BRUNSWICK SRO NRC EXAM ANSWER SHEET

NAME: _____ DATE: 12/18/2012

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

U.S. Nuclear Regulatory Commission

Site-Specific SRO Written Examination

Applicant Information	
Name:	
Date:	Facility/Unit:
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 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 Scores	_____ / _____ / _____ Points
Applicant's Grade	_____ / _____ / _____ Percent

1. Unit Two is operating at rated power when the 2A CRD pump trips.
   The 2B CRD pump has been started.

   The following CRD conditions exist:
   CRD CHARGING WTR PRESS HI is in alarm
   CRD flow rate is at 30 gpm
   Cooling water differential pressure is 18 psid

   Which one of the following choices completes the statements below?

   The *CRD CHARGING WTR PRESS HI* annunciator setpoint is set to alarm when charging water pressure is __(1)__.

   IAW 2OP-08, Control Rod Drive Hydraulic System Operating Procedure, to clear this alarm the procedure will direct __(2)__.

   A. (1) 1510 psig
      (2) throttling closed C12-F014B, CRD Pump 2B Discharge Isolation Valve

   B. (1) 1510 psig
      (2) throttling closed C12-PCV-F003, Drive Pressure Vlv

   C. (1) 275 psid above reactor pressure
      (2) throttling closed C12-F014B, CRD Pump 2B Discharge Isolation Valve

   D. (1) 275 psid above reactor pressure
      (2) throttling closed C12-PCV-F003, Drive Pressure Vlv

2. Which one of the following identifies the power supply to 2C RHR Pump?

A. E1

B. E2

C. E3

D. E4

3. RHR Loop A is operating in the Shutdown Cooling mode of operation with the following parameters:

RHRSW Pump 2A	Operating
RHRSW Flow	2000 gpm
RHR Pump 2A	Operating
RHR Loop A Flow	6000 gpm

Which one of the following choices completes the statements below?

The required operator action to lower the cooldown rate IAW 2OP-17, Residual Heat Removal System Operating Procedure, is to __(1)__.

The effect of this action is that heat exchanger shell to tube differential pressure will __(2)__.

A. (1) throttle open E11-F048A, HX 2A Bypass Valve
(2) rise

B. (1) throttle open E11-F048A, HX 2A Bypass Valve
(2) lower

C. (1) throttle closed E11-PDV-F068A, HX 2A SW Disch Vlv
(2) rise

D. (1) throttle closed E11-PDV-F068A, HX 2A SW Disch Vlv
(2) lower

4. Unit Two is in Mode 3 with shutdown cooling in service when a loss of 2D RHRSW Booster pump occurs.
Both RHR pumps and 2B RHRSW pump continue to operate.
The operator observes annunciator *RHR HX A/B Disch Clg Wtr Temp Hi* in alarm and the RHR HX service water outlet temperature is indicating 185°F.

Which one of the following choices completes the statements below?

Continued operation with this alarm in will cause __(1)__.

IAW the APP, the operator is required to __(2)__.

A. (1) overheating of the RHR Pumps
(2) raise RHRSW flow

B. (1) overheating of the RHR Pumps
(2) throttle open E11-F003B, HX 2B Outlet Vlv

C. (1) short term seismic qualification concerns with the RHRSW system
(2) raise RHRSW flow

D. (1) short term seismic qualification concerns with the RHRSW system
(2) throttle open E11-F003B, HX 2B Outlet Vlv

5. Unit Two is operating at rated power when the circuit breaker on 120V Distribution Panel 32A to the NUMAC Steam Leak Detection Monitor B21-XY-5948A and 5949A trips.

   Which one of the following identifies the effect of this condition on the HPCI system?

   A. E41-F002, HPCI Inboard Steam Line Isolation Valve, will immediately auto-isolate.

   B. E41-F003, HPCI Outboard Steam Line Isolation Valve, will immediately auto-isolate.

   C. The area temperature isolation signal is disabled for the E41-F002, HPCI Inboard Steam Line Isolation Valve. E41-F002 remains open.

   D. The area temperature isolation signal is disabled for the E41-F003, HPCI Outboard Steam Line Isolation Valve. E41-F003 remains open.

6. A transient has occurred on Unit One causing the following plant conditions:

Drywell pressure	12 psig
Reactor water level	65 inches
Reactor pressure	360 psig

Which one of the following choices completes the statement below?

E21-F005A, Core Spray A Inboard Injection Valve, is __(1)__, and E21-F031A, Min Flow Bypass Valve, is __(2)__.

A. (1) open
   (2) open

B. (1) open
   (2) closed

C. (1) closed
   (2) open

D. (1) closed
   (2) closed

7. An ATWS has occurred on Unit One and reactor water level deliberately lowered IAW LPC. The following conditions exist:

Reactor Water Level	maintained between LL4 and TAF
Reactor Power	9%
Reactor Pressure	960 psig
SLC Tank Level	2800 gallons
SLC Pumps	Both operating

Which one of the following choices completes the statements below?

Adequate mixing of the boron with reactor water __(1)__ assured at this level.

Under the current conditions the time for the SLC tank to reach 0% would be approximately __(2)__ minutes.

A. (1) is
(2) 32 to 34

B. (1) is
(2) 65 to 68

C. (1) is NOT
(2) 32 to 34

D. (1) is NOT
(2) 65 to 68

8. Unit Two is in a hydraulic ATWS with the following plant conditions:

Reactor power	31%
Mode Switch	RUN

Which one of the following additional conditions will prevent the operator from resetting RPS and inserting a manual scram prior to the LEP-02, Section 3 jumper installation with the given conditions?

A. *SDV HI-HI LEVEL RPS TRIP* annunciator sealed in.

B. Reactor water level is at 170 inches.

C. *IRM A UPSCALE/INOP and IRM B UPSCALE/INOP* annunciators sealed in.

D. B21-F022A, Inboard MSIV and B21-F028D, Outboard MSIV, closed.

9. Unit One is at rated power. Reactor Engineering has completed performance of 0PT-01.9, LPRM Calibration. The TIPs are currently located at the indexer.

Which one of the following choices completes the statements below?

The TIPS Indexer is located in the __(1)__.

While the TIPS are being withdrawn to the inshield position the expected control room annunciator(s) is(are) __(2)__.

A. (1) TIP Room
(2) *Area Rad Rx Bldg High* and *Tip Room High Rad*

B. (1) TIP Room
(2) *Tip Room High Rad* ONLY

C. (1) Drywell
(2) *Area Rad Rx Bldg High* and *Tip Room High Rad*

D. (1) Drywell
(2) *Tip Room High Rad* ONLY

10. Which one of the following choices completes the statements below?

The __(1)__ varies the sensitivity levels as the IRM range switches are operated.

The IRM Channel Range Correlation Adjustment is required to be performed prior to range __(2)__.

A. (1) voltage preamplifier
(2) 3

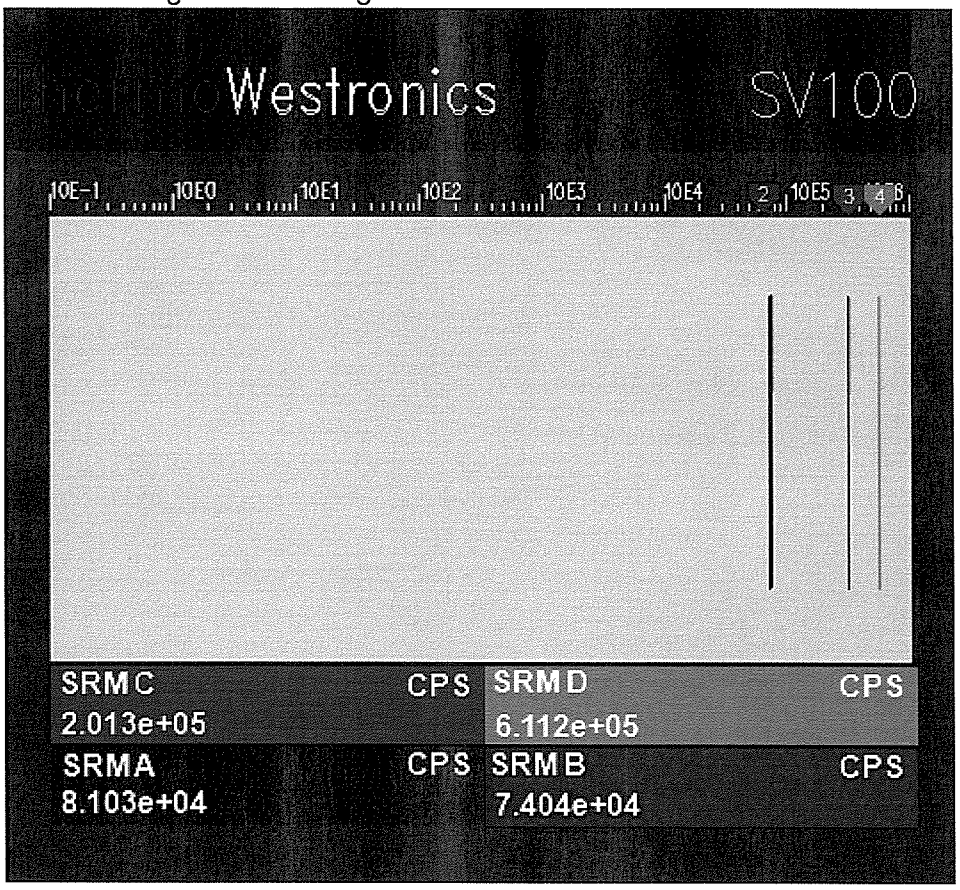
B. (1) voltage preamplifier
(2) 7

C. (1) pulse height discriminator
(2) 3

D. (1) pulse height discriminator
(2) 7

11. Unit Two is in the process of a reactor startup IAW 0GP-02, Approach to Criticality and Pressurization of the Reactor, following a refueling outage.

The following SRM readings are indicated:



All IRMs are on range 4.

Which one of the following identifies the expected plant response with the shorting links installed?

A. Alarm ONLY.

B. Alarm and rod block ONLY.

C. Alarm, rod block and 1/2 scram.

D. Alarm, rod block and full scram.

12. The current quantity of operating LPRM detectors in the flux average is 17 for APRM 1.

An operator is preparing to bypass another LPRM on APRM 1.

Which one of the following predicts the expected annunciator(s) that will alarm after bypassing this LPRM?

A. *APRM Trouble* ONLY.

B. *APRM Upscale Trip/Inop* ONLY.

C. *APRM Trouble* and *Rod Out Block.*

D. *APRM Upscale Trip/Inop* and *Rod Out Block.*

13. Unit One is operating at rated power.

Which one of the following identifies the impact of a loss of DC Switchboard 1A, if any, on Reactor vessel level control using RCIC?

RCIC __(1)__ automatically initiate on a subsequent low level signal.

The E51-F045, Turbine Steam Supply Vlv, __(2)__ auto-close on a subsequent high level signal.

A. (1) will
   (2) will

B. (1) will
   (2) will NOT

C. (1) will NOT
   (2) will

D. (1) will NOT
   (2) will NOT

14. Unit Two operating at rated power when a small break LOCA occurs simultaneously with a Loss of Off-site Power to both units.

Reactor water level	35 inches
Reactor pressure	600 psig and stable
DG1, DG2 and DG3	Tied to their respective busses
DG4	Locked out
2A RHR pump	failed to auto-initiate
2D RHR pump	failed to auto-initiate
2A Core Spray pump	tripped on overcurrent
2B Core Spray pump	Under clearance
ADS Inhibit Switches	in AUTO

Based on the conditions above, which one of the following identifies:

(1) the current status of *Auto Depress Timers Initiated* annunciator and

(2) a subsequent operator action that will result in the ADS valves opening?

A. (1) The annunciator is in alarm
(2) Starting 2A RHR Pump.

B. (1) The annunciator is in alarm
(2) Starting 2D RHR Pump.

C. (1) The annunciator is NOT in alarm
(2) Starting 2A RHR Pump.

D. (1) The annunciator is NOT in alarm
(2) Starting 2D RHR Pump.

15. Unit Two is operating at rated power with B Loop Suppression Pool Cooling in service with cooling maximized.

A plant transient results in the following stable conditions:

DW pressure	3 psig
Reactor pressure	400 psig
Reactor water level	50 inches

Which one of the following choices completes the statement below?

In order to re-establish Suppression Pool Cooling IAW the SPC hard card, __(1)__ must be restarted and the use of RHR SW Booster Pumps B & D LOCA Override Switch __(2)__ be required.

A. (1) the 2B/D RHR and 2B/D RHR SW pumps
(2) will

B. (1) the 2B/D RHR and 2B/D RHR SW pumps
(2) will NOT

C. (1) ONLY the 2B/D RHR SW Pumps
(2) will

D. (1) ONLY the 2B/D RHR SW Pumps
(2) will NOT

16. A LOCA has occurred on Unit Two. Subsequently a steam line leak occurs on the RCIC system. The following plant conditions are present 10 minutes after the steam line leak occurred:

Reactor water level	95 inches
Drywell pressure	3.5 psig
Reactor pressure	900 psig
RCIC Steam Line Tunnel Ambient Temp	170°F

The CRS orders the RO to manually isolate RCIC.

Which one of the following describes the effect when the RCIC Manual Isolation System B pushbutton is depressed on the E51-F007 and F008, Inboard and Outboard Steam Supply Isolation valves?

A. E51-F007 and F008 auto-close.

B. ONLY E51-F008 auto-closes.

C. ONLY E51-F007 auto-closes.

D. E51-F007 and F008 remain open.

17. Unit 1 is operating at rated power.
An operator is performing the valve operability checks portion of 0PT-08.2.2B, LPCI/RHR System Operability Test – Loop B, and is preparing to stroke the E11-F016B, Drywell Spray Otbd Isol Vlv, and E11-F021B, Drywell Spray Inbd Isol Vlv.

Which one of the following completes the statements below IAW 0PT-08.2.2B?

The E11-F016B and E11-F021B __(1)__ both be opened at the same time during the performance of this test.

When E11-F021B is stroked during this portion of the test, some water __(2)__ enter the Drywell through the spray header.

A. (1) can
(2) may

B. (1) can
(2) will NOT

C. (1) can NOT
(2) may

D. (1) can NOT
(2) will NOT

18. Which one of the following choices completes the statements below IAW PCCP and 0OI-37.8, Primary Containment Control Procedure Basis Document?

In the PC/P leg, suppression pool spray must be initiated before __(1)__ pressure reaches 11.5 psig.

If suppression pool spray is NOT initiated before reaching 11.5 psig, then __(2)__.

A. (1) drywell
(2) a crack could occur at the junction of the downcomer and the vent header

B. (1) drywell
(2) air will be drawn in through the vacuum relief system to deinert the primary containment

C. (1) suppression chamber
(2) a crack could occur at the junction of the downcomer and the vent header

D. (1) suppression chamber
(2) air will be drawn in through the vacuum relief system to deinert the primary containment

19. During Unit Two power operation, a power supply loss results in a reactor scram. The operator notes the following MSIV indications immediately after the scram:

Inboard DC solenoid white light	OUT
Inboard AC solenoid white light	LIT
Outboard DC solenoid white light	OUT
Outboard AC solenoid white light	OUT

Which one of the following identifies the power supply that has been lost?

A. Division I AC Power

B. Division I DC Power

C. Division II AC Power

D. Division II DC Power

20. Which one of the following identifies the valves that can be operated from the RSDP and identifies the effect that a loss of MCC 1XDB will have on the Unit One SRVs operations from the RSDP?

The control switches for SRVs B, E, and __(1)__ are located on the RSDP.

These valves __(2)__ be operated from the RSDP following a loss of MCC 1XDB.

A. (1) F
(2) can

B. (1) F
(2) can NOT

C. (1) G
(2) can

D. (1) G
(2) can NOT

21. Unit Two is operating at rated power with no activities in progress.

A leaking SRV has resulted in rising Suppression Pool temperature.

Which one of the following choices completes the statement below?

When Suppression Pool temperature first exceeds __(1)__ entry into __(2)__ is required.

A. (1) 95°F
   (2) PCCP ONLY

B. (1) 105°F
   (2) PCCP ONLY

C. (1) 95°F
   (2) PCCP and RSP

D. (1) 105°F
   (2) PCCP and RSP

22. Unit Two is at 20% power with main turbine roll in progress IAW 2OP-26, Turbine System Operating Procedure. Turbine speed is 900 RPM and slowly rising.

The following turbine journal bearing vibration readings are observed on TSI-XR-640:

Bearing #1	5 mils	Bearing #6	10 mils
Bearing #2	5 mils	Bearing #7	11 mils
Bearing #3	6 mils	Bearing #8	13 mils
Bearing #4	7 mils	Bearing #9	11 mils
Bearing #5	8 mils	Bearing #10	10 mils

Which one of the following:

1) predicts the plant response and

2) identifies required operator action(s), if any, IAW 2OP-26?

A. (1) An automatic turbine trip will occur.
(2) Manually scram the reactor.

B. (1) An automatic turbine trip will occur.
(2) The reactor is NOT required to be manually scrammed.

C. (1) An automatic turbine trip will NOT occur.
(2) Manually scram the reactor and then trip the turbine.

D. (1) An automatic turbine trip will NOT occur.
(2) Manually trip the turbine, the reactor is NOT required to be manually scrammed.

23. Unit Two is operating at 35% power.

Which one of the following choices completes the statements below concerning the CO-FV-49, SJAE Condensate Recirculation Valve?

On a loss of the pneumatic supply to CO-FV-49, condensate system flow will ___(1)___.

On a loss of control power to the CO-FV-49, condensate system flow will ___(2)___.

A. (1) increase
   (2) increase

B. (1) increase
   (2) remain the same

C. (1) remain the same
   (2) remain the same

D. (1) remain the same
   (2) increase

24. Unit Two is operating at 60% power with Reactor Feed Pump (RFP) 2A running and RFP 2B unavailable. RFP A Manual/DFCS selector switch is in the DFCS position. The operator observes the following:

RFP A Control Trouble alarm is received
DFCS Control light for RFP A on XU-1 is out

Which one of the following choices completes the statements below?

RFP 2A speed will __(1)__.
The operator can control RFP speed by __(2)__.

A. (1) lower to 2550 rpm
   (2) operating the RFP Raise/Lower control switch on XU-1

B. (1) lower to 2550 rpm
   (2) placing the RFP A Speed Controller in Manual and adjusting the output demand

C. (1) NOT change
   (2) operating the RFP Raise/Lower control switch on XU-1

D. (1) NOT change
   (2) placing the RFP A Speed Controller in Manual and adjusting the output demand

25. Unit One drywell pressure is slowly rising and venting of the suppression chamber is being performed IAW 1OP-10, Standby Gas Treatment System Operating Procedure. SBGT system valve status:

1-CAC-V172, Supp Pool Purge Exh Vlv	Open
1-CAC-V22, Torus Purge Exh Vlv	Open
1-VA-1D-BFV-RB, Reactor Building SBGT Train 1A Inlet Valve	Closed
1-VA-1H-BFV-RB, Reactor Building SBGT Train 1B Inlet Valve	Closed

Which one of the following choices completes the statements below concerning the predicted plant response if drywell pressure reaches 1.5 psig and reactor water level lowers to 160 inches and then stabilizes?

Both 1-CAC-V172 and 1-CAC-V22 valves __(1)__.
Both 1-VA-1D-BFV-RB and 1-VA-1H-BFV-RB valves __(2)__.

A. (1) auto-close
   (2) remain closed

B. (1) auto-close
   (2) auto-open

C. (1) remain open
   (2) remain closed

D. (1) remain open
   (2) auto-open

26. Unit One is operating at rated power with Standby Gas Treatment (SBGT) system controls aligned as follows:

    Train A in PREF A
    Train B in STBY B

    Off-Site Power is lost.
    DG1 and DG2 tie to their respective busses.
    RPV water level lowers to 115 inches and then stabilizes.
    Containment parameters and radiation levels are normal.

    Which one of the following identifies how SBGT Train A and B will respond?

    A. SBGT Train A only will start.

    B. SBGT Train B only will start.

    C. Both SBGT Train A and B will start.

    D. Both SBGT Train A and B remain off.

27. Unit Two is operating at rated power when a 230 kV Transformer Bus Lockout occurs.

Which one of the following identifies the electrical bus that will remain de-energized with no operator actions?

A. 4160 Bus 2B

B. 480 V MCC WTA

C. 4160 Bus Common B

D. 480 V MCC CWA-Bus A

28. Unit Two is operating at rated power when a Primary UPS Inverter malfunction results in an overvoltage on the inverter output.

Which one of the following choices completes the statements below?

The UPS Distribution Panel 2A __(1)__.

IAW the APPs, the required operator action is to place the UPS Distribution Panel 2A on __(2)__.

A. (1) remains energized
(2) MCC 2CA

B. (1) remains energized
(2) the standby UPS inverter

C. (1) is de-energized
(2) MCC 2CA

D. (1) is de-energized
(2) the standby UPS inverter

29. Which one of the following completes the statements below regarding 125/250 VDC Station Distribution?

During an equalize charge, the charger output voltage to the battery will be at a __(1)__ voltage than when in the float mode.

The 125 VDC batteries are sized to supply emergency power at a 150 amp rate for __(2)__ hours.

A. (1) lower
(2) 8

B. (1) lower
(2) 10

C. (1) higher
(2) 8

D. (1) higher
(2) 10

30. DG1 was running in Control Room Manual for the performance of 0PT-12.2A, No. 1 Diesel Generator Monthly Load Test, and loaded to 2100 KW.

Subsequently off-site power was lost.

Which one of the following choices completes the statements below after the system has stabilized?

The current mode of DG1 governor is in __(1)__ mode of operation.

DG1 frequency is slightly __(2)__ 60 Hz.

A. (1) droop
   (2) less than

B. (1) droop
   (2) greater than

C. (1) isochronous
   (2) less than

D. (1) isochronous
   (2) greater than

31. A loss of offsite power occurs on Unit Two.
Unit One is at rated power.

Which one of the following choices completes the statements below?

If DG3 failed to auto-start and additional power is needed to support the EOPs the required operator action is to crosstie __(1)__ IAW 0AOP-36.1, Loss of Any 4160V Buses or 480V E-Buses.

If a low lube oil pressure occurs on DG4, it __(2)__ trip.

A. (1) E1 to E3
(2) will

B. (1) E4 to E3
(2) will

C. (1) E1 to E3
(2) will NOT

D. (1) E4 to E3
(2) will NOT

32. Unit One was operating at rated power with AOG-HCV-102, AOG System Bypass Valve, control switch in AUTO.

Subsequently, several annunciators began alarming, including:

UA-03 4-2, *Process Off-Gas Rad Hi-Hi*
UA-03 5-4, *Process OG Vent Pipe Rad Hi-Hi*
UA-48 5-2, *AOG System Disch Rad High*
UA-48 6-2, *AOG Building Radiation High*

Which one of following annunciators is also triggered by the same radiation monitor that will prevent the AOG System Bypass Valve from being manually opened?

A. UA-03 4-2

B. UA-03 5-4

C. UA-48 5-2

D. UA-48 6-2

33. Which one of the following identifies the power supply to the Main Stack Radiation Monitor?

A. Powered from Unit One UPS ONLY.

B. Powered from Unit Two UPS ONLY.

C. Normally powered from Unit One UPS, can be transferred to Unit Two UPS.

D. Normally powered from Unit Two UPS, can be transferred to Unit One UPS.

34. Unit Two is operating at rated power when a large unisolable steam leak occurs in the turbine building. Annunciator *TURB BLDG VENT RAD HIGH* has been received.

Which one of the following choices completes the statements below?

The required action IAW RRCP is to __(1)__.

IAW 0OI-37.10, Radioactivity Release Control Procedure Basis Document, the basis for this action is to __(2)__.

A. (1) place Turbine Bldg Ventilation in the recirculation line-up
(2) ensure the Turbine Building envelope is maintained at a negative pressure

B. (1) place Turbine Bldg Ventilation in the recirculation line-up
(2) terminate a large unfiltered volume discharge flow path

C. (1) start an additional Turbine Building Ventilation Exhaust Fan
(2) ensure the Turbine Building envelope is maintained at a negative pressure

D. (1) start an additional Turbine Building Ventilation Exhaust Fan
(2) terminate a large unfiltered volume discharge flow path

35. The control room receives annunciator *Rx Bldg Static Press Diff-Low* due to a microburst thunderstorm.
The operator observes that the VA-PI-1297, Reactor Bldg Neg Pressure, on Panel XU3 is reading 0 inches H2O.

Which one of the following predicts the system response?

Reactor Building ventilation:

A. supply and exhaust fans will auto trip, SBGT system does NOT auto-start.

B. supply and exhaust fans will auto trip, SBGT system auto-starts.

C. exhaust fan vortex dampers will throttle open.

D. supply fan vortex dampers will throttle closed.

36. Unit One is at rated power.
Unit Two is at 48% power in single recirculation loop operation.

Which one the following choices completes the statement below concerning the Minimum Critical Power Ratio (MCPR) safety limit for Unit One and Unit Two?

MCPR shall be greater than or equal to __(1)__ for Unit One.
MCPR shall be greater than or equal to __(2)__ for Unit Two.

A. (1) 1.11
(2) 1.12

B. (1) 1.11
(2) 1.13

C. (1) 1.12
(2) 1.12

D. (1) 1.12
(2) 1.13

37. Unit Two is at rated power with the following plant conditions:

SJAE Train A is in full load operation
CWIPs A, B, and D are in operation
CW Isol Valves Mode Selector switch is in the B position

The following annunciators are received:

CW Screen A Diff-High or Stopped
CW Screen Diff Hi-Hi
Exhaust Hood A Vacuum Low
Exhaust Hood B Vacuum Low

Then *CW Pump A Trip* is received and *CW Screen A Diff-High or Stopped* annunciator clears.

The AO verifies that the screens are in fast mode of operation.

Which one of the following identifies the required action(s) IAW 0AOP-37.0, Low Condenser Vacuum?

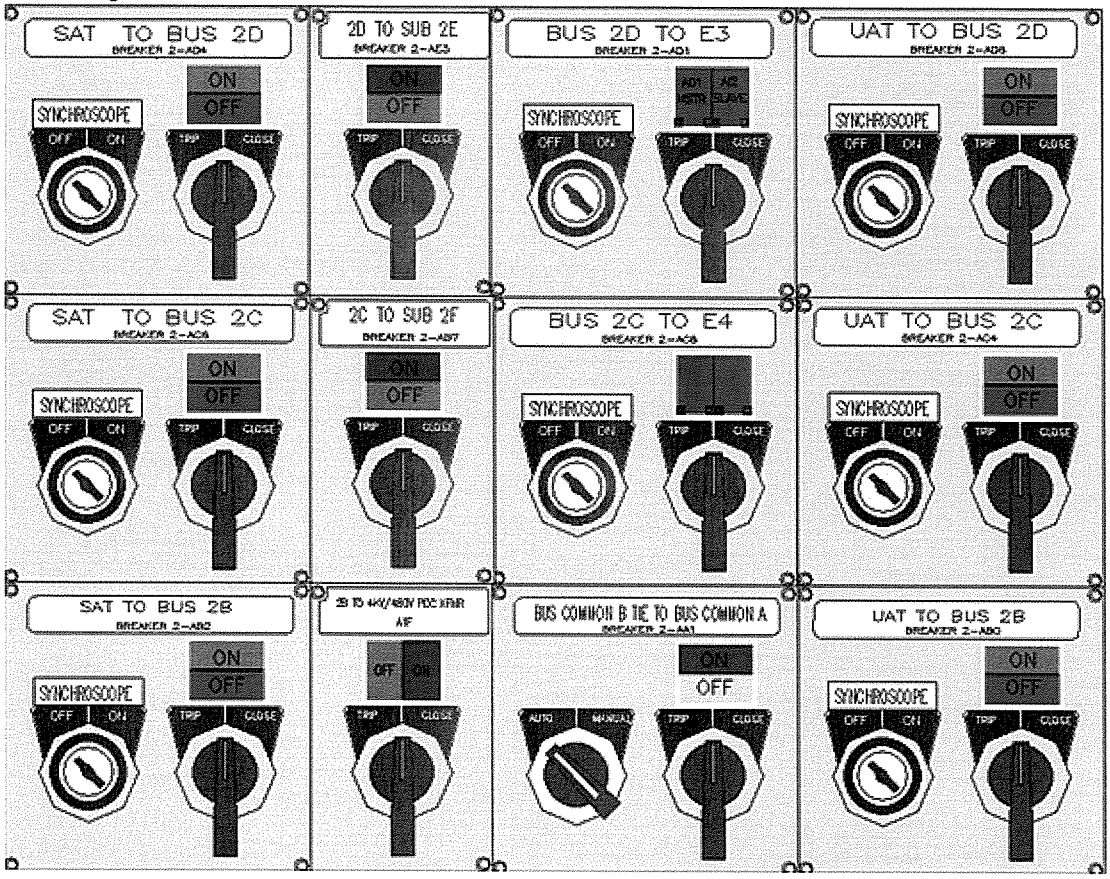
A. Ensure CW Isol Valves Mode Selector switch is in the C position.

B. Place SJAE A and B Trains in half load operation.

C. Start CWIP C which is limited to two consecutive attempts.

D. Restart CWIP A which is limited to two consecutive attempts.

38. Unit Two was operating at rated power when an electrical fault occurred. The operator performed the Scram immediate operator actions and observes the following electrical indications after the transient:



Which one of the following identifies the cause of the electrical transient?

A. UAT Lockout

B. SAT Lockout

C. 2B Bus Lockout

D. Main Generator Lockout

39. The following conditions exist on Unit Two:

Bus E4 125 VDC control power normal supply breaker has tripped

If a severe overcurrent condition subsequently occurs on 2B CRD pump motor windings, which one of the following identifies the breaker(s) that will trip? (Assume no operator action taken)

A. 2-E4-AK8, CRD pump 2B breaker.

B. 2-E4-AJ9, BOP to E Bus slave breaker ONLY.

C. 2C-AC8, BOP to E Bus master breaker ONLY.

D. Both 2C-AC8, BOP to E Bus master and 2-E4-AJ9, BOP to E Bus slave breakers.

40. Unit Two is operating at rated power.

At 12:15:00 the following annunciators are received:

Stat Coolant Inlet Flow-Low
Loss of Stat Coolant Trip Ckt Ener

Reactor power has been lowered IAW 0ENP-24.5, Reactivity Control Planning.

At 12:16:00 Main Generator amperes are 17,814 amps.

Assuming no further operator action, which one of the following indicates the expected plant response?

The Main Generator will trip at:

A. 12:17:00.

B. 12:18:00.

C. 12:18:30.

D. 12:19:30.

41. Which one of the following conditions meet the definition of Shutdown Under All Conditions Without Boron?

All rods inserted except:

A. nine rods at position 02.

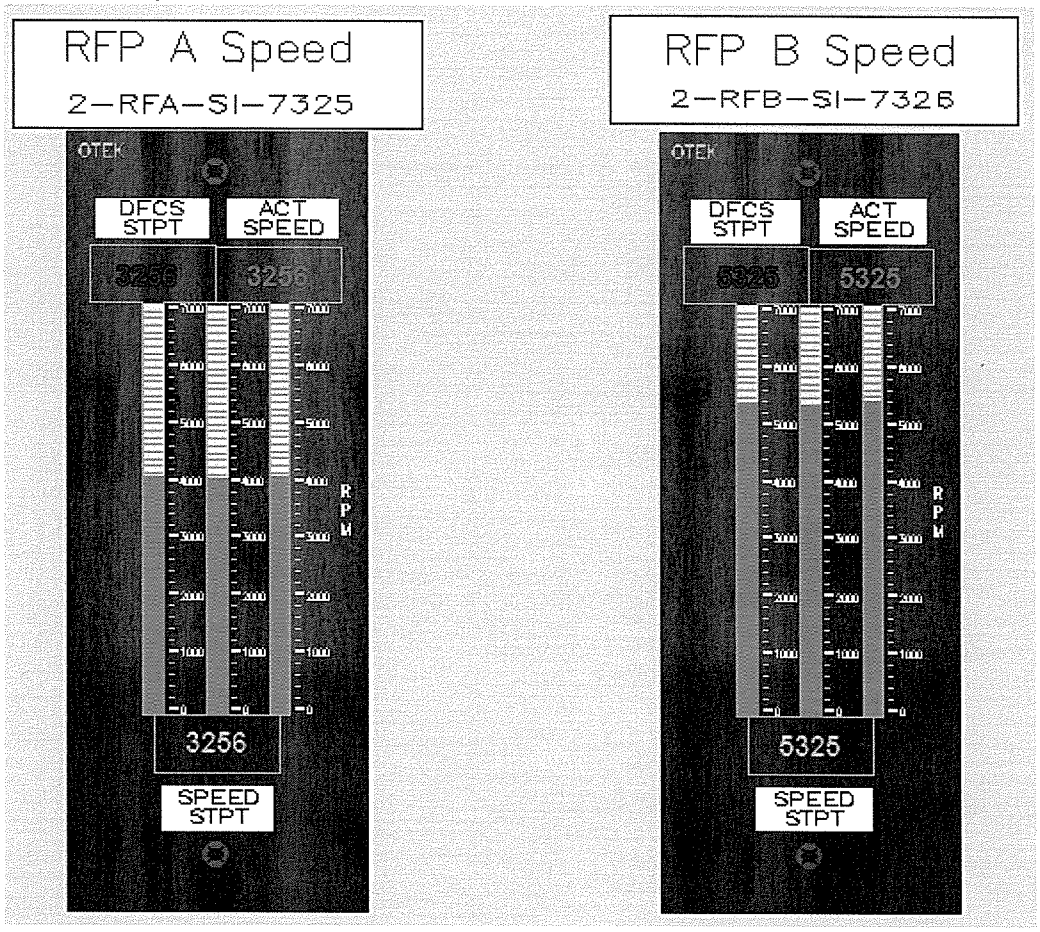
B. two rods which are at position 04.

C. one rod at position 02 and one rod at position 24.

D. ten rods at position 02 and one rod at position 48.

42. Unit Two is at rated power when the following conditions are observed:

Reactor water level is 180 inches
Steam Flow indicates 12.76 Mlbs/hr
Feed Flow indicates 12.05 Mlbs/hr
RFPT speed indications are:



RFP A RFP B

With conditions continuing to degrade, which one of the following actions is required to restore and maintain normal level IAW 0AOP-23.0, Condensate/Feedwater System Failures?

A. Place the Master Feedwater Controller in MANUAL and restore normal level.

B. Place the "A" RFP Feedwater Controller in MANUAL and restore normal level.

C. Place the "B" RFP MANUAL/DFCS switch in MANUAL and restore normal level.

D. Place both RFP Feedwater Controllers in MANUAL and balance the RFP speed.

43. A LOOP has occurred on Unit Two with the following plant conditions:

HPCI	Failed
RCIC	Under Clearance
SLC	Injecting with Demin Water
CRD	Flow maximized IAW SEP-09
ADS	Inhibited
Reactor Water Level	36 inches and stable
Reactor Pressure	950 psig and stable
Suppression Pool Level	-26 inches
Drywell Pressure	2 psig and rising slowly
Drywell Temperature	200°F and rising slowly

(Reference Provided)

Which one of the following choices identifies the required action IAW PCCP?

A. Initiate Drywell Sprays ONLY IAW SEP-02.

B. Start all available DW Coolers IAW SEP-10.

C. Perform Emergency Depressurization IAW RVCP.

D. Initiate Suppression Pool Sprays ONLY IAW SEP-03.

44. Which one of the following completes the statement below IAW 0AOP-32.0, Plant Shutdown From Outside Control Room?

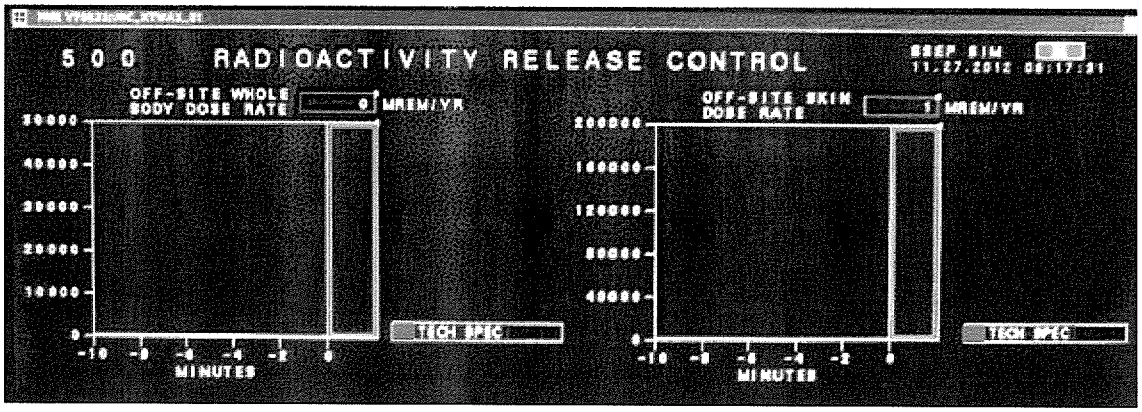
The reason that 0AOP-32.0 includes steps to open all RPS EPA breakers in the cable spreading area is:

A. to ensure that all PCIS group isolations occur and SBGT is running during the performance of the procedure.

B. for a situation where a manual scram could not be performed prior to exiting the control room.

C. to ensure RPS components are not damaged from an RPS Bus electrical perturbation.

D. for protection against over feeding the RPV.

45. 

On SPDS Screen 500, Radioactivity Release Control, the Off-Site Whole Body Dose Rate limit will **first** be exceeded (a red Alarm condition) at which one of the following values?

A. 450 mRem / Yr

B. 500 mRem / Yr

C. 2700 mRem / Yr

D. 3000 mRem / Yr

46. Unit One is performing a reactor startup.

The following events occur prior to rolling the main turbine:

Bus 1D experiences a fault and trips
Unit One NSW header ruptures in the Service Water Building

All Unit One Service Water pumps supplying the NSW Header are manually tripped IAW 0AOP-18.0, Nuclear Service Water System Failure.

The crew has completed all actions of 0AOP-18.0.

Which one of the following identifies the status of the Diesel Generator(s) and the cooling water supply?

A. ONLY DG1 is running with cooling water supplied from the Unit Two NSW Pumps.

B. ONLY DG1 is running with cooling water supplied from the Unit One CSW Pumps.

C. Both DGs 1 & 3 are running with cooling water supplied from the Unit Two NSW Pumps.

D. DG1 is running with cooling water supplied from the Unit One CSW Pumps and DG3 is running with cooling water supplied from the Unit Two NSW Pumps.

47. Which one of the following completes both statements IAW 0AOP-20.0, Pneumatic (Air/Nitrogen) System Failures?

Backup nitrogen system will automatically initiate when the non-interruptible air header pressure first lowers to __(1)__ psig.

One reason that the Backup Nitrogen system automatically initiates is to ensure a pneumatic supply will be maintained to the __(2)__.

A. (1) 105
(2) MSIVs

B. (1) 105
(2) Hardened Wetwell Vent Valves

C. (1) 95
(2) MSIVs

D. (1) 95
(2) Hardened Wetwell Vent Valves.

48. Unit Two is in Cold Shutdown and the following conditions existed:

    Loop A of SDC in service
    RWCU in service

    Subsequently all offsite power is lost.

    The operators are executing 0AOP-15.0, Loss of Shutdown Cooling.
    The E11-F009, RHR Shutdown Cooling Inbd Isol Vlv, cannot be re-opened.
    Reactor water level is being maintained between 200-220 inches.

    Which one of the following parameters is allowed to be used for vessel coolant temperature monitoring IAW 0AOP-15.0?

    A. Reactor vessel pressure.

    B. Vessel Bottom Drain Temperature.

    C. Reactor recirculation loop temperature.

    D. Bottom head metal temperature.

49. Which one of the following choices completes the statement below IAW 0AOP-02.0, Control Rod Malfunction/Misposition, for a loss of CRD pumps?

If reactor pressure is __(1)__ and CRD pressure cannot be restored to greater than or equal to 940 psig, **immediately** insert a manual reactor scram upon the receipt of the __(2)__ HCU low pressure alarm.

A. (1) less than 950 psig
(2) first

B. (1) less than 950 psig
(2) second

C. (1) greater than or equal to 950 psig
(2) first

D. (1) greater than or equal to 950 psig
(2) second

50. A core shuffle is in progress on Unit Two. After releasing a fuel assembly in the spent fuel pool the operator raises the main hoist to a safe elevation to pass through the transfer canal. The following indications on the refuel bridge are observed:

- Grapple Normal Up light is NOT illuminated.
- Hoist Loaded light is NOT illuminated.
- Boundary Zone Bypass light is illuminated.

While moving the refueling bridge to the core the refueling bridge movement abruptly stops.

Which one of the following identifies the reason the refueling bridge motion has automatically stopped?

A. Air has been lost to the refueling bridge.

B. Rod select power has been turned on.

C. A refuel floor ARM alarm has been received.

D. One full in (green) reed switch has failed.

51. During an accident, Unit One plant conditions are:

Reactor pressure	500 psig
Drywell pressure	20 psig
Suppression chamber pressure	19 psig
Suppression pool level	- 42 inches
Suppression pool temperature	160°F

(Reference provided)

Which one of the following is the reason emergency depressurization is required?

A. Steam exists in the suppression chamber air space, which indicates that the pressure suppression feature is being "bypassed."

B. The combination of high suppression chamber level and pressure is threatening the design boundary loading of the torus.

C. Suppression chamber level has lowered to the point of the downcomer elevations.

D. The suppression chamber's heat capacity is being exceeded.

52. Given the following plant conditions with RCIC in pressure control mode:

RCIC controller output	70%
E51-F022, Bypass to CST Vlv	Throttled
RCIC Flow	300 gpm
RCIC Discharge Pressure	1050 psig
RPV pressure	810 psig, slowly lowering
RCIC controller	Automatic set @ 300 gpm

Which one of the following identifies two independent actions that will stabilize RPV pressure?

Throttle the E51-F022 in the __(1)__ direction, or by __(2)__ the RCIC Flow Controller auto setpoint.

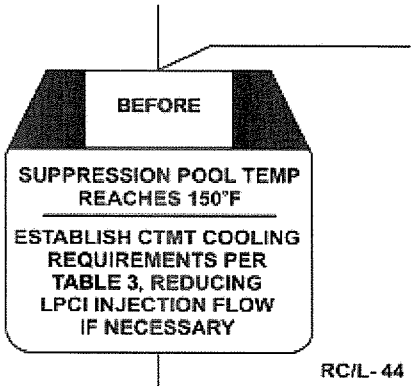
A. (1) open
(2) lowering

B. (1) open
(2) raising

C. (1) closed
(2) lowering

D. (1) closed
(2) raising

53.



IAW OI-37.4, Reactor Vessel Control Procedure Basis Document, which one of the following identifies why the step RC/L-44 is performed?

A. To prevent exceeding the Heat Capacity Temperature Limit.

B. To prevent exceeding primary containment design temperature.

C. To maintain NPSH to low pressure ECCS pumps.

D. To maintain cooling to HPCI and RCIC.

54. Which one of the following identifies a consequence of DW average air temperature reaching 341°F IAW 0OI-37.8, Primary Containment Control Procedure Basis Document?

A. SRVs may not operate

B. Drywell High Range Monitors are no longer reliable

C. Hardened Wetwell Vent Valves may not operate

D. CAC 4409 and 4410 Hydrogen Analyzers are no longer reliable

55. A LOCA has occurred concurrently with a LOOP on Unit Two.
The following conditions exist:

Drywell Pressure	4.5 psig
Reactor Water Level	95 inches and rising with Core Spray
Reactor Pressure	280 psig
Suppression Chamber level	5.5 inches
CST level	20 feet

Which one of the following identifies an injection source that must be secured IAW PCCP? (Assume no circuit alterations have been performed)

A. CRD

B. RCIC

C. HPCI

D. Core Spray

56. Following a DBA LOCA on Unit Two, plant conditions are as follows:

Reactor water level	55 inches and rising
Reactor pressure	150 psig
Torus temperature	220°F
Suppression Chamber pressure	10.5 psig
Torus level	- 43 inches
2A Core Spray pump flow	5000 gpm
2B Core Spray pump flow	2000 gpm
2A RHR Loop flow	17000 gpm

(Reference provided)

Which one of the following identifies the ECCS pump(s) that is/are operating within the associated NPSH limit(s)?

A. 2B CS Pump ONLY

B. 2A CS Pump and 2A RHR Loop ONLY

C. 2A RHR Loop ONLY

D. 2B CS Pump and 2A RHR Loop ONLY

57. The plant has experienced a level transient which has caused the Reactor Recirculation Pumps to trip. Level stabilized at Reactor Recirculation Pump trip setpoint.

Which one of the following choices completes the statement below?

Under these conditions, natural circulation in the entire vessel __(1)__ occurring because reactor water level is __(2)__.

A. (1) is
(2) above the jet pump suction

B. (1) is
(2) above the steam separator return to the downcomer region

C. (1) is NOT
(2) below the jet pump suction

D. (1) is NOT
(2) below the steam separator return to the downcomer region

58. A primary system is discharging into the reactor building with the following plant conditions:

1005 Main Condenser Vacuum is 24.5 inches HG
One Circ Water Pump is running
MSIVs remain open
Reactor Building 20' temperature is 205°F
Reactor Building 50' temperature is 165°F

1030 Reactor Building 20' temperature is 180°F.
Reactor Building 50' temperature is 165°F

1105 Engineering determines that the Reactor Building 50' has exceeded EQ envelopes.

(Reference provided)

Which one of the following is required by SCCP at 1105?

A. Perform emergency depressurization.

B. Operate bypass valves to cooldown the reactor $\leq$100°F/hour.

C. Operate SRVs to cooldown the reactor at $\leq$100°F/hour.

D. Operate bypass valves to cooldown the reactor >100°F/hour, emergency depressurization is NOT required.

59. An ATWS has occurred on Unit One.

The following ATWS actions have been performed:
Terminate and prevent actions have been completed
Reactor water level has been lowered to 90 inches
Table 3 conditions have NOT been met.
Reactor water level band of 60 to 90 inches has been established

Which one of the following identifies why reactor water level was deliberately lowered to 90 inches IAW 0OI-37.5, Level/Power Control Procedure Basis Document?

A. Raise feedwater subcooling.

B. Increase the core boron concentration.

C. Reduce heat input to primary containment if the MSIVs close.

D. Minimize the possibility of large scale core oscillations.

60. Which one of the following alarms is an entry condition into RRCP?

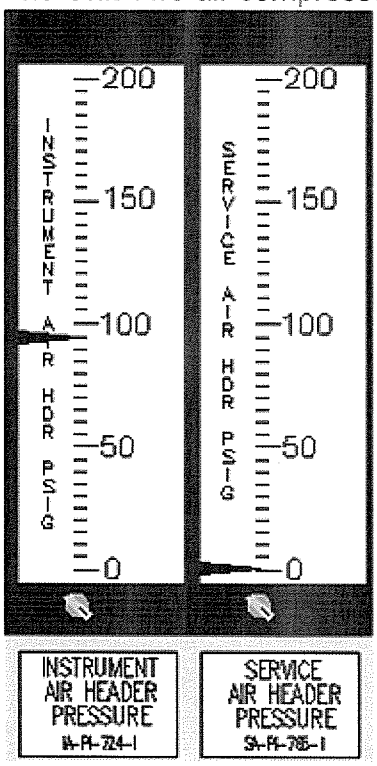
A. *Service Wtr Effluent Rad High.*

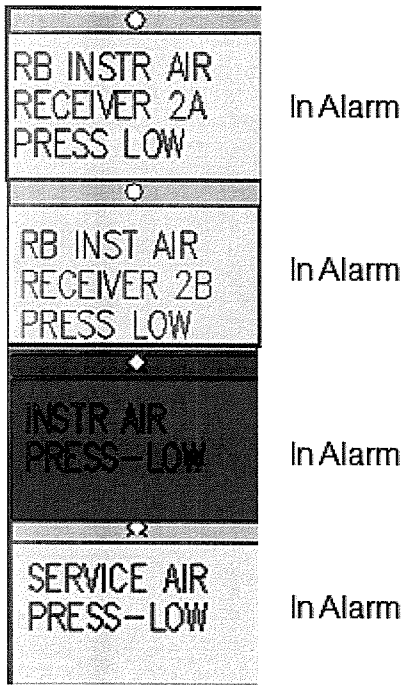
B. *Area Rad RX Bldg High.*

C. *RBCCW Liquid Process Rad High.*

D. *Process Reactor Building Vent Rad High.*

61. Unit Two is at rated power with the plant air systems not crosstied.
The Unit Two air compressors have failed causing the following plant conditions:





Which one of the following identifies the required operator action IAW 0AOP-20.0, Pneumatic (Air/Nitrogen) System Failures?

A. Insert a manual reactor scram.

B. Close Intrpt Air Isol Vlvs, IA-PV-722-1&2

C. Open RNA-SV-5482, Div I Backup N2 Rack Isol Vlv.

D. Open PNS-Cross-tie Valve PNS-SV-5804A, PNS-CS-5804B

62. Which one of the following choices completes the statements below?

The Service Water to TBCCW MOVs (SW-V3 and V4) are powered from __(1)__.
The Service Water to RBCCW MOVs (SW-V103 and V106) are powered from __(2)__.

A. (1) 2F / 2E
   (2) 2F / 2E

B. (1) 2F / 2E
   (2) E8 / E7

C. (1) E8 / E7
   (2) 2F / 2E

D. (1) E8 / E7
   (2) E8 / E7

63. Unit Two is at rated power with the following alignment for RBCCW:

2A RBCCW	control switch in ON
2B RBCCW	control switch in ON
2C RBCCW	control switch in AUTO

The 2D to E3 master breaker tripped spuriously and DG3 failed to auto-start.

Which one of the following identifies the expected response of the RBCCW pumps?

A. No RBCCW pumps are running.

B. ONLY the 2B RBCCW pump is running.

C. ONLY the 2C RBCCW pump is running.

D. 2B and 2C RBCCW pumps are running.

64. The CRS has declared the Control Room Envelope Boundary inoperable.
A fire external to the control room has resulted in smoke intrusion into the control room.
The CRS has determined that control room evacuation is not necessary and has ordered the donning of Scott Air-Pak SCBAs by control room personnel.

Which one of the following indicates the approximate length of time each SCBA bottle will last IAW 0OI-01.01, BNP Conduct of Operations Supplement?

A. 10 minutes

B. One hour

C. Two hours

D. Four hours

65. Unit Two is operating at rated power when small oscillations due to unstable voltage regulation is observed.

Which one of the following choices completes the statements below IAW 2OP-27, Generator and Exciter System Operating Procedure?

The **first** action required is to __(1)__.

This action must be reported to the __(2)__.

A. (1) place the generator voltage regulator in Manual
(2) System Load Dispatcher

B. (1) place the generator voltage regulator in Manual
(2) Plant Transmission Activities Coordinator (PTAC)

C. (1) disable the Power System Stabilizer (PSS)
(2) System Load Dispatcher

D. (1) disable the Power System Stabilizer (PSS)
(2) Plant Transmission Activities Coordinator (PTAC)

66. Following a seven day break in work schedule an operator is assigned to an operating unit with the following work schedule.

Day 1	12	hours
Day 2	12	hours
Day 3	12	hours
Day 4	12	hours
Day 5	0	hours
Day 6	12	hours
Day 7	13	hours
Day 8	14	hours
Day 9	0	hours

Which one of the following choices will ensure compliance IAW ADM-NGGC-0206, Managing Fatigue and Work Hour Limits, without requiring a waiver?

A. Take day 1 off.

B. Take day 7 off.

C. Work only 12 hours on day 7.

D. Work only 13 hours on day 8.

67. Which one of the following identifies the reason 1OP-10, Standby Gas Treatment System Operating Procedure, prohibits venting the drywell and the suppression pool chamber simultaneously with the reactor at power?

This would cause the:

A. unnecessary cycling of torus to drywell vacuum breaker.

B. pressure suppression function to be bypassed.

C. unnecessary cycling of reactor building to torus vacuum breakers.

D. SBGT Train water seal to blow out of the trough.

68. Unit One is in a refueling outage and the initial loading of fuel bundles around each SRM is complete.

Which one of the following completes both statements below IAW 0FH-11, Refueling?

Fuel movement must be suspended when an SRM reading rises by a factor of __(1)__ upon insertion of any single bundle OR if an SRM rises by a factor of __(2)__ relative to the SRM baseline count rate.

A. (1) two
(2) two

B. (1) two
(2) five

C. (1) five
(2) two

D. (1) five
(2) five

69. IAW 0AI-147, Systematic Approach to Troubleshooting, which one of the following identifies the trouble shooting activities that must be approved by the Plant General Manager?

A. ONLY high risk activities (anytime).

B. ONLY those high risk activities that are performed during max/safe/gen periods of operation.

C. ALL medium and high risk activities that are performed during max/safe/gen periods of operation.

D. ALL high risk activities (anytime) and ONLY those medium risk activities that are performed during max/safe/gen periods of operation.

70. Which one of the following meets the conditions required to be in MODE 4 IAW Technical Specifications?

A. Reactor Mode Switch in either Shutdown or Refuel and one reactor head bolt has been fully tensioned.

B. Reactor Mode Switch in either Shutdown or Refuel and all reactor head bolts have been fully tensioned.

C. Reactor Mode Switch in Shutdown and one reactor head bolt has been fully tensioned.

D. Reactor Mode Switch in Shutdown and all reactor head bolts have been fully tensioned.

71. Unit Two is operating at rated power. Drywell leakage calculations are being performed IAW the CO DSR.

The 0800 drywell leakage calculations were:

Floor Drain Leakage	1.3 gpm
Equipment Drain Leakage	3.5 gpm

These leakage values have been constant for several days.

At 1200 the difference in integrator readings is:

Floor Drain	816 gallons
Equipment Drain	960 gallons

Which one of the following choices completes the statement below?

The calculated unidentified leakage is __(1)__ which __(2)__ within the limits of Technical Specifications LCO 3.4.4, RCS Operational Leakage.

A. (1) 3.4 gpm
   (2) is

B. (1) 3.4 gpm
   (2) is NOT

C. (1) 4.0 gpm
   (2) is

D. (1) 4.0 gpm
   (2) is NOT

72. Drywell pressure is 30 psig
Suppression Pool Level is 4 feet

Which one of the following completes the statement below?

IAW PCCP, when venting the primary containment, the __(1)__ UNLESS __(2)__.

A. (1) suppression pool is required to be vented first
(2) alternate source term actions cannot be performed

B. (1) suppression pool is required to be vented first
(2) PCPL-A is reached

C. (1) offsite release rates must be maintained below the ODCM release rate limit
(2) alternate source term actions cannot be performed

D. (1) offsite release rates must be maintained below the ODCM release rate limit
(2) PCPL-A is reached

73. Access is required to a Unit One plant area for inspection.
Radiation levels in the area are 1100 Mrem/hr at 30 cm and 510 Rads/hr at one meter from the radiation source.

Which one of the following choices completes the statements below IAW 0E&RC-0040, Administrative Controls for High Radiation Areas, Locked High Radiation Areas, and Very High Radiation Areas?

This area is required to be posted as a __(1)__.

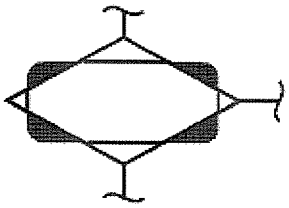
The MINIMUM approvals required to enter this area are the E&RC manager (or designee), Rad Protection Supervisor, and __(2)__.

A. (1) Very High Radiation Area
(2) Plant General Manager

B. (1) Very High Radiation Area
(2) Shift Manager

C. (1) Locked High Radiation Area
(2) Plant General Manager

D. (1) Locked High Radiation Area
(2) Shift Manager



74. Which one of the following identifies the EOP flowchart symbol above IAW 0EOP-01-UG, EOP Users Guide?

A. Action Step

B. Caution Step

C. Critical Step

D. Decision Step

75. Which one of the following choices completes the statements below IAW 0FPP-031, Fire Brigade Staffing Roster and Equipment Requirements?

The Fire Brigade Advisor position __(1)__.

The Fire Brigade Advisor __(2)__ be diverted from supporting the Fire Brigade during 0ASSD-02 implementation.

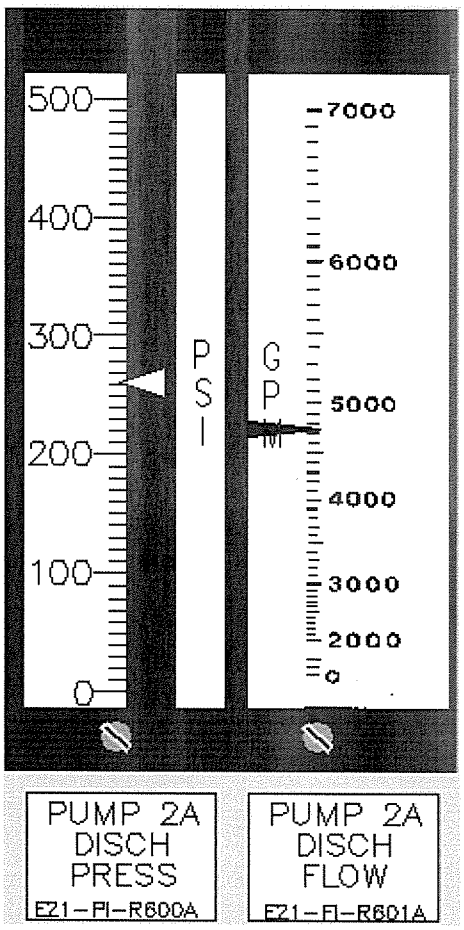
A. (1) must be filled by an SRO
   (2) can

B. (1) can be filled by an RO
   (2) can

C. (1) must be filled by an SRO
   (2) can NOT

D. (1) can be filled by an RO
   (2) can NOT

76.



Unit Two is at rated power with RHR Pump 2D under clearance/inoperable for three days.

0PT-07.2.4A, Core Spray System Operability Test - Loop A comprehensive pump test is in progress.

The AO reports that stopped suction pressure reading was 4.5 psig.

IST personnel have obtained the following vibration data with the pump operating as shown on the left:

1S H 0.356 in/s peak
1W A 0.486 in/s peak
1W H 0.658 in/s peak

The AO reports the running suction pressure reading is 2.5 psig and that the lubricant levels are normal.

(Reference provided)

Based on the performance of 0PT-07.2.4A, which one of the following identifies the **most limiting** required action IAW Technical Specifications?

A. Return a low pressure injection system to OPERABLE in 4 days.

B. Place the unit in Mode 3 in 13 hours.

C. Return a low pressure injection system to OPERABLE in 72 hours.

D. Return Core Spray system to OPERABLE in 7 days.

77. Unit Two is operating at 38% power performing a control rod pattern adjustment.

I&C has identified that the Intermediate and Low Trip setpoints for RBM A and RBM B are inoperable.

The High Trip Setpoint for both RBMs is operable.

MCPR is currently 1.48.

(Reference provided)

Which one of the following is the minimum Technical Specification action, if any, is required, IAW LCO 3.3.2.1 Control Rod Block Instrumentation?

A. Condition A ONLY

B. Condition B ONLY

C. Condition A and Condition B

D. NO required action

78. Unit Two is performing a reactor startup, prior to the point of adding heat.

IRM E is bypassed due to failing downscale.
IRM A Upscale/Inop alarm is received due to the high voltage power supply failing low to IRM A.

(Reference provided)

Which one of the following choices completes the statements below?

The IRM power supply failure will cause a __(1)__.

Addressing **only** TRMS 3.3, Control Rod Block Instrumentation, __(2)__.

A. (1) rod block ONLY
   (2) restore a required channel to operable status in 24 hours

B. (1) rod block ONLY
   (2) NO required compensatory measures, tracking ONLY

C. (1) rod block and 1/2 scram
   (2) restore a required channel to operable status in 24 hours

D. (1) rod block and 1/2 scram
   (2) NO required compensatory measures, tracking ONLY

79. Which one of the following choices completes the statements below?

The impact of a loss of power supply breaker to ADS on 125V DC Panel 4B is that __(1)__.

The procedural step for resetting this individual power supply breaker to ADS on 125VDC Panel 4B is contained in __(2)__.

A. (1) ADS will initiate if required from the "A" logic ONLY
   (2) 0AOP-39.0, Loss of DC Power

B. (1) ADS will initiate if required from the "A" logic ONLY
   (2) 2APP-A-03, 2-2, *Auto Depress Control Pwr Failure*

C. (1) ADS will initiate if required from the "B" logic ONLY
   (2) 0AOP-39.0, Loss of DC Power

D. (1) ADS will initiate if required from the "B" logic ONLY
   (2) 2APP-A-03, 2-2, *Auto Depress Control Pwr Failure*

80. Unit Two was operating at rated power when a loss of UPS Distribution Panel 2A occurs. Subsequently a LOCA occurs. The following plant conditions exist:

Reactor pressure	195 psig
Torus pressure	10 psig
Torus water level	4 inches
Drywell temperature	310°F
Drywell Sprays	NOT available

The CRS has determined that emergency depressurization is required.

Which one of the following choices completes the statements below?

Terminating and preventing injection __(1)__ required.

If all ADS valves fail to manually open, the crew is required to open the remaining SRVs __(2)__.

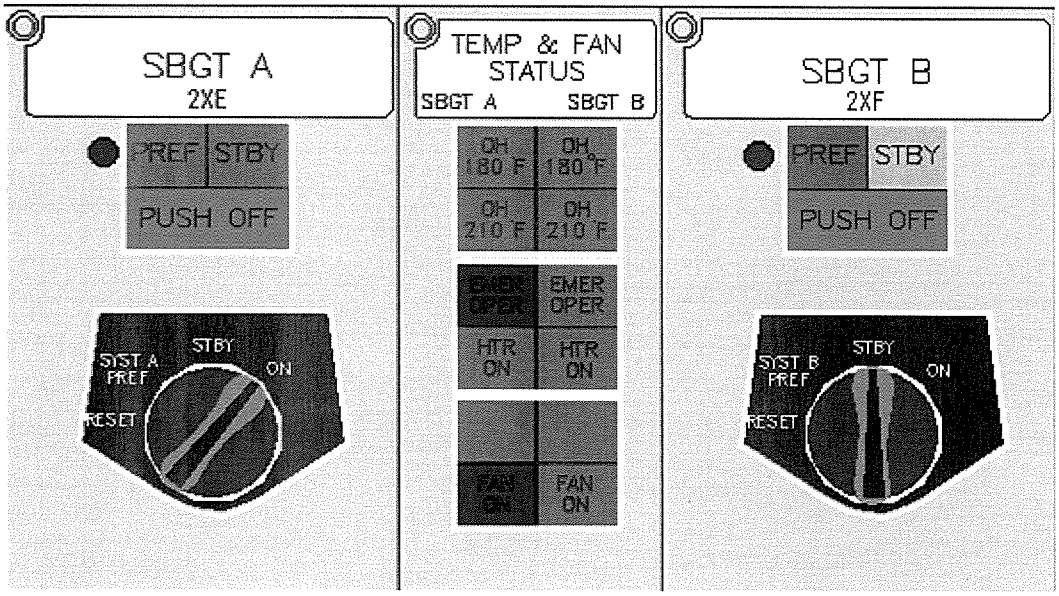
A. (1) is
(2) ONLY

B. (1) is not
(2) ONLY

C. (1) is
(2) and perform AEDP

D. (1) is not
(2) and perform AEDP

81. During accident conditions on Unit Two the response of SBGT is indicated below:



Which one of the following choices completes the statements below?

The SBGT 2A Fan __(1)__ auto trip if the prefilter compartment reaches 210°F.

For a condition where a fire has occurred in a SBGT Train the procedure steps for manually opening the isolation valves to the deluge valves, to allow water to flow inside the SBGT Train, are located in __(2)__.

A. (1) will
   (2) 2OP-10, Standby Gas Treatment System Operating Procedure

B. (1) will
   (2) 0OP-41, Fire Protection and Well Water System

C. (1) will NOT
   (2) 2OP-10, Standby Gas Treatment System Operating Procedure

D. (1) will NOT
   (2) 0OP-41, Fire Protection and Well Water System

82. Both Units are both operating at rated power.

At 1730 on 12/15, *250V Batt A Charger Trouble* and *250V Batt A Undervoltage* annunciators are received on Unit Two.

I&C reports that Battery Charger 2A-1 has a burned diode ring. No spare parts are available and it will take 5 days to make the needed repairs.

At 1600 on 12/18, during performance of SR 3.8.6.1 on the Unit One batteries, the following float voltage data was recorded:

Battery 1A-1 Pilot Cell	2.10 V
Battery 1A-2 Pilot Cell	2.34 V
Battery 1B-1 Pilot Cell	2.05 V
Battery 1B-2 Pilot Cell	2.33 V

(Reference provided)

Which one of the following completes both of the statements below?

__(1)__ 250V DC Battery Subsystems are inoperable IAW Technical Specification 3.8.4.

The earliest time that both Units must be in Mode 3 is by 12/19 at __(2)__ hours.

A. (1) Only two
   (2) 0400

B. (1) Only two
   (2) 0500

C. (1) Three
   (2) 0400

D. (1) Three
   (2) 0500

83. During performance of 0PT-09.2, HPCI System Operability Test, a HPCI steam line leak occurs. SBGT Train 1A is operating. The following conditions exist:

Process OG Vent Pipe Rad - Hi	In alarm
Process Rx Bldg Vent Rad - Hi	In alarm
Stack radiation levels	Rising

Based on the conditions listed above, which one of the following choices completes the statements below?

SBGT 1B Fan __(1)__ auto-started.

The required action IAW RRCP is to enter __(2)__.

A. (1) has
(2) the RSP

B. (1) has
(2) 0GP-05

C. (1) has not
(2) the RSP

D. (1) has not
(2) 0GP-05

84. Unit One is operating at rated power with HPCI suction aligned to the Torus for CST Level switch replacement. The following annunciator is received:

RCIC LOGIC BUS B PWR FAILURE

(Reference provided)

Which one of the following choices completes the following statements?

There has been a loss of power to 125V DC Distribution Panel __(1)__.

IAW Technical Specifications LCO 3.5.3, RCIC System, the required action is to __(2)__.

A. (1) 3B
   (2) be in Mode 3 within 12 hours

B. (1) 4B
   (2) be in Mode 3 within 12 hours

C. (1) 3B
   (2) restore RCIC to operable within 14 days

D. (1) 4B
   (2) restore RCIC to operable within 14 days

85. While performing PT 9.2, HPCI OPERABILITY TEST, the HPCI steam supply line ruptured. HPCI failed to automatically isolate. Subsequently HPCI was manually isolated.

The following Steam Leak Detection NUMAC channels are in alarm:

B21-XY-5949A, Channel A3-3, reading 303°F
B21-XY-5949B, Channel A3-3, reading 298°F
B21-XY-5948A, Channel A5-1, reading 301°F
B21-XY-5948B, Channel A5-1, reading 296°F

No other channels are in alarm.

Which one of the following choices completes the statements below?

(Reference provided)

The required actions IAW SCCP are to __(1)__.

The highest required EAL classification for this event is __(2)__.

A. (1) Scram the reactor and emergency depressurize
   (2) a Site Area Emergency

B. (1) commence a cooldown at normal rates
   (2) a Site Area Emergency

C. (1) Scram the reactor and emergency depressurize
   (2) an Alert

D. (1) commence a cooldown at normal rates
   (2) an Alert

86. The current plant conditions on Unit One are:

Drywell pressure	7 psig, slowly rising
Suppression Pool pressure	4 psig, slowly rising
Drywell temperature	165°F, slowly rising
Suppression Pool level	-28 inches, stable

Which one of the following choices completes the statement below?

The CRS is required to concurrently perform __(1)__.

The CRS will direct __(2)__.

A. (1) RVCP and PCCP ONLY
(2) SEP-02, Drywell Spray Procedure

B. (1) RSP, RVCP, and PCCP
(2) SEP-03, Suppression Pool Spray Procedure

C. (1) RSP, RVCP, and PCCP
(2) SEP-02, Drywell Spray Procedure

D. (1) RVCP and PCCP ONLY
(2) SEP-03, Suppression Pool Spray Procedure

87. Unit Two is operating at rated power when a PNS leak occurs.

Drywell pneumatics have been transferred to RNA IAW 0AOP-20.0, Pneumatic (Air/Nitrogen) System Failures.

Primary containment oxygen concentration remains less than 4 volume percent.

(Reference provided)

Which one of the following choices completes the statements below IAW 0AOP-20.0?

RNA is supplying pneumatics to __(1)__.

An action statement in Technical Specifications LCO 3.6.3.1, Primary Containment Oxygen Concentration, __(2)__ to be entered.

A. (1) Suppression Pool to Drywell and Reactor Building to Torus Vacuum Breakers
   (2) is required

B. (1) Suppression Pool to Drywell and Reactor Building to Torus Vacuum Breakers
   (2) is NOT required

C. (1) Reactor Building to Torus Vacuum Breakers ONLY
   (2) is required

D. (1) Reactor Building to Torus Vacuum Breakers ONLY
   (2) is NOT required

88. A reactor scram on Unit One has occurred. The CRS has directed a Reactor pressure band of 800 - 1000 psig for the following plant conditions:

One SRV	manually opened
Reactor pressure	825 psig and lowering
Control Rod position	All unknown
Supp. Pool water temp.	160°F
Supp. Pool water level	-2 feet 8 inches

(Reference Provided)

Which one of the following choices completes the statements below?

The procedure required for pressure control is __(1)__.

The pressure band that the CRS has directed __(2)__ acceptable.

A. (1) RVCP
   (2) is

B. (1) LPC
   (2) is

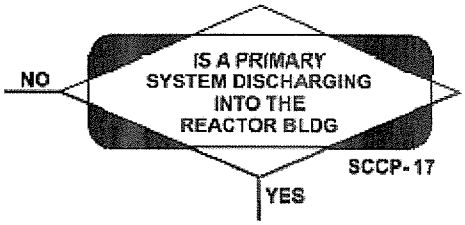
C. (1) RVCP
   (2) is NOT

D. (1) LPC
   (2) is NOT

89. Following a Reactor Scram on Unit Two due to a loss of off-site power, the following plant conditions exist:

Area Rad RX Bldg High	In alarm
South RHR RM Flood Level Hi	In alarm
South CS RM Flood Level Hi	In alarm
Reactor Building 20' Rad Level	Rising
Reactor Building 20' Temperature	125°F and rising
Reactor Water Level	150 inches
Drywell Pressure	2.2 psig

The CRS is evaluating the following step:



Which one of the following choices completes the statements below?

The CRS is required to answer step SCCP-17 as __(1)__.

The CRS will direct the restart of RB HVAC IAW __(2)__.

A. (1) YES
(2) SEP-04, Reactor Building HVAC Restart Procedure

B. (1) NO
(2) SEP-04, Reactor Building HVAC Restart Procedure

C. (1) YES
(2) OP-37.1, Reactor Building Heating and Ventilation System Operating Procedure

D. (1) NO
(2) OP-37.1, Reactor Building Heating and Ventilation System Operating Procedure

90. Unit Two is operating at rated power when a complete loss of UPS occurs. The CRS has directed the RO to insert a manual reactor scram due to rising drywell pressure. Plant conditions are:

Manual Scram pushbuttons	Depressed
Mode Switch	Shutdown position
RPS Lights	NOT lit
ARI	Initiated
Drywell pressure	2.1 psig
APRM Downscale lights	NOT lit
Scram Valve Pil Air Hdr Press Hi/Lo	In alarm

(Reference provided)

Which one of the following choices completes the statements below based on these current conditions ?

The crew must use __(1)__, of LEP-02, Alternate Control Rod Insertion.

The highest required EAL classification is a(n) __(2)__.

A. (1) Section 3, Reset RPS and Initiate a Manual Scram
   (2) Alert

B. (1) Section 3, Reset RPS and Initiate a Manual Scram
   (2) Site Area Emergency

C. (1) Section 4, SCRAM individual rods with the scram test switches
   (2) Alert

D. (1) Section 4, SCRAM individual rods with the scram test switches
   (2) Site Area Emergency

91. Unit Two is operating at rated power when a LOCA and a LOOP occur.
The following conditions exist:

Reactor water level	100 inches rising
Drywell Pressure	32 psig
Suppression Pool Pressure	29 psig
Suppression Pool Level	18 inches
DG3	Tripped on differential overcurrent
DG4	Running loaded
ERFIS	Available

IAW PCCP, for these conditions, which one of the following choices completes the statements below?

Primary containment hydrogen/oxygen concentration must be determined by __(1)__.
When venting of primary containment has been established the CRS will direct the purging of the __(2)__ IAW SEP-05, Primary Containment Purging.

A. (1) placing CAC-AT-4410 in service
(2) Drywell or Suppression Chamber

B. (1) placing CAC-AT-4410 in service
(2) Drywell ONLY

C. (1) E&RC sample ONLY, CAC-AT-4410 cannot be used
(2) Drywell or Suppression Chamber

D. (1) E&RC sample ONLY, CAC-AT-4410 cannot be used
(2) Drywell ONLY

92. Surveillance testing of fire protection components on Unit Two have yielded the following results:

North RHR room sprinkler system	Inoperable
South RHR room sprinkler system	Operable
-17 RHR Pump areas	Smoke detectors 1-4, 1-9, 3-6, and 3-9 are Inoperable
Fire Barriers	All operable

(Reference provided)

Which one of the following choices identifies the minimum required fire watches IAW 0PLP-1.2, Fire Protection System Operability, Action, and Surveillance Requirements?

A. Establish an hourly fire watch in North RHR ONLY.

B. Establish a continuous firewatch in North RHR and an hourly firewatch in South RHR.

C. Establish a continuous fire watch in both North and South RHR.

D. Establish an hourly fire watch in both North and South RHR.

93. Unit Two is operating at rated power with 2A RHR Pump under clearance.

The Load Dispatcher notifies the control room conditions exist where adequate voltage support can **NOT** be provided by the grid in the event of a LOCA.

(Reference provided)

Which one of the following choices completes the statement below IAW Technical Specification 3.8.1, AC Sources – Operating?

Enter LCO 3.8.1 required actions for Condition(s) __(1)__.

The 2B Loop of RHR __(2)__ required to be declared INOPERABLE.

A. (1) E ONLY
   (2) is

B. (1) C and E
   (2) is NOT

C. (1) C and E
   (2) is

D. (1) E ONLY
   (2) is NOT

94. Which one of the following choices completes the statements below when moving spent fuel within the spent fuel pool (no core alterations) IAW FH-11A, Refueling Platform Operations?

A dedicated individual to fulfill the Spotter function with NO other concurrent duties __(1)__ required.

A dedicated Control Room Reactor Operator __(2)__ required.

A. (1) is
(2) is

B. (1) is
(2) is NOT

C. (1) is NOT
(2) is

D. (1) is NOT
(2) is NOT

95. Unit Two is operating at rated power with Core Spray Pump 2A under clearance for pump replacement. The North RHR Room Cooler was subsequently determined to be inoperable.

Which one of the following choices completes the statements below IAW WCP-NGGC-0300, Work Request Initiation, Screening, Prioritization, and Classification?

The highest required work order priority for the North RHR Room Cooler repair is __(1)__.

Given this priority, actual work on the North RHR Room Cooler can __(2)__.

A. (1) Priority 1
   (2) ONLY begin after work order planning

B. (1) Priority 2
   (2) ONLY begin after work order planning

C. (1) Priority 1
   (2) begin immediately in parallel with work order planning

D. (1) Priority 2
   (2) begin immediately in parallel with work order planning

96. Which one of the following choices completes the statements below?
(Consider each statement separately.)

IAW Tech Spec 5.2.2, Facility Staff, the shift crew composition may be less than the minimum requirement of 10 CFR 50.54(m)(2)(i) and Specifications 5.2.2.a and 5.2.2.g for a period of time not to exceed __(1)__ for an unexpected absence of onduty shift crew members.

IAW OPS-NGGC-1000, Fleet Conduct of Operations, the minimum required number of auxiliary operators for manning a shift at BNP is __(2)__.

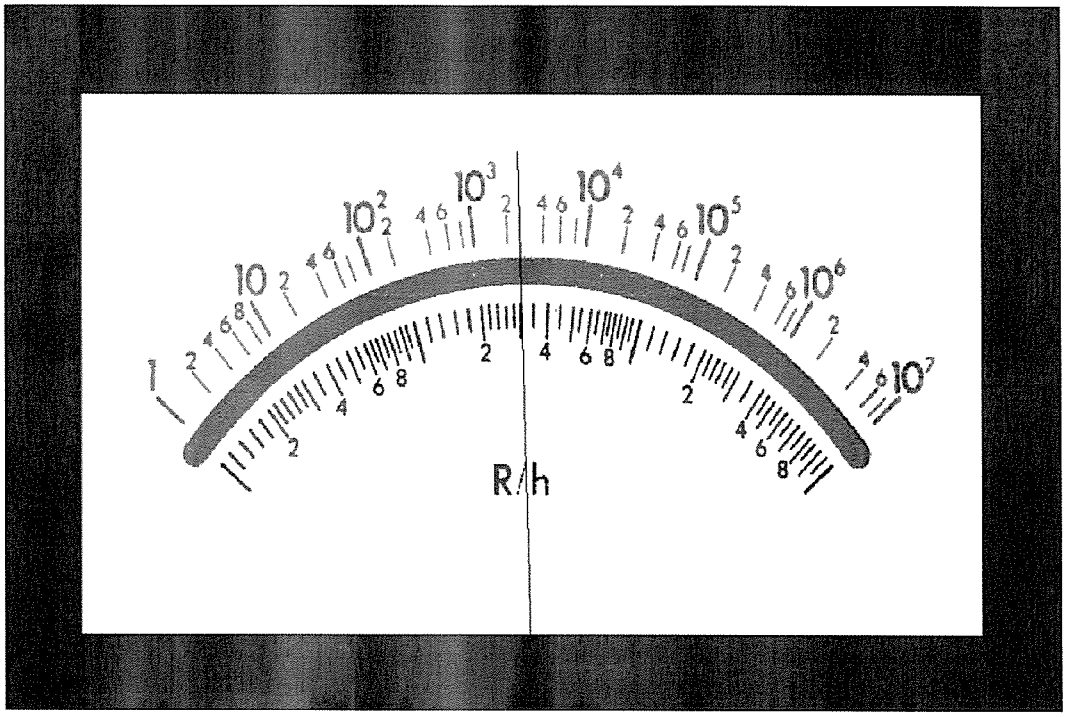
A. (1) one hour
(2) three

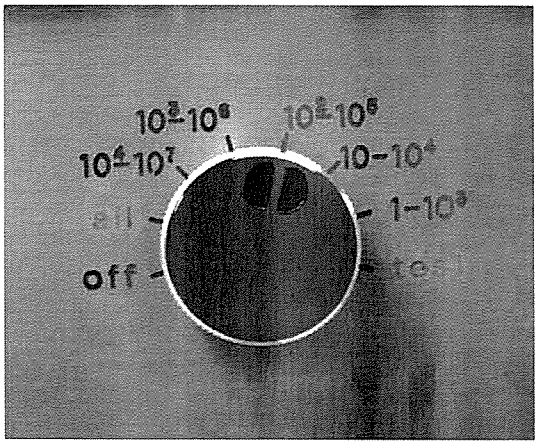
B. (1) one hour
(2) nine

C. (1) two hours
(2) three

D. (1) two hours
(2) nine

97.





Unit Two is shutdown following accident conditions with the given Drywell Monitor indications.

(Reference provided)

Which one of the following identifies whether any fission product barriers are lost or are potentially lost IAW 0PEP-02.1, Brunswick Nuclear Plant Initial Emergency Action Level Matrix?

A. None of the barriers are lost.

B. Lost Fuel Clad Barrier ONLY.

C. Lost Fuel Clad and RCS Barriers ONLY.

D. Lost Fuel Clad and RCS Barriers. Containment Barrier potentially lost.

98. The BSEP Radioactive Liquid Release Permit is being approved with the following step filled out on the permit:

B. **CONFIRM** the following instrumentation is OPERABLE:

1. Liquid Radwaste Radioactivity Monitor, 2-D12-RM-K604 RO
2. Liquid Radwaste Effluent Flow Measurement Device, 2-G16-FIT-N057 INOP

Which one of the following choices completes the statements below?

The minimum required approval to commence any liquid release is(are) __(1)__.

The Radioactive Liquid Release __(2)__.

A. (1) Unit CRS ONLY
(2) can still occur if ODCM compensatory actions are implemented

B. (1) Unit CRS ONLY
(2) is NOT allowed unless 2-G16-FIT-N057 is operable

C. (1) Unit CRS and Shift Manager
(2) can still occur if ODCM compensatory actions are implemented

D. (1) Unit CRS and Shift Manager
(2) is NOT allowed unless 2-G16-FIT-N057 is operable

99. Which one of the following is required IAW Technical Specifications and Bases for 3.3.3.1, Post Accident Monitoring Instrumentation?

A. Drywell High Range Radiation Monitors
Recorders (D22-RR-4195/4197) are required for channel operability.

B. Drywell High Range Radiation Monitors
Recorders (D22-RR-4195/4197) are NOT required for channel operability.

C. Reactor Building Area Rad Monitors
Annunciator UA-3, 2-7, *Area Rad Rx Bldg High*, is required for channel operability.

D. Reactor Building Area Rad Monitors
Annunciator UA-3, 2-7, *Area Rad Rx Bldg High*, is NOT required for channel operability.

100. A General Emergency has been declared. Onsite Emergency Response facilities are being staffed, but are NOT yet activated.

Weather conditions are:

Temperature	92°F
Upper wind speed	9.8 mph
Lower wind speed	7.3 mph
Upper wind direction	318.9°
Lower wind direction	314.3°

(Reference provided)

Which one of the following choices completes the statements below IAW 0PEP-02.6.28, Offsite Protective Action Recommendations?

Zone L __(1)__ required to be recommended for evacuation.

The __(2)__ is responsible for making this PAR.

A. (1) is NOT
(2) Site Emergency Coordinator

B. (1) is NOT
(2) Emergency Response Manager

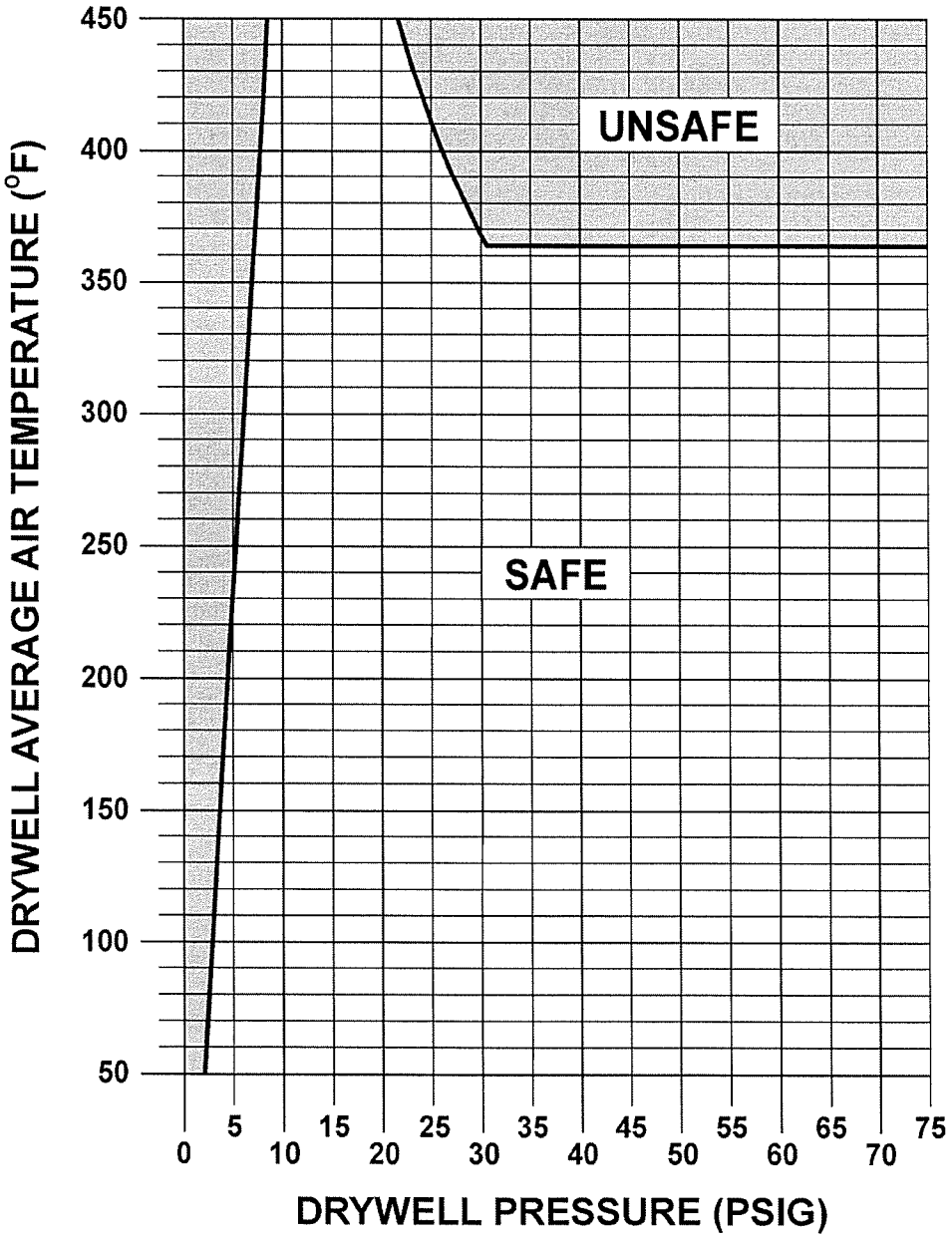
C. (1) is
(2) Site Emergency Coordinator

D. (1) is
(2) Emergency Response Manager

SRO Written Exam Reference Index

1. 0EOP-01-UG, User's Guide, Attachment 5, Figure 1, Drywell Spray Initiation Limit
2. 0EOP-01-UG, User's Guide, Attachment 5, Figure 3, Heat Capacity Temperature Limit
3. 0EOP-01-UG, User's Guide, Attachment 5, Figure 5, Core Spray NPSH Limit
4. 0EOP-01-UG, User's Guide, Attachment 5, Figure 6, RHR NPSH Limit
5. 0EOP-01-UG, User's Guide, Attachment 5, Figure 7, Pressure Suppression Pressure
6. 0EOP-01-UG, User's Guide, Attachment 10, Figure 22, Secondary Containment Area Temperature
7. 0PT-07.2.4a, Core Spray System Operability Test - Loop A
8. 0PEP-02.1, Brunswick Nuclear Plant Initial Emergency Actions
9. 0PEP-02.6.28, Attachment 1, PAR Flowchart
10. 0PEP-02.6.28, Attachment 2, Page 1 of 2, Evacuation Zones/Time Estimates/10 Mile EPZ Map
11. TS 3.3.2.1, Control Rod Block Instrumentation
12. TS 3.5.1, ECCS - Operating
13. TS 3.5.3, RCIC System
14. TS 3.6.3.1, Primary Containment Oxygen Concentration
15. TS 3.8.1, AC Sources - Operating
16. TS 3.8.4, DC Sources—Operating
17. TS 3.8.6, Battery Cell Parameters
18. TRM 3.3, Control Rod Block Instrumentation
19. COLR Table 1, RBM System Setpoints
20. COLR Table 2, RBM Operability Requirements
21. 0PLP-01.2, Fire Protection System Operability, Action, and Surveillance Requirements

FIGURE 1
Drywell Spray Initiation Limit



DRYWELL AVERAGE AIR TEMPERATURE MAY BE DETERMINED USING ATTACHMENT 4.

FIGURE 3

Heat Capacity Temperature Limit

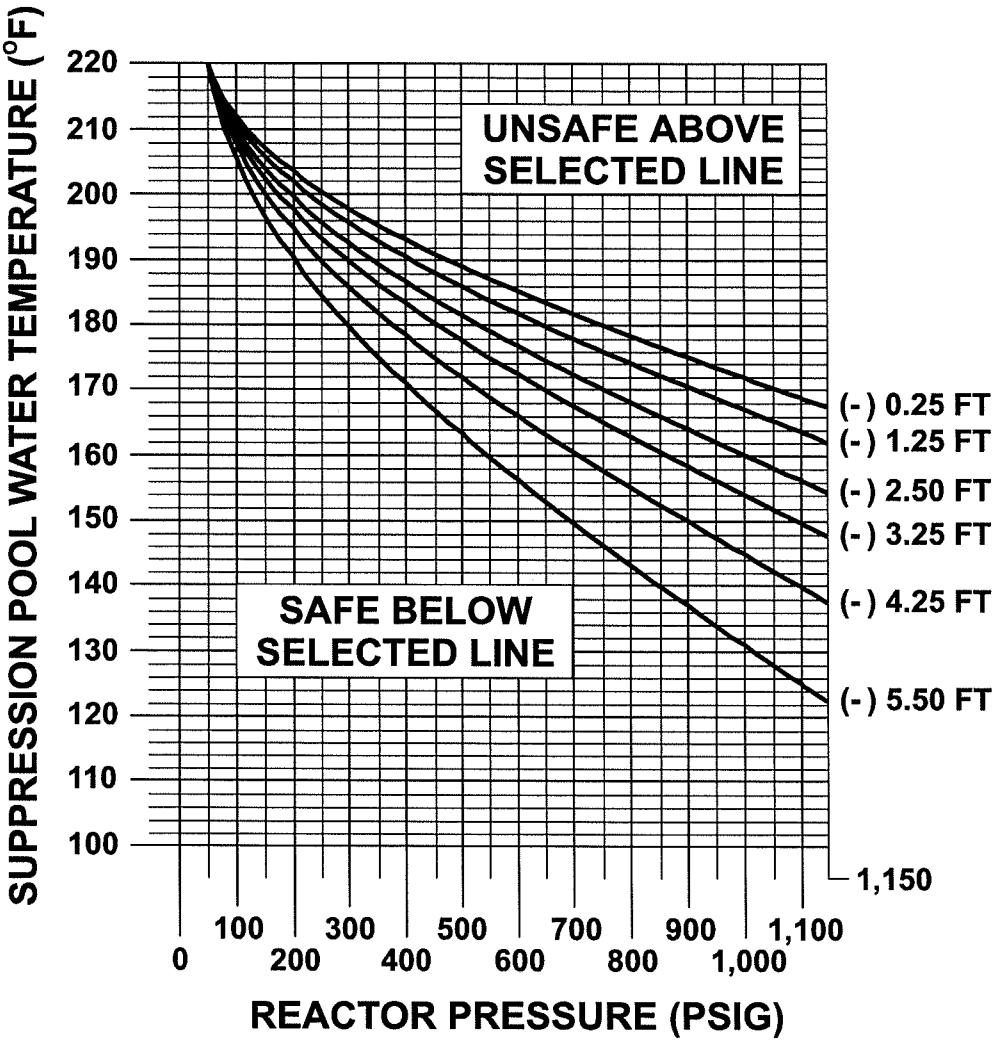
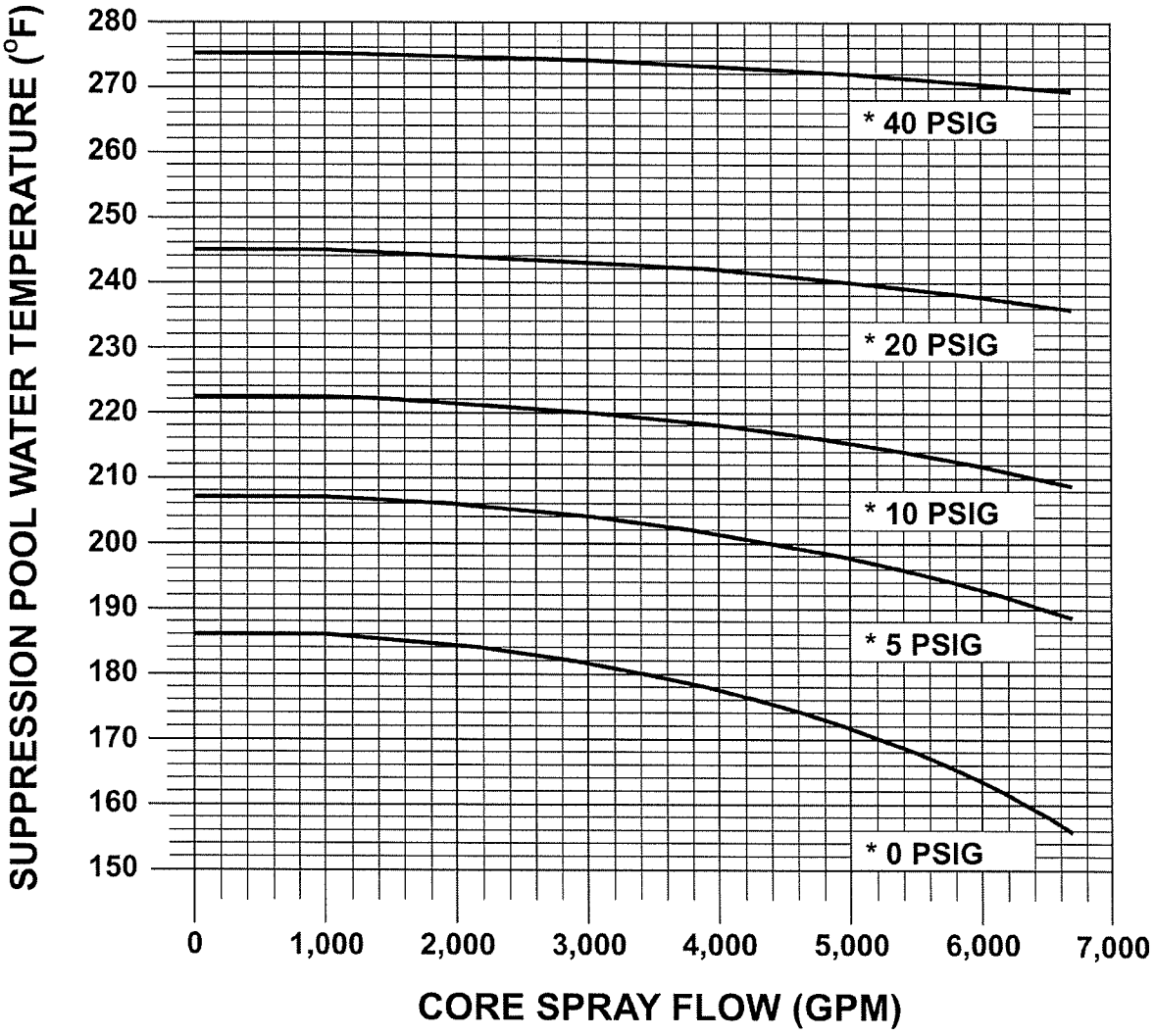


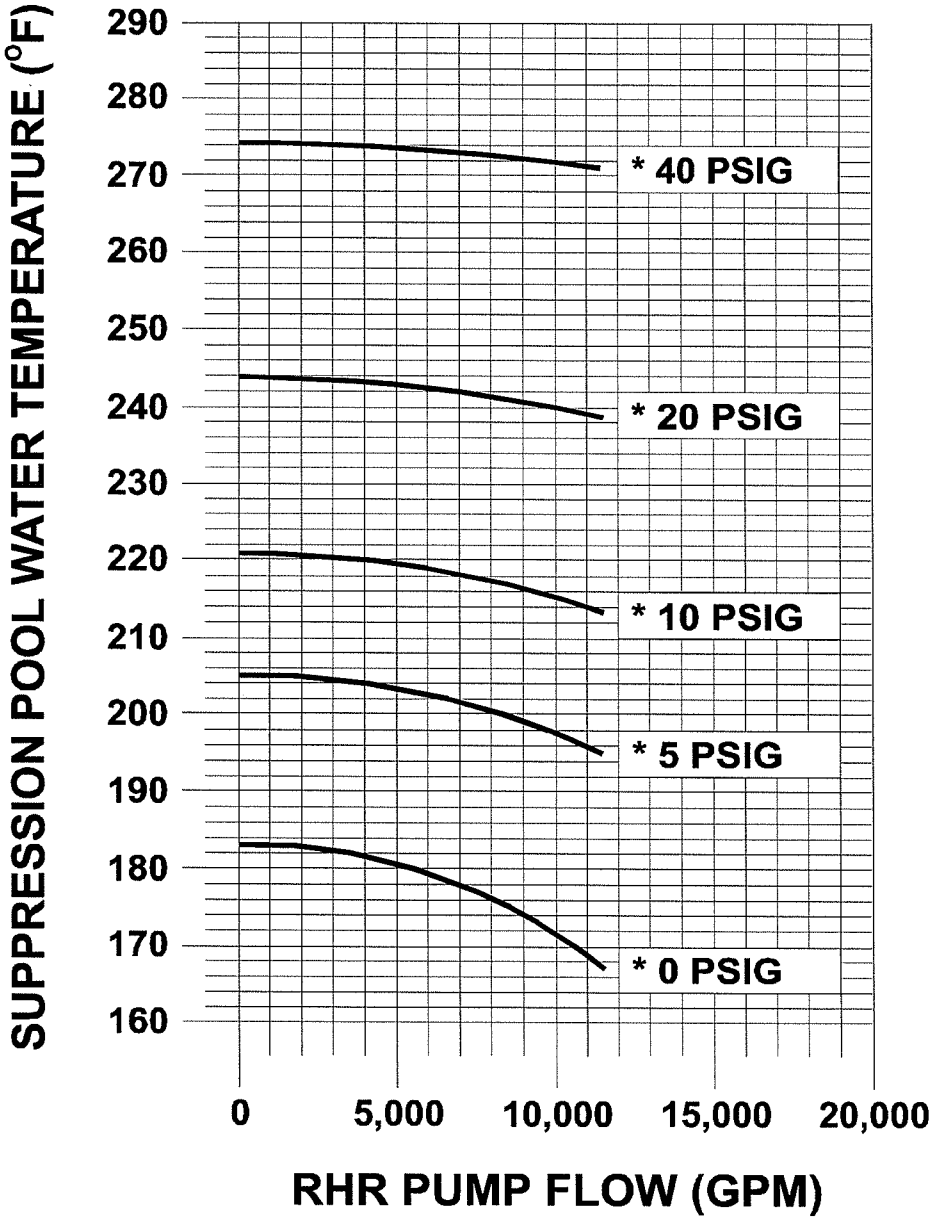
FIGURE 5
Core Spray NPSH Limit



SUBTRACT 0.5 PSIG FROM INDICATED SUPPRESSION CHAMBER PRESSURE FOR EACH FOOT OF WATER LEVEL BELOW A SUPPRESSION POOL WATER LEVEL OF -31 INCHES (-2.6 FEET).

*SUPPRESSION CHAMBER PRESSURE (CAC-PI-1257-2A OR CAC-PI-1257-2B)

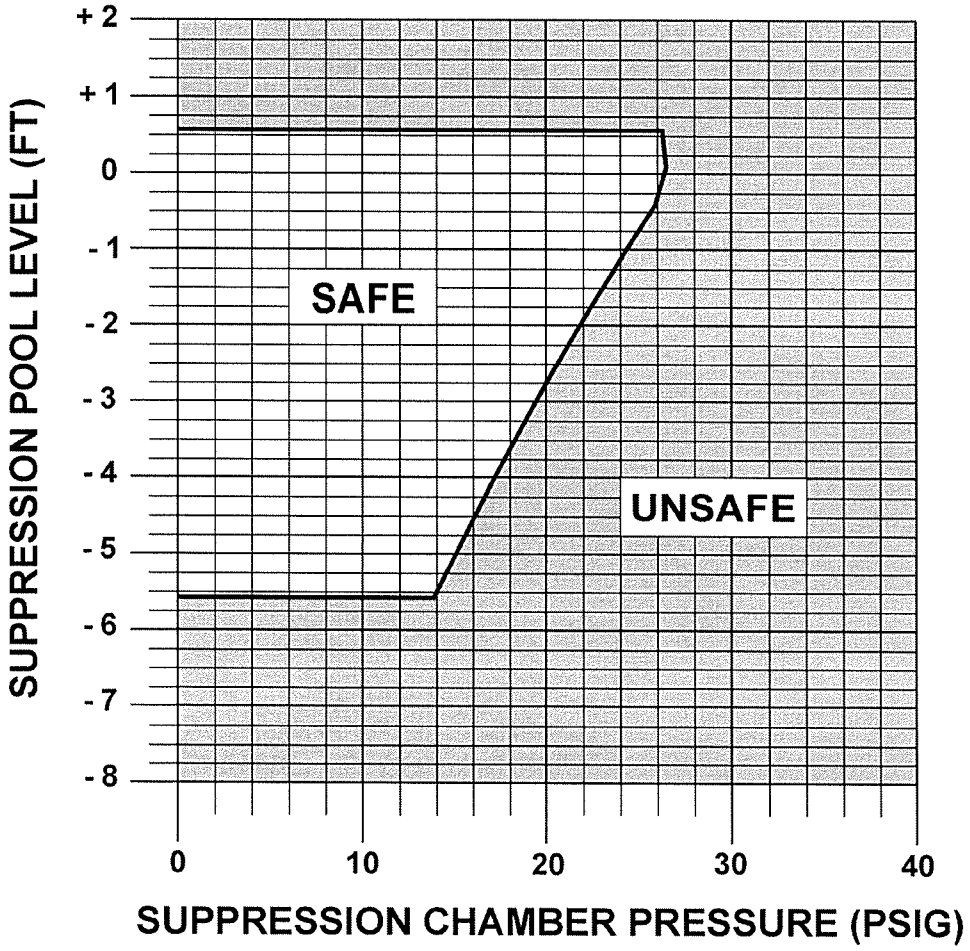
FIGURE 6
RHR NPSH Limit



SUBTRACT 0.5 PSIG FROM INDICATED SUPPRESSION CHAMBER PRESSURE FOR EACH FOOT OF WATER LEVEL BELOW A SUPPRESSION POOL WATER LEVEL OF -31 INCHES (-2.6 FEET).

*SUPPRESSION CHAMBER PRESSURE (CAC-PI-1257-2A OR CAC-PI-1257-2B)

FIGURE 7
Pressure Suppression Pressure



Secondary Containment Temperature and Radiation Limits

FIGURE 22
Secondary Containment Area Temperature

TABLE 1
AREA TEMPERATURE LIMITS

PLANT AREA	PLANT LOCATION DESCRIPTION	STEAM LEAK DETECTION CHANNEL/ LOCATION	INSTRUMENT NUMBER/ WINDOW	MAX NORM OPERATING VALUE (°F) (NOTE 1)	MAX SAFE OPERATING VALUE (°F)	AUTO GROUP ISOL
N CORE SPRAY	N CORE SPRAY ROOM	PANEL XU-3	VA-TI-1603	120	175	N/A
S CORE SPRAY	S CORE SPRAY ROOM	PANEL XU-3	VA-TI-1604	120	175	N/A
RWCU	RWCU PUMP ROOM A	B21-XY-5949A B21-XY-5949B CH. A1-1	G31-TE-N016A G31-TE-N016B	140	225	3
	RWCU PUMP ROOM B	B21-XY-5949A B21-XY-5949B CH. A2-1	G31-TE-N016C G31-TE-N016D			
	RWCU HX ROOM	B21-XY-5949A B21-XY-5949B CH. A3-1	G31-TE-N016E G31-TE-N016F			
N RHR	N RHR EQUIP ROOM	B21-XY-5948A CH. A5-4 PANEL XU-3	E11-TE-N009A VA-TI-1601	175	295	N/A
S RHR	S RHR EQUIP ROOM	B21-XY-5948B CH. A5-4 PANEL XU-3	E11-TE-N009B VA-TI-1602	175	295	N/A
	RCIC EQUIP ROOM	B21-XY-5949A B21-XY-5949B CH. A1-3	E51-TE-N023A E51-TE-N023B	165	295	5
HPCI	HPCI EQUIP ROOM	B21-XY-5948A B21-XY-5948B CH. A1-1	E41-TE-N030A E41-TE-N030B	165		4

NOTE 1: MAX NORM OPERATING VALUE IS THE ANNUNCIATOR/GROUP ISOLATION SETPOINT WHERE APPLICABLE

Secondary Containment Temperature and Radiation Limits

FIGURE 22
Secondary Containment Area Temperature (Cont)

TABLE 1
AREA TEMPERATURE LIMITS

PLANT AREA	PLANT LOCATION DESCRIPTION	STEAM LEAK DETECTION CHANNEL/ LOCATION	INSTRUMENT NUMBER/ WINDOW	MAX NORM OPERATING VALUE (°F) (NOTE 1)	MAX SAFE OPERATING VALUE (°F)	AUTO GROUP ISOL
STEAM TUNNEL	RCIC STM TUNNEL	B21-XY-5949A B21-XY-5949B CH. A3-3	E51-TE-N025A E51-TE-N025B	190	295	5
	HPCI STM TUNNEL	B21-XY-5948A B21-XY-5948B CH. A5-1	E51-TE-NO25C E51-TE-N025D	190	295	4
20 FT	20 FT NORTH	B21-XY-5948A CH. A1-4	B21-TE-5761A	140	200	N/A
	20 FT SOUTH	B21-XY-5948B CH. A1-4	B21-TE-5763B			
50 FT	50 FT NW	B21-XY-5948A CH. A2-4	B21-TE-5762A	140	200	N/A
	50 FT SE	B21-XY-5948B CH. A2-4	B21-TE-5764B			
REACTOR BLDG	MULTIPLE AREAS	ANNUNCIATOR PANEL A-02	WINDOW 5-7	ALARM SETPOINT	N/A	3,4, AND/OR 5
REACTOR BLDG	MSIV PIT	ANNUNCIATOR PANEL A-06	WINDOW 6-7	ALARM SETPOINT	N/A	1

NOTE 1: MAX NORM OPERATING VALUE IS THE ANNUNCIATOR/GROUP ISOLATION SETPOINT WHERE APPLICABLE

Unit 2 Core Spray Pump A Test Information Data Sheet

1. The lubricant level (pump running) is normal: _____

2. Calculate pump dP as follows:

   Pump discharge pressure - suction pressure (run) = pump dP

   _____ - _____ = _____

NOTE: Pump vibration measurement is required only during CPT. Vibration is measured at the test point marked on the pump for the correct bearing number and direction as indicated by the Test Position number as follows:

- the number indicates the bearing number from Attachment 5
- for position, N=North, S=South, E=East, W=West
- for direction, A=Axial, H=Horizontal, V=Vertical

NOTE: Reference values for pump suction and discharge pressures are provided for determining the suitability of alternate test gauges, if used.

NOTE: Pump stopped suction pressure should normally be between 4 and 8 psig. This parameter is a function of torus pressure and suppression pool water level. Values outside of this range may also be indicative of air in the instrument line.

NOTE: Should quarterly pump test data exceed the CPT limits, the pump remains operable and the test results will be evaluated as part of the BNP IST trending program.

UNIT 2 CORE SPRAY PUMP A TEST DATA

TEST PARAMETER	ACTUAL VALUE	REFERENCE VALUE	ACCEPTANCE VALUE RANGE	ALERT RANGE		REQUIRED ACTION RANGE	
				LOW	HIGH	LOW	HIGH
Suction Press. (Stopped) psig		6.0	N/A	N/A	N/A	N/A	N/A
Suction Press. (Running) psig		4.0	N/A	N/A	N/A	N/A	N/A
Discharge Press. Psig		290.0	N/A	N/A	N/A	N/A	N/A
Quarterly Pump DP psid		288.0	260.0 to 316.8	N/A	N/A	< 260.0	> 316.8
CPT Pump DP psid		288.0	267.8 to 296.6	260.0 to <267.8	N/A	< 260.0	> 296.6
Flow Rate gpm		4,700	N/A	N/A	N/A	N/A	N/A
Vibration-vel (in/s peak) Position 1S H		0.230	0 to 0.325	N/A	> 0.325 to 0.700	N/A	> 0.700
Vibration-vel (in/s peak) Position 1W A		0.212	0 to 0.325	N/A	> 0.325 to 0.700	N/A	> 0.700
Vibration-vel (in/s peak) Position 1W H		0.156	0 to 0.325	N/A	> 0.325 to 0.700	N/A	> 0.700

Performed By (Signature): _____ Date: _____ Time: _____

Reviewed, IST Group (Signature): _____ Date: _____

R – Abnorm. Rad Release / Rad Effluent

1 – Offsite Rad Conditions

General Emergency

RG1 Offsite dose resulting from an actual or imminent release of gaseous radioactivity greater than 1,000 mRem TEDE or 5,000 mRem thyroid CDE for the actual or projected duration of the release using actual meteorology

Modes: 1 | 2 | 3 | 4 | 5 | DEF

RG1.1
Any valid radiation monitor reading > Table R-1 column "GE" for > 15 min (Note 1)

RG1.2
Dose assessment using actual meteorology indicates doses > 1 Rem TEDE or 5 Rem thyroid CDE at or beyond the site boundary

RG1.3
Field survey results indicate closed window dose rates > 1 Rem/hr expected to continue for ≥ 1 hr, at or beyond the site boundary
OR
Analyses of field survey samples indicate thyroid CDE of 5 Rem for 1 hr of inhalation, at or beyond the site boundary (Note 1)

Site Area Emergency

RS1 Offsite dose resulting from an actual or imminent release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem thyroid CDE for the actual or projected duration of the release

Modes: 1 | 2 | 3 | 4 | 5 | DEF

RS1.1
Any valid radiation monitor reading > Table R-1 column "SAE" for ≥ 15 min. (Note 1)

RS1.2
Dose assessment using actual meteorology indicates doses > 0.1 Rem TEDE or 0.5 Rem thyroid CDE at or beyond the site boundary

RS1.3
Field survey results indicate closed window dose rates > 0.1 Rem/hr expected to continue for ≥ 1 hr at or beyond the site boundary
OR
Field survey sample analysis indicates thyroid CDE of > 0.5 Rem for 1 hr of inhalation at or beyond the site boundary (Note 1)

Alert

RA1 Any release of gaseous or liquid radioactivity to the environment greater than 200 times the radiological effluent ODCM limits for 15 minutes or longer

Modes: 1 | 2 | 3 | 4 | 5 | DEF

RA1.1
Any valid gaseous monitor reading > Table R-1 column "Alert" for ≥ 15 min (Note 2)

RA1.2
Any valid liquid monitor reading > Table R-1 column "Alert" for ≥ 15 min. (Note 2)

RA1.3
Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 200 x ODCM limits for ≥ 15 min (Note 2)

Unusual Event

RU1 Any release of gaseous or liquid radioactivity to the environment that exceeds two times the radiological effluent Offsite Dose Calculation Manual (ODCM) limits for 60 minutes or longer

Modes: 1 | 2 | 3 | 4 | 5 | DEF

RU1.1
Any valid gaseous monitor reading > Table R-1 column "UE" for ≥ 60 min (Note 2)

RU1.2
Any valid liquid monitor reading > Table R-1 column "UE" for > 60 min (Note 2)

RU1.3
Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 2 x ODCM limits for ≥ 60 min (Note 2)

2 – Onsite Rad Conditions / Fuel Pool Events

Table R-1 Effluent Monitor Classification Thresholds

	Release Point	Monitor	GE	SAE	Alert	UE
Gaseous	Main Stack Rad Monitor	D12-RM-23S	2.13E+09 µCi/sec	2.13E+08 µCi/sec	1.96E+07 µCi/sec	1.80E+06 µCi/sec
Gaseous	Reactor Bldg Vent Noble Gas Monitor	CAC-AQH-1264-3	------	------	------	6.14E+04 cpm
Gaseous	Turbine Building Vent Rad Monitor	D12-RM-23	1.07E+08 µCi/sec	1.07E+07 µCi/sec	3.49E+05 µCi/sec	1.13E+04 µCi/sec
Liquid	Service Water Effluent Radioactivity Monitor	D12-RM-K605	------	------	200 X high alarm	2 X high alarm
Liquid	Radwaste Effluent Rad Monitor	D12-RM-K604	------	------	200 X hi hi alarm	2 X hi hi alarm

Alert

RA2 Damage to irradiated fuel or loss of water level that has or will result in the uncovering of irradiated fuel outside the RPV

Modes: 1 | 2 | 3 | 4 | 5 | DEF

RA2.1
Damage to irradiated fuel or loss of water level (uncovering irradiated fuel outside the RPV) that causes a valid high alarm on any of the following radiation monitors
- Reactor Bldg Vent Rad Monitor Channel A or B (> 3 mR/hr)
- ARM Channel 26 New Fuel Vault (> 6 mR/hr)
- ARM Channel 27 North of Fuel Pool (> 10 mR/hr)
- ARM Channel 28 Between Reactor and Fuel Pool (> 1000 mR/hr)
- ARM Channel 29 Cask Wash Area (> 40 mR/hr)

RA2.2
A water level drop in the reactor refueling cavity, spent fuel pool or fuel transfer canal that will result in irradiated fuel becoming uncovered

Unusual Event

RU2 Unexpected increase in plant radiation

Modes: 1 | 2 | 3 | 4 | 5 | DEF

RU2.1
Unplanned water level drop in the reactor refueling cavity or spent fuel pool, as indicated by low water level alarm (A-04 6-6) or indication
AND
Valid area radiation monitor reading increases on any of the following
- ARM Channel 26 New Fuel Vault
- ARM Channel 27 North of Fuel Pool
- ARM Channel 28 Between Reactor and Fuel Pool
- ARM Channel 29 Cask Wash Area

RU2.2
Unplanned valid area radiation readings or survey results rise by a factor of 1,000 over normal levels *

* Normal levels can be considered as the highest reading in the past 24 hours excluding the current peak value

3 – CR/CAS Rad

Alert

RA3 Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions

Modes: 1 | 2 | 3 | 4 | 5 | DEF

RA3.1
Dose rates > 15 mR/hr in either of the following areas requiring continuous occupancy to maintain plant safety functions
Control Room (ARM Channel 1 1)
OR
Central Alarm Station

H – Hazards

1 – Natural & Destructive Phenomena

Table H-3 Areas Immediately Adjacent to Areas Containing Safe Shutdown Equipment or Components

- Transformer Yard
- Main Turbine Lay Down Areas 20'
- 7-day Fuel Oil Storage Tank
- Chlorination Building
- RCR MG Set Rooms
- FW Heater Corridor (Dragons Breath)
- Security CAS
- Radioactive Waste (Radwaste) Building
- HPCI CO2 Storage Rooms
- Bullet Resistant Enclosures (BREs)
- Resin Processing Building (RW Loading Dock)
- 30 Minute Hold-up Line and associated piping

Table H-1 Areas Containing Safe Shutdown Equipment or Components

- Reactor Building
- Diesel Generator Building
- Diesel 4-Day Tank Rooms
- Service Water Building
- Turbine Building
- Control Building
- CSTs
- Diesel Fuel Oil Storage Tank

Table H-2 Internal Flooding Areas Containing Safe Shutdown Equipment or Components

- Reactor Building
- Diesel Generator Building
- Diesel 4-Day Tank Rooms
- Service Water Intake Structure
- Service Water Building
- Radwaste Building
- Turbine Building
- Control Building

Alert

HA1 Natural or destructive phenomena affecting the plant Vital Area

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HA1.1
Seismic event identified by any two of the following
- Earthquake felt in plant
- Seismic Event alarm (1(2)-UA-28 6-4) actuated
- National Earthquake Center

AND EITHER:
Control Room indication of degraded performance of systems required for the safe shutdown of the plant
OR
Seismic event > Operating Basis Earthquake (0.08 g) per analysis

HA1.2
Tornado striking or sustained high winds > 100 mph resulting in visible damage to any Table H-1 plant structures/equipment or Control Room indication of degraded performance of those safety systems

HA1.3
Turbine failure-generated projectiles resulting in any visible damage to or penetration of any Table H-1 plant structures or equipment or Control Room indication of degraded performance of those safety systems

HA1.4
Flooding in any of the Table H-2 areas resulting in an electrical shock hazard that precludes access to operate or monitor safety equipment or Control Room indication of degraded performance of those safety systems

HA1.5
Intake Canal water level > +22 ft Mean Sea Level
OR
Intake Canal water level < -7.75 ft Mean Sea Level

HA1.6
Vehicle crash resulting in visible damage to any Table H-1 plant structures or equipment or Control Room indication of degraded performance of those safety systems

Unusual Event

HU1 Natural or destructive phenomena affecting the Protected Area

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HU1.1
Seismic event identified by any two of the following:
- Earthquake felt in plant
- Seismic Event alarm (1(2)-UA-28 6-4) actuated
- National Earthquake Center

HU1.2
Tornado striking within Protected Area boundary or sustained high winds > 100 mph

HU1.3
Turbine failure resulting in casing penetration or damage to turbine or generator seals

HU1.4
Flooding that has the potential to affect safety-related equipment needed for the current operating mode in any of the Table H-2 areas

HU1.5
Intake Canal level > +20 ft Mean Sea Level
OR
Intake Canal level < -6.5 ft Mean Sea Level

2 – Fire or Explosion

General Emergency: None

Site Area Emergency: None

Alert

HA2 Fire or explosion affecting the operability of plant safety systems required to establish or maintain safe shutdown

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HA2.1
Fire or explosion resulting in visible damage to any Table H-1 area containing safety systems or components or Control Room indication of degraded performance of those safety systems

Unusual Event

HU2 Fire within the Protected Area not extinguished within 15 minutes of detection or explosion within Protected Area

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HU2.1
Fire not extinguished within 15 min. (Note 3) of control room notification or verification of a control room fire alarm in any Table H-1 or Table H-3 areas

HU2.2
Explosion within Protected Area boundary

3 – Hazardous Gas

General Emergency: None

Site Area Emergency: None

Alert

HA3 Access to a vital area is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HA3.1
Access to any Table H-1 area is prohibited due to toxic, corrosive, asphyxiant, or flammable gases which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor (Note 4)

Unusual Event

HU3 Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to normal plant operations

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HU3.1
Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect normal plant operations

HU3.2
Recommendation by local, county or state officials to evacuate or shelter site personnel based on offsite event

4 – Security

General Emergency

HG4 Hostile Action resulting in loss of physical control of the facility

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HG4.1
A hostile action has occurred such that plant personnel are unable to operate equipment required to maintain safety functions (i.e., reactivity control, RPV water level, or decay heat removal)
OR
A hostile action has caused failure of Spent Fuel Cooling Systems and imminent fuel damage is likely

Site Area Emergency

HS4 Hostile Action within the Protected Area

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HS4.1
A hostile action is occurring or has occurred within the Protected Area as reported by the Security Shift Supervision

Alert

HA4 Hostile action within the owner controlled area or airborne attack threat

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HA4.1
A hostile action is occurring or has occurred within the Owner Controlled Area as reported by the Security Shift Supervision
OR
A validated notification from NRC of a site-specific airliner attack threat < 30 min. away

Unusual Event

HU4 Confirmed security condition or threat which indicates a potential degradation in the level of safety of the plant

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HU4.1
A security condition that does not involve a hostile action as reported by the Security Shift Supervision
OR
A credible site-specific security threat notification
OR
A validated notification from NRC providing information of a site-specific aircraft threat

5 – Control Room Evacuation

General Emergency: None

Site Area Emergency

HS5 Control Room evacuation has been initiated and plant control cannot be established

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HS5.1
Control Room evacuation has been initiated
AND
Control of the plant cannot be established within 15 min

Alert

HA5 Control Room evacuation has been initiated

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HA5.1
Control Room evacuation has been initiated

Unusual Event: None

6 – Judgment

General Emergency

HG6 Other conditions exist that in the judgment of the Site Emergency Coordinator warrant declaration of General Emergency

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HG6.1
Other conditions exist that in the judgment of the Site Emergency Coordinator indicate that events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels (1 Rem TEDE and 5 Rem thyroid CDE) beyond the site boundary

Site Area Emergency

HS6 Other conditions exist that in the judgment of the Site Emergency Coordinator warrant declaration of a Site Area Emergency

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HS6.1
Other conditions exist that in the judgment of the Site Emergency Coordinator indicate that events are in progress or have occurred which involve an 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 result in exposure levels which exceed EPA Protective Action Guideline exposure levels (1 Rem TEDE and 5 Rem thyroid CDE) beyond the site boundary

Alert

HA6 Other conditions exist that in the judgment of the Site Emergency Coordinator warrant declaration of an Alert

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HA6.1
Other conditions exist that in the judgment of the Site Emergency Coordinator indicate that events are in progress 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 beyond the site boundary

Unusual Event

HU6 Other conditions exist that in the judgment of the Site Emergency Coordinator warrant declaration of a UE

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HU6.1
Other conditions exist that in the judgment of the Site Emergency Coordinator indicate that events are in progress 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

E – ISFSI

General Emergency: None

Site Area Emergency: None

Alert: None

Unusual Event

EU1 Damage to a loaded cask confinement boundary

Mode Not Applicable

EU1.1
Damage to a loaded canister confinement boundary

S – System Malfunct.

1 – Loss of AC Power

General Emergency

SG1 Prolonged loss of all offsite and all onsite AC power to emergency buses

Modes: 1 | 2 | 3

SG1.1
Loss of all offsite and all onsite AC power to Emergency 4 KV Buses E1(E3) and E2(E4)
AND EITHER
Reenergization of at least one emergency bus in < 4 hours is not likely
OR
RPV level cannot be restored and maintained > TAF or cannot be determined

Site Area Emergency

SS1 Loss of all offsite power and all onsite AC power to emergency buses for 15 minutes or longer

Modes: 1 | 2 | 3

SS1.1
Loss of all offsite and all onsite AC power to Emergency 4 KV Buses E1(E3) and E2(E4) for ≥ 15 min (Note 3)

Alert

SA1 AC power capability to emergency buses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in loss of all AC power to emergency buses

Modes: 1 | 2 | 3

SA1.1
AC power capability to Emergency 4 KV Buses E1(E3) and E2(E4) reduced to a single power source for ≥ 15 min (Note 3) such that any additional single failure would result in loss of all AC power to emergency buses

Unusual Event

SU1 Loss of all offsite AC power to emergency buses for 15 minutes or longer

Modes: 1 | 2 | 3

SU1.1
Loss of all offsite AC power to Emergency 4 KV Buses E1(E3) and E2(E4) for ≥ 15 min (Note 3)

2 – ATWS / Criticality

General Emergency

SG2 Automatic Scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists

Modes: 1 | 2

SG2.1
Automatic and all manual scrams were not successful
AND
Reactor power is ≥ 2% (APRM downscale)
AND EITHER:
RPV level cannot be restored and maintained > LL-4 or cannot be determined
OR
Suppression pool water temperature and RPV pressure cannot be maintained below the HCTL

Site Area Emergency

SS2 Automatic Scram fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor

Modes: 1 | 2

SS2.1
Automatic scram fails to reduce reactor power < 2% (APRM downscale)
AND
Manual scram actions taken at the reactor control console (Manual PBs, Mode Switch, ARI) do not shutdown the reactor as indicated by reactor power ≥ 2%

Alert

SA2 Automatic Scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor

Modes: 1 | 2

SA2.1
Automatic scram fails to reduce reactor power < 2% (APRM downscale)
AND
Manual scram actions taken at the reactor control console (Manual PBs, Mode Switch, ARI) successfully shutdown the reactor as indicated by reactor power < 2% (APRM downscale)

Unusual Event

SU2 Inadvertent criticality

Modes: 3

SU2.1
Any unplanned sustained positive period observed on nuclear instrumentation

3 – Inability to Reach or Maintain Shutdown Conditions

General Emergency: None

Site Area Emergency: None

Alert: None

Unusual Event

SU3 Inability to reach required shutdown within Technical Specification limits

Modes: 1 | 2 | 3

SU3.1
Plant is not brought to required operating mode within Technical Specifications LCO action statement completion time

4 – Inst.

Table S-2 Communications Systems

System	Onsite (internal)	Offsite (external)
Public Address System	X	
PBX Telephone System	X	X
Corporate Telephone Communications System (Voicenet)	X	X
Commercial Telephones	X	X
Satellite Phones		X
Cellular Phones		X
NRC Emergency Telecommunications System		X

Site Area Emergency

SS4 Inability to monitor a significant transient in progress

Modes: 1 | 2 | 3

SS4.1
Loss of > approximately 75% of the annunciators OR indicators associated with safety systems on the following panels (CRPs) for ≥ 15 min. (Note 3)
- P603
- P601
- XU-1
- XU-2
- XU-3
- XU-51
- XU-30

AND
Compensatory non-alarming indications are unavailable (ERFIS)
AND
Any significant transient is in progress, Table S-1

Alert

SA4 Unplanned loss of safety system annunciation or indication in the control room with EITHER (1) a significant transient in progress OR (2) compensatory indicators unavailable

Modes: 1 | 2 | 3

SA4.1
Unplanned loss of > approximately 75% of the annunciators OR indicators associated with safety systems on the following panels (CRPs) for ≥ 15 min (Note 3):
- P603
- P601
- XU-1
- XU-2
- XU-3
- XU-51
- XU-80

AND EITHER
Any significant transient is in progress, Table S-1
OR
Compensatory non-alarming indications are unavailable (ERFIS)

Unusual Event

SU4 Unplanned loss of safety system annunciation or indication in the control room for 15 minutes or longer

Modes: 1 | 2 | 3

SU4.1
Unplanned loss of > approximately 75% of the annunciators OR indicators associated with safety systems on the following panels (CRPs) for ≥ 15 min (Note 3)
- P603
- P601
- XU-1
- XU-2
- XU-3
- XU-51
- XU-80

5 – Fuel Clad Degradation

General Emergency: None

Table S-1 Significant Transients

- Reactor scram
- Runback > 25% thermal power
- Electrical load rejection > 25% full electrical load
- ECCS injection
- Thermal power oscillations > 10%

Alert: None

Unusual Event

SU5 Fuel clad degradation

Modes: 1 | 2 | 3

SU5.1
Steam Jet Air Ejector Radiation Monitor 1(2)D12-RM-K601A/B Hi-Hi alarm (Process Off-Gas Rad Hi-Hi alarm 1(2)UA-03 4-2)

SU5.2
Coolant activity > 0.2 µCi/gm I-131 dose equivalent for > 48 hrs
OR
Coolant activity > 4.0 µCi/gm I-131 dose equivalent instantaneous

6 – RCS Leakage

General Emergency: None

Site Area Emergency: None

Alert: None

Unusual Event

SU6 RCS leakage

Modes: 1 | 2 | 3

SU6.1
Unidentified or pressure boundary leakage > 10 gpm
OR
Identified leakage > 25 gpm (Note 5)

7 – Loss of DC Power

General Emergency: None

Site Area Emergency

SS7 Loss of all DC power for 15 minutes or longer

Modes: 1 | 2 | 3

SS7.1
Loss of all 125 VDC power based on battery bus voltage indications < 105 VDC for > 15 min. (Note 3) on all of the following
- 1(2)A-1
- 1(2)A-2
- 1(2)B-1
- 1(2)B-2

Alert: None

Unusual Event: None

8 – Comm.

Unusual Event

SU8 Loss of all onsite or offsite communications capabilities

Modes: 1 | 2 | 3

SU8.1
Loss of all Table S-2 onsite (internal) communications capability affecting the ability to perform routine operations
OR
Loss of all Table S-2 offsite (external) communications methods affecting the ability to perform offsite notifications

F – Fission Product Barriers

FG1.1 Modes: 1 | 2 | 3
Loss of any two barriers
AND
Loss or potential loss of third barrier (Table F-1)

FS1.1 Modes: 1 | 2 | 3
Loss or potential loss of any two barriers (Table F-1)

FA1.1 Modes: 1 | 2 | 3
Any loss or any potential loss of either Fuel Clad or RCS (Table F-1)

FU1.1 Modes: 1 | 2 | 3
Any loss or any potential loss of Containment (Table F-1)

Table F-1 Fission Product Barrier Matrix

	Fuel Clad Barrier		Reactor Coolant System Barrier		Containment Barrier	
	Loss	Potential Loss	Loss	Potential Loss	Loss	Potential Loss
A. RPV Level	1. Primary Containment Flooding required due to any of the following - RPV level cannot be restored and maintained above -57.5 inches (Jet Pump Suction) with at least one core spray pump injecting into the reactor vessel - RPV level cannot be restored and maintained above LL-4 (MSCRWL) - RPV water level cannot be determined and RPV flooding conditions cannot be maintained	1. RPV level cannot be restored and maintained > TAF or cannot be determined	1. RPV level cannot be restored and maintained > TAF or cannot be determined	None	None	1. Primary Containment Flooding is required
B. PC Pressure / Temperature	None	None	2. PC pressure > 1.7 psig due to RCS leakage	None	1. PC pressure rise followed by a rapid unexplained drop in PC pressure 2. PC pressure response not consistent with LOCA conditions	2. PC pressure > 62 psig and rising 3. Deflagration concentrations exist inside PC (H2 ≥ 6% AND O2 ≥ 5%) 4. Suppression pool water temperature and RPV pressure cannot be maintained below the HCTL
C. Isolation	None	None	3. Release pathway exists outside primary containment resulting from isolation failure in any of the following (excluding normal process system flowpaths from an unisolable system) - Main steam line - HPCI steam line - RCIC steam line - RWCU - Feedwater 4. Emergency Depressurization is required	1. RCS leakage > 50 gpm inside the drywell 2. Unisolable primary system discharge outside primary containment as indicated by Secondary Containment area radiation or temperature above any Maximum Normal Operating Limit (0EOP-03-SCCP Tables 3, 1)	3. Failure of any valve in any one line to close **AND** Direct release pathway to the environment outside PC exists after PC isolation signal (manual or automatic) 4. Intentional PC venting per EOPs 5. Unisolable primary system discharge outside primary containment as indicated by Secondary Containment area radiation or temperature above any Maximum Safe Operating Limit (0EOP-03-SCCP Tables 3,1)	None
D. Rad	2. Drywell radiation > 2,000 R/hr 3. Primary coolant activity > 300 µCi/gm I-131 dose equivalent	None	5. Drywell radiation > 27 R/hr with reactor shutdown	None	None	5. Drywell radiation > 20,000 R/hr
E. Judgment	4. Any condition in the opinion of the Site Emergency Coordinator that indicates loss of the Fuel Clad barrier	2. Any condition in the opinion of the Site Emergency Coordinator that indicates potential loss of the Fuel Clad barrier	6. Any condition in the opinion of the Site Emergency Coordinator that indicates loss of the RCS barrier	3. Any condition in the opinion of the Site Emergency Coordinator that indicates potential loss of the RCS barrier	6. Any condition in the opinion of the Site Emergency Coordinator that indicates loss of the Containment barrier	6. Any condition in the opinion of the Site Emergency Coordinator that indicates potential loss of the Containment barrier

Notes

Note 1. The SEC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results. See EAL RS1.2. (See EAL RS1.2/RG1.2)

Note 2. The SEC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

Note 3. The SEC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Note 4. If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

Note 5. See Table F-1, Fission Product Barrier Matrix, for possible escalation above the Unusual Event due to RCS Leakage.

Modes: 1 Power Operations | 2 Startup | 3 Hot Shutdown | 4 Cold Shutdown | 5 Refuel | DEF Defueled

Progress Energy

Brunswick Nuclear Plant
Initial Emergency Actions
0PEP-02.1, Rev. 52

EAL-1 MODES 1, 2 & 3

R – Abnorm. Rad Release / Rad Effluent

1 – Offsite Rad Conditions

General Emergency

RG1 Offsite dose resulting from an actual or imminent release of gaseous radioactivity greater than 1,000 mRem TEDE or 5,000 mRem thyroid CDE for the actual or projected duration of the release using actual meteorology

Modes: 1 | 2 | 3 | 4 | 5 | DEF

RG1.1
Any valid radiation monitor reading > Table R-1 column "GE" for ≥ 15 min (Note 1)

RG1.2
Dose assessment using actual meteorology indicates doses > 1 Rem TEDE or 5 Rem thyroid CDE at or beyond the site boundary

RG1.3
Field survey results indicate closed window dose rates > 1 Rem/hr expected to continue for ≥ 1 hr, at or beyond the site boundary
OR
Analyses of field survey samples indicate thyroid CDE of 5 Rem for 1 hr of inhalation, at or beyond the site boundary (Note 1)

Site Area Emergency

RS1 Offsite dose resulting from an actual or imminent release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem thyroid CDE for the actual or projected duration of the release

Modes: 1 | 2 | 3 | 4 | 5 | DEF

RS1.1
Any valid radiation monitor reading > Table R-1 column "SAE" for ≥ 15 min (Note 1)

RS1.2
Dose assessment using actual meteorology indicates doses > 0.1 Rem TEDE or 0.5 Rem thyroid CDE at or beyond the site boundary

RS1.3
Field survey results indicate closed window dose rates > 0.1 Rem/hr expected to continue for ≥ 1 hr at or beyond the site boundary
OR
Field survey sample analysis indicates thyroid CDE of > 0.5 Rem for 1 hr of inhalation at or beyond the site boundary (Note 1)

Alert

RA1 Any release of gaseous or liquid radioactivity to the environment greater than 200 times the radiological effluent ODCM limits for 15 minutes or longer

Modes: 1 | 2 | 3 | 4 | 5 | DEF

RA1.1
Any valid gaseous monitor reading > Table R-1 column "Alert" for ≥ 15 min (Note 2)

RA1.2
Any valid liquid monitor reading > Table R-1 column "Alert" for
≥ 15 min (Note 2)

RA1.3
Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 200 x ODCM limits for > 15 min (Note 2)

Unusual Event

RU1 Any release of gaseous or liquid radioactivity to the environment that exceeds two times the radiological effluent Offsite Dose Calculation Manual (ODCM) limits for 60 minutes or longer

Modes: 1 | 2 | 3 | 4 | 5 | DEF

RU1.1
Any valid gaseous monitor reading > Table R-1 column "UE" for > 60 min (Note 2)

RU1.2
Any valid liquid monitor reading > Table R-1 column "UE" for > 60 min (Note 2)

RU1.3
Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 2 x ODCM limits for > 60 min (Note 2)

2 – Onsite Rad Conditions / Fuel Pool Events

Table R-1 Effluent Monitor Classification Thresholds

	Release Point	Monitor	GE	SAE	Alert	UE
Gaseous	Main Stack Rad Monitor	D12-RM-23S	2.13E+09 µCi/sec	2.13E+08 µCi/sec	1.06E+07 µCi/sec	1.60E+06 µCi/sec
Gaseous	Reactor Bldg Vent Noble Gas Monitor	CAC-AQH-1264-3	------	------	------	8.14E+03 cpm
Gaseous	Turbine Building Vent Rad Monitor	D12-RM-23	1.07E+08 µCi/sec	1.07E+07 µCi/sec	3.49E+05 µCi/sec	1.13E+04 µCi/sec
Liquid	Service Water Effluent Radioactivity Monitor	D12-RM-K605	------	------	200 X High alarm	2 X High alarm
Liquid	Radwaste Effluent Rad Monitor	D12-RM-K604	------	------	200 X Hi-Hi alarm	2 X Hi-Hi alarm

Alert

RA2 Damage to irradiated fuel or loss of water level that has or will result in the uncovering of irradiated fuel outside the RPV

Modes: 1 | 2 | 3 | 4 | 5 | DEF

RA2.1
Damage to irradiated fuel or loss of water level (uncovering irradiated fuel outside the RPV) that causes a valid high alarm on any of the following radiation monitors
- Reactor Bldg Vent Rad Monitor Channel A or B (> 3 mR/hr)
- ARM Channel 26 New Fuel Vault (> 6 mR/hr)
- ARM Channel 27 North of Fuel Pool (> 10 mR/hr)
- ARM Channel 28 Between Reactor and Fuel Pool (> 1000 mR/hr)
- ARM Channel 29 Cask Wash Area (> 40 mR/hr)

RA2.2
A water level drop in the reactor refueling cavity, spent fuel pool or fuel transfer canal that will result in irradiated fuel becoming uncovered

Unusual Event

RU2 Unexpected increase in plant radiation

Modes: 1 | 2 | 3 | 4 | 5 | DEF

RU2.1
Unplanned water level drop in the reactor refueling cavity or spent fuel pool, as indicated by low water level alarm (A-04 6-6) or indication
AND
Valid area radiation monitor reading increases on any of the following
- ARM Channel 26 New Fuel Vault
- ARM Channel 27 North of Fuel Pool
- ARM Channel 28 Between Reactor and Fuel Pool
- ARM Channel 29 Cask Wash Area

RU2.2
Unplanned valid area radiation readings or survey results rise by a factor of 1,000 over normal levels *

* Normal levels can be considered as the highest reading in the past 24 hours excluding the current peak value

3 – CR/CAS Rad

Alert

RA3 Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions

Modes: 1 | 2 | 3 | 4 | 5 | DEF

RA3.1
Dose rates > 15 mR/hr in either of the following areas requiring continuous occupancy to maintain plant safety functions
Control Room (ARM Channel 1-1)
OR
Central Alarm Station

H – Hazards

1 – Natural & Destructive Phenomena

Table H-3 Areas Immediately Adjacent to Areas Containing Safe Shutdown Equipment or Components

- Transformer Yard
- Main Turbine Lay Down Areas 20'
- 7-day Fuel Oil Storage Tank
- Chlorination Building
- RCR MG Set Rooms
- FW Heater Condor (Dungeons Booth)
- Security CAS
- Radioactive Waste (Radwaste) Building
- HPCI CO2 Storage Rooms
- Bullet Resistant Enclosures (BREs)
- Resin Processing Building (RW Loading Dock)
- 30 Minute Hold-up Line and associated piping

Table H-1 Areas Containing Safe Shutdown Equipment or Components

- Reactor Building
- Diesel Generator Building
- Diesel 4-Day Tank Rooms
- Service Water Building
- Turbine Building
- Control Building
- CSTs
- Diesel Fuel Oil Storage Tank

Table H-2 Internal Flooding Areas Containing Safe Shutdown Equipment or Components

- Reactor Building
- Diesel Generator Building
- Diesel 4-Day Tank Rooms
- Service Water Intake Structure
- Service Water Building
- Radwaste Building
- Turbine Building
- Control Building

Alert

HA1 Natural or destructive phenomena affecting the plant Vital Area

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HA1.1
Seismic event identified by any two of the following
- Earthquake felt in plant
- Seismic Event alarm (1(2)-UA-28 6-4) actuated
- National Earthquake Center

AND EITHER
Control Room indication of degraded performance of systems required for the safe shutdown of the plant
OR
Seismic event > Operating Basis Earthquake (0.03 g) per analysis

HA1.2
Tornado striking or sustained high winds > 100 mph resulting in visible damage to any Table H-1 plant structures or equipment or Control Room indication of degraded performance of those safety systems

HA1.3
Turbine failure-generated projectiles resulting in any visible damage to or penetration of any Table H-1 plant structures or equipment or Control Room indication of degraded performance of those safety systems

HA1.4
Flooding in any of the Table H-2 areas resulting in an electrical shock hazard that precludes access to operate or monitor safety equipment or Control Room indication of degraded performance of those safety systems

HA1.5
Intake Canal water level > +22 ft Mean Sea Level
OR
Intake Canal water level < -7.75 ft Mean Sea Level

HA1.6
Vehicle crash resulting in visible damage to any Table H-1 plant structures or equipment or Control Room indication of degraded performance of those safety systems

Unusual Event

HU1 Natural or destructive phenomena affecting the Protected Area

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HU1.1
Seismic event identified by any two of the following:
- Earthquake felt in plant
- Seismic Event alarm (1(2)-UA-28 6-4) actuated
- National Earthquake Center

HU1.2
Tornado striking within Protected Area boundary or sustained high winds > 100 mph

HU1.3
Turbine failure resulting in casing penetration or damage to turbine or generator seals

HU1.4
Flooding that has the potential to affect safety-related equipment needed for the current operating mode in any of the Table H-2 areas

HU1.5
Intake Canal level > +20 ft Mean Sea Level
OR
Intake Canal level < -6.5 ft Mean Sea Level

2 – Fire or Explosion

General Emergency: None

Site Area Emergency: None

Alert

HA2 Fire or explosion affecting the operability of plant safety systems required to establish or maintain safe shutdown

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HA2.1
Fire or explosion resulting in visible damage to any Table H-1 area containing safety systems or components or Control Room indication of degraded performance of those safety systems

Unusual Event

HU2 Fire within the Protected Area not extinguished within 15 minutes of detection or explosion within Protected Area

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HU2.1
Fire not extinguished within 15 min (Note 3) of control room notification or verification of a control room fire alarm in any Table H-1 or Table H-3 areas

HU2.2
Explosion within Protected Area boundary

3 – Hazardous Gas

General Emergency: None

Site Area Emergency: None

Alert

HA3 Access to a vital area is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HA3.1
Access to any Table H-1 area is prohibited due to toxic, corrosive, asphyxiant, or flammable gases which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor (Note 4)

Unusual Event

HU3 Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to normal plant operations

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HU3.1
Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect normal plant operations

HU3.2
Recommendation by local, county or state officials to evacuate or shelter site personnel based on offsite event

4 – Security

General Emergency

HG4 Hostile Action resulting in loss of physical control of the facility

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HG4.1
A hostile action has occurred such that plant personnel are unable to operate equipment required to maintain safety functions (i.e., reactivity control, RPV water level, or decay heat removal)
OR
A hostile action has caused failure of Spent Fuel Cooling Systems and imminent fuel damage is likely

Site Area Emergency

HS4 Hostile Action within the Protected Area

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HS4.1
A hostile action is occurring or has occurred within the Protected Area as reported by the Security Shift Supervision

Alert

HA4 Hostile action within the owner controlled area or airborne attack threat

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HA4.1
A hostile action is occurring or has occurred within the Owner Controlled Area as reported by the Security Shift Supervision
OR
A validated notification from NRC of a site-specific airliner attack threat < 30 min away

Unusual Event

HU4 Confirmed security condition or threat which indicates a potential degradation in the level of safety of the plant

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HU4.1
A security condition that does not involve a hostile action as reported by the Security Shift Supervision
OR
A credible site-specific security threat notification
OR
A validated notification from NRC providing information of a site-specific aircraft threat

5 – Control Room Evacuation

General Emergency: None

Site Area Emergency

HS5 Control Room evacuation has been initiated and plant control cannot be established

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HS5.1
Control Room evacuation has been initiated
AND
Control of the plant cannot be established within 15 min

Alert

HA5 Control Room evacuation has been initiated

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HA5.1
Control Room evacuation has been initiated

Unusual Event: None

6 – Judgment

General Emergency

HG6 Other conditions exist that in the judgment of the Site Emergency Coordinator warrant declaration of General Emergency

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HG6.1
Other conditions exist that in the judgment of the Site Emergency Coordinator indicate that events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels (1 Rem TEDE and 5 Rem thyroid CDE) beyond the site boundary

Site Area Emergency

HS6 Other conditions exist that in the judgment of the Site Emergency Coordinator warrant declaration of a Site Area Emergency

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HS6.1
Other conditions exist that in the judgment of the Site Emergency Coordinator indicate that events are in progress or have occurred which involve an 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 result in exposure levels which exceed EPA Protective Action Guideline exposure levels (1 Rem TEDE and 5 Rem thyroid CDE) beyond the site boundary

Alert

HA6 Other conditions exist that in the judgment of the Site Emergency Coordinator warrant declaration of an Alert

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HA6.1
Other conditions exist that in the judgment of the Site Emergency Coordinator indicate that events are in progress 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 beyond the site boundary

Unusual Event

HU6 Other conditions exist that in the judgment of the Site Emergency Coordinator warrant declaration of a UE

Modes: 1 | 2 | 3 | 4 | 5 | DEF

HU6.1
Other conditions exist that in the judgment of the Site Emergency Coordinator indicate that events are in progress 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

E – ISFSI

General Emergency: None

Site Area Emergency: None

Alert: None

Unusual Event

EU1 Damage to a loaded cask confinement boundary

Mode Not Applicable

EU1.1
Damage to a loaded canister confinement boundary

Modes: 1 Power Operations | 2 Startup | 3 Hot Shutdown | 4 Cold Shutdown | 5 Refuel | DEF Defueled

Progress Energy — Brunswick Nuclear Plant Initial Emergency Actions 0PEP-02.1, Rev. 52

C – Cold SD/ Refuel System Malfunct.

1 – Loss of AC Power

General Emergency: None

Site Area Emergency: None

Alert

CA1 Loss of all offsite and all onsite AC power to emergency buses for 15 minutes or longer

Modes: 4 | 5 | DEF

CA1.1
Loss of all offsite and all onsite AC power to Emergency 4 KV Buses E1(E3) and E2(E4) for ≥ 15 min (Note 3)

Unusual Event

CU1 AC power capability to emergency buses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in loss of all AC power to emergency buses

Modes: 4 | 5

CU1.1
AC power capability to Emergency 4 KV Buses E1(E3) and E2(E4) reduced to a single power source for > 15 min (Note 3) such that any additional single failure would result in loss of all AC power to Emergency Buses

2 – RPV Level

General Emergency

CG2 Loss of RPV inventory affecting fuel clad integrity with Containment challenged

Modes: 4 | 5

CG2.1
RPV level < TAF for > 30 min (Note 3)
AND
Any Containment Challenge indication, Table C-4

CG2.2
RPV level cannot be monitored for ≥ 30 min
AND
A loss of inventory as indicated by either of the following
- Any unexplained RPV leakage indication, Table C-1
- Erratic Source Range Monitor indication

AND
Any Containment Challenge indication, Table C-4

Site Area Emergency

CS2 Loss of RPV inventory affecting core decay heat removal capability

Modes: 4 | 5

CS2.1
RPV level < 99 in.
AND
Containment Closure not established (Note 6)

CS2.2
RPV level < TAF
AND
Containment Closure established (Note 6)

CS2.3
RPV level cannot be monitored for > 30 min (Note 3)
AND
A loss of inventory as indicated by either of the following
- Any unexplained RPV leakage indication, Table C-1
- Erratic Source Range Monitor indication

Alert

CA2 Loss of RPV inventory

Modes: 4 | 5

CA2.1
RPV level < 105 in
OR
RPV level cannot be monitored for ≥ 15 min (Note 3) AND any unexplained RPV leakage indication, Table C-1

Unusual Event

CU2 Unplanned loss of RPV inventory

Modes: 4

CU2.1
RPV level cannot be restored and maintained > 166 in. for > 15 min due to RCS leakage (Note 3)

CU2 Unplanned loss of RPV inventory

Modes: 5

CU2.2
Unplanned RPV level drop for > 15 min (Note 3) below EITHER:
- 355 in. (RPV flange)
- RPV level band when the RPV level band is established below the RPV flange

CU2.3
RPV level cannot be monitored with any unexplained RPV leakage indication, Table C-1

3 – RCS Temp.

General Emergency: None

Site Area Emergency: None

Alert

CA3 Inability to maintain plant in cold shutdown

Modes: 4 | 5

CA3.1
Any unplanned event results in RCS temperature > 212°F for > Table C-3 duration
OR
Unplanned RPV pressure increase > 10 psig due to loss of RCS cooling

Unusual Event

CU3 Unplanned loss of decay heat removal capability with irradiated fuel in the RPV

Modes: 4 | 5

CU3.1
Any unplanned event resulting in RCS temperature > 212°F due to loss of decay heat removal capability

CU3.2
Loss of all RCS temperature and RPV level indication for > 15 min (Note 3)

4 – Comm

General Emergency: None

Site Area Emergency: None

Alert: None

Unusual Event

CU4 Loss of all onsite or offsite communications capabilities

Modes: 4 | 5 | DEF

CU4.1
Loss of all Table C-2 onsite (internal) communications capability affecting the ability to perform routine operations
OR
Loss of all Table C-2 offsite (external) communications affecting the ability to perform offsite notifications

5 – Inadvertent Criticality

General Emergency: None

Site Area Emergency: None

Alert: None

Unusual Event

CU5 Inadvertent criticality

Modes: 4 | 5

CU5.1
Any unplanned sustained positive period observed on nuclear instrumentation

6 – DC Power

General Emergency: None

Site Area Emergency: None

Alert: None

Unusual Event

CU6 Loss of required DC power for 15 minutes or longer

Modes: 4 | 5

CU6.1
< 105 VDC bus voltage indications on all Technical Specification required 125 VDC buses for > 15 min (Note 3)

Table C-1 RPV Leakage Indications

- Drywell equipment drain sump level rise
- Drywell floor drain sump level rise
- Reactor Building equipment drain sump level rise
- Reactor Building floor drain sump level rise
- Suppression pool level rise
- RPV make up rate rise
- Observation of unisolable RCS leakage

Table C-4 Containment Challenge Indications

- Containment Closure not established (Note 6)
- Deflagration concentrations exist inside PC (H_2 > 6% AND O_2 > 5%)
- Unplanned rise in PC pressure
- Secondary Containment area radiation > any Maximum Safe Operating Limit (EOP-03-SCCP Table 3)

Table C-2 Communications Systems

System	Onsite (internal)	Offsite (external)
Public Address System	X	
PBX Telephone System	X	X
Corporate Telephone Communications System (Voicenet)	X	X
Commercial Telephones	X	X
Satellite Phones		X
Cellular Phones		X
NRC Emergency Telecommunications System		X

Table C-3 RCS Reheat Duration Thresholds

* If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is not applicable

1	RCS intact (Containment Closure N/A)	60 min *
2	Containment Closure established (Note 3) AND RCS not intact	20 min *
3	Containment Closure not established (Note 3) AND RCS not intact	0 min

Notes

Note 1 The SEC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results. See EAL RS1.2 (See EAL RS1.2/RG1.2).

Note 2 The SEC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

Note 3 The SEC should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

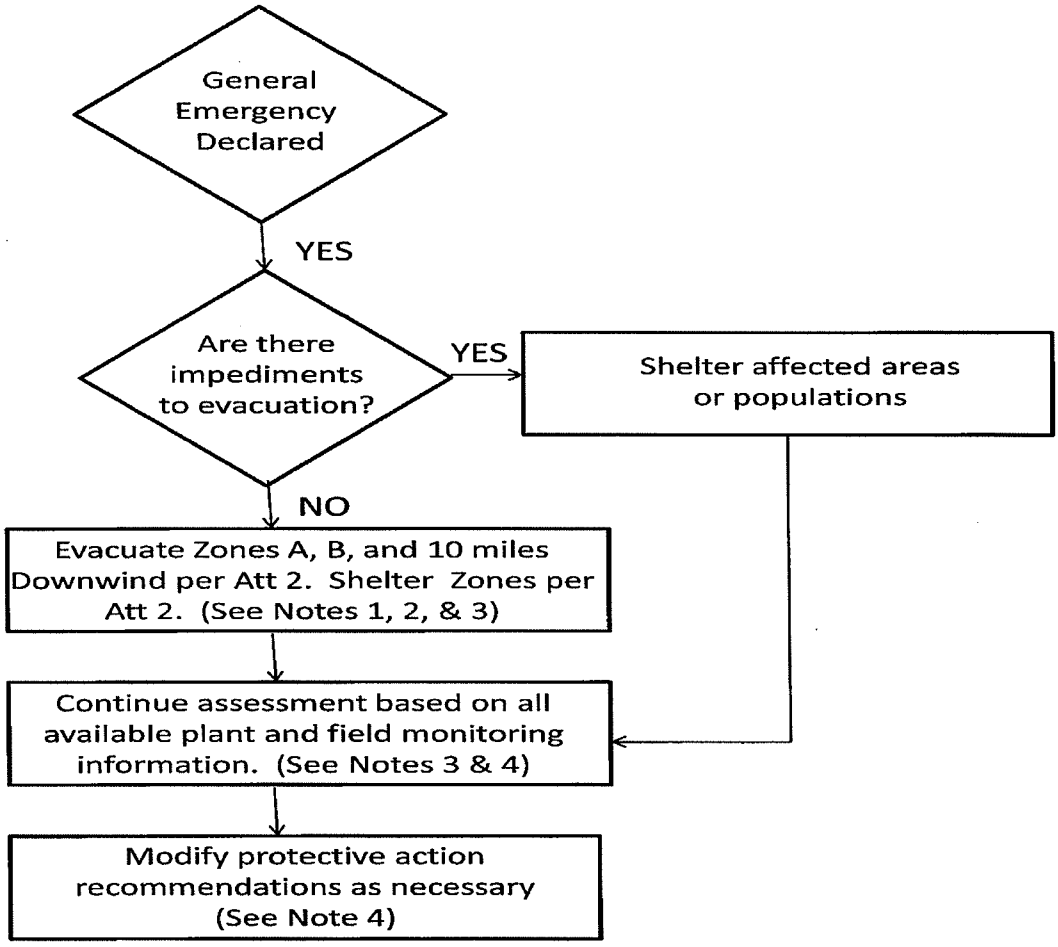
Note 4 If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

Note 5 Not applicable to this page

Note 6 The action taken to secure primary or secondary containment and its associated structures, systems, or components as a functional barrier to fission product release under existing plant conditions. As applied to BNP, Containment Closure is established when either Primary Containment is Operable per Section 3.6.1.1 of Technical Specifications or Secondary Containment meets the requirements of 0AP-022 with the following exception: a functional barrier must exist at the time of the event (i.e., cannot rely on emergency methods to establish a functional barrier).

EAL-2 MODES 4, 5 & Defueled

ATTACHMENT 1
Page 1 0f 1
PAR Flowchart



NOTES:

1. Shelter remaining zones to have population indoors to monitor EAS broadcasts.
2. Shelter may be the appropriate action for controlled releases of radioactive material from containment if there is assurance that the release is short term (puff release) and the area near the plant cannot be evacuated before the plume arrives.
3. For actual or projected doses > 1 Rem TEDE or > 5 Rem CEDE (Thyroid), declare a General Emergency and recommend evacuation of the general population from the affected areas. Recommend use of KI if projected or actual dose is $\geq$ 5 Rem CEDE (Thyroid).
4. A protective action recommendation should not be reduced from the initial recommendation for any zone until the release is terminated, and the decision is coordinated with the state and counties. The following guides should be considered prior to reducing a protective action recommendation:
   a. Long term weather forecast conditions are obtained with a high degree of confidence in the forecast. No sea-breeze in effect.
   b. Radiological environmental conditions are defined.
   c. Plant conditions are stabilized.
   d. Population dose savings are quantifiable as a result of the protective action recommendation change, and the decision is ALARA.

ATTACHMENT 2
Page 1 of 2
Evacuation Zones/Time Estimates/10 Mile EPZ Map

WIND FROM	EVACUATE ZONES	SHELTER ZONES	MAXIMUM EVACUATION TIMES (hours)	
			SUMMER	WINTER
180° - 195°	A,B,G,H,J,K	C,D,E,F,L,M,N	7:40	4:00
196° - 236°	A,B,H,J,K,L	C,D,E,F,G,M,N	9:50	4:00
237° - 271°	A,B,J,K,L,M	C,D,E,F,G,H,N	9:50	4:00
272° - 288°	A,B,J,L,M	C,D,E,F,G,H,K,N	8:05	4:00
289° - 316°	A,B,L,M,N	C,D,E,F,G,H,J,K	8:05	3:50
317° - 327°	A,B,M,N	C,D,E,F,G,H,J,K,L	4:10	3:50
328° - 009°	A,B,C,M,N	D,E,F,G,H,J,K,L	5:00	3:50
010° - 021°	A,B,C,D,M,N	E,F,G,H,J,K,L	8:30	5:20
022° - 038°	A,B,C,D,E,M,N	F,G,H,J,K,L	9:35	6:00
039° - 051°	A,B,C,D,E	F,G,H,J,K,L,M,N	9:35	6:00
052° - 090°	A,B,C,D,E,F	G,H,J,K,L,M,N	9:35	6:10
091° - 112°	A,B,D,E,F	C,G,H,J,K,L,M,N	9:35	6:00
113° - 179°	A,B,E,F,G,H,J	C,D,K,L,M,N	6:55	4:45
ALL ZONES IN 10 MILE EPZ	A,B,C,D,E,F,G,H,J,K,L,M,N		9:50	6:10

If projected or actual dose is ≥ 5 Rem CDE (thyroid), recommend use of KI.

3.3 INSTRUMENTATION

3.3.2.1 Control Rod Block Instrumentation

LCO 3.3.2.1 The control rod block instrumentation for each Function in Table 3.3.2.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.2.1-1.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One rod block monitor (RBM) channel inoperable.	A.1 Restore RBM channel to OPERABLE status.	24 hours
B. Required Action and associated Completion Time of Condition A not met. OR Two RBM channels inoperable.	B.1 Place one RBM channel in trip.	1 hour
C. Rod worth minimizer (RWM) inoperable during reactor startup.	C.1 Suspend control rod movement except by scram. OR	Immediately

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. (continued)	C.2.1.1	Verify ≥ 12 rods withdrawn.	Immediately
		OR	
	C.2.1.2	Verify by administrative methods that startup with RWM inoperable, for reasons other than bypassed control rod(s), has not been performed in the last calendar year.	Immediately
		AND	
	C.2.2	Verify movement of bypassed control rod(s) is in compliance with banked position withdrawal sequence (BPWS) by a second licensed operator or other qualified member of the technical staff.	During control rod movement
D. RWM inoperable during reactor shutdown.	D.1	Verify movement of bypassed control rod(s) is in accordance with BPWS by a second licensed operator or other qualified member of the technical staff.	During control rod movement

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One or more Reactor Mode Switch—Shutdown Position channels inoperable.	E.1 Suspend control rod withdrawal. AND	Immediately
	E.2 Initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies.	Immediately

Table 3.3.2.1-1 (page 1 of 1)
Control Rod Block Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Rod Block Monitor				
a. Low Power Range—Upscale	(a)	2	SR 3.3.2.1.1 SR 3.3.2.1.4 SR 3.3.2.1.7	(h)
b. Intermediate Power Range—Upscale	(b)	2	SR 3.3.2.1.1 SR 3.3.2.1.4 SR 3.3.2.1.7	(h)
c. High Power Range—Upscale	(c),(d)	2	SR 3.3.2.1.1 SR 3.3.2.1.4 SR 3.3.2.1.7	(h)
d. Inop	(d),(e)	2	SR 3.3.2.1.1	NA
e. Downscale	(d),(e)	2	SR 3.3.2.1.1 SR 3.3.2.1.7	NA
2. Rod Worth Minimizer	1[f],2[f]	1	SR 3.3.2.1.2 SR 3.3.2.1.3 SR 3.3.2.1.5 SR 3.3.2.1.8	NA
3. Reactor Mode Switch—Shutdown Position	(g)	2	SR 3.3.2.1.6	NA

(a) THERMAL POWER is ≥ 29% RTP and MCPR less than the limit specified in the COLR except not required to be OPERABLE if the Intermediate Power Range—Upscale Function or High Power Range—Upscale Function is OPERABLE.

(b) THERMAL POWER is ≥ Intermediate Power Range Setpoint specified in the COLR and MCPR less than the limit specified in the COLR except not required to be OPERABLE if the High Power Range—Upscale Function is OPERABLE.

(c) THERMAL POWER ≥ High Power Range Setpoint specified in the COLR and < 90% RTP and MCPR less than the limit specified in the COLR.

(d) THERMAL POWER ≥ 90% RTP and MCPR less than the limit specified in the COLR.

(e) THERMAL POWER ≥ 29% and < 90% RTP and MCPR less than the limit specified in the COLR.

(f) With THERMAL POWER ≤ 8.75% RTP.

(g) Reactor mode switch in the shutdown position.

(h) Allowable Value specified in the COLR.

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS) AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM

3.5.1 ECCS—Operating

LCO 3.5.1 Each ECCS injection/spray subsystem and the Automatic Depressurization System (ADS) function of six safety/relief valves shall be OPERABLE.

APPLICABILITY: MODE 1,

MODES 2 and 3, except high pressure coolant injection (HPCI) and ADS valves are not required to be OPERABLE with reactor steam dome pressure ≤ 150 psig.

ACTIONS

---NOTE---
LCO 3.0.4.b is not applicable to HPCI.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One low pressure ECCS injection/spray subsystem inoperable. OR One low pressure coolant injection (LPCI) pump in each subsystem inoperable.	A.1 Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	7 days
B. One LPCI pump inoperable. AND One core spray (CS) subsystem inoperable.	B.1 Restore LPCI pump to OPERABLE status. OR B.2 Restore CS subsystem to OPERABLE status.	72 hours 72 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 4.	12 hours 36 hours
D. HPCI System inoperable.	D.1 Verify by administrative means RCIC System is OPERABLE. AND D.2 Restore HPCI System to OPERABLE status.	Immediately 14 days
E. HPCI System inoperable. AND One low pressure ECCS injection/spray subsystem is inoperable.	E.1 Restore HPCI System to OPERABLE status. OR E.2 Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	72 hours 72 hours
F. One required ADS valve inoperable.	F.1 Restore required ADS valve to OPERABLE status.	14 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. One required ADS valve inoperable. AND One low pressure ECCS injection/spray subsystem inoperable.	G.1 Restore required ADS valve to OPERABLE status. OR G.2 Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	72 hours 72 hours
H. One required ADS valve inoperable. AND HPCI System inoperable.	H.1 Restore required ADS valve to OPERABLE status. OR H.2 Restore HPCI System to OPERABLE status.	72 hours 72 hours
I. Required Action and associated Completion Time of Condition D, E, F, G, or H not met. OR Two or more required ADS valves inoperable.	I.1 Be in MODE 3. AND I.2 Reduce reactor steam dome pressure to ≤ 150 psig.	12 hours 36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
J. Two or more low pressure ECCS injection/spray subsystems inoperable for reasons other than Condition A or B. OR HPCI System and two or more required ADS valves inoperable.	J.1 Enter LCO 3.0.3.	Immediately

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS) AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM

3.5.3 RCIC System

LCO 3.5.3 The RCIC System shall be OPERABLE.

APPLICABILITY: MODE 1,
MODES 2 and 3 with reactor steam dome pressure > 150 psig.

ACTIONS

NOTE
LCO 3.0.4.b is not applicable to RCIC.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. RCIC System inoperable.	A.1	Verify by administrative means High Pressure Coolant Injection System is OPERABLE.	Immediately
	AND		
	A.2	Restore RCIC System to OPERABLE status.	14 days
B. Required Action and associated Completion Time not met.	B.1	Be in MODE 3.	12 hours
	AND		
	B.2	Reduce reactor steam dome pressure to ≤ 150 psig.	36 hours

3.6 CONTAINMENT SYSTEMS

3.6.3.1 Primary Containment Oxygen Concentration

LCO 3.6.3.1 The primary containment oxygen concentration shall be < 4.0 volume percent.

APPLICABILITY: MODE 1 during the time period:

a. From 24 hours after THERMAL POWER is > 15% RTP following startup, to

b. 24 hours prior to a scheduled reduction of THERMAL POWER to < 15% RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Primary containment oxygen concentration not within limit.	A.1 Restore oxygen concentration to within limit.	24 hours
B. Required Action and associated Completion Time not met.	B.1 Reduce THERMAL POWER to ≤ 15% RTP.	8 hours

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources—Operating

LCO 3.8.1 The following AC electrical power sources shall be OPERABLE:

a. Two Unit 2 qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System;

b. Four diesel generators (DGs); and

c. Two Unit 1 qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

----------NOTE----------
LCO 3.0.4.b is not applicable to DGs.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Only applicable when Unit 1 is in MODE 4 or 5. ---------- One Unit 1 offsite circuit inoperable.	A.1 Restore Unit 1 offsite circuit to OPERABLE status.	45 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. ----------NOTES---------- 1. Only applicable when Unit 1 is in MODE 4 or 5. 2. Condition B shall not be entered in conjunction with Condition A. ---------- Two Unit 1 offsite circuits inoperable due to one Unit 1 balance of plant circuit path to the downstream 4.16 kV emergency bus inoperable for planned maintenance. AND DG associated with the affected downstream 4.16 kV emergency bus inoperable for planned maintenance.	B.1 Declare required feature(s) with no power available inoperable when the redundant required feature(s) are inoperable. AND B.2 Perform SR 3.8.1.1 for OPERABLE offsite circuit(s). AND B.3 Restore both Unit 1 offsite circuits and DG to OPERABLE status.	Immediately from discovery of Condition B concurrent with inoperability of redundant required feature(s) 2 hours AND Once per 12 hours thereafter 7 days AND 10 days from discovery of failure to meet LCO 3.8.1.a or b

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One offsite circuit inoperable for reasons other than Condition A or B.	C.1 Perform SR 3.8.1.1 for OPERABLE offsite circuit(s).	2 hours AND Once per 12 hours thereafter
	AND	
	C.2 Declare required feature(s) with no offsite power available inoperable when the redundant required feature(s) are inoperable.	24 hours from discovery of no offsite power to one 4.16 kV emergency bus concurrent with inoperability of redundant required feature(s)
	AND	
	C.3 Restore offsite circuit to OPERABLE status.	72 hours AND 10 days from discovery of failure to meet LCO 3.8.1.a or b

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. One DG inoperable for reasons other than Condition B.	D.1	Perform SR 3.8.1.1 for OPERABLE offsite circuit(s).	2 hours AND Once per 12 hours thereafter
	AND		
	D.2	Declare required feature(s), supported by the inoperable DG, inoperable when the redundant required feature(s) are inoperable.	4 hours from discovery of Condition D concurrent with inoperability of redundant required feature(s)
	AND		
	D.3.1	Determine OPERABLE DG(s) are not inoperable due to common cause failure.	24 hours
	OR		
	D.3.2	Perform SR 3.8.1.2 for OPERABLE DG(s).	24 hours
	AND		
	D.4	Restore DG to OPERABLE status.	7 days AND 10 days from discovery of failure to meet LCO 3.8.1.a or b

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Two or more offsite circuits inoperable for reasons other than Condition B.	E.1 Declare required feature(s) inoperable when the redundant required feature(s) are inoperable. AND E.2 Restore all but one offsite circuit to OPERABLE status.	12 hours from discovery of Condition E concurrent with inoperability of redundant required feature(s) 24 hours
F. One offsite circuit inoperable for reasons other than Condition B. AND One DG inoperable for reasons other than Condition B.	----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.8.7, "Distribution Systems—Operating," when Condition F is entered with no AC power source to any 4.16 kV emergency bus. ---------- F.1 Restore offsite circuit to OPERABLE status. OR F.2 Restore DG to OPERABLE status.	12 hours 12 hours
G. Two or more DGs inoperable.	G.1 Restore all but one DG to OPERABLE status.	2 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. Required Action and associated Completion Time of Condition A, B, C, D, E, F or G not met.	H.1 Be in MODE 3. AND H.2 Be in MODE 4.	12 hours 36 hours
I. One or more offsite circuits and two or more DGs inoperable. OR Two or more offsite circuits and one DG inoperable for reasons other than Condition B.	I.1 Enter LCO 3.0.3.	Immediately

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources—Operating

LCO 3.8.4 The following DC electrical power subsystems shall be OPERABLE:

a. Unit 2 Division I and Division II DC electrical power subsystems; and

b. Unit 1 Division I and Division II DC electrical power subsystems.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One DC electrical power subsystem inoperable.	A.1 ----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.8.7, "Distribution Systems—Operating," when Condition A results in de-energization of an AC electrical power distribution subsystem or a DC electrical power distribution subsystem. ---------- Restore DC electrical power subsystem to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met. OR Two or more DC electrical power subsystems inoperable.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	12 hours 36 hours

3.8 ELECTRICAL POWER SYSTEMS

3.8.6 Battery Cell Parameters

LCO 3.8.6 Battery cell parameters for the Unit 2 Division I and II batteries and the Unit 1 Division I and II batteries shall be within the limits of Table 3.8.6-1.

AND

Battery cell average electrolyte temperature for the Unit 2 Division 1 and II batteries and the Unit 1 Division I and II batteries shall be within required limits.

APPLICABILITY: When associated DC electrical power subsystems are required to be OPERABLE.

ACTIONS

---NOTE---
Separate Condition entry is allowed for each battery.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more batteries with one or more battery cell parameters not within Category A or B limits.	A.1 Verify pilot cells electrolyte level and float voltage meet Table 3.8.6-1 Category C limits. AND A.2 Verify battery cell parameters meet Table 3.8.6-1 Category C limits. AND	1 hour 24 hours AND Once per 7 days thereafter (continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3 Restore battery cell parameters to Category A and B limits of Table 3.8.6-1.	31 days
B. Required Action and associated Completion Time of Condition A not met. OR One or more batteries with average electrolyte temperature of the representative cells not within limits. OR One or more batteries with one or more battery cell parameters not within Category C limits.	B.1 Declare associated battery inoperable.	Immediately

Table 3.8.6-1 (page 1 of 1)
Battery Cell Parameter Requirements

PARAMETER	CATEGORY A: LIMITS FOR EACH DESIGNATED PILOT CELL	CATEGORY B: LIMITS FOR EACH CONNECTED CELL	CATEGORY C: LIMITS FOR EACH CONNECTED CELL
Electrolyte Level	> Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark[(a)]	> Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark[(a)]	Above top of plates, and not overflowing
Float Voltage	≥ 2.13 V	≥ 2.13 V	≥ 2.07 V
Specific Gravity[(b)(c)]	≥ 1.200	≥ 1.195 AND Average of all connected cells ≥ 1.205	Not more than 0.020 below average of all connected cells AND Average of all connected cells ≥ 1.195

(a) It is acceptable for the electrolyte level to temporarily increase above the specified maximum level during and following equalizing charges provided it is not overflowing.

(b) Corrected for electrolyte temperature and level. However, level correction is not required when on float charge and battery charging current is < 2 amps.

(c) A battery charging current of < 2 amps when on float charge is acceptable for meeting specific gravity limits following a battery recharge, for a maximum of 7 days. When charging current is used to satisfy specific gravity requirements, specific gravity of each connected cell shall be measured prior to expiration of the 7 day allowance.

3.3 CONTROL ROD BLOCK INSTRUMENTATION

TRMS 3.3 The control rod block instrumentation for each Function in Table 3.3-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3-1.

COMPENSATORY MEASURES

----------NOTE----------
Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED COMPENSATORY MEASURE	COMPLETION TIME
A. ----------NOTE---------- Only applicable for Functions 1, 2 and 3. ---------- One or more functions with one or more required channels inoperable.	A.1 Restore channel(s) to OPERABLE status.	24 hours
B. One or more functions with control rod block capability not maintained. OR Required Compensatory Measures and associated Completion Time of Condition A not met.	B.1 Place one channel in trip.	1 hour

Table 3.3-1 (page 1 of 1)
Control Rod Block Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	TEST REQUIREMENTS	ALLOWABLE VALUE
1. Average Power Range Monitors				
a. Upscale (Flow Biased)	1	3	TR 3.3.3 TR 3.3.4 TR 3.3.5	
b. Inoperative	1,2	3	TR 3.3.5	
c. Downscale	1	3	TR 3.3.5	
d. Upscale (Fixed)	2	3	TR 3.3.3 TR 3.3.5	
2. Source Range Monitors				
a. Detector Not Full In	2[(b)],5	2	TR 3.3.1	
b. Upscale	2[(c)],5	2	TR 3.3.1	
c. Inoperative	2[(c)],5	2	TR 3.3.1	
d. Downscale	2[(b)],5	2	TR 3.3.1	
3. Intermediate Range Monitors				
a. Detector Not Full In	2,5	6	TR 3.3.1	
b. Upscale	2,5	6	TR 3.3.1	
c. Inoperable	2,5	6	TR 3.3.1	
d. Downscale	2[(e)],5	6	TR 3.3.1	
4. Scram Discharge Volume Water Level—High	1,2,5[(f)]	1[(g)]	TR 3.3.2 TR 3.3.3	

(a) ≤[0.55(W – ΔW) + 55.0% RTP] when Technical Specification 3.3.1.1, Function 2.b, is reset for single loop operation per LCO 3.4.1, "Recirculation Loops Operating." The value of ΔW is defined in plant procedures.
(b) Bypassed when detector is reading > 100 cps or Intermediate Range Monitor (IRM) channels are on Range 3 or higher.
(c) Bypassed when associated IRM channels are on Range 8 or higher.
(d) Deleted.
(e) Bypassed when IRM channels are on Range 1.
(f) With any control rod withdrawn from a core cell containing one or more fuel assemblies. Not applicable to control rods removed per Technical Specification 3.10.5, "Single Control Rod Drive (CRD) Removal—Refueling," or 3.10.6, "Multiple Control Rod Withdrawal—Refueling."
(g) Signal is contained in Channel A logic only.

Table 1

RBM System Setpoints[1]

Setpoint [a, d]	Trip Setpoint	Allowable Value
Lower Power Setpoint (LPSP[b])	27.7	≤ 29.0
Intermediate Power Setpoint (IPSP[b])	62.7	≤ 64.0
High Power Setpoint (HPSP[b])	82.7	≤ 84.0
Low Trip Setpoint (LTSP[c])	≤ 114.1	≤ 114.6
Intermediate Trip Setpoint (ITSP[c])	≤ 108.3	≤ 108.8
High Trip Setpoint (HTSP[c])	≤ 104.5	≤ 105.0
RBM Time Delay (t_{d2})	≤ 2.0 seconds	≤ 2.0 seconds

a See Table 2 for RBM Operability Requirements.

b Setpoints in percent of Rated Thermal Power.

c Setpoints relative to a full scale reading of 125. For example, ≤ 114.1 means ≤ 114.1/125.0 of full scale.

d. Trip setpoints and allowable values are based on a high power analytical setpoint of 108% (unfiltered).

[1] This table is referred to by Technical Specification 3.3.2.1 (Table 3.3.2.1-1) and 5.6.5.a.5.

Table 2

RBM Operability Requirements[2]

IF the following conditions are met, **THEN RBM Not Required Operable**	
Thermal Power (% rated)	MCPR
≥ 29% and < 90%	≥ 1.83 TLO ≥ 1.86 SLO
≥ 90%	≥ 1.47 TLO

[2] Requirements valid for all fuel designs, all SCRAM insertion times and all core average exposure ranges.

PLANT OPERATING MANUAL

VOLUME XXII

PLANT PROGRAM PROCEDURE

UNIT
0

0PLP-01.2

FIRE PROTECTION SYSTEM OPERABILITY, ACTION, AND SURVEILLANCE REQUIREMENTS

REVISION 39

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1.0 PURPOSE

The purpose of this procedure is to outline the operability, action, and surveillance requirements for fire protection systems required for safe shutdown in the event of a fire. It also addresses the surveillance requirements for these systems which fall under the requirements of the Nuclear Electric Insurance Limited (NEIL) Loss Prevention Program.

R15 This procedure is required to implement license renewal commitments and supports the License Renewal Aging Management Program.

2.0 REFERENCES

2.1 FSAR (updated), Section 9.5.1

2.2 0FPP-020, Impairment Notification

2.3 0AP-033, Fire Protection Program Manual

2.4 0FPP-005, Fire Watch Program

2.5 0FPP-030, Backup and Alternate Fire Suppression

2.6 0PLP-01.1, Fire Protection Commitment Document

2.7 0FPP-031, Fire Brigade Staffing Roster

2.8 0OI-01.01, BNP Conduct of Operations Supplement

2.9 0OI-01.02, Operation Unit Organization and Operating Practices

2.10 ESR 97-00375, Fire Detection Testing Frequency

2.11 ESR 94-00109, CO_2 Piping in the Control Room

2.12 ESR 99-00328, Penetration Seal Statistical Sampling Program

2.13 Nuclear Electric Insurance Limited (NEIL) Loss Control Manual

2.14 ESR 00-00180, Decommission Refuel Floor Fire Detection

R15 2.15 BSEP 04-0006, Letter from BSEP to US Nuclear Regulatory Commission, dated October 18, 2004, Application for Renewal of Operating License

R16 2.16 BNP-LR-611, License Renewal Aging Management Program Description of the Fire Water System Program (AR 100627, AI-29)

R17 2.17 BNP-LR-612, License Renewal Aging Management Program Description of the Fire Protection Program (AR 100627, AI-30)

2.18 OPS-NGGC-1000, Fleet Conduct of Operations

2.19 F-03897, Fire Detection System Block Diagram

3.0 RESPONSIBILITIES

3.1 The Manager - BESS, through the Fire Protection Program Manager shall be responsible for the promulgation and maintenance of this procedure.

3.2 The Shift Manager or his designee shall be responsible for the administration of this procedure.

4.0 DEFINITIONS

4.1 Operable/Operability

A system, subsystem, train, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified function(s). Implicit in this definition shall be the assumption that all necessary attendant instrumentation, controls, normal or emergency electric power sources, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its function(s) are also capable of performing their related support function(s).

4.2 Action

Actions are those additional requirements specified as corollary statements to each specification and shall be part of the specifications.

4.3 Channel Functional Test

A Channel Functional Test shall be:

4.3.1 Analog channels - the injection of a simulated signal into the channel as close to the primary sensor as practicable to verify OPERABILITY including alarm and/or trip functions.

4.3.2 Bistable channels - the injection of a simulated signal into the channel sensor to verify OPERABILITY including alarm and/or trip functions.

5.0 GENERAL

5.1 The operability of the fire protection systems ensures that adequate fire protection capability is available to confine and extinguish fires occurring in any portion of the facility where safety-related/safe-shutdown equipment is located. The fire protection system consists of the water supply system, water suppression systems (sprinklers and standpipes), CO_2 systems, foam systems and halon systems, fire coatings, and fire barriers.

5.2 In the event a system or portions of a system become inoperable, applicable ACTION requirements shall be implemented and continue until the inoperable equipment is restored to operability.

5.3 In the event an inoperable system is returned to operable status prior to expiration of the specified time interval, completion of the ACTION statement is not required.

5.4 Surveillances do not have to be performed on inoperable equipment.

5.5 In the event an inoperable system cannot be returned to service within the time constraints contained in this procedure (7, 14, or 30 days, as applicable), a report will be prepared and submitted to the Plant General Manager within the next 30 days outlining the action taken, the cause of the inoperability, and the plans and schedule for restoring the system to operable status. Additionally a Nuclear Condition Report (NCR) will be issued to determine the failure mode for not returning the system to service within the time required.

5.5.1 If a condition report has already been generated for the equipment failure, an Action Request, Type IMPR (Improvement Request) is sufficient to notify the Plant General Manager and determining the failure mode for not returning the equipment to service within the time required.

5.5.2 The Plant General Manager shall be the approval authority for all action items related for returning the equipment to service. This applies to both completion and due date extensions.

5.0 GENERAL

5.6 Operability of any system may be interrupted to allow for scheduled periodic testing without implementation of compensatory action provided the inoperable system is not left unattended during the test and the system is returned to OPERABLE status within the appropriate time limit (7, 14, or 30 days, as applicable). The Unit CRS shall document the interrupted operability of the system in accordance with 0OI-01.01. In the event the periodic test will exceed the time allowed inoperable, an impairment and the required compensatory actions shall be initiated to allow performance of the test.

NOTE:	The following includes support functions such as electric power, halon system boundaries (e.g. ERFIS computer door, simulator room doors) etc.

5.7 For a fire protection system which is not covered by the requirements in Section 6.1 through 6.11 which is not OPERABLE (i.e. not able to fulfill its fire protection function), establish a tracking impairment in accordance with 0OI-01.01. For a fire protection system or component which has the automatic fire detection reporting function and/or automatic fire suppression function not operable, establish a periodic fire watch of one round per shift. Ensure NEIL notification requirements are reviewed in accordance with 0OI-01.01 and 0FPP-020.

5.8 For surveillance requirements for systems not covered by this procedure, refer to the NEIL Loss Control Manual (accessible through the Progress Energy Intranet.)

5.9 Surveillance results for systems which are tracked under a performance based system will be tracked by the System Engineer. Failure rates greater than the established acceptance criteria will require a shortening of the test interval.

5.10 Fire detection and suppression systems that are monitored by the Edwards EST3 Fire Detection System (Fireworks Software) are identified on Drawing F-03897, Fire Detection System Block Diagram.

6.0 IMPLEMENTATION

6.1 Fire Suppression Water System

6.1.1 Operability

The fire suppression water system shall be OPERABLE at all times with:

1. Two OPERABLE fire pumps, one Electric and one Diesel, each with a flow rate of at least 2000 gpm, at a pump discharge head of greater than or equal to 125 psig with their discharges aligned to the fire suppression yard main;

2. The fire protection water tank, with a minimum contained volume of 232,500 gallons (corresponding to a level of 24' 9 1/2"), and the demineralized water tank, with a minimum contained volume of 90,000 gallons (corresponding to a level of 14' 0"); and

3. An OPERABLE flow path capable of taking suction from each of the water supplies and transferring the water through the yard main and distribution piping with OPERABLE ring header sectionalizing control or isolation valves up to, but not including, the yard hydrant curb valves and the first valve ahead of each sprinkler and hose standpipe system required to be OPERABLE.

6.1.2 Actions

1. With one pump and/or water supply inoperable, restore the inoperable equipment to OPERABLE status within 7 days.

2. With the isolation capability of one ring header sectionalizing control or isolation valve inoperable, demonstrate that the affected portion of piping can be isolated by cycling adjacent ring header valve(s) through one complete cycle of full travel within 24 hours.

6.1.2 Actions

3. With the isolation capability of two or more ring header sectionalizing control or isolation valves inoperable:

   a. Demonstrate that the affected portion of piping can be isolated by cycling OPERABLE adjacent ring header valve(s) through one complete cycle of full travel within 24 hours, and

   b. Restore the inoperable valves to OPERABLE status within 7 days.

4. With two or more ring header sectionalizing control or isolation valves closed, declare any isolated sprinkler and/or hose standpipe system(s) inoperable.

5. With the fire suppression water system otherwise inoperable:

   a. Establish a backup fire suppression water system within 24 hours, or

   b. Be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

R16
R17

6.1.3 Surveillance

1. The fire suppression water system shall be demonstrated OPERABLE:

   a. At least once per 7 days by verifying the contained water supply volume is at least the minimum specified.

   b. At least once per 31 days by starting each pump and operating it for at least the time specified below:

      1. 15 minutes for the Electric Fire Pump,

      2. 20 minutes for the Diesel Fire Pump.

   c. At least once per 92 days by verifying that each valve (manual, power-operated, or automatic) in the flow path is in its correct position.

6.1.3 Surveillance

d. At least once per 12 months by cycling each testable valve in the flow path through at least one complete cycle of full travel.

e. At least once per 18 months by performing a system functional test which includes simulated automatic actuation of the system throughout its operating sequence, and:

1. Verifying that each pump develops at least 2000 gpm at a pump discharge head of greater than or equal to 125 psig;

2. Cycling each valve in the flow path that is not testable during plant operation through at least one complete cycle of full travel; and

3. Verifying that each fire pump starts sequentially to maintain the fire suppression water system pressure greater than or equal to 125 psig.

f. At least once per 3 years by performing a flow test of the system in accordance with Chapter 5, Section 11 of the Fire Protection Handbook, 14th edition, published by the National Fire Protection Association.

g. To ensure operability of the Fire Water System during the period of extended operation and based on Regulatory Commitments associated with License Renewal, non-intrusive baseline pipe thickness measurements shall be taken at various locations, prior to the expiration of the current license and trended through the period of extended operation. Engineering evaluation of the inspection results shall be used to establish the inspection intervals. Results of the inspections of the above grade fire protection piping shall be extrapolated to evaluate the condition of below grade fire protection piping. The activity is the responsibility of the Fire Protection System Engineer.

6.1.3 Surveillance

2. The fire pump diesel engine shall be demonstrated OPERABLE:

   a. At least once per 31 days by verifying:

      1. The fuel storage tank contains at least 500 gallons of fuel, and

      2. The diesel starts from ambient conditions and operates for at least 20 minutes.

   b. At least once per 92 days by verifying that a sample of diesel fuel from the fuel storage tank, obtained in accordance with ASTM-D4057-06, is within the acceptable limits specified in Table 1 of ASTM-D975-06b when checked for viscosity, water, and sediment.

   c. At least once per 18 months, by:

      1. Subjecting the diesel to an inspection in accordance with procedures prepared in conjunction with its manufacturer's recommendations for the class of service, and

      2. Verifying the diesel starts from ambient conditions on the auto-start signal and operates for greater than or equal to 20 minutes while loaded with the fire pump.

3. The fire pump diesel starting 24-volt battery bank and charger shall be demonstrated OPERABLE:

   a. At least once per 7 days by verifying that:

      1. The electrolyte level of each battery is above the plates, and

      2. The overall battery voltage is greater than or equal to 24 volts.

   b. At least once per 92 days by verifying that the specific gravity is appropriate for continued service of the battery.

   c. At least once per 18 months by verifying that:

      1. The batteries, cell plates, and battery racks show no visual indication of physical damage or abnormal deterioration, and

      2. The battery-to-battery and terminal connections are clean, tight, free of corrosion, and coated with anti-corrosion material.

6.1.4 Bases

The OPERABILITY of the fire suppression systems ensures that adequate fire suppression capability is available to confine and extinguish fires occurring in any portion of the facility where safety-related equipment is located. The fire suppression system consists of the water system, spray and/or sprinklers, CO_2, and fire hose stations. The collective capability of the fire suppression systems is adequate to minimize potential damage to safety-related equipment and is a major element in the facility fire protection program.

In the event that portions of the fire suppression system are inoperable, alternate backup fire fighting equipment is required to be made available in the affected areas until the inoperable equipment is restored to service.

In the event of a line break, the design of sectionalizing control or isolation valves allows a portion of the ring header to be isolated while maintaining the remainder of the ring header and associated fire suppression systems in an OPERABLE status. Individual compensatory actions for any isolated sprinkler or hose standpipe system will ensure that alternative fire suppression measures are implemented. A line break that can not be isolated will prevent the ring header from functioning as designed, causing the fire suppression water system to become inoperable.

In the event the fire suppression water system becomes inoperable, immediate corrective measures must be taken since this system provides the major fire suppression capability of the plant. Prompt evaluation of the corrective measures to provide adequate fire suppression capability for the continued protection of the nuclear plant must be made by the Shift Manager or designee.

6.2 Spray and/or Sprinkler Systems

6.2.1 Operability

The spray and/or sprinkler systems shown in Attachment 1 shall be OPERABLE whenever the equipment in the areas protected by the spray and/or sprinkler system is required to be OPERABLE, and is capable of performing its intended function.

6.2.2 Actions

1. Verify the operability of the fire barriers and fire detection in the area and determine if the spray and/or sprinkler is classified as High Safety Significant (HSS) or Low Safety Significant (LSS)

   a. With one or more of the HSS spray and/or sprinkler systems shown in Attachment 1 inoperable, establish a continuous fire watch with backup fire suppression equipment for the unprotected area(s) within 1 hour and restore the system to OPERABLE status within 14 days.

   b. With one or more of the LSS spray and/or sprinkler system inoperable concurrent with a fire detection system or fire barrier in the area inoperable, establish a continuous fire watch with backup fire suppression equipment for the unprotected area(s) within 1 hours and restore the system to OPERABLE status within 14 days.

   c. With one or more of the LSS spray and/or sprinkler systems shown in Attachment 1 inoperable with the fire barriers and fire detection in the area OPERABLE, establish an hourly fire watch with backup fire suppression equipment for the unprotected area(s) within 1 hour and restore the equipment to OPERABLE status within 14 days.

   d. Re-evaluate Steps 6.6.2.1.a, 6.8.2.1.a and 6.10.2.1 for each inoperable fire barrier, fire detection and cable coating in the area and implement revised fire watch requirements to include consideration of the inoperable spray and/or sprinkler system.

2. Place signs at the backup fire suppression equipment to identify the proper hose to be used.

6.2.3 Surveillance

Each of the required spray and/or sprinkler systems shown on Attachment 1 shall be demonstrated OPERABLE:

1. At least once per 12 months by cycling each testable valve in the flow path through at least one complete cycle of full travel.

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2. At least once per 18 months:

   a. By performing a system functional test which includes simulated automatic actuation of the system; and:

      1. Verifying that the automatic valves in the flow path actuate to their correct positions on a simulated actuation signal, and

      2. Cycling each valve in the flow path that is not testable during plant operation through at least one complete cycle of full travel.

   b. By inspection of the spray headers to verify their integrity; and

   c. By inspection of each deluge nozzle to verify no blockage.

6.2.4 Bases

1. Attachment 6 shows fire protection isolation valves that affect sprinkler / spray system operability. Note that a single isolation valve closure may affect multiple sprinkler systems. Example: Unit 2 RB valve 2-FP-V300 closure will isolate the South RHR sprinkler system and the 5' elevation Separation Zone Water Curtain.

2. Removal of the floor plugs above the HPCI mezzanine (by the 20 ft CRD Flow Control Stations) renders the 5' separation zone water curtain inoperable due to the potential to divert the flow of hot gases away from the sprinkler heads.

3. Sprinkler system flow indication is credited in the Fire Hazard Analysis as providing fire detection for the Diesel Generator cells (DG Bldg 23' elev.). Flow indication function is required for operability of the following spray and/or sprinkler systems:

   - Diesel Generator #1 Sprinkler System (HSS)

   - Diesel Generator #2 Sprinkler System (HSS)

6.2.4 Bases

- Diesel Generator #3 Sprinkler System (HSS)

- Diesel Generator #4 Sprinkler System (HSS)

All other spray and/or sprinkler systems listed in Attachment 1 do not require flow indication for system operability.

4. Standby Gas Treatment (SBGT) temperature switches associated with annunciators UA-35 2-9 (Unit 1) or UA-36 2-9 (Unit 2) are required for SBGT deluge system operability. SBGT deluge systems listed in Attachment 1 are manually actuated and the annunciators alert operators that a fire is active in a SBGT charcoal filter bed. Without these annunciators, operators will not be alerted to manually initiate the deluge system.

   Temperature switches for both SBGT A and B are annunciated "REACTOR BLDG SBGT UNITS TEMP HIGH" by UA-35 2-9 (Unit 1) or UA-36 2-9 (Unit 2). A non-fire condition that causes an annunciator to seal-in will result in deluge system inoperability for both SBGT A and B. An inoperable temperature switch (loss of control room annunciation) may result in deluge system inoperability for the associated SBGT train. Note that all SBGT Charcoal Filter Banks have redundant temperature switches and a single switch failure does not necessarily result in deluge system inoperability. Reference 1APP-UA-35 or 2APP-UA-36 for specific details.

6.3 High Pressure CO_2 Systems

6.3.1 Operability

The high pressure CO_2 systems shown in Attachment 2 shall be OPERABLE in Modes 1, 2 and 3, with a minimum contained weight of 67.5 lbs. of CO_2 in each cylinder of the in-service bank.

6.3.2 Actions

1. With one or more of the required high pressure CO_2 systems inoperable, establish a continuous fire watch and backup fire suppression equipment for the unprotected area(s) within 1 hour and restore the system to OPERABLE status within 14 days and

2. Place signs at the backup fire suppression equipment to identify the proper hose to be used.

6.3.3 Surveillance

Each of the required high pressure CO_2 systems shown in Attachment 2 shall be demonstrated OPERABLE:

1. At least once per 6 months by verifying that the high pressure CO_2 cylinders contain at least the minimum specified weight of CO_2.

2. At least once per 18 months by verifying:

   a. The system control heads and associated ventilation dampers actuate manually and automatically, as appropriate, upon receipt of a simulated actuation signal, and

   b. Performance of a flow test through flooding system headers and nozzles to assure no blockage.

6.4 Fire Hose Stations

6.4.1 Operability

The fire hose stations shown in Attachment 3 shall be OPERABLE whenever equipment in the areas protected by the fire hose stations is required to OPERABLE, and is capable of performing its intended function.

6.4.2 Actions

With one or more fire hose stations shown in Attachment 3 inoperable:

1. Within one hour:

   a. Provide an alternative means of fire suppression for the unprotected area(s), and/or

   b. Route an additional equivalent capacity fire hose to the unprotected area(s) from an OPERABLE hose station located in another fire zone using a gated wye connection off that operable station.

2. Place signs at the backup fire suppression equipment to identify the proper hose to be used.

6.4.3 Surveillance

1. Each of the fire hose stations shown in Attachment 3 shall be demonstrated OPERABLE:

   a. At least once per 31 days by visual inspection of the station to assure all required equipment is at the station.

   b. At least once per 18 months by:

      1. Removing the hose for inspection and re-racking, and

      2. Replacement of all degraded gaskets in couplings.

   c. At least once per 3 years by:

      1. Partially opening each hose station valve to verify valve OPERABILITY and no flow blockage, and

      2. Conducting a hose hydrostatic test at a pressure at least 50 psig greater than the maximum pressure available at that hose station.

6.5 Foam Systems

6.5.1 Operability

1. The following foam systems shall be OPERABLE at all times:

   a. The Diesel Generator Fuel Oil Tank Area Foam System with:

      1. The concentrate proportioning and storage subsystem OPERABLE with 240 gallons of concentrate.

      2. Each tank room subsystem OPERABLE with minimum required Fire Detection Instruments shown in Attachment 5 OPERABLE.

6.5.1 Operability

b. The Diesel Generator Air Filter Foam System with:

1. The concentration proportioning and storage subsystem OPERABLE with 40 gallons of concentrate.

2. Each air filter subsystem OPERABLE with minimum required Fire Detection Instruments shown in Attachment 5 OPERABLE.

6.5.2 Actions

1. With one or more tank room subsystems inoperable, establish a continuous fire watch, verify the availability of backup foam fire suppression equipment for the unprotected area(s) within one hour, and restore the system to OPERABLE status within 14 days.

2. With one or more air filter subsystems inoperable, establish a continuous fire watch, verify the availability of backup foam fire suppression equipment for the unprotected area(s) within one hour, and restore the system to OPERABLE status within 14 days.

3. With any Control Room annunciation circuit inoperable that does not prevent actuation of its associated deluge valve or local panel trouble alarm, verify the deluge valve or local panel trouble alarm, as appropriate for the condition, is not actuated at least once per 12 hours.

4. Place signs at the backup foam hose reel(s) or backup fire suppression equipment to identify the proper hose to be used.

6.5.3 Surveillance

1. Each of the required foam systems shall be demonstrated OPERABLE:

a. At least once per 92 days by demonstrating that unsupervised Control Room annunciation circuits are OPERABLE for:

1. The circuit associated with each deluge valve (testing may be performed at the local junction box), and

6.5.3 Surveillance

2. The circuit associated with each local panel trouble alarm.

b. At least once per 12 months by:

1. Cycling each testable valve in the flow path through at least one complete cycle of full travel, and

2. Performing a Channel Functional Test of associated Fire Detection Instruments.

c. At least once per 18 months by:

1. Performing a system functional test which includes simulated automatic actuation of the system, and

a. Verifying that the automatic valves in the flow path actuate to their correct positions on a simulated actuation signal, and

b. Cycling each valve in the flow path that is not testable during plant operation through at least one complete cycle of full travel.

2. A visual inspection of the spray headers to verify their integrity.

3. A visual inspection of each nozzle's spray area to verify that the spray pattern is not obstructed.

4. Conducting a performance evaluation of the concentrate.

6.6 Fire Barrier Penetrations

6.6.1 Operability

All fire barrier penetrations, including cable penetration barriers, fire doors, and fire dampers, in fire zone boundaries protecting safety-related areas shall be functional at all times.

6.6.2 Actions

1. With one or more of the above required fire barrier penetrations nonfunctional:

   a. Within one hour, establish a continuous fire watch on at least one side of the affected penetration, or verify the OPERABILITY of fire detectors (if installed) and a spray or sprinkler system (if installed) on at least one side of the nonfunctional fire barrier and establish an hourly fire watch patrol.

   b. Re-evaluate Steps 6.2.2.1.b and 6.8.2.1.a for each inoperable spray and/or sprinkler system, fire detection and cable coating in the area and implement revised fire watch requirements to include consideration of the inoperable fire barrier.

   c. Restore the nonfunctional fire barrier penetration(s) to functional status within 7 days.

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6.6.3 Surveillance

1. The required fire barrier penetrations shall be verified to be functional:

   a. At least once per 18 months by visually inspecting a statistical sample of penetration seals in each affected building (or group of buildings). Each sample shall be selected based on building seal population utilizing a multiple sampling program in accordance with ANSI/ASQC Z1.4-1993, "Sampling Procedures and Tables for Inspection by Attributes," with an Acceptable Quality Level of 96%.

   b. Prior to restoring a fire barrier penetration to functional status following repairs or maintenance by performance of a visual inspection of the affected fire barrier penetration.

6.6.4 Bases

The functional integrity of the fire barrier penetrations ensures that fires will be confined or adequately retarded from spreading to adjacent portions of the facility. This design feature minimizes the possibility of a single fire rapidly involving several areas of the facility prior to detection and extinguishment. The fire barrier penetrations are a passive element in the facility fire protection program and are subject to periodic inspections.

The barrier penetrations, including cable penetration barriers, fire doors, and dampers, are considered functional when the visually observed condition is the same as the as-designed condition. For those fire barrier penetrations that are not in the as-designed condition, an evaluation shall be performed to show that the modification has not degraded the fire rating of the fire barrier penetration.

During periods of time when the barriers are not functional, either; 1) a continuous fire watch is required to be maintained in the vicinity of the affected barrier, or 2) the fire detectors and spray/sprinkler systems (if installed) on at least one side of the affected barrier must be verified OPERABLE and an hourly fire watch patrol established until the barrier is restored to functional status.

Periodic surveillance of fire barrier penetrations using a statistical sampling method has been determined to be acceptable as discussed in ESR 99-00328, Penetration Seal Statistical Sampling Program.

6.7 Diesel Generator Building Basement Halon

6.7.1 Operability

1. The following portions of the Diesel Generator Building basement halon systems shall be OPERABLE at all times:

   a. As a minimum the fire detection instrumentation for each fire detection zone shown in Attachment 4 for Diesel Generator Building Halon.

   b. Each halon cylinder shall have at least 95% of its liquid level and 90% of its full charge.

   c. The nitrogen supply bottles shall be maintained to at least 95% of their full charge.

6.7.2 Actions

With the halon system inoperable, establish an hourly fire watch with backup fire suppression within one hour and restore the system to OPERABLE status within 14 days.

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6.7.3 Surveillance

1. The Diesel Generator Building halon system shall be demonstrated OPERABLE:

   a. At least once per 6 months by verifying that the halon cylinders contain at least the minimum specified liquid level and both the halon cylinders and the nitrogen supply containers are maintained at the minimum specified pressure.

   b. Each of the required fire detection instruments shall be demonstrated OPERABLE at least once per 12 months by performance of a functional test.

6.7.4 Bases

The Diesel Generator Building Basement Halon System provides fire detection and automatic fire suppression protection for redundant safe shutdown functions in the area as an alternative to strict compliance with 10CFR50, Appendix R, Section III.G.2. The cross-zoned, supervised Halon 1301 suppression system is designed to provide rapid fire suppression in the Diesel Generator Building basement so that one train of systems necessary to achieve and maintain hot shutdown conditions is free of fire damage. The existence of a local sprinkler system provides additional fire suppression for the area.

In the event that the Halon system is inoperable, an hourly fire watch is required in addition to backup fire suppression. Sprinkler systems in the Diesel Generator Building basement, combined with a low combustible loading in the area, provide a reasonable basis for the use of an hourly fire watch.

6.8 Fire Detection Instrumentation

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6.8.1 Operability

1. As a minimum, the fire detection instrumentation for each fire detection zone shown in Attachment 4 shall be OPERABLE at all times.

2. The fire detection instrumentation in the Unit 1 and Unit 2 Turbine Building breezeway shall be OPERABLE with at least three of six detectors (50%) in each breezeway OPERABLE.

   - Unit 1, these detectors are 1-FP-TB-2-1, 2-2, 2-3, 2-9, 2-13, and 2-14.

   - Unit 2, these detectors are 2-FP-TB-2-1, 2-2, 2-3, 2-6, 2-12, and 2-15

6.8.2 Actions

1. With one or more of the required fire detection instrument(s) shown in Attachment 4 inoperable:

   a. Within one hour verify the operability of fire barriers and cable coatings in the area covered by the affected zone and the operability of spray and/or sprinkler systems in the area covered by the affected zone and establish an hourly fire watch patrol.

   b. Re-evaluate Steps 6.2.2.1.b, 6.6.2.1.a and 6.10.2.1 for each inoperable spray and/or sprinkler system, fire barrier and cable coating in the area and implement revised fire watch requirements to include consideration of the inoperable fire detection instrument(s).

   Restore the instrument(s) to operable status within 14 days.

2. With less than three of six detectors (50%) in either Unit 1 or Unit 2 Turbine Building breezeway OPERABLE, within one hour establish an hourly fire watch for the unprotected area and restore the instrument(s) to operable status within 14 days.

6.8.3 Surveillance

1. Each of the Fire Detection Instruments shown in Attachment 4 shall be demonstrated OPERABLE by performance of a Channel Functional Test at the following intervals:

NOTE:	Additional functional testing of smoke detectors in Control Building Zones 4 and 5 is addressed in the Technical Requirements Manual (TRMS 3.12). This additional testing is independent of the functional testing described below.

   a. Flame detectors: at least once per 12 months.

   b. Smoke detectors: at least once per 12 months.

   c. Heat detectors: at least once per 12 months.

6.8.3 Surveillance

2. The unsupervised circuits between the local panels associated with the detector alarms of each of the required fire detection instruments from Attachment 4 and the Control Room shall be demonstrated OPERABLE at least once per 92 days in accordance with approved procedures.

3. Each Fire Detection Instrument in the Unit 1 and Unit 2 Turbine Building Breezeway shall be demonstrated OPERABLE at least once per 12 months by performance of a Channel Functional Test.

6.8.4 Bases

Operability of the fire detection instrumentation ensures that adequate warning capability is available for the prompt detection of fires. This capability is required in order to detect and locate fires in their early stages. Prompt detection of fires will reduce the potential for damage to safety related equipment and is an integral element in the overall facility fire protection program. Control Room annunciation is required for operability of fire detection systems listed in Attachment 4. Fireworks computer work stations 1-FP-TER and 2-FP-TER are **NOT** required for control room annunciation of Unit 1 or Unit 2 fire detection systems.

In the event that a portion of the fire detection instrumentation is inoperable, increasing the frequency of fire patrols in the affected areas is required to provide detection capability until the inoperable instrumentation is restored to OPERABILITY.

The basis for fire detection instrumentation surveillance frequency is contained in ESR 97-00375.

6.9 Public Address Page System

6.9.1 Operability

The Public Address Page system shall be OPERABLE at all times with speakers in all areas functioning.

6.9.2 Actions

With the Public Address Page system inoperable, restore the system to OPERABLE status within 30 days. Notify Security if an inoperable speaker creates a dead zone.

6.9.3 Surveillance

NOTE: Speakers that cannot be heard due to excessive background noise may be exempted from functional testing requirements provided each affected area has been classified as a dead zone by Security.

NOTE: Speakers located in locked high radiation areas may be exempted from functional testing requirements. Locked high radiation areas do not require classification as dead zones since they are not normally accessible.

The Public Address Page system shall be demonstrated OPERABLE at least quarterly (92 days) by a functional test of each PA speaker.

6.9.4 Bases

The purpose of these requirements is to ensure that the alarm functions provided by the Public Address Page System are functional. For this reason, the action requirements only apply to the speakers, not to the handsets or wall stations.

6.10 Fire Protection Coatings, Raceway Barriers, and Special Barriers

6.10.1 Operability

All cable coatings, raceway barriers, and special fire protection barriers installed to comply with Branch Technical Position, 9.5-1, Appendix A and/or 10CFR50 Appendix R, shall be functional at all times.

6.10.2 Actions

1. With any of the above required fire coatings/barriers nonfunctional, within 1 hour establish a continuous fire watch in the area or verify the operability of fire detectors (if installed) and a spray and/or sprinkler system (if installed) in the area of the nonfunctional coating/barrier and establish an hourly fire watch patrol.

2. Re-evaluate Steps 6.2.2.1.b, and 6.8.2.1.a for each inoperable spray and/or sprinkler system, fire barrier, and fire detection in the area and implement revised fire watch requirements to include consideration of the inoperable coating/barrier.

3. Restore the nonfunctional fire coating/barrier to functional status within 7 days.

6.10.3 Surveillance

1. Cable coatings, raceway barriers, and special fire protection barriers installed to comply with Branch Technical Position, 9.5-1, Appendix A and 10CFR50 Appendix R, shall be verified to be functional:

   a. At least once per 18 months by a visual inspection, and

   b. Prior to restoring the coating/barrier to functional status following repairs or maintenance by performance of a visual inspection of the affected coating/barrier.

6.11 Fire Brigade

6.11.1 Operability

A Fire Brigade of at least five members shall be maintained on site at all times. The Fire Brigade shall not include the minimum shift crew required by Technical Specifications or any personnel required for other essential functions during a fire emergency.

6.11.2 Actions

1. With Fire Brigade composition less than the minimum requirements due to unexpected absence, take immediate action to fill the required position(s).

2. Return Fire Brigade composition to minimum requirements within two hours.

6.11.3 Surveillance

None Applicable

6.11.4 Bases

BNP is required to have a five person fire brigade, organized as follows:

1. One Brigade Commander

2. Four Brigade Members, who are supposed to perform the actual fire fighting activities.

3. The qualifications for the fire brigade shall be as follows:

   - All initial and continuing classroom training, live-fire, and drill requirements shall be current.

   - Fire Brigade members shall be considered physically fit. Physically fit means that a qualified physician determines that there are no known physical or medical limitations that would interfere with the performance of strenuous heavy lifting and pulling or with the use of self-contained breathing apparatus that can be required during emergency response activities.

7.0 RECORDS

There are no records generated by this procedure.

ATTACHMENT 1
Page 1 of 2
Required Water Spray/Sprinkler Systems

DIESEL GENERATOR BUILDING
Diesel Generator #1 Sprinkler System (HSS)
Diesel Generator #2 Sprinkler System (HSS)
Diesel Generator #3 Sprinkler System (HSS)
Diesel Generator #4 Sprinkler System (HSS)
South Basement (2') Cable Spread Area Sprinkler System (HSS)
North Basement (2') Cable Spread Area Sprinkler System (HSS)
CONTROL BUILDING
Unit 1 Cable Spread Area Sprinkler System (LSS)
Unit 2 Cable Spread Area Sprinkler System (LSS)
REACTOR BUILDING 1
North and South Core Spray Pump Rooms (LSS)
North (LSS) and South (HSS) RHR Rooms
5'-0 Separation Zone Water Curtain (HSS)
20' Southwest Sprinkler System (LSS)
20' Southwest Separation Zone Water Curtain (HSS)
20' East Separation Zone Water Curtain (HSS)
20' Railroad Bay Sprinkler System (LSS)
20' ECCS Room Sprinkler Head (HSS)
38' Separation Zone Water Curtain (HSS)
50' Sprinkler System (Near Elevator) (LSS)
50' Separation Zone Water Curtain (HSS)
80' Sprinkler System (LSS)
Two Standby Gas Treatment Train 1A Deluge Systems (LSS)
Two Standby Gas Treatment Train 1B Deluge Systems (LSS)

Required Water Spray/Sprinkler Systems

REACTOR BUILDING 2
North and South Core Spray Pump Rooms (LSS)
North (LSS) and South (HSS) RHR Rooms
5'-0 Separation Zone Water Curtain (HSS)
20' Southwest Sprinkler System (LSS)
20' East Separation Zone Water Curtain (HSS)
20' Railroad Bay Sprinkler System (LSS)
20' ECCS Room Sprinkler Head (HSS)
38' Separation Zone Water Curtain (HSS)
50' Sprinkler System (Near Elevator) (LSS)
50' Separation Zone Water Curtain (HSS)
80' Sprinkler System (LSS)
Two Standby Gas Treatment Train 2A Deluge Systems (LSS)
Two Standby Gas Treatment Train 2B Deluge Systems (LSS)
SERVICE WATER BUILDING
Service Water Pump Area Sprinkler System (HSS)
Service Water Cable Spread Area Sprinkler System (HSS)
RADWASTE BUILDING
Drumming Room Sprinkler System (LSS)
MAKEUP WATER TREATMENT BUILDING
Makeup Water Treatment Area Sprinkler System (LSS)

ATTACHMENT 2
Page 1 of 1
Required High Pressure CO_2 Systems

Unit No. 1 HPCI CO_2 System

Unit No. 2 HPCI CO_2 System

ATTACHMENT 3
Page 1 of 3
Required Fire Hose Stations

LOCATION	ELEVATION	HOSE RACK NO.
AOG Building	23'	2-AOG-57
	23'	2-AOG-58
	23'	2-AOG-59
	23'	2-AOG-60
	37'	2-AOG-62
	49'	2-AOG-61
Control Building	23'	1-CB-1
	49'	1-CB-2
	23'	2-CB-1
	49'	2-CB-2
	70'	2-CB-3
Diesel Generator Building	2'	DGB-1
	2'	DGB-2
	2'	DGB-3
	23'	DGB-4
	23'	DGB-5
	23'	DGB-6
	23'	DGB-7
	23'	DGB-8
	23'	DGB-9
	50'	DGB-10
	50'	DGB-11
	50'	DGB-12
	50'	DGB-13
	50'	AFFF HR-2
	50'	AFFF HR-3
Diesel Generator Tank Area	N/A	AFFF HR-1
Radwaste Building	-3'	RW-49
	-3'	RW-50
	-3'	RW-51
	23'	RW-52
	23'	RW-53
	23'	RW-54
	23'	RW-55
	23'	RW-56
Service Water Building	4'	SW-1
	20'	SW-2
	20'	SW-3

Required Fire Hose Stations

LOCATION	ELEVATION	HOSE RACK NO.
Unit 1 Reactor Building	-17'	1-RB-19
	-17'	1-RB-20
	-17'	1-RB-24
	-17'	1-RB-25
	-17'	1-RB-26
	20'	1-RB-21
	20'	1-RB-22
	20'	1-RB-23
	20'	1-RB-27
	20'	1-RB-28
	20'	1-RB-29
	50'	1-RB-30
	50'	1-RB-31
	50'	1-RB-32
	50'	1-RB-33
	50'	1-RB-34
	50'	1-RB-35
	67'	1-RB-48A
	80'	1-RB-36
	80'	1-RB-39
	80'	1-RB-41
	80'	1-RB-43
	80'	1-RB-44
	80'	1-RB-45
	98'	1-RB-37
	117'	1-RB-38
	117'	1-RB-40
	117'	1-RB-42
	117'	1-RB-46
	117'	1-RB-47
	117'	1-RB-48

ATTACHMENT 3
Page 3 of 3
Required Fire Hose Stations

LOCATION	ELEVATION	HOSE RACK NO.
Unit 2 Reactor Building	-17'	2-RB-19
	-17'	2-RB-20
	-17'	2-RB-24
	-17'	2-RB-25
	-17'	2-RB-26
	20'	2-RB-21
	20'	2-RB-22
	20'	2-RB-23
	20'	2-RB-27
	20'	2-RB-28
	20'	2-RB-29
	50'	2-RB-30
	50'	2-RB-31
	50'	2-RB-32
	50'	2-RB-33
	50'	2-RB-34
	50'	2-RB-35
	67'	2-RB-48A
	80'	2-RB-36
	80'	2-RB-39
	80'	2-RB-41
	80'	2-RB-43
	80'	2-RB-44
	80'	2-RB-45
	98'	2-RB-37
	117'	2-RB-38
	117'	2-RB-40
	117'	2-RB-42
	117'	2-RB-46
	117'	2-RB-47
	117'	2-RB-48

ATTACHMENT 4
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Required Fire Detection Instruments

DETECTOR ZONE/ BUILDING AREA	MINIMUM INSTRUMENTS OPERABLE		
	FLAME	HEAT	SMOKE
1. Reactor Building #1			
(-)17' N Core Spray Pump Room Detectors 1-1, 1-2	0	0	1
(-)17' S Core Spray Pump Room Detectors 3-1, 3-2	0	0	1
(-)17' N RHR/CRD Pump Area Detectors 1-4, 1-5, 1-6, 1-8, 1-9	0	0	4
(-)17' S RHR Pump Area Detectors 3-4, 3-5, 3-6, 3-7, 3-9, 3-10	0	0	4
20' N RHR HX Room Detectors 1-10, 1-11	0	0	1
20' S RHR HX Room Detectors 3-11, 3-12	0	0	1
20' South Detectors 2-7, 2-11, 2-12, 1-13, 2-14, 2-15, 2-16, 2-17, 2-18, 2-19, 2-20, 2-21, 2-22, 2-23, 2-24	0	0	10
20' North Detectors 2-27, 2-28, 2-29, 2-30, 2-31, 2-32, 2-33, 2-35, 2-36	0	0	6
20' East Detectors 2-39, 2-40, 2-41, 2-42, 2-43, 2-44, 2-45, 2-46, 2-47, 2-48, 2-50, 2-51	0	0	8
20' Personnel Airlock Detectors 2-8, 2-9	0	0	1
20' Pipe Tunnel – North Half Detectors 2-37, 2-38	0	0	1
20' Pipe Tunnel – South Half Detectors 2-25	0	0	1
20' Personnel Decon Room Detectors 2-53, 2-54	0	0	1

Required Fire Detection Instruments

DETECTOR ZONE/ BUILDING AREA	MINIMUM INSTRUMENTS OPERABLE		
	FLAME	HEAT	SMOKE
1. Reactor Building #1 (continued)			
50' East Detectors 6-1, 6-2, 6-3, 6-5, 6-6, 6-7, 6-8, 6-9, 6-10, 6-11, 6-12, 6-13, 6-15, 6-16	0	0	10
50' North Detectors 6-17, 6-18, 6-19, 6-20, 6-21, 6-22, 6-23	0	0	5
50' West Detectors 6-25, 6-26, 6-27, 6-28	0	0	3
50' South Detectors 6-30, 6-31, 6-32, 6-33, 6-34, 6-35	0	0	4
80' East Detectors 5-13, 5-14, 5-15, 5-16, 5-17, 5-18, 5-19, 5-20, 5-21, 5-22	0	0	7
80' West Detectors 5-1, 5-2, 5-3, 5-5, 5-6, 5-7, 5-8, 5-9, 5-10, 5-11	0	0	7
80' Resin Room Detector 5-24	0	0	1
80' CRD Room Detectors 5-25, 5-26	0	0	1
98' Change Room Detector 5-28	0	0	1
98' Contaminated Equip Room Detector 5-29	0	0	1
117' 4" Elevator Equipment Room Detector 5-31	0	0	1

Required Fire Detection Instruments

DETECTOR ZONE/ BUILDING AREA	MINIMUM INSTRUMENTS OPERABLE		
	FLAME	HEAT	SMOKE
2. Reactor Building #2			
(-)17' N Core Spray Pump Room Detectors 1-1, 1-2	0	0	1
(-)17' S Core Spray Pump Room Detectors 3-1, 3-2	0	0	1
(-)17' N RHR/CRD Pump Area Detectors 1-4, 1-5, 1-6, 1-8, 1-9	0	0	4
(-)17' S RHR Pump Area Detectors 3-4, 3-5, 3-6, 3-8, 3-9	0	0	4
20' N RHR Room Detectors 1-10, 1-11	0	0	1
20' S RHR Room Detectors 3-10, 3-11	0	0	1
20' South Detectors 2-1, 2-5, 2-6, 2-7, 2-8, 2-9, 2-10, 2-11, 2-12, 2-13, 2-14, 2-15, 2-16	0	0	10
20' North Detectors 2-19, 2-20, 2-21, 2-22, 2-23, 2-24, 2-26, 2-27, 2-28	0	0	6
20' East Detectors 2-31, 2-32, 2-33, 2-34, 2-35, 2-36, 2-37, 2-38, 2-39, 2-40, 2-41	0	0	8
20' Personnel Airlock Detectors 2-2, 2-3	0	0	1
20' Pipe Tunnel – North Half Detectors 2-29, 2-30	0	0	1
20' Pipe Tunnel – South Half Detector 2-17	0	0	1

Required Fire Detection Instruments

DETECTOR ZONE/ BUILDING AREA	MINIMUM INSTRUMENTS OPERABLE		
	FLAME	HEAT	SMOKE
2. Reactor Building #2 (continued)			
20' Personnel Decon Room Detectors 2-43, 2-44	0	0	1
50' East Detectors 6-1, 6-2, 6-3, 6-4, 6-6, 6-7, 6-8, 6-9, 6-10, 6-11, 6-13, 6-14, 6-15	0	0	10
50' North Detectors 6-16, 6-17, 6-18, 6-19, 6-20, 6-21, 6-23, 6-24	0	0	5
50' West Detectors 6-25, 6-26, 6-27, 6-28	0	0	3
50' South Detectors 6-29, 6-31, 6-32, 6-33, 6-34, 6-35	0	0	4
80' East Detectors 5-15, 5-16, 5-17, 5-18, 5-19, 5-20, 5-21, 5-22, 5-24, 5-25	0	0	7
80' West Detectors 5-1, 5-2, 5-3, 5-4, 5-6, 5-7, 5-8, 5-9, 5-10, 5-11, 5-12, 5-13	0	0	8
80' Resin Room Detectors 5-26	0	0	1
80' CRD Room Detectors 5-27, 5-28	0	0	1
98' Change Room Detector 5-30	0	0	1
98' Contaminated Equip Room Detector 5-31	0	0	1
117' 4" Elevator Equipment Room Detector 5-33	0	0	1

Required Fire Detection Instruments

DETECTOR ZONE	MINIMUM INSTRUMENTS OPERABLE		
	FLAME	HEAT	SMOKE
3. Service Water Building			
4' EL. Detectors 2-FP-SW-5-1, 5-2, 5-3, 5-4, 5-5, 5-7, 5-8, 5-9, 5-10, 5-11	0	0	7
20' El. Detectors 2-FP-SW-5-12, 5-13, 5-14, 5-15, 5-16, 5-17, 5-19, 5-20	0	0	6
4. AOG Building			
20' Charcoal adsorber area Detectors 2-FP-OG-4-1, 4-2, 4-3, 4-4	0	0	2
20' Cooler condenser area & rad monitor room Detectors 2-FP-OG-4-5, 4-6, 4-7	0	0	2
20' Control panel room, change room, decon area Detectors 2-FP-OG-4-9, 4-10, 4-12, 4-13, 4-14, 4-15, 4-16, 4-17, 4-18	0	6	1
37' Mechanical equip room and plenum Detectors 2-FP-OG-4-20, 4-21, 4-22, 4-23, 4-24, 4-25, 4-26, 4-27	0	4	2
49' Liquid nitrogen storage Detectors 2-FP-OG-4-29, 4-30	0	2	0

Required Fire Detection Instruments

5. Control Building				
Zone 1	70'	0	0	9
Zone 2	49'	0	0	4
Zone 3	49'	0	0	4
Zone 4	49'	0	0	13
Zone 5	49'	0	0	14
Zone 6	49' (See Note)	0	0	6
Zone 7	23'	0	0	3
Zone 8	23'	0	0	3
Zone 9	23'	0	0	25
Zone 10	23'	0	0	24
Zone 11	23'	0	0	3
Zone 12	23'	0	0	3
Zone 13	49'	0	0	9
Zone 14	49'	0	0	9
Zone 15	70'	0	1	0
Zone 16	70'	0	1	0

NOTE: Zone 6 Detects the Control Room Area with 9 detectors (C6-1 through C6-9), and the Operations Back Office with 10 detectors (C6-10 through C6-19). The minimum instruments operable for the Control Room Area is six. The minimum instruments operable for the Operations Back Office is zero.

Required Fire Detection Instruments

DETECTOR ZONE	MINIMUM INSTRUMENTS OPERABLE		
	FLAME	HEAT	SMOKE
6. Diesel Generator Building			
2' Basement	0	0	0
23' North Switchgear Area Detectors 1-7, 1-8, 1-9, 1-10, 1-11, 1-12, 1-13, 1-14, 1-15, 1-16, 1-17	0	0	8
23' South Switchgear Area Detectors 2-7, 2-8, 2-9, 2-10, 2-11, 2-12, 2-13, 2-14, 2-15, 2-16, 2-17	0	0	7
23' Diesel Cell 1 Detectors 1-1, 1-2	1	0	0
23' Diesel Cell 2 Detectors 1-3, 1-4	1	0	0
23' Diesel Cell 3 Detectors 2-1, 2-2	1	0	0
23' Diesel Cell 4 Detectors 2-3, 2-4	1	0	0
50' Air Intake Area Detectors 4-2, 4-3, 4-4, 4-5, 4-6, 4-8, 4-9, 4-11, 4-12	0	0	8
50' Air Filter AFFF Room Detector 4-10	0	0	1
50' 4160V Switchgear E1 Detectors 4-23, 4-24, 4-25	0	0	2
50' 4160V Switchgear E2 Detectors 4-19, 4-20, 4-21, 4-22	0	0	3
50' 4160V Switchgear E3 Detectors 4-16, 4-17, 4-18	0	0	2
50' 4160V Switchgear E4 Detectors 4-13, 4-14, 4-15	0	0	2

Required Fire Detection Instruments

DETECTOR ZONE	NUMBER OF DETECTORS INSTALLED	MINIMUM DETECTORS REQUIRED OPERABLE	MAXIMUM ALLOWABLE INOPERABLE DETECTORS
7. Diesel Generator Building Halon			
Zone 1	18	14	4
Zone 2	18	14	4
Zone 3	20	15	5
Zone 4	20	15	5
Zone 5	18	14	4
Zone 6	18	14	4

NOTE: The fire detectors shown for Diesel Generator Building Halon apply to both Section 6.7 and Section 6.8 operability requirements.

ATTACHMENT 5
Page 1 of 1

Required Foam System Fire Detection Instruments

DETECTOR ZONE	MINIMUM INSTRUMENTS OPERABLE		
	FLAME	HEAT	SMOKE
1. Diesel Generator Fuel Oil Tank Area Foam System			
Fuel Cell Subsystem No. 1	0	2	0
Fuel Cell Subsystem No. 2	0	2	0
Fuel Cell Subsystem No. 3	0	2	0
Fuel Cell Subsystem No. 4	0	2	0
2. Diesel Generator Air Filter Foam System			
DG Air Filter Subsystem No. 1			
Upper Ring	0	2	0
Lower Ring	0	2	0
DG Air Filter Subsystem No. 2			
Upper Ring	0	2	0
Lower Ring	0	2	0
DG Air Filter Subsystem No. 3			
Upper Ring	0	2	0
Lower Ring	0	2	0
DG Air Filter Subsystem No. 4			
Upper Ring	0	2	0
Lower Ring	0	2	0

NOTE: The fire detectors shown in Attachment 5 apply to Section 6.5, Foam Systems operability requirements.

ATTACHMENT 6
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Sprinkler System / Isolation Valve Cross Reference

Unit 1 Reactor Building Sprinkler Systems

SPRINKLER SYSTEM		NCS	SCS	NRHR	SRHR	5' Sep Zone Water Curtain	20' SW	20' SW Sep Zone Water Curtain	20' East Sep Zone Water Curtain	20' East RR Bay	20' ECCS Room	38' Sep Zone Water Curtain	50' Near Elevator	50' Sep Zone Water Curtain	80' System
ISOLATION VALVE	V214	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	V366	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	V302		X												
	V305	X													
	V300				X	X									
	V301			X											
	V326						X	X							
	V316								X	X	X	X			
	V367								X	X	X	X			
	V1032										X				
	V315												X	X	
	V324														X

NOTES: 1. Reference drawings D-29099, Sheets 1 and 2
2. All valves prefixed 1-FP

Sprinkler System / Isolation Valve Cross Reference

Unit 2 Reactor Building Sprinkler Systems

SPRINKLER SYSTEM		NCS	SCS	NRHR	SRHR	5' Sep Zone Water Curtain	20' SW	20' East Sep Zone Water Curtain	20' East RR Bay	20' ECCS Room	38' Sep Zone Water Curtain	50' Near Elevator	50' Sep Zone Water Curtain	80' System
ISOLATION VALVE	V214	X	X	X	X	X	X	X	X	X	X	X	X	X
	V366	X	X	X	X	X	X	X	X	X	X	X	X	X
	V302		X											
	V305	X												
	V300				X	X								
	V301			X										
	V326						X							
	V316							X	X	X	X			
	V367							X	X	X	X			
	V1032									X				
	V315											X	X	
	V324													X

NOTES: 1. Reference drawings D-02299, Sheets 1 and 2
2. All valves prefixed 2-FP

Sprinkler System / Isolation Valve Cross Reference

Service Water Building Sprinkler Systems

SPRINKLER SYSTEM		Service Water Pump Area (above 20' elevation)		Service Water Cable Spread Area (below 20' elevation)	
		Unit 1 Side	Unit 2 Side	Unit 1 Side	Unit 2 Side
ISOLATION VALVE	1-FP-V219	X		X	
	2-FP-V219		X		X
	1-FP-V277	X		X	
	2-FP-V277		X		X
	1-FP-V95	X			
	2-FP-V263		X		
	1-FP-V96			X	
	2-FP-V96				X

NOTE: 1. Reference drawing D-02304

Sprinkler System / Isolation Valve Cross Reference

Radwaste Building Sprinkler System

SPRINKLER SYSTEM		Drumming Room Sprinkler System
ISOLATION VALVE	2-FP-V705	X
	2-FP-V712	X

NOTE: 1. Reference drawing D-02304

Sprinkler System / Isolation Valve Cross Reference

Water Treatment Building Sprinkler System

SPRINKLER SYSTEM		Water Treatment Bldg.
ISOLATION VALVE	2-FP-V100	X

NOTES:
1. Reference drawing D-02304
2. Hose station 2-FP-WT-HR-1 also isolated when 2-FP-V100 closed. However, this is not a Section 6.4 required hose station.

Sprinkler System / Isolation Valve Cross Reference

Diesel Generator Building Sprinkler Systems

SPRINKLER SYSTEM		DG Cell #1	DG Cell #2	DG Cell #3	DG Cell #4	DG Bldg. Basement South	DG Bldg Basement North
ISOLATION VALVE	V225	X					
	V278	X					
	V226		X				
	V279		X				
	V227			X			
	V280			X			
	V228				X		
	V281				X		
	V284					X	
	V285					X	
	V283						X
	V286						X

NOTES: 1. Reference drawing D-02303 Sheets 1 and 2
2. All valves prefixed 2-FP

ATTACHMENT 6
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Sprinkler System / Isolation Valve Cross Reference

Control Building Sprinkler Systems

SPRINKLER SYSTEM		Unit 1 Cable Spread Room	Unit 2 Cable Spread Room
ISOLATION VALVE	1-FP-V140	X	
	1-FP-V451	X	
	2-FP-V140		X
	2-FP-V451		X

NOTE: 1. Reference drawing D-02058 Sheet 3B

REVISION SUMMARY

Revision 39 updated the references section to add Reference 2.9 (F-03897, Fire Detection System Block Diagram), added a general note regarding identification of fire detection and suppression systems that are monitored by the Edwards EST3 Fire Detection System per PRR 568985, and added a Records Section per PRR 569034.

Revision 38 incorporates EC 83141, which identifies new labels and minimum required instruments for AOG and Service Water Buildings instruments.

Revision 37 - Incorporated change described in EC 50934 (PRR 490879). Attachment 5 revised to show existing Diesel Generator Fuel Oil Tank Area Foam System flame and heat detectors replaced with all heat detectors.

Revision 36 – Incorporated change described in EC 50933 (PRR 473626). Attachment 5 revised to show existing Diesel Generator Air Filter Foam System flame and heat detectors replace with all heat detectors.

Revision 35 – Incorporated editorial changes associated with procedure OPS-NGGC-1000 described in PRR 367926. Specifically, reference to 0OI-01.08 was replaced with 0OI-01.01 in Section 2.8, 5.6 and 5.7. Added procedures 0OI-01.02 and OPS-NGGC-1000 to Section 2, References. Incorporated PRR 387555 editorial change in Section 5.5.1, changed Priority 5 CR to Action Request type IMPR. Incorporated PRR 429886 by adding Attachment 6, Sprinkler System / Isolation Valve Cross Reference. Also Revised Steps 6.5.1 and 6.8.1.1 to require operability at all times. Notes were added to Attachment 4 (page 7) and Attachment 5.

Revision 34 – Added procedure 0FPP-005 and 0FPP-030 to Section 2, References. (PRR 282292) Revised Section 6.8.4 to state Control Room annunciation required for fire detection system operability. (PRR 327461) Added Section 6.2.4.3 to describe SBGT deluge system operability as dependent on SBGT temperature switch status. (PRRs 315353 and 318199) Revised the title "*Shift Superintendent*" in Step 3.2 to "*Shift Manager*".

Revision 33 –Incorporated EC50932 Diesel Generator Building Fire Detection Modification, by rewording Step 6.7.4, changing DG Detectors in Attachment 4, and adding DG Halon detectors to Attachment 4.

Revision 32 – Incorporated PRR 265840 by changing Section 5.7 to clarify when fire watch is required and to direct personnel to review NEIL notification requirements. Incorporated PRR 249728 by revising Section 6.3.1 to describe when HPCI CO2 is required operable by reference to reactor mode.

Revision 31 – Incorporates EC 65825 by updating ASTM standards to 2006 edition in Section 6.1.3.2b.