FINAL AS-ADMINISTERED SCENARIOS

FOR THE MONTICELLO INITIAL EXAMINATION

OCTOBER 2002

Monticello Nuclear Generating Plant

SIMULATOR EXERCISE GUIDE

NRC02-02

TRIP OF NO. 11 RHR PUMP

NO. 11 CRD PUMP FAILURE

NO. 11 CONDENSATE PUMP TRIP AND BUS 13 LOCKOUT

NO. 12 CONDENSATE PUMP TRIP, NO 12 RFP TRIP, SCRAM, ATWS

"A" CRD FCV FAILS CLOSED

SELECTED SBLC PUMP FAILS TO START

Rev. 00

07/02

PREPARED BY: _____ _____
Instructor Date

REVIEWED BY: _____ _____
Station Operating Date

APPROVED BY: _____ _____
Supervisor Operations Training Date

SCENARIO OVERVIEW

Narrative Summary:

1. Unit is at 100% power with a CDF of 4.32 E^{-5}/year (Yellow).
2. The following equipment is OOS:
   a. "B" CRD FCV to repair an air line leak.
   b. 13 Service Water Pump due to noise in the motor.
   c. MO-2026 and MO-2027.
3. LCOs:
   a. 3.5.A.1 (72 hour) LPCI injection mode inoperable due to being in Torus Cooling.
   b. 3.7.D.2 for MO-2026 and MO-2027
4. Scenario Description

   The crew will assume the shift with the plant operating at 100% power. Loops 'A' and 'B' of RHR and RHR Service Water are in service for Torus Cooling. RCIC surveillance 0255-08-IA-1 has just been completed to fulfill PMT requirements. Crew is expected to secure Torus cooling.

   While securing Torus cooling, No. 11 RHR Pump will trip. Flow will be required to be reduced to within system requirements.

   No. 11 CRD Pump will trip. Procedure C.4-B.01.03.A, LOSS OF CRD PUMP FLOW will be entered. No. 12 CRD pump does not auto start and must be manually started. If 2 accumulator low pressure alarms are received the reactor must be scrammed

   A trip of No. 11 Condensate Pump will occur and a lockout of Bus 13. This will require entry into C.4.F, RAPID POWER REDUCTION to reduce power to within one Condensate Pump and one Feed Pump. No. 11 RFP will also trip. The lockout of Bus 13 will cause a loss of No 11 Circ Water Pump. Crew will be required to evaluate the loss of Bus 13 and mitigate the consequences.

   A trip of No. 12 Condensate Pump will then be received which will cause a loss of No. 12 RFP. This will result in a low RPV level condition requiring the crew to manually scram the reactor. Control rods will fail to insert and the crew will enter the EOPs for RPV Control, Failure to Scram and Primary Containment Control. The first SBLC system that is selected will fail to start requiring the operator to select the second system. The Torus will begin to heat up due to MSIVs going closed. The crew should terminate and prevent injection to help control reactor power. The crew will insert control rods via alternate methods. The operator should identify that the "A" CRD FCV has failed closed and "B" CRD FCV is already OOS.

   The scenario will be terminated when power is less than 3% and RPV level has been stabilized.

Scenario Run Time: 60 min.

Scenario Events:

Event 1: Trip of No. 11 RHR Pump

A RHR pump is running in both divisions for Torus Cooling in support of RCIC surveillance. No. 11 RHR Pump will trip requiring the crew to take action to reduce flow to within system requirements.

Malfunctions Required: 1 Trip of No. 11 RHR Pump

Event 2: No. 11 CRD Pump Failure

No. 11 CRD Pump will trip. Operator will need to manual start No. 12 CRD Pump. If pump is not started in a reasonable amount of time accumulator low pressure alarms will start to come in. If 2 accumulator low pressure alarms are received, the Reactor must be manually scrammed.

Malfunctions Required: 1 No. 11 CRD Pump Trip

Event 3: No. 11 Condensate Pump Trip With Bus 13 Lockout

No. 11 Condensate Pump will trip which will cause the crew to enter C.4.F, RAPID POWER REDUCTION to increase RFP suction pressure. No. 11 RFP may trip during this time. A lockout of Bus 13 will cause the loss of No 11 RFP if not already tripped and a loss of No. 11 Circ Water Pump. Actions must be taken to control Reactor water level and mitigate the consequences of the Bus 13 Lockout.

Malfunctions Required: 2 Trip of No. 11 Condensate Pump

Lockout of Bus 13

Event 4: No. 12 Condensate Pump Trip, Trip of No. 12 RFP, Scram, ATWS

No. 12 Condensate Pump will trip, causing No. 12 RFP to trip on low suction pressure. RPV level will decrease and the crew will be required to manually scram the reactor. Not all rods will insert and the crew will enter the EOPs for RPV Control, Failure to Scram and Primary Containment Control. The crew should terminate and prevent injection to help control reactor power. The crew will insert control rods via alternate methods and line-up for SBLC injection.

Malfunctions Required: 3 Failure to Scram

Multiple Control Rods Stuck

Trip of No. 12 Condensate Pump

Event 5: "A" CRD FCV Fails Closed

The "A" CRD FCV will fail closed and "B" CRD FCV is OOS to repair an air line. This will prevent the operator from using CRD to insert rods during Alternate Rod Insertion.

Malfunctions Required 1 "A" CRD FCV Valve Fails Closed

Event 6: Failure of "A" or "B" SBLC Pump to Start

The first Train of SBLC that the operator starts will fail to start requiring him to notice the failure and select the other train and start it. The second train will start.

Malfunctions Required: 2 Failure of SBLC System 1
Failure of SBLC System 2

Scenario Objectives:

Unless otherwise stated for a specific objective, the trainee shall demonstrate his or her mastery of the following learning objectives with 100% accuracy through written, performance, and/or oral examination. 1) Knowledge objectives shall be from memory with 100% accuracy; 2) Performance objectives shall be from memory with 100% accuracy and IAW all applicable procedures, and in individual or team performance situations.

Reactor Operator Objectives:	
CR200.147	Perform the procedure for loss of CRD Pump flow.
CR200.203	Perform the procedure for rapid power reduction.
CR200.175	Perform the procedure for feedwater pump trip.
CR200.183	Perform the procedure for loss of Bus 13 or 14.
CR200.174	Perform the procedure for condenser circulating water system failure.
CR200.184	Perform the procedure for loss of Bus 15 or 16.
CR200.187	Perform the procedure for loss of power to LC-103 or its MCCs.
CR200.189	Perform the procedure for loss of power to LC-107 or MCC-114.
CR212.105	Manually initiate the ATWS System.
CR314.105	Perform the actions associated with Alternate Rod Insertion.
CR211.106	Manually initiate the Standby Liquid Control System.
CR314.122	Operate H2/O2 Analyzer.
CR203.102	Start RHR-Torus Cooling Mode.
CR314.112	Perform actions associated required to Terminate and Prevent during an ATWS.

Scenario Objectives:

Unless otherwise stated for a specific objective, the trainee shall demonstrate his or her mastery of the following learning objectives with 100% accuracy through written, performance, and/or oral examination. 1) Knowledge objectives shall be from memory with 100% accuracy; 2) Performance objectives shall be from memory with 100% accuracy and IAW all applicable procedures, and in individual or team performance situations.

Control Room Supervisor Objectives:	
SS299.327	Apply Technical Specification 3.5/4.5 and Bases to the Core and Containment/Cooling System
SS315.102	Supervise the response to loss of CRD Pump flow.
SS315.159	Supervise rapid power reduction.
SS315.119	Supervise response to control neutron flux oscillations.
SS304.193	Implement RPV control.
SS315.164	Supervise immediate reactor shutdown.
SS304.201	Implement the response for a failure to scram.
SS314.104	Supervise alternate rod insertion.
SS314.108	Supervise terminate and prevent.
SS304.194	Implement primary containment control.

PRE-SCENARIO ACTIVITIES

1. If applicable, conduct pre-scenario activities in accordance with MTCP-03.39, Conduct of Licensed Operator Simulator Training, and NUREG 1021, Rev 8, Operator Licensing Examination Standards for Power Reactors.
2. Simulator Setup (the following steps can be done in any logical order)
   a. Initialize simulator in IC 252.
   b. Simulator to RUN.
   c. Establish the following simulator conditions:
      1) LCO Board Updated.
      2) Verify Substation one-line diagram breaker positions show normal electric line-up.
      3) CR Shift Turnover Checklist (Form 3139) is completed.
      4) Verify the following malfunctions/overrides are loaded into the simulator computer:
         - SBLC System 1 to OFF.
         - SBLC System 2 to OFF.
         - Failure to Scram (CH16).
         - Multiple Control Rods Stuck (CH19).
         - 13 Service Water Pump green light OFF.
      5) Verify the procedures listed on pages 34 & 35 are free of any markings and are the revision stated.
      6) Verify Alarm Monitor is cleared.
   d. Secure the following equipment and tag out of service:
      1) "B" CRD FCV.
      2) 13 Service Water Pump.
      3) MO-2026 and MO-2027.

The following information shall be provided by the Simulator Communicator during the Shift Brief. When polled by the Control Room Supervisor:

- Turbine Building Operator:
  - #11 and #12 RHRSW Pumps are in service
  - 5 Demins are in service with the highest d/p on 'C' of 4.9 psid.
- Reactor Building Operator:
  - #11 and #12 RHR Pumps are in service.

Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 1		**Trip of No. 11 RHR Pump**
Objective(s) **SS299.327**	SRO	Acknowledge report of annunciator 3-A-42 "RHR PUMP 11 LOCKOUT"
		1. Refer to Technical Specification 3.5.A.3.b 2. Declare RHR Pump 11 inoperable. 3. Determine 30 day LCO exists.
		Acknowledge actions taken by BOP Operator for trip of No. 11 RHR Pump.
	RO	Monitors plant parameters.
	BOP	1. Acknowledge annunciator 3-A-42 "RHR PUMP 11 LOCKOUT". 2. Consult ARP 3-A-42. 3. Notify Shift Supervision & System Engineer.
		1. Verify No. 11 RHR Pump has tripped. 2. Place the handswitch for 11 RHR Pump in PULL-TO-LOCK. 3. Reduce flow to within system requirements.
		Reports actions taken for trip of No. 11 RHR Pump to SRO.

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 1 Trip of No. 11 RHR Pump	**A RHR pump is running in both divisions for Torus Cooling in support of RCIC surveillance. No. 11 RHR Pump will trip requiring the crew to take action to reduce flow to within system requirements.**
	SIMULATOR OPERATOR
TRG#1	When directed by the Lead Evaluator insert event trigger #1 to cause a trip of 11 RHR Pump. (RH01A)
	SIMULATOR COMMUNICATOR
As System Engineer	If called to report trip of pump acknowledge report and that you will be over to investigate as soon as you can. No further communication is necessary.

Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 2		**No. 11 CRD Pump Failure**
Objective(s) **SS315.102**	SRO	1. Enter C.4-B.01.03.A "LOSS OF CRD PUMP FLOW" 2. Verify #12 CRD Pump is running 3. Notify Shift Supervision and System Engineer 4. Dispatch TBO to ACB-152-506 to investigate cause of the trip.
		Acknowledge report of actions taken by RO.
CR200.147	RO	1. Acknowledge annunciators: • 5-B-17 – CHARGING WATER LOW PRESSURE • 5-B-25 – CRD PUMP 3-16A BREAKER TRIPPED • 5-B-26 – CRD PUMP 3-16A OL 2. Verify #11 CRD Pump has tripped. • #11 CRD Pump Breaker indication on CO5. (Green lamp ON, Red lamp OFF) • CRDH system flow and pump discharge pressure has decreased to 0 as indicated on: a. PI-3-302 Charging Water Header Pressure. (CO5) b. FI-3-306 Cooling Water Header Flow (CO5)
		1. Start #12 CRD Pump. (HS-3B-S4B to START) 2. Verify #12 CRD Pump Starts • (#12 CRD Pump breaker indication – Green lamp OFF, Red lamp ON) • (PI-3-302 Charging Water Header Pressure - CO5) • (FI-3-306 Cooling Water Header Flow - CO5) 3. Monitor and Control system pressures and flows. 4. Verify required actions per C.4-B.01.03.A, LOSS OF CRD PUMP FLOW, are complete.
		Report actions taken for trip of CRD Pump to SRO.
	BOP	Monitoring plant parameters.

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 2 **No. 11 CRD Pump Failure**	**No. 11 CRD Pump will trip. Operator will need to manual start No. 12 CRD Pump. If pump is not started in a reasonable amount of time accumulator low pressure alarms will start to come in. If 2 accumulator low pressure alarms are received, the Reactor must be manually scrammed.**
	SIMULATOR OPERATOR
TRG#2	When directed by the Lead Evaluator insert event trigger #2 to cause a trip of 11 CRD Pump. (CH08A)
	SIMULATOR COMMUNICATOR
As TBO	If dispatched to ACB-152-506 to investigate cause of #11 CRD Pump trip wait approximately 2 minutes and report that unable to determine cause of trip.

Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 3		**No. 11 Condensate Pump Trip & 4160V Bus 13 Lockout**
Objective(s)	CREW	1. Numerous annunciators alarm. Annunciators specific to this event: • 6-A-8 COND PUMP P-1A TRIP • 6-A-33 CONDENSATE PUMP LOW DISCH PRESS • 8-B-11 NO 13 4160V BUS LOCKOUT 2. Consult ARP's 6-A-8, 6-A-33, 8-B-11
	SRO	May Announce now entering "Transient Annunciator Response".
SS315.159		1. Enter C.4.F - RAPID POWER REDUCTION. 2. Direct RO to reduce Recirculation flow as necessary to maintain RPV level (or similar command - i.e. reduce RR flow to minimum). NOTE: #11 Feed Pump will probably trip due to suction pressure <70 psig for 10 seconds unless RR flow is quickly decreased.
SS315.119		1. Determine if core flow is <26 Mlbm/hr. 2. If core flow is <26 Mlbm/hr then enter C.4.B.05.01.02.A - CONTROL OF NEUTRON FLUX OSCILLATIONS concurrently.
		C.4-B.06.03.A - DECREASING CONDENSER VACUUM • Monitor LP Turbine exhaust pressures per SPDS 656. NOTE: Further action will not be required as condenser vacuum will quickly recover.
CR200.263	RO	1. Determine #11 Condensate Pump has tripped using indications below: • (Breaker indication CO6 –Green lamp ON, Red lamp OFF). • Condensate Pump discharge pressure (PI-1289 - CO6). • Condensate Header Flow (FI-1095A - CO6). 2. Notify Shift Supervision.
		Manually reduce Recirculation flow as directed. (Place HS 2A-S18A & 2A-S18B to LOWER - CO4).
		ARP 6-A-8, COND PUMP P-1A TRIP • Verify Reactor Feed Pump suction pressure is >70 psig. (PI-1120 & PI-1121 - CO6)

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 3 **No. 11 Condensate Pump Trip & 4160V Bus 13 Lockout**	**No. 11 Condensate Pump will trip which will cause the crew to enter C.4.F, RAPID POWER REDUCTION to increase RFP suction pressure. No. 11 RFP may trip during this time. A lockout of Bus 13 will cause the loss of No 11 RFP if not already tripped and a loss of No. 11 Circ Water Pump. Actions must be taken to control Reactor water level and mitigate the consequences of the Bus 13 Lockout.**
	SIMULATOR OPERATOR
TRG#3	When directed by the Lead Evaluator insert event trigger #3 to cause a trip of 11 Condensate Pump (FW03A) and a lockout of 4160 VAC Bus 13 (ED05C).
	SIMULATOR COMMUNICATOR
As TBO	If requested to investigate the trip of 11 Condensate Pump then wait 3 minutes and reply "The overcurrent relay is tripped on the 152-304 breaker".
As TBO	If requested to investigate the lockout of Bus 13 then wait 3 minutes and reply "The 183 relay is tripped on the 152-301 breaker".

Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 3 (Cont.)		**No. 11 Condensate Pump Trip & 4160V Bus 13 Lockout**
Objective(s)	RO	ARP 6-A-33, CONDENSATE PUMP LOW DISCH PRESS) • Verify adequate Hotwell Level. (LR-1278 - CO6) • Monitor Reactor Feed Pump suction pressure and flow. (PI-1120 & PI-1121 RFP suction pressure - CO6) (FI-6-89A & FI-6-89B Feedwater flow A & B - CO5) • Verify Condensate discharge pressure is >230 psig. (PI-1289 Condensate discharge pressure - CO6)
		ARP 6-A-6, RCT FEED PUMP P-2A TRIP • Verify CV-3489 Recirc valve closes after 50 sec. (CV-3489 lamp indication – CO6) • Enter C.4-B.6.5.A - FEEDWATER PUMP TRIP
CR200.175		C.4-B.6.5.A - FEEDWATER PUMP TRIP • Verify RPV water level is being controlled +9 to +48 inches. (Feedwater and Safeguards RPV level meters – CO5) • Verify #11 RFP Aux Oil Pump is running. (#11 Aux Oil Pump Bkr ind Red ON, Green OFF – CO6)
CR200.183		C.4-B.09.06.B - LOSS OF BUS 13 OR BUS 14: • Monitor and control Reactor water level between +30 and +40 inches.
		C.4-B.01.03.A - LOSS OF CRD PUMP FLOW • Verify #12 CRD Pump is operating. o (#12 CRD Pump breaker indication – Green lamp OFF, Red lamp ON) o (PI-3-302 Charging Water Header Pressure - CO5) o (FI-3-306 Cooling Water Header Flow - CO5)

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 3 **No. 11 Condensate Pump Trip & 4160V Bus 13 Lockout**	**No. 11 Condensate Pump will trip which will cause the crew to enter C.4.F, RAPID POWER REDUCTION to increase RFP suction pressure. No. 11 RFP may trip during this time. A lockout of Bus 13 will cause the loss of No 11 RFP if not already tripped and a loss of No. 11 Circ Water Pump. Actions must be taken to control Reactor water level and mitigate the consequences of the Bus 13 Lockout.**
	SIMULATOR OPERATOR
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Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 3 (Cont.)		**No. 11 Condensate Pump Trip & 4160V Bus 13 Lockout**
Objective(s) **CR200.183**	BOP	Determine #13 4160V bus lockout has occurred.
		1. Enter C.4-B.09.06.B - LOSS OF BUS 13 OR BUS 14 Enter the following procedures (directed by C.4-B.09.06.B - LOSS OF BUS 13 OR BUS 14): • C.4-B.01.03.A - LOSS OF CRD PUMP FLOW • C.4-B.06.04.A - DECREASED CIRCULATING WATER FLOW • C.4-B.06.03.A - DECREASING CONDENSER VACUUM • C.4-B.09.06.C - LOSS OF BUS 15 OR BUS 16 • C.4-B.09.07.A - LOSS OF POWER TO LC-101 OR ITS MCC'S • C.4-B.09.07.C - LOSS OF POWER TO LC-103 OR ITS MCC'S • C.4-B.09.07.E - LOSS OF POWER TO LC-107 OR MCC-114 • C.4-B.09.07.G - LOSS OF POWER TO LC-109 OR ITS MCC'S
		ARP 8-B-11 NO 13 4160V BUS LOCKOUT • Verify #15 4160V bus has transferred to 1AR. (152-511 breaker indication - Red OFF, Green ON - CO8) (#15 bus voltage indication - CO8) • Verify #11 & #12 Emergency Diesel Generators have started. (#11 & #12 EDG voltage indication - CO8) • Verify LC-107 transfer to LC-108.
		C.4-B.09.06.B - LOSS OF BUS 13 OR BUS 14: • OPEN ACB 52-901 (52-901/CS – CO8) • Place 52-901/SS SYNC 109 CTR SEC ACB to ON – CO8 • CLOSE ACB 52-908 109/102 LOAD CTR TIE ACB (52-908/CS – CO8) • Verify MO-1850 "11 Cir Wtr Pump P-100 Discharge Valve" has closed. (Bkr indicating lamps – CO6) **NOTE: MO-1850 will begin to automatically close when power is restored to LC-109.**

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 3 **No. 11 Condensate Pump Trip & 4160V Bus 13 Lockout**	**No. 11 Condensate Pump will trip which will cause the crew to enter C.4.F, RAPID POWER REDUCTION to increase RFP suction pressure. No. 11 RFP may trip during this time. A lockout of Bus 13 will cause the loss of No 11 RFP if not already tripped and a loss of No. 11 Circ Water Pump. Actions must be taken to control Reactor water level and mitigate the consequences of the Bus 13 Lockout.**
	SIMULATOR OPERATOR
	None
	SIMULATOR COMMUNICATOR
As RBO	If requested to monitor operation of 11 EDG and 12 EDG then acknowledge the request. No further communication is necessary.

Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 3 (Cont.)		**No. 11 Condensate Pump Trip & 4160V Bus 13 Lockout**
Objective(s) **CR200.174**	BOP	C.4-B.06.04.A - DECREASED CIRCULATING WATER FLOW • Place #11 Circulating Water Pump control switch to STOP. (152-305/CS – CO6)
CR200.184		C.4-B.09.06.C - LOSS OF BUS 15 OR BUS 16 • Determine that Bus 15 is being powered by 1AR. (152-511 breaker indication - Red OFF, Green ON - CO8) (#15 bus voltage indication - CO8) • Consider shutdown of #11 & #12 Emergency Diesel Generators.
		C.4-B.09.07.A - LOSS OF POWER TO LC-101 OR ITS MCC'S • No action required – LC-101 re-powered automatically.
CR200.187		C.4-B.09.07.C - LOSS OF POWER TO LC-103 OR ITS MCC'S • Monitor system operation for RBCCW, Stator Cooling, Drywell Ventilation, Service Water and Hydrogen Seal Oil.
CR200.189		C.4-B.09.07.E - LOSS OF POWER TO LC-107 OR MCC-114 • Determine crosstie between LC-107 and LC-108 is closed. (Indicated by control room lighting restored)
		C.4-B.09.07.G - LOSS OF POWER TO LC-109 OR ITS MCC'S • No action required – LC-109 re-powered when breaker 52-908 was closed.

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 3 **No. 11 Condensate Pump Trip & 4160V Bus 13 Lockout**	**No. 11 Condensate Pump will trip which will cause the crew to enter C.4.F, RAPID POWER REDUCTION to increase RFP suction pressure. No. 11 RFP may trip during this time. A lockout of Bus 13 will cause the loss of No 11 RFP if not already tripped and a loss of No. 11 Circ Water Pump. Actions must be taken to control Reactor water level and mitigate the consequences of the Bus 13 Lockout.**
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Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 4-6		**No. 12 Condensate Pump Trip, No. 12 RFP Trip, Scram, ATWS**
Objective(s)	SRO	Acknowledge report of 6-A-9, "COND PUMP P-1B TRIP"
SS315164		NOTE: C.4.K actions may not be performed if RPV water level is decreasing quickly. Per C.4.K - IMMEDIATE REACTOR SHUTDOWN 1. Direct the Reactor Operator to reduce Recirculation flow to minimum. 2. Direct the Reactor Operator to manually scram the reactor
SS304.193		Enter C.5-1100 RPV CONTROL (Entry Condition – Reactor power above 3% when scram required. 1. Verify Reactor Scram has been initiated. 2. Determine all rods ARE NOT in to at least 04. 3. Determine the reactor WILL NOT stay shutdown under all conditions without boron. 4. Leave C.5-1100 and Enter C.5-2007
SS304.201 **CRITICAL STEP**		Enter C.5-2007, FAILURE TO SCRAM 1. Direct the BOP operator to inhibit ADS 2. Direct the BOP operator to prevent Core Spray injection per C.5-3205.
		<u>POWER LEG:</u> 1. Verify Mode switch in SHUTDOWN 2. Determine Main Turbine IS NOT on line 3. Direct RO to actuate ATWS
SS314.101		Direct RO to insert control rods per C.5-3101 - ALTERNATE ROD INSERTION.
CRITICAL STEP		1. Determine Torus Temperature will reach 110 °F. 2. Direct RO to inject SBLC
		<u>PRESSURE LEG</u> 1. Determine Drywell pressure is < 2 psig. 2. Consider opening MSIVs per C.5-3301 if personnel available. 3. Determine SRVs are not rapidly cycling. 4. Consider LO-LO SET can stabilize RPV pressure.

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 4-6 **No. 12 Condensate Pump Trip, No. 12 RFP Trip, Scram, ATWS**	**No. 12 Condensate Pump will trip, causing No. 12 RFP to trip on low suction pressure. RPV level will decrease and the crew will be required to manually scram the reactor. Not all rods will insert and the crew will enter the EOPs for RPV Control, Failure to Scram and Primary Containment Control. The crew should terminate and prevent injection to help control reactor power. The crew will insert control rods via alternate methods and line-up for SBLC injection.**
	SIMULATOR OPERATOR
TRG#4	When directed by the Lead Evaluator insert event trigger #4 to cause the 12 Condensate Pump to trip. (FW03B)
	SIMULATOR COMMUNICATOR
	None

Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 4-6 (Cont.)		**No. 12 Condensate Pump Trip, No. 12 RFP Trip, Scram, ATWS**
Objective(s)	SRO	
SS314.108 CRITICAL STEP		**LEVEL LEG** 1. Check Detail 'A' for instrument limits. 2. Determine no instrument limits have been exceeded. 3. Determine: • Reactor power above 3% • Torus temperature above 110 °F. • SRV open • RPV water level >-126 inches 4. Determine MSIVs are CLOSED. 5. Direct BOP operator to Terminate and Prevent HPCI & LPCI per C.5-3205 – TERMINATE AND PREVENT.
		1. Determine Reactor power is < 3%. 2. Record final RPV level on line 2. 3. Direct that RPV level be maintained between –149 inches and value recorded on line 2 with RCIC & HPCI. 4. Verify instrument limits are satisfactory
		When all control rods have been fully inserted into the core: 1. Directs the RO to stop injecting SBLC. 2. Exits C.5-2007 and returns to C.5-1100, RPV Control. 3. Directs the RO to restore RPV water level +9" to +48" using HPCI.
SS304.194		Enter C.5-1200 PRIMARY CONTAINMENT CONTROL (90 °F Torus Temperature) **TORUS TEMPERATURE STEPS** 1. Determine Torus temperature cannot be maintained < 90 °F. 2. Direct BOP operator to start all available torus cooling. 3. Recognize Torus Temperature will reach 110 °F. 4. Enter C.5-1100 - RPV CONTROL 5. Verify Reactor scram has occurred. 6. Determine Torus temperature can be maintained below fig M, HEAT CAPACITY LIMIT. (SPDS 78)
		DRYWELL TEMPERATURE STEPS 1. Monitor and maintain drywell temperature < 135 °F. NOTE: No further action should be necessary
		DRYWELL/TORUS PRESSURE STEPS 1. Monitor and maintain drywell and torus pressure < 2 psig. NOTE: No further action should be necessary

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 4-6 **No. 12 Condensate Pump Trip, No. 12 RFP Trip, Scram, ATWS**	**No. 12 Condensate Pump will trip, causing No. 12 RFP to trip on low suction pressure. RPV level will decrease and the crew will be required to manually scram the reactor. Not all rods will insert and the crew will enter the EOPs for RPV Control, Failure to Scram and Primary Containment Control. The crew should terminate and prevent injection to help control reactor power. The crew will insert control rods via alternate methods and line-up for SBLC injection.**
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Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 4-6 (Cont.)		**No. 12 Condensate Pump Trip, No. 12 RFP Trip, Scram, ATWS**
Objective(s)	SRO	**<u>TORUS LEVEL STEPS</u>** 1. Monitor and maintain Torus level – 4.0 inches to +3.0 inches. NOTE: No further action should be necessary
		<u>HYDROGEN CONTROL STEPS</u> 1. Direct BOP operator to perform procedure C.5-3501 –H2/O2 ANALYZER OPERATION, as time permits.
CR200.175	RO	1. Acknowledge annunciator 6-A-9 "COND PUMP P-1B TRIP" 2. Determine #12 Condensate Pump has tripped using indications below: (Breaker indication CO6 –Green lamp ON, Red lamp OFF). 3. Condensate Pump discharge pressure (PI-1289 - CO6). 4. Condensate Header Flow (FI-1095A - CO6) 5. Notify Shift Supervision
		1. Acknowledge annunciator 6-A-7 - RCT FEED PUMP P-2B TRIP 2. Determine #12 Reactor Feed Pump has tripped using indications below: • Breaker indication CO6 –Green lamp ON, Red lamp OFF. • Feed Pump discharge pressure (PI-1131 - CO6). • Reactor Feed Flow (FI-6-89A & FI-6-89B – CO5). 3. Enter C.4-B.06.05.A - FEEDWATER PUMP TRIP a. Verify no Condensate Pumps are operating. b. Verify no Reactor Feed Pump suction pressure. c. Determine neither Feed Water Pump is available.
		1. Depress REACTOR SCRAM A and B pushbuttons. (5A-S3A and 5A-S3B) 2. Recognize control rods are NOT inserted to or beyond position 04. (Full Core Display – CO5) (RWM displays – All rods not in) (Reactor Steam flow – Turbine on line) 3. Place the reactor mode switch in SHUTDOWN. 4. Notify Shift Supervision

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 4-6 **No. 12 Condensate Pump Trip, No. 12 RFP Trip, Scram, ATWS**	**No. 12 Condensate Pump will trip, causing No. 12 RFP to trip on low suction pressure. RPV level will decrease and the crew will be required to manually scram the reactor. Not all rods will insert and the crew will enter the EOPs for RPV Control, Failure to Scram and Primary Containment Control. The crew should terminate and prevent injection to help control reactor power. The crew will insert control rods via alternate methods and line-up for SBLC injection.**
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Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 4-6 (Cont.)		**No. 12 Condensate Pump Trip, No. 12 RFP Trip, Scram, ATWS**
Objective(s) **CR212.105**	RO	Locate procedure B.05.06-05 - ATWS SYSTEM MANUAL INITIATION (hard card) 1. SET the arming collars of one pair of the following switches to the armed position and depress the pushbuttons: • ATWS A MAN and ATWS C MAN (PB S-5A & S-5C) (CO5) OR • ATWS B MAN and ATWS D MAN (PB S-5B & S-5D) (CO5) 2. Verify Recirc Pump MG Set generator field breakers have tripped. (Field breaker indicating lights – CO4) 3. Trip the MG set drive motors. 4. Place HS 2A-S1A to STOP (#11 MG set drive motor breaker) 5. Place HS 2A-S1B to STOP (#12 MG set drive motor breaker) 6. Determine Control Rods DO NOT insert.
CR314.105		Locate procedure C.5-3101 - ALTERNATE ROD INSERTION. 1. Determine Part C is appropriate. 2. Determine prerequisites are met: a. CRD pump available (Breaker indication CO5). b. Instrument air available (PI-1476 - CO6 or PR-1176 – CO7). c. Reactor Building accessible. 3. Place the RWM Owner Display Keylock Switch in BYPASS. 4. Verify #12 CRD Pump is operating. 5. Place FC-301 – CRD FLOW CONTROL STATION in MANUAL. (CO5) NOTE: The following step will alert the RO to the CRD Flow Control Valve failure – **Event 5 (CRD FCV Failure)**. 6. ADJUST FC-301 to 100%. 7. Determine "A" CRD FLOW CONTROL VALVE CV-3-19A did not open. a. (Indicating lights, Green - ON, Red – OFF - CO5) b. (PI-3-302 Charging Water Header Pressure - CO5) c. (FI-3-306 Cooling Water Header Flow - CO5) 8. Determine Part C will not work to insert control rods. 9. Notify SS that part C did not work due to CRD Flow Control Valve problem.

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 4-6 **No. 12 Condensate Pump Trip, No. 12 RFP Trip, Scram, ATWS**	**No. 12 Condensate Pump will trip, causing No. 12 RFP to trip on low suction pressure. RPV level will decrease and the crew will be required to manually scram the reactor. Not all rods will insert and the crew will enter the EOPs for RPV Control, Failure to Scram and Primary Containment Control. The crew should terminate and prevent injection to help control reactor power. The crew will insert control rods via alternate methods and line-up for SBLC injection.**
TRG#5	**SIMULATOR OPERATOR** When the C-05 Panel operator begins to drive control rods in, or at the discretion of the Lead Evaluator, insert event trigger #5 to cause the 'A' CRD FCV to fail closed. (CH07B) **SIMULATOR COMMUNICATOR** None

Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 4-6 (Cont.)		**No. 12 Condensate Pump Trip, No. 12 RFP Trip, Scram, ATWS**
Objective(s)	RO	1. Determine C.5-3101 Part D is appropriate. 2. Determine prerequisites are met: • 1 division of RPS power available • Instrument Air available (PI-1476 - CO6 or PR-1176 – CO7) • RPV pressure >100 psig (PI-6-90A & PI-6-90B – CO5) 3. ANNOUNCE over plant PA to evacuate personnel from the Reactor Building 896 ft. Floor and Equipment Drain Tank Room. 4. Depress the ATWS reset PB for the ATWS division actuated earlier. • ATWS A MAN and ATWS C MAN (PB S-4A) (CO5) OR • ATWS B MAN and ATWS D MAN (PB S-4B) (CO5) 5. Determine ATWS cannot be reset. • (5-A-31 – ATWS CHANNEL A TRIP does not clear) • (5-A-32 – ATWS CHANNEL B TRIP does not clear) 6. Direct RBO to • OPEN D-21 Circuit 6 (125V div. 2) • OPEN D-11, Circuit 5 (125V div. 1) 7. Determine scram cannot be reset. 8. BYPASS all automatic scram signals; 9. RESET the scram using the SCRAM LOGIC RESET switch (5A-S9 – CO5) 10. Direct RBO to verify OPEN CRD-14. 11. Verify OPEN SDV vent & drain valves. (light indication CO5) 12. Determine 5-B-21 DISCH VOLUME WATER LEVEL SCRAM TRIP is reset. NOTE: Steps 13 & 14 may be performed concurrently. 13. CLOSE SDV vent & drain valves. (HS 5A-S11 – CO5) 14. Insert a manual scram (pushbuttons 5A-S3A & 5A-S3B CO5). 15. Informs Shift Supervision that all rods inserted.

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 4-6 **No. 12 Condensate Pump Trip, No. 12 RFP Trip, Scram, ATWS**	**No. 12 Condensate Pump will trip, causing No. 12 RFP to trip on low suction pressure. RPV level will decrease and the crew will be required to manually scram the reactor. Not all rods will insert and the crew will enter the EOPs for RPV Control, Failure to Scram and Primary Containment Control. The crew should terminate and prevent injection to help control reactor power. The crew will insert control rods via alternate methods and line-up for SBLC injection.**
	SIMULATOR OPERATOR
Remote RR18	If directed to de-energize the ARI valves (OPEN D-21 Circuit 6 and D-11 Circuit 5 of 125 VDC) wait 2 minutes then insert remote RR18.
Remote PP06	If directed to bypass RPS scrams wait 3 minutes then insert remote PP06.
Remove MALF CH16 & CH19	When an attempt is made to re-scram the reactor, as the scram pushbuttons are depressed remove malfunctions CH16 and CH19 to allow the rods to insert.
	SIMULATOR COMMUNICATOR
As RBO	If directed to close CRD-79-1, RV-7364A INLET (behind CRDH instrument rack), CRD-79-2, RV-7364B INLET (behind CRDH instrument rack), and CRD-168, CRD PUMP BYPASS ISOL then wait 4 minutes and reply that "CRD 79-1, CRD 79-2, and CRD-168 are closed".
As RBO	If directed to verify CRD-14 is OPEN then wait 2 minutes and reply "CRD-14 is verified OPEN".

Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 4-6 (Cont.)		**No. 12 Condensate Pump Trip, No. 12 RFP Trip, Scram, ATWS**
Objective(s)	RO	1. Place SLC system selector switch to SYS 1. (HS 11A-S1 CO5) 2. Determine System 1 SBLC did not actuate. • System 1 SBLC Pump breaker indication – (Green ON, Red OFF CO5) • SBLC DISCHARGE PRESSURE reads 0. (PI-11-65 CO5)
CRITICAL STEP **CR211.106**		1. Place SLC system selector switch to SYS 2. (HS 11A-S1 CO5) 2. Verify system 2 SBLC did actuate. • System 2 SBLC Pump breaker indication – (Green OFF, Red ON CO5) • SBLC DISCHARGE PRESSURE reads slightly higher than reactor vessel pressure. (PI-11-65 CO5) • SBLC tank level decreasing. (LI-11-66) 3. Review procedure B.03.05-05 - MANUAL INITIATION, as time permits.
		Restores RPV water level to +9 inches to +48 inches using HPCI per C.5-3205, TERMINATE AND PREVENT, Part C: • If directed by Shift Supervision to restore HPCI, then place AUX OIL PUMP handswitch 23A-S17 in AUTO.
CRITICAL STEP	BOP	1. Place switches 2E-S7A & 2E-S7B on CO3 to INHIBIT.
CRITICAL STEP **CR314.112**		1. Locate part A (Core Spray) of C.5-3205 – TERMINATE AND PREVENT. 2. Place MO-1751 CS INJECTION BYPASS handswitch in BYPASS. (14A-S16A - CO3) 3. CLOSE MO-1751, CS INJECTION OUTBOARD (HS 14A-S2A – CO3) 4. Place No 11 CORE SPRAY PUMP handswitch in PULL-TO-LOCK. (HS 14A-S5A – CO3) 5. Place MO-1752 CS INJECTION BYPASS handswitch in BYPASS. (14A-S16B - CO3) 6. CLOSE MO-1752, CS INJECTION OUTBOARD (HS 14A-S2B – CO3) 7. Place No 12 CORE SPRAY PUMP handswitch in PULL-TO-LOCK. (HS 14A-S5B – CO3)

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 4-6 **No. 12 Condensate Pump Trip, No. 12 RFP Trip, Scram, ATWS**	**No. 12 Condensate Pump will trip, causing No. 12 RFP to trip on low suction pressure. RPV level will decrease and the crew will be required to manually scram the reactor. Not all rods will insert and the crew will enter the EOPs for RPV Control, Failure to Scram and Primary Containment Control. The crew should terminate and prevent injection to help control reactor power. The crew will insert control rods via alternate methods and line-up for SBLC injection.**
	SIMULATOR OPERATOR
	NOTE: Both SBLC Systems have been prevented from starting via overrides in the simulator setup. This is to ensure that when an attempt to start is made that SBLC will not start. However, this scenario will allow SBLC to be injected when the candidate attempts to start the other system. If System 1 is started first then be prepared to remove the override on SBLC System 2 before the attempt to start System 2 is made. Or if System 2 is started first then ensure the override on SBLC System 1 if removed before an attempt to start System 1 is made.
DEL OVR **SBLC Sys 1** **OR** **SBLC Sys 2**	In accordance with the note above, remove the override of SBLC System 1 or System 2 as applicable after an attempt has been made to start the other SBLC System.
	SIMULATOR COMMUNICATOR
	None

Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 4-6 (Cont.)		**No. 12 Condensate Pump Trip, No. 12 RFP Trip, Scram, ATWS**
Objective(s) **CRITICAL STEP**	BOP	Locate procedure C.5-3205 TERMINATE AND PREVENT parts B & C. <u>Part B</u> 1. OPEN knife switch 10A-S31A (CO3) 2. OPEN knife switch 10A-S31B (CO3) 3. CLOSE MO-2012 (HS 10A-S10A CO3) 4. CLOSE MO-2013 (HS 10A-S10B CO3) <u>Part C</u> 1. Determine HPCI is operating. 2. Depress and hold the TURBINE TRIP pushbutton (PB 23A-S22) 3. Verify HPCI has stopped. (SI-7317 HPCI speed CO3) 4. Place AUX OIL PUMP in PULL-TO-LOCK. (HS 23A-S17) 5. Wait approximately 5 seconds after AUX OIL PUMP in placed PULL-TO-LOCK then release the HPCI TURBINE TRIP pushbutton. 6. Verify HO-7 CLOSED. (lamp indication CO3)
		1. Locate procedure C.5-3205 2. Place HPCI AUX OIL PUMP handswitch to AUTO. (HS 23A-S17)
CR203.102		Place Div. 1 Torus Cooling in service: 1. Locate B.03.04-05.H.5 (Hardcard) 2. Perform steps 1 thru 9 of B.03.04-05.H.5. Place Div. 2 Torus Cooling in service: 1. Locate B.03.04-05.H.6 (Hardcard) 2. Perform steps 1 thru 9 of B.03.04-05.H.6.
CR314.122		1. Locate C.5-3501 – H2/O2 ANALYZER OPERATION 2. Perform steps 1 thru 14 of C.5-3501 (see attachment 1 for steps).

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 4-6 **No. 12 Condensate Pump Trip, No. 12 RFP Trip, Scram, ATWS**	**No. 12 Condensate Pump will trip, causing No. 12 RFP to trip on low suction pressure. RPV level will decrease and the crew will be required to manually scram the reactor. Not all rods will insert and the crew will enter the EOPs for RPV Control, Failure to Scram and Primary Containment Control. The crew should terminate and prevent injection to help control reactor power. The crew will insert control rods via alternate methods and line-up for SBLC injection.**
	Termination Criteria: • Control rods inserted • RPV water level restored • At the discretion of the Lead Evaluator. Classification: Guideline 12 (Alert)

REFERENCES

PROCEDURE	TITLE	REVISION
ARP 3-A-42	RHR PUMP 11 LOCKOUT	2
ARP 5-B-17	CHARGING WATER LOW PRESSURE	1
ARP 5-B-25	CRD PUMP 3-16A BREAKER TRIPPED	1
ARP 5-B-26	CRD PUMP 3-16A OL	1
ARP 6-A-6	RCT FEED PUMP P-2A TRIP	0
ARP 6-A-7	RCT FEED PUMP P-2B TRIP	0
ARP 6-A-8	COND PUMP P-1A TRIP	0
ARP 6-A-9	COND PUMP P-1B TRIP	0
ARP 6-A-33	CONDENSATE PUMP LOW DISCH PRESS	2
ARP 8-B-11	NO 13 4160V BUS LOCKOUT	0
B.03.04-05.H.5	PLACING 'A' LOOP RHR TORUS COOLING IN SERVICE DURING ABNORMAL AND EMERGENCY CONDITIONS	24
B.03.04-05.H.6	PLACING 'B' LOOP RHR TORUS COOLING IN SERVICE DURING ABNORMAL AND EMERGENCY CONDITIONS	24
B.03.05-05.G.1	MANUAL INITIATION	9
B.05.06-05.E.1	ATWS SYSTEM MANUAL INITIATION	4
C.4-B.01.03.A	LOSS OF CRD PUMP FLOW	6
C.4.B.05.01.02.A	CONTROL OF NEUTRON FLUX OSCILLATIONS	6
C.4-B.06.03.A	DECREASING CONDENSER VACUUM	7
C.4-B.06.04.A	DECREASED CIRCULATING WATER FLOW	7
C.4-B.06.05.A	FEEDWATER PUMP TRIP	6

REFERENCES (Cont.)

PROCEDURE	TITLE	REVISION
C.4-B.09.06.B	LOSS OF BUS 13 OR BUS 14	6
C.4-B.09.06.C	LOSS OF BUS 15 OR BUS 16	6
C.4-B.09.07.A	LOSS OF POWER TO LC-101 OR ITS MCC'S	11
C.4-B.09.07.C	LOSS OF POWER TO LC-103 OR ITS MCC'S	10
C.4-B.09.07.E	LOSS OF POWER TO LC-107 OR MCC-114	6
C.4-B.09.07.G	LOSS OF POWER TO LC-109 OR ITS MCC'S	4
C.4.F	RAPID POWER REDUCTION	13
C.4.K	IMMEDIATE REACTOR SHUTDOWN	0
C.5-1100	RPV CONTROL	8
C.5-1200	PRIMARY CONTAINMENT CONTROL	11
C.5-2007	FAILURE TO SCRAM	11
C.5-3101	ALTERNATE ROD INSERTION	3
C.5-3205	TERMINATE AND PREVENT	2
C.5-3501	H2/O2 ANALYZER OPERATION	0

Monticello Nuclear Generating Plant

SIMULATOR EXERCISE GUIDE

NRC02-03

SYNCHRONIZE MAIN GENERATOR TO THE GRID

INCREASE POWER BY PULLING RODS

NO. 11 SERVICE WATER PUMP TRIP

HOTWELL LOW LEVEL

STEAM PACKING EXHAUSTER HIGH TEMPERATURE

CHANNEL "4" APRM FAILS HIGH

DESIGN BASIS EARTHQUAKE

LOSS OF NO. 13 BUS

NUCLEAR BOILER REFERENCE LINE BREAKS

Rev. 00

07/02

PREPARED BY:	_____	_____
	Instructor	Date
REVIEWED BY:	_____	_____
	Station Operating	Date
APPROVED BY:	_____	_____
	Supervisor Operations Training	Date

SCENARIO OVERVIEW

Narrative Summary:

5. Unit is at 18% power with a CDF of 4.52 E^{-5}/year (Yellow).
6. The following equipment is OOS:
   a. No. 13 Service Water Pump due to noise in the motor.
   b. MO-2026 and MO-2027
7. LCOs:
   a. 3.7.D.2 for MO-2026 and MO-2027.
   b. 3.7.A.5.b (24 hour LCO) for Primary Containment inerting.
8. Scenario Description

   The crew will assume the shift with the plant operating at 18% power. The Main Turbine has been placed in service and the crew will be expected to place the Main Generator in service.

   After placing the Main Generator in service, power is increased by pulling rods in accordance with the roller tape and Nuclear Engineer's direction.

   No. 11 Service Water Pump trips and No. 12 Service Water Pump will not automatically start. The operator will be expected to manually start No. 12 Service Water Pump and restore system pressure.

   A Hotwell Low Level is received and investigation should lead the crew to determine that the reject valve controller (CV-1093A & B) is calling for 100% open. The operator will take manual control of CV-1093A & B and close it. RFP suction pressure should be monitored during this transient.

   A Steam Packing Exhauster High Temperature will come in. The operator should be directed to start Steam packing exhauster K-3B and adjust the outlet valve, MO-1049. Steam Packing Exhauster K-3A will then be secured.

   Channel 4 APRM will fail high. This will cause a trip of Channel "B" RPS Scram Logic. An evaluation will determine that the minimum number of APRM channels is satisfied per Tech Specs. The APRM will be bypassed and the "B" RPS Scram Logic will be reset.

   A Design Basis Earthquake will occur which will cause a Bus 13 lockout. The reactor should be manually scrammed and actions taken for the scram and Bus 13 lockout.

   Subsequent to the earthquake a reference line break will occur on the "A" side and then after a time delay of approximately 4 minutes, the reference line will break on the "B" side. Initially C.5-1100, RPV CONTROL will be entered, but when all level indication is lost, C.5-1100 will be exited and C.5-2006, RPV FLOODING, will be entered. An Emergency Depressurization will be conducted and the Reactor vessel flooded. C.5-1200, PRIMARY CONTAINMENT CONTROL will be entered to control Drywell pressure.

   The scenario will be terminated when 3 SRVs are open and there is indication that the Reactor has been flooded by monitoring that RPV pressure is >50 psig above Drywell pressure.

Scenario Run Time: 60 min.

Scenario Events:

Event 1: Synchronize Main Generator to the Grid

The Main Turbine has been placed in service by the previous shift. The crew will take the shift and then place the Main Generator in service.

Malfunctions Required: 0

Event 2: Increase Reactor Power With Control Rods

The crew will increase Reactor power using control rods in accordance with the roller tape starting at rod 34-43.

Malfunctions Required: 0

Event 3: No. 11 Service Water Pump Trip With Failure of Standby Pump to Start

No. 11 Service Water Pump will trip and No. 12 Service Water Pump will not automatically start. Operator will need to manual start No. 12 Service Water Pump.

Malfunctions Required: 2 No. 11 Service Water Pump Trip

No. 12 Service Water Pump Failure to Auto Start

Event 4: Hotwell Low Level

A Hotwell Low Level will be received due to the reject valve controller (CV-1093A & B) calling for 100% open. The controller will need to be placed in manual and the reject valve closed.

Malfunctions Required: 1 CV-1093A & B Failure.

Event 5: Steam packing Exhauster High Temperature

A high temperature will be experienced on Steam Packing Exhauster K-3A. This will require the operator to start Steam Packing Exhauster K-3B and establish vacuum and then shutdown Steam packing Exhauster K-3A.

Malfunctions Required: 1 High Temperature on Steam Packing Exhauster K-3A

Event 6: Channel 4 APRM Fails High

Channel 4 APRM will fail high causing a trip of Channel "B" RPS scram logic. An evaluation will need to be done to ensure Tech Specs is being complied with. Channel 4 APRM will then be bypassed and Channel "B" RPS scram logic will be reset.

Malfunctions Required:	1	Channel 4 APRM Failure High

Event 7 & 8: Design Basis Earthquake and Bus 13 Lockout

A Design Basis Earthquake will be felt which will cause a lockout of Bus 13. The Reactor will be manually scrammed and mitigative actions will be taken for the scram and the Bus 13 lockout.

Malfunctions Required:	4	Earthquake
		Operational Basis Earthquake
		Design Basis Earthquake
		4160V Bus 13 Lockout

Event 9: Loss of All RPV Level Indication

A reference line break will occur on the "A" side followed by a break in the "B" side after approximately 4 minutes. This will cause a loss of all level indication which will drive the crew into C.5-2006, RPV FLOODING. Emergency Depressurization will be accomplished and then water injected to flood the vessel.

Malfunctions Required	3	Division 1 Reference Line Break
		Division 2 Reference Line Break
		Wide Range Level Transmitter Failure

Scenario Objectives:

Unless otherwise stated for a specific objective, the trainee shall demonstrate his or her mastery of the following learning objectives with 100% accuracy through written, performance, and/or oral examination. 1) Knowledge objectives shall be from memory with 100% accuracy; 2) Performance objectives shall be from memory with 100% accuracy and IAW all applicable procedures, and in individual or team performance situations.

Reactor Operator Objectives:	
CR200.126	Synchronize and load the Turbine Generator.
CR200.127	Perform a power ascension after the reactor is on line >15% power.
CR200.176	Perform the procedure for loss of service water.
CR200.208	Perform the procedure for immediate reactor shutdown.
CR200.146	Perform the procedure for a Reactor Scram
CR200.147	Perform the procedure for loss of CRD Pump flow.
CR200.170	Perform the procedure for an earthquake.
CR200.183	Perform the procedure for a loss of Bus 13 or 14.
CR200.174	Perform the procedure for Circulating Water System failure.
CR200.172	Perform the procedure for loss of Condenser Vacuum.
CR200.184	Perform the procedure for a loss of Bus 15 or 16.
CR200.187	Perform the procedure for a loss of power to LC-103 or its MCCs.
CR314.103	Performa actions associated with RPV flooding.
CR314.123	Perform actions associated with containment spray.
CR314.124	Defeat Drywell Cooler Trips.
CR314.122	Operate H2/O2 Analyzer.

Scenario Objectives:

Unless otherwise stated for a specific objective, the trainee shall demonstrate his or her mastery of the following learning objectives with 100% accuracy through written, performance, and/or oral examination. 1) Knowledge objectives shall be from memory with 100% accuracy; 2) Performance objectives shall be from memory with 100% accuracy and IAW all applicable procedures, and in individual or team performance situations.

Control Room Supervisor Objectives:	
SS200.132	Supervise and direct Turbine-Generator Synchronization and Loading.
SS200.133	Supervise and direct increase to full power.
SS315.131	Supervise response to a loss of service water.
SS255.108	Diagnose and perform the actions in the event of inadequate condenser vacuum.
SS299.324	Apply Technical Specifications 3.2/4.2 and Bases to Protective Instrumentation.
SS315.125	Supervise response to an earthquake.
SS315.164	Supervise immediate reactor shutdown.
SS315.139	Supervise response to a loss of Bus 13 or Bus 14.
SS304.193	Implement RPV Control.
SS304.200	Implement RPV Flooding.
SS304.194	Implement primary containment control.
SS314.118	Supervise H2/O2 analyzer operation.
SS314.119	Supervise containment spray.
SS314.120	Supervise defeat drywell cooler trips.

PRE-SCENARIO ACTIVITIES

3. If applicable, conduct pre-scenario activities in accordance with MTCP-03.39, Conduct of Licensed Operator Simulator Training, and NUREG 1021, Rev 8, Operator Licensing Examination Standards for Power Reactors.
4. Simulator Setup (the following steps can be done in any logical order)
   a. Initialize simulator in IC 256
   b. Simulator to RUN.
   c. Establish the following simulator conditions:
      1) LCO Board Updated
      2) Verify Substation one-line diagram breaker positions in normal electrical lineup.
      3) Procedure C.1 marked-up (from the rack) showing completion through step VI.C.4.
      4) Form 2167, Startup Checklist, marked-up showing completion through step H.4 and N/A step H.15.
      5) Set the roller tape at Step 16 rod 34-43 and select.
      6) CR Shift Turnover Checklist (Form 3139) is completed.
      7) Verify the following malfunctions/overrides are loaded into the simulator computer:
         - 12 Service Water Pump White Light ON.
         - 13 Service Water Pump Green Light OFF.
         - River water temperature at 40°F. (Verify by SPDS)
         - Outside air temperature at 35°F. (Verify by SPDS)
      8) Verify the procedures listed on page 36 are free of any markings and are the revision stated.
      9) Verify Alarm Monitor is cleared.
      10) Verify APRM #4 on C-37 Function Switch is selected to AVERAGE.
   d. Secure the following equipment and tag out of service:
      1) 13 Service Water Pump
      2) MO-2026 and MO-2027

NOTE: When setting up the simulator for the SRO candidates perform Event #1 as part of the simulator setup and line-out the information in the turnover sheets about needing to synchronize the generator to the grid. Ensure the C.1 procedure and Form 2167 are marked-up showing these steps being completed.

The following information shall be provided by the Simulator Communicator during the Shift Brief. When polled by the Control Room Supervisor:

7. Turbine Building Operator:
   - ‘A’ and ‘B’ Demins are in service with the highest d/p on ‘A’ of 4.0 psid.
8. Reactor Building Operator:
   - Ready to release Sample Tank T-31B.

Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 1		**Synchronize the Main Generator to the Grid**
Objective(s) **SS200.132**	SRO	Direct the BOP Operator to synchronize the Main Generator to the grid.
		Acknowledge that Main Generator has been synchronized to the grid.
	RO	Monitoring plant parameters and may act as Peer Checker.
CR200.126	BOP	1. Place the synchronizing switch for 8N4 or 8N5 in ON and verify the following: (8N4SS or 8N5SS) (PROCEDURE C.1, STEP VI.C.5) a. Synchronizer pointer is moving. (Synchronizing meter CO8) b. Synchronizing Voltmeters and sensing lights are activated. (Running and Incoming voltage meters CO8) (White sensing lights below synchronizing meter CO8) 2. Using the Speed Load Changer control switch, ADJUST generator speed until synchronous pointer rotation of one revolution in 30 – 120 seconds is achieved. 3. Verify Generator Voltage is between 20.9 KV and 23.1 KV. (Main Generator voltage meter CO8) 4. Using the Manual Voltage Adjust control switch, ADJUST incoming voltage to match running voltage. (Running and Incoming voltage meters CO8) 5. Verify the synchroscope makes at least two complete revolutions. 6. Load the Main Generator by performing the following: a. Verify the synchrocope pointer is in the GREEN band. b. Place either 8N4 or 8N5 control switch to close for approx. 1 sec. (Closed indication for the output breaker is indicated by RED lamp indication above the breaker and generator load present) 7. If the selected output breaker does not close place the breaker control switch to TRIP and return to step 1 above. (step 5 in C.1) 8. If the selected output breaker does not close on the second attempt, DO NOT reset the breaker and notify System Engineer. **NOTE: If the breaker does not close the second time allow several more attempts.**

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 1 **Synchronize the Main Generator to the Grid**	**The Main Turbine has been placed in service by the previous shift. The crew will take the shift and then place the Main Generator in service.**
	SIMULATOR OPERATOR
	None
	SIMULATOR COMMUNICATOR
As System Engineer	If contacted because the output breaker will not close direct that several more attempts may be made because of the close tolerances for breaker closure.

Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 1 (Cont.)		**Synchronize the Main Generator to the Grid**
Objective(s)	BOP	9. Place the SPEED LOAD CHANGER to RAISE and increase load to approximately 30 Mwe. (HS SLCM CO8) 10. Verify phase-to-phase voltages are approx. equal. (HS VS1 CO8) (Main Generator voltage meter CO8) 11. Verify phase-to-phase currents are approx. equal. (3 Generator Amperage meters CO8) 12. Place synchroscope to OFF and remove handle from switch. 13. LOG in the Control Room log. 14. Direct TBO to locally inspect the No. 1 Generator Transformer area and 345KV disconnects. 15. Place the other output breaker synchronizing switch to ON and verify. a. Incoming and Running voltmeters are matched. b. Synchroscope indicated frequency is matched. 16. CLOSE the selected output breaker. (8N4/CS or 8N5/CS) 17. Verify phase-to-phase voltages are approx. equal. (HS VS1 CO8) (Main Generator voltage meter CO8) 18. Verify phase-to-phase currents are approx. equal. (3 Generator Amperage meters CO8) 19. Place synchroscope to OFF and remove handle from switch. 20. LOG in the Control Room log. 21. Notify the Transmission System Operator 9. 22. CLOSE the following valves: a. MO-1197 (HS 1197 CO7) b. MO-1184 (HS 1184 CO7) c. MO-1185 (HS 1185 CO7) d. MO-1186 (HS 1186 CO7) e. MO-1187 (HS 1187 CO7) f. MO-1180 (HS-1180 CO7) g. MO-1181 (HS-1181 CO7) h. MO-1182 (HS-1182 CO7) i. MO-1183 (HS-1183 CO7) **NOTE: Steps 23 thru 27 place the Voltage Regulator in automatic.** 23. ZERO the No. 1 MAIN GENERATOR AMPLIDYNE VOLTAGE using the REGULATOR VOLTAGE ADJUST. (CS-70 CO8) 24. Place the REGULATOR TRANSFER switch to AUTO. (243/CS CO8) 25. Verify the white and red lights above the switch are ON. 26. ADJUST MVAR loading per system dispatch. (CS-90 CO8) (MVAR digital display) 27. ZERO the No. 1 MAIN GENERATOR AMPLIDYNE VOLTAGE using the MANUAL VOLTAGE ADJUST. (CS-70 CO8)

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 1 **Synchronize the Main Generator to the Grid**	**The Main Turbine has been placed in service by the previous shift. The crew will take the shift and then place the Main Generator in service.**
	SIMULATOR OPERATOR
	None
	SIMULATOR COMMUNICATOR
As TBO	If directed to inspect the No. 1 Generator Transformer area and 345KV disconnects wait 2 minutes and report back that everything appears normal.
As Transmission System Operator	If notified of Generator synchronization acknowledge report, no further communication is necessary.
AS System Dispatch	When contacted to determine what MVAR loading should be maintained at direct to maintain MVAR loading between +10 and +20 MVAR

Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 1 (Cont.)		**Synchronize the Main Generator to the Grid**
Objective(s)	BOP	**NOTE: Steps 28 thru 31 place the Power System Stabilizer in service.** 28. Verify the Automatic Voltage Regulator is in service. (white and red lights above the switch are ON) 29. Verify the No. 1 MAIN GENERATOR AMPLIDYNE VOLTAGE meter is at ZERO. 30. PRESS the Power System Stabilizer START button on CO8. 31. Verify the RED light below the button is ON. 32. Verify Exhaust Hood Temperature is < 125 deg F. (SPDS 654, Pt. TRB138 or TR-1717 Pts. 16 & 17) 33. RAISE (slowly) the SPEED/LOAD CHANGER to increase generator load. 34. Verify the SPEED/LOAD CHANGER is no longer controlling. 35. RAISE the SPEED/LOAD CHANGER setpoint to the high speed stop (107%) 36. SELECT SPDS Format 701 and monitor Generator Gross Rate of Change. 37. Report to the SRO that the Main Generator has been synchronized to the grid.

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 1 **Synchronize the Main Generator to the Grid**	**The Main Turbine has been placed in service by the previous shift. The crew will take the shift and then place the Main Generator in service.**
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Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 2		**Increase Reactor Power By Pulling Control Rods**
Objective(s) **SS200.133**	SRO	C.1.VII – Power Ascension 1. Verify outside air temperature is ≥ 32 deg. 2. Verify Isophase Bus Blower in service.
		Direct RBO to reduce RWCU flow to 140 GPM.
		Increase reactor power per C.2-05 Power Operation – System Operation. • Direct the RO to commence Control Rod Withdrawal continuing at step 16, Control Rod 34-43.
CR200.127	RO	Withdraw Control Rods in accordance with the roller tape starting with control rod 34-43.
	BOP	Monitoring plant parameters and may act as Peer Check for rod withdraw.

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 2 **Increase Reactor Power By Pulling Control Rods**	**The crew will increase Reactor power using control rods in accordance with the roller tape starting at rod 34-43.**
	SIMULATOR OPERATOR
	Coordinate with the Simulator Communicator and when directed to reduce RWCU flow to 140 gpm
	SIMULATOR COMMUNICATOR
As TBO	If directed to verify that Isophase Bus Blower is in service report that the Isophase Bus Blower is in service.
As RBO	When directed to reduce RWCU flow to 140 gpm wait 2 minutes, verify that the Simulator Operator has reduced flow to 140 gpm, and then report that "RWCU flow has been reduce to 140 gpm".

Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 3		**No. 11 Service Water Pump Trip - Failure of Standby Pump To Start**
Objective(s) **SS315.131**	SRO	Acknowledge report of 6-B-22, "SERVICE WATER HDR LOW PRESSURE".
		Acknowledge report of action taken for trip of No. 11 Service Water Pump.
	RO	Monitor plant parameters.
CR200.176	BOP	1. Acknowledge annunciator 6-B-22, "SERVICE WATER HDR LOW PRESSURE". 2. Report 6-B-22 to SRO. 3. Monitor Service Water System pressure. (PI-1535 CO6) 4. Determine Service Water System pressure is low, #11 Service Water Pump has tripped and 12 Service Water Pump did not automatically start. (Indicating lights above HS 52-305CS & HS 52-405CS) 5. Start #12 Service Water Pump. (HS 52-405CS to START) 6. Verify #12 Service Water Pump starts and system pressure is restored. (Indicating lights above HS 52-405CS) (PI-1535 CO6) 7. Verify actions per C.4-B.8.1.1.A, LOSS OF SERVICE WATER. 8. Notify Shift Supervision. 9. Direct TBO to: (ARP 6-B-22) • Verify proper operation and alignment of Service Water Pumps. • Verify integrity of the Service Water System. • Verify proper operation of the Service Water Auto Strainer.

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 3 **No. 11 Service Water Pump Trip - Failure of Standby Pump To Start**	**No. 11 Service Water Pump will trip and No. 12 Service Water Pump will not automatically start. Operator will need to manual start No. 12 Service Water Pump.**
	SIMULATOR OPERATOR
TRG#1	When directed by the Lead Evaluator insert event trigger #1 to cause the 11 Service Water Pump to trip. (SW03A)
DEL OVR	When the 12 Service Water Pump is started remove the override on the 12 Service Water Pump white light.
	SIMULATOR COMMUNICATOR
As TBO	When directed to: • verify proper operation and alignment of Service Water Pumps. • verify integrity of the Service Water System. • verify proper operation of the Service Water Auto Strainer. Wait 2 minutes and then report that system integrity is intact and operation appears normal.

Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 4		**Hotwell Low Level (Condensate reject valve open due to false hotwell level signal)**
Objective(s)	SRO	Acknowledge report of the following annunciators: 6-A-24, "COND BYPASS VALVE OPEN POSITION" 6-A-35, "COND DMIN SYSTEM TROUBLE" 6-A-31, "COND E-1B HOTWELL HIGH/LOW LEVEL"
		Acknowledge report of action taken on Hotwell Low Level.
	RO	1. Acknowledge annunciator 6-A-35, COND DMIN SYSTEM TROUBLE. 2. Consult ARP 6-A-35 3. Contact TBO to ascertain which alarm on C-80 is actuated. 4. Acknowledge annunciator 6-A-24, COND BYPASS VALVE OPEN POSITION. 5. Consult ARP 6-A-24
		1. Acknowledge annunciator 6-A-31, COND E-1B HOTWELL HIGH & LOW LEVEL 2. Consult ARP 6-A-31. 3. Verify Hotwell low level exists. (LR-1278 CO6) 4. Determine LC-1093, Hotwell Reject Level Controller, is calling for 100% open. 5. Place LC-1093 in MANUAL. 6. Close LC-1093. 7. Monitor Reactor Feed Pump suction pressure. (PI-1120 & PI-1121 CO6) 8. Notify Shift Supervision. 9. Contact I&C to correct controller problem.
	BOP	Monitor plant parameters and assist in following up on annunciators.

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 4 **Hotwell Low Level (Condensate reject valve open due to false hotwell level signal)**	**A Hotwell Low Level will be received due to the reject valve controller (CV-1093A & B) calling for 100% open. The controller will need to be placed in manual and the reject valve closed.**
	NOTE: This event takes approx. 10 minutes from actuation to the Hotwell Low Level Alarm occurring. NOTE: Annunciators 6-A-24, COND BYPASS VALVE OPEN POSITION and 6-A-35, COND DMIN SYSTEM TROUBLE, will alarm prior to 6-A-31, COND E-1B HOTWELL HIGH/LOW LEVEL, alarming. These alarms indicate that plant conditions have changed but do not specifically identify the condensate reject valve throttled open. Candidates may ascertain the problem prior to 6-A-31 alarming.
	SIMULATOR OPERATOR
TRG#2	When directed by the Lead Evaluator insert event trigger #2 to cause the hotwell reject level control valve to fail open. (FW22)
	SIMULATOR COMMUNICATOR
As TBO	When contacted to determine which alarm on C-80 is actuated wait 2 minutes then report "Alarm 80-A-21, POWDEX SYSTEM HIGH D/P, is in alarm and system dP is 60 psid".
As I&C	If contacted about controller CV-1093A & B failure acknowledge report, and state that it will be looked at very soon.
As TBO	If directed to reset the Flow Balance Override (FBO) per B.06.06-05.G.4 then wait 3 minutes and report "I have performed steps 1 thru 3 for resetting the FBO and it would not reset".

Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 5		**Steam Packing Exhauster High Temperature**
Objective(s) **SS255.108**	SRO	Acknowledge report of 7-A-28, "STM PKG EXH K3A & K3B BLWR MTR HI TEMP".
		Acknowledge report of action taken for Steam Packing Exhauster trouble.
	RO	Monitoring plant parameters.
	BOP	1. Acknowledge annunciator 7-A-28 STM PKG EXH K3A & K3B BLWR MTR HI TEMP. 2. Consult ARP 7-A-28 3. Determine Steam Packing Exhauster K-3A is in service. 4. START Steam Packing Exhauster K-3B. (HS 42-2122/CS to RUN CO7) 5. ADJUST K-3B outlet valve MO-1049 to establish 10" H20 as indicated on PI-1220, STEAM PACKING EXH VAC. (HS-1049 CO7) 6. STOP Steam Packing Exhauster K-3A. (HS 3122/CS to OFF CO7) 7. CLOSE K-3A outlet valve MO-1048. (HS-1048 to CLOSE CO7) 8. Notify Shift Supervision and Plant Electrician.

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 5 **Steam Packing Exhauster High Temperature**	**A high temperature will be experienced on Steam Packing Exhauster K-3A. This will require the operator to start Steam Packing Exhauster K-3B and establish vacuum and then shutdown Steam packing Exhauster K-3A.**
	SIMULATOR OPERATOR
TRG#3	When directed by the Lead Evaluator insert event trigger #3 to cause high motor temperatures on steam packing exhauster K-3A. (A28)
	SIMULATOR COMMUNICATOR
As Plant Electrician	If called to look at Steam Packing Exhauster K-3A aknowledge report and state that you will have somebody look at it as soon as possible.

Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 6		**Channel 4 APRM Fails High**
Objective(s) **SS299.324**	SRO	Acknowledge report of annunciators.
		Acknowledge action taken in response to APRM failure.
		Determine APRM has failed due to equipment failure.
		Determine minimum number of APRM channels are satisfied per Technical Specification, Section 3.2 – Table 3.2.3.
		Direct RO to place #4 APRM in BYPASS. (ARP 5-A-30)
		Notify System Engineer.
		Direct the RO to reset Channel 'B' RPS scram logic. (ARP 5-B-5)
	RO	1. Acknowledge annunciators: • 5-A-3 ROD WITHDRAW BLOCK. • 5-A-14 APRM HIGH. • 5-A-30 APRM HI HI INOP CH 4, 5, 6. • 5-B-3 REACTOR NEUTRON MONITOR SCRAM TRIP. • 5-B-5 REACTOR AUTO SCRAM CHANNEL B. 2. Report annunciators to SRO. 3. Consult ARPs. 4. Determine APRM #4 is indicating UPSCALE. (NR-7-46B CO5) 5. Determine Reactor Protection System Scram Channel 'B' is tripped. (RPS BUS B amber lamps on CO5 extinguished) 6. Determine Rod Block is actuated. (Annunciator 5-A-3 is in alarm) 7. Determine 'HI-HI' indicating lamp for APRM 4 on panel C37 is ON. 8. Determine remaining APRM channels are within expected range. (NR-7-46A –D CO5) 9. Notify Shift Supervision and I&C. 10. Place APRM #4 to bypass. (APRM 4 5 6 bypass joystick CO5) 11. Reset Channel 'B' RPS scram logic. (HS 5A-S9 SCRAM LOGIC RESET CO5)
	BOP	Monitors plant parameters and may act as a peer checker.

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 6 **Event 5** **Channel 4 APRM Fails High**	**Channel 4 APRM will fail high causing a trip of Channel "B" RPS scram logic. An evaluation will need to be done to ensure Tech Specs is being complied with. Channel 4 APRM will then be bypassed and Channel "B" RPS scram logic will be reset.**
	SIMULATOR OPERATOR
TRG#4	When directed by the Lead Evaluator insert event trigger #4 to cause APRM channel 4 to fail full scale. (NI13D)
	SIMULATOR COMMUNICATOR
As System Engineer	If called about APRM Channel 4 failing high acknowledge report and state that you will begin an investigation of the problem.
As I&C	If called about APRM Channel 4 failing high acknowledge report and state that somebody will begin to check it out as soon as possible.

Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 7 & 8		**Design Basis Earthquake and Bus 13 Lockout**
Objective(s) **SS315.125** **SS315.164** **CRITICAL STEP** **SS315.139**	SRO	Acknowledge report of annunciators. May announce now entering "Transient Annunciator Response".
		Determine a Design Basis Earthquake has occurred. (Prairie Island could be called if further clarification is desired). NOTE: C.4.K Immediate Reactor Shutdown may be entered but is not required.
		Direct the RO to manually scram the reactor.
		Per C.4-B.09.06.B, LOSS OF BUS 13 OR BUS 14: • Monitor and control Reactor water level between +30 and +40 inches.
CR200.208 **CR200.146**	RO	Depress REACTOR SCRAM 'A' and 'B' pushbuttons. (5A-S3A and 5A-S3B)
		Carry out actions of C.4.A "REACTOR SCRAM" **APPLICABLE IMMEDIATE OPERATOR ACTIONS** • Determine all control rods are inserted to or beyond position 04. • Place the reactor mode switch in SHUTDOWN. • Notify Shift Supervision **APPLICABLE SUBSEQUENT OPERATOR ACTIONS** • Verify that the Recirc pumps are at minimum speed. • Control Reactor water level between +9" and +48" with Cond & Feed. • Place CV-6-13 (low flow valve) in AUTO. • Place CV-6-13 controller setpoint to 15 to 20 inches. • Verify CV-6-13 is closed when RPV level reaches 15 to 20 inches. • Insert SRM and IRM detectors. • Switch APRM/IRM recorders to IRM. • Monitor power by ranging down the IRMs to maintain indication on scale. • Verify the Scram Discharge Vent and Drain Valves close.
CR200.147		Per C.4-B.01.03.A, LOSS OF CRD PUMP FLOW • Start #12 CRDH Pump • Verify CRD flow is available (PI-3-302 Charging Water Header Pressure - CO5) (FI-3-306 Cooling Water Header Flow - CO5)

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 7 & 8 **Design Basis Earthquake and Bus 13 Lockout**	**A Design Basis Earthquake will be felt which will cause a lockout of Bus 13. The Reactor will be manually scrammed and mitigative actions will be taken for the scram and the Bus 13 lockout.**
	SIMULATOR OPERATOR
TRG#5	When directed by the Lead Evaluator insert event trigger #5 to initiate the following: • Earthquake (C08) • Operational Basis Earthquake (C13) • Design Basis Earthquake (C18) after a 45 second time delay • Lockout of 4160 VAC Bus 13 (ED05C)
	SIMULATOR COMMUNICATOR
	NOTE: When trigger #5 is inserted shake the procedure/form file cabinet for 5 seconds. When the Design Basis Earthquake alarms, 45 seconds after initiation of the event, shake the file cabinet again for 5 seconds.
As Prairie Island	If called to confirm the earthquake reply "an earthquake has been confirmed".

Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 7 & 8 (Cont.)		**Design Basis Earthquake and Bus 13 Lockout**
Objective(s) **CR200.170**	BOP	1. Acknowledge annunciators: • 6-C-8 EARTHQUAKE • 6-C-13 OPERATIONAL BASIS EARTHQUAKE 2. Consult ARPs 6-C-8 & 6-C-13 3. Verify actuation of the Accelerograph Recording System. (Contacting system engineering is an option) 4. Enter C.4-B.5.14A EARTHQUAKE NOTE: Annunciator 6-C-18 will occur 45 seconds after initial earthquake annunciators (6-C-8 & 6-C-13). 5. Acknowledge annunciator 6-C-18, DESIGN BASIS EARTHQUAKE
		Announce over the paging system that a Reactor scram has occurred. (C.4.A)
CR200.146		Carry out actions of C.4.A "REACTOR SCRAM" **APPLICABLE SUBSEQUENT OPERATOR ACTIONS** • When Generator power is ~ 0 Mwe OPEN 8N4 and 8N5. (CO8) • TRIP the Turbine (Turbine emergency trip switch – CO7) • Verify that Turbine-Generator field breaker is OPEN. (CO8) • STOP the amplidyne. (Regulator Transfer Switch to OFF – CO8) • START the Turbine Auxiliary Oil Pump. (CO7) **NOTE: Turbine Aux Oil Pump electrical reset is required for start. (C.4.H)**
CR200.183		• Enter the following procedure: • C.4-B.09.06.B, LOSS OF BUS 13 OR BUS 14 • Enter the following procedures (directed by C.4-B.09.06.B, LOSS OF BUS 13 OR BUS 14): • C.4-B.01.03.A LOSS OF CRD PUMP FLOW • C.4-B.06.04.A DECREASED CIRCULATING WATER FLOW • C.4-B.06.03.A DECREASING CONDENSER VACUUM • C.4-B.09.06.C LOSS OF BUS 15 OR BUS 16 • C.4-B.09.07.A LOSS OF POWER TO LC-101 OR ITS MCC'S • C.4-B.09.07.C LOSS OF POWER TO LC-103 OR ITS MCC'S • C.4-B.09.07.E LOSS OF POWER TO LC-107 OR MCC-114 • C.4-B.09.07.G LOSS OF POWER TO LC-109 OR ITS MCC'S

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 7 & 8 **Design Basis Earthquake and Bus 13 Lockout**	**A Design Basis Earthquake will be felt which will cause a lockout of Bus 13. The Reactor will be manually scrammed and mitigative actions will be taken for the scram and the Bus 13 lockout.**
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Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 7 & 8 (Cont.)		**Design Basis Earthquake and Bus 13 Lockout**
Objective(s)	BOP	10. ARP 8-B-11 NO 13 4160V BUS LOCKOUT • Verify #15 4160V bus has transferred to 1AR. (152-511 breaker indication - Red OFF, Green ON - CO8) (#15 bus voltage indication - CO8) • Verify #11 & #12 Emergency Diesel Generators have started. (#11 & #12 EDG voltage indication - CO8) • Verify LC-107 transfer to LC-108.
		C.4-B.09.06.B, LOSS OF BUS 13 OR BUS 14: • OPEN ACB 52-901 (52-901/CS – CO8) • Place 52-908/SS SYNC 109 CTR SEC ACB to ON – CO8 • CLOSE ACB 52-908 109/102 LOAD CTR TIE ACB (52-908/CS – CO8) • Verify MO-1850 "11 Cir Wtr Pump P-100 Discharge Valve" has closed. (Bkr indicating lamps – CO6) **NOTE: MO-1850 will begin to automatically close when power is restored to LC-109.**
CR200.174		11. C.4-B.06.04.A, DECREASED CIRCULATING WATER FLOW • Place #11 Circulating Water Pump control switch to SHUTDOWN. (152-305/CS – CO6)
CR200.172		C.4-B.06.03.A, DECREASING CONDENSER VACUUM • Monitor LP Turbine exhaust pressures per SPDS 656.
CR200.184		C.4-B.09.06.C, LOSS OF BUS 15 OR BUS 16 • Determine that Bus 15 is being powered by 1AR. (152-511 breaker indication - Red OFF, Green ON - CO8) (#15 bus voltage indication - CO8) • Consider shutdown of #11 & #12 Emergency Diesel Generators.
		C.4-B.09.07.A, LOSS OF POWER TO LC-101 OR ITS MCC'S • No action required – LC-101 re-powered automatically.
CR200.187		C.4-B.09.07.C, LOSS OF POWER TO LC-103 OR ITS MCC'S • Monitor system operation for RBCCW, Stator Cooling,

		Drywell Ventilation, Service Water and Hydrogen Seal Oil.

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 7 & 8 **Design Basis Earthquake and Bus 13 Lockout**	**A Design Basis Earthquake will be felt which will cause a lockout of Bus 13. The Reactor will be manually scrammed and mitigative actions will be taken for the scram and the Bus 13 lockout.**
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Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 9		**Loss of All RPV Level Indication (RPV Level Unknown)**
Objective(s)	SRO	Acknowledge report of annunciators.
		Verify RPV water level is known per: • SPDS (Display 051) • LI-6-52B and LI-2-3-85A.
		NOTE: "B" side level instruments will fail 4 minutes after the "A" side. "B" side instruments will fail as drywell pressure approaches +2 psig requiring entry into C.5-1100.
SS304.193 **CRITICAL STEP**		Enter C.5-1100 RPV CONTROL (Entry condition +2 psig drywell pressure). 1. Verify: a. Reactor scram b. All rods in to at least 04 12. Verify RPV water level instrument limits have not been exceeded. Determine RPV water level is unknown. 2. Leave C.5-1100 – RPV CONTROL. 3. Enter C.5-2006 – RPV FLOODING at step 24.
SS304.200 **CRITICAL STEP** **CRITICAL STEP**		C.5-2006 – RPV FLOODING 1. Determine Torus level is above –5.9 ft. 2. Direct BOP operator to open 3 ADS valves. 3. Verify 3 ADS valves are open. 4. Direct BOP operator to close the: • MSIVs. • Main Steam Line Drains. • RCIC steam isolation valves. 5. Direct BOP and RO to inject to the RPV using: • Condensate. • LPCI. • Core Spray. • CRD. 6. Inject until 3 SRVs are verified OPEN and RPV pressure at least 50 psi above DW pressure, but low as possible.

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 9 Loss of All RPV Level Indication (RPV Level Unknown)	**A reference line break will occur on the "A" side followed by a break in the "B" side after approximately 4 minutes. This will cause a loss of all level indication which will drive the crew into C.5-2006, RPV FLOODING. Emergency Depressurization will be accomplished and then water injected to flood the vessel.**
	SIMULATOR OPERATOR
TRG#6	When directed by the Lead Evaluator insert event trigger #6 to cause the following to occur: • Rupture of RPV Instrumentation Line 'A' immediately. (RR04A) • Failure of the Wide Range Level Transmitter after 1 minute. (RR24) • Rupture of RPV Instrumentation Line 'B' after 5 minutes. (RR04B)
	SIMULATOR COMMUNICATOR
	None

Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 9 (Cont.)		**Loss of All RPV Level Indication (RPV Level Unknown)**
Objective(s)		
SS304.194	SRO	Confirm Drywell high pressure as indicated on PR-2994 (CO4) and SPDS Enter C.5-1200 PRIMARY CONTAINMENT CONTROL (Entry Condition +2 psig Drywell pressure). 1. Determine Drywell pressure >2 psig 2. Go to step 17 3. Verify Torus level <14.1 ft and Torus pressure >2 psig. **SS314.119** 4. Direct BOP operator to start Torus spray per C.5-3502. NOTE: If it is determined that RHR pumps are needed for core cooling, Torus spray will not be initiated until RPV level is restored. 5. Direct BOP operator to stop Torus spray if Torus pressure drops below 2 psig. **SS314.120** 6. Direct Bop Operator To Start All Available Drywell Cooling Per C.5-3503 7. Maintain Torus level –4.0 to +3.0 inches 8. Determine that Torus level can be maintained <+4.3 ft and >-3.3 ft. (steps 15 & 19) **SS314.118** 9. Direct BOP operator to perform procedure C.5-3501 as time permits.
CR304.103	RO	Acknowledge annunciator 5-B-24 “REACTOR WATER LEVEL HI/LO”. Consult ARP 5-B-24 “REACTOR WATER LEVEL HI/LO”. Report annunciator 5-B-24 to SRO. Determine LI-6-52A and LI-2-3-85B have failed upscale. (CO5) Verify LI-6-52B and LI-2-3-85A indicate correctly. (CO5) Determine Reactor Feed Pump trip has occurred on high RPV level and cannot be re-started.
		Decrease Condensate injection as directed.
CRITICAL STEP **CR304.103**	BOP	Place hand switches for A, C & D SRVs to OPEN. 2E-S1A _____ 2E-S1C _____ 2E-S1D _____ Determine ADS valves did open. (amber lamps on CO3 for “A”, “C” & “D” SRVs illuminated)

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 9 Loss of All RPV Level Indication (RPV Level Unknown)	**A reference line break will occur on the "A" side followed by a break in the "B" side after approximately 4 minutes. This will cause a loss of all level indication which will drive the crew into C.5-2006, RPV FLOODING. Emergency Depressurization will be accomplished and then water injected to flood the vessel.**
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Key Events/ Timeline	CREW Pos.	Expected Crew Response
Event 9 (Cont.)		**Loss of All RPV Level Indication (RPV Level Unknown)**
Objective(s)	BOP	1. Place MSIV handswitches to CLOSE. (C-03) (HS 16A-S1A – 16A-S1D) (HS 16A-S2A – 16A-S2D) 2. CLOSE MO-2373. (C-03) (Main Steam Line Drain) (HS 16A-S5) 3. CLOSE MO-2374. (C03) (Main Steam Line Drain) (HS 16A-S6) 4. CLOSE MO-2075. (C-04) (RCIC Isolation) (HS 13A-S1) 5. CLOSE MO-2076. (C-04) (RCIC Isolation) (HS 13A-S3)
CRITICAL STEP		Verify injection from Core Spray A & B and LPCI.
		Verify 3 SRVs are OPEN after floodup is complete by SRV open AMBER lamps ON and RPV pressure increasing as indicated by Recirculation Pump Seal pressure.
		Remove Core Spray & LPCI injection as directed.
CR314.123		If placing Div. 1 Torus Spray in service: 3. Locate C.5-3502 Part A. 4. Perform steps 1 thru 7 of C.5-3502 Part A (See Attachment 1 for steps). If placing Div 2 Torus Spray in service: 1. Locate C.5-3502 Part B. 2. Perform steps 1 thru 7 of C.5-3502 Part B (See Attachment 2 for steps).
CR314.124		Locate procedure C.5-3503 1. Place all DW cooling switches to OFF (42-3312/CS, 42-4312/CS, 42-3313/CS, 42-4313/CS on C25 2. OPEN knife switch KS3100 (behind panel C25) 3. Verify FAN INLET DAMPER control switches in AUTO (C25) 4. Place DW cooling fan control switch in ON. (42-3312/CS, 42-4312/CS, 42-3313/CS, 42-4313/CS on C25) 5. OPEN associated discharge dampers for started fans. FAN / DISCHARGE DAMPERS V-RF-1: V-D-15, V-D-16 V-RF-2: V-D-17, V-D-18 V-RF-3: V-D-19, V-D-20 V-RF-4: V-D-21, V-D-22
CR314.122		Locate C.5-3501 – H2/O2 ANALYZER OPERATION • Perform steps 1 thru 14 of C.5-3501 (See Attachment 3 for steps).

SIMULATOR Commands	INSTRUCTOR ROLE PLAY AND INFORMATION
Event 9 Loss of All RPV Level Indication (RPV Level Unknown)	**A reference line break will occur on the "A" side followed by a break in the "B" side after approximately 4 minutes. This will cause a loss of all level indication which will drive the crew into C.5-2006, RPV FLOODING. Emergency Depressurization will be accomplished and then water injected to flood the vessel.**
	Termination Criteria: • 3 Safety/Relief Valves are open. • RPV pressure is >50 psig above Drywell pressure. • At the discretion of the Chief Examiner. Classification: Guideline 22 (Earthquake); Site Area Emergency

REFERENCES

PROCEDURE	TITLE	REVISION
ARP 5-A-14	APRM HIGH	2
ARP 5-A-3	ROD WITHDRAW BLOCK	1
ARP 5-A-30	APRM HI HI INOP CH 4, 5, 6	2
ARP 5-B-24	REACTOR WATER LEVEL HI/LO	2
ARP 5-B-3	REACTOR NEUTRON MONITOR SCRAM TRIP	0
ARP 5-B-5	REACTOR AUTO SCRAM CHANNEL B	1
ARP 6-A-24	COND BYPASS VALVE OPEN POSITION	1
ARP 6-A-31	COND E-1B HOTWELL HIGH/LOW LEVEL	2
ARP 6-A-35	COND DMIN SYSTEM TROUBLE	1
ARP 6-B-22	SERVICE WATER HDR LOW PRESSURE	1
ARP 6-C-13	OPERATIONAL BASIS EARTHQUAKE	1
ARP 6-C-8	EARTHQUAKE	1
ARP 6-C-18	DESIGN BASIS EARTHQUAKE	1
ARP 7-A-28	STM PKG EXH K3A & K3B BLWR MTR HI TEMP	2
ARP 80-A-21	POWDEX SYSTEM HIGH D/P	1
ARP 8-B-11	NO 13 4160V BUS LOCKOUT	0
C.1	STARTUP PROCEDURE	33
C.2-05	POWER OPERATION	14
C.4.A	REACTOR SCRAM	21
C.4.K	IMMEDIATE REACTOR SHUTDOWN	0
C.4-B.01.03.A	LOSS OF CRD PUMP FLOW	6
C.4-B.05.14.A	EARTHQUAKE	5
C.4-B.06.03.A	DECREASING CONDENSER VACUUM	7
C.4-B.06.04.A	DECREASED CIRCULATING WATER FLOW	7
C.4-B.09.06.B	LOSS OF BUS 13 OR BUS 14	6
C.4-B.09.06.C	LOSS OF BUS 15 OR BUS 16	6
C.4-B.09.07.A	LOSS OF POWER TO LC-101 OR ITS MCC'S	11
C.4-B.09.07.C	LOSS OF POWER TO LC-103 OR ITS MCC'S	10
C.4-B.09.07.E	LOSS OF POWER TO LC-107 OR MCC-114	6
C.4-B.09.07.G	LOSS OF POWER TO LC-109 OR ITS MCC'S	4
C.4-B.8.1.1.A	LOSS OF SERVICE WATER	7
C.5-1100	RPV CONTROL	8
C.5-1200	PRIMARY CONTAINMENT CONTROL	11
C.5-2006	RPV FLOODING	9
C.5-3501	H2/O2 ANALYZER OPERATION	0
C.5-3502	CONTAINMENT SPRAY	6
C.5-3503	DEFEAT DRYWELL COOLER TRIPS	2