

2015 NRC Exam RO Written Exam

RO 1

Given:

- Plant is at 100% power
- SG ILR 1111, Steam Generator 1 Downcomer Level, fails high
- Crew has entered OP-901-201, Steam Generator Level Control Malfunction

Upon a reactor trip, Main Feed Pump A speed will reduce automatically. This design feature was added to reduce the differential pressure across the \_\_\_\_\_(1)\_\_\_\_\_ valves. Upon subsequent entry into OP-902-001, Reactor Trip Recovery procedure, the Main Feed Pump A speed controller (FW IHIC1107) will be controlled in the \_\_\_\_\_(2)\_\_\_\_\_ mode.

	(1)	(2)
A.	Main Feed Regulating	automatic
B.	Main Feed Isolation	automatic
C.	Main Feed Regulating	manual
D.	Main Feed Isolation	manual

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RO 2

The plant was at 100% power when Pressurizer Safety Valve, RC-317A, failed open. The crew tripped the reactor and initiated SIAS and CIAS.

The following conditions exist:

- RCS pressure is 1340 psia and stable
- Reactor Coolant Pumps have been secured
- CET is 556°F, Thot is 550°F, Tcold is 543°F (all stable)
- Pressurizer level is 70% and rising
- Quench Tank pressure is 20 psig with the Quench Tank rupture disc intact.
- QSPDS indicates reactor head level 1 voided
- Steam Generator (SG) 1 and 2 pressures are 980 psia and stable
- SG 1 and 2 levels are 60% WR and slowly lowering

The expected temperature indication of the Pressurizer Relief Line is       (1)       °F.

The crew       (2)       throttle close Train B High Pressure Safety Injection flow control valves.

	<u>      (1)      </u>	<u>      (2)      </u>
A.	258	will not
B.	228	will not
C.	258	will
D.	228	will

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RO 3

Given:

- Small Break LOCA has occurred and the crew has diagnosed to OP-902-002, LOCA Recovery Procedure
- Pressurizer pressure is 1690 PSIA and slowly lowering
- Containment pressure is 17.4 psia and slowly rising
- Containment temperature is 210°F

Which of the following ESFAS signal(s) will have been generated?

- A. MSIS only
- B. SIAS and CIAS only
- C. SIAS, CIAS, and MSIS only
- D. SIAS, CIAS, MSIS, and CSAS

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RO 4

Given:

- A LOCA has occurred
- RCS pressure is 100 PSIA
- The crew is performing OP-902-002, Loss of Coolant Accident Recovery
- The following alarms are received on Control Room Cabinet K:
  - K-19, RAS TRAIN A LOGIC INITIATED
  - K-20, RAS TRAIN B LOGIC INITIATED

The crew will verify that Refueling Water Storage Pool level is \_\_\_\_\_ (1) \_\_\_\_\_ percent.

If required, a manual initiation of an RAS can be performed \_\_\_\_\_ (2) \_\_\_\_\_.

- |    | (1) | (2)                               |
|----|-----|-----------------------------------|
| A. | 10  | from the local ESFAS cabinet only |
| B. | 10  | from CP-7 or local ESFAS cabinet  |
| C. | 15  | from the local ESFAS cabinet only |
| D. | 15  | from CP-7 or local ESFAS cabinet  |

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RO 5

Given:

- The reactor was manually tripped due to 1A RCP ARRD High Temperature
- 1A RCP has been secured
- Five minutes later, the ATC reports that the RCP PMC Mimic indicates RCP 1A speed is 600 rpm

OP-901-130, Reactor Coolant Pump Malfunction, provides the guidance to trip the reactor if ARRD temperature exceeds       (1)       °F. Based on the above conditions, the crew will       (2)      .

	<u>      (1)      </u>	<u>      (2)      </u>
A.	225	only continue to monitor RCP 1A for reverse rotation
B.	210	only continue to monitor RCP 1A for reverse rotation
C.	225	remove all reactor coolant pumps from service
D.	210	remove all reactor coolant pumps from service

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RO 6

Given:

- Plant is at 50% power
- A loss of all Charging Pumps has occurred

The crew will verify closed \_\_\_\_ (1) \_\_\_\_ in accordance with \_\_\_\_ (2) \_\_\_\_.

_____ (1)	_____ (2)
A. Letdown Inside Containment Isolation, CVC-103	OP-901-110, Pressurizer Level Control Malfunction
B. Letdown Stop Valve, CVC-101	OP-901-110, Pressurizer Level Control Malfunction
C. Letdown Stop Valve, CVC-101	OP-901-112, Charging or Letdown Malfunction
D. Letdown Inside Containment Isolation, CVC-103	OP-901-112, Charging or Letdown Malfunction

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RO 7

Given:

- The plant is in Mode 5 with Shutdown Cooling Train A in service
- A loss of Instrument Air has occurred
- SI-129A, LPSI Pump A Discharge Flow Control, is not accessible due to plant conditions

The crew will direct the Operator to force closed SI-129A using a (an) \_\_\_\_\_ (1) \_\_\_\_\_ accumulator. Manipulation of the required 3-way valve will be performed \_\_\_\_\_ (2) \_\_\_\_\_.

	(1)	(2)
A.	nitrogen gas	from the -35 hallway outside of Safeguards Room A
B.	instrument air	from the RAB -15 Valve Gallery
C.	instrument air	from the -35 hallway outside of Safeguards Room A
D.	nitrogen gas	from the RAB -15 Valve Gallery

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RO 8

Given:

- CCW Surge Tank Level Switch CC-ILS-7013A failed low
- CC-200A/727, CCW Hdr A TO AB Supply and Return Isolations, failed closed
- CC-134 A, CCW A Dry Cooling Tower Bypass failed open
- CC-135 A, CCW A Dry Cooling Tower Isolation, failed closed
- Both Train A and Train B CC-620, Fuel Pool Heat Exchanger Temperature Control Valve, control switches are in the CONTROL position at CP-8

Based on this level switch failure,

- A. Spent Fuel Pool temperature will rise since CC-620 failed closed.
- B. Spent Fuel Pool temperature will lower since CC-134 A, CCW A Dry Cooling Tower Bypass failed open.
- C. Spent Fuel Pool temperature will rise since CC-135 A, CCW A Dry Cooling Tower Isolation, failed closed.
- D. Spent Fuel Pool temperature is controlled in automatic since the Train B CC-620 control switch is in CONTROL.



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RO 9

Given:

- The plant is at 100% power
- Control Systems are in normal 100% power alignments
- The Pressurizer Pressure Controller, RC-IPIC-0100, output fails HIGH

Assuming no action by the crew, a reactor trip will occur first due to       (1)        
Pressurizer Pressure generated by       (2)      .

	<u>      (1)      </u>	<u>      (2)      </u>
A.	high	PPS
B.	high	CPCs
C.	low	PPS
D.	low	CPCs

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RO 10

Given:

- Reactor power is 1%
- A large steam leak upstream of MSIV B prompts the crew to trip the reactor
- A manual reactor trip using CP-2 pushbuttons was unsuccessful
- The crew tripped the reactor using the Diverse Reactor Trip System (DRTS)
- All CEAs have inserted into the core

The DRTS de-energized CEDM cabinets by opening the MG set \_\_\_\_ (1) \_\_\_\_\_. Boron injection \_\_\_\_ (2) \_\_\_\_\_.

	(1)	(2)
A.	supply breakers	IS required to maintain shutdown margin
B.	supply breakers	IS NOT required because all CEAs have inserted
C.	load contactors	IS required to maintain shutdown margin
D.	load contactors	IS NOT required because all CEAs have inserted

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RO 11

Given:

- A Steam Generator Tube Rupture (SGTR) has occurred in Steam Generator (SG) #2
- The crew has entered OP-902-007, Steam Generator Tube Rupture Recovery Procedure, and has isolated SG #2
- Steam Generator #2 level is 80% NR and is limiting the RCS cooldown
- The CRS directs lowering SG #2 level to 65% NR using back flow to the RCS.
- RCS boron concentration is presently 1210 ppm
- The CRS directs the ATC to calculate final RCS boron concentration for the SG #2 level reduction

Prior to lowering SG#2 level using backflow, the ATC will verify     (1)    . Final RCS boron concentration will be approximately     (2)     ppm.

	(1)		(2)
A. natural circulation conditions are being met			1101
B. at least one RCP is running			907
C. at least one RCP is running			1101
D. natural circulation conditions are being met			907

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RO 12

An Excess Steam Demand event is in progress and OP-902-004, Excess Steam Demand Recovery is being implemented.

- RCS Subcool Margin 80°F and stable
- SG 1 pressure is 540 psia and lowering
- SG 2 pressure is 670 psia and stable
- SG 1 level 45% WR and lowering
- SG 2 level 60% WR and lowering slowly
- Containment Pressure 25 psia and rising
- Containment Spray Pump A is tagged out with CS-125A gagged shut
- Containment Spray Header B flow is 1000 gpm
- CVC-101, Letdown Stop Valve, is stuck open
- EFW-228A, Emergency Feedwater Isolation SG 1 Primary is tagged closed
- All other systems and components are operating as designed

Based on this, which Safety Function is **NOT** being met?

- A. RCS Pressure Control
- B. RCS Heat Removal
- C. Containment Isolation
- D. Containment Temperature and Pressure Control

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RO 13

Given:

- A Loss of all Main Feedwater has occurred
- The crew has entered OP-902-006, Loss of Main Feedwater Recovery Procedure
- EFW Pump AB is the only EFW pump available

The crew will secure     (1)    . The reason for this response is to     (2)    .

- | (1)                                      | (2)  |
|--|--|
| A. one Reactor Coolant Pump in each loop | reduce heat input into the RCS               |
| B. one Reactor Coolant Pump in each loop | prevent operating RCPs without adequate NPSH |
| C. all Reactor Coolant Pumps             | reduce heat input into the RCS               |
| D. all Reactor Coolant Pumps             | prevent operating RCPs without adequate NPSH |

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RO 14

Given:

- A Station Blackout has occurred.
- The CRS has directed the BOP to restore EDG A to service in accordance with Attachment 23-A, EDG A restoration during SBO.

The minimum requirement for a single start attempt of Emergency Diesel Generator (EDG) A is \_\_\_\_\_(1)\_\_\_\_\_ psig in \_\_\_\_\_(2)\_\_\_\_\_ EDG A Air receiver(s).

	(1)	(2)
A.	125	both
B.	125	one
C.	250	both
D.	250	one

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RO 15

Given:

- A Loss of Offsite Power has occurred 30 minutes ago
- The crew has entered OP-902-003, Loss of Offsite Power Recovery Procedure
- RCS pressure is 1725 psia and slowly rising
- Thot is 595°F and constant
- CET temperature is 600°F and constant
- Tcold is 590°F and constant

The present subcooling margin is       (1)       °F. The crew will verify the operating loop steam generator pressure is approximately equal to saturation pressure for the existing       (2)      .

	<u>      (1)      </u>	<u>      (2)      </u>
A.	15	Thot
B.	15	Tcold
C.	20	Tcold
D.	20	Thot

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RO 16

Given:

- A Loss of all Offsite Power has occurred
- The crew has entered OP-902-003, Loss of Offsite Power/Loss of Forced Circulation Recovery Procedure

The CRS has directed the auxiliary operator to secure TGB loads in accordance with Attachment 33 of OP-902-009, Standard Appendices.

With no turbine building battery chargers energized and no operator action, the maximum discharge time for the turbine building battery is     (1)     minutes. Securing TGB loads will preserve the remote operation of the     (2)     bus feeder breakers.

	<u>    (1)    </u>	<u>    (2)    </u>
A.	30	2
B.	30	1
C.	90	1
D.	90	2



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RO 17

Given:

- Power is 100%
- A level switch malfunction has caused the B Dry Cooling Tower to isolate and bypass.
- The Control Room has entered OP-901-510, Component Cooling Water (CCW) System Malfunction

A Loss of Coolant Accident occurs. Plant conditions are:

- Pressurizer pressure is 1600 psia and slowly lowering
- Containment pressure is 17.3 psia and stable
- CCW heat exchanger B outlet temperature is 105 °F

If ACCW basin temperature is 80 °F, ACC-126B, ACC Hdr B CCW HX Outlet Temp Control valve, will be       (1)       . This occurs to       (2)       .

	<u>      (1)      </u>	<u>      (2)      </u>
A.	open	conserve ultimate heat sink water supply
B.	closed	conserve ultimate heat sink water supply
C.	open	ensure proper component cooling in the Wet mode
D.	closed	ensure proper component cooling in the Wet mode

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RO 18

Given:

- Power is 100%
- Main Generator load is 1200 MW; 200 MVAR out
- Pine Bluff System Operations Center informed the control room that grid parameters are outside of the prescribed operating range
- The crew has entered OP-901-314, Degraded Grid Conditions and TRM 3.8.1.1 due to predicted post-trip offsite AC circuit voltage < 223KV

The concern with a degraded grid (low voltage) is \_\_\_\_\_ (1) \_\_\_\_\_.

To help stabilize the grid, the CRS orders raising main generator voltage. The BOP will \_\_\_\_\_ (2) \_\_\_\_\_ reactive load (MVARs).

- | _____ (1) _____  | _____ (2) _____ |
|--|-----------------|
| A. degraded voltage relay<br>reliability on the safety bus | raise           |
| B. degraded voltage relay<br>reliability on the safety bus | lower           |
| C. emergency core cooling<br>system motor overheating      | raise           |
| D. emergency core cooling<br>system motor overheating      | lower           |

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RO 19

Given:

- Reactor Power is 10% with power ascension in progress
- Reg Group 6 is being withdrawn manually in Manual Group mode to raise power to 15%
- The ATC releases the IN-HOLD-OUT switch at 135" and Reg Group 6 CEA# 20 continues outward movement. The remaining Reg Group 6 CEAs indicate 135"

The operator will FIRST \_\_\_\_ (1) \_\_\_\_ . If CEA 20 has stopped outward motion at 143" the crew will be required to \_\_\_\_ (2) \_\_\_\_ in accordance with the guidance in OP-901-102, CEA or CEDMCS Malfunction.

_____ (1)	_____ (2)
A. place CEDMCS mode select switch to OFF	go to section E1, CEA misalignment greater than 7 inches
B. remove the Group Select switch from the Reg Group 6 position	go to section E1, CEA misalignment greater than 7 inches
C. remove the Group Select switch from the Reg Group 6 position	align CEAs to comply with TS 3.1.3.6, Regulating and Group P CEA Insertion limits
D. place CEDMCS mode select switch to OFF	align CEAs to comply with TS 3.1.3.6, Regulating and Group P CEA Insertion limits

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RO 20

Given:

- The plant is at 55% power performing a power ascension
- Group P is at 140 INCHES for ASI control
- At 0335 Group P Control Element Assembly (CEA) 35 slips to 125"
- Power is stabilized at 55%
- The crew implements OP-901-102, CEA or CEDMCS Malfunction
- Attempts to move the CEA are unsuccessful, CEA 35 is declared INOPERABLE
- At 0420
  - Malfunctioning Automatic Control Timing Module (ACTM) card is replaced and
  - CEA 35 was realigned to 140" and CEA 35 is declared OPERABLE

The earliest that the crew can re-commence the power ascension is \_\_\_\_\_(1)\_\_\_\_\_ to \_\_\_\_\_(2)\_\_\_\_\_.

- |                 |  |
|-----------------|--|
| _____ (1) _____ | _____ (2) _____                              |
| A. 0535         | minimize the effects of Xenon redistribution |
| B. 0535         | allow for clad relaxation                    |
| C. 0620         | minimize the effects of Xenon redistribution |
| D. 0620         | allow for clad relaxation                    |

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RO 21

Given:

- Reactor Power is  $5.5 \times 10^{-8}$
- ENI Log Channel C has failed hi

Startup Channel high voltage is automatically removed when power exceeds approximately       (1)      %. To restore High Voltage power to Startup Channel       (2)      , the HV Control Switch in the Startup Channel drawer will be selected to Alternate.

	<u>      (1)      </u>	<u>      (2)      </u>
A.	$1.0 \times 10^{-4}$	2
B.	$1.0 \times 10^{-4}$	1
C.	$5.3 \times 10^{-6}$	1
D.	$5.3 \times 10^{-6}$	2

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RO 22

Given:

- The plant is in MODE 6 with fuel shuffle in progress in both the Fuel Handling Building and Containment
- Containment Purge is in the Refueling Mode
- Containment equipment hatch and airlock doors are closed and no containment penetrations are impaired
- A fuel bundle is dropped from the Refueling Machine Fuel Hoist
- The crew has entered OP-901-405, Fuel Handling Incident

Which of the following radiation monitors will automatically terminate the radioactive gas release to the environment?

- A. Containment Atmosphere Hi Range Area Radiation Monitor, ARM-IRE-5400AS
- B. Containment Purge Area Radiation Monitor, ARM-IRE-5024
- C. Refueling Machine Area Radiation Monitor, ARM-IRE-5013
- D. Containment PIG Process Radiation Monitor, PRM-IRE-0100S

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RO 23

Given:

- A cooldown is being performed to MODE 5 per OP-901-202, Steam Generator Tube Leakage or High Activity due to a leak on SG 2
- All RCPs are secured
- CET Temp is 382 °F
- $T_{HOT}$  Loop1 is 375 °F
- $T_{HOT}$  Loop2 is 378 °F
- $T_{COLD}$  Loop 1 is 350 °F
- $T_{COLD}$  Loop 2 is 382 °F
- The CRS has placed a lower limit of 30°F on Subcool Margin

Determine the minimum value of RCS pressure that supports the requested RCS Subcool Margin.

- A. 196 psia
- B. 262 psia
- C. 270 psia
- D. 283 psia

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RO 24

During a LOCA or Steam Line Break in Containment, the \_\_\_\_\_(1)\_\_\_\_\_ Radiation Monitor(s) will read erroneously \_\_\_\_\_(2)\_\_\_\_\_ while Containment temperature is rising.

- |    | (1)                    | (2)  |
|----|------------------------|------|
| A. | Containment PIG        | low  |
| B. | Containment PIG        | high |
| C. | Containment High Range | low  |
| D. | Containment High Range | high |



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RO 25

Given:

- Power is 100%
- A special test of the Control Room Envelope has inadvertently rendered continued operation from the Control Room impossible
- The CRS enters OP-901-502, Evacuation of Control Room & Subsequent Plant Shutdown

Plant cooldown will be controlled using the \_\_\_\_ (1) \_\_\_\_\_. Per OP-901-502 Attachment 14, Reliable Instrumentation, reliable indication of Steam Generator pressure can be read on \_\_\_\_ (2) \_\_\_\_\_.

_____ (1) _____	_____ (2) _____
A. atmospheric dump valves	both trains
B. steam bypass control system	both trains
C. atmospheric dump valves	train B only
D. steam bypass control system	train B only

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RO 26

Which ONE of the following conditions will result in a Loss of Containment Integrity per Technical Specification while operating in MODE 1?

- A. One of two normally open redundant containment isolation valves has failed in the CLOSE position with power removed.
- B. A mechanic props OPEN the Personnel Airlock outer door to perform corrective maintenance on an inoperable inner door.
- C. A blank flange was installed in place of a containment isolation valve which had failed its surveillance test.
- D. A manual isolation valve is CLOSED to isolate a penetration where an electrician had disconnected the auto-close feature for a containment isolation valve.

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RO 27

Given:

- Plant is at 100% power
- The crew has entered OP-901-111, Reactor Coolant System Leak
- RCS Tavg is 575 degrees and steady
- Charging Pump A is running
- Pressurizer level is 55% and slowly lowering
- The Standby Charging Pumps selector switch is selected to the B-AB position

To allow for a more accurate leak rate determination, the CRS will direct the ATC to \_\_\_\_\_ (1) \_\_\_\_\_.

The ATC will determine an RCS leak rate by subtracting the total of \_\_\_\_\_ (2) \_\_\_\_\_.

_____ (1) _____	_____ (2) _____
A. place Charging Pump B control switch to the ON position	Charging flow and RCP CBO flow from Letdown flow
B. place the Letdown Flow controller to manual	Charging flow and RCP CBO flow from Letdown flow
C. place the Letdown Flow controller to manual	Letdown flow and RCP CBO flow from Charging flow
D. place Charging Pump B control switch to the ON position	Letdown flow and RCP CBO flow from Charging flow

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RO 28

Given:

- The reactor is operating at 100% power
- At 0100 RCP 1A Lower Seal fails and Controlled Bleedoff flow rises to 2.5 GPM
- OP-901-130, Reactor Coolant Pump Malfunction is implemented and the plant remains at 100% power
- At 0530 RCP 1A Middle Seal fails
- RCP 1A Controlled Bleedoff flow went out of range high and then went to 0 GPM

RCP 1A Controlled Bleedoff flow went low due to closure of \_\_\_\_\_ (1) \_\_\_\_\_.  
The crew should \_\_\_\_\_ (2) \_\_\_\_\_ and secure RCP 1A.

(1)	(2)
A. a RCP Controlled Bleedoff Containment Isolation Valve	perform a shutdown to MODE 3 per OP-010-005, Plant Shutdown
B. a RCP Controlled Bleedoff Containment Isolation Valve	manually trip the reactor and perform Standard Post Trip Actions
C. the check valve on RCP 1A Controlled Bleedoff line	perform a shutdown to MODE 3 per OP-010-005, Plant Shutdown
D. the check valve on RCP 1A Controlled Bleedoff line	manually trip the reactor and perform Standard Post Trip Actions

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RO 29

Given:

- The reactor was at 100% power
- RCP 1A trips on overcurrent

  (1)   RCP 1A Lift Oil Pump(s) started when RCP 1A   (2)  .

- |    | <u>  (1)  </u> | <u>  (2)  </u>           |
|----|----------------|--------------------------|
| A. | One            | load breaker opened      |
| B. | Both           | load breaker opened      |
| C. | One            | speed lowered to 600 RPM |
| D. | Both           | speed lowered to 600 RPM |

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RO 30

Given:

- Power is 100%
- A grid transient causes turbine load to lower by 10%

As a result of this transient, RCS temperature will \_\_\_\_\_(1)\_\_\_\_\_ and the Letdown Backpressure control valve will \_\_\_\_\_(2)\_\_\_\_\_.

- |    | <u>          (1)          </u> | <u>          (2)          </u> |
|----|--------------------------------|--------------------------------|
| A. | lower                          | open                           |
| B. | lower                          | close                          |
| C. | rise                           | open                           |
| D. | rise                           | close                          |

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RO 31

Given:

- The plant is in Mode 4
- Shutdown Cooling Train A is in service
- RCS temperature is 204°F and steady
- Component Cooling Water temperature is dropping through the night as ambient temperature drops

To prevent entry into Mode 5, the SDC Train A Temperature Control Valve (SI-415A) must be throttled       (1)      . This will result in the SDC Train A Flow Control Valve (SI-129A) automatically throttling       (2)      .

- |    | <u>      (1)      </u> | <u>      (2)      </u> |
|----|------------------------|------------------------|
| A. | open                   | open                   |
| B. | open                   | closed                 |
| C. | closed                 | closed                 |
| D. | closed                 | open                   |

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RO 32

What is the power supply to SI-138 A, LPSI Header to RC Loop 2B Control Isolation?

- A. Bus 213 A
- B. Bus 311 A
- C. Bus 314 A
- D. Bus 315 A



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RO 33

Given:

- A Loss Of Cooling Accident is in progress
- Reactor Coolant System (RCS) pressure is 200 PSIA
- High Pressure Safety Injection Pump B trips shortly after starting
- All other equipment functions as designed

The minimum required Safety Injection flow for High Pressure Safety Injection is     (1)     and     (2)     is required for Low Pressure Safety Injection.

	<u>                    (1)                    </u>	<u>                    (2)                    </u>
A.	>185 GPM total flow to the cold legs	no flow
B.	>185 GPM total flow to the cold legs	>185 GPM flow to loop 2 cold legs
C.	>185 GPM to each cold leg	no flow
D.	>185 GPM to each cold leg	>185 GPM flow to loop 2 cold legs

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RO 34

A Steam Generator Tube Rupture has occurred that resulted in an automatic SIAS/CIAS.

Realignment of \_\_\_\_ (1) \_\_\_\_ could result in a Quench Tank Rupture Disc failure. Upon the rupture disc failure, the ATC will expect containment pressure to \_\_\_\_ (1) \_\_\_\_.

- |    | (1)                     | (2)           |
|----|-------------------------|---------------|
| A. | RCP Control Bleedoff    | rise          |
| B. | RCP Vapor Seal Leak Off | be unaffected |
| C. | RCP Control Bleedoff    | be unaffected |
| D. | RCP Vapor Seal Leak Off | rise          |

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RO 35

Given:

- Power is 100%
- CCW Pump A has tripped with CCW Pump AB OOS

Which of the following actions is performed to protect CCW Pump B from runout conditions?

- A. Split out the A and B CCW headers
- B. Close the NNS loop isolations
- C. Secure Train B Containment Fan Coolers
- D. Align Chiller B Cooling to the Wet Tower

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RO 36

Given:

- Plant is at 100% power
- The ATC reports that the Pressurizer Spray Valve, RC-301A, has failed open

The output of the Pressurizer Pressure controller (RC-IPIC-0100) will   (1)   and the Pressurizer back-up heaters are designed to automatically energize at an RCS pressure of   (2)   psia.

- |    | <u>  (1)  </u> | <u>  (2)  </u> |
|----|----------------|----------------|
| A. | lower          | 2225           |
| B. | lower          | 2200           |
| C. | rise           | 2200           |
| D. | rise           | 2225           |

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RO 37

Given:

- The plant is at 100% power
- A loss of SUPS MD occurs

Reactor Trip Switchgear breakers \_\_\_\_\_ (1) \_\_\_\_\_ open and a reactor trip \_\_\_\_\_ (2) \_\_\_\_\_.

- |    | (1)            | (2)            |
|----|----------------|----------------|
| A. | 3, 4, 7, and 8 | occurs         |
| B. | 3, 4, 7, and 8 | does not occur |
| C. | 1, 2, 5, and 6 | occurs         |
| D. | 1, 2, 5, and 6 | does not occur |

2015 NRC Exam RO Written Exam

RO 38

Given:

- Plant is at 90% power
- Reactor Cutback is in service

CRS entered OP-901-201, Steam Generator (SG) level control malfunction due to a problem with SG level control. The following alarms are present in the Control Room:

- SG1 STEAM/FW FLOW SIGNAL DEV
- SG2 STEAM/FW FLOW SIGNAL DEV
- SG1 LEVEL HI/LO
- SG2 LEVEL HI/LO
- FWPT A FLOW LO
- SG1 LEVEL LO PRETRIP A/C
- SG1 LEVEL LO PRETRIP B/D

SG1 level is 26% NR on all indications and stable. SG2 level is 30% NR on all indications and stable. The operator reports FWPT A speed is 3900 rpm and FWPT B speed is 5200 rpm.

The crew will prioritize the \_\_\_\_\_ (1) \_\_\_\_\_ alarm(s) and take action to \_\_\_\_\_ (2) \_\_\_\_\_.

- | _____ (1) _____         | _____ (2) _____           |
|-------------------------|---------------------------|
| A. SG1 LEVEL LO PRETRIP | manually trip FWPT A      |
| B. FWPT A FLOW LO       | manually trip FWPT A      |
| C. SG1 LEVEL LO PRETRIP | manually trip the reactor |
| D. FWPT A FLOW LO       | manually trip the reactor |

2015 NRC Exam RO Written Exam

RO 39

Manual actuation of a Containment Spray Actuation Signal (CSAS) from the Control Room requires \_\_\_\_\_ (1) \_\_\_\_\_ two of the four ESFAS channels and will start \_\_\_\_\_ (2) \_\_\_\_\_ train(s) of Containment Spray.

- |    | <u>                  (1)                  </u> | <u>                  (2)                  </u> |
|----|--|--|
| A. | a specific                                     | one  |
| B. | a specific                                     | both   |
| C. | any  | one  |
| D. | any  | both   |

**2015 NRC Exam RO Written Exam**

RO 40

Given:

- Plant has experienced an Excess Steam Demand event
- RCS Pressure is 1750 PSIA
- Containment Pressure is 16.9 PSIA
- Steam Generator 1 pressure is 650 PSIA
- Steam Generator 2 pressure is 600 PSIA
- Steam Generator #1 level is 5% NR and dropping
- Steam Generator #2 level is 4% NR and dropping

What is the current status of EFAS 1 and EFAS 2?

- A. Only EFAS 1 is initiated
- B. Only EFAS 2 is initiated
- C. Both EFAS 1 and EFAS 2 are initiated
- D. Neither EFAS 1 nor EFAS 2 are initiated



2015 NRC Exam RO Written Exam

RO 41

Given:

- The plant is operating at 100% power
- A LOCA occurs
- Containment pressure is 17.3 PSIA and rising
- Pressurizer pressure is 1700 PSIA and lowering

The containment fan coolers will be operating in \_\_\_\_\_(1)\_\_\_\_\_ speed. Containment Fan Cooler discharge will be to the containment cooling \_\_\_\_\_(2)\_\_\_\_\_.

- |    | (1)  | (2)                      |
|----|------|--------------------------|
| A. | slow | system ring header       |
| B. | slow | safety discharge dampers |
| C. | fast | safety discharge dampers |
| D. | fast | system ring header       |

2015 NRC Exam RO Written Exam

RO 42

Following a valid CSAS signal, the minimum operator actions required to close CS-125A, Containment Spray Header A Isolation valve, is to take the \_\_\_\_\_ to CLOSED.

- A. CP-8 control switch for CS 125A
- B. CP-8 control switch for CS 125A to OPEN, then back
- C. Keyswitch, CS-125A Override, to OVERRIDE, then take the CP-8 control switch for CS 125A
- D. Keyswitch, CS-125A Override, to OVERRIDE, then take the CP-8 control switch for CS 125A to OPEN, then back

2015 NRC Exam RO Written Exam

RO 43

Given:

- Reactor Coolant System Tcold is 500°F and lowering
- Reactor Coolant Pumps 1B and 2B are running
- 15 minutes ago the Reactor Coolant System Tc was 515°F when a controlled cool down was established
- The cool down is being controlled using MS-319A, Main Steam Bypass 1A, at 15% open

IF MS-319A failed open, the maximum allowed cool down rate of (1) which protects the (2) under all conditions, would be exceeded.

- |    | <u>(1)</u> | <u>(2)</u>   |
|----|------------|--|
| A. | 100°F/Hr   | most limiting component in Reactor Coolant System                      |
| B. | 60°F/Hr    | SG tube sheet from cyclic stress, which is the most limiting component |
| C. | 100°F/Hr   | SG tube sheet from cyclic stress, which is the most limiting component |
| D. | 60°F/Hr    | most limiting component in Reactor Coolant System                      |

2015 NRC Exam RO Written Exam

RO 44

Given:

- The plant is at 42% power
- Condensate Pumps A, B and C are in operation
- Both Main Feedwater Pumps are operating

Condensate Pumps A and B trip.

The Main Feedwater Pump Turbine Condensate Pump Interlock will trip Main Feedwater Pump \_\_\_\_\_(1)\_\_\_\_\_. This trip is active if the Main Feedwater Pump Turbine High Pressure (HP) governor valves are \_\_\_\_\_(2)\_\_\_\_\_.

	(1)	(2)
A.	A	<u>not</u> fully closed
B.	A	fully closed
C.	B	fully closed
D.	B	<u>not</u> fully closed

2015 NRC Exam RO Written Exam

RO 45

Given:

- The plant has a experienced a Loss of Main Feedwater Event
- An EFAS-1 has occurred
- Steam Generator #1 level is 40% WR and dropping
- Steam Generator #1 EFW flow transmitter has failed high

The Steam Generator #1 Primary Flow Control Valve is \_\_\_\_\_ (1) \_\_\_\_\_. The Steam Generator #1 Backup Flow Control Valve is \_\_\_\_\_ (2) \_\_\_\_\_.

- |    |                                 |                            |
|----|---------------------------------|----------------------------|
| A. | _____ (1) _____                 | _____ (2) _____            |
|    | closed                          | open to 400 gpm flow value |
| B. | closed                          | closed                     |
| C. | open to a preset valve position | closed                     |
| D. | open to a preset valve position | open to 400 gpm flow value |

2015 NRC Exam RO Written Exam

RO 46

Given:

- Power is 100%
- CEDMCS Motor Generator Tie Breaker (TCB 9) is removed for maintenance

An equipment problem caused an overcurrent condition on the 3A-to-2A bus tie (BT). Overcurrent on the bus tie will trip the \_\_\_\_\_ (1) \_\_\_\_\_. The crew will enter \_\_\_\_\_ (2) \_\_\_\_\_ to mitigate the event.

(1)	(2)
A. 3A-to-2A BT breaker only	OP-901-310, Loss of Train A Safety Bus <u>and</u> OP-902-000, Standard Post Trip Actions concurrently
B. 3A-to-2A BT breaker only	OP-901-310, Loss of Train A Safety Bus only
C. 3A-to-2A <u>and</u> the 2A-to-3A BT breakers	OP-901-310, Loss of Train A Safety Bus <u>and</u> OP-902-000, Standard Post Trip Actions concurrently
D. 3A-to-2A <u>and</u> the 2A-to-3A BT breakers	OP-901-310, Loss of Train A Safety Bus only

## 2015 NRC Exam RO Written Exam

RO 47

Given:

- Power is 100%
- W3 System Engineer and Transmission & Distribution workers are investigating an alarm in the 230KV yard

The Control receives annunciator “EDG B FUEL OIL XFER PUMP POWER LOST” due to Emergency Diesel Generator B fuel oil transfer pump breaker tripping on overcurrent.

Both 230KV West Bus Feeder breakers trip. Both 230KV East Bus Feeder breakers remain closed.

Select the correct statement:

- A. Emergency Diesel Generator B is inoperable and both Offsite Trains remain operable.
- B. Emergency Diesel Generator B is inoperable and both Offsite Trains are inoperable.
- C. Emergency Diesel Generator B remains operable and both Offsite Trains are inoperable.
- D. Emergency Diesel Generator B remains operable and both Offsite Trains remain operable.

2015 NRC Exam RO Written Exam

RO 48

Given:

- Emergency Diesel Generator 'A' is running loaded
- A loss of the 125VDC A Bus occurs

Which of the following describes the effect of the loss of DC control power on the EDG and its auxiliaries?

- A. The EDG must be secured locally by pulling the overspeed trip.
- B. The EDG CCW flow control valve, CC-413A, will fail full open.
- C. Fuel oil transfer pump starts and must be secured to prevent overfilling the feed tank.
- D. Jacket cooling water valves fail open and the jacket water heater loses power.



2015 NRC Exam RO Written Exam

RO 49

Given:

- EDG B is being synchronized to the grid in accordance with OP-009-002, Emergency Diesel Generator, for a retest following maintenance
- The synchroscope is slowly rotating in the counter-clockwise (Slow) direction.
- EDG voltage is approximately 10 volts lower than Bus voltage

IF the EDG output breaker is closed under these conditions, the potential effect of an (a) \_\_\_\_\_ (1) \_\_\_\_\_ trip exists.

Taking action to raise EDG \_\_\_\_\_ (2) \_\_\_\_\_ PRIOR to closing the EDG output breaker will prevent the effect.

- |    | (1)           | (2)       |
|----|---------------|-----------|
| A. | overcurrent   | frequency |
| B. | overcurrent   | voltage   |
| C. | reverse power | frequency |
| D. | reverse power | voltage   |

2015 NRC Exam RO Written Exam

RO 50

Given:

- The crew is performing OP-903-068, Emergency Diesel Generator Operability and Subgroup Relay Operability Verification, for Emergency Diesel Generator B
- The crew has started Emergency Diesel Generator B in accordance with OP-009-002, Emergency Diesel Generator

OP-009-002 Attachment 11.8, Emergency Diesel Generator Start Evaluation, states that a successful start of Emergency Diesel Generator is defined as required voltage and frequency is \_\_\_\_\_ (1) \_\_\_\_\_ within \_\_\_\_\_ (2) \_\_\_\_\_ of taking the EDG B control switch to start.

	(1)	(2)
A.	attained	5 seconds
B.	stabilized	5 seconds
C.	stabilized	10 seconds
D.	attained	10 seconds

## 2015 NRC Exam RO Written Exam

RO 51

Given:

- The plant is at 40% power
- Blowdown discharge to Circ Water is in progress
- BD-303, Blowdown to Circ Water and Metal Waste Pond Isolation Valve, closes

Which ONE of the following can cause the valve to close?

- A. High radiation on the Blowdown Radiation Monitor
- B. High Radiation on the Circ Water Radiation Monitor
- C. Trip of the running Blowdown Pump
- D. Hi pH alarm on Blowdown Proportional Sampler

2015 NRC Exam RO Written Exam

RO 52

Given:

- The crew is preparing to discharge Waste Condensate Tank A to Circ Water per OP-007-004, Liquid Waste Management System

The crew can perform a source check for LWM Radiation Monitor, PRM-IRE-0647 from \_\_\_\_\_(1)\_\_\_\_\_. A successful source check will result in a \_\_\_\_\_(2)\_\_\_\_\_ for the channel under test.

- | _____ (1) _____                          | _____ (2) _____   |
|--|-------------------|
| A. RM-11 at CP-6 only                    | green light       |
| B. RM-11 at CP-6 or locally at the RM-80 | green light       |
| C. RM-11 at CP-6 or locally at the RM-80 | medium blue light |
| D. RM-11 at CP-6 only                    | medium blue light |

**2015 NRC Exam RO Written Exam**

RO 53

Which of the following conditions on the associated loop will send an automatic start signal to ACCW Pump A?

- A. Low ACCW system pressure
- B. High ACCW system temperature
- C. Dry Cooling Tower A bypass opens
- D. Low Component Cooling Water flow

2015 NRC Exam RO Written Exam

RO 54

Given:

- Instrument Air Header pressure has lowered to 100 psig due to a leak
- SA-125, Station Air Backup Supply for IA Press Cntl valve, is at its normal setpoint

SA-125 is \_\_\_\_\_ (1) \_\_\_\_\_. The remote instrument air pressure gauge (IA-IPI-9700) is located on \_\_\_\_\_ (2) \_\_\_\_\_.

- |    | <u>          (1)          </u> | <u>          (2)          </u> |
|----|--------------------------------|--------------------------------|
| A. | open                           | CP-18                          |
| B. | closed                         | CP-1                           |
| C. | open                           | CP-1                           |
| D. | closed                         | CP-18                          |

2015 NRC Exam RO Written Exam

RO 55

A plant trip and SIAS have occurred due to low Pressurizer pressure.

What is the designed range of Containment Annulus to ambient differential pressure in inches of water?

- A. -3.0 to -8.0
- B. +2.0 to -8.0
- C. -3.0 to -10.0
- D. +2.0 to -10.0

2015 NRC Exam RO Written Exam

RO 56

Which ONE of the following alarms would be the **FIRST** indication of a leaking Pressurizer Safety Valve?

- A. Pressurizer Level High/Low
- B. Containment Water Leakage High
- C. Quench Tank Temperature High
- D. Reactor Drain Tank Level High/Low



2015 NRC Exam RO Written Exam

RO 57

Given:

- Plant is operating at 100% power
- TAVG LOOP SELECTOR switches in RRS Cabinets 1 and 2 are in the BOTH position
- RCS temperature Loop 1 Hot Leg (RC-ITI-0111-X) indicates failed low

Letdown flow will initially \_\_\_\_ (1) \_\_\_\_ . Pressurizer heaters will \_\_\_\_ (2) \_\_\_\_ .

- |    | (1)   | (2)         |
|----|-------|-------------|
| A. | lower | de-energize |
| B. | lower | energize    |
| C. | rise  | energize    |
| D. | rise  | de-energize |

2015 NRC Exam RO Written Exam

RO 58

Given:

- A plant Startup to Mode 1 is in progress in accordance with OP-010-003, Plant Startup
- Reactor power is  $10^{-4}$  % power and rising
- The LOGARITHMIC PWR HI BY-PASS annunciator is received

The crew will \_\_\_\_\_ (1) \_\_\_\_\_ on all four PPS Channels prior to exceeding \_\_\_\_\_ (2) \_\_\_\_\_ % power or a reactor trip will occur.

	(1)	(2)
A. verify the High Log power trip is automatically bypassed		1.0
B. manually bypass the High Log power trip		1.0
C. manually bypass the High Log power trip		0.257
D. verify the High Log power trip is automatically bypassed		0.257

## 2015 NRC Exam RO Written Exam

RO 59

Given:

- A LOCA has occurred
- The crew is performing OP-902-002, Loss of Coolant Accident Recovery

Which ONE of the following describes the sequence of actions required to place a Hydrogen Analyzer in service, and the hydrogen concentration indicated when the containment atmosphere reaches the minimum flammable limit?

- A. Open the H2 Analyzer containment isolation valve, then turn the power switch ON; 4%.
- B. Place the power switch ON, then open the H2 Analyzer containment isolation valve; 3%.
- C. Open the H2 Analyzer containment isolation valve, then turn the power switch ON; 3%.
- D. Place the power switch ON, then open the H2 Analyzer containment isolation valve; 4%.

2015 NRC Exam RO Written Exam

RO 60

Given:

- Plant is at 55% power
- Steam Generator Feed Pump (SGFP) B has been started in accordance with OP-003-033, Main Feedwater
- Local speed balance meter is balanced and local controls are in Auto
- Steam Generator Feed Pump B speed is 3900 rpm and the red light on the Speed Governor Control Switch for Main Feed Pump B is illuminated
- The CRS has directed the BOP to align SGFP B for automatic operation

The BOP will manually adjust SGFP B speed using the \_\_\_\_\_(1)\_\_\_\_\_ .

Before placing SGFP B speed controller in auto on CP-1, SGFP B speed controller output will be adjusted to match \_\_\_\_\_(2)\_\_\_\_\_ to assure minimal feedwater flow perturbation.

- | _____ (1) _____                  | _____ (2) _____                |
|----------------------------------|--------------------------------|
| A. speed controller M/A station  | SGFP A speed controller output |
| B. speed governor control switch | SGFP A speed controller output |
| C. speed controller M/A station  | SGFP B speed controller input  |
| D. speed governor control switch | SGFP B speed controller input  |

2015 NRC Exam RO Written Exam

RO 61

RCS Reference Temperature (Tref) signal is generated in the \_\_\_\_\_(1)\_\_\_\_\_ system as a function of the \_\_\_\_\_(2)\_\_\_\_\_ input.

- | _____ (1) _____         | _____ (2) _____                      |
|-------------------------|--------------------------------------|
| A. Reactor Regulating   | Turbine First Stage pressure         |
| B. Steam Bypass Control | Turbine First Stage pressure         |
| C. Reactor Regulating   | Main Steam Crossover Header pressure |
| D. Steam Bypass Control | Main Steam Crossover Header pressure |

2015 NRC Exam RO Written Exam

RO 62

OP-003-001, Condenser Air Evacuation System, requires Condenser Vacuum Pumps       (1)       be operating to provide a suction path for the       (2)      

- |    | <u>      (1)      </u> | <u>      (2)      </u>                                  |
|----|------------------------|---|
| A. | A or B                 | Condenser Air Evacuation WRGM (PRM-IRE-0002)            |
| B. | A or B                 | Condenser Air Evacuation PIG Rad Monitor (PRM-IRE-0004) |
| C. | B or C                 | Condenser Air Evacuation WRGM (PRM-IRE-0002)            |
| D. | B or C                 | Condenser Air Evacuation PIG Rad Monitor (PRM-IRE-0004) |

2015 NRC Exam RO Written Exam

RO 63

In Modes 1 and 2, the Transient Insertion Limits of TS 3.1.3.6 (Regulating and Group P CEA Insertion Limits) ensures that \_\_\_\_\_ (1) \_\_\_\_\_. If these limits cannot be maintained, the crew is required to \_\_\_\_\_ (2) \_\_\_\_\_.

- | _____ (1) _____   | _____ (2) _____                                   |
|---|---|
| A. radial xenon redistribution effects are maintained within limits | emergency borate                                  |
| B. radial xenon redistribution effects are maintained within limits | restore the CEA to within limits within two hours |
| C. minimum shutdown margin requirements are maintained              | restore the CEA to within limits within two hours |
| D. minimum shutdown margin requirements are maintained              | emergency borate                                  |

2015 NRC Exam RO Written Exam

RO 64

Which ONE of the following radiation monitors will cause an AUTO closure of Waste Gas Discharge FCV (GWM-309) valve during a Gaseous Waste Discharge evolution?

- A. Gaseous Waste Management Radiation Monitor
- B. Plant Stack PIG Monitor A or B
- C. Plant Stack WRGM Monitor
- D. RAB HVAC PIG Monitor B



2015 NRC Exam RO Written Exam

RO 65

Turbine Closed Cooling Water (TCCW) Pump B is powered from which bus?

- A. SWGR 21B
- B. SWGR 3B
- C. SWGR 1B
- D. SWGR 2B

## 2015 NRC Exam RO Written Exam

RO 66

Per EN-OP-115, Conduct of Operations, if an operating parameter exceeds any of the reactor protection set points and an automatic shutdown does not occur, the licensed operator is required to:

- A. take action to restore the parameter within limit; if not successful, manually trip the Reactor.
- B. get Control Room Supervisor permission and then manually trip the Reactor.
- C. report "tripping the Reactor" while taking action to manually trip the Reactor.
- D. get a "peer check" on the parameter and then manually trip the Reactor.

2015 NRC Exam RO Written Exam

RO 67

Per TS 3.9.10.1 Water Level-Reactor Vessel and RF-005-001 Fuel Movement, at least 23 feet of water shall be maintained over the top of the \_\_\_\_ (1) \_\_\_\_ during movements of fuel within the reactor pressure vessel. This is equivalent to a \_\_\_\_ (2) \_\_\_\_ foot level in the Refuel Cavity.

	(1)	(2)
A. reactor vessel flange		32
B. reactor vessel flange		43
C. irradiated fuel assemblies seated in the reactor vessel		43
D. irradiated fuel assemblies seated in the reactor vessel		32

2015 NRC Exam RO Written Exam

RO 68

Given:

- A reactor trip has occurred
- The crew is performing OP-902-000, Standard Post Trip Actions

For the RCS Inventory Control Safety Function, the ATC will verify that RCS subcooling is greater than or equal to     (1)     °F. RCS subcooling greater than or equal to the minimum RCS subcooling requirements for RCS inventory control will     (2)     .

	<u>    (1)    </u>	<u>    (2)    </u>
A.	28	validate pressurizer level indication as being representative of total RCS inventory
B.	30	validate pressurizer level indication as being representative of total RCS inventory
C.	28	ensure that Reactor Coolant Pumps are within the acceptable range of the RCP operating curves
D.	30	ensure that Reactor Coolant Pumps are within the acceptable range of the RCP operating curves



2015 NRC Exam RO Written Exam

RO 70

Per TS 3.6.3, a locked closed containment isolation valve can be opened on an intermittent basis under administrative controls.

These administrative controls will include assigning an operator in constant communication with the control room \_\_\_\_\_ (1) \_\_\_\_\_. The list of containment isolation valves can be found in \_\_\_\_\_ (2) \_\_\_\_\_ .

_____ (1) _____	_____ (2) _____
A. to close the valve within four hours of an accident situation	TS 3.6.3
B. to be stationed at the valve controls	TS 3.6.3
C. to close the valve within four hours of an accident situation	TRM 3.6.3
D. to be stationed at the valve controls	TRM 3.6.3

2015 NRC Exam RO Written Exam

RO 71

Given:

- A Steam Generator Tube Leak is in progress in both Steam Generators
- The crew is performing actions in accordance with OP-901-202, Steam Generator Tube Leakage or High Activity
- The condenser is not available

The crew will commence a normal plant cooldown to obtain a Hot leg temperature of less than or equal to 520°F using \_\_\_\_\_ (1) \_\_\_\_\_. The discharge through the Atmospheric Dump Valve(s) is a(an) \_\_\_\_\_ (2) \_\_\_\_\_ release.

_____ (1) _____	_____ (2) _____
A. the atmospheric dump valve on the S/G with the lowest indicated activity	monitored
B. the atmospheric dump valve on the S/G with the lowest indicated activity	unmonitored
C. both atmospheric dump valves	monitored
D. both atmospheric dump valves	unmonitored

2015 NRC Exam RO Written Exam

RO 72

As an Emergency Team member following a loss of reactor cavity level that has resulted in uncovering irradiated fuel, you will enter the Containment in order to rescue an injured person.

The maximum exposure limit (TEDE) allowed for these conditions is \_\_\_\_\_ (1) \_\_\_\_\_.  
Authorization \_\_\_\_\_ (2) \_\_\_\_\_ require that dose rates in the area be known.

- |    | (1)    | (2)      |
|----|--------|----------|
| A. | 10 rem | does     |
| B. | 10 rem | does not |
| C. | 25 rem | does     |
| D. | 25 rem | does not |



2015 NRC Exam RO Written Exam

RO 73

In accordance with OI-038-000, Emergency Operating Procedures Operations Expectations/Guidance, and upon entry to the Emergency Operating Procedures, the operating crew will monitor the safety function status checklist       (1)      . The STA is required to monitor the safety function status checklist every       (2)       minutes.

- |    | <u>      (1)      </u> | <u>      (2)      </u> |
|----|------------------------|------------------------|
| A. | continuously           | 30                     |
| B. | every 30 minutes       | 15                     |
| C. | every 30 minutes       | 30                     |
| D. | continuously           | 15                     |

2015 NRC Exam RO Written Exam

RO 74

The lowest emergency classification that the Technical Support Center (TSC) and the Emergency Operations Facility (EOF) **shall** be activated is an \_\_\_\_ (1) \_\_\_\_\_. Continuous communications with the NRC will be transferred from the Control Room to the \_\_\_\_ (2) \_\_\_\_\_.

- | _____ (1) _____  | _____ (2) _____ |
|------------------|-----------------|
| A. unusual event | EOF             |
| B. unusual event | TSC             |
| C. alert         | TSC             |
| D. alert         | EOF             |

2015 NRC Exam RO Written Exam

RO 75

Given:

- A reactor trip has occurred
- The crew is performing OP-902-000, Standard Post Trip Actions

The minimum requirements to verify the main turbine is tripped is to check \_\_\_\_\_ (1) \_\_\_\_\_ are closed. If the main turbine did not trip automatically, the first contingency action to secure steam admission to the main turbine is to \_\_\_\_\_ (2) \_\_\_\_\_.

_____ (1) _____	_____ (2) _____
A. governor and throttle valves	depress the turbine trip and think pushbuttons
B. governor valves	close both MSIVs
C. governor and throttle valves	close both MSIVs
D. governor valves	depress the turbine trip and think pushbuttons

2015 NRC Exam SRO Written Exam

SRO 1

Given:

- The plant is at 100 % power
- Atmospheric Dump Valve #1 (MS-116A) controller has been placed in manual in an attempt to more fully seat the valve
- The crew is evaluating Tech Spec 3.7.1.7, Atmospheric Dump Valve, requirements

The automatic actuation channel for Atmospheric Dump Valve # 1 is \_\_\_\_(1)\_\_\_\_

For the given power level, TS 3.7.1.7 basis states that the automatic operation of one Atmospheric Dump Valve along with one train of High Pressure Safety Injection is required for mitigation of the \_\_\_\_(2)\_\_\_\_ event.

- | <u>(1)</u>    | <u>(2)</u>                   |
|---------------|------------------------------|
| A. inoperable | steam generator tube rupture |
| B. operable   | steam generator tube rupture |
| C. inoperable | small Break LOCA             |
| D. operable   | small Break LOCA             |

## 2015 NRC Exam SRO Written Exam

SRO 2

Given:

- Large Break LOCA has occurred
- The crew is performing the required actions of OP-902-002, LOCA Recovery Procedure

The CRS will determine if simultaneous Hot and Cold Injection is required based on (1). If conditions are met, hot and cold leg injection must be aligned within the maximum allowable time of (2) hours from the start of the event to ensure boric acid precipitation in the core does not occur.

<u>(1)</u>	<u>(2)</u>
A. HPSI and LPSI flows within acceptable region of the SI flow curves	two
B. Pressurizer level, Reactor vessel level and RCS subcooling	two
C. HPSI and LPSI flows within the acceptable region of the SI flow curves	three
D. Pressurizer level, Reactor vessel level and RCS subcooling	three

2015 NRC Exam SRO Written Exam

SRO 3

Given:

- Component Cooling Water (CCW) Pump A has tripped on overcurrent.

The crew will declare CCW Train A inoperable along with the affected systems listed in (1). The crew is required to demonstrate the operability of the Train B offsite AC circuit by performing surveillance procedure (2) within one hour and at least once per eight hours thereafter.

<u>(1)</u>	<u>(2)</u>
A. OP-100-014, Technical Specification and Technical Requirements Compliance	OP-903-001, Attachment 11.14, Electrical Distribution Operability Check
B. OP-100-010, Equipment Out of Service	OP-903-001, Attachment 11.14, Electrical Distribution Operability Check
C. OP-100-014, Technical Specification and Technical Requirements Compliance	OP-903-066, Electrical Breaker Alignment Check
D. OP-100-010, Equipment Out of Service	OP-903-066, Electrical Breaker Alignment Check

2015 NRC Exam SRO Written Exam

SRO 4

Given:

- A plant shutdown in accordance with OP-010-005, Plant Shutdown, is in progress due to primary to secondary leakage
- The control room has entered OP-901-202, Steam Generator Tube Leakage (SGTL) or High Activity
- Charging pump AB is tagged out

Primary to secondary leakage increases to 95 gpm.

The crew will \_\_\_\_ (1) \_\_\_\_\_. After the initial plant cooldown to 520 °F, the CRS will give the order to de-pressurize the RCS to \_\_\_\_ (2) \_\_\_\_\_.

Note: OP-901-212: Rapid Plant Power Reduction

(1)	(2)
A. transition to OP-901-212, concurrently with OP-901-202, SGTL or High Activity	930 psia to minimize leakage
B. trip the reactor and diagnose into OP-902-007, Steam Generator Tube Rupture Recovery	930 psia to minimize leakage
C. transition to OP-901-212, concurrently with OP-901-202, SGTL or High Activity	1150 psia to maintain RCP NPSH
D. trip the reactor and diagnose into OP-902-007, Steam Generator Tube Rupture Recovery	1150 psia to maintain RCP NPSH

2015 NRC Exam SRO Written Exam

SRO 5

The plant is operating at 100% power when the SUPS power supply to PDP-90A is lost.

The crew will enter section (1) of OP-901-312, Loss of Vital Instrument Bus. The CRS will direct the crew to (2).

	<u>(1)</u>	<u>(2)</u>
A.	E8 Loss of SUPS A	monitor primary plant parameters on Safety Channels B, C, and D
B.	E1 Loss of SUPS MA	verify Component Cooling Water supplying the AB loop from the B train of CCW
C.	E8 Loss of SUPS A	verify Component Cooling Water supplying the AB loop from the B train of CCW
D.	E1 Loss of SUPS MA	monitor primary plant parameters on Safety Channels B, C, and D



2015 NRC Exam SRO Written Exam

SRO 6

Given:

- The plant experienced an uncomplicated reactor trip. The crew transitioned to OP-010-005, Plant Shutdown, and is holding mode 3 conditions.
- An unisolable Instrument Air leak occurred when the plant tripped.
- Instrument Air pressure has been lost for 8 hours due to the leak and leak repair should be complete in 5 hours.
- Reactor Coolant Pumps 1B and 2B are operating.
- The following annunciators are illuminated on CP-2
  - RCP 1A CCW FLOW LO
  - RCP 2A CCW FLOW LO
  - RCP 1B CCW FLOW LO
  - RCP 2B CCW FLOW LO
- The following annunciators are illuminated on CP-18:
  - RCP 1A CCW FLOW LOST
  - RCP 2A CCW FLOW LOST

The CRS will direct the crew to (1) in accordance with the guidance in (2).

<u>(1)</u>	<u>(2)</u>
A. trip Reactor Coolant Pumps 1B and 2B	OP-901-511, Loss of Instrument Air
B. gag open CC-200A and CC-727, CCW Suct & Discharge Header Tie Valves A to AB	OP-901-511, Loss of Instrument Air
C. gag open CC-200A and CC-727, CCW Suct & Discharge Header Tie Valves A to AB	OP-901-510, Component Cooling Water Malfunction
D. trip Reactor Coolant Pumps 1B and 2B	OP-901-510, Component Cooling Water Malfunction

2015 NRC Exam SRO Written Exam

SRO 7

Given:

- Power is 100%
- All CEAs fully withdrawn

Five minutes later, the ATC reports the following:

- CEA 38 indicates 135 inches on the CP-2 CEAC CRT
- CEA 38 indicates 150 inches on the PMC
- Both the Upper and Lower Electrical Limit lights for CEA 38 are extinguished
- All Rod Bottom lights are extinguished
- Tcold is 541 °F and slowly dropping

To verify CEA position, the CRS will request indication on the \_\_\_\_ (1) \_\_\_\_ . The CRS will enter OP-901-102, CEA or CEDMCS Malfunction, sub-section \_\_\_\_ (2) \_\_\_\_.

____ (1) ____	____ (2) ____
A. CPC that CEA 38 is targeted to	E1, CEA Misalignment Greater than 7 inches
B. CPC that CEA 38 is targeted to	E5, CEA Position Indication Malfunction
C. CP-2 digital meter for CEA 38	E1, CEA Misalignment Greater than 7 inches
D. CP-2 digital meter for CEA 38	E5, CEA Position Indication Malfunction

2015 NRC Exam SRO Written Exam

SRO 8

Given:

- Plant is performing a cooldown for a refueling outage
- RCS temperature is 195 °F
- RCS pressure is 350 psia
- EDG A is tagged out

Offsite power train B is declared inoperable because of a voltage problem.

The CRS will verify \_\_\_\_\_ is aligned as the operable boration flow path per OP-903-002, Boration Flow Path Valve Lineup Verification.

- 
- A. the RWSP and HPSI pump A
  - B. the RWSP and HPSI pump B
  - C. BAM pump A and Charging pump A
  - D. BAM pump B and Charging pump B

2015 NRC Exam SRO Written Exam

SRO 9

Given:

- The plant is at 90% and performing a power reduction from 100% due to lowering condenser vacuum

Per OP-901-220, Loss of Condenser Vacuum, the reactor will be tripped if condenser vacuum is approaching (1) Inches Hg. The crew will (2).

- |    | <u>(1)</u> | <u>(2)</u>   |
|----|------------|--|
| A. | 20         | perform OP-902-000, Standard Post Trip Actions, concurrently with OP-901-220 |
| B. | 14         | perform OP-902-000, Standard Post Trip Actions, concurrently with OP-901-220 |
| C. | 14         | go to OP-902-000, Standard Post Trip Actions, exit OP-901-220                |
| D. | 20         | go to OP-902-000, Standard Post Trip Actions, exit OP-901-220                |

2015 NRC Exam SRO Written Exam

SRO 10

Given:

- Plant was operating at 100% power with EDG A danger tagged
- An Excess Steam Demand occurred
- SIAS, CIAS, and MSIS have been initiated
- Pressurizer level is 0%
- After entering OP-902-004, Excess Steam Demand Recovery, the following conditions change:
  - Representative CET temperature and RCS pressure start to rise.
  - A Loss of Off Site Power occurs

All components respond as designed to the event.

Based on these conditions, the CRS will \_\_\_\_\_ (1) \_\_\_\_\_ and \_\_\_\_\_ (2) \_\_\_\_\_

- |    | (1)   | (2)   |
|----|---|---|
| A. | remain in OP-902-004                                      | direct the ATC to stabilize RCS pressure <b>above</b> HPSI Pump shutoff head. |
| B. | remain in OP-902-004                                      | direct the ATC to stabilize RCS pressure <b>below</b> HPSI Pump shutoff head. |
| C. | exit OP-902-004 and enter OP-902-008, Functional Recovery | direct the ATC to stabilize RCS pressure <b>above</b> HPSI Pump shutoff head. |
| D. | exit OP-902-004 and enter OP-902-008, Functional Recovery | direct the ATC to stabilize RCS pressure <b>below</b> HPSI Pump shutoff head. |

2015 NRC Exam SRO Written Exam

SRO 11

As stated in TS surveillance requirement 4.1.2.8, each borated water source shall be demonstrated operable by verifying the Boric Acid Makeup Tank solution temperature is greater than or equal to 60°F when reactor auxiliary building air temperature is less than \_\_\_\_\_ (1) \_\_\_\_\_ °F.

The basis for this minimum temperature is to ensure that \_\_\_\_\_ (2) \_\_\_\_\_.

- |    | <u>(1)</u> | <u>(2)</u>  |
|----|------------|---|
| A. | 60         | assumptions used in the MSLB return to power event remain valid |
| B. | 60         | boron will not precipitate out of solution                      |
| C. | 55         | boron will not precipitate out of solution                      |
| D. | 55         | assumptions used in the MSLB return to power event remain valid |

2015 NRC Exam SRO Written Exam

SRO 12

Given:

- RCS temperature is 180°F and steady
- RCS pressure is 320 PSIA and steady
- SDC Train B is in service
- SDC Train A is secured

The following annunciators are received:

- SIAS Train A Logic Initiated (Cabinet K, G-19)
- SIAS Train B Logic Initiated (Cabinet K, G-20)
- LOOP 1 SDC RELIEF VLV ACTIVE (Cabinet M, A-7)

The addition of borated water       (1)       the capacity of SI-406B, RC Loop 1 SDC Suction LTOP relief to CNTMT Sump. The CRS will secure High Pressure Safety Injection Pumps in accordance with the guidance in       (2)      .

- | <u>      (1)      </u> | <u>      (2)      </u>                   |
|------------------------|--|
| A. is within           | OP-901-131, Shutdown Cooling Malfunction |
| B. exceeds             | OP-901-131, Shutdown Cooling Malfunction |
| C. exceeds             | OP-901-504, Inadvertent ESFAS Actuation  |
| D. is within           | OP-901-504, Inadvertent ESFAS Actuation  |

2015 NRC Exam SRO Written Exam

SRO 13

A turbine control system malfunction has caused the turbine to runback from 100% power. The following indications are present two minutes after the turbine stops running back:

- REACTOR COOLANT Tave-Tref HI alarm in
- SELECTED COLD LEG 1 TEMPERATURE HI alarm in
- PRESSURIZER PRESSURE HI/LO alarm in
- Tcold is 547°F
- PZR Pressure is 2277 psia
- All PZR Heaters have de-energized automatically
- Pressurizer pressure controller output is 0%
- Pressurizer spray valve controller output is 0%

The CRS will address pressurizer pressure control by entering OP-901-120, Pressurizer Pressure Control Malfunction, subsection       (1)       and enter the Tech Spec action(s) for       (2)      .

- |    | <u>      (1)      </u>                          | <u>      (2)      </u>  |
|----|---|---|
| A. | E2, Pressurizer Pressure Controller Malfunction | pressurizer pressure (TS 3.2.8) only  |
| B. | E3, Pressurizer Spray Valve Malfunction         | pressurizer pressure (TS 3.2.8) only  |
| C. | E2, Pressurizer Pressure Controller Malfunction | pressurizer pressure (TS 3.2.8) and reactor coolant cold leg temperature (TS 3.2.6) |
| D. | E3, Pressurizer Spray Valve Malfunction         | pressurizer pressure (TS 3.2.8) and reactor coolant cold leg temperature (TS 3.2.6) |



2015 NRC Exam SRO Written Exam

SRO 14

Given:

- An Excess Steam Demand occurred
- SIAS, CIAS, MSIS and CSAS have been initiated
- After entering OP-902-004, Excess Steam Demand Recovery, the BOP reports that CFC A has tripped on overcurrent

The CRS will determine that the \_\_\_\_\_ (1) \_\_\_\_\_ safety function is not met. The crew will \_\_\_\_\_ (2) \_\_\_\_\_.

	(1)	(2)
A.	containment temperature and pressure control	go to OP-902-008, Functional Recovery procedure
B.	containment isolation	go to OP-902-008, Functional Recovery procedure
C.	containment isolation	remain in OP-902-004, Excess Steam Demand Recovery procedure
D.	containment temperature and pressure control	remain in OP-902-004, Excess Steam Demand Recovery procedure

2015 NRC Exam SRO Written Exam

SRO 15

Given:

- Plant is at 100% power
- Turbine Cooling Water (TCW) Pump B is in service
- Turbine Cooling Water (TCW) Pump A is tagged for repair

Turbine Cooling Water Pump B trips and the crew enters OP-901-512, Loss of Turbine Cooling Water Pumps.

The most limiting component for this event is the \_\_\_\_ (1) \_\_\_\_\_. The crew will perform OP-902-000, Standard Post Trip Actions, and then diagnose to \_\_\_\_ (2) \_\_\_\_\_. Recovery Procedure.

- | _____ (1) _____          | _____ (2) _____                    |
|--------------------------|------------------------------------|
| A. main turbine bearings | OP-902-001, Reactor Trip           |
| B. main generator        | OP-902-006, Loss of Main Feedwater |
| C. main generator        | OP-902-001, Reactor Trip           |
| D. main turbine bearings | OP-902-006, Loss of Main Feedwater |

2015 NRC Exam SRO Written Exam

SRO 16

Given:

- The plant is at 100% power.
- Letdown flow is 50 gpm and rising.
- PZR level indicator RC-ILI-110X indicates 55% and lowering.
- PZR level indicator RC-ILI-110Y indicates 54% and lowering.
- The ATC reports that the pressurizer level setpoint on the Pressurizer Level Controller (RC-ILIC-0110) is 55.6%.
- The output of the Pressurizer Level Controller (RC-ILIC-0110) is 90%.

The CRS will enter \_\_\_\_ (1) \_\_\_\_ and direct the ATC to take manual control of the \_\_\_\_ (2) \_\_\_\_ to restore Pressurizer level.

	(1)	(2)
A.	OP-901-110, Pressurizer Level Control Malfunction	Pressurizer Level Controller (RC-ILIC-0110)
B.	OP-901-112, Charging and Letdown Malfunction	Pressurizer Level Controller (RC-ILIC-0110)
C.	OP-901-110, Pressurizer Level Control Malfunction	Letdown Flow Control Valves controller (RC-IHIC-0110)
D.	OP-901-112, Charging and Letdown Malfunction	Letdown Flow Control Valves controller (RC-IHIC-0110)

2015 NRC Exam SRO Written Exam

SRO 17

Given:

- The Turbine Building watch reports that “Generator Hydrogen Press. Low” annunciator is locked in at the H2 Control Panel
- Main Generator Hydrogen pressure is 29 psig and the crew has tripped the Main Turbine

The crew will enter OP-901-101, Reactor Power Cutback and \_\_\_\_\_(1)\_\_\_\_\_ concurrently. To ensure no hot work or open flames are occurring in the Turbine Building due to the possible explosive mixture from Hydrogen Leakage the CRS will first \_\_\_\_\_(2)\_\_\_\_\_.

	(1)	(2)
A.	OP-901-210, Turbine Trip	contact the Work Management Center
B.	OP-901-210, Turbine Trip	make a plant page
C.	OP-901-211, Generator Malfunction	make a plant page
D.	OP-901-211, Generator Malfunction	contact the Work Management Center

2015 NRC Exam SRO Written Exam

SRO 18

Given:

- Spent Fuel Pooling Cooling Pump A is tagged out.
- A loss of the 3B safety bus has occurred.

The CRS will direct the crew to enter     (1)     To restore Spent Fuel Pool Cooling, the crew will start Spent Fuel Pool (SFP) Cooling Pump B after the EDG sequencer has timed out by     (2)    .

<u>  (1)  </u>	<u>  (2)  </u>
A. OP-901-311, Loss of Train B Safety Bus only	manually energizing the SFP Cooling Pump at the 314B bus <u>then</u> taking the Control Switch to start
B. OP-901-311, Loss of Train B Safety Bus only	taking the Control Switch to start only
C. OP-901-311, Loss of Train B Safety Bus and OP-901-513, Spent Fuel Pool Cooling Malfuction concurrently	taking the Control Switch to start only
D. OP-901-311, Loss of Train B Safety Bus and OP-901-513, Spent Fuel Pool Cooling Malfuction concurrently	manually energizing the SFP Cooling Pump at the 314B bus <u>then</u> taking the Control switch to start

2015 NRC Exam SRO Written Exam

SRO 19

Per EN-OP-115, Conduct of Operations, a minimum of   (1)   members of the site fire brigade and a minimum of   (2)   emergency communicator(s) is required to fulfill minimum shift staffing requirements.

- |    | <u>  (1)  </u> | <u>  (2)  </u> |
|----|----------------|----------------|
| A. | four           | one            |
| B. | four           | two            |
| C. | five           | one            |
| D. | five           | two            |

2015 NRC Exam SRO Written Exam

SRO 20

The surveillance requirements of TS 3.4.7, Specific Activity, states that Chemistry will be notified to perform a sample of the RCS for an isotopic iodine analysis following a reactor power change of greater than     (1)     percent within a one hour period. This surveillance requirement states that the sample will be taken two to     (2)     hours following the downpower.

- |    | <u>    (1)    </u> | <u>    (2)    </u> |
|----|--------------------|--------------------|
| A. | 10                 | six                |
| B. | 10                 | four               |
| C. | 15                 | four               |
| D. | 15                 | six                |

2015 NRC Exam SRO Written Exam

SRO 21

For planned outages, a risk assessment of the outage schedule is performed per the requirements located in \_\_\_\_ (1) \_\_\_\_\_. Based on the risk assessment process, the responsibility for ensuring the hanging, tracking, and prompt removal of protected equipment postings is the responsibility of the \_\_\_\_ (2) \_\_\_\_\_.

_____ (1) _____	_____ (2) _____
A. PLG-009-014, Conduct of Planned outages	Shift Manager
B. PLG-009-014, Conduct of Planned outages	Outage Manager
C. OI-037-000, Operations' Risk Assessment Guideline	Shift Manager
D. OI-037-000, Operations' Risk Assessment Guideline	Outage Manager



## 2015 NRC Exam SRO Written Exam

SRO 22

Given:

- RAD MONITOR SYS ACTIVITY HI-HI annunciator is in alarm
- Plant Stack PIG A and B show rising activity
- HVAC Duct PIG D shows rising activity
- HVAC Duct PIG A is in alarm

The CRS should carry out the actions in:

- A. OP-901-401, High Airborne Activity in Control Room
- B. OP-901-402, High Airborne Activity in Reactor Auxiliary Building
- C. OP-901-403, High Airborne Activity in Containment
- D. OP-901-404, High Airborne Activity in Fuel Handling Building

2015 NRC Exam SRO Written Exam

SRO 23

The following plant conditions exist:

- A radiological release is in progress following a LOCA outside of Containment
- The Emergency Director is evaluating E Plan
- Data is now available for a PARs determination
- The EC directs you to perform this determination per EP-002-052, Protective Action Guidelines.

The following data is available:

- Duration of release is unknown
- Wind Directions is from 345 °

EAB TEDE  Mr/hr	EAB CDE Thyroid Mr/hr	2 mile TEDE  Mr/hr	2 mile CDE Thyroid Mr/hr	5 mile TEDE  Mr/hr	5 mile CDE Thyroid Mr/hr
1250	3200	750	1900	50	730

Which ONE of the following PAR actions meets the required recommendations of EP-002-052, Protective Action Guidelines?

EVACUATE

- A. A1, B1, C1, D1
- B. A1, B1, C1, D1, D2
- C. A1, B1, C1, D1, B2, D2
- D. A1, B1, C1, D1, D2, D3, D4

**2015 NRC Exam SRO Written Exam**

SRO 24

As the Emergency Director, what is the time limit for notification of Operations Hotline Members when plant conditions warrant upgrading from an Unusual Event to an Alert?

- A. 10 minutes
- B. 15 minutes
- C. 30 minutes
- D. 60 minutes

2015 NRC Exam SRO Written Exam

SRO 25

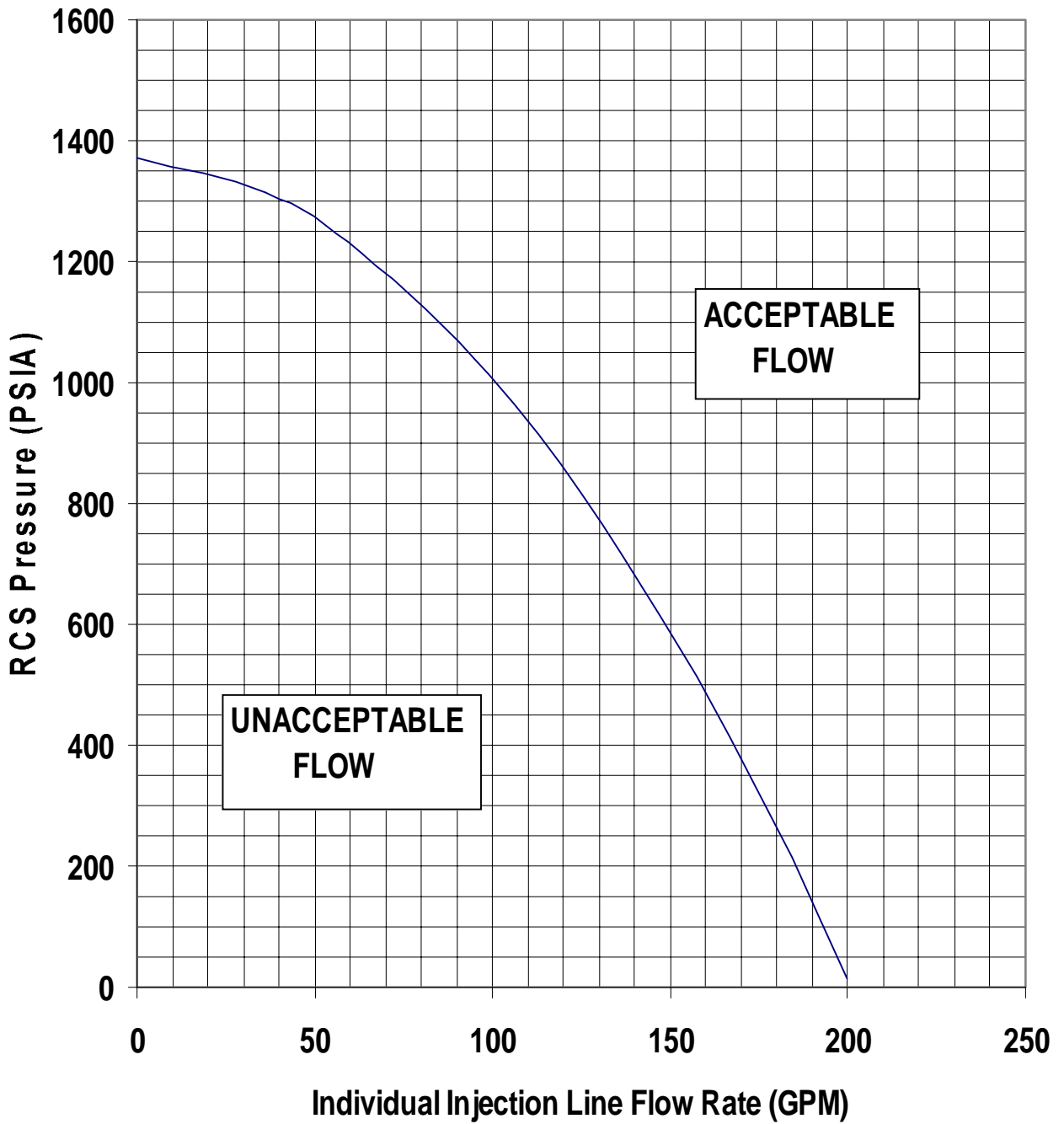
Given:

- A reactor trip has occurred
- The crew is performing Standard Post Trip actions per OP-902-000 and power to the Moisture Separator Re-heater (MSR) Control panel is not available.

The BOP will direct the auxiliary operator to isolate the Moisture Separator Re-heaters by \_\_\_\_\_(1)\_\_\_\_\_ valves. This action is required to \_\_\_\_\_(2)\_\_\_\_\_ .

- |    | (1)  | (2)                                    |
|----|--|--|
| A. | taking to close the manual handwheel for the temperature control valve isolation | prevent overcooling the RCS            |
| B. | taking to close the manual handwheel for the temperature control valve isolation | prevent over-pressurization of the MSR |
| C. | failing closed air operated temperature control                                  | prevent over-pressurization of the MSR |
| D. | failing closed air operated temperature control                                  | prevent overcooling the RCS            |

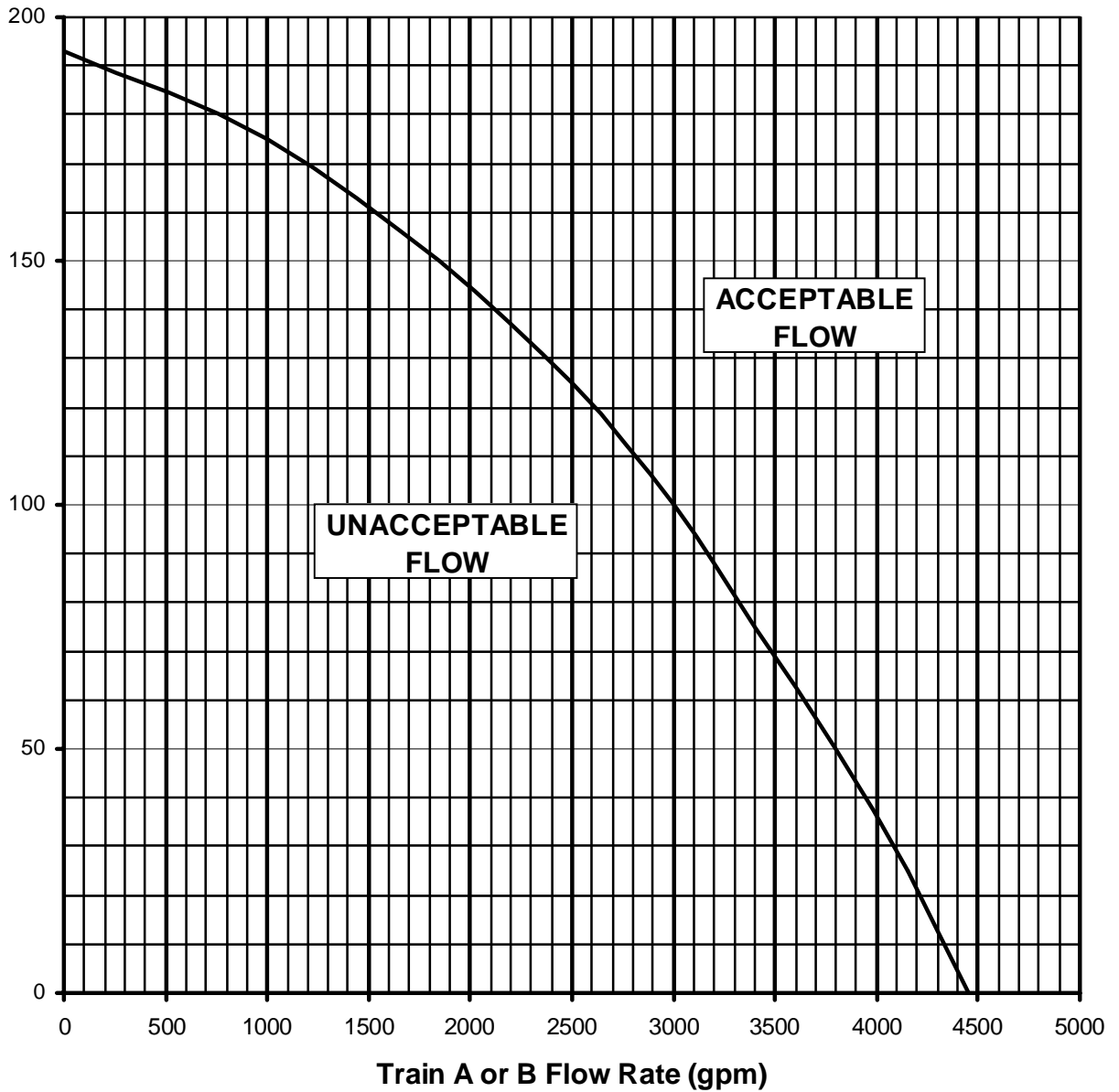
**Figures**  
**Attachment 2-E: HPSI Flow Curve**



End of Attachment 2-E

**Figures**  
**Attachment 2-F: LPSI Flow Curve**

**RCS Pressure, PSIA**



**End of Attachment 2-F**

10.1 OFFSITE POWER TO CLASS 1E DISTRIBUTION TRAIN A CHECK

* LOCATION OF INDICATION	COMPONENT	REQUIRED CONDITION	PERFORMED (INITIAL)
CP-17 or PID A59300	GRID VOLTAGE LINE A	** 226 to 241 KV Note ①	
CP-1 or PID D59355	SUT A DISCONNECT	CLOSED	
CP-1	SUT A to 4KV-ESWGR-2A FDR BKR	CONTROL POWER ON	
CP-1 or PID D59600	2A to 3A TIE BKR	CLOSED	
CP-1 or PID D59601	3A to 2A TIE BKR	CLOSED	
CP-1 or PID D59629	31A FDR BKR	CLOSED	
PID A59506	4KV-ESWGR-2A	4.030 to 4.360 KV	
PID A59600	4KV-ESWGR-3A	3999 to 4360 VOLTS	
PID A59800	SSD-ESWGR-31A	*** 450 to 500 VOLTS	
PID D59357	OCB 7176	**** CLOSED	
PID D59356	OCB 7172	**** CLOSED	

\* Local indication may be substituted.

\*\* Minimum required Grid Voltage is 223KV when the Main Generator is off line.

\*\*\* Maximum required Bus Voltage is 506 Volts when in Mode 5, Mode 6, or defueled.

\*\*\*\* Either OCB 7176 or OCB 7172 must be Closed for the offsite network to be Operable.

OCB positions may be verified by Gretna Transmission Operations Center.

Note ① If listed indication is unavailable, then verify PID A59500 is 4030-4576 volts.

Reason for performing: \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Performed by: \_\_\_\_\_ (Signature) \_\_\_\_\_ (Date)

SM/CRS Review: \_\_\_\_\_ (Signature) \_\_\_\_\_ / \_\_\_\_\_ (Date/Time)

10.2 OFFSITE POWER TO CLASS 1E DISTRIBUTION TRAIN B CHECK

* LOCATION OF INDICATION	COMPONENT	REQUIRED CONDITION	PERFORMED (INITIAL)
CP-17 or PID A59301	GRID VOLTAGE LINE B	** 226 to 241 KV Note ①	
CP-1 or PID D59385	SUT B DISCONNECT	CLOSED	
CP-1	SUT B to 4KV-ESWGR-2B FDR BKR	CONTROL POWER ON	
CP-1 or PID D59607	2B to 3B TIE BKR	CLOSED	
CP-1 or PID D59608	3B to 2B TIE BKR	CLOSED	
CP-1 or PID D59641	31B FDR BKR	CLOSED	
PID A59507	4KV-ESWGR-2B	4.030 to 4.360 KV	
PID A59601	4KV-ESWGR-3B	3999 to 4360 VOLTS	
PID A59801	SSD-ESWGR-31B	*** 450 to 500 VOLTS	
PID D59387	OCB 7186	**** CLOSED	
PID D59386	OCB 7182	**** CLOSED	

\* Local indication may be substituted.

\*\* Minimum required Grid Voltage is 223KV when the Main Generator is off line.

\*\*\* Maximum required Bus Voltage is 506 Volts when in Mode 5, Mode 6, or defueled.

\*\*\*\* Either OCB 7186 or OCB 7182 must be Closed for the offsite network to be Operable.

OCB positions may be verified by Gretna Transmission Operations Center.

Note ① If listed indication is unavailable, then verify PID A59501 is 4030-4576 volts.

Reason for performing: \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Performed by: \_\_\_\_\_ (Signature) \_\_\_\_\_ (Date)

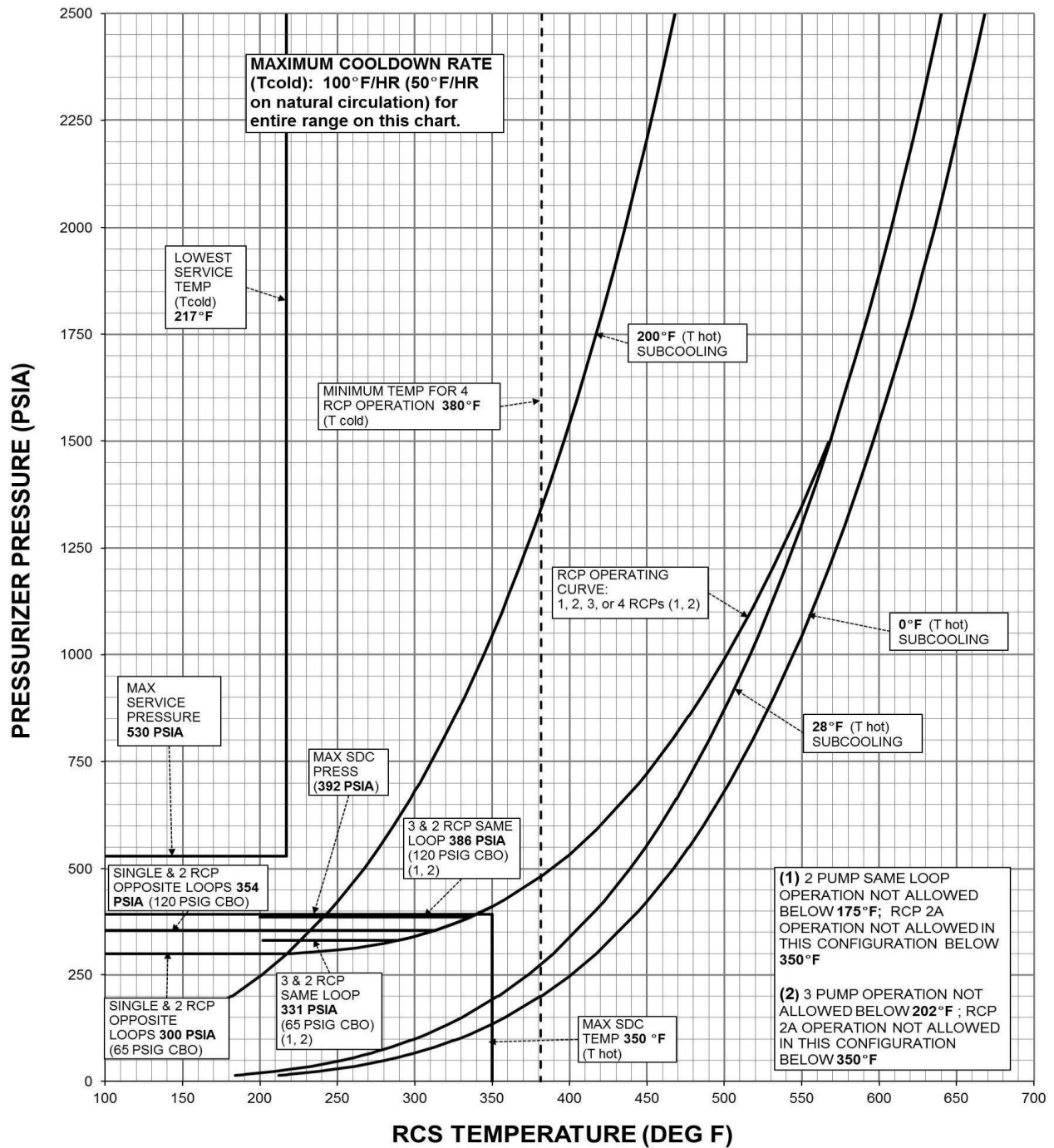
SM/CRS Review: \_\_\_\_\_ (Signature) \_\_\_\_\_ / \_\_\_\_\_ (Date/Time)



## 2.0 Figures

### Attachment 2-A: RCS Pressure and Temperature Limits

RCS PRESSURE AND TEMPERATURE LIMITS (NON-HARSH)



End of Attachment 2-A

**PROTECTIVE ACTION GUIDELINES WORKSHEET, RELEASE OCCURRING**

**USE ATT. 7.1 FOR INITIAL GENERAL EMERGENCY CLASSIFICATION RECOMMENDATIONS**

EVALUATION PERFORMED BY: \_\_\_\_\_ DATE: \_\_\_\_\_ TIME: \_\_\_\_\_

(COMPLETE SECTIONS A, B & C EACH TIME AN EVALUATION IS PERFORMED.)

**A. 0-2 MILE RESPONSE AREA**

PROJECTED DOSE AT THE EAB

TEDE = \_\_\_\_\_ mrem

CDE THYROID = \_\_\_\_\_ mrem

IS THE PROJECTED DOSE  $\geq 1000$  mrem TEDE? **OR**  $\geq 5000$  mrem CDE THYROID?

NO → NO IMMEDIATE PROTECTIVE ACTIONS REQUIRED

YES → EVACUATE (or Shelter)

**0-2 MILE RECOMMENDATION:**

NO PROTECTIVE ACTIONS REQUIRED

EVACUATE AREAS A1, B1, C1, D1

SHELTER AREAS \_\_\_\_\_

**B. 2-5 MILE RESPONSE AREA**

PROJECTED DOSE AT 2 MILES

TEDE = \_\_\_\_\_ mrem

CDE THYROID = \_\_\_\_\_ mrem

IS THE PROJECTED DOSE  $\geq 1000$  mrem TEDE? **OR**  $\geq 5000$  mrem CDE THYROID?

NO → NO IMMEDIATE PROTECTIVE ACTIONS REQUIRED

YES → EVACUATE (or Shelter)

**2-5 MILE RECOMMENDATION:** (See NOTE 1)

NO PROTECTIVE ACTIONS REQUIRED

EVACUATE AREAS \_\_\_\_\_

MONITOR & PREPARE \_\_\_\_\_

SHELTER AREAS \_\_\_\_\_

**C. 5-10 MILE RESPONSE AREA**

PROJECTED DOSE AT 5 MILES

TEDE = \_\_\_\_\_ mrem

CDE THYROID = \_\_\_\_\_ mrem

IS THE PROJECTED DOSE  $\geq 1000$  mrem TEDE? **OR**  $\geq 5000$  mrem CDE THYROID?

NO → NO IMMEDIATE PROTECTIVE ACTIONS REQUIRED

YES → EVACUATE (or Shelter)

**5-10 MILE RECOMMENDATION:** (See NOTE 1)

NO PROTECTIVE ACTIONS REQUIRED

EVACUATE AREAS \_\_\_\_\_

MONITOR & PREPARE \_\_\_\_\_

SHELTER AREAS \_\_\_\_\_

NOTE 1: DETERMINE THE APPROPRIATE PROTECTIVE RESPONSE AREAS BY USING ATTACHMENT 7.3.

## AFFECTED COMPASS SECTORS/PROTECTIVE RESPONSE AREAS CHART

Directions for use:

Locate appropriate wind direction and find plume center line sector and two adjacent sectors in the "Affected Compass Sectors" column. The centerline sector is the middle sector of each set. The corresponding "Protective Response Areas" in which protective actions are to be implemented can then be found for downwind distances of interest by reading across the page.

Note that protective actions for **any** compass sectors in the two-mile radius (0-2 miles column) should be recommended for all 4 protective response areas in the two-mile radius as shown below.

WIND DIRECTION <u>FROM</u>	AFFECTED COMPASS SECTORS	PROTECTIVE RESPONSE AREAS		
		0-2 MILES	2-5 MILES (DOWNWIND)	5-10 MILES (DOWNWIND)
191.3 TO 213.8 (Sector K)	A, B, C	A1, B1, C1, D1	A2, B2	A3, B4
213.8 TO 236.3 (Sector L)	B, C, D	A1, B1, C1, D1	A2, B2	A3, B4
236.3 TO 258.8 (Sector M)	C, D, E	A1, B1, C1, D1	B2, D2	B3, B4
258.8 TO 281.3 (Sector N)	D, E, F	A1, B1, C1, D1	B2, D2	B3, B4, D3
281.3 TO 303.8 (Sector P)	E, F, G	A1, B1, C1, D1	B2, D2	B3, B4, D3
303.8 TO 326.3 (Sector Q)	F, G, H	A1, B1, C1, D1	B2, D2	B3, D3, D4
326.3 TO 348.8 (Sector R)	G, H, J	A1, B1, C1, D1	D2	D3, D4
348.8 TO 11.3 (Sector A)	H, J, K	A1, B1, C1, D1	D2	D4
11.3 TO 33.8 (Sector B)	J, K, L	A1, B1, C1, D1	C2, D2	C4, D4
33.8 TO 56.3 (Sector C)	K, L, M	A1, B1, C1, D1	C2, D2	C4, D4
56.3 TO 78.8 (Sector D)	L, M, N	A1, B1, C1, D1	C2	C4
78.8 TO 101.3 (Sector E)	M, N, P	A1, B1, C1, D1	C2	A4, C3, C4
101.3 TO 123.8 (Sector F)	N, P, Q	A1, B1, C1, D1	C2	A4, C3, C4
123.8 TO 146.3 (Sector G)	P, Q, R	A1, B1, C1, D1	A2, C2	A3, A4, C3
146.3 TO 168.8 (Sector H)	Q, R, A	A1, B1, C1, D1	A2, C2	A3, A4, C3
168.8 TO 191.3 (Sector J)	R, A, B	A1, B1, C1, D1	A2, C2	A3, A4

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

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51.	<u>B</u>		
52.	<u>B</u>		
53.	<u>A</u>		
54.		<u>C</u>	
55.	<u>A</u>		
56.		<u>C</u>	
57.		<u>C</u>	
58.		<u>C</u>	
59.	<u>A</u>		
60.		<u>C</u>	
61.	<u>A</u>		
62.			<u>D</u>
63.			<u>D</u>
64.	<u>A</u>		
65.			<u>D</u>
66.		<u>C</u>	
67.	<u>B</u>		
68.	<u>A</u>		
69.	<u>B</u>		
70.			<u>D</u>
71.	<u>B</u>		
72.		<u>C</u>	
73.			<u>D</u>
74.		<u>C</u>	
75.	<u>A</u>		
S1.		<u>C</u>	
S2.			<u>D</u>
S3.		<u>C</u>	
S4.			<u>D</u>
S5.		<u>C</u>	
S6.		<u>B</u>	
S7.	<u>A</u>		
S8.		<u>B</u>	
S9.	<u>A</u>		
S10.	<u>A</u>		
S11.		<u>C</u>	
S12.			<u>D</u>
S13.	<u>A</u>		
S14.		<u>C</u>	
S15.		<u>B</u>	
S16.	<u>A</u>		
S17.		<u>C</u>	
S18.			<u>D</u>
S19.		<u>C</u>	
S20.			<u>D</u>
S21.	<u>A</u>		
S22.		<u>B</u>	
S23.		<u>B</u>	
S24.		<u>B</u>	
S25.			<u>D</u>