HOPE CREEK ELECTRIC GENERATING STATION
NRC INITIAL LICENSED EXAMINATION SCENARIO 1
NOVEMBER 28, 2005

SCENARIO TITLE: **Reactor Startup/ Loss of 'B' MB Set/ RCIC Steam Leak**

SCENARIO NUMBER: **NRC-001**

EFFECTIVE DATE:

EXPECTED DURATION: 1.0 Hours

REVISION NUMBER: **1**

PROGRAM:

[ ] **L.O. REQUAL**

[X] **INITIAL LICENSE**

[ ] **OTHER** _____

REVISION SUMMARY:

New Scenario.

PREPARED BY: M. L. Brown — 9/29/05
NRC Operations Examiner — **DATE**

FACILITY REVIEWER: _____ — _____
Nuclear Operations Training Supervisor – Hope Creek — **DATE**

APPROVED BY: _____ — _____
NRC Chief Examiner — **DATE**

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 "CT-X.")

II. MAJOR EVENTS:

A. Withdraw Group 7 Control Rods to position 8
B. PT-N078B, Steam Dome Pressure Transmitter fails LOW
C. Loss of "B" MG Set and Control Rod 22-35 inadvertently scrams (TS)
D. "A" CRD pump trips
E. Steam Leak from RCIC piping
F. RCIC isolation valves fail to close
G. "E" SRV fails Open

III. SCENARIO SUMMARY:

The scenario begins with a Reactor Startup in progress with IOP-3 completed up to step 5.3.29. Reactor power is approximately 4%. 1BP116 EHC pump is tagged out for maintenance and will be out of service until a new pressure compensator arrives tomorrow. After the operators have pulled Group 7 rods to position 8 and placed the Secondary Condensate Pump in service, Pressure Transmitter PT-N078B fails low. After Tech specs are addressed, the "B" MG Set trips and Control Rod 22-35 inserts, causing a ½ scram and RWCU isolation. The operators will have to restore power to the "B" RPS from the alternate source. The operators will have to declare the rod inop and comply with Tech Specs. After power has been restored and Tech Specs addressed, the "A" CRD pump trips requiring the operators to start the "B" CRD pump to avoid a Reactor Scram. Once the "B" CRD pump has been started, a steam leak develops on RCIC. The RCIC isolation valves fail to close causing RCIC room temperature to increase. The Crew should enter EOP-103 based on high room temperature and may place FRVS in service per HC.OP-AB.CONT-0004, South Plant Vent Activity and attempt to shutdown RCIC. The Crew will discover that the RCIC isolation valves can't be closed. The Crew should scram the reactor based upon RCIC room temperature approaching safe operating limit and enter EOP-101 or AB-0000. When temperature exceeds Max Safe Operation limit in 2 areas, crew should enter EOP-202, Emergency Depressurization. When the crew goes to Emergency Depressurize, "E" ADS valve will not open, requiring the BOP to open another SRV. Scenario will end after 5 SRVs have been opened.

IV. INITIAL CONDITIONS:

	I.C.
Initial	
	INITIALIZE the simulator to IC-11 (4% power, MOL)
	RAISE Pressure to 500#
	PREWARM "B" SJAE
	RESET HPCI High Level Trip
	PLACE CP161 Chilled Water Circ Pump in MAN

	PREP FOR TRAINING (i.e., RM11 set points, procedures, bezel covers)
Initial	Description
	Items required to be set up each time the SG is performed, i.e. tagged equipment, RM11 set points, procedures, etc.
	COMPLETE Attachment 2 "Simulator Ready-for-Training/Examination Checklist" of NC.TQ-DG.ZZ-0002(Z).

EVENT TRIGGER			
Initial	ET #	Description	
	1	EVENT ACTION: COMMAND: PURPOSE:	rp:k14a>=1.0 && rp:k14b>=1.0&&lcvposx(106)<=0.0 dmf cd062235 Raises EHC Filter Clogging to 100% severity when 'B' EHC pump is started
	2	EVENT ACTION: COMMAND: PURPOSE:	rcvv(1) <= 0.98 // RCIC steam isolation Trip breaker when valve closure attempted
	3	EVENT ACTION: COMMAND: PURPOSE:	rcvv(4) <= 0.98 // RCIC steam isolation Trip breaker when valve closure is attempted
	4	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=130 // RCIC Room Temperature Set hvtr4111 = 120 Raises HPCI Room temp as RCIC temp rises
	5	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=140 // RCIC Room Temperature Set hvtr4111 = 130 Raises HPCI Room temp as RCIC temp rises

EVENT TRIGGER			
Initial	ET #	Description	
	6	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=150 // RCIC Room Temperature Set hvtr4111 = 140 Raises HPCI Room temp as RCIC temp rises
	7	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=160 // RCIC Room Temperature Set hvtr4111 = 150 Raises HPCI Room temp as RCIC temp rises
	8	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=170 // RCIC Room Temperature Set hvtr4111 = 160 Raises HPCI Room temp as RCIC temp rises
	9	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=180 // RCIC Room Temperature Set hvtr4111 = 170 Raises HPCI Room temp as RCIC temp rises
	10	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=190 // RCIC Room Temperature Set hvtr4111 = 180 Raises HPCI Room temp as RCIC temp rises
	11	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=200 // RCIC Room Temperature Set hvtr4111 = 190 Raises HPCI Room temp as RCIC temp rises
	12	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=210 // RCIC Room Temperature Set hvtr4111 = 200 Raises HPCI Room temp as RCIC temp rises
	13	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=220 // RCIC Room Temperature Set hvtr4111 = 210 Raises HPCI Room temp as RCIC temp rises
	14	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=230 // RCIC Room Temperature Set hvtr4111 = 220 Raises HPCI Room temp as RCIC temp rises
	15	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=240 // RCIC Room Temperature Set hvtr4111 = 230 Raises HPCI Room temp as RCIC temp rises
	16	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=250 // RCIC Room Temperature Set hvtr4111 = 240 Raises HPCI Room temp as RCIC temp rises
	17	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=255 // RCIC Room Temperature Set hvtr4111 = 245 Raises HPCI Room temp as RCIC temp rises

EVENT TRIGGER			
Initial	ET #	Description	
	18	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=256 // RCIC Room Temperature Set hvtr4111 = 246 Raises HPCI Room temp as RCIC temp rises
	19	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=257 // RCIC Room Temperature Set hvtr4111 = 247 Raises HPCI Room temp as RCIC temp rises
	20	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=258 // RCIC Room Temperature Set hvtr4111 = 248 Raises HPCI Room temp as RCIC temp rises
	21	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>= 259 // RCIC Room Temperature Set hvtr4111 = 249 Raises HPCI Room temp as RCIC temp rises
	22	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=260 // RCIC Room Temperature Set hvtr4111 = 250 Raises HPCI Room temp as RCIC temp rises
	23	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=261 // RCIC Room Temperature Set hvtr4111 = 251 Raises HPCI Room temp as RCIC temp rises
	24	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=262 // RCIC Room Temperature Set hvtr4111 = 252 Raises HPCI Room temp as RCIC temp rises
	25	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=265 // RCIC Room Temperature Set hvtr4111 = 255 Raises HPCI Room temp as RCIC temp rises
	26	EVENT ACTION: COMMAND: PURPOSE	hvtr 4110>=270 // RCIC Room Temperature Set hvtr4111 = 260 Raises HPCI Room temp as RCIC temp rises

MALFUNCTION SUMMARY:

Initial	Description	Delay	Ramp	Trigger	Init Val	Final Val
	RC10 – RCIC steam isolation valves F007 & F008 fail to Auto Close	---	---	NONE	---	---
	RP17B – RPS PT-N078B failure	---	---	RT-1	515.205	0
	RP02B – RPS MG set B failure	---	---	RT-2	---	---
	CD062235 Control Rod 22-35 SCRAM	0:02	---	RT-2	---	---
	CD10A – CRD Hydraulic Pump A trip	---	---	RT-3	---	---
	RC09 – RCIC Steam Line break inside the RCIC Room 4110	---	1:00	RT-4	0	100
	AN-A2A5 CRYWOLF ANN A2A5 – Fire Prot Panel	---	---	RT-4	---	---
	HP09 – HPCI Steam line break inside the HPCI Room 4111	1:00	---	RT-4	0	1
	AD02EC – ADS/Relief valve F013E fails to OPEN	---	---	NONE	---	---

REMOTE/FIELD FUNCTION SUMMARY:

Initial	Description	Delay	Ramp	Trigger	Init Val	Final Val
	PP05 – OD-3 MFLCPR Fraction Limiting	---	---	NONE	.861	.036
	PP06 – OD-3 MFLPD	---	---	NONE	.723	.028
	PP07 – OD-3 MAPRAT	---	---	NONE	.633	.023
	RC03 – GROUP 6A HV-F007 RCIC Steam Supply Valve	---	---	ET-2	NORMAL	RACK OPEN
	RC05 – GROUP 6A HV-F008 RCIC Steam Supply Valve	---	---	ET-3	NORMAL	RACK OPEN

I/O OVERRIDE SUMMARY:

Initial	Description	Delay	Ramp	Trigger	Init Val	Final Val
		---	---	NONE	---	---

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
Crew assumes the watch at step 5.3.29 of IO.ZZ-0003, and continues plant startup per procedure	• CRS directs the RO to pull group 7 rods to position 8 to get 1 Turbine Bypass valve to open • RO selects Group 7 Control Rod • RO pulls Group 7 rod to position 8 observing the following: • Rod only moves 1 notch • • CRS directs BOP to start the Secondary Condensate Pump IAW SO.AE-0001 • BOP reviews P&L's of SO.AE.0001 • BOP goes to step 5.1.17 of SO.AE-0001 to start the Secondary Cond. Pump (this will refer him/her back to Step 5.1.11) • BOP Ensures at least 2 Cond. Pumps are running • BOP dispatches an NEO to start the Lube Oil System	
After 2 minutes NEO reports back that the Aux Lube Oil Reservoir level for the Secondary Condensate pump to be started is normal	• BOP depresses the SEC CNDS PUMP B AUX LUBE OIL PMP START push-button • BOP observes PI-1669B pressure between 7 to 9 psig. • BOP ensures HV-1651B, discharge valve is closed • BOP Observes SEC CNDS PUMP B START ENABLE is illuminated. • BOP has NEO ensure FIC-1650B is in AUTO with a setpoint of 5500 gpm	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
The NEO reports FIC-1650B is in AUTO with a setpoint of 5500 gpm	• BOP Starts Secondary Condensate Pump B and observes: • Min flow valve OPEN light is illuminated • Motor Amps are < 279 amps • BOP stops the B Aux Lube Oil pump and returns it to AUTO • BOP presses AD-HV-1710 PRI CNDS FLOW PATH MIN FLOW RECIRC CLOSE PB	
PT-N078B fails Low Once the crew has started the Secondary Condensate Pump OR At the discretion of the Lead Examiner **TRIGGER – RT1**	• RO observes several annunciators illuminate and diagnoses that PT-N078B has failed LOW	
	• CRS/RO refers to ARP for the illuminated Annunciators • C3-B4 – RPS TRIP SYS B OUT OF SVCE • C8-A5 – NSSSS INBD ISLN SYS OUT OF SVCE • CRS determines that PT-N078B is INOP and enters the following LCO's • 3.3.1 – Function Unit 3 Action A – Put in the Trip Condition within 12 hours • 3.3.2 Trip Function 7B b.1)b. – Put in the Trip Condition within 12 hours • 3.3.7.5 – Accident Monitoring System Action 80 – Restore to Operable within 30 days or initiate actions of 6.9.2 • CRS contacts I&C to repair instrument	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
Loss of "B" MG Set and Rod 22-35 Inadvertently Scrams Once the CRS has addressed Tech Specs and contacted I&C OR At the discretion of the Lead Examiner **TRIGGER – RT2**	• Crew recognizes trip of "B" MG Set	

	• RO responds to Annunciators
	• RO recognizes that NO actual scram condition exists and DOES NOT scram the reactor
	• CRS enters AB-IC-0003
	• Determines Normal CANNOT be restored
	• Directs RO to Transfer power to Alternate power supply
	  • RO verifies Alternate Power is available
	  • RO Transfers Power to Alternate Power Supply by Positioning the RPS MG SET TRANSFER SWITCH to the Alternate Position.
	  • RO Resets the ½ Scram by:
	  o Turning the key for the Affected RPS channel to the RESET position
	  o Turning the key back to the NORMAL position
	  o Verify the scram is reset
	• BOP Observes MSIV's are OPEN
		Improper operation of this will cause a scram

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments

	• CRS directs that the tripped NSSS logic be reset
	• RO presses the NUCLEAR STEAM SUPPLY SHUTOFF SYSTEM TRIP LOGIC B RESET Pb.
	• RO Verifies MSIV TRIP LOGIC TRIPPED light goes off
	  • CRS directs restoration of isolated Equipment (RWCU isolated and Mechanical Vacuum pumps have tripped)
	  • RO Restores isolated equipment IAW applicable SOP
	  • Crew observes that Mechanical Vacuum pumps have tripped
	  • CRS may elect to restart Mechanical Vacuum pumps here or may wait
	  • RO restores RWCU system IAW applicable SOP.	

	• RO diagnoses that Rod 22-35 has Scrammed • RO references ARP for C6-E3, Rod Drift – Digital Point C078 • Determines only 1 Rod has Scrammed • Informs CRS to refer to Tech Spec 3.1.3 and 3.2 • Checks Reactor Thermal Limits • Notifies the On-Call Reactor Engineer IAW RE-AP.ZZ-0101	This may occur prior to completion of actions for loss of RPS bus

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
	• CRS enters AB.IC-0001, Control Rod • CRS/RO determines that Multiple Rods are NOT drifting or Scrammed • CRS determines that Charging water Header pressure is > 940 psig and DOES NOT have the RO scram the Reactor • CRS Enters Section C of AB.IC-0001, Malfunction results in Inadvertent Rod Motion • Has RO review ARP for Rod Drift • Contacts Rx Engineer for guidance • Compares present LPRM reading with previously recorded LPRM readings • Checks Thermal Limits • CRS determines Control Rod is Fully inserted and cannot be restored and has the Control Rod 22-35 Electrically disarmed • CRS refers to Tech Specs 3.1.3.1 and determines the Control Rod is INOP and complies with b. 2. and has the Control Rod disarmed within 1 hour	
<u>"A" CRD Hydraulic Pump Trip</u> Once the Crew has stabilized the plant and addressed Tech Specs OR At the discretion of the Lead Examiner **TRIGGER RT-3**	• RO responds to Annunciator C6-F2, CRD Trouble – Digital Point D2244 • RO diagnoses "A" CRD pump has tripped.	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments

	• RO/CRS dispatches NEO's to:
	  • The Aux Building to look at the CRD Breaker
	  • The Reactor Building to look at the pump	

After 2 minutes have the NEO in the Aux. Bldg report that the "A" pump motor tripped on overcurrent and the NEO in the Rx Bldg report that the motor is hot to the touch.	• RO places Drive Water Flow controller in Manual and set to 0	
	• RO starts B CRD pump and restores system flow to 63 gpm • RO Adjusts HV-F003 to restore system pressure to normal • RO Returns Drive water flow controller to AUTO	
<u>RCIC Steam Leak</u> Once the crew has stabilized the plant after the CRD pump trip OR At the discretion of the Lead Examiner **TRIGGER – RT4**	• RO responds to Annunciator A2-A5, Fire Prot Panel 10C671 • BOP checks Fire Protection CRT and determines Fire alarm is from the RCIC Pump Room	
	• Crew dispatches an NEO to the RCIC pump room to investigate	
After 2 minutes have the NEO report that he sees a lot of steam in the pump room but no fire.	• BOP responds to annunciator D3-A2, RCIC/RHR B Area Leak Temp Hi	
	• BOP attempts to close HV-F007 and HV-F008, RCIC Steam Supply Isolation Valves • BOP reports Steam Supply isolation valves won't close	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
	• Crew requests assistance from NEO/ WCC to close RCIC isolation valve • CRS Enters EO-0103 based on Room Temp in RCIC Room > Max Normal Op Temp ▪ CRS directs RO/BOP to monitor and Control Reactor Building Temps ▪ BOP reports RCIC pump room temperature > Column 1 – Max Normal Op Temp	
	• CRS determines FRVS is NOT in service • CRS directs BOP to verify proper operation of RBVS and Emergency Area Cooling System • BOP determines RBVS and Emergency Area Cooling systems are operating properly • CRS directs BOP to start all available RBVS fans • BOP starts all available RBVS fans • BOP reports RCIC pump room temperature > Max Safe Op Temp • CRS determines RCS is discharging into the Reactor building	Note – CRS may elect to put FRVS in service at this time. This action is acceptable
CT-1 Crew INITIATES a manual scram BEFORE RCIC Room Temp reaches 250°F	• CRS directs a Recirc Runback and a Reactor Scram before RCIC room temperature reaches 250°F • CRS enters EO-101 concurrently with this procedure • RO Performs the Actions of AB.ZZ-0001, Attachment 1, Reactor Scram	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments

	RO performs the following:
	• **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 **ANNOUNCE** "Scram Report Complete".
	• **INSERTS** the SRM/IRM's.
	• **SELECTS** IRM chart recorders.
	• WHEN Main Generator output reaches zero Mwe
	THEN **TRIPS** the Main Turbine.
	• **LOCK OUTS** the Main Generator.
	• **ENSURES** the Reactor Scram has been announced (over PA).
	• **REPORTS** "All Scram Actions Complete".
	• BOP verifies H2 Injection System Tripped
	• RO maintains RPV level between +12.5" and 54" using Condensate/ Feedwater
	• BOP stabilizes RPV pressure below 1037 psig using the Turbine Bypass valves	

NOTE: If crew attempts to open bypass valves to depressurize the reactor, then fail Bypass valves shut.

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments

	• CRS determines that all entry conditions have cleared and exits EO-0101 and enters AB.ZZ-0000
	• Crew stabilizes the plant in AB.ZZ-0000
	• BOP reports 2nd area has exceeded it's Max Safe Op Limit
	• CRS determines Emergency Depressurization is required and enters EO-0202
	• CRS determines the following:
	  o Reactor is shutdown from all conditions without boron
	  o DW pressure is < 1.68 psig
	  o Supp Pool level > 0"
	• CRS orders 5 ADS valves to be Opened	

CT-2 Crew Emergency Depressurizes the plant within 5 minutes of when ED conditions are reached. Note - Failure of "E" ADS to open was input as an initial condition	• BOP Places all 5 ADS valve hand switches to OPEN • BOP recognizes PSV-F013E failed to OPEN • CRS directs BOP to open non-ADS SRVs until a total of 5 SRVs are open	
CT-3 Crew opens at least 5 SRV's to comply with ED criteria	• BOP opens an additional SRV until a total of 5 SRVs are open	
Termination Requirement: When 5 SRV are OPEN OR At Lead Examiner Discretion	Put the simulator in Freeze	Inform the candidates that the simulator is in freeze and to standby for follow questions

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
	• CRS determines an SAE Classification is required based on 4 points for failure of the RCS barrier (3.2.3 B) and 2 points for the failure of the Containment Barrier (3.3.4)	It is anticipated that the CRS candidate will be asked to classify this event and the results will be counted as one of his JPMs.

VI. SCENARIO REFERENCES:

A. NC.TQ-DG.ZZ-0002 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. SH.OP-AS.ZZ-0001 Operations Standards
I. SH.OP-AP.ZZ-0101 Post Transient Response Requirements
J. SH.OP-AP.ZZ-0108 Operability Assessment and Equipment Control Program
K. HC.OP-IO.ZZ-0003 Startup from Cold Shutdown to Rated Power
L. HC.OP-SO.AE-0001, FEEDWATER SYSTEM OPERATION
M. HC.OP-AB.CONT-0002, PRIMARY CONTAINMENT
N. HC.OP-AB.IC-0001 Control Rod
O. HC.OP-AB.IC-0003, Reactor Protection System
P. HC.OP-AR.ZZ-0002, Overhead Annunciator Window Box A2
Q. HC.OP-AR.ZZ-0011, Overhead Annunciator Window Box C6
R. HC.OP-AB.ZZ-000 Reactor Scram
S. HC.OP-AB.ZZ-0001 Transient Plant Conditions
T. HC.OP-EO.ZZ-0101 RPV Control
U. HC.OP-EO.ZZ-0103 Reactor Building Control
V. HC.OP-EO.ZZ-0202 Emergency RPV Depressurization
W. HC.RE-IO.ZZ-0001 Core Operations Guidelines

VII. NRC CRITICAL TASK RATIONAL

NRC-001 / 01

1.

* ***Crew INITIATES a manual scram BEFORE RCIC Room Temp reaches 250°F.***

K/A 295032 High Secondary Containment Area Temperature
EK3.02 Knowledge of the reasons for the following responses as they apply to HIGH SECONDARY CONTAINMENT AREA TEMPERATURE : Reactor SCRAM.....(CFR: 41.5 / 45.6)
RO 3.6/ SRO 3.8

RCIC Room temperature is approaching the Max Safe Operating Temperature. If the temperature in this room approaches its maximum safe operating value, adequate core cooling, containment integrity, safety of personnel, or continued operability of equipment required to perform EOP actions can no longer be assured. EOP-101 must be entered to make certain the reactor is scrammed. Scramming the reactor reduces to decay heat levels the energy that the RPV may be discharging to the reactor building.

2.

* ***Crew actuates five SRVS within two minutes of RCIC room temperature exceeding 250 degrees by Control Room indication (SPDS/CRIDS).***

K/A 295032 High Secondary Containment Area Temperature
EK3 Knowledge of the reasons for the following responses as they apply to HIGH SECONDARY CONTAINMENT AREA TEMPERATURE
EK3.01 Emergency/normal depressurization RO 3.5 SRO 3.8
EA2 Ability to determine and/or interpret the following as they apply to HIGH SECONDARY CONTAINMENT AREA TEMPERATURE
EA2.01 Area temperature RO 3.8 SRO 3.8

The steam leak in the HPCI room is now affecting a second area. The reactor must be depressurized to place it in it's lowest energy state due to the potential for multiple inoperable safety systems, to reduce the driving head for the leak, and to reject decay heat to the suppression pool rather than the Reactor Building. The term "Crew actuates five SRVs" takes into account the F013D failure, which is already inserted. Two minutes is deemed adequate time to recognize the condition and implement EOP-202 and AB.ZZ-0001 Att. 13.

3.

* ***<u>WHEN</u> the PSV-F013D SRV fails to open,***
<u>THEN</u> before RPV pressure drops below 50 psig, the Crew ensures a fifth SRV is opened to achieve five open SRVs.

K/A 239002 Relief/Safety Valves
A4 Ability to manually operate and/or monitor in the control room:
A4.01 SRV's RO 4.4 SRO 4.4

The Minimum Number of SRVs required for Emergency Depressurization (MNSRED) is five. The MNSRED is utilized to assure the RPV will depressurize and remain depressurized when Emergency Depressurization is required. When the PSV-F013D fails to open, the Crew needs to open an additional SRV to achieve MNSRED. This is directed by both EOP-202 and AB.ZZ-0001. SRV's are designed to open with a minimum differential pressure of 50 psid between the reactor vessel and the suppression chamber. Below this d/p, they may not open. If the Crew does not attempt to open the fifth SRV before this minimum d/p is lost, they cannot validate it's operation. This would prevent them from detecting the failure and pursuing the use of the Alternate Depressurization Systems in EOP-202.

NRC-001 / 00

HOPE CREEK NRC - PRA RELATIONSHIPS EVALUATION FORM

EVENTS LEADING TO CORE DAMAGE

Y/N	EVENT	Y/N	EVENT
	TRANSIENTS:		SPECIAL INITIATORS:
_____	Turbine Trip	_____	Loss of SSW
_____	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	_____	LOCA

COMPONENT/TRAIN/SYSTEM UNAVAILABILITY THAT INCREASES CORE DAMAGE FREQUENCY

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

OPERATOR ACTIONS IMPORTANT IN PREVENTING CORE DAMAGE

Y/N	OPERATOR ACTION
Y	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 Exam.

VIII. TURNOVER SHEET:

Rx Power: 4%
Rx Pressure: 480 psig (May vary slightly):
Work Week: Any
Risk Color: Green
SMD: None
River Temp: 65

Activities Completed Last Shift:
Achieved Criticality, raised pressure up to 460 psig.

Major Activities Next 12 Hours:

- Continue Reactor Startup currently at step 5.3.29
- Pull Group 7 rods to position 8
- Place Secondary Condensate Pump in service

Protected Equipment:
None

Tagged Equipment:
1BP116 EHC pump is tagged out for maintenance and will be out of service until a new pressure compensator arrives tomorrow.

IX. SIMULATOR NRC REVIEW/VALIDATION CHECKLIST

NRC EXAMINATION SCENARIO GUIDE REVIEW/VALIDATION

Note: This form is used as guidance for an examination team to conduct a review for the proposed exam scenario(s). Attach a separate copy of this form to each scenario reviewed.

SELF-CHECK NRC- 001 REVIEWER: _____

_____ 1. The scenario has clearly stated objectives in the scenario.

_____ 2. The initial conditions are realistic, equipment and/or Instrumentation may be out of service, but it does not cue crew into expected events.

_____ 3. Each event description consists of:

- The point in the scenario when it is to be initiated
- The malfunction(s) that are entered to initiate the event
- The symptoms/cues that will be visible to the crew
- The expected operator actions (by shift position)
- The event termination point

_____ 4. The use of non-mechanistic failures (e.g. pipe break) should be limited to one or a credible preceding event has occurred.

_____ 5. The events are valid with regard to physics and thermodynamics.

_____ 6. Sequencing/timing of events is reasonable (e.g. the crew has time to respond to the malfunctions in an appropriate time frame and implements procedures and/or corrective actions).

_____ 7. Sequencing/timing of events is reasonable, and allows for the examination team to obtain complete evaluation results commensurate with the scenario objectives.

_____ 8. If time compression techniques are used, scenario summary clearly so indicates.

_____ 9. The simulator modeling is not altered.

_____ 10. All crew competencies can be evaluated.

_____ 11. Appropriate reference materials are available (SOERs, LERs, etc.)

_____ 12. If the sampling plan indicates that the scenario was used for training during the requalification cycle, evaluate the need to modify or replace the scenario.

_____ 13. Proper critical task methodology used IAW NRC procedures.

NRC Examination Validation:

Rev.	Date	Comments

Note: The following criteria list scenario traits that are numerical in nature. A second set of numbers indicates a range to be met for a set of two scenarios. Therefore, to complete this part of the review, the set of scenarios must be available. The section below should be completed once per scenario set.

NRC: **001** **NRC:** _____

SELF-CHECK

_____ 1. Total malfunctions inserted: 4-8/10-14

_____ 2. Malfunctions that occur after EOP entry: 1-4/3-6

_____ 3. Abnormal Events: 1-2/2-3

_____ 4. Major Transients: 1-2/2-3

_____ 5. EOPs used beyond primary scram response EOP: 1-3/3-5

_____ 6. EOP Contingency Procedures used: 0-3/1-3

_____ 7. Approximate scenario run time: 45-60 minutes (one scenario may approach 90 minutes)

_____ 8. EOP run time: 40-70% of scenario run time

_____ 9. Crew Critical Tasks: 2-5/5-8

_____ 10. Technical Specifications are exercised during the test

_____ 11. Events used in the two scenarios are not repeated

_____ 12. The scenario sets for the exam week do not contain duplicate scenarios

Comments:

HOPE CREEK ELECTRIC GENERATING STATION
NRC INITIAL LICENSED EXAMINATION SCENARIO 2
NOVEMBER 28, 2005

SCENARIO TITLE: **Loss of 10B130/ Electrical ATWS/ Small Break LOCA**

SCENARIO NUMBER: **NRC-002**

EFFECTIVE DATE:

EXPECTED DURATION: 1.0 Hours

REVISION NUMBER: **01**

PROGRAM:

[ ] **L.O. REQUAL**

[X] **INITIAL LICENSE**

[ ] **OTHER** _____

REVISION SUMMARY:

New Scenario.

PREPARED BY: M. L. Brown — 9/29/05
NRC Operations Examiner — **DATE**

FACILITY REVIEWER: _____ — _____
Nuclear Operations Training Supervisor – Hope Creek — **DATE**

APPROVED BY: _____ — _____
NRC Chief Examiner — **DATE**

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 " CT-X.")

II. MAJOR EVENTS:

A. Power increase using Recirc Flow
B. Place 3 RFP in service
C. Inadvertent HPCI initiation
D. 10B130 trips causing a loss of "B" Recirc pump
E. EHC pump filters clog, Electrical ATWS
F. Small Break LOCA
G. RHR pump being placed in Drywell Spray trips

III. SCENARIO SUMMARY:

The plant is operating at 80% power, Middle Of Cycle with SLC Pump AP-208 tagged out for a motor replacement and is expected back within 48 hours. The Crew will raise power to ~80% load by raising Recirc Flow. Once load has been increased to ~80% the Crew will place the 3rd RFP pump in service IAW SO.AE-0001.

When the 3rd RFP has been placed in service, HPCI will inadvertently initiate. The crew will respond per AB.RPV-0001, Reactor Power, and terminate HPCI operation. A scram on high flux may occur if HPCI is not terminated. HPCI will be declared Inoperable and Tech Specs addressed.
Once Tech Specs have been addressed, power will be lost to 480 VAC Unit Substation 10B130. This results in loss of power to the "B" Recirc Pump MG Set Lube Oil pump and loss of a Turbine Building Chiller. The Standby Lube Oil pump will fail to start and the "B" Recirc Pump's MG Set will trip. This places the plant in Region 1 - Immediate Exit region of the power to flow map. Recirculation flow must be increased or control rods must be inserted to exit Region 1. It is expected that the crew will enter AB.RPV-0003 and take the appropriate actions. In addition, loss of the Turbine Building Chiller will require the crew to either restart the chiller or swap to RACS.

Once the crew has stabilized the plant, the EHC discharge filter will clog. The crew will respond to the annunciator and swap EHC pumps after the 2nd pump is started it's filter will also clog requiring a manual scram. Manual scram will not work requiring the crew to initiate RRCS. Shortly after the Rods are inserted, all the turbine bypass valves fail close. As the crew is stabilizing the plant a LOCA occurs causing Drywell pressure to increase. Suppression pool spray will be placed in service, however, Suppression Pool pressure will continue to rise requiring Drywell spray be placed in service. The first RHR pump that is placed in Drywell Spray will trip requiring the operators to swap loops to initiate Drywell spray. The scenario will terminate once Drywell spray has been initiated.

IV. INITIAL CONDITIONS:

	I.C.
Initial	
	INITIALIZE the simulator to IC-5 (~80% power, MOL)
	ESTABLISH conditions with 10A rods at 04, Core Flow at 74 mlbm/hr, Rx Power 83.5%
	ENSURE A1P128 Recirc MG Oil pump running
	PLACE A2P128 Recirc MG Oil pump in MAN
	PLACE CP161 Chilled Water Circ pump in MAN

	PREP FOR TRAINING (i.e., RM11 set points, procedures, bezel covers)
Initial	Description
	Items required to be set up each time the SG is performed, i.e. tagged equipment, RM11 set points, procedures, etc.
	COMPLETE Attachment 2 "Simulator Ready-for-Training/Examination Checklist" of NC.TQ-DG.ZZ-0002(Z).

EVENT TRIGGERS:

Initial	ET #	Description	
	1	EVENT ACTION: COMMAND: PURPOSE:	Tunrhp(2) >= 0.5 // 'B' EHC pump running Imf tc16 100 Raises EHC Filter Clogging to 100% severity when 'B' EHC pump is started
	2	EVENT ACTION: COMMAND: PURPOSE:	Crqnmi <= 30 // Reactor Power <=30% Fails turbine bypass valves shut after reactor is scrammed
	3	EVENT ACTION: COMMAND: PURPOSE:	Rhv021(1) >=1.0 && rh:bkr(2) >=1.0 // 'A' RHR Spray w'B' RHR running Trips 'A' RHR if placed in Drywell Spray while 'B' RHR is still running
	4	EVENT ACTION: COMMAND: PURPOSE:	Rhv021(2) >=1.0 && rh:bkr(1) >=1.0 // 'B' RHR Spray w'A' RHR running Trips 'B' RHR if placed in Drywell Spray while 'A' RHR is still running

MALFUNCTION SUMMARY:

Initial	Description	Delay	Ramp	Trigger	Init Val	Final Val
	AN-C1B1 CRYWOLF ANN C1B1 SLC Pump/Valve O/PF	---	---	NONE	---	---
	HP11 Inadvertent HPCI Start	---	---	RT-1	---	---
	ED12C Loss of 480 VAC Non-essential bus 10B130	---	---	RT-2	---	---
	TC16 EHC pump discharge filter plugging	---	---	RT-3	0	15
	RP04 Failure of RPS to SCRAM (ATWS)	---	---	NONE	---	---
	RZ03A RRCS Channel A – Logic A Failure to Actuate	---	---	NONE	---	---
	RZ03D RRCS Channel B – Logic B Failure to Actuate	---	---	NONE	---	---
	TC01-10 All turbine bypass valves fail closes	01:00	---	ET-2	---	---
	RR31A2 Recirc loop A Large break [V]	---	10:00	RT-4	2	5
	PC04 Downcomer break	---	---	RT-4	---	---
	RH04A RHR pump AP202 trip	---	---	ET-3	---	---
	RH04B RHR pump BP202 trip	---	---	ET-4		

REMOTE/FIELD FUNCTION SUMMARY:

Initial	Description	Delay	Ramp	Trigger	Init Val	Final Val
	ET72 SLC Pump A	---	---	NONE	TAGGED	TAGGED
	PP05 OD-3 MFLCPR Fraction Limiting Critical Power Ratio	---	---	NONE	.861	.801

I/O OVERRIDE SUMMARY:

Initial	Description	Delay	Ramp	Trigger	Init Val	Final Val
	3A24 C OVLO A2P120 MANUAL – LUBE OIL PUMP	---	---	NONE	OFF	OFF
	3A24 D OVLO A2P120 AUTO-LUBE OIL PUMP – A	---	---	NONE	OFF	ON
	1A136 C OVLO MANUAL- CH W Circ Pump CP161	---	---	NONE	OFF	OFF
	1A136 D OVLO AUTO-CH W CIRC Pump CP161	---	---	NONE	OFF	ON
	1A136 D OVDI AUTO-CH W CIRC PUMP CP161	00:15	---	RT-2	OFF	ON

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
Raise Power using Recirc Flow After the crew assumes the watch **Have Load Dispatcher contact crew to raise power**	⇒ CRS – directs RO/BOP to raise power to 80% load using IOP-0006.	
	RO monitors plant for proper operation RO refers to HC.OP-SO.BB-0002 regarding MG set critical vibration and flow instability points	
	• RO – raises reactor power by increasing Recirc Flow per IOP-0006 at a rate not to exceed 1%/minute RO slowly turns the Recirc pump Master Speed Control potentiometer in the clockwise direction.	
	RO monitors the following for proper operation Recirc speed increases Recirc loop flow increases Reactor power increases	
Place the 3rd RFP in service After the Crew has reached 80% load they perform HC.OP-SO.AE-0001 section 5.6.1 (Note – Feedpump should be on recirc)	• BOP OPENS HV-1769C, RFP C Discharge Stop Check valve	
	• BOP closes HV-1772C, RFPT C Steam Low Pressure supply stop valve below seat drain	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
	• BOP opens HV-1751C, RFPT C Low pressure steam isolation valve • BOP depresses the "SEL" push-button as required to select "DEMAND" on the in-service RFPT(s) whose demand will be matched BOP Presses "SEL" push-button for the C RFPT to select "SPEED CTRLR DMND" BOP Presses Increase or decrease buttons as necessary to equalize demand signals while Monitoring: RFPT Discharge Pressure RFPT DEMAND * RFPT "FLOW"	
	• BOP matches Flow and speed and transfers RFPT C Speed Control to automatic by depressing the A/M push-button and observing "A" illuminates BOP reports to CRS that 3rd RFP has been placed in service	
INADVERTENT HPCI INITIATION Once the 3rd RFP has been placed in service OR At the discretion of the Lead Examiner **TRIGGER RT-1**	• RO – diagnoses and reports inadvertent HPCI initiation	
	• CRS directs entry into AB.RPV-0001 • RO verifies Reactor level > -38" • Drywell pressure < 1.68#	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
	RO presses and holds the HPCI TURB TRIP PB RO observes the following close FD-FV-4880 FD-FV-4879 RO adjusts FIC-R600 HPCI Flow controller to 0 gpm RO place FIC-R600 in MANUAL • RO - **PRESSES** FIC-R600 "DECREASE" Pb for approximately 7 seconds. • RO **RELEASES** the HPCI TURB TRIP PB. • RO **VERIFIES** the FD-FV-4879 remains shut. • BOP reduces reactor power with Reactor recirculation flow as necessary to prevent a reactor scram • CRS contacts I&C to investigate HPCI failure • CRS refers to Tech Spec 3.5.1. Determines Action D applies (Verify RCIC OPERABLE and restore HPCI to Operable within 14 days) • CRS refers to ECG and determine reportability requirements (8 hours for loss of single train)	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments

480V Unit Substation 10B130 trips with failure of standby MG Set lube oil pump to start
Once Tech Specs have been addressed
OR
At the discretion of the Lead Examiner
TRIGGER RT-2
	• Crew responds to loss of 10B130
	• Observes the following equipment is lost
	  o "B" Recirc pump
	  o Turbine Building Chiller	

	• RO diagnoses the trip of the "B" Recirc pump • CRS direct entry to AB.RPV-0003 section "A" – Single Recirc Pump Tripped • RO – inserts rods to clear APRM Upscale Alarms • RO - **ENSURE** that the Recirc MG Drive Motor Breaker has TRIPPED for the tripped Pump. • RO - **CLOSES** HV-F031B for approximately 5 minutes, THEN **RE-OPENS** HV-F031A(B). • RO - **IMPLEMENT** the following: DL.ZZ-0026 Att. 3n (as required) DL.ZZ-0026 Att. 3v • CRS - **DIRECTS** the Reactor Engineer to develop a Rod Sequence to achieve an 80% Rod Line. • CRS - **IMPLEMENT** IO-6 Requirements for Single Loop operations. • CRS determines region of operation on power/flow map • CRS directs actions to exit Region 1	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
	• RO either Raises Recirc flow with Recirc pump A or inserts control rods to exit Region 1 • CRS refers to Tech Spec 3.4.1 and COLR for SLO, determine APLHGR limit and APRM setpoints must be modified within 6 hours (4 hours per IOP-6) • CRS contacts I&C to determine cause of failure and to adjust setpoints as required • CRS refers to IOP-6 and determines all appropriate actions have been taken in accordance with Section 5.3 • BOP diagnoses trip of Turbine Building Chiller • CRS directs either the Restart of the Turbine building chiller or swapping Turbine Building cooling to RACS • BOP restarts Chiller as directed • CRS contacts Electrical to investigate cause of trip of 10B130	
EHC Filter Clogging After CRS has stabilized the plant OR At the discretion of the Lead Examiner **TRIGGER RT-3**	• Crew responds to Annunciator D3-F5, TURB HYDR PUMP TROUBLE • BOP diagnoses problem is high delta P across the EHC pump “A” filter • BOP dispatches an NEO to investigate High delta P on pump • BOP starts EHC pump BP116	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
3 minutes after being dispatched the NEO reports back that he see no problem locally with the filters	• BOP stops EHC pump AP116	**Note –** Shortly after starting BP116, this filter will also clog requiring a manual scram
	• BOP observes D3F5 clears and then re-annunciates • BOP diagnoses problem is now High Delta P on BP116.	
	• CRS determines that the plant can no longer be maintained at power and directs that the reactor be manually scrammed	**Note –** Continue to have the filter clog such that the turbine will automatically trip on low EHC pressure within 5 minutes of receiving the High Delta P alarm on the 2nd EHC pump.
	• CRS directs manual scram and entry into EO.ZZ-0101 • RO performs scram actions IAW AB.ZZ-0001 Att. 1. • CRS – directs RRCS to be initiated if not already completed by RO • CRS enters EO.ZZ-0101A if rods are not yet inserted	
CT-1 RRCS is manually actuated within 2 minutes of reaching an Automatic Scram setpoint.	• RO manually initiates RRCS Place RRCS keylock in Trip Place RRCS CS in Trip	
	• RO reports when all rods are inserted • CRS exits EO.ZZ-0101A after control rods are inserted, returns to EO.ZZ-0101	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
Small Break LOCA Once Rods are inserted OR At Lead Examiner Discretion **TRIGGER RT- 4**	• RO observes RPV level lowering and Drywell pressure rising.	

	• CRS directs the BOP to start HPCI to control RPV Level
	• BOP starts HPCI to control RPV level
	• CRS enters EO.ZZ-0102 based on high drywell pressure
	• BOP attempts to control drywell pressure < 1.68 psig using
	  • Drywell ventilation
	  • Containment Atmosphere control
	  • FRVS
	• CRS directs the BOP to initiate Suppression Chamber Sprays	

	• BOP starts suppression pool cooling IAW AB-0001 Attachment 3	**Note:** Assume the Operator places 'B' RHR in Supp Pool Cooling
	• BOP performs the following: • **REDUCE** "B" SACS total loop flow so that the following parameters will NOT be exceeded when the EG-HV-2512B is opened in step (2.0) (establishing flow through the RHR Hx adds ≈ 9000 gpm flow to the SACS loop): Flow >17,000 with one SACS Pump running. Flow >30,000 with "B" SACS supplying TACS.	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
	• **ENSURE** EG-HV-2512B is OPEN. • **ENSURE** BP202 RHR PUMP is RUNNING BOP starts the 'B' RHR pump • **ENSURE** the following valves are CLOSED: A. HV-F021B. B. HV-F016B. • IF required, **OVERRIDE** THEN **CLOSE** HV-F017B. • IF required, **PRESS** AUTO CL OVRD PB for HV-F024B. • THROTTLE **OPEN** HV-F024B UNTIL Loop B Flow indicates ≈ 10,470 gpm. • **ENSURE** HV-F007B closes when flow is >1400 gpm. • **CLOSE** HV-F048A. **MAINTAIN** Loop B Flow ≈ 10,470 gpm by THROTTLING **OPEN/ CLOSE** HV-F024B. • IF Suppression Chamber Spray is required, THEN **PERFORM** the following: A. **PRESS** HV F027B AUTO CL OVRD PB. B. **OPEN** HV F027B. • CRS determines that Supp. Chamber Press CANNOT be maintained < 9.5 psig and orders initiation of Drywell Spray	**Note:** Suppression Chamber Spray is required.

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments

	RO shuts down Recirc pumps
	
	BOP shuts down Drywell Cooling Fans
	
	BOP initiates 1 Loop of Drywell Spray IAW AB-0001 Att. 2
	
	• BOP performs the following actions in AB.ZZ-0001 Att. 2
	
	ENSURE EG-HV-2512A is OPEN.
	
	ENSURE AP202 RHR PUMP is RUNNING.
	
	BOP starts 'A' RHR pump
	
	BOP reports 'A' RHR pump tripped and aligns 'B' RHR pump for Drywell Spray
	
	BOP removes 'B' RHR pump from Suppression Pool Spray as follows:
	• **INITIATE** B RHR Drywell Spray as follows:
	  • **OVERRIDE** THEN **ENSURE** HV-F017B is CLOSED.
	  • **ENSURE** HV-F024B is CLOSED
	  • **ENSURE** HV F027B is CLOSED.
	  • **OPEN** HV-F016B
	  • **OPEN** HV-F021B
	  • **VERIFY** HV-F007B closes when flow is >1400 gpm.
	  • **CLOSE** HV-F048B
	• **THROTTLE** HV-F003B to maintain Loop B flow at ≈ 10,470 gpm.
		Note: Assume "A" Drywell Spray is placed in service
		
		Note: 'A' RHR pump will trip after being started

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
CT-2 Crew places Drywell Spray in service before Emergency Depressurization Criteria is reached.	BOP places Drywell Spray in service before Emergency Depressurization Criteria is reached	
	BOP observes that Drywell and Suppression Chamber pressure is lowering CRS determines that Suppression Chamber Pressure can be maintained below the curve SCP-L	
Termination Requirement: When the CRS has determined that ED criteria will NOT be reached OR At Lead Examiner Discretion	Put the simulator in Freeze	Inform the candidates that the simulator is in freeze and to standby for follow questions

VI. SCENARIO REFERENCES:

A. NC.TQ-DG.ZZ-0002 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. SH.OP-AS.ZZ-0001 Operations Standards
I. SH.OP-AP.ZZ-0101 Post Transient Response Requirements
J. SH.OP-AP.ZZ-0108 Operability Assessment and Equipment Control Program
K. HC.OP-IO.ZZ-0003 Startup from Cold Shutdown to Rated Power
L. HC.OP-AB.IC-0003 REACTOR PROTECTION SYSTEM
M. HC.OP-AB.IC-0001 Control Rod
N. HC.OP-AB.ZZ-000 Reactor Scram
O. HC.OP-AB.RPV-0001 Reactor Power
P. HC.OP-EO.ZZ-0101 RPV Control
Q. HC.OP-EO.ZZ-0101A ATWS-RPV Control
R. HC.OP-EO.ZZ-0102 Primary Containment Control
S. HC.OP-EO.ZZ-0202 Emergency RPV Depressurization
T. HC.RE-IO.ZZ-0001 Core Operations Guidelines
U. HC.OP-IO.ZZ-0006, POWER CHANGES DURING OPERATION
V.

VII. NRC CRITICAL TASK RATIONAL

NRC-002 / 00

1.

* ***RRCS is manually actuated within 2 minutes of reaching an Automatic Scram setpoint..***

K/A 295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown
EA1. Ability to operate and/or monitor the following as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN:
EA1.01 Reactor Protection System RO 4.6 SRO 4.6
EA1.03 ARI/RPT/ATWS RO 4.1 SRO 4.1

RPS has failed to scram the reactor both manually, and automatically. Any Automatic RPS setpoint was chosen to ensure there is adequate protection for the fuel during transient analyses associated with coolant inventory decrease events. With the Turbine Stop valves closed and the reactor at power, reactor pressure will rapidly rise to the point where the SRV's lift and discharge into the Suppression Pool. The Suppression Pool is NOT designed to handle heat loads > Decay heat loads. This could cause Suppression Chamber pressure to rise until the Suppression Chamber ruptures. Additionlly, ARI is failed and will not automatically scram the reactor at any Automatic Setpoint. Operator action is required to shutdown the reactor. The need to manually initiate ARI within 2 minutes of reaching any Automatic Setpoint was chosen because it represents an acceptable level of performance considering the time needed to diagnose the RPS failure and the time required to implement the scram hard card.

2.

* ***Crew places Drywell Spray in service before Emergency Depressurization Criteria is reached.***

K/A 295024 High Drywell Pressure
EA2 Ability to determine and/or interpret the following as they apply to HIGH DRYWELL PRESSURE:
EA2.04 Suppression chamber pressure RO 3.9 SRO 3.9
K/A 223001 Primary Containment Systems and Auxiliaries
A2. Ability to (a) predict the impacts of the following on the PRIMARY CONTAINMENT SYSTEM AND AUXILIARIES; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions of operations:
A2.02 Steam bypass of the suppressions pool RO 3.9 SRO 4.1

If suppression chamber pressure cannot be maintained below the pressure suppression pressure, EOPs direct actions to emergency depressurize the reactor. Drywell Spray initiation will prevent an unnecessary challenge to the Suppression Chamber and prevent a severe transient to the RPV that emergency depressurization will cause.

NRC-002 / 00

HOPE CREEK NRC - PRA RELATIONSHIPS EVALUATION FORM

EVENTS LEADING TO CORE DAMAGE

Y/N	EVENT	Y/N	EVENT
	TRANSIENTS:		SPECIAL INITIATORS:
Y	Turbine Trip		Loss of SSW
	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	Y	ATWS
	Station Black Out	Y	LOCA

COMPONENT/TRAIN/SYSTEM UNAVAILABILITY THAT INCREASES CORE DAMAGE FREQUENCY

Y/N	COMPONENT, SYSTEM, OR TRAIN	Y/N	COMPONENT, SYSTEM, OR TRAIN
	HPCI		Class 1E 120VAC Bus – A Train
	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

Y/N	OPERATOR ACTION
Y	Manual RPV Emergency Depressurization when required
	Manual RPV Depressurization during ATWS
Y	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 Examination.

VIII. TURNOVER SHEET:

Rx Power: ~83%
MWe: (May vary slightly):
Work Week: Any
Risk Color: Green
SMD: None
River Temp: 65

Activities Completed Last Shift:
Lowered Power to 80% and performed a rod sequence change
Removed the "C" RFP from service for a balance shot, completed balance shot and in process of returning "C" RFP to service (currently running in Recirc)

Major Activities Next 12 Hours:
Raise load to ~80% and put the 3rd RFP in service.
Raise power to 100%

Protected Equipment:
None

Tagged Equipment:
SLC Pump AP-208 is tagged out for pump rebuild and is expected back within 48 hours
No other equipment is Out of Service

IX. SIMULATOR NRC REVIEW/VALIDATION CHECKLIST

NRC EXAMINATION SCENARIO GUIDE REVIEW/VALIDATION

Note: This form is used as guidance for an examination team to conduct a review for the proposed exam scenario(s). Attach a separate copy of this form to each scenario reviewed.

SELF-CHECK NRC- 002 REVIEWER: _____

_____ 1. The scenario has clearly stated objectives in the scenario.

_____ 2. The initial conditions are realistic, equipment and/or Instrumentation may be out of service, but it does not cue crew into expected events.

_____ 3. Each event description consists of:

- The point in the scenario when it is to be initiated
- The malfunction(s) that are entered to initiate the event
- The symptoms/cues that will be visible to the crew
- The expected operator actions (by shift position)
- The event termination point

_____ 4. The use of non-mechanistic failures (e.g. pipe break) should be limited to one or a credible preceding event has occurred.

_____ 5. The events are valid with regard to physics and thermodynamics.

_____ 6. Sequencing/timing of events is reasonable (e.g. the crew has time to respond to the malfunctions in an appropriate time frame and implements procedures and/or corrective actions).

_____ 7. Sequencing/timing of events is reasonable, and allows for the examination team to obtain complete evaluation results commensurate with the scenario objectives.

_____ 8. If time compression techniques are used, scenario summary clearly so indicates.

_____ 9. The simulator modeling is not altered.

_____ 10. All crew competencies can be evaluated.

_____ 11. Appropriate reference materials are available (SOERs, LERs, etc.)

_____ 12. If the sampling plan indicates that the scenario was used for training during the requalification cycle, evaluate the need to modify or replace the scenario.

_____ 13. Proper critical task methodology used IAW NRC procedures.

NRC Examination Validation:

Rev.	Date	Comments

Note: The following criteria list scenario traits that are numerical in nature. A second set of numbers indicates a range to be met for a set of two scenarios. Therefore, to complete this part of the review, the set of scenarios must be available. The section below should be completed once per scenario set.

NRC: **002** **NRC:** _____

SELF-CHECK

_____ 1. Total malfunctions inserted: 4-8/10-14

_____ 2. Malfunctions that occur after EOP entry: 1-4/3-6

_____ 3. Abnormal Events: 1-2/2-3

_____ 4. Major Transients: 1-2/2-3

_____ 5. EOPs used beyond primary scram response EOP: 1-3/3-5

_____ 6. EOP Contingency Procedures used: 0-3/1-3

_____ 7. Approximate scenario run time: 45-60 minutes (one scenario may approach 90 minutes)

_____ 8. EOP run time: 40-70% of scenario run time

_____ 9. Crew Critical Tasks: 2-5/5-8

_____ 10. Technical Specifications are exercised during the test

_____ 11. Events used in the two scenarios are not repeated

_____ 12. The scenario sets for the exam week do not contain duplicate scenarios

Comments:

HOPE CREEK ELECTRIC GENERATING STATION
NRC INITIAL LICENSED EXAMINATION SCENARIO 3
NOVEMBER 28, 2005

SCENARIO TITLE: **APRM Failure/ Recirc Pump Hi Vibs/ LOP**

SCENARIO NUMBER: **NRC-003**

EFFECTIVE DATE:

EXPECTED DURATION: 1.0 Hours

REVISION NUMBER: **1**

PROGRAM:

[ ] **L.O. REQUAL**

[X] **INITIAL LICENSE**

[ ] **OTHER** _____

REVISION SUMMARY:

New Scenario.

PREPARED BY: M. L. Brown — 9/29/05
NRC Operations Examiner — **DATE**

FACILITY REVIEWER: _____ — _____
Nuclear Operations Training Supervisor – Hope Creek — **DATE**

APPROVED BY: _____ — _____
NRC Chief Examiner — **DATE**

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 " CT-x.")

II. MAJOR EVENTS:

A. Core Spray Pump test
B. Raise Power if desired
C. "A" APRM Fails
D. Turbine Bldg. Chillers trip
E. "B" Recirculation Pump High Vibration
F. Loss of Offsite Power
G. "A" EDG fails to start
H. "B" RHR pump trips

III. SCENARIO SUMMARY:

The plant is operating at 80% power, Middle Of Cycle returning to power after a mini-outage. The Operators are at Step 5.4.29 of IOP-3, with the 3rd RFP having just been started on the previous shift. The OPRM System is INOPERABLE due to an existing 10CFR21 issue. The OPRM System is still functional but is considered INOPERABLE per Technical Specifications. Core Spray Loop A operability PT will be performed. When the test return valve is opened, the pump will trip. Core Spray A should be declared Inoperable.

After declaring the 'A' Core Spray pump inoperable and addressing tech specs, the Load Dispatcher will call and have the crew raise power. While raising power the "A" APRM fails causing the crew to enter Abnormal Procedure HC.OP-AB.IC-0004,NEUTRON MONITORING and bypass the APRM.

After the APRM is bypassed, the Turbine Building chillers will trip requiring the operators to swap cooling over to RACS, in addition Drywell pressure will rise to > 0.75 psig. The operators will enter AB.CONT-0001, Drywell Pressure to address the high drywell pressure. When pressure rises to > 0.75 psig, Operators will vent drywell. Once preparations are underway to vent the drywell, "B" Recirc pump vibrations will increase causing the operators to enter AB.RPV-0003, Recirculation system. Operators will reduce recirc pump speed in an attempt to clear the vibration alarm. Vibration will continue to increase and cause the operators to trip the "B" Recirc pump on high vibration. After tripping the Recirc pump the operators will have to scram the reactor due to being in Region 1 with OPRM's inop. When the operators have stabilized the plant after the scram a loss of offsite power occurs. The 'A' EDG will fail to start and the 'B' RHR pump will trip. With HPCI running the Operators will forced to start the 'A' EDG to place 'A' RHR in suppression pool cooling. The scenario will end once the operators have restarted the 'A' EDG and place 'A' RHR in Suppression Pool cooling.

IV. INITIAL CONDITIONS:

	I.C.
Initial	
	INITIALIZE the simulator to IC-5 (~80% power, MOL)
	PLACE the 3rd RFP in service
	MAKEUP N2 to the drywell until drywell and Suppression Chamber pressure are 0.53-0.57 psig
	ENSURE BOTH Steam Tunnel unit coolers are in service
	C/T CP161 TB Chilled water circ pump as follows
	• **ENSURE** CP161 is not in service
	• **PLACE** CP161 in MAN
	C/T DK111 as follows:
	• **ENSURE** DK111 is not in service
	• **PRESS** DK111 STOP pushbutton
	• **ENSURE** HV-9503D is CLOSED

	PREP FOR TRAINING (i.e., RM11 set points, procedures, bezel covers)
Initial	Description
	Items required to be set up each time the SG is performed, i.e. tagged equipment, RM11 set points, procedures, etc.
	COMPLETE Attachment 2 "Simulator Ready-for-Training/Examination Checklist" of NC.TQ-DG.ZZ-0002(Z).
	PLACE Red bezel cover on DK111
	PLACE Red bezel cover on HV-9503D
	PLACE Red bezel cover on CP161

EVENT TRIGGERS:

Initial	ET #	Description	
	1	EVENT ACTION: COMMAND: PURPOSE:	Hp:copmp>=1.0 Trip HPCI Aux Oil Pump on start
	2	EVENT ACTION: COMMAND: PURPOSE:	
	3	EVENT ACTION: COMMAND: PURPOSE:	

MALFUNCTION SUMMARY:

Initial	Description	Delay	Ramp	Trigger	Init Val	Final Val
	AN-E5F1 OHA E5-F1 CHILLED WATER TRBL			NONE		
	CS01A Core Spray pump A trip			RT-1		
	NM21A APRM Channel A reads high or low			RT-2	0	100
	CW18A AP161 Chilled Water Circ pump Trip			RT-3		
	CW18B BP161 Chilled Water Circ pump trip	5 sec		RT-3		
	RR26B2 Recirc Pump BP201 elevated vibration		12:00	RT-4	0	12
	EG12 Loss of all off site power			RT-5		
	DG07A Diesel Generator A emergency start			NONE		
	RH04B RHR pump BP202 trip			NONE		

REMOTE/FIELD FUNCTION SUMMARY:

Initial	Description	Delay	Ramp	Trigger	Init Val	Final Val
	HV12 Steam Tunnel unit cooler BVH216			NONE	RUN	RUN
	HP08 HPCI Aux Oil Pump			ET-1	UNTAGGED	TAGGED

I/O OVERRIDE SUMMARY:

Initial	Description	Delay	Ramp	Trigger	Init Val	Final Val
	1A181 A2 LO DK111 INOP light			NONE		ON
	1A181 D DI DK111 START pb			NONE		OFF
	1A181 E1 DI DK111 SAFETY CKT pb			NONE		OFF
	1A181 F LO DK111 STOP light			NONE		OFF
	1A182 E DI HV-9503D OPEN pb			NONE		OFF
	1A182 F LO HV-9503D CLOSE light			NONE		OFF
	1A136 A2 LO CP161 INOP light			NONE		ON
	1A136 D DI CP161 AUTO pb			NONE		OFF
	1A136 E DI CP161 START pb			NONE		OFF
	1A136 F LO CP161 STOP light			NONE		OFF

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
Crew assumes the watch and starts performing HC.OP-ST.BE-0002 **TRIGGER RT-1**	• BOP observes proper Core Spray pump A suction pressure • BOP Ensures pump suction valve (HV-F001A) is Open • BOP Sends an NEO to pump to check pump out prior to start • BOP Starts "A" Core Spray Pump while monitoring pump discharge pressure and confirms discharge pressure rises to > 300 psig in less than or equal to 5.0 seconds • BOP Records time Core Spray pump was started • BOP ensures the following: • Core Spray Division I Room Cooler fan has started • Service Water Outlet valve is Open (NEO to report) • BOP – Throttles open Core Spray Full Flow Test Byp Valve, HV-F015A to obtain ≥ 4625 gpm flow. • BOP observes that 'A' Core Spray pump has tripped • BOP sends an NEO out to determine cause of trip • CRS refers to Tech Specs and determines Tech Spec 3.5.1 and determines that Action A (7 day LCO) applies	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
Power Increase Once Core Spray has been returned to a standby alignment and Tech Spec call has been made OR At the discretion of the Lead Examiner (Note: this step may be bypassed if the crew does not need a Normal Reactivity change) **Have Load Dispatcher contact crew to raise power**	• CRS directs RO/BOP to coordinate Power increase to 90% at < 1%/minute using IOP-0003	
	• RO/BOP coordinate raising power • RO slowly increases Recirc pump speed • BOP monitors RFP speed to ensure proper response	
"A" APRM Fails After Power has been raised 5% OR At the discretion of the Lead Examiner **TRIGGER RT-2**	• RO diagnoses and reports "A" APRM has failed UPSCALE	**Note:** Should get a Half scram
	CRS acknowledges report and enters HC.IO-AB.IC-0004, Neutron Monitoring	
	RO stops all Control Rod Withdrawals	**Note:** Should not be any control rod withdrawals in progress
	RO bypasses the "A" APRM	
	RO ensures all RPS trip conditions are clear	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
	• RO turns the "A" RPS Trip logic key to reset and returns it to the normal position • RO verifies that RPS is reset • CRS refers to Tech Specs 3.3.1	**Note:** Should only be an INFO only LCO – only required to have 2 OPERABLE
TURBINE BLDG CHILLERS TRIP Once the CRS has addressed Tech Specs OR At the discretion of the Lead Examiner **TRIGGER RT-2**	BOP diagnoses/ observes that the Turbine Building Chillers have tripped	
	• RO/BOP observe Drywell temperature/ pressure rising • CRS directs entry into AB.CONT-0001, Drywell Pressure Section C BOP performs the following: • **ALIGN** RACS to the Chill Water System for Drywell Cooling as follows • **CLOSE** HV-9532-1 AND HV-9532-2. • **PRESS** LOOP A SPLY /RTN OPEN RACS PB. • **PRESS** LOOP B SPLY/RTN OPEN RACS PB.	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
	BOP Observes: • HV-9530A1/A3 CLOSED • HV-9530B1/B3 CLOSED • HV-9530A2/A4 OPEN • HV-9530B2/B4 OPEN BOP **OPENS** HV-9532-1 AND HV-9532-2. • IF Drywell Pressure ≥ 0.75 psig, THEN CRS enters Section D - Drywell Pressure ≥ 0.75psig AND No Evidence of Elevated Coolant System Leakage	**Note** – Crew may enter this section but it is not necessary for them to start the Drywell vent prior to moving on with the scenario
"B" Recirc Pump High Vibration Once Drywell vent actions have been initiated OR At the discretion of the Lead Examiner **TRIGGER RT-3**	RO diagnoses/ observes rising "B" Recirc pump vibration	
	CRS directs entry into AB.RPV-0003, Recirculation System Section K RO PRIOR to reducing Recirc Pump Speed, **PERFORM** the following: • **ENSURE** the following controllers are in MANUAL o SIC-R621A PUMP A SPD CONT o SIC-R621B PUMP B SPD CONT RO **RECORD** affected pump speed: o B Recirc Initial Pump Speed	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
	RO **MAINTAIN** the affected Pump ALERT limit [**REFER** to Table 2] clear as follows: • INTERMITTENTLY **PRESS** SIC-R621A(B) PUMP A(B) SPD CONT DECREASE push button on the affected Recirculation Pump. • **INSERT** Control Rods as required by Reactor Engineering Instructions. • RO IF ALERT limit cannot be maintained clear {**REFER** to Table 2] AND the affected Recirculation Pump Speed has been lowered by ≥20% (below the value logged in Step K.1.B), THEN **REMOVE** the affected Recirc Pump from service IAW HC.OP-SO.BB-0002, Single Loop Operation.	
CT-1 Crew removes Recirc Pump from service within 2 minutes of reaching the Danger Setpoint	RO removes pump from service IAW SO.BB-0002	
	RO performs the following: If Danger Limit is Reached on Recirc Pump then • TRIP the affected Recirc Pump • Enter Condition A CRS - **IMPLEMENT** IO-6 requirements for Single Loop operations. CRS determines region of operation on power/flow map	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
	Crew determines plant is in Region 1 of Power/Flow map and OPRM's are INOP.	
	CRS directs a Manual Reactor Scram IAW IOP-6 step 3.1.12	
CT-2 Crew Manually Scrams the reactor within 3 minutes of entering Region 1 with the OPRM's INOP	RO manually scrams reactor	
	RO performs actions of AB.ZZ-0001	
	Crew stabilizes the plant using AB.ZZ-0000	
	RO locks Mode Switch in Shutdown	
	RO verifies the Scram	
	RO inserts SRMs and IRMs AND selects IRMs on the Recorders	
	BOP verifies H2 injection system tripped	
	BOP Trips the Main turbine and verifies Generator lockout is 0 Mwe	
	RO maintains level between +12.5" and 54"	
	RO starts RCIC	
LOSS OF OFFSITE POWER After Crew has stabilized the plant in AB.ZZ-0000 OR At the discretion of the Lead Examiner **TRIGGER RT-4**	• Crew diagnoses Loss of Offsite power	
	CRS directs entry into HC.OP-AB-0000 and HC.OP-AB.ZZ-0135	
	BOP observes failure of "A" EDG to start and manually starts and closes EDG 'A' output breaker	
	RO observes the failure of 'B' RHR pump	

V. SCENARIO GUIDE SEQUENCE AND EXPECTED RESPONSE

Event / Instructor Activity	Expected Plant/Student Response	Comments
	CRS directs that HPCI be placed in service for pressure control. BOP attempts to place HPCI inservice BOP reports that HPCI has tripped. CRS directs that RPV pressure be maintained using SRV's and RCIC.	
CT-3 Crew places Suppression Pool Cooling in service prior to Suppression Pool temp. exceeding 95°F	RO places RHR Loop 'A' in Suppression Pool cooling	
Termination Requirement: When RO has placed RHR train 'A' in Suppression Pool Cooling OR At Lead Examiner Discretion	Put the simulator in Freeze	Inform the candidates that the simulator is in freeze and to standby for follow questions
At Lead Examiner Discretion	Have the CRS classify the event	

VI. SCENARIO REFERENCES:

A. NC.TQ-DG.ZZ-0002 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. SH.OP-AS.ZZ-0001 Operations Standards
I. SH.OP-AP.ZZ-0101 Post Transient Response Requirements
J. SH.OP-AP.ZZ-0108 Operability Assessment and Equipment Control Program
K. HC.OP-IO.ZZ-0003 Startup from Cold Shutdown to Rated Power
L. HC.OP-AB.IC-0003 REACTOR PROTECTION SYSTEM
M. HC.OP-AB.IC-0001 Control Rod
N. HC.OP-AB.ZZ-000 Reactor Scram
O. HC.OP-AB.RPV-0001 Reactor Power
P. HC.OP-EO.ZZ-0101 RPV Control
Q. HC.OP-EO.ZZ-0101A ATWS-RPV Control
R. HC.OP-EO.ZZ-0102 Primary Containment Control
S. HC.OP-EO.ZZ-0202 Emergency RPV Depressurization
T. HC.RE-IO.ZZ-0001 Core Operations Guidelines
U. HC.OP-IO.ZZ-0006, POWER CHANGES DURING OPERATION
V.

VII. NRC CRITICAL TASK RATIONAL

NRC-003 / 00

1.

* ***CREW secures "B" Reactor Recirc pump within two minutes of Vibration reaching the DANGER limit IAW guidance in AB.RPV-0003..***

K/A 202001 Recirculation System
A2 Ability to (a) predict the impacts of the following on the RECIRCULATION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:
A2.17 Loss of seal cooling water RO 3.1 SRO 3.2

This action is listed as a Retainment Override in the Abnormal Procedure, a time limit of 2 minutes is deemed adequate for the operator to recognize the condition and take the appropriate action.. The basis of this action is to prevent pump damage and potential piping damage due to vibration. Damage to the pump casing is a degradation of a Reactor Coolant System boundary.

2.

* ***Crew Manually Scrams the reactor within 3 minutes of entering Region 1 with the OPRM's INOP***

K/A 295006 SCRAM
AA1 Ability to operate and/or monitor the following as they apply to SCRAM :
AA1.05 Neutron monitoring system.....
RO 4.2 SRO 4.2

HC.OP-IO.ZZ-0006 precaution 3.1.12 states that IF the OPRM's are INOPERABLE
… IF Region 1 is entered, THEN MANUALLY SCRAM the reactor
Failure to manually scram the reactor when in the Power instability region results in a significant reduction in the safety margin beyond that irreparably introduced by the scenario.

* ***Crew places Suppression Pool Cooling in service prior to Suppression Pool temp. exceeding 95°F***

K/A 295013 High Suppression Pool Temperature
AA1. Ability to operate and/or monitor the following as they apply to HIGH SUPPRESSION POOL TEMPERATURE
AA1.01 Suppression pool cooling.....RO 3.9 SRO 3.9
AA1.02 Systems that add heat to the suppression pool..... RO 3.9 SRO 3.9

A Loss of Offsite Power has occurred, the only method of pressure control available to the Crew is to dump heat to the Suppression Pool. Failure to maintain Suppression Pool Temperature will result in a significant reduction in the safety margin beyond that irreparably introduced by the scenario.

NRC-002 / 00

HOPE CREEK NRC - PRA RELATIONSHIPS EVALUATION FORM

EVENTS LEADING TO CORE DAMAGE

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

COMPONENT/TRAIN/SYSTEM UNAVAILABILITY THAT INCREASES CORE DAMAGE FREQUENCY

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

OPERATOR ACTIONS IMPORTANT IN PREVENTING CORE DAMAGE

Y/N	OPERATOR ACTION
_____	Manual RPV Emergency Depressurization when required
_____	Manual RPV Depressurization during ATWS
Y	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 Examination.

VIII. TURNOVER SHEET:

Rx Power: 80%
MWe: (May vary slightly):
Work Week: Any
Risk Color: Green
SMD: None
River Temp: 65

Activities Completed Last Shift:
Power lowered to 80% and
Control Rod Sequence Exchange performed

Major Activities Next 12 Hours:
Maintain power at 80% until contacted by the Load Dispatcher, then return to 100% power

Complete HC.OP-ST.BE-0002, Core Spray Pump Loop A Full Flow Test. Currently in progress and completed up to step 5.23 (pump testing).

Protected Equipment:
None

Tagged Equipment:
OPRM System is INOPERABLE due to an existing 10CFR21 issue. The OPRM System is still functional but is considered INOPERABLE per Technical Specifications.
No other equipment is Out of Service

IX. SIMULATOR NRC REVIEW/VALIDATION CHECKLIST

NRC EXAMINATION SCENARIO GUIDE REVIEW/VALIDATION

Note: This form is used as guidance for an examination team to conduct a review for the proposed exam scenario(s). Attach a separate copy of this form to each scenario reviewed.

SELF-CHECK NRC- 002 REVIEWER: _____

_____ 1. The scenario has clearly stated objectives in the scenario.

_____ 2. The initial conditions are realistic, equipment and/or Instrumentation may be out of service, but it does not cue crew into expected events.

_____ 3. Each event description consists of:

- The point in the scenario when it is to be initiated
- The malfunction(s) that are entered to initiate the event
- The symptoms/cues that will be visible to the crew
- The expected operator actions (by shift position)
- The event termination point

_____ 4. The use of non-mechanistic failures (e.g. pipe break) should be limited to one or a credible preceding event has occurred.

_____ 5. The events are valid with regard to physics and thermodynamics.

_____ 6. Sequencing/timing of events is reasonable (e.g. the crew has time to respond to the malfunctions in an appropriate time frame and implements procedures and/or corrective actions).

_____ 7. Sequencing/timing of events is reasonable, and allows for the examination team to obtain complete evaluation results commensurate with the scenario objectives.

_____ 8. If time compression techniques are used, scenario summary clearly so indicates.

_____ 9. The simulator modeling is not altered.

_____ 10. All crew competencies can be evaluated.

_____ 11. Appropriate reference materials are available (SOERs, LERs, etc.)

_____ 12. If the sampling plan indicates that the scenario was used for training during the requalification cycle, evaluate the need to modify or replace the scenario.

_____ 13. Proper critical task methodology used IAW NRC procedures.

NRC Examination Validation:

Rev.	Date	Comments

Note: The following criteria list scenario traits that are numerical in nature. A second set of numbers indicates a range to be met for a set of two scenarios. Therefore, to complete this part of the review, the set of scenarios must be available. The section below should be completed once per scenario set.

NRC: **002** **NRC:** _____

SELF-CHECK

_____ 1. Total malfunctions inserted: 4-8/10-14

_____ 2. Malfunctions that occur after EOP entry: 1-4/3-6

_____ 3. Abnormal Events: 1-2/2-3

_____ 4. Major Transients: 1-2/2-3

_____ 5. EOPs used beyond primary scram response EOP: 1-3/3-5

_____ 6. EOP Contingency Procedures used: 0-3/1-3

_____ 7. Approximate scenario run time: 45-60 minutes (one scenario may approach 90 minutes)

_____ 8. EOP run time: 40-70% of scenario run time

_____ 9. Crew Critical Tasks: 2-5/5-8

_____ 10. Technical Specifications are exercised during the test

_____ 11. Events used in the two scenarios are not repeated

_____ 12. The scenario sets for the exam week do not contain duplicate scenarios

Comments: