
Scenario Outline						
Facilit	Facility: Oyster Creek Scenario No.: NRC 1 Op Test No.: NRC 2008-1					
Exami	ners:			Operators:	SRO-Steve Johnston	
				- '		
				-		
	1		•••• ••••••			
Initial	Conditions:					
• 100)% Power					
• RV	/CU Pump "B	" OOS	;			
• RV	VM is bypasse	ed and	00S			
<u>Turno</u>	<u>ver:</u>					
• Pe	rform 602.4.00	04, Ma	ain Stea	am Isolation Valve 10%	Closure Test.	
Event	Malf. No.	Ev	/ent		Event	
No.		Type*		De	scription	
1	N/A	N	SRO BOP	Performs 602.4.004, Ma Closure Test.	in Steam Isolation Valve 10%	
		те	800	MSIV NS04B sticks oper	n during Closure Test	
2	VLV-RP3004	004 13		TS 3.5.3.		
3	MAL-EDS003B	С	SRO	Respond to Loss of USS	1A2 480V bus.	
		TS	BOP	TS 3.7.B, ABN-45 "Loss	of USS 1A2"	
4	MAL-NIS021F	 	SRO	APRM 6 Inop. Failure ca	uses ½ scram	
			RO	RAP-G2f		
5	MAL- CRD005_22-15	С	SRO	Control Rod Drift Out	f	
			RO	ABIN-6 Control Rod Mail	Notor Dump 1.2	
6	MAL-SWS001B	С	SRO Respond to trip of Service Water Pump 1-2		e water Pump 1-2	
l. 			BOD	Main Condenser Vacuum	n Look	
7	MAL-CEW017	R	SRO	Power Reduction require	n Lean ad	
			RO	ABN-14 "Loss of Conder	nser Vacuum"	
			·····	RWCU Leak in the Reac	tor Building	
	MAL-RCU013 VLV-RCU001	113 01 MA 04		RWCU fails to isolate		
8			ALL	Secondary Containment Control EOP		
				Emergency Depressuriza	ation required	
9	MAL-CNS004A or B or C or D	С	SRO BOP	A Containment Spray pu	mp trips while in Torus Cooling	
*	(N)ormal, (R)ea	ctivity,	(I)nstru	ment, (C)omponent, (M)ajo	r Transient (TS) Tech Spec	

(

NRC 1 Simulator Scenario Summary

Event	Event Summary
1	The plant is at rated power. The BOP will peform 602.4.004, Main Steam Isolation Valve 10% Closure Test, for two MSIVs.
2	MSIV NS04B will stick open during the closure test requiring a TS 3.5.3 entry (TS-SRO)
3	The crew will respond to loss of the USS 1A2 480V Bus. Actions include starting RBCCW 1-2, CRD pump B and swapping RPS power supplies. The SRO will address TS 3.7.B. (TS-SRO)
4	The ATC will respond to an INOP failure of an APRM. The APRM must be bypassed and the ½ scram reset. TS will be reviewed by the SRO (no LCO required).
5	The ATC/BOP respond to indications of a single control rod drifting out. ABN-6, Control Rod Malfunctions, Section 5.0, will be entered. The ATC will insert the control rod, which indicates still drifting out. The BOP will scram the individual control rod from a back panel. The control rod will be isolated and the SRO will declare the control rod inoperable, and will verify < 6 inoperable control rods IAW TS 3.2.B.4.
6	The BOP will respond to a trip of running service water pump 1-2. Actions will be taken IAW RAP-K1f and ABN-18 "Service Water Failure Response" to start the standby pump.
7	The crew will diagnose and respond to a loss of Main Condenser Vacuum IAW ABN-14 "Loss of Condenser Vacuum". The SRO will direct a power reduction to maintain vacuum. The RO will reduce reactor power with recirc flow and condenser vacuum will stabilize.
8	The Crew will respond to an unisolable Reactor Water Cleanup System leak in the Reactor Building. Before any area temperature reaches MAX SAFE, the SRO will direct a manual scram, which will be successful. When two areas exceed the MAX SAFE temperature values, the SRO will direct emergency depressurization. (MAJOR TRANSIENT)
9	Following entry into in Primary Containment Control EOP due to high torus temperature from EMRC operation, a Containment Spray pump will fail to start while being placed in Torus Cooling, requiring the start of an alternate pump.

 $\hat{v}_{\hat{\mathbf{x}}_i}$

Critical Task #1	Scram before any area temperature reaches MAX SAFE.
Critical Task #2	ED when \geq 2 area temperatures exceed MAX SAFE. (PRA)

Op-Test No.: NRC 2008-1 Scenario No.: NRC 1 Events No.: 1 & 2

Event Description:

1. Perform 602.4.004, Main Steam Isolation Valve 10% Closure Test.

2. MSIV NS04B Fails to close during surveillance test.

Initiation: As directed by the Lead Examiner.

Cues: Position indication for MSIV NS04B do not change.

Time	Position	Applicant's Actions or Behavior
<u></u>		
	SRO	 Directs performance of surveillance 602.4.004. beginning at step 6.3.4
		 Declares MSIV NS04B inoperable when valve V-1-10 fails to close
		Reviews/applies Tech Specs 3.5.3.a.
		 LCO- Restore within 4 hours to operable status or isolate the steam line within 4 hours
		 Notifies Work Week Manager/Shift Manager (WWM/SM) for investigation/repair
		Updates the Crew
	BOP	• Performs surveillance 602.4.004, starting at step 6.3.4
		Test of NS03B
		 Simultaneously perform the following two steps:
		 Depress and hold TEST button for Valve V-1-0008 NS03B (Panel 11F).
		Start the stopwatch.
		• Observe the Red open indicating light Extinguishes for NS03B.
		• When half scram signal is received, then simultaneously perform the following two steps:
		Release the TEST button.
		Stop the stopwatch.
		Record stroke time
		 Verify relays 2K17 and 2K18 (Panel 7R) de-energized and all contacts opened.
		Verify Plant Process Computer PID: SOE47_tripped_MSIV

		CLOSURE SCRAM (2K17).
		 Verify Plant Process Computer, PID: SOE48, tripped; MSIV CLOSURE SCRAM (2K18).
		• Verify that the MSIV returns to the fully open position by the red open light illuminating.
		Verify SCRAM SOLENOIDS lights (Panel 7R) extinguished.
		• Verify SCRAM CONTACTOR OPEN alarm (G-1 -c) is received.
		Verify MSIV CLOSED II alarm (J-2-a) annunciated.
		• Verify MN STM VLVS OFF NORMAL alarm (J-8-b) annunciated.
		• Verify relays 2K5I A and 2K52A (Panel 7R) are de-energized.
		Reset the half scram.
		Confirm Plant Process Computer PIDs returned to normal state.
		Confirm Alarms returned to normal state.
		Verify all SCRAM SOLENOID lights lit (4FI7R).
		• Verify SCRAM CONTACTOR OPEN alarm (G-1 -c) clear.
		 Verify MSIV CLOSED II alarm (J-2-a) clear.
		• Verify MN STM VLVS OFF NORMAL alarm (J-8-b) clear.
		• Verify relays 2K17 and 2K18 (Panel 7R) energized.
		• Verify relays 2K51A and 2K52A (Panel 7R) energized.
		 Verify Plant Process Computer PIDs SOE47 and SOE48 are normal.
		Test of V-1-10 NS04B
		 Simultaneously perform the following two steps:
		 Depress and hold TEST button for Valve
		V-1-01 NS04B (Panel 1 1 F).
		Start the stopwatch.
		• Observe the Red open indicating light extinguishes for NS04B.
		Observes the valve failed to close
		Reports failure of valve to SRO
	ATC	Acts as peer checker during the surveillance
Terminus:	MSIV N	S04B is declared inoperable and TS have been applied.

Notes/Comments

Op-Test No.: <u>NRC 2008-1</u> Sce

Scenario No.: NRC 1

Event No.: 3

Event Description: Loss of 480V Bus USS 1A2 [TRIGGER 1]

Initiation: As directed by Lead Examiner

Cues: Annunciators U3a, 1A2 MN BRKR TRIP; S7f, FDR TO 460V 1A2 TRIP; ½ Scram

600	
SRU	 Directs entry into ABN-45, Loss of USS 1A2
	Reviews Tech Specs
	 3.7.B (AC Electrical Power)
	 The reactor shall be placed in cold shutdown in 30 hours
	o 3.7.D.3 (Batteries)
	 Restore the inoperable battery to operable within 2 hours, The reactor shall be placed in cold shutdown in 30 hours
	 3.8.D (Isolation Condensers)
	The reactor shall be placed in cold shutdown in 30 hours
	o 3.5.A.3 (Containment)
	 For RBCCW valve V-5-167
	 Restore or isolate within 4 hours or shutdown in the next 24 hours
	o 3.4.D (CRD)
	 7 day LCO, Check operating pump every 8 hours
	 Notifies WWM/SM for repair/investigation of USS 1A2
	 Makes notifications for TS required shutdown
BOP	 Responds to Annunciators U3a, 1A2 MN BRKR TRIP; S7f, FDR TO 460V 1A2 TRIP
	Reports loss of USS 1A2
	Performs ABN-45
	 Starts RBCCW Pump 1-2 running by placing its control switch to START
	 Starts CRD Pump B running by placing its control switch to START
	 Confirms DW Cooling Recirculation Fans 1-4, and 1-5 running
	 Secures Reactor Building Ventilation
	BOP

	 Confirms V-28-42 and V-28-43 CLOSED, RB Ventilation Isolation Inlet to Drywell 	
	 Confirms RB Ventilation Supply Fan SF-1-14 tripped 	
	 Confirm RB Exhaust Fan EF-1-6 tripped 	
	 Position EXH VALVES TO MAIN EXHAUST switch to CLOSE 	
	 Verify Reactor Building Exhaust Main Isolation Damper, V 28-21 closed 	-
	 Verify Reactor Building Exhaust Main Isolation Damper, V 28-22 closed 	-
	 Verify RB Ventilation Supply isolation Valves 	
	 V-28-1 and V-28-2 	
	 V-28-3 and V-28-4 	
	o V-28-5 and V-28-6	
	 V-28-7 and V-28-8 	
	 V-28-9 and V-28-10 	
	o V-28-11 and V-28-12	
	o V-28-13 and V-28-14	
	 V-28-15 and V-28-16 	
	 V-28-38 and V-28-39 	
	 Starts Standby Gas Treatment System 2 	
	 Places STANDBY GAS SELECT switch in SYS 2 position 	
	 Starts EF 1-9 by placing SGTS System Exhaust Fan contr switch to HAND position 	ol
	 Verifies: 	
	○ EF 1-9 starts	
	o V-28-27 opens	
	o V-28-28 opens	
	o V-28-30 opens	
	 After flow is established, verifies: 	
	o V-28-28 closes	
	o V-28-24 opens	
	 Places SGTS Cross-Tie Valve, V-28-48 switch to CLOSE 	
	• Re-energizes Protection System Panel 1 [ROLE PLAY]	
	 Directs the EO to perform the following: 	
	 Confirm disconnect switch SW-733-169 is off and Kirk Key removed 	
	 Confirm Kirk Key inserted and disconnect switch SW- 733-170 is on 	

 r_{in}

		 Confirm EPA breaker 5 and 6 closed 	
		 Verifies TRANSFORMER OUTPUT green OFF light is lit 	
		above RPS1 POWER SELECT switch (Panel 6R)	
		 Places RPS1 POWER SELECT switch to TRANS position 	
		 Verifies TRANSFORMER OUTPUT red ON light is lit above RPS1 POWER SELECT switch 	
		 Resets ½ scram by pressing SCRAM SYSTEM RESET pushbutton 	
4		 Resets main steam isolation by pressing MAIN STEAM ISOLATION RESET pushbutton 	
		 APRM lights 	
		APRM flow converters	
		 Main Steam Line Radiation Monitors 	
		 Verifies FCTR card status is green and curve selected to 0 Verifies annunciator 9XE3a is clear 	
		 Verifies auto restart of DCC-Y computer (NOT modeled) 	
		 Confirms VLDP-1 transferred to VMCC 1B2 by verifying annunciator 9XF1c is received 	
		 Informs the SRO of Tech Specs 3.7 for inoperable valves V-14-33 and V-14-35 (Isolation Cooling B steam inlet and condensate return) 	
		 Informs SRO to declare C Battery inoperable 	
		 Monitors DC Bus C voltage 	
	ATC	 Starts CRD Pump B running by placing its control switch to START 	
		Directs EO to investigate USS 1A2 and its feeder breaker	
		 Makes announcement of loss of bus, ½ scram 	
ROLE	To re-er	nergizes Protection System Panel 1 from USS 1B2:	
PLAY	• to op	en disconnect switch SW-733-169, insert LOA-EDS133 to OPEN	
	• to clo	ose disconnect switch SW-733-170, insert LOA-EDS133 to 1B2	
	• to clo	ose EPA 5 and 6 breakers, insert LOA-RPS007 to CLOSE	
	When performed, notify the control room: Transformer PS-1 is lined-up to the Bus USS 1B2.		
	 If the him a elect 	SRO orders a reactor shutdown started with the loss of USS 1A2, call as the SM and tell him to leave the plant at its present power to give prical maintenance a chance to correct the problem.	

Terminus:	ABN-45 has been performed and the SRO has addresses Technical
	Specifications.

Notes/Comments

Op-Test N Descriptior	Op-Test No.: NRC 2008-1Scenario No.: NRC 1Event No.: 4Description: APRM 6 INOP [TRIGGER 2]				
Initiation:	As directed	by Lead examiner			
Cue: Ann	unciators G2	2f, APRM HI-HI/INOP; G2d: CHANNEL II			
Time	Position	Applicant's Actions or Behavior			
	ATC	 Responds to annunciator G2f, APRM HI-HI/INOP; G2d, Channel II 			
		 Reports ½ scram RPS System 2 			
		 Reports APRM 6 is upscale and other APRMs indicate normally 			
		 Bypasses APRM 6 by placing APRM BYPASS in CH 6 position (Panel 4F) 			
		 Resets ½ scram by depressing SCRAM SYSTEM RESET pushbutton (Panel 4F) 			
		 Reports APRM bypassed and ½ scram reset 			
	BOP	 Makes a plant announcement for the ½ scram 			
		 Checks APRM 6 on back panel and reports upscale indication (Panel 5F) 			
	SRO	 Directs bypassing APRM 6 IAW procedure 403 and resetting ½ scram 			
		 May request Attachment 403-2 updated. 			
		 May review TS 3.1 (no action required) 			
	 	Notifies WWM/SM for APRM 6 repair			
ROLE PLAY	When requ 3, and 4 a	uested, provide the SRO with the completed Attachments 403-2, nd the blank 403-2.			
Terminus	APRM 6 is	bypassed and ½ scram reset.			

 \mathbf{v}_{cl}

Notes/Comments

Op-Test N Descriptior	No.: <u>NRC 20</u> n: <u>Control Rc</u>	08-1Scenario No.: NRC 1Event No.: 5od 22-15 Drifts Outward [TRIGGER 3]
Initiation:	As directed	by Lead Examiner
Cue: Ann	unciator H6a	a, ROD DRIFT
Time	Position	Applicant's Actions or Behavior
	ATC	 Reports 1 control rod drifting outward (22-15) Refers to annunciator response H6a Refers to ABN-6 "Control Rod malfunctions Confirms Rod Power Switch is ON Selects 22-15 Applies an insert signal to 22-15 to position rod back to "12", then releases switch Recognizes outward motion continues and reports to SRO Applies continuous insert signal After BOP action to scram rod, removes insert signal Recognizes rod remains at "00" and directs EO to isolate the HCU Turns Rod Power OFF Notifies Chemistry (to sample) and Reactor Engineering Monitors for fuel failures Informs SRO to consult TS 3.2.
		 Scrams CR 22-15 IAW procedure 302.2 Control Rod Drive Manual Control System" [BOOTH]
	SRO	 Directs entry to ABN-6 Refers to TS 3.2.B.4, declares Control Rod 22-15 inoperable; verifies <6 inoperable control rods Notifies WWM/SM about the control rod drift
BOOTH	When the malfunctio	control rod indicates a scram condition DELETE the rod drift n.

Sec.

	and the second	
Terminus:	Control Roo	22-15 is at "00" and scrammed; TS have been addressed.

Notes/Comments

* :-

	······		
 0			

Op-Test No.: <u>NRC 2008-1</u>

Scenario No.: NRC 1

Even Description: <u>Service Water Pump 1-2 Trip</u> [TRIGGER 4]

Initiation: As directed by Lead Examiner

Cue: Annunciator K1f, SVC WATER PUMP TRIP; Breaker open indication for Service Water Pump 1-2; Service Water pressure indication downscale

Time	Position	Applicant's Actions or Behavior	
	BOP	 Responds to annunciator K1f May suggest entry into ABN-19, RBCCW Failure Response Reports Service Water Pump 1-2 has tripped Performs ABN-18, Service Water Failure Response Starts Service Water Pump 1-1 by placing SERVICE WATER PUMP 1-1 switch to START Reports service water flow re-established Dispatches EO to check SW pump 1-1 and 1-2 	
	SRO	 May refer to ABN-18, Service Water Failure Response Notifies WWM/SM about SW Pump 1-2 Trip 	
ROLE PLAY	Report ba start on Se	ck as EO, SW pump 1-2 motor is hot to the touch. Report a good ervice Water Pump 1-1.	
Terminus	Service wa	ter pump 1-1 has been started	

Notes/Comments

Op-Test N	No.: <u>NRC 20</u>	08-1 Scenario No.: <u>NRC 1</u> Event No.: <u>7</u>
Even Des [TRIGGE	cription: <u>Mai</u> R 5]	n Condenser Vacuum Leak; Power Reduction required
Initiation:	As directed I	by the Lead Examiner
Cues: Ani	nunciator: Q	3c "Cond Vac Lo 25 inches", Generator MWe decreases
Time	Position	Applicant's Actions or Behavior
	BOP	 Recognize condition by observing indications or reporting alarms Responds to RAP Q3c: COND VAC LO 25 INCHES Responds to ABN-14 "Loss of Condenser Vacuum" Monitors vacuum Confirms Circ Water pumps operating Confirms SJAEs operating Confirms Gland seal system operating Confirm vacuum breaker V-2-44 is closed
	SRO	 Directs entry into ABN-14, Loss of Condenser Vacuum. Directs a power reduction as necessary to maintain vacuum greater than 22 inches Makes notifications for power reduction.
		• Performs a Rapid Power Reduction as directed in ABN-14 by reducing Recirc Flow to not lower than 8.5 X 10 ⁴ gpm
BOOTH	Set Conde	nser Leakage to "0" when power reduction begins.
Terminus:	Rapid Pow	er Reduction Complete, Condenser Vacuum Stable.

No. .

ъ., .

Notes/Comments

Op-Test No.: NRC 2008-1Scenario No.: NRC 1Event No.: 8Event Description: Unisolable leak in the Reactor Water Cleanup System leading to a
manual scram and Emergency Depressurization (or anticipated ED and rapidly
depressurizes the RPV), [TRIGGER 6]

Initiation: As directed by Lead Examiner

Cues: Annunciators L6c, RB ΔP LO; 10F3k, CU SYS AREA HI; 10F1k, AREA MON HI; D8d, CU ROOM TEMP HI; D1d/D2d: RWCU HELB I and II

Time	Position	Applicant's Actions or Behavior	
	SRO	 Directs entry into Secondary Containment Control EOP on RB ΔP low 	
		 Directs BOP to Perform SP-50 to start RB HVAC System 	
		 Directs RO to monitor RB area temperatures and radiation levels 	
		 Directs re-entry into Secondary Containment Control EOP Directs RWCU isolation 	
		 Directs WWM/SM/NLOs notified to close the RWCU valves 	
		 Before any area temperature reaches MAX SAFE, directs manual scram and entry into RPV Control – No ATWS EOP and ABN-1, Reactor Scram (CRITICAL TASK) 	
		 Following the scram, directs RPV water level 138" – 175" using Support Procedure 2 (Feedwater) and/or Support Procedure 3 (CRD) 	
		 Directs performance of Support Procedure 1, Confirmation of Automatic Initiations and Isolations 	
		 May direct RPV pressure band 500 – 600 psig with turbine bypass valves to reduce leak driving head 	
		 When 1 area temperature is above MAX SAFE, may declare Emergency Depressurization is anticipated 	
		 Directs ROPS bypassed 	
		 Directs turbine bypass valves opened and/or directs Isolation Condensers placed into service (IAW SP-11) 	
		 Directs the Reactor Building evacuated 	
		 When second area temperature is reported above MAX SAFE, directs entry into Emergency Depressurization – No ATWS EOP (CRITICAL TASK) 	

	 Directs ROPS bypassed
	 Verifies torus water level > 90"
	 Directs all EMRVs open
	 Recogizes < 5 EMRVs are open
	 IF < 5 EMRVs are OPEN, and RPV pressure is 50 psig > Torus pressure, directs other RPV depressurization methods (if not already in service):
	 Isolation Condensers IAW SP-11
	 Turbine Bypass Valves
	 RWCU in Recirc Mode IAW SP-13
	 RWCU in Letdown Mode IAW SP-14
	 Isolation Condenser Vents IAW SP-52
	 Shutdown Cooling
BOP	 Responds to annunciator L6c, RB ΔP LO
	\circ Reports RB HVAC is shutdown and RB Δ P is >0 "
	 Performs SP-50, Reactor Building Ventilation Restart
	 Verifies REACTOR BUILIDNG VENT MANIFOLD NO. 1 and 2 are < 9 mrem/hr (Panel 2R)
	 In rear of Panel 11R:
	 Removes EOP BYPAS PLUG from BP4
	 Inserts EOP BYPAS PLUG into BP1
	 Opens EXH VALVES TO MAIN EXHAUST V-28-21 and B- 28-22 by placing its control switch to OPEN (Panel 11R)
	 Resets RB Ventilation System by depressing RX BLDG VENT ISOLATION pushbutton
	 Starts REACTOR BUILDING EXHAUST FAN 1-5 by placing its control switch to START
	 Confirms MAIN SUPPLY HEADER VALVES TO DW V- 28042 and V-28-43 are closed
	 Starts SUPPLY FANs 1-12 and 1-14 by placing their control switches to ON
	Responds to Area Radiation Monitors alarms
	 Reports RWCU area radiation rising
	 Announces area of rising radiation over the PA System, if directed
	 Monitors RWCU area temperatures (Panel 10R)
	 Reports RWCU area temperatures rising
	Responds to high area temperature alarms

 $\gamma_{n_1+\dots}$

and the second second second second second

	 Verifies RWCU isolation
	 Reports RWCU did not automatically isolate
	• Attempts to close V 16.1 and V 16.14 by placing their
	control switches to CLOSE (Panel 11F and Panel 3F)
	 Reports RWCU cannot be manually isolated
	 Monitor RB area temperatures and radiation levels as directed (Panel 10R)
	 Reports when 1 area temperature is above MAX NORMAL and continues to monitor
	 Reports when 1 area temperature is above MAX SAFE and continues to monitor
	 Reports when 2 areas temperature are above MAX SAFE
	 Performs SP-1, Confirmation of Automatic Initiations and Isolations
	 Lowers RPV pressure 500 – 600 psig with turbine bypass valves (TBV) as directed by placing the BYPASS VALVE OPENING JACK switch to RAISE and monitors RPV pressure; Places switch in LOWER when the pressure band is reached to close the TBV. (Panel 7F)
	IF directed to anticipate Emergency Depressurization
	 Opens turbine bypass valves by placing BYPASS VALVE OPENING JACK to RAISE (Panel 7F)
	 Reports turbine bypass valves will not open
	 Performs SP-11, Alternate Pressure Control systems Isolation Condensers, if directed
	 Initiates IC system A (B)
	 Confirms Recirculation Pump A (E) tripped
	 Verifies RPV water level < 160"
	 Opens DC Condensate Return Valve V-14-34 (V-14- 35)
	 Reports Isolation Condenser in service
	 Reports second area temperature above MAX SAFE (if it occurs)
	 Performs Emergency Depressurization, if directed (Panel 1F/2F)
	 Opens EMRVs by placing AUTO DEPRESS VALVE switches to MAN
	 Reports 4 EMRVs open
	 Performs other RPV depressurization methods as directed

	ATC	Performs actions IAW ABN-1, reactor Scram (Panel 4F)
		 Press MANUAL SCRAM BUS 1 and BUS 2
		 Places REACTOR MODE SELECTOR switch in SHUTDOWN [BOOTH]
		 When RPV water level begins to rise, trips 2 feedwater pumps by placing their control switches to STOP
		 Places all MFRV FLOW CONTROLLERS in MAN and closes
		 Verifies all control rods to/beyond position 04 and power is lowering
		 Controls RPV water level 138" – 175" with SP-2 and SP-3 as directed
		○ Inserts SRMs and IRMs
		o Verifies:
		 Main turbine tripped
		 Breakers GD1 and GC1 are open
		 Main generator field breaker is open
		 Breakers 1A and 1B are open
		 Breakers S1A and S1B are closed
		• Places ROPS switch in BYPAS, when directed (Panel 4F)
ROLE PLAY	If asked to is coming o	investigate RWCU alarms, WAIT 2 minutes, then report that steam out of the Cleanup Room on elevation 51'.
воотн		
	SRO	 Directs entry into Secondary Containment Control EOP on RB ΔP low
		 Directs BOP to Perform SP-50 to start RB HVAC System
		 Directs RO to monitor RB area temperatures and radiation levels
		 Directs re-entry into Secondary Containment Control EOP Directs RWCU isolation
		 Directs WWM/SM/NLOs notified to close the RWCU valves
		 Before any area temperature reaches MAX SAFE, directs manual scram and entry into RPV Control – No ATWS and ABN-1, Reactor Scram (CRITICAL TASK)

×44.

		 Following the scram, directs RPV water level 138" – 175" using Support Procedure 2 (Feedwater) and/or Support Procedure 3 (CRD)
		 Directs performance of Support Procedure 1, Confirmation of Automatic Initiations and Isolations
		 May direct RPV pressure band 500 – 600 psig with turbine bypass valves to reduce leak driving head
		 When 1 area temperature is above MAX SAFE, may declare Emergency Depressurization is anticipated
		 Directs ROPS bypassed
		 Directs turbine bypass valves opened and/or directs Isolation Condensers placed into service (IAW SP-11)
		 Directs the Reactor Building evacuated
		 When second area temperature is reported above MAX SAFE, directs entry into Emergency Depressurization – No ATWS EOP (CRITICAL TASK)
		 Directs ROPS bypassed
		 Verifies torus water level > 90"
		 Directs all EMRVs open
Terminus	The RPV hat temperature control.	as been emergency depressurized (due to the second area e exceeding the MAX SAFE value) and RPV water level is under

Notes/Comments

8. 1

		······································
	· · · · · · · · · · · · · · · · · · ·	
 	······	

Op-Test No.: NRC 2008-1Scenario No.: NRC 1Event No.: 9Event Description: Trip of Containment Spray Pump while in Torus Cooling

Initiation: As directed by the Lead Examiner.

Cues: Selected Containment Spray Pump does not indicate normal running indications.

Time	Position	Applicant's Actions or Behavior
	SRO	 Enters Primary Containment Control EOP when Torus Temperature reaches 95 degrees F.
- - -		Directs initiation of Torus Cooling IAW Support Procedure 25
	BOP	Reports Torus water temperature 95 °F
		 Places Torus cooling in service as follows IAW SP-25: [BOOTH] CONFIRMS the SYSTEM MODE SELECT SWITCH for the selected system is in the TORUS COOLING position
		 Starts the selected ESW pump
		 Places and Holds the System Pump Start Permissive Keylock for the selected pump in the appropriate position
		 Starts the selected Containment Spray pump.
		 Recognizes trip of Containment Spray pump
		Informs SRO of pump trip.
		Places alternate Containment Spray pump in service.
воотн	After the containm	first pump start is attempted, DELETE the trips on the other nent spray pumps.
Terminus:	Torus Co	oling in service with alternate Containment Spray Pump
	SCENAR AND TOF	IO MAY BE TERMINATED AFTER THE ED IS ACCOMPLISHED RUS COOLING IS IN SERVICE WITH THE ALTERNATE PUMP.
E-PLAN	FS1: SAE LOSS of	E due to LOSS of primary containment barrier AND POTENTIAL reactor coolant system barrier.

)1 to MECH SEIZE (V-16-1)
04 to MECH SEIZE (V-16-14) os the RWCU isolation valves open 13 0-20% over 15 minutes rts a unisolable RWCU leak into the Building
04A (Containment Spray Pump 04B (Containment Spray Pump 04C (Containment Spray Pump 04D (Containment Spray Pump the containment spray pumps the first containment spray pump ttempted and tripped, DELETE the mp trip malfunctions

Shift Turnover

Initial Conditions

- The plant is at rated power
- The RWM is inoperable and bypassed
- RWCU Pump B is tagged out of service for repair

Shift Activities

- Surveillance test 602.4.004, Main Steam Isolation Valve 10% Closure Test, has been initiated and has been completed up to step 6.3.3 (normal surveillance)
 - o Continue with the surveillance test, starting at step 6.3.4
 - Other Operators are appropriately stationed to support this surveillance

				Scenario	Outline	
Facilit	y: Oyster Cre	ek	Scena	rio No.:	NRC 2	Op Test No.: <u>NRC 2008-1</u>
Exami	ners:			0	perators:	SRO- Steve Johnston
<u>Initial</u> • 909 • RW • Iso	Initial Conditions: • 90% Power • RWM is bypassed and OOS • Isophase Bus Fan "A" is OOS					
• Ma <u>Turno</u> • Res aut • Inc	 Main Generator voltage control is in manual <u>Turnover:</u> Restore the amplidyne to service and transfer main generator voltage control to automatic IAW 336.1 "24KV Main Gen Electrical System" Increase reactor power to rated IAW the ReMA 					
Event Malf. No. Event No. Type*		Event Description				
1	N/A	N	SRO ATC	Restore t generator "24KV Ma	he amplidyne r voltage contr ain Gen Electr	to service and transfer main ol to automatic IAW 336.1 ical System"
2	N/A	R	SRO BOP	Increase	reactor power	with control rods
3	MAL- CRD008_34-11	С	SRO ATC	Uncouple ABN-6 "C	ed Control Roc Control Rod Ma	alfunction"
4	SWI-ADS001C	C TS	SRO BOP	EMRV "A ABN-40 "	" Inadvertently Stuck Open E	y Opens MRV"; TS 3.4.B
5	ANN-E6D ANN-E2D VLV-NSS006	C TS	SRO BOP	Respond Discharge ABN-2 "R	to Reactor Re e Valve fails to Recirculation S	ecirc Pump "A" Alarms, Pump o close system Failures" TS 3.3.F.
6	MAL-CRD005 MAL-RPS006 SWI-RPS006	С	SRO ATC	Multiple of fails, ARI ABN-6 "C	control rod drift required Control Rod Ma	ts, Manual scram required and alfunction"
7	MAL-NSS017B MAL-PCN001N	М	ALL	Steam lea Vacuum l	ak in Primary Breaker fails c	Containment, DW/Torus open
8	MAL-RPS007C VLV-CNS008 PMP-CNS008A	С	SRO BOP	Failure of System fa	RWCU to Au ailures	to isolate, Containment Spray

NRC 2 Simulator Scenario Summary

<u>Event</u>	Event Summary
1	The BOP will place the main generator voltage control in automatic voltage control IAW 336.1, 24KV Main Generator Electrical System. (NORMAL EVOLUTION)
2	The ATC will increase reactor power with control rods per the ReMA. (REACTIVITY MANIPULATION)
3	The ATC will respond to an uncoupled control rod IAW ABN-6 "Control Rod Malfunction". (COMPONENT MALFUNCTION)
4	The "A" EMRV will spuriously open and the Crew will enter ABN-40, Stuck Open EMRV. The EMRV will close when the BOP places the back-panel keylock switch in DISABLE. The SRO will review and apply TS 3.4.B.2. If Torus water temperature exceeds 95 °F, the SRO will direct entry into the Primary Containment Control EOP and directs initiation of Torus Cooling. (COMPONENT MALFUNCTION) (TS)
5	The operators will respond to alarms for Recirculation Pump A. Alarms for low oil and high vibrations (RAP-E2d, RAP-E6d) will require an immediate pump trip by the BOP. The recirculation pump discharge valve will fail to close. The SRO will enter ABN-2 "Recirc System Failures and apply TS 3.3.F, Recirc Loop Operability. (COMPONENT MALFUNCTION) (TS)
6	Multiple control rod drifts will occur requiring the RO to scram the reactor. The mode switch and RPS pushbuttons will fail but ARI will be successful. (COMPONENT MALFUNCTION)
7	A steam leak will occur in primary containment resulting in an entry to Primary Containment Control EOP and RPV Control no ATWS EOP. Additionally, one DW/Torus Vacuum Breaker will fail open, resulting in the pressurization of the Torus air space. Emergency Depressurization will be required when it has been determined that Torus pressure cannot be maintained below the PSP. (MAJOR)
8	When attempting to spray the drywell, System 1 Containment Spray Discharge valve will fail closed and one System 2 Containment Spray Pump will have a sheared shaft requiring use of an alternate pump. Additionally, RWCU will fail to isolate on high DW pressure but can be manually isolated. (INSTRUMENT MALFUNCTION after EOP)
Critical Task #1	With the failure of the scram pushbuttons and the reactor mode switch, ARI is initiated to insert control rods.

Critical Task #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 limit
	performing a rapid RPV depressurization before the limits are exceeded. (PRA)

 $\gamma_{0,\mu_{1},\mu_{2},\mu_{2}}$

Op-Test No.: NRC 2008-1

Scenario No.: NRC 2

Event No.: 1

Event Description: <u>Shift from manual generator voltage control to automatic generator voltage</u> control IAW procedure 336.1, 24 KV Main Generator Electrical System, Section 6.0

Initiation: Following shift turnover

Cues: As directed by the SRO

Time	Position	Applicant's Actions or Behavior
	SRO	 Directs 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)
		Makes plant announcement prior to starting the amplidyne.
		 NOTIFY PECO Generation Dispatcher that the Main Generator to be place in Automatic Voltage Control.
		 NOTIFY the Power Team that the Main Generator is to be placed in Automatic Voltage Control.
		 Simultaneously PLACE the AMPLIDYNE CONTROL 43CS switch in TEST and OBSERVE 1A1 bus ammeter for an amp deflection.
		 CONFIRM amplidyne motor started as indicated by the amp deflection on 1A1 bus.
		Locally VERIFY the AMPLIDYNE motor is running. [ROLE PLAY]
		 ZERO the AMPLIDYNE Voltmeter as follows:
		 PRESS and HOLD the AMPLIDYNE VOLTS Low Range pushbutton.
		 OBSERVE the AMPLIDYNE Voltmeter for a zero or center scale reading.
		 IF the needle is deflected, THEN ADJUST the voltage using the AMPLIDYNE ADJUST rheostat to return the regulator output to a zero or center scale reading.
		 RELEASE the AMPLIDYNE VOLTS Low Range pushbutton. VERIFY the AMPLIDYNE Voltmeter reads zero or center scale.
		 PLACE the AMPLIDYNE CONTROL 43CS switch to ON, which leaves the AMPLIDYNE controlling excitation.
		REMOVE VOLTAGE CONTROL IN MANUAL operator aids

	installed earlier.
	• CONTROL terminal voltage or excitation level of the generator by adjusting the AMPLIDYNE ADJUST rheostat as required in the range of 23.3 to 24.7 KV.
	 MAINTAIN a slight BUCK reading by adjusting EXCITER FIELD RHEOSTAT CONTROL 70M switch as needed, which ensures the Main Field will pick up control should the AMPLIDYNE trip.
	Reports the generator voltage control is in automatic.
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



N_{KA}

Ĩ						
agen a star i	Op-Test	: No.: <u>NRC</u>	2008-1	Scenario No.:	<u>NRC 2</u>	Event No.: <u>2 & 3</u>
	Event Description:					
1. Withdraws control rods for a power increase IAW the ReMA						
ĺ	(14-1	15, 14-39, 3	38-15, 38-39, 1	8-43, 18-11, 34-43	3, 34-11 from	position 40 to 48)
	2. <u>Unco</u>	oupled Con	trol Rod 34-11			
	Initiation: As directed by Lead Examiner					
	Cues: A	nnunciator	H5a, ROD OV	ERTRAVEL		
	Time	Position		Applica	nt's Actions or E	Behavior
1		SRO	Conducts	a pre-job reactivit	y maneuver b	prief.
			 Directs the approval s 	e ATC to withdraw sheet (ReMA).	control rods	IAW the reactivity maneuver
ľ			 Acts as th 	e Reactivity Mana	ger during the	e evolution.
			 Directs en becomes 	itry into ABN-6, Co uncoupled	ontrol Rod Ma	Ifunctions, when the control rod
			 Notifies th PLAY] 	e Reactor Engine	er about the ι	Incoupled control rod [ROLE
		BOP	Provides a pe	eer-check for withc	lrawing contro	ol rods and initials on the
			reactivity mar	neuver sheet after	each control	rod is withdrawn.
-						
		ATC	Withdraws co 302.2, Contro	ntrol rods IAW the I Rod Drive Manu	reactivity ma al Control Sys	aneuver sheet and Procedure stem. [PANEL 4F]
1			 Verifies th 	e PERMIT light is	illuminated.	
			 Places the 	e ROD POWER sv	vitch to ON.	
			 Selects the the CONT 	e control rod by de ROL ROD SELEC	epressing the T matrix.	corresponding pushbutton on
			 Verifies 	the pushbutton lig	ght is lit and n	o others are lit.
			Turns the simultaneo OVERRID	ROD CONTROL sously turns the NC	witch to ROE TCH OVERR	OOUT NOTCH position and NDE switch to NOTCH
			• Verifies:			
			o Amber	OVERRIDE light is	5 ON	

and the device of

-		
		 Green insert light is ON following switch movement and remains on for about 1 second
		 Rod position readout momentarily displays the next odd-numbered digit
		 Verifies the WITHDRAW light remains ON for the duration of the withdrawal and an increasing rod position is displayed and releases at position 48
		 Performs a coupling check at position 48
		 Turns the ROD CONTROL switch to ROD OUT NOTCH position and simultaneously turns the NOTCH OVERRIDE switch to NOTCH OVERRIDE
		 Verifies rod display indicates a continuous readout of 48 with red backlight
l		 Responds to annunciator H5a, ROD OVERTRAVEL
		 Reports control rod 34-11 is uncoupled and enters ABN-6, Control Rod Malfunctions
		 Applies a continuous insert signal by placing the ROD CONTROL switch to ROD IN until a response is observed on the nuclear instrumentation (APRMs, LPRMs) or is fully inserted. [BOOTH]
		 Withdraws the control rod and verifies coupling at position 48
		 Reports control rod 34-11 has re-coupled.
~~		 Notifies Reactor Engineering
		 Turns ROD POWER off when complete when control rod manipulations are complete
		Reports all control rods withdrawn IAW the reactivity maneuver approval form
-	NOTE	Control rod 34-11 will be uncoupled.
-		
	ROLE PLAY	As the Reactor Engineer for the uncoupled rod, acknowledge the report. IF the control rod is inserted to between 24-48 during re-coupling, direct that continuous withdrawal is allowed. Below this, single notch, until position 24.
	BOOTH	When the RO is inserting the uncoupled control rod, DELETE the uncoupled control rod malfunction.
ŀ		
	Terminus:	The uncoupled control rod has been re-coupled and all control rods have been withdrawn.

Notes/Comments

Op-Test No.: <u>NRC 2008-1</u>

Scenario No.: NRC 2

Event No.: 4

Event Description: <u>EMRV NR-108A opens spuriously</u> [TRIGGER 1]

Initiation: As directed by Lead Examiner

Cues: Annunciators B3g, EMRV OPEN; B4g, SV/EMRV NOT CLOSED; EMRV NR-108A indicates in the VALVE OPEN REGION (TRIGGER 1)

Time	Position	Applicant's Actions or Behavior	
	BOP	 Responds to annunciators B3g, EMRV OPEN and B4g, SV/EMRV NOT CLOSED 	
		 Identifies and reports EMRV NR108A is open 	
		 Performs actions IAW ABN-40, Stuck Open EMRV 	
		 Places the MASTER FEEDWATER CONTROLLER in MAN [Panel 4F] 	
		 Places EMRV NR108A AUTO DEPRESS VALVE switch in OFF [Panel 1F/2F] 	
		 Determines EMRV NOT closed 	
		 Cycles EMRV NR-108A AUTO DEPRESS VALVE switch from OFF to MAN to OFF 	
4 #		 Determines EMRV NOT closed 	
		 Cycles EMRV NR-108A AUTO DEPRESS VALVE switch from OFF to MAN to OFF 3-5 times 	
		 Determines EMRV NOT closed 	
		 Places the EMRV NR-108A NORMAL/DISABLE switch to DISABLE [rear of Panel 1F/2F] 	
		 Verifies/reports EMRV NR-108A indicates closed 	
		 Places the MASTER FEEDWATER CONTROLLER in AUTO [Panel 4F] 	
		 Selects the P Display on the MASTER FEEDWATER CONTROLLER 	
		 Selects the S Display on the MASTER FEEDWATER CONTROLLER 	
		 Raises/lowers the S to match P 	
		 Places the MASTER FEEDWATER CONTROLLER in AUTO by depressing the AUTO/MAN button 	
		 Verifies the green AUTO light is lit 	

1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -		ATC	Monitors Torus water temperature while EMRV is open
			 Announces EOP entry on high torus water temperature (if it exceeds 95 °F)
			 Performs SP-25, Initiation of the Containment Spray System in the Torus Cooling Mode, if directed (Panel 1F/2F)
			 Makes plant announcement prior to starting pumps
			 Confirms SYSTEM 1 MODE SELECT (SYSTEM 2) switch in TORUS CLG position
			 Starts the associated ESW PUMP by placing its control switch to START
			 Places and holds the SYSTEM 1 (2) PUMPS START PERMISSIVE to the selected pump
			 Starts the selected CONTAINMENT SPRAY PUMP by placing its control switch to START
l			Reports Torus Cooling in service
		SRO	Directs entry into ABN-40, Stuck Open EMRV
			• Declares EMRV NR108A inoperable and reviews/applies TS 3.4.B.2
¹ . Nej pot			 The reactor may remain in operation not to exceed 3 days provided the IC MO isolation and condensate makeup valves in both ICs are verified daily to be operable
4			 Refer to TS 4.5.F.5, 4.5.L
			 Notifies WWM/SM about the failed EMRV
ľ			Briefs the Crew on the event
			 Enters Primary Containment Control EOP (IF torus water temperature exceeds 95 °F)
			 Directs torus cooling initiated IAW SP-25
	Terminus:	EMRV NR- Crew. Toru	-108A is DISABLED, the SRO has reviewed Tech Specs and briefed the is Cooling has been initiated, if required.

Notes/Comments

10

NRC 2

Op-Test No.: <u>NRC 2008-1</u>

Scenario No.: NRC 2

Event No.: 5

Event Description: <u>Reactor Recirculation Pump A abnormal operation requiring pump</u> <u>shutdown (low oil level and high vibration)</u> (TRIGGER 2)

Initiation: As directed by lead examiner

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

Time	Position	Applicant's Actions or Behavior	
	BOP	Responds to Annunciators VIBRATION HI A E2d, and OIL LEVEL HI/LO E6d, (Panel 3F)	
		Annunciator VIBRATION HI A, E2d	
		 Attempts to reset vibration alarm 	
		 Annunciator OIL LEVEL HI/LO, E6d 	
		• Reports that immediate pump trip is required IAW the RAP-E6d	
		Manually trips Reactor Recirc. Pump A	
	-	 Place Recirc Pump A DRIVE MOTOR switch to STOP position 	
		 Refers to ABN-2, Recirculation System Failures 	
		 Confirms the DISCH BYPASS valve open for Recirculation Pump A (V-37-11) 	
		 Closes the Recirculation Pump A DISCHARGE valve (V-37-10) 	
		 Recognizes failure of discharge valve to close and reports this to the SRO 	
		 Closes the Recirculation Pump A SUCTION valve (V-37-9) 	
		 Contacts Electrical maintenance to attempt closure of Recirculation Pump A discharge valve 	
		 Verifies the plotted point on the Power Operation Curve 	
		 Informs SRO to review TS 3.3.F., Recirculation Loop Operability, and 3.10.A., Core Limits 	
		 Selects an operating recirculation loop temperature point 	
		 Monitors for fuel failures: Monitors Offgas activity, Main Steam Line radiation, and reactor coolant activity 	
		 Changes reactor pressure, if directed, by changing the EPR setpoint (980-1020) [Panel 7F] 	
	ATC	Refers to ABN-2, Recirculation System Failures	
		 May verify operation on Power Operations Curve 	

	SRO	 Directs trip of Reactor Recirculation Pump A, IAW RAPs Directs entry into ABN-2, Recirculation System Failures Refers to Tech Spec 3.3.F, 3.10.A Tech Spec 3.0.A.: Be in Cold S/D within 30 hours. Notify System Owner/Dispatcher, Chemistry, Reactor Engineering, WWM/SM
Terminus:	Recirc. Pur reviewed, a	mp A has been manually tripped and suction valve closed; Tech Specs and maintenance contacted.

Notes/Comments



Op-Test No.: NRC 2008-1Scenario No.: NRC 2Event No.: 6Event Description: Multiple rod drifts; Scram Required; Manual Scram Fails; ARI requiredControl rod drifts: 10-11, 10-19, 06-23, and 06-27 (TRIGGER 3)

Initiation: As directed by Lead Examiner

Cues: Annunciators H6a- ROD DRIFT; Full Core Display control rod position indications changing

Time	Position	Applicant's Actions or Behavior
	ATC	Responds to Annunciator H6a- Rod Drift
		Recognizes/reports multiple control rod Drifting
		IAW ABN-1, Reactor Scram, Scrams the Reactor with the RPS Pushbuttons & places the Mode Switch to SHUTDOWN
		Recognizes/Reports failure to Scram
		Initiates ARI (Critical Task)
	, ,	Reports all rods inserted
8 1		 Controls RPV level band of 138" – 175" IAW Support Procedure 2 (Feedwater/Condensate) & Support Procedure 3 (CRD)
		 When RPV water level is rising, THEN SELECT one Feedwater Pump to be the operating pump and trip the Feedwater Pumps not selected CONTROL RPV water level using the following as necessary: (Panel 5F/6F) Feedwater Regulating valves Main Feed Regulating Valve (MFRV) Block valves Feedwater Low Flow valves Heater Bank Outlet Isolation valves Feedwater and Condensate pumps
	SRO	 Directs Reactor Scram when multiple rod drifts are reported May enter RPV Control w/ATWS EOP When informed all rods in, Enters RPV Control - No ATWS EOP Directs a RPV level band of 138" – 175" IAW Support Procedure 2 (Feedwater/Condensate) & Support Procedure 3 (CRD) May direct a pressure band of 800 – 1000 psig with turbine bypass valves

	BOP	May assist in controlling RPV level & Pressure as directed by SRO
Terminus:	The reacto rods insert	r is manually scrammed and ARI initiated, which results in all control ed.

Notes/Comments

······································	·	

٦

Op-Test No.: <u>NRC 2008-1</u>

Scenario No.: NRC 2

Events No.: 7 & 8

Event Description:

1. <u>Steam leak in the Primary Containment; DW/Torus Vacuum Breaker Fails open</u> (TRIGGER 4)

2. Containment Spray System Failures; Failure of RWCU Isolation Valves to isolate

Initiation: The reactor and turbine have tripped; RPV water level is in/near the normal band OR as directed by the Lead Examiner

Cues: Increasing DW pressure and temperature; Annunciators C3f DW PRESS HI/LO, followed by H1d, H2d, DW PRESS HI-HI I & 11; C4f/C5f, TORUS/DW 1/2 VAC BRKR OPEN

Time	Position	Applicant's Actions or Behavior
	BOP/ATC	 Responds to annunciator C4f/C5f Dispatches an EO to the local panel to determine which valve is open
		Responds to annunciator C3f, DW PRESS HI/LO
		Reports Drywell pressure and temperature are rising
		 Reports hi Drywell pressure and entry into Primary Containment Control EOP and RPV Control – No ATWS EOP
		 Monitors/reports Primary Containment parameters
		Confirms automatic actions, IAW Support Procedure 1
		 Reports that RWCU System did not auto isolate and closes the valves and trips the RWCU Pump (V-16-1, V-16-14, and V- 16-61)
		 Lines-up and sprays the DW IAW Support Procedure 29
		 CONFIRM all Reactor Recirculation Pumps tripped.
		 CONFIRM the Drywell Recirc Fans tripped. (Panel 11R)
		 CONFIRM the SYSTEM MODE SELECT switch for the selected system in the DW SPRAY position.
		 VERIFY that the system Torus CLG Discharge valve, V-21-17 (V-21-13) is closed.
		 VERIFY that the system DW Spray Discharge valve, V-21-11 (V-21-5) is open.
2		 START an ESW Pump using its control switch. (Panel 1F/2F)
		 START a Containment Spray Pump in the selected system as follows:
		 SELECT a Containment Spray Pump to be started. PLACE and HOLD the System Pump Start Permissive

	Keylock for the selected pump in the appropriate position.
	• Reports that Containment Spray System 1 discharge valve (V-21- 11) will not open, and continues with Containment Spray System 2
	Reports that Containment Spray Pump 51C indicates no flow
	 Reports Containment Spray Pump 51D starts and is operating normally
	Reports that PSP is rising and when near violated
	Reports PSP is violated
	 Performs Emergency Depressurization when directed (Critical Task)
	 Stops injection with Core Spray not required for adequate core cooling IAW Support Procedure 10
	 OVERRIDE the Core Spray initiation logic by performing the following at the Core Spray Control Logic:
	 PRESS the OVERRIDE switches for all the sensors that are lit.
	 PRESS all ACTUATED switches whether lit or unlit.
	 CONFIRM Closed Core Spray System 1 and System 2 Parallel Isolation Valves not required for assuring adequate core cooling.
	 SECURE Core Spray System 1 and System 2 Booster Pumps not required to assure adequate core cooling by placing their respective control switches in STOP.
	 SECURE Core Spray System 1 and System 2 Main Pumps not required to assure adequate core cooling by placing their respective control switches in STOP.
	 Bypasses ROPS
	 Verifies Torus water level > 90"
	 Opens 5 EMRVs by placing all AUTO DEPRESS VALVE switches in the MAN position
	 Reports all EMRVS open
	 Reports Torus water temperature 95 °F
SRO	 Directs entry into Primary Containment Control EOP and re-enters RPV Control – No ATWS EOP
	 Directs automatic actions confirmed IAW Support Procedure 1
	 Before DW/Torus reaches 12 psig, directs lineup of Drywell Sprays IAW Support Procedure 29
	 When DW/Torus exceeds 12 psig, or before bulk DW temperature reaches 281° E. directs initiation of Drawell Concerns
	temperature reaches 201 F, directs initiation of Drywell Sprays

 $u_{j_{2},\ldots,n}$

		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 (Critical Task)
		 Enters Emergency Depressurization – No ATWS EOP
F F		 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
•		 Re-enters Primary Containment Control EOP on high Torus water temperature
Terminus:	The RPV h has been s	as been emergency depressurized with EMRVs and RPV water level tabilized.

Notes/Comments

Simulator Setup

- 1. Reset the simulator to normal full power IC-65
- 2. Insert the following control rods from position 48 to position 40
 - a. 14-15, 14-39, 38-15, 38-39, 18-43, 18-11, 34-43, 34-11
 - b. Then reduce power to 90% with recirculation flow
- 3. Run SIMPROB
- 4. Have a blank copy of procedure 336.1 available
- 5. Remove the amplidyne from service IAW 336.1, section 5.0 (include the panel operator aids)
- 6. Have a ReMA ready, that has 3 steps:
 - a. Lower recirc flow to 90% power (already performed and signed off)
 - b. Withdraw control rods 14-15, 14-39, 38-15, 38-39, 18-43, 18-11, 34-43, and 34-11 from 40 to 48; continuous out is allowed
 - c. Raise power with recirc flow
- 7. Check APRM gains OK

MALFUNCTIONS

EVENT	TRIGGER	MALFUNCTION
1	NA	None
2	NA	None
3	PRESET →	 MAL-CRD008_3411 This makes control rod 34-11 uncoupled DELETE this malfunction when the operator is driving the control rod inward to re-couple
4	T1 →	 SWI-ADS001C to ON This makes EMRV NR108A open by its control switch. This does allow the EMRV to close when DISABLED

5	PRESET →	VLV-NSS006 to MECH SEIZE
		 This keeps Recirculation Pump A discharge valve open
	T2 →	ANN-E6d to ON
		 This makes annunciator E6d (Recirc. Pump A OIL LEVEL HI/LO) alarm
		 ANN-E2d with a 60-second time delay
		 This makes annunciator E2d (Recirc. Pump A VIBRATION HI) alarm after 60 seconds
6	T3 →	• MAL-CRD005_1011
		 MAL-CRD005_1019 with a 5 second time delay
		 MAL-CRD005_0623 with a 5 second time delay
		 MAL-CRD005_0627 with a 5 second time delay
		 This will drift control rod 10-11, followed by rods 10-19, 06-23 and 06-25 5 seconds later
		SWI-RPS006A to OFF
		 This ensures the MODE switch is not placed in SHUTDOWN position
		MAL-RPS006
		 This fails the RPS scram pushbuttons
		 Taken together, this represents a failure of the mode switch and scram buttons (manual scram failure)
7	T4 →	MAL-NSS017D to 10% over a 20 minute ramp
		 This inserts a steam leak in the primary containment
		• MAL-PCN001N to 100%
		 This opens a Drywell-Torus vacuum breaker
8	PRESETS	MAL-RPS007C
		 This prevents the RWCU System to auto isolate on high DW pressure (but does allow manual isolation)
		VLV-CNS008 to MECH SEIZE
		 This prevents Containment Spray System I DW spray valve V-21-11 from opening

e de la construcción de la constru

PMP-CNS008A
 This breaks the shaft on Containment Spray Pump 51C

Shift Turnover

Initial Conditions

- Reactor power has been reduced to 90% with recirculation flow IAW the ReMA
- The amplidyne is in manual voltage control
- The RWM is inoperable and bypassed
- The isophase bus fan A is out of service for repair

Shift Activities

- 1. Place the amplidyne back in service in automatic voltage control IAW Section 6 of procedure 336.1, 24 KV Main Generator Electrical System
- 2. Continue with the ReMA to raise reactor power
 - o Withdraw control rods
 - Reactor Engineering will run a few cases after control rods have been withdrawn
 - They will notify the Control Room when to raise recirculation flow to achieve 100% power

	Scenario Outline					
Facilit	Facility: Oyster Creek Scenario No.: NRC 3 Op Test No.: NRC 2008-1					
Exami	ners:			_ Operators:	RO- Steve Johnston	
				_		
	••••••••••••••••••••••••••••••••••••••			-		
<u>Initial</u> • 92 ^o • RW • TB <u>Turno</u> • Inc	 Initial Conditions: 92% Power RWM bypassed and OOS TBCCW pump 2 OOS Turnover: Increase reactor power to 100% IAW ReMA 					
Event No.	Malf. No.	Malf. No. Event Type*			Event Description	
1	N/A	R	ATC	Increase Power wit 100% Power	h <u>Rods</u> & Recirc Flow to	
2	MAL- CRD007_3823	С	ATC	Stuck Control Rod		
3	PMP- CRD002A	С	ATC	CRD Pump 1A Sha	ift Failure	
4	ICH-CFW069A	С	ATC	Condensate Pump requires power red to approx. 65% pov	B Motor Bearing Hi Temp uction with Recirculation Flow ver	
5	MAL- NSS017D MAL- CRD021A MAL- CRD021B	м	ALL	Small Steam leak ir ATWS	n containment with Hydraulic	
6	MAL- CRD001A	С	ATC	CRD Flow Control	Valve fails to 0%	
*	(N)ormal (R)eactiv	vitu	/l)netrum	ant (C)ompoppent (M)s	vior Transient (TS) Tech Spec	

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

NRC 3 Simulator Scenario Summary

Event	Event Summary
1	The ATC will be directed to increase reactor power to 100% IAW the Reactivity maneuver Approval Form (ReMA). (REACTIVITY MANIPULATION)
2	The ATC will respond to a stuck control rod IAW procedure 302.2, Control Rod Drive Manual Control System. Increasing drive water pressure will cause the rod to move. (COMPONENT MALFUNCTION)
3	While increasing power, the running CRD Pump 1A will develop a shaft shear. After local investigation, the ATC will start the redundant CRD pump IAW RAP-H1c, and then complete the control rod manipulations. The SRO will declare a 7-day LCO IAW TS 3.4.D.2. (COMPONENT MALFUNCTION)
4	A Condensate Pump B Motor Bearing Hi Temp will occur requiring the ATC to perform a power reduction with Recirc Flow to approx. 65% (COMPONENT MALFUNCTION)
5	A steam leak in containment with a hydraulic ATWS will occur requiring entry to Primary Containment Control EOP and RPV Control w/ATWS EOP. The ATC will insert rods per Support Procedure 21. (MAJOR)
6	While the ATC is inserting control the CRD flow control valve will fail closed requiring additional actions (swap flow control valves) to continue control rod insertion. (COMPONENT MALFUNCTION after EOP)
Critical Task #1	With reactor power > 2%, terminate and prevent injection into the RPV by all systems except CRD and Boron injection systems IAW Support Procedure 17. (PRA)
Critical Task #2	Insert Control Rods IAW Support Procedure 21.

Sec. 1

Op-Test	No.: NRC	2008-1 Scenario No.: <u>NRC 3</u> Event No.: <u>1 8</u>
Event D	escription:	
1. <u>With</u> 2. <u>Res</u> r	draws cont conds to St	trol rods for a power increase IAW the ReMA tuck Control Rod 38-23
Initiation	: As direct	ed by Lead Examiner
Cues: C	ontrol rod	38-23 shows abnormal indications when a withdraw signal is applied
Time	Position	Applicant's Actions or Behavior
	SRO	Conducts a pre-job reactivity maneuver brief.
		Directs the ATC to withdraw control rods IAVV the reactivity maneuver sheet
		 Acts as the Reactivity Manager during the evolution. May refer to ABN-6, Control rod malfunctions due to stuck rod
	BOP	Provides a peer-check for withdrawing control rods and initials on the reactivity maneuver sheet after each control rod is withdrawn.
	ATC	 Withdraws control rods IAW the reactivity maneuver sheet and Procedure 302.2, Control Rod Drive Manual Control System. [PANEL 4F] Verifies the PERMIT light is illuminated. Places the ROD POWER switch to ON.
		 Selects the control rod by depressing the corresponding pushbutton on the CONTROL ROD SELECT matrix. Verifies the pushbutton light is lit and no others are lit
		 Turns the ROD CONTROL switch to ROD OUT NOTCH position and simultaneously turns the NOTCH OVERRIDE switch to NOTCH OVERRIDE
		 Verifies: Amber OVERRIDE light is ON Green insert light is ON following switch movement and remains on f
		 about 1 second Rod position readout momentarily displays the next odd-numbered digit

	 Verifies the WITHDRAW light remains ON for the duration of the withdrawal and an increasing rod position is displayed and releases at position 48
	 Performs a coupling check at position 48
	 Turns the ROD CONTROL switch to ROD OUT NOTCH position and simultaneously turns the NOTCH OVERRIDE switch to NOTCH OVERRIDE
	 Verifies rod display indicates a continuous readout of 48 with red backlight
	 Recognizes & Reports Control Rod 38-23 is stuck
	 May refer to ABN-6 Control Rod Malfunctions
	Refers to 302.2 "Control Rod Drive Manual Control System", precautions and Limitations section
	 Places CRD Drive Water Pressure Control Valve to the closed direction to raise drive water pressure 50 psid, then attempts to move control rod (BOOTH)
3. -	 Restores drive pressure to normal
	 Turns ROD POWER off when complete
	Reports all control rods withdrawn IAW the reactivity maneuver form
воотн	Delete Stuck Rod malfunction after drive water pressure is increased the first time
Terminus:	At the examiners discretion when stuck control rod has been moved and sufficient control rods have been withdrawn for the power increase.

Notes/Comments



Sec. . . .

Op-Test No.: <u>NRC 2008-1</u>

Scenario No.: NRC 3

Event No.: 3

Event Description: Responds to a broken CRD Pump A shaft [TRIGGER 1]

Initiation: As directed by the Lead Examiner

Cues: CRD HYDRAULIC SYSTEM indicators indicate no flow/pressure; Annunciator H7c, CHARG WTR PRESS LOW; H5c, CRD TEMP HI alarms

Time	Position	Applicant's Actions or Behavior
<u> </u>		
	ATC	 Responds to annunciators H5c, H7c Reports CRD HYDRAULIC SYSTEM indicators indicate no flow/pressure
		 Dispatches NLO to investigate CRD Pump A [ROLE PLAY] Starts CRD Pump B by placing CRD PUMP NC01B switch to START and stops CRD Pump A by placing CRD PUMP NC01A switch in STOP, OR:
		 Starts CRD Pump B IAW procedure 302.1 (Panel 4F) May request NLO to inspect CRD Pump B prior to start Places CRD FLOW CONTROLLER in MAN Places CRD PUMP NC01B to START Verifies normal system indications Stops CRD Pump A Places CRD PUMP NC01A to STOP Adjusts CRD FLOW CONTROLLER to attain required flows Places CRD FLOW CONTROLLER in AUTO Verifies normal indications Reports CRD Pump B is operating and CRD System indications are normal
	SRO	 Directs starting CRD Pump B IAW procedure 302.1, Control Rod Drive System, Section 6.0 OR directs the ATC to start CRD Pump B without using the procedure and stopping CRD Pump A Declares CRD Pump A inoperable Reviews Tech Spec 3.4.D.2 States a 7-day LCO is required due to inop CRD Pump A Notifies Work Week manager (WMM) or Shift Manager about the

		inoperable CRD Pump A			
	Briefs the Crew				
	BOP	Makes plant announcement prior to starting CRD Pump B			
ROLE PLAY	 When shaft 	directed to investigate CRD Pump A, WAIT 2 minutes, then report that the has broken, and the motor is really vibrating.			
	 If directed to inspect CRD Pump B prior to start, WAIT 1 minute and report that it is ready for start. 				
Terminus	CRD Pum	p B has been started and the SRO has applied Tech Specs.			

Notes/Comments

					1
					1
					1
					1
					1
					1

Op-Test	No.: <u>NRC 20</u>	08-1 Scenario No.: <u>NRC 3</u> Event No.: <u>4</u>
Event De and powe	escription: <u>Co</u> er reduction [ndensate Pump upper bearing High Temp requires removal from service [TRIGGER 2]
Initiation:	As directed	by Lead examiner
Cues: An	nunciator J8	f, COND/FD PMP BRG TEMP HI
Time	Position	Applicant's Actions or Behavior
	ATC	 Performs a rapid power reduction with recirculation flow by rotating the MASTER RECIRC SPEED CONTROLLER knob CCW to about 65% power, IAW 202.1
	BOP	 Responds to annunciator J8f, COND/FD PMP BRG TEMP HI Monitors pump bearing temperatures (Panel 12XR) Reports bearing temperatures & trend Dispatches EO to verify TBCCW lineup & oil levels for Condensate Pump B [ROLE PLAY]
		•
	SRO	 Directs ATC to reduce reactor power with recirculation flow to within the capacity of 2 feedwater pumps (rapid power reduction IAW 202.1) Directs BOP to remove a Feedwater Pump form service & trip the B Condensate Pump
		 May enter/direct entry into ABN-17, Feedwater System Abnormal Conditions, when the FWP trips
		Notifies WWM/SM about Condensate Pump B.
ROLE PLAY	As the EO	report TBCCW is lined up normally and oil levels are normal.
Terminus	Reactor po Pump B tri	wer has been lowered to the capacity of 2 feedwater pumps, Condensate pped and RPV water level is stable.

Notes/Comments

c.

 \mathbb{V}_{4n}

Op-Test No.: <u>NRC 2008-1</u>

Scenario No.: <u>NRC 3</u>

Event Description:

- 1. Small Steam leak in containment (TRIGGER 3) with Hydraulic ATWS
- 2. CRD Flow Control Valve failure (TRIGGER 4)

Initiation: As directed by the lead examiner

Cue: 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
	RO	Reports Drywell pressure and temperature rising
		 As directed, manually scrams the reactor and carries out ABN-1, Reactor Scram
		Reports control rods not inserted and reports reactor power
		Initiates Alternate Rod Insertion (ARI) (4F)
		 As directed, bypasses ROPS (Reactor Overfill Protection System) (4F)
		Runs recirc flow to minimum
		Trips all recirc pumps
		 Insert control rods IAW Support Procedure 21 (CT) (per section 5.2 and/or 5.3)
		Section 5.2
		 Manual Control Rod Insertion (4F)
		 Directs NLO to close CRD Charging Water Valve V-15-52 (BOOTH)
		Places Mode Switch in Refuel
		 Close CRD drive water pressure control valve
		Resets ARI
		 Selects and Inserts CRAM array
		 Recognizes failure of CRD Flow Control Valve after beginning to drive in control rods
		 Swaps flow control valves IAW 302.1 "CRD System"
		Continues control rod insertion
		Section 5.3
		 Places ARI Normal/Bypass switch in Bypass

	 Press ARI Manual Reset Pushbutton Inserts Bypass plugs BP5, BP6 in RPS Panels 1 & 2 Place SDV HI LVL BYPASS switch in BYPASS Reset the scram by depressing the Scram reset pushbuttons Confirms SDV vents and drains open When the SDV HI-HI alarms clear, manually scrams the reactor Repeats above steps until all rods are inserted Reports control rods inserting/inserted
BOP	 Confirms EOP automatic actions IAW Support Procedure 1 Prevents ADS by placing ADS Timer switches in Bypass (1F/2F) Bypass MSIV Low-Low water level isolation IAW Support Procedure 16 Terminate & prevents injection IAW Support Procedure 17 (CT) Maintains level band of -20 to +30 IAW Support Procedure 19
SRO	 Directs reactor scram and ABN-1, Reactor Scram, prior to drywell pressure scram setpoint Directs entry into RPV Control – With ATWS Directs ARI initiation Directs ROPS bypassed Directs confirmation of automatic actions IAW Support Procedure 1 Directs running Recirc Flow to Minimum Directs tripping of Recirc Pumps Directs bypass MSIV Low-Low water level isolation IAW Support Procedure 16 Directs BOP to terminate & prevent injection IAW Support Procedure 17 (Critical Task) Directs ATC to insert control rods IAW Support Procedure 19 Directs entry into RPV Control – No ATWS (following control rod insertions)

воотн	Close CRD Charging water valve 15-52 for Support Procedure 21 (LOA-CRD024 to 0).
	Insert LOA-CRD011 to 1 and LOA-CRD012 to 1 to open the B CRD FCV intet/outlet valves. Call the Control Room when this lineup is complete.
Scenario Terminus:	RPV injection Terminated & Prevented, and Control rods are inserted.

Notes/Comments

······································	······	
· · · · · · · · · · · · · · · · · · ·		

Simulator Setup

- 1. Reset the simulator to the normal full power IC-65
- 2. Run CAEP file SIMPROB
- 3. Reduce power to 92% with recirculation flow
- 4. Place a tag on the RWM Switch in BYPASS
- 5. Place TBCCW Pump 2 in PTL and hang tag
- 6. Have a prepared ReMA with the following 3 steps:
 - a. Reduce power to 92% with recirculation flow (already completed)
 - b. Withdraw the following control rods from position 12 to position 14:
 - i. 14-31, 14-23, 22-39, 22-15, 30-39, 30-15, 38-31, 38-23
 - c. Raise power to 100% with recirculation flow

MALFUNCTIONS

EVENT	TRIGGER	MALFUNCTION
1	NA	
2	PRESET →	 MAL-CRD007_3823 This sticks control rod 38-23 at its current position (this is the last rod to be moved on the ReMA) DELETE this malfunction after CRD drive pressure is raised
3	T1 →	 PMP-CRD002A This breaks the shaft on CRD Pump NC08A
4	T2 →	 ICH-CFW069A from 195-300 over a 10 minute ramp This causes condensate pump B upper bearing temperature to rise from 195 (alarm point) to 300 °F
5	T3 →	 MAL-NSS017D to 0.1% over a 5 minute ramp This causes a small steam leak in the Drywell

	PRESETS →	 MAL-CRD021A to 100% MAL-CRD021B to 100% This fills the SDV and results in an ATWS (no rod motion) DELETE these malfunctions when the scram is reset
6	T4 →	 MAL-CRD001A to 0 This causes CRD FCV NC30A to fail closed
5/6	MANUAL INSERT	 LOA-CRD024 to 0 This will close CRD charging valve V-15-52 LOA-CRD011 to 1 LOA-CRD012 to 1 These open the standby CRD FCV inlet/outlet manual valves

Shift Turnover

Initial Conditions

- The plant is at 92% power
- The RWM is inoperable and bypassed
- TBCCW Pump 2 is tagged out of service for repair

Shift Activities

• Continue with the ReMA