INITIAL SUBMITTAL

NORTH ANNA EXAM 50-338/2000-301
SEPTEMBER 14 - 21, 2000

INITIAL SUBMITTAL OUTLINES

Facility: North Anna Date of Examination: 09/18-21/00
Examination Level: RO / SRO Operating Test Number: 1

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Shift staffing requirements (Both) (NEW)	JPM: Identify overtime eligibility (RO Only) JPM: Identify overtime eligibility with TS application (SRO Only)
	Plant parameters verification (Both) (BANK)	JPM R97: Determine SDM by hand calculation
A.2	Heat Balance (Both) (BANK)	JPM R57: Perform the calorimetric Heat Balance by hand
A.3	Radiation exposure limits (Both) (NEW)	JPM: Assess personnel exposure to determine if/how valve alignment can be completed
A.4	Emergency communications (RO Only) (NEW)	Question 1: Control Room (CR) evacuation Question 2: Designated actions following CR evacuation.
	Emergency protective action recommendations (SRO Only) (BANK)	JPM S93: Evaluate protective action recommendations (PARs) (SRO)(New)

Rev 0

Facility: North Anna Nuclear Plant Exam Level : RO, SROi, ***SROu***	Date of Examination: 9/18-21/00 Operating Test No.: ___1___

B.1 Control Room Systems

	System / JPM Title	Type Code*	Safety Function
a	***(Rod Control) Retrieve a dropped rod*** Rx Trip	M,A,S	I
b.	***(ESFAS) Restore plant equipment following SI*** Low Power	D,S L	II
c.	(ECCS) Terminate SI following imminent FR-P.1	D,S,L	III
d.	(RCS) Perform NC with steam void in RV w/o RVLIS	D,S,L	IVp
e.	***(PRT) Drain the pressurizer relief tank*** Rx trip	M,A,,S	V
f.	(MTGS) Perform a turbine valve freedom test ~~Rx trip~~ changed to GV3 FAILS to return to its pretest position	M,A,,S	IVs
g.	(FPS) Evacuate the control room due to a fire Rx trip	M,A,,S	VIII

B.2 Facility Walk-Through

a.	(RCPS) Isolate RCP seals	D,R,EOP,	IV
b.	***(Elect) Transfer vital bus from inverter to Sola T***	D	VI
c.	***(SFPC) Align refueling purif sys using SFP coolers***	D,R, AOP	VIII

* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA, *Italics* and **bold** are SROu JPMs

INITIAL SUBMITTAL

NORTH ANNA EXAM 50-338/2000-301

SEPTEMBER 14 - 21, 2000

INITIAL SUBMITTAL JPMS

JPMS - ADMINISTRATIVE,
SIMULATOR, & IN-PLANT

JPM TITLE: PLACE UNIT 1 RESIDUAL HEAT REMOVAL SYSTEM IN SERVICE

JPM NUMBER:NRC Admin A3

JPM REV. DATE:8/9/00

TIME VALIDATION:15 MINUTES

AN 'X' BELOW INDICATES THE APPLICABLE METHOD(S) OF TESTING WHICH MAY BE USED:

PERFORM:__X___ SIMULATE:_____ DISCUSS:_____

INSTRUCTOR's INFORMATION

TASK STANDARDS:

Determined there is no success path for opening valve without exceeding dose margin limits.

REQUIRED MATERIALS:

1. Unit 1 containment survey maps with estimated transit times
2. Calculator

REFERENCES:

None

VALIDATION TIME: 25 min.

K/A: 2.3.4 (2.5/3.1)
2.3.10 (2.9/3.3)

TERMINATING CUES:

Determined there is no success path for opening valve.

READ TO THE TRAINEE

If you have any questions, ask them now and I will answer them. During the test, I cannot answer questions. When you complete all the steps correctly, you will pass this Job Performance Measure.

I will describe the general conditions for the task you will perform and provide the initiating cues.

INITIAL CONDITIONS:

1. Unit 1 has experienced a valid safety injection signal.

2. The crew is attempting to place the residual heat removal system in service, but they are unable to open 1-RH-MOV-1701 from the Main Control Room.

3. You have been tasked with entering containment and locally opening 1-RH-MOV-1701.

4. Your allowable dose margin limit is 1850 mr.

5. Survey maps of the unit 1 containment are available, showing dose rates and one way travel time to reach the valve for each of 3 possible routes.

4. Health physics personnel are currently unavailable to provide assistance.

INITIATING CUES:

You have been directed to determine:

1) Which roundtrip path would result in the lowest radiation exposure.

2) If 1-RH-MOV-1701 can be opened locally by you without exceeding your dose margin limit.

( ) **ELEMENT: 1**

Calculate exposure at valve.

STANDARDS:

__1. (6 R/HR)(1000 MR/R)(1 HR/60 MIN)(5 MIN)= 500 MR

EVALUATOR'S NOTES:

NOTE: The operator may perform the calculations in any order.

( ) **ELEMENT: 2**

Calculate exposure from using elevator.

STANDARDS:

__1. (3 R/HR)(1000 MR/R)(1 HR/60 MIN)(2 MIN)(2 TRIPS) = 200 MR.

__2. (36 R/HR)(1000 MR/R)(1 HR/60 MIN)(2 MIN)(2 TRIPS) = 2400 MR

__3. (200 MR)+(2400 MR)+(500 MR)= 3100 MR TOTAL DOSE.

EVALUATOR'S NOTES:

Note: Total exposure via this path including time at the valve: 3100 mr.

( ) **ELEMENT: 3**

Calculate exposure from using stairway.

STANDARDS:

__1. (4 R/HR)(1000 MR/R)(1 HR/60 MIN)(1 MIN)(2 TRIPS) = 133 MR.

__2. (12 R/HR)(1000 MR/R)(1 HR/60 MIN)(7 MIN)(2 TRIPS) = 2800 MR

__3. (133 MR)+(2800 MR)+(500 MR)= 3433 MR TOTAL DOSE.

EVALUATOR'S NOTES:

Note: Total exposure via this path including time at the valve: 3433 mr

( ) **ELEMENT: 4**

Calculate exposure from using spiral staircase.

STANDARDS:

__1. (1 R/HR)(1000 MR/R)(1 HR/60 MIN)(2 MIN)(2 TRIPS) = 67 MR.

__2. (16 R/HR)(1000 MR/R)(1 HR/60 MIN)(6 MIN)(2 TRIPS) = 3200 MR.

__3. (67 MR)+(3200 MR)+(500 MR) = 3767 MR.

EVALUATOR'S NOTES:

Note: Total exposure via this path including time at the valve: 3667 mr.

(C) **ELEMENT: 5**

Determine lowest exposure path.

STANDARDS:

__1. Compared results of three calculations and determined the path using the elevator to be the lowest exposure.

EVALUATOR'S NOTES:

None

(C) **ELEMENT: 6**

Compare exposure to margin.

STANDARDS:

__1 Compared exposure to margin and determined alignment could not be made within allowable margin of 1850 mr.

EVALUATOR'S NOTES:

TERMINATE JPM AT THIS POINT

JPM STUDENT IC SHEET

INITIAL CONDITIONS:

2. Unit 1 has experienced a valid safety injection signal.

3. The crew is attempting to place the residual heat removal system in service, but they are unable to open 1-RH-MOV-1701 from the Main Control Room.

6. You have been tasked with entering containment and locally opening 1-RH-MOV-1701.

7. Your allowable dose margin limit is 1850 mr.

8. Survey maps of the unit 1 containment are available, showing dose rates and one way travel time to reach the valve for each of 3 possible routes.

5. Health physics personnel are currently unavailable to provide assistance.

INITIATING CUES:

You have been directed to determine:

1) Which roundtrip path would result in the lowest radiation exposure.

2) If 1-RH-MOV-1701 can be opened locally by you without exceeding your dose margin limit

SURVEY DATA:

1-RH-MOV-1701 is located at Survey Map Location 'A'.
Estimated time at the valve: 5 minutes.
Dose rate at the valve: 6 R/hr.

Survey Map Area	One Way Travel Time (min.)	Average Dose Rate (R/hr)
B (from personnel hatch to top of spiral staircase)	2	1
C (spiral staircase to 241' & walk to valve)	6	16
D (from personnel hatch to top of stairway)	1	4
E (stairs to 241' & walk to valve)	7	12
F (from personnel hatch to elevator door)	2	3
G (elevator ride to 241' & walk to valve)	2	36

RESULTS:

Identify the Lowest Exposure Path:

ELEVATOR: ____________

STAIRWAY: ____________

SPIRAL STAIRCASE: ____________

Can the Alignment be completed within your Dose Margin Limit?

_____ YES _____ NO

NRC Developed Admin JPM on Overtime Eligibility
(NRC ADMIN A1)

LESSON TITLE: Evaluate Overtime Eligibility.

Validation time: 15 min.

REVISION NO: 0

Developed by: R. Aiello

SAFETY CONSIDERATIONS:

None.

EVALUATOR NOTES: (Do not read to trainee)

1__ The applicable procedure section **WILL NOT** be provided to the trainee.

2__ If this is the first JPM of the JPM set, read the JPM briefing contained NUREG-1021, Appendix E, or similar to the trainee.

Read the following to trainee.

TASK CONDITIONS:

1__ A startup is planned for the following shift. One Reactor Operator must be held over two hours for startup

2__ The following is the work history (excluding shift turnover time) of the available reactor operators on shift. A break of at least 8 hours occurred between all work periods. All operators began their shift schedule at the same time each day and neither stood watch as the OATC on day 8 (today).

Evaluate Overtime Eligibility.

DAY	1	2	3	4	5	6	7	8 (Today)
Operator #1	0	0	12	12	12	8	14	10
Operator #2	0	0	12	12	12	12	8	14
Operator #3	0	0	12	12	12	8	8	15
Operator #4	0	8	12	10	10	8	10	12
Operator #5	0	4	12	10	10	14	10	12

INITIATING CUE:

Evaluate the work history for all 5 operators. Determine which operator(s), if any, can be held over for two hours without prior overtime approval, and determine which operators CANNOT be held over for two hours without prior overtime approval.

Evaluate Overtime Eligibility.

PERFORMANCE CHECKLIST

NOTE: Sequence is assumed unless denoted in the **Comments**.

Step 1 - Obtain a current revision of VPAP-0103
Current Revision of VPAP-0103 obtained and verified.

SAT/UNSAT* _____

Step 2 - Determine Operator #1 would exceed 24 hours in a 48-hour period.
Determined that Operator #1 would exceed 24 hours in a 48-hour period.

**** CRITICAL STEP ** SAT/UNSAT*** _____

Step 3 - Determine Operator #2 would not exceed any overtime restrictions.
Determined that Operator #2 would not exceed any overtime restrictions.

SAT/UNSAT* _____

Step 4 - Determine Operator #3 would exceed 16 hours strait.
Determined that Operator #3 would exceed 16 hours strait.

**** CRITICAL STEP ** SAT/UNSAT*** _____

Evaluate Overtime Eligibility.

Step 5 - Determine Operator #4 would not exceed any overtime restrictions.
Determined that Operator #4 would not exceed any overtime restrictions.

SAT/UNSAT* _____

Step 6 - Determine Operator #5 would exceed 72 hours in a 7-day period.
Determined that Operator #5 would exceed 72 hours in a 7 day period

TERMINATING CUE: When the examinee has evaluated overtime restrictions, this JPM is complete.

*** Comments required for any step evaluated as UNSAT.**

Evaluate Overtime Eligibility.

RELATED TASKS:

Conduct shift turnover and relief

K/A REFERENCE AND IMPORTANCE RATING:

GEN 2.1.4, 2.1.5

REFERENCES:

____

TOOLS AND EQUIPMENT:

None.

SAFETY FUNCTION (from NUREG 1123, Rev 2.):

A.1 - Conduct Of Operations

REASON FOR REVISION:

New JPM for NRC exam.

Evaluate Overtime Eligibility.

Time Required for Completion: 10 Minutes (approximate).

APPLICABLE METHOD OF TESTING

Performance:	Simulate 4	Actual ___		Unit: ___	
Setting:	Control Room 4	Simulator ___ (Not applicable to In-Plant JPMs)			
Time Critical:	Yes ___	No 4		Time Limit N/A	
Alternate Path:	Yes ___	No 4			

EVALUATION

Trainee:______________________________ SSN: ____________________

JPM: Pass _____ Fail _____

Remedial Training Required: Yes _____ No _____

Did Trainee Obtain Procedure using PROMIS/MIND?: Yes _____ No _____
(Each Student should obtain one procedure per evaluation set using PROMIS/MIND.)

Comments: ____

____

____

TASK CONDITIONS:

1__ A startup is planned for the following shift. One Reactor Operator must be held over two hours for startup

2__ The following is the work history (excluding shift turnover time) of the available reactor operators on shift. A break of at least 8 hours occurred between all work periods. All operators began their shift schedule at the same time each day and neither stood watch as the OATC on day 8 (today).

DAY	1	2	3	4	5	6	7	8 (Today)
Operator #1	0	0	12	12	12	8	14	10
Operator #2	0	0	12	12	12	12	8	14
Operator #3	0	0	12	12	12	8	8	15
Operator #4	0	8	12	10	10	8	10	12
Operator #5	0	4	12	10	10	14	10	12

INITIATING CUE:

Evaluate the work history for all 5 operators. Determine which operator(s), if any, can be held over for two hours without prior overtime approval, and determine which operators CANNOT be held over for two hours without prior overtime approval.

Two Questions

RO A.4

REFERENCE ALLOWED

Questions:

1. A fire has broken out in the Main Control Room (MCR).
2. The SS has directed that personnel evacuate the MCR.
3. You have been designated by the SS as the Unit 2 RO Operator at the auxiliary shutdown panel.

Question 1:

1. Where do you report to immediately upon leaving the Main Control Room to obtain required keys and equipment?

2. Where do you report to after obtaining security keys and equipment from the above location?

Question 2

1. Where does the Unit Two SRO report to after distributing security keys and equipment?

2. What other positions are required to support auxiliary shutdown panel actions on unit 2?

Answer:

1-1: Appendix R locker located in the TSC HVAC room.
1-2: Unit 2 auxiliary shutdown panel.

2-1: Unit 2 auxiliary shutdown panel.
2-2: Emergency switchgear, 2H emergency diesel generator, service water valve house, and remote monitoring panel in the fuel building.

VALIDATION TIME: 15 min.

K/A: 067AA213 (3.3/4.4)

REFERENCE ALLOWED

Questions:

1. A fire has broken out in the Main Control Room (MCR).
2. The SS has directed that personnel evacuate the MCR.
3. You have been designated by the SS as the Unit 2 RO Operator at the auxiliary shutdown panel.

Question 1:

1. Where do you report to immediately upon leaving the Main Control Room to obtain required keys and equipment?

2. Where do you report to after obtaining security keys and equipment from the above location?

Question 2

1. Where does the Unit Two SRO report to after distributing security keys and equipment?

2. What other positions are required to support auxiliary shutdown panel actions on unit 2?

Virginia Power
North Anna Power Station

SENIOR REACTOR OPERATOR

JOB PERFORMANCE MEASURE
(Admin A4)
S93

TASK

Determine protective action recommendations (EPIP-1.06).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

PREREQUISITES

The trainee has completed the applicable course knowledge training at the senior reactor operator level.

OBJECTIVES

1 State the maximum allowable time between declaring a general emergency and transmitting the protective action recommendation to the state (EPIP-1.06).

2 Explain the following concepts as they apply to determining the protective action recommendation (PAR) (EPIP-1.06).

How to determine the downwind sectors

How to determine if a release path from containment to the environment is likely or has occurred

How to determine which PAR to use when multiple emergency action levels exist

Why the PAR should not be transmitted to the local governments

INITIAL CONDITIONS

A reactor trip and safety injection has occurred.

A large tube rupture has occurred in the "A" steam generator.

"A" main steam line is faulted in the main steam valve house upstream of the main steam trip valve.

RCS specific activity is 500 μCi/gm dose equivalent Iodine-131.

A general emergency has been declared due to a fuel failure with a steam generator tube rupture.

INITIATING CUE

You are requested to determine protective action recommendations (PARs).

Continue until off-site authorities have been notified.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

5. Emergency communication
6. Face-to-face communication
7. Giving and acknowledging orders
8. Phonetic alphabet
9. Telephone communication systems

TOOLS AND EQUIPMENT

None

PREFERRED EVALUATION METHOD

Verbal-visual

VALIDATION TIME: 20 min.

K/A: 038EK306 (4.2/4.5)
038EA207 (4.4/4.8)

Virginia Power
North Anna Power Station

SENIOR REACTOR OPERATOR

JOB PERFORMANCE MEASURE

S93

INITIAL CONDITIONS

A reactor trip and safety injection has occurred.

A large tube rupture has occurred in the "A" steam generator.

"A" main steam line is faulted in the main steam valve house upstream of the main steam trip valve.

RCS specific activity is 500 μCi/gm dose equivalent Iodine-131.

A general emergency has been declared due to a fuel failure with a steam generator tube rupture.

INITIATING CUE

You are requested to determine protective action recommendations (PARs).

Continue until off-site authorities have been notified.

PERFORMANCE STEPS

1 Initiate EPIP-1.01.

SAT [ ] UNSAT [ ] NOTE:

2 Determine the emergency action level used to classify the general emergency.

SAT [ ] UNSAT [ ] NOTE:

3 Determine the wind speed and three downwind sectors.

Verbal-Visual Cues

Wind speed is 10 mph, and wind direction is 220 degrees

SAT [ ] UNSAT [ ] NOTE:

4 Determine the protective action recommendation.

SAT [ ] UNSAT [ ] NOTE:

5 Record the wind speed and downwind sectors.

Critical Standards

"10" is entered into the "wind speed" block, and "B, C, D" is entered into the "downwind sectors" block of the meteorological data section of the protective action recommendation form

SAT [ ] UNSAT [ ] NOTE:

6 Mark the appropriate protective action recommendation box.

Critical Standards

"PAR" 1 box is marked on the protective action recommendation form

SAT [ ] UNSAT [ ] NOTE:

7 Enter the downwind sectors to be evacuated.

Critical Standards

"B, C, D" is entered into the "evacuate downwind sectors" blanks of the "protective action recommendation 1" (PAR 1) section

SAT [ ] UNSAT [ ] NOTE:

8 Sign and date the protective action recommendation form.

Critical Standards

Protective action recommendation form is signed and dated

SAT [ ] UNSAT [ ] NOTE:

9 Request the emergency communicators to notify off-site authorities.

Critical Standards

Operator performs both of the following actions

10. Request the state and local communicator to notify the state emergency operations center of the protective action recommendation in accordance with EPIP-2.01

11. Request the NRC communicator to notify the Nuclear Regulatory Commission of the protective action recommendation in accordance with EPIP-2.02

SAT [ ] UNSAT [ ] NOTE:

10 Request the radiological assessment director to implement EPIP-4.07.

Critical Standards

Radiological assessment director is requested to implement EPIP-4.07

SAT [ ] UNSAT [ ] NOTE:

11 Check if a radiological-based protective action recommendation is recommended.

Verbal-Visual Cues

Radiological-based protective action recommendation is not recommended

SAT [ ] UNSAT [ ] NOTE:

12 Check if the emergency is terminated.

Verbal-Visual Cues

Emergency has not been terminated

SAT [ ]	UNSAT [ ]	NOTE:

13 Determine the appropriate procedure step to perform.

Verbal-Visual Cues

Assume that another operator will perform this step

SAT [ ]	UNSAT [ ]	NOTE:

>>>>> END OF EVALUATION <<<<<

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE
(Admin A2)
R57

TASK

Perform the calorimetric heat balance (hand calculation) (1-PT-24).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

Use attached calorimetric as key ***(FACILITY)***.

PREREQUISITES

The trainee has completed the applicable course knowledge training at the reactor operator level.

INITIAL CONDITIONS

Rated thermal power is stable at 100%

Prodac-250 computer demand calorimetric program is inoperable

Prodac-250 computer point power U0980 is available

Prodac-250/PCS computer is available

Daily feedwater flow calorimetric heat balance is required to be performed

INITIATING CUE

You are requested to perform a calorimetric heat balance (hand calculation) and to adjust the power-range nuclear instrumentation, if required.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

1. Emergency communication
2. Face-to-face communication
3. Giving and acknowledging orders
4. Phonetic alphabet
5. Telephone communication systems

TOOLS AND EQUIPMENT

Calculator
Data Sheet

PREFERRED EVALUATION METHOD

Demonstration

VALIDATION TIME: 25 min.

K/A: 015A101 (3.5/3.8)

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE

R57

INITIAL CONDITIONS

Rated thermal power is stable at 100%

Prodac-250 computer demand calorimetric program is inoperable

Prodac-250 computer point power U0980 is available

Prodac-250/PCS computer is available

Daily feedwater flow calorimetric heat balance is required to be performed

INITIATING CUE

You are requested to perform a calorimetric heat balance (hand calculation) and to adjust the power-range nuclear instrumentation, if required.

PERFORMANCE STEPS

1 Review initial conditions, precautions, and limitations.

SAT [ ] UNSAT [ ] NOTE:

2 Verify that the Prodac-250 computer points are reliable.

SAT [ ] UNSAT [ ] NOTE:

3 Obtain the current total blowdown flow rate.

SAT [ ] UNSAT [ ] NOTE:

4 . Determine the feedwater enthalpies.

SAT [ ] UNSAT [ ] NOTE:

5 Complete the steam flow calorimetric determination.

Critical Standards

Calculated feed-flow calorimetric is within 2% of key.

SAT [ ] UNSAT [ ] NOTE:

6 Determine feedwater flow / steam flow ratios.

Evaluator's Cue

Assume another operator will complete the procedure

SAT [ ] UNSAT [ ] NOTE:

>>>>> END OF EVALUATION <<<<<

PT-24 DATA SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF JPM)

P1MS001C = 833.30 PSIG

T1FW001A = 443.81°F

P1MS002C = 833.37 PSIG

T1FW002A = 443.81°F

P1MS003C = 833.29 PSIG

T1FW003A = 443.81°F

F1FW005C Average = 4.26

F1FW006C Average = 4.30

F1FW007C Average = 4.29

SGBD = 60/60/60

Total PRZR Heater Input = 270 kw

T_{ave} = 580.8°F

RCS ΔT = 100%

1st Stage Pressure = 100%

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE
(Admin A1)
R97

TASK

Determine the shutdown margin by hand calculation (1-PT-10A {partially filled out}).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

PREREQUISITES

The trainee has completed the applicable course knowledge training at the reactor operator level.

INITIAL CONDITIONS

Reactor has been shut down for 72 hours following a reactor trip.

Shift supervisor has been notified of this test

There are no equivalent stuck rods

Reactor power was 100% for > 100days prior to the trip with all rods fully withdrawn and a Reactor Coolant System boron concentration of 750 ppm

Core burnup is 9000 MWD/MTU

Reactor Coolant System boron concentration was determined 15 minutes ago to be 1200 PPM

Reactor Coolant System projected temperature is 200°F

No dilutions have occurred since the last Reactor Coolant System boron concentration was determined

Test is being performed to determine if an RCS boration is required prior to cooling down to 200°F

There are no control rods stuck

INITIATING CUE

You are requested to determine the shutdown margin by hand calculation using 1-PT-10A.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

Calculator

PREFERRED EVALUATION METHOD

Demonstration

VALIDATION TIME: 25 min.

K/A: 001A411 (3.5/4.1)

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE

R97

INITIAL CONDITIONS

Reactor has been shut down for 72 hours following a reactor trip.

Shift supervisor has been notified of this test

There are no equivalent stuck rods

Reactor power was 100% for > 100days prior to the trip with all rods fully withdrawn and a Reactor Coolant System boron concentration of 750 ppm

Core burnup is 9000 MWD/MTU

Reactor Coolant System boron concentration was determined 15 minutes ago to be 1200 PPM

Reactor Coolant System projected temperature is 200°F

No dilutions have occurred since the last Reactor Coolant System boron concentration was determined

Test is being performed to determine if an RCS boration is required prior to cooling down to 200°F

There are no control rods stuck

INITIATING CUE

You are requested to determine the shutdown margin by hand calculation using 1-PT-10A.

PERFORMANCE STEPS

(HAND APPLICANT THE PARTIALLY FILLED OUT SDM SHEET, 1-PT-10A)

1 Verify that the initial conditions, precautions, and limitations are met.

SAT [ ] UNSAT [ ] NOTE:

2 Document the reason for this test.

SAT [ ] UNSAT [ ] NOTE:

3 Determine the worth of rods that are stuck, untrippable, and not fully inserted.

SAT [ ] UNSAT [ ] NOTE:

4 Record the current or projected shutdown conditions.

SAT [ ] UNSAT [ ] NOTE:

5 Record the previous critical conditions.

SAT [ ] UNSAT [ ] NOTE:

6 Calculate the sum of the current or projected shutdown conditions.

Critical Standards

Sum is determined to be -10417 ± 100 pcm

SAT [ ] UNSAT [ ] NOTE:

7 Calculate the sum of the previous critical conditions.

Critical Standards

Sum is determined to be -10175 ± 100 pcm

SAT [ ] UNSAT [ ] NOTE:

8 Calculate the difference between the current or projected shutdown conditions and the previous critical conditions.

Critical Standards

Difference is calculated to be –242 pcm

SAT [ ] UNSAT [ ] NOTE:

9 If necessary, calculate the boron concentration required to achieve a shutdown margin of at least 1.77% $\Delta K/K$.

Critical Standards

Determines that RCS must be borated 221.5 PPM.

SAT [ ] UNSAT [ ] NOTE:

12 Verify that the acceptance criteria cited in the procedure have been met.

Evaluator's Cue

Assume another operator will complete the procedure

SAT [ ] UNSAT [ ] NOTE:

>>>>> END OF EVALUATION <<<<<

SIMULATOR SETUP

JOB PERFORMANCE MEASURE

R97

TASK

Determine the shutdown margin by hand calculation (1-PT-10A).

CHECKLIST

_____ Recall the IC for mode 3, 547°F, stable

INITIAL SUBMITTAL

NORTH ANNA EXAM
50-338, 50-339/00-301

SEPTEMBER 14 - 21, 2000

INITIAL SUBMITTAL JPMS

Virginia Power
North Anna Power Station

NON-LICENSED OPERATOR

JOB PERFORMANCE MEASURE

N387
(Safety Function 6, IP, Bank)

TASK

Transfer a vital bus from an inverter to a Sola transformer (1-OP-26.5).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

PREREQUISITES

Before being evaluated on the task, the trainee must have completed the reactor operator's course checkout during which the objectives listed below would have been addressed.

READ TO OPERATOR

DIRECTIONS TO TRAINEE

I will explain the initial conditions, and state the task to be performed. All in-plant steps , including any required communications, **shall be simulated** for this JPM. Under no circumstances are you to operate any plant equipment. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

Vital bus inverter 1-III is to be removed from service for maintenance

INITIATING CUE

You are requested to transfer vital bus 1-III from the inverter to the regulating transformer.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

None

EVALUATION METHOD

Verbal-visual

VALIDATION TIME: 10 min.

K/A: 062A210 (3.0/3.3); 062A304 (2.7/2.9)

Virginia Power
North Anna Power Station

NON-LICENSED OPERATOR

JOB PERFORMANCE MEASURE

N387

INITIAL CONDITIONS

Vital bus inverter 1-III is to be removed from service for maintenance

INITIATING CUE

You are requested to transfer vital bus 1-III from the inverter to the regulating transformer.

PERFORMANCE STEPS

1 Review initial conditions, precautions and limitations.

SAT [ ] UNSAT [ ] NOTE:

2 Energize the regulating transformer.

Critical Standards

Breaker 1J1-1E1R is simulated closed

SAT [ ] UNSAT [ ] NOTE:

3 Verify inverter indications.

SAT [ ] UNSAT [ ] NOTE:

4 Verify SOLA not supplying vital bus 1-IV.

SAT [ ] UNSAT [ ] NOTE:

5 Inform Unit SRO or CRO to enter action.

SAT [ ] UNSAT [ ] NOTE:

6 Close the alternate source AC input breaker.

Critical Standards

The vital bus 1-III alternate source AC input breaker is simulated closed

SAT [ ] UNSAT [ ] NOTE:

7 Verify interlock pin is down.

SAT [ ] UNSAT [ ] NOTE:

8 Rotate 1-BP-SW-3 switch to ALTERNATE SOURCE TO LOAD.

Critical Standards

1-BP-SW-3 switch is simulated rotated to the ALTERNATE SOURCE TO LOAD position

SAT [ ] UNSAT [ ] NOTE:

9 Verify inverter 1-III is unloaded.

SAT [ ] UNSAT [ ] NOTE:

10 Open the inverter output breaker.

SAT [ ] UNSAT [ ] NOTE:

11 Open the battery input breaker.

SAT [ ] UNSAT [ ] NOTE:

12 Open the DC bus inverter supply breaker.

SAT [ ] UNSAT [ ] NOTE:

13 Verify the interlock pin is up.

SAT [ ] UNSAT [ ] NOTE:

>>>>> END OF EVALUATION <<<<<

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE

R639ma
(Safety Function 5, Modified, Alternate Path)

TASK

Drain the pressurizer relief tank (1-OP-5.7).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

PREREQUISITES

The trainee has completed the applicable course knowledge training at the reactor operator level.

INITIAL CONDITIONS

Pressurizer PORV 1455C inadvertently opened then reclosed.

Pressurizer relief tank level is required to be lowered

INITIATING CUE

You are requested to drain the pressurizer relief tank to 74% in accordance with 1-OP-5.7.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

None

PREFERRED EVALUATION METHOD

Demonstration

VALIDATION TIME: 10 min.

K/A: 007A101 (2.9/3.1); 007A410 (3.6/3.8); 007A201 (3.9/4.2)

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE

R639am

INITIAL CONDITIONS

Pressurizer PORV 1455C inadvertently opened then reclosed.

Pressurizer relief tank level is required to be lowered

INITIATING CUE

You are requested to drain the pressurizer relief tank to 74% in accordance with 1-OP-5.7.

PERFORMANCE STEPS

1 Review initial conditions, precautions, and limitations.

SAT [ ] UNSAT [ ] NOTE:

2 Verify positive pressure in the PRT.

SAT [ ] UNSAT [ ] NOTE:

3 Open pressurizer relief tank drain isolation valve 1-RC-HCV-1523.

Critical Standards

1-RC-HCV-1523 control switch is placed in OPEN

SAT [ ] UNSAT [ ] NOTE:

4 Monitor primary drains transfer tank level indicator 1-LI-DG-101.

SAT [ ] UNSAT [ ] NOTE:

5 Close pressurizer relief tank drain isolation valve 1-RC-HCV-1523.

Critical Standards

When PRT level is 74% ($\pm$2%), 1-RC-HCV-1523 control switch is placed in CLOSE

SAT [ ] UNSAT [ ] NOTE:

NOTE TO EVALUATOR: After the PRT drain valve is closed, PORV 1455C will spuriously open.

Read the following cue:

Evaluator's Cue

Respond to plant conditions.

6 Close PRZR PORVs - NO

SAT [ ] UNSAT [ ] NOTE:

7 Close PORV Block Valve – NO

SAT [ ] UNSAT [ ] NOTE:

8 Trip the reactor and carry out E-0

Critical Standards

The reactor is tripped and E-0 immediate actions are completed.

SAT [ ] UNSAT [ ] NOTE:

>>>>> END OF EVALUATION <<<<<

SIMULATOR SETUP

JOB PERFORMANCE MEASURE

R639

TASK

Drain the pressurizer relief tank (1-OP-5.7).

CHECKLIST

____ Recall IC#1, 100% power

____ Open PRZR PORV 1455C to increase tailpipe temperature, then close PORV and allow RCS pressure to recover

____ Increase PRT level to approximately 80% (or until PRT pressure is 14#)

____ Place the simulator in FREEZE

____ NOTE: After candidate closes PRT drain valve, implement malfunction _______ (PORV 1455C spurious open/stuck open); when candidate attempts to close block MOV, implement malfunction _____ (thermal O/L trip)

Virginia Power
North Anna Power Station

NON-LICENSED OPERATOR

JOB PERFORMANCE MEASURE

N10
(Safety Function 4, IP, RCA, EOP, Bank)

TASK

Isolate the reactor coolant pump seals locally (1-ECA-0.0, 1-ECA-0.2, 1-AP-33.2).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

PREREQUISITES

Before being evaluated on the task, the trainee must have completed the reactor operator's course checkout during which the objectives listed below would have been addressed.

READ TO OPERATOR

DIRECTIONS TO TRAINEE

I will explain the initial conditions, and state the task to be performed. All in-plant steps , including any required communications, **shall be simulated** for this JPM. Under no circumstances are you to operate any plant equipment. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

AC power has been lost

1-ECA-0.0 has been entered due to a loss of all AC power

INITIATING CUE

You are requested to isolate reactor coolant pump seals in accordance with 1-ECA-0.0.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

Work was performed in compliance with the Radiation Work Permit; exposure to surface and airborne contamination was minimized; and ALARA principles were applied

TOOLS AND EQUIPMENT

Administrative key

EVALUATION METHOD

Verbal-visual

VALIDATION TIME: 30 min.

K/A: 004A205 (4.0/4.3); 003A201 (3.5/3.9)

Virginia Power
North Anna Power Station

NON-LICENSED OPERATOR

JOB PERFORMANCE MEASURE

N10

INITIAL CONDITIONS

AC power has been lost

1-ECA-0.0 has been entered due to a loss of all AC power

INITIATING CUE

You are requested to isolate reactor coolant pump seals in accordance with 1-ECA-0.0.

PERFORMANCE STEPS

1 Isolate seal injection to all reactor coolant pumps.

Critical Standards

The following seal injection isolation valves are simulated unlocked and closed:
- 1-CH-318, A RCP
- 1-CH-314, B RCP
- 1-CH-310, C RCP

SAT [ ] UNSAT [ ] NOTE:

2 Close the reactor coolant pump thermal barrier component cooling water return valve.

Critical Standards

RCP thermal barrier CC return valve 1-CC-757 is simulated closed

SAT [ ] UNSAT [ ] NOTE:

3 Close the reactor coolant pump seal water return isolation motor-operated valve.

Critical Standards

RCP seal water return valve 1-CH-MOV-1381 is simulated closed

SAT [ ] UNSAT [ ] NOTE:

4 Notify the control room operator that the reactor coolant pump seals are isolated.

SAT [ ] UNSAT [ ] NOTE:

>>>>> END OF EVALUATION <<<<<

Virginia Power
North Anna Power Station

NON-LICENSED OPERATOR

JOB PERFORMANCE MEASURE

N870
(Safety Function 8, IP, AOP, RCA, Bank)

TASK

Align the Refueling Purification System to cool the reactor cavity using the spent fuel pit coolers (1-AP-11).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

PREREQUISITES

Before being evaluated on the task, the trainee must have completed the reactor operator's course checkout during which the objectives listed below would have been addressed.

READ TO OPERATOR

DIRECTIONS TO TRAINEE

I will explain the initial conditions, and state the task to be performed. All in-plant steps , including any required communications, **shall be simulated** for this JPM. Under no circumstances are you to operate any plant equipment. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

Residual Heat Removal System has malfunctioned.

The reactor is shutdown.

1-RP-P-1A is running aligned to the spent fuel pool.

An operator is standing by in containment.

INITIATING CUE

You are requested to align the Refueling Purification System to cool the reactor cavity using the spent fuel pit coolers in accordance with 1-AP-11.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

Work was performed in compliance with the Radiation Work Permit; exposure to surface and airborne contamination was minimized; and ALARA principles were applied

TOOLS AND EQUIPMENT

None

EVALUATION METHOD

Verbal-visual

VALIDATION TIME: 25 min.

K/A: 005A203 (2.9/3.1)

Virginia Power
North Anna Power Station

NON-LICENSED OPERATOR

JOB PERFORMANCE MEASURE

N870

INITIAL CONDITIONS

Residual Heat Removal System has malfunctioned.

The reactor is shutdown.

1-RP-P-1A is running aligned to the spent fuel pool.

An operator is standing by in containment.

INITIATING CUE

You are requested to align the Refueling Purification System to cool the reactor cavity using the spent fuel pit coolers in accordance with 1-AP-11.

PERFORMANCE STEPS

1 Stop the refueling purification pumps.

Critical Standards

Refueling purification pump 1-RP-P-1A control switch is simulated placed in OFF

SAT [ ] UNSAT [ ] NOTE:

2 Align the RP valves in containment.

Evaluator's Cue

The operator in containment has verified closed 1-RP-1 and 1-RP-3, and opened 1-RP-28

SAT [ ] UNSAT [ ] NOTE:

3 Align the RP valves in the auxiliary building basement.

Critical Standards

1-RP-80, RP filters to spent fuel pit, is simulated closed

SAT [ ] UNSAT [ ] NOTE:

4 Align the RP valves in the unit-2 penetration area.

SAT [ ] UNSAT [ ] NOTE:

5 Align the RP valves in the unit-1 penetration area.

SAT [ ] UNSAT [ ] NOTE:

6 Align the RP valves in the auxiliary building basement.

SAT [ ] UNSAT [ ] NOTE:

7 Align the refueling purification filters.

SAT [ ] UNSAT [ ] NOTE:

8 Isolate the refueling purification ion exchanger.

Critical Standards

The following RP ion exchanger valves are simulated closed:

- 1-RP-68, RP IX inlet
- 1-RP-74, RP IX outlet

SAT [ ] UNSAT [ ] NOTE:

9 Align the desired refueling purification pump(s).

Evaluator's Cue

The shift supervisor desires the "A" RP pump to be aligned

SAT [ ] UNSAT [ ] NOTE:

10 Place the spent fuel pool cooling system in service.

Evaluator's Cue

The spent fuel pit cooling system is in service per 0-OP-16.1

SAT [ ] UNSAT [ ] NOTE:

11 Start the refueling purification pump(s).

Critical Standards

Refueling purification pump 1-RP-P-1A control switch is simulated placed in ON

SAT [ ] UNSAT [ ] NOTE:

12 Throttle the valves, as necessary, to maintain the desired refueling purification filter differential pressure.

Evaluator's Cue

RP filter differential pressures are 30 psid

SAT [ ] UNSAT [ ] NOTE:

>>>>> END OF EVALUATION <<<<<

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE

R221
(Safety Function 3, Bank)

TASK

Terminate safety injection during the response to an imminent pressurized thermal shock condition (1-FR-P.1).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

PREREQUISITES

The trainee has completed the applicable course knowledge training at the reactor operator level.

INITIAL CONDITIONS

Low-head safety injection pumps 1-SI-P-1A and 1B are running

Safety injection has been actuated

All three main steam lines are faulted inside containment

Charging pumps 1-CH-P-1A and 1B are running

All three reactor coolant pumps are running

Reactor Coolant System subcooling and reactor vessel level are sufficient to allow safety injection to be terminated

1-FR-P.1 has been completed through checking if safety injection can be terminated

INITIATING CUE

You are requested to terminate safety injection in accordance with 1-FR-P.1. Continue until safety injection flow is verified as being not required.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

Copy of 1-FR-P.1 signed off through checking if safety injection can be terminated

PREFERRED EVALUATION METHOD

Verbal-visual

VALIDATION TIME: 20 min.

K/A: E02, EA11 (4.0/3.9); E08, EA22 (3.5/4.1); 006A213 (3.9/4.2)

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE

R221

INITIAL CONDITIONS

Low-head safety injection pumps 1-SI-P-1A and 1B are running

Safety injection has been actuated

All three main steam lines are faulted inside containment

Charging pumps 1-CH-P-1A and 1B are running

All three reactor coolant pumps are running

Reactor Coolant System subcooling and reactor vessel level are sufficient to allow safety injection to be terminated

1-FR-P.1 has been completed through checking if safety injection can be terminated

INITIATING CUE

You are requested to terminate safety injection in accordance with 1-FR-P.1. Continue until safety injection flow is verified as being not required.

PERFORMANCE STEPS

1 Reset safety injection.

Critical Standards

Both SAFETY INJECTION RESET switches are placed in RESET

SAT [ ] UNSAT [ ] NOTE:

2 Reset containment depressurization actuation.

SAT [ ] UNSAT [ ] NOTE:

3 Reset phase "A" and phase "B" containment isolation.

SAT [ ] UNSAT [ ] NOTE:

4 Establish instrument air to containment.

SAT [ ] UNSAT [ ] NOTE:

5 Stop all but one charging pump.

Evaluator's Cue

Stop the B charging pump

Critical Standards

B charging pump control switch is placed in AUTO AFTER STOP

SAT [ ] UNSAT [ ] NOTE:

6 Verify the low-head safety injection pump suction valves from the containment sump are closed.

SAT [ ] UNSAT [ ] NOTE:

7 Stop the low-head safety injection pumps.

Critical Standards

Both LHSI pump control switches are placed in AUTO AFTER STOP

SAT [ ] UNSAT [ ] NOTE:

8 Verify the low-head safety injection pump suction valves from the containment sump are closed.

SAT [ ]	UNSAT [ ]	NOTE:

9 Check that the charging pump recirculation valves are open.

SAT [ ]	UNSAT [ ]	NOTE:

10 Close boron injection tank inlet valves 1-SI-MOV-1867A and 1867B.

Critical Standards

CLOSE push-buttons for 1-SI-MOV-1867A and 1867B are depressed

SAT [ ]	UNSAT [ ]	NOTE:

11 Close boron injection tank outlet valves 1-SI-MOV-1867C and 1867D.

SAT [ ]	UNSAT [ ]	NOTE:

12 Verify that cold-leg injection alternate isolation valve 1-SI-MOV-1836 is closed.

SAT [ ]	UNSAT [ ]	NOTE:

13 Verify that hot-leg safety injection isolation valves 1-SI-MOV-1869A and 1869B are closed.

SAT [ ]	UNSAT [ ]	NOTE:

14 Manually close charging flow control valve 1-CH-FCV-1122.

SAT [ ]	UNSAT [ ]	NOTE:

15 Check that auxiliary spray valve 1-CH-HCV-1311 is closed.

SAT [ ]	UNSAT [ ]	NOTE:

16 Check that normal charging valve 1-CH-HCV-1310 is open.

SAT [ ]	UNSAT [ ]	NOTE:

17 Open charging isolation valves 1-CH-MOV-1289A and 1289B.

SAT [ ]	UNSAT [ ]	NOTE:

18 Manually open charging flow control valve 1-CH-FCV-1122 to establish 25 gpm charging flow.

SAT [ ]	UNSAT [ ]	NOTE:

19 Maintain seal injection flow.

SAT [ ]	UNSAT [ ]	NOTE:

20 Verify that safety injection flow is not required.

SAT [ ]	UNSAT [ ]	NOTE:

>>>>> END OF EVALUATION <<<<<

SIMULATOR SETUP

JOB PERFORMANCE MEASURE

R221

TASK

Terminate safety injection during the response to an imminent pressurized thermal shock condition (1-FR-P.1).

CHECKLIST

____ Recall IC#36

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE

R476ma
(Safety Function 1, Modified, Alternate Path)

TASK

Retrieve a dropped rod (1-AP-1.2).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

PREREQUISITES

The trainee has completed the applicable course knowledge training at the reactor operator level.

INITIAL CONDITIONS

Unit was at 100% steady-state operation prior to the event

Control bank A control rod P-10 is at 0 steps, as indicated by individual rod position

1-AP-1.2, "Dropped Rod," has been signed off to the point of completing the "Dropped Rod Retrieval" attachment

INITIATING CUE

You are requested to complete the "Dropped Rod Retrieval" attachment in 1-AP-1.2.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

Copy of 1-AP-1.2 signed off to the point of completing the "Dropped Rod Retrieval" attachment

PREFERRED EVALUATION METHOD

Verbal-visual

VALIDATION TIME: 10 min

K/A: APE 003; AA203 (3.6/3.8); 001A211 (4.4/4.7)

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE

R476

INITIAL CONDITIONS

Unit was at 100% steady-state operation prior to the event

Control bank A control rod P-10 is at 0 steps, as indicated by individual rod position

1-AP-1.2, "Dropped Rod," has been signed off to the point of completing the "Dropped Rod Retrieval" attachment

INITIATING CUE

You are requested to complete the "Dropped Rod Retrieval" attachment in 1-AP-1.2.

PERFORMANCE STEPS

1 Place the control rod bank selector switch in BANK SELECT for control bank A.

Critical Standards

Rod control selector switch is placed in the CONTROL BANK A position

SAT [ ] UNSAT [ ] NOTE:

2 Record the affected bank's group step counter reading.

SAT [ ] UNSAT [ ] NOTE:

3 Manually reset the group step counter.

Critical Standards

Control bank A group 2 step counter is manually reset to zero

SAT [ ] UNSAT [ ] NOTE:

4 Request an extra operator to obtain the pulse-to-analog converter reading for control bank A.

Evaluator's Cue

Control bank A pulse-to-analog converter reading is 229

SAT [ ] UNSAT [ ] NOTE:

5 Record the affected bank pulse-to-analog converter reading.

SAT [ ] UNSAT [ ] NOTE:

6 Request an extra operator to reset the pulse-to-analog converter for control bank A.

Evaluator's Cue

Control bank A pulse-to-analog converter has been reset to zero and returned to AUTOMATIC

SAT [ ] UNSAT [ ] NOTE:

7 Record the IRPI identification for the dropped rod.

SAT [ ] UNSAT [ ] NOTE:

8 Open all lift coil disconnect switches for the affected bank, except the switch for the dropped rod.

Critical Standards

All lift coil disconnect switches for control bank A are opened except for rod P-10

SAT [ ]	UNSAT [ ]	NOTE:

9 Independently verify that all lift coil disconnect switches for the affected bank, except the switch for the dropped rod, are open.

Evaluator's Cue

Assume that independent verification has been completed

SAT [ ]	UNSAT [ ]	NOTE:

10 Manually withdraw the affected control rod.

Critical Standards

Control rod P-10 withdrawal is commenced

Evaluator's Cue

Reactor Coolant System temperature control will be accomplished by the balance-of-plant operator

SAT [ ]	UNSAT [ ]	NOTE:

NOTE TO EVALUATOR: After rod withdrawal has commenced and rod has been withdrawn approximately 10 steps, a second control rod will drop but the reactor will not automatically trip.

Read the following cue:

Evaluator's Cue

Respond to plant conditions.

11 Verify only one control rod is dropped.

SAT [ ]	UNSAT [ ]	NOTE:

12 Go to 1-E-0, Reactor Trip or Safety Injection.

SAT [ ]	UNSAT [ ]	NOTE:

13 Verify reactor trip.

Critical Standards

Reactor is manually tripped.

SAT [ ] UNSAT [ ] NOTE:

14 Verify turbine trip.

Critical Standards

Reheater steam supply FCVs are reset.

SAT [ ] UNSAT [ ] NOTE:

15 Verify both AC emergency busses energized.

SAT [ ] UNSAT [ ] NOTE:

16 Check SI status.

SAT [ ] UNSAT [ ] NOTE:

>>>>> END OF EVALUATION <<<<<

SIMULATOR SETUP

JOB PERFORMANCE MEASURE

R476

TASK

Retrieve a dropped rod (1-AP-1.2)

CHECKLIST

____ Recall IC#33

____ Verify malfunctions MRD32 and MRD1624 preloaded

____ When rod P-10 has been withdrawn approximately 10 steps, implement malfunction MRD1621

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE

R523
(Safety Function 1, IP, AOP, Bank)

TASK

Maintain stable plant conditions from the auxiliary shutdown panel (1-AP-20).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

PREREQUISITES

The trainee has completed the applicable course knowledge training at the reactor operator level.

INITIAL CONDITIONS

Control room has been evacuated

Immediate operator actions of 1-AP-20, "Operation from the Auxiliary Shutdown Panel," have been performed

Shift supervisor has assumed the position of station emergency manager

Boric acid transfer pump 1-CH-P-2A is aligned to unit 1

Unit was at 100% steady-state operation prior to the event

Immediate operator actions of 1-E-0, "Reactor Trip or Safety Injection," were performed prior to evacuation

Both emergency busses are energized by offsite power

A and C main feedwater pumps are running

INITIATING CUE

You are requested to stabilize the unit by continuing with 1-AP-20, "Operation from the Auxiliary Shutdown Panel."

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

Copy of 1-AP-20 signed off to the point of determining emergency bus status

PREFERRED EVALUATION METHOD

Verbal-visual

VALIDATION TIME: 25 min.

K/A: APE 068; AA112 (4.4/4.4)

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE

R523

INITIAL CONDITIONS

Control room has been evacuated

Immediate operator actions of 1-AP-20, "Operation from the Auxiliary Shutdown Panel," have been performed

Shift supervisor has assumed the position of station emergency manager

Boric acid transfer pump 1-CH-P-2A is aligned to unit 1

Unit was at 100% steady-state operation prior to the event

Immediate operator actions of 1-E-0, "Reactor Trip or Safety Injection," were performed prior to evacuation

Both emergency busses are energized by offsite power

A and C main feedwater pumps are running

INITIATING CUE

You are requested to stabilize the unit by continuing with 1-AP-20, "Operation from the Auxiliary Shutdown Panel."

PERFORMANCE STEPS

1 Determine the status of the emergency busses.

SAT [ ] UNSAT [ ] NOTE:

2 Request the safeguards operator to place the diesel CRE switches in EMERGENCY.

SAT [ ] UNSAT [ ] NOTE:

3 Verify that all auxiliary feedwater pumps are running.

SAT [ ] UNSAT [ ] NOTE:

4 Determine the status of the Main Feedwater System.

SAT [ ] UNSAT [ ] NOTE:

5 Obtain the shift supervisor's permission and request the turbine building operator to remove the breaker-closing fuses for the main feedwater pump breakers and to open the breakers locally.

<u>Evaluator's Cue</u>

Assume that another operator will perform this step

SAT [ ] UNSAT [ ] NOTE:

6 Maintain steam generator levels at the 33% narrow-range level.

<u>Critical Standards</u>

Local-Remote switches for the following valves are placed in LOCAL:

- 1-FW-MOV-100D
- 1-FW-MOV-100B
- 1-FW-HCV-100C

The following valves are throttled to maintain steam generator levels:

- 1-FW-MOV-100D
- 1-FW-MOV-100B
- 1-FW-HCV-100C

SAT [ ] UNSAT [ ] NOTE:

7 Check if emergency boration is required.

Evaluator's Cue

All IRPIs were verified to indicate zero prior to evacuation of the control room

SAT [ ] UNSAT [ ] NOTE:

8 Verify that pressurizer level is > 15%.

SAT [ ] UNSAT [ ] NOTE:

9 Place the pressurizer backup heaters' group-1 and group-4 LOCAL-REMOTE switches in LOCAL.

SAT [ ] UNSAT [ ] NOTE:

10 Operate pressurizer heaters as required to maintain Reactor Coolant System (RCS) pressure between 2210 psig and 2260 psig.

SAT [ ] UNSAT [ ] NOTE:

11 Maintain pressurizer level between 28% and 64%.

SAT [ ] UNSAT [ ] NOTE:

12 Place each steam generator power-operated relief valves' LOCAL-REMOTE switch in LOCAL.

SAT [ ] UNSAT [ ] NOTE:

13 Manually adjust steam generator power-operated relief valve controllers as required to maintain steam generator pressure between 975 psig and 1000 psig.

SAT [ ] UNSAT [ ] NOTE:

14 Verify that emergency condensate storage tank level is > 40%.

SAT [ ] UNSAT [ ] NOTE:

15 Request the shift technical advisor to monitor plant parameters and the status trees.

SAT [ ] UNSAT [ ] NOTE:

16 Determine if the control room has been uninhabitable for greater than 15 hours.

Evaluator's Cue

Assume 16 hours have elapsed since the unit was tripped

SAT [ ] UNSAT [ ] NOTE:

17 Place the control switch for boric acid transfer pump 1-CH-P-2A to SLOW speed and transfer the pump's control to the auxiliary shutdown panel.

Critical Standards

Local-remote switch for 1-CH-P-2A is placed in LOCAL

SAT [ ] UNSAT [ ] NOTE:

18 Perform an emergency boration to maintain shutdown margin.

Critical Standards

Control switch for 1-CH-P-2A is placed in FAST

Operator is requested to locally open emergency borate valve 1-CH-MOV-1350

SAT [ ] UNSAT [ ] NOTE:

19 Record time emergency boration started.

SAT [ ] UNSAT [ ] NOTE:

20 Determine if emergency boration should be stopped.

Evaluator's Cue

Assume that 17 minutes have elapsed

SAT [ ] UNSAT [ ] NOTE:

21 Secure emergency boration.

Critical Standards

Operator is requested to locally close 1-CH-MOV-1350

Control switch for 1-CH-P-2A is placed in SLOW

SAT [ ] UNSAT [ ] NOTE:

>>>>> END OF EVALUATION <<<<<

SIMULATOR SETUP

JOB PERFORMANCE MEASURE

R523

TASK

Maintain stable plant conditions from the auxiliary shutdown panel (1-AP-20).

CHECKLIST

_____ Recall IC #34

_____ Verify 1-AP-20 immediate operator actions have been performed.

_____ Place the simulator in FREEZE

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE

R554MA
(Safety Function 8, Modified, Alternate Path)

TASK

Evacuate the control room due to a fire and take action for four rods failure to trip (0-FCA-1).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

PREREQUISITES

The trainee has completed the applicable course knowledge training at the reactor operator level.

INITIAL CONDITIONS

Both units are stable at 100% power

Operations shift supervisor has determined that the control room has become uninhabitable and requires evacuation due to a control room fire

Available operations personnel consist of the minimum shift crew composition required by TS-6.2.2 only

INITIATING CUE

You are requested to conduct the actions required to evacuate the control room and assemble shift personnel at the Appendix-R locker due to a fire in accordance with 0-FCA-1.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

None

PREFERRED EVALUATION METHOD

Verbal-visual

VALIDATION TIME: 10 min.

K/A: APE 067; AA213 (3.3/4.4)

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE

R554

INITIAL CONDITIONS

Both units are stable at 100% power

Operations shift supervisor has determined that the control room has become uninhabitable and requires evacuation due to a control room fire

Available operations personnel consist of the minimum shift crew composition required by TS-6.2.2 only

INITIATING CUE

You are requested to conduct the actions required to evacuate the control room and assemble shift personnel at the Appendix-R locker due to a fire in accordance with 0-FCA-1.

PERFORMANCE STEPS

1 Trip the unit-1 reactor, and request the unit-2 OATC to trip the unit-2 reactor.

Critical Standards

Reactor trip switches on benchboard 1-1 and/or 1-2 are placed in the TRIP position

SAT [ ] UNSAT [ ] NOTE:

2 Trip the unit-1 turbine, and request the unit-2 OATC to trip the unit-2 turbine.

SAT [ ] UNSAT [ ] NOTE:

3 Isolate the unit-1 Main Steam System, and request the unit-2 OATC to isolate the unit-2 Main Steam System.

SAT [ ] UNSAT [ ] NOTE:

4 Verify that the unit-1 main steam trip valves are closed, and request the unit-2 OATC to verify that the unit-2 main steam trip valves are closed.

Critical Standards

Main steam isolation valves' normal close pushbuttons are depressed

SAT [ ] UNSAT [ ] NOTE:

5 Close the block valves for the unit-1 pressurizer power-operated relief valves, and request the unit-2 OATC to close the block valves for the unit-2 pressurizer power-operated relief valves.

Critical Standards

Control switches for pressurizer power-operated relief valve block valves 1-RC-MOV-1535 and 1536 are placed in CLOSE

SAT [ ] UNSAT [ ] NOTE:

6 Stop all unit-1 reactor coolant pumps, and request the unit-2 OATC to stop all unit-2 reactor coolant pumps.

Critical Standards

Reactor coolant pumps 1-RC-P-1A, 1B, and 1C control switches are placed in STOP

SAT [ ] UNSAT [ ] NOTE:

7 Align the unit-1 charging system to the RWST and request the unit-2 OATC to align the unit-2 charging system to its RWST.

SAT [ ] UNSAT [ ] NOTE:

8 Place all non-running charging pump control switches in PULL-TO-LOCK and request the unit-2 OATC to place non-running charging pumps on unit-2 in PULL-TO-LOCK.

SAT [ ] UNSAT [ ] NOTE:

9 Close the unit-1 steam generator blowdown trip valves, and request the unit-2 OATC to close the unit-2 steam generator blowdown trip valves.

SAT [ ] UNSAT [ ] NOTE:

10 Obtain the vital/Appendix-R key locker and direct all operations personnel to proceed directly to the Appendix-R locker.

SAT [ ] UNSAT [ ] NOTE:

11 Direct all other personnel to leave the control room, computer room, and Hathaway room areas.

Evaluator's Cue

All other personnel have left the control room, computer room and Hathaway room

SAT [ ] UNSAT [ ] NOTE:

12 Verify that all operations shift personnel have been notified.

Evaluator's Cue

All operators have reported to the Appendix-R locker

SAT [ ] UNSAT [ ] NOTE:

13 Establish remote operations.

Evaluator's Cue

The unit-1 SRO has dispatched all available personnel in accordance with step 10

SAT [ ] UNSAT [ ] NOTE:

14 Obtain equipment from the Appendix-R locker and proceed to the emergency switchgear room.

SAT [ ] UNSAT [ ] NOTE:

Evaluator's Cue

Assume another operator will complete the procedure

>>>>> END OF EVALUATION <<<<<

SIMULATOR SETUP

JOB PERFORMANCE MEASURE

R554

TASK

Evacuate the control room due to a fire (0-FCA-1).

CHECKLIST

_____ Recall IC #1 (100% power)

_____ Enter switch override for MSTV Appendix-R emergency close pushbutton (override OFF)

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE

R62ma
(Safety Function 4, Modified, Alternate Path)

TASK

Perform a turbine valve freedom test (1-PT-34.3).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

PREREQUISITES

The trainee has completed the applicable course knowledge training at the reactor operator level.

INITIAL CONDITIONS

Unit is stable at 860 mwe

Communication has been established between the control room and the turbine building operators

Backboards operator is standing by at the test and calibration panel

INITIATING CUE

You are requested to perform a turbine valve freedom test.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

None

PREFERRED EVALUATION METHOD

Verbal-visual

VALIDATION TIME: 15 min.

K/A: 045A402 (2.7/2.6); 045A408 (2.7/2.6)

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE

R62ma

INITIAL CONDITIONS

Unit is stable at 860 mwe

Communication has been established between the control room and the turbine building operators

Backboards operator is standing by at the test and calibration panel

INITIATING CUE

You are requested to perform a turbine valve freedom test.

PERFORMANCE STEPS

1 Review initial conditions, precautions and limitations.

SAT [ ] UNSAT [ ] NOTE:

2 Request the backboards operator to align the test and calibration panel control for testing governor valves.

Evaluator's Cue

Backboards operator has aligned the Test and Calibration panel to test governor valves

SAT [ ] UNSAT [ ] NOTE:

3 Request the backboards operator to rotate GV test point switch A to the GV-1 P position.

Evaluator's Cue

Governor valve test point switch A is in the GV-1 P position

SAT [ ] UNSAT [ ] NOTE:

4 Request the turbine building operators to observe governor valve GV-1 and GV-4 operation.

SAT [ ] UNSAT [ ] NOTE:

5 Close governor valve GV-1.

Critical Standards

GV-1 CLOSE push-button is depressed until the valve is closed

SAT [ ] UNSAT [ ] NOTE:

6 Open governor valve GV-1.

Critical Standards

GV-1 OPEN push-button is depressed until the valve returns to its pre-test position

SAT [ ] UNSAT [ ] NOTE:

7 Request the backboards operator to rotate GV test point switch A to the GV-2 P position.

Evaluator's Cue

Governor valve test point switch A is in the GV-2 P position

SAT [ ] UNSAT [ ] NOTE:

8 Request the turbine building operators to observe governor valve GV-1, GV-2 and GV-4 operation.

SAT [ ] UNSAT [ ] NOTE:

9 Close governor valve GV-2.

Critical Standards

GV-2 CLOSE push-button is depressed until the valve is closed

SAT [ ] UNSAT [ ] NOTE:

10 Open governor valve GV-2.

Critical Standards

GV-2 OPEN push-button is depressed until the valve returns to its pre-test position

SAT [ ] UNSAT [ ] NOTE:

11 Request the backboards operator to rotate GV test point switch A to the GV-3 P position.

Evaluator's Cue

Governor valve test point switch A is in the GV-3 P position

SAT [ ] UNSAT [ ] NOTE:

12 Request the turbine building operators to observe governor valve GV-1, GV-3 and GV-4 operation.

SAT [ ] UNSAT [ ] NOTE:

13 Close governor valve GV-3.

Critical Standards

GV-3 CLOSE push-button is depressed until the valve is closed

SAT [ ] UNSAT [ ] NOTE:

14 Open governor valve GV-3.

Critical Standards

GV-3 OPEN push-button is depressed until the valve returns to its pre-test position

Verbal-Visual Cues

Local observation showed GV-3 closing after returning to its pre-test position

Valve auto closes after it is returned to its pre-test position

(FAULT: GV-3 FAILS TO RETURN TO ITS PRE-TEST POSITION.)

SAT [ ] UNSAT [ ] NOTE:

>>>>> END OF EVALUATION <<<<<

SIMULATOR SETUP

JOB PERFORMANCE MEASURE

R62

TASK

Perform a turbine valve freedom test (1-PT-34.3).

CHECKLIST

____ Recall IC#1, 100% power.

____ Ramp the unit to 860 MWe using 1-PT-34.3 attachment 5 (record GV data in attachment 4)

____ Verify valve position limiter set at 100% and turbine control in IMP-IN

____

____

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE

R690
(Safety Function 4, Bank)

TASK

Perform a natural circulation cooldown with a steam void in the reactor vessel without RVLIS (1-ES-0.4).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

PREREQUISITES

The trainee has completed the applicable course knowledge training at the reactor operator level.

INITIAL CONDITIONS

1-ES-0.4, "Natural Circulation Cooldown with Steam Void in Vessel (Without RVLIS)," has been completed through attempting to start a reactor coolant pump

Steam dumps are in the STEAM PRESSURE mode with 1-MS-PC-1464B in MANUAL and at 0% demand

Reactor Coolant System T_{avg} is 460°F

Reactor Coolant System pressure is stable at 1,600 psig

RCS cooldown was stopped for turnover

INITIATING CUE

You are requested to continue the performance of 1-ES-0.4 until conditions for isolating the safety injection accumulators are established.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

Copy of 1-ES-0.4 signed off through attempting to start a reactor coolant pump

PREFERRED EVALUATION METHOD

Verbal-visual

VALIDATION TIME: 20 min.

K/A: EPE E10; EA11 (3.8/3.6)

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE

R690

INITIAL CONDITIONS

1-ES-0.4, "Natural Circulation Cooldown with Steam Void in Vessel (Without RVLIS)," has been completed through attempting to start a reactor coolant pump

Steam dumps are in the STEAM PRESSURE mode with 1-MS-PC-1464B in MANUAL and at 0% demand

Reactor Coolant System T_{avg} is 460°F

Reactor Coolant System pressure is stable at 1,600 psig

RCS cooldown was stopped for turnover

INITIATING CUE

You are requested to continue the performance of 1-ES-0.4 until conditions for isolating the safety injection accumulators are established.

PERFORMANCE STEPS

1 Decrease hot leg temperatures to 450°F.

Critical Standards

INCREASE push-button for steam pressure controller 1-MS-PC-1464B is depressed

SAT [ ] UNSAT [ ] NOTE:

2 Verify that the Reactor Coolant System cooldown rate, RCS pressure, and the pressure-temperature relationship are satisfactory.

SAT [ ] UNSAT [ ] NOTE:

3 Maintain pressurizer level stable.

SAT [ ] UNSAT [ ] NOTE:

4 When hot-leg temperatures are less than 450°F, stop the Reactor Coolant System cooldown.

Critical Standards

After RCS hot-leg temperatures are <450°F, the DECREASE push-button for steam pressure controller 1-MS-PC-1464B is depressed

SAT [ ] UNSAT [ ] NOTE:

5 Maintain proper charging and seal injection flows.

SAT [ ] UNSAT [ ] NOTE:

6 Verify that letdown is in service.

SAT [ ] UNSAT [ ] NOTE:

7 Depressurize the Reactor Coolant System using auxiliary spray.

Critical Standards

Either PRZR spray valve, 1-RC-PCV-1455A or 1455B, is opened by depressing its controller's INCREASE push-button

Control switch for auxiliary spray valve 1-CH-HCV-1311 is placed in OPEN

Control switch for normal charging valve 1-CH-HCV-1310 is placed in CLOSE

The PRZR spray valve that was previously opened is throttled closed by depressing its controller's DECREASE push-button

SAT [ ] UNSAT [ ] NOTE:

8 When Reactor Coolant System pressure or PRZR level exceed the desired value stop the depressurization.

Critical Standards

Either of the following actions is performed:

Close pressurizer spray valve 1-RC-PCV-1455A or 1455B by depressing its controller's DECREASE push-button

Place the control switch for auxiliary spray valve 1-CH-HCV-1311 in CLOSE, and place the control switch for normal charging valve 1-CH-HCV-1310 in OPEN

SAT [ ] UNSAT [ ] NOTE:

9 Verify that pressurizer level is less than the maximum allowable value.

SAT [ ] UNSAT [ ] NOTE:

10 Check if the safety injection accumulators should be isolated.

Evaluator's Cue

Assume that another operator will perform this step

SAT [ ] UNSAT [ ] NOTE:

>>>>> END OF EVALUATION <<<<<

SIMULATOR SETUP

JOB PERFORMANCE MEASURE

R690

TASK

Perform a natural circulation cooldown with a steam void in the reactor vessel without RVLIS (1-ES-0.4).

CHECKLIST

_____ Recall IC#37

_____ Turn off RVLIS (boxes on the floor at the bottom of the steps in the computer room, one ON/OFF switch for each train)

_____ Verify RCS Tave stable at 460°F

_____ Verify RCS pressure stable at 1600 psig

_____ Place the simulator in FREEZE

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE

R773
(Safety Function 2, Bank)

TASK

Restore plant equipment following a safety injection (1-OP-7.12).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

PREREQUISITES

The trainee has completed the applicable course knowledge training at the reactor operator level.

INITIAL CONDITIONS

Unit 1 has received a safety injection signal and the signal has been reset

No hi-hi radiation monitor signals are present

INITIATING CUE

You are requested to restore the train "A" and train "B" valves to normal alignment by completing attachments 1 and 2 of 1-OP-7.12.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

None

PREFERRED EVALUATION METHOD

Verbal-visual

VALIDATION TIME: 10 min.

K/A: 013A206 (3.7/4.0)

Virginia Power
North Anna Power Station

REACTOR OPERATOR

JOB PERFORMANCE MEASURE

R773

INITIAL CONDITIONS

Unit 1 has received a safety injection signal and the signal has been reset

No hi-hi radiation monitor signals are present

INITIATING CUE

You are requested to restore the train "A" and train "B" valves to normal alignment by completing attachments 1 and 2 of 1-OP-7.12.

PERFORMANCE STEPS

1 Reset the safety injection signal to the containment sump pumps outside discharge trip valve 1-DA-TV-100A.

Critical Standards

CLOSE push-button for 1-DA-TV-100A is depressed

SAT [ ] UNSAT [ ] NOTE:

2 Reset the safety injection signal to the primary drains transfer tank pumps outside discharge trip valve 1-DG-TV-100A.

Critical Standards

CLOSE push-button for 1-DG-TV-100A is depressed

SAT [ ] UNSAT [ ] NOTE:

3 Open the containment gas vent header outside isolation valve 1-VG-TV-100A.

SAT [ ] UNSAT [ ] NOTE:

4 Open the radiation monitor pump discharge to containment valve 1-RM-TV-100A.

SAT [ ] UNSAT [ ] NOTE:

5 Open the radiation monitor pump suction outside isolation valve 1-RM-TV-100B.

SAT [ ] UNSAT [ ] NOTE:

6 Open the main steam drain header to condenser valve 1-MS-TV-109.

SAT [ ] UNSAT [ ] NOTE:

7 Verify that the condenser air ejector discharge to vent stack "A" is open.

SAT [ ] UNSAT [ ] NOTE:

8 Reset the safety injection signal to the containment sump pumps inside discharge trip valve 1-DA-TV-100B.

Critical Standards

CLOSE push-button for 1-DA-TV-100B is depressed

SAT [ ] UNSAT [ ] NOTE:

9 Reset the safety injection signal to the primary drains transfer tank pumps inside discharge trip valve 1-DG-TV-100B.

Critical Standards

CLOSE push-button for 1-DG-TV-100B is depressed

SAT [ ] UNSAT [ ] NOTE:

10 Open the containment gas vent header inside isolation valve 1-VG-TV-100B.

SAT [ ] UNSAT [ ] NOTE:

11 Open the radiation monitor pump suction inside isolation valve 1-RM-TV-100C.

SAT [ ] UNSAT [ ] NOTE:

12 Open the radiation monitor pump discharge to containment valve 1-RM-TV-100D.

SAT [ ] UNSAT [ ] NOTE:

>>>>> END OF EVALUATION <<<<<

SIMULATOR SETUP

JOB PERFORMANCE MEASURE

R773

TASK

Restore plant equipment following a safety injection (1-OP-7.12).

CHECKLIST

_____ Recall IC #35

OR:

_____ Recall IC #1 (100% power)

_____ Place the simulator in RUN

_____ Go to run, manually actuate SI

_____ Wait one minute, then reset SI and phase A

_____ Place COND AIR EJECTOR DIVERT TO CONT SI RESET switches to RESET

_____ Place the simulator in FREEZE

INITIAL SUBMITTAL

NORTH ANNA EXAM
50-338, 50-339/00-301

SEPTEMBER 14 - 21, 2000

INITIAL SUBMITTAL

SCENARIO OUTLINE

Facility: North Anna Scenario No.: 1 Op-Test No.: 1

Examiners: ______ Operators: (RO) ______
(BOP) ______
(SRO) ______

Initial Conditions: EOL. Condenser steam dumps are in steam pressure control due to a problem with the Tavg input, which is under I&C investigation. A AFW pump is OOS for corrective maintenance. No other equipment is OOS.

Turnover: There are thunderstorms in the area with winds clocking at 60 mph. Large golf ball size hail has also been reported. Slight tremors on the order of 2.1 on the Richter scale have been detected.

POD: Maintain 100% power. Complete 1-PT-17.1 rod operability test, which was commenced by the offgoing shift. Continue corrective maintenance on the A AFW pump.

Event No.	Malf. No.	Event Type*	Event Description
1		N (R)	Conduct rod movement test
2		I (R)	PT-1445 failure high (with failure of turbine to runback in event fail to react timely to PT-445 failure)
3		C (R)	Unisolable PZR PORV leak
4		R (R)	Power reduction due to PZR leak
5		I (B)	A S/G level channel III (LT-1476) failure low
6		C (B)	Steam-driven AFW pump failure
7		C–>M (A)	Main steam line break
7a		M (A)	Reactor trip with MS isolation failure
7b		C (B)	Loss of all auxiliary feed
7c		C (A)	Loss of secondary heat sink with RCS bleed & feed

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor
(R)O (B)OP (A)LL

NORTH ANA POWER STATION
RO/SRO NRC INITIAL LICENSE EXAM
SIMULATOR EVALUATION SCENARIO NRC-1

PROGRAM:	RO/SRO Initial License Training
DESCRIPTION:	Main Steam Line Break / Loss of All Feedwater
LENGTH:	90 minutes
AUTHOR:	R. Aiello (Chief Examiner North Anna)
REVISION DATE:	5/19/00

REVIEWED BY: ____
NRC Senior License Examiner   Date

APPROVED BY: ____
NRC Chief Examiner (Surry)   Date

EVALUATION SCENARIO OBJECTIVES

TERMINAL OBJECTIVE: During normal and abnormal plant conditions, the Shift Operating Crew will perform control room operations in accordance with (IAW) approved plant procedures ensuring that the health and safety of the public is protected and the integrity of the plant maintained.

ENABLING OBJECTIVES:

1. Conduct control rod movement test

2. Given specific plant conditions, plant procedures, and a shift turnover, respond to the following events IAW approved plant procedures:

   a. PT-1445 failure high
   b. Unisolable PRZR PORV leak
   c. Power reduction due to PRZR leak
   d. LT-1476 failure low
   e. Steam-driven AFW pump failure
   f. Main steam line break on MS manifold
   g. Reactor trip with MS isolation failure
   h. Loss of all auxiliary feed
   i. Loss of secondary heat sink with RCS bleed & feed

3. Given abnormal plant conditions, mitigate the adverse consequences of the followingevents IAW approved plant procedures:

   a. Identify abnormalities while assessing actual system response with respect to predicted system response.
   b. Investigate the cause and effect of abnormalities in system performance.
   c. Implement applicable procedures.
   d. Perform immediate actions from memory.

4. Given abnormal plant conditions, implement the applicable on-site and off-site reports and notifications IAW approved plant procedures.

5. Given normal and abnormal plant conditions, using the following principles for operational effectiveness as they apply to all operators, conduct plant operations IAW approved plant procedures:
   a. Plant and control room communication.
   b. Plant/Control Board monitoring.
   c. Plant/Control Board manipulation.
   d. Operational problem solving.
   e. Use of OPs/APs and Technical Specifications.
   f. Use of EOPs IAW EOP Rules of Usage.
   g. Annunciator recognition and response.
   h. Written communications/logs.
   i. ALARA awareness.

EVALUATION SCENARIO OBJECTIVES (cont'd)

6. Given normal and abnormal plant conditions, using the following principles for operational effectiveness as they apply to the Unit Supervisor (US), conduct plant operations IAW approved plant procedures:

   a. Team performance management.
   b. Problem solving.
   c. Decision analysis.
   d. Action planning.
   e. Self-checking.

7. During abnormal and emergency events, the shift operating crew shall apply techniques of teamwork and self-checking IAW established work practices and operating guidelines.

EVALUATION SCENARIO DESCRIPTION

Initial Conditions: Mode 1, 581 degrees F

Turnover: Maintain 100% power steady state operation. Condenser steam dumps are in steam pressure control due to a problem with the Tavg input, which is under I&C investigation. A AFW pump is OOS for corrective maintenance. Control rod movement surveillance test is in progress.

Synopsis: Shortly after completion of the control rod movement test, PT-1445 fails high causing PRZR PORV PCV-1456 to automatically open. Operators respond per 1-AP-44 by manually closing the opened PORV. Following PORV closure, the PORV (PCV-1456) develops a leak. Operators respond by attempting to close MOV-1535, which trips on breaker overload leaving the leak unisolated. The crew evaluates Tech Specs and determines a plant shutdown is needed due to the unisolable PRZR steam space leak (rate at Ops management direction). After a 5% power reduction (or as determined by the evaluator), the A S/G level channel III (LT-1476) fails low. The resulting transient requires the BOP to take A S/G level control to manual per 1-AP-3. Once Technical Specifications have been consulted and the crew briefed on the effects of the failure, the steam-driven AFW pump spuriously auto-starts. When the crew identifies the failure and stops the AFW pump, the overspeed trip mechanism fails, rendering the pump inoperable. Once Technical Specifications have been consulted and the crew briefed on the effects of the failure, a steam break occurs on the main steam manifold in the turbine building. The crew responds per E-0 and addresses a failure of main steamline isolation and a trip of the B AFW pump after auto-start causing a loss of all auxiliary feed water (A AFW pump OOS, B AFW pump failed, steam-driven AFW pump previously failed). Transition to FR-H.1 is made in response to low steam generator levels with a loss of all AFW. Steam generator levels are sufficiently low to require RCS bleed and feed initiation. The exercise is concluded upon establishment of adequate RCS heat removal by bleed & feed (FR-H.1 step 26) or at the evaluator's discretion. The event is classified after scenario completion as a notification of unusual event per EPIP-1.01, tabs A-10, B-8 and G-3 (note that SRO may elect to classify the event as an Alert per tab M-3 based on SEM judgment.)

Event Summary:

EVENT #	DESCRIPTION
3.	Conduct rod movement test *K/A: 001A106 (4.1/4.4*
2	PT-1445 fails high *K/A: APE027; AA215 (3.7/4.0)*
3	PRZR PORV-1456 leak / MOV-1535 overload trip *K/A: 010A203 (4.2/4.2)*
4	Power reduction due to PRZR Leak *K/A: EPE009; EA115 (3.9/4.1)*
5	LT-1476 fails low *K/A: 016A201 (3.0/3.1)*
6	Steam-driven AFW spurious auto-start/failure *K/A 061A2.04*
7a/b	Main steam line break/reactor trip with B AFW pump and MS isolation failures *K/A: APE040; AA104 (4.3/4.3)*
7c	Loss of secondary heat sink (bleed & feed required) *K/A: E05; EK12 (3.9/4.5); EK22 (3.9/4.2)*

Crew Critical Steps:

EVENT #	DESCRIPTION	
7	**1.**	**Manually actuate steam line isolation (MSTV pushbuttons) prior to orange path on subcriticality or integrity or transition to ECA-2.1 (whichever occurs first) (applicable only after main steam line isolation step is read).**
7	**1.**	**When required, initiate RCS bleed and feed so that the RCS depressurizes sufficiently for HHSI injection flow to occur.**

Individual Critical Steps:

The bolded individual actions listed under the respective positions (RO, US, etc.) are for use during evaluations to identify steps that are critical to the individual position.

EVALUATION SCENARIO PRE-EXERCISE BRIEFING

1. **Review the following with students:**

   a. Primary responsibility of the student is to operate the simulator as if it were the actual plant.
   b. The evaluators will observe teamwork skills, communication, and the crew's ability to safely operate the plant during the simulator examination. This includes individual & crew performance.
   c. If you recognize an incorrect decision, response, answer, analysis, action, or interpretation by another crew member but fail to correct it, then the evaluator may assume that you agree with the incorrect item.
   d. The crew should keep a rough log during each scenario sufficient to complete necessary formal log entries.
   e. The simulator instructor facility operator will perform all of the functons of personnel needed outside the control room area.
   f. Before the examination begins, crew members may perform a control board walkdown for up to 10 minutes.

2. **The following are initial conditions for this exam (in shift turnover package, but may be covered verbally if needed):**

   a. Time in core life – 14,000 MWD/MTU
   b. Reactor power and power history – 100% steady state
   c. Turbine status - online
   d. Boron concentration - 51 ppm
   e. Temperature - 581 degrees F
   f. Pressure - 2235 psig
   g. Xenon – Equilibrium for 100% power.
   h. Core cooling - forced
   i. Tech. Spec. LCO(s) in effect
      - 3.7.1.2 Action 3 (30 days); A AFW pump bearing failure
   j. Tagouts in effect – A AFW pump
   k. Significant problems/abnormalities – Condenser steam dumps in steam pressure (manual) control due to Tavg input problem. I&C investigating. .
   l. Evolutions/maintenance for the coming shift – Complete rod operability surveillance and maintain 100% power steady state operation.
   m. Unit 2 - mode 5 on RHR

3. **Ensure students understand examination schedule and that a break will be necessary between scenarios to allow simulator initial condition setup. Cover exam security rules to be observed by students both during and after the exam IAW the latest revision of AG-017 or NUREG-1021 as applicable.**

4. **Before the examination begins, make crew position assignments and allow students to ask any questions concerning the administration of the test.**

EXPECTED OPERATOR ACTIONS

EVENT: 1

BRIEF DESCRIPTION: Conduct rod movement test.

INDICATIONS:

1. Shift orders direct completion of 1-PT-17.1, Rod Operability.

POSITION	TIME	EXPECTED ACTIONS
BOP		1. Assists RO as directed by US
RO		1. Verifies shutdown bank A step counter readings.
		2. Selects SBA on bank selector switch.
		3. Records initial position for shutdown bank A in PT data sheet.
		4. Inserts shutdown bank A 18 steps and observes plant response.
		5. Records final position for shutdown bank A in PT data sheet.
		6. Withdraws shutdown bank A 18 steps and observes plant response.
		7. Calculates rod travel and record in PT data sheet.
		8. Places bank selector switch in MANUAL.
		9. Verifies "D" bank position.
		10. Ensures T_{avg} and T_{ref} are within 1°F.
		11. Requests watchstander to observe bank overlap counter reading.
		12. Records bank overlap counter reading and "D" bank position in PT.
		13. Calculates difference between bank overlap counter and "D" bank position and records in PT.
		14. Places bank selector switch in AUTO.
		15. Performs follow-on tasks and informs US that PT is complete.
US		1. Coordinates/directs performance of PT-17.1
		2. Keeps SS informed of plant status

EXPECTED OPERATOR ACTIONS

EVENT: 2

BRIEF DESCRIPTION: Pressure transmitter PT-1445 fails high opening PORV PCV-1456 and decreasing pressure. The problem is diagnosed and the PORV closed stopping the pressure decrease. The plant is stabilized and PT-1445 is declared OOS.

INDICATIONS:

1. PT-1445 failed high
2. Pressurizer pressure decreases rapidly.
3 Overtemperature Delta-T runback occurs in event of failure to react timely to PT-1445 failure (FAIL THE RUNBACK).
4. All pressurizer heaters energize.
5. When pressure returns above 2000 psig, PCV-1456 opens..
6. Pressure oscillates with PCV-1456 cycling around 2000 psig as appropriate.
7. PRESSURIZER HIGH PRESSURE and PRZR SAFETY VALVE OR PORV OPEN alarms are actuated.

POSITION	TIME	EXPECTED ACTIONS
BOP		1. Assists RO as directed by US
		2. Recognize failure of turbine to runback
		3. Manually run back the turbine (if auto runback called for)
RO		1. Recognizes & reports PRZR pressure control problem
		2. Checks PRZR PORVs closed – NO
		a. Closes PRZR PORV PCV-1456
		3. Checks master pressure controller controlling properly
		4. Verifies PRZR spray valves closed
		5. Verifies all PRZR heaters energized
		6. Checks auxiliary spray valve closed
		7. Verifies PRZR safety valves closed
		8. Verifies RCS pressure stable or increasing
		9. Verifies RCS pressure normal

EXPECTED OPERATOR ACTIONS (cont'd)

EVENT: 2 (cont'd)

POSITION	TIME	EXPECTED ACTIONS
RO (cont'd)		10. Verifies PRZR heaters operable
		11. Checks if PRZR PORV is leaking – NO
		12. Checks if leaking PRZR safety is reducing pressure – NO
		13. Determines if RCS leak is reducing pressure – NO
		14. Checks if PRZR pressure decreasing – NO
		15. Checks RCS pressure stable
		16. Checks if auto pressure control can be established
		17. Establishes auto pressure control
		18. Keeps US informed of plant status
US		1. Coordinates/directs performance of AP-44
		2. Reviews Technical Specifications
		3. Ensures I&C notified
		4. Keeps SS informed of plant status

EXPECTED OPERATOR ACTIONS

EVENT: 3

BRIEF DESCRIPTION: A pressurizer PORV begins to leak. Tech Specs are consulted and the decision is made to attempt to isolate the leaking PORV, but the associated block MOV trips on overload before the leak is isolated. Tech Specs are referenced and the decision made to shut down.

INDICATIONS:

1. Increased charging flow compared to initial conditions
2. PORV tailpipe temperature increased
3. Spray valves closed and additional PRZR heaters required to maintain RCS pressure compared to initial conditions

POSITION	**TIME**	**EXPECTED ACTIONS**
BOP		1. Assists RO as directed by the US
RO		1. RO identifies elevated PRZR tailpipe temperature, spray valves closed with additional heaters required to maintain RCS pressure, and increased charging flow.
		2. Recognizes PRZR PORV leaking and notifies US.
		3. Attempts to close PORV block MOV at US direction.
		4. Recognizes PORV block MOV breaker thermal O/L actuated and notifies US.

EXPECTED OPERATOR ACTIONS (cont'd)

EVENT: 3 (cont'd.)

POSITION	TIME	EXPECTED ACTIONS
US		1. Directs PRZR PORV leak response per Tech Specs.
		a. **Directs MOV-1535 closure & response to ensuing overload trip including direction to locally reset MOV-1535 breaker overload (will not reset)**
		b. Ensures PRZR htrs on to keep pressure > 2205 psig
		c. Directs STA to perform RCS leak rate
		d. Concludes excessive RCS leakage due to unisolable leaking PRZR PORV
		2. Reviews T.S. 3.4.3.2 and determines action for leaking PORV can not be met requiring s/d to HSD.
		3. Informs SS of plant status & requests electrical maintenance support with block MOV bkr

EXPECTED OPERATOR ACTIONS

EVENT: 4

BRIEF DESCRIPTION: With reactor power initially at 100% power, a power reduction to Hot Standby is commenced in response to an unisolable PRZR PORV leak.

INDICATIONS: 1. SS/Ops Management direction

POSITION	**TIME**	**EXPECTED ACTIONS**
BOP		1. Reduces turbine load IAW AP-2.2 or OP-2.2
		2. Performs secondary plant s/d generator-load-dependent activities IAW AP-2.2 or OP-2.2.
		3. Performs activities as directed by US
		a. Notifies Chemistry of need to sample RCS if reactor power reduced > 15%
		4. Keeps US informed of plant status
RO		1. Reduces Rx power IAW AP-2.2 or OP-2.2.
		a. Calculates change req'd to reduce power and borates at rate directed by US
		b. Energizes PRZR backup heaters
		c. Coordinates w/BOP to keep Tref w/in 3°F of Tavg w/rods in manual (1°F w/rods in auto) (if using AP-2.2, maintains Tave and Tref within 5°F)
		d. Observes AFD limitations
		2. Keeps US informed of plant status

EXPECTED OPERATOR ACTIONS (cont'd)

EVENT: 4 (cont'd)

POSITION	**TIME**	**EXPECTED ACTIONS**
US		1. Coordinates power reduction activities of RO & BOP
		2. Performs other activities IAW AP-2.2 or OP-2.2.
		a. Evaluates Xe changes and directs boration rate changes as necessary
		3. Notifies System Dispatcher of load reduction
		4. Keeps SS informed of plant status

EXPECTED OPERATOR ACTIONS

EVENT: 5

BRIEF DESCRIPTION: A S/G level transmitter LT-1476 fails low. The crew recognizes the failure, takes manual control of A S/G FRV, and regains control of S/G level. The channel is declared OOS and compensatory actions taken per 1-AP-3.

INDICATIONS:

1. Failure low of LI-1476
2. A S/G level decreases
3. Annunciator F-B1, SG A LO-LO LEVEL
4. Annunciator F-D1, SG A FF<SF
5. Annunciator F-F1, SG A LEVEL ERROR

POSITION	TIME	EXPECTED ACTIONS
BOP		1. Recognizes failure of LT-1476 and responds as directed by US
		a. Compares to other SG level channels
		b. Verifies no off-normal conditions on related indications
		2. Notifies US of failure
		3. Takes manual control of A S/G level
RO		**1.** Assists BOP as directed by US
		2. Informs US of plant status
US		1. Directs stabilization of plant conditions. May suspend load reduction to perform actions of AP-3 or may continue load reduction and trip bistables later.
		2. Directs compensatory action per AP-3
		a. Verifies related instrument status
		b. Determines which bistables to trip and effects on plant of tripping bistables. Provides this info to RO/BOP for guidance.
		3. Notifies SS of plant status
		4. Ensures Tech. Spec. 3.3.1.1/2 requirements met
		5. Ensures I&C notification of LT-1476 failure and directs initiation of PWO.

EXPECTED OPERATOR ACTIONS

EVENT: 6

BRIEF DESCRIPTION: Steam-driven AFW pump spuriously auto-starts. The crew recognizes the failure and stops the pump. When the pump is stopped,the overspeed trip mechanism fails, which renders the pump inoperable.

INDICATIONS:

1. Steam-driven AFW pump steam supply valves open indication
2. A S/G MFW flow must be manually decreased to maintain SG level
3. A S/G AFW flow indicated
4. RCS Tave decreasing
5. Reactor power increasing
6. Annunciator F-D8, TDAFWP TROUBLE

POSITION	**TIME**	**EXPECTED ACTIONS**
BOP		1. Recognizes steam-driven AFW pump auto-start and notifies US
		a. Observes steam supply valves indicating open
		b. Observes AFW flow indicated to A S/G
		c. Observes A S/G level increasing
		2. Notifies US of failure
		3. Stops steam-driven AFW pump when directed by US
		4. Notes TDAFW pump trouble alarm and informs US
		5. Dispatches watchstander to locally check AFW pump
RO		1. Observes RCS Tave decreasing and reactor power increasing
		2. Notifies US of RCS parameter changes
US		**1. Directs BOP to stop steam-driven AFW pump**
		2. Directs BOP to dispatch watchstander to check AFW pump
		3. Reviews TS-3.7.1.2
		4. Notifies SS of plant status
		5. Ensures Maintenance Dept notified of failure and directs initiation of

a PWO.

EXPECTED OPERATOR ACTIONS

EVENT: 7a/b

BRIEF DESCRIPTION: In response to a steam break on the main steam manifold in the turbine building, reactor trip and SI occur. Operators perform actions of E-0. When MSTVs are verified closed, all MSTVs fail to auto-close. No AFW flow exists (no pumps available: A OOS, B trip on auto-start, steam-driven AFW pump previously failed). Transition to FR-H.1 is made.

INDICATIONS:

1. Reactor trip & SI actuates
2. MSTVs remain open
3. All S/G Pressures dropping
4. No AFW flow

CREW CRITICAL STEPS:

1. Manually actuate steam line isolation (MSTV pushbuttons) prior to orange path on subcriticality or integrity, or transition to ECA-2.1 (whichever occurs first) (applicable only after main steam line isolation step is read).

POSITION	TIME	EXPECTED ACTIONS
BOP		1. Performs IOAs in response to reactor trip with SI per E-0:
		a. Verifies all turbine stop valves closed
		b. Resets MSR steam supply FCVs
		c. Verifies open generator output breaker
		2. Performs other E-0 immediate actions:
		a. Manually initiates SI.

EXPECTED OPERATOR ACTIONS (cont'd)

EVENT: 7a/b (cont'd)

POSITION	**TIME**	**EXPECTED ACTIONS**
BOP (cont'd)		3. Performs subsequent E-0 actions at US direction:

a. Verifies feedwater isolation

b. Manually initiates containment isolation phase A

c. Verifies AFW pumps running – NO

1. Manually starts AFW pumps - NO

2. **Determines NO AFW pumps available (A OOS,B start fail & steam-driven AFW pump overspeed trip). Dispatches local operators to check B AFW pump.**

d. Verifies LHSI pumps running

e. Verifies SW pumps running

f. Checks if main steamlines should be isolated

1. Verifies MSTVs and bypass valves closed – NO

2. Manually closes MSTVs

g. Checks if CDA or QS is required – NO

h. Verifies SI flow indicated

i. Verifies AFW flow – NO

1. Checks S/G NR level >11%[22%] – NO

2. Verifies AFW flow > 340 gpm – NO

3. Manually starts pumps/directs local valve realignment as directed by US to get AFW > 340 gpm – NO

4. Keeps US informed of plant status

EXPECTED OPERATOR ACTIONS (cont'd)

EVENT: 7a/b (cont'd)

POSITION	**TIME**	**EXPECTED ACTIONS**
RO		1. Performs IOAs in response to reactor trip with SI per E-0
		a. Verifies reactor tripped
		b. Verifies AC emergency busses energized
		c. Manually initiates SI
		2. Performs subsequent actions of E-0 as directed by US
		a. Manually initiates containment isolation phase A
		b. Verifies HHSI pumps running
		3. Keeps US informed of plant status
US		1. Directs response to reactor trip and failure of main steam isolation per E-0
		a. Obtains verification of reactor and turbine trip
		b. Determines electric plant status

EXPECTED OPERATOR ACTIONS (cont'd)

EVENT: 7a/b (cont'd)

POSITION	**TIME**	**EXPECTED ACTIONS**
US cont		c. Directs manual SI/phase A
		d. Monitors foldout page including direction to RO to stop all RCPs if subcooling lost
		e. Directs subsequent actions
		1. Ensures manual closure of MSTVs
		2. Transitions to FR-H.1
		3. Keeps SS informed of plant status

EXPECTED OPERATOR ACTIONS

EVENT: 7c

BRIEF DESCRIPTION: Loss of secondary heat sink with RCS bleed and feed

INDICATIONS:
1. No AFW flow indicated
2. All SGs wide-range levels <12%
3. RCS pressure > SG pressures
4. Hot-leg temperatures >350°F

POSITION	TIME	EXPECTED ACTIONS
BOP		1. Observes all SG wide-range levels <12%
		2. Verifies HHSI flow indicated
		3. Verifies instrument air aligned to containment
		4. Opens all reactor head vents and PRZR vents
		5. Verifies applicable E-0 actions per FR-H.1 attachment 5
		6. Keeps US informed of plant status
RO		1. Checks RCS pressure > SG pressures
		2. Checks hot-leg temperatures >350°F
		3. Stops all RCPs
		4. Places all PRZR heaters in PULL-TO-LOCK
		5. Checks SI actuated
		6. Checks at least one charging pump running
		7. Checks SI valve alignment
		8. Resets both trains of SI and containment isolation phase A
		9. Checks PRZR block MOVs energized and open
		10. Opens both PRZR PORVs - NO
		11. Verifies adequate RCS bleed path – NO
		12. Closes charging pump recirc valves

13. Keeps US informed of plant status

EXPECTED OPERATOR ACTIONS (cont'd)

EVENT: 7c (cont'd)

POSITION	**TIME**	**EXPECTED ACTIONS**
US		1. Determines secondary heat sink is required
		2. Determines bleed and feed is immediately required
		3. Directs response to loss of secondary heat sink per FR-H.1
		a. Directs RCPs stopped and PRZR heaters in PTL
		b. Directs bleed and feed alignment
		4. Transitions to ES-1.3 if RWST level decreases to <23%
		5. Classifies event as a Notification of Unusual Event per EPIP-1.01, tabs A-10, B-8 and G-3 (may elect to classify as an Alert per tab M-3 based on SEM judgment)
		6. Keeps SS informed of plant status

SIMULATOR INSTRUCTOR FACILITY OPERATING INSTRUCTIONS

I. SETUP

A. Recall IC # 31

B. Verify 1-FW-P-3A tagged out per MOP-31.01

C. Verify steam dumps in steam pressure mode

D. Verify analog trend pens set up for Tave, Tref, CTMT temperature & VCT level

E. Verify the following malfunctions are preloaded:

1. MMS0501/02/03 (MSTV fails to close when rq'd); TD = 0 sec; trigger = N/A
2. MFW2302 (B AFW pump trips on overcurrent); TD = 5 sec; trigger = SI1

II. CONDUCTING THE EXAMINATION:

A. **Unfreeze the simulator and begin the exam.**

B. **Perform 1-PT-17.1, Control Rod Operability Test**

1. Initiation: Shift orders

2. Response: Respond as safeguards watchstander when requested to obtain bank overlap counter reading (counter reads 613)

C. **PT-1445 fails high (event 2).**

1. Initiation: MRC0702: TD = 10 sec; ramp = 10 sec; start deg = 50; stop deg = 100; trigger = N/A

NOTE: Allow timer to run until the next malfunction (MRC32) is implemented.

2. Response: As SS, state that a work request will be generated and I&C will be notified of the failure. As I&C, reply that a planner will initiate a work package for troubleshooting & repair.

D. **PORV-1456 leak (event 3).**

1. Initiation: MRC32: TD = 20 sec; ramp = 10 sec; start deg = 0; stop deg= 3; trigger = N/A. When crew attempts to close block MOV, takesimloch variable RCMOV535_RACKIN = F; monitor valve position using RCMOV535.

NOTE: Ensure PORV leak does NOT result in pressure decrease (preclude entry into AP-44, which requires a unit trip if the block MOV cannot be closed)

2. Response: As SS, state that a work request will be generated and mechanical maintenance will be notified of the failure.

E. **Power reduction due to PORV block MOV failure (event 4).**

1. Initiation: US review of TS-3.4.3.2 and decision to remove unit from service to comply with the action statement.

2. Response: As SS, concur with US decision to remove unit from service.

F. **LT-1476 fails low (event 5)**

1. Initiation: MFW0103; TD = 30 sec; ramp = 10 sec; start deg = 50; stop deg = 0; trigger = N/A

2. Response: As SS, state that a work request will be generated and I&C will be notified of the failure. As I&C, reply that a planner will initiate a work package for troubleshooting & repair.

G. **Steam-driven AFW pump spuriously starts/fails (event 6).**

1. Initiation: Start pump using Simloch variables MSTV111A(B)_RATE=0 (monitor valve position with MSTV111A(B) (should = 1); Trip pump using MFW09 (overspeed trip); TD = 40 sec; trigger = N/A (simloch variable MS_286 = 0)

2. Response: Respond as safeguards watchstander when requested to locally check steam-driven AFW pump that the overspeed trip latch is broken. As SS, state that a work request will be generated and mechanical maintenance will be notified of the failure. As mechanical maintenance, reply that the trip latch repair will require approximately one hour to accomplish.

H. **Steam break with failure of MS isolation (event 7a/b)**

1. Initiation: MMS0901: TD = 50 sec; ramp = 5 sec; start deg = 0; stop deg = 100; trigger = N/A. When crew closes MSTVs using safeguards panel pushbuttons, remove malfunctions MMS0501/02/03 (MSTV fails to close when rq'd)

NOTE: Allow timer to run until B AFW pump trips.

2. Response: Respond as turbine building watchstander that the turbine building is engulfed in steam.

I. **Loss of secondary heat sink with RCS bleed and feed (event 7c)**

1. Initiation: Previous events cause loss of AFW and SI causes loss of MFW. SG levels decrease below bleed and feed setpoint due to failure of MSTVs to auto-close.

2. Response: Respond as electrical maintenance that B AFW pump breaker has overcurrent trips.

III. TERMINATION CRITERIA:

A. Upon completion of RCS bleed and feed alignment by closing charging pump recirc valves (step 26 of FR-H.1),

OR

B. At the discretion of the evaluator.

EVALUATION SCENARIO CONTENT SUMMARY

1.	Total Number of Malfunctions:	8
2.	Malfunctions Occurring During EOP Performance:	2
	a. B AFW pump start failure b. MS isolation failure	
3.	Abnormal Events:	4
	a. PT-1445 fails high b. PCV-1456 block MOV fails to close c. LT-1476 fails low d. Steam-driven AFW pump spurious start/failure	
4.	Major Transients:	2
	a. MS line break in turbine bldg b. RCS bleed and feed	
5.	EOPs Used:	2
6.	EOP Contingencies Entered:	0
7.	Simulator Run Time:	90 minutes
8.	EOP Run Time:	45 minutes
9.	Crew Critical Tasks:	2

Facility: North Anna Scenario No.: 2 Op-Test No.: 1

Examiners: ____________ Operators: (RO) ____________
____________ (BOP) ____________
____________ (SRO) ____________

Initial Conditions: BOL. Mode 1, 564 degrees. J EDG is OOS for corrective governor maintenance. No other equipment is OOS. No surveillance tests are in progress.

Turnover: There are thunderstorms in the area with winds clocking at 60 mph. Large golf ball size hail has also been reported. Slight tremors on the order of 2.1 on the Richter scale have been detected.

POD: Perform 1-PT-60.2 Reactor Containment Average Air Temperature, with annulus temperature element 1-LM-TE-100-15 inoperable. Conduct a power increase from 50% to 100%. The system dispatcher has asked that this power increase be expedited to deal with an expected high peak demand towards the end of day shift.

Event No.	Malf. No.	Event Type*	Event Description
1a		N (R)	Perform 1-PT-60.2, Reactor Containment Average Air Temperature
1		R (R)	Power increase from 50%
2		I (B)	FT-475 failure low (controlling channel)
3		R,I (R)	TM-408F failure low
3a	MEL1304	C (B)	Loss of Vital bus 1-IV
4		C (R)	RCP thermal barrier failure CC-TV-116B
5		M (A)	Large break LOCA
6		C (A)	LOOP
7		C (A)	A LHSI pump trip (Loss of emergency coolant recirc)

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor
(R)O, (B)OP, (A)LL

NORTH ANNA POWER STATION

RO/SRO NRC INITIAL LICENSE EXAM

SIMULATOR EVALUATION SCENARIO NRC-2

PROGRAM:	RO/SRO Initial License Training
DESCRIPTION:	Large Break Loss of Coolant Accident / Loss of Offsite Power
LENGTH:	90 minutes
AUTHOR:	R. F. Aiello
REVISION DATE:	5/17/00

REVIEWED BY: ____
Senior Operations Engineer   Date

APPROVED BY: ____
NRC Chief Examiner (Surry)   Date

EVALUATION SCENARIO OBJECTIVES

TERMINAL OBJECTIVE: During normal and abnormal plant conditions, the Shift Operating Crew will perform control room operations in accordance with (IAW) approved plant procedures ensuring that the health and safety of the public is protected and the integrity of the plant maintained.

ENABLING OBJECTIVES:

1. Given specific plant conditions, plant procedures, and a shift turnover, respond to the following events IAW approved plant procedures:

   a. Perform 1-PT-60.2, Reactor Containment Average Air Temperature
   b. Power increase from 50%
   c. FT-475 failure low (controlling channel)
   d TM-408F failure low
   e. Loss of Vital bus 1-IV
   f. RCP thermal barrier failure / CC-TV-116B auto close failure
   g. Large break LOCA
   h. Loss of offsite power
   i. A LHSI pump trip (loss of emergency coolant recirculation)

2. Given abnormal plant conditions, mitigate the adverse consequences of the following events IAW approved plant procedures:

   a. Identify abnormalities while assessing actual system response with respect to predicted system response.
   b. Investigate the cause and effect of abnormalities in system performance.
   c. Implement applicable procedures.
   d. Perform immediate actions from memory.

3. Given abnormal plant conditions, implement the applicable on-site and off-site reports and notifications IAW approved plant procedures.

4. Given normal and abnormal plant conditions, using the following principles for operational effectiveness as they apply to all operators, conduct plant operations IAW approved plant procedures:

   a. Plant and control room communication.
   b. Plant/Control Board monitoring.
   c. Plant/Control Board manipulation.
   d. Operational problem solving.
   e. Use of OPs/APs and Technical Specifications.
   f. Use of EOPs IAW EOP Rules of Usage.
   g. Annunciator recognition and response.
   h. Written communications/logs.

i. ALARA awareness.

EVALUATION SCENARIO OBJECTIVES (cont'd)

5. Given normal and abnormal plant conditions, using the following principles for operational effectiveness as they apply to the Unit Supervisor (US), conduct plant operations IAW approved plant procedures:

   a. Team performance management.
   b. Problem solving.
   c. Decision analysis.
   d. Action planning.
   e. Self-checking.

6. During abnormal and emergency events, the shift operating crew shall apply techniques of teamwork and self-checking IAW established work practices and operating guidelines.

EVALUATION SCENARIO DESCRIPTION

Initial Conditions: Mode 1, 50% power

Turnover: Power increase from 50% to 100% power is in progress following main feed pump breaker repair. The system dispatcher has asked that this power increase be expedited to deal with an expected high peak demand towards the end of day shift. J EDG is OOS for corrective governor maintenance. Perform 1-PT-60.2, Reactor Containment Average Air Temperature PT with annulus temperature element 1-LM-TE-100-15 inoperable. Use the provided printout of group review #1.

Synopsis: Perform 1-PT-60.2, Reactor Containment Average Air Temperature. After a 5% power increase (or at lead examiner direction) the controlling steam flow channel on A S/G (FT-475) fails low causing FCV-478 to automatically close. Operator action is required to manually control A S/G level and select the other steam flow channel for level control input. The crew responds per 1-AP-3. Once the plant is stabilized, Technical Specifications are consulted and the crew briefed on the effects of the failure. Next, TM-408F fails low generating erroneous Tref input to rod control. If rods are in AUTO, inward rod movement occurs and operators respond per 1-AP-1.1 taking rod control to MANUAL. Next, the Vital Bus Inverter for Vital Bus 1-IV will fail resulting in a loss of vital bus 1-IV. The crew should identify the bus failure and enter 0-AP-10, "Loss of Electrical Power". The crew will be informed that the Inverter has failed and they will need to re-energize the vital bus via the SOLA transformer. The Unit Supervisor (US) should refer to technical specifications and declare the vital bus inoperable since it is being supplied by the SOLA transformer. Once the bus is re-energized the next event will occur. Following plant stabilization, the B RCP thermal barrier HX experiences a large leak and CC-TV-116B fails to automatically close on high flow. The operators respond per AR-C-C4. After thermal barrier return isolation, RCP shaft vibration begins to increase enough to eventually require a reactor and B RCP trip per AR-A-E6. When B RCP is tripped, the leak becomes a large break loss of coolant accident on the B RCS loop. The crew responds per E-0. While verifying FW isolation, a loss of offsite power occurs. Since the J EDG is OOS, only the H 4kV bus re-energizes on the H EDG. Train A safeguards loads fail to restart and must be manually restarted. The crew transitions to FR-P.1 momentarily and then to E-1. Then, the A LHSI pump trips causing a loss of all LHSI. With no LHSI pumps running, transition is made to ECA-1.1. The exercise is concluded upon reduction of SI flow to minimum (ECA-1.1 step 15), stopping all SI flow (ECA-1.1 step 19) or at the evaluator's discretion. The event is classified after scenario completion as a Site Area Emergency per EPIP-1.01, Tab B-3.

Event summary:

EVENT #	DESCRIPTION
1a	Perform 1-PT-60.2, Reactor Containment Average Air Temperature *K/A: 2.1.23 (3.9/4.0*
1	Power increase from 50% *K/A: 2.2.2 (4.0/3.5)*
2	FT-475 fails low (A S/G FRV closes) *K/A: 035K401 (3.6/3.8)*
3	TM-408F fails low *K/A: 001K602 (2.8/3.3)*
3a	Loss of Vital bus 1-IV *K/A: 062K301 (3.5/3.9)*
4	B RCP TBHX failure / CC-TV-116B auto close failure *K/A: 008K104 (3.3/3.8); 003K112 (3.0/3.3)*
5	Large break loss of coolant accident *K/A: EPE 011; EK309 (4.2/4.5); EK312 (4.4/4.6)*
6	Loss of offsite power (loss of J 4kV bus) *K/A: EPE055; EA106 (4.1/4.5)*
7	A LHSI pump trip (loss of emergency coolant recirc) *K/A: E01; EA11 (3.7/3.7); EK22 (3.5/3.8)*

Crew Critical Steps:

EVENT #	DESCRIPTION
6	**1. Ensure one train of safeguards is actuated and running prior to transitioning from E-0**
7	**1. Stop SI and QS pumps upon reaching 3% in the RWST** **2. Make up to the RWST and minimize RWST outflow per ECA-1.1**

Individual Critical Steps:

The bolded individual actions listed under the respective positions (RO, US, etc.) are for use during evaluations to identify steps that are critical to the individual position.

EVALUATION SCENARIO PRE-EXERCISE BRIEFING

1. Review the following with students:

a. Primary responsibility of the student is to operate the simulator as if it were the actual plant.

b. The evaluators will observe teamwork skills, communication, and the crew's ability to safely operate the plant during the simulator examination. This includes individual & crew performance.

c. If you recognize an incorrect decision, response, answer, analysis, action, or interpretation by another crew member but fail to correct it, then the evaluator may assume that you agree with the incorrect item.

d. The crew should keep a rough log during each scenario sufficient to complete necessary formal log entries.

e. The simulator instructor facility operator will perform all of the functions of personnel needed outside the control room area.

f. Before the examination begins, crew members may perform a control board walkdown for up to 10 minutes.

2. The following are initial conditions for this exam (in shift turnover package, but may be covered verbally if needed):

a. Time in core life – 4000 MWD/MTU

b. Reactor power and power history - 100%-50% 4 hr ago

c. Turbine status - online

d. Boron concentration - ppm

e. Temperature - 564°F

f. Pressure - 2235 psig

g. Xenon - Increasing following 100%-50% downpower 4 hr ago.

h. Core cooling - forced

i. Tech. Spec. LCO(s) in effect
- 3.8.1.1 Action b (1 hrs); J EDG OOS (governor)

j. Tagouts in effect - J EDG

k. Significant problems/abnormalities - None

l. Evolutions/maintenance for the coming shift - Return to 100% power this shift. Expedite to meet system peak.

m. Units 1 and 2 status - unit 1 online; unit 2 s/d

3. Ensure students understand examination schedule and that a break will be necessary between scenarios to allow simulator initial condition setup. Cover exam security rules to be observed by students both during and after the exam IAW the latest revision of AG-017 or NUREG-1021 as applicable.

4. Before the examination begins, make crew position assignments and allow students to ask any questions concerning the administration of the test.

EXPECTED OPERATOR ACTIONS

EVENT: 1a

BRIEF DESCRIPTION: Reactor Containment Average Air Temperature Test (1-PT-60.2) with Annulus Temperature Element (1-LM-TE-100-15) inoperable.

INDICATIONS: 1. Shift orders

POSITION	TIME	EXPECTED ACTIONS
BOP		1. Assists RO as directed by US
RO		1. Reviews containment temperature elements group review (provided).
		2. Determines average temperature of the operable elements at annulus elevation 329 ft.
		3. Enters the average value for the inoperable element into the computer.
		4. Waits at least one minute for the computer to update.
		5. Prints the containment weighted average temperature.
		6. Records data in the PT.
		7. Performs follow-on tasks and informs US that PT is complete.
US		1. Coordinates/directs performance of PT-60.2
		2. Keeps SS informed of plant status

EXPECTED OPERATOR ACTIONS

EVENT: 1

BRIEF DESCRIPTION: Unit is at reduced power (50%) and is directed to return to 100% power.

INDICATIONS:
1. Notification by System
2. Shift turnover

POSITION	TIME	EXPECTED ACTIONS
BOP		1. Increases turbine load at the rate determined by the US.
		2. Keeps US informed of plant status
RO		1. Maintains Tref/Tavg approx equal during uppower
		2. At steady state power with Tavg within 1°F of Tref, places rods in AUTO
		3. Keeps US informed of plant status
US		1. Coordinates and directs uppower evolution
		2. Keeps SS informed of plant status

EXPECTED OPERATOR ACTIONS

EVENT: 2

BRIEF DESCRIPTION: A S/G controlling steam flow FT-475 fails low. The A S/G FRV requires manual operation. The channel is called OOS and compensatory actions are initiated per AP-3.

INDICATIONS:

1. Annunciator F-E1, SG A FEED > STEAM
2. Annunciator F-F1, SG A LEVEL ERROR
3. FI-475 off scale low
4. FCV-478 closing in AUTO
5. Decreasing level in A S/G

POSITION	TIME	EXPECTED ACTIONS
BOP		1. Recognizes failure of FT-475 and responds as directed by US
		a. Compares to other SG FT's and verifies no off-normal conditions on other SG FT's
		2. Notifies US of failure
		3. Takes manual control of FCV-478, restores steam/feed flow balance and stabilizes SG level
		4. Selects alternate SG steam FT channel for control and returns FCV-478 to automatic
RO		1. Assists BOP as directed by US
US		1. Directs stabilization of plant conditions
		2. Directs compensatory action per AP-3
		a. Verifies BOP determination of SG FT status
		b. Determines which b/s to trip and effects on plant of tripping b/s. Provides this info to RO/BOP for guidance.
		3. Notifies SS of plant status

EXPECTED OPERATOR ACTIONS (cont'd)

EVENT: 2 (cont'd)

POSITION	TIME	EXPECTED ACTIONS
US (cont'd)		4. Ensures Tech Spec requirements are met
		5. Notifies I&C of FT-475 failure and directs initiation of PWO

EXPECTED OPERATOR ACTIONS

EVENT: 3

BRIEF DESCRIPTION: TM-408F loses power. Rod control Tref fails low. Rods step in if in AUTO. The crew responds per AP-1.1.

INDICATIONS:
1. Annunciator B-A7, Tavg-Tref DEVIATION
2. Tref input on Tavg-Tref recorder failed low
3. Control rods stepping in if in AUTO

POSITION	TIME	EXPECTED ACTIONS
BOP		1. Assists RO as directed by US.
RO		**1. Responds to TM-408F failure per AP-1.1:**
		a. Determines rods should NOT be moving, places rods in MANUAL & verifies rod motion stopped
		b. Verifies rod low-low insertion limits not exceeded
		c. Increases Tave to match Tref using rods or dilution as directed by US
		d. Checks PRZR pressure and level stable
		e. Checks rods above low insertion limit and restores if necessary as directed by US
		2. Informs US of plant status
US		1. Directs response per AP-1.1
		2. Informs SS/I&C of TM-408F failure
		3. Directs PWO initiation

EXPECTED OPERATOR ACTIONS

EVENT: 3a

BRIEF DESCRIPTION: A loss of vital bus 1-IV occurs. The crew responds per 0-AP-10.

INDICATIONS:

1. Numerous status lights due to de-energized ch IV instruments
2. Vital bus 1-IV voltmeter decreases to zero
3. Annunciator H-A4, VITAL BUS 1-IV INVERTER TROUBLE

POSITION	TIME	EXPECTED ACTIONS
BOP		1. Identifies annunciator 1H-A4, VITAL BUS 1-IV INVERTER TROUBLE
		2. Identifies loss of vital bus 1-IV.
		3. Notifies US of vital bus loss.
		4. Directs safeguards operator to investigate loss of vital bus 1-IV.
		5. Enters 0-AP-10 and performs electrical system diagnostic.
		6. Restores vital bus per MOP-26.63
RO		1. Assists BOP as directed by US.
US		1. Directs BOP to enter 0-AP-10.
		2. Directs electrical department to investigate 1-IV vital bus and inverter.
		3. Directs backboards to energize the vital bus via the SOLA transformer.
		4. Refers to TS 3.8.2.1 and MOP-26.63 and declares the vital bus inoperable.
		5. Backboards energizes the vital bus via the SOLA transformer.

EXPECTED OPERATOR ACTIONS

EVENT: 4

BRIEF DESCRIPTION: B RCP thermal barrier HX (TBHX) fails. CC-TV-116B fails to auto-close on high flow requiring manual closure. AR-C-C4 is performed. After CC-TV-116B closure, B RCP shaft vibration increases requiring a reactor and B RCP trip.

INDICATIONS:

1. Annunciator C–C4, RCP A-B-C THERMAL BARR CC HI-LO FLOW, alarms (CC-TV-116B fails)
2. Annunciator C-D4, RCP A-B-C THERM BARR CC HI TEMP, alarms.
3. Annunciator A-E6, RCP 1B VIBRATION ALERT/DANGER

POSITION	TIME	EXPECTED ACTIONS
BOP		1. Assists RO as directed by US
		2. Reports shaft high vibration condition (RCP vibration monitor panel)
		3. Performs E-0 immediate actions when directed by US
RO		1. Recognizes RCP TBHX failure & informs US
		2. Performs actions as directed by AR-C-C4
		a. Manually closes CC-TV-116B
		b. Verifies seal injection flow to B RCP
		c. Monitors B RCP temperatures
		3. Performs actions as directed by AR-A-E6
		a. Trips reactor & B RCP when directed by US

EXPECTED OPERATOR ACTIONS (cont'd)

EVENT: 4 (cont'd)

POSITION	TIME	EXPECTED ACTIONS
US		**1. Directs mitigative actions IAW AR-C-C4 and A-E6**
		a. Directs CC-TV-116B closure
		b. Directs reactor trip followed by B RCP trip due to high shaft vibration
		2. Informs SS of plant status

EXPECTED OPERATOR ACTIONS

EVENT: 5 & 6

BRIEF DESCRIPTION: In response to plant conditions, a reactor trip & SI has occurred. Operators perform actions of E-0. While verifying FW isolation per E-0, a loss of offsite power occurs and train A ESF loads fail to restart requiring manual restart. E-0 is completed and transition is then made to E-1.

INDICATIONS:
1. Reactor trip directed or actuates
2. Rod bottom lights on and RTBs/BYBs open
3. SI alarms & ESF equipment auto starts
4. Switchyard deenergizes & only H emergency bus reenergizes (J EDG OOS)

CREW CRITICAL STEPS: **1. Ensure one train of safeguards is actuated and running prior to transitioning from E-0**

<u>POSITION</u> **<u>TIME</u>** **<u>EXPECTED ACTIONS</u>**

BOP

1. Responds to reactor trip and SI per E-0

   a. Verifies turbine trip

   b. Manually initiates SI

   c. Verifies feedwater isolation

   d. Manually initiates containment isolation phase A

   e. Verifies AFW pumps running - NO

      1. **Manually starts the A AFW pump**

   f. Verifies LHSI pumps running

   g. Verifies SW pumps running - NO

      1. **Manually starts the A SW pump**

   h. Checks if main steam lines should be isolated

   i. Manually initiates CDA

EXPECTED OPERATOR ACTIONS (cont'd)

EVENT: 5 & 6 (cont'd)

POSITION	TIME	EXPECTED ACTIONS
BOP(cont)		1. Responds to reactor trip and SI per E-0 (cont'd) j. Verifies CC pumps stopped k. Verifies QS pumps running l. Verifies HHSI and LHSI flow m. Verifies proper AFW alignment and flow n. Performs MSLB & SGTR diagnostics 2. Responds to loss of J bus as directed by US 3. Informs US of plant status
RO		1. Responds to reactor trip per E-0 a. Verifies reactor tripped b. Verifies both AC emergency busses energized c. Manually initiates SI 2. Performs continuous action page items as directed by US **a. Checks RCS subcooling and HHSI flow, then trips all RCPs** **b. Closes all charging pump recirc valves** c. Manually actuates CDA

EXPECTED OPERATOR ACTIONS (cont'd)

EVENT: 5 & 6 (cont'd)

POSITION	**TIME**	**EXPECTED ACTIONS**
RO		3. Performs subsequent actions of E-0 as directed by US a. Manually initiates containment isolation phase A b. Verifies charging pumps running c. Checks RCS Tave d. Checks PRZR PORVs/spray valves closed e. Checks RCP trip and charging pump recirc criteria f. Performs LOCA diagnostics
US		**1. Directs response to reactor trip per E-0** a. Obtains verification of reactor trip b. Directs entry into AP-10 for loss of emergency bus c. Directs manual SI/phase A if required **d. Monitors continuous action page items:** **1. Direction to RO to stop all RCPs and close charging pump recirc valves if required by subcooling/Phase B actuation/RCS pressure** 2. Directs manual initiation of CDA **e. Directs manual start of train A AFW and SW pumps** **2. Transitions to appropriate plant procedure (E-1 or appropriate FRP)** 3. Informs SS as to status of plant

EXPECTED OPERATOR ACTIONS

EVENT: 7

BRIEF DESCRIPTION: With a large break LOCA/LOOP, only train A ESF is running (J EDG OOS). From E-0, FR-P.1 is briefly entered followed by transition to either FR-Z.1 if needed or E-1 after which A LHSI pump trips. From E-1, with no LHSI pumps, ECA-1.1 is entered.

INDICATIONS:

1. Cntmt radiation & sump level indications abnormal
2. Safety injection actuated and injecting
3. RWST level dropping
4. RCS cold leg temperature (<285°F for FR-P.1)
5. Annunciator J-A5, LHSI PP A LO OR OL TRIP

CREW CRITICAL STEPS:

1. **Stop charging/QS pumps upon reaching 3% in the RWST**
2. **Make up to the RWST and minimize RWST outflow per ECA-1.1**

POSITION	TIME	EXPECTED ACTIONS
BOP		**1. Performs actions of E-1 as directed:**
		a. Checks for faulted S/Gs
		b. Checks S/G levels and secondary radiation
		c. Checks QS/casing cooling/RS pump status
		d. Checks if EDGs should be stopped – NO
		e. Identifies A LHSI pump tripped and informs US
		f. Checks for cold leg recirc capability - NO

EXPECTED OPERATOR ACTIONS (cont'd)

EVENT: 7 (cont'd)

POSITION **TIME** **EXPECTED ACTIONS**

BOP (cont'd)

2. Performs actions of ECA-1.1 as directed
   a. Checks for cold leg recirc capability - NO
   b. Resets SI recirc mode
   c. Maintains intact S/G levels 11 – 50%
   d. Initiates RCS cooldown using S/G PORVs
3. Performs actions of FR-Z.1 as directed
   a. Verifies phase A valves closed
   b. Checks if CDA is required
   c. Verifies proper operation of QS/SW/RS systems
   d. Verifies MS isolation
   e. Checks if SG feed flow should be isolated
4. Informs US of plant status

RO

1. Performs actions of FR-P.1 as directed:
   a. Checks RCS press > 225 [450] psig – NO
      1. Checks LHSI flow > 650 gpm
2. Performs actions of E-1 as directed:
   a. Check RCP trip and charging pump recirc criteria
   b. Verifies SI, phase A and AMSAC reset
   c. Checks PRZR PORVs and block valves
   d. Checks if SI should be terminated – NO

EXPECTED OPERATOR ACTIONS (cont'd)

EVENT: 7 (cont'd)

POSITION	TIME	EXPECTED ACTIONS
RO (cont'd)		2. Performs actions of E-1 as directed (cont'd):
		e. Resets CDA
		f. Checks if cntmt spray should be stopped
		g. Checks if LHSI pumps should be stopped – NO
		3. Performs actions of ECA-1.1 as directed:
		a. Checks cold-leg recirc capability available – NO
		b. Verifies SI reset
		c. Aligns makeup to the RWST
		b. If RWST level <3%, stops charging/QS pumps
		e. Checks containment air recirc fans
		f. Verifies only one charging pump running
		g. Checks if an RCP should be started - NO
		h. Establishes minimum SI as directed
		4. Informs US of plant status

EXPECTED OPERATOR ACTIONS (cont'd)

EVENT: 7 (cont'd)

POSITION **TIME** **EXPECTED ACTIONS**

US

1. Determines FR-P.1 N/A for LBLOCA
2. **Directs response to LBLOCA per E-1:**
   a. Determines SI cannot be terminated
   b. **Transitions to appropriate procedure or FRP if required by red/orange path CSFST:**
      1) **FR-Z.1 if CNMT pressure > 28 psia**
      2) **ES-1.3 if RWST level < 23%**
      3) **ECA-1.1 for loss of both LHSI pumps**
3. **Directs response to LBLOCA per ECA-1.1:**
   a. **Directs addition of makeup to the RWST**
   b. Directs RCS cooldown
   c. **If RWST level >3%:**
      1) **Reduces containment spray to minimum**
      2) Verifies no backflow from RWST to sump & determines RCP could not be started
      3) **Determines minimum SI flow (figure 1) & directs action accordingly**
   d. **If RWST level < 3%, directs all charging and QS pumps to be stopped**
4. **Classifies event as a Site Area Emergency per EPIP-1.01, Tab B-3**
5. Informs SS of status of unit

SIMULATOR INSTRUCTOR FACILITY OPERATING INSTRUCTIONS

I. **SETUP**

A. Recall IC # 32

B. Verify channel IV SF/FF/1st stage pressure selected for SGWLC

C. Verify analog trend pens set up for Tave, Tref, CTMT temperature & VCT level

D. Verify the following malfunctions are preloaded:

II. **CONDUCTING THE EXAMINATION:**

A. **Unfreeze the simulator and begin the exam.**

B. **Perform 1-PT-60.2, Reactor Containment Average Air Temperature**

1. Initiation: Crew should begin in response to shift turnover.

2. Response: As SS, acknowledge completion of surveillance.

C. **Power increase from 50% (event 1).**

1. Initiation: Crew should begin in response to shift turnover. If slow to begin, call as System Dispatcher and prompt commencement of load increase.

2. Response: Acknowledge load dispatcher/plant management notifications of the load increase. Respond as field operator in response to notification of starting/stopping plant equipment.

D. **FT-475 fails low (A S/G FRV closes) (event 2).**

1. Initiation: MMS0102; TD = 10 sec; ramp = 60 sec; start deg = 50; stop deg = 0; trigger = N/A

2. Response: As SS state that a work request will be generated and I&C will be notified of the failure. As I&C, reply that a planner will initiate a work package for troubleshooting & repair.

E. **TM-408F fails low (event 3).**

1. Initiation: MRD07 (continuous rod insertion in AUTO); TD = 20 sec; trigger = N/A. Meter override: TI-408B (Tref); TD = 19 sec; ramp = 1 sec; 100% negative deviation.

2. Response: Respond as SS/I&C to notification of TM-408B failure. As SS state that a work request will be generated and I&C will be notified. As I&C,

reply that a planner will initiate a work package for troubleshooting/repair.

SIMULATOR INSTRUCTOR FACILITY OPERATING INSTRUCTIONS (cont'd)

F. **Loss of Vital bus 1-IV**

1. Initiation: MEL1304; TD = 30 sec; trigger = N/A

2. Response: Report as safeguards watchstander that the 1-IV inverter appears to have smoked, the outside is charred. Report as the electricians that the inverter is damaged and cannot be re-energized. Also report that the 1-IV vital bus has been checked and has been given the "OK" to re-energize.

G. **B RCP TBHX failure / CC-TV-116B auto close failure / RCP vibration (event 4).**

1. Initiation: MCC0502; TD = 40 sec; ramp = 5 sec; deg = 100; trigger = N/A. Prevent auto-closure of CC-TV-116B using CCTV116_R(2) = 0; monitor valve position using CCTV116(2). When RO pushes CLOSE button, take CCTV116_R(2) = 1200. MRC3902; TD = 50 sec; ramp = 5 sec; start deg = 0; stop deg = 12; trigger = N/A.

NOTE: Allow timer to run after TBHX failure until the RCP vibration malfunction is implemented (requires time for the vibrations to build in after the malfunction is implemented.)

2. Response: Acknowledge direction to auxiliary building watchstander for verification of RCP seal injection flows.

H. **Large break loss of coolant accident (event 5)**

1. Initiation: When the B RCP is tripped, implement malfunction MRC0302; TD = 60 sec; trigger = N/A.

2. Response: Respond as HP if directed to survey the main steam lines and outside containment. After 10-15 minutes, report elevated general area radiation in all areas near containment.

I. **Loss of offsite power (loss of B 4kV bus) (event 6)**

1. Initiation: While crew is verifying FW isolation, implement malfunction MEL01; TD = 70 sec; trigger = N/A.

2. Response: If requested, respond as safeguards watchstander to align alternate power supply to the J emergency bus.

J. **A LHSI pump trip (loss of emergency coolant recirc) (event 7).**

1. Initiation: Immediately after transition from FR-P.1 to either FR-Z.1 or back to

E-1, implement malfunction MSI1501; TD = 80 sec; trigger = N/A.

SIMULATOR INSTRUCTOR FACILITY OPERATING INSTRUCTIONS (cont'd)

2. Response: When directed as safeguards watchstander to check out the A LHSI pump, wait 1-3 minutes and report as follows:

   - If the pump is still running, state that the pump is much noisier than usual and getting worse.
   - If the pump has tripped, state that top of the motor casing is very hot with burnt insulation smell in the room. The pump shaft will not rotate (seized) by hand.

   If asked as mechanical maintenance about J EDG, state that the governor is disassembled and awaiting parts arriving tomorrow. Respond as HP as in event 5. Surveys may now include areas around containment. Acknowledge requests as Chemistry to take periodic S/G activity samples (no activity).

III. TERMINATION CRITERIA:

A. Upon reduction of SI flow to minimum or trip of all pumps with RWST suction (step 17 or 30 of ECA-1.1),

OR

B. At the discretion of the evaluator.

EVALUATION SCENARIO CONTENT SUMMARY

1.	Total Number of Malfunctions:	8
2.	Malfunctions Occurring During EOP Performance:	1

a. A LHSI pump trip /
2. loss of emergency coolant recirc

3.	Abnormal Events:	5

a. FT-475 fails low
b. TM-408 fails low
c. Loss of Vital bus 1-IV
d. RCP thermal barrier failure
e. CC-TV-116B auto close failure

4.	Major Transients:	2

a. Large break loss of coolant accident
b. Loss of offsite power

5.	EOPs Used:	2
6.	EOP Contingencies Entered:	1
7.	Simulator Run Time:	90 minutes
8.	EOP Run Time:	45 minutes
9.	Crew Critical Tasks:	3

INITIAL SUBMITTAL

NORTH ANNA EXAM 50-338/2000-301

SEPTEMBER 14 - 21, 2000

INITIAL SUBMITTAL
RO/SRO WRITTEN EXAMINATION

QUESTION: 1 (1.0)

Given the following plant conditions:

- Reactor power is 20%, increasing to 100%.
- Annunciator A-D4, CMPTR ALARM PR TILT ROD DEV/SEQ, is inoperable.
- Rod height is initially 140 steps on “D” bank.
- As rods are withdrawn, a blown fuse results in one immovable rod—F-6 in “D” bank (located near N-43.)

Which ONE of the following is correct concerning the affect on quadrant power tilt ratio (QPTR) if power ascension continues and “D” bank rods are fully withdrawn?

a. QPTR **decreases** as indicated by the benchboard N-43 AFD meter.

b. QPTR **increases** as indicated by the benchboard N-43 AFD meter.

c. QPTR **increases** as indicated by annunciators A-C7 (C8), NIS PR UP (LWR) DET DEV – DEF <50% remaining lit as power exceeds 50%.

d. QPTR **decreases** as indicated by annunciators A-C7 (C8), NIS PR UP (LWR) DET DEV – DEF <50% clearing as power exceeds 50%.

ANSWER: c

Answer correct: F-6 control rod will suppress flux in the N-43 quadrant; the upper detector will deviate from the average and the alarm will stay lit above 50% power.	Distractors plausible: a-misconception regarding axial flux vs. radial flux b-QPTR will increase d-annunciator normally clears above 50% power	Distractors incorrect: a-QPTR will increase and AFD meters don’t indicate QPTR b-AFD meters don’t indicate QPTR d-QPTR will increase and alarm will remain lit
K/A: 005-AK1.02	Objective: 11029	Source: New
Reference: OP-4.4, PT-17.1, ARPs A-C7 & A-D4, NCRODP-62-LP-1, CDB for Obj 11029	Level: Comprehension	

QUESTION: 2 (1.0)

Given the following plant conditions:

- Refueling is complete and RCS loops have been filled.
- The team has started “A” reactor coolant pump (RCP) for the 90-minute run.
- Immediately after pump start, annunciator A-E5, RCP 1A VIBRATION ALERT/DANGER, alarms.

Which ONE of the following would require the team to trip “A” RCP?

a. Seismic vibration indicates 3.7 mils.

b. Seismic vibration indicates 6.2 mils.

c. Proximity vibration indicates 12 mils.

d. Proximity vibration indicates 18 mils.

ANSWER: b

Answer correct: seismic vibration greater than the danger setpoint of 5 mils requires the RCP to be tripped.	Distractors plausible: All – candidate misconception concerning the RCP vibration values that require the RCP to be tripped.	Distractors incorrect: a – seismic vibration <5 mils does not require tripping the RCP. c & d – proximity vibration <20 mils does not require tripping the RCP.
K/A: 015/017-AA1.23	Objective: 3519	Source: New
Reference: ARP A-E5.	Level: Knowledge	

QUESTION: 3 (1.0)

RCS cooldown is in progress per 1-ES-0.2A, Natural Circulation Cooldown with CRDM Fans. During RCS depressurization, the team notes that subcooling has suddenly decreased from 45°F to 5°F.

In accordance with 1-ES-0.2A Continuous Action Page, what is the required team response?

a. Initiate safety injection and go to 1-ES-0.0, Re-diagnosis.

b. Initiate safety injection and go to 1-E-0, Reactor Trip or Safety Injection.

c. Stop RCS depressurization and continue cooldown to restore subcooling.

d. Continue RCS depressurization and increase the cooldown rate to restore subcooling.

ANSWER: b

Answer correct: per 1-ES-0.2A continuous action page.	Distractors plausible: a – initiating SI is correct, ES-0.0 is used when SI is in service and the team thinks they may be in the wrong procedure c – stopping depressurization and continuing the cooldown will restore subcooling if nothing else is going on, this strategy is used in other EOPs d – increasing the cooldown rate for a given depressurization rate will increase subcooling if nothing else is going on.	Distractors incorrect: All – per 1-ES-0.2A continuous action page, the only correct action is to initiate SI and go to 1-E-0.
K/A: E09-EA1.3	Objective: 12488	Source: New
Reference: 1-ES-0.2A continuous action page, CDB for Obj 12488	Level: Comprehension	

QUESTION: 4 (1.0)

A reactor trip occurred and the team noted that all IRPIs indicated zero except the following:

- L-5 – 22 steps
- K-10 – 16 steps
- E-14 – 9 steps
- B-6 – 11 steps
- D-10 – 20 steps
- C-7 – 17 steps
- H-2 – 13 steps
- J-3 – 19 steps
- B-8 – 6 steps

Emergency boration via 1-CH-241 commenced with "A" BAST level initially at 88%.

Using the references provided, determine which ONE of the following is correct concerning the level in "A" BAST at which the team should stop emergency boration.

a. 28%.

b. 43%.

c. 58%.

d. 73%.

ANSWER: b

Answer correct: per attached calculation—one rod (L-5) is >20 steps, six rods (K-10, B-6, D-10, C-7, H-2, J-3) indicate from 11 – 20 steps, total of 3 equivalent stuck rods requires 15% level decrease for each ESR, 3 X 15% = 45%, 88% - 45% = 43%.	Distractors plausible: Misconception concerning the meaning of "inclusive" could lead to incorrect determination; incorrect conversion from # of IRPIs to # of ESRs, multiple math errors possible.	Distractors incorrect: Per attached calculation, the only correct answer is 43%.
K/A: 024-AK3.02	Objective: 12481	Source: New
Reference: 1-ES-0.1, CDB for Obj 12481	Level: Comprehension	

QUESTION: 5 (1.0)

Which ONE of the following is correct concerning isolation of CC heat exchanger cooling during a containment depressurization actuation (CDA)?

a. CDA isolates CCHX cooling on the **associated unit** to ensure adequate RSHX cooling.

b. CDA on either unit isolates CCHX cooling on **both units** to prevent service water pump runout.

c. CDA on either unit isolates CCHX cooling on **both units** to ensure adequate HHSI pump cooling.

d. CDA isolates CCHX cooling on the **associated unit** to prevent contamination of the service water reservoir.

ANSWER: a

Answer correct: RSHX cooling during accident conditions is the most limiting condition for operation for the SW system.	Distractors plausible: b – SW pump runout is a major concern during post-accident conditions. c – HHSI pumps are cooled by service water. d – CCW contamination could result in SW reservoir contamination via CCHX tube leakage.	Distractors incorrect: b – CDA only isolates the associated unit's CCHX cooling. c – CDA only isolates the associated unit's CCHX cooling. d – prevention of SW reservoir contamination is NOT the reason for isolating CCHX cooling.
K/A: 026-AK3.02	Objective: 7674	Source: New
Reference: CDB for Obj 7674	Level: Knowledge	

QUESTION: 6 (1.0)

Given the following plant conditions:

- Unit 1 startup is in progress.
- The main generator has just been placed on line.
- Multiple failures result in RCS pressure increasing to 2750 psig.

What actions are required per TS-2.1, Safety Limits?

a. Be in hot standby with RCS pressure ≤2735 psig within 1 hour.

b. Notify the NRC Operations Center within 24 hours.

c. Trip the reactor and reduce RCS pressure to ≤2735 psig within 6 hours.

d. Within one hour, take action to place the unit in hot standby within 6 hours.

ANSWER: a

Answer correct: per TS-2.1.2 and definition of operational modes	Distractors plausible: b – NRC operations center must be notified of safety limit violation. c – reactor trip **would** be required for the stated conditions, since PRZR pressure is above 2360 psig, which is the reactor trip setpoint. d – correct if candidate believes TS-3.0.3 applies to the stated conditions.	Distractors incorrect: b – notification of NRC must be done ASAP (in all cases within one hour) and is required by TS-6.7.1, not TS-2.1. c – TS-2.1 does not require the reactor to be tripped; also, pressure must be reduced within 1 hour. d – TS-3.0.3 does not apply for the stated conditions, since compliance with TS-2.1 action is possible.
K/A: 000027/GEN-2.1.11	Objective: 6844	Source: New
Reference: TS-2.1.2; CDB for Obj 6844	Level: Comprehension	

QUESTION: 7 (1.0)

Given the following plant conditions:

- A main steam break occurred with the unit at 100% power.
- Safety injection actuated and all equipment functioned correctly.
- The RO noted that control rod H-14 IRPI indicates 229 and all other rod bottom lights are lit.

What is the required team response?

a. Emergency borate for 25 minutes.

b. No additional actions are required.

c. Perform a shutdown margin calculation.

d. Attempt to manually insert the rod.

ANSWER: b

Answer correct: accident analyses accounts for the most reactive rod being stuck fully withdrawn and the boron injection tank is designed to ensure adequate shutdown margin to prevent reactor restart.	Distractors plausible: a – with no SI flow, emergency boration is required for a stuck rod (25 minutes per rod). c – shutdown margin calculation is done when adequate shutdown margin is in question. d – it would be logical to attempt manual insertion of a stuck rod.	Distractors incorrect: a – emergency boration flow is ineffective with SI in service and is not necessary for the conditions stated. c – performing a shutdown margin calculation would not **mitigate** the stuck rod. d – no guidance exists for manually inserting a stuck rod.
K/A: 040-AA1.18	Objective: 13964	Source: New
Reference: UFSAR section 15.4.2.1.1	Level: Comprehension	

QUESTION: 8 (1.0)

During the performance of 1-FR-P.1, Response to Imminent Pressurized Thermal Shock Condition, the team is directed to stop both low-head safety injection (LHSI) pumps and all but one charging pump.

Which ONE of the following describes the potential consequences of failure to perform these actions?

a. Containment failure.

b. Brittle failure of the reactor vessel.

c. Loss of suction to quench spray pumps.

d. Loss of suction to LHSI and charging pumps.

ANSWER: b

Answer correct: per WOG B/G document, SI flow may have contributed to the RCS cooldown and prevent RCS pressure reduction.	Distractors plausible: a & c – candidate misconception concerning depletion rate of RWST and design of CDA systems. d – candidate misconception concerning auto-swapover of SI pumps to CTMT sump.	Distractors incorrect: a & c – design of CDA systems accounts for loss of RWST inventory to SI system d – SI system suction auto-swaps to CTMT sump at low RWST level.
K/A: E08-EK1.1	Objective: 13012	Source: New
Reference: WOG B/G document for FR-P.1; CDB for Obj 13012	Level: Knowledge	

QUESTION: 9 (1.0)

Given the following plant conditions:

- The unit has just been placed on line.
- Reactor power is 20% and increasing to full power.
- Annunciator A-G1, CNDSR LO VAC C-9 PERM NOT AVAIL, has just alarmed.
- The reactor operator observes main condenser pressure at 4" Hg abs and degrading.

What is the required team response in accordance with 1-AP-14, Low Condenser Vacuum?

a. Reduce turbine load until vacuum is stable.

b. Initiate 1-AP-2.2, Fast Load Reduction.

c. Trip the turbine and go to 1-AP-2.1 while continuing with 1-AP-14.

d. Trip the reactor and go to 1-E-0 while continuing with 1-AP-14.

ANSWER: d

Answer correct: per 1-AP-14, step 4, the reactor must be tripped if condenser pressure is >3.5" Hg abs and power is <30% (chemistry hold point)	Distractors plausible: a – this action is required if vacuum hasn't already degraded beyond the setpoint that requires tripping the reactor. b – this is an option if condenser vacuum hasn't already degraded beyond the setpoint that requires tripping the reactor. c – until recently, tripping the turbine without tripping the reactor was an option with power below 30%.	Distractors incorrect: a & b – although steps are normally performed in sequence, the team must take the actions of step 4 (trip the reactor) **instead of** attempting to reduce turbine load to stabilize vacuum (the intent of steps 2 and 3 is NOT to restore vacuum if it has already degraded beyond the setpoint that requires tripping the reactor). c – tripping the turbine is no longer an option during response to low condenser vacuum.
K/A: 051-AA2.02	Objective: 9877	Source: Bank item #3117 (modified)
Reference: 1-AP-14; CDB for Obj 9877	Level: Comprehension	

QUESTION: 10 (1.0)

Given the following plant conditions:

- Loss of vital bus 1-III occurred with the unit at 100% power.
- Repairs will require at least one hour before the bus can be re-energized.
- CC flow to RCPs could not be restored and the team tripped the unit.
- Five minutes after the trip, RCS average temperature decreased to 538°F.

What actuation(s) will occur, if any?

a. No actuation will occur.

b. High steam flow SI **only** will occur.

c. Steam line isolation **only** will occur.

d. High steam flow SI and steam line isolation will **both** occur.

ANSWER: d

Answer correct: channel III high steam flow bistables go to tripped condition on loss of vital bus 1-III; per NA-DW-5655D33 sheet 7, high steam flow SI and steam line isolation both occur with 2/3 high steam flow and P-12 lo-lo Tave interlock.	Distractors plausible: a – this would be correct for loss of vital bus 1-I or 1-II. b – misconception concerning P-12 interlock. c – this would be correct if high steam flow SI were blocked (also, misconception concerning P-12 interlock.)	Distractors incorrect: Unless action is taken to bypass the safety function, high steam flow SI and main steam line isolation will both occur when RCS average temperature decreases below 543°F, per reference drawings.
K/A: 057-AA2.18	Objective: 12003	Source: New
Reference: NA-DW-5655D33 sheet 7, 8 & 5.	Level: Comprehension	

QUESTION: 11 (1.0)

A loss of reactor coolant on **unit 1** resulted in a reactor trip and safety injection.

Which ONE of the following correctly describes the response of the Service Water System spray valves?

a. Spray valves on **unit 1 only** open, delayed 15 seconds to prevent SW pump runout.

b. Spray valves on **both units** open, delayed 15 seconds to prevent SW pump runout.

c. Spray valves on **both units** open, delayed 15 seconds to ensure adequate supply voltage to the MOVs.

d. Spray valves on **unit 1 only** open, delayed 15 seconds to ensure adequate supply voltage to the MOVs.

ANSWER: c

Answer correct: per ESK, either unit SI signal opens spray MOVs on both units after 15-sec. delay; per CDB, time delay is to ensure adequate supply voltage.	Distractors plausible: a & d – many ESF actuations occur only on the accident unit. b – preventing SW pump runout is a major concern following ESF actuation.	Distractors incorrect: a & d – per ESK, either unit SI opens all spray MOVs. b – per CDB, time delay is to ensure adequate supply voltage to MOVs.
K/A: 062-AK3.02	Objective: 7666	Source: New
Reference: 11715-ESK-6EU; CDB for Obj 7666	Level: Knowledge	

QUESTION: 12 (1.0)

Given the following plant conditions:

- Unit 1 was at 100% power when noxious fumes forced evacuation of the control room.
- The immediate actions of 1-AP-20, Operation from the Auxiliary Shutdown Panel, were performed prior to evacuation.
- AFW flow was throttled to 150 gpm to each S/G prior to evacuation.

What is the sequence of control manipulations for transferring control of "C" S/G AFW flow?

a. Decrease the demand on 1-FW-HCV-100C controller, then place the LOCAL-REMOTE switch in LOCAL.

b. Place the LOCAL-REMOTE switch for 1-FW-HCV-100C in LOCAL, then decrease the demand on the controller.

c. Place the LOCAL-REMOTE switch for 1-FW-MOV-100C in LOCAL, then throttle 1-FW-MOV-100C.

d. Locally throttle closed 1-FW-MOV-100C, then place the LOCAL-REMOTE switch for 1-FW-MOV-100C in LOCAL.

ANSWER: a

Answer correct: per 1-AP-20 note, controllers should be adjusted to the desired position before transferring to LOCAL control; HCV-100C is fully open during normal operation; for the stated conditions, the valve would be partially open when the team transfers control to the ASP.	Distractors plausible: b – per step 7 of 1-AP-20, AFW flow is controlled by selecting LOCAL, **then** throttling the discharge valve. c & d – candidate misconception concerning the normal AFW alignment	Distractors incorrect: b – if step 7 guidance is followed without regard to the step 5 NOTE, AFW flow to "C" S/G will go from full flow to zero flow. c & d – AFW to "C" S/G is not normally supplied via the MOV header.
K/A: 068-AK2.03	Objective: 11097	Source: New
Reference: 1-AP-20	Level: Comprehension	

QUESTION: 13 (1.0)

Using the references provided, determine which ONE of the following conditions describes a loss of containment integrity.

a. With the unit in mode 4, 1-CH-TV-1204B fails its stroke PT; 1-CH-TV-1204A is failed and tagged closed 4 hours later.

b. With the unit in mode 5, a containment penetration exceeds TS-3.6.1.2 leakage rate limits.

c. With the unit in mode 2, the outer containment airlock door is open with the inner escape hatch not fully latched.

d. With the unit in mode 3, the inner containment airlock door is left open while repairing its 0-rings.

ANSWER: c

Answer correct: inner escape hatch must be fully latched for inner door to be considered closed; with both doors not fully closed, containment is inoperable.	Distractors plausible: a – valve failure **does** require entry into TS-3.6.3.1 action. b – OOS leak rate in mode 5 **does** require entry into "info" action (prevent entering mode 4.) d – candidate misconception regarding action "a."	Distractors incorrect: a – containment penetration can be considered operable if the operable valve is deactivated closed within the time limit allowed by TS-3.6.3.1 (four hours.) b – leakage rate spec only applies in modes 1 – 4. d – with inner door inoperable, the **outer** door is the operable CTMT boundary.
K/A: 069-AA2.01	Objective: 5347	Source: New
Reference: TS-3.6.1.1, 3.6.1.2, 3.6.1.3 and 3.6.3.1.	Level: Comprehension	

QUESTION: 14 (1.0)

Given the following plant conditions:

- Unit 1 tripped from 100% power due to a loss of all main and auxiliary feedwater.
- All efforts to restore S/G feedwater flow have failed.
- RCS bleed and feed has now been initiated.

For **all cases**, initiating RCS bleed and feed will __________.

a. prevent core uncovery

b. prevent an inadequate core cooling condition

c. provide temporary core cooling until a secondary heat sink can be restored

d. depressurize the RCS sufficiently to enable the team to place RHR in service

ANSWER: c

Answer correct: bleed and feed is not intended to provide long-term core cooling, it is only an interim measure to "buy time" for the operators to restore a secondary heat sink or place RHR in service.	Distractors plausible: a & b – bleed and feed **does** delay or minimize the possibility of core uncovery and inadequate core cooling. d – bleed and feed will depressurize the RCS to a degree, depending on many variables.	Distractors incorrect: a & b – bleed and feed will not prevent core uncovery and inadequate core cooling for all cases. d – bleed and feed does not depressurize the RCS sufficiently to place RHR in service for all cases.
K/A: 074-EK2.03	Objective: 11295	Source: New
Reference: CDB for Obj 11295	Level: Knowledge	

QUESTION: 15 (1.0)

A valid letdown radiation monitor alarm prompts the team to place excess letdown in service.

What is the basis for this action?

a. Excess letdown is placed in service **in addition to** normal letdown to maximize RCS cleanup.

b. Excess letdown is placed in service **instead of** normal letdown to reduce the dose rates in the Auxiliary Building.

c. Excess letdown is placed in service **instead of** normal letdown to allow flushing the normal letdown radiation monitor.

d. Excess letdown is placed in service **in addition to** normal letdown to allow reducing normal letdown flow.

ANSWER: b

Answer correct: if deemed necessary, normal letdown flow would be reduced in order to reduce dose rates and allow access to the Auxiliary Building.	Distractors plausible: a – increased letdown flow **would** assist in RCS cleanup. c– excess letdown **is** placed in service instead of normal letdown, radiation monitors occasionally need to be flushed. d – reducing normal letdown flow **would** reduce dose rates in the Auxiliary Building.	Distractors incorrect: a & d – normal letdown and excess letdown are not normally placed in service in parallel. c – flushing radiation monitors is usually done when a **invalid** alarms are received.
K/A: 076-AK3.06	Objective: 11666	Source: New
Reference: 1-AP-5, CDB for Obj 11666	Level: Knowledge	

QUESTION: 16 (1.0)

Given the following plant conditions:

- Unit 1 is stable at 50% power.
- Rod control is in AUTOMATIC with "D" bank at 190 steps.
- T_{ave} and T_{ref} are initially matched at 564°F.
- A failure in the median/high select T_{ave} control unit results in T_{ave} indicating 560°F.

As a result, control rods will be __________.

a. inserted at 40 steps per minute

b. withdrawn at 40 steps per minute

c. inserted at 32 steps per minute

d. withdrawn at 32 steps per minute

ANSWER: b

Answer correct: rod speed changes linearly from 8 spm at 3°F mismatch to 72 spm at 5°F mismatch; rod speed with a 4°F mismatch =	Distractors plausible: a & c – candidate misconception regarding direction of rod motion with $T_{ave} < T_{ref}$; a – rod speed is 40 spm. c & d – candidate calculates the rod speed based on half the **difference** between 8 spm and 72 spm, but forgets to add the 8 spm. d – rods **are** withdrawn.	Distractors wrong: a & c – rods are withdrawn. c & d – rod speed is 40 spm.
K/A: 001-AK2.06	Objective: 10180	Source: Bank item #2166 (modified)
Reference: NCRODP-65-LP-2	Level: Knowledge	

QUESTION: 17 (1.0)

The unit is at 100% power when control bank **"B"** rod **D-10** drops with no reactor trip. During the subsequent recovery of rod D-10, the operator mistakenly opens all lift coil disconnect switches in control bank **"A"** except for rod **B-10**. The reactor operator selects control bank "B" and begins outward rod motion.

Which ONE of the following correctly describes the plant response?

a. The ROD CONTROL URGENT FAILURE annunciator will alarm.

b. The ROD CONTROL NON-URGENT FAILURE annunciator will alarm.

c. The ROD CONTROL URGENT FAILURE annunciator will **not** alarm as expected.

d. The ROD CONTROL NON-URGENT FAILURE annunciator will **not** alarm as expected.

ANSWER: c

Answer correct: the urgent failure alarm is expected to actuate due to the open lift coil disconnect switches for rods in the unaffected group of the affected bank; since the lift coil disconnect switches for the affected bank are all still closed, the urgent failure alarm will not actuate as expected.	Distractors plausible: All – candidate misconception concerning the conditions that cause the urgent failure and non-urgent failure alarms to actuate.	Distractors wrong: a – urgent failure alarm will NOT actuate. b – non-urgent failure alarm will not actuate. d – non-urgent failure alarm is not expected to actuate.
K/A: 003-AK2.05	Objective: 10177	Source: Bank item #2157
Reference: 1-AP-1.2; NCRODP-65-LP-2	Level: Knowledge	

QUESTION: 18 (1.0)

Both units are at 100% power when a loss of offsite power occurs. During the post-trip recovery, the team is directed to establish RSS load shed per 0-OP-26.7, Reserve Station Service Load Shed.

To accomplish this, the team needs to send an operator __________.

a. to unit 1 emergency switchgear room **only** to select unit 1 **or** unit 2 for STARTUP

b. to unit 1 emergency switchgear room **only** to select unit 1 **and** unit 2 for STARTUP

c. to unit 1 **and** unit 2 emergency switchgear rooms to select unit 1 **or** unit 2 for STARTUP

d. to unit 1 **and** unit 2 emergency switchgear rooms to select unit 1 **and** unit 2 for STARTUP

ANSWER: a

Answer correct: RSS load shed	Distractors plausible: b & d – since both units will be starting up, logical to assume both units will be selected for startup. c & d – logical to assume that the controls applicable to a unit are located in that unit's ESR..	Distractors wrong: b & d – only one unit at a time can be selected to STARTUP. c & d – RSS load shed controls are located in the unit 1 emergency switchgear room only, not in unit 2.
K/A: 007/GEN-2.4.35	Objective: 10840	Source: New
Reference: 1-ES-0.1; 1-OP-7.11; 0-OP-26.7	Level: Knowledge	

QUESTION: 19 (1.0)

Unit 1 was operating at 100% power when an abnormal event occurred. All equipment automatically actuated as designed. No operator actions have been taken. The event was initiated five minutes ago.

Using the high-level SPDS printouts provided, determine which ONE of the following has occurred.

a. Steam generator tube rupture.

b. Small-break loss of reactor coolant accident.

c. Main steam line break outside containment.

d. Main steam line break inside containment.

ANSWER: b

Answer correct: containment pressure, temperature, radiation and sump level are all elevated; RCS pressure is degraded; HHSI flow is indicated.	Distractors plausible: All – candidate misinterpretation of the data on the SPDS printouts.	Distractors wrong: a – secondary radiation is normal. c & d – S/G levels are all normal, RCS cooldown is not excessive. d – containment radiation is elevated.
K/A: 009-EA1.10	Objective: 13962	Source: New
Reference: NCRODP-106-LP-1 & 2	Level: Comprehension	

QUESTION: 20 (1.0)

The team has tripped unit 1 reactor, manually initiated SI and transitioned to 1-ECA-1.2, LOCA Outside Containment.

Which ONE of the following correctly states the actions required to isolate a leak on the **600-psig piping** in safeguards?

a. Close 1-SI-MOV-1890C **or** 1890D, and close 1-SI-MOV-1864A **or** 1864B.

b. Close 1-SI-MOV-1890C **and** 1890D, and close 1-SI-MOV-1864A **or** 1864B.

c. Close 1-SI-MOV-1890C **and** 1890D, and close 1-SI-MOV-1864A **and** 1864B.

d. Close 1-SI-MOV-1890C **or** 1890D, and close 1-SI-MOV-1864A **and** 1864B.

ANSWER: c

Answer correct: 1890C and 1890D are in parallel – in order to isolate the leak from the RCS, both valves must be closed; 1864A and 1864B are in parallel – in order to isolate the leak from the LHSI pumps, both valves must be closed.	Distractors plausible: a – correct if candidate believes 1890C and 1890D are in series, and 1864A and 1864B are in series. b – correct if candidate believes 1864A and 1864B are in series. d – correct if candidate believes 1890C and 1890D are in series.	Distractors wrong: a – 1890C and 1890D are in parallel – in order to isolate the leak from the RCS, both valves must be closed; 1864A and 1864B are in parallel – in order to isolate the leak from the LHSI pumps, both valves must be closed. b – 1864A and 1864B are in parallel – in order to isolate the leak from the LHSI pumps, both valves must be closed. d – 1890C and 1890D are in parallel – in order to isolate the leak from the RCS, both valves must be closed.
K/A: E04-EK3.3	Objective: 13841	Source: New
Reference: 1-ECA-1.2; 11715-FM-96A.	Level: Comprehension	

QUESTION: 21 (1.0)

Following a small-break LOCA, the team is checking if RHR can be placed in service in accordance with 1-ES-1.2, Post-LOCA Cooldown and Depressurization.

Which ONE of the following conditions prevents RHR from being placed in service?

a. RCS pressure is 440 psig.

b. PRZR level is 22%.

c. 1-RC-PT-1403 is failed low.

d. All RCS hot-leg temperatures are 337°F.

ANSWER: a

Answer correct: per 1-OP-14.1, RCS pressure must be less than 400 psig prior to placing RHR in service; interlocks prevent opening RHR inlet valves MOV-1700/1701 until RCS pressure is < 418 psig.	Distractors plausible: b – correct if candidate believes PRZR level below normal (28%) prevents RHR from being placed in service. c – wide-range pressure transmitter supplies an open permissive to RHR inlet valve 1-RH-MOV-1701. d – hot-leg temperature must be below a certain value prior to placing RHR in service.	Distractors wrong: b – PRZR level is not a criteria for placing RHR in service. c – open permissive from wide-range pressure transmitter will be satisfied with the PT failed low. d – hot-leg temperatures must be below 350°F.
K/A: E03-EK2.2	Objective: 413	Source: Modified bank item #1286
Reference: 1-ES-1.2	Level: Knowledge	

QUESTION: 22 (1.0)

The team just swapped charging pumps and the following plant conditions exist:

- Charging flow indicates 0 gpm.
- "B" charging pump indicates 92 amps (20 amps above normal).
- PRZR program level indicates 64%.
- Actual PRZR level indicates 59%.
- 1-CH-FCV-1122 indicates full demand.

Which ONE of the following has initiated this response?

a. 1-CH-FCV-1122 air supply line severed.

b. "A" charging pump discharge check valve failed.

c. Auxiliary spray valve 1-CH-HCV-1311 failed open.

d. Regenerative heat exchanger tube leak.

ANSWER: b

Answer correct: failure of the discharge check valve on a standby charging pump results in decreasing PRZR level, reduced charging flow, increased charging pump amps, and increased demand on FCV-1122.	Distractors plausible: a – correct if candidate believes FCV-1122 fails closed on loss of IA. c – candidate misconceptions concerning auxiliary spray valve flow path and effects of HCV-1311 failure. d – RHX tube leak **does** result in decreasing PRZR level, increasing demand on FCV-1122 and increased charging pump amps.	Distractors wrong: a – FCV-1122 fails open on loss of IA. c – auxiliary spray valve is a parallel flow path with normal charging valve HCV-1310; opening the valve has no effect on RCS inventory control. d – RHX tube leak results in increased charging flow.
K/A: 022-AA1.03	Objective: 11969	Source: New
Reference: NCRODP-91-SLA-6 (observation of event in simulator); 1-AP-28	Level: Comprehension	

QUESTION: 23 (1.0)

Given the following plant conditions:

- The RCS is stable at 256°F and 300 psig.
- The RCS is solid.
- RHR is in service.
- A loss of **ALL** instrument air (inside and outside containment) occurs.

Which ONE of the following identifies the plant response?

a. RCS temperature and pressure will both increase.

b. RCS temperature and pressure will both decrease.

c. RCS temperature will decrease and pressure will increase.

d. RCS temperature will increase and pressure will decrease.

ANSWER: a

Answer correct: loss of RHR H/X cooling due to CC TVs failing closed causes RCS temperature to increase (even though HCV-1758 fails open and FCV-1605 fails closed); loss of letdown due to HCV-1142 failing closed causes RCS pressure to increase (also, RCS temperature increase in a solid system causes RCS pressure to increase.)	Distractors plausible: b & c – HCV-1758 fails open causing maximum RHR flow through H/X; normally this causes RCS temperature to decrease. c – RCS pressure will increase. d – RCS temperature will increase.	Distractors wrong: b – RCS temperature increases due to loss of RHR H/X cooling; RCS pressure increases due to loss of letdown and increase in RCS temperature. c – RCS temperature increases due to loss of RHR H/X cooling. d – RCS pressure increases due to loss of letdown and increase in RCS temperature.
K/A: 025-AK1.01	Objective: 12690	Source: New
Reference: 1-AP-28	Level: Comprehension	

QUESTION: 24 (1.0)

During performance of 1-FR-S.1, Response to Nuclear Power Generation/ATWS, the BIT is manually injected if emergency boration is not available.

Which ONE of the following correctly explains why SI is **NOT** manually initiated to inject the BIT?

a. SI starts the emergency diesel generators.

b. SI initiates control room bottled air dump.

c. SI trips the running main feedwater pumps.

d. SI initiates phase A containment isolation.

ANSWER: c

Answer correct: initiating SI will trip the MFW pumps and potentially add a loss of heat sink to the transient, since AFW pumps are only designed to remove core decay heat.	Distractors plausible: All are results of SI that are not needed in order to respond to ATWS.	Distractors wrong: All – the only correct basis for not manually initiating SI is to prevent tripping any running MFW pumps.
K/A: 029/GEN-2.4.18	Objective: 11586	Source: New
Reference: WOG B/G document for FR-S.1; NCRODP-95-LP-2	Level: Knowledge	

QUESTION: 25 (1.0)

20 minutes after a reactor trip from 100% power, the following IR NI indications exist:

- N-35 indicates 4 X 10^{-9} amps, SUR indicates 0 dpm.
- N-36 indicates 2.1 X 10^{-11} amps, SUR indicates –0.1 dpm.
- SR detectors N-31 and N-32 are de-energized.

Which ONE of the following is correct?

a. N-35 is undercompensated.

b. N-36 is undercompensated.

c. N-35 is overcompensated.

d. N-36 is overcompensated.

ANSWER: a

Answer correct: 20 minutes after a reactor trip from power, both IR channels should be below 5 X 10^{-11} amps; N-36 is normal; N-35 is reading too high, which indicates that the compensating voltage is set too low.	Distractors plausible: All – candidate misconception regarding effects of compensating voltage misadjustment and normal IR indications following a reactor trip.	Distractors wrong: b & d – N-36 is indicating normally. c – N-35 is reading too high, which indicates that the compensating voltage is set too **low**.
K/A: 033-AK1.01	Objective: 7803	Source: New
Reference: CDB for Obj 7803	Level: Comprehension	

QUESTION: 26 (1.0)

With unit 1 at 100% power, which ONE of the following S/G primary-to-secondary leakage conditions would require reducing power **in accordance with TS-3.4.6.3**?

a. "A" = 55 gpd, "B" = 0 gpd and "C" = 0 gpd.

b. "B" S/G leakage increased from 5 gpd to 75 gpd between surveillance intervals.

c. "A" = 45 gpd, "B" = 35 gpd and "C" = 30 gpd (total leakage increase between surveillance intervals is 40 gpd.)

d. Increasing trend indicates that "C" S/G leakage will be 75 gpd within 90 minutes (total leakage increase between surveillance intervals is 40 gpd.)

ANSWER: b

Answer correct: per TS-3.4.6.3 limit "c," total leakage increase of 60 gpd (from all S/Gs) between surveillance intervals requires reducing power below 50% within 90 minutes.	Distractors plausible: a & c – correct if candidate applies **admin** limits of AP-24. d – candidate misconception concerning the increasing trend limit vs. the total leakage increase limit.	Distractors wrong: a & c – individual limit is 100 gpd, total is 300 gpd. d – limit is increasing trend indicates 100 gpd will be exceeded within 90 minutes.
K/A: 037-AA2.10	Objective: 3526	Source: New
Reference: TS-3.4.6.3	Level: Comprehension	

QUESTION: 27 (1.0)

Given the following plant conditions:

- Spent fuel cask loading is in progress in the Fuel Building.
- Annunciator E-C6, SPENT FUEL PIT LO LEVEL, is lit.
- Spent fuel pit bridge crane radiation monitor indicates 1.2×10^{0} R/hr.

Which ONE of the following actions is required for this situation?

a. No evacuation is required

b. Evacuate the fuel building **only**.

c. Evacuate the fuel building **and** decontamination building.

d. Evacuate the fuel building **and** 4th floor of the auxiliary building.

ANSWER: b

Answer correct: evacuation of the Fuel Building ONLY is required per 0-AP-27.	Distractors plausible: a – correct if candidate is unaware of the CAUTION in 0-AP-27. c – some fuel cask activities occur in the decon building; fuel cask loading is only done by a few operators that have completed special quals. d – correct per 0-AP-5.1 if fuel handling activities are **not** in progress.	Distractors wrong: All – evacuation of the fuel building ONLY is required per 0-AP-27.
K/A: 061-AA2.05	Objective: 11661	Source: New
Reference: 0-AP-27; 0-AP-5.1.	Level: Knowledge	

QUESTION: 28 (1.0)

Following a small-break LOCA, the following plant conditions exist:

- Containment (CTMT) pressure is 16 psia and decreasing (peaked at 19 psia.)
- The team entered 1-FR-Z.3, Response to High Containment Radiation Level.

Which ONE of the following actions is required?

a. Start outside RS pumps and inject the CAT.

b. Start inside RS pumps and inject the CAT.

c. Place containment purge in service via the iodine filter banks.

d. Start the iodine filtration fans.

ANSWER: d

Answer correct: per 1-FR-Z.3 and 1-OP-21.1, iodine filtration fans should be started since CTMT pressure is less than 10 **psig** for the stated plant conditions.	Distractors plausible: a & b – injecting the CAT reduces general area radiation levels by removing iodine from CTMT atmosphere; 1-E-0 and 1-E-1 both address injecting the CAT. c – placing purge in service via iodine filter banks would reduce containment radiation.	Distractors wrong: a & b – CAT should not be injected unless CTMT pressure has exceeded 20 psia. c – containment purge is not an option per FR-Z.3.
K/A: E16-EK1.3	Objective: 13872	Source: New
Reference: 1-FR-Z.3; 1-OP-21.1; 1-E-0; 1-E-1.	Level: Comprehension	

QUESTION: 29 (1.0)

Given the following plant conditions:

- Unit 1 core off-load is in progress.
- The Fuel Building supervisor informs the control room that an irradiated fuel assembly has become separated from the top nozzle and fallen on top of the fuel racks.

Which ONE of the following actions is required to be performed in accordance with 0-AP-30, Fuel Failure During Handling?

a. Manually dump control room bottled air.

b. Verify refueling purification flow aligned to SFP.

c. Increase SFP water level to +6 inches.

d. Secure fuel building supply and exhaust fans.

ANSWER: a

Answer correct: per AP-30, control room bottled air must be manually dumped regardless of whether the fuel building area radiation monitors have reached high alarm.	Distractors plausible: b – refueling purification flow would assist in removal of radioactive material from the SFP water. c – increasing water level to the maximum allowed would increase shielding and reduce dose rates. d– securing ventilation prevents spread of airborne contamination.	Distractors incorrect: b – checking RP flow is not addressed in AP-30. c – increasing SFP water level is not proceduralized. d – fuel building ventilation is not secured, it should be aligned to the auxiliary building iodine filters.
K/A: 036-AK1.01	Objective: 9045	Source: New
Reference: 0-AP-30.	Level: Knowledge	

QUESTION: 30 (1.0)

The team is attempting to dump steam to the condenser in accordance with 1-FR-H.2, Response to Steam Generator Overpressure.

Which ONE of the following correctly states how the team will accomplish this?

a. Open the MSTV bypass valve, because delta-P may preclude opening the MSTV.

b. Open the NRV bypass valve, because its air-operated actuator allows finer control than the NRV.

c. Open the MSTV, because the MSTV bypass valve capacity is inadequate to alleviate S/G overpressure.

d. Open the NRV, because the NRV bypass valve capacity is inadequate to alleviate S/G overpressure.

ANSWER: a

Answer correct: per 1-FR-H.2, step 4	Distractors plausible: b – the NRV bypass valve is opened and allows finer control than the NRV. c – the capacity of a MSTV B/P is much less than that of a MSTV. d – the capacity of a NRV bypass is much less than that of a NRV.	Distractors incorrect: b – actuator is motor-operated, not air-operated. c – the MSTV is **not** opened. d – the NRV is **not** opened.
K/A: E13-EK2.1	Objective: 11256	Source: New
Reference: 1-FR-H.2, CDB for Obj 11256	Level: Knowledge	

QUESTION: 31 (1.0)

With unit 1 at 100% power, the RO takes the following data from the power range NIs.

Detector	N-41	N-42	N-43	N-44
Upper	179	181	193	inoperable
Lower	206	186	226	inoperable

Using the references provided, determine which ONE of the following is correct.

a. QPTR is 1.0113, N-41 upper.

b. QPTR is 1.0115, N-41 lower.

c. QPTR is 1.0158, N-43 upper.

d. QPTR cannot be calculated with one power-range NI inoperable.

ANSWER: c

Answer correct: per attached calculation, 1-PT-23.	Distractors plausible: a – per calculation, this is the value for N-41 upper; various math and/or transposition errors could lead to this conclusion. b – per calculation, this is the value for N-41 lower; various math and/or transposition errors could lead to this conclusion. d – the attachment for hand calculation doesn't mention that QPTR can be calculated using three operable power-range channels, this could be a logical conclusion, since one quadrant cannot be monitored.	Distractors incorrect: a & b – per attached calculation, QPTR is 1.0158 on N-43 upper; with one inoperable power-range NI. d – QPTR can still be determined using the three operable channels.
K/A: 001-A3.04	Objective: 10320	Source: New
Reference: 1-PT-23, Reactor data book	Level: Comprehension	

QUESTION: 32 (1.0)

Given the following plant conditions:

- Unit 1 is at 28% power.
- Annunciator 1C-G7, RCP 1A-B-C SEAL LEAK HI FLOW, has just alarmed.
- "C" RCP no. 1 seal leak-off flow is indicating 6 gpm.

What actions are required?

a. 1) Stop "C" RCP.
2) Verify "C" loop flow decreases to zero.
3) Close "C" RCP seal leak-off valve.

b. 1) Go to 1-E-0, Reactor trip or Safety Injection, while continuing with AP-33.1
2) When the reactor is tripped, then close "C" RCP seal leak-off valve
3) Stop "C" RCP and verify ≤5 minutes have passed since seal failure occurred.

c. 1) Monitor RCP pump radial temperature and seal water return temperature.
2) Initiate unit shutdown to allow stopping "C" RCP within 1 hour.
3) When the unit is in mode 3, then stop "C" RCP.
4) Close "C" RCP seal leak-off valve.

d. 1) Go to 1-E-0, Reactor Trip or Safety Injection, while continuing with AP-33.1
2) When the reactor is tripped, then stop "C" RCP
3) Verify "C" loop flow decreases to zero
4) Close "C" RCP seal leak-off valve.

ANSWER: d

Answer correct: per 1-AP-33.1, this is the correct sequence of actions.	Distractors plausible: a – with Rx power less than 30% (P-8) reactor will not **automatically** trip on single loop loss of flow. b – actions are correct, just not in the correct sequence. c – candidate misconception regarding no. 1 seal failure indications, these actions would be correct for less catastrophic seal problems.	Distractors incorrect: a – the facility license does not allow reactor operation with less than 3 Rx coolant loops in service. b – the RCP must be stopped before closing the seal leak-off valve. c – these actions are inappropriate for the conditions stated (e.g. – catastrophic failure of no. 1 seal).
K/A: 003-A1.09	Objective: 11101	Source: New
Reference: 1-AP-33.1, CDB for Obj 11101	Level: Comprehension	

QUESTION: 33 (1.0)

An electrical disturbance on the grid causes both units to trip from 100% power. Offsite power is **NOT** lost, but the "B" RSST feeder breaker trips open.

Which ONE of the following describes the status of unit 1 and unit 2 reactor coolant pumps?

a. All RCPs running.

b. All RCPs running except unit 1 "B".

c. All RCPs running except unit 2 "B".

d. All RCPs running except unit 1 "B" and unit 2 "B".

ANSWER: c

Answer correct: unit 1 generator has an output breaker that trips and allows unit 1 SS busses to backfeed via the main transformers; unit 2 generator trips via switchyard breakers and SS busses rely on RSSTs for power; for the stated conditions, unit 1 SS busses will all be energized; unit 2 "B" SS bus will be de-energized, unit 2 "A" and "C" SS busses will remain energized.	Distractors plausible: All – candidate misconception regarding operation of the SS electrical system following loss of RSST.	Distractors wrong: All – unit 1 generator has an output breaker that trips and allows unit 1 SS busses to backfeed via the main transformers; unit 2 generator trips via switchyard breakers and SS busses rely on RSSTs for power; for the stated conditions, unit 1 SS busses will all be energized; unit 2 "B" SS bus will be de-energized, unit 2 "A" and "C" SS busses will remain energized.
K/A: 003-K2.01	Objective: 7346	Source: New
Reference: NAPS electrical power distribution drawing (included with SRO item #4); CDB for Obj 7346.	Level: Comprehension	

QUESTION: 34 (1.0)

The team is performing a normal RCS cooldown and depressurization for refueling. Which ONE of the following correctly states the actions required to maintain seal injection flow constant during RCS depressurization?

a. Throttle **open** seal injection supply 1-CH-MOV-1370.

b. Throttle **closed** seal injection supply 1-CH-MOV-1370.

c. Throttle **open** seal injection needle valves.

d. Throttle **closed** seal injection needle valves.

ANSWER: d

Answer correct: As RCS pressure decreases, RCP seal injection flow will increase and needle valves will be throttled closed to maintain flow constant.	Distractors plausible: a & c – candidate misconception regarding effects of RCS pressure decrease on seal injection flow. a & b – 1-CH-MOV-1370 **could** be used to control seal injection flow; some MOVs at the station are throttleable.	Distractors wrong: a & b – 1-CH-MOV-1370 is not throttleable and is not normally used to control seal injection flow. a & c – seal injection will need to be reduced, not increased.
K/A: 004-A1.03	Objective: 358	Source: New
Reference: 1-OP-3.2	Level: Comprehension	

QUESTION: 35 (1.0)

With unit 1 at 100% power, a partial phase "A" containment isolation signal results in closure of letdown isolation valve 1-CH-TV-1204A. No other valves or components are affected by the signal.

Which ONE of the following is correct concerning the affect of this on letdown?

a. Letdown flow indication goes to zero; actual flow continues to the **PRT**.

b. Letdown flow indication goes to zero; actual flow continues to the **PDTT**.

c. Letdown flow indication fluctuates as the relief valve lifts; actual flow continues to the **PRT**.

d. Letdown flow indication fluctuates as the relief valve lifts; actual flow continues to the **PDTT**.

ANSWER: a

Answer correct: letdown flow transmitter is downstream of containment isolation trip valves; relief valve is upstream of trip valve TV-1204A; relief valve lifts at 600 psig and discharges to PRT.	Distractors plausible: b & d – candidate misconception concerning discharge flow path of the letdown relief valve. c & d – candidate misconception concerning the location of the letdown flow transmitter in the flow path.	Distractors wrong: b & d – letdown relief valve discharges to the PRT, not the PDTT. c & d – letdown flow transmitter is downstream of the containment isolation trip valves; indicated flow will be zero.
K/A: 004-A2.12	Objective: 807	Source: Bank item #1696 (modified)
Reference: 11715-FM-95C sheet 1; 11715-FM-95A sheet 4; CDB for Obj 807.	Level: Comprehension	

QUESTION: 36 (1.0)

Following a LOCA with core damage the following conditions were determined to have existed:

- One train of ESF equipment failed to operate.
- Maximum clad temperature reached 2175°F.
- Cladding oxidation was 15% of original cladding thickness.
- Hydrogen generation from zirc-water reaction was 3%.

Which ONE of the following correctly states the 10CFR50.46 ECCS acceptance criterion that was exceeded?

a. Clad temperature.

b. Clad oxidation.

c. Hydrogen generation.

d. ESF equipment availability.

ANSWER: c

Answer correct: maximum allowed hydrogen generation from zirc-water reaction is 1%.	Distractors plausible: a – a limit does exist on clad temperature. b – a limit does exist on clad oxidation. d – candidate misconception regarding the accident analysis assumptions for ESF equipment availability.	Distractors wrong: a – clad temperature limit is 2200°F. b – clad oxidation limit is 17%. d – one train of ESF equipment is assumed inoperable in the accident analysis.
K/A: 013-K3.01	Objective: 3881	Source: New
Reference: 10CFR50.46; CDB for Obj 3881.	Level: Knowledge	

QUESTION: 37 (1.0)

Which ONE of the following identifies the maximum indicated power level that does not exceed the maximum power level allowed by the facility license?

a. 100%

b. 103%

c. 109%

d. 110%

ANSWER: a

Answer correct: license specifies limit of 2893 MWth, which equates to 100% power, per heat balance calorimetric.	Distractors plausible: b – P.R. high flux rod stop setpoint. c – P.R. high flux reactor trip setpoint. d – maximum allowable value for P.R. high flux trip setpoint.	Distractors wrong: All – license specifies limit of 2893 MWth, which equates to 100% power per heat balance calorimetric.
K/A: 015/GEN-2.1.10	Objective: 13856	Source: New
Reference: Facility license; 1-PT-24.1; TS-2.2.1; 1-AR-A-D8	Level: Knowledge	

QUESTION: 38 (1.0)

Which ONE of the following correctly lists the instrument inputs that are used by the ICCM to calculate subcooling margin?

a. PRZR pressure and RCS wide-range T_{hot}.

b. PRZR pressure and core-exit thermocouples.

c. RCS wide-range pressure and core-exit thermocouples.

d. RCS wide-range pressure and RCS wide-range T_{hot}.

ANSWER: c

Answer correct: subcooled margin monitor uses RCS wide-range pressure and core-exit thermocouples to calculate subcooling.	Distractors plausible: a & b – candidate misconception concerning the pressure input to the subcooled margin monitor. a & d – candidate misconception concerning the temperature input to the subcooled margin monitor.	Distractors wrong: a & b – RCS wide-range pressure is used vs. PRZR pressure. a & d – core-exit thermocouples are used vs. wide-range T_{hot}.
K/A: 017-K4.01	Objective: 7739	Source: New
Reference: NCRODP-64-LP-1	Level: Knowledge	

QUESTION: 39 (1.0)

Unit 1 is at 100% power with no equipment out of service and all three containment air recirculation fans (CARFs) running and "C" CARF powered from "H" bus.

If a spurious train "B" CDA occurs, what will be the **immediate** affects on the CARFs?

a. All three CARFs trip.

b. "A" and "B" trip, "C" continues to run.

c. "B" trips, "A" and "C" continue to run.

d. "B" and "C" trip, "A" continues to run.

ANSWER: c

Answer correct: "B" CARF is the only "J" bus powered fan; train "B" CDA only trips fans powered from "J" bus.	Distractors plausible: a – certain RPS/ESF actuations are such that one train performs the actuation and the other train does not (example – all three MFW isolation MOVs close on **train "A"** SI only). b &d – candidate misconception concerning which fans are affected by train "B" CDA.	Distractors incorrect: All – "B" CARF is the only "J" bus powered fan; train "B" CDA only trips fans powered from "J" bus.
K/A: 022-A3.01	Objective: 4478	Source: New
Reference: 1-OP-21.1, 11715-ESK-6B, 6C, 6D	Level: Knowledge	

QUESTION: 40 (1.0)

Unit 1 is operating at 100% power when the RO notices that main feedwater pump suction pressure suddenly decreased and stabilized at the lower pressure. Which ONE of the following could have caused this?

a. Condensate recirc 1-CN-FCV-107 failed open.

b. Powdex bypass 1-CP-HCV-101 failed open.

c. Hotwell high-level divert 1-CN-LCV-108 failed open.

d. "A" HP heater drain tank normal level control 1-SD-LCV-106A failed open.

ANSWER: a

Answer correct: condensate recirc diverts water from condensate discharge header back to the condenser and significantly reduces the amount of flow supplied to the suction of the MFW pumps.	Distractors plausible: b – correct if powdex bypass failed closed. c – correct if high-level divert is unisolated. d – correct if LCV failed closed.	Distractors wrong: b – powdex bypass failing open increases FW pump suction pressure. c – high-level divert is manually isolated during normal plant operation. d – HP heater drain tank NLC valve failing open increases FW pump suction pressure.
K/A: 056-K1.03	Objective: 11989	Source: New
Reference: 11715-FM-73A	Level: Comprehension	

QUESTION: 41 (1.0)

Unit 1 is at 75% power with "B" main feedwater (MFW) pump tagged out. The "C" MFW pump trips. Which ONE of the following correctly describes the plant response? Assume no operator actions are taken.

a. MFRVs modulate open and maintain S/G levels.

b. MFRVs fully open, but S/G levels continue to decrease.

c. MFRVs and bypass valves modulate open and maintain S/G levels.

d. MFRVs and bypass valves fully open, but S/G levels continue to decrease.

ANSWER: b

Answer correct: with a single MFW pump supplying S/G feed flow, pump runout will occur; for the stated conditions, MFRVs will fully open and flow will be inadequate to maintain S/G levels (verified on simulator.)	Distractors plausible: a & c – candidate misconception concerning MFW pump capability. c & d – MFRVs will modulate fully open. d – S/G levels will continue to decrease.	Distractors wrong: a & c – S/G levels will decrease. c & d – bypass valves will not open.
K/A: 059-K3.03	Objective: 11989	Source: New
Reference: CDBs for Obj 14377 and Obj 8816.	Level: Comprehension	

QUESTION: 42 (1.0)

With AFW in service to supply S/G feedwater, ECST level suddenly begins to decrease rapidly due to a rupture in the tank.

Which ONE of the following water sources should be aligned to supply AFW pump suction?

a. **Standby** 300,000-gallon condensate storage tank.

b. **In-service** 300,000-gallon condensate storage tank.

c. Fire Protection System using **diesel-driven** pump 1-FP-P-2.

d. Fire Protection System using **motor-driven** pump 1-FP-P-1.

ANSWER: d

Answer correct: Fire protection using lake water is the preferred source; 1-FP-P-1 takes suction on the lake.	Distractors plausible: a & b – candidate misconception concerning piping configuration for CST supply to AFW system. c – fire protection system is the preferred alternate suction source.	Distractors wrong: a & b – CST cannot be aligned to supply suction directly to the AFW pumps, only to makeup to the ECST; since the ECST is ruptured, this is not an option. c – diesel-driven pump takes suction from the service water reservoir.
K/A: 061-K1.07	Objective: 5971	Source: New
Reference: 1-AR-F-E8; 1-AP-22.5; 1-OP-31.2.	Level: Comprehension	

QUESTION: 43 (1.0)

A loss of offsite power occurs with unit 1 at 100% power. Which ONE of the following correctly describes the response of the **motor-driven** AFW pumps?

a. Pumps will auto-start with **no time delay** when emergency bus voltage is restored.

b. Pumps will auto-start **20 seconds** after emergency bus voltage is restored.

c. Pumps will auto-start **25 seconds** after emergency bus voltage is restored.

d. Pumps will auto-start **27 seconds** after emergency bus voltage is restored.

ANSWER: a

Answer correct: start permissive for auto-start of motor-driven AFW pumps does not include a time delay if SI has not actuated; for the stated conditions, three auto-start signals will be active as soon as emergency bus UV clears (loss of RSS, loss of MFW and low-low S/G level.)	Distractors plausible: b – a 20-second time delay is applicable for SI auto-start. c – a 25-second time delay is applicable for SI auto-start with simultaneous emergency bus UV. d – a 27-second time delay is applicable for AMSAC auto-start.	Distractors wrong: All - start permissive for auto-start of motor-driven AFW pumps does not include a time delay if SI has not actuated; for the stated conditions, three auto-start signals will be active as soon as emergency bus UV clears (loss of RSS, loss of MFW and low-low S/G level.)
K/A: 061-K4.06	Objective: 6035	Source: New
Reference: NCRODP-26B-LP-1; 11715-ESK-5AA & 3A; 11715-FE-21T.	Level: Comprehension	

QUESTION: 44 (1.0)

A waste gas decay tank (WGDT) release is in progress. Which ONE of the following will cause an automatic termination of the release?

a. Waste gas analyzer 1-GW-O2H2-102 fails high.

b. Process vent rad monitor 1-RI-VG-178-1 fails high.

c. WGDT outlet flow transmitter 1-GW-FT-101 fails low.

d. Vent stack "B" rad monitor 1-RM-VG-113 fails high.

ANSWER: b

Answer correct: process vent rad monitor high-high condition will automatically close FCV-101.	Distractors plausible: a – candidate misconception concerning automatic closures of FCV-101. c – candidate misconception regarding automatic operation of the controller for FCV-101. d – candidate misconception concerning automatic closures of FCV-101.	Distractors wrong: a – waste gas analyzer does not input to FCV-101. c – if flow transmitter fails low, the controller will modulate FCV-101 open to increase the release rate. d – vent stack "B" rad monitor does not input to FCV-101.
K/A: 071-A2.02	Objective: 4327	Source: New
Reference: 11715-ESK-6PZ; 11715-FM-97B sheet 1.	Level: Knowledge	

QUESTION: 45 (1.0)

Refueling is in progress on unit 2. Containment purge is in service on **both** units. A high-high alarm locks in on the unit 2 manipulator crane area radiation monitor. Which ONE of the following is correct concerning the effects of this on containment purge?

a. **Both units'** purge supply and exhaust valves close; all purge supply and exhaust fans stop; when the valves are all closed, the fans automatically re-start.

b. **Both units'** purge supply and exhaust valves close; all purge supply and exhaust fans stop and will not re-start until the radiation monitor alarm is reset.

c. **Only the unit 2** purge supply and exhaust valves close; all purge supply and exhaust fans stop; when the unit 2 valves are closed, the fans automatically re-start.

d. **Only the unit 2** purge supply and exhaust valves close; all purge supply and exhaust fans stop and will not re-start until the radiation monitor alarm is reset.

ANSWER: c

Answer correct: only the affected unit's isolation valves close when a manipulator crane area R/M high-high alarm is received; all supply and exhaust fans will stop until the affected unit's isolation valves are closed, then fans will re-start.	Distractors plausible: All – misconception concerning the affects of a manipulator crane high-high radiation alarm on containment purge operation.	Distractors wrong: a & b – only the affected unit's valves will close. b & d – radiation monitor alarm does not have to be reset for fans to re-start.-
K/A: 072-K4.01	Objective: 4600	Source: Bank item #2906
Reference: 11715-ESK-6KE, 6KF, 6CH, 6CJ; NCRODP-47-LP-1.	Level: Knowledge	

QUESTION: 46 (1.0)

The charging pumps are in the following configuration:

- 1-CH-P-1A – auto-standby
- 1-CH-P-1B – auto-standby
- 1-CH-P-1C – running on the "H" bus (15H7)

Which ONE of the following will cause the running charging pump breaker to trip OPEN?

a. Low suction pressure.

b. Safety injection.

c. "H" bus undervoltage.

d. "J" bus undervoltage.

ANSWER: b

Answer correct: SI signal will start the "A" and "B" charging pumps; this results in a trip signal to "C" charging pump due to breakers 15H6 and 15J6 both closed.	Distractors plausible: a – low suction pressure will trip many pumps at the station. c & d – undervoltage on the associated power supply bus trips most pumps at the station.	Distractors incorrect: a – low suction pressure will not trip a charging pump. c & d – charging pumps "ride" the bus on undervoltage.
K/A: 006-A3.05	Objective: 347	Source: Bank item #1188
Reference: 11715-ESK-5AN, 5AL; CDB for Obj 347	Level: Comprehension	

QUESTION: 47 (1.0)

Given the following plant conditions:

- A spurious safety injection occurred with unit 1 at 100% power.
- SI has been terminated, and charging and letdown are in service.
- RCS pressure is stable at 2235 psig, solid plant pressure control.
- PRZR water temperature is 590°F.

Using the steam tables provided, determine the pressure at which the RCS would stabilize if a PRZR bubble were drawn at the current plant conditions.

a. 1417 psig.

b. 1432 psig.

c. 1438 psig.

d. 1453 psig.

ANSWER: a

Answer correct: at 590°F in PRZR, drawing a bubble would result in RCS pressure decreasing to P_{SAT} for 590°F; using steam tables (extrapolating between 588°F and 592°F) = 1431.65 psia – 14.696 = 1416.95 psig	Distractors plausible: b – failure to convert to psig. c – failure to extrapolate (use value for 592°F.) d – failure to extrapolate and failure to convert to psig.	Distractors incorrect: b – per "answer correct" description, there is only one correct answer.
K/A: 010-K5.01	Objective: NCRODP-90E-LP-5, objective "E"	Source: New
Reference: Steam tables	Level: Comprehension	

QUESTION: 48 (1.0)

During the initial RCP start following RCS fill and vent, you are assigned to operate letdown pressure controller 1-CH-PCV-1145. After the RCP is started, you notice RCS pressure decreasing.

Which ONE of the following correctly describes how you should restore pressure?

a. Place PCV-1145 in MANUAL and **decrease** demand on the controller.

b. Place PCV-1145 in MANUAL and **increase** demand on the controller.

c. Leave PCV-1145 in AUTO and rotate the potentiometer clockwise.

d. Leave PCV-1145 in AUTO and rotate the potentiometer counterclockwise.

ANSWER: c

Answer correct: per 1-OP-5.2, letdown pressure controller should be allowed to respond in AUTOMATIC; potentiometer should be adjusted clockwise to raise pressure (parameter-controlling, increasing setpoint will close the valve and raise pressure).	Distractors plausible: a & b – taking MANUAL control to "assist" plant process controllers is acceptable in many cases. b & d – misconception concerning operation of PCV.	Distractors incorrect: a & b – previous experience has shown that PCV-1145 is capable of responding quicker to pressure transients if left in AUTO and adjusted with potentiometer. b & d – objective is to decrease demand on controller to close valve and raise pressure.
K/A: 011-A4.05	Objective: 556	Source: New
Reference: 1-OP-5.2	Level: Comprehension	

QUESTION: 49 (1.0)

With unit 1 at 20% power, a loss of vital bus 1-I occurred. Before any operator actions could be taken, a spurious safety injection occurred.

How will the Safety Injection System respond?

a. **All** train "A" **and** train "B" components will actuate.

b. Train "B" components **only** will actuate.

c. Train "A" components **only** will actuate.

d. **Neither** train "A" **nor** train "B" components will actuate.

ANSWER: b

Answer correct: Vital bus 1-I supplies power to train "A" slave relays, therefore only the train "B" components will actuate.	Distractors plausible: All – candidate misconception concerning the power supply to SI slave relays.	Distractors incorrect: All – train "B" components **only** will actuate.
K/A: 012-K2.01	Objective: 8963	Source: New
Reference: NCRODP-77A-LP-2; CDB for Obj 8963	Level: Knowledge	

QUESTION: 50 (1.0)

Given the following plant conditions:

- All control rods are fully withdrawn.
- A failure in the rod control system causes "D" bank rods to step outward.
- The RO notes the failure and places rod control in MANUAL.
- Group step counters for "D" bank indicate 243 steps.
- IRPIs for "D" bank rods indicate (on the average) 230 steps.

Which ONE of the following is correct concerning the disparity between the group step counters and the IRPIs?

a. This is expected; the IRPIs should eventually drift up to indicate approximately 243 steps.

b. This is expected; the IRPIs should continue to indicate approximately 230 steps.

c. This is **not** expected; the IRPIs should have tracked with the group step counters; they are **still operable** per TS-3.1.3.2.

d. This is **not** expected; the IRPIs should have tracked with the group step counters; they are **inoperable** per TS-3.1.3.2.

ANSWER: b

Answer correct: rods are physically incapable of being withdrawn beyond 230 steps; if demanded, the CRDMs will withdraw the rods to 230 steps, then ratchet as long as demanded (presumably without dropping the affected rods).	Distractors plausible: a – IRPIs are known to lag the group step demand counters somewhat, and also to drift up and down. c – IRPIs should track the group step counters, albeit with some lag possible. d – if IRPIs differ from group step counters >13 steps, they are inoperable per TS-3.1.3.2.	Distractors incorrect: a – since rods are physically at 230 steps, IRPIs should remain at or near 230 steps. c & d – the disparity IS expected, since rods are physically at 230 steps.
K/A: 014-K5.01	Objective: 6542	Source: New
Reference: NCRODP-65-LP-1	Level: Comprehension	

QUESTION: 51 (1.0)

Given the following plant conditions:

- Unit 1 is at 100% power.
- An I & C technician inadvertently isolates and vents the “A” condenser pressure transmitter 1-CN-PT-101A.

Which ONE of the following is correct concerning the affects of this?

a. Trip signal to main turbine and loss of condenser steam dump capability; no affect on “A” condenser pressure recorder indication.

b. Loss of “A” condenser pressure recorder indication; no affect on main turbine or condenser steam dump capability.

c. Trip signal to main turbine and loss of “A” condenser pressure recorder indication; no affect on condenser steam dump capability.

d. Loss of condenser steam dump capability and loss of “A” condenser pressure recorder indication; no affect on main turbine.

ANSWER: d

Answer correct: per loop diagram, “A” condenser pressure transmitter supplies a signal to condenser steam dumps and control room recorder; no turbine trip directly from condenser pressure.	Distractors plausible: All – candidate misconception concerning condenser pressure instruments’ outputs.	Distractors incorrect: a – no turbine trip signal; pressure recorder input is lost. b – condenser steam dump capability is lost. c – no turbine trip signal; condenser steam dump capability is lost.
K/A: 016-A2.03	Objective: 8867	Source: New
Reference: Instrument loops CN-030 and CN-031	Level: Knowledge	

QUESTION: 52 (1.0)

With unit 1 at 100% power a spurious CDA occurs. Which ONE of the following identifies the effect on indicated partial pressure?

a. The indication will remain unchanged.

b. The indication is invalid.

c. The indication will fail **high**.

d. The indication will fail **low**.

ANSWER: b

Answer correct: CDA actuates phase "B" containment isolation, which results in loss of chilled water flow; this renders the partial pressure calculation inoperable; per 1-AP-35, the partial pressure indicators are declared inoperable.	Distractors plausible: All – candidate misconception concerning the effects of CDA on the CARFs and partial pressure indication.	Distractors wrong: a – indication will increase as a result of loss of chilled water flow. c & d – partial pressure indicators do not fail high **or** low as a result of loss of chilled water flow.
K/A: 026-K3.01	Objective:	Source: New
Reference: 1-AP-35; NCRODP-58-LP-1	Level: Comprehension	

QUESTION: 53 (1.0)

Given the following plant conditions:

- Unit startup is in progress, just prior to placing the unit on-line.
- All control systems are in AUTOMATIC and aligned per startup procedures.
- "C" S/G level channel III fails low.

Assuming no operator action, which ONE of the following is correct?

a. "C" FRV bypass valve closes and "C" S/G level decreases.

b. "C" FRV closes and "C" S/G level decreases.

c. "C" FRV bypass valve opens and "C" S/G level increases.

d. "C" FRV opens and "C" S/G level increases.

ANSWER: c

Answer correct: FRV bypass valves are in service to control S/G levels until power is ≥15% during a startup, then control is transferred to the FRVs.	Distractors plausible: a & b – candidate misconception concerning the effects of a level channel failure and equipment alignment during startup. d – candidate misconception concerning the sequence of events and equipment alignment during a startup.	Distractors incorrect: a & b – control valve that is in AUTO will open in response to level channel III failing low. d – FRVs are not placed in service until power is ≥15% during a startup.
K/A: 035-K6.03	Objective: 8818	Source: Bank item #776 (modified)
Reference: 1-OP-2.1; Instrument loop diagrams FW-110 and 111; CDB for Obj 8818	Level: Comprehension	

QUESTION: 54 (1.0)

Given the following plant conditions:

- Unit 1 generator output breaker has just been closed following a reactor startup.
- All control systems are in AUTOMATIC and aligned per startup procedures.
- "A" train of steam dumps is isolated to repair 1-MS-TCV-1408A, which is de-energized and tagged out.
- Main steam line pressure transmitter PT-464 fails high.

Which ONE of the following correctly describes the plant response?

a. All steam dumps remain closed.

b. All steam dumps (except "A") fully open and RCS cooldown stops at 543°F.

c. All steam dumps (except "A") fully open and uncontrolled RCS cooldown condition continues until MSTVs are closed.

d. All steam dumps (except "A") fully open and safety injection occurs when RCS T_{ave} decreases to <543°F.

ANSWER: b

Answer correct: all steam dumps (except "A") open, but only the train "B" valves will be flowing, cooldown continues until all steam dumps close due to P-12 interlock (RCS T_{ave} <543°F).	Distractors plausible: a – candidate misconception concerning operation of steam dumps in steam pressure mode. c & d – all steam dumps (except "A") will open.	Distractors incorrect: a – only "A" steam dump will remain closed. c – cooldown only continues until RCS T_{ave} decreases to <543°F. d – SI will not occur, since only one train of steam dumps is aligned to MS header, only appx. 20% RTP steam flow (SI setpoint is 40% for stated conditions.)
K/A: 039-A2.04	Objective: 10240	Source: New
Reference: NCRODP-23B-LP-1; NA-DW-5655D33, sheet 10; CDB for Obj 10240	Level: Comprehension	

QUESTION: 55 (1.0)

Given the following plant conditions:

- 1H EDG is carrying 1H emergency bus.
- The team is about to transfer 1H bus back to its normal source.
- The diesel operator places the 15H11 synchronizing switch ON.
- The synchroscope begins rotating **very fast** in the **slow** direction (counterclockwise).

Which ONE of the following correctly describes how the 1H EDG speed needs to be adjusted in order to obtain proper synchroscope rotation?

a. **Decrease** speed until synchroscope rotates slowly in the **slow** direction.

b. **Decrease** speed until synchroscope rotates slowly in the **fast** direction.

c. **Increase** speed until synchroscope rotates slowly in the **slow** direction.

d. **Increase** speed until synchroscope rotates slowly in the **fast** direction.

ANSWER: d

Answer correct: EDG speed droop is NOT in service when the EDG is carrying the bus by itself; when preparing to parallel the EDG, speed droop is placed in service when the associated synch switch is turned on; this causes the EDG speed to slow and the synch scope rotates fast in the slow direction; EDG speed must be increased such that it is slightly "faster" than the source it is being paralleled to.	Distractors plausible: all – candidate misconception regarding operation of the EDG speed droop, speed control and synch circuit.	Distractors incorrect: a & b – EDG speed must be increased; c – synch scope must be rotating slowly in the fast direction.
K/A: 062-A4.03	Objective: 6305	Source: New
Reference: 1-OP-6.1; CDB for Obj 6305	Level: Comprehension	

QUESTION: 56 (1.0)

Station battery 1-I capacity is 1800 amp-hours at a given rate of discharge.

Which ONE of the following correctly describes how the battery capacity is affected by the rate of discharge?

a. If the discharge rate increases, the battery capacity decreases.

b. If the discharge rate increases, the battery capacity increases.

c. If the discharge rate increases, the battery capacity remains constant.

d. If the discharge rate decreases, the battery capacity remains constant.

ANSWER: a

Answer correct: battery capacity decreases as discharge rate increases.	Distractors plausible: All – candidate misconception concerning battery capacity and discharge rates.	Distractors incorrect: b & c – battery capacity decreases as discharge rate increases. d – battery capacity increases as discharge rate decreases.
K/A: 063-A1.01	Objective: 5522	Source: New
Reference: NCRODP-35-LP-1	Level: Knowledge	

QUESTION: 57 (1.0)

Given the following plant conditions:

- 1H EDG is loaded to 3000 KW.
- "A" underground fuel oil storage tank is isolated and drained for cleaning.
- Fuel oil transfer pump 1-EG-P-1HB failed to start.
- 1H EDG day tank is at the Tech Spec minimum volume of 450 gallons.

Unless the team takes action, 1H EDG will run out of fuel oil in approximately __________.

a. 30 minutes

b. one hour

c. six hours

d. eight hours

ANSWER: b

Answer correct: per UFSAR, day tank has a minimum capacity to enable the diesel to run for one hour.	Distractors plausible: all – misconception concerning the capacity of the day tank.	Distractors incorrect: per UFSAR, day tank has a minimum capacity to enable the diesel to run for one hour.
K/A: 064-K6.08	Objective: 6307	Source: New
Reference: TS-3.8.1.1; UFSAR	Level: Knowledge	

QUESTION: 58 (1.0)

Which ONE of the following correctly explains why the N-16 main steam radiation monitors' indications are **NOT** used below 20% reactor power?

a. The power-range NI input to the N-16 monitors is unreliable.

b. The N-16 monitors' indications are excessively conservative.

c. The neutron flux is insufficient to produce representative amounts of N-16.

d. Steam flow is so low that all of the N-16 decays prior to reaching the detectors.

ANSWER: c

Answer correct: below 20% power, the neutron flux is insufficient to produce enough N-16 to provide an accurate indication of tube leakage.	Distractors plausible: a – some process parameters indications are unreliable when in the low end of the span. b – N-16 monitors do indicate slightly conservative below 50% power. d –steam flow is much lower at low power and N-16 decay is a function of time following production.	Distractors incorrect: a – power-range NI input is reliable for the full span of indication. b – N-16 monitors' indications are non-conservative below 20% power. d – even if the steam flow at 20% power were high enough to transport the N-16 to the detectors, insufficient N-16 is produced to provide an accurate indication of tube leakage.
K/A: 073-K1.01	Objective: 5264	Source: Bank item #1339 (modified)
Reference: NCRODP-46-LP-1; 1-AP-5	Level: Knowledge	

QUESTION: 59 (1.0)

Given the following plant conditions:

- All unit 1 circulating water pumps are running unthrottled.
- "C" CW pump trips on electrical fault.
- "C" CW pump discharge MOV thermal O/L actuates just as the valve begins to run closed.

Flow **through the running CW pumps** __________.

a. increases

b. decreases

c. remains the same

d. initially decreases, then increases

ANSWER: a

Answer correct: CW pumps have no check valve; the running CW pumps will see decreased system resistance to flow (due to backflow through the tripped pump) as the tripped pump coasts to a stop; flow through each running pump will increase.	Distractors plausible: All – candidate misconception concerning the dynamics of a fluid system.	Distractors incorrect: All - CW pumps have no check valve; the running CW pumps will see decreased system resistance to flow as the tripped pump coasts to a stop; flow through each running pump will increase.
K/A: 075-A2.02	Objective: 7458	Source: New
Reference: 1-OP-48.2; CDB for Obj 7458	Level: Comprehension	

QUESTION: 60 (1.0)

North Anna reservoir level rises to 251 ft. due to heavy rain. In response, Operations places the 1G/2G BUS FAST TRANSFER 15G10 switch in DEFEAT.

What is the basis for this action?

a. Prevent flooding in the emergency switchgear.

b. Prevent damage to CW pump-motor couplings.

c. Protect the RSSTs from overload.

d. Prevent damage to the intake tunnel.

ANSWER: d

Answer correct: prior to fast transfer, bus voltage and frequency could decrease significantly; CW pump speed would decrease as well; if the bus were re-energized, CW pump speed would increase rapidly and the resulting pressure surge could damage the intake tunnel.	Distractors plausible: a – damage to the intake tunnel could cause flooding in the yard. b – fast transfer would place additional stress on the pump-motor coupling. c – fast transfer results in both "G" busses supplied from a single RSST.	Distractors incorrect: a – a floodwall exists to prevent flooding in the emergency switchgear if turbine building flooding occurs. b – pump-motor coupling is designed to withstand the stress of fast transfer. c – a single RSST is capable of supplying both "G" busses.
K/A: 075/GEN-2.1.32	Objective: 7492	Source: New
Reference: 1-OP-48.2; NCRODP-12-LP-1	Level: Knowledge	

QUESTION: 61 (1.0)

A failure of the in-service instrument air dryer in the Auxiliary Building caused instrument air pressure to decrease. The running IA compressor loaded fully and the standby IA compressor started and loaded, but IA pressure continued to decrease.

Which ONE of the following is correct concerning the affects of this on the service air to instrument air PCVs and service air pressure?

a. SA to IA PCVs are **manually isolated**, SA pressure is not affected.

b. SA to IA PCVs are **failed closed**, SA pressure is not affected.

c. SA to IA PCVs are **failed open**, SA pressure initially decreases,

d. SA to IA PCVs **modulate open**, SA pressure initially decreases.

ANSWER: c

Answer correct: service air provides backup to instrument air compressors via PCVs, which were failed open per design change; when demand for IA increases, SA pressure initially decreases (until SA compressors load/start.)	Distractors plausible: a & b – candidate misconception concerning status of SA to IA backup PCVs. d – prior to design change, PCVs modulated open in accordance with controller input.	Distractors incorrect: a – SA to IA PCVs are not manually isolated; SA pressure initially decreases. b – SA to IA PCVs are not failed closed; SA pressure initially decreases. d – SA to IA PCVs no longer modulate, they are failed open.
K/A: 079-A4.01	Objective: 11973	Source: New
Reference: 11715-FM-82B, sheets 1 & 2; NCRODP-17-LP-1	Level: Comprehension	

QUESTION: 62 (1.0)

Per 0-FCA-1, Control Room Fire, the RO verifies either “A” or “C” (normal) charging pump is running.

Why is it preferred for “A” or “C” (normal) to be running?

a. “A” and “C” (normal) have no auto-start features.

b. “B” and “C” (alternate) have no controls in the auxiliary shutdown panel.

c. “J” EDG is capable of being isolated from the MCR, but not locally controlled.

d. “H” EDG is capable of being isolated from the MCR and locally controlled.

ANSWER: d

Answer correct: “H” train is protected for App-R fire scenarios; “H” EDG has MCR isolation and local control capability.	Distractors plausible: a – “C” (normal) and “C” (alternate) has no auto-start features. b – not all equipment is provided with auxiliary shutdown panel controls, “H” train components **are** preferred for App-R fire scenarios. c – “J” EDG **is** capable of local start/stop and speed/voltage control.	Distractors incorrect: a – “A” pump has auto-start features. b – all charging pumps have controls in the auxiliary shutdown panel. c – “J” EDG is not capable of being isolated from the MCR.
K/A: 086/GEN-2.4.27	Objective: 13903	Source: New
Reference: 0-FCA-1; CDB for Obj 13903	Level: Knowledge	

QUESTION: 63 (1.0)

Given the following plant conditions:

- Unit 1 RHR system is being warmed up.
- PRZR level is at 28% with charging flow control in MANUAL.
- The "A" RHR heat exchanger develops a 10 gpm tube leak.
- Heat exchanger bypass flow controller FCV-1605 is in AUTOMATIC.

Which ONE of the following is correct concerning the indications you would expect for this condition?

a. CC head tank level decreases.

b. PRZR level decreases.

c. Indicated RHR flow increases.

d. RHR pump amps decrease.

ANSWER: b

Answer correct: RHR pump discharge pressure is greater than the pressure of CC in the RHR H/X; a tube leak will result in RHR flow into the CC system; PRZR level will decrease and CC head tank level will increase.	Distractors plausible: a – CC pump discharge pressure is nearly as high as RHR pump discharge pressure. c – tube leak provides an additional flow path for RHR system flow. d – FCV-1605 will close to maintain a constant flow rate.	Distractors wrong: a – RHR pump discharge pressure is greater than the pressure of CC in the RHR H/X; a tube leak will result in RHR flow into the CC system; CC head tank level will increase. c – FCV-1605 will modulate to maintain indicated RHR flow constant. d – RHR pump amps will remain constant as FCV-1605 modulates to maintain RHR flow constant.
K/A: 005-K6.03	Objective: 12006	Source: New
Reference: 1-AP-16	Level: Comprehension	

QUESTION: 64 (1.0)

PRT level column vent valve 1-RC-1041 was inadvertently left uncapped during recovery from the last refueling outage. The valve has since developed leak-by of approximately 0.1 scfm. The control room team has maintained PRT pressure within limits.

Using the reference provided, determine which ONE of the following is correct concerning the affects of this.

a. Containment dewpoint indication will decrease.

b. PRT pressure indication will be lower than actual pressure.

c. Containment partial pressure will increase more rapidly.

d. PRT water level indication will be higher than actual water level.

ANSWER: c

Answer correct: more frequent N2 make-ups will be required in order to maintain PRT pressure within limits; this increased N2 leakage to the containment will cause partial pressure to increase more rapidly, just as it used to when excessive instrument air leakage existed in containment.	Distractors plausible: a – **actual** dewpoint will decrease. b– **actual** PRT pressure will decrease more rapidly, requiring more frequent N2 make-ups. d – for a saturated system (S/G, PRZR) this would be correct.	Distractors wrong: a – indication of dewpoint will not be affected, since it was disabled by a recent plant modification. b – PRT pressure indication will not be affected by a leak on reference leg of the level column. d – PRT water level indication will not be affected by a leak on the reference leg of the level column.
K/A: 007-K3.01	Objective: 12002	Source: New
Reference: 11715-FM-93B sheet 2; CDB for Obj 3511.	Level: Comprehension	

QUESTION: 65 (1.0)

The CC surge tank level has been increasing for the past hour. Isolation of which ONE of the following would potentially stop the level increase?

a. PDTT cooler.

b. Fuel pit coolers.

c. RCP seal water return heat exchanger.

d. Non-regenerative heat exchanger.

ANSWER: d

Answer correct: in the NRHX, letdown pressure is higher than CC pressure; a NRHX tube leak would cause CC surge tank level to increase.	Distractors plausible: All – candidate misconception regarding the pressure of the fluids in the heat exchangers.	Distractors wrong: All – CC pressure is higher than the other fluid in the heat exchanger.
K/A: 008-A2.02	Objective: 11658	Source: New
Reference: 0-AP-5.1.	Level: Comprehension	

QUESTION: 66 (1.0)

Unit 1 core off-load is in progress when the reactor cavity seal ring fails. As a result, cavity water level decreases below the minimum required by TS-3.9.10.1. Which ONE of the following is correct concerning the affects of this on the manipulator crane?

a. Bridge, trolley and hoist movement can be accomplished **without** bypassing interlocks.

b. Bridge, trolley and hoist movement can **only** be accomplished using interlock bypass.

c. Bridge and trolley movement can be accomplished without bypassing interlocks, but hoist **downward or upward movement** requires interlock bypass.

d. Bridge and trolley movement can be accomplished without bypassing interlocks, but hoist **upward movement only** requires interlock bypass.

ANSWER: a

Answer correct: manipulator crane movement is not interlocked with cavity water level.	Distractors plausible: All – candidate misconception concerning manipulator crane interlocks.	Distractors wrong: All - manipulator crane movement is not interlocked with cavity water level.
K/A: 034-A1.02	Objective: 9007/9008	Source: New
Reference: 1-OP-4.15.	Level: Knowledge	

QUESTION: 67 (1.0)

Unit 1 is at 18% power when an electrical fault on the main generator actuates generator differential lockout relay 86G. Which ONE of the following correctly explains the resulting sequence of events?

a. Generator and turbine both trip directly from 86G actuation; reactor trips when G-12 is open with turbine impulse pressure >15%.

b. Generator and turbine both trip directly from 86G actuation; reactor trips when 4/4 throttle valves are closed or 2/3 ASO are <45 psig.

c. Generator and turbine both trip directly from 86G actuation; reactor will not automatically trip.

d. Generator trips directly from 86G actuation; turbine trips 30 seconds after G-12 is open; reactor will not automatically trip.

ANSWER: c

Answer correct: 86G directly trips the generator and turbine; reactor trip from turbine trip is blocked below P-8 (30% power.); based on simulator observation of the transient, no other automatic reactor trips will occur.	Distractors plausible: a – generator and turbine will trip directly from 86G; G-12 open with turbine impulse pressure >15% is a protective system actuation. b – generator and turbine will trip directly from 86G; reactor would trip from TVs closed or low ASO pressure if reactor power was >30%. d – generator will trip directly from 86G; 30-second time delay does exist in the protective system scheme; reactor will not automatically trip.	Distractors wrong: a – reactor does not trip based on impulse pressure/G-12 position. b – reactor trip from turbine trip is blocked below P-8 (30% power.) d – turbine trip is not delayed for 30 seconds, and is not based on G-12 position.
K/A: 045-K4.11	Objective: 8964	Source: New
Reference: NCRODP-67-LP-1; CDB for Obj 8964 and 7868.	Level: Comprehension	

QUESTION: 68 (1.0)

After starting the unit 1 "A" containment vacuum pump, the Auxiliary Building watchstander informs you that the vacuum tank level control valve has failed open. Which ONE of the following correctly explains why PG to the vacuum pump must be isolated?

a. Prevents excessive PG flow to the Auxiliary Building sump.

b. Prevents flooding of the process vent flow element.

c. Prevents overpressurization of the vacuum pump casing.

d. Prevents backflow from the vacuum pump casing to the PG system.

ANSWER: b

Answer correct: previous experience with failed vacuum tank LCVs has resulted in flooding of the process vents flow element, which renders the flow indication inoperable and results in entry in TS action; PG is isolated if the LCV does not function properly.	Distractors plausible: a – failed-open LCV does result in increased PG flow to the sump. c & d – candidate misconception concerning configuration of the vacuum tank, vacuum pump casing and PG supply.	Distractors wrong: a – true, but this is not the reason for isolating PG. c – due to piping configuration, pump casing cannot be overpressurized. d – PG is at a higher pressure than the a running vacuum pump.
K/A: 103/GEN-2.1.32	Objective: 11976	Source: New
Reference: 1-OP-19.2.	Level: Knowledge	

QUESTION: 69 (1.0)

A licensed RO is about to start a containment vacuum pump, which is designated as a "Skill-of-the-Craft" task. The RO has performed the task many times since becoming licensed.

Per OPAP-0002, Operations Department Procedures, which ONE of the following is correct concerning the procedure adherence requirements?

a. The RO can perform the task without procedure in hand, but must perform the task in accordance with the procedure.

b. The RO can perform the task without procedure in hand, since the task is not covered by an approved procedure.

c. The RO must have the procedure in hand when performing the task, but is not required to sign-off procedure steps.

d. The RO can perform the task without procedure in hand only if he requests a peer check for each equipment manipulation.

ANSWER: a

Answer correct: Skill-of-the-craft tasks may be performed without a procedure in hand if the operator is familiar with the task as long as the task is performed IAW the applicable procedure (1-OP-19.2 for this task).	Distractors plausible: b – some tasks are not yet covered by procedure. c – candidate misconception concerning the procedure adherence policy with respect to skill-of-the-craft tasks. d – peer check is a recent addition to the operators' tool bag to prevent errors during task performance.	Distractors incorrect: b – this task is covered by an approved procedure. c – the RO is not required to have the procedure in hand. d – peer check is not required nor addressed in OPAP-0002 for procedure adherence.
K/A: GEN-2.1.20	Objective: 13592	Source: Bank item #3001 (modified)
Reference: OPAP-0002	Level: Knowledge	

QUESTION: 70 (1.0)

Given the following plant conditions:

- RCS/secondary plant heat-up is in progress with all RCPs running.
- RCS temperature is 290°F and all steam traps are in service.
- RHR is in service with RHR H/X outlet valve HCV-1758 closed.
- All MSTVs, MS NRVs and NRV bypass valves are open.
- "A" and "B" condenser steam dumps are partially open.
- The RO closes all three NRV bypass valves to increase the RCS heat-up rate.
- Due to a miscommunication, the RO then closes all three MS NRVs.

What is the required team response?

a. Open the MS NRV bypass valves to equalize, then open the MS NRVs.

b. Immediately open all three S/G PORVs as necessary to prevent a mode change, then open the MS NRVs.

c. Close steam dumps, open the MS NRV bypass valves to equalize, then open the MS NRVs.

d. Immediately open all three MS NRVs to prevent a mode change, then open MS NRV bypass valves to control RCS temperature.

ANSWER: c

Answer correct: steam dumps must be closed to prevent depressurization of the MS header and allow equalization across the MS NRVs; NRV bypass valves are opened to equalize, then MS NRVs are opened.	Distractors plausible: a – candidate forgets about condenser steam dumps depressurizing the MS header. b – opening S/G PORVs **would** preclude further heatup. d – opening MS NRVs and bypass valves **would** preclude further heatup.	Distractors incorrect: a – condenser steam dump valves must first be closed to prevent depressurization of MS header and allow equalization across the MS NRVs. b & d – immediate action is not required, since mode change is not imminent for the stated conditions; also, MS NRVs shouldn't be opened with large delta-P, since this can result in S/G swell and P-14 signal.
K/A: GEN-2.2.1	Objective: 10085	Source: New
Reference: 1-OP-28.1; 1-OP-1.3; CDB for Obj 10085	Level: Comprehension	

QUESTION: 71 (1.0)

Maintenance would like to remove the danger tags from a **4160-volt breaker** so they can cycle it in the TEST position. The tag-outs cannot be cleared.

Which ONE of the following correctly describes the operator actions required to facilitate this?

a. Remove the danger tags in accordance with an approved partial clearance, rack the breaker to TEST, then return the danger tags to the Operations Annex.

b. Remove the danger tags in accordance with an approved partial clearance, rack the breaker to TEST, then destroy the danger tags and return the tagging records to the Operations Annex.

c. Remove the danger tags in accordance with an approved temporary release, rack the breaker to TEST, then place a special order blue tag on the breaker racking device and return the danger tags to the Operations Annex.

d. Remove the danger tags in accordance with an approved temporary release, rack the breaker to TEST, then place the tags in a temporary release envelope and attach the envelope to the breaker racking device.

ANSWER: d

Answer correct: per VPAP-1402, breaker testing (TEST position) is done using temporary release; the sequence listed is correct per the VPAP.	Distractors plausible: a & b – partial clearances **are** used to remove danger tags for testing purposes. c – temporary releases **are** used to remove danger tags for testing purposes.	Distractors incorrect: a & b – partial clearances are not used to clear tags for breaker testing in TEST position. c – special order blue tag is not placed on the breaker racking device, danger tags are not returned to Annex.
K/A: GEN-2.2.13	Objective: 13607	Source: New
Reference: VPAP-1402; OPAP-0010	Level: Knowledge	

QUESTION: 72 (1.0)

Which ONE of the following evolutions is prohibited?

a. Entry into the RCP **motor** cubicles during reduced inventory conditions.

b. Entry into the incore sump room while retracting the flux thimbles.

c. Entry into an airborne radioactivity area without a SCBA or respirator.

d. Entry into a 15 Rem/hr area for ten minutes to protect property during a Site Area Emergency.

ANSWER: b

Answer correct: incore sump room becomes an extreme high radiation area with flux thimbles retracted and entry is not allowed under any circumstances.	Distractors plausible: a – entry into the RCP **pump** cubicles is not allowed during reduced inventory conditions. c – station policy previously required respiratory protection in order to enter any airborne radioactivity area. d – entry into a very high radiation area is not normally allowed.	Distractors incorrect: a – entry into RCP motor cubicles is allowed during reduced inventory conditions. c – entry into airborne radioactivity areas does not necessarily require respiratory protection. d – during emergency response, the SEM can authorize entry into very high radiation areas for protection of property.
K/A: GEN-2.3.10	Objective: 7676	Source: New
Reference: VPAP-2101.	Level: Knowledge	

QUESTION: 73 (1.0)

An accident at NAPS results in a radioactive plume passing over the service water reservoir. An operator stationed at the service water pump house is exposed to a 2 Rem/hr whole body dose for **an 8-hour period**.

Which ONE of the following is correct?

a. This operator is in the **low population zone** and **has exceeded** 10CFR100 limits.

b. This operator is in the **low population zone** and **has not exceeded** 10CFR100 limits.

c. This operator is in the **exclusion area** and **has exceeded** 10CFR100 limits.

d. This operator is in the **exclusion area** and **has not exceeded** 10CFR100 limits.

ANSWER: d

Answer correct: SWPH lies within the exclusion area boundary and dose received (16 Rem) is less than the legal limit of 25 Rem.	Distractors plausible: All – candidate misconception regarding the definition of LPZ and exclusion area, and 10CFR100 dose limits.	Distractors incorrect: a & b – SWPH is not in the LPZ a & c – 10CFR100 dose limit is not exceeded.
K/A: GEN-2.3.2	Objective: 8956	Source: New
Reference: UFSAR; CDB for Obj 8956	Level: Comprehension	

QUESTION: 74 (1.0)

Main turbine roll-up is in progress during a unit startup. Turbine speed is approaching the critical speed of 1158 rpm when bearing #4 vibration increases to 16 mils. The team increases the acceleration rate to reduce vibration, but vibration remains at 16 mils (verified locally.)

What is the required team response?

a. Reduce turbine speed below the critical speed.

b. Increase turbine lube oil temperature above 100°F.

c. Trip the turbine and enter 1-AP-2.1, Turbine Trip without Reactor Trip Required.

d. Trip the reactor and turbine and enter 1-E-0, Reactor Trip or Safety Injection.

ANSWER: c

Answer correct: turbine roll-up is conducted with reactor power between 5% and 12%; for sustained vibration above 14 mils with reactor power <30%, turbine trip is required.	Distractors plausible: a – turbine vibration is more likely when at a critical speed; adjusting turbine speed below the critical speed would reduce the probability that vibration will occur. b – increasing turbine lube oil temperature above 100°F reduces the probability that vibration will occur. d – tripping the reactor and turbine is a required action when power is above 30%.	Distractors wrong: a – reducing turbine speed to reduce vibration is not an option per the AR. b – for sustained vibration, increasing lube oil temperature is not an option per the AR. d – reactor trip is not required, since power is <30%.
K/A: GEN-2.4.10	Objective: 3460	Source: New
Reference: 1-AR-G-H8; 1-OP-2.1; 1-OP-15.1.	Level: Comprehension	

QUESTION: 75 (1.0)

The plant has experienced a large-break LOCA. The crew has transitioned from 1-E-0, Reactor Trip or Safety Injection, to 1-E-1 Loss of Reactor or Secondary Coolant. The following conditions exist:

- "A" S/G N/R level is 20%, AFW flow is 110 gpm.
- "B" S/G N/R level is 10%, AFW flow is 110 gpm.
- "C" S/G N/R level is 10%, AFW flow is 110 gpm.
- S/G pressure in all S/Gs is 1035 psig.
- RCS pressure is 100 psig and decreasing.
- No RCPs are running.
- Core Exit T/Cs are 705°F.
- Cold-leg temperatures are 300°F.
- RVLIS full-range level is 53%.
- Containment pressure is 37 psia.
- Gamma-metrics wide-range is 10^{-7} and decreasing.
- Gamma-metrics source range is 10^{4} cps and decreasing.

Using the reference provided, determine the correct procedure to use for these conditions.

a. 1-FR-C.2

b. 1-FR-C.1

c. 1-FR-Z.1

d. 1-FR-H.1

ANSWER: d

Answer correct: adverse CTMT conditions (CTMT pressure is >20 psia) require ≥ S/G N/R level >22% or AFW flow >340 gpm; since all S/Gs are less than 22% N/R and total AFW flow is only 330 gpm, heat sink is a red path (for the stated conditions, it is the only red path.)	Distractors plausible: All – candidate misinterpretation of the data presented and/or misapplication of 1-F-0.	Distractors wrong: a – 1-FR-C.2 is applicable for the stated conditions, but it is only an orange path and is superceded by the heat sink red path. b – 1-FR-C.1 is not applicable, since reactor vessel level is above the required value. c – 1-FR-Z.1 is applicable for the stated conditions, but it is only an orange path and is superceded by the heat sink red path.
K/A: GEN-2.4.21	Objective: 12705	Source: New
Reference: 1-F-0	Level: Comprehension	

QUESTION: 76 (1.0)

Given the following plant conditions:

- The team is responding to a loss of both emergency busses.
- Neither bus could be re-energized and all equipment was placed in PULL-TO-LOCK.
- S/G depressurization resulted in automatic actuation of safety injection.

Which ONE of the following explains why the team is directed to reset the SI signal?

a. Allows the team to reset containment phase "A" isolation when directed.

b. Prevents thermal shock to RCP seals due to uncontrolled restoration of seal cooling.

c. Blocks automatic SI when PRZR low-low pressure occurs during cooldown.

d. Prevents equipment from auto-starting when it is removed from PULL-TO-LOCK.

ANSWER: d

Answer correct: per 1-ECA-0.0, SI is reset to allow manual loading of equipment on a recovered emergency bus.	Distractors plausible: a – throughout EOPs, SI is always reset before CTMT phase "A" isolation. b – thermal shock of RCP seals is a concern during the response to a loss of both emergency buses. c – resetting SI **does** block any further automatic SI signals from actuating SI.	Distractors incorrect: a – this is not the reason for resetting SI when actuated, per ECA-0.0 background; also, phase "A" can be reset without resetting SI. b – thermal shock of RCP seals is prevented by isolating seal cooling and not starting a charging pump until seal cooling is isolated. c – this is not the reason for resetting SI when actuated, per ECA-0.0; also, once SI has actuated, any further SI signals will have no additional adverse affects.
K/A: 055-EK3.02	Objective: 13832	Source: New
Reference: 1-ECA-0.0; WOG B/G document for ECA-0.0	Level: Knowledge	

QUESTION: 77 (1.0)

With unit 1 at 100% power and PRESS LEVEL CHANNEL DEFEAT switch in the 461/460 position, the reference leg for 1-RC-LT-1461 develops a leak equivalent to 1 gpm charging flow.

Which ONE of the following identifies system response?

a. PRZR HI LEVEL alarm actuates; actual PRZR level remains stable.

b. Actual PRZR level continually increases to the PRZR high-level reactor trip setpoint.

c. Actual PRZR level continually decreases and PRZR pressure decreases below the PRZR low-pressure reactor trip setpoint.

d. Actual PRZR level initially decreases until letdown isolates, then increases to the PRZR high-level reactor trip setpoint.

ANSWER: d

Answer correct: with LT-461 selected to LC-459, a leak on the reference leg will cause indicated level on LT-461 to increase; charging flow decreases, actual PRZR level decreases until letdown isolates, then PRZR level increases.	Distractors plausible: a – correct if candidate believes LT-461 is selected to LC-460. b – correct if candidate believes reference leg leak has the opposite effect on the LT. c – correct if candidate believes low pressure trip will occur before letdown isolates.	Distractors wrong: a – LT-461 is selected to LC-459 for the stated conditions. b – actual PRZR level does NOT initially increase; indicated level increases causing charging flow to decrease and actual PRZR level decreases until letdown isolates, THEN actual PRZR level increases. c – PRZR pressure doesn't decrease below the PRZR low-pressure trip setpoint.
K/A: 008-AA2.10	Objective: 10656	Source: New
Reference: NCRODP-74-LP-2	Level: Comprehension	

QUESTION: 78 (1.0)

Which ONE of the following explains why a **negative** number is displayed on the ICCM subcooled margin monitor during a large-break LOCA?

a. The ICCM is not qualified for adverse containment conditions.

b. The core exit thermocouples are invalid in a steam environment.

c. The calculated value is outside its normal range of indication.

d. The number of degrees of superheat is preceded by a negative sign.

ANSWER: d

Answer correct: margin to saturation for subcooled conditions is a positive number; margin to saturation for superheated conditions is a negative number.	Distractors plausible: a – certain instruments are not qualified for post-accident conditions. b – the CETCs are only valid up to a certain temperature. c – when certain instruments monitored by the plant computer are outside their normal range, they display a slightly negative number.	Distractors wrong: a – the ICCM is qualified for adverse containment conditions. b – the CETCs are designed to operate in a steam environment. c – the negative sign does NOT indicate that the calculated value is outside its normal range of indication.
K/A: 011-EA1.14	Objective: 7740	Source: New
Reference: NCRODP-64-LP-1	Level: Knowledge	

QUESTION: 79 (1.0)

An unisolable RCS leak exists in the unit 1 safeguards building. Which ONE of the following describes the expected procedure transitions?

a. E-0, Reactor Trip or Safety Injection, to E-1, Loss of Reactor or Secondary Coolant, to ECA-1.2, LOCA Outside Containment.

b. E-0, Reactor Trip or Safety Injection, to E-1, Loss of Reactor or Secondary Coolant, to ECA-1.1, Loss of Emergency Coolant Recirculation.

c. E-0, Reactor Trip or Safety Injection, to ECA-1.1, Loss of Emergency Coolant Recirculation, to ECA-1.2, LOCA Outside Containment.

d. E-0, Reactor Trip or Safety Injection, to ECA-1.2, LOCA Outside Containment, to ECA-1.1, Loss of Emergency Coolant Recirculation.

ANSWER: d

Answer correct: transition directly from E-0, step 23 to ECA-1.2, then from ECA-1.2, step 2 (RNO) to ECA-1.1.	Distractors plausible: a & b – E-0 to E-1 is logical, since a loss of reactor coolant is in progress. b – ECA-1.1 is the final EOP for the stated conditions. c – all are EOPs that will be addressed for the stated conditions.	Distractors wrong: a & b – if RCS leak is not in containment, E-1 is not used. c – ECA-1.2 is addressed prior to ECA-1.1.
K/A: E11-EA2.1	Objective: 13839	Source: New
Reference: 1-E-0; 1-ECA-1.2; 1-ECA-1.1.	Level: Knowledge	

QUESTION: 80 (1.0)

During the RCS cooldown directed by E-3, Steam Generator Tube Rupture, steam flow to condenser from each steamline is limited to 1×10^6 lbm/hr.

Which ONE of the following correctly states the basis for this limitation?

a. Prevent entry into FR-P.1.

b. Prevent restart of HHSI pumps.

c. Prevent main steamline isolation.

d. Prevent loss of condenser vacuum.

ANSWER: c

Answer correct: per CAUTION in E-3, limit steam flow to prevent MS isolation.	Distractors plausible: a – excessive RCS cooldown could result in entry into FR-P.1. b – high steam flow normally causes a SI signal. d – response to loss of condenser vacuum includes reducing turbine load, which reduces the amount of steam dumped to condenser.	Distractors wrong: a – FR-P.1 entry is precluded by limiting cooldown to a "target" temperature based on ruptured S/G pressure. b – SI is blocked below 543°F. d – condenser vacuum is actually improved by increasing the amount of steam dumped to condenser, assuming condenser cooling is adequate.
K/A: 038/GEN-2.4.48	Objective: 13877	Source: New
Reference: 1-E-3; WOG B/G document for 1-E-3.	Level: Knowledge	

QUESTION: 81 (1.0)

Given the following plant conditions:

- Unit 1 is at 100% power with stable T_{ave}.
- Charging flow is noted to be increasing.
- Annunciator 1C-C5, CH PP TO REGEN HX HI-LO FLOW, has just alarmed.
- VCT level is decreasing and PRZR level is increasing.
- All other plant parameters are normal.

Which ONE of the following correctly states the most likely cause of the conditions described and the required team response?

a. Caused by increasing RCS leakage; the team should enter 1-AP-16, Increasing Primary Plant Leakage.

b. Caused by increasing RCS leakage; the team should isolate letdown and maximize charging flow.

c. Caused by failure of charging flow control; the team should isolate instrument air to FCV-1122.

d. Caused by failure of charging flow control; the team should take manual control of charging.

ANSWER: d

Answer correct: for given conditions, RCS leakage is **not** increasing, most likely cause is failure of charging flow control; per 1-AR-C-C5, take manual control of FCV-1122.	Distractors plausible: a – candidate misconception concerning RCS inventory balance, AP-16 would be correct for increasing leakage. b – candidate misconception concerning RCS inventory balance, isolating letdown and maximizing charging flow would be correct for increasing leakage. c – failure of charging flow control is correct.	Distractors incorrect: a & b – RCS leakage is **not** indicated by VCT level decreasing with PRZR level increasing. c – FCV-1122 fails **open** on loss of IA
K/A: 028-AA1.06	Objective: 11400	Source: New
Reference: 1-AR-C-C5, 1-AP-16, 1-AP-28	Level: Comprehension	

QUESTION: 82 (1.0)

The team is performing a normal shutdown when the RO notices that letdown flow has decreased. Which ONE of the following correctly explains the reason for this?

a. RCS pressure decreased.

b. VCT pressure decreased.

c. PCV-1145 auto setpoint decreased.

d. Channeling of the mixed-bed demin.

ANSWER: a

Answer correct: as RCS pressure decreases, PCV-1145 opens to maintain pressure; eventually, PCV-1145 is full open and continued decrease in RCS pressure results in reduced letdown flow due to reduced differential pressure across the letdown orifices.	Distractors plausible: b – candidate misconception regarding effects of VCT pressure on letdown flow. c – candidate misconception regarding operation of PCV-1145 (**increase** in the auto setpoint of PCV-1145 would result in reduced letdown flow.) d – candidate misconception regarding effects of mixed-bed demin channeling on letdown flow	Distractors wrong: b – decrease in VCT pressure does not cause letdown flow to decrease. c – decrease in auto setpoint results in increased letdown flow. d – channeling does not result in reduced flow through a demin.
K/A: 004-K1.30	Objective: 317	Source: New
Reference: 1-OP-3.2; CDB for Obj 317	Level: Comprehension	

QUESTION: 83 (1.0)

With unit 1 at 100% power, a spurious SI occurred. SI has **not** been reset.

Which ONE of the following is correct?

a. The SI signal must be reset (after a 60-second time delay) before the phase "A" containment isolation can be reset.

b. The SI signal must be reset (no time delay necessary) before the phase "A" containment isolation can be reset.

c. Phase "A" containment isolation can be reset with the SI signal present, but 60 seconds must elapse before phase "A" can be reset.

d. Phase "A" containment isolation can be reset immediately after actuation, even with the SI signal still present.

ANSWER: d

Answer correct: phase "A" CTMT isolation reset logic uses retentive memory with manual reset; the output signal can be reset regardless of whether or not an input signal exists.	Distractors plausible: a & b – candidate misconception concerning the operation of the phase "A" CTMT isolation reset logic. a – **SI** reset can only be done after a 60-second time delay. c – phase "A" can be reset with the SI signal present.	Distractors wrong: a & b – SI does not have to be reset prior to resetting phase "A". b – 60-second time delay must expire before SI can be reset. c – no time delay is necessary prior to resetting phase "A".
K/A: 013-K5.02	Objective: 5769	Source: New
Reference: NA-DW-5655D33 sheets 1 and 16.	Level: Knowledge	

QUESTION: 84 (1.0)

Unit 1 is operating at 100% power with "D" bank rods at 218 steps when an electrical failure deenergizes vital bus 1-III. You have noted that the rods cannot be withdrawn. Which ONE of the following is preventing rod motion?

a. C-1, intermediate-range high flux rod stop.

b. C-2, power-range high flux rod stop.

c. C-3, overtemperature delta-T rod stop.

d. C-4, overpower delta-T rod stop.

ANSWER: b

Answer correct: loss of V.B. 1-III will trip all the bistables associated with power-range channel III (N-43) including the high flux rod stop; coincidence for the rod stop is **one** out of four PR NIs.	Distractors plausible: All will stop automatic and manual rod withdrawal.	Distractors wrong: a – Intermediate-range NIs are powered from vital bus 1-I and 1-II. c - OTΔT rod stop coincidence is 2/3 channels. d – OPΔT rod stop coincidence is 2/3 channels.
K/A: 015-K2.01	Objective: 6542	Source: New
Reference: NCRODP-62-LP-2; 1-AR-A-D8; 1-AR-B-A3, B3.	Level: Comprehension	

QUESTION: 85 (1.0)

With unit 1 at 100% power, chilled water flow is lost to the containment air recirc fans and the crew is unable to align a backup source of cooling water.

Which ONE of the following is correct concerning the potential effects of this?

a. Failure of safety-related equipment in containment could result **during normal operation** if containment air temperature reaches 110°F.

b. Failure of safety-related equipment in containment could result **during normal operation** if containment air temperature reaches 125°F.

c. Failure of safety-related equipment in containment could result **following a MSLB** if containment air temperature reaches 110°F **prior to the MSLB**.

d. Failure of safety-related equipment in containment could result **following a MSLB** if containment air temperature reaches 125°F **prior to the MSLB**.

ANSWER: d

Answer correct: per TS-3.6.1.5 bases, safety-related equipment in containment could experience temperatures greater than that for which they are qualified if CTMT air temperature is >120°F prior to the occurrence of a MSLB or LOCA.	Distractors plausible: a & b – common misconception that the limits on CTMT air temperature are in place to ensure safety-related equipment in CTMT doesn't fail due to high temperature **during normal operation.** c – TS-3.6.1.5 lists two limits on CTMT temperature (105°F and 120°F); correct if candidate believes the basis for the 105°F limit is to ensure equipment doesn't fail due to high temperature following a MSLB.	Distractors wrong: a & b – basis for limit is to ensure equipment doesn't fail following a MSLB or LOCA. c – limit that applies to failure of equipment following a MSLB or LOCA is 120°F, not 105°F.
K/A: 022-K3.01	Objective: 1958	Source: New
Reference: 1-AP-35; TS-3.6.1.5 (and bases.)	Level: Knowledge	

QUESTION: 86 (1.0)

Given the following plant conditions:

- Unit 1 is at 100% power.
- "A" and "B" main feedwater (MFW) pumps are running.
- "C" MFW pump is tagged out.
- A spurious **train "B"** SI occurs.

Which ONE of the following correctly describes the status of the "A" and "B" MFW pumps?

a. 1A1, 1B1, 1A2 and 1B2 all running.

b. 1A1, 1B1, 1A2 and 1B2 all tripped and locked out.

c. 1A1 and 1B1 running, 1A2 and 1B2 tripped and locked out.

d. 1A1 and 1B1 tripped and locked out, 1A2 and 1B2 running.

ANSWER: c

Answer correct: train "B" SI will trip and lockout the 1A2 and 1B2 MFW pump motors, but has no affect on the 1A1 and 1B1 motors.	Distractors plausible: a – the MFW pump discharge MOVs are closed by a train "A" SI signal. b – correct if candidate believes that either train SI will trip and lockout all MFW pump motors. d – correct if candidate believes that train "B" SI will trip and lockout the 1A1 and 1B1 MFW pump motors.	Distractors wrong: a – train "B" SI will trip and lockout the 1A2 and 1B2 motors. b – train "B" SI has no affect on the 1A1 and 1B1 motors. d – train "B" SI will trip and lockout the 1A2 and 1B2 MFW pump motors, but has no affect on the 1A1 and 1B1 motors.
K/A: 059-K4.16	Objective: 1812	Source: New
Reference: 11715-ESK-5T, 5U; CDB for Obj 1812.	Level: Knowledge	

QUESTION: 87 (1.0)

The clarifier outlet radiation monitor indication is noted to be increasing, but has not alarmed. Health Physics analysis of the clarifier outlet indicates that the projected dose due to liquid effluent will exceed the admin limit.

Which ONE of the following actions could be taken to reduce the radioactive content of the clarifier outlet?

a. Place a clarifier demineralizer in service.

b. Isolate the high-capacity blowdown system.

c. Align the CDTs to pump to the low-level liquid waste tanks.

d. Reduce the decontamination factor of the Duratek IX system.

ANSWER: a

Answer correct: the clarifier demineralizers are normally bypassed; they may be placed in service if required in order to meet projected off-site dose limits.	Distractors plausible: b – isolating **low**-capacity blowdown would be correct. c – aligning CDTs to **high-level** liquid waste tanks would be correct. d – candidate misconception regarding decontamination factor and/or the impact of the Duratek IX system on liquid effluent.	Distractors wrong: b – high-capacity blowdown bypasses the clarifier and discharges directly to the CW discharge tunnel. c – LLWT is pumped to the clarifier, so aligning CDTs to LLWT would only delay their arrival at the clarifier outlet. d – reducing the DF will increase the radioactive content of the liquid effluent from the clarifier.
K/A: 068-K5.03	Objective: 5056	Source: New
Reference: NCRODP-43-LP-1	Level: Comprehension	

QUESTION: 88 (1.0)

With a containment vacuum pump running on each unit, a source check was performed on process vent gaseous rad monitor 1-GW-RM-102. The check source window stuck open resulting in actuation of the **high-high** alarm, but the **high** alarm did not actuate. No automatic actuations occurred.

Which ONE of the following is correct?

a. No automatic actuations are expected for the stated conditions.

b. **Only the unit 1** vacuum pump discharge valve should have automatically closed.

c. **Only the unit 2** vacuum pump discharge valve should have automatically closed.

d. **Both units'** vacuum pump discharge valves should have automatically closed.

ANSWER: d

Answer correct: high-high radiation alarm on GW-RM-102 will close both units' vacuum pump discharge trip valves 1-GW-TV-102A and 102B.	Distractors plausible: a – some rad monitor actuations require both the high and high-high alarms to actuate. b – the valves operated are 1-GW-TV-102A and 102B (all unit 1 mark numbers.) c – the process vent rad monitor consists of a particulate monitor (101) and a gaseous monitor (102); common misconception that 101 operates unit 1 valves and 102 operates unit 2 valves.	Distractors wrong: a – process vent rad monitor **high** alarm has no input to the automatic actuations. b – unit 2 discharge valve should also close. c – unit 1 discharge valve should also close.
K/A: 071-A4.25	Objective: 5236	Source: New
Reference: 1-PT-37.1; 11715-FM-97B sheet 1	Level: Knowledge	

QUESTION: 89 (1.0)

Unit 2 is defueled and the fuel assembly insert shuffle is in progress. Annunciator K-D3, RAD MONITOR SYSTEM FAILURE TEST, actuates. The new fuel storage area radiation monitor is noted to be pegged high and unresponsive to source check. The fuel pit bridge radiation monitor indication has not changed.

Which ONE of the following actions is required?

a. Place the fuel building ventilation system in configuration "B."

b. Place the fuel building radiation automatic interlock key switch in DISABLE.

c. Verify the fuel pit bridge radiation monitor is operable.

d. Park the fuel pit bridge crane over the new fuel storage area.

ANSWER: b

Answer correct: the new fuel storage area rad monitor supplies a signal to dump control room bottled air with the key switch in ENABLE, which it would be if insert shuffle is in progress; failure of the rad monitor requires the key switch to be placed in DISABLE to prevent spurious actuation.	Distractors plausible: a – placing fuel building in configuration "B" aligns the ventilation system through the iodine filters, which would be a logical choice if an area rad monitor failed in the fuel building. c – the fuel pit bridge rad monitor also provides a signal to dump control room bottled air; it would be logical to assume that the backup monitor should be verified operable. d – since the accidental criticality monitor is inoperable, TS-3.3.3.1 requires monitoring the area periodically.	Distractors wrong: a & c – this action is not required for the stated conditions. d – the new fuel storage area is monitored by Health Physics technicians per TS-3.3.3.1.
K/A: 072-A2.02	Objective: 5242	Source: New
Reference: 1-AR-K-D3; 0-AP-5.1.	Level: Knowledge	

QUESTION: 90 (1.0)

Given the following plant conditions:

- Unit 1 is stable at 20% power with turbine control in **IMP-IN**.
- Rod control is in MANUAL with T_{ave} and T_{ref} matched.
- "B" RCP trips.
- The reactor does **not** trip automatically.
- **No operator actions** are taken.
- The transient continues until the plant stabilizes.

Which ONE of the following is correct?

a. The final steady-state values for "A" and "C" loop delta-T will be lower than their pre-event values.

b. The final steady-state value for T_{ref} will be higher than its pre-event value.

c. The final steady-state value for "B" loop delta-T will be higher than its pre-event value.

d. The final steady-state value for core delta-T will be higher than its pre-event value.

ANSWER: d

Answer correct: with the turbine in IMP-IN, turbine control will modulate to maintain steam flow constant; as flow through "B" loop decreases, less heat is removed from "B" S/G and more heat is removed from the active loops; final steady-state result is delta-T in active loops increases and delta-T in "B" loop decreases; overall core delta-T increases to maintain constant heat transfer rate.	Distractors plausible: All – candidate misconception concerning the effects of a flow reduction on RCS parameters.	Distractors incorrect: a – active loop delta-Ts increase from pre-event values. b – final steady-state T_{ref} will be equal to initial value. c – "B" loop delta-T will be lower than its pre-event value.
K/A: 002-K5.01	Objective: NCRODP-90H.3-LP-1, objective "B"	Source: New
Reference: NCRODP-90H.3-LP-1; simulator verification of transient	Level: Comprehension	

QUESTION: 91 (1.0)

With unit 1 in mode 5 and making preparations for core off-load, Chemistry reports that the spent fuel pool (SFP) boron concentration is 2280 ppm (confirmed by backup samples.) What actions are required?

a. Enter an information action statement to ensure the SFP is not connected to the reactor cavity until boron concentration is ≥2300 ppm.

b. Immediately perform 1-PT-10 to determine if adequate shutdown margin exists in the SFP.

c. Immediately initiate ≥10 gpm boration to the SFP and continue until shutdown margin is restored.

d. Reduce CC flow through the SFP coolers and allow SFP temperature to increase until shutdown margin is restored.

ANSWER: a

Answer correct: SFP boron concentration requirement only applies when the SFP is connected to the reactor cavity; for the stated conditions, TS-3.9.1 does not apply; information action is entered to ensure the SFP is not connected to the reactor cavity until boron concentration is adequate.	Distractors plausible: b – PT-10 is normally performed to determine shutdown margin. c – this would be correct if the SFP were connected to the reactor cavity. d – allowing SFP temperature to increase does increase shutdown margin, and this tactic is used to assist in restoring core shutdown margin during response to ATWS if boration is not available.	Distractors incorrect: b – SFP shutdown margin is adequate regardless of boron concentration of SFP water; PT-10 is only used to determine core shutdown margin. c – this action is not required, since the SFP is not connected to the reactor cavity for the stated conditions. d – SFP shutdown margin is adequate regardless of boron concentration of SFP water.
K/A: 033-A2.01	Objective: 3748	Source: New
Reference: TS-3.9.1; CDB for Obj 3748.	Level: Comprehension	

QUESTION: 92 (1.0)

Given the following plant conditions:

- The "A" waterbox is being removed from service for leak repairs.
- The operator inadvertently closes 1-VP-4, "A" air ejector suction from **"B"** waterbox, **instead of** 1-VP-3, "A" air ejector suction from **"A"** waterbox.
- CW flow through "A" waterbox is isolated per the MOP.

Which ONE of the following is correct concerning the affect of this on air ejectors and condenser vacuum?

a. "A" air ejector **only** will become steam-bound and condenser vacuum will degrade.

b. "B" air ejector **only** will become steam-bound and condenser vacuum will degrade.

c. "A" and "B" air ejectors both become steam-bound and condenser vacuum will degrade.

d. "A" air ejector **only** will become steam-bound and condenser vacuum will be maintained by "B" air ejector via the suction cross-tie.

ANSWER: a

Answer correct: "A" air ejector is normally aligned to "A" condenser ("A" and "B" waterboxes); per MOP (and based on plant event) if air ejector suction is not isolated prior to securing CW flow through a waterbox, condenser vacuum **will** degrade.	Distractors plausible: b – vacuum will degrade, candidate misconception concerning normal alignment of air ejectors. c – "A" air ejector will become steam-bound, vacuum will degrade, there is a cross-tie on the suction of the air ejectors. d – "A" air ejector will become steam-bound.	Distractors incorrect: b & c – "B" air ejector is not affected, since the suction cross-tie is normally closed. d – the suction cross-tie is normally closed.
K/A: 055-K3.01	Objective: 4048	Source: New
Reference: 1-MOP-48.30; 11715-FM-72A, sheets 1 & 2; CDB for Obj 4048	Level: Comprehension	

QUESTION: 93 (1.0)

Which ONE of the following correctly states the MCC(s) that can be aligned to provide power to the **unit 1** hydrogen recombiner?

a. 1H1-2S **only**.

b. 1H1-2S or 1J1-1 **only**.

c. 1H1-2S or 2H1-2S **only**.

d. 1H1-2S, 2H1-2S, 1J1-1 or 2J1-1.

ANSWER: d

Answer correct: there are four receptacles in the recombiner cubicle, powered from MCCs 1H1-2S, 2H1-2S, 1J1-1 and 2J1-1. Either units' H_2 recombiner can be powered from any one of the four receptacles.	Distractors plausible: a – some non-redundant equipment is powered from "H" train only. b – logical to assume that the unit 1 recombiner can only be powered from unit 1 emergency busses. c – some non-redundant equipment is powered from "H" train only; since recombiners are located in the same cubicle, logical to assume that either unit's "H" bus could be aligned to supply power.	Distractors wrong: All – there are four receptacles in the recombiner cubicle, powered from MCCs 1H1-2S, 2H1-2S, 1J1-1 and 2J1-1. Either units' H_2 recombiner can be powered from any one of the four receptacles
K/A: 028-K2.01	Objective: 5345	Source: New
Reference: 1-OP-63.1.	Level: Knowledge	

QUESTION: 94 (1.0)

On a loss of instrument air with pressure continuing to decrease below 94 psig, the team is directed to isolate the **containment** instrument air header from the **plant** instrument air header.

Which ONE of the following correctly explains the basis for this action?

a. Allows the team to determine whether the IA leak is inside or outside containment.

b. Prevents a loss of plant IA from causing a loss of containment IA.

c. Ensures the containment IA compressors are able to maintain containment IA pressure.

d. Prevents excessive demand on the IA compressors in the Auxiliary Building.

ANSWER: a

Answer correct: after isolating IA to containment from plant header, next step in 1-AP-28 is to check IA pressure outside containment increasing.	Distractors plausible: b – if not for the check valve, a loss of plant IA **could** cause a loss of containment IA. c – containment IA compressors **were** originally designed to maintain containment IA pressure. d – isolating containment IA from the plant IA header would reduce demand on the IA compressors in the Auxiliary Building (if the rupture were in the containment.)	Distractors wrong: b – a check valve in the line prevents backflow from the containment IA header to the plant IA header. c – containment IA compressors are not able to maintain containment IA pressure for extended periods of time. d – IA compressors in the Auxiliary Building are capable of running at maximum output indefinitely.
K/A: 078-K4.02	Objective: 11662	Source: Bank item #2587 (modified)
Reference: 1-AP-28; CDB for Obj 11662	Level: Knowledge	

QUESTION: 95 (1.0)

Unit 1 shutdown is in progress. The current value for control rods fully withdrawn is 229 steps.

The unit enters Mode 3 __________.

a. **only** after all control banks are fully inserted

b. when control bank "D" **only** is fully inserted

c. when control bank "B" is inserted to 101 steps

d. **only** after all control and shutdown bank rods are fully inserted

ANSWER: b

Answer correct: per 1-OP-3.1, unit is declared to be in mode 3 when "D" bank rods are inserted to zero steps.	Distractors plausible: a – misconception concerning the "definition" of mode 3. c – this is the rod height that would correspond to entering mode 2 during a unit startup, per 1-OP-1.5. d – misconception concerning the "definition" of mode 3	Distractors incorrect: All – per 1-OP-3.1, unit is declared to be in mode 3 when "D" bank rods are inserted to zero steps.
K/A: GEN-2.1.22	Objective: 9132	Source: New
Reference: 1-OP-3.1; 1-OP-1.5	Level: Knowledge	

QUESTION: 96 (1.0)

Given the following plant conditions:

- Unit 1 is in mode 6 with all reactor coolant loops isolated.
- At 0910, the team commenced RCS drain down to +74" for reactor head lift.
- PRZR level was 28% cold-cal when drain down commenced.
- Gas stripper influent flow remains constant at 72 gpm during the drain down.
- PDTT is not pumped during the drain down.

Using the references provided, determine what time:

1. PRZR cold-cal level indication will go off scale low,
2. standpipe level 1-RC-LI-102 **local** indication will come on scale,
3. reactor vessel level will be adequate for head lift.

a. 1) 0947
 2) 0955
 3) 1052

b. 1) 0947
 2) 1032
 3) 1052

c. 1) 0946
 2) 0954
 3) 1049

d. 1) 0946
 2) 0954
 3) 1052

ANSWER: d

Answer correct: see attached calculations	Distractors plausible: a – time for point 1 is correct if candidate uses "top of spherical portion of PRZR bottom" instead of "0% cold cal," time difference between points 1 & 2 and between 2 & 3 **are** correct. b – time for point 1... (same as distractor "a"); time for point 2 is correct if candidate uses MCR indication of standpipe level vs. local indication; time for point 3 **is** correct. c – times for points 1 & 2 **are** correct; time for point 3 is correct if candidate thinks draining down TO the reactor vessel flange is adequate for head lift.	Distractors incorrect: All – see attached calculations.
K/A: GEN-2.1.25	Objective: 12970	Source: New
Reference: 1-OP-5.4	Level: Comprehension	

QUESTION: 97 (1.0)

As unit 1 RO, you are coordinating the clearing of a tagout in the service water pump house. The tagout includes mechanical items only—no electrical tags are involved. Two operators have been assigned to you—one will be the **performer**, the other will be the **verifier**.

Which ONE of the following is correct concerning the independent verification requirements?

a) The performer can hand the tagout to the verifier as long as they don't discuss the task.

b. The performer must return the tagout to the MCR so you can assign it to the verifier.

c. The operators may travel to the SWPH together as long as they don't discuss the task.

d. The operators must travel to the SWPH separately to ensure independence is maintained.

ANSWER: c

Answer correct: for remote locations, the operators may travel together as long as they don't discuss the task.	Distractors plausible: a – the performer and the verifier are not allowed to discuss the task. b – except for remote locations, the tagout must be returned to the controller (in this case, the RO in the MCR.) d – except for remote locations, the operators are not allowed any contact.	Distractors incorrect: a – the performer cannot hand the tagout to the verifier. b – the SWPH is a remote location; the tagout need not be returned to the controller. d – the SWPH is a remote location; the operators are allowed to travel together.
K/A: GEN-2.1.8	Objective: 13566	Source: New
Reference: VPAP-1405; OPAP-0010.	Level: Comprehension	

QUESTION: 98 (1.0)

Core off-load is in progress. You are the third licensed RO assigned to the backboards watch. While taking logs, you note that the MCR to unit 1 cable vault delta-P reading is <.05 inches H_2O (**all other** delta-P readings are within limits).

You inform the unit SRO of the reading, and __________.

a. that fuel movement and work over the spent fuel pool must be stopped until delta-P is restored

b. that fuel movement and work over the spent fuel pool may continue for 24 hours (per TS-3.7.7.1) while attempting to restore delta-P

c. to enter TS-3.7.7.1 action for control room emergency habitability; fuel movement may continue indefinitely

d. initiate 0-OP-21.12, Control Room Pressure Envelope Ventilation Troubleshooting, to restore delta-P; fuel movement may continue indefinitely

ANSWER: a

Answer correct: per 0-OP-21.11, any single delta-P indicator out-of-spec requires fuel movement and SFP work to be stopped.	Distractors plausible: b – TS-3.7.7.1 action allows 24 hours to restore delta-P. c – TS-3.7.7.1 action is entered for the stated conditions. d – the OP is a recently-added option for investigating control room pressure envelope problems.	Distractors incorrect: All – per 0-OP-21.11, fuel movement cannot be continued.
K/A: GEN-2.2.30	Objective: 4606	Source: New
Reference: 0-OP-21.11; TS-3.7.7.1; 0-OP-21.12	Level: Knowledge	

QUESTION: 99 (1.0)

A male radiation worker's total effective dose equivalent for the current quarter is 1837 mrem and for the current year is 3823 mrem.

Which ONE of the following correctly states the worker's subsequent RCA access requirements?

a. The worker can enter the RCA if a dose extension request is prepared and authorized.

b. The worker can enter the RCA with no additional authorization other than an RWP.

c. The worker cannot enter the RCA because his quarterly dose **only** has exceeded the administrative limit.

d. The worker cannot enter the RCA because his quarterly and annual dose have both exceeded the administrative limit.

ANSWER: a

Answer correct: per VPAP-2101, a worker whose dose has exceeded admin limits will be denied RCA access; a dose extension request may be prepared and authorized to restore RCA access.	Distractors plausible: All – candidate misconception concerning dose limits and VPAP requirements.	Distractors incorrect: b – per VPAP-2101, an RWP is not sufficient authorization to enter the RCA; the worker needs an approved dose extension request. c & d – for the stated conditions, the worker can be authorized RCA access with an approved dose extension request.
K/A: GEN-2.3.4	Objective: NET-3-LP-4, Obj A	Source: New
Reference: VPAP-2101	Level: Comprehension	

QUESTION: 100 (1.0)

Given the following plant conditions:

- The team is responding to an ATWS in accordance with 1-FR-S.1, Response to Nuclear Power Generation/ATWS.
- The RO is performing the immediate actions without assistance from the third licensed RO.
- Manual trip was attempted but the reactor would **not** trip.
- Control rods are **not** inserting automatically.

In response to this, the RO should __________.

a. trip the turbine, then manually insert control rods

b. manually insert control rods until neutron flux is decreasing, then trip the turbine

c. trip the turbine, then verify automatic control rod insertion (if not, manually insert rods)

d. manually insert control rods until all control rods are at zero steps, then trip the turbine

ANSWER: c

Answer correct: per current Ops philosophy for the performance of FR-S.1 IOAs by one person (unassisted).	Distractors plausible: a – this would be correct if rods do not insert automatically after the turbine is tripped. b – rules of procedure usage specify that, once a step is initiated and is progressing satisfactorily, you can continue with the next step. d – with all control rods at zero steps, reactor power would be in the intermediate range.	Distractors incorrect: a – automatic rod insertion should be verified, rods should only be manually inserted if automatic rod insertion cannot be verified. b & d – turbine trip should be performed before inserting rods when one person is performing the IOAs unassisted.
K/A: GEN-2.4.1	Objective: 11570	Source: New
Reference: 1-FR-S.1	Level: Knowledge	

QUESTION: 76 (1.0)

The team is checking if SI can be terminated in accordance with 1-E-1, Loss of Reactor or Secondary Coolant. RCS subcooling and heat sink are both adequate.

Because RCS pressure is increasing and PRZR level is off-scale low, the team is directed to try to stabilize RCS pressure with normal PRZR spray and to **not** terminate SI at this time.

Which ONE of the following correctly states the basis for stabilizing RCS pressure?

a. Minimizes the potential for brittle failure of the reactor vessel.

b. Prevents continued reduction in safety injection flow.

c. Prevents the PRZR safety valves and/or PORVs from lifting.

d. Prevents excessive primary-to-secondary delta-P across the S/G tube sheets.

ANSWER: b

Answer correct: NAPS uses centrifugal HHSI pumps; as RCS pressure increases, SI flow decreases; for the stated conditions, stabilizing RCS pressure will prevent SI flow from decreasing further and may eventually result in PRZR level coming on scale.	Distractors plausible: a – increasing RCS pressure **does** increase the potential for brittle failure of the vessel. c– increasing RCS pressure **could** eventually result in lifting PRZR safety valves and/or PORVs. d – increasing RCS pressure **does** increase the delta-P across the S/G tube sheets and a maximum limit exists for this parameter.	Distractors incorrect: all - NAPS uses centrifugal HHSI pumps; as RCS pressure increases, SI flow decreases; for the stated conditions, stabilizing RCS pressure will prevent SI flow from decreasing further and may eventually result in PRZR level coming on scale.
K/A: 011-EA2.11	Objective: 13683	Source: New
Reference: 1-E-1	Level: Knowledge	

QUESTION: 77 (1.0)

RCS cooldown is in progress per 1-ES-0.2A, Natural Circulation Cooldown with CRDM Fans.

Which ONE of the following correctly describes how the team will comply with TS-3.5.3, ECCS subsystems (T_{ave} <350°F)?

a. Within 1 hour **after** all cold-leg temperatures are <235°F, put one LHSI pump and all but one HHSI pump in PTL.

b. Within 1 hour **after** all cold-leg temperatures are <235°F, check SI termination criteria met, then put one LHSI pump and all but one HHSI pump in PTL.

c. **Prior to** any cold-leg temperature decreasing to <235°F, check SI termination criteria met, then put one LHSI pump and all but one HHSI pump in PTL.

d. **Prior to** any cold-leg temperature decreasing to <235°F, put one LHSI pump and all but one HHSI pump in PTL.

ANSWER: d

Answer correct: per 1-ES-0.2A, step 22.	Distractors plausible: a – candidate misconception regarding the requirements of TS-3.5.3 and methods for compliance. b – candidate misconception regarding the requirements of TS-3.5.3 and methods for compliance; normally, when EOPs are in effect, SI termination criteria must be met prior to reducing/terminating SI flow. c– normally, when EOPs are in effect, SI termination criteria must be met prior to reducing/terminating SI flow.	Distractors incorrect: a – second train of SI must be defeated within one hour PRIOR to decreasing below 235°F. b – SI is not in service when natural circulation C/D EOPs are in effect; second train of SI must be defeated within one hour PRIOR to decreasing below 235°F. c – SI is not in service when natural circulation C/D EOPs are in effect.
K/A: E09-EA2.2	Objective: 12028	Source: New
Reference: 1-ES-0.2A	Level: Knowledge	

QUESTION: 78 (1.0)

With unit 1 at 100% power, a seismic event resulted in damage to all main steamlines in the main steam valve house. The team entered 1-ECA-2.1, Uncontrolled Depressurization of all Steam Generators.

Given the following plant conditions:

- RCS cooldown rate is 220°F/hr
- A S/G narrow-range level is 8%
- B S/G narrow-range level is 9%
- C S/G narrow-range level is 7%

Which ONE of the following is the minimum **total** AFW flow to all three S/Gs?

a. 75 gpm.

b. 100 gpm.

c. 300 gpm.

d. 340 gpm.

ANSWER: c

Answer correct: per 1-ECA-2.1, AFW flow should be reduced to 100 gpm per S/G (300 gpm total) if the RCS cooldown rate exceeds 100°F/hr.	Distractors plausible: a – per the WOG B/G document, AFW flow should be reduced to 25 gpm per S/G. b – per ECA-2.1, AFW flow should be reduced to 100 gpm to each S/G. d – 340 gpm is normally the minimum AFW flow to ensure adequate heat sink.	Distractors incorrect: a – at NAPS, the AFW flow transmitters are not capable of indicating flow accurately below 100 gpm. b – 100 gpm X 3 S/Gs = 300 gpm. d – 300 gpm total is acceptable to ensure adequate heat sink; 340 gpm is excessive due to resulting RCS cooldown.
K/A: E12-EK1.2	Objective: 13843	Source: New
Reference: WOG B/G document for 1-ECA-2.1	Level: Comprehension	

QUESTION: 79 (1.0)

With both units at 100% power, a fault on switchyard transformer #1 results in actuations that de-energize bus #1. At the same time, the “B” RSST feeder breaker trips. The EDGs re-energize the affected emergency busses.

Using the references provided, determine which ONE of the following is the **most limiting** Tech Spec action.

a. Restore one of the offsite power sources to operable within 24 hours or place **unit 2** in hot standby within the next 6 hours and cold shutdown within the following 30 hours.

b. Within one hour, initiate action to place **unit 2** in hot standby within 6 hours, hot shutdown within the next 6 hours, and cold shutdown within the following 24 hours.

c. Perform 1-PT-80 within 1 hour and restore the offsite circuit to operable within 72 hours or place **unit 1** in hot standby within the next 6 hours and cold shutdown within the following 30 hours.

d. Perform 1-PT-80 within 1 hour; perform 1-PT-82J, 1J EDG Slow Start Test, within 8 hours; restore one of the inoperable sources to operable within 12 hours or place **unit 1** in hot standby within the next 6 hours and cold shutdown within the following 30 hours.

ANSWER: b

Answer correct: for the stated conditions, both offsite power sources are inoperable for unit 2 and both unit 2 EDGs are inoperable because UV/DV protection is not functional when the EDG is carrying the bus; TS-3.0.3 is the most limiting action.	Distractors plausible: all – candidate misconception concerning EDG operability when supplying emergency bus.	Distractors incorrect: a – this presumes unit 2 EDGs are operable, they are not. c – this presumes all EDGs are operable, they are not. d – this presumes unit 2 EDGs are operable, they are not.
K/A: 055/GEN-2.1.33	Objective: 13848	Source: New
Reference: TS-3.0.3, TS-3.8.1.1; CDB for Obj 11548	Level: Comprehension	

QUESTION: 80 (1.0)

Following a loss of all AC power, the air side seal oil backup pump (1-GM-P-8) must be stopped within one hour.

What is the basis for this action per 1-ECA-0.0, Loss of all AC Power?

a. Ensures 125VDC battery 1-IV is capable of performing its design function.

b. Prevents overheating the air side seal oil backup pump.

c. Allows auto-stop oil pressure to decay to aid in tripping the turbine.

d. Minimizes the heat input to the main lube oil reservoir.

ANSWER: a

Answer correct: 1-GM-P-8 is powered from DC bus 1-IV; battery capacity is adversely affected by high discharge rates; if 1-GM-P-8 runs for more than one hour following a loss of all AC, battery 1-IV may not be capable of supplying power for 2 hours.	Distractors plausible: b – the air side seal oil pump **would** tend to overheat as battery voltage decreases. c – air side seal oil backup pump **does** supply the high pressure oil header, which supplies auto-stop oil. d – lube oil cooling would be lost and continued operation of oil pumps does add heat to the oil.	Distractors incorrect: all – per 1-ECA-0.0 background, the basis for stopping the DC oil pumps is to ensure DC bus voltage is not degraded.
K/A: 055-EK3.01	Objective: 5522	Source: New
Reference: 1-ECA-0.0; 1-AR-G-B7; UFSAR sect. 8.3.2.2.1	Level: Knowledge	

QUESTION: 81 (1.0)

Given the following plant conditions:

- Both unit 1 emergency busses are de-energized due to a **fire in the emergency switchgear**.
- Unit 1 was manually tripped from 100% power per 1-ECA-0.0, Loss of All AC Power.
- "A" S/G narrow-range level is 40%.
- "B" and "C" S/G narrow-range levels are both off-scale low.
- All S/Gs are intact.

Which ONE of the following correctly describes the team's response?

a. The team should depressurize **all** S/Gs to 145 psig in accordance with 1-ECA-0.0

b. The team should depressurize "A" S/G **only** to 145 psig in accordance with 1-ECA-0.0

c. The team should depressurize **all** S/Gs to 145 psig in accordance with 1-FCA-2, Emergency Switchgear Room Fire

d. The team should depressurize "A" S/G **only** to 145 psig in accordance with 1-FCA-2, Emergency Switchgear Room Fire

ANSWER: c

Answer correct: ECA-0.0 is entered due to loss of both emergency buses; "App-R" fire exists in emergency switchgear due to fire damage to safe shutdown equipment, so transition to FCA-2; if at least one S/G narrow-range level is >11%, all S/Gs are depressurized to 145 psig.	Distractors plausible: a – all S/Gs **are** depressurized; ECA-0.0 takes precedence over all EOPs/APs (except FCA-2.) b – since "A" S/G is the only one with adequate level, candidate may believe the other two should not be depressurized; ECA-0.0 takes precedence over all EOPs/APs (except FCA-2.) d – since "A" S/G is the only one with adequate level, candidate may believe the other two should not be depressurized.	Distractors incorrect: a & b – for an App-R fire in the emergency switchgear, FCA-2 takes precedence over ECA-0.0. b & d – all S/Gs are depressurized.
K/A: 067/GEN-2.4.27	Objective: 13905	Source: New
Reference: 1-ECA-0.0; 1-FCA-2	Level: Comprehension	

QUESTION: 82 (1.0)

Unit 1 is in mode 3 with the following plant conditions:

- RCS temperature = 360°F
- PRZR pressure = 2200 psig
- PRT pressure = 35 psig

Using the reference provided, determine which ONE of the following tailpipe temperatures would be indicative of a substantial PORV seat leak.

a. 228°F

b. 259°F

c. 281°F

d. 360°F

ANSWER: c

Answer correct: T_{sat} for 35 psig (50 psia) = 281.02°F.	Distractors plausible: a – correct if candidate converts 35 psig to psia by subtracting 15 instead of adding. b – correct if candidate doesn't convert 35 psig to psia, but extrapolates to find T_{sat} for 35 psia instead. d – correct if candidate believes isenthalpic is a constant temperature process.	Distractors incorrect: all – T_{sat} for 35 psig (50 psia) = 281.02°F.
K/A: 008-AK1.01	Objective: 3507	Source: New
Reference: Steam tables; 1-OP-1.4	Level: Comprehension	

QUESTION: 83 (1.0)

The team is responding to a LOCA and the following plant conditions exist:

- Reactor trip occurred 30 minutes ago.
- 1-ECA-1.1, Loss of Emergency Coolant Recirculation, is completed through step 14.
- No RCPs are running and the team was unable to establish CC flow to containment.
- **One** charging pump is running.
- SI flow = 280 gpm.
- The team was unable to start either LHSI pump.
- RVLIS full-range = 69%.
- RCS subcooling = 85°F.
- Core exit TCs are decreasing.
- Containment pressure = 12 psia.
- Containment high-range radiation recorder = 30% (peaked at 75%).

Using the reference provided, determine the crew's next course of action in accordance with 1-ECA-1.1, Loss of Emergency Coolant Recirculation.

a. Reset isolation signals, establish IA to containment, isolate the BIT and continue with the procedure.

b. Depressurize the RCS, check if RHR can be placed in service and continue with the procedure.

c. Reset isolation signals, establish IA to containment, stop LHSI pumps and continue with the procedure.

d. Start one additional charging pump, depressurize the RCS and continue with the procedure.

ANSWER: d

Answer correct: CTMT adverse setpoints apply, so subcooling is below the minimum required to terminate SI flow; SI flow is below the minimum required (290 gpm, per the attachment); team needs to start one additional charging pump and go to step 21 to verify adequate RCS makeup flow (yes) then depressurize the RCS and continue with the ECA.	Distractors plausible:. a – candidate fails to recognize that CTMT adverse setpoints apply and therefore believes that subcooling is adequate. b – candidate misinterprets the graph on attachment 2 and believes adequate SI flow exists. c – candidate fails to recognize that CTMT adverse setpoints apply and therefore believes that subcooling is adequate; also, candidate forgets that no LHSI pumps are running (as stated in the question stem).	Distractors incorrect: all – CTMT adverse setpoints apply, so subcooling is below the minimum required to terminate SI flow; SI flow is below the minimum required (290 gpm, per the attachment); team needs to start one additional charging pump and go to step 21 to verify adequate RCS makeup flow (yes) then depressurize the RCS and continue with the ECA
K/A: E11-EA2.2	Objective: 13839	Source: New
Reference: 1-ECA-1.1	Level: Comprehension	

QUESTION: 84 (1.0)

Unit 1 reactor startup is in progress with "C" control bank rods being withdrawn when source range channel N-31 fails low. The team suspends the startup in accordance with Technical Specification 3.3.1, "Reactor Trip System Instrumentation."

Which ONE of the following correctly states why **both** source range instrument channels are required to be operable during a reactor startup?

a. Ensures that no random single failure will prevent a high flux at shutdown alarm in response to inadvertent **cooldown**.

b. Ensures that no random single failure will prevent a high flux at shutdown alarm in response to inadvertent **dilution**.

c. Ensures that no random single failure will prevent a source range high flux trip in response to a continuous RCCA bank withdrawal event.

d. Ensures that no random single failure will prevent a source range high flux trip in response to reactivity anomalies associated with uncertainties in criticality calculations.

ANSWER: c

Answer correct: per TS bases and UFSAR, operation of the source range trip serves to prevent any significant power generation in the event of an uncontrolled control rod withdrawal.	Distractors plausible: a – cooldown results in positive reactivity addition, which results in increasing power. b – inadvertent dilution results in positive reactivity addition, which results in increasing power. d – errors in the ECP calculation can result in early criticality.	Distractors incorrect: all – per TS bases and UFSAR, operation of the source range trip serves to prevent any significant power generation in the event of an uncontrolled control rod withdrawal.
K/A: 032-AK3.01	Objective: 8965	Source: New
Reference: UFSAR sect. 15.2.1.1.B; TS bases	Level: Knowledge	

QUESTION: 85 (1.0)

The team is depressurizing the RCS using normal PRZR spray valves to stop "B" S/G tube leakage per 1-AP-24, Steam Generator Tube Leak. The following plant conditions exist:

- "A" S/G pressure stable at 670 psig.
- "B" S/G pressure stable at 1035 psig.
- "C" S/G pressure stable at 700 psig.
- RCS pressure = 1060 psig and decreasing.
- PRZR level = 71% and increasing.
- RCS subcooling = 55°F and decreasing.
- "B" S/G narrow-range level is 75% and increasing.

Using the reference provided, determine which ONE of the following is correct concerning the RCS depressurization.

a. The team should close PRZR spray valves and reduce RCS makeup flow.

b. The team should continue depressurization at the maximum attainable rate until RCS pressure is less than 1035 psig.

c. The team should secure all PRZR heaters to increase the rate of pressure decrease and continue depressurization until RCS pressure is less than 1050 psig.

d. The team should reduce RCS makeup flow and continue depressurization at the maximum attainable rate until RCS pressure is less than 1050 psig.

ANSWER: a

Answer correct: when PRZR level exceeds 70%, depressurization must stop regardless of whether or not the RCS pressure has been reduced below the leaking S/G pressure; main concern is reducing RCS makeup flow to prevent PRZR from going solid, which would result in a rapid increase in RCS pressure.	Distractors plausible: b – since the objective of AP-24 is to minimize S/G tube leakage, continuing to reduce RCS pressure to less than that of the leaking S/G is a logical course of action. c – if candidate believes pressure is not "satisfactorily decreasing," and/or if candidate is aware of the CAUTION prior to step 20, this would be a logical course of action. d – reducing RCS makeup flow would aid in preventing further PRZR level decrease; also, if candidate is aware of the CAUTION prior to step 20, this would be a logical course of action.	Distractors incorrect: all – depressurization must be stopped.
K/A: 037-AA1.09	Objective: 11404	Source: New
Reference: 1-AP-24	Level: Comprehension	

QUESTION: 86 (1.0)

Unit 1 is operating at 100% power with the following conditions:

- 1-FW-P-1C tagged out for seal cooler modifications.
- 1-FW-P-1B has just tripped due to an oil leak from the outboard bearing.

Which ONE of the following will **initially** cause 1-FW-P-3A to automatically start?

a. AMSAC.

b. Steam generator low-low level.

c. Steam flow > feed flow with low S/G level.

d. 1 of 2 breakers open on 2 of 3 MFW pumps.

ANSWER: b

Answer correct: with only 1 MFW pump available, AP-31 requires the unit to be manually tripped; S/G levels will shrink below the low-low level setpoint and start all AFW pumps.	Distractors plausible: a – AMSAC **will** actuate. c – steam flow > feed flow with low S/G level **will** occur. d – AFW pumps **will** auto-start based on MFW pump breaker position.	Distractors incorrect: a – AMSAC actuates, but **after** the S/G low-low level signal occurs. c – SF>FF with low S/G level only trips the reactor, it doesn't start AFW pumps. d – all three MFW pumps' breakers have to be open to cause AFW auto-start.
K/A: 054-AA2.03	Objective: 6035	Source: Bank item #3822
Reference: 11715-ESK-5AA	Level: Knowledge	

QUESTION: 87 (1.0)

Which ONE of the following 1H EDG components requires 125VDC power from the 1H EDG 125VDC bus to perform its function?

a. Jacket coolant pump.

b. Output breaker 15H2.

c. Pre-lube pump.

d. Auxiliary fuel oil pump.

ANSWER: d

Answer correct: the auxiliary fuel oil pump is powered from 1H EDG 125VDC.	Distractors plausible: a & c – both pumps receive power from an emergency source. b – 15H2 **does** require 125VDC power to operate.	Distractors incorrect: a & c – both pumps are powered from 480-volt AC emergency source. b – EDG output breaker is powered from 125VDC bus 1-I, **not** 1H EDG 125VDC bus.
K/A: 058-AK3.01	Objective: 6310	Source: New
Reference: 11715-ESK-11C; NCRODP-26B-LP-1	Level: Knowledge	

QUESTION: 88 (1.0)

Given the following plant conditions:
- Unit 1 is at 100% power.
- 1J EDG is tagged for corrective maintenance.
- A loss of offsite power occurs.

Which ONE of the following correctly describes the actions the team should take to align AFW flow to all S/Gs?

a. Align 1-FW-P-3A and 1-FW-P-2 in parallel to feed all three S/Gs via the **MOV header**.

b. Align 1-FW-P-3A and 1-FW-P-2 in parallel to feed all three S/Gs via the **HCV header**.

c. Align 1-FW-P-3A to feed "B" and "C" S/Gs via the **MOV header**; 1-FW-P-2 remains aligned to feed "A" S/G.

d. Align 1-FW-P-3A to feed "B" and "C" S/Gs via the **HCV header**; 1-FW-P-2 remains aligned to feed "A" S/G.

ANSWER: b

Answer correct: per 1-AP-22.3, the running pumps are aligned in parallel to feed all three S/Gs; operator must choose between MOV header and HCV header; HCV header is preferred due to lack of power to operate "J" bus powered MOVs.	Distractors plausible: a – the MOV header **is** the first option listed in the AP Action/Expected Response column; both available pumps **are** aligned in parallel to feed all S/Gs. c – the MOV header **is** the first option listed in the AP Action/Expected Response column; normal alignment for 1-FW-P-2 is dedicated to feed "A" S/G. d – normal alignment for 1-FW-P-2 is dedicated to feed "A" S/G; HCV header **is** preferred.	Distractors incorrect: a – HCV header is preferred due to lack of electrical power to operate "J" bus powered MOVs. c & d – capacity of 1-FW-P-3A is insufficient to supply full AFW flow to **two** S/Gs. c – HCV header is preferred.
K/A: 056-AA1.10	Objective: 11418	Source: New
Reference: 1-AP-22.3; CDB for Obj 11418	Level: Comprehension	

QUESTION: 89 (1.0)

Following replacement of the packing on RWST chemical addition tank outlet valve 1-QS-MOV-102B, the valve is unisolated and a large spill of sodium hydroxide occurs.

Which ONE of the following individuals is responsible for coordinating the response effort?

a. Chemistry shift team leader.

b. Shift Supervisor.

c. Recovery Manager.

d. Environmental Compliance Coordinator.

ANSWER: b

Answer correct: per VPAP-2202, the Shift Supervisor coordinates the response to a hazardous substance spill.	Distractors plausible: a – Chemistry dept. is normally responsible for assisting in dealing with hazardous substances. c – after the LEOF is manned, the RM assumes some of the duties of the SEM during the response to an emergency. d – the Environmental Compliance Coordinator must be notified of all oil and hazardous substance spills.	Distractors incorrect: a – Chemistry shift team leader is not responsible for coordinating the response to a hazardous substance spill. c – a hazardous substance spill does not require activation of the emergency response organization. d – the Environmental Compliance Coordinator is not responsible for directing the response to a hazardous substance spill.
K/A: 013/GEN-2.1.26	Objective: 13638	Source: New
Reference: VPAP-2203	Level: Knowledge	

QUESTION: 90 (1.0)

Given the following plant conditions:

- During core off-load, a fuel assembly is damaged while being placed in the SFP rack.
- The fuel handlers are unaware of the damage.
- Several days later, an increasing trend is noted on the SFP bridge crane area radiation monitor.
- The running SFP cooling pump automatically trips.

Which ONE of the following is **NOT** a reason why increased **off-site** exposure would result? **Assume no operator actions**.

a. Boiling of the SFP water releases particulate radioactivity to the atmosphere.

b. Overheating and subsequent failure of additional fuel assemblies.

c. Loss of refueling purification flow increases activity of SFP water.

d. Loss of shutdown margin due to boron stratification.

ANSWER: d

Answer correct: assuming the SFP water boron concentration is initially homogeneous, boron stratification would only occur if undiluted water were subsequently added.	Distractors plausible: a – candidate misconception concerning the potential for decay heat to cause boiling of SFP water, or the increased particulate release due to boiling. b – candidate misconception concerning the potential for decay heat to cause overheating of spent fuel assemblies. c – failure to realize that piping configuration of SFP/RP requires SFP cooling to be in service before RP can be placed in service.	Distractors incorrect: a – loss of SFP cooling eventually results in boiling, which does release increased amounts of particulate activity to the atmosphere. b – loss of SFP cooling could eventually cause overheating and failure of recently-discharged fuel assemblies, depending on power history. c – SFP/RP piping configuration requires SFP cooling to be in service for RP to be in service; loss of RP flow results in increased activity in SFP water, which increases amount of particulate activity released at the surface (even without boiling).
K/A: 033-A3.02	Objective: 3773	Source: New
Reference: NCRODP-49-NA; 0-OP-16.1	Level: Comprehension	

QUESTION: 91 (1.0)

With unit 1 in mode 5, Instrument Technicians are calibrating “A” S/G narrow-range level transmitter 1-FW-LT-1474.

Using the references provided, determine which ONE of the following correctly lists **all of the valves** associated with 1-FW-LT-1474 that the Instrument Technicians are authorized to manipulate.

a. 1-FW-ICV-3180, 3181, 3182, 3183, and 3184 **only**.

b. 1-FW-ICV-3180, 3181, 3182, 3183, 3184, 3185, 3186, 3187, 3188, 3189, 3190 and 3088 **only**.

c. 1-FW-ICV-3180, 3181, 3182, 3183, 3184, 3185, 3186, and 3088; 1-FW-74 and 75 **only**.

d. 1-FW-ICV-3180, 3181, 3182, 3183, 3184, 3185, 3186, 3187, 3188, 3189, 3190 and 3088; 1-FW-74 and 75 **only**.

ANSWER: b

Answer correct: per VPAP-1401, Instrument Technicians can only manipulate isolation valves if no root valve exists; in this example, 1-FW-74 and 75 are the isolation valves (root valves), so they can only be operated by Operations personnel; the Instrument Technicians can manipulate all of the **other** valves associated with the level transmitter.	Distractors plausible: all – candidate misconception concerning the function of the listed valves and the requirements for valve manipulation.	Distractors incorrect: a – does not list all of the instrument valves associated with the level transmitter. c – includes the root valves, and does not list all of the instrument valves associated with the level transmitter. d – includes the root valves.
K/A: GEN-2.1.1	Objective: 13558	Source: New
Reference: VPAP-1401; 11715-FM-74A; 11715-FK-74A; 1-OP-31.1A	Level: Comprehension	

QUESTION: 92 (1.0)

Unit 1 is at 100% power with the following values for RCS chemistry parameters:

- Chloride = 53 ppb
- Fluoride = 44 ppb
- Hydrogen = 12 cc/kg
- Oxygen = 72 ppb

Using the references provided, determine which ONE of the following is the most limiting action.

a. Immediately initiate unit shutdown; reduce RCS temperature to ≤250°F as quickly as possible.

b. Take action to restore hydrogen to within limit within 24 hours; if not restored, initiate unit shutdown to cold shutdown.

c. Take action to restore hydrogen to within limit within 24 hours; increase monitoring of RCS hydrogen and oxygen, gross beta gamma and suspended solids.

d. Restore oxygen and chloride to within limits within 7 days; if not restored, perform a technical evaluation and implement a program of corrective measures.

ANSWER: a

Answer correct: per VPAP-2201 table 25 (NOTE 4), with hydrogen ≤15 cc/kg and oxygen >50 ppb, plant shutdown should commence IAW action level 3.	Distractors plausible: b – this would be correct if candidate fails to read NOTE 4 of table 25. c – this would be correct without consideration of **oxygen value** as stated in NOTE 4 of table 25. d – oxygen and chloride exceed the action level 1 values; candidate misinterpretation of hydrogen values in table 25.	Distractors incorrect:. b– doesn't take into consideration NOTE 4. c – doesn't take into consideration the oxygen value as stated in NOTE 4. d – combination of hydrogen and oxygen being OOS is more limiting
K/A: GEN-2.1.34	Objective: 15457	Source: New
Reference: VPAP-2201	Level: Comprehension	

QUESTION: 93 (1.0)

A unit 2 refueling outage is scheduled to begin on March 18th, 2001. The following sequence of events is anticipated to occur on that date:

- 0100 – Reactor power < 5%.
- 0130 – Enter mode 3.

Which ONE of the following correctly states the earliest time that core off-load can commence?

a. 3/22 at 0500

b. 3/22 at 0530

c. 3/24 at 0700

d. 3/24 at 0730

ANSWER: d

Answer correct: when unit enters mode 3, reactor is called subcritical; 3/18 @ 0130 + 150 hrs. = 3/24 @ 0730	Distractors plausible: a & b – TS-3.9.3 previously required reactor to be subcritical for only 100 hours. a & c – candidate believes fuel movement can commence when sufficient time has elapsed after entry into mode 2	Distractors incorrect: a & b – TS-3.9.3 requires reactor to be subcritical for 150 hours. a & c – 150 hours must elapse after unit enters mode 3
K/A: GEN-2.2.26	Objective:	Source: New
Reference: TS-3.9.3	Level: Comprehension	

QUESTION: 94 (1.0)

Unit 1 is in mode 6 with reactor cavity level stable at 281'.

Using the references provided, determine which ONE of the following is correct concerning the Tech Spec requirements for reactor vessel water level.

a. Cavity level is adequate for control rod unlatching **and** for core off-load.

b. Cavity level is adequate for core off-load but must be increased prior to commencing control rod unlatching.

c. Cavity level is adequate for control rod unlatching but must be increased prior to commencing core off-load.

d. Cavity level must be increased prior to commencing control rod unlatching **or** core off-load.

ANSWER: c

Answer correct: minimum cavity level for rod unlatching is 275' 9.25" and for core off-load is 286' 1.825".	Distractors plausible: all – misinterpretation of TS-3.9.10.1/2 and refueling procedures requirements.	Distractors incorrect: a & b – cavity level is not adequate for core off-load. d – cavity level does not need to be increased prior to rod unlatching.
K/A: GEN-2.2.28	Objective: 9051	Source: New
Reference: 1-PT-93; TS-3.9.10.1/2	Level: Comprehension	

QUESTION: 95 (1.0)

The on-shift procedure writer presents a PT revision to the unit 1 SRO for his review and approval. The SRO is on the "Cognizant Management A" list, but is **NOT** on the "Cognizant Management B" list. The revision changes the acceptable stroke time for a containment isolation trip valve.

Which ONE of the following is correct concerning the SRO's review of the procedure change?

a. This is a **change of intent**; the SRO **is** authorized to approve the change.

b. This is a **change of intent**; the SRO is **not** authorized to approve the change.

c. This is a **non-intent change**; the SRO **is** authorized to approve the change.

d. This is a **non-intent change**; the SRO is **not** authorized to approve the change.

ANSWER: b

Answer correct: changes to the acceptance criteria for PTs is considered a change of intent, which requires Cognizant Management B approval.	Distractors plausible: all – candidate misconception concerning the definition of change of intent vs. non-intent changes, or Cognizant Mgmt A vs. B.	Distractors incorrect: a – the SRO is not authorized to approve change of intent revisions. c & d – this is a change of intent revision.
K/A: GEN-2.2.6	Objective: 13124	Source: New
Reference: UFSAR sect. 17.2.5; VPAP-0502	Level: Comprehension	

QUESTION: 96 (1.0)

Which ONE of the following correctly states radioactive gaseous release permit requirements?

a. A permit is **not** required for hogging containment if air samples indicate less than minimum detectable activity.

b. A permit is **not** required for containment purge if air samples indicate less than minimum detectable activity.

c. A permit is **not** required for steam-driven auxiliary feedwater pump testing if primary-to-secondary leakage is less than minimum detectable activity.

d. A permit is **always** required for steam dump to atmosphere via S/G PORVs whether or not primary-to-secondary leakage exists.

ANSWER: c

Answer correct: miscellaneous gaseous release permit is only required if primary-to-secondary leakage exists, per HP-3010.030.	Distractors plausible: a & b – logically, if air samples indicate no activity, a permit would serve no purpose. d – placards near the controllers in the MCR indicate that Health Physics should be notified prior to use, if possible.	Distractors incorrect: a & b – a gaseous release permit is always required prior to CTMT purge or hogging. d – planned releases via the S/G PORVs only require a permit if primary-to-secondary leakage exists.
K/A: GEN-2.3.6	Objective: 13636	Source: New
Reference: HP-3010.030	Level: Knowledge	

QUESTION: 97 (1.0)

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.

ANSWER: a

Answer correct: containment integrity must be established prior to entry into mode 6; purge isolation valves receive an auto-closure signal from CTMT gaseous/particulate radiation monitor, which is considered inoperable if no CTMT air recirc fans are running; at least one CTMT air recirc fan must be running to provide a representative sample to the CTMT gaseous/part. R/M.	Distractors plausible: all – candidate misconception regarding the flow CTMT purge system flow path.	Distractors incorrect: all – purge system has separate ductwork from the CTMT air recirc fans.
K/A: GEN-2.3.9	Objective: 4606	Source: New
Reference: 1-OP-4.1; TS-3.3.3.1; TS-3.9.9	Level: Knowledge	

QUESTION: 98 (1.0)

Following a steam generator tube rupture coincident with a loss of offsite power, the Station Emergency Manager notes that the following emergency action levels in EPIP-1.01, Emergency Manager Controlling Procedure, are **all** currently exceeded:

TAB	CONDITION	CLASSIFICATION
A-10	Failure of a safety/relief valve to close after pressure reduction, which may affect the health/safety of the public.	Notification of Unusual Event
B-2	Fuel failure with steam generator tube rupture.	General Emergency
B-4	Gross primary to secondary leakage with loss of offsite power.	Site Area Emergency
B-6	Gross primary to secondary leakage	Alert
E-1	Release imminent or in progress and site boundary doses projected to exceed 1 rem TEDE or 5 rem thyroid CEDE.	General Emergency

Which ONE of the following correctly states the tabs that should be noted when the SEM initially classifies the event?

a. **All tabs**.

b. Tab B-2 **or** E-1.

c. Tabs B-2, E-1 **and** B-4.

d. Tabs B-2 **and** E-1.

ANSWER: d

Answer correct: when a particular emergency classification exists in more than one event category, all applicable event categories should be noted to ensure the emergency classification is not inadvertently downgraded.	Distractors plausible: all – candidate misconception concerning the requirements for event classification.	Distractors incorrect: a & c – there is no need to note emergency classifications below the highest applicable emergency classification. b – both tabs should be noted.
K/A: GEN-2.4.38	Objective: 13138	Source: New
Reference: EPIP-1.01; CDB for Obj 13138	Level: Comprehension	

QUESTION: 99 (1.0)

Which ONE of the following Protective Action Recommendations is the **most conservative**?

a. Evacuate 360° from 0 to 5 miles; shelter 360° from 5 to 10 miles.

b. Shelter 360° from 0 to 2 miles; shelter downwind sectors from 2 to 5 miles.

c. Evacuate 360° from 0 to 5 miles; evacuate downwind sectors from 5 to 10 miles; shelter unaffected sectors from 5 to 10 miles.

d. Evacuate 360° from 0 to 2 miles; evacuate downwind sectors from 2 to 5 miles; shelter downwind sectors from 5 to 10 miles; shelter unaffected sectors from 2 to 10 miles.

ANSWER: c

Answer correct: this is PAR 1, which is the most conservative in accordance with EPIP-1.06.	Distractors plausible: all – candidate misconception regarding the conservatism of actions associated with protecting the public.	Distractors incorrect: all are less conservative than PAR 1.
K/A: GEN-2.4.44	Objective: 13137	Source: New
Reference: EPIP-1.06	Level: Comprehension	

QUESTION: 100 (1.0)

A shutdown LOCA has occurred on unit 1 and RCS cold-leg temperatures are below 285°F.

Which ONE of the following is correct concerning SI termination criteria

a. Criteria are less restrictive below 285°F to prevent RCS overpressurization.

b. Criteria are less restrictive below 285°F to minimize RWST depletion.

c. Criteria are more restrictive below 285°F to ensure adequate reactor vessel refill.

d. Criteria are more restrictive below 285°F to account for RCS pressure drop when SI flow is reduced.

ANSWER: a

Answer correct: with RCS cold-leg temperatures <285°F, a major concern is brittle failure of the reactor vessel; the criteria for reducing SI flow are less restrictive to prevent RCS re-pressurization, which would increase the probability of reactor vessel failure.	Distractors plausible: b – SI termination criteria are less restrictive and RWST depletion can be a concern during certain accident scenarios. c & d – candidate misconception concerning the SI termination criteria and basis for shutdown LOCA procedure guidance; c – reactor vessel refill is a concern during LOCAs. d – RCS pressure does decrease after reducing SI flow.	Distractors incorrect: b – RWST depletion is not the major concern. c & d – SI termination criteria are less restrictive.
K/A: GEN-2.4.9	Objective: 12530	Source: New
Reference: 1-AP-17; CDB for Obj 12530	Level: Knowledge	