

SIMULATOR

EXAMINATION SCENARIO GUIDE

SCENARIO TITLE: NRC EXAM SCENARIO

SCENARIO NUMBER: 1

EFFECTIVE DATE:

EXPECTED DURATION: 1 Hour

REVISION NUMBER:

PROGRAM: L.O. REQUAL

INITIAL LICENSE

OTHER _____

REVISION SUMMARY:

I. OBJECTIVE(S):

Enabling Objectives

- A. The crew must demonstrate the ability to operate effectively as a team while completing a series of CREW CRITICAL TASKS, which measure the crew's ability to safely operate the plant during normal, abnormal, and emergency plant conditions. (Crew critical tasks within this examination scenario guide are identified with an “*.”)

II. MAJOR EVENTS:

- A. Alternate RACS pumps
- B. Reactor Building isolation
- C. Loss of station power transformer T-4 and 10A110
- D. Recirculation pump high vibrations and subsequent trip
- E. LOCA with Loss of Feedwater
- F. HPCI auto start failure

III. SCENARIO SUMMARY:

The scenario begins at 70% Rx power with a Reactor startup in progress. RCIC is unavailable due a system maintenance outage. After alternating RACS pumps, a spurious isolation of RBVS occurs (HD-9414 B closure) requiring FRVS to be placed in service to maintain/restore Rx building ΔP . Shortly after reactor building ΔP is restored, station power transformer T-4 and 7.2KV bus 10A110 trip and lockout resulting in a loss of the "A" RR pump and other 7.2KV loads. After conditions have stabilized, high vibrations on the "B" RR pump occur requiring the crew to secure the pump and initiate a manual Rx scram. If the crew delays in securing the 'B' Recirc pump the high vibration condition will cause the pump to trip. When the scram is initiated, a small LOCA occurs coincident with a trip of the "B" and "C" primary condensate pumps. HPCI fails to auto initiate at 1.68 psig and must be manually initiated to provide sufficient makeup capacity to maintain RPV water level above -190".

The scenario may be terminated when the crew has stabilized RPV water level, and containment parameters are improving.

IV. INITIAL CONDITIONS:

INITIAL IC:

___ Initialize the simulator to 74% power IC; MOL, 100% rod line

___ Insert Groups 10A and 10C to 00.

___ Place Recirculation pumps in Master Manual

___ Raise power to approximately 70%(736 Mwe), and ensure PCP runback unarmed.

PREP FOR TRAINING: (i.e., computer set points, procedures, bevel covers)

Initial	Description
___	1. Mark up HC.OP-IO.ZZ-0003 is complete through step 5.4.20, and step 5.4.22.
___	2. WCD for RCIC system outage. Close RCIC CST suction and secure RCIC Jockey pump.
___	3. COMPLETE Attachment 2 "Simulator Ready-for-Training/Examination Checklist" of NC.TQ-DG.ZZ-0002(Z).

EVENT TRIGGERS:

Initial	Description
___	1. EVENT ACTION: et_array(2) >= 1 && rrlwr <= 12.5 COMMAND: PURPOSE:
___	2. EVENT ACTION: zcrpsudn COMMAND: PURPOSE:

MALFUNCTION SUMMARY:

Initial	Description	Delay	Ramp	Remote/Event	Initial	Final
___	1. HP01 HPCI System Auto Start Failure			Preinsert		
___	2. ED02T4 T4 Station Power Transformer Failure			3/None		
___	3. ED03 loss of 7.2kv bus 10A110			3/None		
___	4. RR26B Recirc Pump B high vibrations	300		3/None		
___	5. RR13B Recirc pump BP201 motor bearing failure			4/None		
___	6. FW01B Primary Condensate Pump B Trip			None/1		
___	7. FW01C Primary Condensate Pump C Trip			None/1		
___	8. RR31A2 Variable LOCA	60		None/1		3
___	9.					

REMOTE/FIELD FUNCTION SUMMARY:

Initial	Description	Delay	Ramp	Remote/Event	Initial	Final
___ 1.	ET015 RCIC INBRD STEAM ISO F007			Preinsert		Rack Close
___ 2.	ET016 RCIC INBRD STEAM BYP ISO F076			Preinsert		Rack Close
___ 3.	ET017 RCIC OUTBRD STEAM ISO F008			Preinsert		Rack Close
___ 4.	RC12 HV-F059 Steam Exhaust Isol Vlv			Preinsert		TAGGED
___ 5.	HV01 Reactor Building Exhaust Fan 'A' Hand Switch			2/None		STOP
___ 6.	HV02 Reactor Building Exhaust Fan 'B' Hand Switch			2/None		STOP
___ 7.	HV03 Reactor Building Exhaust Fan 'C' Hand Switch			2/None		STOP
___ 8.	HV04 Reactor Building Supply Fan 'A' Hand Switch			2/None		STOP
___ 9.	HV05 Reactor Building Supply Fan 'B' Hand Switch			2/None		STOP
___ 10.	HV06 Reactor Building Supply Fan 'C' Hand Switch			2/None		STOP

I/O OVERRIDE SUMMARY:

Initial	Description	Delay	Ramp	Remote/Event	Initial	Final
___ 1.	1A175 E OVDI HD-9414B open-outbd exh-RB	60		1/None		OFF
___ 2.	1A175 F OVDI HD-9414B close-outbd exh-RB	60		1/None		ON
___ 3.	9S12 A OVLO HV-F012 overload power/fail			Preinsert		ON
___ 4.	9S13 B OVLO HV-F012 open indicator			Preinsert		OFF
___ 5.	9S36 A OVLO AP-HV-F010 overload power/fail			Preinsert		ON
___ 6.	9S37 B OVLO AP-HV-F010 closed indication			Preinsert		OFF
___ 7.	9DS32 B OP219 PUMP stopped indication			Preinsert		OFF
___ 8.	9S27 A OP220 PUMP overload power/fail			Preinsert		ON
___ 9.	9DS31 B OP220 PUMP stopped indication			Preinsert		OFF
___ 10.	9S50 A OVDI BP228 OVLD/PWR FAIL			Preinsert		ON
___ 11.	9S30 B OVDI OP219 STOP			Preinsert		OFF
___ 12.	9S29 A OVLO OP219 OVLD/PWR FAIL			Preinsert		ON
___ 13.	9S13 C OVLO HV-F012 OPEN			Preinsert		OFF
___ 14.	9S43 B OVLO HV-F031 CLOSED			Preinsert		OFF
___ 15.	9S42 B OVLO HV-F031 OPF			Preinsert		ON
___ 16.	9DS39 B BP228 STOPPED			Preinsert		OFF
___ 17.	9DS33 B HV-F059 CLOSED			Preinsert		OFF
___ 18.	9S31 A HV-F059 overload power/fail			Preinsert		ON
___ 19.	9DS26 B HV-F025 CLOSED			Preinsert		OFF
___ 20.	9DS27 B HV-F026 CLOSED			Preinsert		OFF

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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1. Alternate RACS pumps:

NOTE: Report as EO, RACS Pump C normal on start.

- CRS directs alternating RACS pumps to A and B pumps in service in accordance with HC.OP-SO.ED-0001.
- PO transfers RACS pumps in accordance with CRS directions by:
 - Ensures that RACS PMP 1AP209 BKR 52-41011 CLOSED is on. (10C650E)
 - Presses the REACTOR AUXILIARIES COOLING PUMP A START PB (10C651A), and observes that START comes on.
 - Observes AI-6460 REACTOR AUXILIARIES COOLING PUMP A MOT AMPS settles at < 180 amps and is approximately the same as the other I/S RACS pumps' motor amps.

2. Reactor Building Isolation:

Insert RT-1 shortly after the transfer of RACS pumps is complete, or at the discretion of the Lead Examiner. This will activate the Rx Bldg isolation one min. later.

- Crew recognizes RBVS problem
 - OHA E6-C5 and E1-F5
 - CRIDS digital alarms:
D3960 RBVS EXH RMT PNL C382
D3961 RBVS SPLY RMT PNL C382
B7164 RX BLDG DIFF PRESS
and informs CRS.
- Crew recognizes loss of RBVS via Rx bldg ΔP decreasing on SPDS and informs CRS.

Event / Instructor Activity	Expected Plant/Student Response	Comments
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Report as EO after an appropriate time delay that low flow alarms are present for all RBVS fans. **Report** that all RBVS fans have tripped. **ACKNOWLEDGE E6-C5**, using Remote Function.
If dispatched, **report as RBEO** report that damper HD-9414B is shut and there are no indications of any problems.

If requested as **RBEO**, **secure** RBVS by inserting **RT-2**

NOTE:

Tech Spec 3.6.5.1 may not be referenced if Rx bldg ΔP is maintained/restored negative.

- CRS directs actions in accordance with AB.CONT-003:
 - Verify dampers HD-9414A/B and HD-9370A/B are open.
- PO determines that HD9414B is closed and informs the CRS.
- RO/PO dispatches EO to investigate problem with RBVS.
- RO/PO dispatches RBEO to check damper HD-9414B and FRVS ready for start.
- CRS directs FRVS placed in service IAW AB-CONT-003.
- RO/PO places FRVS in service in accordance with CRS direction to maintain Rx bldg ΔP .
 - Start 1 FRVS Vent Fan
 - Remove the Reactor Building Ventilation System from service
 - Closes the following dampers
 - ◆ HD9370A
 - ◆ HD9414A
 - ◆ HD9370B
 - Start 4 FRVS Recirculation Fans
- OS/CRS evaluates Tech Specs Sections 3.6.5.1 & 3.6.5.2 for applicability; determines 3.6.5.1 and 3.6.5.2 are applicable.
- CRS directs actions to investigate cause of damper HD-9414B closure.

Event / Instructor Activity	Expected Plant/Student Response	Comments
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If I&C is dispatched, Report as I&C that there is a logic trip output to damper HD-9414B and it will take a few hours to investigate. Inform the CRS a troubleshooting plan will be developed and submitted before work is commenced.

- RO/PO dispatches maintenance personnel to determine cause of damper HD-9414B closure IAW CRS direction.

3. Loss of Station Power Transformer T4 and 7.2KV Bus 10A110:
 Insert RT-3 after an FRVS Vent Fan is placed in service, or at the Lead Examiner's.

- Crew recognizes electrical malfunctions:
 - OHA E3-A1, E3-A2, E3-B1, and E3-C1 I
 - Informs CRS of loss of 10A110 and transfer of all other applicable loads to 1BX501, 1BX502, and 1BX503.

- RO/PO recognizes/reports loss of the following to the CRS:
 - TB chiller AK111
 - Air compressor 10K107
 - A PCP
 - A SCP
 - A RR pump and MG set
- CRS implements:
 - AB.RPV-002, conditions A or B, and C
 - AB.RPV-003 condition A

As yard operator report lockout on station power transformer T-4. If dispatched, report as TBEO 10A110 differential current lockout is tripped.

- RO/PO dispatches yard operator to investigate switchgear, switchyard/ transformer problems IAW CRS direction.

Event / Instructor Activity	Expected Plant/Student Response	Comments
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- CRS directs actions IAW AB.RPV-003:
 - Insert Control Rods to clear APRM Upscale Alarms.
 - Ensure that the Recirc MG Drive Motor Breaker has TRIPPED for the tripped Pump
 - Close HV-F031A for approximately 5 minutes, and then re-open.
 - Implement the following:
 - ◆ DL.ZZ-0026 Att. 3n (as required)
 - ◆ DL.ZZ-0026 Att. 3v
 - Direct the Reactor Engineer to develop a Rod Sequence to achieve an 80% Rod Line
 - Implement IO-6 requirements for Single Loop operations.
- RO inserts control rods per CRS directions.
- RO/PO shuts discharge valve for "A" RR pump IAW CRS direction.
- CRS implements:
 - AB.COMP-001
 - AB.RPV-002, AB.RPV-003, AB.RPV-004
- Crew determines loss of normal Instrument Air compressors:
 - OHA A2-A1, and A2-A2
 - Lowering IA pressure CRIDS
- CRS directs PO to start the Standby or Emergency Instrument Air Compressor in accordance with HC.OP-AB.ZZ-0001.
- PO starts the Standby or EAIC in accordance with CRS instructions.

Event / Instructor Activity	Expected Plant/Student Response	Comments
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NOTE: Operation will stabilize inside the EXIT region.

NOTE: If control rods are inserted so that operation is below the 70% rod line, the crew may reduce the speed of the operating Recirculation Pump in an attempt to lower vibration levels.

- Crew evaluates Rx power and flow, determines operation is currently in the exit region, and monitors for power to flow oscillations.
- Crew monitors for power oscillations.
- CRS directs actions to exit the EXIT region by:
 - Inserting Control Rods, or
 - Raising Recirculation flow
- RO inserts Control Rods per Reverse order of the pull sheet or the Stuff Sheet, and CRS directions in order to clear APRM Upscale alarms and/or to exit the EXIT region.
- Crew ensures proper operation of the Service and Instrument Air system to maintain air pressures.
- Crew ensures that Feedwater system maintains RPV level 12.5"-54"
- Crew makes preparation to enter Single loop operations IAW HC.OP-IO.ZZ-0006.

Event / Instructor Activity	Expected Plant/Student Response	Comments
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4. Recirculation pump high vibrations and subsequent trip:

RR Pump B will develop high vibrations after the loss of 10A110. If crew delays in securing the RR pump, after 3 minutes of operating at the Danger Level (or at the discretion of the Lead Examiner) trip the pump by inserting RT-3.

A2604 – 11 Mils

A2603 – 21 mils

- Crew recognizes rising vibrations on "B" RR pump:
 - CRIDS Display 85, and/or
 - OHA C1-E4 and informs CRS.

must allow time for power reduction first

Note: Lower Recirculation flow may cause intentional entry into the SCRAM region.

NOTE: The crew may scram before tripping the RR pump. That will satisfy this Critical Task.

- CRS directs actions IAW HC.OP-AR.ZZ-0008:
 - If Danger Level is reached, remove the RR pump from service
- CRS directs actions to scram and trip RR B
- * CREW manually scrams the Rx within 60 seconds following trip of both RR pumps.
(K/A 202001 A2.04 3.7/3.8)
(K/A 212000 A4.01 4.6/4.6)
- RO places the Rx mode switch in shutdown and takes actions IAW AB.ZZ-0001:
- RO performs the following IAW AB.ZZ-0001:
 - Announces, "Crew - Standby for Scram Report".
 - Locks the Mode Switch in Shutdown.

Event / Instructor Activity	Expected Plant/Student Response	Comments
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- Announces the following:
 - ◆ Rod Motion status
 - ◆ APRM Downscale status
 - ◆ Reactor Shutdown status
- WHEN the above actions are complete, then announces "Scram Report Complete".
- Inserts the SRM/IRM's
- Selects IRM chart recorders.
- When Main Generator output reaches zero Mwe, then trips the Main Turbine.
- Locks Out the Main Generator
- Ensures the Reactor Scram has been announced (over PA)
- Reports "All Scram Actions Complete"
- RO determines the Rx is shutdown by verifying all control rods are fully inserted and informs CRS
- CRS enters and directs HC.OP-EO.ZZ-0101, RPV Control, to restore and maintain Rx parameters.

5. LOCA with Loss of Feedwater:
 Verify ET-2 becomes active when RPV water level shrinks to <12.5" following the scram.

- CREW recognizes increasing DRWL pressure:
 - OHA A7-E4
 - SPDS indication and informs CRS.
- RO/PO determines RPV level, pressure and containment parameters and informs the CRS.

Event / Instructor Activity	Expected Plant/Student Response	Comments
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- Crew recognizes DRWL pressure at 1.68# :
 - OHA A7-D4, C5-B5, and LOCA initiation signals and informs CRS.
- CRS enters and directs HC.OP-EO.ZZ-0102, Containment Control, to control containment parameters.
- PO verifies the RHR and CS pumps auto-start.
- RO/PO verifies EDGs auto-start.
- CRS directs actions to restore:
 - Instrument gas
 - RACS
 - CRD
- RO/PO restores systems to service IAW CRS direction.
- CRS directs action to initiate supp chamber sprays.
- PO places the "A" RHR loop in supp chamber spray IAW CRS direction.
- * Crew inhibits ADS if RPV water level reaches -129".

← HPCI start also RO recognize failure

HPCI should start before here

(K/A 218000 A4.04 4.1/4.1)
 (K/A 295031 EA1.06 4.4/4.4)

6. HPCI auto start failure

- PO recognizes failure of HPCI to inject at 1.68 psig:
 - Closed indication:
 - HV-F001
 - HV-F006
 - HV-8278 and informs CRS.
- PO manually initiates HPCI to inject when directed by the CRS.

Event / Instructor Activity	Expected Plant/Student Response	Comments
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- * Before RPV water level reaches -190", crew manually initiates HPCI by opening HV-F001, HV-F006, and HV-8278 to maintain RPV water level above -190" and prevent an Emergency Depressurization.

(K/A 295031 EA1.02 4.5/4.5)

- When supp chamber pressure exceeds 9.5# and adequate core cooling is assured, CRS directs action to secure DRWL cooling and initiate one loop of DRWL spray after ensuring compliance with the Drywell Spray Initiation Limit (DSIL) and supp pool level below 125".
- PO places the "A" RHR loop in DRWL spray IAW CRS direction.
- PO prevents injection from low pressure ECCS not required to assure adequate core cooling IAW CRS direction.

Scenario Termination:

With concurrence from the Lead Examiner, the scenario may be terminated when RPV level is > 12.5" and all containment parameters are improving.

VI. SCENARIO REFERENCES:

- A. Conduct of Simulator Training.
- B. NUREG 1021, Examiner Standards
- C. JTA Listing
- D. Probabilistic Risk Assessment
- E. Technical Specifications
- F. Emergency Plan (ECG)
- G. Alarm Response Procedures (Various)
- H. Inservice and Surveillance Test procedures
- I. HC.OP-AB.COMP-0001 Instrument and/or Service Air
- J. HC.OP-AB.CONT-0003 Reactor Building
- K. HC.OP-AB.RPV-0002 Reactor Power Oscillations
- L. HC.OP-AB.RPV-0003 Recirculation System
- M. HC.OP-AB.RPV-0004 Reactor Level Control
- N. HC.OP-AB.ZZ-0001 Transient Plant Conditions
- O. HC.OP-EO.ZZ-0101 RPV Control
- P. HC.OP-EO.ZZ-0102 Primary Containment Control
- Q. HC.OP-SO.AE-0001 Feedwater System Operation
- R. SH.OP-AS.ZZ-0001 Operations Standards

VII. ESG CRITICAL TASK RATIONAL

ESG-001 / 00

1.

- * **CREW manually scrams the Rx within 60 seconds following trip of both RR pumps.**
(K/A 202001 A2.04 3.7/3.8)
(K/A 212000 A4.01 4.6/4.6)

The abnormal procedure requires a manual scram to be initiated if in Condition 1 and no RR pumps are in operation. The resulting high power and low flow conditions provide an unstable operating envelope for the Rx. The sixty-second time limit provides a reference for the "immediate" nature of the required action.

2.

- * **Before RPV water level reaches -190, Crew manually initiates HPCI by opening HV-F001, HV-F006, and HV-8278 to maintain RPV water level above -190" and prevent an Emergency Depressurization.**
(K/A 295031 EA1.02 4.5/4.5)

The HPCI system has failed to automatically initiate upon either low RPV water level or high drywell pressure. Manual initiation of the HPCI system will prevent RPV water level from reaching -190" and will therefore prevent a required emergency depressurization and subsequent transient on the RPV.

3.

- * **Crew inhibits ADS if RPV water level reaches -129".**
(K/A 218000 A4.04 4.1/4.1)
(K/A 295031 EA1.06 4.4/4.4)

Given the current operating conditions in this scenario, an automatic RPV depressurization is not warranted based upon the directions provided in the EOPs. Therefore, inhibiting ADS actuation prevents an emergency depressurization and subsequent transient on the RPV.

HOPE CREEK ESG - PRA RELATIONSHIPS EVALUATION FORM

EVENTS LEADING TO CORE DAMAGE

<u>Y/N</u>	<u>EVENT</u>	<u>Y/N</u>	<u>EVENT</u>
	TRANSIENTS:		SPECIAL INITIATORS:
	Turbine Trip		Loss of SSW
<u>X</u>	Loss of Feedwater		Loss of SACS
	MSIV Closure		Loss of RACS
	Loss of Condenser Vacuum		Loss of Instrument Air
	Inadvertent Open SRV		
	Loss Of Offsite Power		ATWS
	Station Black Out	<u>X</u>	LOCA

COMPONENT/TRAIN/SYSTEM UNAVAILABILITY THAT INCREASES CORE DAMAGE FREQUENCY

<u>Y/N</u>	<u>COMPONENT, SYSTEM, OR TRAIN</u>	<u>Y/N</u>	<u>COMPONENT, SYSTEM, OR TRAIN</u>
	HPCI		Class 1E 120VAC Bus – A Train
<u>X</u>	RCIC		Class 1E 120VAC Bus – D Train
	One SRV		EDG A
	One SSW Pump / Loop		EDG B
	Circulating Water System – 4 pumps		TACS

OPERATOR ACTIONS IMPORTANT IN PREVENTING CORE DAMAGE

<u>Y/N</u>	<u>OPERATOR ACTION</u>
	Manual RPV Emergency Depressurization when required
	Manual RPV Depressurization during ATWS
	Initiation of RHR for Decay Heat Removal
	Initiation of Containment Venting
	Restore Offsite power within 45 minutes
	SACS/SSW restoration after total loss of both systems
	Avoiding Loss of Feedwater during transient
	Recovery of the Main Condenser

Complete this evaluation form for each ESG.

Hope Creek SIMULATOR Turnover Sheet FOR TRAINING USE ONLY

Oncoming Shift: Days [X] Nights []

Op Con: 1 Rx Pwr: 70% Gen Output: 736 MWe Work Window: B Risk Color: Green

Major activities accomplished on the last shift:

- HC.OP-IO.ZZ-0003 is complete through step 5.4.22, except withdrawing control rods per RE guidance to 100% rod line
- Maintenance continuing on RCIC

Major activities scheduled for this shift:

- Place RACS Pump A in service and remove RACS Pump C from service
- Withdraw Groups 10C and 10A control rods to 100% rod line then continue raising power to 100% using RR flow @ $\leq 15\%/hr$.

Operations Superintendent Issues:	
Protected Equip	• HPCI, HPCI 250 VDC, EDG A, switchgear and logic panels
Emergent Issues	• Abnormal noise from C RACS Pump motor. Troubleshooting planned when pump is OOS.
WIN Team	•
Workarounds	•

Safety Issues: Safety Issue Hot Line Call "SAFE" (extension 7233)					
Notif/Date	Description	Immediate Mitigation	Additional Action	Assignee	Date

Active Technical Specification Action Statements:					
Number	Planned	LGO	DEFICIENCY	Exp. Date /Time	Add. Action
SIM-001	Yes	3.7.4	RCIC Turbine Maintenance	+10 days	None

Compensatory Actions in Effect (Required by CROD/CRFA for Operability)			
Number	DEFICIENCY	COMPENSATORY ACTIONS	DUE

Follow-up Operability Assessments (CRFA) Assigned			
Number	DEFICIENCY	ASSIGNED	DUE

Reactivity Controls:

- MOL, Step 1 on Sheet 77, beginning of 10C rods

Standby Safety Systems:

- RCIC C/T for Maintenance. ETR 8 hours

Balance of Plant:

- C RACS Pump abnormal noise

Restricted/Emergency Use Only Equipment:

Electrical:

Chemistry:

Cooling Water:

Computer:

Radiation Monitoring Systems:

Cold Weather Issues:

Administrative:

SIMULATOR

EXAMINATION SCENARIO GUIDE

SCENARIO TITLE: NRC EXAM SCENARIO

SCENARIO NUMBER: 2

EFFECTIVE DATE:

EXPECTED DURATION: 1 Hour

REVISION NUMBER: 00

PROGRAM: L.O. REQUAL

INITIAL LICENSE

OTHER _____

REVISION SUMMARY:

I. OBJECTIVE(S):

Enabling Objectives

- A. The crew must demonstrate the ability to operate effectively as a team while completing a series of CREW CRITICAL TASKS, which measure the crew's ability to safely operate the plant during normal, abnormal, and emergency plant conditions. (Crew critical tasks within this examination scenario guide are identified with an “*.”)

II. MAJOR EVENTS:

- A. Raise Reactor Power with Control Rods
- B. Stuck Control Rod
- C. Inerting the Containment
- D. Loss of 1A-D-482 inverter
- E. Steam leak in the steam tunnel
- F. Small break LOCA /RHR Room Flood(Failure to isolate)
- G. Emergency Depressurization/SRV Failure to open

III. SCENARIO SUMMARY:

The scenario starts with the plant at approximately 17%. The crew will withdraw Control Rods to 15% load. During the Rod withdrawal, a Rod will stick. The crew's efforts to unstick the Rod will be successful. The crew will then commence inerting the drywell.

The 1A-D-482 inverter will develop a fault resulting in TACS isolation requiring restoration, and loss of various indications. Once TACS has been restored, the plant will develop a steam leak in the steam tunnel requiring the unit to be shutdown and the crew to close the Main Steam Isolation Valves.

A LOCA will develop due to the pressure transient from closing the MSIVs. When an RHR Pump D is started, a Suppression Pool leak develops on the suction piping to the pump. Attempts to isolate the leak and to makeup will be unsuccessful, requiring an Emergency Depressurization of the RPV. An SRV will fail to open when required and the crew will be required to open an additional SRV.

The scenario will be terminated when the Reactor is depressurized and level is above -190 inches.

IV. INITIAL CONDITIONS:

INITIAL IC:

___ Initialize the simulator to IC-07; 23% power, MOC. Pull step 487

___ Insert control rods through step 481.

___ Deinert containment to >4% O2. Secure lineup, but leave H2O2 analyzer in service.

___ Ensure lineup to inert containment is up to 5.1.9 of HC.OP-SO.GS-0001.

PREP FOR TRAINING: (i.e., computer set points, procedures, bevel covers)

Initial	Description
___ 1.	Markup HC.OP-IO.ZZ-0003 to Step 5.4.13.
___ 2.	Markup HC.OP-SO.GS-0001 to Step 5.1.8.
___ 3.	Markup HC.OP-AP.ZZ-0104 Forms 1 and 2 to support inerting containment.
___ 4.	Complete Attachment 2 "Simulator Ready-for-Training/Examination Checklist."

EVENT TRIGGERS:

Initial	Description
___ 1.	EVENT ACTION: ZLRHPMR(4) COMMAND: IMF RH07D PURPOSE: Inserts flooding malfunction when RHR D pump is running
___ 2.	EVENT ACTION: ZLMS20A COMMAND: PURPOSE: CLOSED light for A MSIV
___ 3.	EVENT ACTION: LCPNEP01 >= 300 COMMAND: DMF CD031835 PURPOSE: Deletes malfunction when drive pressure is 300 psig
___ 4.	EVENT ACTION: ZDRHFOC(20) COMMAND: PURPOSE: HV-F004D Switch to CLOSE

MALFUNCTION SUMMARY:

Initial	Description	Delay	Ramp	Remote/Event	Initial	Final
___ 1.	CD031835 Control Rod 18-35 stuck			Preinsert		
___ 2.	AD02EC ADS/Relief valve F013E sticks closed			Preinsert		
___ 3.	ED09A2 Loss of 120Vac Class 1 E instr bus 1AD482			1/None		
___ 4.	MS04A Steam line A leak in tunnel		600	2/None		100
___ 5.	RH07D RHR leak via pump D suction			None/1		
___ 6.	PC06 Suppression Pool Break			None/1		10
___ 7.	RR31A2 Recirc Loop A large break		300	None/2		3
___ 8.	RR31B2 Recirc loop B large break		300	None/2		3

REMOTE/FIELD FUNCTION SUMMARY:

Initial	Description	Delay	Ramp	Remote/Event	Initial	Final
___ 1.	RH21D HV-F004 RHR pump D suction valve			None/4		TAGGED
___ 2.						

I/O OVERRIDE SUMMARY:

<i>Initial</i>	Description	Delay	Ramp	Remote/Event	Initial	Final
___ 1.						
___ 2.						
___ 3.						
___ 4.						

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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1. Raise Reactor Power with Control Rods:

- CRS directs the RO to raise Reactor power with Control Rods in accordance with RE guidance.
- RO withdraws Control Rods in accordance with HC.OP-SO.SF-0001 and CRS directions.
 - Selected rod PB comes ON (bright white)
 - CONTROL ROD POSITION FOUR ROD DISPLAY indicates the control rod position (10C650C).
 - The associated Full Core Display (white) numbered rod identification light comes ON (10C650C).
 - At the ROD SELECT MODULE, simultaneously press and hold both the WITHDRAW PB AND the CONTINUOUS WITHDRAW PB and observe the following:
 - ◆ The INSERT (white) light comes ON momentarily.
 - ◆ The WITHDRAW (white) light comes ON and the CONTINUOUS WITHDRAW (white) light comes ON.
 - ◆ CONTROL ROD POSITION FOUR ROD DISPLAY indicates control rod movement.
 - Prior to reaching the desired control rod position, simultaneously release both the WITHDRAW PB and the CONTINUOUS WITHDRAW PB and **OBSERVE** the following:

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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NOTE: LPRM downscale alarms can be expected. As RE, inform crew alarms are expected for this rod pattern.

- ◆ The WITHDRAW (white) light goes OUT.
- ◆ The SETTLE (white) light comes ON for \approx 6 seconds, then goes out.
- ◆ CONTROL ROD POSITION FOUR ROD DISPLAY indicates the control rod has settled to the desired position.
- ◆ At position 48 the applicable Full Core Display FULL OUT (red) light comes on
- Perform a control rod coupling integrity check IAW HC.OP-ST.BF-0001
- Perform the following while giving the selected Control Rod a continuous withdraw signal:
 - Observe the following as indication of the Control Rod being coupled:
 - ◆ ROD OVERTRAVEL alarm does NOT annunciate.
 - ◆ Red Full Out light illuminates on the Full Core Display.
 - ◆ RPIS indicates the Control Rod is full out (48).
 - ◆ Proper response of the Nuclear Instrumentation while withdrawing the Control Rod.
- Indicates the completion of the movement on the Pull Listing.

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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**2. Stuck Control Rod:
Preinserted.**

- RO determines that Control Rod 38-31 is stuck by observing no change in Rod motion on the 4 Rod Display or the RWM and informs the CRS.
- CRS directs actions in accordance with HC.OP-AB.IC-0001, Condition I.
- RO performs actions in accordance with CRS directions:
 - Verifies no Rod Blocks are present.
 - Attempts to operate the drive in both directions to determine the exact condition of the Control Rod.
 - Verifies drive water flow fluctuates normally.
 - Verifies proper operation of the SETTLE, INSERT, AND WITHDRAW lights.
 - Performs the following:
 - ◆ Raises the drive water pressure in approximately 50 psid increments, not to exceed 500 psid
 - ◆ Attempts to notch in OR notch out the Control Rod at the new pressure increment.
- RO observes Rod Movement as indicated on the 4 Rod Display or RWM, and notifies the CRS.
- RO returns the drive water pressure to the normal operating range (260-270 psid on A3015).

NOTE: Crew may request RE guidance. Respond that a withdraw signal then an insert signal may be attempted.

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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3. Inerting the Containment:

- CRS directs the PO to inert the containment in accordance with HC.OP-SO.GS-0001 starting at 5.1.8.
- PO commences inerting the containment in accordance with CRS directions by:
 - Opening the following valves:
 - ◆ HV-4978
 - ◆ HV-5035
 - ◆ P-KH-V9973, Liquid N₂ To Vaporizer (local)
 - ◆ GU-HD-9372A
 - ◆ HV-4958
 - ◆ HV-4952
 - ◆ HV-4950
 - Establishes communications between the Main Control Room AND an operator stationed at TI-3955
 - Log start time on Gaseous Effluent Release Permit
 - Presses the FV-4971 ON push-button.
 - Presses the FIC-4971, N₂ FLOW, AUTO push-button.
- Intermittently presses FIC-4971 N₂ RAISE SETPOINT PB to attain the desired nitrogen flow rate as indicated on FR-4971-1, N₂ FLOW (up to 150,000 scfh).
- Intermittently OPEN one of the PSV-4946A (B,C,D,E,F,G,H), Torus to Drywell Vacuum Breakers, using the TEST OPEN push-button approximately every 15 minutes.

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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4. Loss of 1AD482 Inverter:

TRIGGER RT-1 when Control Rods have been withdrawn, containment inerting is in progress, or at the Lead Examiner's discretion.

NOTE: HC.OP-AB.ZZ-0001 may be referenced also for the transfer of TACS.

- Crew identifies and communicates the loss of TACS to the CRS.
- RO/PO informs CRS that RPV power, level and pressure are stable.
- CRS orders TACS placed on the B SACS loop IAW HC.OP-AB.COOL-0002.
- PO performs HC.OP AB-COOL-0002 as directed by the CRS
- PO ensures the standby SACS pump starts.
- Ensures BOTH pairs of TACS supply and return valves on the Standby loop open to supply TACS. (HV-2522/2496)
- Ensures ALL TACS supply AND return valves on the loop that WAS supplying TACS are CLOSED. (HV-2522/2496)
- Determines that the HV-2522E and HV-2522F are closed THEN re-opens them as follows:
 - Verifies no large break has occurred in TACS by observing SACS expansion tank levels.
 - Determines that no large break in TACS has occurred, then simultaneously presses and holds the HV-2522E and/or HV-2522F OPEN PB's until the valves indicate open.

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
<p>WHEN dispatched to the 1A-D-482 as an operator, THEN REPORT the inverter output breaker CB10 is open, the AC Reg Output breaker CB302 is open and the Static Switch cabinet is de-energized.</p>	<ul style="list-style-type: none"> • Crew identifies the loss of the 1AD482 inverter <ul style="list-style-type: none"> – OHA D3-E3 120VAC UPS TROUBLE – CRIDS 	
<p>WHEN dispatched to the 1A-D-482 as maintenance, THEN REPORT there appears to be a fault in the Static Switch cabinet and you will need to inverter tagged.</p>	<ul style="list-style-type: none"> • CRS implements HC.OP-AB.ZZ-0136, Attachment 5 	
<p>NOTE: If dispatched to investigate H2 Seal Oil System, respond that alarm due to low pressure. Using Remote Function acknowledge alarm.</p>	<ul style="list-style-type: none"> • Crew recognizes loss of RWCU via OHA and trip of both RWCU pumps due to a loss of HV-F001 indication. 	
<p>Note: If dispatched to the Isophase System, alarm was due to high temperature. Using Remote Function acknowledge alarm.</p>	<ul style="list-style-type: none"> • RO/PO refers CRS to HC.OP-AB.RPV-0007 in accordance with HC.OP-AR.ZZ-0008. 	
<p>WHEN dispatched to SACS or SSW, THEN REPORT the equipment is ready for starting or post start checks are SAT.</p>	<ul style="list-style-type: none"> • CRS directs actions to be taken in accordance with HC.OP-AB.RPV-0007, Condition B. • CRS recognize Tech Specs action <ul style="list-style-type: none"> – 3.8.3.1.a.1.e and action A applies. – 3.6.3 Action a (Containment Isolations) 	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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5. Steam leak in the steam tunnel:

TRIGGER RT-2 (Steam leak in the Steam Tunnel) when the crew completes actions for the loss of 1AD482, or at the Lead Examiner's discretion.

WHEN dispatched to perform BOP-0005 actions, REPORT:

Action A.3: Steam Tunnel supply and return back draft dampers – both sets are open.

Action A.4: Place Both Steam Tunnel cooling fans in service by placing REMOTE FUNCTION HV11 and HV12 in run.

WHEN dispatched as ABEO, THEN REPORT GU-HD9395A and 9395B are closed.

- Crew recognizes Steam Tunnel temp rising:
 - A2541 Stm Tunnel Clr Inlet temp in alarm.

- CRS implements HC.OP-AB.BOP-0005, Condition A:
 - Isolate the source of the leak if known.
 - Monitor the following to determine the source of leak:
 - ◆ Main Steam Flow indication
 - ◆ Feedwater Flow indication
 - ◆ RWCU System
 - Ensure proper positioning of Steam Tunnel Supply AND Return Backdraft dampers

- CRS assigns a crewmember to monitor Steam Tunnel temperature.

- CRS implements HC.OP-AB.CONT-0004, Condition A, AND Condition C.

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
<p>NOTE:</p> <p>This alarm may not be received.</p> <p>High alarm is 2.5 mR/hr.</p> <p>The CRS may take conservation action and scram before 145 degrees.</p>	<ul style="list-style-type: none"> • Crew responds to RM-11 "High Alarm" for 9RX620 for the Tech Support Center ARM. • CRS briefs the crew on plant conditions and contingencies for a rising Main Steam Tunnel temperature. • Crew monitors HC.OP-AB.BOP-0005 Retainment Override. • CRS directs a manual Scram when Steam Tunnel temperature > 145 degrees IAW the Retainment Override. • RO takes actions to manually scram the reactor IAW HC.OP-AB.ZZ-0001. • PO takes action to control, restore and maintain RPV level with Feedwater. • CRS implements EOP-101 based on entry condition of 12.5" and directs actions to stabilize the plant. • RO performs the following IAW HC.OP-AB.ZZ-0001: <ul style="list-style-type: none"> – Announces, "Crew - Standby for Scram Report". – Locks the Mode Switch in Shutdown. – Announces the following: <ul style="list-style-type: none"> ◆ Rod Motion status ◆ APRM Downscale status ◆ Reactor Shutdown status 	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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- Inserts the SRM/IRM's
- Selects IRM chart recorders.
- When Main Generator output reaches zero Mwe, then trips the Main Turbine.
- Locks Out the Main Generator
- Ensures the Reactor Scram has been announced (over PA)
- Reports "All Scram Actions Complete"
- CRS transfers level and pressure control to RCIC and SRVs in anticipation of MSIV closure.
- RO/PO coordinate transfer of Reactor Pressure and RPV level control.
- Crew places 'B' RHR in Suppression Pool cooling to support RCIC/SRV operation.
- CRS directs closing MSIVs and drains to isolate steam leak.
- PO closes the MSIVs and drains
- The CRS directs the PO to restore and maintain RPV level / pressure with HPCI and/or RCIC and SRVs.
- CRS implements HC.OP-AB.BOP-0002, Condition A:
 - Verify the Main Turbine valves are CLOSED
 - Ensure the Motor Suction Pump and Turning Gear Oil Pump are running
 - When Main Turbine Speed <900 rpm, ensure all Main Turbine Lift Pumps running.

NOTE:

The MSIVs may automatically close on an isolation signal.

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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6. LOCA:

VERIFY ET-2 triggers a LOCA after MSIV closure, or at the discretion of the Lead Examiner.

- Crew recognizes LOCA condition:
 - RM-11 DLD monitors.
 - Rising Drywell Pressure.
 - OHA A4-F5, A7-E4, C6-C2.
- CRS directs actions for the high Drywell pressure IAW HC.OP-AB.CONT-0001.
 - Maximize Drywell Cooling by ensuring:
 - ◆ All Drywell Fan Cooling Coils are Open
 - ◆ All Drywell Fans are running in Fast Speed
 - ◆ Turbine Bldg. Chill Water system is operating properly
 - Perform the following:
 - ◆ Check Reactor Recirc. Pump Seals
 - ◆ Check SRV Tailpipe Temperatures
- PO maximizes Drywell cooling and checks proper operation of TB Chillers.
- Crew recognizes HI-HI Drywell pressure of 1.68 psig
- CRS reenters EOP-101, enters HC.OP-EO.ZZ-0102, and directs actions to mitigate the leak.
- CRS determines that drywell sprays are required based upon DRWL temperatures / pressure.

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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7. RHR Room Flood (Failure to isolate):

VERIFY ET-1 active when RHR Pump D starts.

As RBEO, two minutes after being dispatched report leak at D pump suction with approximately two inches of water on floor.

NOTE:

Role-play as the building EO to support implementation of EOP 300 level procedures.

Do NOT implement EO-315, use Remote Functions CS02 or CS04. Although, **REPORT** completion of lineup to the MCR.

NOTE:

- CREW may recognize Suppression Pool leak via decreasing Suppression Pool level indications on SPDS and annunciator A6-A5 and informs the CRS.
- CREW determines leak to be in RHR pump D room via SPDS and/or CRIDS alarms D2971 and D2939.
- RO/PO notifies RBEO to investigate cause of RHR pump room flooded alarm.
- CRS enters and directs actions of HC.OP-EO.ZZ-0103/4, Reactor Building and Rad Release to isolate the leak.
- CRS directs actions to isolate RHR Pump D suction by closing HV-F004D.
- PO attempts to close HV-F004D, observes that the OVLD/PWR FAIL illuminates, and informs the CRS.
- When Suppression Pool Level drops below 74.5 inches, CRS reenters HC.OP-EO.ZZ-0102, Primary Containment Control, and directs actions to restore suppression pool level using RCIC, Core Spray, or Service Water.
- CREW closely monitors Torus level decrease and determines

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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Once Crew determines a major failure of the Torus has occurred and level cannot be maintained, they may stop makeup efforts.

level decrease and determines that a major failure of the Torus has occurred.

- * CREW determines that Suppression Pool water level cannot be maintained above 38.5 inches and initiates an emergency depressurization in accordance with HC.OP-EO.ZZ-0202.

(K/A 295030EA2.01 4.1/4.2)

- CRS implements HC.OP-EO.ZZ-0202, Emergency RPV Depressurization, when torus level cannot be maintained above the 38.5".
- PO opens 5 ADS valves IAW CRS direction.

8. SRV Failure:

SRV E Failure to Open is Pre-inserted

- PO recognizes failure of SRV F013E to open via closed indication on 10C650C and informs CRS.
- CRS directs PO to open other SRV(s) until 5 SRVs are open.
- PO opens additional SRV per CRS instructions
- * CREW recognizes via acoustic and temperature indications that F013E, ADS SRV, has failed to open and opens an additional SRV before Suppression Pool level has been below 38.5 inches for 1 minute.

Note: This task is completed satisfactorily if Emergency Depressurization occurs before 38.5" of SPL is reached

(K/A 223001A2.11 3.6/3.8)
(K/A 218000A2.04 4.1/4.2)

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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- PO maintains/restores RPV level >-190 inches in accordance with CRS instructions.
- PO initiates Suppression Pool cooling IAW CRS direction.
-

Termination Requirements

The Scenario may be terminated when RPV level is under control, the RPV is depressurized, or at the discretion of the Lead Examiner.

VI. SCENARIO REFERENCES:

- A. Conduct of Simulator Training.
- B. NUREG 1021, Examiner Standards
- C. JTA Listing
- D. Probabilistic Risk Assessment
- E. Technical Specifications
- F. Emergency Plan (ECG)
- G. Alarm Response Procedures (Various)
- H. Inservice and Surveillance Test procedures
- I. HC.OP-AB.BOP-0002 Main Turbine
- J. HC.OP-AB.BOP-0005 Main Steam Tunnel Temperature
- K. HC.OP-AB.CONT-0001 Drywell Pressure
- L. HC.OP-AB.CONT-0004 Radioactive Gaseous Release
- M. HC.OP-AB.COOL-0002 Safety Auxiliaries Cooling System
- N. HC.OP-AB.IC-0001 Control Rod
- O. HC.OP-AB.RPV-0007 Reactor Coolant Conductivity
- P. HC.OP-AB.ZZ-0001 Transient Plant Conditions
- Q. HC.OP-AB.ZZ-0136 Loss of 120 VAC Inverter
- R. HC.OP-EO.ZZ-0101 RPV Control
- S. HC.OP-EO.ZZ-0102 Primary Containment Control
- T. HC.OP-EO.ZZ-0103/4 Reactor Building and Rad Release
- U. HC.OP-EO.ZZ-0202 Emergency RPV Depressurization
- V. HC.OP-SO.AE-0001 Feedwater System Operation
- W. HC.OP-SO.SF-0001 Reactor Manual Control
- X. HC.OP-ST.BF-0001 Control Rod Drive Exercise - Weekly
- Y. SH.OP-AS.ZZ-0001 Operations Standards

VII. ESG CRITICAL TASK RATIONAL

ESG-002 / 00

1.

*** CREW determines that Suppression Pool water level cannot be maintained above 38.5 inches and initiates an emergency depressurization in accordance with HC.OP-EO.ZZ-0202.**

(K/A 295030EA2.01 4.1/4.2)

EOPs direct action to emergency depressurize the Reactor if Suppression Pool level cannot be maintained above 38.5 inches. This level represents the Suppression pool level that results in uncovering the downcomer pipes and a loss of the pressure suppression function of the Primary Containment.

2.

*** CREW recognizes via acoustic and temperature indications that F013E, ADS SRV, has failed to open and opens an additional SRV before Suppression Pool level has been below 38.5 inches for 1 minute.**

(K/A 223001A2.11 3.6/3.8)

(K/A 218000A2.04 4.1/4.2)

The Minimum Number of SRVs required for Emergency Depressurization (MNSRED) is 5. The MNSRED is utilized to assure the RPV will depressurize and remain depressurized when Emergency Depressurization is required.

HOPE CREEK ESG - PRA RELATIONSHIPS EVALUATION FORM

EVENTS LEADING TO CORE DAMAGE

<u>Y/N</u>	<u>EVENT</u>	<u>Y/N</u>	<u>EVENT</u>
	TRANSIENTS:		SPECIAL INITIATORS:
<input type="checkbox"/>	Turbine Trip	<input type="checkbox"/>	Loss of SSW
<input type="checkbox"/>	Loss of Feedwater	<input type="checkbox"/>	Loss of SACS
<input checked="" type="checkbox"/>	MSIV Closure	<input type="checkbox"/>	Loss of RACS
<input type="checkbox"/>	Loss of Condenser Vacuum	<input type="checkbox"/>	Loss of Instrument Air
<input type="checkbox"/>	Inadvertent Open SRV		
<input type="checkbox"/>	Loss Of Offsite Power	<input type="checkbox"/>	ATWS
<input type="checkbox"/>	Station Black Out	<input type="checkbox"/>	LOCA

COMPONENT/TRAIN/SYSTEM UNAVAILABILITY THAT INCREASES CORE DAMAGE FREQUENCY

<u>Y/N</u>	<u>COMPONENT, SYSTEM, OR TRAIN</u>	<u>Y/N</u>	<u>COMPONENT, SYSTEM, OR TRAIN</u>
<input type="checkbox"/>	HPCI	<input type="checkbox"/>	Class 1E 120VAC Bus – A Train
<input type="checkbox"/>	RCIC	<input type="checkbox"/>	Class 1E 120VAC Bus – D Train
<input checked="" type="checkbox"/>	One SRV	<input type="checkbox"/>	EDG A
<input type="checkbox"/>	One SSW Pump / Loop	<input type="checkbox"/>	EDG B
<input type="checkbox"/>	Circulating Water System – 4 pumps	<input type="checkbox"/>	TACS

OPERATOR ACTIONS IMPORTANT IN PREVENTING CORE DAMAGE

<u>Y/N</u>	<u>OPERATOR ACTION</u>
<input checked="" type="checkbox"/>	Manual RPV Emergency Depressurization when required
<input type="checkbox"/>	Manual RPV Depressurization during ATWS
<input type="checkbox"/>	Initiation of RHR for Decay Heat Removal
<input type="checkbox"/>	Initiation of Containment Venting
<input type="checkbox"/>	Restore Offsite power within 45 minutes
<input type="checkbox"/>	SACS/SSW restoration after total loss of both systems
<input type="checkbox"/>	Avoiding Loss of Feedwater during transient
<input type="checkbox"/>	Recovery of the Main Condenser

Complete this evaluation form for each ESG.

Hope Creek SIMULATOR Turnover Sheet FOR TRAINING USE ONLY

Oncoming Shift: Days [X] Nights []

Rx Pwr: 17% Gen Output: 126 MWe Work Window: D Risk Color: Green SMD: none

Activities completed last shift:

- Reactor Startup in progress to step 5.4.13 of IO-3
- Containment inerting lineup in progress through step 5.1.8 of SO-GS-0001.

Major activities scheduled for the next 12 hours

- Continue with Startup by withdrawing Control Rods @ <15%/hour. Continuous rod withdraw is allowed. RE-Some LPRM downscale alarms may occur during withdraw of rods. Contact RE for guidance.
- Commence inerting the containment IAW HC.OP-SO.GS-0001 step 5.1.9.

Operations Superintendent Issues:	
Protected Equip	•
Emergent Issues	•
WIN Team	•
Workarounds	•

Safety Issues: Safety Issue Hot Line Call "SAFE" (extension 7233)					
Notif/Date	Description	Immediate Mitigation	Additional Action	Assignee	Date

Active Technical Specification Action Statements:					
Number	Planned	LCO	DEFICIENCY	Exp. Date / Time	Add'l Action

Compensatory Actions in Effect (Required by CROD/CRFA for Operability)			
Number	DEFICIENCY	COMPENSATORY ACTIONS	DUE

Follow-up Operability Assessments (CRFA) Assigned			
Number	DEFICIENCY	ASSIGNED	DUE

Reactivity Controls:

- Rod pull step 481

Safety Systems:

-

Balance of Plant:

-

Electrical:

-

Cooling Water:

-

Rad Monitoring:

-

Emergency Use Equipment:

-

Computer:

-

Administrative:

-

SIMULATOR

EXAMINATION SCENARIO GUIDE

SCENARIO TITLE: NRC EXAM SCENARIO

SCENARIO NUMBER: 3

EFFECTIVE DATE:

EXPECTED DURATION: 1 Hour

REVISION NUMBER: 00

PROGRAM: L.O. REQUAL

INITIAL LICENSE

OTHER _____

REVISION SUMMARY:

I. OBJECTIVE(S):

Enabling Objectives

- A. The crew must demonstrate the ability to operate effectively as a team while completing a series of CREW CRITICAL TASKS, which measure the crew's ability to safely operate the plant during normal, abnormal, and emergency plant conditions.
(Crew critical tasks within this examination scenario guide are identified with an “*.”)

II. MAJOR EVENTS:

- A. Lower Reactor Power with Recirculation Flow
- B. Secondary Condensate Pump Trip/Failure of Recirculation Pump to Runback
- C. RWCU Pump Trip
- D. Loss of Station Power Transformer, and then a loss of offsite power
- E. Failure of “B” EDG, and failure of “A” EDG breaker to auto close
- F. HPCI steam leak with failure to automatically isolate
- G. RCIC turbine overspeed

III. SCENARIO SUMMARY:

The scenario begins with the plant at 95% power and reducing power for a forced outage. The “B” PCIG compressor and BS 5-1 are out of service for maintenance. As the shutdown is commenced, Secondary Condensate Pump C trips. This failure will cause an Intermediate Runback on one Recirculation pump, requiring a manual runback of the other.

Following a report of severe weather warnings in the Salem county area, a RWCU Pump Trip will occur. The operator will be required to adjust RWCU system flow to prevent pump damage.

A total loss of offsite power occurs following a lightning strike. The B EDG fails to start and will be unavailable for the duration of the scenario. The A EDG Output Breaker fails to automatically close, and will require manual closure (at 10C651) to energize 10A401. RCIC trips on overspeed upon system initiation and water accumulation in the HPCI steam line will result in a steam line leak in the HPCI room. The HPCI System will fail to automatically isolate. The crew will have to manually isolate HPCI to terminate leakage into the secondary containment. RCIC may be restored to service following local reset of the overspeed trip device.

The scenario may be terminated when RPV water level is being maintained above $-190''$.

IV. INITIAL CONDITIONS:

_____ Initialize the simulator to 100% power IC; MOL, 100% rod line

_____ Complete Attachment 1 “Simulator Ready-for-Training/Examination Checklist.”

OTHER CONDITIONS: (i.e., computer set points, procedures, bevel covers)

Initial	Description
___	1. Place "B" PCIG compressor in manual and place red bezel cover over compressor; close HV-5162 and HV-5160B, place red bezel covers over controls. Place Instrument Gas Loop B in "Man Byp" on Panel 10C650D.
___	2. Acknowledge Annunciator A1-A5 using Remote AN01 to Normal. (If required)
___	3. Set CRIDS point D4498 to 1
___	4. Place RR in Master Manual and lower power to 95%
___	5. Markup and ensure conditions satisfy HC.OP-IO.ZZ-0004, through step 5.1.2.
___	6. Utilizing Monitor set MSTSRVL(12) = 255. This raises F013M tailpipe temperature to 255F. Acknowledge OHA.

EVENT TRIGGERS:

Initial	Description
___	1. EVENT ACTION: COMMAND: PURPOSE:

MALFUNCTION SUMMARY:

Initial	Description	Delay	Ramp	Remote/Event	Initial	Final
___	1. RC01 RCIC turbine overspeed			Preinsert		
___	2. HP10 HPCI valves HV-F002 & F003 fail to auto isolate			Preinsert		
___	3. DG02B Diesel generator B failure			Preinsert		
___	4. DG08A Diesel generator A failure to auto close			Preinsert		
___	5. AN-A1A2 A1A2 Instrument Gas System B trouble			Preinsert		
___	6. AN-D1B3 Containment Isolation Valve OPF			Preinsert		
___	7. FW04C Secondary condensate pump CP137 trip			1/None		
___	8. CU01A RWCU pump A trip			2/None		
___	9. ED0116 Station Service Transformer 1BX501 failure	420		3/None		
___	10. HP09 HPCI steam line break inside the HPCI RM 4111	740	300	3/None	5	40
___	11. EG12 Loss of all offsite power	720		3/None		
___	12. RR30A Recirc system A failure fo intermediate runback			Preinsert		

REMOTE/FIELD FUNCTION SUMMARY:

Initial	Description	Delay	Ramp	Remote/Event	Initial	Final
___	1.					
___	2.					

I/O OVERRIDE SUMMARY:

<i>Initial</i>	Description	Delay	Ramp	Remote/Event	Initial	Final
___ 1.	10A3 B LO BK-202 MAN-INSTRUMENT GAS			Preinsert		OFF
___ 2.	10A3 F LO BK-202 STOP-INSTRUMENT GAS			Preinsert		OFF
___ 3.	10S4 A DI HV-5162 OPEN-INSTRUMENT GAS			Preinsert		OFF
___ 4.	10S4 B LO HV-5162 CLOSED-INSTRUMENT GAS			Preinsert		OFF
___ 5.	10S7 A LO OVLD/PWR FAIL-INSTRUMENT GAS HV-5160B			Preinsert		ON
___ 6.	10DS2 B LO HV-5160B CLOSED-INSTRUMENT GAS HV-5160B			Preinsert		OFF
___ 7.	10S8 C DI OPEN HV-5160B			Preinsert		OFF
___ 8.	7DS4 A LO CH D INBD-CONTAINMENT ISOLATION VALVES-MOV OVLD/PWR FAIL			Preinsert		ON
___ 9.	10S3A A OVLO OVLO/PWR FAIL-INSTRUMENT GAS			Preinsert		ON

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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1. Lower Reactor Power with Recirculation Flow

- CRS directs reduction of Reactor power in accordance with RE guidance and HC.OP-IO.ZZ-0004.
- RO reduces Reactor power using Recirculation pumps in accordance with CRS directions.

2. Secondary condensate pump C trip:

INSERT RT-1 before reducing power to less than 90%, or at the discretion of the Lead Examiner.

- PO recognizes Secondary condensate pump C trip via:
 - Alarm CONDENSATE TRAIN C TROUBLE (A6-F3)
 - Intermediate runback on both REACTOR RECIRC pumps and informs CRS.
- CRS implements HC.OP-AB.RPV-0004 and directs actions to maintain RPV water level between level 4 and level 7.
- PO ensures FWLC maintains water level between level 4 and level 7
- CRS directs the following in accordance with HC.OP-AB.RPV-0004:
 - Ensure Feedwater and Recirc. Pump Runbacks have occurred.
 - Ensure Reactor Power is within Feedwater delivery capability.
 - Close HV-1651C for tripped pump.
 - Bypass the Reactor Feedwater Runback when conditions permit

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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- RO observes that Recirculation Pump A failed to runback, informs the CRS and coordinates running back A pump with the PO.
- PO closes HV-1651C and bypasses the FW runback in accordance with CRS directions.
- CRS directs the following in accordance with HC.OP-AB.RPV-0001:
 - If APRM Upscale alarms are received, then insert control rods to clear APRM Upscale alarms.
 - Verify that Reactor Power is NOT in an Instability Region on the Power to Flow Map.
 - Ensure Main Generator MWe and MVAR are maintained within limits. (MA)
 - Ensure Recirculation pump MG oil temperatures are maintained in the Normal band. (BB)
 - Implement IO-6 as appropriate for the power reduction.
 - Review the Power Maneuvering T/S Surveillance requirements in SHOP-108.
- RO/PO reset runbacks in accordance with CRS directions.
- RO may observe APRM Upscale alarms, and insert control rods in accordance with the Stuff sheet, and CRS directions.

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
<p>Acknowledge orders as EOs from MCR.</p> <p>As TBEO, report SCP C pump motor is extremely hot, unusual odor in the area, and no fire.</p> <p>Severe Weather:</p> <p>CALL as System Operator; PJM has informed us of a severe thunderstorm warning is in effect for Salem county, which includes high winds and hail; If requested, report sustained winds up to 60 MPH are expected.</p>	<ul style="list-style-type: none"> • Crew verifies operation outside the Exit Region of the Power-Flow Map. • PO ensures: <ul style="list-style-type: none"> – Main Generator MWe and MVAR are maintained within limits – Recirculation pump MG oil temperatures are maintained in the Normal band.(Dispatches EO) • CRS dispatches ABEO to check SCP for abnormal conditions. • CRS directs maintenance to investigate problem with "C" SCP. • Crew recognizes a >15% power change has occurred and informs the CRS. • CRS reference SHOP-108 for power change and informs Chemistry and Rad Pro of actions for: <ul style="list-style-type: none"> – T.S. 3.4.5.c. – ODCM for 3.11.2.1. • CRS informs crew of severe weather warning. 	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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3. Loss of RWCU Pump:

INSERT RT-2 after actions have been taken for severe storm warning, or at the discretion of the Lead Examiner.

Insert **RT-3**, call as System Operator; lightning screens shows lightning strikes in plant area.

Respond appropriately as Chemistry Technician. Delay removal of Filter Demineralizer.

Use Met Data file to **RAISE Wind Speed** pts 1, 2, 3, and 7 to ~ 25 mph, **THEN RAISE** again to ~ 59 mph.

NOTE:

CRS should also recognize that a 4-hour surveillance is required IAW 4.7.3.b (DL-26, Att. 3J).

- RO/PO determines that A RWCU pump is tripped by RWCU SYSTEM TROUBLE (C1-C2) alarm, loss of running indication, CRIDS alarms, and informs CRS.
- RO refers to HC.OP-AR.ZZ-0008 and takes actions to reduce RWCU pump flow to <134 gpm by throttling HV-F042 and notify Chemistry to remove one Filter Demineralizer from service.
- RO/PO dispatches RBEO to investigate problem with RWCU pump A.
- CRS references HC.OP-AR.ZZ-0016 for E3-A2.
 - Refers to Tech Spec 3.8.1.1.a due to loss of Station Service Transformer, determines HC.OP-ST.ZZ-0001 is required
- CRS implements HC.OP-AB.MISC-0001 and directs actions to:
 - Monitor River Level every 4 hours
 - Limit outside activities
 - Close outside doors
 - Terminate surveillance testing
- CRS references Tech Spec 3.7.3.

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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As outside operator, report after 2 min. of dispatch; lightning and extreme winds.

4. Loss of Offsite Power:

This malfunction will become active approximately 12 min. after lightning report.

- Crew recognizes loss of power condition via decreased lighting, alarms for Rx scram (window C-3) and station service transformer trouble (window E-3) and informs CRS.

- RO performs the following IAW HC.OP-AB.ZZ-0001:
 - Announces, "Crew - Standby for Scram Report".
 - Locks the Mode Switch in Shutdown.
 - Announces the following:
 - ◆ Rod Motion status
 - ◆ APRM Downscale status
 - ◆ Reactor Shutdown status
 - WHEN the above actions are complete, then announces "Scram Report Complete".

- Ensures the Reactor Scram has been announced (over PA) Reports "All Scram Actions Complete"

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
<p>As ABEO, report broken oil line on "B" EDG.</p>	<ul style="list-style-type: none"> • CRS enters and directs HC.OP-EO.ZZ-0101, RPV Control and directs actions to: <ul style="list-style-type: none"> – Verify scram actions – Verify EDGs start – Verify ECCS actuations – Verify PCIS/NSSSS isolations – H2 injection isolation • RO/PO recognizes "B" EDG failure to start via lack of running indication(s) and "A" EDG breaker failure to close via breaker open indication and informs CRS. • CRS directs RO/PO to close "A" EDG breaker. • RO/PO closes "A" EDG breaker and verifies loading IAW CRS direction. • * Crew energizes 10A401 by closing "A" EDG output breaker. (K/A 295003 AA1.01 3.7/3.8) • CRS directs RO/PO to attempt start of "B" EDG. • RO/PO attempts start of "B" EDG IAW CRS direction and reports failure of "B" EDG to respond. • CRS implements HC.OP-AB.ZZ-0135 and directs actions to mitigate the loss of offsite power condition. • Crew dispatches ABEO/Shift electrician to investigate "B" EDG failure and to attempt local start. 	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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- CRS directs PO to maintain RPV water level between +12.5" and +54" using HPCI and/or RCIC.

5. RCIC Turbine Overspeed:
(Pre-inserted)

As RBEO, report mechanical overspeed of RCIC; standing by for reset attempt.

- PO recognizes RCIC turbine trip condition via alarm B1-A1, turbine trip energized indication, and informs CRS.
- Crew dispatches RBEO to investigate RCIC turbine trip and reset turbine overspeed trip.

6. HPCI Steam Leak with Failure to Isolate

- PO recognizes HPCI steam leak conditions via HPCI trip and alarms B1-A4 & B1-A5 and informs CRS.
- PO recognizes HPCI failure to isolate via isolation initiation signals and failure of HV-F002 and HV-F003 to close and informs CRS.
- CRS directs closure of HV-F002 and HV-F003 to isolate HPCI.
- PO closes HV-F002 and HV-F003 IAW CRS direction.

NOTE:

Isolation of HPCI before receipt of isolation signal is considered satisfactory completion of the critical step.

- * When the HPCI System Isolation Logic initiation signal is received, Crew shuts HV-F002 and/or HV-F003 to terminate source of leakage into secondary containment before HCPI Pump Room (4111) temperature reaches 250°F.

TEMP _____

(K/A 206000 A2.10 4.0/4.1)

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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CLEAR malfunction RC01. When HV-F045 and/or HV-4282 are/is closed, **RESET** overspeed trip with **Remote RC02**, and as **RBE0 report** reset of RCIC turbine overspeed.

- CRS directs actions to reset RCIC trip throttle valve and to restore RCIC to operation IAW HC.OP-SO.BD-0001.
- CRS directs PO to restore and maintain RPV water level to between +12.5" and +54".
- PO injects with RCIC to restore and maintain RPV water level between +12.5" and +54".
- CRS directs RO to restore "A" CRD pump to service, and/or place SLC in service.
- RO restores "A" CRD pump to service.
- RO/PO places available SLC pump in service.
- CRS directs RO to line up and inject with two CRD pumps IAW HC.OP-SO.BF-0001.
- RO coordinates with the EO to start A CRD Pump and line up for two CRD pump operation IAW CRS directions.
- CRS directs inhibiting ADS when RPV level reaches -129".
- PO inhibits ADS IAW HC.OP-SO.SN-0001.
- If RPV water level cannot be maintained above -190", CRS orders an Emergency Depressurization by opening 5 ADS valves IAW EOP-101 AND 202.

NOTE:

Crew may decide to operate two CRD pumps for RPV water level control assistance. Support two CRD pump operating as EO using appropriate Remote Functions (CD).

NOTE:

These actions occur in the event of RPV water level reaching -129".

NOTE

Crew may be able to maintain RPV level >-190".

These will be done before RBE0 is restored

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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- PO opens 5 ADS valves per CRS directions.
- CRS directs injection with available low pressure ECCS pumps to restore RPV level to greater than -190".
- PO lines up and commences injection with available ECCS, and restores level IAW CRS instructions.
- * CREW maintains, or restores, adequate core cooling by maintaining Reactor water level above -190 inches, or emergency depressurizing by opening at least 5 ADS valves and restoring RPV level to above -190 inches IAW HC.OP-EO.ZZ-0101.

(K/A 295031 EA1.08 3.8/3.9)

(K/A 295031 EA1.03 4.4/4.4)

(K/A 295031 EA1.06 4.4/4.4)

Scenario Termination:

With concurrence from the lead examiner, the scenario may be terminated when RPV water level is being maintained >-190".

Restore CRIDS Point D4498 to scan.

VII. SCENARIO REFERENCES:

- A. Conduct of Simulator Training.
- B. NUREG 1021, Examiner Standards
- C. JTA Listing
- D. Probabilistic Risk Assessment
- E. Technical Specifications
- F. Alarm Response Procedures (Various)
- G. HC.OP-AB.MISC-0001 Acts of Nature
- H. HC.OP-AB.RPV-0001 Reactor Power
- I. HC.OP-AB.RPV-0004 Reactor Level Control
- J. HC.OP-AB.RPV-0007 Reactor Coolant Conductivity
- K. HC.OP-AB.ZZ-0001 Transient Plant Conditions
- L. HC.OP-AB.ZZ-0135 Station Blackout//Loss of Offsite Power//Diesel Generator Malfunction
- M. HC.OP-AB.ZZ-0136 Loss of 120 VAC Inverter
- N. HC.OP-EO.ZZ-0101 RPV Control
- O. HC.OP-EO.ZZ-0102 Primary Containment Control
- P. HC.OP-EO.ZZ-0202 Emergency Depressurization
- Q. HC.OP-IO.ZZ-0004 Shutdown From Rated Power to Cold Shutdown
- R. HC.OP-SO.AE-0001 Feedwater System Operation
- S. HC.OP-SO.BD-0001 Reactor Core Isolation Cooling System Operation
- T. HC.OP-SO.BF-0001 CRD Hydraulic System Operation
- U. SH.OP-AS.ZZ-0001 Operations Standards

VIII. ESG CRITICAL TASK RATIONAL

ESG-003 / 00

1.

- * **Crew energizes 10A401 by closing "A" EDG output breaker.**
(K/A 295003 AA1.01 3.7/3.8)

With the "B" EDG unavailable, restoring power to the "A" vital bus, 10A401, provides power for the "A" FRVS vent fan which is required to maintain secondary containment differential pressures. Given the HPCI leakage into the secondary containment, it is critical that the potential release path be monitored and filtered to minimize release and reduce exposure to the public. Additionally, the vital bus will provide the source of power to the "A" RHR pump for long term cooling capability.

2.

- * **When the HPCI system isolation logic initiation signal is received, Crew shuts HV-F002 and/or HV-F003 to terminate source of leakage into secondary containment before HCPI Pump Room(4111) temperature reaches 250°F.**
(K/A 206000 A2.10 4.0/4.1)

The HPCI system has received valid isolation signals based upon high steamline flow and a failure to isolate has occurred. Manual isolation of this release path is necessary to terminate the source of leakage into the secondary containment and prevent a possible unmonitored release via the torus room relief panels. 250°F. is the Max. Safe Temperature for Room 4111 in HC.OP-EO.ZZ-0103.

3.

- * **CREW maintains, or restores, adequate core cooling by maintaining Reactor water level above -190 inches, or emergency depressurizing by opening at least 5 ADS valves and restoring RPV level to above -190 inches IAW HC.OP-EO.ZZ-0101.**
(K/A 295031 EA1.08 3.8/3.9)
(K/A 295031 EA1.03 4.4/4.4)
(K/A 295031 EA1.06 4.4/4.4)

Maintaining adequate Core cooling under these conditions is accomplished by maintaining level above -190", or by emergency depressurizing and restoring level to above -190". [-190" corresponds to the Minimum Steam Cooling RPV Water Level (MSCRWL).]

HOPE CREEK ESG - PRA RELATIONSHIPS EVALUATION FORM

EVENTS LEADING TO CORE DAMAGE

<u>Y/N</u>	<u>EVENT</u>	<u>Y/N</u>	<u>EVENT</u>
	TRANSIENTS:		SPECIAL INITIATORS:
<input type="checkbox"/>	Turbine Trip	<input type="checkbox"/>	Loss of SSW
<input type="checkbox"/>	Loss of Feedwater	<input type="checkbox"/>	Loss of SACS
<input type="checkbox"/>	MSIV Closure	<input type="checkbox"/>	Loss of RACS
<input type="checkbox"/>	Loss of Condenser Vacuum	<input type="checkbox"/>	Loss of Instrument Air
<input type="checkbox"/>	Inadvertent Open SRV		
<input checked="" type="checkbox"/>	Loss Of Offsite Power	<input type="checkbox"/>	ATWS
<input type="checkbox"/>	Station Black Out	<input type="checkbox"/>	LOCA

COMPONENT/TRAIN/SYSTEM UNAVAILABILITY THAT INCREASES CORE DAMAGE FREQUENCY

<u>Y/N</u>	<u>COMPONENT, SYSTEM, OR TRAIN</u>	<u>Y/N</u>	<u>COMPONENT, SYSTEM, OR TRAIN</u>
<input checked="" type="checkbox"/>	HPCI	<input type="checkbox"/>	Class 1E 120VAC Bus – A Train
<input type="checkbox"/>	RCIC	<input type="checkbox"/>	Class 1E 120VAC Bus – D Train
<input type="checkbox"/>	One SRV	<input type="checkbox"/>	EDG A
<input type="checkbox"/>	One SSW Pump / Loop	<input checked="" type="checkbox"/>	EDG B
<input type="checkbox"/>	Circulating Water System – 4 pumps	<input type="checkbox"/>	TACS

OPERATOR ACTIONS IMPORTANT IN PREVENTING CORE DAMAGE

<u>Y/N</u>	<u>OPERATOR ACTION</u>
<input checked="" type="checkbox"/>	Manual RPV Emergency Depressurization when required
<input type="checkbox"/>	Manual RPV Depressurization during ATWS
<input type="checkbox"/>	Initiation of RHR for Decay Heat Removal
<input type="checkbox"/>	Initiation of Containment Venting
<input type="checkbox"/>	Restore Offsite power within 45 minutes
<input type="checkbox"/>	SACS/SSW restoration after total loss of both systems
<input type="checkbox"/>	Avoiding Loss of Feedwater during transient
<input type="checkbox"/>	Recovery of the Main Condenser

Complete this evaluation form for each ESG.

Hope Creek SIMULATOR Turnover Sheet FOR TRAINING USE ONLY

Oncoming Shift: Days [A] Nights []

Op Con: 1 Rx Pwr: 95% Gen Output: 1060 MWe Work Window: C Risk Color: Green

Major activities accomplished on the last shift:

- Commenced plant shutdown due to elevated temperatures on F013M
- "B" PCIG compressor was C/T for maintenance to replace the suction filter last shift.
-

Major activities scheduled for this shift:

- Continue with shutdown IAW HC.OP-IO.ZZ-0004, currently at step 5.1.2.
- RE guidance is to continue power reduction to 75% with RR Flow at <15%/Hr.
- RE will evaluate at 75% power.

Safety Issues: Safety Issue Hot Line Call "SAFE" (extension 7233)					
Notif/Date	Description	Immediate Mitigation	Additional Action	Assigned To	Date

Operations Superintendent Issues:	
Protected Equip.	<ul style="list-style-type: none"> • "A" PCIG, "C" EDG and switchgear
Emergent Problems	<ul style="list-style-type: none"> • Elevated tailpipe temperature F013M SRV
WIN Team	<ul style="list-style-type: none"> •
Operator Workarounds	<ul style="list-style-type: none"> •

Active Technical Specification Action Statements:					
Index	Planned	LCO	DEFICIENCY	Expires	Additional Action
SIM-001	Yes	3.6.3	"B" PCIG (KLHV-5162)	NA	NA

Compensatory Actions in Effect (Required by CROD/CRFA for Operability)			
Number	DEFICIENCY	COMPENSATORY ACTIONS	Due Date

Follow-up Operability Assessments (CRFA) Assigned			
Number	DEFICIENCY	ASSIGNED	Due Date

Reactivity Controls:

- MOL 100% rod line

Standby Safety Systems:

-

Balance of Plant:

-

Restricted/Emergency Use Only Equipment:

-

Electrical:

-

Chemistry:

-

Cooling Water:

-

Computer:

-

Radiation Monitoring Systems:

-

Cold Weather Issues:

-

Administrative:

-

SIMULATOR

EXAMINATION SCENARIO GUIDE

SCENARIO TITLE: NRC EXAM SCENARIO

SCENARIO NUMBER: 4

EFFECTIVE DATE:

EXPECTED DURATION: 1 Hour

REVISION NUMBER:

PROGRAM: L.O. REQUAL

INITIAL LICENSE

OTHER _____

REVISION SUMMARY:

I. OBJECTIVE(S):

Enabling Objectives

- A. The crew must demonstrate the ability to operate effectively as a team while completing a series of CREW CRITICAL TASKS, which measure the crew's ability to safely operate the plant during normal, abnormal, and emergency plant conditions. (Crew critical tasks within this examination scenario guide are identified with an “*.”)

II. MAJOR EVENTS:

- A. Raise power with Control Rods
- B. APRM failure upscale with single rod scram
- C. Failure of Main Turbine to runback following loss of Stator Water Cooling
- D. Full-core ATWS
- E. Turbine Bypass Valve failure
- F. SLC Failure to Automatically Initiate / SLC Pump A trip

III. SCENARIO SUMMARY:

The plant is operating at 40% power during power escalation. The B EDG is inoperable. During preparations for power ascension, APRM C fails upscale, resulting in a half-scram and a single rod scram (02-27) due to a blown fuse. When the APRM is bypassed and the half-scram reset, a loss of Stator Water Cooling occurs with a failure of the turbine to runback.

As the crew is attempting to manually reduce Main Generator load, the turbine trips, and a full-core ATWS occurs. In addition, BPVs fail to respond and control RPV pressure, requiring SRVs for pressure control. In responding to the ATWS condition, the SLC System fails to automatically initiate. This requires the operators to manually initiate SLC. Following SLC start, the A SLC pump will trip. With SRVs controlling RPV pressure, Suppression Pool temperature will begin to rise, eventually requiring intentional lowering of RPV level to control power. The Crew should implement HC.OP-EO.ZZ-0320 to insert control rods and complete the scram.

IV. INITIAL CONDITIONS:

INITIAL IC:

Initialize the simulator to 36% power IC, rod sequence sheet 57.

PREP FOR TRAINING: (i.e., computer set points, procedures, bevel covers)

Initial	Description
___ 1.	Ensure plant conditions support Reactor Startup IAW IO-003 through step 5.4.21, N/A step 5.4.19.C.
___ 2.	Raise Reactor power with Recirc flow to 40% power.
___ 3.	Complete Attachment 2 "Simulator Ready-for-Training/Examination Checklist."
___ 4.	

EVENT TRIGGERS:

Initial	Description
___ 1.	EVENT ACTION: zdrp05nx(2) // Reset RPS Logic A2 COMMAND: dmf cd060227 PURPOSE: This command will delete Malf CD-06 on Rod 02-27
___ 2.	EVENT ACTION: lcvposb(1) <= 700 // Rod 18-03 Position COMMAND: PURPOSE: Inserts left and right ATWS to stick rods.
___ 3.	EVENT ACTION: et_array(2) // Event Trigger #2 COMMAND: SET lclsdv = 700 PURPOSE: Fills the scram discharge volume on the scram
___ 4.	EVENT ACTION: zslpmas // SLC A pump ON COMMAND: PURPOSE: Initiates trip of SLC A pump

MALFUNCTION SUMMARY:

Initial	Description	Delay	Ramp	Remote/Event	Initial	Final
___ 1.	TC01-10 All Turbine BPV fail to open			Preinsert		
___ 2.	SL04A Failure of SLC to auto initiate			Preinsert		
___ 3.	SLO4B Failure of SLC to auto initiate			Preinsert		
___ 4.	TC06 Failure of main turbine automatic runback			Preinsert		
___ 5.	NM21C APRM "C" fails upscale			1/None		100
___ 6.	CD060227 Control rod 02-27 scrams			1/None		
___ 7.	EG04A Stator cooling pump A trip			2/None		
___ 8.	TC03 Main Turbine trip			3/None		
___ 9.	SL01A SBLC injection pump AP208 failure	120		None/4		
___ 10.	RP06 Half-Core ATWS – Left Side			None/2		
___ 11.	RP07 Half-Core ATWS – Right Side			None/2		

REMOTE/FIELD FUNCTION SUMMARY:

Initial	Description	Delay	Ramp	Remote/Event	Initial	Final
___	1. EG-01B "B" Stator Water Cooling Pump			Preinsert		OFF
___	2. FW21 HWCI Status			Preinsert		Running
___	3. AN10 A4-B3 HWCI System Trouble			Preinsert		Norm
___	4. RM03 Main steam rad monitor set points			Preinsert		High
___	5. FW05 Demineralizer E			Preinsert		IN
___	6. FW06 Demineralizer F			Preinsert		IN
___	7. CW15 TACS clg vlv AE126 to Recirc m/g set A			Preinsert		50
___	8. CW16 TACS clg vlv BE126 to Recirc m/g set B			Preinsert		50

I/O OVERRIDE SUMMARY:

Initial	Description	Delay	Ramp	Remote/Event	Initial	Final
___	1.					

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
<p>1. Raise power with Control Rods:</p>	<ul style="list-style-type: none"> • CRS directs power rise using Recirc flow/rod withdrawals per HC.OP-IO.ZZ-003 and RE directions. • CRS informs Load Dispatcher of continued power ascension. • RO raises Reactor Power with Control Rods in accordance with CRS directions. 	
<p>2. APRM "C" upscale failure w/ single rod scram (02-27) Insert RT-1 at the discretion of Lead Evaluator</p>	<ul style="list-style-type: none"> • RO / PO recognizes / takes actions IAW C3-A3, C4 & D4, C6-A1, C7- D3 & D4, and informs CRS. <ul style="list-style-type: none"> - Determines APRM C upscale - Monitors Rx pressure/power/level - Verifies feed flow/ temperatures - Checks non-upscale APRMs, verifies only one channel upscale - Verifies half scram/rod block in • RO / PO recognizes control rod 02-27 single rod scram, informs CRS. • CRS enters / directs actions IAW HC.OP-AB.IC-0001 and HC.OP-AB.IC-0004. • PO checks APRM "C" on back panels, verifies upscale and other APRMs normal. 	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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NOTE:

Verify ET-1 becomes Active when RPS Logic A2 is reset. This will clear the Scrammed Rod Malfunction and insert Malfunction RP-04.

NOTE: EO requested to investigate, report that the Scram Valves for 22-27 are open (if RPS is not reset)

- CRS observes requirements of T/S 3/4.3.1 and T/S 3/4.3.6
- CRS directs I&C to investigate single rod scram
- CRS directs APRM "C" bypassed and half scram reset.
- CRS enters / directs actions IAW C6-E3; directs NEO to check HCU for scrambled rod, notifies RE, and directs fuse replacement and control rod recovery.
- RO / PO takes action IAW C6-E3:
 - Verifies only one control rod scrambled and fully inserted
 - Verifies that thermal limits are within acceptable constraints using the Reactor Engineer to verify
 - Have Reactor Engineer provide guidance to reposition the rod
- CRS refers to T/S 3/4.1.3 and 3/4.2 and directs Reactor Engineer to verify they are within thermal limits.

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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3. Stator Water Cooling "A" pump trip w/ failure of "B" to auto start and main turbine to runback

Insert RT-2 shortly after the CRS determines the necessary notifications, or at the discretion of Lead Evaluator

NOTE:

Report as NEO that no Stator Water Cooling pumps are running. If asked, **report** that the "B" Stator Water Cooling pump will not manually start, and will check breaker status.

- RO / PO recognizes / takes actions IAW E1-C1, informs CRS.
 - Immediately directs local operator to investigate
 - Recognizes Stator Water Cooling low pressure computer point in and is not clearing
- RO / PO recognizes turbine failure to runback and informs the CRS.
- RO informs CRS of Full Reactor Recirculation Pump Runback
- CRS enters / directs actions IAW HC.OP-AB.BOP-0002:
 - Dispatches operator to local panel 10C120 to start both Stator Cooling Pumps and ensure tank level is normal
 - Directs RO to monitor for power oscillations
 - Directs PO to runback main turbine to < 7055 amps and reduce MVARs to zero
- PO manually runs back main turbine to less than 7055 amps and reduces generator MVARs to zero.

NOTE:

IF the CRS directs Recirc flow to minimum and manual scram, **THEN** **Insert RT-3** (trips Main Turbine).

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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- CRS monitors Reactor Power and since power is >25% and Stator Water Cooling has not been restored within 2 minutes, Directs CREW to Scram the Reactor, trip the Turbine and implements HC.OP-EO.ZZ-101.
- RO places and locks the Rx mode switch in shutdown.
- RO performs the following IAW HC.OP-AB.ZZ-0001:
 - Announces, “Crew - Standby for Scram Report”.
 - Locks the Mode Switch in Shutdown.
 - Announces the following:
 - ◆ Rod Motion status
 - ◆ APRM Downscale status
 - ◆ Reactor Shutdown status

4. Turbine trip/ Full-core ATWS

The turbine trip must occur before power is < 30%.

- IF the reactor is not shutdown then perform the following:
 - A. Initiates manual scram from RPS.
 - B. Initiates ARI.
 - C. Announces the following:
 - o Scram Air Header status.
 - o Reactor Shutdown status
- WHEN the above actions are complete, then announces “Scram Report Complete”.

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
	<ul style="list-style-type: none"> - Inserts the SRM/IRM's - Selects IRM chart recorders. - When Main Generator output reaches zero Mwe, then trips the Main Turbine. - Locks Out the Main Generator - Ensures the Reactor Scram has been announced (over PA) - Reports "All Scram Actions Complete" 	
<p>5. Turbine Bypass Valves fail to open TBP Valve failure is pre-inserted</p>	<ul style="list-style-type: none"> • PO/RO recognizes turbine trip during runback, failure of some BPVs to open and informs CRS. • CRS enters / directs actions IAW HC.OP-EO.ZZ-0101A; <ul style="list-style-type: none"> • Directs initiation of SLC • Directs RR pumps tripped • Directs inhibit ADS • Directs alternate control rod insertion methods 	
<p>6. SLC Failure to Automatically Initiate/"A" SLC Pump trip SLC Pump A trip occurs 2 minutes after SLC is manually initiated</p>	<ul style="list-style-type: none"> • A RO/PO record tank level, initiates SLC, and verifies RWCU isolation. • PO inhibits ADS IAW HC.OP-AB.ZZ-0001. 	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
<p>NOTE: Support crew's requests for EOP implementation. Delay EOP-320 until level is intentionally lowered. Use Remote Functions to implement EOPS.</p>	<ul style="list-style-type: none"> ● * Crew prevents an uncontrolled depressurization during ATWS conditions by placing ADS Actuation Timer Inhibit switches to INHIBIT position. <p>(K/A 218000 A4.04 4.1/4.1) (K/A 218000 A4.05 4.2/4.2)</p> <ul style="list-style-type: none"> ● PO initially opens SRVs until RPV pressure drops below 935 psig then stabilizes RPV pressure below 1037 psig or as directed by CRS 	
<p>NOTE: For reference, SLC "A" Pump Breaker is 52-212063</p>	<ul style="list-style-type: none"> ● PO recognizes "A" SLC Pump trip and informs CRS <ul style="list-style-type: none"> – Directs local operator to check "A" SLC Pump and breaker ● CRS enters and directs action IAW HC.OP-EO.ZZ-0102 when Suppression Pool Temperature reaches 95 °F <ul style="list-style-type: none"> – Directs placing Suppression Pool Cooling in service ● PO places Suppression Pool Cooling in service ● CRS directs bypassing Group I low level isolation signal per HC.OP-EO.ZZ-0301, -0311 & -0319. 	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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NOTE:

When CREW is intentionally lowering RPV level, implement EOP-320, if it has been ordered, **THEN Delete RP06 and RP07 when RPS is reset.**

- * CRS enters / directs actions and CREW performs IAW HC.OP-EO.ZZ-0101A to:
 - LOWER RPV level by TERMINATING and PREVENTING injection (except for SLC, CRD and RCIC) UNTIL RPV level drops below -50 in

OR

- IF Supp Pool Temp > 110 °F, power is >4%, and Drywell Press > 1.68 psig or SRV open or cycling, LOWER RPV level by TERMINATING and PREVENT injection (except for SLC, CRD and RCIC) until any of the following:
 - Rx Power < 4%, or
 - RPV Lvl reaches -129", or
 - All SRVs remain closed and Drywell press remains < 1.68 psig

(K/A 203000 A4.02 4.3/4.1)
 (K/A 209001 A4.01 3.8/3.6)
 (K/A 206000 A4.05 4.4/4.4)
- CRS directs PO to maintain RPV level between -190" and level to which it was lowered with Preferred ATWS Injection Systems from Table 1 of HC.OP-EO.ZZ-101A

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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- * Crew maintains or restores adequate core cooling by: restoring/maintaining RPV level ≥ -190 inches, or emergency depressurizing by opening at least 5 SRVs and restoring level to > -190 inches when below the Minimum Alternate RPV Flooding Pressure in accordance with HC.OP-EO.ZZ-0101A.

(K/A 295037 EA2.02 4.1/4.2)

(K/A 295031EA1.06 4.4/4.4)

- After EOP-320 implementation, RO inserts a manual scram, observes that all rods fully inserted, and informs CRS.
- * Crew implements HC.OP-EO.ZZ-0320 OR manually inserts all control rods.

(K/A 295037 EA1.05 3.9/4.6)

- CRS exits HC.OP-EO.ZZ-0101A and reenters HC.OP-EO.ZZ-0101 at RC-1;
 - Directs level restoration
- PO / RO restores level to +12.5" to +54" as directed
- CRS directs:
 - Securing all injection except for SLC, CRD, and RCIC
 - Emergency depressurizes the RPV in accordance with HC.OP-EO.ZZ-0202,
 - Commencing injection to RPV when below the MARFP and raise level to > -190 inches.

NOTE:

IF RPV level cannot be maintained above -190 ", an emergency depressurization is required.

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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Termination Requirements

With concurrence from the Lead Evaluator, the scenario may be terminated when all control rods are fully inserted and Rx parameters are stable.

VI. SCENARIO REFERENCES:

- A. Conduct of Simulator Training.
- B. NUREG 1021, Examiner Standards
- C. JTA Listing
- D. Probabilistic Risk Assessment
- E. Technical Specifications
- F. Emergency Plan (ECG)
- G. Alarm Response Procedures (Various)
- H. HC.OP-AB.BOP-0002 Main Turbine
- I. HC.OP-AB.IC-0001 Control Rod
- J. HC.OP-AB.IC-0004 Neutron Monitoring
- K. HC.OP-AB.RPV-0002 Reactor Power Oscillations
- L. HC.OP-AB.ZZ-0001 Transient Plant Conditions
- M. HC.OP-EO.ZZ-0101 RPV Control
- N. HC.OP-EO.ZZ-0101A ATWS-RPV Control
- O. HC.OP-EO.ZZ-0102 Primary Containment Control
- P. HC.OP-EO.ZZ-0320 Defeating ARI and RPS Interlocks
- Q. HC.OP-EO.ZZ-0322 Core Spray Injection Valve Override
- R. HC.OP-IO.ZZ-0003 Startup from Cold Shutdown to Rated Power
- S. SH.OP-AS.ZZ-0001 Operations Standards

VII. ESG CRITICAL TASK RATIONAL

ESG-073 / 00

1.

- * Crew implements HC.OP-EO.ZZ-0320 OR manually inserts all control rods.
(K/A 295037 EA1.05 3.9/4.6)

Implementation of HC.OP-EO.ZZ-0320 OR manually inserting all control rods provides the only methods for control rod insertion and substantial negative reactivity addition. It is critical for the crew to implement one of these methods to insert control rods and shut the reactor down. Failure to initiate these actions would result in requiring RPV level to be lowered to or below TAF to reduce power to < 4%. This represents a significant challenge to maintaining adequate core cooling.

2.

- * Crew prevents an uncontrolled depressurization during ATWS conditions by placing ADS Actuation Timer Inhibit switches to INHIBIT position.
(K/A 218000 A4.04 4.1/4.1) (K/A 218000 A4.05 4.2/4.2)

Given the current ATWS conditions of this scenario, preventing ADS automatic operation and potential uncontrolled reactor level floodup prevents a significant transient and subsequent positive reactivity addition to the reactor. EOPs direct this action under the current conditions.

3.

- * CRS enters / directs actions and CREW performs IAW HC.OP-EO.ZZ-0101A to:
 - LOWER RPV level by TERMINATING and PREVENTING injection (except for SLC, CRD and RCIC) UNTIL RPV level drops below -50 in
 - OR
 - IF Supp Pool Temp > 110 °F, power is >4%, and Drywell Press > 1.68 psig or SRV open or cycling, LOWER RPV level by TERMINATING and PREVENT injection (except for SLC, CRD and RCIC) until any of the following:
 - Rx Power < 4%, or
 - RPV Level reaches -129", or
 - All SRVs remain closed and Drywell press remains < 1.68 psig
- (K/A 203000 A4.02 4.3/4.1) (K/A 209001 A4.01 3.8/3.6) (K/A 206000 A4.05 4.4/4.4)

Given the above scenario conditions, HC.OP-EO.ZZ-0101A directs actions to lower RPV water level to reduce reactor power. With the Suppression Pool temperature at or approaching 110°F and energy addition to the Suppression Pool in progress (the reactor not shutdown), actions must be taken to reduce Reactor power and prevent challenging the Primary Containment via the Heat Capacity Temperature Limit.

4.

- * Crew maintains or restores adequate core cooling by: restoring/maintaining RPV level \geq -190 inches, or emergency depressurizing by opening at least 5 SRVs and restoring level to $>$ -190 inches when below the Minimum Alternate RPV Flooding Pressure in accordance with HC.OP-EO.ZZ-0101A.
(K/A 295037 EA2.02 4.1/4.2)
(K/A 295031EA1.06 4.4/4.4)

Maintaining adequate core cooling under ATWS conditions is accomplished by maintaining/restoring RPV level \geq -190 inches, or by depressurizing and restoring level to $>$ -190 inches when below the Minimum Alternate RPV Flooding Pressure.

HOPE CREEK ESG - PRA RELATIONSHIPS EVALUATION FORM

EVENTS LEADING TO CORE DAMAGE

<u>Y/N</u>	<u>EVENT</u>	<u>Y/N</u>	<u>EVENT</u>
	TRANSIENTS:		SPECIAL INITIATORS:
<u>X</u>	Turbine Trip	<u> </u>	Loss of SSW
<u> </u>	Loss of Feedwater	<u> </u>	Loss of SACS
<u> </u>	MSIV Closure	<u> </u>	Loss of RACS
<u> </u>	Loss of Condenser Vacuum	<u> </u>	Loss of Instrument Air
<u> </u>	Inadvertent Open SRV		
<u> </u>	Loss Of Offsite Power	<u>X</u>	ATWS
<u> </u>	Station Black Out	<u> </u>	LOCA

COMPONENT/TRAIN/SYSTEM UNAVAILABILITY THAT INCREASES CORE DAMAGE FREQUENCY

<u>Y/N</u>	<u>COMPONENT, SYSTEM, OR TRAIN</u>	<u>Y/N</u>	<u>COMPONENT, SYSTEM, OR TRAIN</u>
<u> </u>	HPCI	<u> </u>	Class 1E 120VAC Bus – A Train
<u> </u>	RCIC	<u> </u>	Class 1E 120VAC Bus – D Train
<u> </u>	One SRV	<u> </u>	EDG A
<u> </u>	One SSW Pump / Loop	<u> </u>	EDG B
<u> </u>	Circulating Water System – 4 pumps	<u> </u>	TACS

OPERATOR ACTIONS IMPORTANT IN PREVENTING CORE DAMAGE

<u>Y/N</u>	<u>OPERATOR ACTION</u>
<u> </u>	Manual RPV Emergency Depressurization when required
<u> </u>	Manual RPV Depressurization during ATWS
<u> </u>	Initiation of RHR for Decay Heat Removal
<u> </u>	Initiation of Containment Venting
<u> </u>	Restore Offsite power within 45 minutes
<u> </u>	SACS / SSW restoration after total loss of both systems
<u> </u>	Avoiding Loss of Feedwater during transient
<u> </u>	Recovery of the Main Condenser

Complete this evaluation form for each ESG.

Hope Creek SIMULATOR Turnover Sheet FOR TRAINING USE ONLY

Oncoming Shift: Days [A] Nights []

Op Con: 1 Rx Pwr: 40% Gen Output: 394 MWe Work Window: B Risk Color: Green

Major activities accomplished on the last shift:

- Performed startup through step 5.4.20 of HC.OP-IO.ZZ-0003
- Performed "B" EDG Surveillance. Because of slow starts, still available but inoperable
- HC.OP-ST.ZZ-0001 completed 1.5 hours ago

Major activities scheduled for this shift:

- Continue with the startup IAW HC.OP-IO.ZZ-0003 at step 5.4.21
- Withdraw rods to the 80% rod line @ <15%/hour
- C/T "B" EDG when maintenance is ready to begin troubleshooting

Operations Superintendent Issues:	
Protected Equip	• A, C, & D EDGs and switchgears, A RHR, A Recombiner, A SLC, A SSW, A SACS
Emergent Issues	•
WIN Team	•
Workarounds	•

Safety Issues: Safety Issue Hot Line Call "SAFE" (extension 7233)					
Notif/Date	Description	Immediate Mitigation	Additional Action	Assignee	Date

Active Technical Specification Action Statements:					
Number	Planned	LCO	DEFICIENCY	Exp. Date / Time	Add'l Action
SIM-001	No	3.8.1.1	EDG "B" Slow Start Time	+70 HOURS	

Compensatory Actions in Effect (Required by CROD/CRFA for Operability)			
Number	DEFICIENCY	COMPENSATORY ACTIONS	DUE

Follow-up Operability Assessments (CRFA) Assigned			
Number	DEFICIENCY	ASSIGNED	DUE

Reactivity Controls:

- RE guidance is to raise power with rods to the 100% rod line, currently on sheet 57

Standby Safety Systems:

-
- **Balance of Plant:**
-

Restricted/Emergency Use Only Equipment:

Electrical:

- "B" EDG had slow start times during surveillance last shift. Not C/T'd yet. Still available, but inoperable. All actions required by Technical Specifications have been completed for the EDG.

Chemistry:

-

Cooling Water:

-

Computer:

-

Radiation Monitoring Systems:

-

Cold Weather Issues:

-

Administrative:

-

SIMULATOR

EXAMINATION SCENARIO GUIDE

SCENARIO TITLE: NRC EXAM SCENARIO

SCENARIO NUMBER: SPARE

EFFECTIVE DATE:

EXPECTED DURATION: 1 Hour

REVISION NUMBER:

PROGRAM: L.O. REQUAL

INITIAL LICENSE

OTHER _____

REVISION SUMMARY:

I. OBJECTIVE(S):

Enabling Objectives

- A. The crew must demonstrate the ability to operate effectively as a team while completing a series of CREW CRITICAL TASKS, which measure the crew's ability to safely operate the plant during normal, abnormal, and emergency plant conditions. (Crew critical tasks within this examination scenario guide are identified with an “*.”)

II. MAJOR EVENTS:

- A. Transfer B RPS to the Alternate Power Supply
- B. Condenser Level Transmitter failure
- C. RWCU leak, failure to automatically isolate
- D. SRV stuck open, and then closes (Similar to Audit, but modified)
- E. Seismic Event, Loss of Chilled Water to the Drywell
- F. Large Break LOCA/Downcomer Failure

III. SCENARIO SUMMARY:

The scenario begins at 100% power. Transfer of RPS B to its alternate power supply is required for MG set maintenance. Following the transfer, the controlling Condenser level transmitter fails. The crew must select an alternate transmitter to prevent a loss of Condenser level.

A leak will develop from the RWCU System. Manual isolation of the leak is required due to a failure of the automatic isolation circuitry.

After actions for the RWCU leak are complete, an SRV will stick open. The crew will be able to close the SRV once the operating switch has been cycled.

A seismic event will cause a loss of chilled water to the Drywell coolers. RACS, the alternate supply of cooling, will be placed in service.

A LOCA with Primary Containment failure will require an emergency depressurization of the RPV to minimize the potential for core damage and a significant off site release.

IV. INITIAL CONDITIONS:

INITIAL IC:

Initialize the simulator to IC-02; 100% power, MOL.

Close SV-4311

PREP FOR TRAINING: (i.e., computer set points, procedures, bevel covers)

Initial	Description
___ 1.	Markup HC.OP-SO.SB-0001, 5.4.1-5.4.4
___ 2.	Complete Attachment 2 "Simulator Ready-for-Training/Examination Checklist."

EVENT TRIGGERS:

Initial	Description
___ 1.	EVENT ACTION: ZDAD13HC COMMAND: DMF AD02HO PURPOSE: Key lock switch for F013H in override
___ 2.	EVENT ACTION: COMMAND: PURPOSE:

MALFUNCTION SUMMARY:

Initial	Description	Delay	Ramp	Remote/Event	Initial	Final
___ 1.	CU11A RWCU isolation valve F001 failure			Preinsert		
___ 2.	CU11B RWCU isolation valve F004 failure			Preinsert		
___ 3.	MC13B Condenser LVL transmitter LT-1657B failure			1/None		100
___ 4.	CU03 RWCU system leak		300	2/None		50
___ 5.	AD02HO Relief Valve F013H sticks open			3/None		
___ 6.	PC07A Seismic Event 1			4/None		
___ 7.	CW18A Turbine BLDG chilled water circ pump A trip	120		4/None		
___ 8.	CW18B Turbine BLDG chilled water circ pump B trip	120		4/None		
___ 9.	CW18C Turbine BLDG chilled water circ pump C trip	120		4/None		
___ 10.	RR31B1 Recirc loop leak in drywell		120	5/None		100
___ 11.	RR31B2 Recirc loop leak in drywell	90	420	5/None		20
___ 12.	PC04 Downcomer Break			5/None		

REMOTE/FIELD FUNCTION SUMMARY:

Initial	Description	Delay	Ramp	Remote/Event	Initial	Final
___ 1.	MS12 Main steamline drain valve HV-F019			Preinsert		Tagged
___ 2.	CU11 Group 7A HV-F004 RWCU supply isolation			Preinsert		Racked Open

I/O OVERRIDE SUMMARY:

Initial	Description	Delay	Ramp	Remote/Event	Initial	Final
___ 1.						
___ 2.						

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
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1. Transfer B RPS to the Alternate Power Supply.

- CRS directs placing the B RPS on its alternate power supply IAW HC.OP-SO.SB-0001.
- PO observes the ALTERNATE B FEED and GENERATOR B FEED is illuminated. (10-C610)
- PO turns the RPS MG SET TRANSFER SW to ALT B. (10-C610)
- PO directs the RO to refer to Section 5.3 and reset the Half Scram. RO:
 - Turns RPS TRIP SYSTEM B TRIP LOGIC B1 and B2 to RESET AND RETURN to NORM
 - Observes the TRIP LOGICB1 and B2 NORMAL/RESET lights are illuminated.
 - Observes the PILOT SCRAM VALVE SOLENOID TRIP ACTUATOR LOGICS A NORMAL AND B NORMAL lights are illuminated (Four Control Rod Groups).
 - Observes the REACTOR SCRAM TRIP LOGIC B1 and B2 annunciators are de-energized.

Event / Instructor Activity	Expected Plant/Student Response	Comments
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Note:

Respond as EO to Control Room instructions to and restore power to HV-F004 (Change Rem CU11 TO NORMAL) and HV-F019 (Change Rem MS12 TO NORMAL).

Note:

Respond as Chemistry that valves are closed.

Note:

Respond as Chemistry that the valves are open.

- PO directs the RO to refer to HC.OP-SO.SM-0001(Q), Primary Containment Isolation System Operation, and reset Nuclear Steam Supply Shutoff System and PCIS.
- Depresses the RESET push buttons for all four channels of PCIS and NSSSS.
- PO resets PAMs Recorders by pressing the High Speed Chart Drive Reset push buttons. (10C650C)
- PO directs restoration of power to the valves that were de-energized in Step 5.4.4.
- PO directs Chemistry to close P-RC-V9670 RWR SAMPLE ISLN TO PANEL 10-C251 and 1-RC-V006, RWCU SAMPLE PNL 10-C251 ISLN VLV.
- When P-RC-V9670 and 1-RC-V006 are CLOSED then the PO has the RO open BB-SV-4311, Reactor Water Sample Valve
- PO directs Chemistry to open P-RC-V9670 RWR Sample Isln to Panel 10-C251 and 1-RC-V006, RWCU Sample Pnl 10-C251 Isln Vlv
- Crew directs EO to shutdown the B RPS MG.

Event / Instructor Activity	Expected Plant/Student Response	Comments
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2. Condenser Level Transmitter failure.
INSERT RT-1 after RPS transfer is complete or at the discretion of the Lead Examiner.

Per HC.OP-AR.ZZ-0004, actions for alarms A6-F1(2,3) are to ensure proper controller operation.

Note: If the level transmitter is not noticed, eventually CONDENSATE TRAIN TROUBLE alarms will be received. If no action is taken, a low level trip of the PCPs, SCPs, RFPs, and a Reactor scram will eventually occur.

NOTE: If requested to respond to the control room and asked for guidance on transmitter failure, request the crew to select another transmitter input.

- Crew recognizes failure of level transmitter from CRIDS POINTS A2430 and T3119, and 10C651A indications.
- CRS directs the PO to select another condenser level transmitter.
- PO selects the directed condenser level transmitter and informs the CRS

3. RWCU leak, failure to automatically isolate.
TRIGGER RT-2 after actions for the condenser level transmitter are complete, or at the discretion of the Lead Examiner.

- Crew determines that a leak exists from RWCU by:
 - Observing CRIDS displays
 - CRIDS Alarms
 - RWCU STM LK ISLN TIMER INITIATED (D3-B3)
- RO notices RWCU DIFF FLOW HI (C1-A2) annunciator in alarm
- RO determines failure of RWCU to automatically isolate.

Time _____

Event / Instructor Activity	Expected Plant/Student Response	Comments
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Closure of F001 and F004 before receiving C1-A2 satisfies this Critical Task.

- RO completes Immediate Operator Actions in accordance with HC.OP-AB.CONT-0002:
 - Closes HV-F001 and F004
 - Informs the CRS
- * CREW isolates the RWCU system by shutting BG-HV-F001 and/or BG-HV-F004 within two minutes following receipt of annunciator C1-A2.
(K/A 223001A4.01 3.6/3.5)
K/A 223001A4.06 3.6/3.7)
- CRS directs the following in accordance with HC.OP-AB.CONT-0002:
 - Ensure that the isolation is effective
 - Direct Chemistry to isolate the Cleanup Filter Demin Inlet
- RO informs CRS of loss of continuous conductivity monitoring when OHA C1-F2 is received.

Time _____

4. SRV stuck open, and then closes.

TRIGGER RT-3 after actions for the RWCU leak are complete, or at the discretion of the Lead Examiner.

- CREW recognizes SRV F013A is open via annunciator C1-A3 and SRV F013A OPEN indication (10C650C).
- CREW verifies SRV F013A is open by checking Mwe drop, steam/feed flow mismatch, acoustic monitor, and/or SRV tailpipe temperature rising.

Time _____

Event / Instructor Activity	Expected Plant/Student Response	Comments
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If the Crew manually scrams the reactor during actions for the SRV failing open, **insert RT-4**

Verify malfunction **AD02HO** clears when PO cycles correct SRV.

- CRS implements HC.OP-AB.RPV-0006 and directs actions to:
 - Reduce power to 95%
 - CYCLE the SRV control switch to attempt to close the SRV
 - RO reduces power with Recirculation pumps to 95%.
 - PO cycles the F013H control switch and closes the F013H.
 - * CREW initiates actions and closes PSV-F013H by positioning key lock CLOSE/AUTO/OPEN control switch to the CLOSED position on 10C650C within 2 minutes of determining that F013H is open.
- (K/A 239002A2.03 4.1/4.2)
 (K/A 239002A4.01 4.4/4.4)
- RO monitors: RPV pressure, water level, power.
 - CREW recognizes SRV F013H is closed based upon SRV closed indication (10C650C), Mwe restoration, and proper steam/feed flow indication.
 - CRS references Tech. Spec. 4.6.4.1.b.1 for Suppression Chamber-DW vacuum breaker surveillance requirements following steam discharge to the Suppression Chamber and verifies SRV operability (Tech Spec 3.4.2.1, 3.4.2.2)

Time _____

NOTE:

Required Test is HC.OP-ST.GS-0004; required within 12 hours.

Event / Instructor Activity	Expected Plant/Student Response	Comments
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5. Seismic Event, Loss of Chilled Water to the Drywell.

After Technical Specifications have been addressed, **TRIGGER RT-4, ANNOUNCE "Motion can be felt and then stops"** or play the "Earthquake" sound effect for 15 seconds.

- RO/PO recognizes alarm condition, informs the CRS, and refers to alarm response procedure HC.OP-AR.ZZ-0001.
- CRS implements HC.OP-AB.MISC-0001 and directs actions to:
 - Terminate activities on the Refuel Floor
 - Determine the Seismic Event Level IMMEDIATELY following a Seismic Event by comparing the measured response spectra to the Operating Basis Earthquake (0.1g)
 - Thoroughly inspect systems essential for safe shutdown
 - Make a visual inspection of the plant to ensure structural integrity
 - Verify that the Security System is intact
- CRS dispatches the auxiliary building EO to investigate the alarm at panel 10C673.

Report as the ABEO that the seismic switch has tripped (Amber light on power supply drawer is on) and that the tape recorders are advanced but not running. The Event indicator is white.

Event / Instructor Activity	Expected Plant/Student Response	Comments
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If the National Earthquake Center is called, **report** seismic activity of 6.0 on Richter scale centered on Wilmington, Delaware.

- CRS evaluates the Response Spectrum annunciator (10C650C), and determines that a plant shutdown is required IAW HC.OP-IO.ZZ-0004.
- Crew recognizes that Turbine Bldg Chilled Water has been lost by observing E5-E1, and E5-F1 annunciators in alarm
- Crew recognizes that Drywell pressure is rising.
- CRS implements HC.OP-AB.CONT-0001 and directs actions to:
 - Align RACS to the Chill Water System in accordance with Action C
- PO aligns RACS to the Drywell in accordance with Action B:
 - Closes HV-9532-1 and HV-9532-2.
 - Presses LOOP A PLY/RTN OPEN RACS PB.
 - Presses LOOP B SPLY/RTN OPEN RACS PB.
 - Observes the following indications:
 - ◆ HV-9530A1/A3 CLOSED
 - ◆ HV-9530B1/B3 CLOSED
 - ◆ HV-9530A2/A4 OPEN
 - ◆ HV-9530B2/B4 OPEN
 - Opens HV-9532-1 and HV-9532-2.

Event / Instructor Activity	Expected Plant/Student Response	Comments
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6. Large Break LOCA/Downcomer Failure.
 TRIGGER RT-5 after Drywell cooling is being supplied by RACS, or at the discretion of the Lead Examiner.

- PO reports status of aligning RACS to the Drywell
- CREW recognizes / takes action for rising D/W press / temp, OHAs C6-B1, A7-E4 & D4, C5-B5, and informs CRS.
- CRS directs actions for the high Drywell pressure IAW HC.OP-AB.CONT-0001.
 - Maximize Drywell Cooling by ensuring:
 - ◆ All Drywell Fan Cooling Coils are Open
 - ◆ All Drywell Fans are running in Fast Speed
 - Perform the following:
 - ◆ Check Reactor Recirc. Pump Seals
 - ◆ Check SRV Tailpipe Temperatures
- PO maximizes Drywell cooling.
- Crew recognizes HI-HI Drywell pressure of 1.68 psig
- CRS reenters HC.OP-EO.ZZ -0101, enters HC.OP-EO.ZZ-0102, and directs actions to mitigate the leak.

Event / Instructor Activity	Expected Plant/Student Response	Comments
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- RO places the Rx mode switch in shutdown and takes actions IAW HC.OP-AB.ZZ-0001
- RO performs the following IAW HC.OP-AB.ZZ-0001:
 - Announces, “Crew - Standby for Scram Report”.
 - Locks the Mode Switch in Shutdown.
 - Announces the following:
 - ◆ Rod Motion status
 - ◆ APRM Downscale status
 - ◆ Reactor Shutdown status
 - WHEN the above actions are complete, then announces “Scram Report Complete”.
 - Inserts the SRM/IRM's
 - Selects IRM chart recorders.
 - When Main Generator output reaches zero Mwe, then trips the Main Turbine.
 - Locks Out the Main Generator
 - Ensures the Reactor Scram has been announced (over PA)
 - Reports “All Scram Actions Complete”
- RO/STA determines the Rx is shutdown by verifying all control rods are fully inserted and informs CRS

Event / Instructor Activity	Expected Plant/Student Response	Comments
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Note: If the CREW avoids exceeding the PSP curve by anticipating Emergency Depressurization and/or initiating Drywell Sprays, this critical task is considered to be met.

- Crew determines that containment pressure cannot be maintained below the Action Required area of the PSP curve.
- CRS directs actions to emergency depressurize the RPV in accordance with HC.OP-EO.ZZ-0202
- PO opens 5 ADS valves IAW HC.OP-AB.ZZ-0001.
- * CREW emergency depressurizes the RPV by opening at least 5 SRVs when Suppression Chamber level and pressure cannot be maintained below the PSP curve before Suppression Chamber pressure reaches 40 psig.

(K/A 295024EA2.04 3.9/3.9)

(K/A 223001A2.02 3.9/4.1)

Termination Requirements

The scenario can be terminated when the Reactor is depressurized, RPV level is being maintained in accordance with the Emergency Operating Procedures, or at the discretion of the Lead Examiner.

VI. SCENARIO REFERENCES:

- A. Conduct of Simulator Training.
- B. NUREG 1021, Examiner Standards
- C. JTA Listing
- D. Probabilistic Risk Assessment
- E. Technical Specifications
- F. Alarm Response Procedures (Various)
- G. Inservice and Surveillance Test procedures
- H. HC.OP-AB.CONT-0001 Drywell Pressure
- I. HC.OP-AB.CONT-0002 Primary Containment
- J. HC.OP-AB.MISC-0001 Acts of Nature
- K. HC.OP-AB.RPV-0006 Safety/Relief Valve
- L. HC.OP-AB.ZZ-0001 Transient Plant Conditions
- M. HC.OP-EO.ZZ-0101 RPV Control
- N. HC.OP-EO.ZZ-0101A ATWS-RPV Control
- O. HC.OP-EO.ZZ-0102 Primary Containment Control
- P. HC.OP-EO.ZZ-0202 Emergency RPV Depressurization
- Q. HC.OP-SO.SB-0001 Reactor Protection System Operation
- R. HC.OP-SO.SM-0001 Isolation Systems Operation
- S. SH.OP-AS.ZZ-0001 Operations Standards
- T.

VII. ESG CRITICAL TASK RATIONAL

ESG-SPARE / 00

1.

*** CREW isolates the RWCU system by shutting BG-HV-F001 and/or BG-HV-F004 within two minutes following receipt of annunciator C1-A2.**

(K/A 223001A4.01 3.6/3.5)

K/A 223001A4.06 3.6/3.7)

The RWCU System has failed to isolate automatically. Failure of the Crew to manually isolate the system will result in a bypass of the Primary Containment boundary and release of radioactive materials to the Reactor Building. Two minutes is deemed adequate time to affect isolation from the time confirmation of failure of the automatic isolation function is received.

2.

*** CREW initiates actions and closes PSV-F013H by positioning key lock CLOSE/AUTO/OPEN control switch to the CLOSED position on 10C650C within 2 minutes of determining that F013H is open.**

(K/A 239002A2.03 4.1/4.2)

(K/A 239002A4.01 4.4/4.4)

Crew actions prescribed in the Abnormal procedure provide the success path to preclude insertion of a manual scram. Abnormal procedures and Technical Specifications require a Reactor scram if unable to close the SRV within 2 minutes of opening. 2 minutes is sufficient time to attempt to close the SRV.

3.

*** CREW emergency depressurizes the RPV by opening at least 5 SRVs when Suppression Chamber level and pressure cannot be maintained below the PSP curve before Suppression Chamber pressure reaches 40 psig.**

(K/A 295024EA2.04 3.9/3.9)

(K/A 223001A2.02 3.9/4.1)

If suppression chamber pressure cannot be maintained below the pressure suppression pressure, EOPs direct actions to emergency depressurize the reactor. A LOCA condition while in the action required region of the Pressure Suppression Pressure curve, could cause design containment limits to be exceeded. Based upon the rate of pressure increase in this scenario, the upper limit of 40 psig is established to give the operator time to evaluate conditions and direct emergency depressurization actions.

HOPE CREEK ESG - PRA RELATIONSHIPS EVALUATION FORM

EVENTS LEADING TO CORE DAMAGE

<u>Y/N</u>	<u>EVENT</u>	<u>Y/N</u>	<u>EVENT</u>
	TRANSIENTS:		SPECIAL INITIATORS:
<input type="checkbox"/>	Turbine Trip	<input type="checkbox"/>	Loss of SSW
<input type="checkbox"/>	Loss of Feedwater	<input type="checkbox"/>	Loss of SACS
<input type="checkbox"/>	MSIV Closure	<input type="checkbox"/>	Loss of RACS
<input type="checkbox"/>	Loss of Condenser Vacuum	<input type="checkbox"/>	Loss of Instrument Air
<input checked="" type="checkbox"/>	Inadvertent Open SRV		
<input type="checkbox"/>	Loss Of Offsite Power	<input type="checkbox"/>	ATWS
<input type="checkbox"/>	Station Black Out	<input checked="" type="checkbox"/>	LOCA

COMPONENT/TRAIN/SYSTEM UNAVAILABILITY THAT INCREASES CORE DAMAGE FREQUENCY

<u>Y/N</u>	<u>COMPONENT, SYSTEM, OR TRAIN</u>	<u>Y/N</u>	<u>COMPONENT, SYSTEM, OR TRAIN</u>
<input type="checkbox"/>	HPCI	<input type="checkbox"/>	Class 1E 120VAC Bus – A Train
<input type="checkbox"/>	RCIC	<input type="checkbox"/>	Class 1E 120VAC Bus – D Train
<input type="checkbox"/>	One SRV	<input type="checkbox"/>	EDG A
<input type="checkbox"/>	One SSW Pump / Loop	<input type="checkbox"/>	EDG B
<input type="checkbox"/>	Circulating Water System – 4 pumps	<input type="checkbox"/>	TACS

OPERATOR ACTIONS IMPORTANT IN PREVENTING CORE DAMAGE

<u>Y/N</u>	<u>OPERATOR ACTION</u>
<input checked="" type="checkbox"/>	Manual RPV Emergency Depressurization when required
<input type="checkbox"/>	Manual RPV Depressurization during ATWS
<input type="checkbox"/>	Initiation of RHR for Decay Heat Removal
<input type="checkbox"/>	Initiation of Containment Venting
<input type="checkbox"/>	Restore Offsite power within 45 minutes
<input type="checkbox"/>	SACS/SSW restoration after total loss of both systems
<input type="checkbox"/>	Avoiding Loss of Feedwater during transient
<input type="checkbox"/>	Recovery of the Main Condenser

Complete this evaluation form for each ESG.

Hope Creek SIMULATOR Turnover Sheet

FOR TRAINING USE ONLY

Oncoming Shift: Days [X] Nights []

Rx Pwr: 100% Gen Output: 1114 MWe Work Window: B Risk Color: Green SMD: none

Activities completed last shift:

- Continued 100% power operations
- Made preparations to transfer B RPS power to Alternate. HC.OP-SO.SB-0001 complete through 5.4.4. Operators are standing by at the breakers

Major activities scheduled for the next 12 hours

- Transfer B RPS to Alternate power supply and remove the MG from service. Inform maintenance when removed from service.
- Continue 100% power operations

Operations Superintendent Issues:	
Protected Equip	•
Emergent Issues	•
WIN Team	•
Workarounds	•

Safety Issues: Safety Issue Hot Line Call "SAFE" (extension 7233)					
Notif/Date	Description	Immediate Mitigation	Additional Action	Assignee	Date

Active Technical Specification Action Statements:					
Number	Planned	LCO	DEFICIENCY	Exp. Date / Time	Add'l Action

Compensatory Actions in Effect (Required by CROD/CRFA for Operability)			
Number	DEFICIENCY	COMPENSATORY ACTIONS	DUE

Follow-up Operability Assessments (CRFA) Assigned			
Number	DEFICIENCY	ASSIGNED	DUE

Reactivity Controls:

- 100% power MOL

Safety Systems:

-

Balance of Plant:

-

Electrical:

-

Cooling Water:

-

Rad Monitoring:

-

Emergency Use Equipment:

-

Computer:

-

Administrative:

-