U.S. Nuclear Regulatory Commission

Site-Specific SRO Written Examination

Applicant Information	
Name:	
Date:	Facility/Unit: McGuire Nuclear Station
Region: I / (II) / III / IV	Reactor Type: (W) / CE / BW / GE
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination you must achieve a final grade of at least 80.00 percent overall, with a 70.00 percent or better on the SRO-only items if given in conjunction with the RO exam; SRO-only exams given alone require a final grade of 80.00 percent to pass. You have 8 hours to complete the combined examination, and 3 hours if you are only taking the SRO portion.

Applicant Certification

All work done on this examination is my own. I have neither given nor received aid.

_____
Applicant's Signature

Results				
RO/SRO-Only/Total Examination Values	_____ /	_____ /	_____	Points
Applicant's Score	_____ /	_____ /	_____	Points
Applicant's Grade	_____ /	_____ /	_____	Percent

U.S.N.R.C. Site-Specific Written Examination
McGuire
Senior Reactor Operator

1.	A	B	C	D	26.	A	B	C	D
2.	A	B	C	D	27.	A	B	C	D
3.	A	B	C	D	28.	A	B	C	D
4.	A	B	C	D	29.	A	B	C	D
5.	A	B	C	D	30.	A	B	C	D
6.	A	B	C	D	31.	A	B	C	D
7.	A	B	C	D	32.	A	B	C	D
8.	A	B	C	D	33.	A	B	C	D
9.	A	B	C	D	34.	A	B	C	D
10.	A	B	C	D	35.	A	B	C	D
11.	A	B	C	D	36.	A	B	C	D
12.	A	B	C	D	37.	A	B	C	D
13.	A	B	C	D	38.	A	B	C	D
14.	A	B	C	D	39.	A	B	C	D
15.	A	B	C	D	40.	A	B	C	D
16.	A	B	C	D	41.	A	B	C	D
17.	A	B	C	D	42.	A	B	C	D
18.	A	B	C	D	43.	A	B	C	D
19.	A	B	C	D	44.	A	B	C	D
20.	A	B	C	D	45.	A	B	C	D
21.	A	B	C	D	46.	A	B	C	D
22.	A	B	C	D	47.	A	B	C	D
23.	A	B	C	D	48.	A	B	C	D
24.	A	B	C	D	49.	A	B	C	D
25.	A	B	C	D	50.	A	B	C	D

51.	A	B	C	D	76.	A	B	C	D
52.	A	B	C	D	77.	A	B	C	D
53.	A	B	C	D	78.	A	B	C	D
54.	A	B	C	D	79.	A	B	C	D
55.	A	B	C	D	80.	A	B	C	D
56.	A	B	C	D	81.	A	B	C	D
57.	A	B	C	D	82.	A	B	C	D
58.	A	B	C	D	83.	A	B	C	D
59.	A	B	C	D	84.	A	B	C	D
60.	A	B	C	D	85.	A	B	C	D
61.	A	B	C	D	86.	A	B	C	D
62.	A	B	C	D	87.	A	B	C	D
63.	A	B	C	D	88.	A	B	C	D
64.	A	B	C	D	89.	A	B	C	D
65.	A	B	C	D	90.	A	B	C	D
66.	A	B	C	D	91.	A	B	C	D
67.	A	B	C	D	92.	A	B	C	D
68.	A	B	C	D	93.	A	B	C	D
69.	A	B	C	D	94.	A	B	C	D
70.	A	B	C	D	95.	A	B	C	D
71.	A	B	C	D	96.	A	B	C	D
72.	A	B	C	D	97.	A	B	C	D
73.	A	B	C	D	98.	A	B	C	D
74.	A	B	C	D	99.	A	B	C	D
75.	A	B	C	D	100.	A	B	C	D

Question: 1

1 Pt Given the following:

- Due to an under-frequency relaying problem, all NCPs tripped causing a reactor trip
- The crew is performing the actions of ES-0.1 (Reactor Trip Response)
- NC System T-Hots are 575°F and slowly rising
- NC System T-Colds are 549°F and slowly lowering
- All S/G levels indicate 8% NR and rising slowly

Which ONE (1) of the following are action(s) required in accordance with ES-0.1 for this condition?

A. Throttle open steam dumps or raise CA flow until NC system T-Hots are stabilized.

B. Throttle open steam dumps or raise CA flow until NC system T-Ave is stable at or trending to 557°F.

C. Close steam dumps and throttle CA flow to minimize cooldown; maintain total feed flow greater than 450 GPM.

D. Close steam dumps and throttle CA flow as necessary to stabilize NC system T-Colds; no other restrictions apply.

Question: 2

1 Pt Given the following conditions on Unit 1:

- SI actuated due to a LOCA inside Containment
- "A" and "B" NI pumps are TRIPPED
- "A" and "B" NV pumps are TRIPPED
- NC system pressure is 250 PSIG
- All other equipment is running as designed
- Containment pressure is 8 PSIG
- E-0, Reactor Trip or Safety Injection has been implemented

Which ONE (1) of the following describes the required action and reason for the action with respect to the NC pumps?

A. Leave all NC pumps running to provide forced cooling flow of the NC system.

B. Leave all NC pumps running to prevent phase separation of NC system liquid.

C. Stop all NC pumps to prevent mechanical damage to the pump and motor.

D. Stop all NC pumps to minimize fluid mass loss out of the break.

Question: 3

1 Pt Given the following conditions:

- Unit 1 is operating at 100% RTP
- AP-008 (Malfunction of NC Pump) has been implemented due to a seal malfunction on 1B NC pump

Which ONE (1) of the following indicates that the failure is the 1B NC pump #2 Seal?

A.
- #1 Seal Leak off flow - GOING UP
- NC Pump number 2 Seal Standpipe HIGH level alarm - LIT

B.
- #1 Seal Leak off flow - GOING UP
- NC Pump number 2 Seal Standpipe LOW level alarm - LIT

C.
- #1 Seal Leak off flow - GOING DOWN
- NC Pump number 2 Seal Standpipe LOW level alarm - LIT

D.
- #1 Seal Leak off flow - GOING DOWN
- NC Pump number 2 Seal Standpipe HIGH level alarm - LIT

Question: 4

1 Pt Given the following:

- A startup is in progress on Unit 2 following refueling
- NC system is solid with one NC pump in service
- SU-8 (Heatup To 200°F) is in progress
- LTOP is in service
- NC system pressure is 360 PSIG

Which ONE (1) of the following describes how bulk non-condensable gases are removed from the NC system prior to forming a bubble in the Pressurizer?

A. Notify Primary Chemistry to add Hydrazine.

B. Cycle the Reactor Vessel Head vents.

C. Vent the Volume Control Tank.

D. Cycle Pressurizer PORVs.

Question: 5

1 Pt Given the following:

- Unit 2 is operating at 100% RTP
- Rod control in manual

Which ONE (1) of the following will cause the Channel 2 OTΔT trip setpoint to decrease?

A. N-42 upper detector fails high.

B. Auctioneered high T-ave fails high.

C. NC system wide range pressure channel fails low.

D. Power reduction to 50% with normal pressure and temperature.

Question: 6

1 Pt

Unit 1 operators are responding to a LOCA in E-0.

Given the following conditions:

- The OATC is performing supplementary action steps in E-0.
- The 2nd RO is busy manually controlling feedwater flow to the SGs.
- An alarm annunciates on the electrical relay back panel behind the main control boards (1AD11-E8, Transfer Trip System B Trouble).

What is the correct response by the RO who is the OATC in accordance with OMP 2-2?

A. The OATC can investigate the alarm because the surveillance area does not apply during EOPs.

B. The OATC can investigate the alarm because the electrical relay panel is within the OATC defined surveillance area.

C. The OATC must remain within the surveillance area. The alarm should not be investigated until another operator is available.

D. The OATC is allowed to momentarily leave the surveillance area to investigate the alarm in the event of an emergency affecting the safety of operations.

Question: 7

1 Pt Given the following:

- Unit 1 was operating at 100% RTP
- S/G 1B steam line breaks inside Containment
- Containment pressure is currently 4.0 PSIG

Which ONE (1) of the following correctly describes CF system indications on the Main Control Board as a result of the above conditions?

A. A and B CF Pump Turbine Tripped annunciators - LIT
1CF-2 and 1CF-5 (CF Pump Discharge valves) indicate CLOSE

B. A and B CF Pump Turbine Tripped annunciators - LIT
1CF-2 and 1CF-5 (CF Pump Discharge valves) indicate OPEN

C. A and B CF Pump Turbine speed indications - 2800 RPM
1CF-2 and 1CF-5 (CF Pump Discharge valves) indicate CLOSE

D. A and B CF Pump Turbine speed indications - 2800 RPM
1CF-2 and 1CF-5 (CF Pump Discharge valves) indicate OPEN

Question: 8

1 Pt A Safety Injection due to a stuck open Pressurizer Safety valve has occurred.

Which ONE (1) of the following describes an indication which will be adversely affected by this accident condition and the reason the indication is affected?

A. Subcooling.
Voiding in the reactor vessel head causes inaccurate CET input to the subcooling monitor.

B. Pzr level.
Voiding in the reactor vessel head forces water out of the reactor vessel into the Pressurizer.

C. Subcooling.
Rapid vapor space depressurization causes inaccurate pressure input to the subcooling monitor.

D. Pzr level.
Rapid vapor space depressurization results in Pzr level reference leg flashing.

Question: 9

1 Pt

Unit 2 is responding to a LOCA and the operators have reached the step of ES-1.2 (Post LOCA Cooldown and Depressurization) which requires isolating cold leg accumulators.

Which ONE (1) of the following describes why the Cold Leg Accumulators are isolated at this step?

A. To prevent injecting the CLA nitrogen bubble into the reactor and creating a hard bubble in the Pressurizer.

B. Ensures that NC system pressure can be reduced to below ND pump shutoff head, and further Cold Leg Accumulator injection will not occur.

C. Ensures that the inventory contained in the CLA's is available should the need arise to recover core cooling later in the procedure.

D. To prevent CLA injection when the NC system depressurizes, resulting in thermal stress and PTS concerns from the cold water on the reactor vessel.

Question: 10

1 Pt Which of the following best describes the Priority Mode of Diesel Sequencer operation?

A. Actuated by a Blackout signal and begins sequencing if bus voltage ONLY is greater than minimum required.

B. Actuated by a Blackout signal and begins sequencing if bus voltage AND frequency are greater than minimum required.

C. Actuated by a Safety Injection signal and begins sequencing if bus voltage ONLY is greater than minimum required.

D. Actuated by a Safety Injection signal and begins sequencing if bus voltage AND frequency are greater than minimum required.

Question: 11

1 Pt Given the following conditions:

- The crew has entered FR-H.1 (Response to Loss of Secondary Heat Sink) due to a loss of inventory in the S/Gs and failure of the CA pumps to start

Time	1400	1410	1420	1430
S/G 1A WR [%]	43	37	30	26
S/G 1B WR [%]	41	32	25	20
S/G 1C WR [%]	42	34	29	25
S/G 1D WR [%]	40	33	26	21
Total feed flow [GPM]	0	0	0	0
Cont press [PSIG]	0.75	2.1	3.2	2.8

Which ONE (1) of the following is the EARLIEST time (if any) that the crew would be required to initiate NC system Feed and Bleed based on plant conditions?

A. Feed and Bleed is not required.

B. 1410

C. 1420

D. 1430

Question: 12

1 Pt Given the following plant conditions:

- A reactor trip has occurred on Unit 1 as a result of a Loss of Offsite Power (LOOP)
- 1B D/G has started and loaded normally
- 1A D/G did not start and attempts to start it have been unsuccessful
- The operating crew has entered ES-0.2 (Natural Circulation Cooldown)
- The crew is preparing to start a cooldown and depressurization using natural circulation

Based on the conditions above, the required SUBCOOLING MARGIN during the cooldown and depressurization is __(1)__ based on __(2)__.

A. (1) 50°F
(2) preventing void formation in the reactor vessel head.

B. (1) 50°F
(2) providing adequate thermal driving head for natural circulation.

C. (1) 100°F
(2) preventing void formation in the reactor vessel head.

D. (1) 100°F
(2) providing adequate thermal driving head for natural circulation.

Question: 13

1 Pt

Given the following:

- A BLACKOUT has occurred on 2ETB
- D/G 2B failed to start due to an 86N relay actuation
- Annunciator Panel 2AD-11-F4 (Battery EVCD Undervoltage) is in alarm

Per AP-15 (Loss of Vital or Aux Control Power) which ONE (1) of the following addresses the Battery EVCD undervoltage condition?

A. Cross tie EVDD to EVDB.

B. Align Battery Charger EVCS to Battery EVCD.

C. Swap Battery Charger Connection box to 1EMXB.

D. Swap Battery Charger Connection box to 1EMXH.

Question: 14

1 Pt Given the following on Unit 1:

- 1KC-132 (L/D HX Cooling Water Control Valve) has failed
- LD HX outlet temperature is 115°F and increasing

If LD Hx outlet temperature reaches __(1)__ 1NV-127A (LD Hx Outlet 3-Way Temp Cntrl) will AUTO divert letdown flow to the __(2)__.

A. (1) 138°F
(2) VCT to protect the demineralizer resin

B. (1) 138°F
(2) RHT to prevent a reactor power reduction

C. (1) 120°F
(2) VCT to protect the demineralizer resin

D. (1) 120°F
(2) RHT to prevent a reactor power reduction

Question: 15

1 Pt Given the following conditions on Unit 1:

- A small break LOCA occurred in Containment
- SI has actuated on both trains
- 1B NV pump tripped on overcurrent
- Containment pressure is 3.5 PSIG

Based on the above conditions, ALL cooling would be lost to the NC pump …

A. seals ONLY.

B. motor bearings ONLY.

C. seals AND pump lower bearings.

D. motor bearings AND pump lower bearings.

Question: 16

1 Pt Given the following initial conditions:

- Unit 2 is operating at 100% RTP
- PZR Pressure Channel Select is in 1-2 position
- NC system pressure is 2235 PSIG

The following occurs:

- 2NC-27 (Pressurizer Spray Control) RED lamp is lit and the GREEN lamp is extinguished
- 2NC-29C (Pressurizer Spray Control) GREEN lamp is lit and the RED lamp is extinguished
- NC system pressure is decreasing
- Attempts to close 2NC-27 using its controller have been unsuccessful

Which ONE (1) of the following describes the actions required in accordance with AP-11 (Pressurizer Pressure Anomalies)?

A. Manually trip the reactor and stop 2A NC pump.

B. Ensure the PZR Channel Select is swapped to a non-affected channel.

C. Manually place the Pressurizer Spray Emergency Close switch to the close position.

D. Ensure the Pressurizer Backup heaters energize at 2210 PSIG to stop the pressure decrease.

Question: 17

1 Pt

Given the following:

- Unit 1 is shutdown
- NC system temperature is 140°F
- 'A' Train components are in operation
- D/G 1B is tagged for maintenance
- The NC system WR level is 55 inches

Given the following events occur:

- The 1A RN pump trips on overcurrent
- The operating crew has completed the actions of AP-20 Case 1 (Loss of Operating RN Train)

What actions are required (if any) per Tech Spec 3.7.7 (Nuclear Service Water System)?

A. RN is not required to be Operable in Mode 5:
No action is required per this LCO.

B. Only ONE train of RN is required to be Operable:
No action is required per this LCO.

C. BOTH trains of RN are required to be Operable:
Enter the applicable action statement of TS 3.7.7.

D. Only ONE train of RN is required to be Operable but must have Emergency Power available :
Enter the applicable Action Statement of TS 3.7.7.

Question: 18

1 Pt Given the following conditions:

- A LOCA has occurred on Unit 1
- ECA 1.1 (Loss of Emergency Coolant Recirculation (ECR) has been implemented
- All ECCS pumps are taking suction from the FWST
- FWST level is 100 inches
- Containment sump level is 1.5 feet

Which ONE (1) of the following describes the mitigation strategies of ECA 1.1?

A. Attempts are made to locate and isolate the cause of the loss of inventory from containment and makeup is initiated to the FWST. NC system is cooled down and depressurized to allow the CLA's to inject.

B. Attempts are made to locate and isolate the cause of the loss of inventory from containment and makeup is initiated to the FWST. NC System is cooled down, depressurized and placed on RHR cooling.

C. Containment spray and Injection flow are minimized, makeup is initiated to the FWST, NC System conditions are maintained stable until FWST and containment sump inventories are recovered or ECR capability is restored.

D. Containment spray and Injection flow are minimized, attempts are made restore ECR, makeup is initiated to the FWST, and the NC System is cooled down, depressurized and placed on RHR cooling.

Question: 19

1 Pt Given the following:

- Unit 1 is shutdown in Mode 5
- A purge of the Containment atmosphere is in progress
- Personnel are preparing for refueling operations
- 1EMF-38(L) (Containment Particulate Low Range) experiences a loss of power

Which ONE (1) of the following lists the automatic action(s) that will occur?

A. VQ secured, VP secured, Containment Sump pumps 1A1, 1A2, 1B1, 1B2 and Incore Sump pump secured, Containment evacuation alarm sounded.

B. VQ secured, VP secured, Containment Sump pumps 1A1, 1A2, 1B1, 1B2 and Incore Sump pump secured ONLY.

C. VQ and VP secured ONLY.

D. VQ secured ONLY.

Question: 20

1 Pt Given the following:

- 1NV-241(Seal Water Injection Flow Control) failed closed and cannot be reopened
- Normal L/D has been isolated
- Excess L/D has been placed in service at a flow rate of 26 GPM
- Seal Injection is presently 7 GPM per NC pump
- Total NC pump seal leak off flow is 12 GPM
- PZR level is 44%

Assuming no further operator action is taken, how long will it take for the PZR Heater feeder breakers to trip open?

REFERENCE PROVIDED

A. 164 Minutes

B. 180 Minutes

C. 360 Minutes

D. 520 Minutes

Question: 21

1 Pt Which ONE (1) of the following describes the effect of an UNDER-COMPENSATED Intermediate Range Channel following a Reactor Trip?

A. Channel will indicate high, Source Ranges will correctly energize due 1/2 logic.

B. Channel will indicate low, prematurely energizing the Source Ranges due to 1/2 logic.

C. Channel will indicate high, preventing P-6 from energizing the Source Ranges due to not satisfying 2/2 logic.

D. Channel will indicate low, Source Ranges will not energize until P-6 is met from other Channel due to 2/2 logic.

Question: 22

1 Pt IAW Tech Spec 3.7.1 (Main Steam Safety Valves), the FIRST safety valve is set to open at _(1)_ PSIG and the LAST safety valve is set to open at _(2)_ PSIG.

A. (1) 1170
(2) 1220

B. (1) 1190
(2) 1220

C. (1) 1170
(2) 1225

D. (1) 1190
(2) 1225

Question: 23

1 Pt Which ONE (1) of the following is the basis for the minimum temperature of the FWST as it relates to a Containment Spray actuation?

A. Prevent soluble boron from coming out of solution which could result in clogging of the NS spray nozzles and reduced spray flow.

B. Prevent an excessive reduction in containment pressure, which could decrease the rate at which steam can be vented out the break and increases peak clad temperature.

C. Prevent exceeding the maximum external pressure load on the containment shell due to an internal vacuum caused by overcooling of the Post-Accident Containment atmosphere.

D. Prevent thermal shock of NS system piping specifically the NS spray nozzles which could be exposed to adverse containment conditions following a High Energy Line Break inside Containment.

Question: 24

1 Pt Given the following:

- Unit 1 is operating at 100% RTP
- The 1A D/G has just been declared inoperable due to an oil leak on the Woodward governor

Which ONE (1) of the following describes ALL checks which must be performed within 1 hour to ensure compliance with TS 3.8.1 (AC Sources – Operating)?

A. Flowpaths through which 1ETA AND 1ETB are being supplied by offsite power.

B. Flowpath through which 1ETA is being supplied by offsite power AND determine that 1ETA is being supplied independently from 1ETB.

C. Flowpath through which 1ETA OR 1ETB is being supplied by offsite power AND determine that 1ETA and 1ETB are being supplied independently.

D. Flowpaths through which 1ETA AND 1ETB are being supplied by offsite power AND determine that 1ETA and 1ETB are being supplied independently.

Question: 25

1 Pt Given the following conditions on Unit 1:

- Reactor power is 40%
- 1CM-843 (1A Main Condenser Vacuum Breaker) has failed in the intermediate position. Maintenance is attempting to close this valve
- EXH HOOD TEMP HI alarm is lit
- Condenser vacuum is 26 inches Hg and DEGRADING slowly
- (1ZJP5000) CSAE steam pressure is reading 100 PSIG

Which ONE (1) of the following actions is directed by AP-23 (Loss of Condenser Vacuum) and will be the MOST effective in mitigating this event?

A. Reduce turbine load

B. Start additional RC pumps

C. Open the Exhaust Hood Spray valves

D. Dispatch operator to restore CSAE steam pressure

Question: 26

1 Pt In the event of a fire which activates the fire protection system, which ONE (1) of the following sequence of events is the normal starting sequence for the fire pumps?

A. LEAD Jockey Pump starts at 43" level in the pressurizer tank
STBY Jockey Pump starts at 41" level in the pressurizer tank
"A" Fire Pump starts at 81 psig
"B" Fire Pump starts at 76 psig
"C" Fire Pump starts at 71 psig

B. LEAD Jockey Pump starts at 51" level in the pressurizer tank
STBY Jockey Pump starts at 45" level in the pressurizer tank
"A" Fire Pump starts at 81 psig
"B" Fire Pump starts at 76 psig
"C" Fire Pump starts at 71 psig

C. LEAD Jockey Pump starts at 43" level in the pressurizer tank
STBY Jockey Pump starts at 41" level in the pressurizer tank
"A" Fire Pump starts at 83 psig
"B" Fire Pump starts at 78 psig
"C" Fire Pump starts at 73 psig

D. LEAD Jockey Pump starts at 51" level in the pressurizer tank
STBY Jockey Pump starts at 45" level in the pressurizer tank
"A" Fire Pump starts at 83 psig
"B" Fire Pump starts at 78 psig
"C" Fire Pump starts at 73 psig

Question: 27

1 Pt Which ONE (1) of the following is supplied from DC Distribution Center SDSP?

A. FWPT 'A' Emergency Oil pump

B. 1SM-1AB, 1D Main Steam Isol

C. Turbine Emergency Bearing Oil pump

D. 1CA161C, RN Supply to Turbine Driven CA pump

Question: 28

1 Pt Which ONE (1) of the following describes the correct reason for ensuring that NC system pressure, is less than 2335 PSIG during implementation of FR-S.1 (Response to Nuclear Power Generation/ATWS)?

A. Minimize the potential for reactor vessel pressurized thermal shock.

B. Verifies or ensures a sufficient boron flow rate into the NCS.

C. Minimize the potential of the PRT rupture disc bursting.

D. Verifies that the pressurizer PORVs are closed.

Question: 29

1 Pt

Unit 2 is currently operating at 60% power with a load increase in progress. Given the following events and conditions:

- Pressurizer level control is in the "1-2" position (normal control)
- Pressurizer level is at program level and in "automatic"
- Pressurizer level Channel 1 fails at its current level

If the channel failure remains undiscovered, which ONE (1) of the following describes the system response as plant load is increased from 60% to 90%?

A. Charging flow decreases
Letdown isolates
Pressurizer heaters turn off

B. Charging flow increases
Pressurizer backup heaters energize
Pressurizer level stabilizes at ~ 52%

C. Charging flow increases
Pzr Low Level Control annunciator alarms
Pressurizer level increases to the trip setpoint

D. Charging flow decreases
Pzr Low Level Control annunciator alarms
Letdown isolates

Question: 30

1 Pt Given the following:

- A LOCA has occurred on Unit 1
- ES-1.2 (Post LOCA Cooldown and Depressurization) has been implemented

Which ONE (1) of the following describes major actions of ES-1.2?

A. (1) Establish a 100°F/hr cooldown rate
(2) Sequentially stop all but one NV pump

B. (1) Cooldown and depressurize at maximum rate
(2) Sequentially stop all but one NV pump

C. (1) Establish a 100°F/hr cooldown rate
(2) Secure all NC pumps

D. (1) Cooldown and depressurize at maximum rate
(2) Secure all NC pumps

Question: 31

1 Pt Given the following:

- Unit 2 is operating at 100% RTP
- A Loss of Offsite Power occurs on both Units 1 and 2

Which ONE (1) of the following provides the assured source of cooling water to maintain containment temperatures within Tech Spec limits?

A. BOTH '2A' AND '2B' RN pumps

B. RV pump selected in "Auto"

C. '2A' RN pump ONLY

D. '2B' RN pump ONLY

Question: 32

1 Pt

Unit 1 was operating at 100% when the following sequence of events occurred:

- A Loss-of-Offsite Power resulted in a Reactor Trip
- When the 1A D/G attempted to load 1ETA, a fault on the bus resulted in an 87G (Generator Differential) relay actuation
- The plant transient resulted in a LOCA inside containment and a safety injection
- Containment pressure is 3.0 PSIG and increasing

Which ONE (1) of the following describes the status of the VE (Annulus Ventilation) fans?

A. ONLY 1B VE fan is running.

B. 1A and 1B VE fans are running.

C. ONLY 1B VE fan will start after a 10 minute time delay.

D. 1A and 1B VE fans will start after a 10 minute time delay.

Question: 33

1 Pt Unit 1 & 2 are operating at 100% RTP:

- The TCC has notified the Control Room of impending grid frequency disturbances
- The crew is performing actions of AP-05 (Generator Voltage and Electric Grid Disturbances)
- Both Unit 1 & 2 have been operating with frequency less than 59.5 Hz for greater than 20 Minutes

Which ONE (1) of the following describes why Turbine First Stage Impulse pressure is reduced to less than 340 PSIG prior to opening the Switchyard PCB's in accordance with AP-05?

A. Opening the Switchyard PCB's prior to Turbine First Stage Impulse pressure decreasing below 340 PSIG will result in a Turbine Trip.

B. Turbine First Stage Impulse pressure <340 PSIG ensures that a Turbine Trip will occur once separated from the Grid but that a Reactor Trip will not occur.

C. Opening the Switchyard PCB's above 340 PSIG Turbine First Stage Impulse pressure will initiate a Complete Loss of Load transient and the Main Generator load will reduce to In-House loads.

D. Turbine First Stage Impulse pressure <340 PSIG ensures that the AMSAC circuit will not trip the Main Turbine during the resulting feedwater transient as the Turbine runs back to In-House loads.

Question: 34

1 Pt Given the following conditions:

- Unit 1 is responding to a LOCA
- All sources of feedwater have been lost, S/G NR levels are 17% and decreasing
- NC pumps are secured
- FR-C.1 (Response to Inadequate Core Cooling) has been implemented
- NI and NV pumps are unavailable
- Peak Containment pressure reached 2.5 PSIG
- S/G depressurization has failed to restore adequate core cooling
- Core Exit Thermocouples are currently indicating 1210°F
- NC pump support requirements can NOT be met

What is the major action(s) required by FR-C.1 under these conditions?

A. Do NOT restart NC pumps, open all PZR PORVs and head vents to depressurize the NC system.

B. Restart all NC pumps and restore secondary heat sink in FR-H.1 before proceeding in FR-C.1.

C. Restart NC pumps one at a time until CETs are less than 1200°F to force two phase flow through the core for core cooling.

D. Do NOT restart NC pumps, continue efforts to initiate feed and bleed of the NC system to restore core cooling.

Question: 35

1 Pt Unit 1 is shutdown with the following conditions:

- 1A and 1B ND trains are in service providing shutdown cooling IAW SO-9 (ND System Parallel Heat Exchanger Operation)
- The flow rate on each ND train is currently 1500 GPM
- NC system temperature is being maintained at 170°F
- The air line for 1ND-34 (1A & 1B ND Hx Byp Isol) breaks off

Which ONE (1) of the following describes the indications that will be observed by the Operators in the Main Control Room over the next 15 minutes?

	1A ND Train Total Flowrate	1B ND HX Inlet Temperature
A.	Increase	Increase
B.	Increase	Decrease
C.	Decrease	Increase
D.	Decrease	Decrease

Question: 36

1 Pt Given the following events and conditions on Unit 2:

- A large break LOCA occurred
- SI and Sequencers were reset
- Subsequently a Loss of Offsite Power occurs
- 2B D/G failed to start

Which ONE (1) of the following correctly describes the restoration process for the Train A NV, NI, ND, and CA pumps?

A. 2A NV and 2A CA pumps automatically restart
2A NI and 2A ND pumps must be restarted by operator action

B. 2A NV and 2A NI pumps automatically restart
2A ND and 2A CA pumps must be restarted by operator action

C. 2A ND and 2A CA pumps automatically restart
2A NV and 2A NI pumps must be restarted by operator action

D. 2A NI and 2A ND pumps automatically restart
2A NV and 2A CA pumps must be restarted by operator action

Question: 37

1 Pt Given the following conditions on Unit 1:

- Rod M-4 has dropped due to a blown fuse
- AP-14 (Rod Control Malfunction) has been implemented
- The fuse has been replaced and the dropped rod has been realigned with the rest of the rods in Control Bank D

Due to a miscommunication with I&E, the Pulse-to-Analog Converter was not reset to the correct bank step position.

The "Control Bank Lo-Lo Limit" annunciator will:

A. alarm SOONER than required because the RIL function of the OAC is calculating CB-D rods to be higher than actual.

B. alarm LATER than required because the RIL function of the OAC is calculating CB-D rods to be higher than actual.

C. alarm SOONER than required because the RIL function of the OAC is calculating CB-D rods to be lower than actual.

D. alarm LATER than required because the RIL function of the OAC is calculating CB-D rods to be lower than actual.

Question: 38

1Pt Given the following sequence of events:

- A Large Break LOCA occurs on Unit 1
- All ECCS systems are injecting from the FWST
- Safety Injection is reset
- FWST level is currently 200 inches

An Operator depresses the 'SS-RESET' pushbuttons on the 'CNTRL PERMISSIVE FOR RECIRC MODE 1NI-185A / 184B' switches.

Concerning the following valves:

- 1NI-185A (RB Sump to Train A ND & NS)
- 1NI-184B (RB Sump to Train B ND & NS)
- 1ND-19A (A ND Pump Suction from FWST or NC)
- 1ND-4B (B ND Pump Suction from FWST or NC)

Which ONE (1) of the following describes what the Operator observes with regards to the automatic operation of the ECCS valves listed above after the SS-RESET pushbuttons are depressed?

A. Immediately after depressing the SS-RESET pushbuttons, 1NI-185A/184B, OPEN AND 1ND-19A/4B CLOSE.

B. Immediately after depressing the SS-RESET pushbuttons, 1NI-185A/184B OPEN AND 1ND-19A/4B REMAIN OPEN.

C. When 2/3 FWST Lo Level Bistables are received, 1NI-185A/184B OPEN AND 1ND-19A/4B CLOSE.

D. When 2/3 FWST Lo Level Bistables are received, 1NI-185A/184B REMAIN CLOSED AND 1ND-19A/4B REMAIN OPEN.

Question: 39

1 Pt Given the following:

- AP-17 (Loss of Control Room) has been entered

Which ONE (1) of the following describes the reason why the operator at the reactor trip breakers SHALL NOT TRIP the reactor until directed to do so by the SRO at the ASP?

A. Ensures control is established at the Auxiliary Shutdown Panel before placing the plant in a transient.

B. A "fire" may have caused the Control Room evacuation and a coordinated effort is required for the SRO to isolate controls from the normal power source(s).

C. Emergency Boration must be initiated prior to tripping the Reactor and because the control room indications are no longer available, action has to be verified by the SRO at the ASP.

D. Reactivity manipulations must be performed or directed by a licensed operator; therefore the operator at the Reactor Trip breakers must be directed by the SRO at the ASP.

Question: 40

1 Pt Given the following:

- Unit 1 is operating at 100% RTP with all systems in normal
- Instrument Air (VI) is inadvertently lost to containment

Which ONE (1) of the following Main Control Board indications will occur as a result?

A. 1NV-24B (NC Loop To Excess Letdown Heat Exchanger Isolation) in the CLOSE position.

B. 1NV-35A (Variable Letdown Orifice Outlet Flow Control Isolation) in the CLOSE position.

C. 1NV-459 (Variable Letdown Orifice Outlet Flow Control) in the OPEN position.

D. 1NV-1A (NC Letdown Isolation Valve) in the OPEN position.

Question: 41

1 Pt

Unit 1 is operating at 100% power with the PZR level control system in a 1-2 lineup.

The following events occur in the order listed:

1) Letdown isolates and all pressurizer heaters de-energize
2) Pressurizer level increases
3) Charging flow decreases

What is the cause of these indications?

A. Pressurizer level channel I fails high.

B. Pressurizer level channel II fails low.

C. Pressurizer Level Master Controller output has failed low.

D. Auctioneered Hi-Tave input to the Pzr Control circuit fails low.

Question: 42

1 Pt

During recovery from a Loss of all AC power, operators are performing actions in ECA-0.0 (Loss of All AC Power).

Which ONE (1) of the following describes the importance of locally ISOLATING the KC supply to the NC pump thermal barriers prior to restarting a KC pump?

A. To prevent damage to the NC pump thermal barriers due to thermal shock.

B. To prevent potential mechanical failure of the NC pump thermal barriers due to water hammer.

C. To prevent steam from forming and circulating in the KC system and ensures the KC system is available to cool equipment necessary for recovery.

D. To ensure elevated heat loads as a result of the loss of all AC power are within the design cooling capacity of the KC system prior to starting a KC pump.

Question: 43

1 Pt Given the following conditions on Unit 1:

- ES-1.2 (Post LOCA Cooldown and Depressurization) is being performed due to a LOCA inside Containment.
- 1A NV pump and 1A NI pump are running
- Containment pressure is 4 PSIG
- Pressurizer level is 33%
- BOTH subcooling monitors are INOPERABLE
- NC system CETs indicate 500°F
- NC system WR pressure indicates 750 PSIG

Which ONE (1) of the following describes the condition of the fluid in the NC system and the required actions (if any) based on these indications?

REFERENCE PROVIDED

A. Saturated; Manually initiate a Phase A Isolation.

B. Subcooled; Manually initiate a Phase A Isolation.

C. Saturated; Start 1B NI and 1B NV pumps.

D. Subcooled; Start 1B NI and 1B NV pumps.

Question: 44

1 Pt

Unit 1 is responding to a steam break inside containment from 100% RTP.

Given the following events and conditions:

- Narrow range S/G level is 15% for each intact S/G
- The NCPs were tripped
- FR-P.1 (*Response to Imminent Pressurized Thermal Shock Condition)* has been implemented
- NCS temperature is now stable
- NCS pressure is stable with only the control group of pressurizer heaters energized
- Letdown has been restored

The crew has determined that a 1 hour soak is required. Which ONE (1) of the following evolutions could be performed by the crew in the next hour while continuing on through the EP procedures?

A. Start 1D NCP.

B. Place auxiliary spray in service.

C. Energize Backup heaters.

D. Increase CA flow to one intact S/G to raise NR level to 50%.

Question: 45

1 Pt Given the following conditions on Unit 1:

- Unit is operating at 70% RTP
- The OATC determines that AUTO rod withdrawal is not functioning
- Further investigation reveals that manual rod withdrawal is functioning normally
- Control Bank 'D' rods are currently at 190 steps

Which ONE (1) of the following failures has caused this condition?

A. Turbine Impulse Pressure Channel II fails low.

B. Turbine Impulse Pressure Channel I fails low.

C. Loop 2 ΔT Channel fails high.

D. PR Channel N-41 fails high.

Question: 46

1 Pt Given the following conditions on Unit 2:

- The core has been off-loaded to the Spent Fuel Pool
- 2A KF Pump is running
- 2B KF Pump is off
- A Loss of Off-Site Power occurs
- 2A and 2B D/Gs start and load normally
- 30 minutes after the loss of power, a Spent Fuel Pool Hi Temperature alarm is received

Which ONE (1) of the following is the cause of this condition?

A. The 2A or 2B KF pump was not manually restarted (sequencer reset required).

B. The 2A or 2B KF pump was not manually restarted (sequencer reset NOT required).

C. The 2A KF pump ONLY did not automatically load on the Blackout sequence as designed.

D. The 2A and 2B KF pumps did not automatically load during the Blackout sequence as designed.

Question: 47

1 Pt Given the following conditions on Unit 1:

- NC system temperature is 250°F
- 2 NC pumps are in operation

Which ONE (1) of the following lists the Tech Spec 3.5.3 (ECCS - Shutdown) operability requirements based on the above conditions?

A. ONE Charging subsystem and ONE RHR subsystem must be OPERABLE.

B. BOTH Charging subsystems and BOTH RHR subsystems must be OPERABLE.

C. ONE Charging subsystem and BOTH RHR subsystems must be OPERABLE.

D. BOTH Charging subsystems and ONE RHR subsystem must be OPERABLE.

Question: 48

1 Pt A LOCA has occurred on Unit 2 inside Containment. The following conditions are observed:

- Containment pressure is 2.5 PSIG
- Containment sump level is 11 feet
- 1EMF51A (Reactor Building Activity) indicates 40 R/Hr
- Containment hydrogen concentration is 0.4%

Which ONE (1) of the following procedures should be implemented?

A. FR-Z.1 (Response to High Containment Pressure)

B. FR-Z.2 (Response to Containment Flooding)

C. FR-Z.3 (Response to High Containment Radiation Level)

D. FR-Z.4 (Response to High Containment Hydrogen)

Question: 49

1 Pt Given the following:

- Unit 1 is operating at 100% RTP
- Unit 2 is refueling
- Unit 1 is releasing a minimally decayed Waste Gas Decay Tank
- A significant packing leak starts on isolation valve 1WG-160, (WG Decay Tank Outlet to Unit Vent Control)

Which ONE (1) of the following correctly describes the automatic actions which will ensure that the leak is contained and filtered?

A. 0EMF-50 (Waste Gas Disch Hi Rad) automatically closes 1WG-160 AND 1EMF-41 (Aux Bldg Vent Hi Rad) automatically stops the Auxiliary Building ventilation unfiltered exhaust fans.

B. 1EMF-35 (Unit Vent Part Hi Rad) automatically stops the Auxiliary Building ventilation unfiltered exhaust fans AND 1EMF-41 (Aux Bldg Vent Hi Rad) automatically aligns the Auxiliary Building ventilation filter trains.

C. 1EMF-36 (Unit Vent Gas Hi Rad) automatically closes 1WG-160 AND 1EMF-35 (Unit Vent Part Hi Rad) automatically aligns the Auxiliary Building ventilation filter trains.

D. 1EMF-41 (Aux Bldg Vent Hi Rad) automatically stops the Auxiliary Building ventilation unfiltered exhaust fans AND 1EMF-36 (Unit Vent Gas Hi Rad) automatically closes 1WG-160.

Question: 50

1 Pt Which of the following plant evolutions does NOT require that a 1/M plot be performed in accordance with NSD 304 (Reactivity Management)?

A. Initial reactor startup via boron dilution

B. Primary plant cooldown prior to a refueling outage

C. Fuel Loading

D. Reactor startup following a trip from 50% power

Question: 51

1 Pt Which ONE (1) of the following lists the setpoints for the design feature of the ND system which functions to protect the system from overpressure?

A. Suction relief - 450 PSIG
Discharge relief - 650 PSIG

B. Suction relief - 400 PSIG
Discharge relief - 600 PSIG

C. Suction relief - 450 PSIG
Discharge relief - 600 PSIG

D. Suction relief - 400 PSIG
Discharge relief - 650 PSIG

Question: 52

1 Pt Given the following:

- A VI header rupture occurs causing the VI system to completely depressurize.

Which ONE (1) of the following describes how the VS system is prevented from depressurizing due to the break on the VI system?

A. The VI and VS headers are separated using a manual isolation valve. However, VS air compressor will start automatically to maintain VS header pressure.

B. The VI and VS headers are separated using a manual isolation valve. And, the VS air compressor must be manually started to maintain VS header pressure.

C. A valve will automatically close to separate the VI and VS headers. And, the VS air compressor will start automatically to maintain VS header pressure.

D. A valve will automatically close to separate the VI and VS headers. However, the VS air compressor must be manually started to maintain VS header pressure.

Question: 53

1 Pt

Given the following conditions:

- Refueling is in progress on Unit 1
- Reactor vessel head is removed and the refueling cavity is full

Which ONE (1) of the following states the requirements for ND Loop operability in accordance with Tech Spec 3.9.5 (Residual Heat Removal (RHR) and Coolant Circulation — High Water Level) for the conditions above?

A. ONE ND Loop must be OPERABLE and in operation. An ND Loop consists of one ND pump, one heat exchanger, and a flow path from an NC system COLD leg to an NC system HOT leg.

B. TWO ND Loops must be OPERABLE with one ND Loop in operation. An ND Loop consists of one ND pump, one heat exchanger, and a flow path from an NC system COLD leg to an NC system HOT leg.

C. ONE ND Loop must be OPERABLE and in operation. An ND Loop consists of one ND pump, one heat exchanger, and a flow path from an NC system HOT leg to an NC system COLD leg.

D. TWO ND Loops must be OPERABLE with one ND Loop in operation. An ND Loop consists of one ND pump, one heat exchanger, and a flow path from an NC system HOT leg to an NC system COLD leg.

Question: 54

1 Pt Given the following conditions on Unit 1:

- A small break LOCA has occurred inside Containment
- E-1 (Loss of Reactor or Secondary Coolant) has been implemented
- 1ETA is de-energized
- The 1B NI pump has failed
- The 1B Hydrogen Recombiner is out of service
- Containment hydrogen concentration is 7%
- The TSC has recommended purging containment to reduce hydrogen concentration to 3.5% before energizing the igniters

Which ONE (1) of the following statements correctly describes the method for performing this evolution to control the off-site dose?

A. Containment air is exhausted to the Annulus where it is filtered prior to release to the unit vent stack.

B. Containment air is exhausted to the Auxiliary Building where it is filtered prior to release to the unit vent stack.

C. Containment air is exhausted through the Incore Instrument Ventilation system where it is filtered prior to release to the unit vent stack.

D. Containment air is exhausted through the Containment Air Release system where it is filtered prior to release to the unit vent stack.

Question: 55

1 Pt Given the following:

- Unit 2 is operating at 90% RTP after a start-up from a refueling outage
- A Pressurizer PORV is found to be leaking
- The leaking PORV's block valve has been shut

The PRT has been cooled down to the following current conditions:

- PRT level – 65 %
- PRT pressure – 9 PSIG
- PRT temperature – 100°F
- Lower Containment temperature – 118°F

What actions are required in accordance with OP/2/A/6150/004 (Pressurizer Relief Tank) to restore and maintain normal operating conditions in the PRT for the long term?

A. Vent the PRT to containment.

B. Vent the PRT to the waste gas system.

C. Continue to cool the PRT by initiating spray flow from the NCDT.

D. Continue to cool the PRT by initiating spray flow from the RMWST.

Question: 56

1 Pt Given the following initial conditions on Unit 2:

- A unit shutdown and cooldown was in progress
- All actions associated with NC system pressure going below P-11 were completed
- 'B' Train components are in service

The following sequence of events occurs:

1. 120VAC Vital panel board EKVD de-energizes due to an electrical fault
2. 'A' Main Steam line ruptures
3. Pressurizer pressure is 1840 PSIG and going down
4. Containment pressure is 1.2 PSIG and going up

Which ONE (1) of the following would get an automatic START signal? (Assume no operator actions have occurred.)

A. All ECCS equipment

B. None of the ECCS equipment

C. Only 'A' Train ECCS equipment

D. Only 'B' Train ECCS equipment

Question: 57

1 Pt Given the following:

- Unit 2 is operating at 100% RTP
- It has been determined that eight (8) Ice Condenser doors will not open due to floor buckling

Which ONE (1) of the following statements describes the Containment design pressure AND how peak Containment pressure during a Design Basis Accident is affected by the condition above?

A. Containment design pressure is 3 psig. Peak pressure will be reached LATER than normal.

B. Containment design pressure is 3 psig. Peak pressure will be reached SOONER than normal.

C. Containment design pressure is 15 psig. Peak pressure will be reached LATER than normal.

D. Containment design pressure is 15 psig. Peak pressure will be reached SOONER than normal.

Question: 58

1 Pt Given the following conditions:

- A power ascension to 100% RTP is in progress on Unit 1
- The power increase is currently on hold at 80% RTP
- Power Range Channel N-43 fails high

Narrow Range level for _____ increases to the 100% setpoint level.

Which ONE (1) of the following best completes the statement above?

A. all four S/Gs

B. S/G 'C' ONLY

C. S/G 'A' and S/G 'D' ONLY

D. S/G 'B' and S/G 'C' ONLY

Question: 59

1 Pt Given the following conditions on Unit 1:

- A loss of voltage has occurred on 1ETA
- Blackout loading is in progress
- A Safety Injection signal is received before Blackout loading is completed on 1ETA

Which of the following describes the events that occur from the time the Safety Injection signal is received?

A. The Blackout load sequence is completed, 1ETA is cleared of all non-SI loads, and the SI load sequence is actuated.

B. The Blackout load sequence stops, 1ETA is cleared of all non-SI loads, and the SI load sequence is actuated.

C. The Blackout load sequence is completed, 1ETA is cleared of all loads, and the SI load sequence is actuated.

D. The Blackout load sequence stops, 1ETA is cleared of all loads, and the SI load sequence is actuated.

Question: 60

1 Pt Given the following conditions on Unit 1:

- The unit is at 100% power.
- The following annunciator is received in the Control Room:
  - BATT EVCA GROUND

Which ONE (1) of the following describes the indication available if the ground is on the positive leg of battery EVCA, and the resulting operation of the DC Bus?

A. Ground indication light on the back of the Main Control Board will be extinguished. Equipment malfunctions are NOT expected with a ground on one side.

B. Ground indication light on the back of the Main Control Board will be brightly lit. Equipment malfunctions are expected with a ground on either the positive OR negative terminal.

C. Ground indication light on the back of the Main Control Board will be brightly lit. Equipment malfunctions are NOT expected with a ground on one side.

D. Ground indication light on the back of the Main Control Board will be extinguished. Equipment malfunctions are expected with a ground on either the positive OR negative terminal.

Question: 61

Given the following conditions:

- The unit is in Mode 5
- A loss of ND has occurred
- The crew is performing the actions of AP-19 (LOSS OF ND OR ND SYSTEM LEAKAGE)
- BOTH ND Pumps were tripped
- The crew is preparing to start "1A" ND Pump

Which ONE (1) of the following describes the required position of the 1A ND Heat Exchanger outlet isolation (1ND-29) and HX bypass isolation valve (1ND-34) in accordance with AP-19?

	1ND-29	**1ND-34**
A.	OPEN	OPEN
B.	CLOSED	OPEN
C.	OPEN	CLOSED
D.	CLOSED	CLOSED

Question: 62

1 Pt Which of the following will occur simultaneously with an automatic Containment Spray Actuation?

A. Phase A Isolation

B. Feedwater Isolation

C. Main Steam Isolation

D. Containment Ventilation Isolation

Question: 63

1 Pt Given the following:

- Unit 1 @ 100% RTP
- CETs currently indicate 615°F
- A malfunction of the Reference Junction Box temperature control causes the junction box temperature to INCREASE by 20°F

Assuming that ACTUAL core-exit temperature remains constant, which ONE (1) of the following lists the new indication for the non-safety related CETs?

A. 635°F

B. 625°F

C. 605°F

D. 595°F

Question: 64

1 Pt Given the following conditions:

- Unit 1 is in Mode 4
- ND system is providing core cooling
- AP-22 (Loss of VI) has been implemented
- ND system flow rate is being controlled by throttling:

  1NI-173A (1A ND to A & B Cold Legs Cont Outside Isol)
  1NI-178B (1B ND to C & D Cold Legs Cont Outside Isol)

Which ONE (1) of the following describes the requirements in AP-22 for operating the manual loaders for 1ND-14 and 1ND-29 (1B/1A ND Hx Outlet Isolation)?

A. Turn the manual loaders 5-6 times in the clockwise direction to ensure that the valves close when VI pressure is returned to normal.

B. Turn the manual loaders 5-6 times in the counter-clockwise direction to ensure that the valves close when VI pressure is returned to normal.

C. Turn the manual loaders 5-6 times in the clockwise direction to ensure that the valves remain open when VI pressure is returned to normal.

D. Turn the manual loaders 5-6 times in the counter-clockwise direction to ensure that the valves remain open when VI pressure is returned to normal.

Question: 65

1 Pt Which ONE (1) of the exposures would exceed a 10CFR20 annual exposure limit?

A. 45 REM to the thyroid

B. 17 REM to the lens of the eye

C. 45 REM to the leg below the knee

D. 17 REM to the skin

Question: 66

1 Pt Given the following:

- In preparation for a containment entry RP requested that a U-1 RO to align 1EMF 38, 39 & 40 to sample Upper Containment only
- Due to a miscommunication from RP the request is never made to realign this sample point to normal
- 1EMF 38, 39 & 40 sample point remains aligned to upper containment ONLY over the next 12 hours
- A VQ release in is in progress

Which ONE (1) of the following describes the effect on the 1EMF 38, 39 & 40 sample package's ability to monitor changing radiation levels associated with conditions inside U-1 Containment?

A. Due to the limited amount of communication between atmosphere in upper and lower containment, 1EMF-38 will not be able to detect a 1 GPM NC system leak within one hour.

B. Because air is released from upper containment, this will have no effect on the ability of the affected EMF's to auto terminate a VQ release should radiation levels increase.

C. Prolonged operation of this EMF sample package aligned to Upper Containment ONLY could result in damage to the associate sample pump resulting in a degraded sample flowrate.

D. Due to the normal mixing of containment atmosphere by the ventilation system, this does not significantly effect the ability of this sample package to sample the containment atmosphere.

Question: 67

1 Pt

Given the following:

- Unit 2 is operating at 100% RTP
- 'B' Train is in service
- 2A RN train is in operation for testing
- The RN trains are split with 2RN-41B (Train B to Non-Ess Hdr Isol) closed
- 2B RN pump flow is reading approximately 2700 GPM

Subsequently, 2RN-190B (RN to B KC HX Control) is positioned to a value of 100%.

Which ONE (1) of the following correctly describes the component that will stabilize at a LOWER value?

A. Containment temperature

B. NC pump stator temperatures

C. NC pump bearing temperatures

D. Letdown Heat Exchanger temperature

Question: 68

1 Pt

Unit 1 is operating at 100% RTP. Given the following events and conditions:

2100 Power is lost to all Control Room annunciators
2120 The OSM declares an Unusual Event
2125 The Emergency Notification form is completed, and the OSM directs an operator to make the notification to the state and counties
2130 A reactor trip occurs on Unit 1 and the OSM declares a Site Area Emergency
2135 The OSM completes a new Emergency Notification Form and directs the notification of state and counties

Which ONE (1) of the following indicates the time when the state and counties must be first notified of the events described above?

A. 2135

B. 2140

C. 2145

D. 2150

Question: 69

1 Pt

A worker needs to repack a valve in an area that has the following radiological characteristics:

- The worker's present exposure is 800 mREM for the year
- General area dose rate = 65 mREM/hr
- Airborne contamination concentration = 20 DAC

The job will take 4 hours with a mechanic wearing a full-face respirator. It will only take 2 hours if the mechanic does NOT wear the respirator.

Which of the following choices for completing this job would maintain the workers exposure within the Station ALARA requirements?

A. The worker should wear the respirator; otherwise he will exceed 25% of the DAC limit.

B. The worker should NOT wear the respirator because the total TEDE dose received will be greater if he wears one.

C. The worker should NOT wear the respirator because the airborne contamination is low enough that a respirator is not required.

D. The worker should wear the respirator because the total TEDE dose received will be less than if he does not wear one.

Question: 70

1 Pt

The following conditions exist on Unit 1:

- Reactor Power is 50%
- A momentary loss of power occurs on EKVA causing the following instruments to fail low:
  - First Stage Turbine Impulse Pressure Channel 1
  - Power Range Channel N-41

Which ONE (1) of the following correctly completes the statement below?

Tref on the Tave / Tref recorder indicates...

A. 585°F but control rods do not move.

B. 557°F but the control rods do not move.

C. 585°F and the control rods step out at 72 steps per minute.

D. 557°F and the control rods step in at 72 steps per minute.

Question: 71

1 Pt Plant conditions:

- Both units are at 100% power
- Maintenance has requested an opportunity to do troubleshooting on Battery EVCA
- An Electronic Risk Assessment Tool (ORAM) assessment has resulted in a WHITE status on this activity

Which ONE (1) of the following identifies how this maintenance activity should be handled?

A. Allow the maintenance to be performed;
The risk assessment is minimal.

B. Allow the maintenance to be performed;
The risk assessment is acceptable.

C. Do NOT allow the maintenance to be performed;
The risk assessment is high.

D. Do NOT allow the maintenance to be performed;
ORAM cannot determine the risk level.

Question: 72

1 Pt

Unit 1 is being returned to full power following a refueling outage when the following annunciators are received in the Control Room:

- "S/G A FLOW MISMATCH LO STM FLOW" (1AD4-A1)
- "LOOP D/T DEV" (1AD6-E10)
- "A NC PUMP LO FLO ALERT" (1AD6-F1)
- The Safety breaker AND the Feeder breaker for 1A NC pump indicate CLOSED
- Reactor power remains at 55% RTP

Based on the above conditions, which ONE (1) of the following actions is required to be performed?

A. Reduce reactor power to less than 48% and trip 1A NC pump.

B. Manually trip the reactor and go to E-0, Reactor Trip or Safety Injection.

C. Select Delta-T defeat for the affected loop per the Annunciator Response Procedure.

D. Place the A S/G Feed Reg Valve in Manual and reduce feed flow.

Question: 73

1 Pt

The following conditions exist:

- Both units are operating at 100% RTP
- The following alarms are received on both units:
  - 1AD-11 C-5 (XFMR A URGENT ALARM)
  - 2AD-11 C-5 (XFMR A URGENT ALARM)
- Each alarm is the result of a loss of BOTH Cooling Groups to the respective transformer

Which ONE (1) of the following describes the difference in the Operator's response to these two annunciators?

A. The 1A Main Transformer cooling must be restored within 8 min 45 sec in order to prevent a turbine runback to <56%.

B. The 1A Main Transformer cooling must be restored within 28 min 45 sec in order to prevent a turbine runback to <56%.

C. The 2A Main Transformer cooling must be restored within 8 min 45 sec in order to prevent a turbine runback to <56%.

D The 2A Main Transformer cooling must be restored within 28 min 45 sec in order to prevent a turbine runback to <56%.

Question: 74

1 Pt Given the following conditions on Unit 1:

- A LOCA has occurred
- Safety Injection has been initiated

Which ONE (1) of the following describes the operation of the Containment Cooling system based on these conditions?

A. All VU units have started and RV containment isolation valves are open.

B. All VU units have started and RV containment isolation valves are closed.

C. All VU units have shunt tripped off and RV containment isolation valves are open.

D. All VU units have shunt tripped off and RV containment isolation valves are closed.

Question: 75

1 Pt

Unit 1 is operating at 100% RTP. Given the following events and conditions:

- In preparation for a Unit 1 TD CA pump performance test the following valves are positioned as indicated:
  - 1CA-64AB (TD CA Pump To 1A S/G) -- CLOSED
  - 1CA-52AB (TD CA Pump To 1B S/G) -- CLOSED
  - 1CA-48AB (TD CA Pump To 1C S/G) -- OPEN
  - 1CA-36AB (TD CA Pump To 1D S/G) -- OPEN
- An air line supplying 1SA-48ABC (SM FRM S/G 1C TO TD CA PUMP ISOL) ruptures resulting in a loss of air to the valve

Which ONE (1) of the following describes the impact to the Unit 1 CA system AND what actions are required by the operating crew, in accordance with OPS MANAGEMENT EXPECTATIONS, to mitigate the consequences of this event?

A. ALL flow control valves OPEN:
Crew should close all TD CA flow control valves as soon as practical.

B. ALL flow control valves OPEN:
Crew should delay closing all TD CA flow control valves until appropriate procedures have been implemented.

C. Flow control valves remain AS IS:
Crew should close all TD CA flow control valves as soon as practical.

D. Flow control valves remain AS IS:
Crew should delay closing all TD CA flow control valves until appropriate procedures have been implemented.

Question: 76

1 Pt

Given the following:

- Unit 2 is operating at 45% RTP
- A failure of the RC system has occurred resulting in a severe reduction in RC flow to the Main Condenser
- Main Condenser vacuum is at 21" Hg and degrading and the crew has entered AP-23 (Loss of Condenser Vacuum)
- Annunciator 2AD-1, F8 (TURB EXH HOOD HI-HI TEMP) alarms

Which ONE (1) of the following actions would be required to mitigate the current plant conditions?

A. Reduce Turbine Generator load and start additional RC pumps per AP-23.

B. Reduce Turbine Generator load and dispatch operators to start Main Vacuum pumps per AP-23.

C. Trip the turbine, transition to AP-02 (Main Turbine Trip), stabilize reactor power at 12-15%.

D. Trip the reactor, transition to E-0 (Reactor Trip or Safety Injection).

Question: 77

1 Pt

Given the following:

- Unit 1 is operating at 100% RTP
- Train 'B" SSPS testing is in progress

In accordance with OMP 5-3 (TSAIL) entry into Tech Spec 3.3.1 (RTS Instrumentation) for "One Rx Trip Breaker Train Inoperable" must be made when the ___(1)___ and if the RTA Bypass (BYA) breaker is racked in and closed while RTB Bypass (BYB) breaker is racked in and closed, ___(2)___ would receive a trip open signal.

Which ONE (1) of the following correctly completes the statement above?

A. (1) BYB breaker is racked in ONLY
(2) RTA and RTB breakers ONLY

B. (1) BYB breaker is racked in and closed
(2) RTA and RTB breakers ONLY

C. (1) BYB breaker is racked in ONLY
(2) RTA, RTB, BYA, and BYB breakers

D. (1) BYB breaker is racked in and closed
(2) RTA, RTB, BYA, and BYB breakers

Question: 78

1 pt

Unit 1 & 2 are operating at 100% RTP.

- The TCC has notified the Control Room that the "Real Time Contingency Analysis" (RTCA) indicates that switchyard voltage would not be adequate should a Unit Trip occur
- AP-05, (Generator Voltage and Electric Grid Disturbances) has been implemented on BOTH units

Concerning Unit 1, which ONE (1) of the following is the reason why Tech Spec 3.0.3 is entered, AND the reason why Tech Spec 3.8.1 (AC Sources - Operating) is entered?

A. Both D/Gs Load Sequencers being Inoperable, AND
Both D/Gs being Inoperable.

B. Both D/Gs Load Sequencers being Inoperable, AND
Both Offsite Power Sources being Inoperable.

C. Both ECCS trains being Inoperable, AND
Both Offsite Power Sources being Inoperable.

D. Both ECCS trains being Inoperable, AND
Both D/Gs being Inoperable.

Question: 79

1 Pt Given the following conditions:

- Unit 1 is operating at 75% RTP when a dropped rod occurs
- The crew is performing the actions of AP-14 (Rod Control Malfunction) when it is noted that AFD has exceeded the limits of Tech Specs
- The dropped rod has not yet been recovered

Which ONE (1) of the following describes the required actions in accordance with AP-14 and the reason for those actions?

A. Transition to AP-4 (Rapid Downpower) and reduce power to less than 50% to ensure that the fuel is not damaged due to exceeding Radial peaking factors.

B. Initiate a reactor trip and transition to E-0 (Reactor Trip or Safety Injection) to ensure that the fuel is not damaged due to exceeding Radial peaking factors.

C. Transition to AP-4 (Rapid Downpower) and reduce power to less than 50% to ensure that the fuel is not damaged due to exceeding Axial peaking factors.

D. Initiate a reactor trip and transition to E-0 (Reactor Trip or Safety Injection) to ensure that the fuel is not damaged due to exceeding Axial peaking factors.

Question: 80

1 Pt

Unit 1 is operating at 100% RTP with 'B' train components in service with a normal RN system alignment. 1B RN pump amps are swinging.

The following annunciators are in alarm:

- "B RN Pump Suction Lo Press"
- "B RN Pump Discharge Lo Press"

Which ONE (1) of the following is the correct response to the above conditions based on the implementation of AP-20 (Loss of RN)?

A. Implement Case 1, Loss of Operating RN Train
Place the '1A' RN pump in service and,
Remain on Low Level Intake

B. Implement Case 1, Loss of Operating RN Train
Swap alignment to the Nuclear Service Water Pond and,
Place the '1A' RN pump in service

C. Implement Case 2, Loss of Low level or RC Supply Crossover
Place the '1A' RN pump in service and,
Remain on Low Level Intake

D. Implement Case 2, Loss of Low level or RC Supply Crossover
Swap alignment to the Nuclear Service Water Pond and,
Place the '1A' RN pump in service

Question: 81

1 Pt With regards to the analysis for a Design Basis Containment Flooding event, which of the following describes (1) the basis for the maximum Containment sump level AND (2) the sources of water which contribute to the maximum sump level?

A. 1) Sufficient volume to prevent exceeding containment design pressure in the event of a hydrogen ignition event.
2) The entire contents of the NC system, FWST, NI Accumulators and CA Storage Tank.

B. 1) Ensures that vital equipment needed for the safe shutdown of the plant remain available.
2) The entire contents of the NC system, FWST, NI Accumulators and CA Storage Tank.

C. 1) Sufficient volume to prevent exceeding containment design pressure in the event of a hydrogen ignition event.
2) The entire contents of the NC system, FWST, and NI Accumulators ONLY.

D. 1) Ensures that vital equipment needed for the safe shutdown of the plant remain available.
2) The entire contents of the NC system, FWST, and NI Accumulators ONLY.

Question: 82

1 Pt Given the following conditions on Unit 1:

- A Loss of Offsite Power has occurred resulting in a partially stuck open PZR Safety and subsequent Safety Injection
- The 1B D/G failed to start
- Actions in E-0 (Reactor Trip or Safety Injection) are complete
- NC pressure is 1585 PSIG
- RVLIS Lower Range level is 45% and decreasing
- 1NI-9A (NC Cold Leg Inj from NV) is closed and cannot be opened
- CETs are reading 705°F
- Subcooling Monitor is indicating -35°F

Which ONE (1) of the following indicates both the correct procedure and associated strategy which will result in RECOVERY of NC system inventory?

A. Go to FR-C.1 (Response to Inadequate Core Cooling) and establish high head injection via the Standby M/U Pump and the PD pump.

B. Go to FR-C.2 (Response to Degraded Core Cooling) and establish high head injection via the Standby M/U Pump and the PD pump.

C. Go to FR-C.1 (Response to Inadequate Core Cooling) and dump steam from intact S/Gs to allow CLAs and/or ND to recover core cooling.

D. Go to FR-C.2 (Response to Degraded Core Cooling) and dump steam from intact S/Gs to allow CLAs and/or ND to recover core cooling.

Question: 83

1 Pt

Unit 1 is operating at 100% RTP

The following indications are observed:

- NC PUMP SEAL INJ LO FLOW alarm
- CHARGING LINE ABNORMAL FLOW alarm
- REGEN HX LETDN HI TEMP alarm
- NC pump lower bearing temperatures are slowly increasing

Based on the above indications, the crew will enter ____(1)____ and the mitigating strategy for this procedure will require the operators to ____(2)____.

Which ONE (1) of the following correctly completes the statement above?

A. (1) AP-8 (Malfunction of NC Pump)
(2) start the PD pump

B. (1) AP-12 (Loss of Letdown, Charging, or Seal Injection)
(2) start the PD pump

C. (1) AP-8 (Malfunction of NC Pump)
(2) operate 1NV-243 (Regen HX Tube Inlet Control Bypass) as necessary

D. (1) AP-12 (Loss of Letdown, Charging, or Seal Injection)
(2) operate 1NV-243 (Regen HX Tube Inlet Control Bypass) as necessary

Question: 84

1 Pt

Given the following:

- Unit 1 has experienced a Loss of All AC Power
- ECA-0.0 (Loss of All AC Power) is in effect
- The attempted start of the Standby Make-up Pump was unsuccessful
- In accordance with ECA-0.0 the crew is preparing to depressurize the intact S/Gs to 290 PSIG

Which ONE (1) of the following describes the procedural requirements for depressurizing the S/Gs?

A. S/Gs should be depressurized at the maximum rate. S/G depressurization should NOT be stopped if reactor vessel head voiding occurs.

B. S/Gs should be depressurize to establish a cooldown rate close to 100°F / hr. S/G depressurization should NOT be stopped if reactor vessel head voiding occurs.

C. S/Gs should be depressurized at the maximum rate. S/G depressurization should ONLY be stopped if reactor vessel head voiding occurs.

D. S/Gs should be depressurize to establish a cooldown rate close to 100°F / hr. S/G depressurization should ONLY be stopped if reactor vessel head voiding occurs.

Question: 85

1 Pt

Given the following conditions:

- Unit 1 is operating at 100% power
- AP-12 (Loss of Letdown, Charging, or Seal Injection) has been implemented due to fluctuating charging flow indication and 1B NV pump (the running pump) has been stopped
- It is discovered that the VCT N_2 pressure regulator has failed resulting in a high VCT pressure
- The regulator has been replaced and VCT pressure returned to normal
- Pressurizer level is currently at 25% and decreasing at a rate of 1% / min
- Operators in the field are performing AP-12 Enclosure 1 (NV Pump Venting) and report that it will take at least 15 minutes to complete

Which ONE (1) of the following is the required action per AP-12 for the conditions listed above?

A. Start the Standby Makeup pump per Enclosure 3 (Standby Makeup Pump Startup).

B. WHEN pressurizer level decreases to less than 17%, THEN start the Standby Makeup pump per Enclosure 3 (Standby Makeup Pump Startup).

C. Complete the actions of Enclosure 1 and then start an NV pump.

D. WHEN pressurizer level decreases to less than 17%, THEN stop performing Enclosure 1 and IMMEDIATELY start 1A NV pump.

Question: 86

1 Pt

Unit 1 is operating at 100% RTP.

Under which ONE (1) of the following conditions may an active licensed STA assume the duties of the Control Room Supervisor?

The CRS or relief SRO is available to return to the control room within ___(1)___ AND the periods during which the STA assumes SRO duties do not exceed ___(2)___ in duration.

A. (1) 15 minutes
   (2) 15 minutes

B. (1) 15 minutes
   (2) 10 minutes

C. (1) 10 minutes
   (2) 15 minutes

D. (1) 10 minutes
   (2) 10 minutes

Question: 87

1 Pt Given the following:

- Unit 2 is responding to a large LOCA with 10 % failed fuel
- 2NI-184B (1B ND Pump Suction From Cont Sump Isol) would not open during FWST swapover
- 2NI-184B breaker has tripped and will not reset
- The OSM has determined that manual alignment of 2NI-184B is required to protect the health and safety of the general public
- RP projects that expected dose rates in the area of the valve may exceed 150 REM/hr

Which ONE (1) of the following TEDE exposure limits would apply to a worker who volunteered to manually open 2NI-184B in accordance with RP/004 General Emergency?

A. The worker(s) may exceed 25 REM

B. Do not exceed 25 REM

C. Do not exceed 10 REM

D. Do not exceed 5 REM

Question: 88

1 Pt Per RP-10 (NRC Immediate Notification Requirements) which ONE (1) of the following is an event requiring IMMEDIATE notification to the NRC?

A. Any event that may have caused an exposure of greater than or equal to 70 REM EDE.

B. Any event that threatens to cause an exposure of greater than or equal to 50 REM CEDE.

C. Any event that may have caused or threatens to cause an exposure of greater than or equal to 25 REM TEDE.

D. Any event that may have caused or threatens to cause an exposure of greater than or equal to 200 RAD SDE to the skin or extremities.

Question: 89

1 Pt Given the following conditions:

- 45 minutes ago a large break LOCA occurred on Unit 1
- Containment pressure indicates 9 PSIG
- Containment hydrogen concentration is 1%
- CETs indicate temperatures of 1100°F
- RVLIS lower range level indicates 40%
- EMF 51A indicates 185 R/hr
- Subcooling margin indicates -35°F
- All S/G NR level are off scale low with no CA flow indicated

Which ONE (1) of the following is the correct classification and associated EAL Number for this event?

REFERENCES PROVIDED

A. Site Area Emergency based on EAL # 4.1.S.2

B. General Emergency based on EAL # 4.1.G.2

C. Site Area Emergency based on EAL # 4.1.S.1

D. General Emergency based on EAL # 4.1.G.1

Question: 90

1 Pt Which ONE (1) of the following describes the process for notating a Temporary Modification on a flow diagram or electrical one-line drawing in accordance with OMP 10-2, Temporary Modifications?

A. Affected drawings are notated with a pink cloud to refer the operator to the TM package.

B. Flow diagrams and electrical one line drawings SHALL always be red-marked to reflect the temporary modification.

C. Flow diagrams SHALL be red-marked to reflect the temporary modification; electrical one line drawings shall NOT be red marked to reflect the temporary modification.

D. Drawings in WCC office may be red-marked at the SRO's discretion, but the drawings in the Control Room and Tagout office must be changed by the responsible engineer.

Question: 91

1 Pt Given the following conditions:

- Unit 1 is in a refueling outage
- Core unload is in progress
- The Spent Fuel Pool Level Low computer alarm has actuated
- Actual Spent Fuel Pool level is minus 2 feet and slowly going down
- 1EMF-17 (Spent Fuel Bldg. Refueling Bridge) and 1EMF-42 (Fuel Building Radiation Monitor) are in the trip 1 condition
- Unit 1 "INCORE SUMP INST ROOM SUMP HI LEVEL" alarm is received

Which ONE (1) of the following statements describes the mitigating actions for this event?

A. Implement AP-40, Loss of Refueling Cavity Level, and stop the KF pumps and ensure that VF has been placed in filter mode.

B. Implement AP-41, Loss of Spent Fuel Pool Cooling and Level, and stop the KF pumps and ensure that VF has been placed in filter mode.

C. Implement AP-40, Loss of Refueling Cavity Level, move the fuel transfer cart to the Refueling Canal side and have maintenance install the weir gate.

D. Implement AP-41, Loss of Spent Fuel Pool Cooling and Level, move the fuel transfer cart to the Refueling Canal side and have maintenance install the weir gate.

Question: 92

1 Pt Given the following:

- Unit 1 was operating at 100% RTP
- While performing maintenance activities in the 1A D/G Room, one of the heat detectors associated with the Halon system was inadvertently actuated
- The Halon actuation was successfully aborted by the fire watch depressing the ABORT/OFF pushbutton prior to actual Halon discharge

Which ONE (1) of the following describes how the 1A D/G Halon system is affected AND what actions are required per SLC 16.9.3 (Halon Systems)?

A. Auto actuation ONLY is blocked
Establish an Hourly fire watch within one hour

B. BOTH Manual and Auto actuation of the system is blocked.
Establish a Hourly fire watch within one hour.

C. Auto actuation ONLY is blocked
Establish a Continuous Fire Watch within one hour.

D. BOTH Manual and Auto actuation of the system is blocked.
Establish a Continuous Fire Watch within one hour.

Question: 93

1 Pt Given the following conditions:

- A large break LOCA has occurred on Unit 1
- Containment pressure is 11 psig
- FWST level is below the swap over setpoint
- ECA-1.1 (Loss of Emergency Coolant Recirculation) is implemented

Which ONE (1) of the following describes the priority for NS pump operation in this condition and the basis for that operation?

A. ONLY one NS pump is required to be running during ECA-1.1 even if containment pressure red path criteria is exceeded.

B. Both NS pumps are required to be running because FR-Z.1 was implemented in response to an orange path and FRPs have priority over ECA procedures.

C. ONLY one NS pump is required to be running because this conserves FWST water level while providing sufficient NS flow to reduce containment pressure.

D. Both NS pumps are required to be running because a total loss of ND causes the NS system to become relatively more important in reducing containment pressure.

Question: 94

1 Pt Given the following conditions:

- Unit 1 is operating at 25% RTP
- Reactor Power input for 1EMF-71 thru 74 (Unit 1 Steam Line N-16 Monitors) has failed to 100% power.

Based on the conditions above, the alarm setpoints for 1EMF-71 thru 74 are __(1)__ for current plant conditions. Per SLC 16.7.6 (Radiation Monitoring for Plant Operations) basis, the MINIMUM sensitivity required to ensure that the monitors remain OPERABLE is __(2)__.

A. (1) lower than normal
(2) 30 GPD

B. (1) lower than normal
(2) 5 GPD

C. (1) higher than normal
(2) 30 GPD

D. (1) higher than normal
(2) 5 GPD

Question: 95

1 Pt Given the following conditions:

- Unit 1 is at 100% RTP.
- Battery EVCB is aligned for an equalize charge.
- Battery Room Exhaust fans have become inoperable due to low fan capacity.
- It was determined the measured air flows through the battery rooms are below required values.

Which ONE (1) of the following correctly describes the action(s) according to SLC 16.9.23 (Control Room Area Ventilation System) AND the SLC basis for those actions?

Immediately suspend the EVCB equalize charge...

A. ONLY.
This is done to prevent H2 concentration from exceeding the 4% flammability limit.

B. ONLY.
This is done to prevent H2 concentration from exceeding the 2% volume limit in the battery room.

C. AND Lock open all BR-XF Check Dampers.
This is done to prevent H2 concentration from exceeding the 4% flammability limit.

D. AND Lock open all BR-XF Check Dampers.
This is done to prevent H2 concentration from exceeding the 2% volume limit in the battery room.

Question: 96

1 Pt Given the following initial conditions:

- Unit 1 is in Mode 6
- NC system is mid-loop at +10"
- Both ND trains are in operation
- NC system temperature is 190°F
- ND system flow rate is 2000 GPM

Current (amps) indication for both ND pumps begins to fluctuate.

Which ONE (1) of the following describes the condition that is causing the abnormal indications and the actions taken in accordance with AP-19 (Loss of ND or ND System Leakage) to mitigate the problem?

A. ND pumps are cavitating.
Reduce the ND system flow rate.

B. ND pumps are cavitating.
Stop both ND pumps.

C. ND pumps are operating at a runout condition.
Reduce ND system flow rate.

D. ND pumps are operating at a runout condition.
Stop both ND pumps.

Question: 97

1 Pt Given the following:

- The VI system on Unit 1 has become heavily contaminated with oil due to a maintenance problem
- The VI Air Dryer packages rapidly clog

Which ONE (1) of the following describes the impact on VI system operation AND the actions directed by AP-22 (Loss if VI) to mitigate the consequences of the malfunction?

VI header pressure will decrease until…

A. 1VI-1812 (VI Air Dryer Bypass Filter Isol) automatically opens at 85 PSIG. If the valve fails to open, Enclosure 5 (VI Dryer and VI to VS System Isolation) directs the operators to bypass the air dryers locally at 82 PSIG.

B. 1VI-1812 (VI Air Dryer Bypass Filter Isol) automatically opens at 90 PSIG. If the valve fails to open, Enclosure 5 (VI Dryer and VI to VS System Isolation) directs the operators to bypass the air dryers locally at 85 PSIG.

C. 1VI-820 (VI to VS Supply) automatically closes at 85 PSIG. As a backup to the automatic action, AP-22 directs the operators to manually close 1VI-820 at 82 PSIG.

D. 1VI-820 (VI to VS Supply) automatically closes at 90 PSIG. As a backup to the automatic action, AP-22 directs the operators to manually close 1VI-820 at 85 PSIG.

Question: 98

1 Pt Given the following initial conditions:

- Unit 2 was operating at 100% RTP
- Pressurizer Pressure Control switch is in the '1-2' position

Subsequently, the following conditions are observed:

- NC pressure increases
- Pressurizer PORVs 2NC-32B and 2NC-36B open at 2335 PSIG
- Pressure modulates between 2315 PSIG and 2335 PSIG

Which ONE (1) the following instrument failures would cause the conditions observed above AND if the Pressurizer Pressure Control switch remains in the '1-2' position what is current status of 2NC-34A?

A. PZR pressure channel I fails LOW.
2NC-34A is INOPERABLE .

B. PZR pressure channel I fails HIGH.
2NC-34A is INOPERABLE.

C. PZR pressure channel I fails LOW.
2NC-34A is OPERABLE.

D. PZR pressure channel I fails HIGH.
2NC-34A is OPERABLE.

Question: 99

1 Pt In accordance with OP/1/A/6400/006 (Nuclear Service Water System), Enc. 4.4 (Filling the SNSWP), which ONE (1) of the following describes the preferred source of makeup to the SNSWP during normal operations and the basis for it being the preferred source?

A. 'A' Train RN because 'B' Train aligned to the SNSWP makes the Unit 1 SSF inoperable.

B. 'B' Train RN because 'A' Train aligned to the SNSWP makes the Unit 1 SSF inoperable.

C. 'A' Train RN because it maintains train separation.

D. 'B' Train RN because it maintains train separation.

Question: 100

1 Pt Both Units are operating at 100% RTP.

- Loss of Offsite Power occurred on Unit 1
- Both DGs started and loaded as designed
- 1A D/G subsequently trips on overspeed
- At Step 17 of ES 0.1 (Reactor Trip Response), the decision is made to implement AP-07 (Loss of Electrical Power)

Which ONE (1) of the following correctly describes the Time Critical local operator actions associated with AP-07?

A. Implement Enc. 7 (DC Bus Alignment) to realign Battery Charger EVCA to Unit 2 within one hour.

B. Implement Enc. 7 (DC Bus Alignment) to realign Battery EVCA to Battery Charger EVCS within one hour.

C. Implement Generic Enc. 13 (VC and VA System Operation) to restart the Train A VC/YC Chiller within 37.5 minutes.

D. Implement Generic Enc. 13 (VC and VA System Operation) to swap Train A VC/YC Chiller power and water to Unit 2 and restart chiller within 1 hour and 15 minutes.

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McGuire Nuclear Station 2009 Written Examination Answer Key

Question	Answer	Question	Answer	Question	Answer	Question	Answer
1	C	26	C	51	C	76	D
2	C	27	D	52	D	77	D
3	D	28	B	53	C	78	C
4	B	29	C	54	A	79	D
5	A	30	A	55	B	80	D
6	D	31	C	56	C	81	B
7	B	32	A	57	D	82	D
8	B	33	A	58	C	83	B
9	A	34	C	59	B	84	B
10	C	35	A	60	C	85	A
11	C	36	A	61	D	86	C
12	C	37	B	62	C	87	A
13	C	38	D	63	D	88	C
14	A	39	A	64	C	89	B
15	B	40	B	65	B	90	B
16	C	41	B	66	A	91	A
17	A	42	C	67	C	92	C
18	D	43	C	68	A	93	C
19	B	44	B	69	B	94	C
20	C	45	B	70	D	95	D
21	C	46	B	71	D	96	B
22	C	47	A	72	B	97	A
23	B	48	C	73	C	98	C
24	D	49	B	74	C	99	B
25	D	50	B	75	C	100	A

2009 SRO License Exam

References

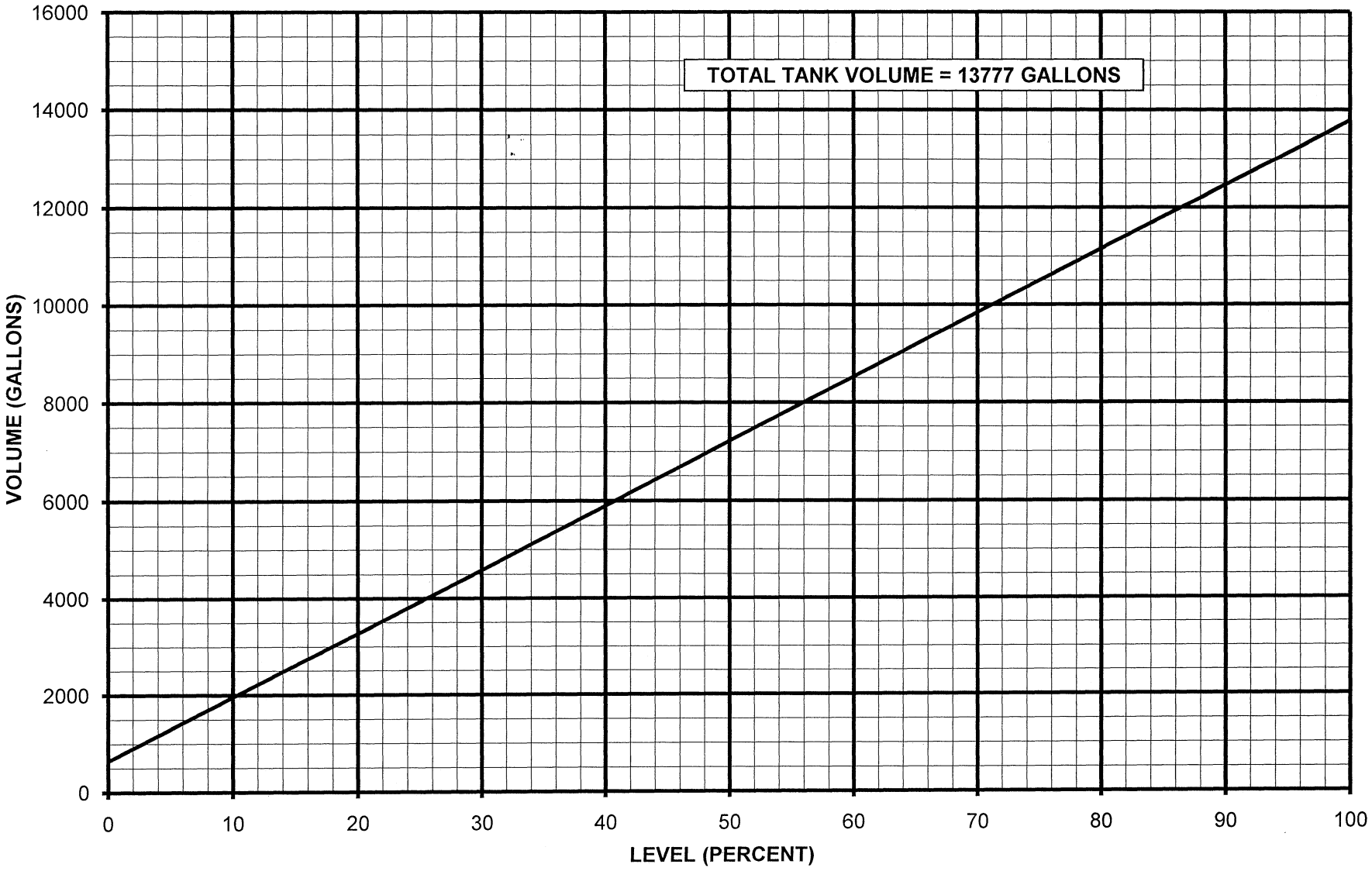
Table of Contents

The following references are provided:

- Copy of the Steam Tables
- RP/0/A/5700/000
- U-1 Data Book Curve 7.38
- U-1 Data Book Curve 1.10B

UNIT 1

OP/1/A/6100/22
ENCLOSURE 4.3
CURVE 7.38
PRESSURIZER
(VOLUME vs. TANK LEVEL)



UNIT 1

This data is also available on the OAC.

OP/1/A/6100/22
ENCLOSURE 4.3
CURVE 1.10B

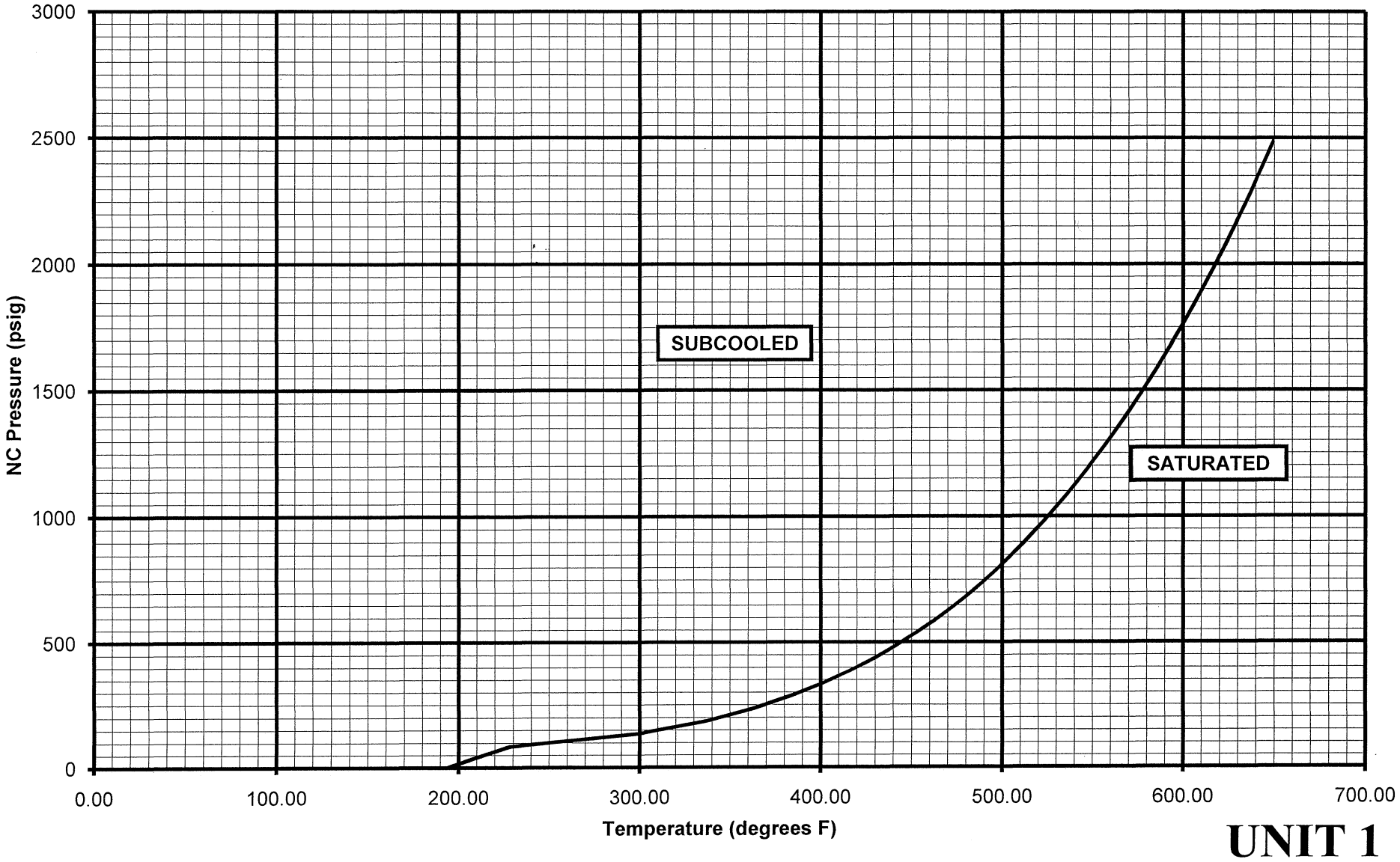
SATURATION CURVE ADJUSTED FOR INSTRUMENT ERROR
(WIDE RANGE NC PRESSURE SENSOR)

NC PRESSURE (psig)	SATURATION TEMP. ADJUSTED FOR INSTRUMENT ERROR (^{O}F)
0.0	193.90
35.3	207.84
85.3	228.15
135.3	299.73
185.3	336.80
235.3	363.07
285.3	383.81
335.3	401.13
385.3	416.09
435.3	429.35
485.3	441.28
535.3	452.17
585.3	462.20
635.3	471.53
685.3	480.25
735.3	488.45
785.3	496.21
885.3	510.56
985.3	523.66
1085.3	535.73
1185.3	546.93
1285.3	557.41
1385.3	567.26
1485.3	576.56
1585.3	585.37
1685.3	593.76
1785.3	601.75
1885.3	609.39
1985.3	616.71
2085.3	623.74
2185.3	630.50
2285.3	637.00
2385.3	643.27
2485.3	649.32

References:
1) Calculation File MCC-1552.08-00-0160, Instrument Uncertainties for ICCM and OAC Subcooling Margin, Rev. 1.
2) MCEI-0400-08, ICCM and OAC Error Adjusted Saturation Tables, Rev. 0.
3) IP/0/A/3000/18, ICCM-86 Programming and Operation, approved 12/3/91.

UNIT 1

OP/1/A/6100/22
ENCLOSURE 4.3 - CURVE 1.10B
SATURATION CURVE ADJUSTED FOR INSTRUMENT ERROR
(WIDE RANGE NC PRESSURE SENSOR)



UNIT 1

Duke Energy McGuire Nuclear Station **Classification Of Emergency** **Reference Use**	Procedure No. **RP/0/A/5700/000** Revision No. **014** Electronic Reference No. **MC0048M3**

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 systems 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 the protection of the public.

1.3.2 Any releases are not expected to 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 Guidelines exposure levels offsite for more than the immediate site area.

2. Immediate Actions

_____ 2.1 Determine operating mode that existed at the time the event occurred prior to any protection system or operator action initiated in response of the event.

_____ 2.2 **IF** the plant was in Mode 1-4 and a **valid** condition affects fission product barriers, **THEN** proceed to Enclosure 4.1 (Fission Product Barrier Matrix).

_____ 2.3 **IF** a General Emergency is **NOT** declared in Step 2.2, **OR** the condition does not affect fission product barriers, **THEN** review the listing of enclosures to determine if the event is applicable to one of the categories shown.

_____ 2.4 Compare actual plant conditions to the Emergency Action Levels evaluated in 2.2 and/or 2.3, then declare the appropriate Emergency Class as indicated.

2.4.1 Event Declaration time _____.

_____ 2.5 Implement the applicable Emergency Response Procedure (RP) for that classification and continue with subsequent steps of this procedure.

Notification of Unusual Event	RP/0/A/5700/001
Alert	RP/0/A/5700/002
Site Area Emergency	RP/0/A/5700/003
General Emergency	RP/0/A/5700/004.

3. Subsequent Actions

_____ 3.1 To escalate, de-escalate, or terminate the Emergency, compare plant conditions to the Initiating Conditions of Enclosures 4.1 through 4.7.

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

_____ 3.3 Refer to section D of the McGuire EPLAN as the basis document for classification of emergencies as needed.

4.0 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 Fire/Explosion 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 Readings for Enclosure 4.3 EALs
4.11 Commitment Reference for Emergency Action Levels

Enclosure 4.1

Fission Product Barrier Matrix

Use EALs to determine Fission Product Barrier status (Intact, Potential Loss, or Loss). Add points for all 3 barriers. Classify according to the table on page 2 of 5 of this enclosure.

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

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

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

Note 4: Critical Safety Function (CSF) indications are not meant to include transient alarm conditions which may appear during the start-up of engineered safeguards equipment. A CSF condition is satisfied when the alarmed state is **valid** and **sustained**. The STA should be consulted to affirm if any CSF has been **validated** prior to that CSF being used as the basis to classify an emergency. {1} Example: If ECA-0.0, Loss of All AC Power, is implemented with an appropriate CSF alarm condition **valid** and **sustained**, that 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.

EAL #	Unusual Event
4.1.U.1	Potential Loss of Containment
4.1.U.2	Loss of Containment

EAL #	Alert
4.1.A.1	Loss **OR** Potential Loss of Nuclear Coolant System
4.1.A.2	Loss **OR** Potential Loss of Fuel Clad
4.1.A.3	Potential Loss of Containment **AND** Loss **OR** Potential Loss of Any Other Barrier

EAL #	Site Area Emergency
4.1.S.1	Loss **OR** Potential Loss of Both Nuclear Coolant System **AND** Fuel Clad
4.1.S.2	Loss **AND** Potential Loss Combinations of Both Nuclear Coolant System **AND** Fuel Clad
4.1.S.3	Loss of Containment **AND** Loss **OR** Potential Loss of Any Other Barrier

EAL #	General Emergency
4.1.G.1	Loss of All Three Barriers
4.1.G.2	Loss of Any Two Barriers **AND** Potential Loss of the Third

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 matrix as a place holder only, and has no point value assigned.

Barrier	Points (1-5)	Potential Loss (X)	Loss (X)
Containment		1	3
NCS		4	5
Fuel Clad		4	5
Total Points			

Total Points	Classification
1 – 3	Unusual Event
4 – 6	Alert
7 – 10	Site Area Emergency
11 - 13	General Emergency

1. Compare plant conditions against the Fission Product 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 "potential loss" **OR** "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 this enclosure, under one of the four "classification" columns, select the event (e.g. 4.1.A.1 for Loss of Nuclear Coolant System) that best fits the loss of barrier description.
7. Using that EAL number (e.g. 4.1.A.1) select the preprinted notification form **OR** a blank form and complete the required information for Emergency Coordinator/EOF Director approval and transmittal.

Enclosure 4.1

Fission Product Barrier Matrix

4.1.C CONTAINMENT BARRIER

POTENTIAL LOSS - (1 Point)	LOSS - (3 Points)
1. Critical Safety Function Status	
• Containment-RED. • Core Cooling - RED Path is indicated for >15 minutes.	• Not applicable.
2. Containment Conditions	
• 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.	• Rapid unexplained decrease in containment pressure following initial increase. • Containment pressure or sump level response not consistent with LOCA conditions.

CONTINUED

4.1.N NCS BARRIER

POTENTIAL LOSS - (4 Points)	LOSS - (5 Points)
1. Critical Safety Function Status	
• NCS Integrity-RED. • Heat Sink-RED.	• Not applicable.
2. NCS Leak Rate	
• 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.

CONTINUED

4.1.F FUEL CLAD BARRIER

POTENTIAL LOSS - (4 Points)	LOSS - (5 Points)
1. Critical Safety Function Status	
• Core Cooling-ORANGE. • Heat Sink-RED.	• Core Cooling-RED.
2. Primary Coolant Activity Level	
• Not applicable.	• Coolant Activity GREATER THAN 300 µCi/cc Dose Equivalent Iodine (DEI) I-131.

CONTINUED

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. Containment Isolation Valves Status After Containment Isolation Actuation		**3. SG Tube Rupture**		**3. Containment Radiation Monitoring**	
• Not applicable.	• Containment isolation is incomplete and a release path from containment exists.	• 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 EMF 51 A or 51 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. SG Secondary Side Release With Primary-to-Secondary Leakage		**4. Containment Radiation Monitoring**		**4. Emergency Coordinator/EOF Director Judgement**	
• 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.	
				END	

CONTINUED

CONTINUED

Enclosure 4.1

Fission Product Barrier Matrix

4.1.C CONTAINMENT BARRIER

POTENTIAL LOSS - (1 Point)	LOSS - (3 Points)
5. Significant Radioactive Inventory In Containment • Containment Rad. Monitor EMF51A or 51B Reading @ time since shutdown: > 390 R/hr @ 0 - 0.5 hr > 170 R/hr @ 0.5 - 2 hr > 125 R/hr @ 2 - 4 hr > 90 R/hr @ 4 - 8 hr > 53 R/hr @ > 8 hr.	• Not applicable.
6. Emergency Coordinator /EOF Director Judgement • 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. **END**	

4.1.N NCS BARRIER

POTENTIAL LOSS - (4 Points)	LOSS - (5 Points)
5. Emergency Coordinator/EOF Director Judgement • 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. **END**	

4.1.F FUEL CLAD BARRIER

POTENTIAL LOSS - (4 Points)	LOSS - (5 Points)

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.

OR

- 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*

4.2.U.3-1 Dose Equivalent I-131 greater than the Technical Specification allowable limit. (*mode 3 with ^{T}avg $\geq$ 500°F)

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

OPERATING MODE: 1, 2, 3, 4

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

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

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

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

OPERATING MODE: ALL

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

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

END

Enclosure 4.3

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

Note: (This applies to all EALs in the 4.3.U.1 IC). 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.

4.3.U.1-1 A **valid** indication on radiation monitor EMF- 49L, EMF-44L or EMF-31 (when aligned to RC) of ≥ 5.45E+06 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 HP/0/B/1009/010, HP/0/B/1009/029, or SH/0/B/2005/001.

(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

Note: (This applies to all EALs in the 4.3.A.1 IC). 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.

4.3.A.1-1 A **valid** indication on radiation monitor EMF- 49H of ≥ 1. 56 E + 03 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/1009/010, HP/0/B/1009/029, or SH/0/B/2005/001.

(Continued)

SITE AREA EMERGENCY

4.3.S.1 **Boundary Dose Resulting from an Actual or Imminent Release of Radioactivity that Exceeds 100 mRem TEDE or 500 mRem CDE Adult Thyroid for the Actual or Projected Duration of the Release.**

OPERATING MODE: ALL

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.

(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

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.

(Continued)

Enclosure 4.3

Abnormal Rad Levels/Radiological Effluent

UNUSUAL EVENT

4.3.U.1-2 A **valid** indication on radiation monitor EMF- 36L of ≥ 2.05E+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 HP/0/B/1009/010, HP/0/B/1009/029, or SH/0/B/2005/001.

4.3.U.1-3 A **valid** indication on radiation monitor EMF-31 (when aligned to WC or WWCB) of ≥ 9.174 E+03 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 HP/0/B/1009/010, HP/0/B/1009/029, or SH/0/B/2005/001.

4.3.U.1-4 Gaseous effluent being released exceeds two times **SLC** 16.11-6 for ≥ 60 minutes as determined by Radiation Protection (RP) procedure.

4.3.U.1-5 Liquid effluent being released exceeds two times **SLC** 16.11-1 for ≥ 60 minutes as determined by Radiation Protection (RP) procedure.

(Continued)

ALERT

4.3.A.1-2 A **valid** indication on radiation monitor EMF- 36L of ≥ 2.05E+06 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/1009/010, HP/0/B/1009/029, or SH/0/B/2005/001.

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 Radiation Protection (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 Radiation Protection (RP) procedure.

(Continued)

SITE AREA EMERGENCY

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

4.3.S.1-1 A **valid** indication on radiation monitor EMF-36H of ≥3.4 E + 03 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**.

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**.

END

GENERAL EMERGENCY

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

4.3.G.1-1 A **valid** indication on radiation monitor EMF-36H of ≥3.4 E + 04 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**.

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**.

END

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 exceeds the levels 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-17
2EMF-4

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

Reactor Building Refueling Bridge
1EMF-16*
2EMF-3*

Containment Noble Gas
1EMF-39*
2EMF-39*

*Applies to Mode 6 and No Mode Only.

(Continued)

SITE AREA EMERGENCY

GENERAL EMERGENCY

Abnormal Rad Levels/Radiological Effluent

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 <358 inches 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)

Abnormal Rad Levels/Radiological Effluent

UNUSUAL EVENT | **ALERT** | **SITE AREA EMERGENCY** | **GENERAL EMERGENCY**

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

OPERATING MODE: ALL

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

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

4.3.A.3-3 **Valid** area EMF 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

Loss of Shutdown Functions

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 200°F

OR

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

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.

(Continued)

GENERAL EMERGENCY

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
		4.4.S.3-2 Failure of heat sink causes loss of cold shutdown conditions. **AND** Reactor Coolant (NC) system narrow range level less than 6 inches and decreasing after initiation of NC system makeup.	
		4.4.S.3-3 Failure of heat sink causes loss of cold shutdown conditions. **AND** Either train ultrasonic level indication less than 6 inches 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)

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.

Continued

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:

Loss of both unit related EVDA and EVDD busses as indicated by bus voltage less than 110 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

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY

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 EVDA and EVDD busses as indicated by bus voltage less than 110 VDC.

AND

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

END

Enclosure 4.6

Fire/Explosion and Security Events

UNUSUAL EVENT

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

OPERATING MODE: ALL

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

- Reactor Building
- Auxiliary Building
- Diesel Generator Rooms
- Control Room
- Standby Shutdown Facility
- CAS
- SAS
- Doghouses
- FWST
- Turbine Building
- Service Building
- Interim Radwaste Building
- Equipment Staging Building
- **ISFSI**.

(Continued)

ALERT

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

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

4.6.A.1-1 The following conditions exist: (includes non-security events) **Fire** or **explosion** in any of the following areas:

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

AND

(Continued)

SITE AREA EMERGENCY

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

OPERATING MODE: ALL

4.6.S.1-1 **Intrusion** into any of the following plant areas by a **HOSTILE FORCE**:

- Reactor Building
- Auxiliary Building
- Diesel Generator Rooms
- Control Room
- Standby Shutdown Facility
- Doghouses
- CAS
- SAS.

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

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

4.6.S.1-4 Other security events as determined from Safeguards Contingency Plan and reported by the security shift supervision.

(Continued)

GENERAL EMERGENCY

4.6.G.1 Security Event Resulting in Loss of Physical Control of the Facility.

OPERATING MODE: ALL

4.6.G.1-1 A **HOSTILE FORCE** has taken control of plant equipment such that plant personnel are unable to operate equipment required to maintain safety functions.

END

UNUSUAL EVENT

4.6.U.1-2 Report by plant personnel of an unanticipated **explosion** within the **protected area** boundary resulting in **visible damage** to permanent structures or equipment or a loaded cask in the **ISFSI**.

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

OPERATING MODE: All

4.6.U.2-1 Security events as determined from Safeguards Contingency Plan and reported by the 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.

4.6.U.2-4 **Hostage** situation/**extortion**.

4.6.U.2-5 A **violent civil disturbance** within the owner controlled area.

END

ALERT

One of the following:

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

- Affected safety system parameter indications show degraded performance
- Plant personnel report **visible damage** to permanent structures or equipment within the specified area.

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: (includes non-security events) **Fire** or **explosion** in any of the following areas:

- Spent Fuel Pool
- Auxiliary Building.

AND

(Continued)

SITE AREA EMERGENCY

4.6.S.2 Site Attack

OPERATING MODE: ALL

4.6.S.2-1 A notification from the site security force that an armed attack, explosive attack, airliner impact, or other **HOSTILE ACTION** is occurring or has occurred within the protected area.

END

GENERAL EMERGENCY

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
	One of the following: Note: Only one train of a system needs to be affected or damaged in order to satisfy this condition. • Spent Fuel Pool level and/or temperature show degraded performance • Plant personnel report **visible damage** to permanent structures or equipment supporting Spent Fuel Pool Cooling.		

4.6.A.3 Other Security Events as Determined from Safeguards Contingency Plan.

OPERATING MODE: ALL

4.6.A.3-1 Other security events as determined from Safeguards Contingency Plan and reported by the security shift supervision.

4.6.A.4 Notification of an Airborne Attack Threat.

OPERATING MODE: ALL

4.6.A.4-1 A validated notification from NRC of airliner attack threat less than 30 minutes away.

(Continued)

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY

4.6.A.5 Notification of HOSTILE ACTION within the OCA.

OPERATING MODE: ALL

4.6.A.5-1 A notification from the site security force that an armed attack, explosive attack, airliner impact or other **HOSTILE ACTION** is occurring or has occurred within the OCA.

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 M1D2422).

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.

(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-13, E-7

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
- Standby Shutdown Facility
- Doghouses
- CAS
- SAS.

OR

Sustained winds ≥ 74 mph for > 15 minutes. {4}

(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, or AP/1(2)/A/5500/024. {3]

AND

Control of the plant cannot be established from the Auxiliary Shutdown Panel or the Standby Shutdown Facility within 15 minutes.

(Continued)

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

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 - Expected to occur within 1-3 hours.

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

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

ISFSI - Independent Spent Fuel Storage Installation.

NO MODE - Defueled.

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

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

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.

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

SIGNIFICANT 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 Guideline exposure levels beyond the site boundary.

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

SLC - Selected Licensee Commitments.

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

TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE) - The sum of external dose exposure to a radioactive plume, to radionuclides deposited on the ground by the plume, and the internal exposure from 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 safety 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.

- The Emergency Coordinator shall review all applicable initiating events to ensure proper classification.

- The BASIS Document (located in Section D of the McGuire Nuclear Site Emergency Plan) is available for review if any questions arise over proper classification.

- If an event occurs on more than one unit concurrently, the event with the higher classification will be classified on the emergency notification form. Information relating to the problem on the other unit will be captured on the emergency notification form line 13 remarks section.

- The Affected Unit(s) on Line 11 is tied to the EAL (IC) Number and EAL (IC) Description on Line 4. Certain events could occur at the plant site such that multiple units are affected. These may include Abnormal Rad Levels/Radiological Effluents; Fire/Explosion and Security Events; and Natural Disasters, Hazards, and Other Conditions Affecting Plant Safety. This shall be considered when evaluating the accuracy of the Unit designation. {PIP 0-M97-4638} If the initiating event puts more than one unit in the same Emergency Classification (example Alert), then the unit designation may be either the Affected Unit numbers or "All." If the initiating event drives one unit to a higher classification, then the unit with the higher classification should be listed as Affected Unit. {PIPs M-03-3294 and C-04-2586}

- The EAL (IC) Number and EAL (IC) Description provided on Line 4 of the emergency notification form should be based on the highest emergency classification that applies. Other classifiable events should be included on Line 13, Remarks, on the emergency notification form, but not given an EAL number. {PIPs M-03-3294 and C-04-2586}

- 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 hot shutdown or higher. An event that is recognized at cold shutdown or lower shall not be classified using the fission product barrier matrix. Reference would be made to the additional 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 a specific duration. 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.

2. 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.

3. 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.

4. If an emergency classification was warranted, but the plant condition has been corrected prior to declaration and notification, the following are applicable: {2}

    a. For UNUSUAL EVENT, the emergency shall be declared and the condition shall be reported. The event should be terminated in a follow-up notification as soon as time permits, but within one hour.

    b. For ALERT, SITE AREA EMERGENCY, and GENERAL EMERGENCY, the emergency shall be declared and the Emergency Response Organization shall be activated. The TSC Emergency Coordinator shall be responsible for terminating the emergency as soon as time permits when appropriate.

    c. The Control Room Emergency Coordinator (Operations Shift Manager) shall ensure that any required follow-up notifications are conducted as required prior to activation of the TSC.

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

1. If plant conditions require implementation of EP/1 or 2/A/5000/E-0 (Reactor Trip or Safety Injection), increased emphasis shall be given to evaluation of plant conditions for determination of EAL(s) when "kickout" of the diagnostic procedure occurs. "Event Time" is the time at which the EAL(s) is determined to be valid by the Emergency Coordinator/EOF Director.

2. If plant conditions do not require implementation of EP/1 or 2/A/5000/E-0 (Reactor Trip or Safety Injection), and conditions of a specific EAL are met, the "Event Time" is the time at which the EAL(s) is determined to be valid by the Emergency Coordinator/EOF Director.

3. The time the event is classified shall be entered on the initial 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 EALs

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	695'	FF, GG-56	Aux. Bldg. Corridor	500	5000
1EMF-5	716'	FF-54	Unit 1 NM Sample Room	600	5000
1EMF-8	733'	HH-56	Aux. Bldg. Corridor	100	5000
1EMF-10	750'	LL-56	Aux. Bldg. Corridor	100	5000
1EMF-13	775'	QQ-56	Shift Lab/Count Room	100	5000
1EMF-17	786'	N/A	Unit 1 Spent Fuel Pool Refueling Bridge	100	5000
2EMF-1	716'	EE, FF-58	Unit 2 NM Sample Room	300	5000
2EMF-4	786'	N/A	Unit 2 Spent Fuel Pool Refueling Bridge	100	5000
2EMF-9	767'	JJ-59	Aux. Bldg. Corridor	100	5000

Enclosure 4.11

Commitment Reference for Emergency Action Levels

{1} PIP-M-00-2138, CA # 18
{2} PIP-M-02-0187, CA # 6
{3} PIP-M-01-2860, CA #2
{4} PIP-M-03-4281, CA #3
{5} PIP-M-05-3403, CA#3, multiple changes in enclosure 4.6

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) – At all times.

BOMB - A fused explosive device.

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.

CONFINEMENT BOUNDARY - The barrier(s) between areas containing radioactive substances and the environment.

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.

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 Guidelines exposure levels offsite for more than the immediate site area.

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

HOSTILE ACTION - An act toward an NPP or its personnel that includes the use of violent force to destroy equipment, takes 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).

UNUSUAL EVENT | ALERT | SITE AREA EMERGENCY | GENERAL EMERGENCY

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

OPERATING MODE: ALL

4.7.A.3-1 Control Room evacuation has been initiated per AP/1(2)/A/5500/017, or AP/1(2)/A/5500/024. {3}

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

Natural Disasters, Hazards, And Other Conditions Affecting Plant Safety

UNUSUAL 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.

END

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

Note: Structures for the below EALs:

- Reactor Building
- Auxiliary Building
- Diesel Generator Rooms
- Control Room
- Standby Shutdown Facility
- Doghouses
- CAS
- SAS.

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

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

(Continued)

SITE AREA EMERGENCY

GENERAL EMERGENCY

Natural Disasters, Hazards, And Other Conditions Affecting Plant Safety

UNUSUAL EVENT

4.7.U.1-5 Independent Spent Fuel Cask tipped over or dropped greater than 12 inches.

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

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

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

OPERATING MODE: ALL

4.7.U.2-1 Report or detection of **toxic** or flammable **gases** that could enter within the **site 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.

(Continued)

ALERT

4.7.A.1-3 **Visible** structural **damage** caused by either:

- Vehicle crashes, **OR**
- Turbine failure generated missiles, **OR**
- Other catastrophic events

on any of the following plant structures:

- Reactor Building
- Auxiliary Building
- FWST
- Diesel Generator Rooms
- Control Room
- Standby Shutdown Facility
- Doghouses
- CAS
- SAS
- Ultimate heat sink (Standby Nuclear Service Water Pond Dam and Dikes and Cowan's Ford Dam and associated Dikes).

(Continued)

SITE AREA EMERGENCY

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