76. Unit 1 was at 100% Reactor Power when Reactor Recirc Pump 1A tripped. Total Core Flow indication lowered to 50%.

Which ONE of the following completes the statements below?

Following the trip, APRM Flow Biased Scram set point will be__**(1)**__ Simulated Thermal Power.

The APRM Flow Biased Simulated Thermal Power – HIGH setpoint is required to be adjusted to Single Loop allowable value within a MAXIMUM of __**(2)**__ in accordance with T.S. 3.4.1, "Recirculation Loops Operating."

A. **(1)** 92%
(2) 12 hours

B. **(1)** 92%
(2) 24 hours

C. **(1)** 98%
(2) 12 hours

D. **(1)** 98%
(2) 24 hours

77. Which ONE of the following completes the statement below?

In accordance with the Unit 1 Bases for Tech Spec 3.3.1.1, "RPS Instrumentation," an RPS actuation is required as a result of Turbine Stop Valve Closure above a **MINIMUM** Reactor Power of __**(1)**__ to ensure the __**(2)**__ Safety Limit is not exceeded.

A. **(1)** 25%
(2) Reactor core MCPR

B. **(1)** 25%
(2) Reactor Coolant System RPV Pressure

C. **(1)** 30%
(2) Reactor core MCPR

D. **(1)** 30%
(2) Reactor Coolant System RPV Pressure

78. Unit 3 was operating at 100% Reactor Power when the following occurred:

- Main Control Room evacuation is required due to a fire in the Control Bay
- The Backup Control Panel is manned twenty-five (25) minutes after evacuation of the Main Control Room
- The Unit Supervisor is informed that ONE SRV is continuously open **AND** a second SRV is cycling periodically

Which ONE of the following completes the statements below?

Based on the SRV status, Reactor Power is currently between __**(1)**__ .

In accordance with EPIP-1, "Emergency Plan Implementing Procedure," the **HIGHEST** emergency action level classification that is required for these conditions is a (an) __**(2)**__.

A. **(1)** 6% and 14%
(2) Alert

B. **(1)** 15% and 23%
(2) Alert

C. **(1)** 6% and 14%
(2) Site Area Emergency

D. **(1)** 15% and 23%
(2) Site Area Emergency

79. Unit 1 RHR 1A is in Shutdown Cooling with Reactor Coolant temperature at 180° F. The Drywell Equipment Hatch is open. A leak on RHR Loop I results in the following:

- RHR LOOP I PUMP ROOM FLOOD LEVEL HIGH, (1-9-4C, Window 17), is in alarm
- RHR Loop I is secured **AND** isolated
- RHR Loop II is placed in service
- Reactor Coolant Temperature is now 215° F

Which ONE of the following completes the statements below?

Entry into 1-EOI-3, "Secondary Containment Control," __**(1)**__ required.
In accordance with EPIP-1, "Emergency Plan Implementing Procedure," __**(2)**__.

[REFERENCE PROVIDED]

A. **(1)** is
(2) Emergency Action Level for an Alert is met

B. **(1)** is
(2) Emergency Action Level for a Site Area Emergency is met

C. **(1)** is **NOT**
(2) Emergency Action Level for an Alert is met

D. **(1)** is **NOT**
(2) Emergency Action Level for a Site Area Emergency is met

80. Unit 3 was operating at 100% Reactor Power, when a leak in the Drywell resulted in the following conditions:

- Drywell Pressure is 57 psig and rising
- Suppression Chamber Pressure is 56 psig and rising
- Suppression Pool Level is 15 feet
- Drywell Radiation is 2500 R/Hr
- Reactor Water Level lowered to (-) 180 inches and is now (-) 170 inches and rising

Which ONE of the following identifies the required procedure to vent the Primary Containment **AND** the release rate requirements during the venting process in accordance with 3-EOI-2, "Primary Containment Control?"

A. 3-EOI-APPENDIX-12, "Primary Containment Venting";
vent irrespective of offsite release rates

B. 3-EOI-APPENDIX-12, "Primary Containment Venting"
venting MUST be secured if approaching General Emergency Release Rate Limits

C. 3-EOI-APPENDIX-13,"Emergency Venting Primary Containment";
vent irrespective of offsite release rates

D. 3-EOI-APPENDIX-13,"Emergency Venting Primary Containment";
venting MUST be secured if approaching General Emergency Release Rate Limits

81. Given the following plant conditions on Unit 3:

- A steam line break has occurred inside the Drywell
- **ALL** Reactor Water Level (RWL) instruments display erratic indication
- Reactor Pressure **AND** Drywell Temperature are in the Action Required region of RPV Saturation Curve 8

Which ONE of the following completes the statement below?

The Unit Supervisor must select EOI flowchart __**(1)**__ for these conditions and raise injection to establish Reactor Pressure to a **MINIMUM** of __**(2)**__ above Suppression Chamber Pressure.

A. **(1)** 3-C-4, "RPV Flooding"
(2) 70 psig

B. **(1)** 3-C-2, "Emergency Depressurization"
(2) 70 psig

C. **(1)** 3-C-4, "RPV Flooding"
(2) 90 psig

D. **(1)** 3-C-2, "Emergency Depressurization"
(2) 90 psig

82. Unit 1 is at 100% Reactor Power:

- Main Steam Line radiation levels are greater than three times normal full power background
- OG AVG ANNUAL RELEASE RATE EXCEEDED 1-RA-90-157C, (1-9-4C, Window 27) is in alarm

Which ONE of the following completes the statement below?

The direction **AND** criteria to **CLOSE** MSIVs is contained in __**(1)**__ **AND** is based upon a determination that __**(2)**__.

A. **(1)** 0-EOI-4, "Radioactivity Release Control"
(2) releases are still in excess of Offsite Dose Calculation Manual limits

B. **(1)** Alarm Response Procedure 1-9-3A, Window 27 Section for MAIN STEAM LINE RADIATION HIGH-HIGH
(2) releases are still in excess of Offsite Dose Calculation Manual limits

C. **(1)** 0-EOI-4, "Radioactivity Release Control"
(2) the reactor will remain subcritical without boron under all conditions

D. **(1)** Alarm Response Procedure 1-9-3A, Window 27 Section for MAIN STEAM LINE RADIATION HIGH-HIGH
(2) the reactor will remain subcritical without boron under all conditions

83. UNIT 2 was at 100% Reactor Power when an accident resulted in the following conditions:

- Main Steam Tunnel Temperature in the Turbine Building is 298 °F and rising.
- Main Steam Tunnel Temperature in the Reactor Building is 190 °F and rising.
- Main Steam Line C Inboard **AND** Outboard MSIVs can **NOT** be closed.
- Gaseous Release Rate Stack Noble Gas (WRGERMS) reading has been 6×10^{10} µCi/sec for 16 minutes.
- **NO** Offsite Emergency Response Facilities are operational.

Which ONE of the following completes the statements below?

In accordance with the EOIs, Emergency Depressurization __**(1)**__ required to be performed for these conditions.

The Shift Manager / Site Emergency Director __**(2)**__ delegate the determination of Protective Action Recommendation.

[REFERENCE PROVIDED]

A. **(1)** is
(2) can

B. **(1)** is **NOT**
(2) can

C. **(1)** is
(2) CANNOT

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

84. A leak into Unit 2 Suppression Pool has resulted in the following indications:

- At 0200 Suppression Pool Level is (-) 3 inches and rising at 1 inch per hour

Which ONE of the following completes the statements below?

The Tech Spec Limit for 3.6.2.2, "Suppression Pool Level," will be reached at __**(1)**__.

The bases of the Tech Spec Suppression Pool upper level limit is to __**(2)**__ during a DBA LOCA.

A. **(1)** 0315
(2) ensure that peak primary containment pressure does not exceed maximum allowable values

B. **(1)** 0315
(2) prevent excessive clearing loads from S/RV discharges and excessive pool swell loads

C. **(1)** 0400
(2) ensure that peak primary containment pressure does not exceed maximum allowable values

D. **(1)** 0400
(2) prevent excessive clearing loads from S/RV discharges and excessive pool swell loads

85. Unit 3 was operating at 100% Reactor Power. RHR Pump 3B was tagged out for planned maintenance at 0600 on 1/13/11.

At 1000 on 1/14/11, a RCIC steam line leak occurred in the Reactor Building resulting in a trip of Loop I Core Spray Room Cooler.

Based on these conditions, which ONE of the following identifies the **LATEST** time that Unit 3 must be in Mode 3 in accordance with Tech Spec 3.5.1, "ECCS-Operating"?

[REFERENCE PROVIDED]

A. 2200 on 1/14/11

B. 2300 on 1/14/11

C. 1800 on 1/20/11

D. 2200 on 1/21/11

86. Unit 1 has experienced a Loss of Offsite Power concurrent with a LOCA. Multiple equipment failures have resulted in need for RHR Crosstie to be lined up for injection into the reactor.

Which ONE of the following completes the statements below?

Unit 1 RHR can be crosstied to Unit 2 RHR __**(1)**__ .

The Unit 2 RHR Pump Suction Valve interlocks must be defeated in accordance with __**(2)**__.

A. **(1)** Loop I
(2) 2-OI-74, "Residual Heat Removal System"

B. **(1)** Loop I
(2) 1-EOI Appendix 7C, "Alternate RPV Injection System Lineup RHR Crosstie"

C. **(1)** Loop II
(2) 2-OI-74, "Residual Heat Removal System"

D. **(1)** Loop II
(2) 1-EOI Appendix 7C, "Alternate RPV Injection System Lineup RHR Crosstie"

87. The following conditions exist on Unit 3:

- Reactor Power is 100%
- Emergency Diesel Generator 3EA is tagged out of service

The following sequence of events occur:

- 1130 **ALL** Offsite power is lost and NO Unit 3 EDG's tie to their associated Board
- 1140 EDG 3EB started and tied to its associated Board
- 1145 EDG 3EB Output Breaker trips open and cannot be closed
- 1155 EDG 3EC started and tied to its associated Board
- 1205 EDG 3EB Output Breaker is repaired and subsequently closed

Which ONE of the following identifies the **HIGHEST** emergency classification required **AND** who the Site Emergency Director should notify within five minutes of classifying the event?

[REFERENCE PROVIDED]

A. Alert;
Operations Duty Specialist

B. Alert;
State of Alabama

C. Site Area Emergency;
Operations Duty Specialist

D. Site Area Emergency;
State of Alabama

88. Unit 3 is at 100% Reactor Power. Standby Gas Treatment System (SGTS) A was tagged out of service on 1/16/11 at 0600. SGTS B has been manually started. At 1000 on 1/16/11, a container is removed from the Unit 3 Spent Fuel Pool (SFP) resulting in the following Refuel Zone Radiation Monitor indications:

- 3-RM-90-140 Detector A is reading 73 mr/hr
- 3-RM-90-140 Detector B is reading 72 mr/hr
- 3-RM-90-141 Detector A is reading 71 mr/hr
- 3-RM-90-141 Detector B is reading 71 mr/hr

SGTS C did **NOT** start. The container was placed back in the SFP **AND** Refuel Zone Radiation Monitor indications returned to normal.

Which ONE of the following completes the statements below?

A Tech Spec required shutdown condition must be entered at __**(1)**__ in accordance with Tech Spec 3.6.4.3, "Standby Gas Treatment System."

A __**(2)**__ hour report to the NRC is required when the shutdown is commenced.

[REFERENCE PROVIDED]

A. **(1)** 1000 on 1/16/11
(2) four

B. **(1)** 0600 on 1/23/11
(2) four

C. **(1)** 1000 on 1/16/11
(2) one

D. **(1)** 0600 on 1/23/11
(2) one

89. With Unit 1 Operating at 100% Reactor Power, a Loss of Offsite Power occurs.

Which ONE of the following completes the statements below?

In accordance with Tech Spec 3.8.1 Bases, "AC Sources – Operating," on a Loss of Offsite Power, the **MAXIMUM** allowed time for Emergency Diesel Generators to energize their associated Shutdown Boards is __**(1)**__ seconds.

Direction to reset EECW to Control Air Compressors is contained in__**(2)**__ .

A. **(1)** 7
(2) 0-AOI-32-1, "Loss of Control and Service Air Compressors"

B. **(1)** 10
(2) 0-AOI-32-1, "Loss of Control and Service Air Compressors"

C. **(1)** 7
(2) 0-AOI-57-1A, "Loss of Offsite Power (161 and 500 KV)/Station Blackout"

D. **(1)** 10
(2) 0-AOI-57-1A, "Loss of Offsite Power (161 and 500 KV)/Station Blackout"

90. Unit 3 is at 100% Reactor Power. Plant Control Air has been aligned to Drywell Control Air to allow maintenance on the Nitrogen Storage Tanks.

Which ONE of the following completes the statement below?

Technical Requirements Manual Section 3.6.3, "Drywell Control Air System," requires Reactor Thermal Power be reduced to less than or equal to __**(1)**__ power within __**(2)**__ if Plant Control Air is being used to supply the pneumatic control system inside primary containment.

A. **(1)** 15%
   (2) 12 hours

B. **(1)** 15%
   (2) 24 hours

C. **(1)** 25%
   (2) 12 hours

D. **(1)** 25%
   (2) 24 hours

91. Which ONE of the following completes the statements below?

Tech Spec 3.3.1.1, "Reactor Protection System (RPS) Instrumentation" **AND** its associated Bases for the Reactor Vessel Water Level - Low, Level 3 setpoint is to prevent significant carryunder __**(1)**__.

If this function is lost due to TWO inoperable channels in a trip system, then RPS trip capability must be restored __**(2)**__ .

A. **(1)** to ensure the accuracy of core D/P and level instrumentation
(2) Immediately

B. **(1)** to ensure the accuracy of core D/P and level instrumentation
(2) within 1 hour

C. **(1)** to protect available Reactor Recirc Pump Net Positive Suction Head
(2) Immediately

D. **(1)** to protect available Reactor Recirc Pump Net Positive Suction Head
(2) within 1 hour

92. The following alarms **AND** indications exist on Unit 3:

- DRYWELL PRESS HIGH, (3-9-3B, Window 23), is in alarm
- REACTOR VESSEL WTR LVL CH A LOW-LOW-LOW (3-9-5B, Window 4), is in alarm
- REACTOR VESSEL WTR LVL CH B LOW-LOW-LOW (3-9-5B, Window 5), is in alarm
- DRYWELL EQPT DR SUMP PUMP EXCESSIVE OPRN, (3-9-4B, Window 11), is in alarm
- Drywell Floor Drain Leakage is calculated at 100 gpm
- Group 1 PCIS Logic A Success light is **NOT** illuminated
- **ALL** other PCIS Logic Success lights are illuminated
- Dose equivalent Iodine-131 sample results indicate 16 µCi/gm

Which ONE of the following completes the statement below?

These alarms **AND** indications establish that _____.

A. a loss of the Fuel Clad Barrier **ONLY** exists

B. a loss of the Reactor Coolant System Barrier **ONLY** exists

C. a loss of the Reactor Coolant System Barrier **AND** Fuel Clad Barrier **ONLY** exists

D. a loss of the Containment Barrier **AND** Reactor Coolant System Barrier **ONLY** exists

93. Unit 3 is operating at 100% Reactor Power. Offgas Hydrogen Analyzer 3A was tagged out for planned maintenance at 0600 on 1/13/11.

At 0700 on 1/13/11, the Unit Supervisor discovers an error on Offgas Hydrogen Analyzer 3B Surveillance completed at 0400 on 1/13/11. Based on the corrected calculation, Offgas Hydrogen Analyzer 3B alarm setpoint is set too high to ensure the limit of TRM LCO 3.7.2 is not exceeded.

Which ONE of the following completes the statements below?

In accordance with TR 3.7.2, "Airborne Effluents," the concentration of hydrogen in Offgas downstream of the recombiners shall be limited to a **MAXIMUM** of __**(1)**__ . In accordance with TR 3.3.9, "Offgas Hydrogen Analyzer Instrumentation," Condition A must be entered with a start time of __**(2)**__ on 1/13/11.

[REFERENCE PROVIDED]

A. **(1)** 1%
(2) 0600

B. **(1)** 1%
(2) 0700

C. **(1)** 4%
(2) 0600

D. **(1)** 4%
(2) 0700

94. Which ONE of the following completes the statements below for Shift Turnover **AND** Control Board walk down requirements in accordance with OPDP-1,"Conduct of Operations?"

During shift turnover, the oncoming **Shift Manager** __**(1)**__ required to walk down the Control Boards with an off going RO or SRO.

The **Unit Supervisor** must walk down Main Control Room panels __**(2)**__.

A. **(1)** is
(2) once prior to mid shift brief **AND** once prior to end of shift turnover

B. **(1)** is **NOT**
(2) once prior to mid shift brief **AND** once prior to end of shift turnover

C. **(1)** is
(2) once every hour during power operations with a 25% grace period

D. **(1)** is **NOT**
(2) once every hour during power operations with a 25% grace period

95. In accordance with OPDP-10, "License Status Maintenance, Reactivation and Proficiency for Non-Licensed Operators," which ONE of the following completes the statements for License Reactivation requirements?

Licensee requalification training must be verified current __**(1)**__ 40 hours of shift functions under instruction.

When **ALL** Reactivation requirements are met, the Licensed individual is authorized to resume licensed activities by the __**(2)**__.

A. **(1)** prior to standing
   (2) Plant Manager

B. **(1)** prior to standing
   (2) Site Licensing Manager

C. **(1)** after standing
   (2) Plant Manager

D. **(1)** after standing
   (2) Site Licensing Manager

96. Which ONE of the following completes the statements below?

If the criteria is met (in accordance with TS Section 1.3, "Completion Times") to apply a Completion Time extension, the total Completion Time allowed for completing a Required Action shall be limited to the __**(1)**__ restrictive of either:

- The stated Completion Time, as measured from the initial entry into the Condition, plus an additional __**(2)**__ ;**OR** the stated Completion Time as measured from discovery of the subsequent inoperability.

A. **(1)** more
(2) 12 hours

B. **(1)** less
(2) 12 hours

C. **(1)** more
(2) 24 hours

D. **(1)** less
(2) 24 hours

97. A seismic event has resulted in the following Unit 2 plant conditions:

- **ALL** control rods are fully inserted
- RPV level is (-)150 inches and lowering slowly
- RPV pressure is 875 psig with a cooldown in progress at $\leq$90 ^{O}F/hr
- RHR Loop II is lined up for Drywell Spray
- **ALL** other ECCS systems are unavailable
- Drywell pressure is 4.8 psig and lowering
- ADS has been inhibited in accordance with 2-EOI-1, "RPV Control" step RC/L-7

Which ONE of the following describes the required actions to mitigate this event?

A. Enter 2-EOI-C1, "Alternate Level Control" and direct performance of 2-EOI-Appendix 6A, "Injection Subsystems Lineup Condensate."

B. Enter 2-EOI-C1, "Alternate Level Control" and direct performance of 2-EOI-Appendix 5A, "Injection System Lineup Condensate/Feedwater."

C. Enter 2-EOI-C2, "Emergency Depressurization" and direct performance of 2-EOI-Appendix 6A, "Injection Subsystems Lineup Condensate."

D. Enter 2-EOI-C2, "Emergency Depressurization" and direct performance of 2-EOI-Appendix 5A, "Injection System Lineup Condensate/Feedwater."

98. Which ONE of the following completes the statements below in accordance with 1-GOI-200-2, "Primary Containment Initial Entry and Closeout?"

Initial Drywell Entry with the Reactor at Power must be approved by the __**(1)**__ .

A member of __**(2)**__ will remain at the Personnel Airlock in continuous communication with the Control Room **AND** with the persons in the Drywell.

A. **(1)** Shift Manager **ONLY**
(2) Rad Protection

B. **(1)** Shift Manager **AND** Plant Manager
(2) Rad Protection

C. **(1)** Shift Manager **ONLY**
(2) Operations

D. **(1)** Shift Manager **AND** Plant Manager
(2) Operations

99. In accordance with RCDP-3, "Administration of Radiation Work Permits," for normal and emergency situations, which ONE of the following completes the statements below?

During NORMAL situations, RADPRO Supervision __**(1)**__ authorize short term deviation from RWP requirements (for example, verbally requiring additional protective clothing), without revising the RWP.

If the Shift Manager authorizes IMMEDIATE entry into a High Radiation Area during emergency situations, then RADPRO escort __**(2)**__.

A. **(1)** may
(2) is still required

B. **(1)** may **NOT**
(2) is still required

C. **(1)** may **NOT**
(2) is **NOT** required

D. **(1)** may
(2) is **NOT** required

100. With an ATWS, Emergency Operating Instructions (EOIs) require operators to reduce Recirc Pump speeds to minimum prior to tripping them if Reactor Power is above 5%.

Which ONE of the following identifies the **(1)** bases for this action **AND (2)** the EOI leg which requires it?

A. **(1)** To allow time for ARI to actuate thus allowing the Recirc Pumps to stay in operation for coolant circulation.
(2) C-5, Level / Power Control

B. **(1)** To allow time for ARI to actuate thus allowing the Recirc Pumps to stay in operation for coolant circulation.
(2) EOI-I, RPV Control, RC/Q leg

C. **(1)** To prevent tripping the turbine on high water level **AND** exceeding the capacity of the bypass valves.
(2) C-5, Level / Power Control

D. **(1)** To prevent tripping the turbine on high water level **AND** exceeding the capacity of the bypass valves.
(2) EOI-I, RPV Control, RC/Q leg

Pearson NCS Test Sheet 100/W

1

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KEY ID
(A) (B) (C) (D)

SCORING & PRINTING OPTIONS:
RESCORE
MULTIPLE ANSWER SCORING
CORRECT ANSWER
MARK X
TOTAL ONLY
MARK ONLY ONE

FEED IN THIS DIRECTION

	T	F					
1	A	B	C	●	E		
2	A	B	●	D	E		
3	A	B	●	D	E		
4	●	B	C	D	E		
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6	●	B	C	D	E		
7	A	●	C	D	E		
8	A	●	C	D	E		
9	A	●	C	D	E		
10	A	●	C	D	E		
11	A	●	C	D	E		
12	A	B	C	●	E		
13	A	●	C	D	E		
14	A	●	C	D	E		
15	A	B	C	●	E		
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35	A	●	C	D	E		
36	●	B	C	D	E		
37	●	B	C	D	E		
38	A	●	C	D	E		
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93	A	B	C	●	E		
94	A	●	C	D	E		
95	●	B	C	D	E		
96	A	B	●	D	E		
97	●	B	C	D	E		
98	A	B	C	●	E		
99	●	B	C	D	E		
100	A	B	C	●	E		

ANSWER KEY INFO.

# OF KEYS	ITEM COUNT			
				2
1	1	1	1	3
	2	2	2	4
	3	3	3	
	4	4	4	
	5	5	5	
	6	6	6	
	7	7	7	
	8	8	8	
	9	9	9	

PERFORMANCE ASSESSMENT

% OF TOTAL SCORE (00 = 100%)			POINTS EARNED		
	0	0	0	0	0
	1	1	1	1	1
	2	2	2	2	2
	3	3		3	3
	4	4		4	4
	5	5		5	5
	6	6		6	6
	7	7		7	7
	8	8		8	8
	9	9		9	9

EQUAL PT VALUE

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Bar Code

NUMBER CORRECT	
PERCENT CORRECT	
ROSTER NUMBER	
SCORE	
RESCORE	

PEARSON NCS

COMBINED POINTS EARNED	
COMBINED PERCENT CORRECT	
LETTER GRADE	
SCORE	
RESCORE	

100 ITEM

NAME Answer Key

SUBJECT

PERIOD DATE

MARKING INSTRUCTIONS

Use a No. 2 Pencil

(A) ● (C) (D) (E)
Fill oval completely

(A) (B) (C) (D) (E)
Erase cleanly

STUDENT ID NUMBER

0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9

SRO REFERENCES PROVIDED

13 EOI Curve 1 & 2 Rev. 8

14 EOI Caution 1 / Curve 8

28 2-LI-3-52/62 Correction Curve

49 DG KW vs. KVAR LOADING 0-OI-82 Rev. 112 Illustration 1

79 EPIP-1 Rev. 46 Matrix Sect. 1 (Minimum Re-flood Pressures blanked out)

83 EPIP-1 Rev. 46 Matrix Sect. 4

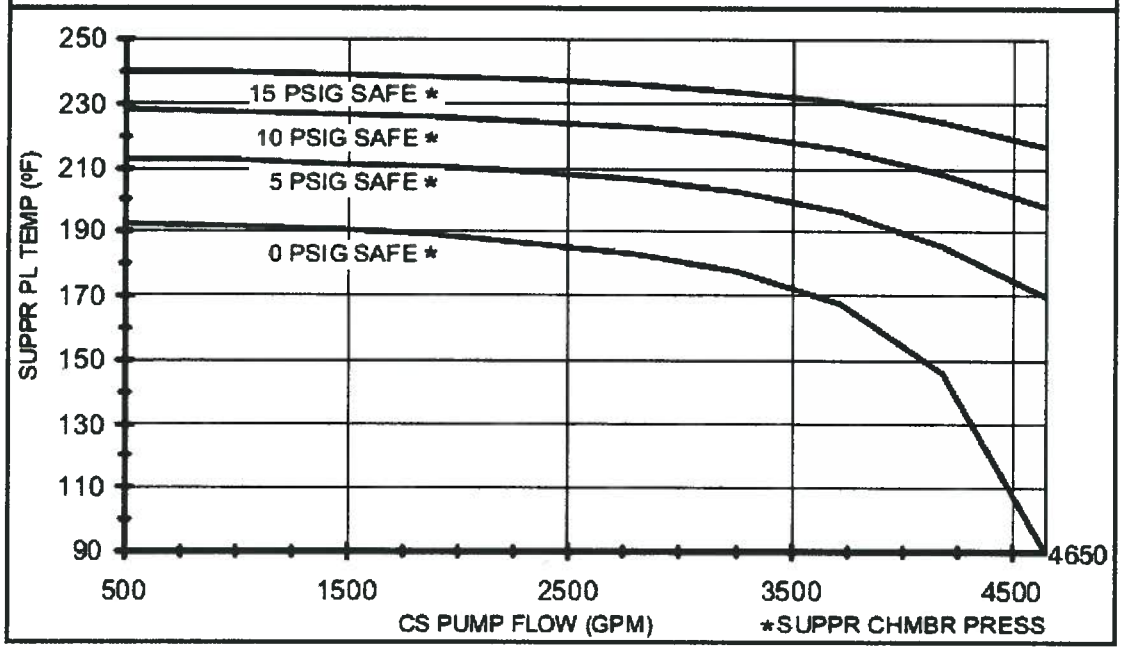
85 U3 TS 3.5.1 ECCS

87 EPIP-1 Rev. 46 Matrix Sect. 5

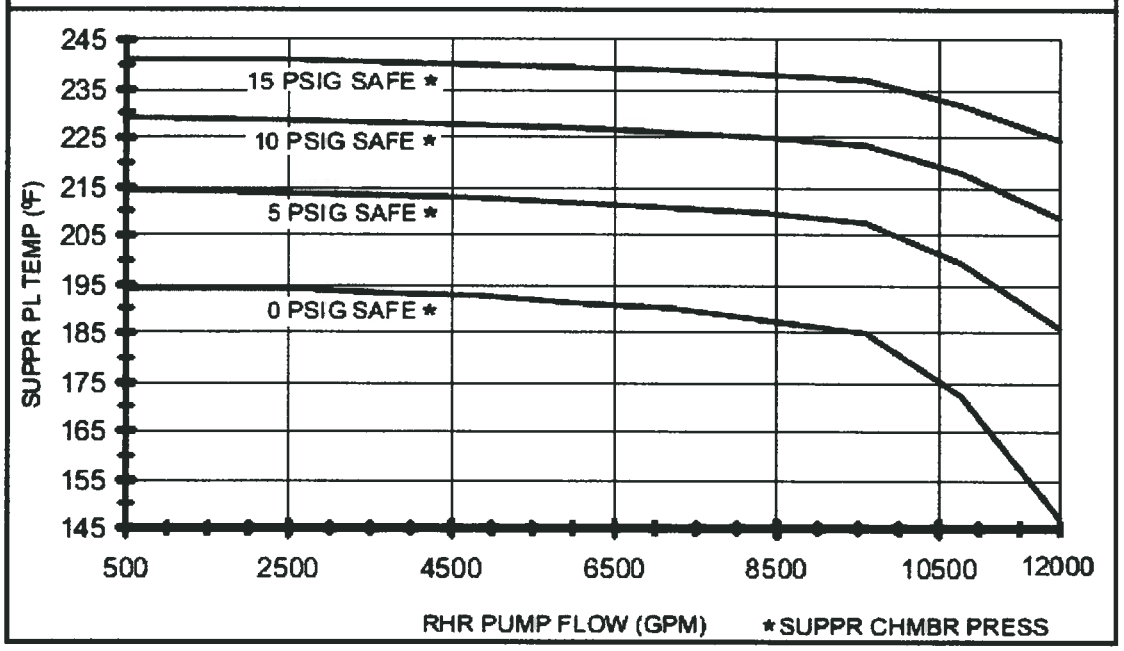
88 U3 TS 3.6.4.3 SGTS

93 U3 TR 3.3.9 Offgas H2 Analyzer

CURVE 1
CS NPSH LIMITS



CURVE 2
RHR NPSH LIMITS



CAUTIONS

CAUTION #1

- AN RPV WATER LVL INSTRUMENT MAY BE USED TO DETERMINE OR TREND LVL ONLY WHEN IT READS ABOVE THE MINIMUM INDICATED LVL ASSOCIATED WITH THE HIGHEST MAX DW OR SC RUN TEMP.
- IF DW TEMPS, OR SC AREA TEMPS (TABLE 6), AS APPLICABLE, ARE OUTSIDE THE SAFE REGION OF CURVE 8, THE ASSOCIATED INSTRUMENT MAY BE UNRELIABLE DUE TO BOILING IN THE RUN.

INSTRUMENT	RANGE	MINIMUM INDICATED LVL	MAX DW RUN TEMP (FROM XR-64-50 OR TI-64-52AB)	MAX SC RUN TEMP (FROM TABLE 6)
LI-3-58A, B	EMERGENCY -155 TO +60	ON SCALE	N/A	BELOW 150
		-145	N/A	151 TO 200
		-140	N/A	201 TO 250
		-130	N/A	251 TO 300
		-120	N/A	301 TO 350
LI-3-53 LI-3-60 LI-3-206 LI-3-253 LI-3-208A, B, C, D	NORMAL 0 TO +60	ON SCALE	N/A	BELOW 150
		+5	N/A	151 TO 200
		+15	N/A	201 TO 250
		+20	N/A	251 TO 300
		+30	N/A	301 TO 350
LI-3-52 LI-3-62A	POST ACCIDENT -268 TO +32	ON SCALE	N/A	N/A
LI-3-55	SHUTDOWN FLOODUP 0 TO +400	+10	BELOW 100	N/A
		+15	100 TO 150	N/A
		+20	151 TO 200	N/A
		+30	201 TO 250	N/A
		+40	251 TO 300	N/A
		+50	301 TO 350	N/A
		+65	351 TO 400	N/A

CURVE 8
RPV SATURATION TEMP

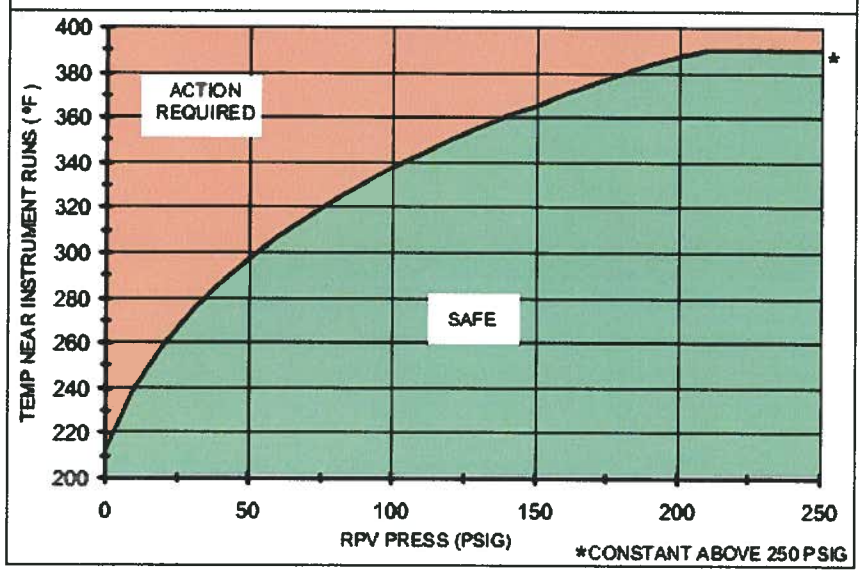


TABLE 6
SECONDARY CONTMT INSTRUMENT RUNS

INSTRUMENT	SC TEMP ELEMENTS AND LOCATIONS			
	EL 621 (74-95F)	EL 593 (74-95C AND D)	EL 565 (69-835A THRU D)	RWCU HXRM (69-29F, G, H)
LI-3-58A	°F	°F	N/A	°F
LI-3-58B	°F	°F	N/A	N/A
LI-3-53	°F	°F	N/A	°F
LI-3-60	°F	°F	N/A	N/A
LI-3-206	°F	°F	N/A	°F
LI-3-253	°F	°F	N/A	N/A
LI-3-52	°F	°F	°F	N/A
LI-3-62A	°F	°F	°F	N/A
LI-3-55	°F	°F	N/A	N/A
LI-3-208A, B	°F	°F	N/A	°F
LI-3-208C, D	°F	°F	N/A	N/A

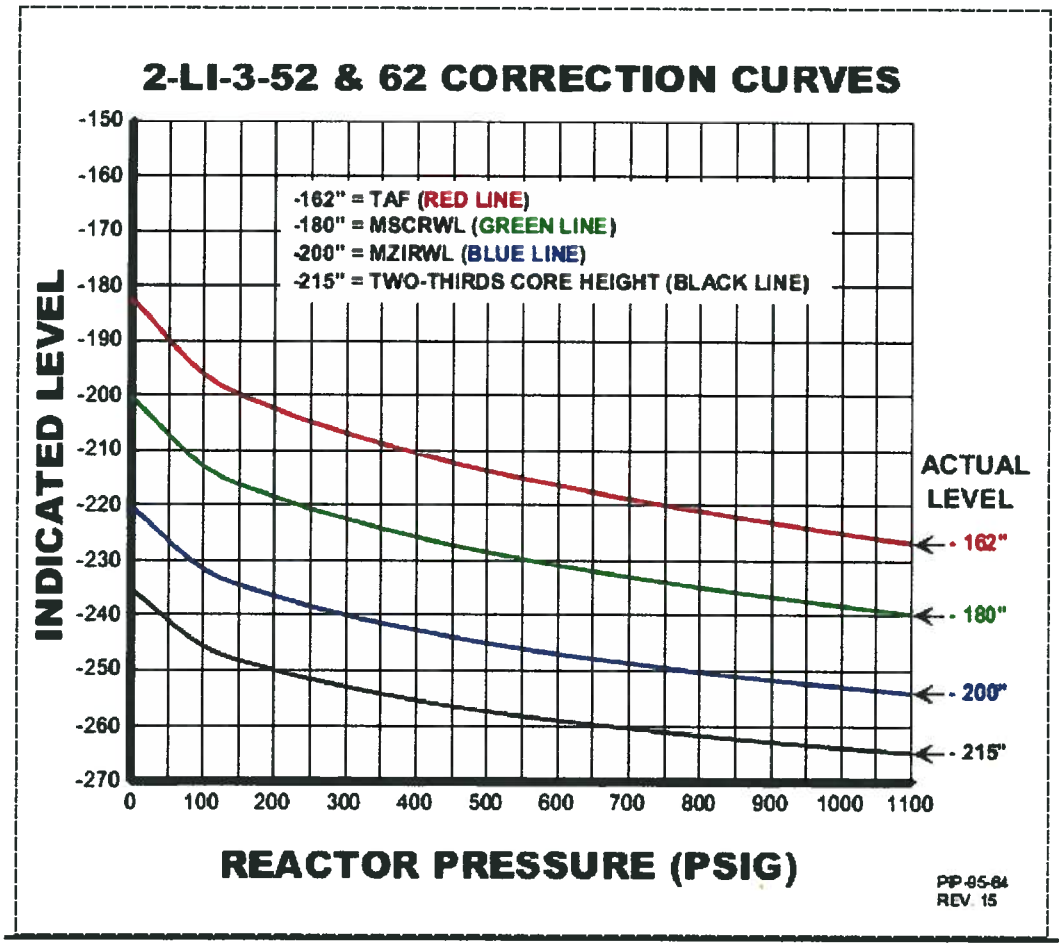
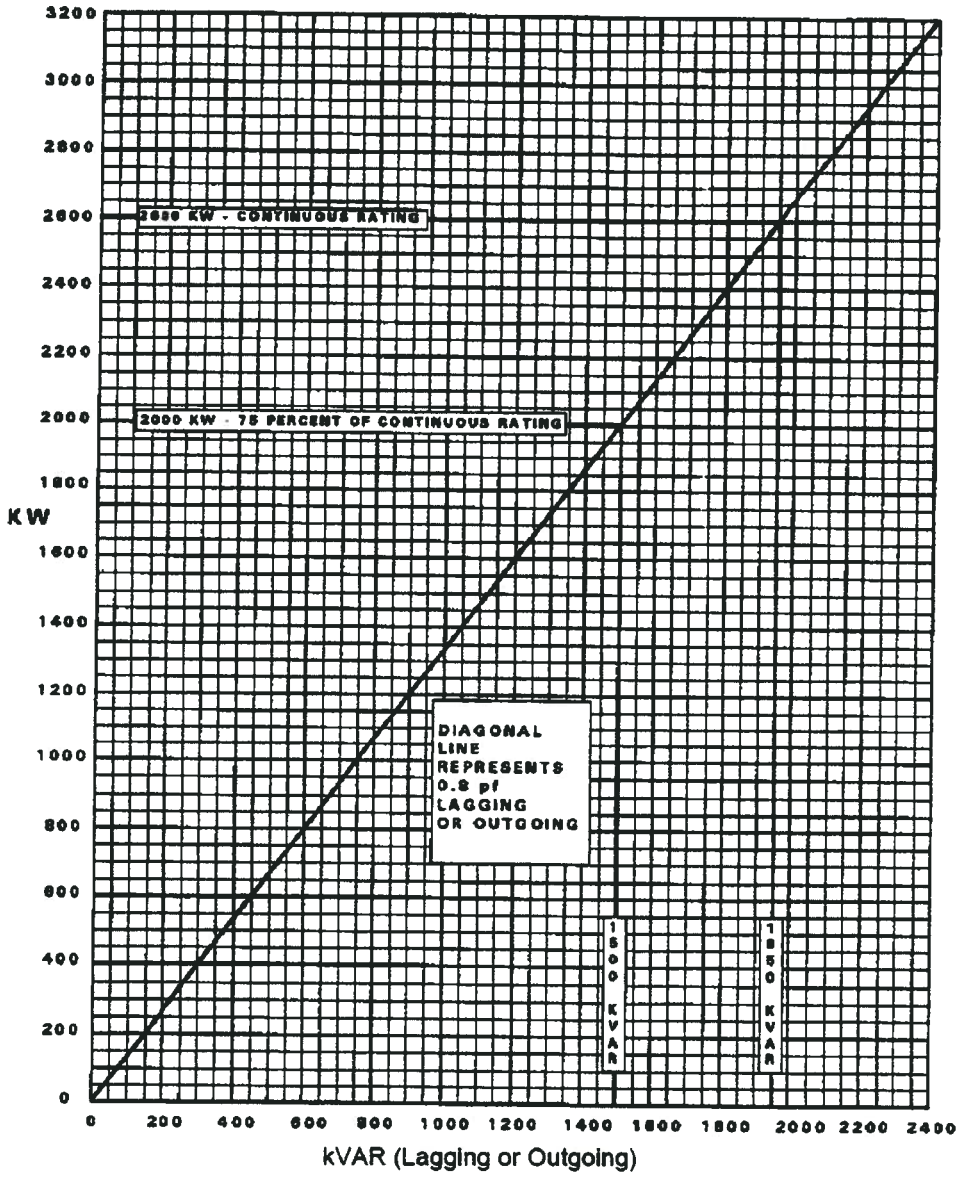

2-LI-3-52 & 62 CORRECTION CURVES
-162" = TAF (RED LINE)
-180" = MSCRWL (GREEN LINE)
-200" = MZIRWL (BLUE LINE)
-215" = TWO-THIRDS CORE HEIGHT (BLACK LINE)
INDICATED LEVEL
-150
-160
-170
-180
-190
-200
-210
-220
-230
-240
-250
-260
-270
0
100
200
300
400
500
600
700
800
900
1000
1100
ACTUAL LEVEL
162"
180"
200"
215"
REACTOR PRESSURE (PSIG)
PIP-95-84
REV. 15

Illustration 1
(Page 1 of 1)

DG kW vs. kVAR Loading



REACTOR
1.0

NOTES

1.1-U1/1.1-A1 Applicable when the Reactor Head is removed and the Reactor Cavity is flooded.

1.1-S1 Applicable in Mode 5 when the Reactor Head is installed.

1.1-G2 The reactor will remain subcritical under all conditions without boron when:

- Unit 1: All control rods are inserted to or beyond position 02.
  Unit 2: Any 19 control rods are inserted to position 02, with all other control rods fully inserted.
  Unit 3: Any 19 control rods are inserted to position 02, with all other control rods fully inserted.
- All control rods except one are inserted to or beyond position 00.
- Determined by Reactor Engineering.

CURVES/TABLES:

TABLE 1.1 - G2
MINIMUM ALTERNATE RPV FLOODING PRESS (MARFP)

NUMBER OF OPEN MSRVs	MARFP (PSIG)
6 or More	190
5	230
4	290

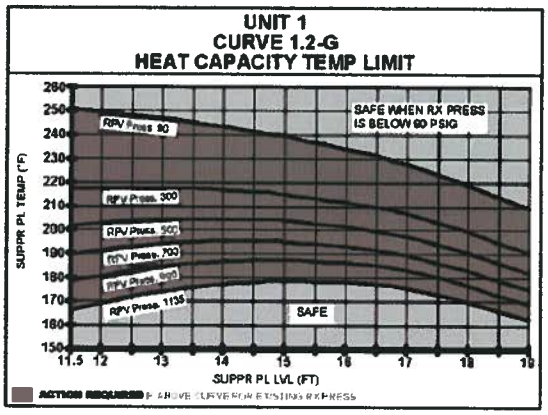
WATER LEVEL

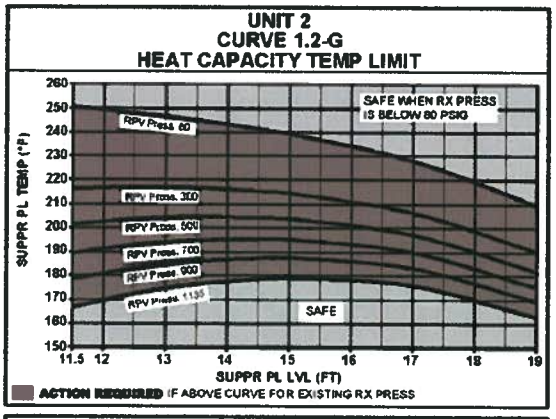
Description	Description	
1.1-U1 NOTE Uncontrolled water level decrease in Reactor Cavity with irradiated fuel assemblies expected to remain covered by water. OPERATING CONDITION: Mode 5	**1.1-U2** Uncontrolled water level decrease in Spent Fuel Pool with irradiated fuel assemblies expected to remain covered by water. OPERATING CONDITION ALL	UNUSUAL EVENT
1.1-A1 NOTE Uncontrolled water level decrease in Reactor Cavity expected to result in irradiated fuel assemblies being uncovered. OPERATING CONDITION: Mode 5	**1.1-A2** Uncontrolled water level decrease in Spent Fuel Storage Pool expected to result in irradiated fuel assemblies being uncovered. OPERATING CONDITION: ALL	ALERT
1.1-S1 NOTE Reactor water level can NOT be maintained above -162 inches. (TAF) OPERATING CONDITION: ALL	**1.1-S2** Reactor water level can NOT be determined. OPERATING CONDITION: Mode 1 or 2 or 3	SITE EMERGENCY
1.1-G1 Reactor water level can NOT be restored and maintained above -180 inches. OPERATING CONDITION: Mode 1 or 2 or 3	**1.1-G2** NOTE TABLE US Reactor water level can NOT be determined **AND** Either of the following exists: • The reactor will remain subcritical without boron under all conditions, and ➢ Less than 4 MSRVs can be opened, or ➢ Reactor pressure can NOT be restored and maintained above Suppression Chamber pressure by at least ❖ UNIT 1 – ☐ psi ❖ UNIT 2 – ☐ psi ❖ UNIT 3 – ☐ psi • It has NOT been determined that the reactor will remain subcritical without boron under all conditions and unable to restore and maintain MARFP in Table 1.1-G2. OPERATING CONDITION: Mode 1 or 2 or 3	GENERAL EMERGENCY

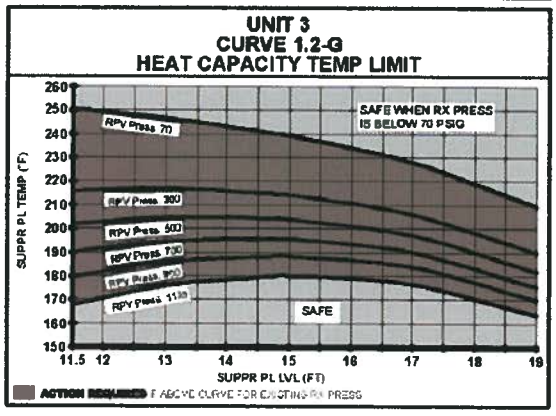
NOTES

1.2 Subcritical is defined as reactor power below the heating range and not trending upward.

CURVES/TABLES:



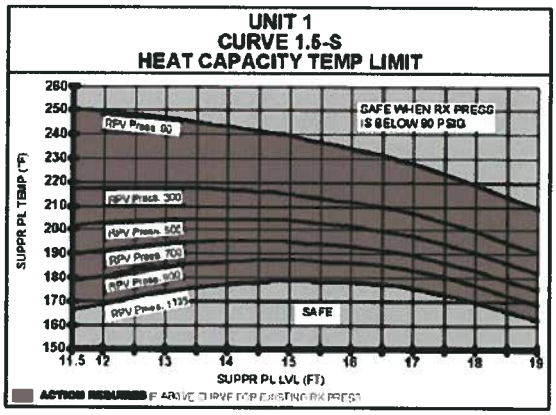


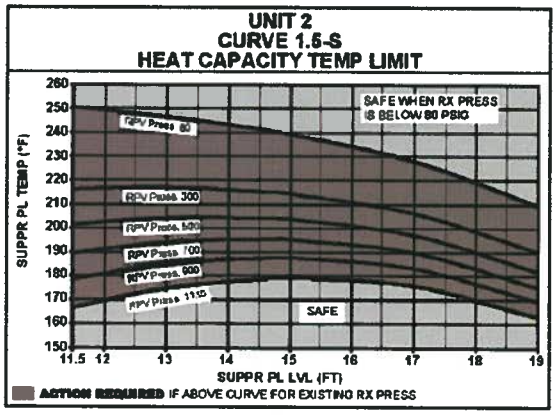


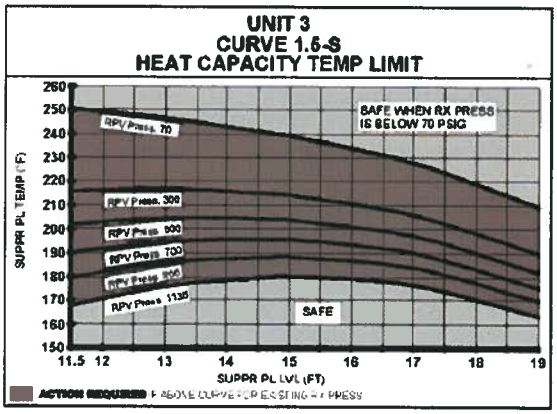
SCRAM FAILURE	REACTOR COOLANT ACTIVITY	
Description	Description	
	1.3-U Reactor coolant activity exceeds 26 µCi/gm dose equivalent I-131 (Technical Specification Limits) as determined by chemistry sample. OPERATING CONDITION ALL	UNUSUAL EVENT
1.2-A NOTE Failure of RPS automatic scram functions to bring the reactor subcritical **AND** Manual scram or ARI (automatic or manual) was successful. OPERATING CONDITION: Mode 1 or 2	1.3-A Reactor coolant activity exceeds 300 µCi/gm dose equivalent Iodine-131 as determined by chemistry sample. OPERATING CONDITION: Mode 1 or 2 or 3	ALERT
1.2-S NOTE Failure of automatic scram, manual scram, and ARI to bring the reactor subcritical. OPERATING CONDITION: Mode 1		SITE EMERGENCY
1.2-G CURVE US Failure of automatic scram, manual scram, and ARI. Reactor power is above 3% **AND** Either of the following conditions exists: • Suppression Pool temp exceeds HCTL. Refer to Curve 1.2-G. • Reactor water level can NOT be restored and maintained at or above -180 inches. OPERATING CONDITION: Mode 1 or 2		GENERAL EMERGENCY

NOTES

CURVES/TABLES:







MSL / OFFGAS RADIATION	LOSS OF DECAY HEAT REMOVAL	
Description	Description	
1.4-U Valid MAIN STEAM LINE RADIATION HIGH-HIGH alarm, 1, 2, or 3-RA-90-135C OR Valid OG PRETREATMENT RADIATION HIGH alarm, 1, 2, or 3-RA-90-157A. OPERATING CONDITION: Mode 1 or 2 or 3		UNUSUAL EVENT
	1.5-A Reactor moderator temperature can NOT be maintained below 212^{0} F whenever Technical Specifications require Mode 4 conditions or during operations in Mode 5. OPERATING CONDITION: Mode 4 or 5	ALERT
	1.5-S CURVE US Suppression Pool temperature, level and RPV pressure can NOT be maintained in the safe area of Curve 1.5-S. OPERATING CONDITION: Mode 1 or 2 or 3	SITE EMERGENCY
		GENERAL EMERGENCY

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RADIOACTIVITY RELEASES 4.0

NOTES

4.1-U Prior to making this emergency classification based upon the WRGERMS indication, assess the release by either of the following:

1. Actual field measurements exceed the limits in table 4.1-U
2. 0-SI 4.8.B.1.a.1 release fraction exceeds 2.0

If neither assessment can be conducted within 60 minutes then the declaration must be made on the valid WRGERMS reading.

4.1-A Prior to making this emergency classification based upon the WRGERMS indication, assess the release by either of the following:

1. Actual field measurements exceed the limits in table 4.1-A
2. 0-SI 4.8.B.1.a.1 release fraction exceeds 200

If neither assessment can be conducted within 15 minutes then the declaration must be made on the valid WRGERMS reading.

4.1-S Prior to making this emergency classification based upon the gaseous release rate indication, assess the release by either of the following methods:

1. Actual field measurements exceed the limits in table 4.1-S.
2. Projected or actual dose assessments exceed 100 mrem TEDE or 500 mrem CDE.

If neither assessment can be conducted within 15 minutes then the declaration must be made based on the valid WRGERMS reading.

4.1-G Prior to making this emergency classification based upon the gaseous release rate indication, assess the release by either of the following methods:

1. Actual field measurements exceed the limits in table 4.1-G.
2. Projected or actual dose assessments exceed 1000 mrem TEDE or 5000 mrem CDE.

If neither assessment can be conducted within 15 minutes then the declaration must be made based on the valid WRGERMS reading.

CURVES/TABLES:

Table 4.1-U
RELEASE LIMITS FOR UNUSUAL EVENT

TYPE	MONITORING METHOD	LIMIT	DURATION
Gaseous Release Rate	Stack Noble Gas (WRGERMS)	2.88×10^{7} µCi/sec	1 Hour
Gaseous Release Rate	0-SI 4.8.B.1.a.1	Release Fraction 2.0	1 Hour
Site Boundary Radiation Reading	Field Assessment Team	0.10 MREM/HR Gamma	1 Hour

Table 4.1-A
RELEASE LIMITS FOR ALERT

TYPE	MONITORING METHOD	LIMIT	DURATION
Gaseous Release Rate	Stack Noble Gas (WRGERMS)	2.88×10^{8} µCi/sec	15 Minutes
Gaseous Release Rate	0-SI 4.8.B.1.a.1	Release Fraction 200	15 Minutes
Site Boundary Radiation Reading	Field Assessment Team	10 MREM/HR Gamma	15 Minutes

Table 4.1-S
RELEASE LIMITS FOR SITE AREA EMERGENCY

TYPE	MONITORING METHOD	LIMIT	DURATION
Gaseous Release Rate	Stack Noble Gas (WRGERMS)	5.9×10^{9} µCi/sec	15 Minutes
Site Boundary Radiation Reading	Field Assessment Team	100 MREM/HR Gamma	1 Hour
Site Boundary Iodine-131	Field Assessment Team	3.9×10^{-7} µCi /cm^{3}	1 Hour

Table 4.1-G
RELEASE LIMITS FOR GENERAL EMERGENCY

TYPE	MONITORING METHOD	LIMIT	DURATION
Gaseous Release Rate	Stack Noble Gas (WRGERMS)	5.9×10^{10} µCi/sec	15 Minutes
Site Boundary Radiation Reading	Field Assessment Team	1000 MREM/HR Gamma	1 Hour
Site Boundary Iodine-131	Field Assessment Team	3.9×10^{-6} µCi / cm^{3}	1 Hour

GASEOUS EFFLUENT

Description	
4.1-U NOTE TABLE Gaseous release exceeds ANY limit and duration in Table 4.1-U. OPERATING CONDITION: ALL	UNUSUAL EVENT
4.1-A NOTE TABLE Gaseous release exceeds ANY limit and duration in Table 4.1-A. OPERATING CONDITION: ALL	ALERT
4.1-S NOTE TABLE EITHER of the following conditions exists: • Gaseous release exceeds or is expected to exceed ANY limit and duration in Table 4.1-S. • Dose assessment indicates actual or projected dose consequences above 100 mrem TEDE or 500 mrem thyroid CDE. OPERATING CONDITION: ALL	SITE EMERGENCY
4.1-G NOTE TABLE EITHER of the following conditions exists: • Gaseous release exceeds or is expected to exceed ANY limit and duration in Table 4.1-G. • Dose assessment indicates actual or projected dose consequences above 1000 mrem TEDE or 5000 mrem thyroid CDE. OPERATING CONDITION ALL	GENERAL EMERGENCY

NOTES

CURVES/TABLES:

MAIN STEAM LINE BREAK	LIQUID EFFLUENT	
Description	Description	
4.2-U Main Steam Line break outside Primary Containment with isolation. OPERATING CONDITION: Mode 1 or 2 or 3	**4.3-U** Liquid release rate exceeds 20 times ECL as determined by chemistry sample AND Release duration exceeds or will exceed 60 minutes. OPERATING CONDITION: ALL	UNUSUAL EVENT
	4.3-A Liquid release rate exceeds 2000 times ECL as determined by chemistry sample AND Release duration exceeds or will exceed 15 minutes. OPERATING CONDITION: ALL	ALERT
4.2-S Unisolable Main Steam Line break outside Primary Containment. OPERATING CONDITION: Mode 1 or 2 or 3		SITE EMERGENCY
		GENERAL EMERGENCY

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LOSS OF POWER
5.0

NOTES

5.1-U Loss of normal and alternate supply voltage implies inability to restore voltage from any qualified source to normal or alternate feeder for at least one of the unit specific boards within 15 minutes. At least two boards must be energized from Diesel power to meet this classification. If only one board can be energized and that board has only one source of power then refer to EAL 5.1-A1 or 5.1-A2.

5.1-A1 Only one source of power (Diesel or Offsite) is available to any one of the listed unit specific 4KV Shutdown Boards. No power is available to the three remaining boards.

5.1-A2 Loss of voltage to all unit specific 4KV Shutdown Boards applies to those boards which normally supply emergency AC power to the affected unit only. Determination of the event classification depends on the affected unit operating mode. For units in operation 5.1-S would apply.

5.1-S Loss of voltage to all unit specific 4KV Shutdown Boards applies to those boards which normally supply emergency AC power to the affected unit only. Determination of the event classification depends on the affected unit operating mode. For units in Shutdown or Refuel 5.1-A2 would apply.

5.1-G Loss of voltage to all unit specific 4KV Shutdown Boards applies to those boards which normally supply emergency AC power to the affected unit only.

CURVES/TABLES:

Table 5.1
UNIT 4KV SHUTDOWN BOARD APPLICABILITY

APPLICABLE UNIT	APPLICABLE 4KV SHUTDOWN BOARDS
UNIT 1	A, B, C, and D
UNIT 2	A, B, C, and D
UNIT 3	3A, 3B, 3C, and 3D

LOSS OF AC POWER

Description	Description	
5.1-U NOTE TABLE US Loss of normal and alternate supply voltage to ALL unit specific 4KV shutdown boards from Table 5.1 for greater than 15 minutes **AND** At least two Diesel Generators supplying power to unit specific 4KV shutdown boards listing in Table 5.1. OPERATING CONDITION: ALL		**UNUSUAL EVENT**
5.1-A1 NOTE TABLE US Loss of voltage to ANY THREE unit specific 4KV shutdown boards from Table 5.1 for greater than 15 minutes **AND** Only ONE source of power available to the remaining board. OPERATING CONDITION: Mode 1 or 2 or 3	**5.1-A2** NOTE TABLE US Loss of voltage to ALL unit specific 4KV shutdown boards from Table 5.1 for greater than 15 minutes. OPERATING CONDITION: Mode 4 or 5 or Defueled	**ALERT**
5.1-S NOTE TABLE US Loss of voltage to ALL unit specific 4KV shutdown boards from Table 5.1 for greater than 15 minutes. OPERATING CONDITION: Mode 1 or 2 or 3		**SITE EMERGENCY**
5.1-G NOTE TABLE US Loss of voltage to ALL unit specific 4KV shutdown boards from Table 5.1 **AND** Either of the following conditions exists; • Restoration of at least one 4KV shutdown board is NOT likely within three hours. • Adequate core cooling can NOT be assured. OPERATING CONDITION: Mode 1 or 2 or 3		**GENERAL EMERGENCY**

NOTES

5.2 250V DC power voltage below 248 volts constitutes a loss of DC power to the affected board. The voltage readings may be obtained at the 250V Shutdown Battery Board (or the 250V Plant Battery Board) that is feeding the affected board.

CURVES/TABLES:

Table 5.2-U
UNIT 4KV SHUTDOWN BOARD APPLICABILITY

APPLICABLE UNIT	APPLICABLE 4KV SHUTDOWN BOARDS
UNIT 1	A, B, C, AND D
UNIT 2	A, B, C, AND D
UNIT 3	3A, 3B, 3C, AND 3D

Table 5.2-S
CRITICAL DC POWER AND ESSENTIAL SYSTEMS

COMBINATION	LOSS OF CRITICAL 250V DC POWER (Unit Specific Unless Otherwise Noted)	POTENTIALLY RESULTS IN
I	Control Power for 4KV Unit Boards A, B, and C **AND** Control Power for 480V Unit Boards A and B **AND** Power for Panel 9-9 Cabinet 1	Loss of Main Condenser **AND** Loss of Both EHC Pumps **AND** Loss of All Reactor Feed Pumps
II	Power for 250V DC RMOV Board A	Loss of HPCI
III	Power for 250V DC RMOV Board C	Loss of RCIC
IV	Power for 250V DC RMOV Boards A, B, and C **AND** Control Power for 4KV Shutdown Boards A, B, C, and D (4KV Shutdown Boards 3A, 3B, 3C, and 3D for Unit 3)	Less than 4 MSRVs **AND** Loss of All RHR Pumps And Core Spray Pumps

LOSS OF 250V DC POWER

Description	Description	
5.2-U NOTE TABLE US Unplanned loss of 250V DC control power to ALL unit specific 4KV shutdown boards from Table 5.2-U for greater than 15 minutes OR Unplanned loss of 250V DC control power to unit specific 480V shutdown boards A and B for greater than 15 minutes. OPERATING CONDITION: Modes 4 or 5		UNUSUAL EVENT
		ALERT
5.2-S NOTE TABLE US Loss of 250V DC power to ALL combinations (I, II, III, and IV) of essential systems from Table 5.2-S for greater than 15 minutes. OPERATING CONDITION: Mode 1 or 2 or 3		SITE EMERGENCY
		GENERAL EMERGENCY

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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. <u>OR</u> One low pressure coolant injection (LPCI) pump in both LPCI subsystems inoperable.	A.1 Restore low pressure ECCS injection/spray subsystem(s) 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.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	12 hours 36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. HPCI System inoperable.	C.1	Verify by administrative means RCIC System is OPERABLE.	Immediately
	AND		
	C.2	Restore HPCI System to OPERABLE status.	14 days
D. HPCI System inoperable. AND Condition A entered.	D.1	Restore HPCI System to OPERABLE status.	72 hours
	OR		
	D.2	Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	72 hours
E. One ADS valve inoperable.	E.1	Restore ADS valve to OPERABLE status.	14 days
F. One ADS valve inoperable. AND Condition A entered.	F.1	Restore ADS valve to OPERABLE status.	72 hours
	OR		
	F.2	Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	72 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
G. Two or more ADS valves inoperable. OR Required Action and associated Completion Time of Condition C, D, E, or F not met.	G.1 AND G.2	Be in MODE 3. Reduce reactor steam dome pressure to ≤ 150 psig.	12 hours 36 hours
H. Two or more low pressure ECCS injection/spray subsystems inoperable for reasons other than Condition A. OR HPCI System and one or more ADS valves inoperable.	H.1	Enter LCO 3.0.3.	Immediately

3.6 CONTAINMENT SYSTEMS

3.6.4.3 Standby Gas Treatment (SGT) System

LCO 3.6.4.3 Three SGT subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During operations with a potential for draining the reactor vessel (OPDRVs).

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SGT subsystem inoperable.	A.1 Restore SGT subsystem to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, or 3.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	12 hours 36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. Required Action and associated Completion Time of Condition A not met during OPDRVs.	C.1	Place two OPERABLE SGT subsystems in operation.	Immediately
	OR		
	C.2	Initiate action to suspend OPDRVs.	Immediately
D. Two or three SGT subsystems inoperable in MODE 1, 2, or 3.	D.1	Enter LCO 3.0.3.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Two or three SGT subsystems inoperable during OPDRVs.	E.1 Initiate action to suspend OPDRVs.	Immediately

TR 3.3 INSTRUMENTATION

TR 3.3.9 Offgas Hydrogen Analyzer Instrumentation

LCO 3.3.9 There shall be at least one OPERABLE Offgas Hydrogen Analyzer instrument with alarm setpoint set to ensure the limit of TRM LCO 3.7.2 is not exceeded.

APPLICABILITY: During main condenser offgas treatment system operation

----------NOTE----------
TRM LCO 3.0.3 is not applicable.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. No OPERABLE Offgas Hydrogen Analyzer instruments.	A.1 Install a temporary monitor	4 hours
	OR	
	A.2.1 Take grab samples	4 hours from discovery of no OPERABLE instrument
	AND	AND
		Every 4 hours thereafter
	A.2.2 Analyze the sample for explosive concentration of hydrogen.	4 hours following grab sample