Final Submittal

NORTH ANNA JUNE EXAM
50-338 & 50-339/2004-301

JUNE 17 - 25, 2004

1. Final RO Written Examination

NCS Pearson Test Sheet 100/W

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

MARK ONLY ONE

FEED IN THIS DIRECTION

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

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

ANSWER KEY INFO.

# OF KEYS ITEM COUNT			
0	0	0	2
1	1	1	3
	2	2	4
	3	3	
	4	5	
	5	6	
	6	7	
	7	8	
	8	9	

PERFORMANCE ASSESSMENT

% OF TOTAL SCORE		POINTS EARNED	
00 = 100%			
EQUAL PT VALUE	0	0	0
	1	1	1
	2	2	2
	3	3	3
	4	4	4
	5	5	5
	6	6	6
	7	7	7
	8	8	8
	9	9	9

Bar Code

FEED IN THIS DIRECTION

NUMBER CORRECT
PERCENT CORRECT
ROSTER NUMBER
SCORE
RESCORE

NCS Pearson™

COMBINED POINTS EARNED
COMBINED PERCENT CORRECT
LETTER GRADE
SCORE
RESCORE

100 ITEM

STUDENT ID NUMBER

NAME

SUBJECT

PERIOD DATE

MARKING INSTRUCTIONS

Use a No. 2 Pencil

A ● C D E

Fill oval completely

A B C D E

Erase cleanly

Printed on recyclable paper

The following changes were made based on feedback from validation. <u>Please note that I wish to include an extra examinee reference for question 067AG2.2.22.</u>

002A1.09 Removed bullet about work being performed on valve and added "since turnover" to last bullet. Current I&C procedures would require valve to be placed in manual for work.

007EK2.02 Added AND verbiage to correct answer and one distracter. RTA being closed would not stop SI from being reset if the SI signal was clear.

033AA2.05 Changed correct answer since IR undercompensation would have a negligible effect when in the power range. (Left original answer as a distracter.)

056A2.04 Reworded two bullets (valves are in normal alignment and crew is **briefing** to start the condensate pump) so that applicants would realize that discharge valve was not throttled for starting the pump.

061AK2.01 Added the words "per 0-AP-5.1...." to the stem since removing the fuses would also stop the actuations from occurring as this would clear the high alarm. The procedure does not give this option.

067AG2.2.22 Feel that bases to TS 3.7.5 is also required as part of the references given to the examinee in order for ROs to answer this question. Originally decided not to give the bases because it would have answered an SRO question but this (SRO) question has since been revised. (The bases for this tech spec was included in the references originally given to you with the question.)

G2.3.2 Made the word <u>NOT</u> bold and underlined as per normal conventions.

Corrected misspelled words and changed any ONE (1) to just ONE.

I have included any additional or new question references based on the changes we made during our visit to Atlanta. I included these in case a reviewer needed them.

References needed for RO exam

Curves for question 001K5.09
0-AP-27 for question 033K3.03
T.S. 3.7.5 and bases for question 067AG2.2.22
Steam tables for question 010K5.02

002A1.09 001

The following plant conditions exist.

- Unit 1 is at 50% power
- MOL conditions
- A saturated mixed-bed ion exchanger is in service
- The OATC notices that the **output** of 1-CC-TCV-106 has drifted down approximately 30% since turnover.

Which ONE of the following describes the plant response to this event?

A. T_{ave} will increase until rods step in

B. T_{ave} will decrease until rods step out

C. 1-CH-PCV-1145, letdown PCV, will begin to throttle open

D. 1-CH-TCV-1143, letdown IX divert valve, diverts flow around the ion exchangers

A. Correct. This in an inverse acting valve. When the output drifts down the valve is actually opening. When the valve opens the letdown stream begins to cool off. This causes the demins to have a greater affinity for boron. Tave will increase until rods step out, or the TCV position is adjusted.

B. Incorrect. Could be chosen if candidate does not realize valve is reverse-acting.

C. Incorrect. Will not affect the pressure of letdown stream, only the temperature.

D. Incorrect. Will cool off the letdown stream, not heat it up. T_{ave}, though, will increase.

Ability to predict and/or monitor changes in parameters associated with operating the RCS controls including: RCS T-ave
(CFR: 41.5:45.5)

Modified bank question 50803

References:
Objective 328 from CVCS study guide

Level (RO/SRO):	RO	Tier:	2
Group:	2	Importance Rating:	3.7/3.8
Type (Bank/Mod/New):	MODIFIED	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

007EK2.02 001

The Unit 1 control room team is responding to an inadvertent safety injection (SI). The reactor tripped and the crew is performing 1-E-0, REACTOR TRIP OF SAFETY INJECTION. Two minutes after the event, the crew identifies a sheared shaft on "A" low-head safety injection (LHSI) pump. The Unit Supervisor directs the operator to reset safety injection and secure the "A" low-head safety injection pump. Both SI Reset Switches are placed in RESET. However, the "A" LHSI pump could not be secured when its switch was placed in PULL-TO-LOCK.

Which ONE of the following would explain the inability to reset Train "A" safety injection?

A. Reactor trip breaker RTA failed to open AND the signal that initiated the SI has not cleared.

B. Reactor trip breaker RTB failed to open AND the signal that initiated the SI has not cleared

C. Time delay for resetting SI has not been met

D. Signal that initiated the SI has not cleared ONLY

A. Correct. If RTA did not open and the safety injection signal is still present, then the "A" train of SI will reinitiate once the RESET switch for "A" train springs back from the RESET position.

B. Incorrect. The "B" train of SI can be reset and initiation of "B" train of SI blocked with the "B" train SI reset switch. Candidate chould choose this answer if he/she is not aware that the reset signal is train dependent.

C. Incorrect. The SI signal can be reset after 60 seconds. The stated conditions were that the SI had occurred over 2 minutes ago. Could be chosen if candidate does not know the correct time delay.

D. Incorrect. Signal that initiated SI does not have to be clear in order to reset the SI signal if the reactor trip breakers are open. Candidiate could choose this answer if he/she does not know the conditions for resetting SI.

Knowledge of the interrelations between Reactor Trip - Stabilization and the following: Breakers, relays and disconnects

(CFR: 41.7 / 45.7 / 45.8)

North Anna bank question 5772

References:
NCRODP module 77 - Reactor Protection System (page 50)

Level (RO/SRO):	RO	Tier:	1
Group:	1	Importance Rating:	2.6/2.8
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

033AA2.05 001

Unit 1 is currently at 5% power. The crew has just started increasing power following a chemistry hold when annunciator A-C5, NIS IR HI FLUX ROD STOP, illuminates. Surveying the board the OATC notes the following:

- Permissive P-D2, P-10 PERM PR > 10% BLK NIS LP TRIPS is NOT lit
- The reactor has not tripped, nor is a reactor trip required.

Based on the above, which ONE of the following is correct?

A. The setpoint is incorrect for the intermediate range hi flux rod stop.

B. An intermediate range NI is undercompensated.

C. An intermediate range NI is overcompensated.

D. An intermediate range NI has a blown control power fuse.

A. Correct. The IR range hi flux rod stop has an incorrect value installed.

B. Incorrect. Although undercompensation of an intermediate range would cause the intermediate range to read higher, this effect is negligable when the reactor is in the power range.

C. Incorrect. If an intermediate range was overcompensated it would read lower than the correctly compensated IR. The IR rod stop comes in when either of the IR is above 30% current equivalent. If the correctly compensated IR was reading >30% power equivalent, then the power ranges would also show this power increase and P-D2 would be lit. If an IR had failed low there would be no rod stop.

D. Incorrect. If an intermediate range NI had blown a control power fuse the reactor would have tripped.

Ability to determine and interpret the following as they apply to the Loss of Intermediate Range Nuclear Instrumentation: Nature of abnormality, from rapid survey of control room data

New question

References:
Objective 7803 from self-study guide on Ex-Core Nuclear Instrumentation
Annunciator responses for P-D2, A-C5

Level (RO/SRO):	RO	Tier:	1
Group:	2	Importance Rating:	3.0/3.1
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

056A2.04 001

The following conditions exist on Unit 1:

- 100% power operation
- An oil change has been completed on "B" condensate pump motor
- All tags on "B" condensate pump have been cleared and all valves are in normal alignment
- The crew is briefing to place "B" condensate pump in service
- "B" condensate pump is still in PULL-TO-LOCK
- "A" condensate pump trips
- Annunciators F-B6, "MAIN FD PPS SUCT HDR LO PRESS," and F-A4, "MAIN FD PPS DISCH HDR LO PRESS," illuminate.

Which ONE of the following is correct concerning the crew's response to this event per 1-AP-31, "Loss of Main Feedwater?"

A. Start 'B' condensate pump

B. Restart 'A' condensate pump

C. Trip the reactor and perform the immediate operator actions of 1-E-0

D. Reduce turbine load until feedwater pump suction pressure is adequate

A. Correct. Annunciator response for F-B6 indicates that if the condition persists, main feed pumps will begin to trip following time delays. Annunciator F-A4 is an entry condition for 1-AP-31, Loss of Main Feedwater." Starting the "standby" condensate pump that was about to be started anyway is the fastest way to restore feed pump suction pressure.

B. Incorrect. While it is correct to start a condensate pump to restore main feed pump suction pressure, it would be improper to attempt to restart a failed pump when there was no indication of why the pump failed. Since "B" condensate pump was ready to be placed in service it should be started at this time. This answer could be chosen if candidate believes that the operating procedure should be used to start the "B" pump, or that PMT needs to be satisfied before the pump is placed in service.

C. Incorrect. An attempt should be made to start "B" condensate pump to restore feed pump suction pressure. This answer could be chosen if candidate believes that the operating procedure should be used to start the "B" pump, or that PMT needs to be satisfied before the pump is placed in service.

D. Incorrect. With only one condensate pump running it will not be possible to reduce turbine load fast enough to keep the feed pumps from tripping. This answer could be chosen if the candidate does not remember that the feed pumps will begin to sequentially trip if the low suction pressure condition persists.

Ability to (a) predict the impacts of the following on the Condensate system and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: Loss of condensate pumps

(CFR: 41.5 / 43.5 / 45.3 / 45.13)

North Anna bank question 5039

References:
Objective 14561 from self-study guide for Abnormal Procedures

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	2.6/2.8
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

061AK2.01 001

Assume the following:

- Fuel building ventilation is in Configuration B for work in the spent fuel pit.
- Hi and hi-hi radiation alarms are received on 1-RMS-RM-152, New Fuel Storage Area radiation monitor.
- 1-RM-RMS-153, Fuel Pit Bridge radiation monitor is reading normally.
- A call is received from the fuel building reporting that 1-RM-RMS-152 has apparently failed high.

Which ONE of the following describes the actions that the backboards operator should take per 0-AP-5.1, "Common Radiation Monitoring System?"

A. Place the Fuel Building Radiation Automatic Interlock keyswitch in DISABLE within 2 minutes of time the hi-hi radiation alarm was received to stop automatic actions

B. Remove the fuses from 1-RM-RMS-152 within 2 minutes of time the hi-hi radiation alarm was received to stop automatic actions

C. Reset the hi-hi alarm on 1-RMS-RM-152 ONLY to stop automatic actions

D. Declare 1-RMS-RM-152 inoperable, all automatic actions require BOTH 152 and 153 to be reading hi-hi radiation

A. Correct. The keyswitch will be in the ENABLE position with fuel building ventilation in configuration B lineup. The radiation alarm is due to a malfunction of 1-RMS-RM-152. The keyswitch must be placed in DISABLE within 2 minutes of the time the hi-hi alarm was received to prevent swapping the control room to emergency ventilation and dumping air bottles.

B. Incorrect. The high and the high-high alarms must both be in for 2 minutes with the keyswitch in ENABLE in order for the automatic actions to occur. Removing the fuses for the radiation monitor will clear the high alarm (control power must be available for the high alarm to be in) and thus keep the automatic actions from occurring; however, the AP does not direct these actions.

C. Incorrect. The radiation monitor is failed; the hi-hi alarm will not clear. If the alarm would clear within the two minutes then the automatic actions would not occur.

D. Incorrect. With the keyswitch in ENABLE it only takes one of the two radiation monitors (152 or 153) to be hi-hi to cause the automatic actions. A candidate could choose this answer based on the knowledge that both radiation monitors are located in the fuel building and the assumption that a hi-hi alarm on both would be likely if radiation was actually increasing.

Knowledge of the interrelations between Area Radiation Monitoring system and the following: Detectors at each ARM system location

(CFR: 41.7 / 45.7 / 45.8)

New Question

References:
Module 46 on Radiation Monitors (pages 2, 12-13, 27)
0-AP-5.1,"Common Radiation Monitoring System."
Objective 10705 from self-study guide on Radiation Monitoring System

Level (RO/SRO):	RO	Tier:	1
Group:	2	Importance Rating:	2.5/2.6
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

The following conditions exist:

- Unit 1 is at 100% power
- 1-FW-P-3A ("A" motor-driven aux feed pump) is tagged out for repair
- 1-MS-95, "C" Main Steam Header to Auxiliary Feedwater Pump (1-FW-P-2), is closed due to a leak downstream
- A fire has started in the motor-driven auxiliary feed pump house that has spread to oil soak pads and engulfed 1-FW-P-3B.

Based on these conditions, the crew should _____.

A. enter T.S. 3.7.5 and be in mode 3 within 6 hours

B. enter T.S. 3.0.3 and be in mode 3 within 7 hours

C. enter T.S. 3.7.5 and immediately initiate action to restore one AFW pump to operable status

D. enter T.S. 3.7.5 and restore one AFW train to operable status within 72 hours

A. Correct. Two aux feed pumps are inoperable, 1-FW-P-3A and 1-FW-P-3B. (The bases for the tech spec only requires that 2 of the 3 steam supplies to the terry turbine be operable.) Per action C of T.S. 3.7.5 the unit must be in mode 3 within 6 hours.

B. Incorrect. T.S. 3.7.5 contains an action for having two aux feed water trains inoperable. The candidate may think that all three pumps are inoperable and choose this answer based on the fact that many tech specs do not contain a provision for this type of situation.

C. Incorrect. This is the action per T.S. 3.7.5 for three inoperable aux feed pumps. Only two pumps are inoperable. The candidate may think all three pumps are inoperable due to the closed steam supply valve.

D. Incorrect. This is the action per T.S. 3.7.5 for having one aux feed pump inoperable; two pumps are inoperable. The candidate may not realize that two pumps are inoperable based on the fire.

Plant Fire On-site
Knowledge of limiting conditions for operations and safety limits.

New question

Candidate will need copy of tech spec 3.7.5 and bases

References:
Tech Spec 3.7.5 and bases

Level (RO/SRO):	RO	Tier:	1
Group:	2	Importance Rating:	3.4/4.1
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	Y	Last Exam(Y/N):	N

G2.3.2 001

Which ONE of the following is **NOT** part of the ALARA plan for reducing dose during a unit refueling outage?

A. Using the gas stripper to degas the primary during RCS cooldown.

B. Opening of an RCS loop bypass MOV during RCS cooldown.

C. Keeping pressurizer spray valves open for as long as possible during RCS cooldown.

D. Keeping RCPs running as long as possible during RCS cooldown.

A. Correct. The RCS is degassed to reduce hydrogen concentration to allow the loops to be opened for maintenance.

B. Incorrect. This is an ALARA practice to allow cleanup of the inactive bypass lines. This answer could be chosen if the examinee does not realize that it is allowable to open one bypass MOV as long as the other two RCS loops are operable.

C. Incorrect. This is an ALARA practice to flush hot spots out of the spray lines. Examinee could choose this answer if he/she does not realize that a spray valve may be opened as long as RCP NPSH requirements and pressurizer cooldown limits are monitored.

D. Incorrect. Keeping the RCPs running during cooldown keeps crud deposits from forming in the idle loops causing hot spots. An examinee could choose this answer if he/she does not realize that hot spots can form in idle loops.

Radiation Control
Knowledge of facility ALARA program

References:
1-OP-3.2, "Unit Shutdown from Mode 3 to Mode 4."
Objective 12958 from study guide on Integrated Plant Operations

Level (RO/SRO):	RO	Tier:	3
Group:		Importance Rating:	2.5/2.9
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

Additional or new question references for questions added or revised during our Atlanta visit.

The STOP position of the pump control switch provides a manual pump stop feature. When STOP is selected, the discharge MOV shuts, then the pump stops. Interlocks are provided to prevent the initiation of a discharge valve closure and the corresponding pump trip, if less than 4 minutes have elapsed since the automatic or manual trip of another pump, or if less than 4 minutes have elapsed since a previous pump start.

Each discharge MOV (MOV 100A, B, C & D) has variable position throttling capability between 45 degrees and full open. Once open, each discharge valve may be throttled to any position between 45 degrees and full open by use of THROTTLE/OPEN pushbuttons located on the intake structure panel. An electrical interlock prevents the simultaneous pickup of both the open and close contactors if both pushbuttons are depressed together. Both pushbuttons are back lit, the THROTTLE pushbutton is color coded green, the OPEN pushbutton red. Valve position limit switches are interlocked to prevent throttling past the 45-degree position. There is also an indicator, located above the pushbuttons for each valve, which indicates valve position in percent.

The following indications for the circulating water pumps are also provided on the Intake Structure Control Panel in the MCR:

1. Pump discharge MOV red (OPEN) and green (CLOSED) lights;
2. Circulating water pump motor ammeters. (running current is 300 ±10 amps);
3. A blue CIRCULATING WATER START/STOP INHIBIT light, warning the operator that a circulating water pump cannot be started or stopped until the light is extinguished after 4 minutes from the previous start, stop, or automatic trip of a previous pump;
4. CIRCULATING WATER PUMP 1A, 1B, 1C, and 1D ELBOW FULLY PRIMED red lights as sensed by LS-VP-111A, B, C, and D; and
5. CIRCULATING WATER INTAKE TUNNEL FULL red light as sensed by LS-VP-112.

The following alarms are associated with the circulating water pumps:

1. CIRCULATING WATER PUMP 1A-1B-1C-1D AUTO TRIP (window 1B-A5) annunciating an overcurrent trip,
2. 4 kV BUS 1G UNDERVOLTAGE (window 1H-H8), and
3. CIRCULATING WATER PUMPS LOSS OF DC CONTROL POWER alarm (window 1J-F7) annunciating the loss of 125V dc control power at 4 kV Bus 1G.

The following information associated with operation of the circulating water pumps is provided to the computer:

1. Circulating water pump breaker closed for each pump;

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14.	CHECK INSTRUMENT AIR PRESSURE OUTSIDE CONTAINMENT - INCREASING: • 1-IA-PI-100 • 2-IA-PI-200	Do the following, WHILE CONTINUING WITH THIS PROCEDURE: • Locally check if 2-IA-TV-211, 2-IA-D-7 Bypass Valve, is open, as indicated by illuminated red light at 2-IA-CP-5 and by local valve position. • IF Instrument Air pressure is NOT trending to greater than 94 PSIG, THEN do the following: a) Bypass BOTH Instrument Air Dryers by locally opening the following valves (Auxiliary Building): • 1-IA-1676, Instrument Air Dryer 1 Bypass Valve (1-IA-D-1) • 2-IA-23, Instrument Air Dryer 1 Bypass Valve (2-IA-D-1)

(STEP 14 CONTINUED ON NEXT PAGE)

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

14. CHECK INSTRUMENT AIR PRESSURE OUTSIDE CONTAINMENT - INCREASING (Continued):

b) IF an Instrument Air Dryer is continuously blowing down, THEN isolate the affected dryer, as follows (Auxiliary Building):

- IF 1-IA-D-1 is affected, THEN close the following valves:
  - 1-IA-1678, Instrument Air Dryer 1 Outlet Hdr Isol Valve
  - 1-IA-1677, Instrument Air Dryer 1 Inlet Isolation Valve
- IF 2-IA-D-1 is affected, THEN close the following valves:
  - 2-IA-24, Instrument Air Dryer 1 Outlet Isolation Valve
  - 2-IA-26, Instrument Air Dryer 1 Inlet Isolation Valve

GO TO Step 28.

NOTE: Attachment 4 provides additional information to heighten awareness of important equipment that may be affected by loss of Instrument Air.

15.__ CONTINUE ATTEMPTS TO RECOVER CONTAINMENT INSTRUMENT AIR

Topic 2.1.2: Instrument Air Compressor Control 4271

2.1.2a. Objective

Explain the following concepts associated with the instrument air compressor's controls.

- How each position of the compressor control switch in the control room affects compressor operation
- Why the compressor automatically unloads at 118 psig as sensed at pressure switch 1-IA-PS-115C
- How the compressor LOSS OF POWER RESET switch position affects compressor operability for a momentary loss of power
- Purpose of the RESET/START push-button on the compressor
- How instrument air compressor run time is determined
- Purpose of the two MOTOR OVERLOAD RESET push-button

2.1.2b. Content

1. Each position of the Instrument Air Compressor control switch in the Control Room operates as follows.
    1.1. Control switch to "Hand"
        1.1.1. Compressor will start
        1.1.2. Loads at 110 psig decreasing
        1.1.3. Unloads at 115 psig increasing
        1.1.4. Compressor will not shut off it will stay running unloaded indefinitely
    1.2. Control switch to "Auto"
        1.2.1.1. Compressor will start
        1.2.1.2. Loads at 108 psig
        1.2.1.3. Unloads at 113 psig
        1.2.1.4. If compressor runs unloaded for 20 minutes in auto it will trip
        1.2.1.5. Compressor auto starts at 108 psig decreasing
    1.3. Control switch to "Off"
        1.3.1. Compressor stops after an unloading delay of 4 sec

2. The compressor LOSS OF POWER RESET switch position affects compressor operability for a momentary loss of power as follows.
   2.1. Assuming the switch in Control Room is in "Hand" or "Auto", following a loss of power, the compressor will automatically start provided the reset switch is in the "On" position.
   2.2. If the Reset Switch is in the "Off" position, the compressor must be reset locally in order for it to restart following restoration of power.
   2.3. The Service air compressor does not have a loss of power reset switch

3. Instrument Air Compressor run time is determined by use of a counter located on the control section of the Instrument Air Compressor.

4. The purpose of the RESET/START push-button on the Instrument Air Compressor is to allow restarting the compressor following a loss of power.
   4.1. This action is only required when the LOSS OF POWER RESET switch is in "Off."

5. There are two MOTOR OVERLOAD RESET pushbuttons on the IA compressor front panel. One pushbutton resets the compressor motor; the other resets the fan motor.

6. The instrument air compressor automatically unloads at 118 psig to prevent overloading the emergency bus and limits motor horsepower to 109.

Dominion

NORTH ANNA POWER STATION

PROCEDURE NO: **1-OP-46.1**

REVISION NO: **8**

PROCEDURE TYPE: **OPERATING PROCEDURE**

UNIT NO: **1**

PROCEDURE TITLE:

OPERATION OF 1-IA-C-1, INSTRUMENT AIR COMPRESSOR

REVISION SUMMARY:

- Converted to FrameMaker using Template Rev. 030.
- Changed Shift Supervisor to SRO.
- Incorporated OP 03-0588, by adding subsection 5.2, to allow jogging the air compressor.

PROBLEMS ENCOUNTERED: ☐ NO ☐ YES **Note:** If YES, note problems in remarks.

REMARKS: _____

_____

_____

_____

_____ (Use back for additional remarks.)

SRO: _____ DATE: _____

TABLE OF CONTENTS

1.0 PURPOSE

1.1 To direct placing 1-IA-C-1, Instrument Air Compressor, in Service.

1.2 To direct removing 1-IA-C-1, Instrument Air Compressor, from Service.

2.0 REFERENCES

2.1 Source Documents

None

2.2 Technical Specifications

None

2.3 Technical References

2.3.1 DCP 89-04B, Service and Instrument Air System Upgrade

2.3.2 Atlas Copco Tech Manual for ZR3 Series

2.3.3 1-AR-25

2.4 Commitment Documents

None

3.0 INITIAL CONDITIONS

Verify at least one Service Water header operable and in service.

4.0 PRECAUTIONS AND LIMITATIONS

4.1 Perform all operations in accordance with RWPs. Make every effort to maximize personnel safety while minimizing personnel exposure and area contamination, both surface and airborne. Use ALARA concepts.

4.2 Comply with the following guidelines when marking steps N/A:

- IF the conditional requirements of a step do not require the action to be performed, THEN mark the step N/A.
- IF any other step is marked N/A, THEN have the SRO approve the N/A and justify the N/A on the Procedure Cover Sheet.

4.3 IF the compressor loses electrical power, THEN, when power is restored, the compressor will start and run for approximately 20 minutes provided the AUTO START switch located on the compressor is in ON and the Control Room switch is in HAND or AUTO.

4.4 The compressor will trip because of any of the following:

- Motor Overload (compressor or cooling fan)
- Cooling System Fault (low flow)
- Low Oil Pressure (20 psig)
- High Oil Temperature (175° F)
- Air Temperature LP Outlet (425° F)
- Air Temperature HP Inlet (145° F)
- Air Temperature HP Outlet (425° F)

4.5 IF the compressor is running in AUTO, THEN the compressor will load at 98 psig and unload at 106 psig.

4.6 IF the compressor is running in HAND, THEN the compressor will load at 103 psig and unload at 109 psig.

Init Verif

5.0 INSTRUCTIONS

5.1 Starting 1-IA-C-1, Instrument Air Compressor, When Compressor Was In Auto/Standby

_____ 5.1.1 Verify Initial Condition is satisfied.

_____ 5.1.2 Review Precautions and Limitations.

NOTE: IF power is NOT available to 1-IA-C-1, THEN refer to 1-MOP-46.01, Instrument Air Compressor 1-IA-C-1, to provide power to 1-IA-C-1.

_____ 5.1.3 Verify power available to 1-IA-C-1.

_____ 5.1.4 Start the compressor by pushing the HAND button for 1-IA-C-1 located on the H Train Safeguards Panel.

_____ 5.1.5 Depress the OFF button associated with the AUTO Control button.

Completed by: _____ Date: _____

5.2 **Jogging 1-IA-C-1, Instrument Air Compressor, When Compressor Was In Auto/Standby**

5.2.1 Review Precautions and Limitations.

5.2.2 Verify power available to 1-IA-C-1. IF power is NOT available, THEN GO TO 1-MOP-46.01, Instrument Air Compressor 1-IA-C-1.

5.2.3 Jog the compressor by pushing the HAND button for 1-IA-C-1 located on the H Train Safeguards Panel.

5.2.4 Depress the OFF button associated with the HAND control button.

5.2.5 IF the compressor was placed in AUTO, AND Instrument Air is at least 106 psig, THEN after approximately 20 minutes, verify that the AUTO OPERATION annunciator lights and the compressor stops.

Completed by: _____ Date: _____

5.3 Removing 1-IA-C-1, Instrument Air Compressor, From Service

5.3.1 Review Precautions and Limitations.

5.3.2 Verify sufficient air systems are available before removing 1-IA-C-1 from service.

5.3.3 Do one of the following. Mark N/A the steps not used.

a. Remove 1-IA-C-1 from service by pushing the OFF buttons located on the H Train Safeguards Panel.

b. IF it is desired to place 1-IA-C-1 in Auto/Standby, THEN do the following at the 1-IA-C-1 control switch in the Control Room:

1. Push the AUTO button.

2. Push the OFF button associated with the HAND control button.

5.3.4 IF the compressor was placed in AUTO, AND Instrument Air is at least 106 psig, THEN, after approximately 20 minutes, verify that the AUTO OPERATION annunciator lights and the compressor stops.

Completed by: _____ Date: _____

001K5.09 001

Unit 1 is currently at 50% power. Power escalation was stopped several hours ago due to a problem with governor valve #1. The reactor engineer has requested that rods be withdrawn to 110 steps on D bank to place them further above the rod insertion limits. The following plant conditions exist:

- Time in life is 11,200 MWD/MTU (Cycle 17)
- Control rods are currently at 105 steps on D bank
- RCS boron is 975 ppm
- "A" BAST is at 14,000 ppm
- Xenon is stable
- RCS Tave is stable on program.

Which ONE of the following indicates the number of gallons of boric acid that will have to be added in order to maintain RCS Tave and reactor power stable at 50% power with rods at 110 steps on D bank?

A. 10.8

B. 15.3

C. 26.6

D. 100.8

A. Incorrect. This is the approximate answer you would get if you use HZP rod worth values.

B. Correct. Using At-power rod worth of 634.2 (interpolated) for 105 steps and 607.6 for 110 steps and a boron worth of –6.73 pcm/ppm

634.2 - 607.6 = 26.6 pcm/ -6.73 = -3.95 ppm

Using equation 50455.4 * ln[(14000 - 975)/(14000 - 978.95)] = 15.3 gallons

C. Incorrect. This is the pcm needed. If candidate does not finish equation they could choose this answer.

D. Incorrect. This is the approximate answer you would get if you do not divide by the boron worth number, i.e. use 1001 as your final boron number versus 979.

Knowledge of the operational implications of the following concepts as they apply to the Control Rod drive system: Relationships between reactivity due to boron and reactivity due to control rod
(CFR: 41.5 / 45.7)

New question

References used and needed: rod worth curve tables (3.5 - give both HZP and full power tables), boration table/equation (2.2), boron coefficient curve (3.4)

Level (RO/SRO):	RO	Tier:	2
Group:	2	Importance Rating:	3.5/3.7
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	Y	Last Exam(Y/N):	N

002A1.09 001

The following plant conditions exist.

- Unit 1 is at 50% power
- MOL conditions
- A saturated mixed-bed ion exchanger is in service
- The OATC notices that the **output** of 1-CC-TCV-106 has drifted down approximately 30% since turnover.

Which ONE of the following describes the plant response to this event?

A. T_{ave} will increase until rods step in

B. T_{ave} will decrease until rods step out

C. 1-CH-PCV-1145, letdown PCV, will begin to throttle open

D. 1-CH-TCV-1143, letdown IX divert valve, diverts flow around the ion exchangers

A. Correct. This in an inverse acting valve. When the output drifts down the valve is actually opening. When the valve opens the letdown stream begins to cool off. This causes the demins to have a greater affinity for boron. Tave will increase until rods step out, or the TCV position is adjusted.

B. Incorrect. Could be chosen if candidate does not realize valve is reverse-acting.

C. Incorrect. Will not affect the pressure of letdown stream, only the temperature.

D. Incorrect. Will cool off the letdown stream, not heat it up. T_{ave}, though, will increase.

Ability to predict and/or monitor changes in parameters associated with operating the RCS controls including: RCS T-ave
(CFR: 41.5:45.5)

Modified bank question 50803

References:
Objective 328 from CVCS study guide

Level (RO/SRO):	RO	Tier:	2
Group:	2	Importance Rating:	3.7/3.8
Type (Bank/Mod/New):	MODIFIED	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

003AK3.09 001

Unit 2 is at 45% power when a control bank rod drops into the core. The reactor did not trip. The procedure for recovering this rod requires that the dropped rod's group step counter reading be recorded.

Which ONE of the following states the reason for this requirement?

A. This allows the operator to determine final position of the dropped rod at the end of recovery.

B. This documents that the rod insertion limits have not been violated during recovery.

C. This allows the bank overlap unit to be reset to its proper value after recovery.

D. This allows the operator to determine rod withdrawal rate in accordance with Attachment 3, " Calculation of Maximum Rod Withdrawal Rate."

A. Correct. The operator will have to withdraw the dropped rod back to the position of all the other rods in that bank. All other rods in that bank will have their lift coils disconnected. This will allow only the dropped rod to move. The step counter is repositioned to zero and the P/A Converter tracks its movement. The operator uses the recorded step counter reading to know where to place the dropped rod before reconnecting all the other rods in that bank.

B. Incorrect. Step 6 of 1-AP-1.2 has the operator verify Rod Insertion Limits met. This is done before the step counter is taken to zero , therefore there is no need to record step counter numbers while performing this step. This step does need to be done per 1-AP-1.2 and the operator does need to know rod heights. This makes this answer plausible.

C. Incorrect. The Bank Overlap function is not affected because individual bank select is used to withdraw control rods. This answer is plausible. Bank overlap will have to be reset if an entire bank did not move when demanded. Attachment V to verify proper bank overlap is performed in 1-AP-1.3, " Control Rod Out of Alignment."

D. Incorrect. Rod withdrawal rate using Attachment 3 will be performed but the withdrawal rate is based on time since the rod dropped. This is plausible due to Attachment 3 needing to be performed. Examinee may figure localized xenon effects are the basis for limiting withdrawal rate. Xenon is a function of power. The examinee may relate this function to rod height.

Knowledge of the reasons for the following responses as they apply Dropped Control Rod:

Recording of group bank position for dropped rod (reference point used to withdraw dropped rod to equal height with other rods in the bank)

(CFR: 41.5 / 41.10 / 45.6 / 45.13)

North Anna bank question 460

References:
Objective 15168 from Abnormal Procedures study guide

Level (RO/SRO):	RO	Tier:	1
Group:	2	Importance Rating:	3.0/3.5
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

003GG2.2.22 001

Unit 1 is in mode 4
RHR is in service
The following RCS conditions exist:

Loop Cold Leg Temperatures		Steam Generator Temperatures	
Loop A	285°F	SG A	345°F
Loop B	228°F	SG B	250°F
Loop C	269°F	SG C	319°F

Based on the above parameters, which ONE of the following lists the RCPs that can be started?

A. None of the reactor coolant pumps.

B. "B" reactor coolant pump ONLY.

C. "A" and "C" reactor coolant pumps ONLY.

D. All of the reactor coolant pumps.

A. Correct. Since loop B cold leg temperature is <235, each SG temperature would have to be less than or equal to 50 degrees above each cold leg temperature.

B. Incorrect. Candidates may pick this answer if they think the limit is > 50 degrees, vice less than or equal to,and do not realize that it applies to each SG and cold leg.

C. Incorrect. Candidates may pick this answer if they think it is permissible to start pumps in the loops that are less than or equal to 50 degrees below the respective cold leg temperatures.

D. Incorrect. Candidates could pick this answer if they think they 50 degree limit only applies to the loop that has a cold leg temperature that is less than or equal to 235. "B" loop meets the 50 degree criteria.

RCPs
Knowledge of limiting conditions for operations and safety limits.

Modified North Anna bank question 60116

References:

Objective 3528 from study guide on RCS
Tech Spec 3.4.6

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	3.4/4.1
Type (Bank/Mod/New):	MODIFIED	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

004K2.04 001

Unit 1 has just restored power to the 1H 4160V bus. Operators are currently restoring power to associated MCCs. The following annunciators are currently lit:

B-C5 BAT 1A HI TEMP CH I-II
B-C6 BAT 1A LO TEMP CH I-II

Which ONE of the following describes the actions(s) required to clear these annunciators?

A. Press the reset button on the heater's power supply breaker.

B. Adjust setpoint on local temperature controllers.

C. Take the heater's breaker control switch to PTL then back to AUTO.

D. Cycle the heater's power supply breaker to OFF then back to ON.

A. Correct. When the BAST heaters lose power both the HI and LO temperature annunciators will come in. The heaters must be reset using the local reset button on the heater's power supply breaker.

B. Incorrect. There are TICs located in the auxiliary building near the tanks. These are only adjusted by instrument techs for ICPs. Operators take logs on these once a day. A candidate could choose this answer if he/she doesn't realize that adjustment of the TIC will not clear the HI and LO temperature alarms, the undervoltage signal must be reset.

C. Incorrect. Pressurizer heaters can be reset using this method. A charging pump breaker Lockout annunciator is also reset using this method. There are no control switches for the BAST heaters. A candidate could choose this answer based on knowledge of how other equipment is reset.

D. Incorrect. The reset button is located on the breaker, turning the breaker OFF then back ON will not reset the heater UV on the breaker. A candidate could choose this answer is he/she remembers that the reset involves the breaker, but does not remember that a reset button must be pressed.

Knowledge of electrical power supplies to the following: BWST tank heaters

(CFR: 41.7)

New question

References:
Attachment 3 of AP-10
Annunciator response for B-C6

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	2.6/2.7
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

005A4.02 001

The following conditions exist:

- Unit 1 is in mode 5
- RHR is in service maintaining a stable RCS temperature
- 1-CC-MOV-100A and 1-CC-MOV-100B (CC to the RHR heat exchangers) are throttled open approximately 5%
- The RHR flow control valve (1-RH-FCV-1605) is controlling in automatic
- An instrument technician inadvertently isolates air to the RHR heat exchanger outlet valve (1-RH-HCV-1758).

Which ONE of the following describes the effect of this failure on the RHR system?

RHR outlet temperature will _____ and 1-RH-FCV-1605 output will _____ to maintain a stable flow rate.

A. decrease; decrease

B. increase; increase

C. decrease; increase

D. increase; decrease

A. Correct. 1-RH-HCV-1758 fails open. This will cause full flow through the heat exchanger(s). RHR outlet temperature will decrease. In automatic, 1-RH-FCV-1605 output will decrease to throttle the valve closed in order to control RHR flow at the setpoint.

B. Incorrect. 1-RH-FCV-1605 fails closed. The candidate could mistakenly think that 1-RH-HCV-1758 also fails closed. This assumption would make this answer correct.

C. Incorrect. In automatic, 1-RH-FCV-1605 output will decrease to throttle the valve closed in order to control RHR flow at the setpoint.

D. Incorrect. RHR temperature will decrease since 1758 fails open. In automatic, 1-RH-FCV-1605 output will decrease to throttle the valve closed in order to control RHR flow at the setpoint. Candidate could mistakenly think that 1758 failed closed and that 1605 is a reverse acting valve.

Ability to manually operate and/or monitor in the control room: Heat exchanger bypass flow control

(CFR: 41.7 / 45.5 to 45.8)

New Question

References:
NCRODP module 40 – Residual Heat Removal (pages 8, 17-18)
Attachment to 0-AP-10
Loop Book RH-005

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	3.4/3.1
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

005K1.09 001

Which ONE of the following would be an effect of placing the Residual Heat Removal System in service when its boron concentration is lower than that of the Reactor Coolant System?

A. A loss of shutdown margin could occur.

B. The decay heat load could increase due to the lower suspended solids in the system.

C. Radiation levels in the RHR system would decrease.

D. RHR system heat exchangers could become fouled due to the sudden pH change.

A. Correct. If the RHR boron concentration is lower than that of the RCS then placing the RHR system in service will allow this water to mix with the RCS, lowering the RCS boron concentration. The new, lower RCS boron concentration may not be high enough to meet shutdown margin criteria.

B. Incorrect. The examinee may think lower suspended solids could lead to less neutron absorption from subcritical multiplication leading to an increased decay heat load.

C. Incorrect. The examinee may assume since RHR is at a lower boron concentration that it was last in service earlier in core life. Radiation levels in the RCS tend to increase over core life due to leaking fuel.

D. Incorrect. The high boron concentration will raise the pH of the RHR system, but this will not cause fouling in the heat exchangers.

Knowledge of the physical connections and/or cause-effect relationships between RHR system and the following: RCS

(CFR: 41.2 to 41.9 / 45.7 to 45.8)

North Anna bank question 2004

References:
1-OP-14.1

Level (RO/SRO):	RO	Tier:	2
Group:	2	Importance Rating:	3.6/3.9
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	

006K2.04 001

Unit 1 has experienced a loss of offsite power with a failure of the 1H diesel to start. An SI signal is then generated due to SG delta P.

Under these conditions, which ONE of the following sets of valves will reposition on the SI signal?

A. 1-SI-MOV-1867D, BIT outlet
1-CH-MOV-1115B, Charging pump suction from RWST
1-CH-MOV-1289B, Normal charging outlet

B. 1-SI-MOV-1867C, BIT outlet
1-CH-MOV-1115B, Charging pump suction from RWST
1-CH-MOV-1115E, Charging pump suction from VCT

C. 1-SI-MOV-1867A, BIT inlet
1-CH-MOV-1289B, Normal charging outlet
1-CH-MOV-1115B, Charging pump suction from RWST

D. 1-SI-MOV-1867B, BIT inlet
1-CH-MOV-1289A, Normal charging outlet
1-CH-MOV-1115E, Charging pump suction from VCT

A. Correct. 1867D is BIT outlet MOV powered from J bus. 1-CH-MOV-1115B is charging pump suction from RWST powered from J bus. 1-CH-MOV-1289B is normal charging outlet powered from 1J bus. (The charging pump suctions from the RWST and VCT are confusing. 1115C and 1115D are powered from the H bus while 1115B and 1115E are powered from the J bus. If the candidate confuses these power supplies he/she could immediately discard all answers with 1115B in them as being incorrect.)

B. Incorrect. 1-SI-MOV-1867C is powered from H bus.

C. Incorrect. 1-SI-MOV-1867A is powered from H bus.

D. Incorrect. 1-CH-MOV-1289A is powered from H bus.

Knowledge of electrical power supplies to the following: ESFAS-operated valves

(CFR: 41.7)

New question

References:
North Anna load list

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	3.6/3.8
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

007A4.01 001

The following conditions exist:

- Unit 1 is at 100% power
- A PRZR safety valve has been leaking by for several hours
- Annunciator B-H1, PRZ RELIEF TK HI TEMP, has just illuminated
- The annunciator response directs the operator to do a feed and bleed on the PRT to reduce temperature.

The operator will open 1-RC-HCV-1519B, PRZR RELIEF TANK MAKEUP WATER SUPPLY ISOL, to fill the PRT using the _____ located on _____.

A. switch; benchboard 1-1

B. switch; benchboard 1-2

C. pushbutton; "H" safeguards panel

D. pushbutton; "J" safeguards panel

A. Correct. The valve is operated by an open/close switch located on benchboard 1-1.

B. Incorrect. The switch is located on benchboard 1-1 not benchboard 1-2.

C. Incorrect. While valves located on the safeguards panels are usually operated by pushbutton, this valve is located on benchboard 1-1. 1-RC-HCV-1519**A** is located on the "H" safeguards panel.

D. Incorrect. While valves located on the safeguards panels are usually operated by pushbutton, this valve is located on benchboard 1-1.

Ability to manually operate and/or monitor in the control room: PRT spray supply valve
(CFR: 41.7 / 45.5 to 45.8)

New question

References:
NCRODP module 38, Reactor Coolant System (page 60)

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	2.7/2.7
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

007EK2.02 001

The Unit 1 control room team is responding to an inadvertent safety injection (SI). The reactor tripped and the crew is performing 1-E-0, REACTOR TRIP OF SAFETY INJECTION. Two minutes after the event, the crew identifies a sheared shaft on "A" low-head safety injection (LHSI) pump. The Unit Supervisor directs the operator to reset safety injection and secure the "A" low-head safety injection pump. Both SI Reset Switches are placed in RESET. However, the "A" LHSI pump could not be secured when its switch was placed in PULL-TO-LOCK.

Which ONE of the following would explain the inability to reset Train "A" safety injection?

A. Reactor trip breaker RTA failed to open AND the signal that initiated the SI has not cleared.

B. Reactor trip breaker RTB failed to open AND the signal that initiated the SI has not cleared

C. Time delay for resetting SI has not been met

D. Signal that initiated the SI has not cleared ONLY

A. Correct. If RTA did not open and the safety injection signal is still present, then the "A" train of SI will reinitiate once the RESET switch for "A" train springs back from the RESET position.

B. Incorrect. The "B" train of SI can be reset and initiation of "B" train of SI blocked with the "B" train SI reset switch. Candidate could choose this answer if he/she is not aware that the reset signal is train dependent.

C. Incorrect. The SI signal can be reset after 60 seconds. The stated conditions were that the SI had occurred over 2 minutes ago. Could be chosen if candidate does not know the correct time delay.

D. Incorrect. Signal that initiated SI does not have to be clear in order to reset the SI signal if the reactor trip breakers are open. Candidate could choose this answer if he/she does not know the conditions for resetting SI.

Knowledge of the interrelations between Reactor Trip - Stabilization and the following: Breakers, relays and disconnects

(CFR: 41.7 / 45.7 / 45.8)

North Anna bank question 5772

References:
NCRODP module 77 - Reactor Protection System (page 50)

Level (RO/SRO):	RO	Tier:	1
Group:	1	Importance Rating:	2.6/2.8
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

008AK1.02 001

Which ONE of the following describes how and why the **rate** of RCS depressurization changes as RCS pressure decreases from 1000 psig due to a stuck open pressurizer PORV? (Assume SI DOES NOT initiate and NO operator action is taken.)

A. Steam voiding in the vessel head acts like a pressurizer and decreases the rate of RCS depressurization.

B. Reduced restrictions through the PRT rupture disk increase the rate of RCS depressurization.

C. As RCS pressure decreases, pressurizer heaters are energized, decreasing the rate of RCS depressurization.

D. At low RCS pressure, heat retained in the steam generators is released and increases the rate of RCS depressurization.

A. Correct. The phase change as the RCS hits saturation will slow the rate of depressurization until the amount of inventory loss becomes so great that the phase change does little to change the rate of RCS depressurization.

B. Incorrect. The PRT rupture disk is sized to allow relief through the PORV's without inhibiting their capacity to relieve RCS pressure. If the rupture disk were smaller than the PORV's this answer would cause the rate of decrease to slow. This makes this answer plausible.

C. Incorrect. As pressure decreases pressurizer heaters will energize but will not slow depressurization of the RCS from a stuck open PORV. The rate of inventory loss is so great that the contribution of the heaters can't be seen. This answer is plausible because on a slow loss of inventory heaters do affect the rate at which pressure decreases.

D. Incorrect. Heat released from a steam generator is a function of RCS temperature in comparison to steam generator temperature. During cold RCS temperatures RCP starts can cause a pressure spike in the RCS if steam generators are hotter than the RCS. This is mentioned both in procedures and Tec. Specs. Examinee may use this knowledge to choose this answer.

Knowledge of the operational implications of the following concepts as they apply to the Pressurizer Vapor Space Accident: Change in leak rate with change in pressure

(CFR: 41.8 to 41.10 / 45.3)

From INPO bank - Farley 1

Which one of the following describes the reason the rate of RCS pressure decrease changes as RCS pressure decreases from 1000 psig due to a stuck open pressurizer PORV? (Assume SI DOES NOT initiate and NO operator action is taken.

A. Steam voiding in the RCS acts like a pressurizer and slows down the rate of RCS pressure decrease.
B. RCS pressure decrease rate increases due to reduced restrictions through the PRT rupture disk
C. As RCS pressure decreases, pressurizer heaters are energized, slowing the rate of RCS pressure decrease.
D. At low RCS pressure, heat retained in the steam generators is released which increases the rate of RCS pressure decrease.

Answer: A

Level (RO/SRO):	RO	Tier:	1
Group:	1	Importance Rating:	3.8/3.7
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

008K4.01 001

Assume the following conditions.

- Unit 1 is in mode 5
- 1H EDG is tagged out for pre-planned maintenance
- 1-CC-P-1A is in auto-standby
- 1-CC-P-1B is running
- The 1J emergency bus normal feeder trips on overcurrent
- The 1J EDG starts and loads on the 1J bus as designed

Assuming that all systems respond as designed, which ONE of the following responses describes the final component cooling pump configuration after the event?

A. 1-CC-P-1A running; 1-CC-P-1B running

B. 1-CC-P-1A running; 1-CC-P-1B not running

C. 1-CC-P-1A not running; 1-CC-P-1B running

D. 1-CC-P-1A not running; 1-CC-P-1B not running

A. Correct. The "A" CC pump will start when the UV occurs on the "J" bus. The "B" CC pump will start 15 seconds after power is restored to the "J" bus.

B. Incorrect. The "A" CC pump will start when the UV occurs on the "J" bus. The "B" CC pump will start 15 seconds after power is restored to the "J" bus. A candidate who doesn't remember that the circuit does not look to see if there is another pump running when power is restored to the bus could choose this answer.

C. Incorrect. The "A" CC pump will start when the UV occurs on the "J" bus. A candidate who doesn't remember that the "A" pump has an auto start on UV on the opposite bus could choose this answer.

D. Incorrect. Both CC pumps will be running. The "A" CC pump will start when the UV occurs on the "J" bus. The "B" CC pump will start 15 seconds after power is restored to the "J" bus.

Knowledge of CCW design feature(s) and/or interlock(s) which provide for the following:
Automatic start of standby pump

North Anna bank question 3052

References:
Objective 3656 from Self-study guide for CC
ESK 5P, 5Q

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	3.1/3.3
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

009EA1.17 001

The following conditions exist on Unit 1:

- A small break LOCA has occurred
- Containment pressure is currently 10.5 psia
- Safety Injection is in service.

Given the above, at what PRT pressure would the OATC expect the rupture discs to blow?

A. 95.8 psig

B. 100 psig

C. 110.5 psig

D. 114.7 psig

A. Correct. PRT pressure will decrease when the rupture disk blows.

B. Incorrect. Pressurizer level will not take a step decrease when the rupture disk blows.

C. Incorrect. PRT level will remain stable.

D. Incorrect. Pressurizer pressure may be decreasing, but it will not take a step decrease when the PRT rupture disk blows.

Ability to operate and / or monitor the following as they apply to Small Break LOCA: PRT

(CFR: 41.7 / 45.5 / 45.6)

Modified bank question 5447

References:
Objective 15847 from self-study guide on Reactor Coolant System

Level (RO/SRO):	RO	Tier:	1
Group:	1	Importance Rating:	3.4/3.4
Type (Bank/Mod/New):	MODIFIED	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

010GG2.4.31 001

The following conditions exist:

- Unit 1 is at 100% power
- Annunciator B-F7, PRZ HI-LO PRESS has just illuminated
- 1-RC-PI-1444 indicates 1700 psig
- 1-RC-PI-1445, 1-RC-PI-1455, 1-RC-PI-1456, and 1-RC-PI-1457 indicate pressure is 2315 psig and slowly increasing.

Based on these conditions, the OATC should place the master pressure controller in manual and press the _____ pushbutton to _____ the controller output.

A. lower; increase

B. lower; decrease

C. raise; increase

D. raise, decrease

A. Correct. 1-RC-PI-1444 has failed low. This PI has a range of 1700 to 2500 psig. The master pressure controller is inverse acting. The lower pushbutton should be pressed because pressure is high. This will increase the output of the master pressure controller causing heaters to turn off and sprays to open to lower pressure. Candidate must realize that pressure is indeed **increasing** and that output must be **increased** in order to **decrease** pressure.

B. Incorrect. The lower pushbutton is correct; however this will increase, not decrease, the output of the controller.

C. Incorrect. The raise pushbutton is incorrect; however the output of the controller does need to be increased.

D. Incorrect. The raise pushbutton is incorrect as is the desired change in the output of the controller. Candidate must realize that actual pressure is high.

Pressurizer Pressure Control
Knowledge of annunciators alarms and indications and use of the response instructions.

New question

References:
Annunciator response for B-F7
Loop book RC-111

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	3.3/3.4
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

010K5.02 001

Unit 1 is at 100% power. A pressurizer PORV is leaking to the PRT. During this process the _____ of the leaking steam stays constant while the moisture content of the steam will _____.

A. enthalpy; decrease

B. enthalpy; increase

C. entropy; decrease

D. entropy; increase

A. Correct. The process is isenthalpic and the moisture content of the steam will decrease during the process, possibly becoming superheated.

B. Incorrect. Although the process is isenthalpic, the moisture content of the steam will decrease

C. Incorrect. The process is isenthalpic not isentropic.

D. Incorrect. The process is isenthalpic not isentropic and the moisture content of the steam will decrease.

Knowledge of the operational implications of the following concepts as they apply to the Pressurizer Pressure control system Constant enthalpy expansion through a valve

(CFR: 41.5 / 45.7)

New Question
Candidate will have steam tables as reference

References:
Objective 3603 from Pressurizer Pressure and Protection System study guide

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	2.6/3.0
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	Y	Last Exam(Y/N):	N

011EG2.4.49 001

The following conditions exist on Unit 1:

- The unit is operating at 100% power
- Annunciator J-A6, RX CONT SUMP HI LEVEL, has just illuminated
- Containment pressure is 18 psia and increasing
- Pressurizer level is 30% and decreasing
- Pressurizer pressure is 1900 psig and decreasing.

Based on these indications, which ONE of the following lists the correct order of the OATC's next actions?

A. Trip the reactor, trip the turbine, verify emergency busses energized, then initiate SI.

B. Trip the turbine, trip the reactor, verify emergency busses energized, then initiate SI.

C. Immediately initiate SI, then verify the reactor and turbine are tripped and emergency busses are energized.

D. Trip the reactor, trip the turbine, verify emergency busses energized, an SI will not be required.

A. Correct. These are the immediate actions, in order, for 1-E-0. A reactor trip signal should have been generated on low pressurizer pressure (1870 psig and rate sensitive)

B. Incorrect. The reactor must be tripped first per the immediate actions of 1-E-0

C. Incorrect. The reactor and turbine should be tripped before SI is initiated per the immediate actions of 1-E-0.

D. Incorrect. SI would be required under these conditions. Pressurizer pressure is decreasing rapidly and the SI setpoint for low low pressurizer pressure is 1780 psig, by the time the other actions are performed an SI signal would have been generated.

Large Break LOCA
Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.

Bank question

References:
Objective 12020 from study guide on Emergency Procedures
OPAP-0002 6.4.4e

Level (RO/SRO):	RO	Tier:	1
Group:	1	Importance Rating:	4.0/4.0
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

011K6.04 001

The following conditions exist:

- Unit 1 is at 8% power and stable
- The median-select T_{ave} unit has failed high.

Assuming no operator action, which ONE of the following describes the effect this malfunction will have on the pressurizer level control system?

A. The pressurizer will stabilize at 64.5% level.

B. The unit will trip on high pressurizer level.

C. The pressurizer will fill solid with no reactor trip.

D. The unit will trip on low pressurizer level.

A. Correct. The pressurizer level setpoint is based on median/high select T_{ave} from no-load T_{ave} to full-load T_{ave}. Full-load T_{ave} is 580.8 degrees, at this T_{ave} the programmed pressurizer level is 64.5%. 1-CH-FCV-1122 will open to increase level to 100% program (64.5%), then maintain level at this point.

B. Incorrect. Since less than P-10 would not trip on high level since this trip is blocked. FCV-1122 will increase level to 100% program and maintain it at this point.

C. Incorrect. FCV-1122 will open increase level to 100% program and maintain it at this point.

D. Incorrect. Although pressurizer pressure feeds into the T_{ave}/delta T protection circuit for the OTDT setpoint the opposite is not true.

Knowledge of the effect of a loss or malfunction of the following will have on the PZR LCS: Operation of PZR level controllers

North Anna bank question 2269

References:
Objectives 10654 and 8839 from Pressurizer Control and Protection study guide
NCRODP module 74 Pressurizer Control and Protection (page 40)

Level (RO/SRO):	RO	Tier:	2
Group:	2	Importance Rating:	3.1/3.1
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

012K2.01 001

The power to the Reactor Protection System logic bays is supplied from 120-volt AC vital busses. Train "A" is supplied from _____, and train "B" is supplied from _____.

A. busses I and II; busses III and IV

B. busses I and III; busses II and IV

C. bus II ONLY ; bus IV ONLY

D. bus I ONLY ; bus III ONLY

A. Correct. Power to train A logic bay of RPS is supplied from vital busses I and II. Power to train B logic bay of RPS is supplied from vital busses III and IV.

B. Incorrect. Candidate could think that busses I and III (odd) should be together, as well as II and IV (even).

C. Incorrect. Candidate could think that only the "even" busses are used to supply the RPS logic bays.

D. Incorrect. Candidate could think that only the "odd" busses are used to supply the RPS logic bays. The slave relays are supplied from these busses.

Knowledge of electrical power supplies to the following: RPS channels, components and interconnections (CFR: 41.7)

North Anna bank question 1475

References:
Objective 8963 from self-study guide for Reactor Protection

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	3.3/3.7
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

012K6.01 001

Unit 1 was operating at 100% power when an "A" loop hot leg RTD failed. The following plant conditions exist:

- The instrument shop requested that the channel be placed in trip immediately for troubleshooting
- The crew performed applicable actions of 1-MOP-55.74, " Delta T/T_{ave} Protection Instrumentation, " to prepare for placing the channel in trip
- As the instrument technician correctly placed 1-RC-TTS-1412B-1 (BS-1) on card C1-421 to TEST the Reactor Operator did NOT receive the expected annunciators or computer alarms.

Based on the above conditions, the crew should _____.

A. be in hot standby within 7 hours due to the questionable operability of both trains of solid state

B. be in cold shutdown within 84 hours of the time the channel failed because the channel cannot be placed in trip

C. place the redundant bistable for overpower deltaT in the "B" or "C" Loop to TEST to ensure reactor trip reliability, then repair the "A" channel within 72 hours

D. continue with 1-MOP-55.74 until completed and write a work request on 1-RC-TTS-1412B-1 (BS-1) test switch; power operations may continue

A. Correct. If the bistable switch is not operating correctly then the operability of solid state is in question and the crew should enter 3.0.3 per the Precautions and Limitations and Caution of the MOP. The unit must be placed in mode 3 within 7 hours.

B. Incorrect. At this point it is not the operability of the channel that is in question, but the operability of solid state. Thus 3.0.3 should be entered and actions taken to place the unit in hot standby within 7 hours. However, 84 hours is a plausible time for a mode 4 entry if it were applicable.

C. Incorrect. Placing more than one channel in TEST could possibly cause a unit trip. At this point the operability of the delta T/Tave channel is not the greatest concern. It is the operability of solid state protection.

D. Incorrect. At this point it is not the operability of the channel that is in question, but the operability of solid state protection. Thus 3.0.3 should be entered. Power operations cannot continue.

Knowledge of the effect of a loss or malfunction of the following will have on the RPS: Bistables and bistable test equipment

North Anna bank question 60461

References:
1-MOP 55.74

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	2.8/3.3
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

013K4.10 001

Unit 1 was operating at 95% power when a LOCA occurred, resulting in a reactor trip. The following plant conditions exist:

- Safety injection has actuated due to low-low pressurizer pressure
- "B" steam generator level is now 10% NR
- The crew has placed the control switch for the "3B" auxiliary feedwater pump in PTL due to severe pump vibration.

Which ONE of the following lists the signal(s) that will prevent the "3B" auxiliary feedwater pump from stopping?

A. Safety injection and ATWS Mitigation System Actuation Circuit (AMSAC) only

B. Safety injection only

C. Low-low steam generator level only

D. Safety injection, ATWS Mitigation System Actuation Circuit (AMSAC), and low-low steam generator level

A. Correct. Both AMSAC and SI must be reset before the pump can be secured.

B. Incorrect. With a reactor trip from this power level, AMSAC will have actuated and must also be reset.

C. Incorrect. Low-low SG level will automatically start AFW pumps. However, even if the steam generator level is still low, the pump can be stopped.

D. Incorrect. All of these signals will automatically start AFW pumps. Only SI and AMSAC signals must be reset in order to stop the pump.

Knowledge of ESF design feature(s) and or interlock(s) which provide for the following: Safeguards equipment control reset

(CFR: 41.7)

North Anna bank question 5752

References:
Objective 6036 from self-study guide for Auxiliary Feedwater

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	3.3/3.7
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

014K4.06 001

The following plant conditions exist on Unit 1:

- Reactor startup is in progress
- Control bank D rods are at 25 steps
- All other rods are at expected position for this plant condition
- While taking critical data, Control Bank A, Group 2 rods drop to the bottom of the core due to a mechanical failure.

As the rods drop, which ONE of the following annunciators would receive an alarm input signal for this event?

A. CMPTR ALARM ROD DEV/SEQ

B. NIS PWR RGE HI Φ RATE RX TRIP

C. ROD BANK A LO/LO-LO LIMIT

D. NIS PR LWR DET DEV-DEF <50%

A. Correct. This annunciator should alarm when rods are ≥24 steps from bank position below 50% power.

B. Incorrect. This annunciator/trip is caused by 2/4 power range channels ± 5% in 2 seconds. This reactor is not in the power range at this time. This answer could be chosen if candidate remembers that multiple rod drops are a probable cause for this annunciator. It is a symptom or entry condition of 1-AP-1.2, " Dropped Rod."

C. Incorrect. This annunciator is driven from the P/A converter. This drives the step counters. The alarm comes off the step counters instead of the IRPIs. If the examinee doesn't make this distinction they would choose this answer.

D. Incorrect. Although power is < 50%, the reactor is currently not in the power range. This is an alarm that can be caused by rod misalignment, making this a plausible distracter. It is a symptom or entry condition of 1-AP-1.2, " Dropped Rod."

Knowledge of Rod Position Indication design feature(s) and or interlock(s) which provide for the following:

Individual and group misalignment

(CFR: 41.7)

INPO bank question from Prairie Island 2

The following plant conditions exist on Unit 1:

Reactor startup in progress
Control Bank D rods are at 25 steps
All other rods at expected position for given plant conditions.

While taking ICRR data, the Control Bank A Group 2 rods drop from their present position to the bottom due to a mechanical failure.

As the rods drop which of the following would be the FIRST annunciator to receive an alarm input signal for this event?

a. "COMPUTER ALARM ROD DEVIATION/SEQUENCING"
b. "FLUX RATE REACTOR TRIP"
c. "CONTROL BANKS LOW LIMIT"
d. "ROD AT BOTTOM"

Answer: a

References:
Annunciator responses for A-F1, D-E4, A-H1, A-C8
Entry conditions for 1-AP-1.2, "Dropped Rod."

Level (RO/SRO):	RO	Tier:	2
Group:	2	Importance Rating:	3.4/3.7
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

015AA2.08 001

A component cooling water malfunction has caused reduced cooling flow to the Reactor Coolant Pumps (RCPs). The following conditions exist:

- Unit 1 is at 100% power
- RCP temperatures are as follows:

	A	B	C
Motor Bearing	191	185	190
Pump Bearing	195	200	230
Stator	225	285	245

Based on this information the crew should _____.

A. Trip the reactor, then trip the "C" RCP due to high pump bearing temperature

B. Trip the reactor, then trip "A" RCP due to high motor bearing temperature

C. Immediately trip the "C" RCP due to high pump bearing temperature

D. Continue to monitor RCP temperatures, no temperatures meet the RCP trip criteria

A. Correct. The "C" RCP pump bearing temperature is > 225 degrees. The reactor must be tripped before securing the "C" RCP.

B. Incorrect. The "A" RCP motor bearing temperature, though higher than the other two motors, is not greater than the RCP trip criteria of 195 degrees.

C. Incorrect. Though the "C" RCP should be tripped due to high pump bearing temperature, the reactor should be tripped first.

D. Incorrect. The "C" RCP pump bearing temperature is greater than the RCP trip criteria of 225 degrees.

Ability to determine and interpret the following as they apply to RCP Malfunction: When to secure RCPs on high bearing temperature

(CFR: 41.10 / 43.5 / 45.13)

Modification of Cook question to fit KA

..000015.A2.02 12/9/2002
WEC Cook 1

A Component Cooling water leak inside containment has caused reduced flow to the RCPs. The following
conditions exist:

-Unit 1 is at 100% power.
-Temperatures / RCP # 11 12 13 14

Motor Bearing	196 F	178 F	189 F	173 F
Lower Bearing Water	195 F	184 F	201 F	184 F
Seal Leakoff	187 F	176 F	177 F	179 F

-Ann 107 Drop 52, RCP Vibration High - NOT LIT

Which ONE of the following set of actions must be taken?

Immediately Trip the Reactor, then trip RCP#11.
Open QRV-150, No. 1 Seal Bypass Valve.
Perform a rapid Plant Shutdown and stop RCP#13 within 30 minutes.
Immediately Trip the Reactor, then trip RCP#13.

References:
Objective 11659 from study guide on Abnormal Procedures.
1-AP-15, "Loss of Component Cooling."
Precautions and limitations from 1-OP-5.2

Level (RO/SRO):	RO	Tier:	1
Group:	1	Importance Rating:	3.4/3.5
Type (Bank/Mod/New):	MODIFIED	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

015G2.1.28 001

1-RC-P-1B ("B" RCP) amps start fluctuating and the indicated vibrations begin increasing rapidly. The backboards operator reports that "B" RCP proximity vibration indication just pegged high, then the indication went to zero. The amps continue to fluctuate.

With respect to the RCP only, which ONE of the following actions should be taken and why?

A. Trip the "B" RCP; the vibration monitoring indication was over-ranged and therefore failed low.

B. Do not trip "B" RCP; the vibration instrument has failed and amp indication is known to occasionally fluctuate.

C. Do not trip the "B" RCP until predictive analysis confirms that actual vibrations are high.

D. Trip the "B" RCP; vibrations have returned to normal but fluctuating amps are an RCP trip criterion.

A. Correct. Extremely high vibrations can cause the Bently-Nevada indication to fail either high or low. The fluctuating amps are another indication that there is a problem with the RCP. The RCP should be tripped.

B. Incorrect. Extremely high vibrations can cause the Bently-Nevada indication to fail either high or low. RCP amps are NOT known to occasionally fluctuate.

C. Incorrect. Extremely high vibrations can cause the Bently-Nevada indication to fail either high or low.

D. Incorrect. Fluctuating amps are not an RCP trip criterion. The vibrations have not returned to normal as the indication is reading zero.

RCP Malfunctions
Knowledge of the purpose and function of major system components and controls

North Anna bank question 3810

References:
Objective 9840 from self-study guide for Reactor Coolant system

Level (RO/SRO):	RO	Tier:	1
Group:	1	Importance Rating:	3.2/3.3
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	Y(02)

016A4.01 001

Unit 1 is at 100% power. A failure has occurred which caused rods to step in and steam generator level controllers to decrease level to 33% in all steam generators. Operators have placed rod control in manual and are manually restoring steam generator levels to 44%.

In order to return rods and steam generator level control to automatic the operators must first _____.

A. swap to an operable first stage pressure channel

B. place the failed first stage pressure in trip

C. swap to an operable deltaT/T_{ave} channel

D. place the failed deltaT/T_{ave} channel in trip

A. Correct. The failed channel is an input to rod control and SG water level control. An operable channel will need to be selected to allow rods to be placed back in automatic and to allow automatic SG level control to control at 44%. This will be done in 1-AP-3, "Loss of Vital Instrumentation."

B. Incorrect. Examinee may realize the MOP to place failed first-stage pressure channel in trip will require these valves to be placed in manual and feel that this needs to be performed before the controls are placed in automatic. By tech specs, the channel does not have to be placed in trip for 72 hours.

C. Incorrect. Failure of a Tave/ Delta T channel hi would cause rods to step in but median select Tave should select out the failed channel if out of range. If the examinee fails to realize how median select Tave works, they could choose this answer.

D. Incorrect. If the examinee doesn't realize median select Tave selects out the channel when it failed, they may feel the need to place the bistables in trip before returning controls to auto. There is no way to select out the failed channel.

Ability to manually operate and/ or monitor in the control room: NNI channel select controls

(CFR: 41.7 / 45.5 to 45.8)

References:
Objective 12007 in Rod Control study guide
1-AP-3, "Loss of Vital Instrumentation."

Level (RO/SRO):	RO	Tier:	2
Group:	2	Importance Rating:	2.8/2.9
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

022K3.01 001

The following conditions exist.

- Unit 1 is at 100% power
- The mechanical chiller has tripped
- Containment temperature is currently 102°F.

The crew has entered 1-AP-35, "Loss of Containment Air Recirculation Cooling" and has reached the step to Check Containment Temperature <105°F. A note prior to the step explains that containment temperature should be kept less than 105°F due to _____.

A. EQ concerns relating to equipment life expectancy

B. overheating of the control rod drive coils

C. concerns for containment entry stay times

D. the containment partial pressure indicators being unreliable at high ambient temperatures

A. Correct. Per the note there are EQ concerns relating to equipment life expectancy

B. Incorrect. While overheating of the control rod drive coils is a concern for failure of the CRDM fans it is not a concern during failure of a containment air recirc fan. A candidate could choose this answer based on knowledge that overheating of control rod drive coils is a concern.

C. Incorrect. While containment stay times would be affected this is not the reason for the concern with temperature. A candidate could choose this answer based on knowledge that stay times would be reduced at this high of a containment temperature.

D. Incorrect. The containment partial pressure is calculated using temperatures taken at the outlet of the containment air recirc fans. Due to the trip of the chiller these indications are declared inoperable; however the 105°F temperature has nothing to do with whether these indicators are reliable. A candidate could choose this question based on knowledge that the partial pressure indications are declared inoperable on a loss of containment cooling.

Knowledge of the effect that a loss or malfunction of the Containment Cooling system will have on the following: Containment equipment subject to damage by high or low temperature, humidity and pressure (CFR: 41.7 / 45.6)

Modified question

References:
1-AP-35

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	2.9/3.2
Type (Bank/Mod/New):	MODIFIED	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	Y(00)

024AK1.04 001

Unit 1 is operating at 100% power when the auxiliary building operator reports that there is a low temperature alarm locked in on an emergency borate heat trace line.

Per technical specifications lines containing borated water should be kept at a minimum of 115°F in order to _____.

A. maintain boron solubility

B. reduce O_2 to minimize corrosion

C. maintain protective oxide film to minimize corrosion

D. prevent crud bursts

A. Correct. The tech spec minimum temperature of 115 degrees is based on maintaining the boron in solution.

B. Incorrect. Since O_2 levels are a concern in the RCS this answer could be chosen.

C. Incorrect. Candidate could think that maintaining the oxide film is the reason, though this is a concern for high flows.

D. Incorrect. Since crud bursts are usually undesirable this answer could be chosen.

Knowledge of the operational implications of the following concepts as they apply to the Emergency Boration system: Low temperature limits for boron concentration

(CFR: 41.8 to 41.10 / 45.3)

Modified Surry question from INPO bank.

References:

TRM 3.1.1
T.S. 3.5.6 Bases
NCRODP module 22 Heat Tracing (page 14)

Level (RO/SRO):	RO	Tier:	1
Group:	2	Importance Rating:	3.8/3.6
Type (Bank/Mod/New):	MODIFIED	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

026A3.02 001

A CDA has occurred on Unit 1. The operator assigned to perform Attachment 2 of 1-E-0, "Verification of Phase B isolation," is at the step to Verify SW Aligned to RS Heat Exchangers. When checking the valve lineup the operator notices that the light bulbs are burned out for 1-SW-MOV-104A, SW Return from "A" RSHX Isolation Valve.

Which ONE of the following indications can the operator use to verify that this valve is open?

A. Indication for "A" RSHX heat exchanger SW flow on the "H" Safeguards Panel.

B. Annunciator J-B3, SERV WTR RETURN HDR LO FLOW, **NOT** lit.

C. Indication for RSHX radiation monitor flow located on the backboards Unit one radiation monitor panel.

D. Annunciator J-E6, "UNIT ONE SW MODE VALVES CHANGE POS, is lit.

A. Correct. There is an indication of SW flow through the heat exchanger located on the "H" safeguards panel.

B. Incorrect. This annunciator indicates low SW flow on one of the return headers to the SW reservoir, these lines should be flowing at this time. This annunciator being unlit will not verify whether or not there is flow through the RS heat exchanger.

C. Incorrect. There is no flow indication for the radiation monitor on the backboards. There is an annunciator that would come in if there was insufficient flow through the rad monitor making this answer plausible.

D. Incorrect. This annunciator has nothing to do with the RSHX inlet or outlet valves. It monitors the SW valves going to the discharge tunnel for lake-to-lake operations. This annunciator being either lit or unlit will not verify whether there is flow through the RS heat exchanger. This answer could be chosen by a candidate who mistakenly believes that this annunciator is associated with the SW valves to RSHX changing position.

Ability to monitor automatic operations of the Containment spray system including: Verification that cooling water is supplied to the containment spray heat exchanger

(CFR: 41.7 / 45.5)

New question

References:
FM 78B sheet 3
Loop book SW-003
Annunciator response for J-B3, J-E6

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	3.9/4.2
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

026K4.09 001

A large break LOCA has occurred on Unit 2. The safety injection system has swapped to cold-leg recirculation mode. The BOP is verifying that 2-SI-MOV-2885A, B,C, and D (Low-head SI Pump Recirc Valves) are all closed.

These valves must be closed in order to _____.

A. prevent a radioactivity release to atmosphere

B. ensure adequate low-head flow is available to the charging pump suctions

C. ensure adequate low-head flow is available to the cold legs

D. prevent low-head SI pump runout

A. Correct. In recirculation mode the low-heads are taking a suction from the water in the containment sump which will be radioactive. The low head recircs must be closed to keep from putting this sump water into the RWST which is vented to atmosphere.

B. Incorrect. Low head flow (design flow is 3000 gpm) is adequate to supply the charging pump suctions even with the recircs open. A candidate could choose this answer based on knowing the importance of maintaining low-head flow to the charging pumps.

C. Incorrect. Low head flow is adequate (design flow is 3000 gpm) to supply water to the cold legs and the charging pump suctions even with the recircs open.

D. Incorrect. The maximum flow rate for the low heads is 4500 gpm. The low heads can supply the charging pumps, the cold legs, and the recircs without running out the pumps. The recircs are provided to allow a flow path (keep from dead heading) when the low heads are running with RCS pressure above the discharge pressure of the pumps.

Knowledge of CSS design feature(s) and/or interlock(s) which provide for the following: Prevention of path for escape of radioactivity from containment to the outside (interlock on RWST isolation after swapover)

New question

References:
NCRODP module 52 (Safety Injection) page 16

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	3.7/4.1
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

027AK3.01 001

Unit 1 is operating at 10% power with all systems in automatic when an outsurge from the pressurizer causes level to drop to 12%. The OATC notices that the pressurizer spray valves have gone closed.

The spray valves closed _____.

A. due to the level decrease causing a corresponding pressure decrease

B. because the pressurizer heaters turned off on low level, which sent a signal to shut the spray valves

C. directly from a pressurizer low-low level signal

D. to prevent them from spraying cold water on the uncovered pressurizer heaters which could burn them out

A. Correct. The pressure decrease caused by a combination of the outsurge and the loss of the pressurizer heaters on low level, would cause the output of the master pressurizer controller to decrease until the spray valves were shut.

B. Incorrect. There are no signals sent from the pressurizer heaters which close the spray valves. This answer could be picked by a candidate that does not understand that such a signal is not needed.

C. Incorrect. There is no signal from low or low-low pressurizer level which close the spray valves. This answer could be picked by a candidate that does not understand that such a signal is not needed.

D. Incorrect. The heaters are turned off on level <15% to keep them from burning up. A candidate could pick this answer based on this reasoning.

Knowledge of the reasons for the following responses as they apply to Pressurizer Pressure Control system malfunction: Isolation of PZR spray following loss of PZR heaters

(CFR: 41.5 / 41.10 / 45.6 / 45.13)

New question.

References:
NCRODP module 74 - Pressure Control and Protection (page 4, 28)

Level (RO/SRO):	RO	Tier:	1
Group:	1	Importance Rating:	3.5/3.8
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

029A2.01 001

The following conditions exist on unit 1:

- The unit is in mode 6
- Containment purge is in service
- Core alterations are in progress
- A hi-hi radiation signal is received on 1-RMS-RM-162, Manipulator Crane Radiation Monitor
- The refueling SRO reports that a bag of radioactive waste was carried by the manipulator crane and has now cleared the area
- Radiation reading has returned to normal on 1-RMS-RM-162.

Based on the above, containment purge _____.

A. has isolated and must be manually restored after hi-hi radiation signal is reset

B. has isolated and will automatically restore after hi-hi radiation signal is reset

C. has not isolated since it does not get a signal from 1-RMS-RM-162

D. was isolated, but automatically restored when the radiation reading returned to a normal value

A. Correct. A hi-hi radiation signal on 1-RMS-RM-162 will isolate purge and exhaust and it must be manually restored once the hi-hi signal is reset.

B. Incorrect. The system must be manually restored. A candidate could choose this answer based on the information that the area radiation has returned to normal and knowledge that if both containments are purging the containment that was not the cause of the isolation signal has purge automatically restored.

C. Incorrect. The system does get a signal from 1-RMS-RM-162 when this rad monitor is in service. The containment purge system also gets a signal from 159/160. A candidate could choose this answer if he/she does not remember that the system also gets a signal from 162.

D. Incorrect. The system does not automatically restore, and the hi-hi signal must be reset, as it will not clear when radiation readings return to normal. A candidate could choose this answer based on the information that the area radiation has returned to normal.

Ability to (a) predict the impacts of the following on the Containment purge and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: Maintenance or other activity taking place inside containment

(CFR: 41.5 / 43.5 / 45.3 / 45.13)

New question

References:
Annunciator response for K-D3, RAD MONITOR SYSTEM FAILURE TEST
NCRODP module 47 Primary ventilation (page 28)
NCRODP Module 46, Radiation Monitoring (page 28)
Note in 1-OP-21.2, "Containment Purge."

Level (RO/SRO):	RO	Tier:	2
Group:	2	Importance Rating:	2.9/3.6
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

032AA2.09 001

Unit 1 is in mode 3 when the OATC notes that N-31 and N-32 are not within the specified tolerance of one-half decade. I&C determined that the high voltage setting for N-31 is set too high.

Due to this mis-calibration, N-31 is reading _____ than it should due to _____.

A. higher; the gas amplification effect

B. lower; over-compensation

C. higher; under-compensation

D. lower; the gas amplification effect

A. Correct. If the high voltage setting is set too high the gas amplification effect will cause the detector counts to be high.

B. Incorrect. Both parts of this answer are incorrect. The counts will be higher and there is no compensation voltage for the source ranges.

C. Incorrect. The first part of the answer is correct, however there is no compensating voltage for the source ranges.

D. Incorrect. The second part of the answer is correct, however this will cause the detector counts to be high.

Ability to determine and interpret the following as they apply to Loss of Source Range: Effect of improper HV setting

(CFR: 41.10 / 43.5 / 45.13)

New question

References:
Objective 7771 from self-study guide on Ex-Core Nuclear Instrumentation

Level (RO/SRO):	RO	Tier:	1
Group:	2	Importance Rating:	2.5/2.9
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

033AA2.05 001

Unit 1 is currently at 5% power. The crew has just started increasing power following a chemistry hold when annunciator A-C5, NIS IR HI FLUX ROD STOP, illuminates. Surveying the board the OATC notes the following:

- Permissive P-D2, P-10 PERM PR > 10% BLK NIS LP TRIPS is NOT lit
- The reactor has not tripped, nor is a reactor trip required.

Based on the above, which ONE of the following is correct?

A. The setpoint is incorrect for the intermediate range hi flux rod stop.

B. An intermediate range NI is undercompensated.

C. An intermediate range NI is overcompensated.

D. An intermediate range NI has a blown control power fuse.

A. Correct. The IR range hi flux rod stop has an incorrect value installed.

B. Incorrect. Although undercompensation of an intermediate range would cause the intermediate range to read higher, this effect is negligible when the reactor is in the power range.

C. Incorrect. If an intermediate range was overcompensated it would read lower than the correctly compensated IR. The IR rod stop comes in when either of the IR is above 30% current equivalent. If the correctly compensated IR was reading >30% power equivalent, then the power ranges would also show this power increase and P-D2 would be lit. If an IR had failed low there would be no rod stop.

D. Incorrect. If an intermediate range NI had blown a control power fuse the reactor would have tripped.

Ability to determine and interpret the following as they apply to the Loss of Intermediate Range Nuclear Instrumentation: Nature of abnormality, from rapid survey of control room data

New question

References:
Objective 7803 from self-study guide on Ex-Core Nuclear Instrumentation
Annunciator responses for P-D2, A-C5

Level (RO/SRO):	RO	Tier:	1
Group:	2	Importance Rating:	3.0/3.1
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

033K3.03 001

The following conditions exist.

- Unit 1 is currently in a scheduled refueling outage
- The refueling team is currently latching control rods in the unit one containment
- Unit two has been at 100% for 3 months following a 26-day refueling outage
- Both SFP cooling pumps are currently isolated due to a leak on a common line
- Annunciator E-C5, SFP HI/HI-HI TEMP has illuminated.

Per 0-AP-27, "Malfunction of Spent Fuel System," the expected heat-up rate for spent fuel pit under these conditions is _____ degrees Fahrenheit per hour (°F/hr).

A. 3.8

B. 4.05

C. 9.24

D. 9.88

A. Incorrect. This number is from the non-back to back refueling table if the core has been reloaded. The candidate could choose this answer if he/she does not realize that the outages are back-to-back.

B. Correct. The outages are back to back and the unit one reactor has been refueled. Using the table for back to back refueling (<120 days between refuelings) with the second core on-loaded.

C. Incorrect. This number is from the non-back to back refueling table, and is the number to use if the core has not been reloaded. The candidate could choose this answer if he/she does not realize that the outages are back-to-back and that the core has been reloaded.

D. Incorrect. This is from the correct table, but this is the heat up rate if the second core has not been on-loaded. The candidate could choose this answer if he/she does not realize that rods being LATCHED means that the core has been reloaded.

Knowledge of the effect that a loss of malfunction of the Spent Fuel Pool Cooling System will have on the following: Spent fuel temperature

Candidate will need copy of 0-AP-27.

References:
0-AP-27, Attachment 6

Level (RO/SRO):	RO	Tier:	2
Group:	2	Importance Rating:	3.0/3.3
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	Y	Last Exam(Y/N):	N

038EK1.02 001

The following conditions exist:

- A SGTR has occurred on Unit 2
- The RCS cooldown is complete and the crew is preparing to depressurize the RCS in accordance with 2-E-3, "Steam Generator Tube Rupture."

Which ONE of the following describes the reason for the RCS depressurization?

A. Increases SI flow to increase RCS inventory while decreasing the amount of leakage to the ruptured SG.

B. Allows backflow of the ruptured steam generator into the RCS minimizing contamination levels in the generator.

C. Minimizes the probability of a pressurized thermal shock event when the RCS is cooled down in a recovery procedure.

D. Ensures there will be no release of radioactivity through the ruptured SG PORV for the duration of the event.

A. Correct. The depressurization is done to refill the pressurizer and reduce break flow prior to terminating safety injection.

B. Incorrect. Backfill is the preferred method for getting rid of the water but it is not desired until ES-3.1. It has procedural steps that address reactivity control while performing this process.

C. Incorrect. PTS is only a concern if ruptured SG pressure is low. A candidate could choose this answer based on the knowledge that pressurized thermal shock is often a concern after a cooldown has occurred.

D. Incorrect. Due to auxiliary feedwater supply and safety injection flow, a heat sink is provided that absorbs some of the decay heat. It is assumed that the PORV on the ruptured generator will not open > 30 minutes after the event.

Knowledge of the operational implications of the following concepts as they apply to the SGTR:

Leak rate vs. pressure drop

(CFR: 41.8 to 41.10 / 45.3)

From INPO bank, Indian Point 2

Level (RO/SRO):	RO	Tier:	1
Group:	1	Importance Rating:	3.2/3.5
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

039K1.07 001

Assume the following conditions.

- Unit 2 was operating at 100% power
- The station experienced a total loss of all AC power
- The crew is currently depressurizing the steam generators in accordance with 2-ECA-0.0.

As steam generator (SG) pressures are lowered, available auxiliary feedwater flow will _____ as SG pressure decreases to 150 psig.

A. remain above 340 gpm

B. decrease to 150 gpm

C. decrease to zero gpm

D. remain above the designed flow of 735 gpm

A. Correct. As steam generator pressures decline, driving head for the turbine driven AFW Pump decreases but so does the backpressure against which it pumps. Terry Turbine will provide 340 gpm down to 120 psig steam generator pressure.

B. Incorrect. As pressure decreases flow decreases but will remain above 340 gpm. This answer is plausible. The examinee may mistake required flow for max flow. As pump performance degrades flow could expect to be something less than 340 but at some lower value.

C. Incorrect. Examinee may think this pressure is too low to provide water to the steam generators. This would be true if it were trying to deliver flow to a steam generator at operating pressure. This makes this distractor plausible.

D. Incorrect. Flow is expected to remain above 340 gpm but performance of the Terry Turbine AFW Pump will be degraded. It will not be able to deliver design flow of 735 gpm. If the examinee understands the concept of system response to decreasing steam generator pressure they could choose this response.

Knowledge of the physical connections and/or cause-effect relationships between Main and reheat steam and the following: AFW

(CFR: 41.2 to 41.9 / 45.7 to 45.8)

North Anna Bank Question 3085

References:
Objective 5972 from self-study guide for Auxiliary Feedwater

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	3.4/3.4
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

040AK3.04 001

In accordance with the accident analysis concerning a steam line break, the operators need to isolate auxiliary feedwater flow to the faulted steam generator within _____ to prevent _____.

A. 30 minutes; a challenge to containment integrity

B. 15 minutes; depletion of the ECST for the duration of the accident

C. 30 minutes; depletion of the ECST for the duration of the accident

D. 15 minutes; a challenge to containment integrity

A. Correct. Per accident analysis aux feedwater is isolated within 30 minutes to keep containment pressure down.

B. Incorrect. The time is incorrect and the reason is for a feed line break in containment, not a steam line break.

C. Incorrect. The time is correct, but the reason is incorrect. Could be chosen by a candidate that remembers the correct time, but not the correct reason.

D. Incorrect. The reason is correct, but the time is incorrect. Could be chosen by a candidate who remembers the correct reason, but not the correct time.

Knowledge of the reasons for the following responses as they apply to Steam Line Rupture – Excessive Heat Transfer: Actions contained in EOPs for steam line rupture

(CFR: 41.5 / 41.10 / 45.6 / 45.13)

North Anna bank question 3661

References:
Objective 13705 from self-study guide for Emergency Procedures
UFSAR accident analysis table 6.2-18

Level (RO/SRO):	RO	Tier:	1
Group:	1	Importance Rating:	4.5/4.7
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

051AA1.04 001

Unit 1 was being returned to service. Power was stabilized at 49% to perform required surveillances. The crew has entered 1-AP-14, "Low Condenser Vacuum," due to worsening condenser vacuum. The following conditions exist:

- The turbine is being ramped down at 1% per minute
- Control rods are stepping in automatic
- Three minutes later annunciator A-F1, CMPTR ALRM ROD DEV/SEQ, illuminates
- Several IRPIs in D bank are indicating 12 to 15 steps different from the group step counters
- PCS shows all rods within 5 steps of the group step counters
- Condenser vacuum is still not stable.

At this time the crew should _____.

A. continue ramping while monitoring rod positions because no LCO has been violated

B. stop the ramp and place rods in manual because rods should be ± 12 steps from the group step counters

C. continue the ramp using manual rod control because rods are not operating correctly in auto

D. place rods in manual and continue the ramp using boration only because rod control is not operating properly

A. Correct. The deviation in rod positions is being caused by IRPI drift due to changes in RCS temperature. Rods can deviate from group step counters by up to 24 steps for up to 1 hour in every 24 hours when power is less than 50%.

B. Incorrect. Condenser vacuum has not yet stabilized so the ramp should continue. Per the AR, it is not necessary to place rods in manual if the alarm is due to IRPI drift.

C. Incorrect. There is no reason to place rods in manual at this time. Auto rod control is operable. IRPIs are drifting.

D. Incorrect. There is no reason to place rods in manual at this time. The rod control system is operating properly. IRPIs are drifting.

Ability to operate and / or monitor the following as they apply Loss of Condenser Vacuum: Rod position

(CFR: 41.7 / 45.5 / 45.6)

New question

References:
Annunciator response for A-F1
T.S. 3.1.4 and bases.

Level (RO/SRO):	RO	Tier:	1
Group:	2	Importance Rating:	2.5/2.5
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

054AA1.03 001

Unit 1 has experienced a loss of main feed water and operators have entered the emergency procedures. A security officer reports that there is an oil leak on the turbine-driven aux feedwater pump (1-FW-P-2).

Which ONE of the following lists the method(s) the operator can use to monitor the terry turbine lube oil reservoir level?

A. TURBINE DRIVEN AFW PUMP TROUBLE OR LUBE OIL TRBL annunciator,
Local indicator

B. PCS computer point,
Local indicator

C. Local indicator ONLY

D. TURBINE DRIVEN AFW PUMP TROUBLE OR LUBE OIL TRBL annunciator,
PCS computer point,
Local indicator

A. Correct. The annunciator will illuminate on low lube oil level in the reservoir, there is a local indicator on the reservoir.

B. Incorrect. There is no PCS computer point.

C. Incorrect. There is also an annunciator for low lube oil level

D. Incorrect. There is an annunciator and a local indicator, there is no PCS computer point.

Ability to operate and / or monitor the following as they apply to Loss of Main Feedwater: AFW auxiliaries, including oil cooling water supply

(CFR: 41.7 / 45.5 / 45.6)

New question

References:
AR for annunciator F-D8
Objective 5969 from self-study guide for Auxiliary Feedwater

Level (RO/SRO):	RO	Tier:	1
Group:	1	Importance Rating:	3.5/3.7
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

055EG2.4.6 001

During a loss of all AC, the most important concern is regaining electrical power. Which ONE of the following describes the action(s) utilized to ensure core cooling?

A. Depressurize and cool the Reactor Coolant System by dumping steam from the steam generators and injecting the safety injection accumulators.

B. Maximize auxiliary feedwater to the steam generators and slowly steam off to conserve steam generator inventory.

C. Depressurize Reactor Coolant System through the power-operated relief valves to remove heat and dump safety injection accumulators.

D. Use the head vent system to cool the head and prevent void formation.

A. Correct. The only way to get any core cooling without AC power is to depressurize the SGs, thus depressurizing the RCS. This will minimize the seal leakage and allow the safety injection accumulators to inject. All of these factors will extend the time to core uncovery, allowing time for the restoration of an emergency bus.

B. Incorrect. Will only have the terry turbine available. Steaming rate will be determined by the amount of heat in the RCS that is transferred to the SGs.

C. Incorrect. Depressurizing through the PRZR PORVs will deplete RCS inventory, not conserve it.

D. Incorrect. Although there is an installed head vent system utilizing it under these circumstances will allow void formation, not prevent it.

Station Blackout
Knowledge symptom based EOP mitigation strategies

North Anna Bank question 60127

References:
Objective 13835 from self-study guide for Emergency Contingency Action Procedures
ECA-0.0 background

Level (RO/SRO):	RO	Tier:	1
Group:	1	Importance Rating:	3.1/4.0
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

055K3.01 001

Unit 1 is operating at 100% power when a failure of 1-AS-FCV-100A, Steam Supply to "A" Condenser Air Ejector, occurs and the valve closes.

Which ONE of the following describes the effect of this failure?

A. Condenser vacuum will worsen due to non-condensible gases building up

B. Indicated reactor power will increase significantly due to the loss of condensate pre-heating from "A" air ejector

C. 1-MS-PCV-105, Main Steam to Aux Steam PCV, will open to back up auxiliary steam to the air ejectors

D. 1-AS-FCV-100B will open further to provide steam to both air ejectors

A. Correct. Condenser vacuum will worsen as non-condensable gases build up.

B. Incorrect. Although a loss of condensate pre-heating can cause reactor power to increase, the amount of condensate preheating from the air ejectors is minimal (1 degree).

C. Incorrect. Although the main steam PCV will back up auxiliary steam, this failure is not due to a loss of auxiliary steam.

D. Incorrect. Each FCV only feeds one air ejector. Candidate could assume that both FCVs feed both air ejectors.

Knowledge of the effect that a loss or malfunction of the Condenser Air Removal system will have on the following: Main condenser

(CFR: 41.7 / 45.6)

Modified question

References:
FM 72A sheet 2
Figure 10-3 from NCRODP module on Auxiliary Steam (10)
NCRODP module 25 on Main Condensate, pages 10-11

Level (RO/SRO):	RO	Tier:	2
Group:	2	Importance Rating:	2.5/2.7
Type (Bank/Mod/New):	MODIFIED	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	Y(00)

056A2.04 001

The following conditions exist on Unit 1:

- 100% power operation
- An oil change has been completed on "B" condensate pump motor
- All tags on "B" condensate pump have been cleared and all valves are in normal alignment
- The crew is briefing to place "B" condensate pump in service
- "B" condensate pump is still in PULL-TO-LOCK
- "A" condensate pump trips
- Annunciators F-B6, "MAIN FD PPS SUCT HDR LO PRESS," and F-A4, "MAIN FD PPS DISCH HDR LO PRESS," illuminate.

Which ONE of the following is correct concerning the crew's response to this event per 1-AP-31, "Loss of Main Feedwater?"

A. Start 'B' condensate pump

B. Restart 'A' condensate pump

C. Trip the reactor and perform the immediate operator actions of 1-E-0

D. Reduce turbine load until feedwater pump suction pressure is adequate

A. Correct. Annunciator response for F-B6 indicates that if the condition persists, main feed pumps will begin to trip following time delays. Annunciator F-A4 is an entry condition for 1-AP-31, Loss of Main Feedwater." Starting the "standby" condensate pump that was about to be started anyway is the fastest way to restore feed pump suction pressure.

B. Incorrect. While it is correct to start a condensate pump to restore main feed pump suction pressure, it would be improper to attempt to restart a failed pump when there was no indication of why the pump failed. Since "B" condensate pump was ready to be placed in service it should be started at this time. This answer could be chosen if candidate believes that the operating procedure should be used to start the "B" pump, or that PMT needs to be satisfied before the pump is placed in service.

C. Incorrect. An attempt should be made to start "B" condensate pump to restore feed pump suction pressure. This answer could be chosen if candidate believes that the operating procedure should be used to start the "B" pump, or that PMT needs to be satisfied before the pump is placed in service.

D. Incorrect. With only one condensate pump running it will not be possible to reduce turbine load fast enough to keep the feed pumps from tripping. This answer could be chosen if the candidate does not remember that the feed pumps will begin to sequentially trip if the low suction pressure condition persists.

Ability to (a) predict the impacts of the following on the Condensate system and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: Loss of condensate pumps

(CFR: 41.5 / 43.5 / 45.3 / 45.13)

North Anna bank question 5039

References:
Objective 14561 from self-study guide for Abnormal Procedures

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	2.6/2.8
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

056AK1.01 001

Assume the following conditions on Unit 2:

- A loss of off-site power has occurred
- Emergency busses are energized via the emergency diesel generators
- Three control rod drive mechanism fans are in operation
- Cooldown to cold shutdown is in progress
- The operators are checking the hot-leg temperatures to determine if they are less than 550°F.

Which ONE of the following describes the basis for this hot-leg temperature check?

A. To guarantee that the minimum required RCS subcooling will be maintained during subsequent depressurization to block safety injection circuitry.

B. To determine if the RCS cooldown has resulted in steam formation in the upper vessel head.

C. To verify that natural circulation still exists between the core and the steam generators.

D. To verify that the RCS cooldown has not resulted in a severe challenge to the integrity critical safety function.

A. Correct. This statement is from the WOG background document.

B. Incorrect. While void formation will be of concern later in the cooldown, the check of hot-leg temperatures is to determine if enough subcooling exists for the initial depressurization to block SI. An examinee could choose this answer based on his/her knowledge of the concern for void formation while doing a natural circulation cooldown.

C. Incorrect. Natural circulation verification is done using a variety of parameters and trends. It is not the concern of this step. An examinee could choose this answer based on the knowledge that a natural circulation cooldown will be necessary with no RCPs in service.

D. Incorrect. The cooldown on natural circulation with CRDM fans is limited to 25 degrees an hour. This cooldown rate will not challenge the integrity status tree. An examinee could choose this answer based on the knowledge that challenges to the integrity status tree are of concern during a cooldown.

Knowledge of the operational implications of the following concepts as they apply to Loss of Offsite Power: Principle of cooling by natural convection

North Anna bank question 3163

References: WOG ERGs for ES-0.1 and ES.0.2

Level (RO/SRO):	RO	Tier:	1
Group:	1	Importance Rating:	3.7/4.2
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

056K1.03 001

Unit 1 is in Mode 3 following a refueling outage. While taking surveillance logs, the Unit 1 Operator at the Controls (OATC) notices main feedwater pump suction pressure and main condensate pump amps are fluctuating. Additionally, the controller output for the Main Feedwater Regulating Valve Bypass Valves have increased.

Which ONE of the following statements best describes the reason for these changes in secondary plant parameters?

A. Suction strainers for the main condensate pumps are clogged with debris.

B. Discharge check valve on the standby main condensate pump has failed.

C. Main Condensate Pump Recirculation Valve 1-CN-FCV-107 has failed open.

D. Condensate Polishing System Fast Vent Valve 1-CP-TV-106 has failed open.

A. Correct. Debris lodged in the suction strainer of the condensate pumps will decrease flow through the pump. With reduced flow the condensate pump is doing less work and amperage on the pump will decrease. This would in turn reduce suction pressure to the feed pumps and result in reduced flow to the feed reg valves causing them to open up.

B. Incorrect. The symptoms are similar making this distractor plausible. Feed pump suction pressure will decrease because flow is diverted back to the condenser through the discharge check valve on the standby pump. What makes this answer incorrect is the running condensate pumps will begin pumping more water because of the extra flow path back to the condenser. This will cause condensate pump amps to increase.

C. Incorrect. Again the symptoms are similar. Feed pump suction will go down and the feed regs will open up but again amps on the condensate pumps will go up due to increased output of the condensate pumps. They are doing more work with the extra flow path through the recirc back to condenser. Most of the symptoms are the same as the correct answer making this distractor plausible.

D. Incorrect. The fast vent valve being open will have no effect if the individual vessel vent valves are closed. An interlock prevents opening the individual vent valves if the vessel inlet and outlet valves are open. This answer could be chosen if the candidate does not remember that the system vent valve being open has no effect unless a vessel vent valve is open.

Knowledge of the physical connections and/or cause-effect relationships between Condensate system and the following: MFW

(CFR: 41.2 to 41.9 / 45.7 to 45.8)

North Anna bank question 5692

References:
Objective 4011 in self-study guide for Condensate.
Objective 1829 in Self-study guide for Main Feedwater

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	2.6/2.6
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

057AK3.01 001

The following conditions exist:

- Unit 1 has experienced a spurious reactor trip
- A loss of vital bus 1-III occurs
- An extra operator has entered 0-AP-10, " Loss of Electrical Power"
- The OATC begins to perform the actions of 0-AP-10 attachment 24, "Unit 1 CRO Loss of Power Actions."

Which ONE of the following indicates the reason that this attachment directs the OATC to monitor the RCPs ?

A. CC flow has been lost to the RCPs.

B. CC flow indication ONLY has been lost to the RCPs.

C. Thermal barrier flow ONLY has been lost to the RCPs.

D. Power has been lost to the CRDM fan dampers causing them to close.

A. Correct. CC flow will be lost to the RCPs due to CC trip valves going closed. This will cause RCP bearing temperatures to increase.

B. Incorrect. CC flow indication is lost because CC flow is lost. The flow indicators are powered from semi-vital bus 1A, which is fed from "H" emergency bus. The candidate may remember that there is a loss of power that only affects indication of CC flow. This makes this answer plausible.

C. Incorrect. CC supply to pumps is also lost. Candidate may only remember that RCP temperatures are affected, but not how, i.e. that all cooling flow is lost to both motor and pump.

D. Incorrect. CRDM fan dampers are operated by air flow. The CRDM fans dump into the RCP motor cubes. Candidate may only remember that RCP temperatures are affected and not remember that this is due to a loss of CC. This makes this answer plausible.

Knowledge of the reasons for the following responses as they apply to the Loss of Vital AC Instrument Bus: Actions contained in EOP for loss of vital AC electrical instrument bus

New question.

As discussed: the loss of a vital AC electrical bus is handled by an AP. There are no EOPs that handle this failure, even if it occurs during the performance of an EOP the crew would enter the AP to handle the failure.

References:
AP-10 attachment 24

Level (RO/SRO):	RO	Tier:	1
Group:	1	Importance Rating:	4.1/4.4
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

058AA2.03 001

If the operating crew fails to re-energize 125-volt DC bus 1-III immediately, 0-AP-10, "Loss of Electrical Power," directs the crew to minimize Reactor Coolant System (RCS) makeup flow and to maximize RCS sample flow, assuming that pressurizer level is greater than 28%.

Which ONE of the following describes why this action must be taken?

A. To reduce the rate of pressurizer level increase due to a loss of normal and excess letdown.

B. To reduce the rate of volume control tank level decrease due to a loss of normal letdown.

C. To increase the rate of RCS inventory turnover due to a loss of the blender flow path.

D. To reduce the rate of RCS inventory turnover due to a loss of the blender flow path.

A. Correct. DC bus 1-III takes away letdown capability. Sample flow will reduce RCS inventory. It won't be enough to offset charging. Charging will need to be taken to minimum. Pressurizer level will still go up but the rate will be reduced.

B. Incorrect. VCT level will be decreasing but since pressurizer level is greater than 15% swap over to the RWST is not a concern yet. At lower VCT levels this would be a concern because makeup capability is lost. This makes this answer plausible.

C. Incorrect. Increase in RCS turnover is not required. The blender is lost and is an operational concern. This makes this answer plausible.

D. Incorrect. RCS turnover isn't a concern. This is usually associated with chemistry concerns. The student may choose this because sample flow is used to reduce RCS inventory. RCS samples are also associated with chemistry. Examinee may link these events and choose this answer. The blender is also lost and is an operational concern.

Ability to determine and interpret the following as they apply Loss of DC power: DC loads lost; impact on ability to operate and monitor plant systems

(CFR: 41.10 / 43.5 / 45.13

North Anna bank question 2411

References:
AP-10 attachment 15

Level (RO/SRO):	RO	Tier:	1
Group:	1	Importance Rating:	3.5/3.9
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

059K1.02 001

Assume the following conditions exist on Unit 1:

- A reactor trip results from a loss of the Main Feedwater System
- All auxiliary feedwater pumps start automatically
- Main feed line to the "C" steam generator ruptures in containment

Assuming a normal auxiliary feedwater lineup, which ONE of the following statements describes the response of the Auxiliary Feedwater System to the feed line rupture?

A. FW-PCV-159B would modulate closed to maintain 900 psig in the HCV supply header.

B. FW-PCV-159A would modulate closed to maintain 900 psig in the MOV supply header.

C. FW-PCV-159B would modulate closed to maintain 900 psig in the MOV supply header.

D. FW-PCV-159A would modulate closed to maintain 900 psig in the HCV supply header.

A. Correct. "C" SG is normally fed from the HCV header via PCV-159B. Aux feed water would be flowing from the break in the main feed line. The PCV would close to maintain 900 psig on the header.

B. Incorrect. The "C" SG is normally fed from the HCV header.

C. Incorrect. The "C" SG is normally fed from the **HCV** header via the 159B PCV. It is easy to get the PCVs confused. (For instance, "B" SG is fed via the "B" AFW pump through the "B" MOV and the "A" PCV.)

D. Incorrect. The "C" SG is normally fed from the HCV header, but through the 159**B** PCV.

Knowledge of the physical connections and/or cause-effect relationships between Main Feedwater system and the following: AFW system

(CFR: 41.2 to 41.9 / 45.7 to 45.8)

North Anna bank question 2840

References:
Objective 10176 from study guide for Auxiliary Feedwater

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	3.4/3.4
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

061AK2.01 001

Assume the following:

- Fuel building ventilation is in Configuration B for work in the spent fuel pit.
- Hi and hi-hi radiation alarms are received on 1-RMS-RM-152, New Fuel Storage Area radiation monitor.
- 1-RM-RMS-153, Fuel Pit Bridge radiation monitor is reading normally.
- A call is received from the fuel building reporting that 1-RM-RMS-152 has apparently failed high.

Which ONE of the following describes the actions that the backboards operator should take per 0-AP-5.1, "Common Radiation Monitoring System?"

A. Place the Fuel Building Radiation Automatic Interlock keyswitch in DISABLE within 2 minutes of time the hi-hi radiation alarm was received to stop automatic actions

B. Remove the fuses from 1-RM-RMS-152 within 2 minutes of time the hi-hi radiation alarm was received to stop automatic actions

C. Reset the hi-hi alarm on 1-RMS-RM-152 ONLY to stop automatic actions

D. Declare 1-RMS-RM-152 inoperable, all automatic actions require BOTH 152 and 153 to be reading hi-hi radiation

A. Correct. The keyswitch will be in the ENABLE position with fuel building ventilation in configuration B lineup. The radiation alarm is due to a malfunction of 1-RMS-RM-152. The keyswitch must be placed in DISABLE within 2 minutes of the time the hi-hi alarm was received to prevent swapping the control room to emergency ventilation and dumping air bottles.

B. Incorrect. The high and the high-high alarms must both be in for 2 minutes with the keyswitch in ENABLE in order for the automatic actions to occur. Removing the fuses for the radiation monitor will clear the high alarm (control power must be available for the high alarm to be in) and thus keep the automatic actions from occurring; however, the AP does not direct these actions.

C. Incorrect. The radiation monitor is failed; the hi-hi alarm will not clear. If the alarm would clear within the two minutes then the automatic actions would not occur.

D. Incorrect. With the keyswitch in ENABLE it only takes one of the two radiation monitors (152 or 153) to be hi-hi to cause the automatic actions. A candidate could choose this answer based on the knowledge that both radiation monitors are located in the fuel building and the assumption that a hi-hi alarm on both would be likely if radiation was actually increasing.

Knowledge of the interrelations between Area Radiation Monitoring system and the following: Detectors at each ARM system location

(CFR: 41.7 / 45.7 / 45.8)

New Question

References:
Module 46 on Radiation Monitors (pages 2, 12-13, 27)
0-AP-5.1,"Common Radiation Monitoring System."
Objective 10705 from self-study guide on Radiation Monitoring System

Level (RO/SRO):	RO	Tier:	1
Group:	2	Importance Rating:	2.5/2.6
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

061K5.05 001

Unit 2 is at 100% power. Following the quarterly PT on 2-FW-P-2, the Unit 2 safeguards operator has just called to report that the discharge piping for the turbine-driven auxiliary feedwater pump is hot to the touch. A contact pyrometer was placed on the piping and indicated a temperature of 130°F.

Which ONE of the following describes why the hot auxiliary feedwater piping is of concern?

A. The pump's discharge check valves are leaking through which could cause steam binding of the pump when it is started.

B. 2-MS-TV-211A or 2-MS-TV-211B has excessive leak through and discharge paperwork needs to be filed with health physics due to a release to atmosphere.

C. The pump's turbine trip/throttle valve is leaking through and the excess steam could cause the pump to overspeed when it is started.

D. The pump was run on recirc for an extended period of time which could lead to pump degradation.

A. Correct. If the pump discharge piping is hot to the touch the pump will become steam bound and should be vented and filled per 2-OP-31.09.

B. Incorrect. These trip valves leaking through will not heat up the pump discharge piping. Paperwork is filed with HP when the pump is run due to steam discharge.

C. Incorrect. This trip/throttle valve leaking through would not cause the discharge piping to heat up.

D. Incorrect. Although there are cautions about running an aux feed pump on recirc for extended periods, this is not the reason that the discharge piping temperature is monitored.

Knowledge of the operational implications of the following concepts as they apply to the AFW system: Feed line voiding and water hammer

(CFR: 41.5 / 45.7)

Modified question 411 from North Anna bank.

References:

Objective 5977 from Auxiliary Feedwater study guide

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	2.7/3.2
Type (Bank/Mod/New):	MODIFIED	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

062A2.03 001

Unit 1 is at 100% power. Fifty minutes ago a problem with the 1-III inverter necessitated swapping the 1-III vital bus to the Sola transformer. The electricians have now corrected the problem. The operator sent to transfer the 1-III vital bus back to the inverter neglects to press the pre-charge pushbutton on the inverter.

Which ONE of the following describes what will occur and the procedure the crew must use to correct the problem?

A. The **input** breaker will trip open on overcurrent. The crew will need to perform 1-OP-26.5, "120-Volt Vital Bus Distribution," to transfer the bus from the Sola to the inverter.

B. The **output** breaker will trip open on overcurrent. The crew will need to perform 1-OP-26.5, "120-Volt Vital Bus Distribution," to transfer from the Sola to the inverter.

C. The **input** breaker will trip open on overcurrent. The crew will need to perform 0-AP-10, "Loss of Electrical Power," to re-energize the 1-III Vital Bus.

D. The **output** breaker will trip open on overcurrent. The crew will need to perform 0-AP-10, "Loss of Electrical Power," to re-energize the 1-III Vital Bus.

A. Correct. The pre-charge pushbutton charges a capacitor bank. If the input breaker is closed it will trip open on overcurrent as the capacitor bank is charged.

B. Incorrect. If the examinee doesn't know the purpose of the pre-charge pushbutton he/she could select an answer with the output breaker tripping. He/she will assume no load on the inverter until the output breaker is closed.

C. Incorrect. If examinee doesn't realize that the Sola goes through the output of the inverter he/she will come to the conclusion that the bus will become de-energized.

D. Incorrect. The examinee may choose the output breaker tripping open when the output breaker is closed. This would de-energize the bus.

Modified question

Ability to (a) predict the impacts of the following on the AC electrical distribution system and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: Consequences of improper sequencing when transferring to or from an inverter

(CFR: 41.5 / 43.5 / 45.3 / 45.13)

References:
Objective 5512 from Vital and Emergency Electrical Distribution study guide

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	2.9/3.4
Type (Bank/Mod/New):	MODIFIED	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	Y(02)

063A1.01 001

Unit 1 tripped from 100% power following a loss of several electrical busses. The following conditions exist:

- Operating crew has completed 1-ES-0.1, "Reactor Trip Response"
- All electrical busses have been restored with the exception of the 1J emergency bus
- Repairs to the bus are expected to take 6 hours
- The 1J bus has been dead for one hour
- All AC vital busses are being supplied from their respective inverters.

In response to these conditions, operators can expect the 1-III DC bus voltage to drop _____ at first, then later drop _____.

A. slowly; faster due to cell reversal

B. quickly; more slowly due to cell reversal

C. slowly; faster due to high load

D. quickly; more slowly due to low load

A. Correct. The battery voltage will drop slowly at first. The longer the battery supplies the bus without a battery charger, the faster the battery voltage will drop. This is due to the individual battery voltages being affected by cell reversal on any weak, or weakening cells.

B. Incorrect. Both parts of answer are incorrect. Candidate may choose this answer based on the mistaken idea that the battery voltage will drop faster at the beginning and if he only remembers that cell reversal causes the rate of voltage drop to change.

C. Incorrect. The first part of the answer is correct. The candidate may choose this answer based on the mistaken idea that high load is what causes the battery voltage discharge rate to increase.

D. Incorrect. Both parts of this answer are incorrect. The candidate could choose this answer based on the mistaken assumption that the discharge rate will be faster at the beginning and the knowledge that some DC loads (such as turbine oil pumps) are removed from service when possible.

Ability to predict and/or monitor changes in parameters associated with operating the DC Electrical system controls including: Battery capacity as it is affected by discharge rate

(CFR: 41.5 / 45.5)

North Anna bank question 4088

References:
Objective 10792 from self-study guide on Abnormal Procedures

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	2.5/3.3
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

064K3.03 001

Unit 1 has experienced a loss of all AC power. The crew is depressurizing the RCS in accordance with 1-ECA-0.0, " Loss of all AC Power," when power is restored to the 1H Emergency bus from the 1H EDG. The crew transitions to step 27. The BOP notices that subcooling is indicating 23 degrees F.

The crew will manually _____ .

A. load SI equipment in 1-ECA-0.2, "Loss of All AC Power Recovery with SI Required," because the power source is considered unreliable

B. initiate SI in 1-ECA-0.2, " Loss of All AC Power Recovery with SI Required," because no flow is currently going to the core

C. load SI equipment in 1-ECA 0.0, "Loss of all AC Power," because the power source is considered unreliable

D. initiate SI in 1-ECA 0.0, "Loss of all AC Power," because no flow is currently going to the core

A. Correct. SI equipment is loaded in ECA 0.2. It is done manually due to the instability of the power source. This is the basis for manually loading equipment in the WOG.

B. Incorrect. It is common for crews to feel time pressure due to no flow to the core. A common mistake is to SI in ECA 0.2.

C. Incorrect. A common mistake is to load equipment in ECA 0.0 based on this time pressure. The basis portion is correct. This combination makes this answer plausible.

D. Incorrect. A common mistake is to load equipment in ECA 0.0 based on this time pressure. This time pressure comes from having no flow to the core.

Knowledge of the effect that a loss or malfunction of the EDGs will have on the following: ED/G (manual loads)

(CFR: 41.7 / 45.6)

References: 1-ECA 0.0, "Loss of all AC Power"
1-ECA-0.2, " Loss of All AC Power Recovery With SI Required"
WOG Guideline for 1-ECA-0.2

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	3.6/3.9
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

065AA2.03 001

When responding to a loss of instrument air event caused by a ruptured instrument line, 1-AP-28, "Loss of Instrument Air," directs the operator to determine if the rupture is inside the containment by _____.

A. closing the instrument air containment isolation valves and verifying that outside instrument air pressure increases

B. bypassing both containment instrument air dryers and verifying instrument air pressure increases

C. verifying the instrument air containment isolation valves auto close at 94 psig instrument air pressure

D. dispatching all available operators to walk down sections of the instrument air header and to report any leak discovered

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A. Correct. Per 1-AP-28, a containment instrument air isolation valve is closed and instrument air pressure outside containment is verified to be increasing. If so then the leak is inside containment.

B. Incorrect. The procedure directs isolation of the instrument air dryers from the auxiliary building, not the **containment** instrument air dryers. This answer could be chosen if the candidate remembers that the procedures addresses bypassing of dryers.

C. Incorrect. This is the setpoint for SAND FLTR IA SUPPLY LO PRESS annunciator, which is the first annunciator received on low instrument air pressure. The only auto close signal for the instrument air containment isolation valves is phase B.

D. Incorrect. Dispatching operators to look for leaks may help to identify an air leak outside of containment depending on its location, but will not help to identify an air leak inside containment.

Ability to determine and interpret the following as they apply to Loss of Instrument Air: Location and isolation of leaks

(CFR: 41.10 / 43.5 / 45.13

North Anna bank question 2587

References:
1-AP-28
Objective 11662 from self-study guide on Abnormal Procedures

Level (RO/SRO):	RO	Tier:	1
Group:	1	Importance Rating:	2.6/2.9
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

The following conditions exist:

- Unit 1 is at 100% power
- 1-FW-P-3A ("A" motor-driven aux feed pump) is tagged out for repair
- 1-MS-95, "C" Main Steam Header to Auxiliary Feedwater Pump (1-FW-P-2), is closed due to a leak downstream
- A fire has started in the motor-driven auxiliary feed pump house that has spread to oil soak pads and engulfed 1-FW-P-3B.

Based on these conditions, the crew should _____.

A. enter T.S. 3.7.5 and be in mode 3 within 6 hours

B. enter T.S. 3.0.3 and be in mode 3 within 7 hours

C. enter T.S. 3.7.5 and immediately initiate action to restore one AFW pump to operable status

D. enter T.S. 3.7.5 and restore one AFW train to operable status within 72 hours

A. Correct. Two aux feed pumps are inoperable, 1-FW-P-3A and 1-FW-P-3B. (The bases for the tech spec only requires that 2 of the 3 steam supplies to the terry turbine be operable.) Per action C of T.S. 3.7.5 the unit must be in mode 3 within 6 hours.

B. Incorrect. T.S. 3.7.5 contains an action for having two aux feed water trains inoperable. The candidate may think that all three pumps are inoperable and choose this answer based on the fact that many tech specs do not contain a provision for this type of situation.

C. Incorrect. This is the action per T.S. 3.7.5 for three inoperable aux feed pumps. Only two pumps are inoperable. The candidate may think all three pumps are inoperable due to the closed steam supply valve.

D. Incorrect. This is the action per T.S. 3.7.5 for having one aux feed pump inoperable; two pumps are inoperable. The candidate may not realize that two pumps are inoperable based on the fire.

Plant Fire On-site
Knowledge of limiting conditions for operations and safety limits.

New question

Candidate will need copy of tech spec 3.7.5 and bases

References:
Tech Spec 3.7.5 and bases

Level (RO/SRO):	RO	Tier:	1
Group:	2	Importance Rating:	3.4/4.1
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	Y	Last Exam(Y/N):	N

073K3.01 001

Annunciators 1K-D2, RAD MONITOR SYSTEM HI RAD LEVEL, and 1K-D4, RAD MONITOR SYST HI-HI RAD LEVEL, were received due to 1-RM-LW-111 (Clarifier Outlet) failing high.

Which of the following actions will NOT occur due to this condition?

A. Contaminated Drain Tank pumps trip

B. 1-LW-PCV-115 (Liquid Waste Tunnel Isol Control) closes

C. Low-Capacity Steam Generator Blowdown pumps trip

D. 1-LW-FCV-100 (Holdup Tank Influent Valve) closes

A. Correct. The contaminated drain tank pumps do NOT get a trip signal from either the Hi-Hi rad, or on the influent valve going closed. The pumps' discharge lines contain recirc lines back to the tank.

B. Incorrect. The clarifier effluent valve PCV-115 does get a close signal from a Hi-Hi radiation signal on LW-RM-111. A candidate could choose this answer based on the thought that the influent valve is closed on the hi-hi radiation signal, so there would be no reason for the effluent valve to close.

C. Incorrect. The (low capacity) blowdown pumps do trip because the influent valve goes closed on the Hi-Hi radiation signal. The candidate may choose this answer if he forgets that the clarifier inlet valve being not full open is a trip signal to the blowdown pumps.

D. Incorrect. The clarifier influent pump does trip on a Hi-Hi radiation signal from LW-RM-111. The candidate could choose this answer if he thinks that the clarifier effluent radiation monitor only effects the clarifier effluent valve (PCV-115).

Knowledge of the effect that a loss or malfunction of the Process radiation monitoring will have on the following: Radioactive effluent releases

(CFR: 41.7 / 45.6)

North Anna bank question 3798

References:
Objective 10705 from self-study guide on Radiation Monitoring

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	3.6/4.2
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	

075K4.01 001

Assume the following plant conditions:

- Unit 1 is operating at 100% power
- All circulating water pumps are running, except for 1-CW-P-1D
- Control room crew is informed that all of the oil has leaked out of the lower bearing of 1-CW-P-1A.
- Backboards operator immediately places the "A" circulating water pump in STOP

Because of this action, the "A" circulating water pump will _____ and the ability of the condenser to remove heat will _____.

A. stop immediately after the discharge MOV closes; be diminished

B. stop 4 minutes after the discharge MOV closes; be diminished

C. remain running unless its interlock key switch is placed in DEFEAT; not change

D. stop and the "D" circulating water pump will automatically start; not change

A. Correct. The pump will stop once the discharge MOV closes if no circ water pumps have been started or stopped within the last four minutes. The ability of the condenser to remove heat will be diminished due to less circulating water flow to transfer heat to.

B. Incorrect. There is no time delay if no pumps have been started or stopped within the last four minutes. Since heat transfer capability will be diminished this answer could be chosen based on remembering that there is a four minute time delay at certain times.

C. Incorrect. The interlock defeat switch being in defeat allows the pump to be started without its corresponding water box in service; it has nothing to do with stopping a pump. Since this interlock exists, this answer could be chosen. If the pump did not stop, then the heat removal capabilities would not be affected.

D. Incorrect. There are no auto starts for circulating water pumps. If there was no change in the number of pumps running then there would be no change in the heat removal capability of the condenser.

Knowledge of Circulating water system design feature(s) and or interlock(s) which provide for the following: Heat sink

(CFR: 41.7)

North Anna bank question 5703

References:
Objective 7457 from self-study guide for Circulating Water
NCRODP module 12 page 34

Level (RO/SRO):	RO	Tier:	2
Group:	2	Importance Rating:	2.5/2.8
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

076A4.01 001

Unit 1 is operating at 100% power with both Unit 2 SW pumps in operation when annunciator J-H3, SW PP 1-P1B, 2-P1B AUTO TRIP, illuminates. The annunciator response directs the operator to start another service water pump.

In order to start the Unit 1 service water pump on the same header as the pump that tripped, the OATC should start _____ from _____.

A. 1-SW-P-1A; "H" safeguards panel

B. 1-SW-P-1B; "J" safeguards panel

C. 1-SW-P-1A; benchboard 1-II

D. 1-SW-P-1B; benchboard 1-II

A. Correct. The Unit 1 "A" service water pump and the Unit 2 "B" service water pump are aligned to the "A" SW header, the pump is started from the "H" safeguards panel

B. Incorrect. The Unit 1 "B" service water pump is aligned to the "B" SW header. This answer could be chosen if the candidate does not remember that the "B" SW pumps are aligned to two different headers. The "B" pump would be started from the "J" safeguards panel.

C. Incorrect. The correct pump, but the wrong location for starting it. Benchboard 1-II contains switches for starting other secondary equipment such as Component Cooling water pumps. Could be chosen by candidate who confuses the CC pump switch location with the SW pump switch location.

D. Incorrect. Incorrect pump and incorrect location for starting it. Could be chosen if candidate thinks that it is "B" pump that should be started and confuses the CC pump switch location with the SW pump switch location.

Ability to manually operate and/or monitor in the control room: SWS pumps
(CFR: 41.7 / 45.5 to 45.8)

New question

References:

Objective 7670 from self-study guide on Service Water

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	2.9/2.9
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

078A3.01 001

Assume the following conditions:

- 1-IA-C-1 was running in HAND
- 2-IA-C-1 was started in HAND to allow placing 1-IA-C-1 in standby
- The OATC depressed the 1-IA-C-1 AUTO button, then depressed the OFF button associated with the HAND button.
- Instrument air pressure is unchanged at 115 psig.

Which ONE of the following is correct concerning the resulting operation of 1-IA-C-1?

A. Compressor will unload immediately and stop approximately 20 minutes after the OFF button is depressed.

B. Compressor will unload approximately 20 minutes after the OFF button depressed and will run indefinitely.

C. Compressor will unload and stop immediately after the OFF button is depressed.

D. Compressor will unload immediately after the OFF button is depressed and will run indefinitely.

A. Correct. The unload setpoint is 113 psig. The compressor will continue to run for 20 minutes and then shutdown.

B. Incorrect. The compressor will unload immediately, but will not shut down for 20 minutes. This answer could be chosen if the candidate remembers the 20 minutes, but does not realize that the compressor unloads immediately if air pressure is >113 psig when it is in AUTO and stops after 20 minutes.

C. Incorrect. The compressor runs unloaded for 20 minutes if the switch is in auto and air pressure is normal. This answer could be chosen if the candidate does not realize that OFF button only

D. Incorrect. The compressor will unload immediately but it will stop after 20 minutes.

Ability to monitor automatic operations of the Instrument air system including: Air pressure

CFR: 41.7 / 45.5)

North Anna Bank Question

References: 1-OP-46.1, "Operation of 1-IA-C-1, Instrument Air Compressor."
Objective 4271 from study guide on Compressed Air System

078GG2.1.30 001

Unit 1 experienced a loss of all AC. The crew has transitioned out of EOPs and desires to start 1-SA-C-1, Service Air Compressor, to return instrument air to its normal lineup. The operator will have to reset the compressor lockout located on the _____ and the compressor may be started _____.

A. compressor; on J Safeguards Panel

B. breaker; on J Safeguards Panel

C. compressor; locally

D. breaker; locally

A. Correct. If the service air compressors lose power, they have a local lockout that needs to be reset on the compressor. The switch to start the compressor is on the J Safeguards Panel.

B. Incorrect. The lockout is on the compressor not the breaker. Lock outs are normally found on breakers. If the examinee is not familiar with equipment in the field they may choose this answer based on the above.

C. Incorrect. The lockout is on the compressor but the compressor is procedurally started from the control room. It is a component that is seldom manipulated during simulator training and the examinee may not be familiar with its location.

D. Incorrect. The examinee may choose this answer based on the lockout location. Again most lockouts are located on breakers. The component is seldom operated and the examinee may not be familiar with the location at which it is started.

Instrument Air
Ability to locate and operate components, including local controls.
(CFR: 41.7 / 45.5)

References: 1-OP-46.2, Service Air Compressor.

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	3.9/3.4
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	3.1/3.2
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	

086A2.04 001

Unit 1 is at 100% power when a fire occurs in the Unit 1 emergency switchgear room. The emergency switchgear halon system could not be actuated either from the control room or locally. The crew entered 1-FCA-2, "Emergency Switchgear Room Fire," and had an operator place the Appendix-R key switches for the steam generator Power-operated relief valves (PORVs) in the EMER CLOSE position.

Reactor coolant system temperature is controlled by locally _____.

A. controlling the steam generator PORVs using the manual handwheel

B. opening the decay heat release valve

C. opening the main steam trip bypass valves using the manual handwheel

D. placing the Appendix-R key switches back to the NORMAL position periodically

A. Correct. The PORVs will have to be manually operated from the main steam valve house.

B. Incorrect. The decay heat release valve has lines from all three SG and these are normally isolated.

C. Incorrect. The main steam trip valves are closed by the FCA and are not manually operated.

D. Incorrect. The PORVs would not be operated using the keyswitches. These keyswitches are used to isolate the valves not control them.

Ability to (a) predict the impacts of the following on the Fire Protection system and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: Failure to actuate the FPS when required, resulting in fire damage

(CFR: 41.5 / 43.5 /

North Anna bank question 60525

References:
Objective 13901 from Fire Contingency Action Procedures study guide
1-FCA-2 attachment 5

Level (RO/SRO):	RO	Tier:	2
Group:	2	Importance Rating:	3.3/3.9
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	Y(02)

103K4.06 001

Containment isolation within the required 60-second time limit ensures that the release of radioactive material to the environment will be consistent with the assumptions used in the analyses for a _____.

A. loss of coolant accident

B. steam generator tube rupture

C. main steam line break

D. fuel element failure

A. Correct. The UFSAR states that the time limit is based on a LOCA.

B. Incorrect. Fuel failure due to core uncovery is unlikely to occur during a SGTR. Radioactive release is a concern due to the possibility of an atmospheric release from the secondary side of the SG which is not mitigated by containment isolation.

C. Incorrect. The concern for a main steam line break is containment temperature and pressure, not radioactive release.

D. Incorrect. The failure of a fuel element is listed in the containment isolation T.S. as one of the accidents that could cause a radioactive release and thus requires containment isolation. However, this would not require isolation within 60 seconds.

Knowledge of containment system design feature(s) and/or interlock(s) which provide for the following: Containment isolation system

North Anna bank question 3866

Level (RO/SRO):	RO	Tier:	2
Group:	1	Importance Rating:	3.1/3.7
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

G.2.1.1 001

Valve lineups are in progress to support unit startup. The valve lineup being worked specifies that a valve should be "locked 2 turns open."

Which ONE of the following correctly describes the process for initially checking, and for independently verifying the valve's position?

A. The valve should be fully closed, then re-opened 2 turns with a simultaneous verifier observing and concurring that the valve is opened 2 turns, then the lock should be installed.
The independent verifier should verify the lock is properly installed on the correct valve.

B. The valve should be fully closed, then re-opened 2 turns, then the lock should be installed. No SV is required.
The independent verifier should visually verify valve position and check that the lock is properly installed.

C. The valve should be fully closed, then re-opened 2 turns with a simultaneous verifier observing and concurring that the valve is opened 2 turns, then the lock should be installed.
The independent verifier should remove the lock and fully close the valve, then re-open the valve 2 turns and install the lock.

D. The valve should be fully closed, then re-opened 2 turns with a simultaneous verifier observing and concurring that the valve is opened 2 turns.
The independent verifier should visually verify valve position and install the lock.

A. Correct. The valve would be simultaneously verified when it was positioned since an OP-1A was being performed (could not be sure of valve's initial position). The IV'er would verify that a lock was installed on the correct valve and that it was properly locked (plant OE where a lock was found to be improperly locked).

B. Incorrect. The valve would need to be simultaneously verified when it was positioned. The IV'er would be unable to determine whether the valve was in the correct position. This is the way a locked closed or locked open valve would be positioned and verified.

C. Incorrect. There still needs to be independent verification that the lock is installed correctly on the valve.

D. Incorrect. This would ensure the valve was placed in the correct position; however, without the lock being initially installed, there would be no guarantee that it was still positioned correctly when the IV'er arrived.

Conduct of Operations
Knowledge of conduct of operations requirements

North Anna bank question 60113

References:
OPAP-0012
Objective 13611 in study guide for Administrative procedures (Not included as is parrots OPAP-0012)

Level (RO/SRO):	RO	Tier:	3
Group:		Importance Rating:	3.7/3.8
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

G2.1.20 001

You have been asked to perform a step in an emergency procedure that contains bulleted substeps.

Which ONE of the following is true concerning these substeps?

A. The substeps do not have to be performed sequentially, but all of them must be performed.

B. The substeps must be performed sequentially.

C. The substeps do not have to be performed sequentially and all of the steps do not have to be performed.

D. The substeps must be performed sequentially **and** simultaneously verified.

A. Correct. Bulleted substeps can be performed in any order.

B. Incorrect. Bulleted substeps do not have to be performed sequentially, but they must be performed.

C. Incorrect. All of the steps must be performed, but they do not have to be performed sequentially.

D. Incorrect. Although a peer-check should be obtained if possible, bulleted substeps are not designations for simultaneous verification. This type of step is designated with an SV notation.

Conduct of Operations
Ability to execute procedure steps.

New question

References:
Objective 12039 from study guide on Emergency Procedures.
OPAP-0002, "Operations Department Procedures"

Level (RO/SRO):	RO	Tier:	3
Group:		Importance Rating:	4.3/4.2
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

G2.1.22 001

RCS temperature is currently stable at 340° F. Rated thermal power is <5% and Keff is <0.99.

Which ONE of the following is the correct operational mode for the given condition?

A. Mode 4

B. Mode 5

C. Mode 3

D. Mode 2

A. Correct. Mode 4 is defined as > 200°F but < 350°F

B. Incorrect. Mode 5 is defined as ≤ 200°F.

C. Incorrect. Mode 3 is defined as ≥ 350°F.

D. Incorrect. Mode 2 is defined as ≤ 5% power.

Conduct of Operations
Ability to determine Mode of Operation

Modified question 5335 from North Anna bank.

References:
Table 1.1-1 from tech specs

Level (RO/SRO):	RO	Tier:	3
Group:		Importance Rating:	2.8/3.3
Type (Bank/Mod/New):	MODIFIED	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

G2.2.2 001

The crew is returning Unit 1 to service following refueling. Reactor power is currently 36% when the reactor operator notices Annunciator A-F7, AMSAC MANUAL BYPASS and Annunciator P-H7, AMSAC OPERATIONAL BYPASS are both lit.

Based on 1-OP-2.1, "Unit Startup From Mode 2 to Mode 1," the operator determines AMSAC is required to be in service prior to exceeding_____ power on first stage pressure and it may be placed in service by using the AMSAC _____ .

A. 40%; Normal/Bypass switch

B. 50%; Test switch

C. 40%; Test switch

D. 50%; Normal/Bypass switch

A. Correct. According to the study guide, the ARP, and the OP associated with ramping the unit AMSAC must be placed in service by 40% power. This is done using the Normal/Bypass Switch.

B. Incorrect. 50% is the requirement for reactor power, not first stage pressure. This makes it plausible. The AMSAC Test Switch is used to bypass individual points.

C. Incorrect. 40% is the setpoint per the ARP and OP. This makes this answer plausible. The AMSAC Test Switch is not the correct switch.

D. Incorrect. 50% is the requirement for reactor power, not first stage pressure. This makes it plausible. It is also the correct switch to place it in service.

Equipment Control
Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels

References: 1-AR-P-H7, AMSAC OPERATIONAL BYPASS
1-AR-A-F7, AMSAC MAN BYPASS
1-OP-2.1 CAUTION

Level (RO/SRO):	RO	Tier:	3
Group:		Importance Rating:	4/3.5
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

1-PT-82H, "1H Emergency Diesel Generator Slow Start Test," is being performed to satisfy a monthly surveillance of Tech Spec 3.8.1. The procedure states the operator should declare the EDG inoperable and enter action of Tech Spec 3.8.1.

This action is entered _____.

A. for the entire length of the surveillance due to the Load Shed and Load Sequencing Timers being defeated while the EDG is on the bus and the operator needs to perform 1-PT-80, AC Sources Operability Verification," within 1 hour of the EDG becoming inoperable

B. only for the time period the 1H EDG Mode Selector Switch is in Man/Local due to the defeat of the auto-start capability and the operator needs to perform 1-PT-80, AC Sources Operability Verification," within 1 hour of the EDG becoming inoperable

C. for the entire length of the surveillance due to the Load Shed and Load Sequencing Timers being defeated while the EDG is on the bus and the operator needs to perform 1-PT-80, AC Sources Operability Verification," within 8 hours of the EDG becoming inoperable

D. only for the time period the 1H EDG Mode Selector Switch is in Man/Local due to the defeat of the auto-start capability and the operator needs to perform 1-PT-80, AC Sources Operability Verification," within 8 hours of the EDG becoming inoperable

A. Correct. Per the note in 1-PT-82H, The EDG is declared inoperable for the entire run because while tied to the bus load shedding and sequencing are inoperable. Per Tech Spec 3.8.1, 1-PT-80 is required to be performed within 1 hr.

B. Incorrect. Man/Local will defeat the autostart capability of the EDG. This is mentioned in the precautions and limitations of the PT. The examinee may answer the question based on knowledge of this precaution.

C. Incorrect. It is correct to declare the EDG OOS for the entire surveillance but the opposite train verification time frame is one hour not 8 hours. Eight hours is the periodicity once the surveillance is complete.

D. Incorrect. Man/Local will defeat the autostart capability of the EDG. This is mentioned in the precautions and limitations of the PT. The examinee may answer the question based on knowledge of this precaution. This is also true of the opposite train verification. Eight hours is the periodicity once the surveillance is complete. Based on this they may also choose this answer.

Equipment Control
Knowledge of limiting conditions for operations and safety limits

References: 1-PT-82H, " 1H Emergency Diesel Generator Slow Start Test "
Tech Spec 3.8.1

Level (RO/SRO):	RO	Tier:	3
Group:		Importance Rating:	3.4/4.1
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

G2.2.27 001

The refueling cavity is **normally** filled with water prior to refueling operations using a _____ pump.

A. low-head safety injection

B. charging

C. refueling purification

D. residual heat removal

A. Correct. The cavity is filled by first gravity feeding from the RWST and then starting a low head SI pump, flowing to the hot legs, and overflowing the vessel into the cavity.

B. Incorrect. A charging pump is not used for this purpose as the flow rate would be too low. A candidate could choose this answer because charging pumps are the normal makeup method for the RCS.

C. Incorrect. The RP system is used to fill the transfer canal from the RWST (by backflowing through the canal drain line) and also to clean up the water in the cavity. It can also be used to pump the cavity back to the RWST. A candidate could choose this answer based on RP pumps being used for many refueling tasks.

D. Incorrect. The RHR system can be used to pump the cavity back to the RWST, although this does not clean up the water like using the RP system does. A candidate could choose this answer by confusing the methods for emptying the cavity versus filling the cavity.

Equipment Control
Knowledge of the refueling process

North Anna bank question 751

References:
Objective 9025 from study guide on Fuel Handling
1-OP-4.1, "Controlling Procedure for Refueling."

Level (RO/SRO):	RO	Tier:	3
Group:		Importance Rating:	2.6/3.5
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

G2.3.2 001

Which ONE of the following is **NOT** part of the ALARA plan for reducing dose during a unit refueling outage?

A. Using the gas stripper to degas the primary during RCS cooldown.

B. Opening of an RCS loop bypass MOV during RCS cooldown.

C. Keeping pressurizer spray valves open for as long as possible during RCS cooldown.

D. Keeping RCPs running as long as possible during RCS cooldown.

A. Correct. The RCS is degassed to reduce hydrogen concentration to allow the loops to be opened for maintenance.

B. Incorrect. This is an ALARA practice to allow cleanup of the inactive bypass lines. This answer could be chosen if the examinee does not realize that it is allowable to open one bypass MOV as long as the other two RCS loops are operable.

C. Incorrect. This is an ALARA practice to flush hot spots out of the spray lines. Examinee could choose this answer if he/she does not realize that a spray valve may be opened as long as RCP NPSH requirements and pressurizer cooldown limits are monitored.

D. Incorrect. Keeping the RCPs running during cooldown keeps crud deposits from forming in the idle loops causing hot spots. An examinee could choose this answer if he/she does not realize that hot spots can form in idle loops.

Radiation Control
Knowledge of facility ALARA program

References:
1-OP-3.2, "Unit Shutdown from Mode 3 to Mode 4."
Objective 12958 from study guide on Integrated Plant Operations

Level (RO/SRO):	RO	Tier:	3
Group:		Importance Rating:	2.5/2.9
Type (Bank/Mod/New):	NEW	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

G2.3.9 001

Unit 1 is in mode 5 and the team is preparing for entry into mode 6.

Which ONE of the following correctly states why at least one containment air recirc fan must be in operation prior to placing containment purge in service?

A. Ensures the purge isolation valves are operable.

B. Provides a flow path for the purge exhaust fans.

C. Provides a flow path for the purge supply fans.

D. Prevents backflow through the ring header.

A. Correct. Containment integrity must be established prior to entry into mode 6. Purge isolation valves receive an auto-closure signal from the containment gaseous/particulate radiation monitors. These rad monitors are considered inoperable if no containment air recirc fan is running to provide sample flow.

B. Incorrect. Purge exhaust has separate ductwork from the containment air recirc fans. Candidate could choose this answer if he/she thought the exhaust ductwork was common.

C. Incorrect. Purge supply has separate ductwork from the containment air recirc fans. Candidate could choose this answer if he/she thought the supply ductwork was common.

D. Incorrect. Purge system has separate ductwork from the containment air recirc fans. Candidate could choose this answer if he/she thought the ductwork was common.

Radiation Control
Knowledge of the process for performing a containment purge

References:
1-OP-21.2, " Containment Purge."
Tech Spec 3.9.4

Level (RO/SRO):	RO	Tier:	3
Group:		Importance Rating:	2.5/3.4
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	Y(99)

G2.4.15 001

Unit 2 experiences a reactor trip and safety injection due to a LOCA. The following sequence of events takes place:

- 0742 Unit 2 experiences a LOCA
- 0754 SEM declares an ALERT based on pressurizer level being below 20% and leakage greater than 50 GPM
- 0757 Subcooling on Unit 2 drops to 25 degrees based on CET's
- 0759 SEM upgrades to Site Area Emergency based on subcooling less than 30 degrees.

The latest time the **initial** state notification can be made is _____.

A✓ 0809

B. 0757

C. 0814

D. 0812

A. Correct. Notification of the state is required within 15 mins of the initial classification.

B. Incorrect. This time is 15 mins from the initial event not the classification. This distractor uses the 15 min time frame. This makes it plausible. The examinee could remember the time frame but forget when the clock starts.

C. Incorrect. This answer is 15 mins from when the SEM upgrades the classification. Since the upgrade was declared before the initial notification, the examinee may think the clock is reset and they have 15 mins from the upgrade to make state notifications.

D. Incorrect. This time is 16 mins from the time subcooling is lost. Keeping with the 15 min time frame makes this answer plausible. If examinee is confused as to what starts the 15 min clock they may choose this answer.

Emergency Procedures/Plan
Knowledge of communications procedures associated with EOP implementation

Based on various North Anna bank questions.

References:
EPIP 2.01, "Notification of State and Local Governments."
Objective 13134 in study guide for Emergency Plan Implementing Procedures

Level (RO/SRO):	RO	Tier:	3
Group:		Importance Rating:	3/3.5
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

G2.4.29 001

Which one of the following responsibilities can be delegated by the Station Emergency Manager? (Assume that the LEOF is not activated.)

A. Coordinating emergency operations

B. Classifying the event

C. Notifying the NRC

D. Making PARS

A. Correct. There are four duties that cannot be delegated, this is not one of them.

B. Incorrect. Classification cannot be delegated. Examinee may use STA to verify classification. They may mistake this for delegation. It is not. It is still the responsibility of the SEM to classify.

C. Incorrect. Even though notifying the NRC is done by the communicator it is a responsibility of the SEM. The examinee may interpet this as delegation making this answer plausible.

D. Incorrect. EPIP's stress the implementation of actions is the responsibility of the state and counties. The SEM is responsible for recommendations. Examinee make not be able to make this distinction making this answer plausible.

Emergency Procedures/Plan
Knowledge of the emergency plan

North Anna bank question 2912

References:
Objective 13697 from study guide on Emergency Plan Implementing Procedures

Level (RO/SRO):	RO	Tier:	3
Group:		Importance Rating:	2.6/4
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	KNOWLEDGE
Reference (Y/N):	N	Last Exam(Y/N):	N

WE02EK2.2 001

Given the following Unit 1 conditions:

A safety injection occurred due to a faulted steam generator
The crew is currently in 1-FR-P.1, "Response to Imminent Pressurized Thermal Shock"

Which ONE of the following correctly identifies parameters the operators will monitor to verify if SI can be terminated?

A. RCS subcooling and RVLIS indication.

B. RCS subcooling and PZR level.

C. RVLIS indication and RCS Pressure.

D. Heat sink and PZR level.

A. Correct. These are the parameters that are used to determine if SI can be terminated in FR-P.1.

B. Incorrect. These are parameters that are used to determine if SI can be terminated in other EOPs (E-1, E-0), but not in P.1.

C. Incorrect. RVLIS is used in P.1 to determine if SI can be terminated, but RCS pressure is not.

D. Incorrect. These are parameters that are used to determine if SI can be terminated in other EOPs (E-1, E-0), but not in P.1.

Knowledge of the interrelations between SI Termination and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems and relations between the proper operation of these systems to the operation of the facility.

(CFR: 41.7 / 45.7 / 45.8)

North Anna bank

References:
Objective 12656 of study guide for Functional Restoration Procedures
E-1, E-0 steps for terminating or reducing SI

Level (RO/SRO):	RO	Tier:	1
Group:	2	Importance Rating:	3.5/3.9
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

WE04EA2.1 001

A Unit 1 reactor trip occurs from 65% power and the immediate operator actions of 1-E-0, "Reactor Trip or Safety Injection," have been completed. In diagnosing the event in progress, the crew identifies the following plant conditions:

- Pressurizer level is decreasing
- Pressurizer pressure is decreasing
- Containment pressure is 9 psia and stable
- Containment radiation monitors are reading normal
- Reactor Coolant System T_{avg} is stable at 547°F
- Steam generator levels are consistent between generators.

The event in progress is a _____ and will be handled by _____.

A. loss-of-coolant accident outside containment; 1-ECA-1.2, "LOCA Outside Containment"

B. loss-of-coolant accident inside containment; 1-E-1, "Loss of Reactor or Secondary Coolant"

C. loss-of-coolant accident inside containment; 1-ES-1.2, "Post-LOCA Cooldown and Depressurization"

D. loss-of-coolant accident outside containment;1-E-1, "Loss of Reactor or Secondary Coolant"

A. Correct. Pressurizer level and pressure are decreasing indicating a LOCA situation since Tave and steam generator conditions are normal, with containment pressure and radiation conditions normal the LOCA must be someplace outside of containment. 1-ECA-1.2 will handle this situation.

B. Incorrect. The LOCA is not inside containment as indicated by normal containment conditions. Thus, although it is a loss of reactor coolant, 1-E-1 will not handle isolating the leak.

C. Incorrect. The event and the procedure are both incorrect. The procedure would be correct if the accident was a small break LOCA inside containment.

D. Incorrect. The event is correctly identified, however the procedure to handle the event is incorrect. Even though it is a loss of reactor coolant, 1-E-1 will not handle isolation of the leak.

Ability to determine and interpret the following as they apply to LOCA outside containment: Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

(CFR: 41.10 / 43.5 / 45.13)

References:
Objective 13841 from self-study guide on Emergency Contingency Action Procedures

Level (RO/SRO):	RO	Tier:	1
Group:	1	Importance Rating:	3.4/4.3
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

WE05EK2.2 001

The following conditions exist on Unit 1:

- The crew is responding to a loss of heat sink
- "B" and "C" S/G wide range levels are 20%
- "A" S/G wide range level is 10%
- Containment pressure is 18 psia
- Containment radiation is normal.

Which ONE of the following lists the **proper order of priority** of cooling restoration directed by 1-FR-H.1,"Response To Loss Of Secondary Heat Sink"?

A. AFW, MFW, Condensate, bleed and feed, Fire Protection/Service Water

B. MFW, AFW, Condensate, bleed and feed, Fire Protection/Service Water

C. Bleed and feed, Fire Protection/Service Water, AFW, MFW, Condensate

D. AFW, MFW, Condensate, Fire Protection/Service Water, bleed and feed

A. Correct. Aux feed is preferred source, followed by main feed. Condensate usage requires depressurization of SGs. If any two SGs cannot be maintained >12% WR then bleed and feed must be initiated. If an adequate bleed path cannot be aligned, then SGs must be further depressurized to allow use of Fire Protection or Service Water.

B. Incorrect. Aux feed is preferred over main feed since it is a safety system. Candidate could assume that since main feed is a higher capacity feed source, then it would be preferred over auxiliary feed.

C. Incorrect. As containment conditions are not adverse, bleed and feed is not necessary until 2 SGs are < 14% WR. "A" SG is the only one <14% WR. A candidate could choose this answer based on a SG being below 14% WR.

D. Incorrect. Fire main and service water are only used if an adequate bleed path cannot be established. As containment conditions are not adverse, bleed and feed is not required since only 1 SG is <14% WR.

Knowledge of the interrelations between Inadequate Heat Transfer – Loss of Secondary Heat Sink and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems and relations between the proper operation of these systems to the operation of the facility

(CFR: 41.7 / 45.7 / 45.8)

North Anna bank question 5027

References:
Objectives 11295 & 11257 from self-study guide on Functional Restoration Procedures

Level (RO/SRO):	RO	Tier:	1
Group:	1	Importance Rating:	3.9/4.2
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

The operating crew has just entered 1-FR-C.2, "Response to Degraded Core Cooling." The "A" and "C" reactor coolant pumps (RCPs) are secured. The "B" RCP is running, but component cooling water flow to the pump has just been lost. The crew should _____ stop the RCP, since continued operation _____.

A. not; may provide core cooling

B. immediately; could cause damage to the motor windings

C. immediately; will cause damage to the pump seals

D. not; will allow control of reactor coolant system pressure

A. Correct. RCPs should not be stopped in this condition, even if RCP support conditions are lost or RCP trip criteria are met.

B. Incorrect. RCPs should not be stopped in this condition even though there is not CC cooling available.

C. Incorrect. RCPs should not be stopped in this condition even though there is not CC cooling available.

D. Incorrect. Though it is correct that RCPs should not be stopped, they should be kept running to provide flow through the core to keep it cool. Pressure control is not being provided by the RCP.

Ability to determine and interpret the following as they apply to Degraded Core Cooling:Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments

(CFR: 41.10 / 43.5 /45.13)

North Anna bank question 2540

References:
Objective 11674 from self-study guide on Functional Restoration Procedures
Background for FR-C.2

Level (RO/SRO):	RO	Tier:	1
Group:	2	Importance Rating:	3.5/4.1
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N

WE11EK2.2 001

The following plant conditions exist:

- Loss-of-coolant accident in progress
- The operators are responding to a loss of emergency coolant recirculation
- One RCP is running
- The RWST level has decreased to <3%
- The operators are slowly depressurizing intact steam generators to inject the SI accumulators and maintain RVLIS dynamic head >36%.

Which ONE of the following describes why steam generators are depressurized slowly?

A. Extends the time until accumulator depletion

B. Allows time for refilling the RWST

C. Prevents injection of nitrogen into the RCS

D. Allows the RCP to remain running

A. Correct. SGs are slowly depressurized to maintain an adequate RVLIS level.

B. Incorrect. Making up to the RWST is an option earlier in the procedure. Once level decreases to 3% all pumps taking a suction from the RWST are stopped.

C. Incorrect. The injection of nitrogen is avoided by stopping the depressurization when SG pressure is <120 psig.

D. Incorrect. An RCP is stopped based on No.1 seal delta P or low seal leakoff flow.

Knowledge of the interrelations between Loss of Emergency Coolant Recirc and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems and relations between the proper operation of these systems to the operation of the facility (CFR: 41.7 / 45.7 / 45.8)

North Anna bank question 19

Objective 9627 from self-study guide on Emergency Contingency Action Procedures ECA-1.1,"Loss of Emergency Coolant Recirculation."

Level (RO/SRO):	RO	Tier:	1
Group:	1	Importance Rating:	3.9/4.3
Type (Bank/Mod/New):	BANK	Cog (Knowledge/Comp):	COMPREHENSION
Reference (Y/N):	N	Last Exam(Y/N):	N