load <math>\geq 5600</math> kW and <math>\leq 5750</math> kW.</p>	31 days
SR 3.8.1.4 Verify each day tank contains $\geq 470$ gal of fuel oil.	31 days
SR 3.8.1.5 Check for and remove accumulated water from each day tank.	31 days
SR 3.8.1.6 Verify the fuel oil transfer system operates to transfer fuel oil from storage system to the day tank.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.8.1.7 -----NOTE----- All DG starts may be preceded by an engine prelube period.</p> <hr/> <p>Verify each DG starts from standby condition and achieves in <math>\leq 11</math> seconds voltage of <math>\geq 3740</math> V and frequency of <math>\geq 57</math> Hz and maintains steady-state voltage <math>\geq 3740</math> V and <math>\leq 4580</math> V, and frequency <math>\geq 58.8</math> Hz and <math>\leq 61.2</math> Hz.</p>	<p>184 days</p>
<p>SR 3.8.1.8 Verify automatic and manual transfer of AC power sources from the normal offsite circuit to each alternate offsite circuit.</p>	<p>18 months</p>

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.8.1.9 -----NOTE----- If performed with the DG synchronized with offsite power, it shall be performed at a power factor <math>\leq 0.9</math>.</p> <hr/> <p>Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and:</p> <ul style="list-style-type: none"> <li>a. Following load rejection, the frequency is <math>\leq 63</math> Hz;</li> <li>b. Within 3 seconds following load rejection, the voltage is <math>\geq 3740</math> V and <math>\leq 4580</math> V; and</li> <li>c. Within 3 seconds following load rejection, the frequency is <math>\geq 58.8</math> Hz and <math>\leq 61.2</math> Hz.</li> </ul>	18 months
<p>SR 3.8.1.10 Verify each DG does not trip and generator speed is maintained <math>\leq 500</math> rpm during and following a load rejection of <math>\geq 5600</math> kW and <math>\leq 5750</math> kW.</p>	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.8.1.11 -----NOTES-----</p> <ol style="list-style-type: none"> <li>1. All DG starts may be preceded by an engine prelube period.</li> <li>2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4.</li> </ol> <hr/> <p>Verify on an actual or simulated loss of offsite power signal:</p> <ol style="list-style-type: none"> <li>a. De-energization of emergency buses;</li> <li>b. Load shedding from emergency buses;</li> <li>c. DG auto-starts from standby condition and:               <ol style="list-style-type: none"> <li>1. energizes the emergency bus in <math>\leq 11</math> seconds,</li> <li>2. energizes auto-connected shutdown loads through automatic load sequencer,</li> <li>3. maintains steady state voltage <math>\geq 3740</math> V and <math>\leq 4580</math> V,</li> <li>4. maintains steady state frequency <math>\geq 58.8</math> Hz and <math>\leq 61.2</math> Hz, and</li> <li>5. supplies auto-connected shutdown loads for <math>\geq 5</math> minutes.</li> </ol> </li> </ol>	<p>18 months</p>

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.8.1.13 <del>NOTE</del> <del>This Surveillance shall not be performed in MODE 1 or 2.</del></p> <hr/> <p>Verify each DG's automatic trips are bypassed on actual or simulated loss of voltage signal on the emergency bus concurrent with an actual or simulated ESF actuation signal except:</p> <ul style="list-style-type: none"> <li>a. Engine overspeed;</li> <li>b. Generator differential current;</li> <li>c. Low - low lube oil pressure; and</li> <li>d. Voltage control overcurrent relay scheme.</li> </ul>	<p>18 months</p>
<p>SR 3.8.1.14 <del>NOTES</del></p> <ul style="list-style-type: none"> <li>1. <del>Momentary transients outside the load and power factor ranges do not invalidate this test.</del></li> <li>2. <del>This Surveillance shall not be performed in MODE 1 or 2.</del></li> </ul> <hr/> <p>Verify each DG operating at a power factor <math>\leq 0.9</math> operates for <math>\geq 24</math> hours loaded <math>\geq 5600</math> kW and <math>\leq 5750</math> kW.</p>	<p>18 months</p>

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.8.1.15 -----NOTES-----</p> <ol style="list-style-type: none"> <li>1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated <math>\geq</math> 1 hour loaded <math>\geq</math> 5600 kW and <math>\leq</math> 5750 kW or until operating temperature is stabilized.</li> </ol> <p style="padding-left: 40px;">Momentary transients outside of load range do not invalidate this test.</p> <ol style="list-style-type: none"> <li>2. All DG starts may be preceded by an engine prelube period.</li> </ol> <hr/> <p>Verify each DG starts and achieves, in <math>\leq</math> 11 seconds, voltage <math>\geq</math> 3740 V, and frequency <math>\geq</math> 57 Hz and maintains steady state voltage <math>\geq</math> 3740 V and <math>\leq</math> 4580 V and frequency <math>\geq</math> 58.8 Hz and <math>\leq</math> 61.2 Hz.</p>	<p>18 months</p>
<p>SR 3.8.1.16 -----NOTE-----</p> <p>This Surveillance shall not be performed in MODE 1, 2, 3, or 4.</p> <hr/> <p>Verify each DG:</p> <ol style="list-style-type: none"> <li>a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power;</li> <li>b. Transfers loads to offsite power source; and</li> <li>c. Returns to standby operation.</li> </ol>	<p>18 months</p>

(continued)



SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.8.1.17 -----NOTE----- This Surveillance shall not be performed in MODE 1, 2, 3, or 4.</p> <hr/> <p>Verify, with a DG operating in test mode and connected to its bus, an actual or simulated ESF actuation signal overrides the test mode by:</p> <ul style="list-style-type: none"> <li>a. Returning DG to standby operation; and</li> <li>b. Automatically energizing the emergency load from offsite power.</li> </ul>	<p>18 months</p>
<p>SR 3.8.1.18 Verify interval between each sequenced load block is within the design interval for each automatic load sequencer.</p>	<p>18 months</p>

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.8.1.19 -----NOTES-----</p> <ol style="list-style-type: none"> <li>1. All DG starts may be preceded by an engine prelube period.</li> <li>2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4.</li> </ol> <p>-----</p> <p>Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ESF actuation signal:</p> <ol style="list-style-type: none"> <li>a. De-energization of emergency buses;</li> <li>b. Load shedding from emergency buses; and</li> <li>c. DG auto-starts from standby condition and:               <ol style="list-style-type: none"> <li>1. energizes the emergency bus in <math>\leq 11</math> seconds,</li> <li>2. energizes auto-connected emergency loads through load sequencer,</li> <li>3. achieves steady state voltage <math>\geq 3740</math> V and <math>\leq 4580</math> V,</li> <li>4. achieves steady state frequency <math>\geq 58.8</math> Hz and <math>\leq 61.2</math> Hz, and</li> <li>5. supplies auto-connected emergency loads for <math>\geq 5</math> minutes.</li> </ol> </li> </ol>	<p>18 months</p>

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.8.1.20 -----NOTE----- All DG starts may be preceded by an engine prelube period.</p> <hr/> <p>Verify when started simultaneously from standby condition, each DG achieves, in <math>\leq 11</math> seconds, voltage of <math>\geq 3740</math> V and frequency of <math>\geq 57</math> Hz and maintains steady state voltage <math>\geq 3740</math> V and <math>\leq 4580</math> V, and frequency <math>\geq 58.8</math> Hz and <math>\leq 61.2</math> Hz.</p>	<p>10 years</p>