

Scenario Outline

Facility: Oyster Creek

Scenario No.: NRC 3

Op Test No.: NRC 2006-1

Examiners: _____

Operators: _____

Initial Conditions:

- The plant is in 5-loop operation at 95% power.
- Cleanup Pump B is out of service for motor repair, and is expected to return to service tomorrow.
- Isolation Condenser System A was removed from service two hours ago and is isolated, due to motor operated valve torque switch replacement. Technical Specifications applicability has been reviewed. The system is expected to return to an operable status in 1 hour.
- IRM 14 failed during the control rod withdrawal to critical, and is BYPASSED. Technical Specifications applicability has been reviewed and an IR has been generated.
- Procedure 634.2.004, 24 Volt DC Battery Weekly Surveillance, is in progress.

Turnover:

- Place Instrument Air Compressor #2 in LEAD and place Instrument Air compressor #1 in LAG IAW procedure 334. A Non Licensed Operator and Field Supervisor are already in the field and will be controlling the evolution. Control manipulations of the air compressors will be from the Control Room.

Event No.	Malf. No.	Event Type*		Event Description
1		N	BOP	Swaps Instrument Air compressors.
2		TS	SRO	Respond to field report of loss of oil in Core Spray backup pump.
3		C TS	BOP RO SRO	Respond to trip of Reactor Protection System (RPS) MG Set 1 and single control rod scram.
4		C	RO	Responds to control rod high temperature.
5		R	RO	Respond to loss of feedwater heating.
6		C	BOP RO	Respond to turbine high vibrations and turbine thrust bearing high annunciator with failure of turbine to auto trip.
7		M	Crew	Respond to break in cleanup system with failure to isolate.
8		C	Crew	Respond to failure of Reactor Building ventilation radiation monitors to automatically initiate SGTS.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor Transient, (TS) Tech Specs

Total Malfunctions (5-8):	8
Malfunctions after EOP entry (1-2)	1
Abnormal Events (2-4)	4
Major Transients (1-2)	2
EOPs entered requiring substantive actions (1-2)	1
EOP Contingencies w/ substantive actions (0-2)	1
Critical Tasks (2-3)	2

Event	Player	Type	Description
3	RO	C	Respond to trip of RPS MG Set 1 and single control rod scram
4	RO	C	Responds to control rod high temperature
5	RO	R	Respond to loss of FW heating

Event	Player	Type	Description
1	BOP	N	Swaps Instrument Air compressors
3	BOP	C	Respond to trip of RPS MG Set 1 and single control rod scram
6	BOP	C	Respond to failure of turbine to auto trip

Event	Player	Type	Description
6	Crew	M	Respond to turbine high vibrations and turbine thrust bearing high annunciator
7	Crew	M	Respond to break in cleanup system with failure to isolate
8	Crew	C after EOP	Respond to failure of RB vent radiation monitors

Event	Player	Type	Description
2	SRO	TS	Respond to field report of loss of oil in Core Spray backup pump (TS 3.4.A)
3	SRO	TS	Respond to trip of RPS MG Set 1 and single control rod scram (TS 3.2)

Scenario Summary

1. The BOP will swap Instrument Air compressors IAW procedure 334, Instrument and Service Air System. **(NORMAL EVOLUTION)**
2. A Non Licensed Operator will call the Control Room to explain that while on Rounds, he's found a considerable amount of oil on the floor surrounding the core spray main backup pump NZ01C, and that the glass oil cup is broken. It is expected that the SRO will declare the pump inoperable and apply Tech Specs 3.4.A. **(TS)**
3. The crew will respond to the trip of RPS MG Set 1 and a single control rod scram to position 04 (RAP-G2c, ABN-6, CRD Failures, ABN-50, Loss of VMCC 1A2). The BOP will re-power the RPS Bus and the RO will reset ½ scram and ½ isolations. The Crew may attempt to manually insert the scrambled control rod from 04-00. If attempted, the rod stuck malfunction will be deleted and the rod will insert fully. The SRO will review TS 3.2.B.4 and declare the control rod inoperable, and valve-out the control rod at position at 04. **(COMPONENT FAILURE) (ABN) (TS)**
4. The RO will respond to a control rod high temperature alarm (RAP-H5c). The RO will apply stall flows IAW 617.4.002 (CRD Exercise and Flow Test/IST Cooling Water Header Check Valve), which will clear the alarm. **(COMPONENT FAILURE) (ABN)**
5. The crew will respond to a loss of feedwater heating. The SRO will direct a power reduction (ABN-17, Feedwater System Abnormal Conditions). **(COMPONENT FAILURE) (ABN) (REACTIVITY MANIPULATION)**.
6. Turbine vibration annunciators (Q3b) will alarm, and the turbine thrust bearing high alarm (Q2b) (causes auto turbine trip). The turbine will fail to auto trip and can be successfully tripped by the operator. The scram will be successful and ABN-1 (Scram), and ABN-10 (Turbine Trip) will be entered. **(COMPONENT FAILURE) (ABN) (MAJOR)**
7. A cleanup system break occurs with failure of automatic isolation, and it cannot be isolated. Secondary Containment Control EOP is entered. Two areas (cleanup and cleanup pump/heat exchanger areas) will exceed MAX SAFE parameters and the SRO will direct Emergency Depressurization (IAW Emergency Depressurization – No ATWS) or may anticipate ED and direct a rapid RPV depressurization with ICs and TBVs. **(EOP) (MAJOR) (EOP CONTINGENCY)**
8. As Reactor Building radiation levels rise, the RB vent radiation monitors will increase to the setpoint of auto isolation of RB HVAC and auto start of SGT. Not all of these automatic actions will occur, but are expected to be performed by the operators. **(COMPONENT FAILURE)**

Critical Tasks

1. Initiate Emergency Depressurization when two areas exceed the MAX SAFE levels for radiation or temperature, or rapidly depressurize the RPV with TBVs/ICs when ED is anticipated.
 - This places the RPV in the lowest energy state to minimize the amount of energy deposited outside of Secondary Containment (radioactivity barrier).
2. With the RB HVAC vent exhaust radiation monitors above the high setpoint for automatic initiation of SGTS and SGTS not running, manually initiate SGT.
 - This automatic action minimizes the off-site radiological dose. To ensure protection of the public, a manual system initiation will fulfill this function.

Op-Test No.: <u>NRC 2006-1</u>		Scenario No.: <u>NRC 3</u>	Event No.: <u>1</u>
Event Description: <u>Place Instrument Air Compressor #2 in LEAD and place Instrument Air compressor #2 in LAG IAW procedure 334.</u>			
Initiation: Following shift turnover.			
Cues: When notified by In-Plant Operator/Field Supervisor.			
Time	Position	Applicant's Actions or Behavior	
ROLE PLAY		As the Field Supervisor, call the Control Room and report: Steps 5.4.1.1 through 5.4.1.4 of procedure 334 have been completed. The local display indicates "ready for start local or remote" for air compressor #2. Start air compressor #2 per step 5.4.1.5 of procedure 334.	
Sim. Operator		Ensure #2 air compressor is selected as LEAD locally (LOA-CAS038 to LEAD).	
	SRO	<ul style="list-style-type: none"> Allows continuing placing air compressors #2 in the LEAD, and #1 air compressor in LAG, IAW procedure 334, Section 5.4 (start will be from the Control Room) (attached) 	
	BOP	<ul style="list-style-type: none"> Makes plant page regarding starting #2 air compressor Places #2 air compressor as the LEAD by: (7F) <ul style="list-style-type: none"> Place COMPRESSOR 2 switch to the START position for 3-5 seconds Reports to the Field Supervisor that step 5.4.1.5 is complete. Places #1 air compressor as the LAG <ul style="list-style-type: none"> Place the COMPRESSOR 1 switch to the START position for 3-5 seconds Confirm #1 air compressor runs unloaded for 10 minutes and then auto shuts down Verify #2 air compressor loads and unloads to maintain system pressure 85-105 psig (7F) Reports air compressor status to SRO 	

ROLE PLAY	As the Field Supervisor, after completion of step 5.4.1.5 (#2 air compressor running), call the Control Room and report: Compressor #2 is operating normally. Step 5.4.1.7 of procedure 334 has been completed satisfactorily. Request that the Control Room stop #1 Compressor IAW Step 5.4.1.8. Compressor settings for air compressor #1 have been confirmed IAW step 5.4.1.9. Place air compressor #1 in LAG IAW step 5.4.1.9.2.
Terminus:	#2 air compressor is running as the LEAD, and #1 air compressor is running as the LAG (do not need to wait for auto shutdown of #1 air compressor)

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u>			Scenario No.: <u>NRC 3</u>			Event No.: <u>2</u>		
Event Description: <u>Report of oil leak on Core Spray Main Backup Pump NZ01C</u>								
Initiation: #2 air compressor is running as the LEAD, and #1 air compressor is running as the LAG								
Cues: Call from in-plant Non Licensed Operator								
Time	Position	Applicant's Actions or Behavior						
ROLE PLAY	As the NLO, call the Control Room with the following report: While on Rounds, I found a considerable amount of oil on the floor surrounding Core Spray Main Pump NZ01C, and the glass oil cup is broken. I have contained the oil and none has reached a floor drain. I will continue cleaning up the oil. If requested to check the other core spray pumps, report that there are no visible deficiencies with the other core spray pumps.							
	SRO	<ul style="list-style-type: none"> • Reviews Tech Spec 3.4.A (attached) <ul style="list-style-type: none"> ○ CONDITION: Any active loop component becomes inoperable ○ REQUIREMENT: The Reactor may remain in operation for a period not to exceed 15 Days. ○ PROVIDED: Both Emergency Diesel Generators are OPERABLE. The Redundant active loop components within the same loop as the inoperable components are verified OPERABLE on a daily basis. Specification 3.4.A.3 is met unless only a core spray booster pump is inoperable <ul style="list-style-type: none"> ▪ 3.4.A.3: APLHGR shall not exceed 90% of the limits (attached) ○ Declares Core Spray Main Pump NZ01C inoperable • Notifies Work Week manager for repair • Protects the other Core Spray Pumps and EDGs • Updates the Crew 						
	Note	Unexpected Plant Change Checklist Redundant System Verification Form OP-OC-101-1000						
Terminus:	Core Spray Main Backup Pump NZ01C has been declared inoperable and the Crew has been updated.							

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u>			Scenario No.: <u>NRC 3</u>			Event No.: <u>3</u>		
Event Description: <u>Trip of RPS MG 1 and single control rod scram (which sticks initially at a non-fully inserted position) (control rod 14-43)</u>								
Initiation: Core Spray Main Backup Pump NZ01C has been declared inoperable and the Crew has been updated								
Cues: Annunciator G2c, RPS MG SET 1 TRIP; G1c, SCRAM CONTACTOR OPEN; H6a, ROD DRIFT; 9XF3a, PROT SYS PNL PWR LOST (plus RPS A ½ scram annunciators)								
Time	Position	Applicant's Actions or Behavior						
	RO	<ul style="list-style-type: none"> • Responds to annunciators G1c, SCRAM CONTACTOR OPEN and H6a, ROD DRIFT <ul style="list-style-type: none"> ○ Reports loss of RPS A ○ Reports single control rod scram 14-43: did not scram full-in ○ Refers to ABN-6, Control Rod Drive System ○ May insert control rod 14-43 • Following restoration of RPS A, resets the following: (4F) <ul style="list-style-type: none"> ○ Half scram <ul style="list-style-type: none"> ▪ Depresses SCRAM SYSTEM RESET pushbutton ○ Main Steam isolation <ul style="list-style-type: none"> ▪ Depresses MAIN STEAM ISOLATION RESET pushbutton ○ Associated annunciators 						
Sim Operator	IF the RO attempts to manually insert the scrambled stuck rod, DELETE the stuck rod malfunction.							
	BOP	<ul style="list-style-type: none"> • Refers to annunciator G2c, RPS MG SET 1 TRIP and 9XF3a, PROT SYS PNL PWR LOST <ul style="list-style-type: none"> ○ Checks MG status lights and voltage (6R) ○ Verifies loss of power to RPS A components ○ Dispatches NLO to investigate RPS MG 1 • Restores System Panel 1 (PSP-1) from Transformer PS-1 IAW procedure 408.12, Operation of Reactor Protection System Panel 1-1 and Transformer PS-1, Section 5.4 (6R) (attached) • Following restoration of RPS A, resets components IAW procedure 408.12: <ul style="list-style-type: none"> ○ Steps 5.4.8 – 5.4.12 (attached) 						

		<ul style="list-style-type: none"> • Monitor 4160V level for Transformer PS-1 hourly (8F/9F)
ROLE PLAY	As the NLO, when requested to investigate RPS MG 1, report the following: RPS A MG Set input breaker is open (EPA breakers EPA-1 and EPA-2 are open also??), with no indications of a fault.	
	SRO	<ul style="list-style-type: none"> • Directs the rod scram event <ul style="list-style-type: none"> ○ Directs entry into ABN-6, Control Rod Drive System ○ May direct control rod 14-43 be manually inseted ○ Declare the control rod inoperable and directs to isolate the control rod IAW 302.1, Control Rod Drive System ○ Applies TS 3.2.B.4 (attached) ○ Applies TS 3.2.A (attached) ○ May also apply TS 3.13, Accident Monitoring Instrumentation, while RPS A is de-energized (due to loss of one channel of Wide Range Torus Water Level indication and one channel of Containment High Range Radiation instrument). ○ Notify Reactor Engineering of control rod event • Directs the loss of RPS event <ul style="list-style-type: none"> ○ Directs restoration of Protection System Panel 1 (PSP-1) from Transformer PS-1 IAW procedure 406.12, Operation of Reactor Protection System Panel 1-1 and Transformer PS-1 ○ Notifies Work Week manager of RPS MG set and scrammed control rod ○ May direct shutdown of the RPS A MG Set
Sim Operator	When the scram is reset, DELETE the control rod scram malfunction.	
ROLE PLAY	As the NLO, when requested to isolate the scrammed control rod, report back a few minutes later that the control rod is isolated IAW 302.1, Control Rod Drive System	
Terminus:	RPS A has been transferred to Transformer PS-1 and alarms/isolations reset (not required to wait for MG Set shutdown)	

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u>		Scenario No.: <u>NRC 3</u>	Event No.: <u>4</u>
Event Description: <u>High temperature control rod 02-19</u>			
Initiation: RPS A has been transferred to Transformer PS-1 and alarms/isolations reset			
Cues: Annunciator H5c, CRD TEMP HI (4F)			
Time	Position	Applicant's Actions or Behavior	
	RO	<ul style="list-style-type: none"> • Responds to annunciator H5c, CRD TEMP HI <ul style="list-style-type: none"> ○ Confirm CRD cooling water differential pressure/flow within limits of 302.1, Control Rod Drive System (15 psid at 30-45 GPM) ○ Direct NLO to check leaky scram discharge valve for control rod 02-19 ○ Attempt to clear the alarm: <ul style="list-style-type: none"> ▪ Apply stall flow signals to control rod 02-19 IAW procedure 617.4.002, CRD Exercise and Flow Test/IST Cooling Water Header Check Valve (attached) 	
ROLE PLAY	As NLO, when requested to check leaky scram discharge valve for control rod 02-19, report that the scram discharge piping is no warmer than other control rods in the area.		
Sim. Operator	When the RO is applying stall flow, DELETE the CRD high temperature malfunction (it will take about 30 seconds to clear the annunciator).		
	BOP	<ul style="list-style-type: none"> • Responds to annunciator H5c, CRD TEMP HI <ul style="list-style-type: none"> ○ Determines which control rod is effected (02-19) and reports (8R) • Verifies control rod 02-19 temperature normal following stall flow (8R) 	
CUE:	<p>Control Rod Drive Temperature recorders on Panel 8R are SIMULATED. When the BOP investigates, he should read a note that the only alarming control rod is Control Rod 02-19 indicates 260° F and steady. PLACE a note on the recorder PRIOR to this event that rod 02-19 indicates 260° F and steady.</p> <p>Following the stall flow, when the BOP goes to monitor CRD temperatures, tell the BOP that control rod 02-19 indicates 235° F and steady.</p>		
Terminus:	CRD 02-19 shows normal temperature.		

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u>		Scenario No.: <u>NRC 3</u>	Event No.: <u>5</u>
Event Description: <u>Loss of Feedwater Heating</u>			
Initiation: CRD 02-19 shows normal temperature			
Cues: Annunciator N3d, HP A3 LEVEL HI/LO (7F)			
Time	Position	Applicant's Actions or Behavior	
	BOP	<ul style="list-style-type: none"> • Responds to annunciator N3d, HP A3 LEVEL HI/LO; N2d, HP A3 MRV OPEN; N1d, HP A3 REV CK VLV TRIP (and similar for FWH A1 and A2) (7F) <ul style="list-style-type: none"> ○ Monitors feedwater temperature (5F/6F) and reports FW temperature value/trend ○ Refers to ABN-17, Feedwater System Abnormal Conditions <ul style="list-style-type: none"> ▪ Monitor off-gas activity (1R) ▪ Monitor Main Steam Line radiation (1R) ▪ Monitor FLLLP (PPC) ○ May adjust RPV pressure with EPR changes 	
ROLE PLAY	As the NLO and when requested, notify the Control Room that HP (IP, LP) feedwater heater level is high.		
	RO	<ul style="list-style-type: none"> • Monitors reactor power • Reduces reactor power as directed to 20% less than the pre-trip value with recirc. flow <ul style="list-style-type: none"> ○ Rotates the MASTER RECIRC SPEED CONTROLLER knob in the counter-clockwise direction (4F) ○ Monitors the Power Operations Curve 	
	SRO	<ul style="list-style-type: none"> • Directs entry into ABN-17, Feedwater System Abnormal Conditions <ul style="list-style-type: none"> ○ Direct reactor power reduction with recirculation flow to maintain 20% below the pre-trip power level or until 8.5×10^4 GPM ○ Maintains plant load less than 502.5 MWe ISW ABN-17 with 1 bank (LP, IP and HP) heaters lost ○ Notifies Work Week Manager for repair ○ Makes notification for down-power 	

Sim. Operator	The intent is to trip all three FW heaters in string A. If they do not all trip as designed, then activate the associated annunciators to simulate the trip (annunciators N1d through N8d).
Terminus:	Reactor power has been lowered with recirc. flow

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u> Scenario No.: NRC 3 Event No.: <u>6</u>		
Event Description: <u>High main turbine vibrations, high main turbine thrust bearing wear and failure of main turbine to auto trip</u>		
Initiation: Reactor power has been stabilized from the down-power.		
Cues: Annunciator Q3b, VIBRATION HI, followed by annunciator Q2b, THRUST BRG WEAR HI		
Time	Position	Applicant's Actions or Behavior
	BOP	<ul style="list-style-type: none"> • Respond to Annunciator Q3b, VIBRATION HI, and Q2b, THRUST BRG WEAR HI <ul style="list-style-type: none"> ○ Verify thrust bearing indication (7F) and report indication is above the turbine trip setpoint ○ Report that scram and turbine trip required IAW RAP-Q2b <ul style="list-style-type: none"> ▪ (Following the scram) Depresses TURBINE EMERGENCY TRIP pushbuttons (7F) ▪ Confirm the following: <ul style="list-style-type: none"> • Main Stop valves closed • Turbine Control valves closed • Turbine Reheat and Intercept valves closed • HWC H2 inlet Isolation valve, V-567-005, closed • 230 KV breakers GC1 and GD1 open • Plant electrical loads are transferred to the Startup Transformers SA, SB • Maintain RPV pressure 800-1000 psig with TBVs IAW RPV Control – No ATWS
Sim Operator	Input the EVENT 7 items (Cleanup leak and radiation response) when the reactor is manually scrammed.	
	RO	<ul style="list-style-type: none"> • Manually scrams the reactor and carries out ABN-1, Reactor Scram (attached) (4F) <ul style="list-style-type: none"> ○ Scrams the reactor ○ Inserts SRMs/IRMs ○ Maintains RPV water level
	SRO	<ul style="list-style-type: none"> • Direct reactor scram and turbine trip • Directs entry into RPV Control – No ATWS

		<ul style="list-style-type: none"> ○ Directs auto actions confirmed ○ Directs RPV water level 138" – 175" with feedwater ○ Directs RPV pressure 800 – 1000 psig with turbine bypass valves
Terminus:	The reactor has been scrammed and main turbine tripped, and ABN-1 immediate actions have been performed.	

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u>			Scenario No.: <u>NRC 3</u>			Event No.: <u>7</u>		
Event Description: <u>Non-isolatable leak from the Cleanup System into the Secondary Containment (with failure of system isolation valves to close) and fuel failures</u>								
Initiation: When the reactor is manually scrammed								
Cues: Annunciators 10F1f, VENT HI; 10F3k, CU SYS AREA; followed by annunciator D8d, CU ROOM TEMP HI (3F) ;								
Time	Position	Applicant's Actions or Behavior						
	RO/BOP	<ul style="list-style-type: none"> • Respond to annunciators 10F1f, VENT HI; 10F3k, CU SYS AREA <ul style="list-style-type: none"> ○ Reports failure of Cleanup System to automatically isolate and manually attempts to close the following valves by taking the respective switch to the CLOSE position: <ul style="list-style-type: none"> ▪ V-16-1, CU Inlet IV from RPV ▪ V-16-2, Inlet IV to CU Aux. Pump ▪ V-16-14, CU Inlet IV ▪ V-16-61, Heat Exchanger Outlet to RPV <ul style="list-style-type: none"> • Reports that the valves V-16-1 and V-6-14 will not close • Dispatches NLO to manually close the valves • Re-established RB HVAC IAW Support Procedure 50 (following RB HVAC trip on high RB ΔP from the leak, followed by alarm RB ΔP LO, L6c) • Respond to radiation alarms: AREA MON HI (10F1k), CU SYS AREA HI (10F3k), VENT HI (10F1f) (10F) <ul style="list-style-type: none"> ○ Verify radiation monitors (2R) ○ Evacuate the Reactor Building ○ Confirm Secondary Containment initiations and isolations IAW Support Procedure 49 (after VENT HI alarm) <ul style="list-style-type: none"> ▪ Initiates SGT by placing EXHAUST FAN 1-8 (1-9) switch to the HAND position (11R) (CT) ▪ Verifies SUPPLY FAN 1-12 and 1-14 OFF (Place SUPPLY FAN 1-12, 1-14 to the OFF position) ▪ Reports 2 areas above MAX SAFE temperature • For rapid RPV depressurization, opens TBVs fully • For Emergency Depressurization: <ul style="list-style-type: none"> ○ Stops injection with Core Spray not required for adequate core cooling IAW Support Procedure 10 (1F/2F) <ul style="list-style-type: none"> ▪ Depress the OVERRIDE switches for all sensors that are lit ▪ Depress all ACTUATED switches 						

		<ul style="list-style-type: none"> ▪ Confirm closed Core Spray Parallel Isolation Valves not required to be open for adequate core cooling <ul style="list-style-type: none"> • Place PARALLEL ISOL switches to the CLOSE position for Core Spray pumps not required ▪ Secure Core Spray Booster pumps not required for adequate core cooling <ul style="list-style-type: none"> • Place BOOSTER PUMP switches to the STOP position for Core Spray Booster pumps not required ▪ Secure Core Spray Main pumps not required for adequate core cooling <ul style="list-style-type: none"> • Place MAIN PUMP switches to the STOP position for Core Spray Main pumps not required ▪ Bypass ROPS (Reactor Overfill Protection) (4F) ▪ Report Torus water level > 90" ▪ Open 5 EMRVs (1F/2F) (CT) <ul style="list-style-type: none"> • Place AUTO DEPRESS VALVE switches in the MAN position
Role Play	When the RB ΔP Low annunciator alarms, as the NLO call the Control Room that steam is visible coming from the Reactor Water Cleanup cage and that you have exited the RB.	
	SRO	<ul style="list-style-type: none"> • Directs entry into EMG-3200.11, Secondary Containment Control <ul style="list-style-type: none"> ○ Directs isolation of systems discharging into Secondary Containment ○ Directs rapid RPV depressurization when ED is anticipated ○ Directs Emergency Depressurization when 2 area radiation levels or 2 area temperatures exceed the MAX SAFE level (CT) ▪ Directs entry into EMG-3200.04A, Emergency Depressurization – No ATWS <ul style="list-style-type: none"> • Direct stopping injection with Core Spray not required for adequate core cooling IAW Support Procedure 10 • Directs ROPS bypass • Directs verification of Torus water level • Directs 5 EMRVs open • Directs evacuation of Reactor Building from high radiation • Directs initiation of SGT (CT)
Terminus:	The RPV has been emergency depressurized	

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u>		Scenario No.: <u>NRC 3</u>	Event No.: <u>8</u>
Event Description: Failure of Standby Gas Treatment (SGT) System to auto-initiate			
Initiation: During the steam leak into the secondary containment			
Cues: Annunciator 10F1f, VENT HI (10F)			
Time	Position	Applicant's Actions or Behavior	
	RO/BOP	<ul style="list-style-type: none"> • Responds to annunciator 10F1f, VENT HI (10F) <ul style="list-style-type: none"> ○ Verifies radiation monitor VENT MANIFOLD 1, 2 readings (2F) ○ Reports failure of SGT to auto initiate ○ Manually starts SGT 1 (2) (11R) <ul style="list-style-type: none"> ▪ Confirm STANDBY GAS SELECT in SYS 1 (SYS 2) ▪ Start exhaust Fan EF-1-8 (9) by placing EXHAUST FAN 1-8 (1-9) to the HAND position ▪ Verify exhaust fan starts and valves open ▪ Verify RB Main Supply valves close ▪ Verify RB Containment Isolation valves close ▪ Verify RB Supply Fans trip and Exhaust Fans trip and Supply valves close 	
	SRO	<ul style="list-style-type: none"> • Directs manual start of SGT IAW Support Procedure 49 (CT) 	
Terminus:	SGT has been initiated Emergency Plan Classification: Site Area Emergency, FS1: Potential Reactor Coolant System Barrier Loss (Unisolable primary system leakage outside of the DW as indicated by one or more area temperatures greater than the MAX NORMAL) and Primary Containment Barrier loss (Failure of any line penetrating the Primary Containment to close when required AND downstream pathway exists to the environment OR Unisolable primary system leakage outside of the DW as indicated by one or more area temperatures greater than the MAX NORMAL).		

Notes/Comments

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Malfunction List

Presets:

- IRM 14 failed: MAL-NIS010D
- Cleanup Pump B OOS – Pump switch in PTL
- After shift turnover, PLACE a note on the CRD Temperature recorder PRIOR to event 4 that rod 02-19 indicates 260° F and steady.

Event 1: Swap air compressors

- LOA-CAS038 to LEAD to place air compressor #2 in Lead
- LOA-CAS037 to LAG to place air compressor #1 in Lag

Event 2: Report of oil leak on Core Spray Backup Main Pump NZ01C

- None

Event 3: Trip of RPS MG Set A and scram of control rod 14-43 (from position 48)

- Note: The 3 malfunctions below all go in together.
- LOA-RPS001; RPS MG Set 1-1 Supply Breaker Trip
- MAL-CRD011_1443 (with an 8 second delay) Scram of control rod 14-43
 - it takes about 8 seconds for ½ scram on loss of AC input breaker to RPS MG Set
- MAL-CRD007_1443 (with a 12 second delay) Stuck Rod 14-43
 - The additional time delay lets the control rod scram part way in before becoming stuck

Event 4: High temperature on control rod 02-19

- MAL-CRD013_0219: Plugged cooling orifice for control rod 02-19
 - it takes about 30-45 seconds for high temp. alarm to come in, and about 30-45 seconds to clear once deleted
 - this malfunction must be **deleted** when the RO takes expected actions to do stall flow for control rod 02-19

Event 5: FW Heater A3, A2, and A1 high level and fuel failures

- CNH-001B to 0 (high level): High level in A3 FW Heater
 - shortly after high level annunciator, steam admission reverse check valve closes and moisture removal valve will auto open (both annunciated).
- CNH-FWH004B to 0 delayed 15 seconds (high level): High level in A2 FW heater (and eventual heater trip)
- CNH-FWH007B to 0 delayed 30 seconds (high level): High level in A1 FW heater (and eventual heater trip)
 - These FW heater malfunctions can all be placed in at the same time
- MAL-RXS001 to 0.001 over 15 minutes (added in Event 8)

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Event 6: Main turbine high vibrations with high thrust bearing vibration with failure of main turbine to auto trip on high thrust bearing vibration

- MAL-TSI002A thru TSI002J to 11-13 mils (all bearings high vibrations are not required)
- To simulate a turbine thrust bearing trip:
 - ANN-Q-2b to ON: this simulates a high thrust bearing with failure of main turbine to auto trip (manual and other auto trips still function)
 - STL-TSI002 to ON: this activates the thrust trip amber light on Panel 7F

Event 7: Leak in the Cleanup System with failure of the Cleanup System isolation to close (failure of both auto and manual) Also put in Event 9 malfunction now.)

- MAL-RCU013 to 20% over 15 minutes Cleanup System leak
- Fail CU IVs:
 - VLV-RCU001 to Mech Seize (V-16-1)
 - VLV-RCO004 to Mech Seize (V-16-14)
- Fuel Failures
 - MAL-RXS001 to 0.001 over 15 minutes
 - ICH-RMS028A to 1.85 5-minute ramp with 2-minute delay for SDC ARM
 - ICH-RMS025A to 2.5 5-minute ramp with 2-minute delay for RWCU ARM
 - ICH-RMS027A to 1.5 5-minute ramp with 2-minute delay for IC ARM
 - ICH-RMS035A to 1.25 6-minute ramp with 2-minute delay for #1 vent rad. monitor
 - ICH-RMS036A to 1.15 6-minute ramp with 2-minute delay for #2 vent rad. monitor
- Failure of SGTS to auto start
 - MAL- SCN005

Event 8: Failure of SGT to auto start on high radiation in RB HVAC discharge

- MAL- SCN005

NOTE: This malfunction may not be required. On high RB pressure, normal HVAC trips and isolates. Secondary Containment EOP states that if RBHV isolates or shuts-down, it is restarted by Support Procedure 50. The jumper used to allow manual start of RB HVAC also over-rides an auto shutdown of RB HVAC from high RB Building HVAC radiation monitors. When these radiation monitors do go high, normal HVAC and SGTS remains unaffected. The Operator must manually start SGTS and secure the other valves.

	Procedure #	Procedure Name	Revision
1	334	Instrument and Service Air	93
2	RAP-G2c	RPS MG SET 1 TRIP	0
3	RAP-G1c	SCRAM CONTACTOR OPEN	1
4	RAP-H6a	ROD DRIFT	0
5	ABN-6	Control Rod Drive System	2
6	408.12	Operation of Reactor Protection System Panel 1-1 and Transformer PS-1	12
7	RAP-H5c	CRD TEMP HI	0
8	302.1	Control Rod Drive System	92
9	617.4.002	CRD Exercise and Flow Test/IST Cooling Water Header Check Valve	44
10	RAP-N3d	HP A3 LEVEL HI/LO	0
11	RAP-N1d	HP A3 REV CK VLV TRIP	0
12	ABN-17	Feedwater System Abnormal Conditions	3
13	RAP-N2d	HP A3 MRV OPEN	0
14	ABN-38	Station Seismic Event	3
15	RAP-Q3b	VIBRATION HIGH	2
16	RAP-Q2b	THRUST BRG WEAR HI	0
17	ABN-1	Reactor Scram	2
18	ABN-10	Turbine Generator Trip	2
19	RAP-D1d	RWCU HELB I	2
20	RAP-D2d	RWCU HELB II	2
21	EMG-3200.11	Secondary Containment Control	12
22	EMG-3200-04A	Emergency Depressurization – No ATWS	4
23	RAP-10F1f	VENT HI	0
24	330	Standby Gas Treatment System	43
25	317.1	Feedwater Heaters	36

Facility: Oyster Creek

Scenario No.: NRC 2

Op Test No.: NRC 2006-1

Examiners: _____ Operators: _____

Initial Conditions:

- The plant is in 4-loop operation at 100% power.
- Cleanup Pump B is out of service for motor repair, and is expected to return to service tomorrow.
- Isolation Condenser System A was removed from service two hours ago and is isolated, due to motor operated valve torque switch replacement. Technical Specifications applicability has been reviewed. The system is expected to return to an operable status in 1 hour.
- IRM 14 failed during the control rod withdrawal to critical, and is BYPASSED. Technical Specifications applicability has been reviewed and an IR has been generated.
- Surveillance procedure 604.4.016, Torus to Drywell Vacuum Breaker Operability and In-Service Test, is in-progress for a normal surveillance. The surveillance is being controlled by the in-plant Operators.
- The main generator is in manual voltage control. The amplidyne is ready to be placed back into service following minor maintenance, IAW 336.1, 24 KV Main Generator Electrical System.

Turnover:

- Restore the amplidyne to service and transfer the main generator from manual voltage control to automatic voltage control IAW procedure 336.1.

Event No.	Malf. No.	Event Type*		Event Description
1		N	BOP	Restore the amplidyne to service and transfer the main generator from manual voltage control to automatic voltage control.
2		TS	SRO	Respond to Drywell-Torus vacuum breaker fail to close.
3		C	BOP	Respond to indications of low TBCCW cooling.
4		R C TS	RO BOP SRO	Respond to Reactor Recirculation Pump alarms.
5		I	RO	Respond to failure of RPV water level input to Feed Water Level Control System (LT ID13A and LT ID13C).
6		C	RO	Respond to failure of Average Power Range Monitor 7 (APRM).
7		M	Crew	Respond to loss of stator cooling.
8		M	Crew	Respond to steam leak in the primary containment with failure of the Containment Spray system.
9		C	Crew	Respond to failure of primary containment to automatically isolate.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor Transient, (TS) Tech Specs

Total Malfunctions (5-8):	8
Malfunctions after EOP entry (1-2)	2
Abnormal Events (2-4)	4
Major Transients (1-2)	2
EOPs entered requiring substantive actions (1-2)	1
EOP Contingencies w/ substantive actions (0-2)	1
Critical Tasks (2-3)	2

Event	Type	Position	Description
4	R	RO	Respond to recirculation pump alarms
5	I	RO	Respond to failure of RPV level input to FWLC (LT ID13A and LT ID13C)
6	C	RO	Respond to failure of APRM 7

Event	Type	Position	Description
1	N	BOP	Restore amplidyne to service
3	C	BOP	Respond to indications of low TBCCW cooling
4	C	BOP	Respond to recirculation pump alarms

Event	Type	Position	Description
7	M	Crew	Respond to loss of stator water cooling
8	M	Crew	Respond to steam leak in the drywell with failure of containment spray
9	C	Crew	Respond to failure of drywell equipment drain and floor sump isolation valves to auto close on the primary containment isolation signal (V-22-1, V-22-2, V-22-28, and V-22-29)

Event	Type	Position	Description
2	TS	SRO	Respond to vacuum breaker failure (open) (TS 3.5.A.5)
4	TS	SRO	Respond to recirculation pump alarms

Scenario Summary

The scenario will begin with field personnel continuing the drywell-torus vacuum breaker surveillance test. No actions are taken by control room operators except communicating with the field personnel and annunciation acknowledgement. The last valve is to be tested. Field personnel will continue with the surveillance after being notified by the control room that the test may reconvene (after placing the amplidyne in service).

1. The BOP will swap from main generator manual voltage control to automatic voltage control IAW 336.1, 24 KV Main Generator Electrical System. **(NORMAL EVOLUTION)**

2. Operators in the field are performing the DW/Torus vacuum breaker exercise test. The last vacuum breaker tested (V-26-14) opens with a little more resistance than the others, makes a strange noise when fully opened, then remains open after being allowed to close. Alarms of the open valve are present in the control room. The SRO will declare the valve inoperable and applies TS 3.5.A.5 **(TS)**

3. One of the operating TBCCW pumps will trip, and the low system pressure switch to start the standby pump will not function. The Stator Temp Hi annunciator will alarm. The BOP will deduct the reduced system pressure and start another TBCCW pump IAW ABN-20, TBCCW Failure Response. **(COMPONENT FAILURE) (ABN)**

4. The operators will respond to alarms for a recirculation pump. Alarms for low oil and high vibrations (RAP-E2d, RAP-E6d) will require an immediate pump trip by the BOP. The RO will make changes to power to ensure recirc pump limitations and power/flow considerations are met (recirc flow and/or CRAM rods). The SRO will apply TS 3.3.F, Recirc Loop Operability, and 3.10.A, Core Limits (as required by the Core Operating Limits Report). **(COMPONENT FAILURE) (REACTIVITY MANIPULATION) (TS) (ABN)**

5. The RO will respond to a leak in the common leg to RPV water level transmitters ID13A and ID13C which input to feed water level control. The crew will enter ABN-17, Feedwater System Abnormal Conditions. The RO will take manual control of feed water and return water level to the normal band. The RO will swap level transmitters to Feedwater Level Control IAW procedure 317, Feedwater System. **(INSTRUMENT FAILURE)**

6. The next event is an INOP failure of APRM 7 causing a ½ scram. The RO will bypass the APRM and reset the ½ scram. The SRO will verify compliance with Tech Specs. **(COMPONENT FAILURE)**

7. The crew will receive annunciator STATOR CLG TROUBLE (R6c) and indications of the loss of one pump and auto start of the standby stator water pump. The standby pump will then trip causing a turbine runback. The Crew will implement ABN-11, Loss of Generator Stator Cooling, and will scram the reactor and perform ABN-1, Reactor Scram. **(MAJOR) (ABN)**

8. A steam leak in the primary containment occurs and the crew will enter the Primary Containment Control EOP. Because a drywell-to-torus vacuum breaker is open, the pressure suppression function of the torus is lost/reduced. The Containment Spray System 1 will not function in the Containment Spray mode (Some of System 2 will function). The SRO will direct emergency depressurization (IAW Emergency Depressurization – No ATWS) as primary suppression pressure limits are approached. The SRO may also anticipate emergency depressurization and order a rapid RPV depressurization with TBVs and ICs. **(MAJOR) (EOP) (COMPONENT FAILURE) (EOP CONTINGENCY)**

9. The Operators will recognize that the drywell equipment drain isolation valves and drywell sump isolation valves failed to close on a primary containment isolation signal and will manually close the valves (V-22-1, V-22-2, and V-22-28, V-22-29) **(COMPONENT FAILURE) (CT)**

Critical Tasks

1. With a failure of primary containment isolation on a valid isolation signal, manually isolate the primary containment.
 - With a Primary Containment isolation signal present and the failure of the Primary Containment to isolate, manual actions should occur to complete the isolation.
2. Initiate Emergency Depressurization with EMRVS prior to exceeding Primary Suppression Pressure Limit (PSP), or when the Primary Containment bulk temperature cannot be maintained below 281° F; or, anticipating ED and performing a rapid RPV depressurization before the limits are exceeded.
 - Performing an Emergency Depressurization (or performing an anticipatory ED rapid depressurization) ensures the Primary Containment does not fail.

Op-Test No.: <u>NRC 2006-1</u>		Scenario No.: <u>NRC 2</u>	Event No.: <u>1</u>
Event Description: <u>Shift from manual generator voltage control to automatic generator voltage control IAW procedure 336.1, 24 KV Main Generator Electrical System, Section 6.0</u>			
Initiation: Following shift turnover			
Cues: As directed by the SRO			
Time	Position	Applicant's Actions or Behavior	
	SRO	<ul style="list-style-type: none"> Direct the BOP to shift from manual generator voltage control to automatic generator voltage control IAW procedure 336.1, 24 KV Main Generator Electrical System, Section 6.0. 	
	BOP	Shift from manual generator voltage control to automatic generator voltage control IAW procedure 336.1, 24 KV Main Generator Electrical System, Section 6.0 (8F/9F) (attached) <ul style="list-style-type: none"> Makes plant announcement prior to starting the amplidyne Shifts voltage control IAW procedure 336.1, section 6.0. (attached) After placing the amplidyne in auto, reports the amplidyne is in service 	
Role Play	As the NLO, when directed to verify the amplidyne running, state the amplidyne is running.		
Terminus:	The amplidyne is in automatic control.		

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u>		Scenario No.: <u>NRC 2</u>	Event No.: <u>2</u>
Event Description: <u>DW/Torus vacuum breaker V-26-14 will not close after being manually opened locally for surveillance.</u>			
Initiation: The amplidyne has been placed in automatic.			
Cues: Notification from in-plant Operator.			
Time	Position	Applicant's Actions or Behavior	
Role Play		As the in-plant Operator, call the Control Room and report: The final DW/Torus vacuum breaker is ready to be tested (V-26-14). IAW the surveillance procedure, Step 6.3.12, you will receive two alarms when the vacuum breaker is opened (C4f, TORUS/DW I VAC BRKR OPEN and C5f, TORUS/DW 2 VAC BRKR OPEN). The Control Room is to make an announcement over the page phone or radios when both alarms are received (step 6.3.12).	
	BOP	Notifies In-Plant Operator when annunciators C4f and C5f (TORUS/DW VAC BRKR OPEN I and II) are received	
Sim. Operator		When the Role Play in-plant operator is ready to open the last vacuum breaker, V-26-14, then open the valve.	
Role Play		As the in-plant Operator, call the Control Room and report: vacuum breaker V-26-14 open, but will not close and cannot be closed.	
	SRO	<p>Torus/DW Vacuum Breaker V-26-14 will not close</p> <ul style="list-style-type: none"> • Declares the vacuum breaker inoperable • Review Tech Spec 3.5.A.5.a (attached) <ul style="list-style-type: none"> ○ 3.5.A.5.a: When primary containment is required, all suppression chamber-drywell vacuum breakers shall be OPERABLE except during testing and as stated in Specification 3.5.A.5.b and c, below. ○ 3.5.A.5.b: Five of the fourteen suppression chamber - drywell vacuum breakers may be inoperable provided that they are secured in the closed position. ○ 3.5.A.5.d: If Specifications 3.5.A.5(a), (b) or (c) can not be met, the reactor shall be PLACED IN the COLD SHUTDOWN CONDITION within 24 hours. ○ Refers to OP-OC-100, Oyster Creek Conduct of Operations • Notifies Work Week manager for repair • Notifies plant management about TS required shutdown • Updates the Crew 	

ROLE PLAY:	When alerted to the required Shutdown by the SRO (as Operations Management), tell the SRO NOT to start the shutdown right now. We will first try to repair the valve.	
Terminus:	TS 3.5.A.5 has been reviewed and the Crew has been updated.	

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u>		Scenario No.: <u>NRC 2</u>	Event No.: <u>3</u>
Event Description: <u>The running TBCCW pump trips (without trip annunciation), combined with the failure of standby TBCCW pump to auto start (PS-116 fails to trip)</u>			
Initiation: TS 3.5.A.5 has been reviewed and the Crew has been updated.			
Cues: Annunciator R6c, STATOR CLG TROUBLE (8F/9F)			
Time	Position	Applicant's Actions or Behavior	
	BOP	Responds to Annunciator R6c, STATOR CLG TROUBLE <ul style="list-style-type: none"> • Request NLO investigate the Stator Water Cooling System (TB Basement) • Reports TBCCW Pump 1-1 has tripped • Reports the standby TBCCW Pump did not auto start on low TBCCW discharge pressure; and, starts the standby TBCCW Pump 1-2 (13R) <ul style="list-style-type: none"> ▪ Places TBCCW Pump 1-2 switch to START ▪ Verifies TBCCW pump start and system pressure • Enters ABN-20, TBCCW Failure Response, if directed. 	
	SRO	<ul style="list-style-type: none"> • May direct entry into ABN-20, TBCCW Failure Response • Notifies Work Week Manager about the failed TBCCW pump and the failure of the standby TBCCW to auto start 	
Role Play	As the NLO investigating the Stator Water Cooling System, report stator cooling pressure is steady at 80 psig. Tank level is normal. There has been no change in stator water pump status (1 pump running). As the NLO, if asked to check TBCCW Pumps, report that only TBCCW Pump 1-3 is running.		
Sim. Operator	A minute after the standby TBCCW Pump is started, delete the annunciator for R6c, STATOR CLG TROUBLE.		
Terminus:	The standby TBCCW Pump has been manually started.		

Notes/Comments

Op-Test No.: NRC 2006-1Scenario No.: NRC 2Event No.: 4Event Description: Reactor Recirculation Pump A abnormal operation requiring pump shutdown (low oil level and high vibration)

Initiation: Following TBCCW evolution

Cues: Annunciators E6d, OIL LEVEL HI/LO, and E2d, VIBRATION HI A

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Responds to Annunciators VIBRATION HI A E2d, and OIL LEVEL HI/LO E6d, (3F)</p> <ul style="list-style-type: none"> • Annunciator VIBRATION HI A, E2d <ul style="list-style-type: none"> ○ Attempts to reset vibration alarm (3F) • Annunciator OIL LEVEL HI/LO, E6d <ul style="list-style-type: none"> ○ Reports that immediate pump trip is required IAW the RAP-E6d • Manually trips Reactor Recirc. Pump A <ul style="list-style-type: none"> ○ Place Recirc Pump A DRIVE MOTOR switch to STOP position (3F) • Refers to ABN-2, Recirculation System Failures, Section 3.1.2 (attached) <ul style="list-style-type: none"> ○ Close the Pump A DISCHARGE valve (3F) ○ Selects an operating recirc loop temperature point (3F) ○ Monitors for fuel failures • Changes reactor pressure, if directed, by changing the EPR setpoint (980-1020) (7F)
	RO	<p>Refers to ABN-2, Recirculation System Failures</p> <ul style="list-style-type: none"> • Verifies operation NOT within the Exclusion Zone • Reports recirc. flow > 8.5 E4 GPM and pump speed > 33 Hz • Reduces reactor power IAW ABN-2, Section 3.1.2.E (attached) <ul style="list-style-type: none"> ○ Lowers reactor power with recirc flow to 8.5 E4 GPM OR until pump speed < 33 Hz (4F) ○ With recirc speed still > 33 Hz, lowers reactor power to about 55% power by inserting CRAM rods using the ROD CONTROL swiych to ROD IN (4F) ○ Once at about 55% power, lower recirc pump speed to < 33 Hz • Verifies position on Power Operations Curve • Reports having entered the Buffer Zone on the Power Operations Curve

		<ul style="list-style-type: none"> ○ Maintains heightened awareness of plant parameters ○ May range down on IRM Ranges to clear IRM D/S alarms
	SRO	<ul style="list-style-type: none"> • Directs trip of Reactor Recirc. Pump A, IAW RAPs • Directs reactor power reduction IAW ABN-2 • Refers to Tech Spec 3.3.F, 3.10.A (3.3.F attached) <ul style="list-style-type: none"> ○ Tech Spec 3.3.F.2b: When there are 2 inoperable recirculation loops, the reactor core thermal power shall not exceed 90% of rated power. • Notify System Owner/Dispatcher, Chemistry, Reactor Engineering • May direct other actions such as raising reactor pressure IAW procedure 202.1, Power Operations, Section 6.3.7, Power Reductions
Terminus:	Recirc Pump A has been manually tripped; reactor power has been reduced IAW with ABN-2.	

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u> Scenario No.: <u>NRC 2</u> Event No.: <u>5</u>		
Event Description: <u>Leak in variable leg to RPV water level transmitters ID13A & ID13C (inputs into Feedwater Level Control System, FWLC)</u>		
Initiation: Reactor power is stable and notifications of the down-power event are made.		
Cues: RPV water level indicators ID13A and ID13C both lowering (5F/6F), and other RPV water level indicators rising (5F/6F) rising and feedwater flow rising (5F/6F); followed by annunciator J8c, FCS/RFCS; followed by annunciator H7e, RX LVL HI/LO (5F/6F);		
Time	Position	Applicant's Actions or Behavior
	RO	<p>Reports RPV water level indicators ID13A and ID13C are lowering and other RPV water level indicators are rising and FW flow is rising (5F/6F)</p> <p>Refer ABN-17, Feedwater System Abnormal Conditions, Section 3.2.1</p> <ul style="list-style-type: none"> • Changes the Level Select into Feedwater Level Control IAW procedure 317, section 11.8 (attached) (4F) <ul style="list-style-type: none"> ○ When the RPV water level input has been changed: <ul style="list-style-type: none"> ▪ Monitor feedwater flow and RPV water level ▪ Reports Level Control is selected to B and that FW/RPV water level are responding
	BOP	<p>Responds to annunciator J8c (FCS/RFCS) and H7e (RX LVL HI/LO)</p> <ul style="list-style-type: none"> • Checks RPV water level indication (5F/6F) <ul style="list-style-type: none"> ○ Reports RPV water level indicators ID13A and ID13C are rising and other RPV water level indicators lowering • Checks DW bulk temperature (PPC) • Checks DW pressure (4F, 1F/2F) • Refer to ABN-17, Feedwater System Abnormal Conditions
	SRO	<ul style="list-style-type: none"> • Directs entry into ABN-17, Feedwater System Abnormal Conditions • May refer to ABN-59, RPV Level Instrument Failures • Directs changing the Level Select input into Feedwater Level Control IAW procedure 317, Section 11.8 (from ABN-17) • Notifies Work Week manager for repair • Refers to Tech Spec 3.3.D if DW unidentified leak rate increases > 2 GPM (attached)
Terminus:	ID13B is the selected RPV water level input to FWLC and RPV water level and FW flow are at/near normal values.	

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u>		Scenario No.: <u>NRC 2</u>	Event No.: <u>6</u>
Event Description: <u>INOP failure of APRM 7</u>			
Initiation: 2 minutes after ID13B is the selected RPV water level input to FWLC and RPV water level and FW flow are at/near normal values.			
Cues: Annunciators G2f, APRM HI-HI/INOP II (3F); G1c, SCRAM CONTACTOR OPEN (3F)			
Time	Position	Applicant's Actions or Behavior	
	RO	<ul style="list-style-type: none"> • Responds to annunciators G2f, APRM HI-HI/INOP II (3F); G1c, SCRAM CONTACTOR OPEN (3F) <ul style="list-style-type: none"> ○ Reports DN SCL INOP light ON for APRM CH 7 and normal reading on the other operable APRMs • Bypasses APRM 7 (3F) <ul style="list-style-type: none"> ○ Places APRM BYPASS joystick to the CH 7 position • Resets the ½ scram (3F) <ul style="list-style-type: none"> ○ Presses SCRAM SYSTEM RESET pushbutton 	
	BOP	<ul style="list-style-type: none"> • Checks APRM cabinets (5R) 	
	SRO	<ul style="list-style-type: none"> • Reviews Tech Spec 3.1 <ul style="list-style-type: none"> ○ Declares APRM 7 inoperable • Directs APRM 17 bypassed • Directs ½ scram reset • Notifies Work Week Manager for repair 	
Terminus:		APRM 7 is bypassed.	

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u>		Scenario No.: <u>NRC 2</u>	Event No.: <u>7</u>
Event Description: <u>Loss of Stator Water Cooling Pumps</u>			
Initiation: 2-3 minutes after APRM 7 is placed in bypassed.			
Cues: Annunciator R6c, STATOR CLG TROUBLE (7F)			
Time	Position	Applicant's Actions or Behavior	
	BOP	<ul style="list-style-type: none"> • Respond to annunciator R6c, STATOR CLG TROUBLE <ul style="list-style-type: none"> ○ Dispatch NLO to the Stator Water Cooling Panel (Role Play) ○ Monitors stator temperature ○ Enters ABN-11, Loss of Generator Stator Cooling ○ Reports generator runback (TBVs opening) • Following the scram, maintains reactor pressure 800-1000 with TBVs (or as directed) 	
Role Play	As the NLO sent to the Stator Water Cooling Panel, report that the running Stator Water Cooling Pump has tripped, and the standby stator cooling pump has started. (About 2 minutes later, trip the second pump as the SIM OPERATOR) and report that the second Stator Water Cooling Pump also tripped and that neither pump can be started.		
	SRO	<ul style="list-style-type: none"> • Directs entry into ABN-11, Loss of Generator Stator Cooling • Directs the RO to scram the reactor and perform ABN-1, Reactor Scram, due to generator runback • Directs entry into RPV Control – No ATWS EOP on low RPV water level <ul style="list-style-type: none"> ○ Directs RPV water level 138"-175" with feedwater/condensate IAW Support Procedure 2 (attached) ○ Directs RPV pressure 800-1000 psig with TBVs <ul style="list-style-type: none"> ▪ May direct a reactor cooldown at below 100° F/Hr 	
	RO	<ul style="list-style-type: none"> • Manually scrams the reactor and carries out ABN-1, Reactor Scram, Section 3.2 through 3.7, and 3.10 (attached) <ul style="list-style-type: none"> ○ Scrams the reactor ○ Inserts SRMs and IRMs 	
	BOP	<ul style="list-style-type: none"> • Performs ABN-1, Reactor Scram actions, Section 3.8, and 3.11 (attached) 	

Terminus:	The reactor is scrammed; RPV Control – No ATWS EOP has been entered and RPV water level and RPV pressure are being controlled in the desired band.	

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u>			Scenario No.: <u>NRC 2</u>			Event No.: <u>8/9</u>		
Event Description: <u>Steam leak in the Primary Containment with failure of Containment Spray System #1 and failure of Containment Spray Pump 51C, which leads to Emergency Depressurization of the RPV due to PSP Concerns</u>								
Initiation: The reactor and turbine have tripped; RPV water level is in/near the normal band								
Cues: Increasing DW pressure and temperature; Annunciators C3f DW PRESS HI/LO, followed by H1d, H2d, DW PRESS HI-HI I & 11								
Time	Position	Applicant's Actions or Behavior						
	BOP/RO	<ul style="list-style-type: none"> • Responds to annunciator C3f, DW PRESS HI/LO • Reports hi containment pressure and entry into Primary Containment Control EOP and RPV Control – No ATWS • Monitors/reports Primary Containment parameters • Confirms automatic actions, IAW Support Procedure 1 (attached) <ul style="list-style-type: none"> ○ Reports that Drywell Equipment Drain Isolation Valves, V-22-1 and V-22-2, and DW Sump valves V-22-28 and V-22-29 did not close, and closes the valves <ul style="list-style-type: none"> ▪ Place EQUIP SUMP switches to the CLOSE position (11F) (CT) ▪ Places DW SUPM switches to the CLOSE position (11F) (CT) • Lines-up and sprays the DW IAW Support Procedure 29 (attached) • Reports that PSP is rising • For Emergency Depressurization: (CT2) <ul style="list-style-type: none"> ○ Stops injection with Core Spray not required for adequate core cooling IAW Support Procedure 10 (1F/2F) (attached) ○ Bypass ROPS (Reactor Overfill Protection) (4F) ○ Report Torus water level > 90" (1F/2F) ○ Open 5 EMRVs by placing AUTO DEPRESS VALVE switches in the MAN position (1F/2F) • Initiates torus cooling, as directed, IAW Support Procedure 25 (attached) (1F/2F) 						
	SRO	<ul style="list-style-type: none"> • Directs entry into Primary Containment Control EOP and re-enters RPV Control – No ATWS <ul style="list-style-type: none"> ○ Directs automatic actions confirmed IAW Support Procedure 1 ○ Before DW/Torus reaches 12 psig, directs lineup of Drywell Sprays IAW Support Procedure 29 						

		<ul style="list-style-type: none"> ○ When DW/Torus exceeds 12 psig, or before bulk DW temperature reaches 281° F, directs initiation of Drywell Sprays IAW Support Procedure 29 ○ When it has been determined that bulk DW temperature cannot be restored/maintained below 281° F or it has been determined that Torus pressure cannot be maintained below Pressure Suppression Pressure, then direct Emergency Depressurization (CT) ○ Enters EMG-3200-04A, Emergency Depressurization – No ATWS <ul style="list-style-type: none"> ▪ Direct stopping injection with Core Spray not required for adequate core cooling IAW Support Procedure 10 ▪ Directs ROPS bypass ▪ Directs verification of Torus water level ▪ Directs 5 EMRVs open ○ May direct torus cooling be placed into service IAW Support Procedure 25
Terminus:	The RPV has been emergency depressurized with EMRVs and RPV water level has been stabilized.	

Notes/Comments

Emergency Plan Classification: Alert, FA1; DW pressure GT 3 psig and indication of RCS leakage in the DW.

Malfunction List

Presets:

- IRM 14 failed: MAL-NIS010D
- Cleanup Pump B OOS - place control switch in PTL

Event 1: Shifting to automatic generator voltage control

- None

Event 2: DW/Torus vacuum breaker V-26-14 opens

- MAL-PCN001N to 100%

Event 3: Trip of TBCCW Pump 1-1 combined with failure of auto-start of the standby TBCCW Pump, failure of TBCCW Pump 1-1 Trip annunciator (Q3f)

- MAL-TBC001A, Trip of TBCCW Pump 1-1
- PSW-TBC001A to Fail to Trip (prevents auto start of standby TBCCW pump 1-2)
- ANN-Q-3f to OFF to fail TBCCW PUMP 1 TRIP annunciator (Q3f)
- ANN-R-6b to ON for H2 System Trouble alarm

Event 4: Low oil level in Recirc Pump A, followed by Recirc Pump A high vibration

- LOA-RCP001 to TRUE
- ANN-E-6D Hi/Lo oil level annunciator for Recirc Pump A (delayed 1-2 minutes from high vibration annunciator)

Event 5: Variable leg leak in common leg to RPV level transmitters ID13A and ID13C (indicators on 5F/6F and input into FW level control)

- MAL-NSS012E to 5% over 12 minutes

Event 6: High trip of APRM 7

- MAL-NIS021G INOP trip of APRM 7

Event 7: Failure of stator water pumps

- MAL-GEA005A Trip of Stator Water Cooling Pump A - ON
- MAL-GEA005B Trip of Stator Water Cooling Pump B - ON
 - Delay trip of the second stator cooling pump by 10-20 seconds from NLO role play at the stator cooling control panel verifying auto start of the standby stator cooling pump

Event 8: Steam leak in DW with failure of Containment Spray System 1 (torus cooling valve stays open) and Containment Spray 52C will not start

- MAL-NSS017A to 10% over 20 minutes steam leak in DW
- SWI-CNS011C to OFF Containment Spray System 1 fails in torus cooling mode
- SWI-CNS004C to ON Disables Containment Spray Pump 51C
 - PLACE Event 9 malfunctions in at this time also

Event 9: Failure of DWEDT isolation valves and DW Sump isolation valves to auto close on high DW pressure [valves V-22-1 and V-22-2 (equipment drains), V-22-28 and V-22-29 (sump drains)]

- MAL-RPS007A to Fail to Actuate

Setup Notes - IC-172

1. Cleanup Pump B control switch is in PTL with a clearance tag applied
2. Isolation Condenser A is isolated (steam and condensate return valves closed and tagged), with vents open
3. IRM 14 is failed and bypassed with a clearance tag
4. The main generator is in manual voltage control with yellow magnetic operator aids applied on the panel
5. Have a copy of 604.4.016, Torus to Drywell Vacuum Breaker Operability and In-Service Test available for crew reference
6. Have a copy of Attachment 403-2, LPRM and APRM Status Information Sheet filled out with inoperable LPRMs/APRMs
7. Ensure generator voltage is in manual and that to get to automatic, an adjustment must be made (ie, vary something so BOP will need to adjust when going to AUTO).
8. Have a copy of 604.4.016 for the crew.
9. May need to reduce cooling due to the tripped recirc. MG set

	Procedure #	Procedure Name	Revision
1	336.1	24 KV Main Generator Electrical System	45
2	604.4.016	Torus to Drywell Vacuum Breaker Operability and In-Service Test	34
3	Tech Specs		
4	RAP-C4f	Torus/DW 1 Vac Brkr Open	0
5	RAP-C5f	Torus/DW 2 Vac Brkr Open	0
6	ABN-2	Recirculation System Failures	5
7	ABN-17	Feedwater System Abnormal Conditions	3
8	317	Feedwater	74
9	RAP-R6b	H2 System Trouble	0
10	ABN-20	TBCCW Failure Response	2
11	RAP-G2f	APRM HI-HI/INOP	2
12	RAP-G1c	SCRAM CONTACTOR OPEN	1
13	RAP-R6c	STATOR CLG TROUBLE	0
14	ABN-1	Reactor Scram	2
15	EMG-3200.01A	RPV Control – No ATWS	12
16	EMG-3200.02	Primary Containment Control	17
17	EMG-3200.04A	Emergency Depressurization – No ATWS	4
18	RAP-H7e	RX LVL HI/LO	0
19	202.1	Power Operation	98
20	ABN-11	Loss of Generator Stator Cooling	0
21	RAP-E2d	VIBRATION HI A	0
22	RAP-E6d	OIL LEV L HI/LO A	0

Facility: Oyster Creek **Scenario No.:** NRC 1 **Op Test No.:** NRC 2006-1
Examiners: _____ **Operators:** _____

Initial Conditions:

- The reactor is starting up, after a 5-day forced outage, with the MODE SWITCH in STARTUP.
- Cleanup Pump B is out of service for motor repair, and is expected to return to service tomorrow.
- IRM 17 failed during the control rod withdrawal to critical, and is BYPASSED. Technical Specifications applicability has been reviewed and an IR has been generated.

Turnover:

- Complete the withdrawal of control rods in the current Group, and then transfer from the Low Flow Regulating Valve (LFRV) to the Main Flow Regulating Valve (MFRV).

Event No.	Malf. No.	Event Type*		Event Description
1		R	RO	Withdraw control rods.
2		N	BOP	Transfers from the LFRV to the MFRV.
3		TS	SRO	RPV High Pressure Instrument RE15 to Isolation Condenser Initiation Logic Fails High
4		I	BOP	Respond to failed acoustic monitor for Electromatic Relief Valve (EMRV)
5		C R TS	RO RO SRO	Respond to Control Rod Drive Flow Control Valve (CRD FCV) failed closed followed by control rod drift
6		C	RO	Respond to Intermediate Range Monitor (IRM) 11, which fails low.
7		C	BOP	Respond to Electronic Pressure Regulator (EPR) fluctuations.
8		M	Crew	Respond to failure of the Mechanical Pressure Regulator (MPR) and Anticipated Trip Without Scram (ATWS) (electric).
9		M	Crew	Respond to a LOCA.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor Transient, (TS) Tech Spec

Total Malfunctions (5-8):	8
Malfunctions after EOP entry (1-2)	1
Abnormal Events (2-4)	4
Major Transients (1-2)	2
EOPs entered requiring substantive actions (1-2)	2
EOP Contingencies w/ substantive actions (0-2)	0
Critical Tasks (2-3)	2

Event	Type	Position	Description
1	R	RO	Withdraw control rods
5	C/R	RO	Failed closed of CRD FCV
6	C	RO	Drifting low IRM

Event	Type	Position	Description
2	N	BOP	Transfer from the LFRV to the MFRV
4	C	BOP	EMRV acoustic monitor failure
7	C	BOP	EPR Fluctuations

Event	Type	Position	Description
8	M	Crew	MPR failure plus ATWS
9	M	Crew	LOCA in primary containment

Event	Type	Position	Description
3	TS	SRO	RPV High Pressure Instrument RE15A to Isolation Condenser Initiation Logic Fails High (TS Table 3.1.1.C.1)
5	TS	SRO	Control rod 10-07 isolated at position 00 (TS 3.2.B.4)

Scenario Summary

The scenario will begin with Instrument Maintenance calibrating the drywell wide range pressure transmitters PT-53 (IAW 604.3.018, Wide Range Drywell Pressure Calibration).

1. The RO will withdraw control rods IAW procedure 201, Plant Startup. **(REACTIVITY MANIPULATION)**
2. The BOP will successfully transfer from the LFRV to the MFRV per procedure (This will be directed by procedure 201, step 6.57, and performed in procedure 317, step 6.3.15) **(NORMAL EVOLUTION)**
3. RPV high pressure instrument RE15A to Isolation Condenser Initiation Logic fails high. No Isolation Condenser initiation will/should occur from this failure. The SRO will review/apply TS Table 3.1.1, part C.1. **(TS)**
4. The BOP will respond to a failure of the acoustic monitor for EMRV NR-108A. Annunciator B4g, SV/EMRV NOT CLOSED, will alarm and the effected EMRV will still indicate closed. The BOP will defeat the alarm IAW procedure 413, Operation of the Safety Valve/EMRV Acoustic Monitoring System. **(INSTRUMENT FAILURE) (ABN)**
5. The in-service CRD FCV (NC30A) will fail closed. Several panel indications are available to diagnose the problem. The RO will swap to the alternate FCV IAW procedure 302.1 (Control Rod Drive System), step 4.3.3. ABN-6, Control Rod Drive System may be entered. Following restoration of a CRD FCV, control rod 10-07 will drift inward. **(COMPONENT FAILURE) (ABN)**
6. IRM 11 will fail low causing a rodblock (RAP-G1e, G2e). The IRM can be bypassed, and the rodblock cleared. The SRO will verify TS, and that no actions are required. (TS 3.1.1) **(COMPONENT FAILURE)**

7. Small step changes in the EPR begins, which affect reactor power and pressure. ABN-9, EPR Malfunctions, should be entered. It is expected that the BOP will transfer to the Mechanical Pressure Regulator (MPR) IAW 315.4, Transferring Pressure Regulators. **(COMPONENT FAILURE) (ABN)**

8. The MPR will fail causing all turbine bypass valves (TBVs) to go closed, causing RPV pressure to increase. The RO may attempt to scram prior to the RPV high pressure scram setpoint, but an electrical ATWS will occur and no control rods will insert. The crew will enter RPV Control – With ATWS. The crew will insert control rods by venting the scram air header (IAW SP-21, Alternate Insertion of Control Rods). RPV pressure control will be available with both loops of isolation condensers and electromatic relief valves (EMRVs). **(EOP) (MAJOR)**

9. A LOCA in the primary containment will require the Crew to enter the Primary Containment Control EOP. The operator will spray the containment (IAW SP-29, Initiation of the Containment Spray System for Drywell Sprays). **(EOP) (MAJOR)**

Critical Tasks

1. With a scram signal present and the reactor not shutdown, initiate alternate control rod insertion methods to bring the reactor shutdown.
 - These actions act to shutdown the reactor given that a reactor scram setpoint has been reached (high reactor pressure) and the reactor did not automatically shutdown.
2. Sprays the Drywell when Drywell/Torus pressure exceeds 12 psig.
 - This action ensures the continued operability of the Primary Containment as a viable fission product barrier.

Op-Test No.: <u>NRC 2006-1</u>		Scenario No.: <u>NRC 1</u>	Event No.: <u>1</u>
Event Description: <u>Raise reactor power by withdrawing control rods IAW 302.2, Control Rod Drive Manual Control System, step 3.3/4.3. (as directed from procedure 201, Plant Startup.). Complete the withdrawal of control rods in the current group. Continuous withdrawal is allowed.</u>			
Initiation: Following the shift turnover and the Crew assumption of the shift.			
Cue: As directed by SRO			
Time	Position	Applicant's Actions or Behavior	
	SRO	<ul style="list-style-type: none"> Direct control rod withdrawals to raise power IAW procedure 201, Plant Startup, with control rod manipulations performed IAW procedure 302.2, Control Rod Drive Manual Control System, step 3.3. 	
	RO	<ul style="list-style-type: none"> Withdraws control rods IAW procedure 302.2, Control Rod Drive Manual Control System, step 3.3 (attached). (Panel 3F) 	
	BOP	<ul style="list-style-type: none"> The individual performing the peer check shall verify that the correct control rod has been selected by comparing the control rod selected with the governing procedure. The individual performing the peer check shall state agreement with the control rod selection, its initial position, its target position, the method (i.e. single notch or continuous) and the direction of movement. Observe the actions of the RO to verify movement of the correct control rod to its target position. 	
Terminus:	Control rods in the current group have been withdrawn to their target position.		

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u>		Scenario No.: <u>NRC 1</u>	Event No.: <u>2</u>
Event Description: <u>Transfers from Low Flow Regulating Valve (LFRV) to the Main Feed Regulating Valve (MFRV) for Feedwater Pump A, IAW procedure 317, Feedwater System, section 6.3.15.</u>			
Initiation: Directly following control rod withdrawals.			
Cue: As directed by SRO following control rod withdrawals.			
Time	Position	Applicant's Actions or Behavior	
	SRO	<ul style="list-style-type: none"> • Direct BOP to transfer from the Low Flow Regulating Valve (LFRV) to the Main Feed Regulating Valve (MFRV) and then place on the MASTER FEEDWATER LEVEL CONTROLLER in AUTO IAW procedure 317, Feedwater System, section 6.3.15. 	
	BOP	<ul style="list-style-type: none"> • Transfers from the Low Flow Regulating Valve (LFRV) to the Main Feed Regulating Valve (MFRV) and places on the MASTER FEEDWATER LEVEL CONTROLLER in AUTO IAW procedure 317, Feedwater System, section 6.3.15. (attached). • Report the MFRV for FW Pump A is in service in AUTO. 	
Terminus:		Feedwater flow control has been transferred from the LFRV to the MFRV and placed on the MASTER FEEDWATER LEVEL CONTROLLER in AUTO.	

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u>		Scenario No.: <u>NRC 1</u>	Event No.: <u>3</u>
Event Description: <u>RPV High Pressure Instrument RE15A to Isolation Condenser Initiation Logic Fails High.</u>			
Initiation: Following the shift from the LFRV to the MVRV.			
Cue: Annunciator C1a, LOGIC TRAIN 1 ACTUATED			
Time	Position	Applicant's Actions or Behavior	
	BOP	<ul style="list-style-type: none"> • Responds to annunciator C1a, LOGIC TRAIN 1 ACTUATED • Reports no Isolation Condenser System initiation and no Recirculation Pumps tripped 	
	SRO	<ul style="list-style-type: none"> • Review Tech Specs Table 3.1.1, Section C.1 (attached) • Determines that there is one operable and one tripped Trip Systems and that no further TS actions are required • Notifies Work Week manager for investigation/repair • Updates the Crew 	
Terminus:	The SRO has applied TS Table 3.1.1, updated the Crew, and requested repair.		

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u>		Scenario No.: <u>NRC 1</u>	Event No.: <u>4</u>
Event Description: <u>Acoustic monitor for EMRV NR-108A fails.</u>			
Initiation: Following Crew update of failed DW Pressure Transmitter PT-53.			
Cue: Annunciator B4g, SV/EMRV NOT CLOSED, is in alarm.			
Time	Position	Applicant's Actions or Behavior	
	BOP	<ul style="list-style-type: none"> • Responds to annunciator B4g, SV/EMRV NOT CLOSED alarm (1F/2F) <ul style="list-style-type: none"> ○ Verifies RPV pressure, checks for Auto-Depressurization and checks Valve Open position indication (1F/2F) ○ Reports that EMRV NR-108A shows open by acoustic monitor but no other indications show that the valve is open ○ Defeats the alarm IAW procedure 413, section 4.3.6 (Panel 15R) <ul style="list-style-type: none"> ▪ Switches the HI-ALARM switch to DEFEAT ▪ Switches the LO-BIAS switch to DEFEAT ▪ Presses the associated Alarm Reset push-button 	
	SRO	<ul style="list-style-type: none"> • Directs BOP to defeat the acoustic monitor alarm • Directs EMRV tailpiece temperature monitoring once/shift • Notifies Work Week manager for repair • Reviews Tech Spec 3.13, Accident Monitoring Instrumentation (no actions required) 	
ROLE PLAY	If asked as the NLO, report that all EMRV Thermocouples on RB 23' indicate normal		
Terminus:	The acoustic monitor has been defeated for EMRV NR-108A.		

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u>			Scenario No.: <u>NRC 1</u>			Event No.: <u>5</u>		
Event Description: <u>In-Service CRD FCV (NC30A) fails closed. A control rod drift will occur when the CRD FCV is recovered.</u>								
Initiation: Following defeat of acoustic monitor for EMRV NR-108A								
Cue: COOLING WATER FLOW, CLG WTR/REACTOR Δ P, DRV WTR/REACTOR Δ P indicators show downscale; position indicator for NC30A indicates closed; (4F) CRD TEMP HI annunciator H5c (5F/6F)								
Time	Position	Applicant's Actions or Behavior						
	RO	<ul style="list-style-type: none"> • Responds to annunciator H5c, CRD TEMP HI (5F/6F) • Reports off-normal CRD indications • Reports CRD FCV NC30A indicates closed • Dispatches NLO to investigate (Role Play) • Places alternate CRD FCV in service IAW procedure 302.1, Control Rod Drive System, section 4.3.3. (Panel 4F) (attached) • Reports CRD parameters have returned to normal with CRD FCV NC30B in service. • Responds to annunciator H6a, ROD DRIFT • Reports control rod 10-06 drifting in • Selects control rod 10-06 and takes the ROD CONTROL switch to ROD IN until fully inserted (4F) 						
Sim. Operator / Role Play		<ul style="list-style-type: none"> • As the NLO directed to investigate the CRD FCV A, report to the Control Room: There is a leak in the air line to CRD FCV A, and that you have isolated it. (FCV fails closed on loss of air) • When requested to place CRD FCV B in service, insert LOA-CRD012 to "1" (open) for the FCV inlet valve and LOA-CRD011 to "1" (open) for the FCV outlet valve. No need to isolate the failed CRD FCV. When complete, ROLE PLAY as the NLO and report the CRD FCV B has been lined-up. After the RO places the CRD FLOW CONTROL VALVES switch to NC30B and when asked, report that the 4-way valve has been placed in the correct position. • After the above, INSERT the control rod drift (IN) for rod 10-07 (MAL-CRD006_1007). • When requested to isolate control rod 10-07, DELETE the drift malfunction, then report control rod 01-07 is isolated. 						
	BOP	<ul style="list-style-type: none"> • Verifies CRD temperatures at CRD Temperature recorders (Panel 8R) 						

NOTE:	The CRD Temperature recorders (8R) are NON-FUNCTIONAL in the simulator. If the BOP goes back to read these recorders, state that several control rods indicate greater than 250° F (this is the alarm setpoint).	
	SRO	<ul style="list-style-type: none"> • Directs RO to place the alternate CRD FCV in service IAW procedure 302.1, Control Rod Drive System (section 4.3.3). • Notifies Work Week manager for FCV air line repair. • Directs entry into ABN-6, Control Rod Drive System for the rod drift • Directs control rod 10-07 be isolated IAW 302.1 • Reviews TS 3.2.B.4. Verifies less than 6 inoperable control rods. (attached)
Role Play		
Terminus:	CRD FCV B (NC30B) is in service with all CRD parameters returned to normal. Control rod 10-07 is valved out at position 00, and The Tech. Specs. have been applied	

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u>		Scenario No.: <u>NRC 1</u>	Event No.: <u>6</u>
Event Description: <u>Intermediate Range Monitor (IRM) 11 fails low</u>			
Initiation: Control rod 10-07 has been isolated and Crew brief by the SRO			
Cue: Annunciator G4e, IRM DSCL, and H7a, ROD BLOCK			
Time	Position	Applicant's Actions or Behavior	
	RO	<ul style="list-style-type: none"> • Responds to annunciator G4e (3F), IRM DSCL and H7a, ROD BLOCK (5F/6F) <ul style="list-style-type: none"> ○ Reports IRM 11 is downscale and all other operable IRMs show normal indications • Bypasses IRM 11 IAW procedure 402.4, IRM Bypass Operation (4F) <ul style="list-style-type: none"> ○ Place IRM BYPASS joystick in the CH 11 position ○ Verify alarms clear ○ Verify IRM 11 HI-HI, HIGH, and DN SCL OR INOP lights illuminated ○ Reports IRM 11 bypassed 	
	BOP	<ul style="list-style-type: none"> • Checks IRM 11 drawer (3R) and reports IRM 11 is downscale and all other operable IRMs show normal indications • Verify IRM BYPASS light is illuminated on the SRM-IRM AUXILIARIES drawer (when bypassed) (3R) 	
	SRO	<ul style="list-style-type: none"> • Verifies Tech Spec 3.1.1, and directs IRM 11 bypassed • Notifies Work Week Manager for repair 	
Terminus:		IRM 11 is bypassed	

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u>		Scenario No.: <u>NRC 1</u>	Event No.: <u>7</u>
Event Description: <u>Electronic Pressure Regulator (EPR) fluctuations</u>			
Initiation: Following IRM 11 bypass			
Cue: Changes in reactor pressure and power (4F), Changes in EPR relay position indication (7F), Changes in Turbine Bypass valve positions (7F)			
Time	Position	Applicant's Actions or Behavior	
	RO	<ul style="list-style-type: none"> • Report change in reactor power and pressure 	
	BOP	<ul style="list-style-type: none"> • Reports change in EPR Relay position • Enters ABN-9, Electronic Pressure Regulator Malfunction <ul style="list-style-type: none"> ○ Transfers RPV pressure control to the Mechanical Pressure Regulator (MPR) IAW procedure 315.4, Transferring Pressure Regulators (7F) <ul style="list-style-type: none"> ▪ Lower the MPR setpoint by placing the MPR RELAY POSITION switch to the lower position (↑%) for approximately 1 second periods until the MPR indicator moves in the direction of and reaches the EPR setting ▪ When the MPR is in control, TURN OFF the EPR power switch ▪ Raise RPV pressure to normal, as directed by the SRO 	
	SRO	<ul style="list-style-type: none"> • Directs entry into ABN-9, Electronic Pressure Regulator Malfunction, to swap to the MPR • Directs raising RPV pressure back to normal with the MPR • Notifies Work Week Manager for repair 	
Terminus:	The MPR has been placed in control of RPV pressure.		

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u>		Scenario No.: <u>NRC 1</u>	Event No.: <u>8</u>
Event Description: <u>Failure of the MPR causing all Turbine Bypass Valves to go closed and electric ATWS</u>			
Initiation: After the MPR has been placed in control of RPV pressure			
Cue: Turbine Bypass Valves (TBV) indicate closed; RPV pressure rises.			
Time	Position	Applicant's Actions or Behavior	
	RO	<ul style="list-style-type: none"> • Reports RPV pressure and power rising • Manually scrams the reactor and carries out ABN-1, Reactor Scram <ul style="list-style-type: none"> ▪ Scrams the reactor ▪ Inserts SRMs • Reports control rods not inserted and reports reactor power • Initiates Alternate Rod Insertion (ARI) (4F) • Bypasses ROPS (Reactor Overfill Protection System) (4F) • Maintain RPV water level in the band 138" – 175" TAF IAW Support Procedure 19 (attached) • Insert control rods IAW Support Procedure 21 (CT) (attached) <ul style="list-style-type: none"> ○ Vent the Scram Air Header ○ Manual Control Rod Insertion (4F) ○ Directs NLO to close CRD Charging Water Valve V-15-52 • Reports all control rods inserted 	
Sim. Operator/	To vent the scram air header, insert LOA-CAS021 to "0" to close the scram air inlet valve and LOA-CAS024 to "1" to open the scram air vent valve.		
ROLE PLAY	To close the CRD charging header supply valve V-15-52, insert LOA-CRD024 to "0".		
	To close CRD Charging Water Valve V-15-52: LOA-CRD024 to "0" ROLE PLAY as required to report valve closed.		
	BOP	<ul style="list-style-type: none"> • May report TBV indicate closed • Confirms EOP automatic actions IAW Support Procedure 1 (attached) • Prevents ADS by placing ADS Timer switches in Bypass (1F/2F) • Bypass MSIV Low-Low water level isolation IAW Support Procedure 16 (attached) • Bypass RBCCW Drywell Isolation IAW Support Procedure 18 (attached) • Trips recirc. pumps, as directed (3F) 	

		<ul style="list-style-type: none"> • Controls RPV pressure 800-1000 psig with Support Procedure 11/12 <ul style="list-style-type: none"> ○ EMRVs: Cycle EMRV control switch to MAN/AUTO to open/close the valve (1F/2F) ○ Isolation Condensers: Cycle IC Condensate Return Valves (1F/2F)
	SRO	<ul style="list-style-type: none"> • May directs reactor scram and ABN-1, Reactor Scram, prior to reactor pressure scram setpoint (1045 psig) • Directs entry into RPV Control – With ATWS <ul style="list-style-type: none"> ○ Directs ARI initiation ○ Directs ROPS bypassed ○ Directs confirmation of automatic actions IAW Support Procedure 1 ○ Directs ADS Timer switches in Bypass ○ Directs bypass MSIV Low-Low water level isolation IAW Support Procedure 16 ○ Directs bypass of RBCCW isolation IAW Support Procedure 18 ○ Directs RPV water level band 138” – 175” TAF IAW Support Procedure 19 ○ Directs Crew to insert control rods IAW Support Procedure 21 ○ Directs 800 – 1000 psig RPV pressure with Isolation Condensers IAW Support Procedure 11 and EMRVs IAW Support Procedure 12 ○ Directs recirc. pumps tripped • Directs entry into RPV Control – No ATWS (following control rod insertions) <ul style="list-style-type: none"> ○ May direct ADS placed back to AUTO
Terminus:	All control rods have been inserted, and RPV water level and pressure are under control.	

Notes/Comments

Op-Test No.: <u>NRC 2006-1</u>		Scenario No.: <u>NRC 1</u>	Event No.: <u>9</u>
Event Description: Recirc Leak in the Primary Containment			
Initiation: When all control rods are fully inserted			
Cue: Annunciator C3f, DW PRESS HI/LO, H1d, H2d, DW PRESS HI-HI I & II, drywell temperature and pressure rising			
Time	Position	Applicant's Actions or Behavior	
	RO/BOP	<ul style="list-style-type: none"> • Respond to annunciator C3f, DW PRESS HI/LO (1F/2F) • Report Primary Containment Control EOP entry and RPV Control – No ATWS EOP at 3 psig DW pressure • Confirms EOP automatic actions IAW Support Procedure 1 (attached) • Lines-up Containment Spray IAW Support Procedure 29 (attached) • Initiates Drywell Spray IAW Support Procedure 29 (CT) (attached) • RPV water level control <ul style="list-style-type: none"> ○ Uses FW (IAW Support Procedure 2, Feed and Condensate System Operation), and Core Spray (Support Procedure 9, Lineup for Core Spray System Injection) to control RPV water level above TAF (attached) ○ Lowers RPV pressure to allow Core Spray injection 	
	SRO	<ul style="list-style-type: none"> • Directs entry into RPV Control – No ATWS <ul style="list-style-type: none"> ○ Directs using FW/Cond, Core Spray for RPV water level control IAW Support Procedure 2 and Support Procedure 9 ○ Directs lowering RPV pressure to allow low pressure injection systems • Direct entry into Primary Containment Control EOP <ul style="list-style-type: none"> ○ Direct isolations confirmed IAW Support Procedure 1 ○ Prior to 12 psig PC pressure, directs lineup of Drywell Sprays IAW Support Procedure 29 ○ When PC pressure exceeds 12 psig, direct initiation of Drywell Sprays IAW Support Procedure 29 	
Terminus:	Drywell sprays are in service controlling drywell pressure.		

Notes/Comments

Emergency Plan Classification: Failure of Reactor Protection System: MS4 - Site Area Emergency; Auto and Manual Scram NOT Successful

Malfunction List

Presets:

- Cleanup Pump B out-of-service: PTL control switch
- IRM 17 failed: MAL-NIS010H (and bypassed)
- EPR in service

Event 1: Raise reactor power with control rods

- None

Event 2: Transfer from LFRV to MFRV

- None

Event 3: Failure of RPV high pressure input to Isolation Condenser initiation

- ICH-NSS087A to 1200 psig

Event 4: Failure of EMRV NR-108A Acoustic Monitor

- MAL-NSS026A to 120% EMRV NR0108A acoustic monitor fails upscale

Event 5: In-service CRD flow control valve NC30A fails closed/Control rod 10-07 drifts IN

- MAL-CRD001A to "0" fails CRD FCV closed
- MAL-CRD006_1007

To place the alternate CRD FCV in service:

- LOA-CRD012 to "1" to open standby CRD FCV NC30B inlet valve
- LOA-CRD011 to "1" to open standby CRD FCV NC30B outlet valve
- Note: No need to isolate the failed FVC

Event 6: IRM 15 fails low

- MAL-NIS009E to "0"

Event 7: EPR fluctuations

- MAL-TCS010 to 980 psig over 15 second ramp
- MAL-TCS010 to 970 psig over 15 second ramp (one-two minutes after initial TCS010 malfunction)

Event 8: Failure of MPR causing increased reactor pressure and TBVs fail closed plus Electric ATWS

- MAL-TCS008 to 1084 psig (raises reactor pressure) (MAY NOT BE NECESSARY)
- MAL-TCS006A through TCS006I to "0" (individual malfunctions to close each TBV) BUT fail 1st and 2nd TBV (MAL-TCS006A and MAL-TCS006B over 12 minutes.
- Electric ATWS (CAED ATWS)

To vent the scram air header:

- LOA-CAS021 to 0 (close air inlet valve) AND LOA-CAS022 to 1 (open vent valve)

To close the CRD charging header supply valve V-15-52 to insert control rods during ATWS:

- LOA-CRD024 to 0

Event 9: Recirc LOCA inside primary containment

- MAL-NSS004A recirc suction break to 5% over 10 minutes

Set-Up Notes - IC-174

1. Have a marked-up copy of the startup procedure, 201 (2 copies: one for RO, one for SRO)
2. IRM-17 is bypassed
3. Cleanup Pump B is in PTL with a clearance tag on the panel control switch
4. The EPR is in control

References:

	Procedure #	Procedure Name	Revision
1	201	Plant Startup	39
2	317	Feedwater System	74
3	302.2	Control Rod Drive Manual Control System	28
4	302.1	Control Rod Drive System	92
5	RAP-H5c	CRD TEMP HI	0
6	RAP-H7a	Rod Block	2
7	402.4	IRM Bypass Operation	9
8	ABN-9	Electronic Pressure Regulator Malfunction	1
9	315.4	Transferring Pressure Regulators	2
10	EMG-3200-01B	RPV Control – With ATWS	14
11	EMG-3200-02	Primary Containment Control	17
12	401.3	Operation of the Nuclear Instrumentation SRM Channel during and After Shutdown	9
13	402.3	IRM Operation During Plant Shutdown	11
14	SP-1	Confirmation of Automatic Initiations and Isolations	17
15	SP-29	Initiation of the Containment Spray System for Drywell Sprays	17
16	RAP-B4g	SV/EMRV NOT CLOSED	0
17	SP-2	Feed and Condensate System Operation	12
18	SP-9	Lineup for Core Spray System Injection	12
19	EMG-32-01AA	RPV Control – No ATWS	12
20	413	Operation of the Safety Valve/EMRV Acoustic Monitoring System	17
21	SP-21	Alternate Insertion of Control Rods	14
22	Tech Specs		