Question: 1
(1 point)

Given the following:

- Unit 1 entered EP/1/A/5000/ECA-1.1, (Loss of Emergency Coolant Recirculation) following a LOCA outside containment
- Safety Injection Termination criteria is NOT met
    - o The crew has been directed to determine minimum SI flow per Enclosure 4 (Minimum S/I Flowrate Versus Time After Trip)

Current conditions:

- The Unit 1 Reactor was tripped 60 minutes ago
- NCS pressure is 1000 psig.
- 1B NI pump is running with flow indicated at 380 gpm
- 1A NV pump is running with flow indicated at 400 gpm

The MINIMUM S/I Flowrate required to remove current reactor decay heat is _____(1)_____.

The _____(2)_____ pump is required to be secured.

REFERENCE PROVIDED

A. 1. 340 gpm
   2. 1A NV

B. 1. 340 gpm
   2. 1B NI

C. 1. 360 gpm
   2. 1A NV

D. 1. 360 gpm
   2. 1B NI

Question: 2
(1 point)

Given the following:

- The crew has just completed the actions of EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) following a Safety Injection due to Hi Containment Pressure
- NV pump flow to the NC system Cold Legs is 390 GPM
- NC system pressure is 1350 PSIG and STABLE
- SG pressures are 1092 PSIG and STABLE
- NC system subcooling on the ICCM is 22°F and STABLE

Per the requirements of EP/1/A/5000/E-0, Enclosure 1 (Foldout Page), the crew _____(1)_____ be required to secure NC pumps.

Upon transition to EP/1/A/5000/E-1 (Loss of Reactor or Secondary Coolant), Steam Generators _____(2)_____ be required for heat removal.

A. 1. will
2. will

B. 1. will
2. will NOT

C. 1. will NOT
2. will

D. 1. will NOT
2. will NOT

Question: 3
(1 point)

Given the following:

- Unit 1 is in Mode 3
- Rod control is capable of rod withdrawal.
- NC loops 1A, 1B, and 1D are in operation.
- The crew has entered AP/1/A/5500/008 (Malfunction of Reactor Coolant Pump)
- 1A NC Pump lower bearing temperature is currently 190ºF and increasing 5ºF per minute

(1) 1A NC Pump lower bearing temperature will reach trip setpoint in ________________ .

(2) What is the specified Completion Time of the action required by TS 3.4.5 (RCS Loops – MODE 3) following the trip of 1A NCP?

A. 1. 7 minutes
   2. immediately

B. 1. 7 minutes
   2. 1 hour

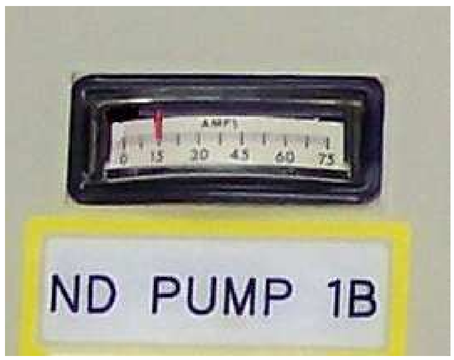
C. 1. 1 minute
   2. immediately

D. 1. 1 minute
   2. 1 hour

Question: 4
(1 point)

Given the following:

- Unit 1 refueling is in progress
- NC level is at 98%
- 1B ND is in service
- 1AD-9 B/6 “ND Trn B to NC C-Legs Loops A-B Lo Flow” alarms
- The BOP notes the following amperage indication



The crew will enter _____(1)_____ of AP/1/A/5500/019 (Loss of Residual Heat Removal System).

Once 1A ND is placed in service, the requirements of T.S. 3.9.4 (Residual Heat Removal and Coolant Circulation – High Water Level) _____(2)_____ met.

A. 1. Case II (Leak in ND)
   2. are

B. 1. Case II (Leak in ND)
   2. are NOT

C. 1. Case III (Loss of ND with Large Vent Path Established)
   2. are

D. 1. Case III (Loss of ND with Large Vent Path Established)
   2. are NOT

Question: 5
(1 point)

Given the following:

- Unit 1 is at 100% RTP
- 1A1 KC Pump is in service
- 1B NV Pump is in service
- OAC Alarm C1D2215 (KC Train A Low-Low Level Surge Tank Isol) is actuated due to an instrument failure

Following the receipt of the OAC alarm, and assuming no operator action:

1RN-291 (KC Hx 1A Outlet Throttle Valve) will throttle in the _____(1)_____ direction in order to maintain KC system temperature.

1B NV Pump motor bearing temperatures will _____(2)_____ .

A. 1. open
2. increase

B. 1. open
2. remain constant

C. 1. closed
2. increase

D. 1. closed
2. remain constant

Question: 6
(1 point)

Given the following:

- Unit 1 is at 100% RTP
- A DCS malfunction has caused an Alternate Action on SPP-1 (Selected PZR Pressure-1)

Subsequently:

- The Main Turbine trips
- The Reactor does NOT trip automatically or manually
- The crew has entered EP/1/A/5000/FR-S.1 (Response to Nuclear Power Generation/ATWS)

As NC pressure increases, 1NC-32B (PZR PORV) _____(1)_____ automatically open.

FR-S.1 contains guidance to ensure PZR pressure remains below the PORV setpoint in order to _____(2)_____ .

A. 1. will
   2. ensure sufficient boration flow

B. 1. will
   2. prevent challenging PZR Safety Valves

C. 1. will NOT
   2. ensure sufficient boration flow

D. 1. will NOT
   2. prevent challenging PZR Safety Valves

Question: 7
(1 point)

Given the following:

- Unit 1 Reactor has experienced a Safety Injection due to Low PZR Pressure
- The CRS has just completed reading the immediate action steps of EP/1/A/5000/E-0 (Reactor Trip or Safety Injection)
- The following EMFs are in Trip 2 condition:
  - 1EMF-33 (Condenser Air Ejector Exhaust)
  - 1EMF-71 (S/G A Leakage)
  - 1EMF-74 (S/G D Leakage)
  - 1EMF-26 (Steam Line 1A)
- 1A S/G NR level is 35%
- 1B, 1C and 1D S/G NR levels are 23%
- Total CA flow is approximately 1000 gpm
- The RO has depressed the “CA SYS VLV CTRL TRN A” and “CA SYS VLV CTRL TRN B” reset buttons
- “CA SYS VLV CTRL TRN A” reset light is DARK
- “CA SYS VLV CTRL TRN B” reset light is LIT

CA flow to 1A S/G using the flow control valve _____(1)_____ under operator control

EP/1/A/5000/E-0 _____(2)_____ require isolation of CA flow to the 1A S/G at this time.

A. 1. is
   2. does

B. 1. is
   2. does NOT

C. 1. is NOT
   2. does

D. 1. is NOT
   2. does NOT

Question: 8
(1 point)

Given the following:

- A seismic event has resulted in the following:
  - 2A S/G has experienced a complete shear of the Main Steam line at the S/G outlet
  - 2D S/G has experienced a complete shear of the Main Feed line at the S/G inlet

Which Steam Generator will decrease to 0% WR level FIRST?

Procedural guidance to isolate 2D S/G is contained in _____(2)_____ .

A. 1. 2A S/G
   2. EP/2/A/5000/E-1 (Loss of Reactor or Secondary Coolant)

B. 1. 2A S/G
   2. EP/2/A/5000/E-2 (Faulted Steam Generator Isolation)

C. 1. 2D S/G
   2. EP/2/A/5000/E-1 (Loss of Reactor or Secondary Coolant)

D. 1. 2D S/G
   2. EP/2/A/5000/E-2 (Faulted Steam Generator Isolation)

Question: 9
(1 point)

Given the following:

- Both units have experienced a Loss of Offsite Power (LOOP)
- No backup Diesel VI compressor is available
- EP/1/A/5000/ECA-0.0 (Loss of All AC Power) was implemented on Unit 1 and the crew has just transitioned to EP/1/A/5000/ECA-0.1 (Loss of All AC Power Recovery Without S/I Required)

Current conditions:

- 30 minutes have elapsed since the LOOP
- NC T_{hots} are STABLE
- S/G pressures are STABLE at 725 PSIG
- S/G levels are decreasing and approaching 11% NR
- NC T_{colds} are 490°F and STABLE
- VI header pressure is 0 PSIG

Natural Circulation flow ___(1)___ be verified

In accordance with ECA-0.1, the Operators will increase CA flow ___(2)___.

REFERENCE PROVIDED

A. 1. can
2. using flow controllers in the control room

B. 1. can
2. by notifying AO to throttle CA valves locally

C. 1. can NOT
2. using flow controllers in the control room

D. 1. can NOT
2. by notifying AO to throttle CA valves locally

Question: 10
(1 point)

Given the following:

- Unit 1 tripped from 100% RTP due to a Loss of Offsite Power
- NC cooldown is currently in progress in accordance with EP/1/A/5000/ES-0.2 (Natural Circulation Cooldown)
- The trend of NC Temperature is as follows:

Time	0800	0830	0900
NC Temperature	535ºF	495ºF	455ºF

In accordance with ES-0.2:

NC Temperature will be determined by monitoring of _____(1)_____ .

At 0900, the required cooldown rate _____(2)_____ been exceeded.

A. 1. NC Tave
2. has

B. 1. NC Tave
2. has NOT

C. 1. NC Tcolds
2. has

D. 1. NC Tcolds
2. has NOT

Question: 11
(1 point)

Given the following:

- Unit 1 is at 100% RTP
- 1ERPA is de-energized
- The crew has entered AP/1/A/5500/029 (Loss of Vital or Aux Control Pwr)

In accordance with AP/29, an operator will be dispatched to 1A D/G room because _____(1)_____ .

Entry conditions of AP/1/A/5500/016 (Malfunction of Nuclear Instrumentation System) _____(2)_____ been met.

A. 1. D/G control power has been lost
2. have

B. 1. D/G control power has been lost
2. have NOT

C. 1. D/G Day Tank auto makeup capability has been lost
2. have

D. 1. D/G Day Tank auto makeup capability has been lost
2. have NOT

Question: 12
(1 point)

Given the following:

- Unit 1 is at 100% RTP
- The 125 VDC/120 VAC Auxiliary Control Power System is in normal alignment
- The supply breaker from 1CDA to Static Inverter 1KXIA trips open

Alternate power to 1KXPA will be _____(1)_____ aligned.

The crew can verify 1KXPA is energized by observing that _____(2)_____ .

A. 1. manually
2. NC pump vibration monitor is IN SERVICE

B. 1. automatically
2. NC pump vibration monitor is IN SERVICE

C. 1. manually
2. individual P-11 Channel 1 status light on 1SI-7 is LIT

D. 1. automatically
2. individual P-11 Channel 1 status light on 1SI-7 is LIT

Question: 13
(1 point)

Given the following:

- Units 1 & 2 are at 100% RTP
- 1A RN pump is in service
- 1A and 2A KC trains are in service

Subsequently:

- The following Unit 1 annunciators are lit
    - o 1AD-12 B/2 “RN PIT A Screen Hi D/P”
    - o 1AD-12 B/1 “RN Pump Intake Pit A Level – LO”
    - o 1AD-12 E/2 “RN Pit A Swap to SNSWP”
- The crew has entered AP/0/A/5500/020 (Loss of Nuclear Service Water), Case II (Loss of RN Pit Level)

Enclosure 2 (RN Valve Alignment for RN Swap to SNSWP) will direct the BOP to ensure _____(1)_____ is closed .

Following system stabilization, the BOP is directed to “Ensure KC Hx Outlet Mode Switches – Properly Aligned”. In response, the BOP _____(2)_____ required to reposition 1RN-291 (KC Hx 1A Outlet Throttle Valve) from its original alignment.

A. 1. 1RN-47A (RN Supply X-Over Isol)
 2. is

B. 1. 1RN-47A (RN Supply X-Over Isol)
 2. is NOT

C. 1. 1RN-48B (RN Supply X-Over Isol)
 2. is

D. 1. 1RN-48B (RN Supply X-Over Isol)
 2. is NOT

Question: 14
(1 point)

Given the following:

- Both units are at 100% RTP
- VI pressure is decreasing
- The crew has entered AP/0/A/5500/022 (Loss of Instrument Air)

In accordance with AP/22, an operator will be dispatched to align air cylinders to operating compressors if VI pressure decreases below a MAXIMUM of _____(1)_____ in order to _____(2)_____ .

A. 1. 60 psig
2. provide a backup VI supply

B. 1. 60 psig
2. prevent compressor damage

C. 1. 76 psig
2. provide a backup VI supply

D. 1. 76 psig
2. prevent compressor damage

Question: 15
(1 point)

Given the following:

- Unit 1 is at 100% RTP
- Operators are controlling the Main Generator Voltage Regulator in MANUAL
- An electrical grid disturbance results in the Main Generator operating with a power factor of 0.8 lagging

The concern with operating the Main Generator at a 0.8 lagging power factor is overheating of the generator _____(1)_____ .

If the OATC depresses the Voltage Adjust “RAISE” pushbutton, power factor will become _____(2)_____ lagging.

REFERENCE PROVIDED

A. 1. core end
   2. more

B. 1. field windings
   2. more

C. 1. core end
   2. less

D. 1. field windings
   2. less

Question: 16
(1 point)

Given the following:

- EP/1/A/5000/ECA-1.2 (LOCA Outside Containment) has been entered following an event

Containment Phase A Isolation _____(1)_____ automatically occurred.

In accordance with ECA-1.2, the parameter used to verify that the LOCA has been isolated is _____(2)_____ .

A. 1. has NOT
2. pressurizer level

B. 1. has NOT
2. NC pressure

C. 1. has
2. pressurizer level

D. 1. has
2. NC pressure

Question: 17
(1 point)

Given the following:

- Unit 1 has experienced a Safety Injection due to Hi Containment Pressure
- Containment pressure peaked at 2.7 psig and is now slowly decreasing
- The crew has implemented EP/1/A/5000/FR-H.1 (Response to Loss of Secondary Heat Sink)
- All attempts to restore CA flow have been unsuccessful

In accordance with FR-H.1:

The NEXT source of feed water attempted for restoration of flow to the S/Gs is through the CM/CF system using _____(1)_____ .

The crew will be required to establish bleed and feed when W/R level in at least 3 S/Gs is less than a MAXIMUM level of _____(2)_____ .

A. 1. either Main Feed Water pump
   2. 24%

B. 1. either Main Feed Water pump
   2. 36%

C. 1. Hotwell and Booster pumps
   2. 24%

D. 1. Hotwell and Booster pumps
   2. 36%

Question: 18
(1 point)

Which of the following is a complete list of the reasons for the reactor operator performing a controlled depressurization of the Steam Generators (SGs) during the performance of EP/1/A/5000/ECA-1.1, (Loss of Emergency Coolant Recirculation)?

List of Reasons

1. Minimize NC dilution potential in case of a subsequent tube rupture
2. To establish conditions for injection of the Cold Leg accumulators
3. Minimize reactor coolant flow from the LOCA
4. To establish conditions for ND system operation

A. 1 and 2 ONLY

B. 3 and 4 ONLY

C. 1, 2, and 3 ONLY

D. 2, 3, and 4 ONLY

Question: 19
(1 point)

Given the following:

- The crew is responding to a continuous rod withdrawal on Unit 1 per AP/1/A/5500/015 Case 2, Continuous Rod Motion
- Control rods have been placed in manual and rod motion has stopped
- Boron is being added with 1A boric acid transfer pump to return Tavg to Tref

Subsequently:

- 1ETA experiences a loss of power
- The blackout sequencer re-energized 1ETA

Which choice states the <u>minimum</u> action(s), if any, required to be completed before the operator can secure the 1A boric acid transfer pump using its control switch?

A. Reset the 1A diesel generator sequencer and then reset the 1A boric acid transfer pump

B. Reset the 1A diesel generator sequencer

C. Reset the 1A boric acid transfer pump

D. No additional actions are required

Question: 20
(1 point)

In accordance with SLC 16.9-19 (Refueling Operations – Manipulator Crane), the overload cutoff limit for the Reactor Building Manipulator crane is required to be less than or equal to _____(1)_____ pounds.

The reason for the manipulator crane overload limits is to prevent damage to the _____(2)_____ .

A. 1. 2900
   2. Core Internals

B. 1. 3250
   2. Core Internals

C. 1. 2900
   2. Refueling Bridge

D. 1. 3250
   2. Refueling Bridge

Question: 21
(1 point)

Given the following:

- A Steam Generator Tube Leak has occurred on Unit 2
- All NC pumps are running
- The crew is preparing to depressurize the NC system to minimize subcooling

Which of the following sets of operating conditions will result in the LEAST Primary-to-Secondary leakage?

	NCS Temperature	NCS Pressure
A.	504°F	770 PSIG
B.	512°F	826 PSIG
C.	516°F	855 PSIG
D.	524°F	885 PSIG

Question: 22
(1 point)

Given the following:

- Unit 2 is at 50% Power.
- The crew enters AP/2/A/5500/023 (Loss of Main Condenser Vacuum) due to decreasing vacuum.

The following conditions are noted:

Time	1257	1258	1259	1300
A Cond. Vacuum	23.2”	22.0”	21.7”	21.5”
B Cond. Vacuum	24.0”	22.6”	21.9”	21.7”
C Cond. Vacuum	24.3”	22.9”	22.3”	22.0”

Based upon the above information, which of the following describes:

1) The latest time the crew must take action(s) PRIOR to exceeding the turbine trip setpoint?

2) The action(s) the crew must take?

A.
1. 1258
2. Trip the Turbine and Reactor

B.
1. 1258
2. Trip the Turbine ONLY

C.
1. 1259
2. Trip the Turbine and Reactor

D.
1. 1259
2. Trip the Turbine ONLY

Question: 23
(1 point)

Given the following:

- The Control Room has been evacuated due to toxic gas

Following Control Room evacuation, per AP/1/A/5500/017 (Loss of Control Room), which of the following completes the statements below?

Reactor shutdown condition can be verified by monitoring of _____(1)_____ .

Shutdown margin will be maintained by use of the _____(2)_____ .

A. 1. Source Range instrumentation
   2. Standby Makeup Pump

B. 1. Source Range instrumentation
   2. Boric Acid Transfer Pumps

C. 1. Wide Range Neutron instrumentation
   2. Standby Makeup Pump

D. 1. Wide Range Neutron instrumentation
   2. Boric Acid Transfer Pumps

Question: 24
(1 point)

In accordance with AP/1/A/5500/018, (High Activity in Reactor Coolant) which of the following is a complete list of EMFs used to validate High Reactor Coolant Activity?

1. 1EMF-18 (NC Filter 1A)
2. 1EMF-48 (NC Sample Line Reactor Coolant)
3. 1EMF-39 (Containment Gas Hi Rad)

A. 1 ONLY

B. 2 and 3 ONLY

C. 1 and 2 ONLY

D. 1, 2, and 3

Question: 25
(1 point)

In accordance with EP/1/A/5000/ES-1.2 (Post LOCA Cooldown And Depressurization):

The crew will <u>FIRST</u> attempt to establish an NC system cooldown using the _____(1)_____ .

The crew will cooldown _____(2)_____ .

A. 1. SM PORVs
   2. as close as possible without exceeding 100°F in an hour

B. 1. SM PORVs
   2. at the maximum rate

C. 1. Condenser Dumps
   2. as close as possible without exceeding 100°F in an hour

D. 1. Condenser Dumps
   2. at the maximum rate

Question: 26
(1 point)

Given the following:

- Following an event, equipment failures have resulted in a RED condition on the NC Integrity CSF Status Tree.
- NC Cooldown rate was approximately 220°F per hour
- NC System temperature is currently 240°F
- The crew is performing a soak in accordance with EP/1/A/5000/FR-P.1 (Response to Imminent Pressurized Thermal Shock Condition).

Which of the following actions is permitted by FR-P.1 during the soak?

A. Energize PZR heaters

B. Start an additional NV Pump

C. Place Auxiliary Spray in service

D. Initiate a cooldown at less than 50°F per hour

Question: 27
(1 point)

Given the following:

- Unit 1 has experienced an event
- Containment pressure is 2.8 psig
- Containment radiation is indicating 30 R/Hr
- Containment sump level is 17 feet

Entry requirements for _____(1)_____ are currently met.

TS 3.3.3 (Post-Accident Monitoring Instrumentation) requires operability of _____(2)_____ .

A. 1. EP/1/A/5000/FR-Z.2 (Response to Containment Flooding)
   2. Containment Radiation Instruments ONLY

B. 1. EP/1/A/5000/FR-Z.2 (Response to Containment Flooding)
   2. Containment Radiation AND Containment Sump Water Level Instruments

C. 1. EP/1/A/5000/FR-Z.3 (Response to High Containment Radiation Level)
   2. Containment Radiation Instruments ONLY

D. 1. EP/1/A/5000/FR-Z.3 (Response to High Containment Radiation Level)
   2. Containment Radiation AND Containment Sump Water Level Instruments

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Question: 28
(1 point)

Which of the following alarms would confirm a failure of a #2 NCP seal?

1A NCP Standpipe _____(1)_____ level alarm.

1A NCP #1 Seal Leakoff _____(2)_____ flow alarm.

A. 1. High
2. High

B. 1. High
2. Low

C. 1. Low
2. High

D. 1. Low
2. Low

Question: 29
(1 point)

Given the following:

- A malfunction of 1NV-224 (H2 Sup to VCT Press Reg Vlv) has isolated the VCT Hydrogen supply
- VCT Purge is in progress
- 1AD-7 H/2 (VCT HI/LO Pressure) is in alarm

As VCT pressure decreases, NCP #1 Seal leakoff flow will _____(1)_____ .

The Annunciator Response Procedure for 1AD-7 H/2 will direct Chemistry to _____(2)_____ .

A. 1. decrease
   2. secure VCT purge

B. 1. decrease
   2. increase primary sample frequency

C. 1. increase
   2. secure VCT purge

D. 1. increase
   2. increase primary sample frequency

Question: 30
(1 point)

The 1A Boric Acid Transfer Pump receives power from __________ .

A. SMXG

B. 1EMXA

C. 1EMXG

D. 1MXW

Question: 31
(1 point)

Given the following:

- The Unit 1 NC system is currently SOLID in Mode 5
- 1A ND is in service
- 1B ND is secured
- ND Letdown is in service
- The BOP has been directed to perform a 10ºF heatup

To commence heatup, the BOP will manually operate _____(1)_____ .

In order to prevent exceeding LTOP limits during the heatup, the BOP will throttle 1NV-135 (ND Flow to Letdown HX) in the _____(2)_____ direction.

A. 1. 1ND-26 (ND HX 1A Outlet CTRL)
   2. open

B. 1. 1ND-26 (ND HX 1A Outlet CTRL)
   2. closed

C. 1. 1ND-27 (ND HX 1A Bypass CTRL)
   2. open

D. 1. 1ND-27 (ND HX 1A Bypass CTRL)
   2. closed

Question: 32
(1 point)

Given the following:

- The crew is performing EP/1/A/5000/E-3 (Steam Generator Tube Rupture) following a Unit 1 event
  - o 1B S/G has been isolated per EP/1/A/5000/E-3
  - o A plant cooldown has been initiated
  - o The crew is preparing to depressurize the NC system
  - o **ALL NC pumps are in service**

During NC cooldown, 1B NC Hot Leg Temperature (T_{hot}) will be _____(1)_____ 1C NC Hot Leg (T_{hot}) Temperature.

During NC depressurization 1NC-27 (PZR Spray Ctrl Frm Loop A) will be _____(2)_____ effective than 1NC-29 (PZR Spray Ctrl Frm Loop B)

A. 1. equal to
   2. less

B. 1. higher than
   2. less

C. 1. equal to
   2. more

D. 1. higher than
   2. more

Question: 33
(1 point)

Given the following:

- Unit 1 is in the process of drawing a bubble in the Pressurizer
- The following step is taken from OP/1/A/6100/001 (Controlling Procedure For Unit Startup) following actions to vent Nitrogen from the PZR as the bubble is formed:

_____ 3.44.4 **WHEN** N_2 venting is complete, open a PZR PORV for 15 seconds to ensure pure steam exists in the PZR steam space, then close the PZR PORV.

In order to determine when Nitrogen venting is complete, the operators will verify _____(1)_____ .

If necessary to lower PRT pressure following this evolution, PRT level will be decreased by draining to the _____(2)_____ .

A. 1. PRT temperature equalizes with PZR steam space temperature
   2. Reactor Coolant Drain Tank

B. 1. PRT temperature equalizes with PZR steam space temperature
   2. Containment Floor and Equipment Sump

C. 1. PRT level increases without a corresponding PRT pressure increase
   2. Reactor Coolant Drain Tank

D. 1. PRT level increases without a corresponding PRT pressure increase
   2. Containment Floor and Equipment Sump

Question: 34
(1 point)

Given the following:

- A Unit 1 event has occurred
- Containment pressure peaked at 3.2 psig

The non-essential KC headers were automatically isolated by the _____(1)_____ signal.

Based on this alignment, Spent Fuel Pool temperature will _____(2)_____ .

A. 1. Phase A
   2. increase

B. 1. Phase A
   2. decrease

C. 1. Phase B
   2. increase

D. 1. Phase B
   2. decrease

Question: 35
(1 point)

Given the following:

- Unit 1 is at 100% RTP
- A slight cooldown of the NC system causes the "C" PZR heaters to be full "on"
- A malfunction of two PZR pressure transmitters causes an Alternate Action to occur on the Pressurizer Pressure Control System

Assuming NO operator actions:

The PZR Pressure Master will be in _____(1)_____ control

AND

“C” Heaters _____(2)_____ be energized.

A. 1. Manual
2. will

B. 1. Manual
2. will NOT

C. 1. Automatic
2. will

D. 1. Automatic
2. will NOT

Question: 36
(1 point)

Given the following:

- Unit 2 is at 100% RTP
- 2B Pressurizer heaters are manually energized to promote mixing following unit start-up
- All plant parameters are at equilibrium
- A fault causes breaker 2LXH-6C (2B NC PZR Heater Power Panel PHP2B Feeder) to OPEN.

1) How will the output of the pressurizer master control change?

2) What is the system's response to the loss of heat input?

A.
1. Increase
2. Pressurizer Spray Valves will close prior to "A" & "D" Pressurizer Heaters energizing

B.
1. Decrease
2. Pressurizer Spray Valves will close prior to "A" & "D" Pressurizer Heaters energizing

C.
1. Increase
2. "A" & "D" Pressurizer Heaters will energize prior to Pressurizer Spray Valves closing

D.
1. Decrease
2. "A" & "D" Pressurizer Heaters will energize prior to Pressurizer Spray Valves closing

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Question: 37
(1 point)

Which of the following describes the impact on the Reactor Protection System for a loss of 125 VDC Panelboard 1EPA or 1EPD?

A. SSPS Logic Bay has lost one of two power supplies

B. SSPS Output Bay has lost one of two power supplies

C. The associated Reactor Trip Breaker cannot be opened by the UV trip

D. The associated Reactor Trip Breaker cannot be opened by the Shunt trip

Question: 38
(1 point)

Which of the following describes features of the Engineered Safety Features Actuation System (ESFAS) which are designed to prevent spurious actuations?

A loss of a MAXIMUM of _____(1)_____ Vital I&C channel(s) will NOT result in an actuation.

Hi Containment Pressure Safety Injection signal logic requires _____(2)_____ channels above setpoint for actuation.

A. 1. one
2. 2 of 3

B. 1. one
2. 2 of 4

C. 1. two
2. 2 of 3

D. 1. two
2. 2 of 4

Question: 39
(1 point)

Given the following:

- An accident has occurred on Unit 1

The Containment Air Return Fans will start _____(1)_____ following receipt of an Sp signal.

In order to open, Containment Air Return Dampers require differential pressure to be less than or equal to a MAXIMUM of _____(2)_____ .

A. 1. 10 seconds
   2. 0.5 psid

B. 1. 10 seconds
   2. 0.9 psid

C. 1. 9 minutes
   2. 0.5 psid

D. 1. 9 minutes
   2. 0.9 psid

Question: 40
(1 point)

Under normal conditions, Containment Ventilation Units are cooled by the _____(1)_____ system.

Containment Ventilation cooling water supply is isolated by a _____(2)_____ signal.

A.
1. YV
2. Phase A

B.
1. YV
2. Phase B

C.
1. RN
2. Phase A

D.
1. RN
2. Phase B

Question: 41
(1 point)

Given the following:

- A Unit 1 event has occurred
- NC System pressure is 1940 PSIG and lowering slowly
- Containment pressure is 2.3 PSIG and rising slowly

NF (ICE CONDENSER) system valve(s) ______ will receive a signal to CLOSE.

COMPONENT LEGEND:

1NF-228A (Glycol Sup Cont Isol Otsd)
1NF-233B (Glycol Ret Cont Isol)
1NF-234A (Glycol Ret Cont Isol)

A. 1NF-233B ONLY

B. 1NF-228A and 1NF-233B ONLY

C. 1NF-228A and 1NF-234A ONLY

D. 1NF-228A, 1NF-233B and 1NF-234A

Question: 42
(1 point)

The bistables required to permit Containment Spray Pump operation will _____(1)_____ to actuate. Once started, the NS pumps will secure on decreasing containment pressure at _____(2)_____ .

A. 1. energize
2. 0.9 psig

B. 1. energize
2. 0.35 psig

C. 1. de-energize
2. 0.9 psig

D. 1. de-energize
2. 0.35 psig

Question: 43
(1 point)

Given the following:

- A Unit 1 reactor trip has occurred due to a secondary system malfunction
- EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) has been performed and a transition has been made to EP/1/A/5000/ES-0.1 (Reactor Trip Response)
- The crew has entered EP/1/A/5000/FR-H.2 (Response to Steam Generator Overpressure)
- The crew is preparing to dump steam from the affected S/G

FR-H.2 will only allow steam release from the affected S/G if NR level is less than a MAXIMUM of _____(1)_____ .

If the maximum level has been exceeded, an evaluation must be performed prior to release due to the potential effects of _____(2)_____ .

A. 1. 83%
   2. steamline water hammer

B. 1. 92%
   2. steamline water hammer

C. 1. 83%
   2. condenser tube damage

D. 1. 92%
   2. condenser tube damage

Question: 44
(1 point)

Given the following:

- Unit 2 is at 100% RTP

Subsequently:

- 2A CFPT tripped
- All S/G levels remain within a 48%-52% band for the 30 seconds following the CFPT trip

If reactor power was greater than a MINIMUM of _____(1)_____ prior to the event, S/G level control setpoints will change to a lower specific value for a period of _____(2)_____ prior to ramping back to the normal programmed value.

A. 1. 56%
2. 6 minutes

B. 1. 65%
2. 6 minutes

C. 1. 56%
2. 10 minutes

D. 1. 65%
2. 10 minutes

Question: 45
(1 point)

Given the following:

- Unit 1 is at 100% RTP

The Steam Generator Water Level Control system will automatically runback CFPTs at 3% per minute if _____(1)_____ until the condition is cleared.

In order to ensure 1B CFPT assumes MORE load than 1A, “CFPT BIAS” must be adjusted _____(2)_____ than 0%

A.
1. CFPT speed exceeds 6226 rpm
2. greater

B.
1. CFPT speed exceeds 6226 rpm
2. less

C.
1. CF Header Pressure exceeds 1300 psig
2. greater

D.
1. CF Header Pressure exceeds 1300 psig
2. less

Question: 46
(1 point)

Given the following:

- A Unit 1 event has occurred
- Containment pressure 4.5 psig
- No Containment EMFs are in alarm
- The crew has entered EP/1/A/5000/E-0 (Reactor Trip or Safety Injection)

S/G	1A	1B	1C	1D
NR Level	28% increasing	26% increasing	9% decreasing	24% increasing
CA Flow	225 gpm	200 gpm	250 gpm	150 gpm

Prior to being given specific S/G level control guidance by the CRS, the OATC can reduce feed flow to non-faulted S/Gs when level reaches _____(1)_____ .

Following completion of Enclosure 1 (Foldout Page) actions, S/G _____(2)_____ will be receiving the highest CA flow rate.

A. 1. 29%
2. 1A

B. 1. 29%
2. 1D

C. 1. 39%
2. 1A

D. 1. 39%
2. 1D

Question: 47
(1 point)

Which of the following describes how the concern for potential feed line voiding and water hammer in the discharge piping of the CA pumps is addressed?

If a _____(1)_____ condition exists, an OAC alarm is generated.

To mitigate this condition, the operators will _____(2)_____ .

A. 1. high pressure
   2. run the CA pump to flush and reseat the CA pump discharge check valve

B. 1. high temperature
   2. run the CA pump to flush and reseat the CA pump discharge check valve

C. 1. high temperature
   2. operate 1CF-105 (S/G Tempering Flow Supply Throttle) to increase tempering flow

D. 1. high pressure
   2. operate 1CF-105 (S/G Tempering Flow Supply Throttle) to increase tempering flow

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Question: 48
(1 point)

Given the following:

- Unit 1 is at 100% RTP
- Battery Charger 1ECC needs to be removed from service for maintenance
- Standby Charger 1ECS will be aligned to supply Distribution Center 1EDC

In accordance with OP/1/A/6350/008 (125V/120VAC Vital Instrument and Control Power System), 1ECS must be powered from _____(1)_____ . This power supply alignment is required in Modes _____(2)_____ .

A. 1. 1EMXA
2. 1 - 4

B. 1. 1EMXA
2. 1 - 6

C. 1. 1EMXJ
2. 1 – 4

D. 1. 1EMXJ
2. 1 - 6

Question: 49
(1 point)

Given the following:

- Unit 2 is in Mode 4 performing a cooldown for refueling
- Train 2A ND is in service
- ND flow is stable at 3400 gpm

Which of the following describes:

1) the effect on NC cooldown rate of losing power to Vital DC Bus 2EPA;

AND

2) what action the operator will take to restore the desired cooldown rate per AP/2/A/5500/029 (Loss of Vital or Aux Control Power)?

A.
1. Rate INCREASES
2. Manually adjust setpoint of 2ND-26 (ND HX 2A OUTLET CTRL)

B.
1. Rate DECREASES
2. Place PWR DISCON FOR 2NI-173A switch to THROT and manually control 2NI-173A

C.
1. Rate INCREASES
2. Place PWR DISCON FOR 2NI-173A switch to THROT and manually control 2NI-173A

D.
1. Rate DECREASES
2. Manually adjust setpoint of 2ND-26 (ND HX 2A OUTLET CTRL)

Question: 50
(1 point)

Given the following:

- Unit 1 is at 100% RTP

Subsequently:

- A Blackout of 1ETA occurs
- While loading, the Accelerated Sequence halts at Load Group 2

Assuming D/G voltage and speed permissives are met, the <u>Accelerated Sequence</u> _____(1)_____ re-initiate once the <u>Committed Sequence</u> completes Load Group 2.

Following completion of all Load Groups, the sequencer _____(2)_____ need to be reset in order to start the 1A KF Pump.

A. 1. will
2. does

B. 1. will
2. does NOT

C. 1. will NOT
2. does

D. 1. will NOT
2. does NOT

Question: 51
(1 point)

Concerning the operation of 1EMF-46A (Component Cooling Water):

When a Trip 2 alarm is received, 1KC-122 (KC Surge Tank Vent) _____________ automatically close.

When the associated KC train pumps are NOT running, the EMF loss of flow alarm ________________ blocked from being received in the control room.

A. 1. will
   2. is

B. 1. will
   2. is NOT

C. 1. will NOT
   2. is

D. 1. will NOT
   2. is NOT

Question: 52
(1 point)

Per EP/1/A/5000/ES-1.3 (Transfer to Cold Leg Recirculation), Enclosure 2 (Aligning NS for Recirculation), in order to provide cooling to the Containment Spray (NS) Heat Exchanger, the operator will align _____(1)_____ at a flowrate less than the MAXIMUM of _____(2)_____.

A. 1. RN
2. 5000 gpm

B. 1. RN
2. 4650 gpm

C. 1. KC
2. 5000 gpm

D. 1. KC
2. 4650 gpm

Question: 53
(1 point)

Given the following:

- The BOP is currently performing actions of EP/1/A/5000/ES-1.3 (Transfer to Cold Leg Recirculation), Enclosure 2 (Aligning NS for Recirculation)
- Containment pressure is 6 psig
- Containment sump level is 5 feet

Upon opening 1NS-18A (NS Pump A Suct From Cont Sump), Containment Integrity status will change to _____(1)_____ .

In order to return Containment Integrity status to a "Yellow" condition, the BOP will be required to _____(2)_____ .

A. 1. red
2. start 1A NS pump ONLY

B. 1. orange
2. start 1A NS pump ONLY

C. 1. red
2. start 1A NS pump and align 1A NS HX cooling water flow

D. 1. orange
2. start 1A NS pump and align 1A NS HX cooling water flow

Question: 54
(1 point)

Given the following:

- Unit 1 and 2 are operating at 100% RTP
- AP/0/A/5500/022 (Loss of Instrument Air) has been entered due to decreasing VI header pressure
- Attempts to restore VI pressure have been unsuccessful

Subsequently:

- Both units are tripped per direction of AP/22
- VI Pressure continues to decrease

Per OMP 1-7 (Emergency/Abnormal Procedure Implementation Guidelines), the actions of AP/22 will be continued _____(1)_____ .

As VI pressure decreases, AP/22 will FIRST dispatch operators to manually control _____(2)_____ .

Procedure Legend:
EP/1(2)/A/5000/E-0 (Reactor Trip or Safety Injection)
EP/1(2)/A/5000/ES-0.1 (Reactor Trip Response)

A. 1. following actions to control key plant parameters in ES-0.1
2. CA feed flow

B. 1. following actions to control key plant parameters in ES-0.1
2. NV charging flow

C. 1. IMMEDIATELY following completion of Immediate Actions in E-0
2. CA feed flow

D. 1. IMMEDIATELY following completion of Immediate Actions in E-0
2. NV charging flow

Question: 55
(1 point)

Given the following:

- A Unit 1 event has occurred
- Containment pressure is 3.8 psig and slowly decreasing
- SI has not been reset
- Containment isolation signals have not been reset

In order to re-establish Instrument Air to Containment:

Safety Injection _____(1)_____ required to be RESET.

Phase “B” _____(2)_____ required to be RESET.

A. 1. is
2. is

B. 1. is
2. is NOT

C. 1. is NOT
2. is

D. 1. is NOT
2. is NOT

Question: 56
(1 point)

Given the following:

- Unit 1 is at 50% RTP
- Control Rod Bank Select Switch is in "Auto"
- Control Bank "D" is at 195 steps withdrawn

Subsequently:

- STIP-1 (Selected Turbine Impulse Pressure Input to Reactor Control System) fails to the 100% value

Assuming no operator action, Control Bank "D" will __________ .

A. withdraw 5 steps

B. withdraw 36 steps

C. remain at 195 steps

D. withdraw until Reactor Power reaches 103%

Question: 57
(1 point)

Given the following:

- Unit 1 tripped from 100% RTP due to a loss of Offsite Power.
- The crew has transitioned to EP/1/A/5000/ES-0.3 (Natural Circulation Cooldown With Steam Void In Vessel) due to void formation in the Vessel Head
- All PZR Heaters are OFF

Under these conditions, if charging flow is greater than letdown flow, PZR level will _____(1)_____ .

Vessel UR Level must be maintained greater than 68% in order prevent _____(2)_____ .

A. 1. decrease
2. fuel uncovery

B. 1. decrease
2. void entry into hot legs

C. 1. increase
2. fuel uncovery

D. 1. increase
2. void entry into hot legs

Question: 58
(1 point)

Given the following:

- Unit 1 is at 100% RTP

Consider each statement separately

If AFD exceeds specified limits, the OATC will be notified by an alarm on the _____(1)_____ .

If the AFD monitor function is not available, T.S. 3.2.3 (Axial Flux Difference) requires _____(2)_____ .

A. 1. Operator Aid Computer
   2. a power reduction to <50%

B. 1. Operator Aid Computer
   2. manual logging of % delta flux

C. 1. Detector Current Comparator
   2. a power reduction to <50%

D. 1. Detector Current Comparator
   2. manual logging of % delta flux

Question: 59
(1 point)

Containment Hydrogen Recombiners receive power from a(n) _____(1)_____ Motor Control Center.

Containment Hydrogen Recombiners should not be placed in service if Containment Hydrogen concentration is greater than or equal to a MAXIMUM of _____(2)_____ .

A. 1. unit
2. 4%

B. 1. unit
2. 6%

C. 1. essential
2. 4%

D. 1. essential
2. 6%

Question: 60
(1 point)

Given the following:

- Unit 1 has tripped from 100% power
- 1A Rx Trip Breaker is OPEN
- 1B Rx Trip Breaker is CLOSED

The MAXIMUM NC temperature at which all Steam Dumps will be fully closed is _____(1)_____ degrees F.

Atmospheric Dumps _____(2)_____ operate following the Reactor Trip.

A. 1. 557
2. will

B. 1. 557
2. will NOT

C. 1. 560
2. will

D. 1. 560
2. will NOT

Question: 61
(1 point)

Given the following:

- Unit 1 is at 100% power.
- Generator Breaker 1A spuriously opens.
- The ONLY annunciator associated with the Turbine or Generator that alarms is:
  - 1AD-11, F/1, GEN BKR B OVERCURRENT

Which of the following describes:

1) another annunciator which SHOULD have alarmed;

AND

2) a manual action required for mitigating these conditions?

A. 1. 1AD-1, F/4, TURB RUNBACK INITIATED
   2. Manually initiate a turbine runback to 48%

B. 1. 1AD-1, F/4, TURB RUNBACK INITIATED
   2. Manually trip Generator Breaker 1B

C. 1. 1AD-11, F/7, GEN BKR B TROUBLE
   2. Manually initiate a turbine runback to 48%

D. 1. 1AD-11, F/7, GEN BKR B TROUBLE
   2. Manually trip Generator Breaker 1B

Question: 62
(1 point)

Given the following:

- Unit 1 is at 100% RTP
- A S/G tube leak has developed

If 1EMF-33 exceeds the _____(1)_____ setpoint, the BOP will ensure the _____(2)_____ system AUTOMATICALLY re-aligns (assuming NO operator action).

A.
1. Trip 1
2. S/G Blowdown (BB)

B.
1. Trip 1
2. Condenser Offgas (ZJ)

C.
1. Trip 2
2. S/G Blowdown (BB)

D.
1. Trip 2
2. Condenser Offgas (ZJ)

Question: 63
(1 point)

Given the following:

- The Condensate System is aligned for High Pressure Cleanup

Subsequently:

- The 1A CFPT experiences a complete loss of oil pressure due to an LF Pump trip

The windmill protection circuit will send a direct signal to trip the operating _____(1)_____ .

Low CFPT oil pressure will cause the 1A CFPT _____(2)_____ to close.

A. 1. Hotwell Pumps
   2. recirc valve

B. 1. Hotwell Pumps
   2. discharge valve

C. 1. Condensate Booster Pumps
   2. recirc valve

D. 1. Condensate Booster Pumps
   2. discharge valve

Question: 64
(1 point)

Given the following:

- Unit 1 is at 100% RTP
- 1A1 Cont Floor & Equip Sump Pump has automatically started due to normal operational leakage

Subsequently:

- 1EMF-53A (Containment Hi Range) loses power

As a result of this power failure:

1A1 Cont Floor & Equip Sump Pump is _____(1)_____ .

Entry in the action statement of Tech Spec 3.3.3 (Post Accident Monitoring Instrumentation) _____(2)_____ required.

A. 1. ON
2. is

B. 1. ON
2. is NOT

C. 1. OFF
2. is

D. 1. OFF
2. is NOT

Question: 65
(1 point)

Given the following:

- Unit 1 is at 4% RTP following startup
    - o Main Turbine warming is in progress
    - o 1A CFPT is in service
    - o 1B CFPT is Tripped
    - o All S/G levels are 39%
- The crew has entered AP/1/A/5500/023 (Loss of Condenser Vacuum) due to a loss of Condenser Circulating Water (RC) Pumps

Subsequently:

- 1A CFPT trips on low vacuum actuation

The OATC _____(1)_____ required to trip the reactor.

1A and 1B CA pumps _____(2)_____ automatically start.

A. 1. is
2. will

B. 1. is
2. will NOT

C. 1. is NOT
2. will

D. 1. is NOT
2. will NOT

Question: 66
(1 point)

Note the table below from SLC 16.5-3, Chemistry (excerpt).

PARAMETER	STEADY STATE LIMIT	TRANSIENT LIMIT
Dissolved Oxygen	= 0.10 ppm	= 1.00 ppm
Chloride	= 0.15 ppm	= 1.50 ppm
Fluoride	= 0.15 ppm	= 1.50 ppm

1) In accordance with SLC 16.5-3 (Chemistry), Fluoride is a _____(1)_____ chemistry parameter.

2) In accordance with the applicable abnormal operating procedure, if dissolved oxygen were at a value in Action Level 3, a shutdown to Mode 3 would be required in a MAXIMUM of _____(2)_____ hours.

A. 1. Primary
2. 3

B. 1. Primary
2. 24

C. 1. Secondary
2. 3

D. 1. Secondary
2. 24

Question: 67
(1 point)

Given the following:

- Unit 1 is at 100% RTP
- 1AD-7 C/4 “NCP Seal Water Lo Flow” alarms
    - The OAC indicates 1B NCP Seal Injection Flow is 0 gpm

In order to determine that seal water flow to the 1B NCP has been isolated, the BOP would verify an increase in flow on _____(1)_____ .

Following an actual loss of seal injection flow, the BOP _____(2)_____ expect to receive OAC alarm C1A0831 “NC Pump B Lower Brg Water Temp Hi-Hi”.

A. 1. 1NVP5650 (Total Seal Wtr Flow)
   2. will

B. 1. 1NVP5650 (Total Seal Wtr Flow)
   2. will NOT

C. 1. 1NVP5330 (NCP 1A Seal In Flow)
   2. will

D. 1. 1NVP5330 (NCP 1A Seal In Flow)
   2. will NOT

Question: 68
(1 point)

Given the following:

- During an outage, a planned maintenance activity will result in a YELLOW Defense in Depth (DID) sheet configuration.

In accordance with NSD 403 (Shutdown Risk Management):

Defense in Depth (DID) sheets are first initiated once _____(1)_____is reached on a shutdown.

A RISK MANAGEMENT PLAN is _____(2)_____ for a YELLOW risk condition.

A. 1. Mode 3
2. optional

B. 1. Mode 3
2. required

C. 1. Mode 4
2. optional

D. 1. Mode 4
2. required

Question: 69
(1 point)

Given the following:

- Unit 1 is in Mode 3

In accordance with Tech Spec 2.1.2 (RCS Pressure Safety Limit), NC system pressure shall be less than or equal to a MAXIMUM of _____(1)_____ PSIG.

Based on the conditions above, if the NC system Safety Limit is exceeded, NC system pressure must be restored to within limits in a MAXIMUM of _____(2)_____ .

A.
1. 2485
2. 5 minutes

B.
1. 2735
2. 5 minutes

C.
1. 2485
2. 1 hour

D.
1. 2735
2. 1 hour

Question: 70
(1 point)

Given the following:

- Unit 1 is in Mode 6
- A fuel handling accident involving fuel damage occurs
  - o 1EMF-17 (Reactor Building Refueling Bridge) is in alarm

In accordance with AP/1/A/5500/025 (Damaged Spent Fuel), additional radiation monitoring will be provided by _____(1)_____ .

If this radiation monitor reaches Trip 2 setpoint, the Containment Evacuation Alarm _____(2)_____ .

A. 1. 1EMF-53A/B (Containment Train A/B)
   2. will AUTOMATICALLY actuate

B. 1. 1EMF-53A/B (Containment Train A/B)
   2. must be MANUALLY actuated

C. 1. 1EMF-38 (Containment Particulate Monitor)
   2. will AUTOMATICALLY actuate

D. 1. 1EMF-38 (Containment Particulate Monitor)
   2. must be MANUALLY actuated

Question: 71
(1 point)

Given the following:

- Unit 1 is in Mode 3.
- The NV system is being aligned for startup.
- The procedure in use requires independent verification of a single valve located in a room with a general dose rate of 130 mREM/hr.
- Estimated time to independently verify the valve's position is 10 minutes.
- There are no known hot spots in the area.
- There is no airborne activity in this room.
- The room has no surface contamination areas.
- Necessary approvals are obtained.

Per NSD 700 (Verification Techniques), independent verification of the valve above _____(1)_____ be waived because _____(2)_____ .

A. 1. may
2. the general area dose rate is GREATER than 100 mREM/hr

B. 1. may NOT
2. the general area dose rate is LESS THAN 1 REM/hr

C. 1. may
2. the radiation exposure for a single verification would EXCEED the allowable limit

D. 1. may NOT
2. the radiation exposure for a single verification is WITHIN the allowable limit

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Question: 72
(1 point)

Given the following:

- Prior to a Refueling Outage, an Operator's exposure for the current year is 1250 mREM
- The Operator's first assigned task during the Refueling Outage results in a dose of 600 mREM

Based on the conditions above, the next time the Operator logs on to the EDC computer, they will receive an _____(1)_____ notification flag.

In accordance with PD-RP-ALL-001 (RADIATION WORKER RESPONSIBILITIES), the Operator must _____(2)_____ prior to entering the RCA.

A. 1. ALERT
   2. notify their supervisor <u>AND</u> obtain a dose extension

B. 1. EXCLUDE
   2. notify their supervisor <u>AND</u> obtain a dose extension

C. 1. ALERT
   2. notify their supervisor ONLY

D. 1. EXCLUDE
   2. notify their supervisor ONLY

Question: 73
(1 point)

Given the following:

- A large fire was reported at the Operations Training Building

1) Which of the following describes the availability of the Fire Brigade to respond to this fire?
2) Which procedure contains the guidance for requesting offsite fire department support?

A.
1. The fire brigade is not allowed to respond to fires outside the Protected Area
2. AP/0/A/5500/045 (Plant Fire)

B.
1. The fire brigade is not allowed to respond to fires outside the Protected Area
2. RP/0/B/5000/029 (Fire Brigade Response)

C.
1. The fire brigade may respond to fires outside the Protected Area as resources permit
2. AP/0/A/5500/045 (Plant Fire)

D.
1. The fire brigade may respond to fires outside the Protected Area as resources permit
2. RP/0/B/5000/029 (Fire Brigade Response)

Question: 74
(1 point)

Given the following:

- 1A S/G has experienced a Tube Rupture
- The crew has transitioned to EP/1/A/5000/E-3 (Steam Generator Tube Rupture)
- NC pressure is 1650 psig
- The CRS has just read a series of NOTES prior to E-3, Step 10
  "*Initiate NC System cooldown as follows:*"

Once the cooldown is initiated:

the OATC will dump steam while maintaining steam pressure negative rate less than 2 psig per second in order to prevent a _____(1)_____ .

if NC system subcooling is lost, the crew _____(2)_____ secure NC pumps.

A. 1. main steam isolation
   2. will

B. 1. main steam isolation
   2. will NOT

C. 1. S/G lo-lo level actuation
   2. will

D. 1. S/G lo-lo level actuation
   2. will NOT

Question: 75
(1 point)

Given the following:

- A Fire alarm has actuated in the Unit 1 CA Pump Room
- An Operator dispatched to the area reports that there is smoke and some cables with glowing embers but, **NO** visible flames

In accordance with AP/1/A/5500/045 (Plant Fire), this _____(1)_____ classified as an ACTIVE fire.

In accordance with RP/0/B/5000/029 (Fire Brigade Response), in addition to making an announcement on the Fire Brigade Radio and activating the Fire Brigade Pagers, a Plant PA announcement _____(2)_____ required when dispatching the Fire Brigade.

A. 1. is
2. is

B. 1. is
2. is NOT

C. 1. is NOT
2. is

D. 1. is NOT
2. is NOT

Question: 76
(1 point)

Given the following:

- Unit 1 is in Mode 4
- 1A and 1B CA Pumps are aligned for standby readiness
- In service:
  - o 1A ND Pump
  - o 1B NC Pump
- Removed from service per R&R:
  - o 1B ND Pump
  - o 1A, 1C, and 1D NC Pumps

Subsequently:

- 1B NCP Supply Breaker fails
  - o The crew has entered the actions of LCO 3.4.6 (RCS Loops – Mode 4)
- S/G Levels are as follows:

S/G	1A	1B	1C	1D
NR Level	11%	14%	12%	11%

Consider each statement separately

Restoring 1B ND pump _____(1)_____ allow the crew to exit the actions of LCO 3.4.6.

Restoring 1A NC pump _____(2)_____ allow the crew to exit the actions of LCO 3.4.6.

A. 1. will
2. will

B. 1. will
2. will NOT

C. 1. will NOT
2. will

D. 1. will NOT
2. will NOT

Question: 77
(1 point)

Given the following:

- Unit 1 was at 100% RTP when the Main Turbine tripped
- Automatic and Manual Reactor Trips have failed
- The crew has entered EP/1/A/5000/FR-S.1 (Response to Nuclear Power Generation/ATWS)
    - Emergency Boration has been initiated

Subsequently:

- The Reactor Trip and Bypass Breakers are opened locally

In order to initiate Emergency Boration, a MINIMUM of _____(1)_____ NV Pump(s) must be in operation.

The crew will transition to EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) following verification that _____(2)_____ .

A.
1. one
2. the reactor is subcritical ONLY

B.
1. two
2. the reactor is subcritical ONLY

C.
1. one
2. SDM is verified per Reactivity Balance Procedure

D.
1. two
2. SDM is verified per Reactivity Balance Procedure

Question: 78
(1 point)

Given the following:

- Unit 1 has experienced a Loss of Offsite Power
- 1B D/G failed to start
- Safety Injection was initiated due to decreasing PZR level following Reactor Trip
- Given the following parameters
    - All CA flow control valves are closed
    - All S/G pressures are approximately 1125 psig and stable
    - 1A S/G NR level is 67% and increasing
    - 1B, 1C, & 1D S/G NR levels are 39% and slowly decreasing
    - NC Subcooling is 8ºF and stable

Which of the following describes the correct classification for this event in accordance with RP/0/A/5000/001 (Classification of Emergency)?

REFERENCE PROVIDED

A. 4.1.S.2

B. 4.1.S.3

C. 4.1.A.1

D. 4.5.A.2

Question: 79
(1 point)

Given the following:

- Unit 1 was at 100% power when a total loss of onsite and offsite power occurred.

(1) Which procedure contains voltage values on essential DC busses (EDA, EDB, EDC, and EDD) requiring essential batteries (EBA, EBB, EBC, EBD) to be removed from service?

(2) After power is restored and the battery chargers are placed in service, in accordance with Tech Spec 3.8.4 (DC Sources – Operating), what is the MINIMUM voltage required for the essential batteries to be OPERABLE?

Procedure Legend:
AP/1/A/5500/007 (Loss of Normal Power)
AP/1/A/5500/029 (Loss of Vital or Aux Control Power)

A. 1. AP/07
   2. 125 volts

B. 1. AP/29
   2. 125 volts

C. 1. AP/07
   2. 110 volts

D. 1. AP/29
   2. 110 volts

Question: 80
(1 point)

Given the following:

- Unit 1 is at 100% RTP
- The TCC has reported that “Real Time Contingency Analysis” (RTCA) indicates INADEQUATE switchyard voltage
- The crew has entered AP/1/A/5500/037 (Generator Voltage and Electric Grid Disturbances)
- Main Generator operating conditions are as follows
    - o Hydrogen Pressure (psig) 73
    - o Generator VARS 750
    - o Generator MW 1200

In accordance with AP/37:

the CRS will direct the OATC to _____(1)_____ .

once required jumpers are placed, both trains of offsite power _____(2)_____ remain inoperable.

REFERENCE PROVIDED

A. 1. decrease turbine load
2. do

B. 1. decrease turbine load
2. do NOT

C. 1. decrease generator voltage
2. do

D. 1. decrease generator voltage
2. do NOT

Question: 81
(1 point)

Given the following:

- A Unit 1 event has occurred from 100% RTP
- NC Pressure is 300 psig
- All S/G Pressures are 700 psig
- Containment sump level is currently 3.4 feet and slowly increasing
- EP/1/A/5000/ES-1.3 (Transfer to Cold Leg Recirculation) has been implemented
- 1NI-185A (ND Pump 1A Cont Sump Suct) AND 1NI-184B (ND Pump 1B Cont Sump Suct) will NOT open

Implementation of _____(1)_____ is required.

The implemented procedure will direct the crew to _____(2)_____ .

Procedure Legend:
EP/1/A/5000/ECA-1.1 (Loss of Emergency Coolant Recirculation)
EP/1/A/5000/ECA-1.3 (Containment Sump Blockage)

A. 1. ECA-1.1
2. depressurize S/Gs to cooldown the NC system

B. 1. ECA-1.1
2. depressurize the NC system to increase SI flow

C. 1. ECA-1.3
2. depressurize S/Gs to cooldown the NC system

D. 1. ECA-1.3
2. depressurize the NC system to increase SI flow

Question: 82
(1 point)

Unit 1 is operating at 98% power. PT/1/A/4600/001 (RCCA Movement Test) is in progress. As Control Bank D was being moved, one control rod in Control Bank D slipped to 120 steps withdrawn and stopped. Below is an incore thermocouple map one minute later.

	R	P	N	M	L	K	J	H	G	F	E	D	C	B	A
1						576		572		576					
2			546		599		611		603		605				
3				605				624				BAD		569	
4			597		602				609				617		
5		602				625				616				614	
6	563		611				611				626		623		568
7		602		606				617				620			
8	561				612		634		572				626		
9		619				611				613				614	
10	548		610				606				613				574
11				627				BAD				610		614	
12			612		599				608				622		
13				620		619				576		626		562	
14			540		628		613		608		614				
15						BAD		622		580					

Rod _____(1)_____ is misaligned.

In order to continue Mode 1 operation, Tech. Spec. 3.1.4 (Rod Group Alignment Limits) will require a power reduction, SDM verification, and completion of _____(2)_____ .

A. 1. D-12
2. $F^N_{\Delta H}(X,Y)$ surveillance ONLY

B. 1. M-4
2. $F^N_{\Delta H}(X,Y)$ surveillance ONLY

C. 1. D-12
2. $F^N_{\Delta H}(X,Y)$ AND $F_Q(X,Y,Z)$ surveillances

D. 1. M-4
2. $F^N_{\Delta H}(X,Y)$ AND $F_Q(X,Y,Z)$ surveillances

Question: 83
(1 point)

Given the following:

- Unit 1 is in Mode 6 offloading fuel
- N-31 and N-32 are in service
- 1A and 1B BDMS are in service

Subsequently:

- Source Range Instrument (N-31) fails

The CRS _____(1)_____ required to enter the action statement of LCO 3.9.2 (Nuclear Instrumentation).

In order to meet the operability requirements of LCO 3.9.2, source range audible indication _____(2)_____ required.

A. 1. is
   2. is

B. 1. is
   2. is NOT

C. 1. is NOT
   2. is

D. 1. is NOT
   2. is NOT

Question: 84
(1 point)

Given the following:

- A Unit 1 event has occurred
- Upon completion of step 2 of ES-1.3, the OATC reports the following Status Indicators / Annunciators:
    - Reactor Coolant Integrity Status is RED
    - 1AD-9 B/6 “ND Trn B To C-Legs Loops A-B Lo Flow” is LIT due to trip of 1B ND Pump

The CRS is required to implement __________ .

Procedure Legend:
EP/1A/5000/ES-1.3 (Transfer to Cold Leg Recirculation)
EP/1A/5000/FR-P.1 (Response to Imminent Pressurized Thermal Shock)
EP/1A/5000/ECA-1.1 (Loss of Emergency Coolant Recirculation)

A. FR-P.1 IMMEDIATELY

B. FR-P.1 at step 8 of ES-1.3

C. ECA-1.1 IMMEDIATELY

D. ECA-1.1 at step 4 of ES-1.3

Question: 85
(1 point)

Given the following:

- Unit 1 was initially at 100% power.
- The reactor tripped due to a spurious turbine trip.
- The crew has performed and exited EP/1/A/5000/E-0, (Reactor Trip or Safety Injection).
- 1B S/G pressure is being maintained at approximately 1210 psig.

The MAXIMUM number of S/G safety relief valves (associated with 1B S/G) that did NOT function as designed is _____(1)_____ .

To mitigate this event, the CRS would enter _____(2)_____ .

Procedure Legend:
EP/1/A/5000/FR-H.2, (Response to Steam Generator Overpressure)
EP/1/A/5000/FR-H.4, (Response to Loss of Normal Steam Release Capabilities)

A. 1. 3
2. FR-H.2

B. 1. 5
2. FR-H.2

C. 1. 3
2. FR-H.4

D. 1. 5
2. FR-H.4

Question: 86
(1 point)

Given the following:

- Unit 1 is at 100% RTP
- Containment Pressure Channel Two has failed low
- All required Tech Spec actions have been completed

Subsequently:

- A faulty Containment Pressure bistable has initiated a Reactor Trip and Safety Injection

The faulty bistable initiating this event was associated with Containment Pressure Channel _____(1)_____ .

The CRS will direct the SI termination sequence per _____(2)_____ .

A. 1. One
   2. EP/1/A/5000/E-0 (Reactor Trip or Safety Injection)

B. 1. One
   2. EP/1/A/5000/ES-1.1 (Safety Injection Termination)

C. 1. Four
   2. EP/1/A/5000/E-0 (Reactor Trip or Safety Injection)

D. 1. Four
   2. EP/1/A/5000/ES-1.1 (Safety Injection Termination)

Question: 87
(1 point)

Given the following:

- The crew has entered EP/1/A/5000/ECA-2.1 (Uncontrolled Depressurization of All Steam Generators) following a Unit 1 event
- All attempts to close MSIVs from the Control Room have failed

Subsequently:

- The crew has reached the step (in ECA-2.1) just prior to verification of S/I termination criteria
- 1A MSIV indicates closed on the main control board
- 1A S/G pressure is slowly increasing

In accordance with ECA-2.1, the crew is required to transition to EP/1/A/5000/E-2 (Faulted Steam Generator Isolation) _____(1)_____ based on indication of _____(2)_____ .

A. 1. immediately
 2. increasing S/G pressure

B. 1. following completion of S/I termination in ECA-2.1
 2. increasing S/G pressure

C. 1. immediately
 2. MSIV closure

D. 1. following completion of S/I termination in ECA-2.1
 2. MSIV closure

Question: 88
(1 point)

Given the following:

- Unit 1 is in Mode 4
- 1A ND train is in RHR
- CA system aligned per T.S. minimum requirements

Subsequently:

- PRT level is increasing
- PZR level is decreasing
- PZR Relief Valve and Safety Valve Temperatures indicate 105 ºF and stable
- AP/1/A/5500/027 (Shutdown LOCA) has been entered

Following completion of applicable steps in AP/27, the CRS will transition to _____(1)_____ .

If needed, additional heat removal capability will be available via operation of _____(2)_____ CA Pump(s).

A. 1. AP/1/A/5500/010 (Reactor Coolant Leak)
   2. one

B. 1. AP/1/A/5500/010 (Reactor Coolant Leak)
   2. two

C. 1. AP/1/A/5500/019 (Loss of Residual Heat Removal System)
   2. one

D. 1. AP/1/A/5500/019 (Loss of Residual Heat Removal System)
   2. two

Question: 89
(1 point)

Given the following:

1000 Both Units are at 100% RTP
1AD-11 E/7 “D/G B Panel Trouble” is received

- Dispatched operator reports B/1 “Low Level Lube Tank” in alarm
- Operator also reports leak at D/G Lube Oil Tank
- The crew enters the actions of LCO 3.8.1 (AC Sources – Operating)

1005 The crew enters OP/0/A/6400/006C, Enclosure 4.11 and then transitions to Enclosure 4.12B

1020 Enclosure 4.12B alignment is completed

At 1005 **Unit 2** _____(1)_____ in LCO 3.7.8 (Nuclear Service Water System), Condition “A” (One NSWS train inoperable).

At 1020 **Unit 2** _____(2)_____ in LCO 3.7.8 (Nuclear Service Water System), Condition “A” (One NSWS train inoperable).

Procedure Legend for OP/0/A/6400/006C (Nuclear Service Water System):
Enclosure 4.11 (Operability Actions With One RN Pump and/or Its Associated D/G Inoperable With Both Units Entering an Action Statement)
Enclosure 4.12B (Alignment For Single Pump Flow Balance Due To One Train B RN Pump and/or Its Associated D/G Inoperable)

A. 1. is
2. is

B. 1. is
2. is NOT

C. 1. is NOT
2. is

D. 1. is NOT
2. is NOT

Question: 90
(1 point)

Given the following:

- The VI system on Unit 1 has become heavily contaminated with oil
- “E” VI Dryer has become clogged
- The crew enters AP/0/A/5500/022 (Loss of Instrument Air)
- Backup VI Compressors CANNOT be started

Subsequently:

- The VI system is restored
- A Temporary Engineering change is required to align alternate air supply to CA Flow Control valves for system oil removal

During performance of AP/22, the CRS FIRST directed operators to verify proper operation of _____(1)_____ as pressure decreased.

The required Temporary Engineering Change _____(2)_____ require a 10CFR50.59 evaluation.

A. 1. 1VI-670 (VI Dryer Auto Bypass)
 2. does

B. 1. 1VI-670 (VI Dryer Auto Bypass)
 2. does NOT

C. 1. 1VI-487 (Skid “E” Purge Exhaust to Atmos)
 2. does

D. 1. 1VI-487 (Skid “E” Purge Exhaust to Atmos)
 2. does NOT

Question: 91
(1 point)

Given the following:

- Unit 1 is at 100% RTP
- 1AD-9 E/1 “Accum Tank A Hi/Lo Press” has alarmed
- The BOP has determined 1A Cold Leg Accumulator Pressure is low

The CRS will direct a Nitrogen makeup to the 1A CLA in order to ensure the T.S. 3.5.1 (Accumulators) MINIMUM required pressure of _____(1)_____ psig is not violated.

A MINIMUM of _____(2)_____ operable CLAs will sufficiently cover the core prior to significant fuel clad melting following a LOCA.

A.
1. 585
2. Three

B.
1. 585
2. Four

C.
1. 678
2. Three

D.
1. 678
2. Four

Question: 92
(1 point)

Given the following:

- Unit 1 is at 100% RTP
- Channel 4 PZR Pressure has failed low
- All required T.S. actions have been completed

Subsequently:

- 1B NC Loop T_{cold} experiences a power supply failure

Channel 2 $OT_{delta}T$ setpoint will _____(1)_____ .

Assuming no other actions are taken, the latest time that Unit 1 will be required to reach Mode 3 is in _____(2)_____ hours.

A. 1. increase
   2. 7

B. 1. decrease
   2. 7

C. 1. increase
   2. 78

D. 1. decrease
   2. 78

Question: 93
(1 point)

Concerning operation of the Reactor Building Manipulator Crane:

In order to prevent dropping a fuel assembly, the load cell must indicate less than _____(1)_____ in order to operate the Gripper.

In accordance with MP/1/A/7150/026 B (Unit 1 Reactor Manipulator Crane Operation), any Interlock bypass, not approved by procedure, requires a MINIMUM of _____(2)_____ .

A. 1. 500 lbs
   2. Fuel Handling SRO approval ONLY

B. 1. 500 lbs
   2. Fuel Handling SRO approval AND CRS notification when bypassed and restored

C. 1. 1200 lbs
   2. Fuel Handling SRO approval ONLY

D. 1. 1200 lbs
   2. Fuel Handling SRO approval AND CRS notification when bypassed and restored

---

Question: 94
(1 point)

Concerning Fuel Handling requirements:

PT/1/A/4550/001C (Refueling Communications Test) is required to be performed within a MAXIMUM of _____(1)_____ of commencing fuel movement.

In order to unlatch Control Rods per MP/0/A/7150/067 (Rod Cluster Control Assembly Drive Rod Latching & Unlatching), the Refueling SRO _____(2)_____ required to be in the Reactor Building.

A. 1. 30 minutes
   2. is

B. 1. 30 minutes
   2. is NOT

C. 1. 1 hour
   2. is

D. 1. 1 hour
   2. is NOT

Question: 95
(1 point)

Given the following:

- Unit 1 is at 100% RTP
- Unit 2 is in Mode 4

In order to meet the MINIMUM requirements of OMP 1-10 (Shift Manning and Overtime Requirements), _____(1)_____ licensed SROs will be onsite at all times.

Per NSD 200 (Work Hour Guidelines and Limits), all hours worked during a declared emergency _____(2)_____ be included in future work hour calculations.

A. 1. 4
   2. will

B. 1. 4
   2. will NOT

C. 1. 5
   2. will

D. 1. 5
   2. will NOT

Question: 96
(1 point)

For high activity in the reactor coolant, to ensure that the requirements of Tech. Spec. 3.4.16, (RCS Specific Activity) are met, the SRO is ALSO required to apply the requirements of AP/1/A/5500/018, (High Activity in Reactor Coolant) for NC System Dose Equivalent _____(1)_____ .

These RCS Specific Activity limits are based on the _____(2)_____ Design Basis Accident.

A. 1. I-131
   2. LOCA outside containment

B. 1. I-131
   2. Steam Generator Tube Rupture

C. 1. Xe-133
   2. LOCA outside containment

D. 1. Xe-133
   2. Steam Generator Tube Rupture

Question: 97
(1 point)

Given the following:

- Unit 1 is in Mode 6
- 1AD-4 B/1 (S/G A Level Deviation) will not illuminate. IAE has Blocked the inputs for outage related activities
- 1AD-9 B/7 (FWST Emerg Lo Temp) will not illuminate. IAE has disconnected the associated transmitter in order to temporarily change the alarm setpoint for an upcoming test

In accordance with OMP 2-31(Control Room Instrumentation Status):

OMP 2-31, Attachment 1 (TMs Affecting Control Room Annunciators) will be used to track the inoperability of _____(1)_____ .

Attachment 1 will be filed in the _____(2)_____ .

A. 1. 1AD-4 B/1
   2. Ops Shift Routine Logbook

B. 1. 1AD-9 B/7
   2. Ops Shift Routine Logbook

C. 1. 1AD-4 B/1
   2. Shift Work Manager Logbook

D. 1. 1AD-9 B/7
   2. Shift Work Manager Logbook

Question: 98
(1 point)

Given the following:

- Unit 1 is in Mode 3 following a refueling outage
- The status of the Personnel Air Locks (PAL) is as follows:
  - o Upper Airlock Inner Door Operable
  - o Upper Airlock Outer Door Operable
  - o Lower Airlock Inner Door Inoperable
  - o Lower Airlock Outer Door Operable
- Repairs required are on the barrel (airlock side of the inner door)

The guidance for Containment entry, to repair the Lower Airlock Door, is contained in _____(1)_____ .

The Lower Airlock Outer Door _____(2)_____ be opened to make the repair.

A. 1. Tech. Spec. 3.6.2, (Containment Air Locks)
   2. may

B. 1. Tech. Spec. 3.6.2, (Containment Air Locks)
   2. may NOT

C. 1. Site Directive 3.1.2, (Access to Reactor Building and Areas Having High Pressure Steam Relief Devices)
   2. may

D. 1. Site Directive 3.1.2, (Access to Reactor Building and Areas Having High Pressure Steam Relief Devices)
   2. may NOT

Question: 99
(1 point)

For a planned release of the contents of a Monitor Tank to the Low Pressure Service Water discharge (RL) via the Nuclear Service Water System (RN), which of the following describes a condition that would PREVENT approval of the release?

A. The pH of the contents is 8.8.

B. A boron release with a boron concentration at 480 ppm

C. Planned release flowrate is 95 gpm

D. RN is aligned to the Standby Nuclear Service Water Pond

Question: 100
(1 point)

Given the following:

- A General Emergency has been declared.
- The TSC, OSC, and EOF have NOT been activated.

In accordance with RP/0/A/5000/005 (TSC Activation Procedure):

The SM/Emergency Coordinator's responsibility of making Protective Action Recommendations _____(1)_____ be delegated.

Turnover of command and control to the TSC or EOF_____(2)_____ relieve the SM of classification, notification, and Protective Action Recommendation (PAR) responsibilities.

A. 1. can
2. does

B. 1. can
2. does NOT

C. 1. can NOT
2. does

D. 1. can NOT
2. does NOT

Examination KEY for: ILT15 CNS SRO NRC Examin

Question Number	Answer
1	C
2	C
3	B
4	C
5	C
6	C
7	C
8	D
9	A
10	C
11	C
12	B
13	D
14	B
15	B
16	D
17	A
18	D
19	A
20	A
21	D
22	B
23	B
24	C
25	C

Examination KEY for: ILT15 CNS SRO NRC Examin

Question Number	Answer
26	C
27	B
28	B
29	C
30	B
31	A
32	C
33	C
34	C
35	A
36	B
37	D
38	A
39	C
40	B
41	D
42	B
43	B
44	D
45	D
46	D
47	B
48	B
49	C
50	B

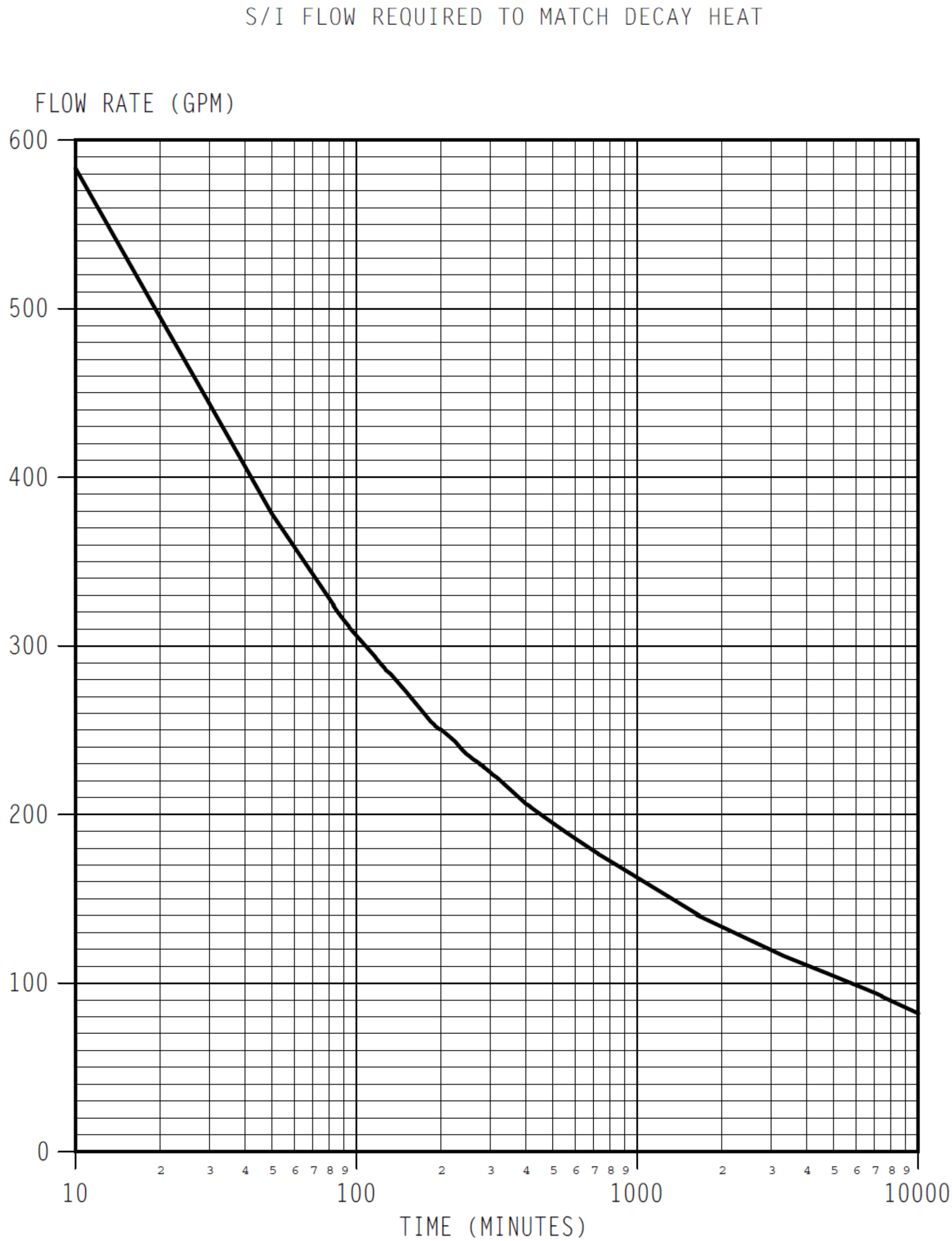
Examination KEY for: ILT15 CNS SRO NRC Examin

Question Number	Answer
51	C
52	B
53	D
54	B
55	C
56	A
57	B
58	B
59	D
60	D
61	A
62	C
63	A
64	D
65	C
66	A
67	D
68	C
69	B
70	C
71	C
72	B
73	D
74	B
75	C

Examination KEY for: ILT15 CNS SRO NRC Examin

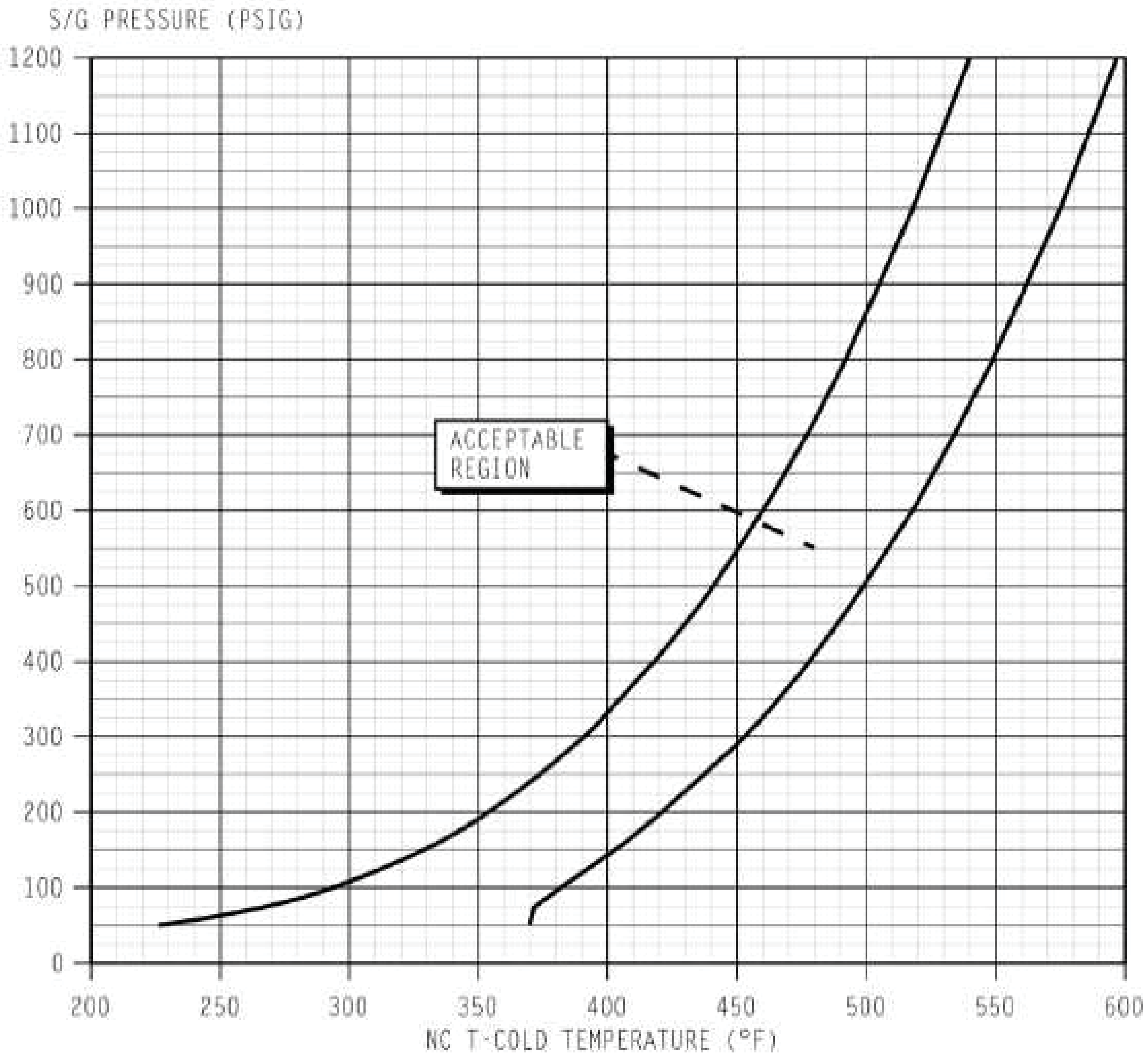
Question Number	*Answer*
76	B
77	A
78	B
79	B
80	C
81	A
82	D
83	D
84	B
85	C
86	C
87	A
88	C
89	B
90	C
91	A
92	A
93	B
94	C
95	C
96	B
97	B
98	A
99	D
100	C

Minimum S/I Flowrate Versus Time After Trip



1. The following conditions support or indicate natural circulation flow:

   - o NC subcooling - GREATER THAN 0°F
   - o S/G pressures - STABLE OR DECREASING
   - o NC T-Hots - STABLE OR DECREASING
   - o Core exit T/Cs - STABLE OR DECREASING
   - o NC T-Colds - AT SATURATION TEMPERATURE FOR S/G PRESSURE (WITHIN THE LIMITS OF THE GRAPH BELOW).



2. <u>IF</u> Natural Circulation flow is not established, <u>THEN</u> increase dumping steam to establish Natural Circulation flow.

Source: CNM-1300.00153, Fig. 17-3, Dwg 435HA148 (Rev. 2)

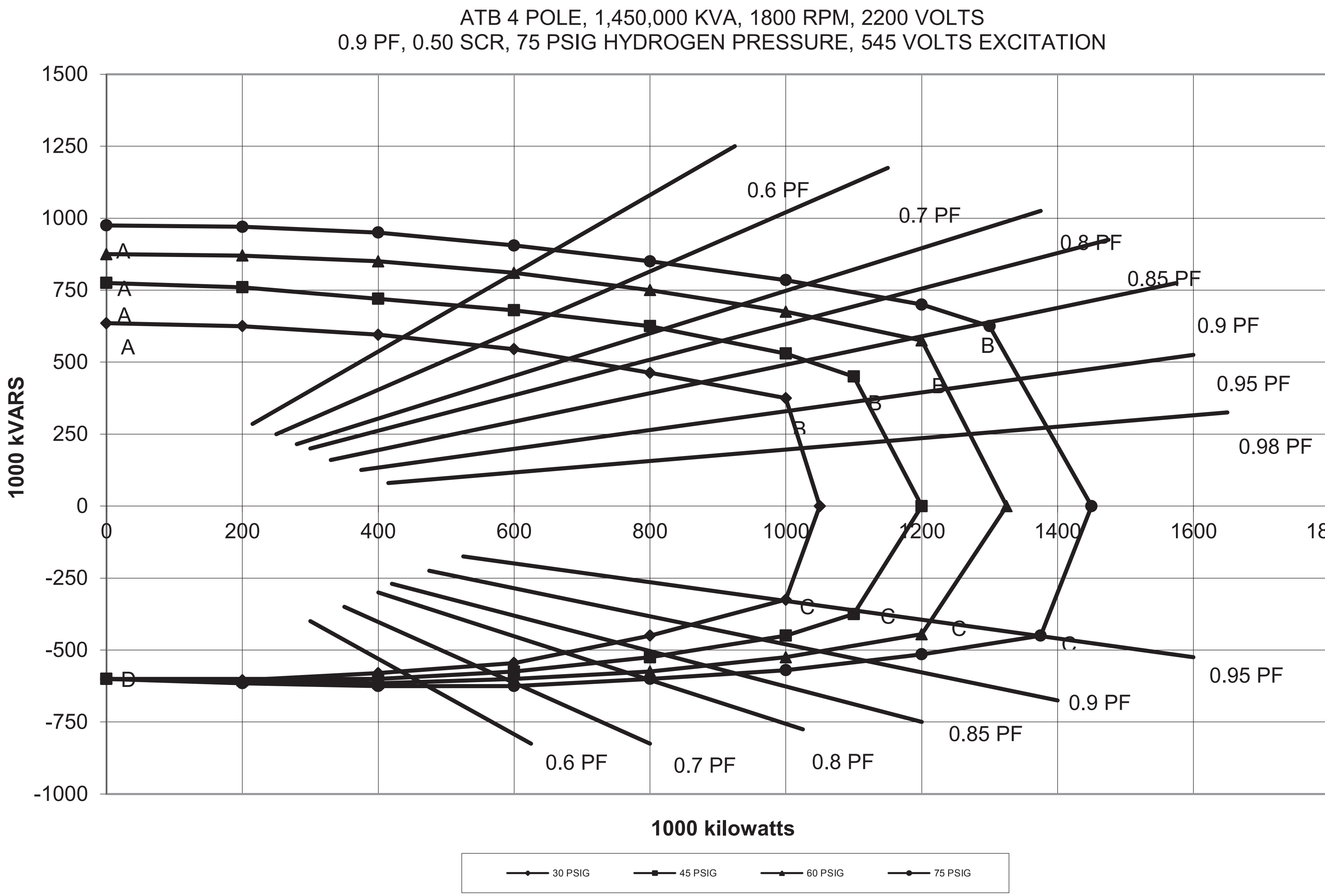


Figure 43 - Generator Capability Curves

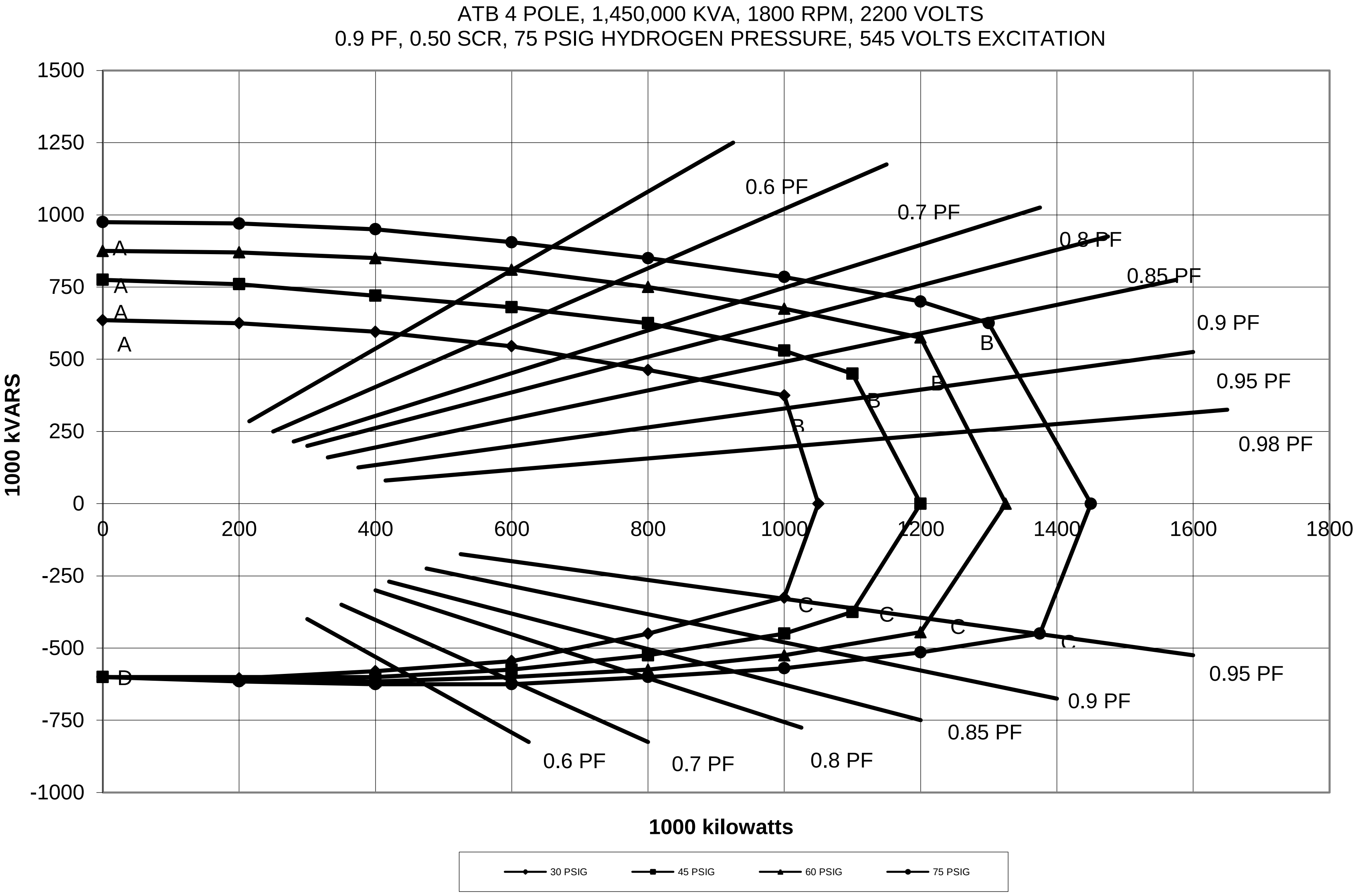


Figure 43 - Generator Capability Curves

Duke Energy Catawba Nuclear Station **Classification of Emergency** **Reference Use**	Procedure No. **RP/0/A/5000/001** Revision No. **033** Electronic Reference No. **CN005GNK**

PERFORMANCE

* * * * * * * * * * UNCONTROLLED FOR PRINT * * * * * * * * * *

(ISSUED) - PDF Format

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 or indicate a security threat to facility protection has been initiated.

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 or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of **HOSTILE ACTION**.

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 or **HOSTILE ACTION** that results in intentional damage or malicious acts; (1) toward site personnel or equipment that could lead to the likely failure of or; (2) that prevent effective access to equipment needed for protection of the public.

1.3.2 Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond 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 or **HOSTILE ACTION** that results in an actual loss of physical control of the facility.

1.4.2 Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

2. Immediate Actions

_____ 2.1 **<u>IF</u>** performing this procedure due to security-related event(s) considered to be a **CREDIBLE THREAT** or **HOSTILE ACTION**, perform the following.

- **<u>IF</u>** Security reports that a **SECURITY CONDITION** or **HOSTILE ACTION** is imminent (15 minutes) or in-progress, notify station personnel via the plant page to take the appropriate protective actions. Refer to RP/0/B/5000/026, Site Response to Security Events, as soon as possible for scripted message.
- Perform accelerated notification to the NRC within 15 minutes of the occurrence of the event.

_____ 2.2 Assessment, classification and declaration of any applicable emergency condition should be completed within 15 minutes after the availability of indications or information to **COGNIZANT FACILITY STAFF** that an EAL threshold has been exceeded. (Refer to Enclosure 4.9, Emergency Declaration Guidelines, as needed)

_____ 2.3 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.

_____ 2.4 **<u>IF</u>** the plant was in Mode 1-4 and a valid condition affects fission product barriers, proceed to Enclosure 4.1 (Fission Product Barrier Matrix).

_____ 2.5 **<u>IF</u>** a General Emergency is **NOT** declared in Step 2.4 **<u>OR</u>** 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.

_____ 2.6 Compare actual plant conditions to the Emergency Action Levels evaluated in step 2.4 and/or 2.5 and declare the appropriate Emergency Class as indicated.

_____ 2.7 Document the declaration time. ___________________

_____ 2.8 Activate the ERO per the appropriate Response Procedure (RP) utilizing the Control Room ERO Notification Job Aid.

_____ 2.9 **<u>IF</u>** the declaration is made in the Control Room, announce the classification and declaration time to the Control Room Crew at the first opportunity that will not interfere with the performance of the crew or the flow of the Emergency Procedure.

_____ 2.10 **<u>IF</u>** the declaration is made in the TSC or EOF, announce the classification and declaration time to the applicable facility personnel.

_____ 2.11 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 4.9.

_____ 3.2 Refer to enclosure 4.9, Emergency Declaration Guidelines, as needed.

_____ 3.3 Refer to Section D of the Catawba Emergency Plan for basis information about the Emergency Classification System as needed.

_____ 3.4 Refer to RP/0/A/5000/020, "TSC Activation Procedure" concerning the use of 10CFR50.54(x). If the TSC is activated, contact the TSC Emergency Coordinator (EC) for concurrence when using 10CFR50.54(x).

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

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

Note 1: 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 judgment and classify as if the thresholds are exceeded.

Note 2: 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 **validated and sustained**, even if the conditions do not currently exist.

Note 3: 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 prior to the CSF being used as a basis to classify an emergency.

Example: If ECA-0.0, Loss of All AC Power Procedure, is implemented with an appropriate CSF alarm condition **valid** and **sustained**, the CSF should be used as the basis to classify an emergency prior to any function restoration procedure being implemented within the confines of ECA-0.0.

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

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 5 of 5.
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 5, under one of the four “classification” columns, 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 **OR** a blank notification form and complete the required information for Emergency Coordinator approval and transmittal.

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)
1. <u>Critical Safety Function Status</u>		**1. <u>Critical Safety Function Status</u>**		**1. <u>Critical Safety Function Status</u>**	
• Containment-RED • Core cooling-RED Path is indicated for >15 minutes	• Not applicable	• NCS Integrity-Red • Heat Sink-Red	• Not applicable	• Core Cooling-Orange • Heat Sink-Red	• Core Cooling-Red
2. <u>Containment Conditions</u>		**2. <u>NCS Leak Rate</u>**		**2. <u>Primary Coolant Activity Level</u>**	
• Containment Pressure > 15 PSIG • H2 concentration > 9% • Containment pressure greater than 3 psig with less than one full train of NS and a VX-CARF operating **after actuation**.	• Rapid unexplained decrease in containment pressure following initial increase • Containment pressure or sump level response not consistent with LOCA conditions. **NOTE:** Refer to Emergency Plan, Sect. D, 4.1.C.2, last paragraph for inability to maintain normal annulus pressure.	• Unisolable leak exceeding the capacity of one charging pump in the normal charging mode with letdown isolated.	• GREATER THAN available makeup capacity as indicated by a loss of NCS subcooling.	• Not applicable	• Coolant Activity GREATER THAN 300 µCi/cc Dose Equivalent Iodine (DEI) I-131

<u>CONTINUED</u> **<u>CONTINUED</u>** **<u>CONTINUED</u>**

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)
3. <u>Containment Isolation Valves Status After Containment Isolation Actuation</u>		**3. <u>SG Tube Rupture</u>**		**3. <u>Containment Radiation Monitoring</u>**	
• Not applicable	• Containment isolation is incomplete and a direct release path from containment exists to the environment	• Primary-to-Secondary leak rate exceeds the capacity of one charging pump in the normal charging mode with letdown isolated.	• Indication that a SG is Ruptured and has a Non-Isolable secondary line fault • Indication that a SG is ruptured and a prolonged release of contaminated secondary coolant is occurring from the affected SG to the environment	• Not applicable	• Containment radiation monitor 53 A or 53 B Reading at time since Shutdown. 0-0.5 hrs > 99 R/hr 0.5-2 hrs > 43 R/hr 2-4 hrs > 31 R/hr 4-8 hrs > 22 R/hr >8 hrs > 13 R/hr
4. <u>SG Secondary Side Release With Primary-to-Secondary Leakage</u>		**4. <u>Containment Radiation Monitoring</u>**		**4. <u>Emergency Coordinator/EOF Director Judgement</u>**	
• Not applicable	• Release of secondary side to the environment with primary to secondary leakage GREATER THAN Tech Spec allowable	• Not applicable	• Not applicable	• 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.	

<u>END</u>

<u>CONTINUED</u>

<u>CONTINUED</u>

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)
5. <u>Significant Radioactive Inventory In Containment</u>		**5. <u>Emergency Coordinator/EOF Director Judgement</u>**			
• Containment Rad. Monitor EMF53A or 53B Reading at time since shutdown: 0 - 0.5 hr > 390 R/hr 0.5 - 2 hr > 170 R/hr 2 - 4 hr > 125 R/hr 4 - 8 hr > 90 R/hr > 8 hr > 53 R/hr	• Not applicable	• 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 NCS barrier.			
		<u>END</u>			
6. <u>Emergency Coordinator /EOF Director Judgment</u>					
• 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 containment barrier.					
<u>END</u>					

Enclosure 4.2

System Malfunctions

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

END

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY

4.2.U.3 Fuel Clad Degradation.

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

4.2.U.3-1 Dose Equivalent I-131 greater than the Technical Specifications allowable limit.

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

OPERATING MODE: 1, 2, 3, 4

4.2.U.4-1 Unidentified leakage ≥ 10 gpm.

4.2.U.4-2 Pressure boundary leakage ≥ 10 gpm.

4.2.U.4-3 Identified leakage ≥ 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

Abnormal Rad Levels/Radiological Effluent

UNUSUAL EVENT

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.

OPERATING MODE: ALL

4.3.U.1-1 A **valid** Trip 2 alarm on radiation monitor EMF-49L or EMF-57 for ≥ 60 minutes or will likely continue for ≥ 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.

4.3.U.1-2 A **valid** indication on radiation monitor EMF- 36L of ≥ 3.00E+04 cpm for ≥ 60 minutes or will likely continue for ≥ 60 minutes, which indicates that the release may have exceeded the initiating condition and indicates the need to assess the release with procedure AD-EP-ALL-0202.

(Continued)

ALERT

4.3.A.1 Any Unplanned Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds 200 Times the SLC limits for 15 Minutes or Longer.

OPERATING MODE: ALL

4.3.A.1-1 A **valid i**ndication on radiation monitor EMF- 49L or EMF-57 of ≥ 1.2E+05 cpm for ≥ 15 minutes or will likely continue for ≥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.

(Continued)

SITE AREA EMERGENCY

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.

OPERATING MODE: ALL

4.3.S.1-1 A **valid** indication on radiation monitor EMF-36L of ≥ 2.7E+06 cpm **sustained** for ≥ 15 minutes.

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**.

(Continued)

GENERAL EMERGENCY

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.

OPERATING MODE: ALL

4.3.G.1-1 A **valid** indication on radiation monitor EMF-36H of ≥ 8.3E+03 cpm **sustained** for ≥ 15 minutes.

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**.

(Continued)

Enclosure 4.3

Abnormal Rad Levels/Radiological Effluent

UNUSUAL EVENT

4.3.U.1-3 Gaseous effluent being released exceeds two times **SLC** 16.11-6 for ≥ 60 minutes as determined by RP procedure.

4.3.U.1-4 Liquid effluent being released exceeds two times **SLC** 16.11-1 for ≥ 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 ≥ 5.4E+05 cpm for ≥ 15 minutes or will likely continue for ≥15 minutes, which indicates that the release may have exceeded the initiating condition and indicates the need to assess the release with procedure AD-EP-ALL-0202.

4.3.A.1-3 Gaseous effluent being released exceeds 200 times the level of **SLC** 16.11-6 for ≥ 15 minutes as determined by RP procedure.

4.3.A.1-4 Liquid effluent being released exceeds 200 times the level of **SLC** 16.11-1 for ≥ 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

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 1,000 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.

Does not apply to spent fuel in dry cask storage. Refer to EPLAN Section D basis document

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

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)**		

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 1EMF-12 greater than 15 mrem/hr in the Control Room. **4.3.A.3-2 Valid** indication of radiation levels greater than 15 mrem/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

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.

OPERATING MODE: 1, 2, 3

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)

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.

OPERATING MODE: 1

4.4.S.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.

(Continued)

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

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

EITHER of the following conditions exist:

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

END

UNUSUAL EVENT

ALERT

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

OPERATING MODE: 5, 6

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

AND

One of the following:

- Inability to maintain reactor coolant temperature below 200ºF
- Uncontrolled reactor coolant temperature rise to >180ºF.

END

SITE AREA EMERGENCY

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

OPERATING MODE: 1, 2, 3, 4

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

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

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

OPERATING MODE: 5, 6

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

AND

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)

GENERAL EMERGENCY

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 Busses 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 busses.

(Continued)

ALERT

4.5.A.1 Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses 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 Busses.

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.

(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

(Continued)

Enclosure 4.5

Loss of Power

UNUSUAL EVENT

OPERATING MODE: 5, 6, No Mode

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

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

AND

One emergency diesel generator is supplying power to its respective essential bus.

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

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.

AND

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

END

ALERT

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.

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:

SATA	SATB
ATC	ATD
D/G A	D/G B

END

SITE AREA EMERGENCY

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

OPERATING MODE: 1, 2, 3, 4

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.

AND

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

END

GENERAL EMERGENCY

At least one of the following conditions exist:

- Restoration of at least one essential bus within 4 hours is **NOT** likely
- Indication of continuing degradation of core cooling based on Fission Product Barrier monitoring.

END

Enclosure 4.6

Fire/Explosion and Security Events

UNUSUAL EVENT

4.6.U.1 Fire Within Protected Area Boundary <u>NOT</u> Extinguished Within 15 Minutes of Detection <u>OR</u> Explosion Within the Protected Area Boundary.

OPERATING MODE: ALL

4.6.U.1-1 **Fire** in any of the following areas **<u>NOT</u>** 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
- Monitor Tank Building
- ISFSI
- Unit 1/2 Transformer Yard Areas

<u>(Continued)</u>

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).

<u>AND</u>

One of the following:

- Affected safety system parameter indications show degraded performance

<u>(Continued)</u>

SITE AREA EMERGENCY

4.6.S.1 HOSTILE ACTION within the PROTECTED AREA

OPERATING MODE: ALL

4.6.S.1-1 A **HOSTILE ACTION** is occurring or has occurred within the **PROTECTED AREA** as reported by the CNS Security Shift Supervision

<u>END</u>

GENERAL EMERGENCY

4.6.G.1 HOSTILE ACTION Resulting in Loss of Physical Control of the Facility.

OPERATING MODE: ALL

4.6.G.1-1 A **HOSTILE ACTION** has occurred such that plant personnel are unable to operate equipment required to maintain safety functions.

4.6.G.1-2 **A HOSTILE ACTION** has caused failure of Spent Fuel Cooling Systems and **IMMINENT** fuel damage is likely for a **FRESHLY OFF-LOADED REACTOR CORE** in pool.

<u>END</u>

Enclosure 4.6

Fire/Explosion and Security Events

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 or a loaded cask in the **ISFSI**.

4.6.U.2 Confirmed SECURITY CONDITION or Threat Which Indicates a Potential Degradation in the Level of Safety of the Plant.

OPERATING MODE: All

4.6.U.2-1 A **SECURITY CONDITION** that does **NOT** involve a **HOSTILE ACTION** as reported by the CNS Security Shift Supervision.

4.6.U.2-2 A credible site-specific security threat notification.

4.6.U.2-3 A validated notification from NRC providing information of an aircraft threat.

END

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 Pump house

AND

One of the following:

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

(Continued)

SITE AREA EMERGENCY

GENERAL EMERGENCY

UNUSUAL EVENT	**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 HOSTILE ACTION Within the OWNER CONTROLLED AREA or Airborne Attack Threat.** **OPERATING MODE: ALL** **4.6.A.3-1** A **HOSTILE ACTION** is occurring or has occurred within the **OWNER CONTROLLED AREA** as reported by the CNS Security Shift Supervision **4.6.A.3-2** A validated notification from NRC of airliner attack threat within 30 minutes of the site. **END**		

Enclosure 4.7

Natural Disasters, Hazards, And Other Conditions Affecting Plant Safety

UNUSUAL EVENT

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

OPERATING MODE: ALL

4.7.U.1-1 Tremor felt and **valid** alarm on the Syscom Seismic Monitoring System (OAC C1D2252).

4.7.U.1-2 Report by plant personnel of tornado striking within **protected area** boundary/ISFSI.

4.7.U.1-3 Vehicle crash into plant structures or systems within **protected area** boundary/ISFSI.

4.7.U.1-4 Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.

4.7.U.1-5 Independent Spent Fuel Cask tipped over or dropped greater than 24 inches.

4.7.U.1-6 Uncontrolled flooding in the **ISFSI** area.

4.7.U.1-7 Tornado generated missiles(s) impacting the **ISFSI**.

(Continued)

ALERT

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

OPERATING MODE: ALL

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

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

Tornado striking plant structures within the **vital area**:

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

OR

sustained winds ≥ 74 mph for > 15 minutes.

(Continued)

SITE AREA EMERGENCY

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

OPERATING MODE: ALL

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

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

AND

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

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

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

GENERAL EMERGENCY

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

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

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

OR

(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.

END

<u>**UNUSUAL EVENT**</u>

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 <u>could enter</u> within the **site 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.

<u>**END**</u>

<u>**ALERT**</u>

4.7.A.1-3 Visible structural **damage** caused by <u>either</u>:

- Vehicle crashes

<u>**OR**</u>

- Turbine failure generated missiles,

<u>**OR**</u>

- Other catastrophic events

on any of the following plant structures:

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

<u>**(Continued)**</u>

<u>**SITE AREA EMERGENCY**</u>

<u>**GENERAL EMERGENCY**</u>

UNUSUAL EVENT | **ALERT** | **SITE AREA EMERGENCY** | **GENERAL 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 <u>life threatening</u> 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)

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY

ALERT

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

ALERT- Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of hostile action. 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 - Refers to an explosive device suspected of having sufficient force to damage plant systems or structures.

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.

COGNIZANT FACILITY STAFF - Any member of facility staff, who by virtue of training and experience, is qualified to assess the indications or reports for validity and to compare the same to the EALs in the licensee's emergency classification scheme (Does not include staff whose positions require they report, rather than assess, abnormal conditions to the facility.).

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.

EMERGENCY RELEASE - Any unplanned, quantifiable radiological release to the environment during an emergency event. The release does not have to be related to a declared emergency.

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 not be considered a fire.

FRESHLY OFF-LOADED REACTOR CORE - The complete removal and relocation of all fuel assemblies from the reactor core and placed in the spent fuel pool. (Typical of a "No Mode" operation during a refuel outage that allows safety system maintenance to occur and results in maximum decay heat load in the spent fuel pool system.)

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 or hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA protective action guideline exposure levels offsite for more than the immediate site area.

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

HOSTILE ACTION - An act toward an NPP or its personnel that includes the use of violent force to destroy equipment, take **HOSTAGES**, and/or intimidates the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, **PROJECTILES**, vehicles or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. **HOSTILE ACTION** should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the NPP. Non-terrorism-based EALs should be used to address such activities (e.g., violent acts between individuals in the **OWNER CONTROLLED AREA**).

HOSTILE FORCE - One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming or causing destruction.

IMMINENT - Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where **IMMINENT** time frames are specified, they shall apply.

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 - A person(s) present in a specified area without authorization. Discovery of a **BOMB** in a specified area is indication of **INTRUSION** into that area by a **HOSTILE FORCE**.

ISFSI - Independent Spent Fuel Storage Installation - Includes the components approved for loading and storage of spent fuel assemblies.

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

NO MODE - Defueled.

OWNER CONTROLLED AREA - Area outside the protected area fence that immediately surrounds the plant. Access to this area is generally restricted to those entering on official business.

PROJECTILE - An object directed toward a NPP that could cause concern for its continued operability, reliability or personnel safety.

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

PROTECTED AREA - Typically, the site specific area which normally encompasses all controlled areas within the security **PROTECTED AREA** fence.

REACTOR COOLANT SYSTEM (RCS/NCS) LEAKAGE - RCS Operational Leakage as defined in the Technical Specification Basis B 3.4.13.

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. Equipment found tampered with or damaged due to malicious mischief may not meet the definition of **SABOTAGE** until this determination is made by security supervision.

SECURITY CONDITION - Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel or a potential degradation to the level of safety of the plant. A **SECURITY CONDITION** does not involve a **HOSTILE ACTION**.

SIGNIFICANT PLANT TRANSIENT- An unplanned event involving one or more of the following: (l) 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 protection of the public or **HOSTILE ACTION** that results in intentional damage or malicious acts; (1) toward site personnel or equipment that could lead to the likely failure of or; (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to exceed **EPA** Protective Action Guidelines to exposure levels beyond the site boundary.

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

SLC - Selected Licensee Commitments.

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 or indicate a security threat to facility protection has been initiated. 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: (l) 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 per the security plan. Therefore, **VITAL AREA** is a security term.

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

- Assessment, classification and declaration of any applicable emergency condition should be completed with 15 minutes after indication or information is available to **COGNIZANT FACILITY STAFF** that an EAL threshold has been exceeded.

- 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.

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. Event time is the time at which indications become available that an EAL has been exceeded.
2. Event time is the time the 15 minutes clock starts for classification.
3. The event classification time 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

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 mR/hr	Alert mR/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

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

17. (Continued)

c. Verify RVLIS indication adequate as follows:

__ c. **RETURN TO** Step 14.

__ • **IF** all NC pumps are off, **THEN** verify "REACTOR VESSEL LR LEVEL" - GREATER THAN 61%.

__ • **IF** any NC pump is on, **THEN** verify "REACTOR VESSEL D/P" - GREATER THAN REQUIRED D/P FROM TABLE BELOW:

Number of NC Pumps On	Required "REACTOR VESSEL D/P"			
	TRN A With NC Pump 1A		TRN B With NC Pump 1C	
	On	Off	On	Off
4	80%	N/A	80%	N/A
3	60%	32%	60%	32%
2	45%	20%	45%	20%
1	35%	14%	35%	14%

__ d. Dispatch operator to restore power to all CLA discharge isolation valves. **REFER TO** EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 9 (Power Alignment for CLA Valves).

__ e. Maintain NC pressure greater than CLA pressure until the CLAs are isolated or vented.