12/27/99

NOTE TO: NRC DOCUMENT CONTROL DESK
MAIL STOP 0-5-D-24

FROM: Virgil Curley, LICENSING ASSISTANT
~~OPERATING LICENSING~~ BRANCH _ REGION I

SUBJECT: OPERATOR LICENSING EXAMINATION ADMINISTERED ON
May 7, 10-13, 1999, AT Susquehanna Units 1 & 2
DOCKET NOS 50-387 & 388

ON May 7, 10-13, 1999 OPERATOR LICENSING EXAMINATIONS WERE ADMINISTERED AT THE REFERENCED FACILITY. ATTACHED YOU WILL FIND THE FOLLOWING INFORMATION FOR PROCESSING THROUGH NUDOCS AND DISTRIBUTION TO THE NRC STAFF, INCLUDING THE NRC PDR.

Item #1 a) FACILITY SUBMITTED OUTLINE AND INITIAL EXAM SUBMITTAL DESIGNATED FOR DISTRIBUTION UNDER RIDS CODE A070.

b) AS GIVEN OPERATING + written with outlines for operating test EXAMINATION, DESIGNATED FOR DISTRIBUTION UNDER RIDS CODE A070.

Item #2 EXAMINATION REPORT WITH THE AS GIVEN WRITTEN EXAMINATION ATTACHED, DESIGNATED FOR DISTRIBUTION UNDER RIDS CODE IE42.

A070

PDR ADOCK 05000387

b

Facility: Susquehanna **Date of Examination:** 05/10/99
Examination Level: SRO **Operating Test Number:**

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Plant Cooldown Limits	JPM - Calculate a cooldown rate in accordance with SO-100-011
	Reactor Startup Requirements	JPM - Determine if Rod Worth Minimizer bypassing can be authorized in accordance with NDAP-QA-0338
A.2	Technical Specification 3.0.3 actions	JPM - Determine plant equipment operability and implement Tech Spec 3.0.3 including documentation/reports
A.3	Liquid Radioactive Waste Releases	Ques #1- Liquid Radwaste Rad Monitor operation during releases
		Ques #2- Cooling Tower blowdown flow during releases
A.4	Emergency Director Actions	JPM - Classify and make protective action recommendations for a General Emergency

A070

SUSQUEHANNA NRC ADMIN EXAM
POST SUBMITTAL CHANGES

NOTE: NORMAL type indicates exam changes made from additional facility validation completed AFTER the initial exam submittal to the NRC.
BOLD type indicates exam changes made based upon the NRC comments per telcon on 04/15/99.

PENNSYLVANIA POWER & LIGHT COMPANY
ADMIN JOB PERFORMANCE MEASURE
APPROVAL AND ADMINISTRATIVE DATA SHEET

SRO	NRC Admin A.1 #1	O	05/10/99	N/A	N/A
Appl To	JPM Number	Rev No.	Date	NUREG 1123 Sys. No.	SFG

Task Title: Calculate A Cooldown Rate In Accordance With SO-100-011

Completed By: Reviews:

C. J. Tyner	03/20/99		
Writer	Date	Instructor/Writer	Date

Approval:

Requesting Supv./C.A. Head	Date	Nuclear Training Supv.	Date

ALTERNATE PATH: N/A TIME CRITICAL: NO LOW POWER/SHUTDOWN: N/A

TESTING METHOD: PERFORM - SIMULATOR/PLANT

JPM SOURCE: NEW

Date of Performance:

	10 Min	
	Allowed Time (Min)	Time Taken (Min)

JPM Performed By:

Last	First	M.I.	Employee #/S.S. #

JPM Performance Evaluation: ( ) Satisfactory ( ) Unsatisfactory

Evaluator Name:

Signature	Typed or Printed

Comments:

REQUIRED TASK INFORMATION
ADMIN JOB PERFORMANCE MEASURE
NRC Admin A.1 #1

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP-AD-001, Operations Shift Policies.

B. All applicable safety precautions shall be taken in accordance with established PP&L safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment; such as hearing or eye protection, safety shoes, hardhats, etc; is required and/or posted as being necessary.

II. REFERENCES

A. SO-100-011, "Reactor Vessel Temperature And Pressure Recording", Rev. 12, Section 6.1

B. <u>**Evaluator**</u> - See attached copy of SO-100-011, Attachment A filled out as expected.

III. REACTIVITY MANIPULATIONS

N/A

IV. TASK CONDITIONS

A. Unit 1 is shutdown and is performing a normal cooldown and depressurization

B. The plant process computer is not available for taking cooldown data

V. INITIATING CUE

The Unit Supervisor directs you to take plant cooldown data and to determine if the Technical Specification cooldown rate has been violated.

<u>**JPM Setup**</u> - Ensure a copy of SO-100-011 and blank SO-100-11 Attachment A are available for Candidate.

PERFORMANCE CHECKLIST

Appl. To/JPM No: NRC Admin A.1 #1 Candidate Name:______________________

Step	Action	Standard	Eval	Comments
1.	Obtain a controlled copy of SO-100-011	Controlled copy obtained		
2.	Selects correct section to perform **Evaluator** - provide copy of Attachment A when Candidate locates controlled copy	Selects Section 6.1 and Attachment A		
3.	Records current date and time	Records date/time on Attachment A		
4.	Records initial set of plant parameters at time "0" from panel indications **Cue** - When correct recorder and panel identified for each data point provide the following to the Candidate at time "0" • Recirc Loop "A" - 435 deg F • Recirc Loop "B" - 435 deg F • Bottom Head Drain - 402 deg F • Reactor pressure - 485 psig	Records the following parameters: • Recirc Loop "A" temperature (TR-B31-1R650 on C652) • Recirc Loop "B" temperature (TR-B31-1R650 on C652) • Reactor Vessel Bottom Head Drain temperature (TR-B21-1R006 on C007) • Reactor pressure (PI-C32-1R605 on C652)		
*5.	Calculate and record steam dome temperature **Evaluator** - 485 psig + 15 psi = 500 psia = 467 deg F **Cue** - When steam dome temp calculated and recorded cue candidate that 15 minutes have passed	Notes direct steam dome temperature not available, calculates temperature using steam tables and reactor pressure, records approx 467 deg F		

* - Critical Step # - Critical Sequence

Appl. To/JPM No: NRC Admin A.1 #1

Candidate Name:_______________

Step	Action	Standard	Eval	Comments
6.	Records plant parameters at time "15" from panel indications **Cue** - When correct recorder and panel identified for each data point provide the following to the Candidate at time "15" • Recirc Loop "A" - 425 deg F • Recirc Loop "B" - 425 deg F • Bottom Head Drain - 389 deg F • Reactor pressure - 395 psig	Records the following parameters: • Recirc Loop "A" temperature (TR-B31-1R650 on C652) • Recirc Loop "B" temperature (TR-B31-1R650 on C652) • Reactor Vessel Bottom Head Drain temperature (TR-B21-1R006 on C007 • Reactor pressure (PI-C32-1R605 on C652)		
*7.	Calculate and record steam dome temperature **Evaluator** - 395 psig + 15 psi = 410 psia = 447 deg F	Notes direct steam dome temperature not available, calculates temperature using steam tables and reactor pressure, records approx 447 deg F		
*8.	Calculate and record temperature changes for first 15 minutes of cooldown **Cue** - When delta T's calculated and recorded cue candidate that 15 additional minutes have passed	Calculates/records delta T's from time "0" to time "15" as follows: • Recirc Loop "A" - 10 deg F • Recirc Loop "B" - 10 deg F • Bottom head drain - 13 deg F • Steam dome - 20 deg F		

* - Critical Step # - Critical Sequence

Appl. To/JPM No: NRC Admin A.1 #1 Candidate Name:________________

Step	Action	Standard	Eval	Comments
9.	Records plant parameters at time "30" from panel indications **Cue** - When correct recorder and panel identified for each data point provide the following to the Candidate at time "30" • Recirc Loop "A" - 417 deg F • Recirc Loop "B" - 417 deg F • Bottom Head Drain - 378 deg F • Reactor pressure - 320 psig	Records the following parameters: • Recirc Loop "A" temperature (TR-B31-1R650 on C652) • Recirc Loop "B" temperature (TR-B31-1R650 on C652) • Reactor Vessel Bottom Head Drain temperature (TR-B21-1R006 on C007 • Reactor pressure (PI-C32-1R605 on C652)		
*10.	Calculate and record steam dome temperature **Evaluator** - 320 psig + 15 psi = 335 psia = 428 deg F	Notes direct steam dome temperature not available, calculates temperature using steam tables and reactor pressure, records approx 428 deg F		
*11.	Calculate and record temperature changes for second 15 minutes of cooldown	Calculates/records delta T's from time "15" to time "30" as follows: • Recirc Loop "A" - 8 deg F • Recirc Loop "B" - 8 deg F • Bottom head drain - 11 deg F • Steam dome - 19 deg F		

* - Critical Step # - Critical Sequence

PERFORMANCE CHECKLIST

Appl. To/JPM No: NRC Admin A.1 #1 Candidate Name:________________________

Step	Action	Standard	Eval	Comments
*12.	Confirm compliance with TS 3.4.10.1 **Evaluator** - SO-100-001 Step 6.1.4 at bottom of page 6 directs verifying TS compliance every half hour. Candidate verifying TS compliance after just first 15 minutes of data is NOT satisfactory. In addition, Not (1) at top of page 7 states that Steam Dome Temperature should be used to "best determine" cooldown rate. Candidate should use the change in calculated steam dome temperature from time "0" to time "30" to determine if TS limit of >100 deg in any one hour has been violated.	Calculates steam dome temperature change from time "0" to time "30". Determines change is 39 deg. Determines current cooldown rate is 78 deg/hour. Reports to US that cooldown is 78 deg/hour and is less than TS limit .		

* - Critical Step # - Critical Sequence

TASK CONDITIONS:

A. Unit 1 is shutdown and is performing a normal cooldown and depressurization

INITIATING CUE:

The Unit Supervisor directs you to take plant cooldown data and to determine if the Technical Specification cooldown rate has been violated.

TASK CONDITIONS:

A. Unit 1 is shutdown and is performing a normal cooldown and depressurization

INITIATING CUE:

The Unit Supervisor directs you to take plant cooldown data and to determine if the Technical Specification cooldown rate has been violated.

PENNSYLVANIA POWER & LIGHT COMPANY
ADMIN JOB PERFORMANCE MEASURE
APPROVAL AND ADMINISTRATIVE DATA SHEET

SRO	NRC Admin A.1 #2	O	05/10/99	N/A	N/A
Appl To	JPM Number	Rev No.	Date	NUREG 1123 Sys. No.	SFG

Task Title: Authorize Bypassing Rod Worth Minimizer In Accordance With NDAP-QA-0338

Completed By: Reviews:

C. J. Tyner	03/20/99		
Writer	Date	Instructor/Writer	Date

Approval:

Requesting Supv./C.A. Head	Date	Nuclear Training Supv.	Date

ALTERNATE PATH: N/A TIME CRITICAL: NO LOW POWER/SHUTDOWN: N/A

TESTING METHOD: PERFORM - SIMULATOR/PLANT

JPM SOURCE: NEW

Date of Performance: ______ 10 Min Allowed Time (Min) ______ Time Taken (Min)

JPM Performed By:

______ Last First M.I. ______ Employee #/S.S. #

JPM Performance Evaluation: ( ) Satisfactory ( ) Unsatisfactory

Evaluator Name:

______ Signature ______ Typed or Printed

Comments:

REQUIRED TASK INFORMATION
ADMIN JOB PERFORMANCE MEASURE
NRC Admin A.1 #2

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP-AD-001, Operations Shift Policies.

B. All applicable safety precautions shall be taken in accordance with established PP&L safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment; such as hearing or eye protection, safety shoes, hardhats, etc; is required and/or posted as being necessary.

II. REFERENCES

A. NDAP-QA-0338, "Reactivity Management And Controls Program", Rev. 5, Section 6.8

B. NDAP-QA-0338, Attachment I

C. NDAP-QA-0312, Attachment C

III. REACTIVITY MANIPULATIONS

N/A

IV. TASK CONDITIONS

A. Unit 1 is at 8% with power ascension to 100% in progress

B. Control rod 50-35 has just been withdrawn from Notch "08" to Notch "12" per step A2-306

C. When rod 50-27 was withdrawn from Notch "O8" to "12" per Step A2-307, a Rod Block alarm was received and rod motion stopped

D. RSCS indications show it is not generating the rod block and Rod Position Indication is Operable

E. The Rod Worth Minimizer Withdraw Block status light is illuminated

F. All rods have been verified to be in the pull sheet required positions

G. The Reactor Engineer has verified the pull sheet to be correct

H. Troubleshooting has determined that a RWM failure has caused the rod block and that there have been no computer problems

V. INITIATING CUE

The Shift Supervisor directs you to determine if RWM bypassing is allowed for these conditions.

Evaluator - once Candidate has determined the RWM can be bypassed, direct completion the required documentation and any additional actions.

JPM Setup - Ensure a copy of NDAP-QA-0338, blank NDAP-QA-0338 Attachment I and LCO Report form are available for Candidate.

PERFORMANCE CHECKLIST

Appl. To/JPM No: NRC Admin A.1 #2

Candidate Name:____________________

Step	Action	Standard	Eval	Comments
1.	Obtain controlled copy of NDAP-QA-0338	Controlled copy obtained		
2.	Selects correct section to perform **<u>Evaluator</u>** - provide copy of Attachment I when Candidate locates controlled copy	Selects Section 6.8 and Attachment I		
*3.	Determines Rod Worth Minimizer can be bypassed **<u>Evaluator</u>** - see attached copy of Attachment I **<u>Evaluator</u>** - once Candidate has determined RWM can be bypassed, cue completion of documentation and any additional required actions.	Completes NDAP-QA-0338 Section 6.8 and Attachment I, determines RWM can be bypassed, informs Shift Supervisor		
*4.	Authorize bypassing RWM	Checks authorization to bypass RWM, signs/dates Attachment I		
*5.	Refers to Tech Spec 3.3.2.1, Action C	Determines startup can continue if all rod movements verified to be in accordance with BPWS by 2nd licensed operator, STA or RE AND if the RWM has not been Inop for a startup in the last calendar year.		
*6.	Completes LCO Report Form for LCO 3.3.2.1 **<u>Evaluator</u>** - see attached copy of LCO Report Form	LCO Report Form completed		

* - Critical Step # - Critical Sequence

TASK CONDITIONS:

A. Unit 1 is at 8% with power ascension to 100% in progress

B. Control rod 50-35 has just been withdrawn from Notch "08" to Notch "12" per step A2-306

C. When rod 50-27 was withdrawn from Notch "O8" to "12" per Step A2-307, a Rod Block alarm was received and rod motion stopped

D. RSCS indications show it is not generating the rod block and Rod Position Indication is Operable

E. The Rod Worth Minimizer Withdraw Block status light is illuminated

F. All rods have been verified to be in the pull sheet required positions

G. The Reactor Engineer has verified the pull sheet to be correct

H. Troubleshooting has determined that a RWM failure has caused the rod block and that there have been no computer problems

INITIATING CUE:

The Shift Supervisor directs you to determine if RWM bypassing is allowed for these conditions.

TASK CONDITIONS:

A. Unit 1 is at 8% with power ascension to 100% in progress

B. Control rod 50-35 has just been withdrawn from Notch "08" to Notch "12" per step A2-306

C. When rod 50-27 was withdrawn from Notch "O8" to "12" per Step A2-307, a Rod Block alarm was received and rod motion stopped

D. RSCS indications show it is not generating the rod block and Rod Position Indication is Operable

E. The Rod Worth Minimizer Withdraw Block status light is illuminated

F. All rods have been verified to be in the pull sheet required positions

G. The Reactor Engineer has verified the pull sheet to be correct

H. Troubleshooting has determined that a RWM failure has caused the rod block and that there have been no computer problems

INITIATING CUE:

The Shift Supervisor directs you to determine if RWM bypassing is allowed for these conditions.

PENNSYLVANIA POWER & LIGHT COMPANY
ADMIN JOB PERFORMANCE MEASURE
APPROVAL AND ADMINISTRATIVE DATA SHEET

SRO	NRC Admin A.2	O	05/10/99	N/A	N/A
Appl To	JPM Number	Rev No.	Date	NUREG 1123 Sys. No.	SFG

Task Title: Determine Plant Equipment Operability And Implement Tech Spec 3.0.3 Including Documentation/Reports

Completed By: Reviews:

C. J. Tyner	03/20/99		
Writer	Date	Instructor/Writer	Date

Approval:

Requesting Supv./C.A. Head	Date	Nuclear Training Supv.	Date

ALTERNATE PATH: N/A TIME CRITICAL: NO LOW POWER/SHUTDOWN: N/A

TESTING METHOD: PERFORM - SIMULATOR/PLANT

JPM SOURCE:

Date of Performance:

	15 Min	
	Allowed Time (Min)	Time Taken (Min)

JPM Performed By:

Last	First	M.I.	Employee #/S.S. #

JPM Performance Evaluation: ( ) Satisfactory ( ) Unsatisfactory

Evaluator Name:

Signature	Typed or Printed

Comments:

REQUIRED TASK INFORMATION
ADMIN JOB PERFORMANCE MEASURE
NRC Admin A.2

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP-AD-001, Operations Shift Policies.

B. All applicable safety precautions shall be taken in accordance with established PP&L safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment; such as hearing or eye protection, safety shoes, hardhats, etc; is required and/or posted as being necessary.

II. REFERENCES

A. SO-159-002, "Monthly Operability Check Of Suppression Chamber Drywell Vacuum Relief Breaker Valves", Rev. 8

B. Unit Tech Spec 3.6.1.6 and 3.0.3

III. REACTIVITY MANIPULATIONS

N/A

IV. TASK CONDITIONS

A. During a Recirc runback to the #1 Limiter, the "D" Safety Relief Valve momentarily opened and immediately reclosed

B. The appropriate operator actions for the runback and SRV opening were taken.

C. SO-159-002, "Monthly Operability Check Of Suppression Chamber Drywell Vacuum Relief Breaker Valves", was performed within 2 hours of the SRV opening

V. INITIATING CUE

You are directed to review the provided Checksheet 1 for Attachment A of SO-159-002, complete the Data Sheet for Attachment A and take the appropriate actions including any required documentation.

<u>JPM Setup</u> - Ensure a copy of SO-159-002 and SO-159-002 Checksheet 1 Attachment A are filled out per attached and a blank Data Sheet are available for Candidate.

PERFORMANCE CHECKLIST

Appl. To/JPM No: NRC Admin A.2

Candidate Name:____________________

Step	Action	Standard	Eval	Comments
1.	Reviews provided SO-159-002 Checksheet 1 **Evaluator** - if Candidate asks, the operator was directed to complete the entire surveillance even after the first inop vacuum breaker was discovered	Reviews Checksheet 1 Data		
*2.	Determines Vacuum Breaker Relief Valves Operability	Determines both Vacuum Breaker Relief Valves in Downcomers "B" and "E" did not open during test, declares both pairs of valves Inoperable		
*3.	Completes SO-159-002 Attachment A Data Sheet	Circles "No" for Acceptance Criteria 1 and 2 and initials in "Confirm" block, circles "Yes" for Required Action 1 and "No" for 2 & 3 and initials in "Confirm" block, may note in remarks that two pairs of vacuum breakers did not open		
*4.	Refers to TS 3.6.1.6	Declares Inboard and Outboard Vacuum Breaker Relief Valves for both the "B" and "E" Downcomer Inoperable, notes no applicable action statements for these conditions, determines TS 3.0.3 applicable		

* - Critical Step   # - Critical Sequence

PERFORMANCE CHECKLIST

Appl. To/JPM No: NRC Admin A.2 Candidate Name:________________________

Step	Action	Standard	Eval	Comments
*5.	Refers to TS 3.0.3 and initiates actions to comply with 3.0.3 **Evaluator** - must start TS 3.0.3 actions within one hour	Required to initiate actions within 1 hour to be in Mode 2 within 7 hours, Mode 3 within 13 hours and Mode 4 within 37 hours		
6.	Directs actions for plant shutdown	• Direct Unit PCO to obtain and review GO-100-004, "Plant Shutdown to Minimum Power" • Contract RE for control rod shutdown sequence		
7.	Contact maintenance	• Initiate WA for Vacuum Breaker troubleshoot/repair • Inform maintenance that Unit is in Shutdown LCO		
8.	Make notifications	Notify: • Duty Manager • NRC • PCC • Operations Manager		
9.	Complete LCO Log Sheet	Completes LCO Log Sheet IAW NDAP-QA-0302		

* - Critical Step # - Critical Sequence

TASK CONDITIONS:

A. During a Recirc runback to the #1 Limiter, the "D" Safety Relief Valve momentarily opened and immediately reclosed

B. The appropriate operator actions for the runback and SRV opening were taken.

C. SO-159-002, "Monthly Operability Check Of Suppression Chamber Drywell Vacuum Relief Breaker Valves", was performed within 2 hours of the SRV opening

INITIATING CUE:

You are directed to review the provided Checksheet 1 for Attachment A of SO-159-002, complete the Data Sheet for Attachment A and take the appropriate actions including any required documentation.

TASK CONDITIONS:

A. During a Recirc runback to the #1 Limiter, the "D" Safety Relief Valve momentarily opened and immediately reclosed

B. The appropriate operator actions for the runback and SRV opening were taken.

C. SO-159-002, "Monthly Operability Check Of Suppression Chamber Drywell Vacuum Relief Breaker Valves", was performed within 2 hours of the SRV opening

INITIATING CUE:

You are directed to review the provided Checksheet 1 for Attachment A of SO-159-002, complete the Data Sheet for Attachment A and take the appropriate actions including any required documentation.

CANDIDATE: ____________________ **DOCKET:** ______________ **DATE:** ______________

QUESTION: A.3 #1

The Liquid Radwaste Radiation Monitor has been determined to be Inoperable. What are the limitations and restrictions for liquid releases for these conditions?

ANSWER:

The Laundry Drain Sample Tank CANNOT be released. Other tanks (Liquid Radwaste Sample and Distillate Sample tanks) can be released for up to 14 days provided:

- A minimum of two independent tank samples are drawn and analyzed IAW TRO 3.11.1.1
- The release rate calculations are independently verified
- The release check-off list (discharge valve lineup) is performed and independently verified

RESPONSE:

SAT _____ **UNSAT** _____ **K/A NUMBER:** 268000G303 1.8/2.9

REFERENCES: OP-069-050, "Release Of Liquid Radioactive Waste", Rev. 21, Sections, 3.1.3.h, 3.2.3.h and 3.3.3.h, Pages 7, 33 and 61

NDAP-QA-0310, "Liquid Effluent Release", Rev. 3, Section 6.2, Page 9

Unit 1 TRM 3.11.1.4, Action B, Page 3.11-9

QUESTION: A.3 #2

Unit 1 is ready to perform a release of the "A" and "B" LRW Sample Tanks. Total Site Blowdown instrumentation is inoperable. The Unit 2 cooling tower basin is drained.

How is the minimum blowdown flow of 5500 gpm assured during the release of this tank for these conditions?

ANSWER:

Must ensure that Unit 1 cooling tower blowdown is at least 5500 gpm. Done by closing the Cooling Tower Blowdown Valve then reopening it to a position specified. Once at this position, the desired flow (from graph) is compared with indicated flow. If the indicated flow is above the graph, the instrumentation is providing valid indication..

RESPONSE:

SAT ______ **UNSAT** ______ **K/A NUMBER:** 268000G306 2.1/3.1

REFERENCES: OP-069-050, "Release Of Liquid Radioactive Waste", Rev. 21, Sections, 3.3.9, 3.3.10 and Attachment F, Pages 68-70 and 168-174

PENNSYLVANIA POWER & LIGHT COMPANY
ADMIN JOB PERFORMANCE MEASURE
APPROVAL AND ADMINISTRATIVE DATA SHEET

SRO	NRC Admin A.4	O	05/10/99	N/A	N/A
Appl To	JPM Number	Rev No.	Date	NUREG 1123 Sys. No.	SFG

Task Title: Classify And Make Protective Action Recommendations For A General Emergency

Completed By: Reviews:

C. J. Tyner	03/20/99		
Writer	Date	Instructor/Writer	Date

Approval:

Requesting Supv./C.A. Head	Date	Nuclear Training Supv.	Date

ALTERNATE PATH: N/A TIME CRITICAL: YES LOW POWER/SHUTDOWN: N/A

TESTING METHOD: PERFORM - SIMULATOR/PLANT

JPM SOURCE: Facility JPM 9.100.01.081, Rev. 00 - Modified to provide new plant parameters for GE classification, updated to latest procedure revisions

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Date of Performance: ____________ Allowed Time (Min) ____________ Time Taken (Min)

JPM Performed By: ____________ Last First M.I. ____________ Employee #/S.S. #

JPM Performance Evaluation: ( ) Satisfactory ( ) Unsatisfactory

Evaluator Name: ____________ Signature ____________ Typed or Printed

Comments:

REQUIRED TASK INFORMATION
ADMIN JOB PERFORMANCE MEASURE
NRC Admin A.4

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP-AD-001, Operations Shift Policies.

B. All applicable safety precautions shall be taken in accordance with established PP&L safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment; such as hearing or eye protection, safety shoes, hardhats, etc; is required and/or posted as being necessary.

II. REFERENCES

A. EP-PS-100, "Emergency Director, Control Room", Rev. 13

B. EP-PS-126, "Control Room Communicator", Rev. 14

III. REACTIVITY MANIPULATIONS

N/A

IV. TASK CONDITIONS

A. Unit 1 has experienced a MSIV closure from 100% power

B. Control rods did NOT insert and all methods of inserting rods have been unsuccessful

C. The Scram Discharge Volume did not isolate on the scram signal

D. Both Standby Liquid Control Squib Valves failed to fire

E. Reactor power is 43%

F. Suppression pool water temperature is 195 degrees F

G. Containment Rad Monitors are reading 1 rem/hour

V. INITIATING CUE

You are directed to classify this event and take appropriate actions IAW the Emergency Plan.

JPM Setup - Ensure a copy of EP-PS-100 and EP-PS-126, blank ENR and PAR forms and blank Notification Matrix are available for Candidate.

PERFORMANCE CHECKLIST

Appl. To/JPM No: NRC Admin A.4

Candidate Name:____________________

Step	Action	Standard	Eval	Comments
	Evaluator - After the Candidate has the task conditions, the initiating cue and understands the task, state that steps within this JPM are **TIME CRITICAL**. **Evaluator** - Note start time for event classification.			
*1.	Classify the emergency within 15 minutes for the given conditions. **Evaluator** - GE classification must be made within 15 minutes of start time	• Refers to EP-PS-0100 Emergency Director Tab 6 • Evaluate Unit conditions • Declares General Emergency IAW EAL #11.4 • Classification made within 15 minutes of JPM start		
2. 3.	Document and communicate the classification **Cue** - Acknowledge CR announcement as US **Cue** - Acknowledge direction as Communicator	Refers to Tab "E" for the following: • Announce to CR that you are ED, a GE has been declared and the time and date of the classification. • Appoint a CR Communicator and direct performance of EP-PS-126 • Direct CR Communicator to make page announcement of classification • Initiate Accountability and Site Evacuation of non-essential personnel		

* - Critical Step # - Critical Sequence

Appl. To/JPM No: NRC Admin A.4

Candidate Name:____________________

Step	Action	Standard	Eval	Comments
*4.	Make public protective action recommendation within 15 minutes of General Emergency declaration. **Evaluator** - PAR shall be made within 15 minutes of GE classification time, see attached PAR form **Cue** - acknowledge as communicator	Refers to Tab 7 for the following: • Completes Tab 7 flow chart and determines that PAR should be Shelter in a 0 -10 mile radius • Completes PAR form per Tab 11 • Directs CR Communicator to notify PEMA EOC of PAR		
5.	Activate the Emergency Response Organizations	Directs CR Communicator to notify SCC to activate NERO: • Notifies HP and Chemistry • EOF Staff • OSC Staff • Duty Manager • Recovery Manager		
*6.	Complete Emergency Notification Report within 15 minutes. **Cue** - You are directed to complete the ENR **Evaluator** - See attached ENR, this step is critical for filling out the form, not meeting the 15 minute requirements since the Candidate is doing all the work alone **Cue** - When ENR completed, cue Candidate to demonstrate how to make the notifications.	Directs CR Communicator to complete ENR. • Completes ENR per Tab 11		

* - Critical Step # - Critical Sequence

PERFORMANCE CHECKLIST

Appl. To/JPM No: NRC Admin A.4 Candidate Name:________________________

Step	Action	Standard	Eval	Comments
7.	Make Emergency Notifications **<u>Evaluator</u>** - once notifications made, cue Candidate the JPM is complete.	Refers to EP-PS-126, Tab 4 and/or the flowchart and makes all required notifications.		

* - Critical Step # - Critical Sequence

TASK CONDITIONS:

A. Unit 1 has experienced a MSIV closure from 100% power

B. Control rods did NOT insert and all methods of inserting rods have been unsuccessful

C. The Scram Discharge Volume did not isolate on the scram signal

D. Both Standby Liquid Control Squib Valves failed to fire

E. Reactor power is 43%

F. Suppression pool water temperature is 195 degrees F

G. Containment Rad Monitors are reading 1 rem/hour

INITIATING CUE:

You are directed to classify this event and take appropriate actions IAW the Emergency Plan.

TASK CONDITIONS:

A. Unit 1 has experienced a MSIV closure from 100% power

B. Control rods did NOT insert and all methods of inserting rods have been unsuccessful

C. The Scram Discharge Volume did not isolate on the scram signal

D. Both Standby Liquid Control Squib Valves failed to fire

E. Reactor power is 43%

F. Suppression pool water temperature is 195 degrees F

G. Containment Rad Monitors are reading 1 rem/hour

INITIATING CUE:

You are directed to classify this event and take appropriate actions IAW the Emergency Plan.

JPM QUESTIONS

Appl. To/JPM No: NRC 1-#1 Candidate Name:________________________

QUESTION NO: __1__ **ONLY REFERENCE USE ALLOWED IS PRINTS**

With the plant at normal operating conditions, how does throttling the CRD Pressure Control Valve in the closed direction result in an increased drive water pressure (D/P)? How does the Flow Control Valve respond during this change of pressure? Explain your answer?

EXPECTED ANSWER:

-- For a steady flowrate, closing the valve raises the differential pressure across the valve
-- The FCV will open
-- As the PCV is closed, flow though the system is reduced, therefore FCV opens to restore flow to setpoint

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 201001K407 3.1/3.0

REFERENCES: SY017 K-2, "Control Rod Drive Hydraulics", Rev. 2, Section IV.B.4.c.1)h), Page 16, LO - 7.c

JPM QUESTIONS

Appl. To/JPM No: NRC 1-#1 Candidate Name:______________________

QUESTION NO: 2 **THIS QUESTION IS CLOSED REFERENCE**

How is the reactivity insertion rate (required control rod speed) regulated during a SINGLE control rod withdrawal/insertion movement? Though not a Tech Spec number, normal control rod movement speeds are limited. What is the basis for limiting the maximum speed for control rod movement?

EXPECTED ANSWER:

- -- The water flow going to and leaving from the under-piston area of the control rod drive mechanism is throttled. (needle valves on directional control valves 120 and 123)
- -- Maximum speed is based upon limiting the maximum reactivity addition rate during a continuous control rod withdrawal accident during a startup.

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 201001K110 2.8/2.8

REFERENCES: SY017 K-2, "Control Rod Drive Hydraulics", Rev. 1, Section IV.A.4.d, Pages 4 & 5, LO - 7.e

USAR, Volume 7, Section 4.6

JPM QUESTIONS

Appl. To/JPM No: NRC 1-#1 Candidate Name:________________________

QUESTION NO: _2_ **THIS QUESTION IS CLOSED REFERENCE**

How is the reactivity insertion rate (required control rod speed) regulated during a SINGLE control rod withdrawal/insertion movement? Though not a Tech Spec number, normal control rod movement speeds are limited. What is the basis for limiting the maximum speed for control rod movement?

JPM QUESTIONS

Appl. To/JPM No: NRC 1-#1 Candidate Name:________________________

QUESTION NO: 1 **ONLY REFERENCE USE ALLOWED IS PRINTS**

With the plant at normal operating conditions, how does throttling the CRD Pressure Control Valve in the closed direction result in an increased drive water pressure (D/P)? How does the Flow Control Valve respond during this change of pressure? Explain your answer?

Appl. To/JPM No: NRC 1-#1 Candidate Name:______________________

TASK CONDITIONS:

A. Unit 1 is operating at power

B. SO-156-001, "Weekly Control Rod Exercising", is in progress

C. Control rod 18-11 is the next control rod to be exercised

D. A second operator is available for control rod verifications

INITIATING CUE

The Unit Supervisor directs you to continue with and complete SO-156-001, starting with control rod 18-11

PENNSYLVANIA POWER & LIGHT COMPANY
JOB PERFORMANCE MEASURE
APPROVAL AND ADMINISTRATIVE DATA SHEET

SRO	NRC 1-#2	0	05/10/99	206000	2
Appl To	JPM Number	Rev No.	Date	NUREG 1123 Sys. No.	SFG

Task Title: Place HPCI In CST To CST Mode - Steam Leak Without Isolation

Completed By: Reviews:

C. J. Tyner	03/10/99		
Writer	Date	Instructor/Writer	Date

Approval:

Requesting Supv./C.A. Head	Date	Nuclear Training Supv.	Date

- -

ALTERNATE PATH: YES TIME CRITICAL: NO LOW POWER/SHUTDOWN: NO

TESTING METHOD: PERFORM - SIMULATOR

JPM SOURCE: NEW

- -

Date of Performance: ______

10 Min
Allowed Time (Min)

Time Taken (Min)

JPM Performed By:

Last First M.I. Employee #/S.S. #

JPM Performance Evaluation: ( ) Satisfactory ( ) Unsatisfactory

Ques #1: ( ) Satisfactory ( ) Unsatisfactory Ques #2: ( ) Satisfactory ( ) Unsatisfactory

Evaluator Name:

Signature Typed or Printed

Comments:

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
NRC 1-#2

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP-AD-001, Operations Shift Policies.

B. All applicable safety precautions shall be taken in accordance with established PP&L safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment; such as hearing or eye protection, safety shoes, hardhats, etc; is required and/or posted as being necessary.

II. REFERENCES

A. OP-152-001, "High Pressure Coolant Injection", Rev. 25, Section 3.8

III. REACTIVITY MANIPULATIONS

N/A

IV. TASK CONDITIONS

A. Unit 1 is operating at power

B. Maintenance needs to take vibrations readings on HPCI

C. Suppression pool cooling is in service

D. Standby Gas Treatment and ESW are in service

E. An operator is standing by in the HPCI Room and HPCI has been verified filled and vented.

V. INITIATING CUE

The Unit Supervisor directs you to perform a manual start of HPCI and place it in the CST to CST Mode at 5000 gpm at 900 psig discharge pressure with the flow controller in "Automatic" in accordance with OP-152-001, Section 3.8. A second operator is available to perform SO-159-010.

PERFORMANCE CHECKLIST

Appl. To/JPM No: NRC 1-#2 Candidate Name:______________________

Step	Action	Standard	Eval	Comments
0.	**Simulator Setup:** • Any at-power IC • Place suppression pool cooling, Standby Gas Treatment and ESW in service • Support Candidate as requested for HPCI operation • Allow candidate to start HPCI and place in "Automatic" at 5000 gpm then insert malfunction for steam leak with a failure to auto isolate. Fail the Manual Isolation as well. Allow the valves to close when Candidate closes them with the switches			
1.	Obtain controlled copy of OP-152-001	Controlled copy of OP-152-001 obtained.		
2.	Selects applicable procedure section	Selects Section 3.8		
3.	Review prerequisites and precautions	Ensure prerequisites and precautions are met		
4.	Place HPCI Div 1 and 2 MOV OL Bypass keyswitches to "Test"	HS-E41-1S42 and 1S41 in "Test", HPCI Out Of Service annunciator received, HPCI Div 1 and 2 MOVS In Test lights on		
5.	Place HPCI Div 1 and 2 Out Of Service switches to "Inop"	HS-E41-1S34A and 1S34B in "Inop", HPCI Div 1 and 2 Out Of Service status lights on		
6.	Ensure HPCI Pump suction pressure is GTE 18 psig	Checks PI-E41-1R606 GTE 18 psig		

* - Critical Step # - Critical Sequence

PERFORMANCE CHECKLIST

Appl. To/JPM No: NRC 1-#2 Candidate Name:________________________

Step	Action	Standard	Eval	Comments
7.	Perform SO-159-010 **Evaluator** - the second operator is ready to perform SO-159-010	Identifies requirement to perform SO-159-010		
8.	Ensure HPCI Injection Valve (F006) is closed	Checks HV-155-F006 closed		
9.	Open Breaker 1D264061 for HPCI Injection Valve **SIM OP** - open breaker when Candidate requests	Directs local operator to open breaker. Verifies HPCI Div 2 OL or Power Loss light is on when breaker is opened		
10.	Place SGTS, ESW and Supp Pool cooling in service	Verifies all in service, from initial conditions		
11.	Check HPCI Test Line to CST Valve (F008) closed	Verifies HV-155-F008 closed		
*12.	Open HPCI Test Line to CST Valve (F011)	Opens HV-155-F011		
13.	Check HPCI filled and vented	Verifies HPCI filled and vented, from initial conditions		
14.	Evacuate personnel from HPCI Room and Pipe areas	Makes announcement to evacuate areas/directs local operator to leave area		
15.	Place HPCI Flow Controller in "Manual" and set at "Minimum"	Places FC-E41-1R600 in "Manual" and runs tape down to "Minimum"		
16.	Start HPCI Barometric Condenser Vacuum Pump	Starts 1P216		

* - Critical Step # - Critical Sequence

PERFORMANCE CHECKLIST

Appl. To/JPM No: NRC 1-#2 Candidate Name:______________________

Step	Action	Standard	Eval	Comments
17.	Open HPCI Lube Oil Cooling Water Valve (F059)	Opens HV-156-F059		
*18.	Simultaneously start HPCI Aux Oil Pump and open Turbine Steam Supply Valve (F001)	Starts 1P213 and opens HV-155-F001		
19.	Ensures normal HPCI startup response	Ensures the following: • HPCI Line Drain To Condenser Inboard and Outboard Isolation valves (HV-155-F028 & F029) close • HPCI Barometric Condenser Condensate Pump Discharge Drain Valves (HV-155-F025 & F026) close if open • HPCI Room Cooler (1V209A/B) starts at 1C681 • HPCI Min Flow To Suppression Pool Valve (HV-155-F012) opens • HPCI Pump Discharge Low Flow alarm is received after time delay • Full open indication on HPCI Turbine Stop Valve (FV-15612)		
*20.	Raise HPCI turbine speed to approx 2200-2500 rpm using HPCI Flow Controller (FC-E41-1R600)	HPCI turbine speed raised to between 2200-2500 with flow controller in "Manual"		
21.	Throttle open HPCI Test Line to CST Isolation Valve (F008) and adjust HPCI Flow Controller (FC-E41-1R600) to achieve approx 2500 gpm	Throttles open HV-155-F008 and adjusts turbine speed to obtain approx 2500 gpm on FI-E41-1R600-1		

* - Critical Step # - Critical Sequence

Appl. To/JPM No: NRC 1-#2 Candidate Name:________________________

Step	Action	Standard	Eval	Comments
22.	Ensure normal HPCI response	Ensures the following occur: • HPCI Aux Oil Pump (1P213) stops • HPCI Min Flow To Suppression Pool Valve (HV-155-F012) closes • HPCI Pump Discharge Low Flow alarm clears		
23.	Null the HPCI Flow Controller and place in "Automatic"	Nulls the HPCI Flow Controller (FC-E41-1R600) and places in "Automatic"		
*24.	Adjusts HPCI Test Line to CST Isolation Valve (F008) and HPCI Flow Controller (FC-E41-1R600) to achieve approx 5000 gpm	HV-155-F008 and turbine speed adjusted to obtain approx 5000 gpm on FI-E41-1R600-1 at 900 psig discharge pressure		
*25.	Recognize/take action for AR-114-001 A02, A03, F04 & F05 inform US **Evaluator** - Unit Supervisor acknowledges	Acknowledges and silences alarms, informs US		
*26.	Recognize HPCI steam leak indications and failure to isolate, inform US **Evaluator** - Unit Supervisor acknowledges	Recognizes steam leak indications and a HPCI failure to isolate, informs US		

* - Critical Step # - Critical Sequence

Appl. To/JPM No: NRC 1-#2 Candidate Name:______________________

Step	Action	Standard	Eval	Comments
*27.	Isolate HPCI **Evaluator** - Unit Supervisor acknowledges, Candidate should NOT have to refer to AR-114-001 for required actions.	Isolates HPCI: • Closes Steam Supply Inboard & Outboard Isolation Valves (HV-155-F002 & F003) • Verifies Warm Up Line Isolation Valve (HV-155-F100) closed • Verifies Pump Suction From Suppression Pool (HV-155-F042) closed • Verifies HPCI turbine trips • Informs US HPCI isolation actions completed		
28.	Check HPCI Leak Detection for indications of steam line break **Evaluator** - Inform Candidate another operator will complete the remaining actions for securing HPCI	Checks for steam line break indications		

* - Critical Step # - Critical Sequence

TASK CONDITIONS:

A. Unit 1 is operating at power

B. Maintenance needs to take vibrations readings on HPCI

C. Suppression pool cooling is in service

D. Standby Gas Treatment and ESW are in service

E. An operator is standing by in the HPCI Room and HPCI has been verified filled and vented.

INITIATING CUE:

The Unit Supervisor directs you to perform a manual start of HPCI and place it in the CST to CST Mode at 5000 gpm at 900 psig discharge pressure with the flow controller in "Automatic" in accordance with OP-152-001, Section 3.8. A second operator is available to perform SO-159-010.

JPM QUESTIONS

Appl. To/JPM No: NRC 1-#2 Candidate Name:________________________

QUESTION NO: 1

HPCI is running and injecting to the reactor following a valid initiation signal. The flow controller is in "Automatic" with flow at 5000 gpm. What would be the effect on HPCI if the Ramp Generator failed to its "low" limit? Explain your answer. Can flow be restored to 5000 gpm by placing the flow controller in "Manual"? Explain your answer.

EXPECTED ANSWER:

-- Turbine speed and pump flow lower
-- The flow signal and the ramp generator signal both input into a "low" signal selector which passes the lowest signal on to the speed control circuitry. The "low" signal is now the output signal from the failed ramp generator so the turbine receives a speed reduction signal.
-- No
-- The manual signal from the controller goes to the "low" signal selector same as the automatic signal

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 206000K505 3.3/3.3

REFERENCES: SY017 C-6, "High Pressure Coolant Injection System", Rev. 2, Figure 18, LO - 8.d, 9 & 10

JPM QUESTIONS

Appl. To/JPM No: NRC 1-#2 Candidate Name:________________________

QUESTION NO: 2

Describe how and why HPCI operating in the CST to CST mode for surveillance testing will affect steady state plant operation at maximum power. What actions are directed to prevent these problems?

EXPECTED ANSWER:

- -- Running HPCI will cause a small loss of feedwater heating due to HPCI utilizing some of the steam that had been going to feed heating. This causes a rise in reactor power. (Approx 15 MWe)
- -- While performing this surveillance, the operator is directed to maintain reactor power LTE 100%

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 206000A217 3.9/4.3

REFERENCES: SO-152-002, "Quarterly HPCI Flow Verification", Rev. 24, Section 5.17, Page 7

SY017 C-6, "High Pressure Coolant Injection System", Rev. 2, Section II.C, Page 1, LO - 9

JPM QUESTIONS

Appl. To/JPM No: NRC 1-#2 Candidate Name:________________________

QUESTION NO: _2_

Describe how and why HPCI operating in the CST to CST mode for surveillance testing will affect steady state plant operation at maximum power. What actions are directed to prevent these problems?

JPM QUESTIONS

Appl. To/JPM No: NRC 1-#2 Candidate Name:__________________________

QUESTION NO: 1

HPCI is running and injecting to the reactor following a valid initiation signal. The flow controller is in "Automatic" with flow at 5000 gpm. What would be the effect on HPCI if the Ramp Generator failed to its "low" limit? Explain your answer. Can flow be restored to 5000 gpm by placing the flow controller in "Manual"? Explain your answer.

Appl. To/JPM No: NRC 1-#2 Candidate Name:__________________________

TASK CONDITIONS:

A. Unit 1 is operating at power

B. Maintenance needs to take vibrations readings on HPCI

C. Suppression pool cooling is in service

D. Standby Gas Treatment and ESW are in service

E. An operator is standing by in the HPCI Room and HPCI has been verified filled and vented.

INITIATING CUE:

The Unit Supervisor directs you to perform a manual start of HPCI and place it in the CST to CST Mode at 5000 gpm at 900 psig discharge pressure with the flow controller in "Automatic" in accordance with OP-152-001, Section 3.8. A second operator is available to perform SO-159-010.

PENNSYLVANIA POWER & LIGHT COMPANY
JOB PERFORMANCE MEASURE
APPROVAL AND ADMINISTRATIVE DATA SHEET

SRO	NRC 1-#3	0	05/10/99	205000	4
Appl To	JPM Number	Rev No.	Date	NUREG 1123 Sys. No.	SFG

Task Title: Transfer Operating RHR Pumps While In Shutdown Cooling

Completed By: Reviews:

C. J. Tyner	04/12/99	______	______
Writer	Date	Instructor/Writer	Date

Approval:

______	______	______	______
Requesting Supv./C.A. Head	Date	Nuclear Training Supv.	Date

ALTERNATE PATH: NO TIME CRITICAL: NO LOW POWER/SHUTDOWN: YES

TESTING METHOD: PERFORM - SIMULATOR

JPM SOURCE: NEW

Date of Performance: ______

15 Min
Allowed Time (Min)

______
Time Taken (Min)

JPM Performed By

______ Last First M.I. ______ Employee #/S.S. #

JPM Performance Evaluation: ( ) Satisfactory ( ) Unsatisfactory

Ques #1: ( ) Satisfactory ( ) Unsatisfactory Ques #2: ( ) Satisfactory ( ) Unsatisfactory

Evaluator Name:

______ Signature ______ Typed or Printed

Comments:

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
NRC 1-#3

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP-AD-001, Operations Shift Policies.

B. All applicable safety precautions shall be taken in accordance with established PP&L safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment; such as hearing or eye protection, safety shoes, hardhats, etc; is required and/or posted as being necessary.

II. REFERENCES

A. OP-149-002, "RHR Operation in Shutdown Cooling Mode", Rev. 26, Section 3.4

B. OP-054-001, "Emergency Service Water System", Rev. 18, Section 3.2

III. REACTIVITY MANIPULATIONS

N/A

IV. TASK CONDITIONS

A. The Plant is shut down with shutdown cooling in service on the "A" RHR Loop

B. RHR Pump 1P202A and ESW Pumps OP504A & OP504C are running

C. The Local Operator has completed the prestart checks on the RHR and ESW Pumps and is standing by to assist you.

V. INITIATING CUE

The Unit Supervisor directs you to transfer "A" RHR Loop operating pumps from the "A" Pump running to the "C" Pump running.

Simulator indication has not been updated to the current plant procedures. Specific indications will be provided as necessary.

PERFORMANCE CHECKLIST

Appl. To/JPM No.: NRC 1-#3 Candidate Name:______________________

Step	Action	Standard	Eval	Comments
	Simulator Setup: • Plant shutdown • Shutdown cooling in service on the "A" Loop of RHR with the "A" RHR Pump running • ESW in service with both Loop "A" ESW Pumps running			
1.	Obtain a controlled copy of OP-149-002.	Controlled copy obtained.		
2.	Select the correct section to perform.	Selects Section 3.4.		
3.	Review the prerequisites. **Evaluator** - Inform Candidate all prerequisites have been met and SDC has been in service for 65 hours	Ensures that all prerequisites have been met.		
4.	Place ESW in service in accordance with OP-054-001 supplying the "C" RHR Pump and Room Cooler	Controlled copy obtained, selects Section 3.2		
5.	Review the prerequisites and precautions	Ensures that all prerequisites have been met. Refers to Attachment A to determine that ESW Pumps "B"/"D" supply RHR Pump "1C"		
*6.	Places the "B" ESW Loop in service **Evaluator** - Conditions require only one "B" Loop ESW Pump to be started. Candidate may start the "B" or "D" Pump but starting both pumps is also acceptable	Presses ESW Pump OP504B and/or OP504D "Run" pushbutton		

* - Critical Step # - Critical Sequence

PERFORMANCE CHECKLIST

Appl. To/JPM No.: NRC 1-#3 Candidate Name:________________

Step	Action	Standard	Eval	Comments
7.	Ensures Spray Pond Loop "B" Bypass Valve HV-01222B Open	Checks HV-01222B open		
8.	Ensures ESW Pump Supply Fan OV521B and/or D starts **Evaluator** - Fan(s) started depends on which pump(s) started in Step 6. When Candidate starts to verify OP-128-001 damper lineup, **Cue** - another operator has performed OP-128-001, dampers are aligned as required.	Checks OV521B and/or D running		
9.	Observe A/C and B/D Discharge Header Loop flows **Evaluator** - if asked, inform Candidate conditions do not require use of the Spray Networks. Inform Candidate ESW flow rates are correct as indicated	Notes Loop "A" flow approx 7800 gpm and Loop "B" flow approx 6000 gpm		
10.	Place the RHR Loop A MOV OL Bypass Switch to "Test"	Places HS-E11-1S62A in "Test"		
*11.	Throttle RHR flow between 4000 and 8000 gpm with RHR Injection Flow Control Valve (F017A)	Throttles HV-151-F017A to obtain RHR loop flow between 4000 and 8000 gpm		
*12.	Start RHR Pump 1P202C	Starts the "C" RHR Pump		
13.	Ensure RHR Pump Room Cooler 1V210C starts	Verifies "C" RHR Pump Room Cooler running		

* - Critical Step # - Critical Sequence

Appl. To/JPM No.: NRC 1-#3 Candidate Name:________________________

Step	Action	Standard	Eval	Comments
14.	Ensure RHR Pump "A" and "C" motor currents approximately equal	Checks pump running current values approximately equal on CRT		
*15.	Stop RHR Pump 1P202A	Stops the "C" RHR Pump		
*16.	Throttle RHR flow between 5000 and 10000 gpm with RHR Injection Flow Control Valve (F017A)	Throttles HV-151-F017A to obtain RHR loop flow between 5000 and 10000 gpm		
17.	Wait 2 minutes then Place the RHR Loop A MOV OL Bypass Switch to "Norm"	Places HS-E11-1S62A in "Norm"		
18.	Ensure RHR Pump Room Cooler 1V210A stops **Evaluator** - If Candidate continues on to stop the "A" ESW Loop Pumps, **Cue** - another operator will secure the "A" ESW Loop Pumps	Verifies "A" RHR Pump Room Cooler stops		
19.	Notify HP to survey the "A" RHR Pump Room **Evaluator** - acknowledge as HP	Calls Health Physics		

* - Critical Step # - Critical Sequence

TASK CONDITIONS

A. The Plant is shut down with shutdown cooling in service on the "A" RHR Loop

B. RHR Pump 1P202A and ESW Pumps OP504A & OP504C are running

C. The Local Operator has completed the prestart checks on the RHR and ESW Pumps and is standing by to assist you.

INITIATING CUE

The Unit Supervisor directs you to transfer "A" RHR Loop operating pumps from the "A" Pump running to the "C" Pump running.

Simulator indication has not been updated to the current plant procedures. Specific indications will be provided as necessary.

Appl. To/JPM No: NRC 1-#3 Candidate Name:________________________

QUESTION NO: __1__

With Unit 1 in Mode 4, a total loss of shutdown cooling occurs. Temperature is rapidly rising. One primary airlock door has been removed and sent offsite for repairs. When are actions required to be taken for these conditions? What actions are required to be taken.

EXPECTED ANSWER:

-- No action REQUIRED until Mode 3 entered (>200 degrees F) but actions below will probably be taken.
-- Verify the operable airlock door is closed within 1 hour and lock the operable airlock door closed within 24 hours. Verify the locked door to be locked at least once per 31 days. Otherwise be in Mode 3 (already there) within 12 hours and back in Mode 4 within 36 hours.

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 295021K201 3.6/3.7

REFERENCES: Unit 1 Tech Spec 3.6.1.2, Page 3.6-4

Appl. To/JPM No: NRC 1-#3 Candidate Name:________________________

QUESTION NO: _2_

Unit 1 reactor temperature is 225 degrees F cooling down with Shutdown Cooling in operation. It has been determined that PIS-B31-1NO18A, is Inoperable based upon a review of a previous calibration.

What actions are required?

EXPECTED ANSWER:

Table 3.3.6.1-1, Page 6 of 6, requires 1 instrument per trip system. The design has only 1 instrument per trip system. The inoperable channel be placed in "trip" within 24 hours and ensure the affected penetration flowpath (SDC) is isolated within one hour.

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 205000G222 3.4/4.1

REFERENCES: Unit 1 Tech Spec 3.3.6.1, Page 3.3-52

Appl. To/JPM No: NRC 1-#3 Candidate Name:__________________________

QUESTION NO: 2

Unit 1 reactor temperature is 225 degrees F cooling down with Shutdown Cooling in operation. It has been determined that PIS-B31-1NO18A, is Inoperable based upon a review of a previous calibration.

What actions are required?

Appl. To/JPM No: NRC 1-#3 Candidate Name:____________________

QUESTION NO: __1__

With Unit 1 in Mode 4, a total loss of shutdown cooling occurs. Temperature is rapidly rising. One primary airlock door has been removed and sent offsite for repairs. When are actions required to be taken for these conditions? What actions are required to be taken.

Appl. To/JPM No: NRC 1-#3 Candidate Name:________________________

TASK CONDITIONS

A. The Plant is shut down with shutdown cooling in service on the "A" RHR Loop

B. RHR Pump 1P202A and ESW Pumps OP504A & OP504C are running

C. The Local Operator has completed the prestart checks on the RHR and ESW Pumps and is standing by to assist you.

INITIATING CUE

The Unit Supervisor directs you to transfer "A" RHR Loop operating pumps from the "A" Pump running to the "C" Pump running.

Simulator indication has not been updated to the current plant procedures. Specific indications will be provided as necessary.

PENNSYLVANIA POWER & LIGHT COMPANY
JOB PERFORMANCE MEASURE
APPROVAL AND ADMINISTRATIVE DATA SHEET

SRO	NRC 1-#4	0	05/10/99	219000	5
Appl To	JPM Number	Rev No.	Date	NUREG 1123 Sys. No.	SFG

Task Title: Place RHR in Suppression Pool Cooling At The Remote Shutdown Panel

Completed By: Reviews:

C. J. Tyner	03/10/99		
Writer	Date	Instructor/Writer	Date

Approval:

Requesting Supv./C.A. Head	Date	Nuclear Training Supv.	Date

ALTERNATE PATH: NO TIME CRITICAL: NO LOW POWER/SHUTDOWN: NO

TESTING METHOD: PERFORM - SIMULATOR

JPM SOURCE: Facility JPM 49.OP.008.101, Rev. 0 - direct from source, updated to latest procedure revisions

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Date of Performance: ____________

20 Min
Allowed Time (Min)

____
Time Taken (Min)

JPM Performed By

Last First M.I. Employee #/S.S. #

JPM Performance Evaluation: ( ) Satisfactory ( ) Unsatisfactory

Ques #1: ( ) Satisfactory ( ) Unsatisfactory Ques #2: ( ) Satisfactory ( ) Unsatisfactory

Evaluator Name:

Signature Typed or Printed

Comments:

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
NRC 1-#4

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP-AD-001, Operations Shift Policies.

B. All applicable safety precautions shall be taken in accordance with established PP&L safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment; such as hearing or eye protection, safety shoes, hardhats, etc; is required and/or posted as being necessary.

II. REFERENCES

A. ON-100-009, "Control Room Evacuation", Rev. 4, Section 4.3
B. OP-149-005, "RHR Operation in Suppression Pool Cooling Mode", Rev. 17, Section 3.5

III. REACTIVITY MANIPULATIONS

N/A

IV. TASK CONDITIONS

A. A condition has occurred requiring abandonment of the Control Room.

B. All required immediate operator actions of ON-100-009 have been completed prior to abandoning the Control Room.

C. Transfer switch positions have been changed on the RSP IAW ON-100-009, Section 4.3.

D. Reactor pressure is being maintained by the SRVs cycling.

E. RPV water level is >-38 inches and stable.

F. ESW System is in service IAW OP-054-001.

G. RHRSW "B" Loop is in service IAW OP-116-001.

V. INITIATING CUE

The Unit Supervisor directs you to place RHR "B" Loop in Suppression Pool Cooling.

PERFORMANCE CHECKLIST

Appl. To/JPM No.: NRC 1-#4 Student Name:______________________

Step	Action	Standard	Eval	Comments
	Simulator Setup: • Establish RPV water level approximately "0" inches • Complete operator actions for Control Room Evacuation in the IAW ON-100-009. • If NOT performing JPM 00.ON.015.101 prior to this JPM, transfer Control and Instrumentation to the RSDP IAW ON-100-009. • Start B and D ESW pumps. • Place "B" Loop RHRSW in service at 9,000 gpm. • Place Simulator in FREEZE. • When ready, place Simulator in RUN.			
1.	Obtain a controlled copy of OP-149-005. **Evaluator** - Student may review previous sections of ON-100-009.	Controlled copy of OP-149-005 obtained.		
2.	Select correct section(s) to perform.	Selects Section 3.5.		
3.	Review prerequisites.	Ensure prerequisites are met.		
4.	Review precautions when controlled from RSDP: • RHR MIN FLOW 1F007B will not auto open or close. • RHR Pump B will not auto start on LPCI signal. • RHR Loop "B" will not auto align for LPCI.	Follows precautions while performing RHR operations.		
5.	Ensure ESW Loop "B" and RHRSW in operation	Operating per turnover.		
6.	Stop the "2B" RHR Pump if running. **Evaluator** - When "2B" RHR Pump is addressed, inform Candidate, "2B" RHR Pump is not running.	Directs Local Operator to verify "2B" RHR Pump not running		

* - Critical Step # - Critical Sequence

PERFORMANCE CHECKLIST

Appl. To/JPM No.: NRC 1-#4 Student Name:____________________

Step	Action	Standard	Eval	Comments
*7.	Align RHR Loop "B" for a pump start.	Aligns RHR Loop "B" as follows: • Checks HX B SHELL-SIDE BYPASS HV-151-F048B open. • Opens SUPPRESSION CHAMBER SPRAY TEST SHUTOFF HV-151-F028B. • Check RHR MIN FLOW HV-151-F007B open.		
8.	Ensure "B" Loop RHR is filled and vented. **Evaluator** - When requested, inform Candidate "B" Loop RHR local discharge pressure is 75 psig. **Evaluator** - When requested as NLO, inform Candidate "B" Loop RHR has been manually checked filled and vented IAW OP-149-001, Section 3.6 and "B" Loop RHR Pumps are checked ready for a start.	Directs NLO to obtain "B" Loop RHR local discharge pressure and to check RHR Loop "B" filled and vented.		
*9.	Start "B" RHR Pump.	Momentarily places handswitch for "B" RHR Pump 1P202B to START.		
*10.	Establish flow to suppression pool.	• Throttles TEST LINE CTL HV-151-F024B to achieve and maintain flow through the heat exchanger, not to exceed 10,000 gpm. • Closes RHR Pump MIN FLOW HV-151-F007B when at least 3,000 gpm loop flow is reached. • Throttle closed HX B SHELL-SIDE BYPASS HV-151-F048B.		

* - Critical Step # - Critical Sequence

PERFORMANCE CHECKLIST

Appl. To/JPM No.: NRC 1-#4 Student Name:________________________

Step	Action	Standard	Eval	Comments
11.	Ensure room cooler running. **Evaluator** - When requested, inform Candidate RHR Room Cooler 1V202B is running.	Directs NLO to check RHR Room Cooler 1V202B running.		

* - Critical Step # - Critical Sequence

TASK CONDITIONS

A. A condition has occurred which requires abandonment of the Control Room.

B. All required immediate operator actions of ON-100-009, Control Room Evacuation, have been completed prior to abandoning the Control Room.

C. Transfer switch positions have been changed on the RSP IAW ON-100-009, Section 4.3.

D. Reactor pressure is being maintained by the SRVs cycling.

E. RPV water level is >-38 inches and stable.

F. ESW System is in service IAW OP-054-001.

G. RHRSW "B" Loop is in service IAW OP-116-001.

INITIATING CUE

The Unit Supervisor directs you to place RHR "B" Loop in Suppression Pool Cooling.

Appl. To/JPM No: NRC 1-#4 Student Name:________________________

QUESTION NO: 1 **THIS QUESTION IS CLOSED REFERENCE.**

Assuming suppression pool temperature is 135 degrees F and rising and suppression pool level is lowering. When will the lowering level in the suppression pool begin to impact the running RHR Pumps? How will this be recognized by the operator in the Control Room? What is one additional adverse consequence of a lowering suppression pool water level other than a loss of pressure suppression capability for either an open SRV or a LOCA or pump damage?

EXPECTED ANSWER:

- -- Pump operation may affected when suppression pool level lowers to less than 18 feet.
- -- Operator may notice oscillating RHR Pump motor amps, discharge pressure, discharge flow.
- -- With level below the suctions of HPCI, RCIC, RHR, CS a possible vent path will exist from the primary to the secondary containment if a LOCA occurred. (Lowering level causes a loss of the water seal)

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 219000A201 3.0/3.1

REFERENCES: EO-100-103, "Primary Containment Control", Figure 7 VL

EO-000-103, "Primary Containment Control", Step SP/L-4, Page 11

Appl. To/JPM No: NRC 1-#4 Student Name:______________________

QUESTION NO: 2

If the "2B" RHR Pump had been left running and the "1B" RHR Pump had been started from the Remote Shutdown Panel, what would have been the result? Prove your answer utilizing the appropriate prints.

EXPECTED ANSWER:

The "1B" RHR Pump would have NOT have started (the interlock with the Unit 2 "B" RHR Pump is not defeated when operating from the RSP.)

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 295016K201 4.4/4.5

REFERENCES: SY017 C-1, "Residual Heat Removal System", Rev. 2, Figure 10, LO - 7, 12.a and 19.a

RHR Pump Start Logic

Appl. To/JPM No: NRC 1-#4 Student Name:________________________

QUESTION NO: _2_

If the "2B" RHR Pump had been left running and the "1B" RHR Pump had been started from the Remote Shutdown Panel, what would have been the result? Prove your answer utilizing the appropriate prints.

Appl. To/JPM No: NRC 1-#4 Student Name:__________________________

QUESTION NO: 1 **THIS QUESTION IS CLOSED REFERENCE.**

Assuming suppression pool temperature is 135 degrees F and rising and suppression pool level is lowering. When will the lowering level in the suppression pool begin to impact the running RHR Pumps? How will this be recognized by the operator in the Control Room? What is one additional adverse consequence of a lowering suppression pool water level other than a loss of pressure suppression capability for either an open SRV or a LOCA or pump damage?

Appl. To/JPM No: NRC 1-#4 Student Name:______________________

TASK CONDITIONS

A. A condition has occurred which requires abandonment of the Control Room.

B. All required immediate operator actions of ON-100-009, Control Room Evacuation, have been completed prior to abandoning the Control Room.

C. Transfer switch positions have been changed on the RSP IAW ON-100-009, Section 4.3.

D. Reactor pressure is being maintained by the SRVs cycling.

E. RPV water level is >-38 inches and stable.

F. ESW System is in service IAW OP-054-001.

G. RHRSW "B" Loop is in service IAW OP-116-001.

INITIATING CUE

The Unit Supervisor directs you to place RHR "B" Loop in Suppression Pool Cooling.

PENNSYLVANIA POWER & LIGHT COMPANY
JOB PERFORMANCE MEASURE
APPROVAL AND ADMINISTRATIVE DATA SHEET

SRO	NRC 1-#5	0	05/10/99	264000	6
Appl To	JPM Number	Rev No.	Date	NUREG 1123 Sys. No.	SFG

Task Title: Synchronize Diesel Generator B To 4.16 KV Bus 2B - Runaway Diesel

Completed By: Reviews:

C. J. Tyner	03/10/99		
Writer	Date	Instructor/Writer	Date

Approval:

Requesting Supv./C.A. Head	Date	Nuclear Training Supv.	Date

ALTERNATE PATH: YES TIME CRITICAL: NO LOW POWER/SHUTDOWN: NO

TESTING METHOD: PERFORM - SIMULATOR

JPM SOURCE: Facility JPM 24.OP.006.202, Rev. 0 - Modified to different diesel & alternate path, updated to latest procedure revisions

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Date of Performance: ____________ 20 Min Allowed Time (Min) ____________ Time Taken (Min)

JPM Performed By

Last First M.I. Employee #/S.S. #

JPM Performance Evaluation: ( ) Satisfactory ( ) Unsatisfactory

Ques #1: ( ) Satisfactory ( ) Unsatisfactory Ques #2: ( ) Satisfactory ( ) Unsatisfactory

Evaluator Name:

Signature Typed or Printed

Comments:

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
NRC 1-#5

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP-AD-001, Operations Shift Policies.

B. All applicable safety precautions shall be taken in accordance with established PP&L safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment; such as hearing or eye protection, safety shoes, hardhats, etc; is required and/or posted as being necessary.

II. REFERENCES

A. OP-024-001, "Diesel Generators", Rev. 33, Section 3.3

III. REACTIVITY MANIPULATIONS

N/A

IV. TASK CONDITIONS

A. Diesel Generator "B" was started manually from OC653 in accordance with OP-024-001 and has been running unloaded for five minutes.

B. No other diesel generator is operating synchronized to the grid.

C. An NPO is standing by at the diesel.

V. INITIATING CUE

The Unit Supervisor directs you to manually synchronize Diesel Generator "B" with 4.16 KV Bus 2B and pick up 4,000 KW of load.

Step	Action	Standard	Eval	Comments
	Note Unless otherwise stated, all controls and indicators are located on Panel OC653. **Simulator Setup** - • Perform a manual start of the "B" Diesel Generator IAW OP-024-001 and allow it to stabilize • When Candidate closes output breaker and goes to "Raise" to pickup the initial 1000 KW load, fail the Speed Governor switch in the "Raise" position and allow DG to slowly ramp up to maximum load. • If taken to "Lower", the Speed Governor will not reduce DG load			
1.	Obtain a controlled copy of OP-024-001.	Controlled copy obtained.		
2.	Select the correct section to perform.	Selects Section 3.3 subsection 3.3.4		
3.	Review the prerequisites. **Evaluator** - Inform the Candidate that all prerequisites have been met.	Ensures that all prerequisites have been met.		
4.	Review the precautions. **Evaluator** - If asked, inform the Candidate that the diesel has now been running for 15 minutes unloaded.	Follows the precautions as applicable.		

* - Critical Step # - Critical Sequence

Step	Action	Standard	Eval	Comments
5.	Obtain a key for the DG sync selector switch.	Obtains key for DG sync selector switch		
*6.	Turn the sync selector switch on. **Evaluator** - When the switch is placed in the ON position the Synchroscope pointer will start moving (either direction), the white light on each side of the Synchroscope will flash off and on as the pointer rotates. The lights will be off when the pointer is between 10° before the 12 o'clock position and 10° after the 12 o'clock position.	Places the DG B to Bus 2B Sync Sel HS-00040B switch in the ON position.		
*7.	Adjust diesel generator voltage. **Evaluator** - Voltage is matched when the pointer on the Diesel Gen Bus Diff Volts Meter is "0".	Takes the DG B Voltage Adjust HS-00053B switch to the RAISE or LOWER position as required to match Incoming and Running volts on the Diesel Gen Bus Diff Volts XI-00036 meter. (In green band)		
*8.	Adjust diesel generator speed. **Evaluator** - The FAST direction is clockwise.	Takes the DG B Speed Governor HS-00054B switch to the RAISE or LOWER position to cause the Synchroscope XI-00037 pointer to rotate slowly in the FAST direction. (≈1 rotation in one minute).		

* - Critical Step # - Critical Sequence

Appl. To/JPM No.: NRC 1-#5 Candidate Name:____________________

Step	Action	Standard	Eval	Comments
*9.	Close the diesel generator output breaker. **Evaluator** - • Both white lights will be extinguished and the Synchroscope pointer will stop at the 12 o'clock position. • The Running Idle light will extinguish, and the Running Loaded light illuminates on the Local Panel OC521A.	Takes the DG B to Bus 2B Bkr 2A20204 switch to the CLOSE position when the Synchroscope XI-00037 pointer is at or slightly before the 12 o'clock position.		
*10.	Pick up load on the DG.	Immediately take and hold the DG B Speed Governor HS-00054B to the RAISE position until DG B Watts XI-00032A meter indicates ≥1,000 KW (over 30 to 45 seconds).		
*11.	Recognize DG B load continuing to rise after Speed Governor released, inform US **Evaluator** - Unit Supervisor acknowledges	Releases Speed Governor at approx 1000 KW, recognizes load continues to rise, informs US		
12.	Attempts to reduce DG B load **Evaluator** - Unit Supervisor acknowledges	Places DG B Speed Governor in to the LOWER position, recognizes load still rising, informs US		
*13.	Trip DG B and/or open DG B Output breaker	Press DG B STOP pushbutton and/or takes the DG B to Bus 2B Bkr 2A20204 switch to the OPEN position.		

* - Critical Step # - Critical Sequence

Step	Action	Standard	Eval	Comments
14.	Verifies DG B no longer overloaded or is running in the cooldown mode, Inform US **Evaluator** - Unit Supervisor acknowledges. Inform Candidate that another operator will complete the remaining procedural steps and will initiate troubleshooting.	Checks DG B output breaker open, DG B running in cooldown mode, informs US		

* - Critical Step # - Critical Sequence

TASK CONDITIONS:

A. Diesel Generator A was started manually from OC653 in accordance with OP-024-001 and has been running unloaded for five minutes.

B. No other diesel generator is operating synchronized to the grid.

C. An NPO is stationed at the diesel.

INITIATING CUE:

The Unit Supervisor directs you to manually synchronize Diesel Generator "B" with 4.16 KV Bus 2B and pick up 4,000 KW of load.

Appl. To/JPM No: NRC 1-#5 Candidate Name:________________________

QUESTION NO: 1 **THIS QUESTION IS CLOSED REFERENCE.**

Given that the diesel generator is running after a manual start and is synched to its 4160 VAC bus, what will happen to the diesel if a LOCA occurs? What would occur if a loss of off-site power subsequently occurs?

EXPECTED ANSWER:

-- The DG output breaker will open, engine control will swap to the isochronous mode.
-- If the 4160 VAC bus is lost, the diesel will automatically re-synch to the bus. (output breaker will reclose)

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 264000A210 3.9/4.2

REFERENCES: SY017 G-1, "Diesel Generator", Rev. 3, Section IV.D.9.a.2), Page 25, LO - 11

Appl. To/JPM No: NRC 1-#5 Candidate Name:________________________

QUESTION NO: 2 **ONLY REFERENCE USE ALLOWED IS PRINTS**

Given the following conditions:

- The "E" Diesel Generator is running in "Test" but NOT as a substitute for any other Diesel Generator
- A valid loss of off-site power occurs

What will be the expected response of "E" DG and its output breaker? What will be the expected response of the ESW System? Why is ESW designed to respond this way? Prove your answer on the ESW response in the prints, specifically the HV-01112E Loop "A" ESW Supply Valve.

EXPECTED ANSWER:

-- "E" DG trips and output breaker opens
-- ESW "A" and "B" Loop Supply and Return Valves auto close
-- Ensures ESW is available to support required cooling loads during the LOOP

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 264000A306 3.1/3.2

REFERENCES: SY017 G-1, "Diesel Generators", Rev. 3, Section III.A.16.b, Page 14

Diesel Prints E-146 Sheet 17A and E-184 Sheet 2A

Appl. To/JPM No: NRC 1-#5 Candidate Name:____________________

QUESTION NO: 2 ONLY REFERENCE USE ALLOWED IS PRINTS

Given the following conditions:

- The "E" Diesel Generator is running in "Test" but NOT as a substitute for any other Diesel Generator
- A valid loss of off-site power occurs

What will be the expected response of "E" DG and its output breaker? What will be the expected response of the ESW System? Why is ESW designed to respond this way? Prove your answer on the ESW response in the prints, specifically the HV-01112E Loop "A" ESW Supply Valve.

Appl. To/JPM No: NRC 1-#5 Candidate Name:______________________

QUESTION NO: __1__ **THIS QUESTION IS CLOSED REFERENCE.**

Given that the diesel generator is running after a manual start and is synched to its 4160 VAC bus, what will happen to the diesel if a LOCA occurs? What would occur if a loss of off-site power subsequently occurs?

Appl. To/JPM No: NRC 1-#5 Candidate Name:______________________

TASK CONDITIONS:

A. Diesel Generator A was started manually from OC653 in accordance with OP-024-001 and has been running unloaded for five minutes.

B. No other diesel generator is operating synchronized to the grid.

C. An NPO is stationed at the diesel.

INITIATING CUE:

The Unit Supervisor directs you to manually synchronize Diesel Generator "B" with 4.16 KV Bus 2B and pick up 4,000 KW of load.

PENNSYLVANIA POWER & LIGHT COMPANY
JOB PERFORMANCE MEASURE
APPROVAL AND ADMINISTRATIVE DATA SHEET

SRO	NRC 1-#6	0	05/10/99	218000	3
Appl To	JPM Number	Rev No.	Date	NUREG 1123 Sys. No.	SFG

Task Title: Respond To A Stuck Open Safety Relief Valve

Completed By: Reviews:

C. J. Tyner	03/10/99		
Writer	Date	Instructor/Writer	Date

Approval:

Requesting Supv./C.A. Head	Date	Nuclear Training Supv.	Date

ALTERNATE PATH: NO TIME CRITICAL: YES RCA ENTRY: NO

TESTING METHOD: PERFORM - SIMULATOR

JPM SOURCE: Facility JPM 83.ON.001.181, Rev. 0 - modified to different SRV, updated to current procedure revisions

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Date of Performance: ____________ 5 Min Allowed Time (Min) ____________ Time Taken (Min)

JPM Performed By ____________ Last First M.I. ____________ Employee #/S.S. #

JPM Performance Evaluation: ( ) Satisfactory ( ) Unsatisfactory

Ques #1: ( ) Satisfactory ( ) Unsatisfactory Ques #2: ( ) Satisfactory ( ) Unsatisfactory

Evaluator Name: ____________ Signature ____________ Typed or Printed

Comments:

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
NRC 1-#6

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP-AD-001, Operations Shift Policies.

B. All applicable safety precautions shall be taken in accordance with established PP&L safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment; such as hearing or eye protection, safety shoes, hardhats, etc; is required and/or posted as being necessary.

II. REFERENCES

A. ON-183-001, "Stuck Open Safety Relief Valve", Rev. 18, Section 3

III. REACTIVITY MANIPULATIONS

N/A

IV. TASK CONDITIONS

A. Unit 1 is operating at 90% power.

V. INITIATING CUE

The Unit Supervisor directs you to respond to any alarms received.

NOTE: Do NOT tell Candidate this is a Time Critical task.

Appl. To/JPM No.: NRC 1-#6 Candidate Name:________________

Step	Action	Standard	Eval	Comments
	Evaluator **This is a TIME CRITICAL JPM and must be performed in the simulator.** • In order to successfully complete this JPM, the Candidate MUST give some indication that the reactor has to be scrammed within two minutes of the SRV opening. • The Candidate may obtain a copy of ON-183-001 at any time during the performance of the JPM, but still must meet the two minute time constraint. **Simulator Setup** • Select a 100 percent power IC (i.e., IC 18) and lower Recirc flow to result in 90% power. • Assign the following malfunction to a Function Button (Instructor Station or Hand-Held Remote): **IMF RV01:PSV141F13B**. This will cause the B SRV to inadvertently open and stay open. • When ready to begin, place the simulator to **RUN**. • When Candidate has read the Task Conditions/ Initiating Cue Sheet, **DEPRESS the assigned Function Button** to enter the malfunction.			

* - Critical Step # - Critical Sequence

PERFORMANCE CHECKLIST

Appl. To/JPM No.: NRC 1-#6 Candidate Name:_______________

Step	Action	Standard	Eval	Comments
*1.	Recognize/take action for AR-110-E1, E2 & E-3, recognize SRV "B" is open, inform US/Control Room **Evaluator** - When/if Candidate states the time requirement, you (acting as US) should maintain the timeline and update the Candidate periodically as attempts are made to close the SRV. Do NOT provide the required action, just the elapsed time	• Determines that the "B" SRV is open • Announces open SRV to Control Room personnel. • States or gives indication that the event is time critical		
2.	Ensure SRV "B" should NOT be open	Verifies reactor pressure is: • Less than SRV lift setpoint • Less than 1,087 psig		
*3.	Attempt to close SRV "B"	Places the control switch for the "B" SRV to the OFF position.		
4.	Check for SRV closure **Cue** - Acknowledge report as US	Checks any of the following indications: • Acoustic monitor lights on 1C601or 1C690 extinguished • Tailpipe temperature decrease • Reactor thermal power or generator MWe increase • RPV pressure trend Recognizes SRV "B" NOT closed, informs US		

* - Critical Step # - Critical Sequence

Step	Action	Standard	Eval	Comments
*5.	Attempt to cycle SRV "B"	Places control switch for SRV "B" to the OPEN position, THEN to OFF position.		
6.	Checks for SRV closure. **<u>Evaluator</u>** - The student may repeat the cycling sequence two or more times before continuing. As long as the two-minute time limit is not exceeded, this operation will not affect JPM performance evaluation.	Checks any of the following indications: • Acoustic monitor lights on 1C601or 1C690 extinguished • Tailpipe temperature decrease • Reactor thermal power or generator MWe increase • RPV pressure trend		
7..	Determine that the SRV has not closed. **<u>Evaluator</u>** - As US, inform Candidate when approximately one minute fifty seconds have elapsed, since the SRV opened	Announces/states SRV is still open.		
*8.	Scram the reactor/recommend reactor be scrammed. Note: This decision may be based upon SRV being open for nearly 2 minutes OR that the SRV cannot be closed. **<u>Evaluator</u>** - When Candidate has shown indication of the requirement to place the Mode Switch in SHUTDOWN, place the Simulator in FREEZE, and instruct the Candidate to stop	Recommends that the reactor be scrammed/places the Mode Switch in the SHUTDOWN position		

* - Critical Step # - Critical Sequence

TASK CONDITIONS

A. Unit 1 is operating at 90% power.

INITIATING CUE

The Unit Supervisor directs you to respond to any alarms received.

Facility: Susquehanna	**Date of Examination:** 05/10/99
Examination Level: SRO(I)	**Operating Test No:**

System / JPM Title / Type Codes*	Safety Function	Planned Follow-up Questions: K/A/G - Importance - Description
1. RMCS/Take Actions For A Control Rod Double Notch/S,N	1	a. 201001K407 - 3.1/3.0 - PCV and FCV operational relationship
		b. 201001K110 - 2.8/2.8 - Control rod speed adjustments
2. HPCI/Place HPCI In CST To CST Mode - Steam Leak w/o Isolation/S,N,A	2	a. 206000K505 - 3.3/3.3 - Failed ramp generator
		b. 206000A217 - 3.9/4.3 - HPCI operation vs loss of feedwater heating
3. SDC/Transfer Operating RHR Pumps While In Shutdown Cooling/S,L,N	4	a. 295021K201 - 3.6/3.7 - Mode change/Tech Specs
		b. 205000G222 - 3.4/4.1 - Inop pressure switch - SDC Iso
4. RHR-SPC Mode/Place Suppression Pool Cooling In Service From RSDP/S,D	5	a. 219000A201 - 3.0/3.1 - RHR Pump vortex limits
		b. 295016K201 - 4.4/4.5 - RHR operations at RSDP
5. Diesel Gen/Synch "B" DG To 4.16KV Bus 2B-Runaway Diesel/S,M,A	6	a. 264000A210 - 3.9/4.2 - DG response to LOCA while paralleled
		b. 264000A306 - 3.1/3.2 - "E" DG response to LOOP
6. ADS/Respond To A Stuck Open Safety Relief Valve/S,M	3	a. 218000K106 - 3.9/3.9 - SRV operations with failed bellows
		b. 218000K601 - 3.9/4.1 - ECCS input to ADS logic
7. SGT/Perform Manual Startup Of SGTS & Vent The Drywell/S,M	9	a. 261000G112 - 2.9/4.0 - Inop SGTS vs Secondary Containment Integrity
		b. 261000A103 - 3.2/3.8 - Off-site doses at site boundary
8. SLC/Connect SLC Storage Tank To RCIC/M,P,R	1	a. 211000A205 - 3.1/3.4 - T.S. actions for SLC pump suction temperatures
		b. 211000A109 - 4.0/4.1 - Local pump operations
9. PCIS/Bypass MSIV And MSL Drain Isolation Signals/D,P	5	a. 223002K408 - 3.3/3.7 - One jumper not installed affect on isolation logic.
		b. 295037K306 - 3/8/4.1 - ES requirements vs plant conditions
10. RSCS/Bypass Control Rod In Rod Sequence Control System/P,M	7	a. 201004K301 - 3.3/3.4 - Rod movement with Inop RSCS
		b. 201004A201 - 3.3/3.6 - Rod withdrawals with sequential failed reed switches

* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol Room, (S)imulator, (L)ow power, (P)lant, (R)CA

Facility: Susquehanna	**Date of Examination:** 05/10/99
Examination Level: SRO(U)	**Operating Test No:**

System / JPM Title / Type Codes*	Safety Function	Planned Follow-up Questions: K/A/G - Importance - Description
1. N/A		a.
		b.
2. N/A		a.
		b.
3. SDC/Transfer Operating RHR Pumps While In Shutdown Cooling/S,L,N	4	a. 295021K201 - 3.6/3.7 - Mode change/Tech Specs
		b. 205000G222 - 3.4/4.1 - Inop pressure switch - SDC Iso
4. RHR-SPC Mode/Place Suppression Pool Cooling In Service From RSDP/S,D	5	a. 219000A201 - 3.0/3.1 - RHR Pump vortex limits
		b. 295016K201 - 4.4/4.5 - RHR operations at RSDP
5. Diesel Gen/Synch "B" DG To 4.16KV Bus 2B-Runaway Diesel/S,M,A	6	a. 264000A210 - 3.9/4.2 - DG response to LOCA while paralleled
		b. 264000A306 - 3.1/3.2 - "E" DG response to LOOP
6. N/A		a.
		b.
7. N/A		a.
		b.
8. SLC/Connect SLC Storage Tank To RCIC/M,P,R	1	a. 211000A205 - 3.1/3.4 - T.S. actions for SLC pump suction temperatures
		b. 211000A109 - 4.0/4.1 - Local pump operations
9. N/A		a.
		b.
10. RSCS/Bypass Control Rod In Rod Sequence Control System/P,M	7	a. 201004K301 - 3.3/3.4 - Rod movement with Inop RSCS
		b. 201004A201 - 3.3/3.6 - Rod withdrawals with sequential failed reed switches

* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol Room, (S)imulator, (L)ow power, (P)lant, (R)CA

PENNSYLVANIA POWER & LIGHT COMPANY
JOB PERFORMANCE MEASURE
APPROVAL AND ADMINISTRATIVE DATA SHEET

SRO	NRC 1-#1	0	05/10/99	201002	1
Appl To	JPM Number	Rev No.	Date	NUREG 1123 Sys. No.	SFG

Task Title: Take Actions For A Control Rod Double Notch

Completed By: Reviews:

C. J. Tyner	03/10/99		
Writer	Date	Instructor/Writer	Date

Approval:

Requesting Supv./C.A. Head	Date	Nuclear Training Supv.	Date

ALTERNATE PATH: NO TIME CRITICAL: NO LOW POWER/SHUTDOWN: NO

TESTING METHOD: PERFORM - SIMULATOR

JPM SOURCE: NEW

Date of Performance:

	10 Min	
	Allowed Time (Min)	Time Taken (Min)

JPM Performed By:

Last	First	M.I.	Employee #/S.S. #

JPM Performance Evaluation: ( ) Satisfactory ( ) Unsatisfactory

Ques #1: ( ) Satisfactory ( ) Unsatisfactory Ques #2: ( ) Satisfactory ( ) Unsatisfactory

Evaluator Name:

Signature	Typed or Printed

Comments:

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
NRC 1-#1

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP-AD-001, Operations Shift Policies.

B. All applicable safety precautions shall be taken in accordance with established PP&L safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment; such as hearing or eye protection, safety shoes, hardhats, etc; is required and/or posted as being necessary.

II. REFERENCES

A. ON-155-001, "Control Rod Problems", Rev. 14, Section 3.7

B. SO-156-001, "Weekly Control Rod Exercising", Rev. 11

III. REACTIVITY MANIPULATIONS

N/A

IV. TASK CONDITIONS

A. Unit 1 is operating at power

B. SO-156-001, "Weekly Control Rod Exercising", is in progress

C. Control rod 18-11 is the next control rod to be exercised

D. A second operator is available for control rod verifications

V. INITIATING CUE

The Unit Supervisor directs you to continue with and complete SO-156-001, starting with control rod 18-11

PERFORMANCE CHECKLIST

Appl. To/JPM No: NRC 1-#1 Candidate Name:______________________

Step	Action	Standard	Eval	Comments
	Simulator Setup • Provide copy of SO-156-001 and Attachment A. Markup to rod 18-11. • Any at-power IC • Start the SO with control rod 18-11, and insert malfunction for a double notch on the second fully withdrawn rod to be inserted (18-15) Only want the rod to go in 2 notches • Allow the rod to be recovered and withdrawn back to Notch "48" • If necessary, the third rod in this group can be used for the double notch (18-19)			
1.	Obtain and review controlled copy of SO-156-001 Evaluator - Candidate may review previous SO-156-001 steps and rods	Controlled copy of SO-156-001 obtained, reviews prerequisites and precautions		
2.	Selects applicable procedure section at control rod 18-11	Selects Section 6.5 for rod 18-11		
*3.	Selects and inserts control rod 18-11 one notch	Presses rod select pushbuttons for 18-11, presses the Insert pushbutton momentarily		
4.	Monitors for proper response	Checks control rod position indication for rod insertion, may monitor CRD system parameters, reactor power, etc.		

* - Critical Step # - Critical Sequence

PERFORMANCE CHECKLIST

Appl. To/JPM No: NRC 1-#1 Candidate Name:________________________

Step	Action	Standard	Eval	Comments
*5	Withdraw control rod 18-11 one notch **Evaluator** - Candidate may use Continuous Withdraw to perform coupling check per 6.5.7	Presses the Withdraw pushbutton momentarily		
6.	Monitors for proper response	Checks control rod position indication for rod return to position on Data Sheet, may monitor CRD system parameters, reactor power, etc.		
7.	Confirm completion of operability check	Circles "Sat" in Operability Check column of Data Sheet, no problems with rod to record		
*8.	Perform coupling check for control rod 18-11	Presses Withdraw pushbutton and checks the following: • Records Drive Water Flow in Withdrawal Stall Flow column • Notch "48" indicated • Full-Out red light on full core display • No Rod Overtravel received • Circles "Sat" in Full Out Position Indication Check column		
9.	Confirm completed actions on rod 18-11 **Evaluator** - another operator will initial the Verify column	Initials Confirm column		

* - Critical Step # - Critical Sequence

Appl. To/JPM No: NRC 1-#1 Candidate Name:________________________

Step	Action	Standard	Eval	Comments
*10	Selects and inserts control rod 18-15 one notch	Presses rod select pushbuttons for 18-15, presses the Insert pushbutton momentarily		
*11.	Monitors for proper response, recognize rod double notches to Notch "44" **Evaluator** - acknowledge double notch as US	Checks control rod position indication for rod insertion, recognizes rod continues in to Notch "44", informs US		
*12.	Enters ON-155-001 **Evaluator** - acknowledge ON-155-001 entry as US	Enters and takes actions IAW Section 3.7 of ON-155-001, informs US		
13.	Documents double notch of rod 18-15 **Evaluator** - This control rod is NOT in the CRC Book if asked	Completes Attachment A of ON-155-001 for rod 18-15		
14.	Withdraw rod 18-15 to Notch "46"	Presses the Withdraw pushbutton, observes normal parameters, notes rod moves out to Notch "46", informs US		

* - Critical Step # - Critical Sequence

Appl. To/JPM No: NRC 1-#1 Candidate Name:________________

Step	Action	Standard	Eval	Comments
*15	Withdraw rod 18-15 to Notch "48" **Evaluator** - Candidate may use Continuous Withdraw here to perform coupling check per 6.5.7 **Note:** It is acceptable for the Candidate to withdraw this control rod from "44" to "48 and perform the coupling check in one step.	Presses the Withdraw pushbutton, observes normal parameters, notes rod moves out to Notch "48", informs US, records data on Attachment A		
*16.	Perform coupling check for control rod 18-15	Presses Withdraw pushbutton and checks the following: • Records Drive Water Flow in Withdrawal Stall Flow column • Notch "48" indicated • Full-Out red light on full core display • No Rod Overtravel received • Circles "Sat" in Full Out Position Indication Check column		
17.	Confirm completed actions on rod 18-15 **Evaluator** - another operator will initial the Verify column **Evaluator** - Another operator will continue the control rod exercising	Initials Confirm column		

* - Critical Step # - Critical Sequence

Appl. To/JPM No: NRC 1-#6 Candidate Name:________________________

QUESTION NO: __1__ **ONLY REFERENCE USE ALLOWED IS TECH SPECS**

With the plant operating at power, how would a failure of the "J" Safety Relief Valve bellows affect operation of the SRV? How would this failure affect continued plant operation? How would the operator know the bellows has failed?

EXPECTED ANSWER:

- Normal operation of the SRV in the ADS mode and the Relief Mode (Electrical/pneumatic operation) would be possible. The valve would NOT open in the Safety mode.
- Would not affect plant operation IAW Tech Specs (must have the safety mode of 12 SRV operable)
- No indications until pressure reaches the safety setpoint of the valve. (Would not open at all or would open at a much higher pressure than required.)

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 218000K106 3.9/3.9

REFERENCES: SY017 C-4, "Automatic Depressurization And Overpressure Protection Systems", Rev. 1, Section III.A.2.c.(9) and Figures 2 & 3, Page 3, LO - 5

Unit 1 Tech Spec 3.4.3, Page 3.4-8

TASK CONDITIONS:

A. Unit 1 is operating at power

B. SO-156-001, "Weekly Control Rod Exercising", is in progress

C. Control rod 18-11 is the next control rod to be exercised

D. A second operator is available for control rod verifications

INITIATING CUE

The Unit Supervisor directs you to continue with and complete SO-156-001, starting with control rod 18-11

Appl. To/JPM No: NRC 1-#6 Candidate Name:______________________

QUESTION NO: 2

Plant conditions resulted in an initiation of the Automatic Depressurization System. All ADS SRVs have opened.

What will be the expected ADS SRV response if all running low pressure ECCS pumps are secured? Confirm your answer utilizing the appropriate logic prints.

EXPECTED ANSWER:

All ADS SRVs will remain open. (ADS logic is seal-in requiring operator action to reset to reclose the SRVs)

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 218000K601 3.9/4.1

REFERENCES: SY017 C-4, "Automatic Depressurization And Overpressure Protection Systems", Rev. 1, Section III.E.5 & Figure 5, Page 13, LO - 6 & 9

Appl. To/JPM No: NRC 1-#6 Candidate Name:______________________

QUESTION NO: __2__

Plant conditions resulted in an initiation of the Automatic Depressurization System. All ADS SRVs have opened.

What will be the expected ADS SRV response if all running low pressure ECCS pumps are secured? Confirm your answer utilizing the appropriate logic prints.

Appl. To/JPM No: NRC 1-#6 Candidate Name:________________________

QUESTION NO: 1 **ONLY REFERENCE USE ALLOWED IS TECH SPECS**

With the plant operating at power, how would a failure of the "J" Safety Relief Valve bellows affect operation of the SRV? How would this failure affect continued plant operation? How would the operator know the bellows has failed?

Appl. To/JPM No: NRC 1-#6 Candidate Name:______________________

TASK CONDITIONS

A. Unit 1 is operating at 90% power.

INITIATING CUE

The Unit Supervisor directs you to respond to any alarms received.

PENNSYLVANIA POWER & LIGHT COMPANY
JOB PERFORMANCE MEASURE
APPROVAL AND ADMINISTRATIVE DATA SHEET

SRO	NRC 1-#7	0	05/10/99	261000	9
Appl To	JPM Number	Rev No.	Date	NUREG 1123 Sys. No.	SFG

Task Title: Perform a Manual Startup of the SGTS and Vent the Drywell

Completed By: Reviews:

C. J. Tyner	03/10/99	____________	________
Writer	Date	Instructor/Writer	Date

Approval:

____________	________	____________	________
Requesting Supv./C.A. Head	Date	Nuclear Training Supv.	Date

ALTERNATE PATH: NO TIME CRITICAL: NO LOW POWER/SHUTDOWN: NO

TESTING METHOD: PERFORM - SIMULATOR

JPM SOURCE: Facility JPM 70.OP.004.101, Rev. 0 - modified to vent the drywell, updated to latest procedure revisions

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Date of Performance:

________ 10 Min Allowed Time (Min) ________ Time Taken (Min)

JPM Performed By

________________________ Last First M.I. ________________ Employee #/S.S. #

JPM Performance Evaluation: ( ) Satisfactory ( ) Unsatisfactory

Ques #1: ( ) Satisfactory ( ) Unsatisfactory Ques #2: ( ) Satisfactory ( ) Unsatisfactory

Evaluator Name:

________________ Signature ________________ Typed or Printed

Comments:

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
NRC 1-#7

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP-AD-001, Operations Shift Policies.

B. All applicable safety precautions shall be taken in accordance with established PP&L safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment; such as hearing or eye protection, safety shoes, hardhats, etc; is required and/or posted as being necessary.

II. REFERENCES

A. OP-070-001, "Standby Gas Treatment System", Rev. 17, Section 3.2

B. OP-173-003, "Primary Containment Nitrogen Makeup and Venting", Rev. 5, Section 3.3

III. REACTIVITY MANIPULATIONS

N/A

IV. TASK CONDITIONS

A. The Unit 1 Drywell pressure has slowly been rising over the last 2 shifts

B. The SGTS is aligned for automatic initiation in accordance with OP-070-001.

C. All prerequisites, Tech Spec and TRM requirements have been met.

D. Unit 2 is not venting their drywell.

V. INITIATING CUE

The Unit Supervisor directs you to perform a manual startup of "A" Standby Gas Treatment train and vent the drywell to reduce pressure by 0.5 psig.

PERFORMANCE CHECKLIST

Appl. To/JPM No: NRC 1-#7 Candidate Name:______________________

Step	Action	Standard	Eval	Comments
	<u>Simulator Setup:</u> • Any at-power IC • Ensure the "A" SGTS Train lined up for normal auto start IAW OP-070-001 • Attempt to have a slightly elevated drywell pressure			
1.	Obtain a controlled copy of OP-070-001. <u>Note</u> - Candidate may refer to OP-173-003 first which directs starting SGTS IAW OP-070-001.	Controlled copy obtained.		
2.	Select the correct section to perform.	Selects Section 3.2.		
3.	Review the prerequisites: <u>Evaluator</u> - Inform Candidate that all prerequisites have been met.	Ensures that all prerequisites have been met.		
4.	Review the precautions.	Follows precautions as applicable.		
*5.	Open the SGTS outside air damper. <u>Note</u> - HD-07555A remains open for 70 seconds after pushbutton released. Must establish flowpath before that time or it will close and SGTS Fan will not start.	Depress the OPEN pushbutton for SGTS Clg OA Dmp HD-07555A. Observes that SGTS Clg OA Dmp HD-07555A opens for approximately 70 seconds.		
*6.	Start SGTS.	Places the selector switch for SGTS Fan OV109A in the START position.		

* - Critical Step # - Critical Sequence

Appl. To/JPM No: NRC 1-#7 Candidate Name:________________

Step	Action	Standard	Eval	Comments
7.	Monitor the air flowrate.	Monitors SGTS AIR FLOW FR07553A for a flowrate of >3,000 CFM.		
8.	Check SGTS damper position.	Confirms that the following dampers are in the indicated position: • SGTS Makeup OA Dmp FD07551A2 - MODULATING • SGTS Fan Inlet Dmp HD07552A - OPEN • SGTS A Inlet Dmp HD07553A - OPEN		
9	Refers to OP-173-003, Section 3.3 to vent the drywell	Refers to OP-173-003, Section 3.3		
*10.	Open the Drywell/Wetwell Burp Dampers (HD-17508A & B)	Switches for HD-17508A & B placed in OPEN		
*11.	Open The Drywell Vent Isolation Valve (HV-15713)	Switch for HV-15713 placed in OPEN		
*12.	Open the Drywell Vent Bypass Outboard Isolation Valve (HV-15711)	Switch for HV-15711 placed in OPEN		
13.	Monitor drywell pressure **Evaluator** - Inform Candidate that another operator will complete the venting	Monitors pressure on PI-15702 with HSS-15702 selected to CONTN		

* - Critical Step # - Critical Sequence

TASK CONDITIONS:

A. The Unit 1 Drywell pressure has slowly been rising over the last 2 shifts

B. The SGTS is aligned for automatic initiation in accordance with OP-070-001.

C. All prerequisites, Tech Spec and TRM requirements have been met.

D. Unit 2 is not venting their drywell.

INITIATING CUE:

The Unit Supervisor directs you to perform a manual startup of "A" Standby Gas Treatment train and vent the drywell to reduce pressure by 0.5 psig

Appl. To/JPM No: NRC 1-#7 Candidate Name:________________________

QUESTION NO: 1

With the plant operating at power, both trains of Standby Gas Treatment have been declared "Inoperable". What are the restrictions on continued plant operation for these conditions? How does this impact the Secondary Containment?

EXPECTED ANSWER:

-- Must restore one SGTS subsystem to Operable in 4 hours or be in Mode 3 in next 12 hours and Mode 4 within 36 hours.
-- With both SGTS subsystems Inop, Secondary Containment is Inop. Same actions and completion times as SGTS.

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 261000G112 2.9/4.0

REFERENCES: Unit 1 Tech Spec 3.6.4.1 and 3.6.4.3, Pages 3.6-35 & 42

SY017 L-3, "Standby Gas Treatment System", Rev. 2, LO - 12

Appl. To/JPM No: NRC 1-#7 Candidate Name:________________________

QUESTION NO: 2

A loss of coolant accident with confirmed fuel damage has occurred on Unit 1. All plant systems responded as designed during and after the accident.

What is the expected maximum dose expected to be received at the site boundary?

EXPECTED ANSWER:

25 rem whole body or 300 rem to the thyroid from iodine

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 261000A103 3.2/3.8

REFERENCES: 10CFR100.11, "Determination of Exclusion Area, Low Population Zone And Population Zone Center Distance", Rev. 1-1-92 Edition, Section (a)(1) Page 417

SY017 L-3, "Standby Gas Treatment System", Rev. 2, LO - 1, 2 & 3.d

Appl. To/JPM No: NRC 1-#7 Candidate Name:____________________

QUESTION NO: 2

A loss of coolant accident with confirmed fuel damage has occurred on Unit 1. All plant systems responded as designed during and after the accident.

What is the expected maximum dose expected to be received at the site boundary?

Appl. To/JPM No: NRC 1-#7 Candidate Name:________________________

QUESTION NO: __1__

With the plant operating at power, both trains of Standby Gas Treatment have been declared "Inoperable". What are the restrictions on continued plant operation for these conditions? How does this impact the Secondary Containment?

Appl. To/JPM No: NRC 1-#7 Candidate Name:________________________

TASK CONDITIONS:

A. The Unit 1 Drywell pressure has slowly been rising over the last 2 shifts

B. The SGTS is aligned for automatic initiation in accordance with OP-070-001.

C. All prerequisites, Tech Spec and TRM requirements have been met.

D. Unit 2 is not venting their drywell.

INITIATING CUE:

The Unit Supervisor directs you to perform a manual startup of "A" Standby Gas Treatment train and vent the drywell to reduce pressure by 0.5 psig

PENNSYLVANIA POWER & LIGHT COMPANY
JOB PERFORMANCE MEASURE
APPROVAL AND ADMINISTRATIVE DATA SHEET

SRO	NRC 1-#8	0	05/10/99	217000	1
Appl To	JPM Number	Rev No.	Date	NUREG 1123 Sys. No.	SFG

Task Title: Connect the SLC Storage Tank to the RCIC System

Completed By: Reviews:

C. J. Tyner	03/10/99		
Writer	Date	Instructor/Writer	Date

Approval:

Requesting Supv./C.A. Head	Date	Nuclear Training Supv.	Date

ALTERNATE PATH: NO TIME CRITICAL: NO RCA ENTRY: YES

TESTING METHOD: SIMULATE - PLANT

JPM SOURCE: Facility JPM 50.EO.005.102, Rev. 0 - modified to add the steps to actually inject, updated to current procedure revisions, added examiner Cues

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Date of Performance:

	30 Min	
	Allowed Time (Min)	Time Taken (Min)

JPM Performed By

Last	First	M.I.	Employee #/S.S. #

JPM Performance Evaluation: ( ) Satisfactory ( ) Unsatisfactory

Ques #1: ( ) Satisfactory ( ) Unsatisfactory Ques #2: ( ) Satisfactory ( ) Unsatisfactory

Evaluator Name:

Signature	Typed or Printed

Comments:

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
NRC 1-#8

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP-AD-001, Operations Shift Policies.

B. All applicable safety precautions shall be taken in accordance with established PP&L safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment; such as hearing or eye protection, safety shoes, hardhats, etc; is required and/or posted as being necessary.

II. REFERENCES

A. ES-150-002, "Boron Injection Via RCIC", Rev. 11, Section 4.3

III. REACTIVITY MANIPULATIONS

N/A

IV. TASK CONDITIONS

A. An ATWS condition exists

B. All efforts to insert the control rods have failed.

C. Both Recirc pumps have been tripped.

D. Suppression Pool temperature is 105° F

E. ADS has been inhibited.

F. SLC injection has failed.

G. EO-100-102, RPV Control, is being executed in conjunction with other required procedures.

V. INITIATING CUE

The Unit Supervisor directs you to line up the SLC storage tank to the RCIC System in accordance with ES-150-002.

PERFORMANCE CHECKLIST

Appl. To/JPM No.: NRC 1-#8 Candidate Name:_______________

Step	Action	Standard	Eval	Comments
	JPM Setup: • Obtain a copy of the latest revision of ES-150-002, and mark it up as if it was actually to be performed, and provide it to the Candidate with the Task Conditions/Initiating Cue Sheet.			
1.	Review Sections 1.0 through 3.0. **Evaluator** - tell Candidate that ES-150-001 has been evaluated and is not required	Reviews the purpose, required equipment, and the precautions and limitations sections of the procedure.		
2.	Ensure that Shift Supervision approval has been given to perform this procedure.	Notes that Section 4.1 is signed.		
3.	Obtain the required key. **Evaluator:** • The Candidate would need to obtain the SLC ES box key. • For purpose of this JPM, an ES key may be signed out from the Ops key locker with Shift Supervision approval. DO NOT remove a key from the ES box in the Shift Supervisor's office.	Obtains the following from Shift Supervision: • SLC ES box key		
4.	At RB Elevation 749', obtain the equipment to perform the connection. **Evaluator** - Inventory the equipment with the Candidate, then restore all equipment to the box and lock it. No equipment is to be removed.	Opens the RCIC ES box and obtains equipment.		

* - Critical Step # - Critical Sequence

Appl. To/JPM No.: NRC 1-#8 Candidate Name:________________

Step	Action	Standard	Eval	Comments
5.	Rotate pipe elbow on the downstream side of the SLC Flushing Drain 148F015. **Evaluator** - This elbow is located just prior to the floor drain near the pipe support between the pumps. **CUE** - When correct elbow located, cue that elbow connection has been loosened and the elbow is being rotated to the horizontal position facing South	Locates the pipe elbow. Loosens elbow connections and rotates the elbow to a horizontal position (Facing South).		
*6.	Install piping in the SLC Flushing Drain Line. **CUE** - When correct pipe selected, cue that connections are being made up, pipe is installed and tightened	Installs the two foot section of one inch pipe, taken from the RCIC ES box, into the elbow in the SLC Flushing Drain Line.		
*7.	Install the hose coupling on the pipe just installed. **Cue** - hose coupling installed on 2 foot pipe section, connections tightened	Installs a one inch double female pipe coupling, taken from the RCIC ES box, on the end of the two foot pipe that was just installed.		
8.	Place the noncollapsible hose in place. **Cue** - hose run to northeast stairwell and lowered down to RCIC room. Hose tied off as necessary.	Unreels the 300 feet of 1.5 inches noncollapsible hose down the northeast stairwell to the RCIC Room on RB Elevation 645'.		
*9.	Connect noncollapsible hose to SLC system. **Cue** - hose connected to SLC with hose clamps, all connections tightened.	Using both one foot hose clamps, taken from the RCIC ES box, fasten the noncollapsible hose to the pipe coupling installed in the two foot section of one inch pipe.		

* - Critical Step # - Critical Sequence

Appl. To/JPM No.: NRC 1-#8 Candidate Name:____________________

Step	Action	Standard	Eval	Comments
10.	Securely tie hose. **Cue** - hose securely tied,	Securely ties the hose, using the nylon rope obtained from the ES box. Hose not tied to snubbers.		
11.	Remove Cap From RCIC Supp Pool Suction Drain Valve 149012 **Cue** - when correct valve located, cap is removed from drain valve.	Removes the cap from the RCIC Supp Pool Suction Drn 149012.		
*12.	Install one-inch coupling to RCIC Supp Pool Suction Drain Valve 149012 **Cue** - coupling installed on 149012 and connection tightened	Installs a one-inch double female coupling, taken from the RCIC ES box, on RCIC Supp Pool Suction Drn Valve 149012.		
"13.	Connects 1.5 inch non-collapsible hose with hose clamp to pipe coupling at 149012 drain line **Cue** - hose connected to drain line, connection tightened	Hose connected to 149012 drain line		
14.	Informs Control Room that SLC is connected to RCIC **Cue** - Control Room acknowledges the call and informs you that RWCU is isolated, RCIC is injecting into the reactor and they are ready for Step 4.4	Calls Control Room and informs them that Sections 4.3.1 and 4.3.2 of ES-150-002 have been completed.		
*15.	Open SBLC Injection Pumps Suction Drain Valve 148F015 (El 749, Area 29) **Cue** - when correct valve located, valve repositioned fully counter-clockwise	Repositions F015 fully open		

* - Critical Step # - Critical Sequence

Appl. To/JPM No.: NRC 1-#8 Candidate Name:______________

Step	Action	Standard	Eval	Comments
16.	Check hose for leaks and flow restrictions **Cue** - no leaks or flow restrictions in the hose	Walks down hose and verifies no leaks, kinks, bends, etc.		
17.	Informs Control Room hose is pressurized **Cue** - Control Room acknowledges and has completed Step 4.4.3, they direct you to complete the lineup to inject	Calls Control Room and reports Step 4.4.2 completed		
18.	Verifies SBLC Storage Tank heaters in "Auto" (EL 749, Area 29) **Cue** - Heater switch is in "Auto"	Checks heater switch in "Auto"		
19.	Informs Control Room that flow is being initiated **Cue** - Control Room acknowledges	Calls Control Room and reports Step 4.4.5		
*20.	Opens RCIC Supp Pool Suction Drain (149012) (El 645, Area 28) **Cue** - When correct valve located, valve is positioned fully counter-clockwise	Repositions 149012 fully open		
*21.	Opens RCIC Pump Suct From Supp Pool Bypass (149019) (El645, Area 28) **Cue** - When correct valve located, valve is positioned fully counter-clockwise, Control Room reports lowering SBLC Storage Tank level	Repositions 149019 fully open		

* - Critical Step # - Critical Sequence

TASK CONDITIONS

A. An ATWS condition exists.

B. All efforts to insert the control rods have failed.

C. Both Recirc pumps have been tripped.

D. Suppression Pool temperature is 105° F

E. ADS has been inhibited.

F. SLC injection has failed.

G. EO-100-102, RPV Control, is being executed in conjunction with other required procedures.

INITIATING CUE

The Unit Supervisor directs you to line up the SLC storage tank to the RCIC System in accordance with ES-150-002.

Appl. To/JPM No: NRC 1-#8 Candidate Name:________________________

QUESTION NO: __1__

Given the following Standby Liquid Control parameters taken from the logs:

- Storage tank level	4755 gallons
- Sodium Pentaborate concentration	13.8%
- Storage tank temperature	71 degrees F
- SLC Pump suction temperature	64 degrees F

What are the required actions for the given conditions?

EXPECTED ANSWER:

-- SLC Pump suction temperature is out of specification low

-- Declare both SLC subsystems Inoperable, restore at least one subsystem to Operable within 8 hours or be in Mode 3 within the next 12 hours

-- Restore pump suction temperature to 69-69 degrees F (per Figure 3.1.7-2)

-- Perform the biannual determination that the heat tracing piping between the storage tank and the pump suction is unblocked within 24 hours of restoring correct temperature

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 211000A205 3.1/3.4

REFERENCES: Unit 1 Tech Spec 3.1.7, Page 3.1-20

SY0-17 C-3, "Standby Liquid Control System", Rev. 2, LO - 4

Appl. To/JPM No: NRC 1-#8 Candidate Name:____________________

QUESTION NO: __2__

The Standby Liquid Control quarterly flow verification is about to be run. How is the Reactor Water Cleanup System isolation and SLC Squib Valves firing avoided during this test? Explain/verify your answer in prints.

EXPECTED ANSWER:

-- **The pumps are started and run from the local control station by holding the pushbutton depressed**
-- Pump starts with these pushbuttons bypass the RWCU isolation and the Squib Valve firing circuits.

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 211000A109 4.0/4.1

REFERENCES: SY0-17 C-3, "Standby Liquid Control System", Rev. 2, Figure 6, LO - 6.a & 14.d

Appl. To/JPM No: NRC 1-#8 Candidate Name:________________________

QUESTION NO: 2

The Standby Liquid Control quarterly flow verification is about to be run. How is the Reactor Water Cleanup System isolation and SLC Squib Valves firing avoided during this test? Explain/verify your answer in prints.

Appl. To/JPM No: NRC 1-#8 Candidate Name:________________________

QUESTION NO: 1

Given the following Standby Liquid Control parameters taken from the logs:

- Storage tank level	4755 gallons
- Sodium Pentaborate concentration	13.8%
- Storage tank temperature	71 degrees F
- SLC Pump suction temperature	64 degrees F

What are the required actions for the given conditions?

Appl. To/JPM No: NRC 1-#8 Candidate Name:____________________

TASK CONDITIONS

A. An ATWS condition exists.

B. All efforts to insert the control rods have failed.

C. Both Recirc pumps have been tripped.

D. Suppression Pool temperature is 105° F

E. ADS has been inhibited.

F. SLC injection has failed.

G. EO-100-102, RPV Control, is being executed in conjunction with other required procedures.

INITIATING CUE

The Unit Supervisor directs you to line up the SLC storage tank to the RCIC System in accordance with ES-150-002.

PENNSYLVANIA POWER & LIGHT COMPANY
JOB PERFORMANCE MEASURE
APPROVAL AND ADMINISTRATIVE DATA SHEET

SRO	NRC 1-#9	0	05/10/99	223002	5
Appl To	JPM Number	Rev No.	Date	NUREG 1123 Sys. No.	SFG

Task Title: Bypass All MSIV Isolation Signals and MSL Drain Isolation Signals

Completed By: Reviews:

C. J. Tyner	03/10/99		
Writer	Date	Instructor/Writer	Date

Approval:

Requesting Supv./C.A. Head	Date	Nuclear Training Supv.	Date

ALTERNATE PATH: NO TIME CRITICAL: NO RCA ENTRY: NO

TESTING METHOD: SIMULATE - PLANT

JPM SOURCE: Facility JPM 84.EO.001.102, Rev. 0 - direct from source, updated to current procedure revisions, added examiner Cues

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Date of Performance:

	20 Min	
	Allowed Time (Min)	Time Taken (Min)

JPM Performed By

Last	First	M.I.	Employee #/S.S. #

JPM Performance Evaluation: ( ) Satisfactory ( ) Unsatisfactory

Ques #1: ( ) Satisfactory ( ) Unsatisfactory Ques #2: ( ) Satisfactory ( ) Unsatisfactory

Evaluator Name:

Signature	Typed or Printed

Comments:

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
NRC 1-#9

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP-AD-001, Operations Shift Policies.

B. All applicable safety precautions shall be taken in accordance with established PP&L safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment; such as hearing or eye protection, safety shoes, hardhats, etc; is required and/or posted as being necessary.

II. REFERENCES

A. ES-184-002, "Reopening MSIVs Bypassing Isolations", Rev. 6, Section 4.2.4

III. REACTIVITY MANIPULATIONS

N/A

IV. TASK CONDITIONS

A. Unit 1 is operating in EO-100-112, "Rapid Depressurization"

B. Plant conditions are such that bypassing of ALL MSIV and MSL Drain isolation signals are required.

C. Sections 4.2.1, 4.2.2 and 4.2.3 of ES-184-002 have been completed

D. 125 V DC is NOT available.

V. INITIATING CUE

The Unit Supervisor directs you to bypass ALL MSIV and MSL Drain isolation signals in accordance with ES-184-002, Section 4.2.4

Appl. To/JPM No.: NRC 1-#9 Candidate Name:_______________

Step	Action	Standard	Eval	Comments
	JPM Setup: Obtain a copy of ES-184-002 and mark it up as if Section 4.2.4 is actually to be performed and provide it to the Candidate.			
1.	Review Sections 1.0 through 3.0 and completed portions of 4.0	Reviews Sections 1.0, 2.0, 3.0 and completed portions of 4.0		
2.	Ensure Shift Supervision approval obtained to perform Section 4.2.4.	Observes Shift Supervision initials in Section 4.1giving approval to perform Section 4.2.4		
3.	Obtain the required jumpers. **Evaluator** - Have the Candidate show you the jumpers, but do not remove them from the SS box.	Obtains required jumpers from ES box in Shift Supervisor's office.		
*4.	Install jumper between terminal posts 11 and 13 on relay B21H-K7A. **Evaluator** - Panel 1C609, RPS Trip Sys A1/A2 NSS Shutoff Sys Panel, is located in the Upper Relay Room. Relay B21H-K7A is labeled CX/B21H-K7A and is located in 1C609 DIV 1 section inside the right door. It is in the second row of relays from the top on the far right. Refer to Attachment A of ES-184-002 for location of terminal posts 11 and 13. **Cue** - when correct panel and relay identified, jumper is installed between terminal posts 11 & 13	Correctly locates 1C609. Correctly identifies Relay B21H-K7A. Installs jumper between terminal posts 11 and 13.		

* - Critical Step # - Critical Sequence

Appl. To/JPM No.: NRC 1-#9 Candidate Name:______________________

Step	Action	Standard	Eval	Comments
*5.	Install jumper between terminal posts 11 and 13 on Relay B21H-K7C. **Evaluator** - Relay B21H-K7C is labeled AN/B21H-K7C and is located in 1C609 DIV 2 section inside the right door. It is in the second row of relays from the top on the far right. Refer to Attachment A of ES-184-002 for location of terminal posts 11 and 13. **Cue** - when correct panel and relay identified, jumper is installed between terminal posts 11 & 13	Correctly identifies Relay B21H-K7C. Installs jumper between terminal posts 11 and 13.		
*6.	Install jumper between terminal posts 11 and 13 on Relay B21H-K7B. **Evaluator** - Panel 1C611, RPS Trip Sys B1/B2 NSS Shutoff Sys Panel, is located in the Lower Relay Room. Relay B21H-K7B is labeled CX/B21H-K7B and is located in 1C611 DIV 1 section inside the right door. It is in the second row of relays from the top of the far right. Refer to Attachment A of ES-184-002 for location of terminal posts 11 and 13. **Cue** - when correct panel and relay identified, jumper is installed between terminal posts 11 & 13	Correctly locates 1C611. Correctly identifies Relay B21H-K7B. Installs jumper between terminal posts 11 and 13.		

* - Critical Step # - Critical Sequence

Appl. To/JPM No.: NRC 1-#9

Candidate Name:____________________

Step	Action	Standard	Eval	Comments
*7.	Install jumper between terminal posts 11 and 13 on Relay B21H-K7D. **Evaluator** - Relay B21H-K7D is labeled AN/B21H-K7D and is located in 1C611 DIV 2 section inside the right door. It is in the second row of relays from the top on the far right. Refer to Attachment A of ES-184-002 for location of terminal posts 11 and 13. **Cue** - when correct panel and relay identified, jumper is installed between terminal posts 11 & 13	Correctly identifies Relay B21H-K7D. Installs jumper between terminal posts 11 and 13.		
8.	Inform Control Room all MSIV and MSL Drain Valve Isolation Signals have been bypassed **Evaluator** - acknowledge report as Control Room	Calls Control Room and reports Section 4.2.4 completed.		

* - Critical Step # - Critical Sequence

TASK CONDITIONS:

A. Unit 1 is operating in EO-100-112, "Rapid Depressurization"

B. Plant conditions are such that bypassing of ALL MSIV and MSL Drain isolation signals are required.

C. Sections 4.2.1, 4.2.2 and 4.2.3 of ES-184-002 have been completed

D. 125 V DC is <u>NOT</u> available.

INITIATING CUE:

The Unit Supervisor directs you to bypass <u>ALL</u> MSIV and MSL Drain isolation signals in accordance with ES-184-002, Section 4.2.4.

Appl. To/JPM No: NRC 1-#9 Candidate Name:________________________

QUESTION NO: 1

If the jumper between terminal posts 11 & 13 in the back of 1C609 had NOT been installed (Step 4.2.4.1.(2)) and reactor water level subsequently lowered to -129 inches, what would be the response of the MSIVs? Confirm your answer utilizing logic prints. Assume the other 3 jumpers were correctly installed.

EXPECTED ANSWER:

The MSIVs should remain open. Installing three jumpers should still defeat the needed "one-out-of-two-taken-twice" logic for an isolation.

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 223002K408 3.3/3.7

REFERENCES:

Appl. To/JPM No: NRC 1-#9 Candidate Name:________________________

QUESTION NO: 2

Under what specific plant conditions is opening the Main Steam Isolation Valves authorized with a fuel failure or steam line break present?

EXPECTED ANSWER:

- Conditions require a Rapid Depressurization and less than 4 SRV can be opened
- Conditions require RPV venting

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 295037K306 3.8/4.1

REFERENCES: ES-184-002, "Reopening MSIVs Bypassing Isolations", Rev. 6, Section 6.3.8, Page 29

Appl. To/JPM No: NRC 1-#9 Candidate Name:____________________

QUESTION NO: __2__

Under what specific plant conditions is opening the Main Steam Isolation Valves authorized with a fuel failure or steam line break present?

Appl. To/JPM No: NRC 1-#9 Candidate Name:____________________

QUESTION NO: 1

If the jumper between terminal posts 11 & 13 in the back of 1C609 had NOT been installed (Step 4.2.4.1.(2)) and reactor water level subsequently lowered to -129 inches, what would be the response of the MSIVs? Confirm your answer utilizing logic prints. Assume the other 3 jumpers were correctly installed.

Appl. To/JPM No: NRC 1-#9 Candidate Name:______________________

TASK CONDITIONS:

A. Unit 1 is operating in EO-100-112, "Rapid Depressurization"

B. Plant conditions are such that bypassing of ALL MSIV and MSL Drain isolation signals are required.

C. Sections 4.2.1, 4.2.2 and 4.2.3 of ES-184-002 have been completed

D. 125 V DC is <u>NOT</u> available.

INITIATING CUE:

The Unit Supervisor directs you to bypass <u>ALL</u> MSIV and MSL Drain isolation signals in accordance with ES-184-002, Section 4.2.4.

PENNSYLVANIA POWER & LIGHT COMPANY
JOB PERFORMANCE MEASURE
APPROVAL AND ADMINISTRATIVE DATA SHEET

SRO	NRC 1-#10	0	05/10/99	201004	7
Appl To	JPM Number	Rev No.	Date	NUREG 1123 Sys. No.	SFG

Task Title: Bypass of Control Rod - Rod Sequence Control System (RSCS)

Completed By: Reviews:

C. J. Tyner	03/10/99		
Writer	Date	Instructor/Writer	Date

Approval:

Requesting Supv./C.A. Head	Date	Nuclear Training Supv.	Date

ALTERNATE PATH: NO TIME CRITICAL: NO RCA ENTRY: NO

TESTING METHOD: SIMULATE - PLANT

JPM SOURCE: Facility JPM 56.OP.008.101, Rev. 0 - modified to different control rod, updated to latest procedure revisions, added examiner Cues

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Date of Performance:

	10 Min	
	Allowed Time (Min)	Time Taken (Min)

JPM Performed By

Last	First	M.I.	Employee #/S.S. #

JPM Performance Evaluation: ( ) Satisfactory ( ) Unsatisfactory

Ques #1: ( ) Satisfactory ( ) Unsatisfactory Ques #2: ( ) Satisfactory ( ) Unsatisfactory

Evaluator Name:

Signature	Typed or Printed

Comments:

REQUIRED TASK INFORMATION
JOB PERFORMANCE MEASURE
NRC 1-#10

I. SAFETY CONSIDERATIONS

A. All Operations personnel are responsible for maintaining their radiation exposure As Low As Reasonably Achievable in accordance with OP-AD-001, Operations Shift Policies.

B. All applicable safety precautions shall be taken in accordance with established PP&L safety policies and the Safety Rule Book, for example:

1. Whenever any electrical panel is opened for inspection during JPM performance.

2. Whenever entering any plant area where specific safety equipment; such as hearing or eye protection, safety shoes, hardhats, etc; is required and/or posted as being necessary.

II. REFERENCES

A. OP-156-002, "Rod Sequence Control System (RSCS)", Rev. 9, Section 3.2

B. NDAP-QA-0338, "Reactivity Management and Controls Program", Rev. 5, Attachment I

III. REACTIVITY MANIPULATIONS

None

IV. TASK CONDITIONS

A. A startup is in progress on Unit 1.

B. Control Rod 34-47 has experienced a RPIS failure.

C. There are no control rods bypassed on the RSCS Cabinet 1C649.

D. Form NDAP-QA-0338, Attachment I, has been completed, authorizing Control Rod 34-47 to be bypassed in RSCS.

V. INITIATING CUE

The Unit Supervisor directs you to bypass Control Rod 34-47 in the Rod Sequence Control System (RSCS)

PERFORMANCE CHECKLIST

Appl. To/JPM No.: NRC 1-#10 Candidate Name:________________________

Step	Action	Standard	Eval	Comments
	<u>Simulator Setup:</u> • Markup copy of NDAP-QA-0338, Attachment I, to authorize bypassing control Rod 34-47			
1.	Obtain a controlled copy of OP-156-002.	Controlled copy obtained.		
2.	Select the correct section to perform.	Selects Section 3.2		
3.	Review the prerequisites. **<u>Evaluator</u>** - Inform Candidate all prerequisites have been met.	Ensures all prerequisites have been met.		
4.	Review the precautions.	Precautions reviewed		
*5.	Determine Binary Coordinate Code for control rod 34-47 by using the Fault Map on Analyzer Section of Rod Drive Control Cabinet 1C616 or Attachment B of this procedure.	Determine Binary Coordinate Code for control rod 34-47 is 01010 01101		
6.	Open RSCS Bypass Switch Card Cover in RSCS Cabinet 1C649	RSCS Bypass Switch Card Cover opened		

* - Critical Step # - Critical Sequence

(((

PERFORMANCE CHECKLIST

Appl. To/JPM No.: NRC 1-#10 Candidate Name:______________________

Step	Action	Standard	Eval	Comments
*7	Select first Bypass Switch Card not in use and position Bypass Ident Select Switches in proper Binary Coordinate Code positions. **Cue** - When card and toggle switches located, cue Candidate that each is placed in the position stated and shown.	Code is 01010 01101 with switches positioned left for "0" and right for "1" TOP X_4 0 - L X_3 1 - R X_2 0 - L X_1 1 - R X_0 0 - L Y_4 0 - L Y_3 1 - R Y_2 1 - R Y_1 0 - L Y_0 1 - R BOTTOM		
*8.	Place bypass switch on Bypass Switch Card in BYPASS position. **Cue** - when switch located, cue Candidate switch is positioned as stated, red light is "on"	Positions Bypass Switch to "Bypass" (to the right), observes red light on		

* - Critical Step # - Critical Sequence

Appl. To/JPM No.: NRC 1-#10 Candidate Name:______________________

Step	Action	Standard	Eval	Comments
9.	Direct Unit PCO to perform the following: • Using RED Display Control, check RED LED at core location 34-47 illuminated. • Select Control Rod 34-47 at Control Rod Select pushbuttons, and verify withdraw and insert blocks are clear. **Evaluator** - Inform Candidate that Control Room RSCS Display red LED is illuminated, that control rod 34-47 has been selected and the insert and withdraw blocks are clear.	Directs Unit PCO to perform Steps e, f & g of Section 3.2		

* - Critical Step # - Critical Sequence

TASK CONDITIONS

A. A startup is in progress on Unit 1.

B. Control Rod 34-47 has experienced a RPIS failure.

C. There are no control rods bypassed on the RSCS Cabinet 1C649.

D. Form NDAP-QA-0338, Attachment I, has been completed, authorizing Control Rod 34-47 to be bypassed in RSCS.

INITIATING CUE

The Unit Supervisor directs you to bypass Control Rod 34-47 in the Rod Sequence Control System (RSCS).

Appl. To/JPM No: NRC 1-#10 Candidate Name:________________________

QUESTION NO: 1 **THIS QUESTION IS CLOSED REFERENCE**

Unit 1 reactor power is 8% with a startup in progress. The Rod Sequence Control System has been declared Inoperable.

What are the choices available to the operator regarding continued control rod movement?

EXPECTED ANSWER:

-- Suspend control rod movement except by scram
-- OR bypass RSCS and verify all rod movements by a second licensed operator or other qualified member of the technical staff
-- OR bypass RSCS and verify RWM Operable IAW LCO 3.3.2.1

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 201004K301 3.3/3.4

REFERENCES: Unit TRM 3.1.5, Page 3.1-12

SY017 K-4, "Rod Sequence Control System", Rev. 1, LO - 7 & 8

Appl. To/JPM No: NRC 1-#10 Candidate Name:________________________

QUESTION NO: 2

Assuming the control rod in this task (34-47) was being withdrawn from Notch "12" to "24" and had failed RPIS reed switches at Notches "16" and "18". What would be the sequence of events required to continue rod withdrawals past Notch "16" first? Then past Notch "18". Include the expected indications received as the rod is withdrawn.

EXPECTED ANSWER:

-- When Notch "16" reached, a rod insert and withdraw block would be received (rod motion stops). This would be defeated by entering a substitute rod position. This clears the rod blocks.
-- When Notch "18" reaches, another rod insert and withdraw block would be received. Since RSCS will not allow another substitute rod position the only way to continue rod withdrawals on this rod is to bypass the rod entirely in RSCS.

ACTUAL ANSWER:

SAT ________ UNSAT ________

K/A NUMBER: 201004A201 3.3/3.6

REFERENCES: SY017 K-4, "Rod Sequence Control System", Rev. 1, Section IV.B.5, Pages 8 & 9

Appl. To/JPM No: NRC 1-#10 Candidate Name:________________________

QUESTION NO: 2

Assuming the control rod in this task (34-47) was being withdrawn from Notch "12" to "24" and had failed RPIS reed switches at Notches "16" and "18". What would be the sequence of events required to continue rod withdrawals past Notch "16" first? Then past Notch "18". Include the expected indications received as the rod is withdrawn.

Appl. To/JPM No: NRC 1-#10 Candidate Name:______________________

QUESTION NO: 1 THIS QUESTION IS CLOSED REFERENCE

Unit 1 reactor power is 8% with a startup in progress. The Rod Sequence Control System has been declared Inoperable.

What are the choices available to the operator regarding continued control rod movement?

Appl. To/JPM No: NRC 1-#10 Candidate Name:____________________________

TASK CONDITIONS

A. A startup is in progress on Unit 1.

B. Control Rod 34-47 has experienced a RPIS failure.

C. There are no control rods bypassed on the RSCS Cabinet 1C649.

D. Form NDAP-QA-0338, Attachment I, has been completed, authorizing Control Rod 34-47 to be bypassed in RSCS.

INITIATING CUE

The Unit Supervisor directs you to bypass Control Rod 34-47 in the Rod Sequence Control System (RSCS).

Scenario Outline

Facility: Susquehanna S E S **Scenario No.: 1** **Op Test No.:**

Examiners: ______________________ **Candidates:** ______________________**SRO**

______________________ ______________________**RO**

______________________ ______________________**BOP**

Objectives: See attached

Initial Conditions: See attached

Turnover: SEE ATTACHED "SHIFT TURNOVER" SHEET

Event No.	Malf No.	Event Type*	Event Description
1		N	SBGT damper fails
2		I	Inadvertent HPCI start
3		R	Main turbine oil temp increase / power reduction
4		N	Manual turbine trip
5		M	ATWS
6		C	SLC injection failure
7		C	RCIC T&TV failure
8		C	MSIV closure
9		M	Rapid depressurization
10		R	Reactor shutdown

* **(N)**ormal, **(R)**eactivity, **(I)**nstrument, **(C)**omponent, **(M)**ajor

UNIT SUPERVISOR TURNOVER SHEET

UNIT: 1 Date: March 22, 1999

SHIFT 1900 (Start) to 0700 (End)

MODE 1

POWER LEVEL 90 %

GENERATOR OUTPUT 1020 MWe

SHIFT 0700 (Start) to 1900 (End)

MODE

POWER LEVEL %

GENERATOR OUTPUT MWe

1. Instrument Air Compressor 'B' is O/S for rebuild
2. SRV 'R' is leaking, tailpipe temperature is ≈300°F
3. RRP 'B' experiencing seal oscillations, occasional seal stage Hi-Lo flow alarms
4. Unit two is in MODE 2 ~1 hour from synchronizing to the grid

COMMON:

1. Fuel Handling in progress in Unit 1 Spent Fuel Pool
2. SBGT 'B' is in service for SO-070-001, data recording is complete and step 6.3.9 is ready to be performed.

OFFGOING UNIT SUPERVISOR CHECKLIST:

1900-0700	0700-1900	
		1. Evolutions in progress and items to be completed during next shift, as noted in remarks, have been discussed with oncoming Unit Supervisor.
		2. Problems encountered during past shift and abnormal plant conditions, as noted in remarks, have been discussed with oncoming Unit Supervisor.

1900 - 0700 ______________________________

0700 - 1900 ______________________________

Offgoing Unit Supervisor

ONCOMING UNIT SUPERVISOR CHECKLIST:

0700 1900	1900-0700	
		1. LCO Log reviewed.
		2. TRO Log reviewed.

0700 - 1900 ______________________________

1900 - 0700 ______________________________

Oncoming Unit Supervisor

POST RELIEF

	0700 1900	1900-0700	
			1. Walk down Control Room panels with Unit Responsible PCO.
(14)			2. Unit Log reviewed for entries made in past 24 hours.
(5)			3. Non-Routine Training current.

SCENARIO #1

Initial Conditions:

IC-18, 90% Power.
Fuel Handling in progress in Unit 1 Spent Fuel Pool.
IA Compressor 'B' O/S for rebuild.
SRV 'R' Leaking.
RRP 'B' experiencing seal oscillations, occasional seal stage Hi/Lo flow alarms.
SBGT 'B' I/S for SO-070-001, data recording is complete and step 6.3.9 is ready to be performed.

Scenario sequence:

1. Complete in-progress SGTS surveillance
    a. Damper fails, 'B' SBGT is operable
2. Inadvertent HPCI start
    a. Controller failed, shut steam supply isolation valves
    b. HPCI inoperable
3. Main Turbine oil temp increase
    a. Reactor power reduction
    b. Main turbine bearing high vibration
    c. Manual reactor scram – failure to scram
    d. Manual turbine trip
4. ATWS
    a. SLC injection fails
    b. Lower RPV level using feedwater
    c. Override RCIC, T & TV fails

5. Outboard MSIVs close after RWL in target band

    a. Loss of high pressure feed, <TAF

6. Rapid Depressurization

    a. Restore adequate core cooling using Condensate or RHR LPCI

7. Reactor Shutdown

SCENARIO 1 SUMMARY

The scenario begins with Unit 1 at 90% power. Unit 2 is 1 hour from synchronizing to the grid. Fuel handling is in progress in Unit 1 Spent Fuel Pool. Instrument Air compressor 'B' is out of service for rebuild. SRV 'R' is leaking. Reactor Recirc 'B' pump is experiencing seal oscillations accompanied by seal stage Hi/Lo flow alarms. SBGT 'B' in service for SO-070-001.

The crew will complete the SBGT surveillance activity on the 'B' train. When the crew shuts down the train the fan inlet damper will fail to close, the SRO will determine the SBGT system is operable in this condition.

HPCI will inadvertently start and inject to the RPV. The crew will attempt to override HPCI injection, a controller malfunction will eventually require isolation of HPCI steam supply isolation valves to terminate injection. HPCI will remain inoperable.

Main turbine oil temperature increases due to a faulty Temperature Control Valve (TCV). A power reduction will be performed to reduce main turbine load. Along with elevated temperatures, main turbine bearing vibration will increase to require a manual reactor scram and main turbine trip. A failure to scram occurs when the Mode Switch is placed to shutdown.

During the response to the ATWS event, ARI and SLC will fail, drifting control rods will be prevented. The crew will lower RPV level with feedwater to the target level control band and override RCIC injection. After control is established in the target band the outboard MSIVs will close. Insufficient high pressure makeup will result in reactor water level decreasing below top of active fuel. The crew will stop and prevent injection except from CRD, initiate Rapid Depressurization, and restore adequate core cooling with Condensate or RHR LPCI injection.

The crew can manually drive rods. When RPV level is restored >-161", full rod insertion will be accomplished by isolating and venting the scram air header.

The scenario will terminate when all control rods are inserted, reactor water level is restoring +13 to +54 inches, and direction is given to align Suppression Pool Cooling.

The Emergency Plan classification is EAL 11.3, Site Area Emergency or EAL 11.4, General Emergency. The classification difference is the initial reactor power level.

	PP&L–SUSQUEHANNA TRAINING CENTER	
	SIMULATOR SCENARIO	

Scenario Title:	INITIAL LICENSE SIMULATOR EXAM # 1
Scenario Duration:	90 MINUTES
Scenario Number:	99NRC1
Revision/Date:	REV. 2, 4/29/99
Course:	SM100, INITIAL LICENSE EXAM
Operational Activities:	

Prepared By:	Terry W. Logsdon Instructor	4-30-99 Date
Reviewed By:	[signature] Nuclear Operations Training Supervisor	4/3./99 Date
Approved By:	[signature] Supervising Manager/Shift Supervisor	4/3./99 Date

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SCENARIO SUMMARY

The scenario begins with Unit 1 at 90% power. Unit 2 is 1 hour from synchronizing to the grid. Fuel handling is in progress in Unit 1 Spent Fuel Pool. Instrument Air compressor 'B' is out of service for rebuild. SRV 'R' is leaking. Reactor Recirc 'B' pump is experiencing seal oscillations accompanied by seal stage Hi/Lo flow alarms. SBGT 'B' in service for SO-070-001.

The crew will complete the SBGT surveillance activity on the 'B' train. When the crew shuts down the train the fan inlet damper will fail to close, the SRO will determine the SBGT system is operable in this condition.

HPCI will inadvertently start and inject to the RPV. The crew will attempt to override HPCI injection, a controller malfunction will eventually require isolation of HPCI steam supply isolation valves to terminate injection. HPCI will remain inoperable.

Main turbine oil temperature increases due to a faulty Temperature Control Valve (TCV). A power reduction will be performed to reduce main turbine load. Along with elevated temperatures, main turbine bearing vibration will increase to require a manual reactor scram and main turbine trip. A failure to scram occurs when the Mode Switch is placed to shutdown.

During the response to the ATWS event, ARI and SLC will fail, drifting control rods will be prevented. The crew will lower RPV level with feedwater to the target level control band and override RCIC injection. After control is established in the target band the outboard MSIVs will close. Insufficient high pressure makeup will result in reactor water level decreasing below top of active fuel. The crew will stop and prevent injection except from CRD, initiate Rapid Depressurization, and restore adequate core cooling with Condensate or RHR LPCI injection.

The crew can manually drive rods. When RPV level is restored >-161", full rod insertion will be accomplished by isolating and venting the scram air header.

The scenario will terminate when all control rods are inserted, reactor water level is restoring +13 to +54 inches, and direction is given to align Suppression Pool Cooling.

The Emergency Plan classification is EAL 11.3, Site Area Emergency or EAL 11.4, General Emergency. The classification difference is the initial reactor power level.

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SCENARIO OBJECTIVES

The SRO candidate will:

1. Ensure Plant Operates IAW the Operating License and Technical Specifications (00.TS.001)
2. Ensure that Required Actions per Technical Specifications/Technical Requirements are met when a LCO/TRO is entered (00.TS.003)
3. Inform other shift members and plant management of changes in plant status, potential plant problems or limitations. (00.AD.131)
4. Implement Scram (00.ON.018)
5. Implement RPV Control (00.EO.026)
6. Implement Level / Power Control (00.EO.031)
7. Implement Primary Containment Control (00.EO.027)
8. Ensure that Required Actions per Technical Specifications are met when a LCO is not met (00.TS.002)
9. Shutdown the reactor when it is determined reactor safety is in jeopardy, or when operating parameters exceed any RPS setpoint and scram does not occur. (00.AD.031)
10. Implement Main Turbine trip. (93.ON.006)
11. Implement appropriate portions of Power Maneuvers (00.GO.010)
12. Implement appropriate portions of Station Communication Practices (00.AD.016)
13. Implement appropriate portions of Operation shift Policies and Work Practices (00.AD.131)

The RO candidate will:

1. Perform operation of RHR in Suppression Pool Cooling with a LPCI signal present (49.OP.012)
2. Perform maximizing CRD flow (55.OP.001)
3. Perform initiation of Standby Liquid Control System (53.OP.003)
4. Perform inserting manual scram with CRD in service (55.OP.006)
5. Perform inhibiting ADS (83.OP.005)
6. Implement Scram (00.ON.018)
7. Implement RPV Control (00.EO.026)
8. Implement Level / Power Control (00.EO.031)
9. Implement Primary Containment Control (00.EO.027)
10. Implement Main Turbine trip. (93.ON.006)
11. Implement appropriate portions of Power Maneuvers (00.GO.010)
12. Perform Monthly Operational Check of SBGT System (70.SO.001)
13. Perform overriding HPCI System (52.OP.009)
14. Perform a 10% power change with Recirc or Rods (00.GO.012)
15. Perform Bypassing MSIV and CIG Interlocks (84.OP.001)
16. Perform overriding RCIC System (50.OP.003)
17. Perform overriding Core Spray System (51.OP.004)
18. Perform overriding RHR System (49.OP.011)
19. Perform initiation of SLC (53.OP.002)
20. Perform Manual operation of ADS (83.OP.001)
21. Perform manual bypass of RWM (31.OP.001)
22. Implement appropriate portions of Station Communication Practices (00.AD.016)
23. Implement appropriate portions of Operation shift Policies and Work Practices (00.AD.131)

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SCENARIO REFERENCES

1. SO-070-001 SGT SURVEILLANCE
   a. SO-070-001 MONTHLY STANDBY GAS TREATMENT
   b. T.S. 3.6.4 STANDBY GAS TREATMENT SYSTEM
   c. NDAP-QA-0321 SECONDARY CONTAINMENT INTEGRITY CONTROL

2. INADVERTENT HPCI INITIATION
   a. OP-152-001 HPCI SYSTEM OPERATION
   b. T.S. 3.5.1 EMERGENCY CORE COOLING SYSTEMS
   c. AR-101-B05 RB AREA PANEL 1C605 HI RADIATION

3. MAIN TURBINE BEARING HIGH TEMPERATURE/HIGH VIBRATION
   a. AR-123-H05 MTLO COOLER DSCH HI TEMP
   b. AR-105-C05 TURB GEN BRG HI TEMP
   c. AR-105-E05 TURB GEN BRG HI VIBR
   d. ON-100-101 REACTOR SCRAM
   e. ON-193-002 MAIN TURBINE TRIP

4. RPV CONTROL
   a. EO-100-102 RPV CONTROL

5. FAILURE TO SCRAM - ATWS
   a. EO-100-113 LEVEL POWER CONTROL
   b. OP-150-001 RCIC SYSTEM OPERATION
   c. OP-155-001 CRD SYSTEM OPERATION
   d. OP-149-001 RHR SYSTEM OPERATION
   e. OP-151-001 CORE SPRAY SYSTEM OPERATION
   f. OP-145-001 FEEDWATER SYSTEM OPERATION
   g. OP-144-001 CONDENSATE SYSTEM OPERATION

6. RAPID DEPRESSURIZATION
   a. EO-100-112 RAPID DEPRESSURIZATION

7. PRIMARY CONTAINMENT CONTROL
   a. EO-100-103 PRIMARY CONTAINMENT CONTROL
   b. OP-116-001 RHRSW SYSTEM OPERATION
   c. OP-149-005 RHR SPC OPERATION

8. OP-AD-001 OPERATIONS SHIFT POLICIES AND WORK PRACTICES

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SCENARIO SPECIAL INSTRUCTIONS

1. Initialize simulator to IC-18, 100% power.

2. Manually start SBGT 'B' system.

3. Lower core flow until APRM power is 90%.

4. Reduce main turbine load set as necessary.

5. Raise DW pressure ≈0.2 psig above existing pressure with nitrogen makeup.

6. Place IA Compressor 'B' control switch to 'OFF' and Pink Tag.

   a. Run the exam initial condition batch file **bat YPB.NRC**
   b. Ensure Main Steam SRV Leaking annunciator is in alarm - AR-110-E01

NOTE: Ensure SBGT 'B' dampers have aligned and operation is stable before continuing.

7. Enter preference file: **restorepref YPP.99NRC1**

   a. Verify environment window

MALFS	**REMFS**	**OVRDS**	**TRG**
6:6	1	1:1	1

   b. Ensure 15 function buttons lit.

8. Silence and reset alarms.

9. Prepare a turnover sheet indicating:

   a. Fuel handling is in progress in Unit 1 fuel pool.
   b. Instrument Air compressor 'B' is out-of-service for rebuild.
   c. SRV 'R' is leaking, tailpipe temp is steady at ≈300°F.
   d. RRP 'B' is experiencing occasional seal oscillations accompanied with seal stage Hi/Lo flow alarms.
   e. SBGT 'B' is in service for SO-070-001, data recording is complete and step 6.3.9 is ready to be performed.
   f. Unit 2 start-up is in progress, approximately 2 hours from synchronizing to the grid.

10. Place simulator in **RUN.**

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SCENARIO EVENT DESCRIPTION FORM

Initial Conditions: Scenario special instructions are complete. Provide the crew with the turnover information. Assign shift positions. Direct the crew to begin the five minute panel walk down.

EVENT	TIME	DESCRIPTION
1		Complete SBGT Surveillance
2		Inadvertent HPCI Start
3		Main Turbine Bearing High Temperature/High Vibration
4		Level/Power Control
5		Outboard MSIVs Close / RPV Level <TAF
6		Rapid Depressurization
7		Reactor Shutdown / Primary Containment Control
		Termination Cue

SCENARIO EVENT FORM

Event No: 1
Brief Description: **Complete Surveillance SO-070-001 / HD-07552B fails to close**

POSITION	TIME	STUDENT ACTIVITIES
SRO		Directs PCO to perform SO-070-001 step 6.3.9
BOPRO		Refers to SO-070-001 step 6.3.9
		Places SGTS fan OV-109B to STOP
		Recognizes fan inlet damper HD-07552B fails to close
		Notifies SRO HD-07552B failed to close
		Refers to AR-130-C10, SGTS OA MU DMP FAIL OPEN
		Dispatch NPO to locally determine damper positions
SRO		Refers to T.S. 3.6.4
		Refers to NDAP-QA-0321 Att. 'A' , SECONDARY CONTAINMENT INTEGRITY
	Note 1	Declares SGTS B is operable and LCO is met.
		Directs PCO to place SGTS fan OV109B to AUTO LEAD
		Identifies fuel handling may continue in this condition
		Contacts maintenance to investigate the failure of HD-07552B damper
BOPRO		Places SGTS fan 0V-109B to Auto Lead

★ Denotes Critical Task

NOTES:	1. Corrective maintenance may lead to LCO not being met, therefore, Required Action A.1 would be
entered.	

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 1
Brief Description: Complete Surveillance SO-070-001 / HD-07552B fails to close

INSTRUCTOR ACTIVITY:

None

ROLE PLAY:

1. If dispatched as NPO to locally check position of fan inlet damper HD-07552B, wait ≈2 mins. and report the damper is open and there are no mechanical obstructions.

2. If dispatched as maintenance to investigate HD-07552B damper, wait ≈5 mins. and report the damper appear bound open. We will get a work plan approved to perform the necessary repairs. No time estimate is available at this time.

SCENARIO EVENT FORM

Event No: 2
Brief Description: **Inadvertent HPCI Initiation and Injection**

POSITION	TIME	STUDENT ACTIVITIES
BOPRO		Recognizes and reports HPCI has initiated
		Determines HPCI initiation is not valid by observing RWL indication and Drywell pressure indication
		Refers to OP-152-001 Section 3.9 to override HPCI
SRO		Determines HPCI mis-operation in Auto
		Directs RO to override HPCI injection
		Directs RO to monitor reactor power
BOPRO		Takes action to override HPCI injection
		Notifies SRO HPCI is not responding
RO		Monitors APRM and thermal power change
		Directs NPO to reset 1C605 Rad Monitors
SRO		Directs isolation of HPCI
		Directs RO to monitor MSL and Off-gas rad levels
		Monitors MSL and Off-gas Rad Monitors
BOPRO		Depresses isolation pushbutton and verifies HPCI F003 shuts, turbine trips and injection stops
SRO		Call I&C to investigate HPCI problem
		Refers to T.S. 3.5.1
		Declares HPCI inoperable and declares LCO not met
		Enter RA D.1, verify RCIC is operable immediately and D.2, restore HPCI Operable in 14 days

★ Denotes Critical Task

NOTES:	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 2
Brief Description: Inadvertent HPCI Initiation and Injection

INSTRUCTOR ACTIVITY:

1. When actions are complete for SGTS, insert the following to cause HPCI initiation:

   [P-1] IMF HP152004 INADVERTENT HPCI START

2. When HPCI low flow annunciator alarms, insert the following to fail the flow controller auto function:

   [P-2] IMF CN02:FCE411R600 89 0 100 CONTROLLER 1R600 AUTO FAILURE

NOTE: Manual control of 1R600 is failed by a pre-inserted malfunction.

3. If requested to reset ARMs at panel 1C605, insert the following:

   [P-3] MRF RM179004 RESET RESET ARMs AT 1C605

ROLE PLAY:

As I & C dispatched to investigate HPCI system, wait ≈5 mins. and report an intermittent ground exists in the logic. Additional investigation is required, no time estimate for restoration is possible at this time.

SCENARIO EVENT FORM

Event No: 3
Brief Description: Main Turbine Bearing Oil High Temperature / High Bearing Vibration

POSITION	TIME	STUDENT ACTIVITIES
RO		Recognizes and reports alarm "MTLO CLR DSCH HI TEMP"
		Reports TIC-10955 controller output is 100%
		Dispatches NPO locally to TCV-10955 to investigate
		Monitors bearing parameters using PICSY formats
		Refers to AR-123-H05 "MTLO CLR DSCH HI TEMP"
RO		Recognizes and reports alarm "TURB GEN BRG HI TEMP"
		Refers to AR-105-C05 "TURB GEN BRG HI TEMP"
SRO		Directs power reduction to limit bearing temps to <250°F
		Notifies plant management
		Contacts maintenance for assistance
RO		Reports bearing vibration increasing on bearings # 4 & 5, >10 mils but < 11 mils
		Reports alarm "TURB GEN BRG HI VIBR"
		Refers to AR-105-E05 "TURB GEN BRG HI VIBR"
SRO		Directs power reduction to limit bearing vibration
		Enters ON-100-101, Rx Scram, directs performance of scram imminent actions
		Directs manual reactor scram and main turbine trip when bearing vibration exceeds 11 mils
		Notify Chemistry, HP, and RE of power reduction

★ Denotes Critical Task

NOTES:	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 3
Brief Description: **Main Turbine Bearing Oil High Temperature / High Bearing Vibration**

INSTRUCTOR ACTIVITY:

1. When actions are complete for HPCI, insert the following to cause a Main Turbine Bearing High Oil Temperature:

   [P-4] IMF AV04:TV10955 5 0 25 TV10955 FAILS TO 5% OPEN

NOTE: MTLO cooler discharge high temperature alarms in ≈30 seconds, bearing metal temperature reaches ≈190°F in ≈3 minutes.

Limit bearing metal temps to a maximum of 200°F by modifying the failed position of TV-10955.

2. When bearing metal temperature reaches 190°F, insert the following to cause high vibration in bearings 4 & 5:

   [P-5] bat TUB.NRC1A BRG 4 10.3 MILS & BRG 5 10.1 MILS

3. After power is reduced ≈10 %, insert the following to increase bearing 4 & 5 vibration to > 11 mils:

   [P-6] bat TUB.NRC1B BRG 4 11.2 MILS & BRG 5 11.7 MILS

4. After the Main Turbine is tripped, insert the following to decrease bearing 4 & 5 vibration:

   [P-7] bat TUB.NRC1C DELETES BEARING MALFUNCTIONS

5. If the crew fails to trip the Main Turbine, insert the following to cause the Main Turbine to Trip:

   [P-8] IMF TC193001 TRIP MAIN TURBINE

ROLE PLAY:

1. As NPO dispatched to TV-10955, wait 3 minutes and report the valve appears to be near fully closed and there is some service water flow through the valve by its sound.

2. As NPO dispatched to TV-10955 manual bypass (HV-109110), if manual bypass operation is requested acknowledge the direction for manual control, wait ≈3 mins. and report the valve vibrates shut after it is cracked open. You will try to hold it in position.

SCENARIO EVENT FORM

Event No: 4
Brief Description: ATWS/LEVEL POWER CONTROL

POSITION	TIME	STUDENT ACTIVITIES
RO		Performs power reduction per SRO direction
		Refers to GO-100-012, POWER MANEUVERING
		Plots position on Power / Flow map
		Selects a control rod; monitors for core flux oscillations
		Performs scram imminent actions
		Scrams reactor and trips main turbine per SRO direction
		Recognizes/reports failure to scram
		Arms and depresses the RPS manual scram pushbuttons
BOPRO		Initiates ARI; reports ARI has failed
		Ensures Isolations, ECCS Initiations, and Diesel Generator starts
SRO		Enters EO-100-102, RPV Control and exits to EO-100-113, Level Power Control
		Directs SLC initiated and ADS inhibited
		Directs performance of ES-150-002, SLC Injection with RCIC
		Directs insertion of control rods IAW EO-100-113 Sht. 2, Control Rod Insertion
		Directs venting Scram Air Header
		Directs performance of ES-158-001, De-energizing Scram Pilot Solenoids
		Directs bypassing RSCS and RWM and establishing normal CRD system parameters to manually drive control rods
BOPRO		Initiates SLC and inhibits ADS
		Reports SLC injection has failed

★ Denotes Critical Task

NOTES:	

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 4
Brief Description: ATWS/LEVEL POWER CONTROL

INSTRUCTOR ACTIVITY:

When the Mode Switch is placed to shutdown, ensure event trigger #1 actuates to throttle CRD to zero.

MRF RD155023 0

ROLE PLAY:

If requested to perform ES-150-002, SLC Injection with RCIC, acknowledge the direction but take no actions.

SCENARIO EVENT FORM

Event No: 4,5
Brief Description: ATWS/LEVEL POWER CONTROL / OTBD MSIVs CLOSE

POSITION	TIME	STUDENT ACTIVITIES
SRO		Directs RPV water level lowered to <-60" but >-161" with Feedwater
		Directs RPV pressure stabilized below 1087 psig
		Directs overriding RCIC
		Directs bypassing MSIV and CIG interlocks
RO		Lowers and controls RPV water level <-60" but >-161" using feedwater
BOPRO		Overrides RCIC by closing the T & TV
		Bypasses MSIV and CIG interlocks IAW OP-184-001, Main Steam System
		Recognizes/reports OTBD MSIVs have closed
SRO		Directs control of RPV level with RCIC
		Directs monitoring RPV water level
		Directs RPV pressure controlled with SRVs <1087 psig
BOPRO		Attempts restoration of RCIC for injection
		Recognizes/reports RCIC T & TV will not open
		Reports corrected fuel zone level after WR level decreases below -145"
		Reports RPV level is <-161"

★ Denotes Critical Task

NOTES:	

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 4,5
Brief Description: ATWS/LEVEL POWER CONTROL / OTBD MSIVs CLOSE

INSTRUCTOR ACTIVITIES:

When RCIC T & TV is overridden closed, insert the following to cause the Trip and Throttle Valve to unlatch and prevent RCIC restart:

[P-9] IMF RC150011	DISABLE RCIC T & TV AFTER CLOSING

When RPV water level is stable between -60" and -110", insert the following to cause the Outboard MSIVs and Drain F019 to close and fail FW controller demand to zero:

[P-10] IMF MS183002	OUTBOARD MSIVs CLOSE
[P-11] IMF MV05:HV141F019	F019 CLOSE
[P-15] bat FWB.99NRC1	FW DEMAND TO MINIMUM

If requested to perform ES-158-001, wait ≈10 minutes and call the control room and state you are ready to pull Div 1 RPS fuses. When permission is granted, insert the following to pull Div. 1 RPS fuses:

[P-12] bat RPB.ES158001A	REMOVE DIV 1 RPS FUSES

ROLE PLAY:

As NPO dispatched to RCIC, wait ≈2 mins. and report the linkage is bent and will not engage the Trip and Throttle Valve.

SCENARIO EVENT FORM

Event No: 6
Brief Description: RAPID DEPRESSURIZATION

POSITION	TIME	STUDENT ACTIVITIES
SRO		Directs all injection stopped and prevented except from CRD and SLC
		Enters EO-100-112, Rapid Depressurization
		Directs Suppression Pool level is verified >5'
		Directs Rapid depressurization by opening all ADS SRVs
BOPRO		Stops and prevents injection except from CRD and SLC
		Verifies Suppression Pool level is >5'
		Rapidly depressurizes the reactor by opening ADS SRVs
SRO		Directs slowly restoring RPV level <-60" but >-161" with CRD, SLC, LPCI or Condensate
		Directs RO to monitor core power as injection begins
RO		Aligns feedwater for start up level control
BOPRO		Slowly restore RPV level <-60" but >-161" as directed
RO		Monitors reactor power during injection

★ Denotes Critical Task

NOTES:	

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 6
Brief Description: RAPID DEPRESSURIZATION

INSTRUCTOR ACTIVITY:

None

ROLE PLAY:

As Necessary

SCENARIO EVENT FORM

Event No: 7
Brief Description: REACTOR SHUTDOWN

POSITION	TIME	STUDENT ACTIVITIES
RO		Bypasses RSCS and RWM; attempts to establish normal CRD parameters for manual rod insertion
		Recognizes/reports inability to establish normal CRD system parameters but attempts manual rod insertion
		If manual rod insertion is attempted, reports rod insertion is successful
		Inserts control rods IAW EO-100-113 Sheet 2
		Co-ordinates venting Scram Air Header with the NPO
		Verifies control rod insertion as Scram Air Header is vented
		Verifies all control rods are fully inserted
SRO		Directs SLC injection be terminated
		Exits EO-100-113 Sheets 1 and 2; re-enter EO-100-102
		Directs establishing RPV water level +13" to +54"
		Enters EO-100-103, Primary Containment Control
		Directs maximizing Suppression Pool Cooling
RO		Terminates SLC injection
		Establishes RPV water level +13" to +54" with CRD, LPCI or Condensate
BOPRO		Places both loops of RHR in Suppression Pool Cooling IAW OP-149-005, RHR Operation in the Suppression Pool Cooling Mode

★ Denotes Critical Task

NOTES:	

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 7
Brief Description: REACTOR SHUTDOWN

INSTRUCTOR ACTIVITY:

1. When the crew has performed Rapid Depressurization and RPV water level is restored to >-161" insert the following to vent the Scram Air Header:

   [P-13] bat RDB.VSAH VENTS SCRAM AIR HEADER

2. If directed to restore the Scram Air Header following venting, wait ≈2 mins. and insert the following:

   [P-14] bat RDB.RSAH RESTORES SCRAM AIR HEADER

ROLE PLAY:

1. As NPO venting the Scram Air Header, inform the crew that you have closed/checked closed HV-147002A/B and uncapped and opened HV-147007. Air has rushed out of the header and has now stopped.

2. As NPO directed to restore the Scram Air Header, wait ≈2 mins. and report you have closed and capped HV-147007 and re-opened HV-147002A, which was the supply valve that was open previously.

TERMINATION CUE:

All control rods are inserted, reactor water level is restoring +13" to +54", and direction is given to align Suppression Pool Cooling.

Facility: Susquehanna S E S **Scenario No.:** 2 **Op Test No.:**

Examiners: ______________________ **Candidates:** ______________________ **SRO**

______________________ ______________________ **RO**

______________________ ______________________ **BOP**

Objectives: See attached

Initial Conditions: See attached

Turnover: SEE ATTACHED "SHIFT TURNOVER" SHEET

Event No.	Malf No.	Event Type*	Event Description
1		N	D/G 'A' trip
2		I	Feedwater channel 'A' drift low
3		C	Recirc Pp dual seal failure
4		R	Reduce power
5		N	SCRAM reactor
6		C	D/G 'C' fails to start
7		C	HPCI turbine trip
8		M	LOOP
9		M	LOCA
10		M	Rapid depressurization
11		C	RHR valve failure

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

UNIT SUPERVISOR TURNOVER SHEET

UNIT: 1 Date: April 29, 1999

SHIFT 1900 to 0700 (Start / End)	SHIFT 0700 to 1900 (Start / End)
MODE 1	MODE
POWER LEVEL 65 %	POWER LEVEL %
GENERATOR OUTPUT 725 MWe	GENERATOR OUTPUT MWe

1. Power was reduced for repair of RWCU HX endbell which has been completed
2. No instructions have been issued for increasing power, current rod sequence is A2/SD step 522.
3. Instrument Air Compressor 'B' is O/S for rebuild
4. SRV 'R' is leaking, tailpipe temperature is ≈300°F
5. RRP 'B' experiencing seal oscillations, occasional seal stage Hi-Lo flow alarms
6. Unit two is in MODE 2 ~1 hour from synchronizing to the grid

COMMON:

1. Fuel Handling in progress in Unit 1 Spent Fuel Pool
2. SO-024-001, D/G Monthly Operability Test is in progress for D/G 'A'. D/G 'A' is paralleled to ESS Bus 1A201, the loaded run time has been met. Complete the surveillance starting at step 6.1.16 t (3).

OFFGOING UNIT SUPERVISOR CHECKLIST:

1900-0700	0700-1900

1. Evolutions in progress and items to be completed during next shift, as noted in remarks, have been discussed with oncoming Unit Supervisor.
2. Problems encountered during past shift and abnormal plant conditions, as noted in remarks, have been discussed with oncoming Unit Supervisor.

1900 - 0700 ______________________________

0700 - 1900 ______________________________

Offgoing Unit Supervisor

ONCOMING UNIT SUPERVISOR CHECKLIST:

0700 1900	1900-0700

1. LCO Log reviewed.
2. TRO Log reviewed.

0700 - 1900 ______________________________

1900 - 0700 ______________________________

Oncoming Unit Supervisor

POST RELIEF

	0700 1900	1900-0700
(14)		
(5)		

1. Walk down Control Room panels with Unit Responsible PCO.
2. Unit Log reviewed for entries made in past 24 hours.
3. Non-Routine Training current.

SCENARIO #2

Initial Conditions:

IC-32, 65% Power.
Fuel Handling in progress in Unit 1 Spent Fuel Pool.
'B' IA Compressor O/S for rebuild.
SRV 'R' Leaking, Tailpipe temperature is ≈300°F
RRP 'B' experiencing seal oscillations, occasional seal stage Hi/Lo flow alarms.
Power was reduced for repair of RWCU HX endbell, which has been completed.
No instructions have been issued for increasing power, current rod sequence is A2/SD step 522.
D/G 'A' is paralleled to bus 1A201 for performance of SO-024-001.

1. Complete D/G 'A' Surveillance and S/D D/G 'A'
   a. D/G 'A' trip - inoperable

2. RRP lower seal fails

3. Feedwater channel 'A' drift low
   a. Manually control FW injection
   b. Swap to channel 'B'

4. RRP upper seal fails – dual seal failure
   a. Reduce reactor power
   b. Shutdown or Trip RRP 'B'
   c. Isolate pump - suction isolation fails to close

5. Drywell pressure increase
   a. Manually scram reactor
   b. >1.72 psig, Aux load shed – loss of FW
   c. >1.72 psig D/G 'C' fails to start
   d. Inject with RCIC and CRD for RPV level control
   e. HPCI turbine trip

6. LOOP

   a. MSIVs Close

   b. ESS Buses 1B and 1D energize from D/Gs

7. Large LOCA

   a. RPV water level decreases below TAF

8. Rapid Depressurization

   a. RHR F015B injection valve fails to auto open

   b. Inject LP ECCS to recover adequate core cooling

SCENARIO 2 SUMMARY

The scenario begins with Unit 1 at 65% power. Power was reduced for repair of RWCU HX endbell, which has been completed. No instructions have been issued for increasing power, current rod sequence is A2/SD step 522. Instrument Air compressor 'B' is out of service for rebuild. SRV 'R' is leaking. Reactor Recirc "B' is experiencing seal oscillations accompanied by seal stage Hi/Lo flow alarms. Unit 2 is 1 hour from synchronizing to the grid. Fuel handling is in progress in Unit 1 Spent Fuel Pool. D/G 'A' is paralleled to bus 1A201 for performance of SO-024-001.

The crew will complete the D/G surveillance and shutdown D/G 'A'. While the 15 minute run time at reduced load is timing, reactor recirc pump 'B' lower seal failure will occur. The crew will monitor for changes in leakage into the drywell equipment drain tank. Once the D/G cooldown is started the diesel will trip and be declared inoperable. Direction may be given to substitute D/G 'E' for D/G 'A'.

While the seal failure investigation is continuing the controlling feedwater level channel will drift low resulting in RPV water level increasing. The crew will respond by taking manual control of feedwater injection and transfer control to the backup water level channel. Feedwater control can then be transferred back to automatic.

Reactor Recirc pump 'B' upper seal fails resulting in drywell pressure increase. The crew will reduce power in preparation for removing the pump from service. The crew will evaluate plant conditions and decide to trip Reactor Recirc pump 'B' or perform an orderly shutdown of the pump. Once the pump is stopped the crew will isolate the pump to reduce leakage. When the crew attempts to close the suction valve F023B will fail to close. Drywell pressure will continue to increase, the crew will perform scram imminent action and manually scram the reactor.

Feedwater will initially be available to maintain RPV water level until plant aux load shed trips condensate pumps when drywell pressure exceeds 1.72 psig. HPCI fails during initiation and can not be recovered. RCIC and CRD can be started for injection. D/G 'C' will fail to start and will not be available.

A LOOP occurs that results in loss of division 1 RHR and Core Spray systems. Division 2 RHR and Core Spray systems will be available after D/Gs energize the ESS buses. Containment control will require use of sprays for pressure and temperature control. The leakage rate will increase beyond RCIC and CRD makeup ability and RPV level decreases below TAF. Rapid Depressurization will be required to recover adequate core cooling using low pressure ECCS systems.

Auto opening of RHR injection valve F015B fails and requires operator action to manually open for injection.

The scenario terminates when the reactor is depressurized, reactor water level is restoring +13 to +54 inches, and containment control actions are being addressed.

The Emergency Plan classification is EAL 12.3, Site Area Emergency or EAL 12.4, General Emergency. The difference is the amount of time reactor water level was below TAF.

PP&L–SUSQUEHANNA TRAINING CENTER

SIMULATOR SCENARIO

Scenario Title:	INITIAL LICENSE SIMULATOR EXAM #2
Scenario Duration:	90 MINUTES
Scenario Number:	99NRC2
Revision/Date:	REV.2, 4/29/99
Course:	SM100, INITIAL LICENSE EXAM
Operational Activities:	

Prepared By:	Terry W. Logsdon Instructor	4-30-99 Date
Reviewed By:	[illegible] Nuclear Operations Training Supervisor	5/3/99 Date
Approved By:	[illegible] Supervising Manager/Shift Supervisor	5/3/99 Date

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SCENARIO SUMMARY

The scenario begins with Unit 1 at 65% power. Power was reduced for repair of RWCU HX endbell, which has been completed. No instructions have been issued for increasing power, current rod sequence is A2/SD step 522. Instrument Air compressor 'B' is out of service for rebuild. SRV 'R' is leaking. Reactor Recirc "B' is experiencing seal oscillations accompanied by seal stage Hi/Lo flow alarms. Unit 2 is 1 hour from synchronizing to the grid. Fuel handling is in progress in Unit 1 Spent Fuel Pool. D/G 'A' is paralleled to bus 1A201 for performance of SO-024-001.

The crew will complete the D/G surveillance and shutdown D/G 'A'. While the 15 minute run time at reduced load is timing, reactor recirc pump 'B' lower seal failure will occur. The crew will monitor for changes in leakage into the drywell equipment drain tank. Once the D/G cooldown is started the diesel will trip and be declared inoperable. Direction may be given to substitute D/G 'E' for D/G 'A'.

While the seal failure investigation is continuing the controlling feedwater level channel will drift low resulting in RPV water level increasing. The crew will respond by taking manual control of feedwater injection and transfer control to the backup water level channel. Feedwater control can then be transferred back to automatic.

Reactor Recirc pump 'B' upper seal fails resulting in drywell pressure increase. The crew will reduce power in preparation for removing the pump from service. The crew will evaluate plant conditions and decide to trip Reactor Recirc pump 'B' or perform an orderly shutdown of the pump. Once the pump is stopped the crew will isolate the pump to reduce leakage. When the crew attempts to close the suction valve F023B will fail to close. Drywell pressure will continue to increase, the crew will perform scram imminent action and manually scram the reactor.

Feedwater will initially be available to maintain RPV water level until plant aux load shed trips condensate pumps when drywell pressure exceeds 1.72 psig. HPCI fails during initiation and can not be recovered. RCIC and CRD can be started for injection. D/G 'C' will fail to start and will not be available.

A LOOP occurs that results in loss of division 1 RHR and Core Spray systems. Division 2 RHR and Core Spray systems will be available after D/Gs energize the ESS buses. Containment control will require use of sprays for pressure and temperature control. The leakage rate will increase beyond RCIC and CRD makeup ability and RPV level decreases below TAF. Rapid Depressurization will be required to recover adequate core cooling using low pressure ECCS systems.

Auto opening of RHR injection valve F015B fails and requires operator action to manually open for injection.

The scenario terminates when the reactor is depressurized, reactor water level is restoring +13 to +54 inches, and containment control actions are being addressed.

The Emergency Plan classification is EAL 12.3, Site Area Emergency or EAL 12.4, General Emergency. The difference is the amount of time reactor water level was below TAF.

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SCENARIO OBJECTIVES

The SRO candidate will:

1. Ensure Plant Operates IAW the Operating License and Technical specifications (00.TS.001)
2. Ensure that Required Actions per Technical Specifications/Technical Requirements are met when a LCO/TRO is entered (00.TS.003)
3. Implement Diesel Generator Trip (24.ON.003)
4. Implement RPV Water Level Control System Malfunction (45.ON.006)
5. Implement Appropriate Portions of Single Loop Operation (00.GO.008)
6. Implement Scram (00.ON.018)
7. Implement RPV Control (00.EO.26)
8. Implement Primary Containment Control (00.EO.027)
9. Implement Loss of Offsite Power (04.ON.009)
10. Implement Appropriate Portions of Reactivity Management and Controls Program (00.AD.047)
11. Implement Rapid Depressurization (00.EO.030)
12. Implement RRP Dual Seal Failure (64.ON.005)
13. Implement appropriate portions of Station Communication Practices (00.AD.016)
14. Implement appropriate portions of Operations Shift Policies and Work Practices (00.AD.131)

The RO candidate will:

1. Perform synchronizing D/G to Grid to Restore Normal Power (24.OP.003)
2. Implement Diesel Generator Trip (24.ON.003)
3. Implement RPV Water Level Control System Malfunction (45.ON.006)
4. Implement Appropriate Portions of Single Loop Operation (00.GO.008)
5. Implement Scram (00.ON.018)
6. Implement RPV Control (00.EO.26)
7. Implement Primary Containment Control (00.EO.027)
8. Implement Loss of Offsite Power (04.ON.009)
9. Perform Auto/Manual Startup of RCIC System (50.OP.010)
10. Perform Maximizing CRD (55.OP.001)
11. Implement Appropriate Portions of Reactivity Management and Controls Program (00.AD.047)
12. Perform RHR Response During Auto Initiation of LPCI Mode of Operation (49.OP.009)
13. Perform Core Spray Response During Auto Initiation (51.OP.007)
14. Implement Rapid Depressurization (00.EO.030)
15. Implement RRP Dual Seal Failure (64.ON.005)
16. Perform RHR Operation in Containment Spray (49.OP.005)
17. Perform Manual Operation of ADS (83.OP.001)
18. Perform Manual Operation of SRVs (83.OP.008)
19. Perform Overriding Core Spray Injection (51.OP.004)
20. Perform Overriding RHR Injection (49.OP.011)
21. Perform RHRSW System Startuo Unit 1 Pump to Unit 1 HX (16.OP.002)
22. Implement appropriate portions of Station Communication Practices (00.AD.016)
23. Implement appropriate portions of Operations Shift Policies and Work Practices (00.AD.131)
24. Implement Alarm Responses as applicable (00.AR.005)

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SCENARIO REFERENCES

1. COMPLETE D/G 'A' SURVEILLANCE AND SHUTDOWN D/G A

A.	SO-024-001	D/G MONTHLY OPERABILITY TEST
B.	ON-024-001	DIESEL GENERATOR TRIP
C.	T.S. 3.8.1	AC SOURCES OPERATING

2. RRP 'B' LOWER SEAL FAILURE

A.	AR-102-G05	RRP 'B' SEAL STAGE HI/LO FLOW
B.	ON-164-003	RRP 'B' DUAL SEAL FAILURE

3. FEEDWATER CHANNEL 'A' DRIFT LOW

A.	ON-145-001	RPV LEVEL CONTROL SYSTEM MALFUNCTION
B.	AR-102-B17	RPV WATER LEVEL HI/LO

4. RRP 'B' UPPER SEAL FAILURE

A.	ON-164-003	RRP 'B' DUAL SEAL FAILURE
B.	AR-102-G04	SEAL LEAKAGE HI/LO
C.	T.S. 3.4.4	RCS OPERATIONAL LEAKAGE
D.	GO-100-009	SINGLE RECIRC LOOP OPERATION

5. DRYWELL PRESSURE INCREASE

A.	ON-100-101	SCRAM
B.	EO-100-002	RPV CONTROL

6. LOSS OF OFFSITE POWER

A.	ON-104-001	UNIT 1 RESPONSE TO LOSS OF OFFSITE POWER

7. LARGE LOCA IN CONTAINMENT

A.	EO-100-103	PRIMARY CONTAINMENT CONTROL

8. RAPID DEPRESSURIZATION

A.	EO-100-112	RAPID DEPRESSURIZATION
B.	OP-149-004	RHR CONTAINMENT SPRAY

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SCENARIO SPECIAL INSTRUCTIONS

1. Initialize simulator to IC-32, 69% power.

2. Using Recirc flow, lower power to 65% on APRMs.

3. Raise DW pressure ≈0.2 psig above existing pressure using nitrogen make up.

4. Align Bus 1A201 as follows:

    a. Start ESW pumps A & B
    b. Start D/G 'A' from 0C653
    c. Parallel D/G 'A' to 1A201, increase load to 4MWe

5. Place IA Compressor 'B' control switch to 'OFF' and Pink Tag.

    a. Run the exam initial condition batch file **bat YPB.NRC**

6. Enter preference file: **restorepref YPP.99NRC2**

    a. Verify environment window

MALFS	**REMFS**	**OVRDS**	**TRG**
4:4	1	0:0	2

    b. Ensure <u>10</u> function buttons lit.

7. Add the CRC package to the shutdown section.

8. Silence and reset alarms.

9. Prepare a turnover sheet indicating:

    a. Fuel handling is in progress in Unit 1 fuel pool.
    b. Instrument Air compressor 'B' is out-of-service for rebuild.
    c. SRV 'R' is leaking, tailpipe temp is steady at ≈300°F.
    d. RRP 'B' is experiencing occasional seal oscillations accompanied with seal stage Hi/Lo flow alarms.
    e. Power was reduced for repair of RWCU HX endbell, which has been completed.
    f. No instructions for increasing power have been issued, current rod sequence is A2/SD step 522.
    g. SO-024-001, D/G Monthly Operability Test is in progress for D/G 'A'. D/G 'A' is paralleled to bus 1A201, the loaded run time has been met. Complete the surveillance starting a step 6.1.16.t (3)
    h. Unit 2 start-up is in progress, approximately 2 hours from synchronizing to the grid.

10. Place simulator in **RUN.**

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SCENARIO EVENT DESCRIPTION FORM

Initial Conditions: Scenario special instructions are complete. Provide the crew with the turnover information. Assign shift positions. Direct the crew to begin the five minute panel walkdown.

EVENT	TIME	DESCRIPTION
1		COMPLETE D/G 'A' SURVEILLANCE
2		RRP 'B' LOWER SEAL FAILURE
3		FEEDWATER CHANNEL 'A' DRIFTS LOW
4		RRP 'B' UPPER SEAL FAILURE / DUAL SEAL FAILURE
5		DRYWELL PRESSURE INCREASE
6		LOSS OF OFFSITE POWER
7		LARGE BREAK LOCA IN DRYWELL
8		RAPID DEPRESSURIZATION

SCENARIO EVENT FORM

Event No: 1,2
Brief Description: COMPLETE D/G 'A' SURVEILLANCE / RRP 'B' LOWER SEAL AILURE

POSITION	TIME	STUDENT ACTIVITIES
SRO		Directs completion of D/G 'A' surveillance
BOPRO		Refers to SO-024-001, step 6.1.16.t (3)
		Reduces D/G load to 380-1000 KW
		Performs a 15 minute run prior to shutdown
RO		Recognizes/reports AR-102-G05, RRP B SEAL STAGE HI/LO FLOW
		Refers to AR-102-G05
		Recognizes upper seal cavity pressure is high
		Monitors DEDT level recorder for a change in leakage rate
		Monitors seal cavity temperature for trend on 1C614
SRO		Directs ROs to monitor changes in leakage rate and containment parameters
		Notifies Operations Duty Manager and system engineer about seal condition
		May refer to ON-164-003, RRP DUAL SEAL FAILURE

★ Denotes Critical Task

NOTES:	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 1,2
Brief Description: COMPLETE D/G 'A' SURVEILLANCE / RRP 'B' LOWER SEAL AILURE

INSTRUCTOR ACTIVITY:

Once the 15 minute run at reduced load is started, insert the following to cause the RRP 'B' lower seal to fail:

[P-2] IMF RR164003B 5 0 0 RRP 'B' LOWER SEAL FAILURE

ROLE PLAY:

As necessary

SCENARIO EVENT FORM

Event No: 1,2
Brief Description: COMPLETE D/G 'A' SURVEILLANCE / RRP 'B' LOWER SEAL AILURE

POSITION	TIME	STUDENT ACTIVITIES
BOPRO		Reduces D/G load 300-500 KW
		Trips breaker 1A20104
		Adjust D/G voltage until ≈4.25 KV
		Performs a 5 minute cooldown
		Recognizes/reports D/G 'A' has tripped
		Dispatches NPO to 0C521A to investigate cause of trip
		Refers to ON-024-001, DIESEL GENERATOR TRIP
SRO		Refers to T.S. 3.8.1, AC SOURCES OPERATING
NOTE 1		Declares D/G 'A' inoperable and LCO not met
		Enters RA B.1, perform SR 3.8.1.1 within 1 hour; RA B.3.1, determine other D/Gs are not inoperable; RA B.4, restore D/G to operable in 72 hours
		Refers to NDAP-QA-312, SAFETY FUNCTION DETERMINATION
		Contacts maintenance to investigate D/G 'A

★ Denotes Critical Task

NOTES:	NOTE 1: May direct substitution of D/G 'E' for D/G 'A'.

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 1,2
Brief Description: COMPLETE D/G 'A' SURVEILLANCE / RRP 'B' LOWER SEAL AILURE

INSTRUCTOR ACTIVITY:

When D/G 'A' breaker 1A20104 is open and voltage is adjusted for 4.25 KV insert the following to trip D/G 'A':

[P-1] IMF DG024005A D/G 'A' TRIP

ROLE PLAY:

1. As NPO dispatched to investigate the cause of D/G 'A' trip, wait ≈1 minute and report lockout relay 86E-HR for "DIFFERENTIAL TRIP LOCKOUT RELAY' has tripped.

   As NPO dispatched to reset the lockout relay 86E-HR, report the relay will not reset.

2. As Electrical Maintenance or Meter and Relay Test dispatched to D/G 'A' lockout relay problem, wait ≈5 minutes and report the 86E-HR relay appears bad. Estimate 4 hours to set up and bench test a replacement relay.

SCENARIO EVENT FORM

Event No: 3
Brief Description: FEEDWATER CHANNEL 'A' DRIFT LOW

POSITION	TIME	STUDENT ACTIVITIES
RO		Recognize/reports RX WATER LEVEL HI-LO ALARM
		Reports RPV water level is high
		Refers to AR-101-B17, RX WATER LEVEL HI-LO ALARM
SRO		Directs RO to take manual control of RFPTs
		Directs restoration of RPV level to ≈35"
		Directs implementation of ON-145-001,RPV LEVEL CONTROL SYSTEM MALFUNCTION
		Contacts I & C to investigate level channel 'A' problem
RO		Takes manual control of RFPTs
		Lowers RPV level to +35 "
		Implements ON-145-001, Section 3.7
		Selects FWLC RPV water level channel 'B'
		Nulls master FWL Controller and places controller in Auto
SRO		Refers to T.S. 3.3.2.2, MT High Water Level Trip Instrumentation
		Declares channel 'A' inoperable
		Declares LCO not met
		Enters RS A.1, place channel in trip within 7 days

★ Denotes Critical Task

NOTES:	

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 3
Brief Description: FEEDWATER CHANNEL 'A' DRIFT LOW

INSTRUCTOR ACTIVITY:

1. When actions are complete for D/G 'A', insert the following to cause FWLC channel 'A' drift low:

   [P-3] IMF TR02:PDTC321N004A 29.5 3 34.5 FWLC CH 'A' OUTPUT DRIFT TO 29.5"

2. When the "RPV Water Level HI" alarms, insert the following to cause FWLC channel 'A' to drift to 26":

   [P-4] IMF TR02:PDTC321N004A 26 3:00 29.5 FWLC CH 'A' OUTPUT DRIFT TO 26"

ROLE PLAY:

As I&C dispatched to investigate FWLC channel 'A' failure, wait ≈3 mins. and report the 'A' channel differential pressure transmitter is failed and must be replaced. Repair time is estimated at 12 hours.

SCENARIO EVENT FORM

Event No: 4
Brief Description: RRP 'B UPPER SEAL FAILURE / DUAL SEAL FAILURE

POSITION	TIME	STUDENT ACTIVITIES
RO		Recognizes/reports RRP 'B' SEAL LEAKAGE HI FLOW
		Refers to AR-102-G04, reports RRP 'B' SEAL LEAKAGE HI FLOW
SRO		Directs implementation of ON-164-003, RRP DUAL SEAL FAILURE
		Directs RO to monitor drywell parameters
		Directs RO to calculate RCS leakage
		Directs the shutdown and isolation of RRP 'B'
		Refers to T.S. 3.4.4, RCS Operational Leakage
		Notifies Reactor Engineering of intent to S/D and isolate RRP 'B'
RO		Refers to ON-164-003, RRP DUAL SEAL FAILURE
		Plots position on Power to Flow Map during the power reduction
		Decrease core flow to ≥55 mlbm/hr
		Inserts control rods below the 70% rod line if a controlled pump shutdown is performed
		Reduces RRP 'B' speed to ≈30%
		Stops RRP 'B'
		Increases RRP 'A' speed to <80% and total core flow >40 mlbm/hr
		Attempts to isolate RRP 'B' by closing suction valve HV-151F023B
NOTE 1		Recognizes/reports suction valve HV-151F023B has dual indication
BOPRO		Reports DW pressure is increasing faster

★ Denotes Critical Task

NOTES:	1. The crew may continue with isolation of RRP 'B' as directed in ON-164-003.

**INSTRUCTOR ACTIVITIES, ROLE PLAY,
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 4
Brief Description: RRP 'B UPPER SEAL FAILURE / DUAL SEAL FAILURE

INSTRUCTOR ACTIVITY:

1. When the crew has returned FWLC to Auto, insert the following to fail RRP 'B' upper seal:

   [P-5] IMF RR164004B 2 0 0 RRP 'B' UPPER SEAL FAILURE 2 GPM

NOTE: Inserting this malfunction will slowly raise drywell pressure and require a manual reactor scram.

2. When the RO attempts to close the suction valve HV-151F023B, insert the following to increase the seal leakage rate:

   [P-6] MMF RR164004B 50 1:00 2 RRP 'B' UPPER SEAL FAILURE 50 GPM

3. If directed to close RRP 'B' seal purge supply valve HV-1431F008B, insert the following:

   [P-7] MRF RR164041 CLOSE CRD TO RRP 'B'

ROLE PLAY:

As necessary

SCENARIO EVENT FORM

Event No: 5
Brief Description: DRYWELL PRESSURE INCREASE

POSITION	TIME	STUDENT ACTIVITIES
SRO		Enters ON-100-101 and directs scram imminent actions
		Directs manual reactor scram
		Enters EO-100-102, RPV CONTROL
BOPRO		Transfers Aux Buses 11A and 11B to Tie Bus
RO		Starts MTLO pumps
		Manually scrams reactor; verifies all rods full in
		Inserts SRMs and IRMs
		Aligns FW for start up level control
BOPRO		Reports DW pressure >1.72 psig
		Recognizes/reports HPCI turbine trip
		Recognizes/reports D/G 'C' has failed to start; selects isoch and presses start pushbutton
		Verifies ESW cooling to D/Gs
		Initiates RCIC injection to maintain +13" to +54" if feed and condensate trip
SRO		Directs RPV water level control +13" to +54" with RCIC and CRD
		Directs RPV pressure control <1087 psig
		Directs local start of D/G 'C'
		Enter EO-100-103, Primary Containment Control
		Directs cooldown at <100°F/hr
		Contacts Electrical Maintenance to investigate failure of D/G 'C'

★ Denotes Critical Task

NOTES:	

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 5
Brief Description: DRYWELL PRESSURE INCREASE

INSTRUCTOR ACTIVITY:

NOTE: After the reactor scram drywell pressure increases more rapidly as leakage rate increases.

1. When the Mode Switch is placed in shutdown, ensure trigger E1 actuates to insert the bottom head drain line leak:

   IMF RR164010 1 30

2. When HPCI F001 opens, ensure trigger E2 actuates to insert a HPCI turbine trip:

   IMF HP152015

3. When requested to attempt a local start of D/G 'C', wait ≈2 mins., transfer D/G 'C' to local using:

   [P-8] IOR QDI43CMC LOCAL D/G 'C' TO LOCAL

ROLE PLAY:

1. As NPO sent to D/G 'C' to attempt a local start, after transferring to local call the control room and report the local start was not successful.

2. As Electrical Maintenance dispatched to D/G 'C', wait ≈5 minutes and report no cause for the failure can be located and we will continue to investigate.

SCENARIO EVENT FORM

Event No: 5,6
Brief Description: DW PRESSURE INCREASE / LOSS OF OFFSITE POWER

POSITION	TIME	STUDENT ACTIVITIES
BOPRO		Dispatches NPO to attempt local start of D/G 'C'
SRO		Directs use of Suppression Chamber Sprays
		Directs termination of Suppression Chamber sprays before suppression chamber pressure drops to 0 psig
BOPRO		Recognizes/reports Loss of Offsite Power
		Reports 4KV Buses 1B and 1D are energized
SRO		Directs a 1C601 walk down for Initiations, Isolations, and D/G starts
		Directs restarting CRD pump 'B'
		Directs maintaining RPV pressure <1087 psig with SRVs
		Contacts PCC and Electrical Maintenance to investigate the loss of power
BOPRO		Starts CRD pump 'B' as directed
		Maintains RPV pressure <1087 psig with SRVs

★ Denotes Critical Task

NOTES:	

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 5,6
Brief Description: DW PRESSURE INCREASE / LOSS OF OFFSITE POWER

INSTRUCTOR ACTIVITY:

After drywell pressure exceeds 1.72 psig and the initial plant assessment is complete, insert the following to cause a loss of offsite power:

[P-9] bat DSB.LOOPT21 LOOP

ROLE PLAY:
As PCC contacted for offsite power information, report a breaker failure in the Montour switchyard is responsible for loss of the 230 KV line.

The 230-500 KV tie line has Supervisory Information that indicates a fault on Auto Transformer T-21. Hazleton Dispatch reports sending a crew to the 230 KV switchyard to investigate why the 230 KV breakers 1W and 1T failed to auto re-close.

SCENARIO EVENT FORM

Event No: 7,8
Brief Description: LOCA IN DW / RAPID DEPRESSURIZATION

POSITION	TIME	STUDENT ACTIVITIES
BOPRO		Reports RPV water level is decreasing
		Verifies all LP ECCS pumps start when level drops below -129"
		Transitions to fuel zone level indication when WR level drops below -145"
		Reports corrected fuel zone RPV level is < -161"
SRO		Enters EO-100-112, RAPID DEPRESSURIZATION when RPV level drops below -161"
		Verifies suppression pool level is >5'
		Directs opening 6 ADS SRVs
		Directs Low Pressure ECCS injection to restore RPV level > -161"
BOPRO		Opens 6 ADS SRVs
		Manually opens RHR injection HV-151F015B when RPV pressure is <436 psig
		Restores RPV level above -161" with LP ECCS injection systems
		Transfer to WR level indication when fuel zone indication is >-110"
SRO		Directs throttling injection to restore and maintain RPV level +13" to +54"
		Directs Core Spray injection for RPV level control
		Directs use of Suppression Chamber Sprays
		Directs termination of Suppression Chamber sprays before suppression chamber pressure drops to 0 psig
BOPRO		Implements OP-149-004, RHR CONTAINMENT SPRAY
		Terminates Suppression Chamber sprays before suppression chamber pressure drops to 0 psig
		Limits suppression chamber spray flow to ≈500 gpm

★ Denotes Critical Task

NOTES:	

DIESEL GENERATOR START LOG

A. START IDENTIFICATION

_____ - ____________________ - ____________________ ____________________
DG — SEQUENTIAL START NUMBER — BUS CONNECTED TO THIS TEST — DATE OF START

Purpose for start/run (i.e., Surveillance, Troubleshooting run, Automatic Start, etc.)

____

____

____

B. CLASSIFICATION RESULTS

Use flow chart on pages 7 and 8 of 8 to make following valid, non-valid test determination:

DATA:

FREQUENCY REACHED (sec)	
Voltage REACHED (sec)	

START TIME (sec.)	

DATA:

TIME OF STARTUP	
TIME OF SYNCH	
TIME OF FULLY LOADED	
TIME LOAD REDUCED FROM FULLY LOADED	
TIME BKR OPENED	
TIME OF SHUTDOWN	

Confirm _____

TEST RESULTS:

Type of Test	SUCCESSFUL	UNSUCCESSFUL
Non Valid Start	1	2
Valid Start	3	4
Non-Valid Load Run	5	6
Valid Load-Run	7	8
Evaluate last 25 valid starts/loaded runs (Boxes 3, 4, 7, 8). Enter sequential start number for those with boxes 4 or 8 checked. If none enter NA	9	

_____

C. REMARKS:

Description of events is required if boxes 2, 4, 6 & 8 checked under test results.

____

____

____

____________________ / ____________ / ____________
Responsible Individual — DATE — TIME

D. REVIEW:

1. If block 4 or 8 has been checked:
   - If DG test frequency has changed, NOTIFY NPS-OPS.
   - Evaluate surveillance test interval evaluated (NDAP-QA-0401) and forward a copy of this log to NPS-OPS.

DIESEL GENERATOR START LOG

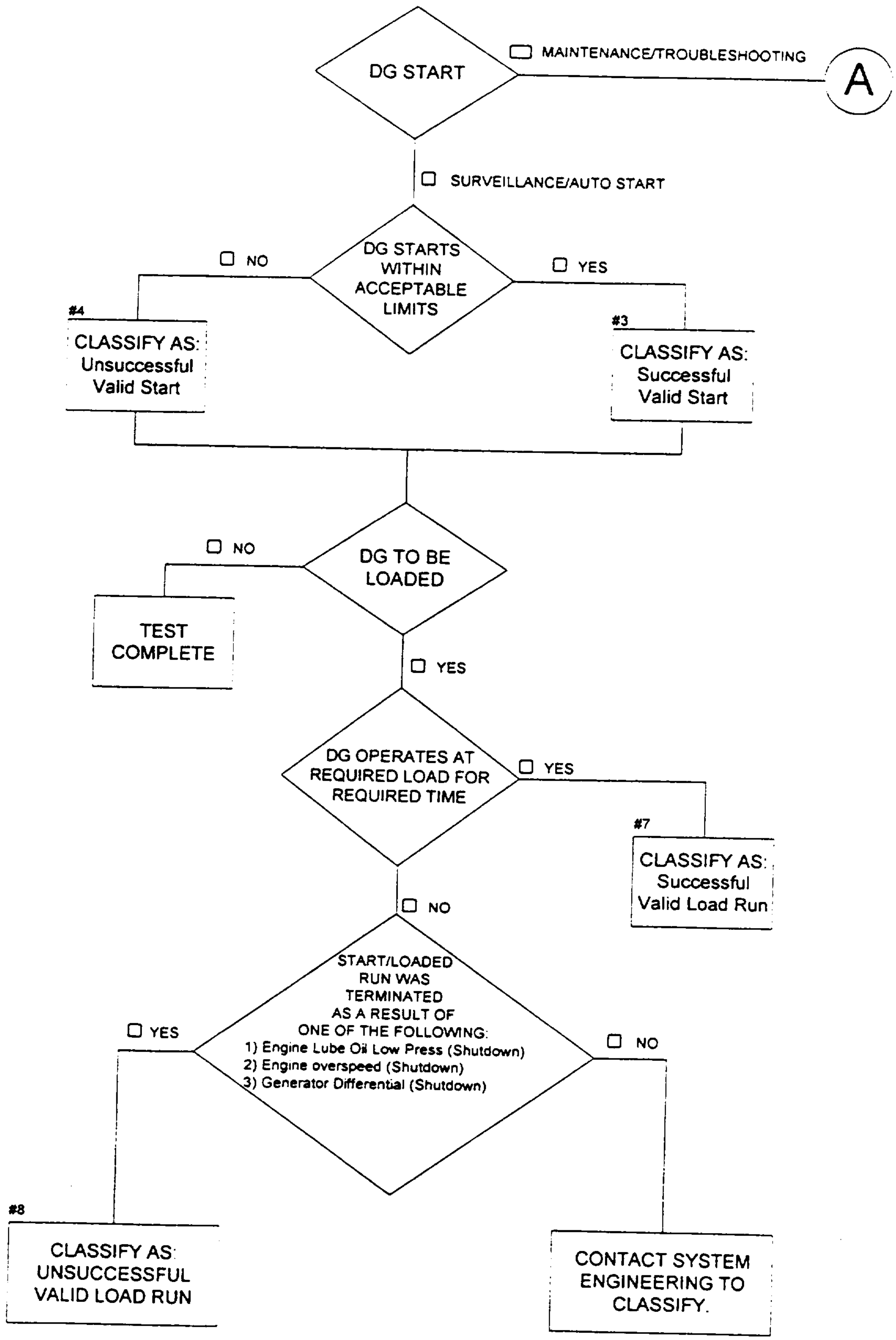
2. For unsuccessful Test (Boxes 2, 4, 6 , 8 checked):

   - System Engineer notified. Name ________________ Date __________ Time __________
   - CR initiated in accordance with NDAP-QA-0702 CR No. ________________

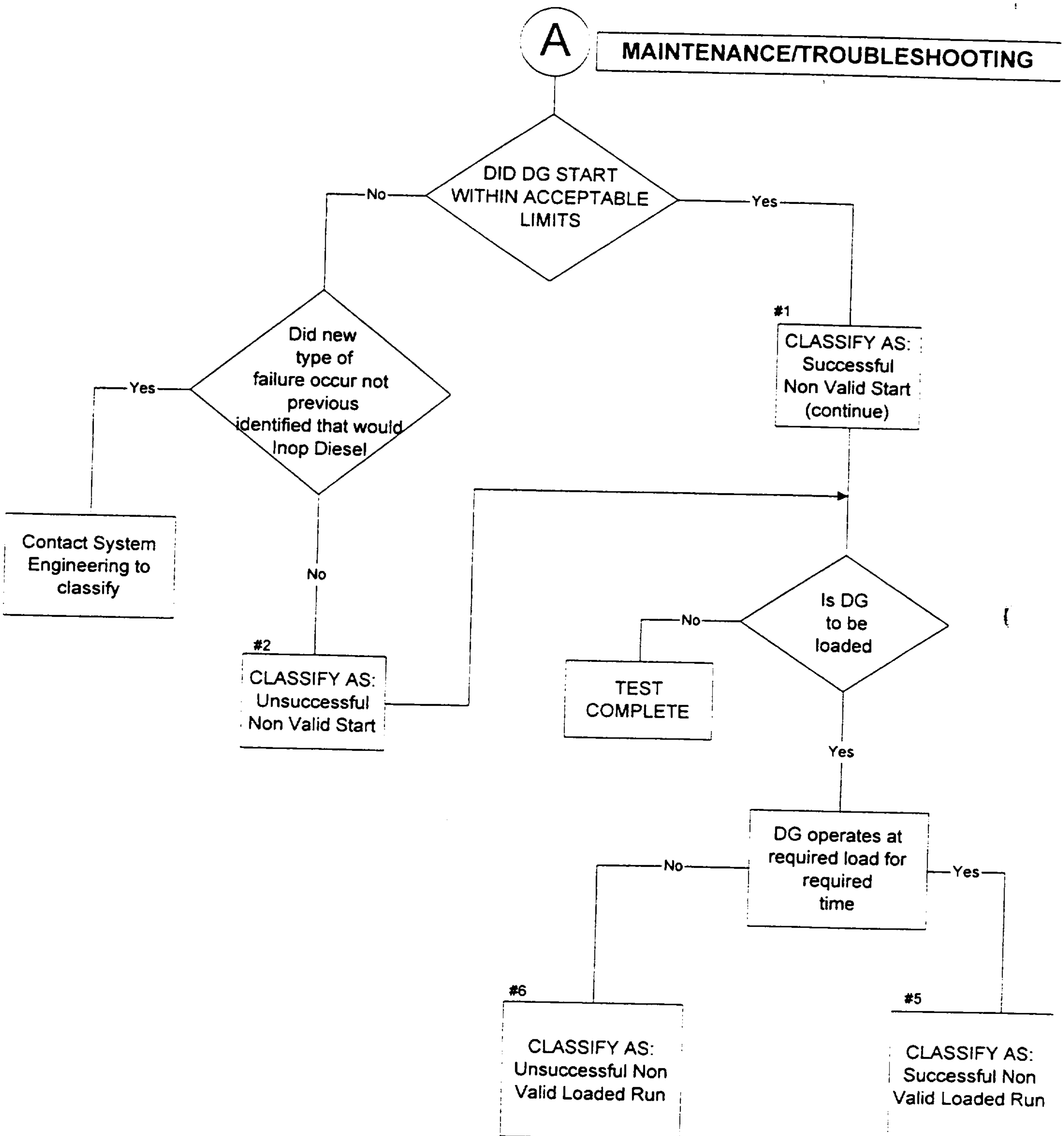
3. Above DG start has been reviewed for completeness, proper classification, correct surveillance test interval and a copy forwarded to system engineer.

____________________ / __________ / __________
SHIFT SUPERVISION DATE TIME

DIESEL GENERATOR
START/LOADING CLASSIFICATION GUIDE



\# Numbers correspond to box numbers under test results.



\# Numbers correspond to box numbers under test results.

Facility: Susquehanna S E S **Scenario No.:** 3 **Op Test No.:**

Examiners: ______________________ **Candidates:** ______________________ **SRO**

______________________ ______________________ **RO**

______________________ ______________________ **BOP**

Objectives: See attached

Initial Conditions: See attached

Turnover: SEE ATTACHED "SHIFT TURNOVER" SHEET

Event No.	Malf No.	Event Type*	Event Description
1		N	RFPT signal failure
2		I	CRD flow transmitter fails high
3		C	Loss of 4 KV bus
4		R	Rod drift
5		R	Loss of recirc pump cooling
6		C	Pump cooling valve fails to move
7		M	Steam leak in Secondary Containment
8		C	HPCI fails to isolate
9		M	Rapid depressurization
10			

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIO #3

Initial Conditions:

IC-18, 85% Power.
Fuel Handling in progress in Unit 1 Spent Fuel Pool.
IA Compressor 'B' O/S for rebuild.
SRV 'R' Leaking, tailpipe temperature is ≈300°F.
RRP 'B' experiencing seal oscillations, occasional seal stage Hi/Lo flow alarms.
RFPT 'B' is controlling on the MSC and the Hydraulic Jack is "ON'. A signal failure condition was repaired and RFPT 'B' should be restored to a normal alignment.

1. Recover RFPT 'B' signal failure

2. CRD Flow Transmitter Fails High

3. Momentary loss of 4 KV Bus 1A204

4. Restart CRD pump

   a. Rod Drift in to position 38

5. Loss of RRP motor cooling

   a. Decrease power

6. Steam Leak in Secondary Containment

   a. HPCI fails to isolate

   b. Scram reactor

   c. Two areas > max safe temperature

7. Rapid Depressurization

SCENARIO 3 SUMMARY

The scenario begins with Unit 1 at 85% power, Unit 2 is 1 hour from synchronizing to the grid. Fuel handling is in progress in Unit 1 Spent Fuel Pool. Instrument Air compressor 'B' is out of service for rebuild. SRV 'R' is leaking. Reactor Recirc 'B' is experiencing seal oscillations accompanied by seal stage Hi/Lo flow alarms. RFPT 'B' is controlling on the MSC and the Hydraulic Jack is 'ON'. A signal failure conditions was repaired and RFPT 'B' should be restored to a normal alignment.

Work has been completed on RFPT 'B' control signal failure condition, the crew will restore RFPT 'B' to normal alignment.

During the restoration of RFPT 'B', an upscale failure of the CRD flow transmitter occurs resulting in low cooling water flow and CRD mechanism high temperatures. The crew will respond by manually controlling CRD system flow, the mechanism high temperatures will clear and normal rod motion will be restored.

A momentary loss of 1A204 bus requires the crew to recover several systems. Two significant equipment failures occur, a loss of CRD and a loss of chilled water to the RRP motors. When the crew recovers CRD a single control rod will drift partially into the core. The crew will respond by fully inserting the control rod to '00'. When actions are taken to restore cooling to the RRP motors, HV-18792B1 will remain closed. The crew will reduce power to limit motor heat up while action to restore the failed valve continues.

Steam leakage will occur in the Pipe routing Area from HPCI. The Leakage Detection System will alarm for both HPCI and RCIC Pipe Routing Area high temperatures; the crew will enter the Secondary Containment Control procedure. Pipe Routing Area temperatures continue to increase, eventually tripping the Riley Tempmatics and energizing the Pipe Routing Area timers. The crew will make a decision to isolate either HPCI or RCIC and monitor instrumentation for decreasing temperatures in the Pipe Routing Area. When the crew attempts to manually close HPCI steam supply valves F002 and F003, the valves fail to fully close. The Pipe Routing area temperature continues to increase to maximum safe levels, requiring the crew to enter the RPV Control procedure and scram the reactor. Complicating matters will be a brief failure of the Feedwater Master Level Controller to respond properly in Automatic, resulting in RPV level dropping to < -38", causing auto initiation of RCIC and HPCI. When HPCI auto starts, a steam supply line break in the HPCI Equipment Area will result in two areas in Secondary Containment being greater than maximum safe temperatures, requiring Rapid Depressurization.

The scenario terminates when Rapid Depressurization is complete, RPV water level is restoring +13 to +54 inches, and actions are addressed for suppression pool water high temperature in Primary Containment Control.

The Emergency Plan classification is EAL 18.3, Site Area Emergency.

UNIT SUPERVISOR TURNOVER SHEET

UNIT: 1 Date: March 17, 1999

SHIFT 1900 (Start) to 0700 (End)	SHIFT 0700 (Start) to 1900 (End)
MODE 1	MODE ______
POWER LEVEL 85 %	POWER LEVEL ______ %
GENERATOR OUTPUT 980 MWe	GENERATOR OUTPUT ______ MWe

1. Instrument Air Compressor 'B' is O/S for rebuild
2. SRV 'R' is leaking, tailpipe temperature is ≈300°F
3. RRP 'B' experiencing seal oscillations, occasional seal stage Hi-Lo flow alarms
4. RFPT 'B' is controlling on the MSC and the Hydraulic Jack is 'ON'. A signal failure condition was repaired and RFPT 'B' should be restored to a normal alignment.
5. Unit two is in MODE 2 ~1 hour from synchronizing to the grid

COMMON:

1. Fuel Handling in progress in Unit 1 Spent Fuel Pool

OFFGOING UNIT SUPERVISOR CHECKLIST:

1900-0700	0700-1900

1. Evolutions in progress and items to be completed during next shift, as noted in remarks, have been discussed with oncoming Unit Supervisor.
2. Problems encountered during past shift and abnormal plant conditions, as noted in remarks, have been discussed with oncoming Unit Supervisor.

1900 - 0700 ______________________________

0700 - 1900 ______________________________

Offgoing Unit Supervisor

ONCOMING UNIT SUPERVISOR CHECKLIST:

0700 1900	1900-0700

1. LCO Log reviewed.
2. TRO Log reviewed.

0700 - 1900 ______________________________

1900 - 0700 ______________________________

Oncoming Unit Supervisor

POST RELIEF

	0700 1900	1900-0700
(14)		
(5)		

1. Walk down Control Room panels with Unit Responsible PCO.
2. Unit Log reviewed for entries made in past 24 hours.
3. Non-Routine Training current.

PP&L–SUSQUEHANNA TRAINING CENTER

SIMULATOR SCENARIO

Scenario Title:	INITIAL LICENSE SIMULATOR EXAM #3
Scenario Duration:	90 MINUTES
Scenario Number:	99NRC3
Revision/Date:	REV.2, 4/29/99
Course:	SM100, INITIAL LICENSE EXAM
Operational Activities:	

Prepared By:	Terry W. Logsdon Instructor	4-30-99 Date
Reviewed By:	[illegible signature] Nuclear Operations Training Supervisor	[illegible] Date
Approved By:	[illegible signature] Supervising Manager/Shift Supervisor	4/3./99 Date

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SCENARIO SUMMARY

The scenario begins with Unit 1 at 85% power, Unit 2 is 1 hour from synchronizing to the grid. Fuel handling is in progress in Unit 1 Spent Fuel Pool. Instrument Air compressor 'B' is out of service for rebuild. SRV 'R' is leaking. Reactor Recirc 'B' is experiencing seal oscillations accompanied by seal stage Hi/Lo flow alarms. RFPT 'B' is controlling on the MSC and the Hydraulic Jack is 'ON'. A signal failure conditions was repaired and RFPT 'B' should be restored to a normal alignment.

Work has been completed on RFPT 'B' control signal failure condition, the crew will restore RFPT 'B' to normal alignment.

During the restoration of RFPT 'B', an upscale failure of the CRD flow transmitter occurs resulting in low cooling water flow and CRD mechanism high temperatures. The crew will respond by manually controlling CRD system flow, the mechanism high temperatures will clear and normal rod motion will be restored.

A momentary loss of 1A204 bus requires the crew to recover several systems. Two significant equipment failures occur, a loss of CRD and a loss of chilled water to the RRP motors. When the crew recovers CRD a single control rod will drift partially into the core. The crew will respond by fully inserting the control rod to '00'. When actions are taken to restore cooling to the RRP motors, HV-18792B1 will remain closed. The crew will reduce power to limit motor heat up while action to restore the failed valve continues.

Steam leakage will occur in the Pipe routing Area from HPCI. The Leakage Detection System will alarm for both HPCI and RCIC Pipe Routing Area high temperatures; the crew will enter the Secondary Containment Control procedure. Pipe Routing Area temperatures continue to increase, eventually tripping the Riley Tempmatics and energizing the Pipe Routing Area timers. The crew will make a decision to isolate either HPCI or RCIC and monitor instrumentation for decreasing temperatures in the Pipe Routing Area. When the crew attempts to manually close HPCI steam supply valves F002 and F003, the valves fail to fully close. The Pipe Routing area temperature continues to increase to maximum safe levels, requiring the crew to enter the RPV Control procedure and scram the reactor. Complicating matters will be a brief failure of the Feedwater Master Level Controller to respond properly in Automatic, resulting in RPV level dropping to < -38", causing auto initiation of RCIC and HPCI. When HPCI auto starts, a steam supply line break in the HPCI Equipment Area will result in two areas in Secondary Containment being greater than maximum safe temperatures, requiring Rapid Depressurization.

The scenario terminates when Rapid Depressurization is complete, RPV water level is restoring +13 to +54 inches, and actions are addressed for suppression pool water high temperature in Primary Containment Control.

The Emergency Plan classification is EAL 18.3, Site Area Emergency.

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SCENARIO OBJECTIVES

The SRO candidate will:

1. Ensure that Required Actions per Technical Specifications / Technical Requirements are met when a LCO/TRO is entered. (00.TS.003)
2. Implement appropriate portions of Power Maneuvers (00.GO.010)
3. Implement appropriate portions of Station Communication Practices (00.AD.016)
4. Implement appropriate portions of Operations Shift Policies and Work Practices (00.AD.131)
5. Implement RPV Control (00.EO.026)
6. Implement Primary Containment Control (00.EO.027)
7. Implement Scram (00.ON.018)
8. Implement Loss of 4KV Bus (00.ON.011)
9. Implement Loss of CRD System Flow (55.ON.014)
10. Implement Loss of RBCW (34.ON.005)
11. Implement Rod Drift (55.ON.013)
12. Implement Primary Break Outside Drywell (00.EO.023)
13. Implement Secondary Containment Control (00.EO.028)

The RO candidate will:

1. Implement appropriate portions of Power Maneuvers (00.GO.010)
2. Implement appropriate portions of Station Communication Practices (00.AD.016)
3. Implement appropriate portions of Operations Shift Policies and Work Practices (00.AD.131)
4. Implement RPV Control (00.EO.026)
5. Implement Primary Containment Control (00.EO.027)
6. Implement Scram (00.ON.018)
7. Implement Alarm Responses as applicable (00.AR.005)
8. Perform RHR in Containment Suppression Chamber Spray (49.OP.005)
9. Perform a 10% power change with Recirc Flow or Rods (00.GO.012)
10. Perform insert a manual scram with CRD in service (55.OP.006)
11. Operate the Manual Scram Pushbuttons (58.ON.003)
12. Implement Loss of 4KV Bus (00.ON.011)
13. Implement Loss of CRD System Flow (55.ON.014)
14. Implement Loss of RBCW (34.ON.005)
15. Implement Rod Drift (55.ON.013)
16. Implement Primary Break Outside Drywell (00.EO.023)
17. Implement Secondary Containment Control (00.EO.028)
18. Perform RFPT Hydraulic Jack Operation (45.OP.016)
19. Perform Manual Operation of ADS (83.OP.001)

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SCENARIO REFERENCES

1. RFPT ' B' SIGNAL FAILURE
   - A. ON-145-001 RPV LEVEL CONTROL MALFUNCTION
   - B. OP-145-001 RFP & RFP LUBE OIL SYSTEM

2. CRD FLOW TRANSMITTER FAILURE
   - A. AR-103-H05 CRD PANEL 1C007 HI TEMP
   - B. ON-155-007 LOSS OF CRD SYSTEM FLOW
   - C. OI-055-003 CRD HIGH TEMPERATURE SPECIAL LOG

3. MOMENTARY LOSS OF BUS 1A204
   - A. ON-104-204 LOSS OF 4KV BUS 1D
   - B. ON-155-007 LOSS OF CRD SYSTEM FLOW

4. LOSS OF RBCW TO RRP 'B'
   - A. AR-102-F04 RECIRC PUMP B MTR WINDING CLG WATER LO FLOW

5. ROD DRIFT
   - A. ON-155-001 CONTROL ROD PROBLEMS
   - B. AR-104-H05 ROD DRIFT

6. SECONDARY CONTAINMENT CONTROL
   - A. AR-108-E05 RCIC LEAK DETECTION HI TEMP
   - B. AR-114-E05 HPCI LEAK DETECTION HI TEMP
   - C. AR-108-F04 RCIC LEAK DET LOGIC A HI TEMP
   - D. AR-108-F05 RCIC LEAK DET LOGIC B HI TEMP
   - E. AR-114-F04 HPCI LEAK DET LOGIC A HI TEMP
   - F. AR-114-F05 HPCI LEAK DET LOGIC B HI TEMP
   - G. AR-114-A02 HPCI STEAM LINE LOGIC A HI DIFF PRESS
   - H. AR-114-A03 HPCI STEAM LINE LOGIC B HI DIFF PRESS
   - I. EO-100-104 SECONDARY CONTAINMENT CONTROL
   - J. ON-100-101 REACTOR SCRAM

7. RPV CONTROL
   - A. EO-100-102 RPV CONTROL

8. RAPID DEPRESSURIZATION
   - A. EO-100-112 RAPID DEPRESSURIZATION

9. PRIMARY CONTAINMENT CONTROL
   - A. EO-100-103 PRIMARY CONTAINMENT CONTROL
   - B. OP-149-005 RHR OPERATION IN THE SUPPRESSION POOL COOLING MODE

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SCENARIO SPECIAL INSTRUCTIONS

1. Initialize the Simulator to **IC-18**, Unit 1 at 100 percent power.

2. Set-up the simulator for the scenario by performing the following:

   A. Reduce Recirc flow until reactor power is 85% on APRMs.
   B. Raise drywell pressure ≈0.2 psig above existing pressure using nitrogen makeup.
   C. Place CRD Pump 'B' in service.
   D. Place IA Compressor 'B' Control Switch to OFF.
   E. Enter batch file **bat YPB.NRC**
   F. Initiate RFPT 'B' control signal failure as follows:
      1) Insert malfunction **IMF FW145004B**
      2) Place RFP 'B' controller in Manual at 65% output
      3) Lower MSC until in control
      4) Place hydraulic jack ON
      5) Mismatch RFP 'B' flow by .5 mlbm of other pumps
      6) Delete malfunction **DMF FW145004B**

3. Enter Preference File: **restorepref YPP.99NRC3**

   A. Check the Environment Window:

MALFS	REMFS	OVRDS	TRIGS
4:3	1	0:0	4

   B. Ensure 7 Function Buttons lit.

4. Silence and reset alarms.

5. Prepare a turnover sheet indicating:

   A. Unit 1 is in MODE 1 at 85% reactor.
   B. Fuel handling is in progress in Unit 1 fuel pool.
   C. Instrument Air compressor 'B' is out-of-service for rebuild.
   D. SRV 'R' is leaking, tailpipe tempature is steady at ≈300°F.
   E. RRP 'B' is experiencing occasional seal oscillations accompanied with seal stage Hi/Lo flow alarms.
   F. RFPT 'B' is controlling on the MSC and the Hydraulic Jack is "ON'. A signal failure condition was repaired and RFPT 'B' should be restored to a normal alignment.
   G. Unit 2 start-up is in progress, approximately 2 hours from synchronizing to the grid.

6. Place the Simulator in **RUN**.

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SCENARIO EVENT DESCRIPTION FORM

Initial Conditions: Scenario special instructions are complete. Provide the crew with the turnover information. Assign shift positions. Direct the crew to begin the five minute panel walk down.

EVENT	TIME	DESCRIPTION
1		RECOVER RFPT 'B' SIGNAL FAILURE
2		CRD FLOW TRANSMITTER FAILURE
3		MOMENTARY LOSS OF 4KV BUS 1A204
4		ROD DRIFT
5		LOSS OF RRP MOTOR COOLING
6		STEAM LEAK IN SECONDARY CONTAINMENT
7		RAPID DEPRESSURIZATION
8		TERMINATION CUE

SCENARIO EVENT FORM

Event No: 1
Brief Description: Recover RFPT 'B' signal failure

POSITION	TIME	STUDENT ACTIVITIES
SRO		Directs recovery of RFPT 'B' signal failure
RO		Refers to OP-145-001, Section 3.16
		Resets RFPT 'B' signal failure
		Raise RFPT 'B' speed controller 1R601B to 100% output
		Adjusts the bias thumbwheel to zero
		Selects hydraulic jack to 'OFF'
		Decreases RFPT 'B' speed controller 1R601B until control is established
		Raises MSC to High Speed Stop (HSS) using FAST RAISE pushbutton
		Nulls RFPT "B' speed controller 1R601B and places controller in Auto
		Adjusts bias controls to balance RFP flows

★ Denotes Critical Task

NOTES:	

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 1
Brief Description: Recover RFPT 'B' signal failure

INSTRUCTOR ACTIVITY:

None

ROLE PLAY:

As necessary

SCENARIO EVENT FORM

Event No: 2
Brief Description: CRD FLOW TRANSMITTER FAILURE

POSITION	TIME	STUDENT ACTIVITIES
RO		Recognize/reports CRD Panel 1C007 Hi Temperature alarm
		Refers to AR-103-H05, CRD Panel 1C007 HI TEMP
		Checks CRD system parameters
		Determines indicated CRD system flow is high and CRD flow controller output is at minimum
		Refers to ON-155-007, LOSS OF CRD SYSTEM FLOW
		Identifies OI-055-003, CRD HIGH TEMPERATURE SPECIAL LOG is required to be performed
SRO		Directs restoration of CRD using OP-155-001 or ON-155-007
RO		Takes manual control of CRD flow controller FC-C12-1R600
		Restores CRD cooling water flow to ≈63 gpm
		Recognizes CRD mechanism high temperature alarms clear
SRO		Contacts I&C to investigate CRD system flow instrument failure

★ Denotes Critical Task

NOTES:	

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 2
Brief Description: CRD FLOW TRANSMITTER FAILURE

INSTRUCTOR ACTIVITY:

When RFPT 'B' is restored to Auto control, insert the following to cause an upscale failure of the CRD flow transmitter:

[P-1] IMF TR02:C12IN004 100 FT-C12-1N004 FAILS UPSCALE

ROLE PLAY:

1. As NPO dispatched to panel 1C007, wait 2 minutes and report all CRD mechanisms appear to have high temperatures.

   NOTE: Monitor mechanism temps on RD-11.

2. As I&C dispatched to investigate the CRD system flow indication failure, wait 3 minutes and report FT-C12-1N004 has failed upscale and needs replacement. Estimate 3 hours to repair.

SCENARIO EVENT FORM

Event No: 3
Brief Description: MOMENTARY LOSS OF 4KV BUS 1A204

POSITION	TIME	STUDENT ACTIVITIES
BOPRO		Recognizes/reports power transfer to bus 1A204
		Determines bus 1A204 is energized
		Recognizes/reports D/G 'D' has started
		Verifies ESW cooling to D/G 'D'
		Dispatches NPO to investigate breaker 1A20409
		Dispatches NPO to D/G 'D' to check proper operation
SRO		Directs recovery IAW ON-104-204, LOSS OF 4KV BUS 1D
		Directs restoration of CRD IAW ON-155-007, LOSS OF CRD SYSTEM FLOW
		Directs restoration of RBCW IAW ON-104-204, LOSS OF 4KV BUS 1D
		Contacts EM to investigate problems with 4KV bus 1A204
BOPRO		Restores CRD as directed by SRO
		Restores RBCW as directed by SRO
		Recognizes/reports HV-18792B1 failed to open
		Verifies Instrument Air is operating
		Verifies CIG is operating
		Verifies RBCW is restored to DW coolers
RO		Recognizes/reports rod drift condition when CRD is restored

★ Denotes Critical Task

NOTES:	

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 3
Brief Description: MOMENTARY LOSS OF 4KV BUS 1A204

INSTRUCTOR ACTIVITY:

1. When the crew has completed the CRD system flow failure, insert the momentary loss of power to 4KV bus 1A204 using:

   [P-2] MRF BR061A20409 TRIP TRIP OPEN BKR 1A20409

2. Immediately after the momentary power loss to bus 1D, on 1C681 verify HV-18792B1 is closed, insert a failure to re-open HV-18792B1 using:

   [P-3] IMF AV04:HV18792B1 0 0 0 HV-18792B1 FAILS CLOSED

3. When either CRD pump is restored and flow returned to ≈63 gpm, insert control rod drift of rod 30-47 to position 38 using:

   [P-4] IMF RD1550043047 (NONE 0 10) 10 ROD 30-47 DRIFT TO POSITION 38

ROLE PLAY:

As Electrical Maintenance dispatched to investigate bus 1A204, wait ≈3 mins. and report there is no apparent reason for breaker 1A20409 trip. We will continue to investigate and keep you updated as we trouble shoot.

SCENARIO EVENT FORM

Event No: 4
Brief Description: RESTART CRD/ROD DRIFT

POSITION	TIME	STUDENT ACTIVITIES
RO		Selects "Display Rods Drifting", identifies rod 30-47 as drifting
		Selects rod 30-47
		Identifies rod at position 38
		Determines rod 30-47 should be at position 48
		Refers to ON-155-001, CONTROL ROD PROBLEMS
		Refers to AR-104-H05, ROD DRIFT
SRO		Directs rod 30-47 insertion to position 00
		Notifies Reactor Engineering
RO		Inserts rod 30-47 to position 00

★ Denotes Critical Task

NOTES:	

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 4

Brief Description: RESTART CRD/ROD DRIFT

INSTRUCTOR ACTIVITY:

None

ROLE PLAY:

As Reactor Engineering notified about the rod drift condition, reply an investigation is required as to why the rod drifted. While that is happening I will review options to insert symmetrical rods as well as actions to recover the drifted rod 30-47.

SCENARIO EVENT FORM

Event No: 5
Brief Description: LOSS OF RRP MOTOR COOLING

POSITION	TIME	STUDENT ACTIVITIES
SRO		Directs RO to monitor RRP 'B' temperatures on 1C614 recorder
		Contacts maintenance to investigate failure of HV-18792B1
		Directs Recirc pump speeds reduced before motor reaches 204°F
NOTE 1		Directs reactor scram before motor temp reaches 248°F
		Directs power reduction below the 70% rod line
		Notify Chemistry, HP, and RE about power change
BOPRO		Monitors RRP 'B' temperatures
		Refers to AR-102-F02, RRP B MTR WINDING CLG WATER LO FLOW
RO		Reduces Recirc pump speed as directed
		Maintains total core flow >55 mlbm/hr
		Plots position on Power to Flow map
		Selects control rod to monitor core flux oscillations

★ Denotes Critical Task

NOTES:	1. Scram imminent actions may be performed as temp. approaches 248°F.

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 5
Brief Description: LOSS OF RRP MOTOR COOLING

INSTRUCTOR ACTIVITY:

None

ROLE PLAY:

As maintenance sent to investigate HV-18792B1, wait ≈5 mins. and report the solenoid failed and must be replaced. I estimate a minimum of 4 hours to complete the work.

SCENARIO EVENT FORM

Event No: 6
Brief Description: STEAM LEAK IN SECONDARY CONTAINMENT / PRIMARY BREAK OUTSIDE DRYWELL

POSITION	TIME	STUDENT ACTIVITIES
BOPRO		Recognizes/reports AR-108-E05, RCIC LEAK DETECTION HI TEMP and/or AR-114-E05, HPCI LEAK DETECTION HI TEMP.
		Reports Simplex Area 28/29 719' CTMT ACCESS alarm.
		Checks recorders 1R604 and 1R605 and Riley Tempmatic readings at 1C614; reports elevated temperatures in the HPCI/RCIC Pipe Routing Area.
SRO		Enters EO-100-104, SECONDARY CONTAINMENT CONTROL based on Pipe Routing area temperatures.
		Directs starting ESW and all individual Room Coolers.
BOPRO		Responds to AR-108-F04/F05, RCIC LEAK DET LOGIC A/B HI TEMP and AR-114-F04/F05, HPCI LEAK DET LOGIC A/B HI TEMP.
		Reports Pipe Routing Area timers on 1C614 are energized.
		Starts ESW and individual Room Coolers.
		Recognizes/reports HPCI/RCIC auto-isolation and failure of HPCI to isolate.
SRO		Directs manual isolation of HPCI and/or RCIC.
BOPRO		Attempt to manually isolate HPCI, recognizes/reports HPCI F002 valve indicates full open and F003 has lost indication.
		Dispatches NPO to investigate HPCI F003 breaker 1D264081.
NOTE 1		Reports Pipe Routing temperature is approaching 240°F.

★ Denotes Critical Task

NOTES:	NOTE 1: 240°F = MAX SAFE temperature in pipe routing area.

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 6
Brief Description: STEAM LEAK IN SECONDARY CONTAINMENT / PRIMARY BREAK OUTSIDE DRYWELL

INSTRUCTOR ACTIVITY:

When the crew has completed actions for the power reduction with recirc flow, insert the following to cause a steam leak in the Pipe Routing Area:

[P-5] IMF HP152003 1.5 HPCI STEAM SUPPLY LINE LEAK IN PIPE TUNNEL

NOTE: Indications of HPCI leak in Pipe Routing Area occur ≈2.5 minutes after inserting above malfunction.

ROLE PLAY:

1. As NPO dispatched to check trouble alarm at panel 1C275, Rx. Bldg. HVAC, wait ≈3 minutes and report that the alarm received was BDIDs have closed. Indication at 1C275 that nine BDIDs associated with the RHR pipe rooms indicate closed.

2. As NPO dispatched to check breaker 1D264081, wait ≈2 minutes and report that the breaker is closed and appears to be normal.

3. As Electrical Maintenance dispatch to check breaker 1D264081, wait ≈3 minutes and report that it appears as if the breaker has lost control power. You will need to conduct additional troubleshooting to confirm the failure. There is no time estimate for completion of troubleshooting/repairs at this time.

SCENARIO EVENT FORM

Event No: 6
Brief Description: RPV CONTROL/SECONDARY CONTAINMENT CONTROL

POSITION	TIME	STUDENT ACTIVITIES
SRO		Dispatches Electrical Maintenance to investigate breaker 1D264081.
		May direct scram-imminent actions, if time permits.
		Enters EO-100-102, RPV CONTROL after determining that a primary system is discharging into an area and cannot be isolated.
		Directs Mode Switch to SHUTDOWN when Pipe Routing Area reaches Maximum Safe temperature.
		Directs verification of isolations and initiations.
		Directs maintaining RPV level +13" to +54" using available injection sources.
		Directs maintaining RPV pressure <1087 psig with BPVs.
BOPRO		Verifies isolations, initiations and DG starts
		Verifies auto start and proper operation of RCIC.
RO		Maintains RPV pressure with BPVs as directed.
		Reports RPV level dropped < -38", but is recovering with FW.
BOPRO		Verifies auto start of HPCI; recognizes/reports AR-114-A02/A03, HPCI STEAM LINE LOGIC A/B HI DIFF PRESS and reports HPCI has tripped.
SRO		Directs monitoring of Secondary Containment temperatures to assure two areas are not above Maximum Safe Temperatures.

★ Denotes Critical Task

NOTES:	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 6
Brief Description: RPV CONTROL/SECONDARY CONTAINMENT CONTROL

INSTRUCTOR ACTIVITY:

1. When the Mode Switch is placed in Shutdown, verify Event Triggers activate to cause the following:

   a. FWLC Master Controller 1R600 fails low for approximately 20 seconds, then responds as designed in Automatic (resulting in -38" actuations/isolations).

   b. When HPCI starts, a steam line break in the HPCI room is triggered and the pipe routing area leak severity increases, resulting in HPCI Turbine trip, but the F002 and F003 valves are still failed. HPCI Equipment Area temperatures exceed Max Safe, resulting in two areas inside the Secondary Containment exceeding Table 8 requirements for Max Safe temperatures, requiring Rapid Depressurization.

2. When the event trigger activation is verified, insert the following to ramp the HPCI room temperatures above maximum safe values:

   [P-6] bat HPB.99NRC3 RAMP HPCI RM TEMPS ABOVE MAX SAFE

ROLE PLAY:

1. If Security or Health Physics is requested to check for steam release from HPCI blowout panel, wait ≈2 mins. and report there is storm covers have lifted and steam is exiting the vent plenum.

2. If HP is contacted to perform dose calcs for the HPCI release, acknowledge the request. No feedback will be given.

SCENARIO EVENT FORM

Event No: 7
Brief Description: RAPID DEPRESSURIZATION/PRIMARY CONTAINMENT CONTROL

POSITION	TIME	STUDENT ACTIVITIES
SRO		Performs Rapid Depressurization when two area temperatures reach Maximum Safe temperature.
RO		Reports Simplex Area 25/28 645' HPCI PUMP ROOM alarm.
NOTE 1		Reports HPCI Equipment Area temperature is approaching 300°F.
		Reports HPCI area radiation levels are approaching 100 mrem/hr.
SRO		Enters EO-100-112, RAPID DEPRESSURTIZATION due to second area exceeding Maximum Safe temperature.
		Verifies Suppression Pool level >5'.
		Directs Rapid Derpessurization by opening all ADS valves.
		Determines validity of SPING alarm.
		Monitors SPDS for indications of radiation releases.
BOPRO		Rapid Depressurizes the RPV by opening all ADS valves.
		May direct NPO to back-up ADS with Relay Room switches.

NOTES:	NOTE 1: 300°F = MAX SAFE temperature for HPCI EQUIP. AREA.

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 7
Brief Description: RAPID DEPRESSURIZATION/PRIMARY CONTAINMENT CONTROL

INSTRUCTOR ACTIVITY:

If directed to actuate/back-up ADS from Relay Room, wait ≈2 minutes and insert the following:

[P-7] bat ADB.ADSKEYS SIMULATES OPERATING ADS VALVES FROM LRR

ROLE PLAY:

As NPO dispatched to actuate ADS from the Relay Room, wait ≈2 minutes and report that the 6 ADS valves have been keylocked-open for the Lower Relay Room.

SCENARIO EVENT FORM

Event No: 7
Brief Description: RAPID DEPRESSURIZATION/PRIMARY CONTAINMENT CONTROL

POSITION	TIME	STUDENT ACTIVITIES
SRO		Directs restoring RPV level to +13" to +54".
		Re-enters EO-100-104 due to elevated HPCI area radiation levels.
BOPRO		Restores RPV level to +13" to +54" with available systems.
SRO		Enters EO-100-103, PRIMARY CONTAINMENT CONTROL.
		Directs placing both loops of RHR in Suppression Pool Cooling.
BOPRO		Places both loops of RHR in Suppression Pool Cooling IAW OP-149-005, RHR OPERATION IN THE SUPPRESSION POOL COOLING MODE

NOTES:	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 7
Brief Description: RAPID DEPRESSURIZATION/PRIMARY CONTAINMENT CONTROL

INSTRUCTOR ACTIVITY:

None

ROLE PLAY:

As necessary

TERMINATION CUE:

Rapid Depressurization is complete, RPV water level is restoring +13" to +54", and actions are addressed for suppression pool water temperature high in Primary Containment Control.

Facility: Susquehanna S E S **Scenario No.:** 4 **Op Test No.:**

Examiners: ______________________ **Candidates:** ______________________ SRO

______________________ ______________________ RO

______________________ ______________________ BOP

Objectives: See attached

Initial Conditions: See attached

Turnover: SEE ATTACHED "SHIFT TURNOVER" SHEET

Event No.	Malf No.	Event Type*	Event Description
1		N	RHR SW HX outlet fails
2		I	Recirc Pp MG set hyd fluid temp controller fails
3		R	Loss of extraction steam
4		R	Core flux oscillations / SCRAM
5		C	Mode switch failure
6		C	Buses 11A and 11B fail to transfer
7		M	Drywell instrument line leak
8		C	HPCI autostart failure
9		M	RHR suction leak
10		C	RHR suction fails to isolate

* **(N)**ormal, **(R)**eactivity, **(I)**nstrument, **(C)**omponent, **(M)**ajor

SCENARIO #4

Initial Conditions

IC-18, 100% Power.
Fuel Handling in progress in Unit 1 Spent Fuel Pool.
IA Compressor 'B' O/S for rebuild.
SRV 'R' Leaking, tailpipe temperature is ~300°F.
RRP 'B' experiencing seal oscillations, occasional seal stage Hi/Lo flow alarms.
Shutdown RHRSW and ESW following completion of RHR loop 'B' in suppression pool cooling.

1. Shutdown RHRSW and ESW following completion of RHR loop 'B' in suppression pool cooling
   a. RHRSW HX outlet fails after closing

2. RRP 'A' MG-Set Hyd Fluid Temp Controller Auto Output Failure

3. Loss of Extraction Steam
   a. Decrease power by 20%

4. Core Flux Oscillation
   a. Scram reactor

5. Failure of Mode Switch
   a. Scram using RPS Manual Scram Pushbuttons

6. Loss of Aux Buses 11A and 11B
   a. Buses fail to transfer
   b. Loss FW and Condensate

7. Instrument Line Break inside DW
   a. DW pressure increase

8. HPCI Auto Start failure
   a. Perform a component by component start up

9. Decreasing Suppression Pool Level

   a. RHR Suction Leak when pump starts

   b. Shutdown pump

   c. Isolate suction – fails to isolate

   d. Operate RHR division 2 in sprays

SCENARIO 4 SUMMARY

The scenario begins with Unit 1 at 100% power, Unit 2 is 1 hour from synchronizing to the grid. Fuel handling is in progress in Unit 1 Spent Fuel Pool. Instrument Air compressor 'B' is out of service for rebuild. SRV 'R' is leaking. Reactor Recirc 'B' is experiencing seal oscillations accompanied by seal stage Hi/Lo flow alarms. Shutdown RHRSW and ESW following completion of RHR loop 'B' in suppression pool cooling.

The crew will shutdown RHRSW and ESW following completion of RHR loop 'B' in suppression pool cooling. When the RHRSW heat exchanger outlet valve is closed it fails in the closed position. The RHRSW loop will remain inoperable, the SRO will declare the LCO not met and enter a 7 day Completion Time for restoring the loop to operable.

The RRP 'A' MG-Set hydraulic fluid temperature controller auto output fails resulting in high oil temperature supply to the MG-Set bearings and fluid coupler. The temperature can be lowered by manual operation of the controller to avoid the drive motor breaker trip and scoop tube lock.

A loss of Extraction Steam to 4C heater occurs. The crew will respond by lowering power by 20% using recirculation flow and complete the response by taking the actions stated in the Off Normal procedure. During the follow up actions core flux oscillations occur, the crew will manually scram the reactor. The mode switch to shutdown fails to scram the reactor, however, the manual scram pushbuttons or ARI will insert the control rods.

Following the scram, the Aux Buses 11A and 11B will fail to transfer and a instrument line break occurs inside the drywell. HPCI auto start function is failed but the system can be started using a component by component start up. RPV water level will be maintained with injection from HPCI, RCIC, CRD and SLC. RPV pressure will be controlled by SRV actuation.

When RHR is started a suction leak will develop. The crew will stop the RHR pumps and isolate the suction valve. Suction isolation will fail and suppression pool level will decrease. The crew should continue with actions to control primary containment pressure and temperature. Suppression pool level will stabilize high enough to avoid Rapid Depressurization.

The scenario will terminate when RPV water level is being maintained >TAF, Suppression Chamber and Drywell sprays have been used to control Primary Containment parameters.

The Emergency Plan classification is EAL 12.1, Unusual Event or EAL 4.2, Alert.

UNIT SUPERVISOR TURNOVER SHEET

UNIT: 1 Date: March 22, 1999

SHIFT 1900 (Start) to 0700 (End)	SHIFT 0700 (Start) to 1900 (End)
MODE 1	MODE ____
POWER LEVEL 100 %	POWER LEVEL ____ %
GENERATOR OUTPUT 1135 MWe	GENERATOR OUTPUT ____ MWe

1. Instrument Air Compressor 'B' is O/S for rebuild
2. SRV 'R' is leaking, tailpipe temperature is ≈300°F
3. RRP 'B' experiencing seal oscillations, occasional seal stage Hi-Lo flow alarms
4. Shutdown RHRSW and ESW following completion of RHR loop 'B' in suppression pool cooling
5. Unit two is in MODE 2 ~1 hour from synchronizing to the grid

COMMON:

1. Fuel Handling in progress in Unit 1 Spent Fuel Pool

OFFGOING UNIT SUPERVISOR CHECKLIST:

1900-0700	0700-1900	
		1. Evolutions in progress and items to be completed during next shift, as noted in remarks, have been discussed with oncoming Unit Supervisor.
		2. Problems encountered during past shift and abnormal plant conditions, as noted in remarks, have been discussed with oncoming Unit Supervisor.

1900 - 0700 ______________________________

0700 - 1900 ______________________________

Offgoing Unit Supervisor

ONCOMING UNIT SUPERVISOR CHECKLIST:

0700 1900	1900-0700	
		1. LCO Log reviewed.
		2. TRO Log reviewed.

0700 - 1900 ______________________________

1900 - 0700 ______________________________

Oncoming Unit Supervisor

POST RELIEF

	0700 1900	1900-0700	
			1. Walk down Control Room panels with Unit Responsible PCO.
(14)			2. Unit Log reviewed for entries made in past 24 hours.
(5)			3. Non-Routine Training current.

SPARE NOT USED

PP&L–SUSQUEHANNA TRAINING CENTER

SIMULATOR SCENARIO

Scenario Title:	INITIAL LICENSE SIMULATOR EXAM #4
Scenario Duration:	90 Minutes
Scenario Number:	99NRC4
Revision/Date:	2, 4/29/99
Course:	SM001, INITIAL LICENSE EXAM
Operational Activities:	

Prepared By:	Terry W. Logsdon Instructor	4-30-99 Date
Reviewed By:	[signature] Nuclear Operations Training Supervisor	4/30/99 Date
Approved By:	[signature] Supervising Manager/Shift Supervisor	4/30/99 Date

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SCENARIO SUMMARY

The scenario begins with Unit 1 at 100% power, Unit 2 is 1 hour from synchronizing to the grid. Fuel handling is in progress in Unit 1 Spent Fuel Pool. Instrument Air compressor 'B' is out of service for rebuild. SRV 'R' is leaking. Reactor Recirc 'B' is experiencing seal oscillations accompanied by seal stage Hi/Lo flow alarms. Shutdown RHRSW and ESW following completion of RHR loop 'B' in suppression pool cooling.

The crew will shutdown RHRSW and ESW following completion of RHR loop 'B' in suppression pool cooling. When the RHRSW heat exchanger outlet valve is closed it fails in the closed position. The RHRSW loop will remain inoperable, the SRO will declare the LCO not met and enter a 7 day Completion Time for restoring the loop to operable.

The RRP 'A' MG-Set hydraulic fluid temperature controller auto output fails resulting in high oil temperature supply to the MG-Set bearings and fluid coupler. The temperature can be lowered by manual operation of the controller to avoid the drive motor breaker trip and scoop tube lock.

A loss of Extraction Steam to 4C heater occurs. The crew will respond by lowering power by 20% using recirculation flow and complete the response by taking the actions stated in the Off Normal procedure. During the follow up actions core flux oscillations occur, the crew will manually scram the reactor. The mode switch to shutdown fails to scram the reactor, however, the manual scram pushbuttons or ARI will insert the control rods.

Following the scram, the Aux Buses 11A and 11B will fail to transfer and a instrument line break occurs inside the drywell. HPCI auto start function is failed but the system can be started using a component by component start up. RPV water level will be maintained with injection from HPCI, RCIC, CRD and SLC. RPV pressure will be controlled by SRV actuation.

When RHR is started a suction leak will develop. The crew will stop the RHR pumps and isolate the suction valve. Suction isolation will fail and suppression pool level will decrease. The crew should continue with actions to control primary containment pressure and temperature. Suppression pool level will stabilize high enough to avoid Rapid Depressurization.

The scenario will terminate when RPV water level is being maintained >TAF, Suppression Chamber and Drywell sprays have been used to control Primary Containment parameters.

The Emergency Plan classification is EAL 12.1, Unusual Event or EAL 4.2, Alert.

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SCENARIO OBJECTIVES

The **SRO Candidate** will:

1. Ensure that required actions per Technical Specifications/Technical Requirements are met when a LCO/TRO is entered (00.TS.003).
2. Implement Loss of Extraction Steam (47.ON.005).
3. Implement appropriate portions of Power Maneuvers (00.GO.010).
4. Direct Reactor Scram on indication of Core Flux Oscillations (78.ON.003).
5. Implement Scram (00.ON.018).
6. Implement RPV Control (00.EO.026).
7. Implement loss of Auxiliary Buses (03.ON.006).
8. Implement Primary Containment Control (00.EO.027).
9. Implement RPV Water Level Anomaly (45.ON.007).
10. Implement Secondary Containment Control (00.EO.028).
11. Implement appropriate portions of Station Communication Practices (00.AD.016).
12. Implement appropriate portions of Operations Shift Policies and Work Practices (00.AD.131).

The **RO Candidate** will:

1. Place RHRSW in standby readiness (16.OP.001).
2. Shutdown ESW system (54.OP.005).
3. Implement Loss of Extraction Steam (47.ON.005).
4. Perform a 10% power change with Rods/Recirc Flow (00.GO.012).
5. Implement appropriate portions of Power Maneuvers (00.GO.010).
6. Implement Core Flux Oscillations (78.ON.003).
7. Insert a Manual Scram with CRD in service (55.OP.006).
8. Operate the Manual Scram Pushbuttons (58.ON.003).
9. Implement Scram (00.ON.018).
10. Implement RPV Control (00.EO.026).
11. Implement loss of Auxiliary Buses (03.ON.006).
12. Implement Primary Containment Control (00.EO.027).
13. Perform a manual start up of HPCI (52.OP.012).
14. Perform maximizing CRD (55.OP.001).
15. Implement RPV Water Level Anomaly (45.ON.007).
16. Place RHR in Containment Suppression Chamber Spray (49.OP.005).
17. Place RHR in Suppression Pool Cooling (49.OP.003).
18. Implement Secondary Containment Control (00.EO.028).
19. Implement Alarm Responses as applicable (00.AR.005).
20. Implement appropriate portions of Station Communication Practices (00.AD.016).
21. Implement appropriate portions of Operations Shift Policies and Work Practices (00.AD.131).

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SCENARIO REFERENCES

1. SHUTDOWN RHRSW AND ESW FOLLOWING COMPLETION OF 'B' RHR IN SUPPRESSION POOL COOLING

   a. OP-149-005 RHR OPERATION IN SUPPRESSION POOL COOLING
   b. OP-116-001 RHRSW SYSTEM
   c. T.S. 3.7.1 RHRSW SYSTEM AND ULTIMATE HEAT SINK
   d. AR-150-B01 RHR SERVICE WATER SYSTEM
   d. OP-054-001 EMERGENCY SERVICE WATER SYSTEM

2. RRP 'A' MG-SET HYD FLUID TEMP CTLR FAILURE

   a. AR-102-C05 RECIRC MG SET A/B BRG OR FLUID DRIVE HI TEMP
   b. AR-102-C03 RECIRC MG A FLUID DRIVE OIL HI/LO TEMP

3. LOSS OF EXTRACTION STEAM TO 4C FEEDWATER HEATER

   a. ON-147-001 LOSS OF FEEDWATER EXTRACTION STEAM
   b. GO-100-012 POWER MANEUVERS

4. CORE FLUX OSCILLATIONS

   a. ON-178-002 CORE FLUX OSCILLATIONS

5. FAILURE OF MODE SWITCH

   a. ON-100-101 SCRAM
   b. E0-100-102 RPV CONTROL

6. LOSS OF AUX BUSES 11A AND 11B

   a. ON-103-003 13.8KV BUS 11A & 11B LOSS OF BUS LOAD SHEDDING ON UNDERVOLTAGE
   b. EO-100-102 RPV CONTROL

7. INSTRUMENT LINE BREAK INSIDE THE DRYWELL

   a. EO-100-103 PRIMARY CONTAINMENT CONTROL
   b. ON-145-004 RPV WATER LEVEL ANOMALY

8. HPCI AUTO START FAILURE

   a. OP-152-001 HIGH PRESSURE COOLANT INJECTION SYSTEM

9. DECREASING SUPPRESSION POOL LEVEL

   a. EO-100-104 SECONDARY CONTAINMENT CONTROL
   b. AR-109-H8 RHR LOOP A ROOM FLOODED

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SCENARIO SPECIAL INSTRUCTIONS

1 Initialize simulator to IC-18, 100% power.

2 Place IA Compressor 'B' control switch to 'OFF' and Pink Tag.

3 Run the exam initial condition batch file **bat YPB.NRC**

4 Align ESW and RHRSW
   a Place ESW Pump 'A' and 'B' in service
   b Place RHRSW 'B in service
      1) Enable LOCA Trip
      2) Place rad monitor in service; **MRF RM179006 ONLINE**
      3) Adjust RHRSW loop flow 6 - 9 Kgpm

5 Enter preference file: **restorepref YPP.99NRC4**

   a Verify environment window

MALFS	REMFS	OVRDS	TRG
9:9	2	1:1	3

   b Ensure 8 function buttons lit.

6 Silence and reset alarms.

7 Prepare a turnover sheet indicating:

   a Fuel handling is in progress in Unit 1 fuel pool.
   b Instrument Air compressor 'B' is out-of-service for rebuild.
   c SRV 'R' is leaking, tailpipe temp is steady at ≈300°F.
   d RRP 'B' is experiencing occasional seal oscillations accompanied with seal stage Hi/Lo flow alarms.
   e RHR 'B' was in Suppression Pool Cooling; shutdown RHRSW and ESW.
   f Unit 2 start-up is in progress, approximately 1 hours from synchronizing to the grid.

8 Place simulator in **RUN.**

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SCENARIO EVENT DESCRIPTION FORM

Initial Conditions: Initialize the Simulator to **IC-18**. Place the Simulator to RUN. Ensure the Program Buttons are assigned as indicated on the Special Instructions sheet via the appropriate Preference File. Assign Shift positions. Direct the start of the 5 minute panel walk down.

EVENT	TIME	DESCRIPTION
1		Shutdown RHRSW and ESW following completion of RHR 'B' in Supp Pool Cooling
2		RRP 'A' MG-Set Hyd Fluid Temp Controller Failure
3		Loss of Extraction Steam to 4C Feedwater Heater
4		Core Flux Oscillations
5		Failure of RPS Mode Switch
6		Loss of Auxiliary Buses 11A and 11B
7		Instrument Line Break inside the Drywell
8		HPCI Auto Start Failure
9		Decreasing Suppression Pool Level

SCENARIO EVENT FORM

Event No: 1
Brief Description: Shutdown RHRSW and ESW following completion of Suppression Pool Cooling.

POSITION	TIME	STUDENT ACTIVITIES
SRO		Direct shutdown of 'B' loop RHRSW and ESW.
		Reviews Technical Requirements TRO 3.8.2.1; Required Action A.1 (8 hour TRO) when motor overload bypass is placed in TEST position.
BOP RO		Reviews OP-149-005 and OP-116-001.
		Stops RHRSW Pump.
		Attempts to isolate B RHRSW valves.
		Recognizes/reports BIS alarm indication for RHRSW valve HV-11215B failure.
		Acknowledges BIS alarm AR-150-B01.
		Recognizes/reports valve had stroked full closed when alarm received.
		Directs NPO to check breaker 1B247012.
SRO		Reviews Technical Specification LCO 3.7.1; determines Required Action A.1 (7 day LCO).
		Request assistance from Electrical Maintenance / EWAC.
BOP RO		Reviews OP-054-001.
		Stops running ESW pumps.

NOTES:	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 1
Brief Description: Shutdown RHRSW and ESW following completion of Suppression Pool Cooling.

INSTRUCTOR ACTIVITY:

When HV-11215B is full closed, insert the following to prevent valve opening:

[P-1] IOR ZDIHS11215B1 NORM

ROLE PLAY:

As NPO sent to investigate breaker 1B247012, report that it appears the breaker tripped on thermals and will not reset.

As Electrical Maintenance/EWAC: report that the valve motor operator's closed torque switch has failed and the breaker tripped on thermal overload. The limit switch will need to be replaced and the valve checked for damage. You will provide a time estimate as soon as possible.

SCENARIO EVENT FORM

Event No: 2
Brief Description: RRP 'A' MG-Set Hyd Fluid Temp Controller Failure

POSITION	TIME	STUDENT ACTIVITIES
RO		Recognize/report RECIRC MG SET A/B BRG OR FLUID DRIVE OIL HI TEMP.
		Refers to AR-102-C05
		Determines controller TIC-11016A is at minimum output
		Dispatch NPO to investigate position of TV-11016A.
		Determines MG Set 'A' temps are high by monitoring TRS-B31-1R625 on Panel 1C614
SRO		Directs restoration of RRP 'A' MG Set Hyd Fluid Temperature
RO		Recognize/reports RECIRC MG A FLUID DRIVE OIL HI/LO TEMP
		Refers to AR-102-C03
		Takes manual control of TIC-11016A and lowers oil temps before RRP 'A' drive motor breaker trips
SRO		Request assistance from I&C.

NOTES:	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 2
Brief Description: **RRP 'A' MG-Set Hyd Fluid Temp Controller Failure**

INSTRUCTOR ACTIVITY:

When Crew has completed actions for RHRSW 15B valve failure, initiate RRP 'A' MG-Set Hyd Fluid Temp Controller Auto output failure:

[P-8] IMF CNO2:TIC11016A 0

ROLE PLAY:

1 As NPO dispatched to TV-11016A: wait ~2 minutes and report the valve appears closed unless the valve was opened by manual operation of the TIC on 1C668.

2 As I&C investigating TV-11016A problem: wait ~5 minutes and report the controller auto output circuitry has failed to minimum. The controller must be replaced.

SCENARIO EVENT FORM

Event No: 3
Brief Description: Loss of Extraction Steam to 4C Heater.

POSITION	TIME	STUDENT ACTIVITIES
BOP RO		Recognize/report Extraction Steam to 4C Heater isolation valve HV-10241C going closed.
		Dispatch NPO to 1C103 to investigate.
SRO		Implement ON-147-001 and GO-100-012.
RO		Reduce reactor power by 20%.
		Plot position on Power/Flow map.
		Adjust load set as necessary.
		Select a control rod; monitor for Core Flux Oscillations.
BOP RO		Monitor Off Gas and MSL radiation monitors.
		Isolate Extraction Steam to 5C heater.
		Isolate Moisture Separator Drains to 4C heater.
SRO		Notify Chemistry, HP, and RE of power reduction.
		Request assistance from I&C.

NOTES:	

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 3
Brief Description: **Loss of Extraction Steam to 4C Heater.**

INSTRUCTOR ACTIVITY:

When Crew has completed actions for RHRSW 15B valve failure, initiate isolation of Extraction Steam to 4C heater:

[P-2] IMF MV05:HV10241C

ROLE PLAY:

3 As NPO dispatched to 1C103: wait ~2 minutes and report no apparent reason for 41C valve closure, feedwater heating system is responding as expected.

4 As I&C investigating extraction steam isolation: wait ~5 minutes and report no obvious reason for isolation has been found; continuing to investigate/troubleshoot.

SCENARIO EVENT FORM

Event No: 4/5/6
Brief Description: Core Flux Oscillations / Failure of Mode Switch / Loss of Aux Buses 11A&B.

POSITION	TIME	STUDENT ACTIVITIES
RO		Recognize/report APRM/LPRM oscillations.
		Monitor severity of power swings.
SRO		Implement ON-178-002.
		Contact Reactor Engineering.
		Direct power reduction to limit oscillations.
RO		Recognize/report severe flux oscillations, LPRM upscale and downscale indications.
		Place Mode Switch to SHUTDOWN.
SRO		Direct reactor scram.
		Implement ON-100-101 and EO-100-102.
RO		Recognize/report failure of Mode Switch.
		Initiate Manual Scram using Manual Scram Push Buttons.
		Insert SRMs and IRMs.
		Report all rods fully inserted.
BOP RO		Initiate ARI (Note 1).
		Recognize/report loss of Aux Buses 11A and 11B.
		Control RPV level with HPCI and/or RCIC.
		Control RPV pressure with SRVs.
SRO		May direct closing MSIVs since condenser is not available.

NOTES:	BOP RO may not initiate ARI if RO reports Scram Push Buttons successfully inserted
all control rods.	

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 4/5/6
Brief Description: Core Flux Oscillations / Failure of Mode Switch / Loss of Aux Buses 11A&B.

INSTRUCTOR ACTIVITY:

1. After 20% power reduction has been performed, and actions to isolate extraction steam to 5C heater are complete per ON-147-001, initiate mild Core Flux Oscillations:

   [P-3] bat NMB.FLUXOSC1

   NOTE: The oscillation batch file may need to be inserted several times while the Crew investigates; Depress P-2 as necessary.

2. When the Crew has noticed the mild oscillations, initiate severe Core Flux Oscillations:

   [P-4] bat NMB.FLUXOSC3

3. When the Manual Scram Push Buttons are depressed, ensure the Trigger E1 actuates to modify Mode Switch position <u>and</u> insert instrument line break malfunction:

   MOR ZDIHSC72A1S01 SHUTDN
   IMF RR180001 100 15:00

ROLE PLAY:

As Electrical Maintenance/EWAC sent to investigate the Aux Buses: wait ~5 minutes and report that it appears there is a failure in the breaker logic for 1A10104 and 1A10204 preventing breaker closure. More time is needed for investigation/troubleshooting.

SCENARIO EVENT FORM

Event No: 7/8
Brief Description: Instrument Line Break Iside the Drywell / HPCI Auto Start Failure.

POSITION	TIME	STUDENT ACTIVITIES
RO/BOP RO		Recognize/report loss of Division 1 level and pressure indications.
		Verify RPV level using redundant level indicators.
		Recognize/report Drywell pressure and temperature slowly increasing.
SRO		Implement ON-145-004.
		Implement EO-100-103.
		Re-enter EO-100-102 on High Drywell pressure.
BOP RO		Recognize/report failure of HPCI to auto start (if not already running).
		Start HPCI component by component per OP-152-001.

NOTES:	

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 7/8
Brief Description: Instrument Line Break Iside the Drywell / HPCI Auto Start Failure.

INSTRUCTOR ACTIVITY:

After HPCI is started and RPV level is recovering, increase severity of Drywell leak:

[P-5] IMF RR164010 15 8:00

ROLE PLAY:

As necessary.

SCENARIO EVENT FORM

Event No: 9
Brief Description: Decreasing Suppression Pool Level.

POSITION	TIME	STUDENT ACTIVITIES
SRO		Direct Suppression Chamber Sprays using 'A' Loop of RHR.
BOP RO		Aligns 'A' Loop of RHRSW.
		Aligns 'A' Loop of RHR for Suppression Chamber Sprays; starts an RHR pump.
		Recognizes/reports RHR LOOP A ROOM FLOODED alarm.
		Verifies Suppression Pool level decreasing.
		Dispatches NPO to investigate room flood.
		Stops RHR pump, closes F004A and F004C.
		Recognizes/reports failure of 4A to close.
SRO		Implements EO-100-104.
		Directs isolation of 'A' Loop RHR.
		Directs start of ESW and Reactor Building room coolers.
		Requests assistance from Maintenance/EWAC to isolate RHR.
		Directs HPCI isolation if level cannot be maintained above 17 feet.
		Directs 'B' Loop RHR placed in Containment Sprays.

NOTES:	If RHR 'A' is started for SPC before sprays, the same actions will occur.

INSTRUCTOR ACTIVITIES, ROLE PLAY, AND INSTRUCTOR'S PERSONAL NOTES

Event No: 9
Brief Description: Decreasing Suppression Pool Level.

INSTRUCTOR ACTIVITY:

1. When 'A' Loop of RHR is placed in service, insert a break on the RHR suction line:

   [P-6] IMF RH149004A 20 4:00

2. When Suppression Pool level reaches 17 feet, verify Trigger E2 actuates to delete the RHR leak:

   DMF RH149004A

ROLE PLAY:

1. As NPO dispatched to verify the RHR room flood alarm: wait ~3 minutes and report that there is at least 4 inches of water on the floor, you have exited the area and closed the water tight door.
2. As Electrical Maintenance/EWAC dispatched to isolate the RHR 4A valve: acknowledge the order and perform no further action.

SCENARIO EVENT FORM

Event No: 9
Brief Description: Decreasing Suppression Pool Level.

POSITION	TIME	STUDENT ACTIVITIES
RO		Starts ESW and Reactor Building room coolers.
		Monitors Primary and Secondary Containment status.
		Dispatches NPO to F004A breaker, 1B216032.
BOP RO		Places 'B' Loop of RHR in Containment Sprays.
		Isolates HPCI as directed, based on Suppression Pool level.
RO		Maximizes CRD as necessary to maintain RPV level.
		Directs bypass of CRD suction filter, as necessary.

NOTES:	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 9
Brief Description: **Decreasing Suppression Pool Level.**

INSTRUCTOR ACTIVITY:

1. If directed to bypass the CRD suction filter:

   [P-7] MRF RD155028 100

2. When Suppression Pool level reaches 17 feet, verify Trigger E2 actuates to delete the RHR leak.

   DMF RH149004A

ROLE PLAY:

As NPO dispatched to check breaker 1B216032, wait ~3 minutes and report the breaker tripped and will not reset.

TERMINATION CUE:

When RPV level is being maintained above TAF with available sources and Suppression Chamber/Drywell Sprays have been utilized for containment control, the scenario may be terminated.

U.S. Nuclear Regulatory Commission
Site-Specific
Written Examination

Applicant Information

Name:	Region: I
Date: 5/10/99	Facility: Susquehanna
License Level: SRO	Reactor Type: GE
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected four hours after the examination starts.

Applicant Certification

All work done on this examination is my own. I have neither given nor received aid.

____
Applicant's Signature

Results

Examination Value	__________ Points
Applicant's Score	__________ Points
Applicant's Grade	__________ Percent

PART B - WRITTEN EXAMINATION GUIDELINES

1. ***[Read Verbatim]*** After you complete the examination, sign the statement on the cover sheet indicating that the work is your own and you have not received or given assistance in completing the examination.

2. To pass the examination, you must achieve a grade of 80.00 percent or greater. Every question is worth one point.

3. For an initial examination, the time limit for completing the examination is four hours.

   For a requalification examination, the time limit for completing both sections of the examination is three hours. If both sections are administered in the simulator during a single three-hour period, you may return to a section of the examination that was already completed or retain both sections of the examination until the allotted time has expired.

4. You may bring pens and calculators into the examination room. Use only black ink to ensure legible copies.

5. Print your name in the blank provided on the examination cover sheet and the answer sheet. You may be asked to provide the examiner with some form of positive identification.

6. Mark your answers on the answer sheet provided and do not leave any question blank. Use only the paper provided and do not write on the back side of the pages. If you decide to change your original answer, draw a single line through the error, enter the desired answer, and initial the change.

7. If the intent of a question is unclear, ask questions of the NRC examiner or the designated facility instructor only.

8. Restroom trips are permitted, but only one applicant at a time will be allowed to leave. Avoid all contact with anyone outside the examination room to eliminate even the appearance or possibility of cheating.

9. When you complete the examination, assemble a package including the examination questions, examination aids, answer sheets, and scrap paper and give it to the NRC examiner or proctor. Remember to sign the statement on the examination cover sheet indicating that the work is your own and that you have neither given nor received assistance in completing the examination. The scrap paper will be disposed of immediately after the examination.

10. After you have turned in your examination, leave the examination area as defined by the proctor or NRC examiner. If you are found in this area while the examination is still in progress, your license may be denied or revoked.

11. Do you have any questions?

Senior Reactor Operator Answer Sheets

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Senior Reactor Operator Answer Sheets

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Senior Reactor Operator Examination

1. Given the following conditions:

   - Unit 1 was operating at 100% power
   - Following a valid reactor scram signal the Reactor Protection System was unable to de-energize the 185 individual Scram Pilot Valves
   - The Backup Scram Valves did function as designed and all control rods fully inserted

   Which of the following would be an indication that the Backup Scram Valves actually accomplished the scram?

   a. No hydraulic control unit accumulator fault alarms would be received on the full core display.

   b. The total elapsed time from the scram signal to all control rods fully inserted would be noticeably longer.

   c. The Scram Discharge Volume Vent and Drain Valves would not reposition.

   d. The individual control rod scram speeds would be slower.

2. Given the following CURRENT full core display parameters for control rod 22-35 that had been at Notch "48".

   - Full-In: Illuminated
   - Full-Out: NOT Illuminated
   - Drifting: Illuminated
   - Selected: NOT Illuminated
   - Accumulator: NOT Illuminated
   - Scram Valves: NOT Illuminated

   These conditions are the result of:

   a. the Scram Inlet Valve (126) opening.

   b. the Scram Outlet Valve (127) opening.

   c. the Scram Inlet Valve (126) and Scram Outlet Valve (127) both opening.

   d. the control rod being driven to Notch "00" using the "Insert Rod" pushbutton.

3. Given the following conditions:

   - Control rod withdrawals for a Unit 2 reactor startup are in progress
   - The Unit PCO is withdrawing control rods to Notch "48" using the Continuous Rod Withdrawal and Withdraw Rod pushbuttons
   - When control rod 18-19 is withdrawn the following are received
     - Rod Overtravel alarm
     - Rod position indicates "--"

   Which of the following is the cause of these indications?

   a. The Reactor Manual Control System Rod Motion Timer has malfunctioned resulting in an "overtravel" condition.

   b. The PCO provided a withdraw signal to the rod for an excessive period of time after reaching Notch "48".

   c. The control rod drive mechanism is at the "overtravel" position but control rod position is currently unknown.

   d. The rod has drifted beyond the last even numbered Notch and is still settling back to Notch "48".

4. Given the following conditions:

   - Control rod withdrawals for a Unit 1 reactor startup are in progress
   - The current Rod Worth Minimizer (RWM) group is Group 1
   - Group 1 contains 12 control rods that are to be withdrawn from Notch "00" to Notch "48"
   - The first 10 rods have been withdrawn to Notch "48" and the remaining 2 rods to Notch "44"
   - A control rod in Group 2 has been selected but NOT withdrawn

   For these conditions the RWM will display:

   a. two withdraw errors and if a third withdraw error is made further rod withdrawals will be blocked except for the three rods with the withdraw errors.

   b. two withdraw errors and further rod withdrawals will be blocked except for the rods with the withdraw errors.

   c. two insert errors and if a third insert error is made, further rod withdrawals will be blocked except for the three rods with the insert errors.

   d. two insert errors and further rod withdrawals will be blocked except for the rods with the insert errors.

5. Given the following conditions:

- Unit 1 was operating at 80% power
- A logic failure has resulted in the "B" Recirculation Pump running back to the #2 Limiter
- Actual #2 Limiter Runback conditions do NOT exist

Which of the following describes the plant limitations required while operating under these conditions?

a. If the "B" Recirculation Pump runback cannot be reset in 2 hours it must be tripped within the next 12 hours.

b. Single loop operating restrictions and limitations must be in place within 2 hours.

c. The "B" Recirculation Pump runback must be reset and speed raised or the "A" Pump speed reduced to 45% within 2 hours.

d. Mismatched loop flow operation is not permitted and immediate action must be taken to be in Mode 3 within 12 hours.

6. Given the following conditions:

- Unit 2 is making preparations for a reactor and plant startup
- Reactor temperature is 120 degrees F
- The reactor is at atmospheric pressure
- The Condensate and Feedwater Systems are in Long Path Recirculation
- Reactor Water Cleanup is operating for reactor water level control

Following the start of the Reactor Recirculation Pumps, what is the MAXIMUM speed at which they can be operated for these conditions?

a. 20%

b. 30%

c. 40%

d. 45%

7. Given the following conditions:

- Both Units are operating at 100% power
- Unit 2 has Suppression Pool cooling in service on the "A" Residual Heat Removal (RHR) Pump
- A loss of DC power to the Unit 1 RHR Division 1 logic has occurred
- While troubleshooting is in progress a valid loss of coolant accident signal is received on Unit 1

Which of the following describes the expected impact on BOTH Unit's RHR systems?

a. The Unit 1 "B" RHR Loop will start and inject normally. The Unit 1 "A" RHR Loop must be manually started and aligned for injection. The Unit 2 "A" RHR Pump will trip.

b. The Unit 1 "B", "C" and "D" RHR Pumps will start with injection via both RHR Loops. The Unit 2 "A" RHR Pump will automatically trip then the Unit 1 "A" RHR Pump will start.

c. The Unit 1 "B" RHR Loop will start and inject normally. The Unit 1 "A" RHR Loop must be manually started and aligned for injection. The Unit 2 "A" RHR Pump must be manually tripped.

d. The Unit 1 "B", "C" and "D" RHR Pumps will start with injection only via the "B" RHR Loop. The Unit 2 "A" RHR Pump must be manually tripped then the Unit 1 "A" RHR Pump will start.

8. Given the following conditions:

- Following a transient, Unit 1 is operating in accordance with EO-100-102, "RPV Control"
- The Pressure Control Leg has directed the use of Reactor Water Cleanup (RWCU) in the Blowdown Mode
- ES-161-001, "RWCU Blowdown Mode Bypassing Interlocks", has been implemented
- Moments after placing RWCU in the Blowdown Mode, a "RWCU System High Leakage" alarm is received and is present for greater than 60 seconds

Select the required operator actions for these conditions assuming RWCU responds as expected.

a. Verify automatic closure of the Inboard and Outboard Isolation Valves (F001 and F004).

b. Verify automatic closure of the Blowdown Flow Regulator Valve (F033).

c. Verify automatic closure of the Inboard and Outboard Isolation Valves (F001 and F004) and the Blowdown Flow Regulator Valve (F033).

d. Manually close the Inboard and Outboard Isolation Valves (F001 and F004) and verify automatic closure of the Blowdown Flow Regulator Valve (F033).

9. Given the following conditions:

- Unit 2 is in Mode 4 with Shutdown Cooling in service on the "B" Residual Heat Removal (RHR) loop
- A large leak has developed just upstream of the Shutdown Cooling Suction Outboard Isolation Valve (F008)
- Reactor water level rapidly reaches the Low Pressure Coolant Injection (LPCI) initiation setpoint
- All expected actions occur
- Core Spray is NOT available

Which of the following describes the expected affect on the leak and reactor water level for these conditions?

a. The leak will be stopped and reactor water level will stabilize but not recover unless operator action is taken to inject.

b. The leak will NOT be stopped. Operator action is required to isolate the leak and inject with RHR to recover level.

c. The leak will be stopped and reactor water level will rise due to the "B" Loop of RHR injecting in the LPCI mode.

d. The leak will NOT be stopped. Operator action is required to isolate the leak allowing automatic LPCI injection to recover level.

10. Given the following conditions:

- The Unit 1 High Pressure Coolant Injection (HPCI) system is running in the CST to CST mode
- The Flow Controller is in "Automatic" set for 3500 gpm
- System flowrate is 3500 gpm
- The Extra PCO reports that HPCI turbine speed is lowering

Which of the following would cause this response?

a. A relay failure has just transferred the Flow Controller from "Automatic" to "Manual"

b. The HPCI Test Line To CST Isolation Valve (F011) has just auto closed.

c. The HPCI ramp generator output just failed to its "low" limit.

d. The HPCI Minimum Flow To Suppression Pool Valve (F012) has just opened.

11. Which of the following High Pressure Coolant Injection (HPCI) "support" systems/components, if Inoperable, would NOT affect the Operability of HPCI?

    a. Standby Gas Treatment System

    b. The Auxiliary Oil Pump

    c. The Suppression Pool

    d. The Condensate Storage Tank

12. Which of the following conditions MUST be met when the "A" Core Spray loop suction is lined up to the Condensate Storage Tank (CST)? Assume the Unit CSTs are NOT cross-connected.

    a. The reactor vessel head must be removed and the core defueled.

    b. The "A" Core Spray loop must be declared Inoperable.

    c. The Unit Condensate Storage Tank level must be greater than 49%.

    d. The opposite Units' Condensate Storage Tank must remain available.

13. Given the following conditions:

    - Unit 2 has experienced a failure-to-scram (ATWS)
    - The Standby Liquid Control (SLC) system was initiated and injected for 52 minutes before both SLC Pumps failed
    - Reactor power is in the source range

    How does this failure affect the planned reactor cooldown and depressurization?

    a. Boron concentration is sufficient to allow a complete cooldown under any plant conditions.

    b. Cooldown can be accomplished if completed before Xenon decays out of the core.

    c. Boron concentration is sufficient to allow a complete cooldown with a maximum of 8 control rods not fully inserted.

    d. Reactor Engineering must make the determination if current boron concentration will allow a complete cooldown.

4. Given the following conditions:

- Unit 1 is operating at 100% power
- The "B" Standby Liquid Control (SLC) Pump was declared "Inoperable" 4 days ago
- The "Loss Of Continuity To Squib Valves" alarm has just been received
- Investigation reveals broken leads to the "A" SLC Squib Valve primers
- The "B" SLC Squib Valve primer continuity status has not changed

Select the required actions for these conditions.

a. Restore one subsystem to Operable status in 8 hours or be in Mode 3 within the next 12 hours.

b. Continue in the 7 day Required Action for one Inoperable subsystem, no further actions are required.

c. Enter a 7 day Required Action for the "A" SLC Subsystem, continue in the 7 day Required Action for the "B" SLC Subsystem.

d. Extend the current 7 day Required Action for one Inoperable subsystem not to exceed 10 days from the initial failure to meet the LCO.

5. Given the following conditions:

- Unit 2 is operating at 60% power
- A valid reactor scram signal occurs on high drywell pressure

Which of the following failures would PREVENT the Backup Scram Valves from venting the scram air header?

a. The solenoid on the upstream Backup Scram Valve (110B) does not de-energize.

b. The Alternate Rod Injection Scram Air Header Block Valves (SV 14799 & 147100) did not close on the scram.

c. Only one Reactor Protection System Trip System de-energized on the scram signal.

d. The check valve (111) bypassing the downstream Backup Scram Valve (110A) does not open.

16. Given the following conditions:

- Unit 1 is operating at 100% power
- The "B" Reactor Protection System (RPS) MG Set is out of service for extended maintenance
- One of the "A" RPS MG Set Electrical Protection Assembly (EPA) output breaker undervoltage relays has been determined to be Inoperable

Select the required actions.

a. Insert a half scram and remove the "A" RPS MG Set from service within 1 hour.

b. Restore the EPA to Operable status within 72 hours or be in Mode 3 in 12 hours and Mode 4 in 36 hours

c. Transfer the "A" RPS Bus to the alternate power supply within 72 hours.

d. Restore the EPA to Operable status within 1 hour or be in Mode 3 in 12 hours and Mode 4 in 36 hours

17. The following are the current indications on Valve Control Monitor Panel for Channel 1 of the Traversing Incore Probe (TIP) System (see attached figure) :

- Ball Valve "Closed" lights - both illuminated
- Ball Valve "Open" lights - both extinguished
- Shear Valve Monitor Lights - both illuminated
- Squib Monitor lights - both extinguished

Which of the following describes the status of TIP Channel 1's Shear Valves and primary containment integrity?

a. The TIP Shear Valves are inoperable and primary containment integrity is met.

b. The TIP Shear Valves are inoperable and primary containment integrity is not met.

c. The TIP Shear Valves are operable and primary containment integrity is met.

d. The TIP Shear Valves are operable and primary containment integrity is not met.

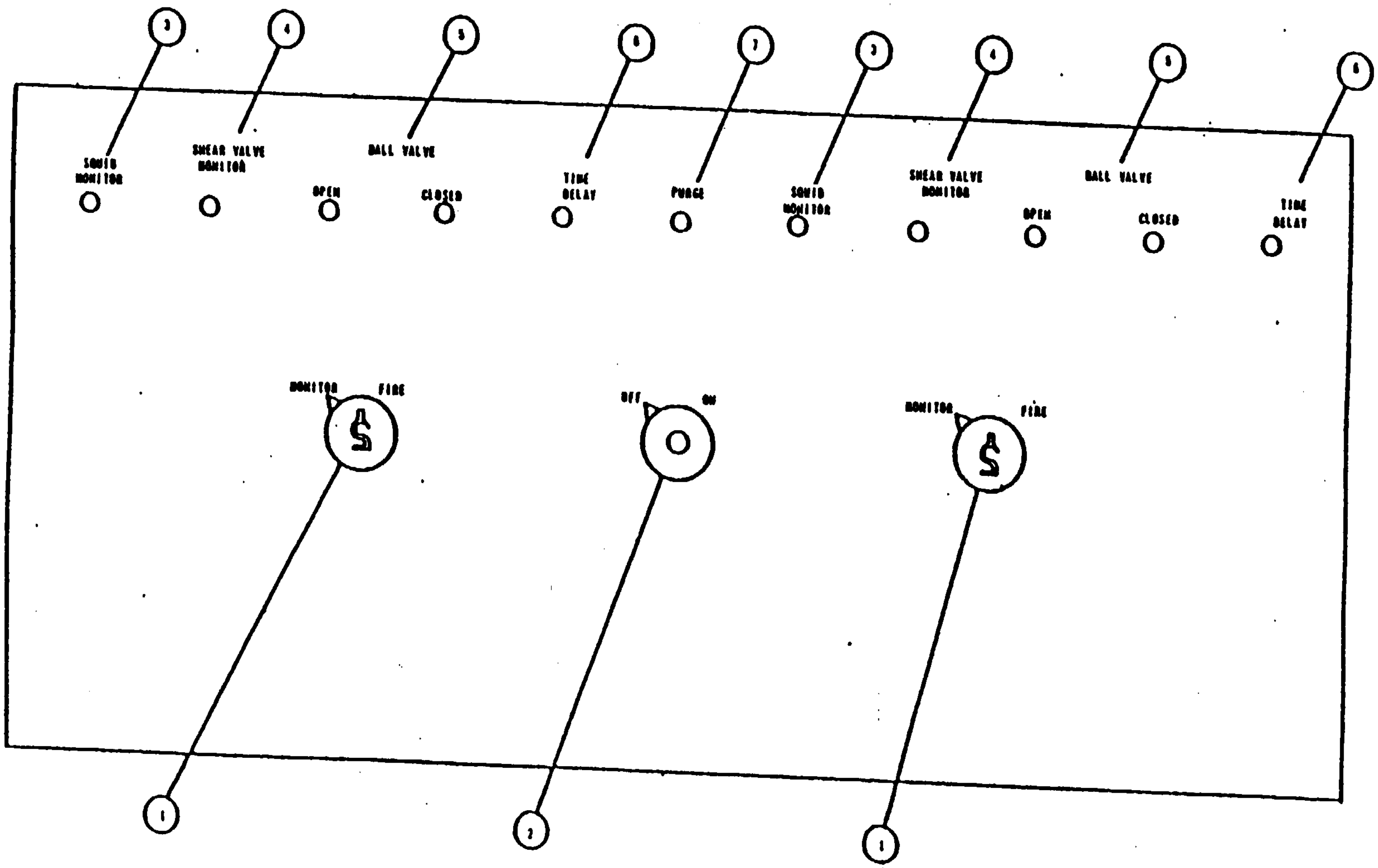


FIGURE 14
DUAL VALVE CONTROL MONITOR

18. Given the following conditions:

- Unit 2 is at 35% with power ascension in progress
- The "A" Rod Block Monitor (RBM) channel Gain Change Circuit malfunctions and does NOT provide any LPRM input signal gain adjustments
- The "B" RBM channel is bypassed with the "joystick"

How does this malfunction affect the continuing reactor startup?

a. The RBM channel would default to its low trip setpoint and generate a rod withdrawal block.

b. Local power around a withdrawing control rod may reach a higher level before any automatic protective actions occur.

c. The RBM channel would transfer to the alternate Reference APRM allowing continued rod withdrawals.

d. The local power rise during a control rod withdrawal can only be controlled by the RBM Backup Trip Unit.

19. Given the following conditions on Unit 1:

- A reactor startup is in progress with the Reactor Mode Switch in "Startup/Hot Standby"
- All Intermediate Range Monitor (IRM) channels are reading 3/125 on Range 2
- All Average Power Range Monitor (APRM) channels are reading "downscale"
- Both Rod Block Monitor (RBM) channels are reading "downscale"
- The Rod Select Clear pushbutton is illuminated
- All systems are operating as designed

Control rod withdrawals are being prevented by:

a. an RBM rod block.

b. an APRM rod block.

c. a "No Rod Selected" rod block.

d. an IRM rod block.

20. Given the following conditions:

- Unit 1 is ready to load fuel following a complete core offload (no fuel assemblies are in the core)
- Source Range Monitor (SRM) channels "A" and "C" are Inoperable
- SRM detectors "B" and "D" are fully inserted with count rates of 1.2 cps and 2 cps respectively
- The Signal-To-Noise Ratio for SRM "B" and "D" is 3:1 for both channels

Which of the following describes what is required to commence core reload under these conditions?

a. One of the Operable SRMs must be in the quadrant where core alterations are being performed and the other in an adjacent quadrant. Minimum count rate is not required to be met until 4 fuel assemblies have been installed adjacent to the SRM.

b. SRM "A" or "C" must be returned to Operability to allow core alterations to begin. Minimum count rate is not required to be met until 4 fuel assemblies have been installed adjacent to the SRM.

c. One of the Operable SRMs must be in the quadrant where core alterations are being performed and the other in an adjacent quadrant. A neutron source must be installed adjacent to the SRMs to achieve a minimum 3 cps.

d. SRM "A" or "C" must be returned to Operability and a neutron source must be installed adjacent to the SRMs to achieve a minimum 3 cps to allow core alterations to begin.

21. Given the following conditions:

- Unit 1 is operating at 100% power
- Average Power Range Monitor (APRM) Channel "C" has been bypassed with the joystick for maintenance

A Gain Adjustment for APRM "C" will be required:

a. prior to taking it out of "Bypass".

b. if it differs by more than 2% from the average of the remaining 5 APRM channels.

c. prior to exceeding a gain adjustment factor (AGAF) of 1.00.

d. if its gain adjustment factor (AGAF) is less than 0.98.

22. Given the following conditions:

- Unit 2 is performing a startup from 180 degrees F
- When the point of adding heat is reached the Unit PCO reports that one of the Wide Range Level indicators has started to lower at a slow but steady rate
- This trend continues as the plant heatup continues
- Drywell pressure and temperature are unchanged
- All other level indicators are steady
- Assume this level indicator has a dedicated reference leg

This level indicator lowering is caused by:

a. the instrument d/p cell equalizing valve leaking by.

b. instrument reference leg outgassing occurring.

c. a rise in Reactor Building ambient temperatures.

d. the instrument reference leg excess flow valve being closed.

23. Given the following conditions:

- Unit 2 is operating at 75% power
- Suppression pool water level is 23.9 feet
- Condensate Storage Tank level is 45.3 inches (13%)
- The Reactor Core Isolation Cooling (RCIC) system is in a normal standby lineup except that the Pump Suction From CST Valve (F010) has just been closed for a stroke test
- While the F010 is closed RCIC receives a valid initiation signal

Selected the expected RCIC system response to these conditions?

a. The Pump Suction From CST Valve (F010) will open allowing RCIC to start and inject normally.

b. The Pump Suction From Suppression Pool Valve (F031) will open allowing RCIC to start and inject normally.

c. RCIC will start, run up to an overspeed condition and then trip.

d. The Steam To RCIC Turbine Valve (F045) will not open due to pump low suction pressure.

24. Given the following conditions:

- Unit 2 has experienced a loss of off-site power
- The Reactor Core Isolation Cooling (RCIC) system automatically initiated as designed
- The Extra PCO has placed the RCIC Flow Controller in "Manual" to control flow at 350 gpm to maintain reactor water level
- While in these conditions a failure of the shaft driven lube oil pump results in a total loss of oil pressure (reading 0 psig)

Which of the following describes the expected response of RCIC?

a. RCIC will immediately trip on low lube oil pressure.

b. RCIC will decelerate as the governor valve strokes closed.

c. RCIC speed will remain constant until turbine bearing damage begins.

d. RCIC will accelerate and trip on overspeed.

25. Given the following conditions:

- The Automatic Depressurization System (ADS) Manual Initiation pushbuttons "A" and "C" (HS30A and HS30C) have been armed and pressed
- There is no response from the ADS safety relief valves

Which of the following electrical bus failures caused this system response?

a. A loss of 125 VDC Bus 1D624

b. A loss of 250 VDC Bus 1D652.

c. A loss of 125 VDC Bus 1D614.

d. A loss of 250 VDC Bus 1D662.

~6. Given the following conditions:

- Control Room conditions are such that an evacuation is required
- At the Remote Shutdown Panel, ALL Safety Relief Valve (SRV) Emergency Transfer Switches have been placed in "Emergency"
- Valid Automatic Depressurization System initiation signals and conditions are then received
- No Operator actions are taken

Select the expected automatic SRV response for these conditions.

a. Three SRVs will open.

b. Six SRVs will open.

c. Only the transferred SRVs will open.

d. No SRVs will open

27. Given the following conditions:

- Unit 1 is operating at 50% power
- Main Steam Isolation Valve (MSIV) stroke testing is in progress
- The Inboard MSIV in the "A" steam line did not fully stroke closed

Select the required actions.

a. Verify the "A" steam line Outboard MSIV is operable and continue plant operation indefinitely.

b. Close and deactivate the "A" steam line Outboard MSIV and continue plant operation indefinitely.

c. Close and deactivate the "A" steam line Outboard MSIV within 8 hours and commence a shutdown to be in Mode 4 in 36 hours.

d. Verify the "A" steam line Outboard MSIV is operable within 8 hours and commence a shutdown to be in Mode 4 in 36 hours.

28. Given the following conditions:

- Unit 2 is shutdown with core alterations in progress
- While a fuel bundle is being raised out of the core the "Normal Up" light illuminates and the fuel hoist stops
- The Fuel Grapple position indicator (Z) reads 20
- The expected "Normal Up" position should be 16

Which of the following describes the use of the "Hoist Override" pushbutton for these conditions?

a. Hoist Override may be used to raise the grapple only to the "Normal Up" position of 16 with Refueling SRO explicit permission.

b. With the refueling bridge over the core, the Hoist Override pushbutton is bypassed and is unavailable for use.

c. With irradiated fuel on the hoist use of the Hoist Override pushbutton is procedurally prohibited.

d. Hoist Override may be used for raising the grapple one "Z" direction increment at a time if a second licensed operator is available for concurrent position verification.

29. Given the following conditions:

- Unit 1 is performing a reactor startup and heatup
- The reactor is critical and pressure is 150 psig
- Instrument air was lost to the Outboard Main Steam Isolation Valves (MSIV) and they drifted closed
- All expected automatic actions occurred but NO operator actions were taken
- Instrument air has just been restored and the air header has repressurized

Which of the following is the expected response of the Outboard MSIVs and the reason for that response?

The MSIVs will:

a. reopen as soon as instrument air has repressurized the lines, the accumulators and the valve actuators.

b. remain closed until the control switches are placed in "Close" and the NSSSS Isolation reset push-buttons (Div I and II) are pressed.

c. reopen as soon as both of the valve pneumatic control solenoids on each MSIV are reenergized.

d. remain closed because the differential pressure across the valve will prohibit opening without equalization.

30. Given the following conditions:

- Unit 2 has experienced a closure of all Main Steam Isolation Valves from 100% power
- Reactor pressure control is via manual Safety Relief Valves (SRV) operation to maintain pressure less than 965 psig

Which of the following is a direct indication that both of the discharge line vacuum breakers on a single SRV have failed "open" for these conditions?

a. SRV tail pipe temperatures are abnormally high for current plant conditions.

b. Plant parameter limits requiring RPV Flooding may be reached sooner than anticipated.

c. The Suppression Chamber to Drywell vacuum breakers are cycling each time the SRV is opened and then closed.

d. Plant parameters may exceed the Heat Capacity Temperature Limit curve earlier than expected.

31. Which of the following describes how the main turbine is protected from overspeed conditions if the generator output breaker trips open at 30% power? (See attached figure.)

The Electro-Hydraulic Control (EHC) system:

a. load reject circuit will initiate a fast closure of the Intercept Valves.

b. power/load unbalance circuit will initiate a fast closure of the Turbine Control Valves.

c. load reject circuit will throttle the Intercept Valves closed.

d. power/load unbalance circuit will throttle the Turbine Control Valves closed.

32. During a Unit 1 startup and heatup in accordance with GO-100-002, "Plant Startup, Heatup And Power Operation", the operator is directed to maintain turbine first stage pressure less than 120 psig during shell warming.

Which of the following would be expected to occur if this value is exceeded?

a. Main turbine Exhaust Hood Spray initiates.

b. Reactor scram.

c. Main turbine overspeed trip

d. Main Steam Isolation Valve closure.

33. Given the following conditions:

- Unit 1 experienced a reactor scram from 95% power
- Reactor water level reached 0 inches
- Feedwater level control remained in "Automatic" and reactor water level currently at +5 inches and is rising
- The Unit PCO has pressed the "Level Setpoint Setdown" pushbutton (HS-C32-1S08)
- All plant systems responded as designed

Reactor water level will:

a. return to +35 inches.

b. stabilize at +5 inches.

c. rise to +13 inches

d. stabilize at +18 inches

A 400 SHT.516 REV.2 DATE 11/30/89

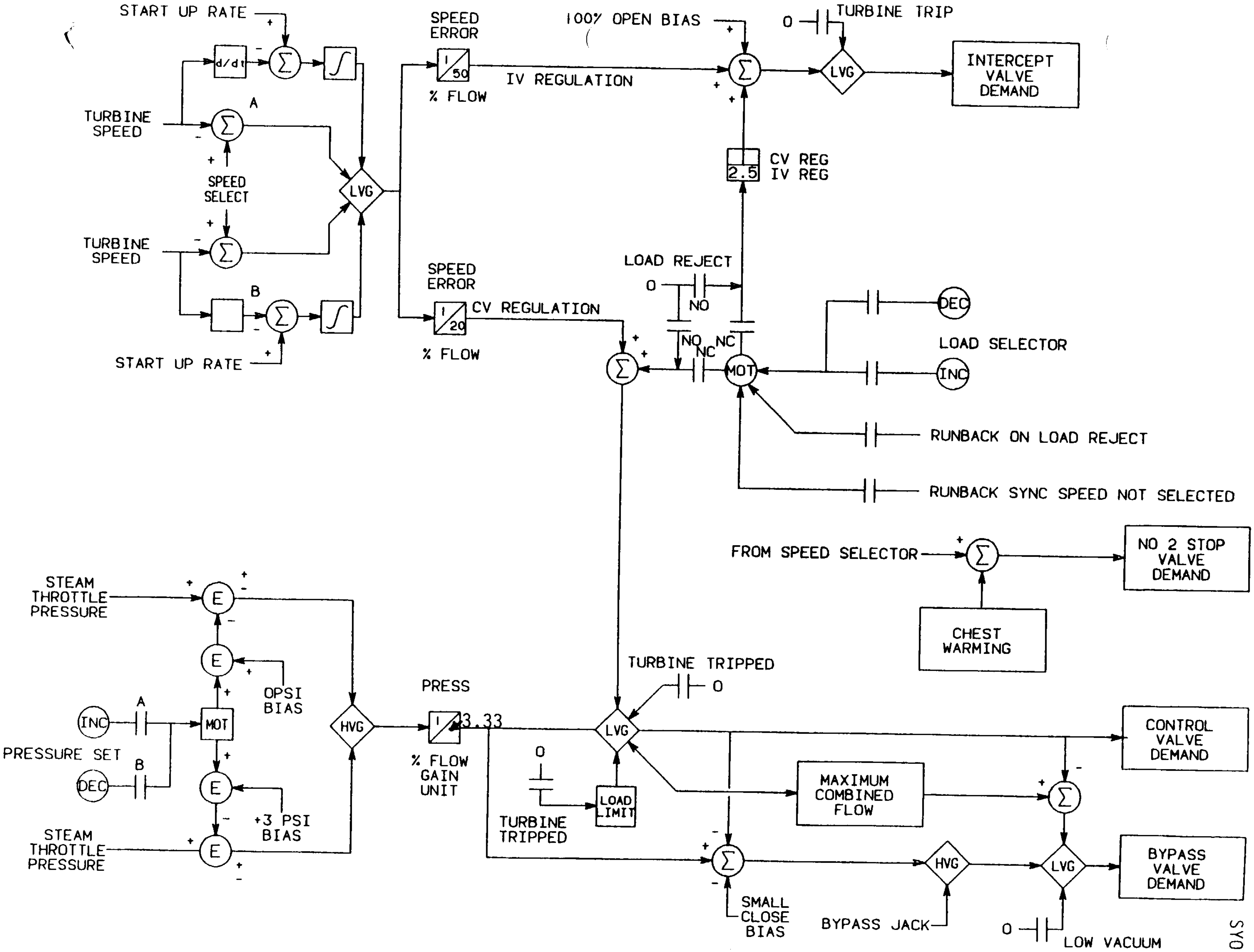


FIGURE 8
SPEED AND ACCELERATION CONTROL UNIT

SY017 A-8

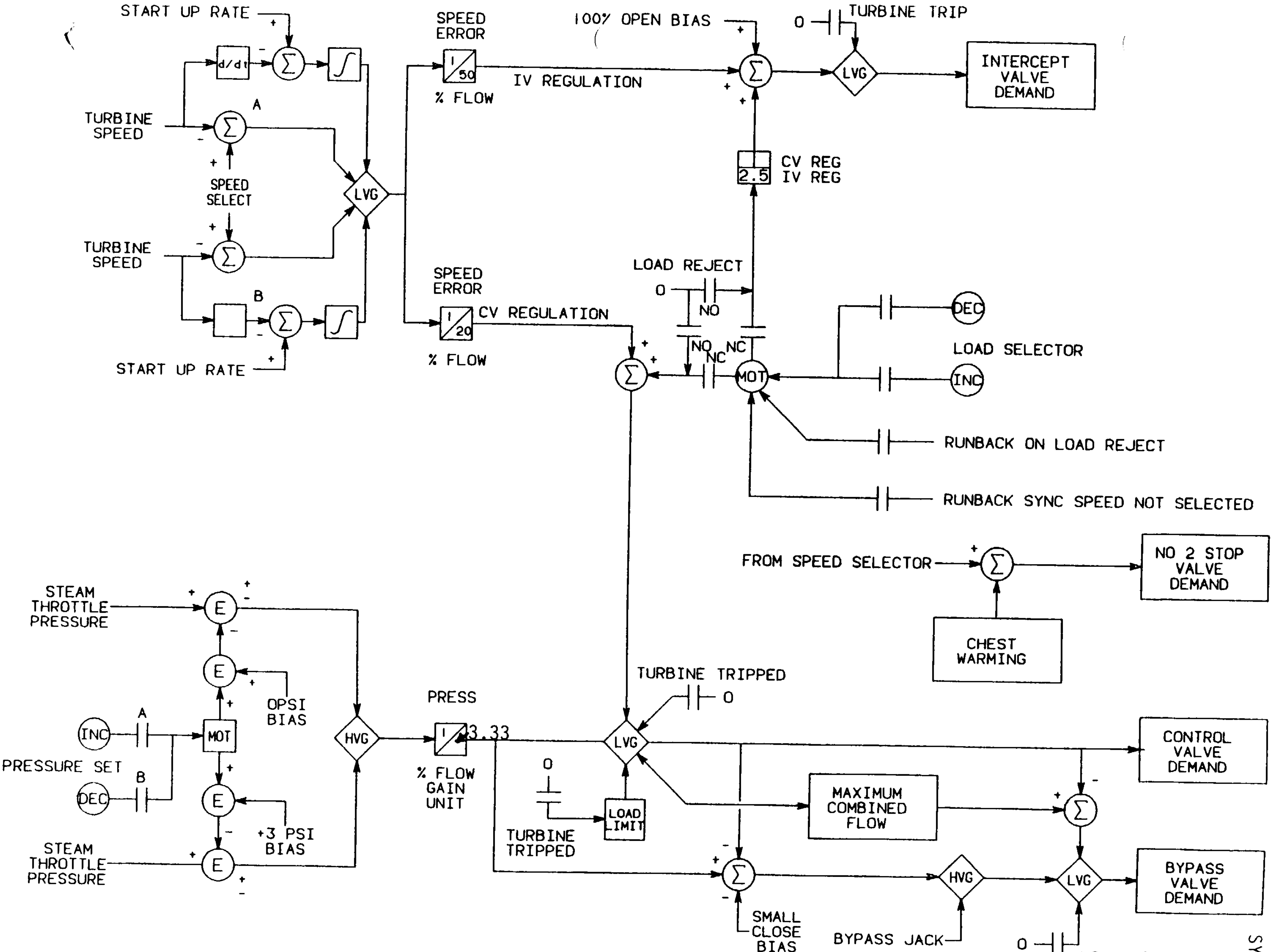


FIGURE 8
SPEED AND ACCELERATION CONTROL UNIT

A 400 SHT.516 REV.2 DATE 11/30/89

SY017 A-8

34. Given the following conditions:

- Both Units are operating at 100% power
- The Standby Gas Treatment System (SGTS) is in a normal, standby lineup
- A valid Unit 1 SGTS system initiation signal on high drywell pressure is received

Which of the following is the location from which SGTS will AUTOMATICALLY take suction for these conditions?

SGTS will begin to process the:

a. High Pressure Coolant Injection Barometric Condenser Vacuum Pump discharge.

b. drywell atmosphere via the drywell and suppression chamber purge connections.

c. discharge flow from the running Reactor Building Ventilation Exhaust Fans.

d. drywell atmosphere via the drywell vent connections.

35. Given the following conditions:

- Both Units are operating at 100% power
- All Startup Bus power sources are available
- All four Diesel Generators are available
- The Normal Source Breaker (1A201-01) to ESS Bus 1A is opened with its handswitch on Panel 0C653
- No other operator actions were taken

Which of the following describes what must occur to reenergize the ESS 1A Bus assuming all systems operate as designed?

a. The "A" Diesel Generator will start and the Emergency Source Breaker (1A201-04) will automatically close.

b. The Alternate Source Breaker (1A201-09) will automatically close.

c. The PCO will have to start the "A" Diesel Generator and close the Emergency Source Breaker (1A201-04).

d. The PCO will have to close the Alternate Source Breaker (1A201-09).

36. The Unit 1 Unit Supervisor is reviewing the following surveillance data on the 125 VDC 1D640 Battery with the Unit at 100% power:

- Maximum pilot cell specific gravity - 1.215
- Minimum pilot cell specific gravity - 1.205
- Maximum battery cell specific gravity - 1.217
- Minimum battery cell specific gravity - 1.176
- Average battery cell specific gravity - 1.208
- Electrolyte levels in all cells are within limits
- Float voltages in all cells are within limits

What is MAXIMUM permissible time Unit 1 may remain at power for these conditions?

a. 2 hours

b. 12 hours

c. 14 hours

d. 31 days

37. At the "C" Diesel Generator Local Control Panel the Control Mode Select switch has been placed in "Local".

Which of the following describes the operational status of the "C" Diesel Generator?

The "C" Diesel Generator:

a. must be manually started by the local operator on either a loss of off-site power or a LOCA signal.

b. will automatically start on a loss of off-site power but the output breaker for the associated bus will not automatically close.

c. must be manually started by the local operator and the output breaker locally closed on a loss of off-site power.

d. will automatically start in response to both a loss of off-site power and a LOCA signal but load sequencing will not occur.

38. Given the following conditions:

- Unit 2 is operating at 55% power with the "C" Main Steam Line (MSL) isolated (Inboard and Outboard MSIVs are closed)
- A fuel failure results in rising main steam line radiation levels

Which of the following describes the Main Steam Line Radiation Monitor automatic MSIV closure functions under these conditions?

a. With the "C" MSL MSIVs closed, the "C" MSL Rad Monitor signal is removed from the circuitry and the isolation logic is modified to a one-out-of-three to close the remaining 6 MSIVs.

b. The physical location of the 4 MSL Rad Monitors allows each of them to "see" all four steam lines providing for a normal MSIV closure based upon rad levels in the operating steam lines.

c. With the "C" MSL MSIVs closed, the "C" MSL Rad Monitor will have a "downscale" signal present providing one of the two required "trips" for the isolation.

d. The physical location of the 4 MSL Rad Monitors upstream of the Inboard MSIV provides for continued monitoring of the "C" MSL even though it is isolated.

39. Given the following conditions:

- Unit 1 is operating at 90% power
- The functional test of the Standby Gas Treatment (SGTS) Fire Suppression System has just been performed
- The test results were UNSATISFACTORY for both SGTS trains

How does this failure impact continued plant operation?

a. Both trains of SGTS are Inoperable. If one cannot be restored to Operable status in 4 hours, the plant must be in Mode 3 within 12 hours.

b. The secondary containment is Inoperable. If one SGTS train cannot be restored to Operable status in 4 hours, the plant must be in Mode 3 within 12 hours.

c. Both trains of SGTS remain Operable with no restrictions on plant operations.

d. A continuous fire watch is required in the area when running either SGTS train.

40. Given the following conditions on Unit 1:

- MFLPD	0.91
- MFLCPR	0.80
- Reactor power	89%
- Core flow	85%

What are the proper actions for these conditions?

a. Reduce the APRM scram setpoints by a multiple of the RTP/MFLPD ratio.

b. Initiate immediate corrective action to restore LHGR to within limits in 1 hour.

c. Reduce the APRM Gain Adjustment Factor by the ratio of MFLPD/RTP.

d. Initiate immediate corrective action to restore MCPR to within limits in 1 hour.

41. Select the specific plant conditions requiring the Unit 2 Unit Supervisor to assume full responsibility for the plant Common Systems.

a. The Unit 1 Unit Supervisor is out of the Unit 1 "At-The-Controls" area.

b. The Unit 1 Unit Supervisor has assumed the Control Room command function in the absence of the Shift Supervisor.

c. Unit 1 is in an "off-normal" condition requiring Unit Supervisor and Shift Supervisor attention.

d. Unit 1 is shutdown for a scheduled refueling and maintenance outage.

42. Unit 2 has entered LCO 3.0.3 at 1400, May 10, 1999. Preparations for Unit shut down are in progress.

What are the SSES administrative time guidelines for commencing the power reduction?

Power reduction should begin:

a. immediately.

b. not later than 1500.

c. not later than 1700.

d. not later than 1800.

43. Given the following information for a Unit 1 Technical Specification System:

- This System is Inoperable and must be restored to Operable status within 7 days
- If not returned to Operable status within 7 days, this System is required to:
  - -- Be in Mode 3 in 12 hours
    AND
  - -- Be in Mode 4 in 36 hours
- The 7 day return to Operable status requirement expired at 0300 on May 12th
- Unit 1 reached Mode 3 at 0900 May 12th

When is Unit 1 required to be in Mode 4?

a. 0300 May 13th

b. 1500 May 13th

c. 2100 May 13th

d. 0300 May 14th

44. Prior to placing the Reactor Mode Switch to "Startup/Hot Standby" during a reactor startup, the Shift Supervisor shall notify and obtain approval from the:

a. Supervisor - Reactor Engineering.

b. Operations Supervisor - Nuclear.

c. Manager - Nuclear Operations.

d. General Manager - Susquehanna.

45. During a Unit 1 evolution, a procedure must be removed from its Controlled Manual. The Operations Department Clerk is not available to provide the User Controlled copy required. The copy of the procedure was made at 1300 on May 11, 1999.

Which of the following is the maximum expiration date and time allowed for this procedure WITHOUT requiring User Controlled tracking from the Document Control Center?

a. 1900, May 11, 1999

b. 0700, May 12, 1999

c. 1300, May 12, 1999

d. 1300, May 13, 1999

'6. Given the following conditions:

- Unit 2 is operating at 85% power
- Operations is performing a check-off list on a system with manually operated valves in the drywell
- These valves do not have Control Room indications
- Assume this system is operating normally

The operator is procedurally directed to verify the position of these drywell valves by:

a. obtaining their positions as noted on the most current Status Control Log.

b. referring to the most recently completed check-off list on the system

c. verifying system parameters (flow, pressure, etc.) are as expected for the current plant conditions.

d. noting the inaccessible valves for verification on the next planned or un-planned drywell entry.

47. With Unit 1 operating at power, a status change via procedure revision has been made to the Reactor Water Cleanup (RWCU) system Checkoff List. The RWCU Reactor Bottom Head Drain Bypass Valve (144F103) component numerical identification has been changed.

How this status change is procedurally required to be tracked until the drywell is accessible allowing a new checkoff list lineup to be performed?

The RWCU checkoff list status change shall be:

a. placed on the list for completion at the next scheduled or unscheduled outage.

b. tracked in the Unit 1 Unit Supervisor Turnover Sheet.

c. documented on the most recently completed checkoff list for the system.

d. tracked in the Unit 1 LCO/TRO log.

48. Given the following information:

- Plant Systems "A" and "B" are required to support the operation of System "C"
- The completion times for restoration of these systems to Operable status are:
  - System "A" - 7 days
  - System "B" - 14 days
  - System "C" - 3 days
- System "A" became Inoperable 4 days ago at 0800
- System "B" became Inoperable today at 0800
- System "A" was restored to Operable status today at 1200

Assuming the "Maximum Out Of Service Time" criteria, when must System "B" be restored to Operable status?

At 0800:

a. 6 days from today.

b. 10 days from today.

c. 14 days from today.

d. 17 days from today.

49. Which of the following individuals has the procedural responsibility to authorize entry into a Unit 2 area with a dose rate of 750 mr/hour for investigation of abnormal equipment vibration WITHOUT a job specific RWP or specific work plan?

a. The on-shift Health Physics Foreman.

b. The Unit Supervisor.

c. The Radiological Operations Supervisor.

d. The Shift Supervisor

50. Given the following conditions:

- Unit 1 is making preparations for performing a procedure on a system in a radiation area with a 75 mr/hour dose rate
- The appropriate radiological precautions have been taken
- An HP Briefing has been completed

Using the As Low As Reasonably Achievable (ALARA) guidelines, which of the following is the PREFERRED method for completing this procedure?

a. One individual performing the procedure in the area for 70 minutes.

b. Two individuals performing the procedure in the area for 25 minutes.

c. One individual installing shielding in the area for 30 minutes then performing the procedure for 45 minutes with a reduced dose rate of 7.5 mr/hour.

d. Two individuals installing shielding in the area for 10 minutes then both performing the procedure for 25 minutes with a reduced dose rate of 7.5 mr/hour.

51. Given the following conditions:

- A General Emergency has been declared on Unit 1
- It has been determined that immediate action is required to operate specific plant equipment in order to stop an in-progress release
- The Dose Assessment Supervisor is NOT yet available to approve the Emergency Dose Authorization
- The Emergency Dose Authorization has been approved by the Emergency Director and the Rad Protection Coordinator

What is the MAXIMUM Total Effective Dose Equivalent (TEDE) radiation exposure that the Emergency Director can direct emergency personnel to receive for these conditions?

a. 2 Rem

b. 4 Rem

c. 5 Rem

d. 10 Rem

52. Given the following conditions:

- The Unit 1 Extra PCO is writing a blocking permit for a plant component in an area with a 6.5 rem/hour dose rate requiring a Health Physics escort for entry
- The component is already in the required position and has remote indication

Which of the following describes how the component blocking is accomplished for these conditions?

The Unit Supervisor will:

a. approve red tag installation directly on the component by Operations Personnel and waive the Independent Verification requirement.

b. direct Health Physics to hold the red tag and provide it as part of the Radiation Work Permit briefing to all personnel subsequently entering the area.

c. direct the red tag be installed on the knob or handle of the door to the area where the component is located.

d. approve the permit without the need for red tag installation if the Operations Lock is accounted for on the permit.

53. Due to Simplex Fire Protection sensor failure, an hourly firewatch is required in a High Radiation Area.

Which of the following describes the restrictions on these firewatch tours?

The Firewatch individual:

a. shall step into the area, make an observation and exit the area.

b. must be escorted by a Health Physics Technician.

c. shall perform a normal walkthrough inspection of the area if total dose expected to be received is less than 10 mrem.

d. may only be a Health Physics Technician.

54. An emergency on Unit 1 has occurred requiring immediate actions be taken that depart from the requirements of Technical Specifications. No actions consistent with Technical Specifications that can provide adequate equivalent protection are immediately apparent.

Which of the following identifies who is required to approve these actions and the specific conditions allowing the actions to be taken as directed in 10CFR50.54(x) & (y)?

a. The Emergency Director (Unit 1 Shift Supervisor) approves actions to be taken to protect the health and safety of the personnel outside the SSES site boundary.

b. The Emergency Director (General Manager - SSES) approves actions to be taken to protect the health and safety of the personnel outside the SSES site boundary.

c. The Emergency Director (Unit 1 Shift Supervisor) approves actions to be taken to protect the health and safety of the personnel inside the SSES site boundary.

d. The Emergency Director (General Manager - SSES) approves actions to be taken to protect the health and safety of the personnel inside the SSES site boundary.

55. What is LATEST time that the Emergency Director shall ensure that the State and Local agencies are notified of an emergency once the conditions for an Emergency Action Level (EAL) have been identified? Assume the EAL conditions were identified at 0815.

a. 0830

b. 0845

c. 0915

d. 0945

56. Given the following conditions:

- During a transient Unit 2 momentarily met the conditions requiring a Site Area Emergency
- Prior to the actual classification being made, conditions continued to change such that an Alert is now the appropriate classification

What is the guidance for the classification of this event?

The event shall be classified as:

a. a Site Area Emergency and then downgraded to an Alert after the initial Emergency Notification Report has been acknowledged by the NRC, state and local agencies.

b. an Alert, but should make note of the momentarily Site Area Emergency conditions on the Emergency Notification Report.

c. a Site Area Emergency, make the appropriate notifications and then downgrade the classification to an Alert as soon as possible with management concurrence.

d. an Alert, but should consider upgrading to the Site Area Emergency once all emergency response facilities are activated.

57. Given the following conditions:

- Unit 1 is operating at 100% power
- An Electro-Hydraulic Control (EHC) malfunction has resulted in rapidly rising reactor pressure
- Reactor pressure has reached 1100 psig

What are the EXPECTED Unit PCO actions for these conditions?

a. Initiate a manual reactor scram and inform the Unit Supervisor of the condition and the action taken.

b. Immediately lower the setpoint of the Maximum Combined Flow Limiter to reduce reactor pressure.

c. Inform the Unit Supervisor of the condition and initiate a manual reactor scram when directed.

d. Immediately reduce reactor pressure by placing the Turbine Bypass Valves in "Test" and opening them.

58. With Unit 1 performing a startup from Cold Shutdown when do the operator actions required by Technical Specifications first become applicable should a Recirculation Pump trip occur?

a. The Reactor Mode Switch has been placed in "Run".

b. The reactor is at or above criticality.

c. The Reactor Mode Switch has been placed in "Startup/Hot Standby".

d. Reactor coolant temperature is > 200 degrees F.

59. Given the following conditions:

- Unit 1 had been operating at 90% power
- The "A" Recirculation Pump tripped
- Parameter verification shows the plant operating in Region II of the Power/Flow Map

Select the desired method for exiting this region.

a. Raise flow by raising the speed of the "B" Recirculation Pump

b. Place the Reactor Mode Switch in "Shutdown" and enter ON-100-101, "Scram"

c. Raise flow by restarting the "A" Recirculation Pump.

d. Reduce power by reducing recirculation flow.

60. Given the following conditions:

- Unit 2 is operating at 22% power with power ascension in progress
- All plant systems are operating as designed
- Main condenser backpressure is 6.0" HgA and is rising
- No operator actions are taken

The reactor will scram due to:

a. a main turbine trip.

b. main steam isolation valve closure.

c. high reactor pressure.

d. low reactor water level.

61. Given the following conditions:

- A Station Blackout (SBO) has occurred
- Unit 1 Reactor water level control is via Reactor Core Isolation Cooling (RCIC)
- The Condensate Storage Tank is NOT available due to a tank rupture

Which of the following describes how RCIC operation for level control is accomplished with steadily rising suppression pool temperatures (and subsequent rising lube oil temperatures) during the SBO?

a. RCIC suction is lined up to the Refueling Water Storage Tank (RWST) for a source of cool water.

b. RCIC lube oil cooling water is supplied from the Fire Protection System.

c. All RCIC protective features and trips are bypassed by EO-100-033, "RCIC Operating Guidelines During Station Blackout".

d. RCIC will be run only as necessary to maintain reactor water level +13 to +54".

62. Given the following conditions:

- Unit 2 is performing a startup with the Reactor Mode Switch in "Startup/ Hot Standby"
- Main condenser vacuum has been established
- The Outboard Main Steam Isolation Valves have just been opened and steam line warming is in progress
- The "B" Reactor Protection System MG set has just tripped
- The alternate power supply is not available

How will this bus loss affect the plant assuming it is NOT restored as directed by ON-158-001, "Loss Of RPS"?

a. Main condenser vacuum will begin to degrade.

b. The Recirculation Pumps will immediately trip.

c. The Scram Discharge Volume will begin filling.

d. The Outboard Main Steam Isolation Valves will begin to drift closed.

63. The "D" Diesel Generator is running with its Unit 1 output breaker (1A204-04) closed following a valid start signal. 125 VDC Bus 1D644 is then deenergized.

The "D" Diesel Generator:

a. output breaker will trip and the engine may trip on overspeed.

b. will trip and the output breaker will have to be opened locally.

c. will continue running as before but all automatic protective features are Inoperable.

d. should be placed in Local Control Mode and the DC power selector transferred to the Unit 2 power supply.

64. Given the following conditions:

- Unit 1 was operating at 100% when a generator fault resulted in a main turbine trip
- The Extra PCO verified the generator and turbine trip but reports that turbine speed is 1920 rpm and is rising

Which of the following should be directed by the Unit Supervisor?

a. Place the running and standby EHC Pumps in "Stop".

b. Open the Moisture Separator Main Steam Cross-Around line drain valves.

c. Break main condenser vacuum.

d. Close the Main Steam Isolation Valves.

65. While operating in accordance with ON-100-101, "Scram", on a normal plant shutdown reactor scram, which of the following criteria is utilized to determine if EO-100-113, "Level/Power Control" entry is also required?

a. The position and number of control rods inserted.

b. The value of reactor Source Range Monitor (SRM) period after rod movement and detector insertion is complete.

c. The status of the Average Power Range Monitor (ARPM) "Downscale" lights.

d. The ability to monitor instrumentation for valid, current reactor power level.

66. Given the following conditions:

- Unit 1 has been scrammed
- A large coolant leak into the drywell is occurring
- In anticipation of rapid depressurization, all Bypass Valves have been opened
- Reactor pressure has been reduced to 175 psig
- Conditions worsen requiring entry into EO-100-112, "Rapid Depressurization"

Select the required actions for these conditions.

a. Open the 6 ADS valves and close the Bypass Valves.

b. Close the Bypass Valves and open the 6 ADS valves

c. Open the 6 ADS valves and leave the Bypass Valves open.

d. Complete the depressurization using only the Bypass Valves.

67. Given the following conditions:

- Unit 1 is operating at 100% power
- A loss of coolant accident occurs
- Reactor water level is -50 inches
- Drywell pressure is 2.4 psig
- All plant systems respond as designed

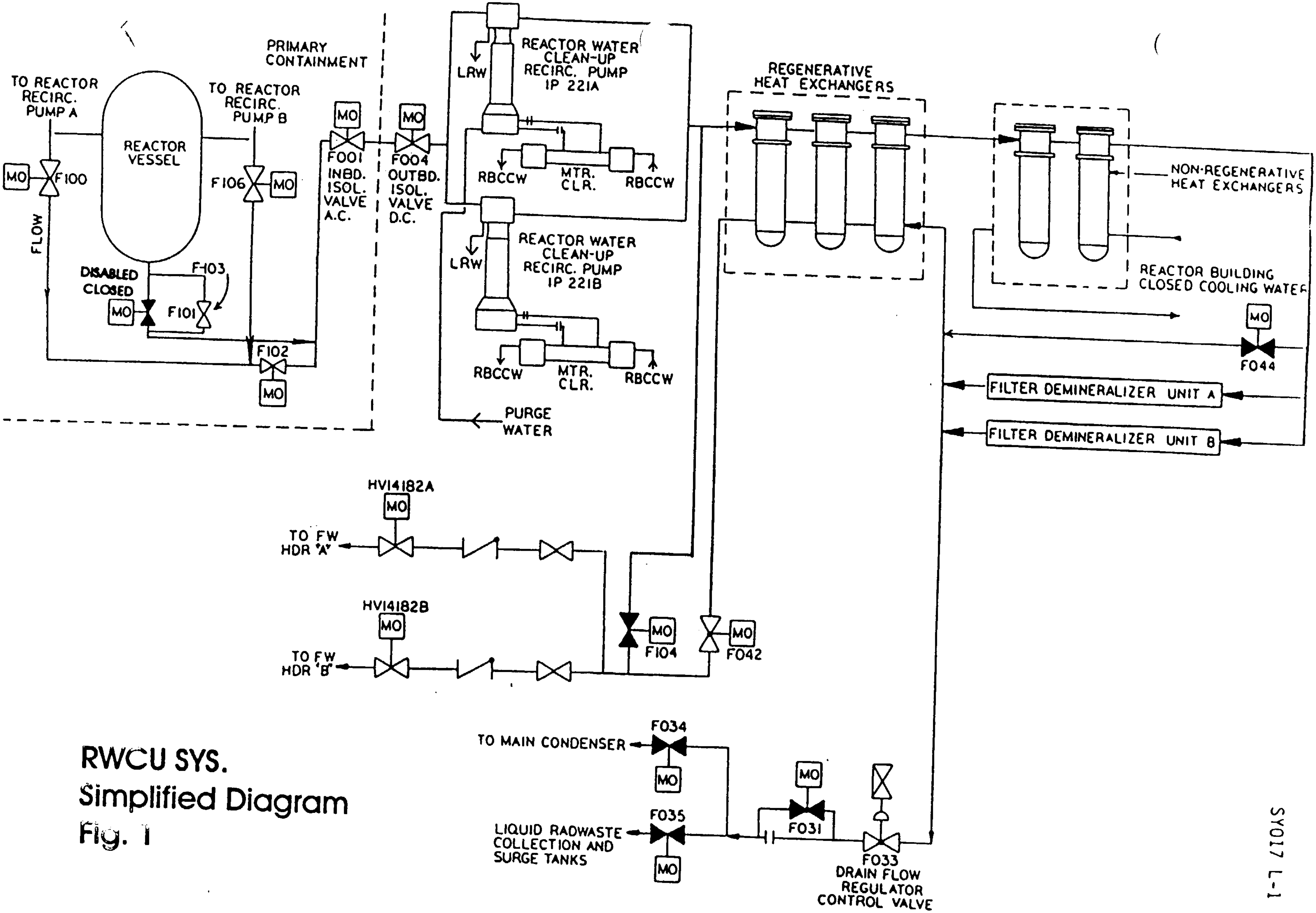
Using the attached Reactor Water Cleanup System diagram, determine the valves that REQUIRE operator action to be closed for completion of the system isolation for these plant conditions.

a. HV-144-F001 and HV-144-F004

b. HV-144-F042 and HV-144-F104

c. HV-14182A and HV-14182B

d. HV-144-F100 and HV-144-F106



RWCU SYS.
Simplified Diagram
Fig. 1

68. Given the following conditions:

- Unit 1 has performed a manual reactor scram as directed by ON-100-101, "Scram"
- The reason for scramming was a trip of both Recirculation Pumps
- The Control Rod Drive Flow Controller has been lowered to "Minimum" as directed by the ON
- The delta T between the reactor bottom head drain and the steam dome is 156 degrees F

For these conditions the operator is required to:

a. establish natural circulation flow.

b. cooldown to Mode 4.

c. start at least one Recirc Pump.

d. ensure natural circulation flow will not occur.

69. A small Recirculation loop leak exists on Unit 2.

Which of the following describes the expected pressure relationship between the drywell and suppression chamber as the leak continues and pressure rises?

Drywell pressure:

a. will rise to about 4.5 to 5.0 psi above suppression chamber, the two pressures will equalize and remain nearly equal as the leak continues.

b. will rise to about 0.5 to 1.0 psi above suppression chamber and that differential will be maintained as the leak continues.

c. and suppression chamber pressure will initially equalize and maintain that equalization as the leak continues.

d. will rise to about 4.5 to 5.0 psi above suppression chamber and that differential will be maintained as the leak continues.

70. Given the following conditions:

- A large leak into the drywell has occurred on Unit 1
- Drywell pressure is 28 psig
- Drywell sprays are being started as directed by EO-100-103, "Primary Containment Control"
- When the Inboard Drywell Spray Isolation Valve (F016) is throttled open to establish the required spray flow, the valve strokes to the full open position instead of stopping when the handswitch is released
- No additional operator actions are taken

What is the result of this failure?

a. The Residual Heat Removal Pump goes to "runout" and trips on overcurrent.

b. Possible drywell spray header damage may occur from water hammer.

c. The limits of the RHR & CS Vortex Limit curve may be exceeded damaging the pump.

d. Possible drywell damage may occur from exceeding the differential pressure limit.

71. Given the following conditions:

- Unit 1 is operating at 100% power
- Drywell temperature and pressure are rising due to a leak
- All expected automatic actions occurred as drywell pressure exceeded 1.72 psig
- EO-100-103, "Primary Containment Control", was entered for high drywell temperature
- The sections of ES-134-001, "Restoring Drywell Cooling With A LOCA Signal Present", appropriate for current plant conditions, have been completed

Which of the following describes the current drywell cooling capabilities for these conditions?

The Drywell Cooling Fans are:

a. running with Reactor Building Chilled Water supplying the coolers.

b. running with no cooling water to the coolers.

c. running with Reactor Building Closed Cooling Water supplying the coolers.

d. tripped due to the current LOCA conditions and will not be restarted until drywell spraying has been completed.

72. Given the following conditions AFTER a transient from 90% power on Unit 1:

- Reactor power (MWt) is slightly higher
- Generator megawatts (MWe) are slightly lower
- Indicated feedwater flow is greater than indicated steam flow (matched before the transient)
- Reactor water level is slightly lower

These conditions are being caused by:

a. isolation of extraction steam to one feedwater heater.

b. a stuck open Safety Relief Valve.

c. rising main condenser backpressure (degrading vacuum).

d. failure of the on-service EHC pressure regulator to a lower output.

73. Given the following conditions:

- Unit 1 has experienced a Main Steam Isolation Valve closure from 100% power
- The control rods did not insert
- EO-100-113, "Level/Power Control", has been entered
- The Safety Relief Valves have been manually opened to control pressure less than 965 psig
- Standby Liquid Control is not available

For these conditions, the Heat Capacity Temperature Limit:

a. will steadily become more restrictive.

b. will remain constant.

c. will steadily become less restrictive.

d. has been exceeded.

74. While at 90% power, Unit 1 has experienced a loss of feedwater heating resulting in a feedwater temperature drop of 55 degrees F.

Assuming no operator actions taken, what is the operational concern for these conditions?

a. Immediate core flux oscillations

b. Recirculation loop jet pump vibrations.

c. Violation of the Susquehanna Unit 1 Operating License

d. Entry into Region I of the Power/Flow Map

75. Given the following conditions:

- Unit 1 is operating at 100% power
- A complete loss of the Rod Position Indication System has occurred requiring a shutdown
- Recirculation flow has been reduced to 55 mlbm/hour and the Reactor Mode Switch placed in "Shutdown"

For these conditions, how will the Unit Supervisor (US) make the determination on whether injection of Standby Liquid Control is required?

a. Control rod position can be verified by demanding an OD-7, Option 1 printout.

b. The Unit PCO can monitor Average Power Range Monitor (APRM) power levels.

c. Control Rod position can be verified by the Rod Worth Minimizer Full Core Display screen.

d. The Unit PCO can verify a red "Scram Valves" light is received for each control rod.

76. A Control Room evacuation is required. All Immediate Operator Actions of ON-100-009, "Control Room Evacuation", were completed prior to leaving.

What will be the current means of core heat removal when the operators arrive to establish control at the Remote Shutdown Panel?

a. Recirculation flow removing core heat for dissipation via the Safety Relief Valves.

b. Natural circulation flow removing core heat for dissipation via Turbine Bypass Valves.

c. Recirculation flow removing core heat for dissipation via the Turbine Bypass Valves.

d. Natural circulation flow removing core heat for dissipation via the Safety Relief Valves.

77. Given the following conditions:

- A Unit 1 fire has resulted in the closure of all Outboard Main Steam Isolation Valves from 100% power
- High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) both automatically initiated and are injecting
- The Immediate Operator Actions of ON-100-009, "Control Room Evacuation" were completed
- All Remote Shutdown Panel (RSP) Control Transfer Switches have been placed in "Emergency"
- The RSP operator trips RCIC when reactor water level reaches +54 inches

Reactor water level will:

a. lower until RCIC automatically re-initiates at -30 inches.

b. lower until HPCI automatically re-initiates at -38 inches.

c. lower until both HPCI and RCIC automatically re-initiate.

d. continue to rise due to HPCI injection.

78. Entry into EO-100-105, "Radioactivity Release Control", and completion of the required actions will limit the activity release from:

a. the reactor coolant into the primary containment.

b. the reactor coolant into areas outside the primary and secondary containment.

c. damaged fuel directly into the reactor coolant and plant primary systems.

d. the reactor coolant into the secondary containment.

79. Given the following conditions:

- Unit 2 is operating at 100% power
- The "A" Reactor Protection System (RPS) Bus is on the alternate power supply
- The "B" RPS MG Set has just tripped

Which of the following describes the restrictions on continued plant operation for these conditions?

The plant may operate in Mode 1 for a limited amount of time based upon:

a. the availability of the Reactor Building Equipment Drain Sump Pumps.

b. the rate at which the instrument air supply to the Outboard MSIVs depressurizes.

c. the availability of the Reactor Recirculation Pumps.

d. the rate at which the Scram Discharge Volume fills.

80. Given the following conditions:

- Unit 1 is operating at 35% power
- Unit 2 Instrument Air is NOT available
- Unit 1 Instrument Air pressure is 105 psig and is slowly lowering

When is Unit 1 REQUIRED to be scrammed?

a. More than 2 control rod "drift" alarms are received.

b. Instrument Air pressure has reached 95 psig.

c. The Scram Discharge Volume high level control rod block is received.

d. The red "Scram Valves" light is received for any control rod.

81. With Unit 1 at 75% power, the Inboard Main Steam Isolation Valve (MSIV) in the "A" Main Steam Line fails closed.

Select the expected automatic plant response.

a. A half scram on "A" RPS occurs.

b. The remaining 7 MSIVs close.

c. The reactor will stabilize at a lower pressure.

d. The reactor power will stabilize at a higher power.

72. Given the following conditions:

- Unit 2 has experienced a loss of Shutdown Cooling while in Mode 3
- Primary and Secondary Containment are established
- The plant has been shutdown for 36 hours
- Reactor water level is stable at +48 inches
- Reactor pressure is being maintained 20 to 98 psig by opening Non-ADS Safety Relief Valves (SRV) as needed
- Following opening of the "B" SRV, the Extra PCO is unable to close the valve

Which of the following describes the effect of this failure to close as the reactor depressurizes?

a. SRV "Open" position indication from the Acoustic Monitor will be lost as discharge downcomer flow lowers.

b. The reactor will reach saturation temperature with a subsequent reduction in the "time-to-boiling" value.

c. Adequate core cooling will not be maintained for these conditions.

d. The SRV discharge downcomer may begin to reflood with suppression pool water.

73. Given the following conditions:

- Unit 1 is performing a reactor startup
- Reactor pressure is 825 psig
- The Reactor Mode Switch is in "Startup/Hot Standby"
- Control Rods 30-15 and 46-47 (both at Notch "00") have accumulator alarms in on low pressure and are being recharged
- The "A" Control Rod Drive Pump is not available
- The "B" Control Rod Drive Pump has just tripped and cannot be restarted
- Charging header pressure has equalized with reactor pressure

Which of the following describes the plant conditions requiring the Reactor Mode Switch be placed in "Shutdown"?

a. Charging header pressure cannot be raised to or above 940 psig within 20 minutes.

b. An accumulator alarm is received on control rod 46-43 at Notch "00".

c. An accumulator alarm is received on a currently withdrawn control rod.

d. Control rods 30-15 and 46-47 cannot be returned to Operable status within 20 minutes.

84. Given the following conditions:

- Unit 1 is in Mode 5
- The "A" Residual Heat Removal (RHR) loop is being placed in the Fuel Pool Cooling mode

Which of the following prevents draining the containment fuel pools to the suppression pool via the RHR Minimum Flow Valve (F007A) when starting the "A" RHR Pump?

a. The operator is procedurally directed to establish flow to the fuel pools before the F007A valve automatically opens.

b. F007A is manually overridden closed by the operator prior to starting the RHR pump.

c. The RHR pump is started with a complete, established flowpath to the fuel pools to prevent this.

d. The F007A automatic operation is defeated by lifting leads during the Fuel Pool Cooling mode lineup.

85. Given the following parameters:

- Drywell pressure	3.5 psig and rising
- Drywell temperature	145 degrees F and rising
- Suppression chamber pressure	4.6 psig and rising
- Suppression pool water temperature	87 degrees F and steady

Which of the following describes what has occurred?

a. A downcomer vacuum breaker has failed open during a recirculation leak to the drywell.

b. A pipe break into the drywell has occurred with a suppression chamber to drywell vacuum breaker open.

c. A safety relief valve tail pipe has broken above the suppression pool water level while the valve is open.

d. A recirculation line partial break has occurred with all containment parameters responding as designed.

Senior Reactor Operator Examination

86. Given the following conditions:

- Unit 1 was operating at 100% power
- A severe overpressure transient has resulted in the Safety Relief Valves (SRV) opening in their "Safety Valve" mode
- All valves, with the exception of one, have reseated (closed)
- The required actions of ON-183-001, "Stuck Open Safety Relief Valve" have been completed
- The reactor has been scrammed
- The SRV has NOT closed

#86 deleted. No correct ans. XYB

As the reactor cools down and depressurizes through the stuck open SRV tail pipe temperature will:

a. start at 305 degrees F and will slowly fall following reactor pressure during the depressurization.

b. start at 270 degrees F, rise to approximately 300 degrees F and then will slowly fall following reactor pressure during the depressurization below 500 psig

c. start at 525 degrees F and will slowly fall following reactor pressure during the depressurization.

d. start at 285 degrees F, rise to approximately 325 degrees F and then will slowly fall following reactor pressure during the depressurization below 500 psig

87. The Unit 1 Reactor Mode Switch was placed in "Shutdown" due to suppression pool temperature being greater than the Technical Specification limit.

Suppression pool temperature must be at or below:

a. 110 degrees F for 36 hours prior to entering Mode 3.

b. 90 degrees F within 24 hours of placing the Reactor Mode Switch in "Shutdown".

c. 110 degrees F prior to entering Mode 2 on the ensuing startup.

d. 90 degrees F prior to reaching the point of adding heat on the ensuing startup.

98. Given the following conditions:

- Unit 1 is operating at 50% power
- Suppression pool cooling is in service
- High Pressure Coolant Injection (HPCI) is operating in the CST to CST mode for a surveillance
- During the surveillance suppression pool temperature reached 96 degrees F

What are the requirements for entry into, and implementation of, EO-100-103, "Primary Containment Control", for these conditions?

a. Technical Specifications modify the Emergency Operating Procedure entry condition to 105 degrees F while surveillance testing to the suppression pool is in progress.

b. EO-100-103 actions may be deferred for 24 hours while suppression pool temperature is reduced to less than 90 degrees F.

c. The HPCI surveillance procedures allow 4 hours to reduce suppression pool temperature below 90 degrees F before EO-100-103 entry is required.

d. The actions of EO-100-103 are required to be performed as soon as suppression pool temperature is above 90 degrees F.

99. Given the following conditions:

- Unit 2 is operating at 100% power
- Drywell pressure and temperatures are rising rapidly
- High Pressure Coolant Injection (HPCI) did not start on high drywell pressure

As these conditions worsen and water level lowers following the scram, HPCI:

a. must be initiated by the operator because wide range level indication will be off-scale low.

b. will initiate late because the wide range level indication will be reading higher than actual water level.

c. will not initiate because wide range level indication will be off-scale high.

d. will initiate early because the wide range level indication will be reading lower than actual water level.

90. Which of the following describes how the operator determines if water level in the containment is above the top of active fuel while flooding the primary containment?

Top of active fuel is determined by:

a. indicated drywell pressure versus containment level correlation if the drywell is vented to atmosphere.

b. a pressure and temperature corrected reading from Wide Range Suppression Pool Level indication.

c. a level calculated from the pressure differential between the drywell and the suppression chamber.

d. direct reading from the reactor water level Fuel Zone Level indicator if the drywell is vented to atmosphere.

91. Given the following conditions on Unit 1:

- A failure-to-scram (ATWS) condition exists
- Reactor power is 22%
- Standby Liquid Control is injecting
- The Scram Discharge Volume did NOT isolate
- Suppression pool level is 15 feet and lowering
- A greater than Max Safe Water Level exists in two (2) Reactor Building areas

Which of the following are the appropriate actions for these conditions?

a. Immediately open 6 ADS Safety Relief Valves.

b. Take no action until power is less than 5% or all rods are inserted.

c. Immediately open the Turbine Bypass Valves.

d. Take no action until suppression pool reaches 12 feet.

92. Given the following conditions:

- Reactor Core Isolation Cooling (RCIC) is providing injection to the reactor
- Reactor pressure is 455 psig and lowering
- Suppression pool water level is 16 feet and lowering
- Suppression pool temperature is 155 degrees F and rising
- The plant is operating in accordance with EO-100-103, "Primary Containment Control"

Which of the following is the expected result with RCIC continuing to run under these conditions?

a. The Heat Capacity Temperature Limit will be exceeded.

b. RCIC will trip.

c. Suppression chamber design pressure will be exceeded.

d. RCIC will cavitate.

93. Conditions on Unit 1 are such that EO-100-102, "RPV Control", requires steam cooling.

If the coolant inventory remaining in the reactor vessel is the source of steam for steam cooling, which of the following describes why water level must reach -205 inches before initiating steam cooling?

a. The reduced level ensures the uncovered fuel will be hot enough to provide a large differential temperature between it and the steam being generated allowing maximum heat removal.

b. Core temperatures will lower, allowing additional time for restoration of an injection source before the rapid depressurization is required.

c. Allowing level to lower will reduce the reactor core differential pressure assisting the thermal driving head for natural circulation flow.

d. This level ensures the initial swell upon depressurization will sweep enough coolant past the fuel to break up the boundary layer maximizing heat transfer.

94. While operating in EO-100-104/EO-200-104, "Secondary Containment Control", the Max Safe Temperatures for the HPCI Equipment Areas are different between Unit 1 (300 degrees F) and Unit 2 (240 degrees F).

Which of the following describes the reason for this difference and how that difference will affect operation in Secondary Containment Control?

a. The Unit 2 HPCI Room room coolers are arranged differently and can be provided with cooling from both DX Units. This additional cooling capacity allows lower EO-200-104 temperature limits.

b. The Unit 2 safe shutdown analysis for HPCI equipment operability concerns during loss of off-site power was more restrictive than that done on Unit 1. Thus, EO-200-104 requires action earlier than EO-100-104.

c. On Unit 2, temperature instrumentation location for RCIC and HPCI is such that the rooms are considered one "area" for EO-200-104 purposes. Therefore, the more restrictive RCIC Max Safe Temperature is limiting.

d. Post loss of off-site power natural ventilation flow has more heat removal capabilities in the Unit 2 Reactor Building as opposed to Unit 1. Additional equipment operability analysis allows a higher temperature in EO-100-104.

5. With Unit 1 at power an EO-100-104, "Secondary Containment Control", entry condition has been received.

Which of the following EO-100-104 directed actions will NOT reduce any current and future Off-Site doses for these conditions?

a. "Go to RPV Control" - Step SC/R-5

b. "Rapid Depress is required" - Step SC/R-6

c. "Restart RB HVAC" - Step SC-3

d. "Isolate all systems discharging into area" - Step SC/R-1

96. Given the following conditions:

- A confirmed fuel failure has occurred on Unit 1 resulting in a Main Steam Isolation Valve closure
- The HPCI Equipment Area high water level alarm was received just after the Safety Relief Valves opened on the scram
- Suppression pool water level is lowering
- The Reactor Building general area radiation levels are 7.5 rem/hour

Which of the following describes how the water level in the HPCI Equipment Area should be determined in order to take the actions as required in EO-100-104, "Secondary Containment Control"?

a. Assume the water level in the HPCI Equipment Area is above Max Safe Water Level.

b. Calculate the suppression pool water level loss rate and assume it is all going to the HPCI Equipment Area.

c. Obtain a dose extension authorization and attempt a direct observation of HPCI Equipment Area water level.

d. Calculate the Reactor Building Floor Drain Sump Pump run times and extrapolate that value to a HPCI Equipment Area water level.

97. Given the following conditions:

- Unit 1 had a main turbine trip from 95% power
- 125 control rods did NOT insert on the scram
- High Pressure Coolant Injection is not available
- The Unit Supervisor determined that reactor water level could not be maintained > -161" and directed a Rapid Depressurization
- All injection to the reactor (except CRD, SLC and RCIC) has been stopped and prevented

The Unit Supervisor shall direct restarting injection flow to the reactor when:

a. reactor power is less than 5%.

b. reactor water level is -205 inches.

c. reactor pressure is less than 152 psig.

d. 6 ADS Safety Relief Valves have been confirmed open.

98. While operating in accordance with EO-100-113, "Level/Power Control", the operator is directed to lower level to between -60 and -110 inches (Step LQ/L-6) utilizing Table 15 systems.

Which of the following describes why the Low Pressure Coolant Injection (LPCI) mode of Residual Heat Removal (RHR) system is the LEAST preferred Table 15 system for accomplishing this step?

a. Utilizing the other Table 15 systems first maintains RHR available for containment and/or suppression pool problems during the ATWS.
b. The LPCI injection flowpath receives minimal preheating and its use may result in power/flow instabilities as level is lowered.
c. The relatively low RHR Pump shutoff head limits the systems' ability to inject during an high power/pressure ATWS.
d. The high RHR Pump flow rates may result in sweeping any injected boron out of the core resulting in a power rise as level is lowered.

99. EO-100-105, "Radioactivity Release Control", directs isolation of all primary systems discharging into areas outside Primary Containment or Reactor Building except those systems required to support EOP/DSP actions.

These systems are specifically exempted from isolation because:

a. additional off-site releases from them are unlikely.
b. they are required to support alternate reactor depressurization methods.
c. their isolation may result in larger, uncontrolled releases as the transient continues.
d. these additional isolations would require an unnecessarily escalation of the emergency classification.

100. Unit 1 is operating in accordance with ON-113-001, "Response To Fire".

Select the specific conditions that direct the Unit Supervisor to EXIT ON-113-001 even with a fire still burning.

a. The fire is affecting Unit equipment required to reach and maintain "safe shutdown".
b. The Fire Brigade Leader has determined that off-site fire fighting assistance is required.
c. Any Emergency Operating Procedure entry condition is met.
d. ON-100-009, "Control Room Evacuation", entry is required.

Senior Reactor Operator Answer Key

1. b
2. b
3. c
4. c
5. c
6. b
7. ~~d~~ b TEB
8. a
9. a
10. c
11. a
12. c
13. a
14. b
15. c
16. b
17. a
18. b
19. d
20. a
21. d
22. d
23. a
24. d
25. c
26. b
27. b
28. c
29. a
30. b
31. a
32. b
33. d
34. a
35. b
36. c
37. a
38. b
39. c
40. a
41. d
42. c
43. b
44. d
45. c
46. c
47. b
48. a
49. d
50. d

Changes based on a review of licensee's comments following the exam.

Tony E. Briggs
Chief Examiner

Senior Reactor Operator Answer Key

51. b
52. c
53. a or b. YEB
54. a
55. b or a. YEB
56. c
57. a
58. c
59. a
60. d
61. b
62. a
63. ~~c~~ b. YEB
64. d
65. a
66. c
67. c
68. d
69. d
70. d
71. b
72. b
73. a
74. c
75. b
76. d or a. YEB
77. b
78. b
79. c
80. a
81. d
82. d
83. c
84. d
85. c
~~86. d~~ deleted YEB
87. d or C YEB
88. d
89. b
90. a
91. a
92. b
93. a
94. c
95. c
96. a
97. d
98. b
99. c
00. d