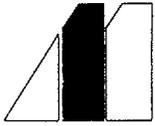


Facility: <u>MP2</u>	Scenario No.: <u>ES02LI1</u>	Op-Test No.: <u>1</u>
Examiners: _____	Operators: _____	
_____	_____	
_____	_____	
Initial Conditions: <u>100% power, MOL, Eq. Xe., 821 ppm Boron SGBD @ 25 gpm per SG, 24E aligned to 24C, TDAFP OOS for bearing replacement</u>		
Turnover: <u>100% power, MOL, Eq. Xe., 821 ppm Boron, blend ratio: 6.3 to 1 SGBD @ 25 gpm per SG, 24E aligned to 24C, TDAFP OOS for bearing replacement, in TSAS 3.7.1.2.a and TRM II, 3.0, item 2, no other equipment OOS and no surveillance in progress or due.</u>		

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N	Pump containment sump
2	CH07 RD0328	N/A R	Earthquake causing CEA #28 to slip 35 steps into the core.
3	N/A	R	Downpower to < 70%power for CEA recovery
4	RX11D	I	#2 SG Alternate steam flow transmitter failure
5	RD0132	M	2 nd dropped CEA - Manual reactor trip
6	ED02	C	RSST Fault - loss of off-site power
7	EG08A	C	A DG breaker failure to close
8	FW30B FW20B	M	Degradation/loss of the 'B' AFW pump
9	I/O	C	Breaker A505 trip/failure to close

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor



**Millstone Station
Unit 2 Operator Training**

SIMULATOR EXERCISE GUIDE

I. Title: Simulator Evaluation

ID Number: ES02L11

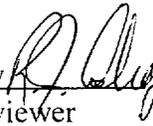
Revision: 0

II. Initiated:


R. N. Spurr
Developer

11/22/2002
Date

III. Reviewed:


R. J. Ashley
Reviewer

11/25/2002
Date

IV. Approved:


Operator Training Supervisor

12/4/02
Date

TABLE OF CONTENTS

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1. Cover Page
2. Table of Contents
3. Exercise Overview
4. Instructor Guide / Summary
5. Scenario Initial Conditions Attachments
 - Validation Checklist
 - Training Turnover Sheet

EXERCISE OVERVIEW

1. Purpose:
 - a. Evaluate the licensees' ability, as a team and individually, to safely and responsibly operate the plant during normal plant operations, abnormal operating conditions and emergency operating conditions.
 - b. Evaluate licensees in the following areas, as applicable:
 - 1) Ability of the crew to perform crew-dependent (and time-critical) tasks.
 - 2) Ability of individuals to perform critical tasks.
 - 3) Ability of the crew to:
 - a) Understand/interpret alarms/annunciators
 - b) Diagnose events/conditions based on signals/readings
 - c) Understand plant/systems response
 - d) Comply with/use procedures and Technical Specifications
 - e) Properly communicate information/proper crew interactions
 - f) Perform control board operations
 - 4) Ability of each individual to:
 - a) Respond and correctly interpret annunciators
 - b) Correctly diagnose events
 - c) Properly interpret integrated system response
 - d) Comply with and use Technical Specifications
 - e) Comply with and use procedures
 - f) Properly perform control board operations
 - g) Demonstrate a responsible attitude
 - h) Properly communicate information and interact with the rest of the crew

2. Exercise Brief:

The simulator will be prepared for the evaluation and the licensees will be briefed on the conduct of the evaluation and the areas in which they will be evaluated.

The simulator will be initialized at 100% power, MOL, Eq Xe, 821 ppm boron. The TDAFP is out of service for bearing replacement. TSAS 3.7.1.2.a and TRM II 3.0 item 2 are in effect. The containment sump has been filling slowly due to a verified secondary system leak and has required pumping at approximately 18 hour intervals. The sump is presently 78% and needs to be pumped to avoid entry into a TSAS for loss of an RCS leak detection mechanism. There is no surveillance in progress and no other equipment out of service.

Shortly following the pumping of the containment sump a seismic event will be experienced. Various vibration alarms will come in and a PEO will call in to report feeling ground movement. The seismic event will cause a CEA partial drop > 20 steps. The crew will enter AOP 2562 Earthquake and AOP 2556 CEA Malfunctions, perform the checks of 2562 and balance primary and secondary power. After the required notifications the crew will perform a downpower for CEA recovery. During the downpower, the alternate steam flow transmitter for #2 SG will start to fail low. Feed flow to #2 SG will trend down. The SPO must diagnose the problem, take manual control, deselect the failed transmitter and restore the FRV to auto. Later a second CEA will drop fully into the core. A manual trip is required in response to 2 dropped CEAs. On the trip the RSST will fault. Both EDGs will start, but the 'A' output breaker will not close automatically or manually. Due to no cooling water the 'A' EDG must be emergency tripped. The 'B' AFW pump will be started to feed the SGs and air will be x-tied from Unit 3. During 2525 the 'B' AFW pump will degrade such that feed will be inadequate during performance of the diagnostic flowchart. Degraded performance leads to a trip of the 'B' AFW pump. The US should diagnose a Loss of All Feed and transition to EOP 2537.

Main feed is unavailable due to the LNP. The TDAFP and 'B' AFW pump cannot be restored in time. When 4160V bus 24E is attempted to be restored from Unit 3 to power bus 24C and the 'A' AFW pump, breaker A505 for Unit 3 to bus 24E will trip. Electrical maintenance will provide a repair estimate that will require initiation of Once-Through-Cooling (OTC). Early initiation is appropriate, especially lacking a second HPSI pump. The OTC option must be implemented if either SG level reaches 70". Once OTC is initiated the crew must transition to EOP 2540. Safety Functions must then be assessed and prioritized. The crew should enter 2540D for success path HR-3.

Title: Simulator Evaluation

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After OTC is initiated, electrical maintenance will contact the control room informing them that breaker A505 was just mis-aligned and can be used to power 24E and 24C. The crew should bring power in from unit 3, start the 'A' AFW pump, restore at least one SG as a heat sink, and take actions to secure from OTC.

The scenario may be terminated when feed has been restored to at least one SG with level >70" and increasing, the crew in EOP 2540D pursuing success path HR-3, and actions being taken to secure from OTC.

3. Plant/Simulator differences that may affect the scenario are:

None

4. Duration: 2.0 hours

All Control Room Conduct, Operations and Communications shall be in accordance with Master Manual 14 (MP-14). Review the Simulator Operating Limits (design limits of plant) and Simulator Modeling Limitations and Anomalous Response List prior to performing this training scenario. The instructor should be aware if any of these limitations may be exceeded.

SECTION 4

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Time	IDA/Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
T ₀	IC-24 or equivalent	<u>Simulator Setup and Initial Conditions:</u> 100 % Power, MOL. Equilibrium Xenon, RCS Boron 821 ppm	Inst.		
	CC10A "XX"	Use malfunction CC10A (CEDM cooler leak) to fill CTMT sump to ~78%, then delete malfunction and allow RBCCW surge tank to refill & stabilize.	Inst.		
	WDR07 0.5	Use Remote for a 1 gpm secondary system leak in CTMT to the normal sump. Note: minimize Run time before session start to ensure that the CTMT sump doesn't alarm.	Inst.		
	FWR22 LCL MSR12 RI MSR13 RI	Simulate placing the TDAFP OOS by placing its control in Local, ensuring both steam isolation valves MS-201 & 202 are racked in, place simulator in Run, close 201 & 202, use remotes to rack out both steam stops, then yellow tag 2-MS-201, 202, and SV-4188.	Inst.		
	ED02 BT1	Enter malfunction for loss of the RSST on a plant trip.	Inst.		TM1, EM1, AE1

SECTION 4

ID Number ES02L11

Revision: 0

Time	IDA/Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
	EG08A	Enter malfunction to prevent the 'A' EDG output breaker from closing in Auto or Manual.	Inst.		TM2, EM2
	CS-2/21S3-24E2 Trip On CS-2/21S3-24E2 CIs Off	Enter I/O over-rides to prevent breaker A505 (MP3 to bus 24E) from closing and simulate a trip signal	Inst.		TM7, EM4
		Brief the crew on their roles and the conduct of the exam. Ensure that any questions are resolved prior to starting the exam.	Inst.		
		<u>For Turnover Brief:</u> ◇ 100% power, MOL, Equilibrium Xenon ◇ 821 ppm boron / Blend ratio - 6.3:1 ◇ SG Blowdown - 25 gpm each ◇ 24E aligned to bus 24C ◇ TDAFP out for bearing replacement ◇ In TSAS 3.7.1.2.a. and TRM II, 3.0, item 2		Note: If asked, the CTMT leakage is stable at ~0.3 gpm and has been determined by sample to be secondary based on lack of boron or activity and no loss from the RBCCW surge tank or PWST. If asked how many support staff: <ul style="list-style-type: none"> • 2 I&C techs • 1 mechanic 	

Time	HDA/Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
Initial		<ul style="list-style-type: none"> ◇ CTMT sump needs pumping every 18 hours to avoid TSAS for RCS leak detection. ◇ No other surveillances due ◇ This is a Saturday and there are only a limited number of support people here. <p>Using the info above and T/O sheet, provide the crew with turnover info, allow the crew to walk-down the boards, and perform briefing. The crew should indicate that they have 'taken the watch'.</p>	Inst.	<ul style="list-style-type: none"> • 1 electrician 	
			US	Direct SPO to pump the CTMT sump	
			SPO	<p>IAW OP 2336A, pump the CTMT sump</p> <ul style="list-style-type: none"> • Place 'A' or 'B' CTMT sump pump to start. • Verify sump isol. Valves 2-SSP-16.1 & 2-SSP-16.2 go open. • When sump level lowers to ~10%, place the running CTMT sump pump to stop. <p>Verify sump isol. Valves 2-SSP-16.1 & 2-SSP-16.2 go closed.</p>	OP 2336A Section 4.2

SECTION 4

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Revision: 0

Time	IDA/Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
T ₁	CH07 RD0328 35%	Shortly after 'taking the watch', (or as directed by the lead examiner), enter malfunction to simulate an earthquake, (various transitory vibration alarms), immediately enter malfunction to slip CEA # 28 by 35 steps into the core, and call the control room as the Turbine Bldg. PEO to report minor ground movement.	Inst.		TM3, AE2

SECTION 4

ID Number ES02L11

Revision: 0

Time	IDA/Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
		<p>NOTE: Vibration alarms associated with the main turbine and SGFPs will immediately reset. Vibration alarms for the CAR fans & RCPs will reset when their reset pushbuttons are depressed. The key diagnostic alarm is the "SEISMIC INSTRUMENT TRIGGERED" alarm. Key indications for the slipped CEA will be the red "flashing" CEA Group 1 bar on the CEAPDS display and various CEA group deviation alarms on C04 annunciator panel.</p>	Crew	<p>Respond to annunciators and reports, diagnose occurrence of a seismic event and enter AOP 2562. If CEA drop indications are identified at this time the crew may enter AOP 2556 as well. If not, directions in 2562 will direct the crew to check for CEA drop and 2556 will be entered at that time.</p>	AOP 2562
		<p>Note: With the exception of the slipped CEA, key plant equipment and parameters are all acceptable.</p> <p>Note: As a site event, MP3 would take the lead for E-plan purposes.</p>	US	<p>If the slipped CEA is identified immediately, may direct SPO to balance secondary load to halt RCS cooldown.</p> <p>Query/direct board operators regarding the status of key plant equipment and parameters.</p> <ul style="list-style-type: none"> • Pzr level, Pzr pressure • SG levels • SW, RBCCW, CAR fans • Check for dropped CEAs • Turbine vibration • Changes in Radmonitors <p>Loose parts monitor</p>	<p>AOP 2556</p> <p>AOP 2562</p>

SECTION 4

ID Number ES02LH

Revision: 0

Time	ID#/Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
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			Crew	If not done earlier, identify CEA #28 slipped into the core, balance primary and secondary power, enter AOP 2556, and refer to Tech Specs.	
			SPO	Reduce turbine load as needed to stabilize RCS T-cold.	AOP 2556
			US	Enter AOP 2556 and determine only 1 CEA slipped. <ul style="list-style-type: none"> • Use section 4.0 • Direct PPO/SPO to balance load & stabilize Pzr level & pressure & RCS temperature • Enter TSAS 3.1.3.1.e due to one CEA dropped (mis-aligned) by more than 20 steps • Determine need to reduce power to <70% for CEA recovery • Direct PPO & SPO to make preparations for power reduction. Contact I&C for assistance	AOP 2556

Note: There are 2 I&C technicians on site and both are familiar with CEDS.

SECTION 4

ID Number: ES02111

Revision: 0

Time	ID/Alif	Instructor Information / Activity	Task Assign	Expected Actions	Standard
		<p>As the MP3 Shift Tech: Call the MP2 control room to report that the magnitude of the seismic event has been determined to be 0.065 g Z/PA and that the MP3 SM has declared a UIE/ID-1 and is taking the lead and responsibility for subsequent actions and notifications regarding the seismic event. The MP3 SM may recommend that he coordinate with the MP2 STA to ensure AOP 2562 is completed, thus allowing MP2 to focus on the dropped CEA response. (This recommendation will be at the discretion of the lead examiner).</p>	Inst.		
		<p>*SM may be requested to make some or all of the required notifications.</p>	US	<p>Enter AOP 2575, Rapid Downpower to reduce reactor power to <70% within 1 hour from initial CEA drop:</p> <ul style="list-style-type: none"> • Direct/remind crew to refer to Attachments 1, 5, & 6 during downpower (Rapid Downpower Parameters, Temperature vs. Power Program, & Rapid Power Overview) • *Make notifications regarding downpower <ul style="list-style-type: none"> • HP re: charging/letdown increase • CONVEX & ISO-NE 	AOP 2556

SECTION 4

ID Number ES02L11

Revision: 0

Time	IDA Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
				<ul style="list-style-type: none"> • MP3 • Management • Direct PPO to initiate downpower of reactor and SPO to follow with turbine load 	
		<p>Note: Boration from the RWST is listed as the preferred method and will result in a power reduction rate of ~32%+ at MOL with 1 charging pump. If boration is selected, should determine an addition rate of 12 to 17 gpm. (possibly higher depending on time)</p> <p>May opt to use 2 charging pumps from RWST, then ~64% per hour.</p> <p>Note: Due to slipped CEA, no CEA movement. (for ASI control or initial drop), is allowed during downpower.</p>	PPO	<p>Initiate forcing sprays. (if not already in progress), by starting all available backup heaters and lowering Pzr pressure controller setpoint to ~2200 psia.</p> <p>May use boration to chg. Pp. Suction or align to RWST for suction to achieve recommended S/D rate.</p> <p>If using RWST suction:</p> <ul style="list-style-type: none"> • Power reduction rate with 1 charging pump will be ~32% per hour (MOC) • Ensure VCT bypass CH-192 closed • Ensure CH-504 RWST suction to charging open. • Close CH-501, VCT outlet isolation • Check proper flow rate <p style="text-align: center;">OR</p> <p>If using boration from BAST tanks:</p>	AOP 2575

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Time ID A Malf Instructor Information / Activity Task Assignn Expected Actions Standard

				<ul style="list-style-type: none"> • Insert CEA's an initial 5 to 10 steps • Determine boration rate of 12 to 17 gpm • Borate to charging pp. suction by: <ul style="list-style-type: none"> • Ensure M/U Mode Select switch in Dilute • Ensure valves M/U Stop Valve CH-512, VCT M/U Bypass CH-196, and RWST Isol. CH-192 all closed. • Ensure BA Controller FC-210Y in Auto • Adjust FC-210Y to 12 to 17 gpm • Open CH-504 • Place M/U Mode Select switch in Manual • Start a Boric Acid pp. & verify disch. pressure >98# • Open VCT M/U Bypass CH-196 	
13	RX111D	Insert malfunction to cause the #2 SG	Inst.	<p>SPO</p> <p>Follow reactor downpower by reducing turbine load to maintain RCS temperature program.</p>	TM4

SECTION 4

ID Number ES02111

Revision: 0

Time	IDA/Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
	70% 180 sec ramp	alternate steam flow transmitter to ramp fail lower. Note: Failing steam flow transmitter may be identified by "SG Level Deviation" annunciator on C05 or abnormal indication on SG Trend screen. Note: SPO may shift to Main transmitter immediately or take manual control of FRV, then shift to Main, stabilize level and return FRV control to Auto.	SPO	Identify response of #2 SG level and FRV positioning, diagnose failing steam flow detector, and take actions to de-select the failed detector and restore #2 SG level and FRV to auto.	ARP 2590D
13	RD00132	After the failed detector has been identified and action to correct has been completed or is in progress, insert malfunction to drop a second CEA.	Inst.		TM5, MA1
14	FW30B 100	Insert malfunction to degrade the performance of the 'B' AFW pump such that it will not provide adequate feed.	Inst.		TM6, EM3
			Crew	Identify 2 nd dropped CEA. (similar indications as initial dropped/slipped CEA)	
		CT-1: Critical based on the core being outside of analyzed 'safe' reactivity	US	In response to 2 CEAs dropped, direct board operators to trip the plant and carry out EOP	AOP 2556 CT-1, EU1

SECTION 4

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Time	IDA/Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
		conditions requiring a prompt manual trip. Manual reactor trip required ≤ 1 min. following 2nd CEA verification.		2525.	
		Note: US will pose questions regarding these aspects of each safety function. PPO and SPO responses critical to proper diagnosis and key actions are contained in their individual sections, immediately following.	US	Query PPO and SPO on the status of Safety Functions as delineated in EOP 2525: <ul style="list-style-type: none"> • Reactivity Control (PPO) <ul style="list-style-type: none"> • Reactor • Maintenance of Vital Auxiliaries (SPO) <ul style="list-style-type: none"> • Turbine • Electrical buses • SW & RBCCW • RCS Inventory Control (PPO) <ul style="list-style-type: none"> • Pzr level & SCM, value & trend • RCS Pressure Control (PPO) <ul style="list-style-type: none"> • Pzr pressure, value & trend • Core Heat Removal (PPO) <ul style="list-style-type: none"> • RCP status • Loop delta-T • Th SCM • RCS Heat Removal (SPO) <ul style="list-style-type: none"> • SG pressures 880-920# 	EOP 2525

SECTION 4

ID Number ES02111

Revision: 0

Time	IDA/Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
				<ul style="list-style-type: none"> • RCS Te 530-535 °F • SG levels, value & trend • RCS SCM • Containment (CTMT) Isolation (PPO) <ul style="list-style-type: none"> • Radmonitors inside CTMT, outside CTMT, steam plant, not in alarm or rising. • CTMT pressure <1# • CTMT Temperature & Pressure Control (PPO) <ul style="list-style-type: none"> • CTMT temperature < 120° F • CTMT pressure <1# • CTMT Combustible Gas Control (PPO) <ul style="list-style-type: none"> • CTMT temperature < 120° F • CTMT pressure <1# 	
			PPO	Carry out actions of EOP 2525: <ul style="list-style-type: none"> • Trip RX • Verify all CEAs inserted • SUR negative and power decreasing 	EOP 2525

SECTION 4

ID Number ES02111 _____

Revision: 0

Time	IDA/Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
			SPO	<p>Carry out actions of EOP 2525:</p> <ul style="list-style-type: none"> • Trip turbine, ensure valves closed, Mwe = 0, and 8T&9T open • Identify loss of RSST with buses 25A&B, 24A,B.&C dead • Identify bus 24D being carried by EDG 'B' • Identify EDG 'A' running but not closed onto bus 24C • Determine need to trip 'A' EDG after attempting to close output breaker • Both DC buses & VA10 & 20 live • 1 SW and RB facility • MSIVs closed and main feed lost due to loss of Cires and condensate • Attempted feeding SGs with 'B' AFW pump, inadequate discharge pressure • X-tie air from MP3 • Should dispatch PEO to check running EDG (not procedurally directed) 	<p>EOP 2525 EC1</p>

SECTION 4

ID Number ES02111Revision: 0

Time	IDA Malf	Instructor Information	Activity	Task Assign	Expected Actions	Standard
	LAR10 OPEN		Use remote function to open air cross-tie from MP3 when PEO is dispatched to perform alignment.	Inst.		
15	FW20B		After the pump has been identified, insert malfunction to cause the breaker to trip.	Inst.		MA2
				SPO	Identify inadequate feed/degraded pump performance/pump trip.	EOP 2525
				US	Perform diagnostic flowchart, diagnose a LOAF, and transition to EOP 2537.	EOP 2525
			Note: The SM would classify this event as an Alert/C-1 based on PA2, 'Single AC Source'			

Time	IDA Matl	Instructor Information	Activity	Assign	Expected Actions	Standard
				US	<p>Direct actions of EOP 2537:</p> <ul style="list-style-type: none"> • Close 2-MIS-220A & B and 2-MIS-191A & B • Monitor SG levels to determine if either SG is approaching 70" • May direct PPO to "prepare" for possibility of OTC by obtaining PORV keys. 	EC2 EOP 2537
				Crew	Determine that bus 24C can be re-energized from MP3 via 24E and then the 'A' AFW pump can be used to feed the SGs.	EC2
				US	Request authorization to power 24E and 24C from MP3 IAW Appendix 25.	EOP 2537
			As MP3 SM, authorize MP2 to take power from 34A to power up buses 24E & C	Inst.		

SECTION 4

Revision: 0

ID Number: ES02111

Task

Standard

Assign

Instructor Information Activity

Expected Actions

Time	ID A Mail	Instructor Information Activity	Assign	Expected Actions	Standard
			SPO	Using Appendix 23N, attempt to power bus 24E from MP3: <ul style="list-style-type: none"> • Ensure no 24E loads • Satisfy 'Sync' interlock • Close breaker A505 powering 24E • Identify breaker A505 failure to close with amber tripped light. 	EOP 2541
			US	<ul style="list-style-type: none"> • If either SG level approaches 70", direct OTC • Should contact electrical maintenance to investigate breaker A505. 	EOP 2537
		If contacted as Maintenance to investigate breaker A505, inform the control room that the only electrician in today had to go home for some emergency and is not expected back for at least an hour. There are no other electricians available.	Inst.		

SECTION 4

ID Number: F-S02111

Revision: 0

Time	IDA/Malf	Instructor Information	Activity	Task Assign	Expected Actions	Standard
			Note: If necessary to get the scenario moving, may call as Ops Dept head for status update and recommend early OTC rather than “hope” for feed.	US	Based on the inability to restore a source of feed and less than a full complement of OTC equipment (1 HPSI) decision should be made to initiate OTC early.	
			CT-2 (HR-1): Establish OTC. Must be initiated if either SG level decreases to < 70 inches wide range level with no feed source to either SG.	US	Direct the following: <ul style="list-style-type: none"> • All pwr heaters Off • Both ADVs fully open • Z2 SIAS actuated • All available HPSI & Chg. Pumps running • Both PORV block valves open • Open both PORVs using keys • Transition to EOP 2540 	EOP 2537 CT-2
			Note: Initiation of OTC is still an Alert/C-1 based on RCB2 RCS Barrier loss.			

SECTION 4

ID Number: ES02111Revision: 0

Time	IDA Malf	Instructor Information	Activity	Task Assign	Expected Actions	Standard
				US	Perform/direct initial actions of EOP 2540: <ul style="list-style-type: none"> • Verify SIAS/CIAS/EBFAS • Sample SGs • Place H2 analyzer in service 	EOP 2540
				SPO	Open SG sample isolations and contact Chemistry to sample SGs for boron, activity, and a quick frisk with quick report.	EOP 2540
				PPO	Place 'B' H2 Analyzer in service using Appendix 19 of EOP 2541: <ul style="list-style-type: none"> • Ensure RM fan F39B off • Ensure RM inlet & outlet (AC-527 & AC-528) closed • Ensure open EB-89, AC-47, & AC-20 • Place H2 analyzer control switch momentarily to RESET • Check Red pump power light ON • Check all alarm lights not ON 	EOP 2541

SECTION 4

ID Number: E502111

Revision: 0

Time	ID/Malt	Instructor Information	Activity	Task Assign	Expected Actions	Standard
			*May choose CTPC-2 based on projecting CTFM pressure or temperature response to continued OTC. This will not change the scenario flow.	US	Using RAIS, assess each Safety Function and identify the success paths to be used for each. The following success paths should be selected: RC-1, DC-1, AC-2, IC-2, PC-2, HR-3, CI-1, *CTPC-1, CCGC-1 Prioritize such that HR-3 is implemented first. Enter EOP 2540D for HR-3.	EOP 2540
	CS-2 21S3-2412 Trip On CS-2 21S3-2412 CIs Off Delete both	After US enters EOP 2540D: Delete the over-rides preventing breaker A505 from closing. THEN Call control room as Maintenance to report that the electrician returned early, checked A505 and discovered a simple breaker interlock mis-alignment which he has corrected. A505 can now be closed.		Inst.		

SECTION 4

ID Number FS02L11

Revision: 0

Time	IDA Malf	Instructor Information	Activity	Task Assign	Expected Actions	Standard
				US	Assess steps 1 through 4 of 2540D HR-3. (Steps 1 through 4 are repeats of actions taken in EOP 2537)	EOP2540D
				US	Determine that restoring power to bus 24C will allow powering 'A' AFW pump and restoring feed. Contact Unit 3 to request permission to x-tie buses from MP3.	EOP2540D
			As Unit 3 SM authorize MP2 to x-tie buses and power up 24E and 24C	Inst.		
				US	After receiving authorization from Unit 3 to take power, direct SPO to x-tie from Unit 3 to 24E, then power up 24C, and start 'A' AFW pump.	EOP2540D

SECTION 4

ID Number: I-SO2111

Revision: 0

Time	ID/V/Malf	Instructor Information	Activity	Task Assign	Expected Actions	Standard
				SPO	Using Appendix 23N, power bus 24E from MP3: <ul style="list-style-type: none"> • Ensure no 24E loads • Satisfy 'Sync' interlock • Close breaker A505 powering 24E • Verify bus voltage 	EOP 2541
				SPO	Using Appendix 23D, power bus 24C from bus 24E: <ul style="list-style-type: none"> • Ensure/strip bus 24C <ul style="list-style-type: none"> • RBCCW & SW in PTL • Bypass & reset UV signal on ESAS • Override & reset SI equipment • Energize bus 24C • Remove UV bypass keys 	EOP 2541
			CT-3 (LOAF-4): Establish a primary to secondary heat sink. (required to terminate OTC)	SPO	Start 'A' AFW pump and establish feed to at least one SG to restore SG as a heat sink: <ul style="list-style-type: none"> • Close ADV's • Control Tc <535°F 	EOP 2537 CT-3

SECTION 4

ID Number: 1802111

Revision: 0

Time	ID/A Maff	Instructor Information / Activity	Task Assign	Expected Actions	Standard
	Crew			Monitor for HPSI & LPSI stop throttle criteria: <ul style="list-style-type: none"> • LPSI: pwr pressure <360# and controlled • HPSI: stop/throttle criteria will not be met until PORVs are closed. 	EOP2540D
	Inst.	<p>Note: In order to expedite the scenario, once SG feed is re-established, direction may be provided to the US to perform actions necessary to terminate OTC.</p>			
	US			Direct actions to terminate OTC: <ul style="list-style-type: none"> • Establish at least one SG >70" wide range level and verify feed and steaming capability • Ensure CEF temperature <600°F and not rising (from ICCS cabinets) • RVLMS ≥43% level (from ICCS cabinets) • PORVs not required for PC-3 success path 	EC4

SECTION 4

ID Number: ES02111

Revision: 0

Time	IDA MalF	Instructor Information	Activity	Task Assign	Expected Actions	Standard
				SPO	Using 'A' AFW pump, feed one or both SGs. (as directed), to >70% level and report completion to US. May verify ability of ADV(s) to establish steaming.	EOP2540D
				PPO	Report CET's <600°F and not rising. Report RVLMS level.	EOP2540D
				US	Since success path PC-3 is not in use and other conditions are met, direct closure of PORVs.	EOP2540D
				PPO	Close both PORVs by turning keys to close.	EOP2540D
			When the PORVs have been closed, the scenario may be terminated. The scenario may be terminated at an earlier time at the evaluators' discretion based on time and completion of critical tasks.	Inst.		

SECTION 4
SUMMARY

Title: Simulator Evaluation

ID Number: ES02L11

Revision: 0

CRITICAL TASKS

- **CT-1:** Critical based on the core being outside of analyzed 'safe' reactivity conditions requiring a prompt manual trip.
- **CT-2 (HR-1):** Establish OTC. Must be initiated if either SG level decreases to < 70 inches wide range level with no feed source to either SG.
- **CT-3 (LOAF-4):** Establish a primary to secondary heat sink.

SECTION 5
SCENARIO INITIAL CONDITIONS

File: Simulator Evaluation _____ Revision: 0
ID Number: ES02111 _____

Initial Conditions

- ◇ 100% power, MOI, equilibrium Xenon
- ◇ 821 ppm boron / Blend ratio - 6.3 :1
- ◇ SG Blowdown - 2.5 gpm each
- ◇ 24E aligned to bus 24C
- ◇ TDAFP is out of service for bearing replacement
- ◇ No other surveillances due

Out of Service Equipment

Turbine Driven AFW pump

Crew Instructions

Perform actions required to respond to events.

ATTACHMENT
VALIDATION CHECKLIST

Title: Simulator Evaluation Revision: 0
ID Number: ES02L11

Remote functions:

All remote functions contained in the guide are certified.

Verified By:

RMS

Malfunctions:

All malfunctions contained in the guide are certified

RMS

Initial Conditions:

The initial condition(s) contained in the guide are certified or have been developed from certified IC's.

RMS

Simulator Operating Limits:

The simulator guide has been evaluated for operating limits and/or anomalous response.

RMS

Test Run:

The scenario contained in the guide has been test run on the simulator. Simulator response is reasonable and as expected.

RMS



Actions Completed

11/22/02

Date

MP2 SIMULATOR TRAINING SHIFT TURNOVER REPORT

FOR TRAINING USE ONLY

Simulator Scenario: ES02LH

PLANT STATUS:	
MODE: <u>1</u> MEGAWATTS: Thermal: <u>2695</u> MWEH Electric: <u>900</u> MWE RCS LEAKAGE: Identified: <u>0.02</u> gpm Unidentified: <u>0.147</u> gpm BLEND RATIO: BAST <u>6.3:1</u> AEVON TREND: <u>stable</u> ASI TREND: <u>stable</u> ESI Value: <u>-0.05</u>	RX POWER: <u>100%</u> PZR PRESS: <u>2250</u> psia RCS T-AVE: <u>572</u> degrees F S/G BLOWDOWN: # <u>1</u> <u>25</u> gpm <u>1</u> <u>1.2</u> turns small # <u>2</u> <u>25</u> gpm <u>1</u> <u>1.2</u> turns small RCS BORON: <u>821</u> ppm UNIT 1/2 SA CROSSTIE: <u>Isolated</u> HOUSE HEATING: <u>Supplied by U3 Aux. Boiler</u> Water Treatment Vendor: <u>CST @ 100 gpm</u>

TS LCO and TRM ACTION Statements Coming Due						
Date	Time	LCO	ACTION	ACTION REQUIREMENT	EQUIPMENT	REASON
X XX 02	2 hrs ago	3.7.1.2	a.	With 1 AFW pump inoperable, restore to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.	TDAFP pump	bearing work
X XX 02	2 hrs ago	TRM II 3.0. item 2	a.	Restore operability of affected component within 7 days	TDAFP pump	bearing work

Continuous TS LCO and TRM ACTION Statements in effect				
ACTION REQUIREMENT	LCO	ACTION	EQUIPMENT	REASON
Maintain the inoperable vent path closed with power removed from the valves. Maintain one PORV & block valve operable.	TRMAS 3.4.11.b	a	PZR vent solenoids	Manually isolated due to leakage (2-RC-440 is closed).

SYSTEM/COMPONENT AVAILABILITY: (systems, components out of service, deviations from required system alignments, the need for valve lineups or other restoration activities)	
SYSTEM/COMPONENT	STATUS
TDAFP pump	Out of service for bearing work

U-1/U-2/U-3 CROSS UNIT EQUIPMENT STATUS List the status of all Unit 1 and Unit 3 equipment alignments that effect Unit 2, i.e., fire protection, Bus 34A/B, Circulating Water (dilution flow) etc.	
SYSTEM	STATUS
Aux Steam	U-3 supplying U-2 aux steam (from Unit #3 Aux. Boiler).

RADWASTE SYSTEM STATUS (ARW, CLRW, CPF, GRW) (identify water/gaseous inventory problems, discharges in progress or planned.)	
SYSTEM	STATUS
ARW	Pumping CTMT sump 18 hour frequency, pump prior to high level alarm to avoid PSAS on leak detection

SURVEILLANCES/EVOLUTIONS IN PROGRESS	
None	Lead Dept

FOR TRAINING USE ONLY

Attachment

SCENARIO ATTRIBUTES CHECKLIST

Scenario Title:	<u>Simulation Evaluation</u>	Number:	<u>ES021.11</u>
Technical Reviewer:	<u>Richard N Spurr</u>	Date:	<u>11/22/2002</u>

QUALITATIVE ATTRIBUTES

- Y 1. The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue the crew into expected events.
- Y 2. The scenario consists mostly of related events.
- Y 3. Each event description consists of:
- the point in the scenario when it is to be initiated
 - the malfunction(s) that are entered to initiate the event
 - the symptoms/cues that will be visible to the crew
 - the expected operator actions (by shift position)
 - the expected Emergency Plan classification
 - the event termination point (if applicable)
- Y 4. No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.
- Y 5. The events are valid with regard to physics and thermodynamics.
- Y 6. Sequencing/timing of events is reasonable, and allows for the examination team to obtain complete evaluation results commensurate with the scenario objectives.
- N/A 7. If time compression techniques are used, scenario summary clearly so indicates. Operators have sufficient time to carry out expected activities without undue time constraints. Cues are given.
- Y 8. The simulator modeling is not altered.
- Y 9. The scenario has been validated. Any open simulator performance deficiencies have been evaluated to ensure that functional fidelity is maintained while running the scenario.

SCENARIO ATTRIBUTES CHECKLIST

Note: Following criteria list scenario traits that are numerical (quantitative) in nature. Credited malfunctions tasks and procedures should be bolded in the evaluation guide.

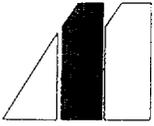
- | | | |
|----|--|----------|
| 1. | Total Malfunctions (TM) - Include EMs – (5 – 8) | <u>7</u> |
| | 1. RSST Loss | |
| | 2. 'A' EDG Output Breaker Failure | |
| | 3. CEA #28 Slipped | |
| | 4. #2 Steam Flow Transmitter Failure | |
| | 5. CEA #32 Dropped | |
| | 6. Degrade/trip 'B' AFW Pump | |
| | 7. Breaker A505 trip/failure to close | |
| 2. | Malfs after EOP entry (EMs) – (1 – 2) | <u>4</u> |
| | 1. RSST Loss | |
| | 2. 'A' EDG Output Breaker Failure | |
| | 3. Degrade/trip 'B' AFW Pump | |
| | 4. Breaker A505 trip/failure to close | |
| 3. | Abnormal Events (AE) – (2 – 4) | <u>2</u> |
| | 1. Loss of Off-site Power | |
| | 2. CEA Malfunctions | |
| 4. | Major Transients (MA) – (1 – 2) | <u>2</u> |
| | 1. Trip due to 2 dropped CEA's | |
| | 2. Loss of All Feed | |
| 5. | EOPs entered requiring substantive actions (EU) - (1 – 2) | <u>4</u> |
| | 1. EOP 2525 | |
| | 2. EOP 2537 | |
| | 3. EOP 2540 | |
| | 4. EOP 2540D | |
| 6. | EOP Contingencies requiring substantive actions (EC) – (0-2) | <u>4</u> |
| | 1. Trip 'A' EDG-No SW | |
| | 2. Initiate OTC | |
| | 3. Restore Bus 24C for 'A' AFW Pump | |
| | 4. Terminate OTC | |

7. Critical Tasks (CT)- (2 – 3) 3
- 1. Trip due to 2 dropped CEA's
 - 2. Establish OTC
 - 3. Establish Primary-to-Secondary Heat Sink
8. Approximate Scenario Run Time: 60 to 90 min. Total 120
9. Technical Specifications exercised during the scenario (Y/N) Y

Facility: <u>MP2</u>	Scenario No.: <u>ES02LI2</u>	Op-Test No.: <u>2</u>
Examiners: _____	Operators: _____	
_____	_____	
_____	_____	
Initial Conditions: <u>100% power, MOL, Eq. Xe., 821 ppm Boron SGBD @ 25 gpm per SG, 24E aligned to 24C</u>		
Turnover: <u>100% power, MOL, Eq. Xe., 821 ppm Boron, blend ratio: 6.3 to 1 SGBD @ 25 gpm per SG, 24E aligned to 24C, no equipment OOS and no surveillance in progress or due.</u>		

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N	Swap CTMT penetration cooling fans
2	CW02C	C	C Traveling Screen DP high
3	SG01B	C	SGTL in #2 SG
4	CV04A	C	Backup charging pump trips
5	N/A	R	Downpower due to SGTL
6	SG02B	M	Steam generator tube rupture
7	RX01A	C	Main spray valve stuck open on trip
8	RX14A, B,C,D	C	SD&BV's to condenser fail closed when rapid RCS cooldown is attempted

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor



Millstone Station Unit 2 Operator Training

SIMULATOR EXERCISE GUIDE

I. Title: Simulator Evaluation

ID Number: ES02LI2

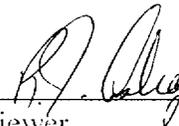
Revision: 0

II. Initiated:


R. K. Spivey
Developer

11/22/2002
Date

III. Reviewed:


R. J. Ashev
Reviewer

11/25/2002
Date

IV. Approved:


Operator Training Supervisor

12/4/02
Date

TABLE OF CONTENTS

SECTIONS LISTED IN ORDER:

1. Cover Page
2. Table of Contents
3. Exercise Overview
4. Instructor Guide / Summary
5. Scenario Initial Conditions Attachments
 - Validation Checklist
 - Training Turnover Sheet

EXERCISE OVERVIEW

1. Purpose:
 - a. Evaluate the licensees' ability, as a team and individually, to safely and responsibly operate the plant during normal plant operations, abnormal operating conditions and emergency operating conditions.
 - b. Evaluate licensees in the following areas, as applicable:
 - 1) Ability of the crew to perform crew-dependent (and time-critical) tasks.
 - 2) Ability of individuals to perform critical tasks.
 - 3) Ability of the crew to:
 - a) Understand/interpret alarms/annunciators
 - b) Diagnose events/conditions based on signals/readings
 - c) Understand plant/systems response
 - d) Comply with/use procedures and Technical Specifications
 - e) Properly communicate information/proper crew interactions
 - f) Perform control board operations
 - 4) Ability of each individual to:
 - a) Respond and correctly interpret annunciators
 - b) Correctly diagnose events
 - c) Properly interpret integrated system response
 - d) Comply with and use Technical Specifications
 - e) Comply with and use procedures
 - f) Properly perform control board operations
 - g) Demonstrate a responsible attitude
 - h) Properly communicate information and interact with the rest of the crew

2. Exercise Brief:

The simulator will be prepared for the evaluation and the licensees will be briefed on the conduct of the evaluation and the areas in which they will be evaluated.

The simulator will be initialized at 100% power, MOL, Eq Xe, 821 ppm boron. Work control requests that the 'B' Penetration Cooling fan be placed in service and the 'A' secured due to cleaning activities in the overhead of the West piping penetration room. There is no equipment out of service and no surveillance in progress.

Shortly after shifting the penetration cooling fans, the 'C' traveling screen DP will start a ramp increase due to a sheared pin in the drive gear. In response to the alarm, the crew will enter AOP 2517, Circulating Water Malfunctions. The crew will need to x-tie water-boxes due to the loss of the 'C' Circ pump.

Next a 2 gpm SGTL will cause an N16 radmonitor alarm followed by a SJAE alarm. The crew will enter AOP 2569, verify the leak, log TSAS 3.4.6.2.c, and enter AOP 2575 to commence a Rapid Downpower. When forcing pressurizer sprays, one of the valves will stick partially open. This will not be noticeable until the plant is tripped. During the downpower the lead charging pump will trip. This must be diagnosed and an alternate pump started or charging and letdown restored (if lost on high letdown temperature). The SGTL will become a SGTR. The crew should respond to the increased loss rate and MSLRM alarm and manually trip the plant. The PPO should identify the failed open spray valve during EOP 2525 and stop the associated RCPs. The US should perform the diagnostic flowchart, diagnose a SGTR and transition to EOP 2534. A cooldown to $\leq 515^{\circ}$ F on both loop Thots must be performed. All 4 of the SD&BV valves will fail closed when a cooldown to the condenser is attempted. This will require that the crew use the ADVs to perform the cooldown. The ruptured generator must then be isolated. Following isolation of the ruptured generator, the primary-to-secondary leak rate should be minimized by controlling RCS pressure at the lower end of the allowable pressure range and the RCS cooldown should be resumed.

When the ruptured generator has been isolated, the cooldown resumed, and RCS pressure being controlled at the lower end the exam scenario may be terminated.

3. Plant/Simulator differences that may affect the scenario are:

None

4. Duration: 1.5 hours

All Control Room Conduct, Operations and Communications shall be in accordance with Master Manual 14 (MP-14). Review the Simulator Operating Limits (design limits of plant) and Simulator Modeling Limitations and Anomalous Response List prior to performing this training scenario. The instructor should be aware if any of these limitations may be exceeded.

SECTION 4

ID Number ES02112Revision: 0

Time	IDA Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
E ₁	IC-24 or equivalent	<u>Simulator Setup and Initial Conditions:</u> 100 % Power, MOL, Equilibrium Xenon, RCS Boron 821 ppm, no TSAS, no equipment OOS, and no surveillance in progress. Ensure 'B' Charging pump is aligned to Facility 2 and the C02 lamicoid agrees.	Inst.		
	RX01A 25% BT1	Enter malfunction to stick spray valve RC-100E 25% open on a plant trip.	Inst.		TM2, EM1
		Brief the crew on their roles and the conduct of the exam. Ensure that any questions are resolved prior to starting the exam.	Inst.		
		<u>For Turnover Brief:</u> <ul style="list-style-type: none"> ◇ 100% power, MOL, Equilibrium Xenon ◇ 821 ppm boron / Blend ratio - 6.3:1 ◇ SG Blowdown - 25 gpm each ◇ 24E aligned to bus 24C ◇ No equipment OOS and no TSAS ◇ No surveillance in progress or due 			

SECTION 4

ID Number: ES0214E

Revision: 0

Time	IDA Malif	Instructor Information / Activity	Task Assign	Expected Actions	Standard
Initial		Using the info above and T/O sheet, provide the crew with turnover info, allow the crew to walk-down the boards, and perform briefing. The crew should indicate that they have "taken the watch".	Inst.		
		Call control room as Work Control: Performing cleaning in the overhead of the West piping penetration room. Safety considerations require that the 'A' Containment Penet. cooling fan be secured and the 'B' fan be placed in service in its stead.	Inst.		
			US	Direct SPO to place 'B' Penetration Cooling fan in service and secure 'A' IAW OP 2314E.	
			SPO	IAW OP 2314E, place 'B' Penetration Cooling fan in service and secure 'A'	OP2314E
1:	CW02C 80% 1200 sec ramp	NOTE: Insert immediately following request to swap penetration cooling fans, Insert malfunction to cause the 'C' Traveling screen to slowly increase DP.	Inst.		TMR, AEI
			SPO	Identify screen DP increase or respond to "Traveling Screen DP Hi" alarm at 12", refer to ARP, and report same.	MM-14

ID Number: ES02112

SECTION 4

Revision: 0

Time: _____ IDA Made: _____ Instructor Information: _____ Activity: _____ Task: _____ Assign: _____ Expected Actions: _____ Standard: _____

Time	IDA Made	Instructor Information	Activity	Task	Assign	Expected Actions	Standard
				US		Enter AOP 2517 Circ Water Malfunctions and refer to Section 9.0. "Traveling Screen Differential Pressure High".	ARP 2590E
				US		Dispatch PFD to intake to manually start screens and investigate.	AOP 2517
				Inst.		As PFD dispatched to intake, report the 'C' screen drive motor is rotating, but the drive gear is not and appears to have a sheared pin.	
				US		Contact maintenance to report sheared pin.	AOP 2517
				Crew		Note: Procedure does not direct proactive securing, but does provide guidance on X-ing in response to a tripped pump and lowering vacuum. Should proactively secure 'C' Circ pp. prior to trip at 30" DP and X-tie 'C' and 'D' water-boxes from 'D' Circ pp. or may respond to CW pump trip using AOP 2517. Section 5.0 and X-tie 'C' & 'D' waterboxes from 'D' CW pump.	AOP 2517

SECTION 4

ID Number: ES02112Revision: 0

Time	HDA MalF	Instructor Information	Activity	Task Assign	Expected Actions	Standard
				SPO	Secure 'C' Circ. Pump and x-tie waterboxes from 'D' Circ. Pump by: <ul style="list-style-type: none"> • Trip or verify tripped the 'C' Circ. Pp. • Close 'C' waterbox inlet • Open 'C' to 'D' x-tie 	AOP2517
15	SG01B 20%		Insert malfunction for a 2 gpm SGFL.	Inst.		TM4, AE2
				Crew	Identify SG tube leakage by N-16 alarm and/or SJAЕ radmonitor alarm.	MM-14

SECTION 4

ID Number F802112

Revision: 0

Time	ID/Malf	Instructor Information - Activity	Task Assign	Expected Actions	Standard
		<p>As PEO report that HV-4287 and HV-4288 are closed.</p>	<p>US</p>	<p>Enter AOP 2569:</p> <ul style="list-style-type: none"> • Verify valve closures due to SJAE RM alarm. <ul style="list-style-type: none"> • SG Blowdown MS-220A&B • Blowdown Quench tank discharge MS-135 • SG Blowdown tank drain MS-15 • Secondary sample panel SG sample isolations HV-4287 & HV-4288 (local) • Verify SGBD input to calorimetric at 0 gpm per SG. (PPC) • Confirm leakage in #2 SG, N-16 RM, as >75 gpd and rising by >15 gpd per ½ hour and direct plant downpower at ~50% per hour (displayed on PPC) • Direct PEO actions to prevent unmonitored releases: <ul style="list-style-type: none"> • Verify CN-334 closed • Secure condenser pit sump pumps • Realign SJAE aftercooler drains • Monitor sump levels • Establish Chem. Sampling of sumps. 	<p>AOP 2569</p>

SECTION 4

ID Number: LS02L12Revision: 0

Time	IDA Malfunction	Instructor Information / Activity	Task Assign	Expected Actions	Standard
			SM/US	Quantify SGTL leak rate in excess of TS LCO of 0.035 gpm per SG and enter TSAS 3.4.6.2.c	TS
		<p>*SM may be requested to make some or all of the required notifications.</p> <p>Note: SM should classify as Echo due to plant shutdown required by Tech Specs.</p>	US	<p>Enter AOP 2575. Rapid Downpower :</p> <ul style="list-style-type: none"> • Direct/remind crew to refer to Attachments 1, 5, & 6 during downpower (Rapid Downpower Parameters, Temperature vs. Power Program, & Rapid Power Overview) • *Make notifications regarding downpower <ul style="list-style-type: none"> • HP re: charging/letdown increase • CONVEX & ISO-NE • MP3 • Management • Direct PPO to initiate downpower of reactor and SPO to follow with turbine load 	AOP 2569
			PPO	<p>Initiate forcing sprays, (if not already in progress), by starting all available backup heaters and lowering Pzr pressure controller setpoint to ~2200 psia.</p> <p>May use boration to chg. Pp. Suction or align to RWST for suction to achieve recommended S/D rate.</p>	<p>AOP 2575</p> <p>AE3</p>

SECTION 4

ID Number: LS02112

Revision: 0

Time	HDA Malfunction	Instructor Information	Activity	Task Assign	Expected Actions	Standard
					<p>If using RWST suction:</p> <ul style="list-style-type: none"> • Power reduction rate with 2 charging pumps will be ~64% per hour (MOC) • Ensure VCT bypass CH-192 closed • Ensure CH-504 RWST suction to charging open. • Close CH-501, VCT outlet isolation • Check proper flow rate for 2 pumps: <p style="text-align: center;">OR</p> <p>If using boration from BAST tanks:</p> <ul style="list-style-type: none"> • Insert CEAs an initial 5 to 10 steps • Determine boration rate of ~20 gpm • Borate to charging pp. suction by: <ul style="list-style-type: none"> • Ensure M/U Mode Select switch in Dilute • Ensure valves M/U Stop Valve CH-512, VCT M/U Bypass CH-196, and RWST Isol. CH-192 all closed. • Ensure BA Controller FC-210Y in Auto • Adjust FC-210Y to ~20 gpm • Open CH-504 	

Time IDA Mail Instructor Information Activity Assign Task Expected Actions Standard

					<ul style="list-style-type: none"> Place M/U Mode Select switch in Manual Start a Boric Acid pp. & verify discharge pressure >98 psig Open VCT M/U Bypass CH-196 	
			SPO		Follow reactor downpower by reducing turbine load to maintain RCS temperature program.	AOP2575
ES	CV04C	<p>During the downpower, use malfunction to trip the (C) lead charging pump.</p> <p>Note: If only one charging pump running, letdown may be lost on high temperature unless an alternate charging pump is started promptly.</p> <p>*Initial checks for charging & letdown restoration not required since system was just operating.</p>	Inst.	<p>Identify loss of chg. Pp. and start the A or B charging pump in time to prevent loss of letdown. (use Level 1 switch or shift Lead pump).</p> <p>OR</p> <p>*Restore charging and letdown by:</p> <ul style="list-style-type: none"> Place letdown backpressure controller PIC-201 in Manual with ~10-20% open signal Place Letdown Limiter in Bypass Place Letdown Flow Control, HIC-110 in Manual Close CH-110P and CH-110Q 	<p>TMI</p> <p>OP2304A</p>	

SECTION 4

ID Number: ES02L12

Revision: 0

Time	IDA Malfunction	Instructor Information - Activity	Task Assign	Expected Actions	Standard
				<ul style="list-style-type: none"> • Place Ion Exchange Bypass, CH-520 in Bypass • Open/ensure open Letdown isolations CH-515, CH-516, and CH-089 • Adjust HIC-110 for ~15 gpm letdown, ensuring letdown backpressure ~460# • Start one charging pump • After ~40 seconds, adjust Letdown backpressure to ~300# and shift PIC-201 to Auto • Adjust HIC-110 for ~40 gpm letdown • Place Letdown Limiter in Normal • Adjust HIC-110 to restore Pzr level to normal • Place Ion Exchange Bypass to Auto 	
			Crew	Verify charging pump alignment to be LAWTS LCO, i.e.: one Operable charging pump aligned to each facility.	OP2304A
14	SG02B 15% 300 sec ramp	Insert malfunction for the SGTR to degrade to a SGTR ~450 gpm in #2 SG over a 5 minute period.	Inst.		TMI5, MAI

SECTION 4

ID Number: ES02112

Revision: 0

Time	IDA Malfunction	Instructor Information	Activity	Task Assign	Expected Actions	Standard
				Crew	Identify increasing RCS leakage by: <ul style="list-style-type: none"> • Chg./LD mismatch, or • Rising radmonitors, or • Main Steam Line Radmonitor (MSLRM) alarm 	MM-14
				US	Direct plant trip and EOP 2525 on verified MSLRM alarm on C01 alarm panel.	AOP 2569
				PPO	Perform manual reactor trip by depressing 4 trip buttons on C04.	EOP 2525 EU 1
			Note: US will pose questions regarding these aspects of each safety function. PPO and SPO responses critical to proper diagnosis and key actions are contained in their individual sections, immediately following.	US	Query PPO and SPO on the status of Safety Functions as delineated in EOP 2525: <ul style="list-style-type: none"> • Reactivity Control (PPO) <ul style="list-style-type: none"> • Reactor • Maintenance of Vital Auxiliaries (SPO) <ul style="list-style-type: none"> • Turbine • Electrical buses • SW & RBCCW • RCS Inventory Control (PPO) <ul style="list-style-type: none"> • Pzr level & SCM, value & trend 	EOP 2525

Time: ID: A Staff: Instructor Information: Activity: Assign: Task: Expected Actions: Standard:

		<ul style="list-style-type: none"> • RCS Pressure Control (PPO) <ul style="list-style-type: none"> • Pzr pressure, value & trend • Core Heat Removal (PPO) <ul style="list-style-type: none"> • RCP status • Loop delta-T • Th SCM • RCS Heat Removal (SPO) <ul style="list-style-type: none"> • SGI pressures 880-920# • RCS Te 530-535 °F • SGI levels, value & trend • RCS SCM • Containment (CTMI) Isolation (PPO) <ul style="list-style-type: none"> • Radmonitors inside CTMT, outside CTMT, steam plant, not in alarm or rising. • CTMT pressure < 1# • CTNMT Temperature & Pressure Control (PPO) <ul style="list-style-type: none"> • CTNMT temperature < 120° F • CTNMT pressure < 1# • CTMT Combustible Gas Control (PPO) <ul style="list-style-type: none"> • CTMT temperature < 120° F
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SECTION 4

ID Number: ES02112

Revision: 0

Time	IDA/Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
				<ul style="list-style-type: none"> CTMT pressure <1# 	
			SPO	Perform SPTA and report results when queried: <ul style="list-style-type: none"> Turb tripped, valves closed, 8T & 9T open All electrical buses energized 2 SW, 2 RB, feeding with main feed Feed to #2 SG throttled to maintain level 40% to 70% (Iodine scrubbing) IA normal 	EOP 2525
			PPO	Perform SPTA and report results when queried: <ul style="list-style-type: none"> Rx trip, all CEAs in, power dropping, SUR negative. Pzr level & pressure low and dropping. Spray valve RC-100E partially open, won't close in manual, trip A & C RCPs. B & D RCPs may be secured as well if pressure continues to lower and HIC-4165 in Manual closed if all RCPs secured. Verify or initiate SIAS/CIAS/EBFS when pzr pressure approaches 1714 (may be actuated approx. 1800# decreasing IAW Master Manual MM-14 instructions) 	EOP 2525

SECTION 4

ID Number: ESO2112

Revision: 0

Time	IDA Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
				<ul style="list-style-type: none"> • Verify one train of Control Room Air Conditioning (CRACS) in recirc. • RCS temperature normal • Radmonitors inside & outside of CTMT not in alarm or rising • Secondary system radmonitors in alarm or elevated. • CTMT pressure and temperature normal. 	
			US	Query PPO & SPO regarding the status of EOP 2525 subsequent actions	EOP 2525
			SPO	Report subsequent actions complete and verified when accomplished.	EOP 2525
			PPO	Report subsequent actions complete and verified when accomplished.	EOP 2525
			US	Perform diagnostic flowchart and diagnose SGTR. (based on N-16 response and MSLRM should identify #2 SG), direct entry into EOP 2534 SGTR.	EOP 2525

SECTION 4

ID Number: ES02L12Revision: 0

Time	IDA Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
			US	Verify SGTR via sampling of SGs.	EOP 2534 EU2, EC1
		Note: After ~15 minutes following request and opening of sample valves, report samples taken and quick frisk results show #2 SG ~150 CPM above background and #1 SG reading background.	SPO	Open SG sample isolation valves, contact Chemist, and request SG samples for boron, activity, and a quick frisk to verify SGTR and confirm the ruptured SG.	EOP 2534
		Note: SM would classify this event as Alert/C-1. Depending on a number of variables the unit 2 stack radmonitor (Kaman RM-8168) may reach a value which would trigger a higher level classification. Tracking of this parameter and notification of the SM would be performed by the STA.			

Time: _____ HD A Mail: _____ Instructor Information / Activity: _____ Task: _____ Assign: _____ Expected Actions: _____ Standard: _____

			US	Direct PPO to verify actuation of SIAS, CIAS, and EBFAS and one complete train of CRACS in recirc.	EOP 2534
			PPO	<ul style="list-style-type: none"> • Verify actuation of SIAS, CIAS, and EBFAS • Verify one complete train of CRACS in recirc. • Verify SI flow adequate per Appendix 2 Figure • Ensure all available charging pumps running • Ensure vital switchgear cooling running • Align condenser air removal to Unit 2 stack (SPO) 	EOP 2534
			US	Direct operators to perform a cooldown of both SGs using steam dumps to condenser to Th < 515° F.	EOP 2534
		CTI (SGTR-7): Perform RCS cooldown for SG isolation. Complete to support SG isolation in ≤ 50 minutes.	SPO	Initiate cooldown to < 515° F in both hot legs by steaming to the condenser at maximum controllable rate using the SD&BV's	EOP 2534 CTI
	RX14.A.B. C.D) 0%	In rapid succession, enter malfunctions to fail closed all 4 of the SD&BV's when the SPO initiates a rapid cooldown.	Inst.		

SECTION 4

ID Number: ESO2L12

Revision: 0

Time	HDA-Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
			SPO	Identify loss of the 4 SD&BV's and shift to the ADV's to perform the rapid cooldown to <515°F	EOP 2534
		If PEO dispatched to SD&BV's to investigate, report back that there is a branch air header that has separated at a solder joint.	Inst.		
		*Maintain p/r pressure >NPSH, <920#, within 50# of #2 SG, and IAW P/T curve. **NPSH N/A if all RCPs off.	Crew	Perform cooldown at max controllable rate to Th < 515° F, monitor SCM and **RCP NPSH. Minimize pri-sec DP* to limit transfer to SG.	EOP 2534
		Note: Since ADV's are being used, this step is not required, but may be performed based on the expectation that the SD&BV's may be restored to operable.	Crew	Monitor for MSIS and block when allowable. If MSI actuates, may perform actions to maintain vacuum in the main condenser: <ul style="list-style-type: none"> • Close disconnects for MS-65A&B • Ensure SD&BV's fully closed • Re-pressurize steam header • Re-open MSIV's 	EOP 2534

SECTION 4

ID Number: ES02112

Revision: 0

Time	IDA MalF	Instructor Information / Activity	Task Assign	Expected Actions	Standard
		<p>CT-2 (SGTR-2): Establish RCS pressure control such that primary-to-secondary delta-P is maintained low such that the ruptured SG doesn't overflow (>100% actual level).</p>	<p>Crew</p>	<p>Minimize the primary to secondary delta-P such that the ruptured SG does not overflow.</p>	<p>CT-2 EOP 2534</p>
		<p>CT3 (SGTR-5): Isolate most affected SG. SG must be isolated in ≤ 50 minutes from the time of the SGTR.</p>	<p>Crew</p>	<p>Isolate #2 SG when both Th are less than 515° F:</p> <ul style="list-style-type: none"> • ADV in Auto @ 920# & closed • MSIV & Bypass closed • Main FRV & block valve closed • Main feed air-assist check closed • SGBD isolated (MS-220B) • AAFAS switches in PTL • Aux FRV FW-43B closed 	<p>CT3 EOP 2534</p>

SECTION 4

ID Number: LS02L12

Revision: 0

Time	IDA Matl	Instructor Information / Activity	Task Assign	Expected Actions	Standard
			PPO	Monitor for HPSI throttle/stop criteria and perform actions to throttle and/or stop HPSI to minimize pri-to-sec delta-P to prevent SG overfill. <ul style="list-style-type: none"> • RCS SCM within P/T curve • Pzr level >20% and NOT dropping • At least 1 SG removing heat • Rx vessel level \geq 43% 	EOP 2534
		The exam scenario may be terminated when both Th have been reduced to < 515° F, #2 SG has been successfully isolated, and RCS pressure is being maintained IAW procedural guidance.	Inst.		

SECTION 4
SUMMARY

Title: Simulator Evaluation

ID Number: ES02LI2

Revision: 0

CRITICAL TASKS

- CT1 (SGTR-7): Perform RCS cooldown for SG isolation. Complete to support SG isolation in ≤ 50 minutes.
- CT2 (SGTR-2): Establish RCS pressure control such that primary-to-secondary delta-P is maintained low such that the ruptured SG doesn't overflow ($>100\%$ actual level).
- CT3 (SGTR-5): Isolate most affected SG. SG must be isolated in ≤ 50 minutes from the time of the SGTR.

SECTION 5
SCENARIO INITIAL CONDITIONS

File: Simulator Evaluation

ID Number: ES02L12

Revision: 0

Initial Conditions

- ◇ 100% power. MOL. equilibrium Xenon
- ◇ 821 ppm boron ; Blend ratio - 6.3 : 1
- ◇ SG Blowdown - ~25 gpm each
- ◇ 24F aligned to bus 24C
- ◇ No equipment OOS and no TSAS
- ◇ No surveillance in progress or due

Out of Service Equipment

None

Crew Instructions

Perform actions required to respond to events.

ATTACHMENT
VALIDATION CHECKLIST

Title: Simulator Evaluation

ID Number: ES02L12

Revision: 0

Remote functions:

All remote functions contained in the guide are certified.

Verified By:

RMS

Malfunctions:

All malfunctions contained in the guide are certified

RMS

Initial Conditions:

The initial condition(s) contained in the guide are certified or have been developed from certified ICs.

RMS

Simulator Operating Limits:

The simulator guide has been evaluated for operating limits and/or anomalous response.

RMS

Test Run:

The scenario contained in the guide has been test run on the simulator. Simulator response is reasonable and as expected.

RMS



Actions Completed

11/22/02

Date

MP2 SIMULATOR TRAINING SHIFT TURNOVER REPORT

FOR TRAINING USE ONLY

Simulator Scenario: ES02L12

PLANT STATUS:	
MODE: <u>1</u> MEGAWATTS: Thermal: <u>2695</u> MWTH Electric: <u>900</u> MWE RCS LEAKAGE: Identified: <u>0.024</u> gpm Unidentified: <u>0.147</u> gpm BLEND RATIO: BAST <u>6.3:1</u> XENON TREND: <u>stable</u> ASI TREND: <u>stable</u> ESI Value: <u>-.005</u>	RX POWER: <u>100%</u> PZR PRESS: <u>2250</u> psia RCS T-AVE: <u>572</u> degrees F S/G BLOWDOWN: # <u>1</u> <u>25</u> gpm <u>1.1/2</u> turns small # <u>2</u> <u>25</u> gpm <u>1.1/2</u> turns small RCS BORON: <u>821</u> ppm UNIT 1/2 SA CROSSTIE: <u>Isolated</u> HOUSE HEATING: <u>Supplied by U3 Aux. Boiler</u> Water Treatment Vendor: <u>CST@ 100 gpm</u>

TS LCO and TRM ACTION Statements Coming Due						
Date	Time	LCO	ACTION	ACTION REQUIREMENT	EQUIPMENT	REASON

Continuous TS LCO and TRM ACTION Statements in effect				
ACTION REQUIREMENT	LCO	ACTION	EQUIPMENT	REASON
Maintain the inoperable vent path closed with power removed from the valves. Maintain one PORV & block valve operable.	TRMAS 3.4.11.b	a	PZR vent solenoids	Manually isolated due to leakage (2-RC-440 is closed).

SYSTEM/COMPONENT AVAILABILITY: (systems, components out of service, deviations from required system alignments, the need for valve lineups or other restoration activities)	
SYSTEM/COMPONENT	STATUS

U-1/U-2/U-3 CROSS UNIT EQUIPMENT STATUS List the status of all Unit 1 and Unit 3 equipment alignments that effect Unit 2. i.e., fire protection, Bus 34A/B, Circulating Water (dilution flow) etc.	
SYSTEM	STATUS
Aux Steam	U-3 supplying U-2 aux steam (from Unit #3 Aux. Boiler).

RADWASTE SYSTEM STATUS (ARW, CLRW, CPF, GRW) (identify water/gaseous inventory problems, discharges in progress or planned.)	
SYSTEM	STATUS
N A	

SURVEILLANCES/EVOLUTIONS IN PROGRESS	Lead Dept
1. None	

FOR TRAINING USE ONLY

Attachment

SCENARIO ATTRIBUTES CHECKLIST

Scenario Title: Simulator Evaluation Number: ES02L12
Technical Reviewer: Richard N Spurr Date: 11/22/2002

QUALITATIVE ATTRIBUTES

- Y 1. The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue the crew into expected events.
- Y 2. The scenario consists mostly of related events.
- Y 3. Each event description consists of:
- the point in the scenario when it is to be initiated
 - the malfunction(s) that are entered to initiate the event
 - the symptoms/cues that will be visible to the crew
 - the expected operator actions (by shift position)
 - the expected Emergency Plan classification
 - the event termination point (if applicable)
- Y 4. No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.
- Y 5. The events are valid with regard to physics and thermodynamics.
- Y 6. Sequencing/timing of events is reasonable, and allows for the examination team to obtain complete evaluation results commensurate with the scenario objectives.
- N/A 7. If time compression techniques are used, scenario summary clearly so indicates. Operators have sufficient time to carry out expected activities without undue time constraints. Cues are given.
- Y 8. The simulator modeling is not altered.
- Y 9. The scenario has been validated. Any open simulator performance deficiencies have been evaluated to ensure that functional fidelity is maintained while running the scenario.

Attachment Guide No.: ES02L12
SCENARIO ATTRIBUTES CHECKLIST

Note: Following criteria list scenario traits that are numerical (quantitative) in nature. Credited malfunctions tasks and procedures should be bolded in the evaluation guide.

- 1. Total Malfunctions (TM) - Include EMs – (5 – 8) 6
 - 1. Lead Charging Pump trips
 - 2. RC-100E Failed Open
 - 3. 'C' Traveling Screen Fouling
 - 4. 'B' SG Tube Leak
 - 5. 'B' SGTR
 - 6. SD& BV's fail closed

- 2. Malfs after EOP entry (EMs) – (1 – 2) 2
 - 1. RC-100E Failed Open
 - 2. SD&BV's fail closed

- 3. Abnormal Events (AE) – (2 – 4) 3
 - 1. Circ. Water Malfunctions
 - 2. 'B' SG Tube Leak
 - 3. Rapid Downpower

- 4. Major Transients (MA) – (1 – 2) 1
 - 1. 'B' SGTR

- 5. EOPs entered requiring substantive actions (EU) - (1 – 2) 2
 - 1. EOP 2525
 - 2. EOP 2534

- 6. EOP Contingencies requiring substantive actions (EC) – (0-2) 1
 - 1. EOP 2534

- 7. Critical Tasks (CT)- (2 – 3) 3
 - 1. Perform RCS C/D for SG Isolation
 - 2. Control RCS pressure/avoid SG overflow
 - 3. Isolate Most Affected SG

- 8. Approximate Scenario Run Time: 60 to 90 min. Total 90

- 9. Technical Specifications exercised during the scenario. (Y/N) Y

Facility: MP2 Scenario No.: ES02LI4 Op-Test No.: 4

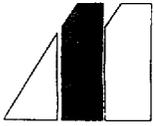
Examiners: _____ Operators: _____

Initial Conditions: 100% power, MOL, Eq. Xe., 821 ppm Boron SGBD @ 25 gpm per SG, 24E aligned to 24C, 'B' EDG OOS - cleaning and refilling oil sump

Turnover: 100% power, MOL, Eq. Xe., 821 ppm Boron, blend ratio: 6.3 to 1 SGBD @ 25 gpm per SG, 24E aligned to 24C, 'B' EDG OOS - cleaning and refilling oil sump, in TSAS 3.8.1.1.b, TDAFP has been verified operable & line surveillance due in 3 hours, no other equipment OOS and no other surveillance in progress or due

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N	Swap running TBCCW pumps
2	RP19C	I	'C' RPS Lower NI Fails low
3	CW04C	C	'C' Waterbox Condenser Tube Leak
4	FW01	C	Isolated condenser tube leak becomes vacuum leak
5	N/A	R	Downpower due to vacuum leak
6	TC04	M	Turbine load shed causes trip
7	ED02	C	RSST Fault - Loss of Off-site Power
8	ES03I	C	'A' HPSI Pump failure to start on SIAS
9	RC06B	M	Stuck open PORV - LOCA
10	PC01	C	Plant Process Computer lost on trip

- (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor



**Millstone Station
Unit 2 Operator Training**

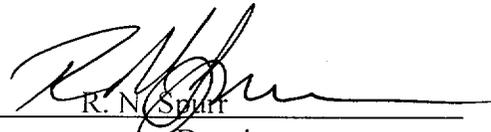
SIMULATOR EXERCISE GUIDE

I. Title: Simulator Evaluation

ID Number: ES02LI4

Revision: 0

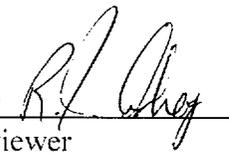
II. Initiated:



R. N. Spurr
Developer

11/21/2002
Date

III. Reviewed:



R. J. Ashe
Reviewer

11/25/2002
Date

IV. Approved:



Operator Training Supervisor

12/4/02
Date

TABLE OF CONTENTS

SECTIONS LISTED IN ORDER:

1. Cover Page
2. Table of Contents
3. Exercise Overview
4. Instructor Guide / Summary
5. Scenario Initial Conditions Attachments
 - Validation Checklist
 - Training Turnover Sheet

EXERCISE OVERVIEW

1. Purpose:
 - a. Evaluate the licensees' ability, as a team and individually, to safely and responsibly operate the plant during normal plant operations, abnormal operating conditions and emergency operating conditions.
 - b. Evaluate licensees in the following areas, as applicable:
 - 1) Ability of the crew to perform crew-dependent (and time-critical) tasks.
 - 2) Ability of individuals to perform critical tasks.
 - 3) Ability of the crew to:
 - a) Understand/interpret alarms/annunciators
 - b) Diagnose events/conditions based on signals/readings
 - c) Understand plant/systems response
 - d) Comply with/use procedures and Technical Specifications
 - e) Properly communicate information/proper crew interactions
 - f) Perform control board operations
 - 4) Ability of each individual to:
 - a) Respond and correctly interpret annunciators
 - b) Correctly diagnose events
 - c) Properly interpret integrated system response
 - d) Comply with and use Technical Specifications
 - e) Comply with and use procedures
 - f) Properly perform control board operations
 - g) Demonstrate a responsible attitude
 - h) Properly communicate information and interact with the rest of the crew

2. Exercise Brief:

The simulator will be prepared for the evaluation and the licensees will be briefed on the conduct of the evaluation and the areas in which they will be evaluated.

The simulator will be initialized at 100% power, MOL, Eq Xe, 821 ppm boron. The 'B' EDG is OOS for cleaning and refilling of the lube oil sump due to trace contaminants found in the most recent sample. The unit is in TSAS 3.8.1.1.b. A sample of the 'A' EDG lube oil was taken and found to be free of any contaminants and the TDAFP has been proven Operable. Bus 24E is aligned to 24D. Off-site lines surveillance was performed 5 hours earlier, therefore due in 3 hours. There is no other surveillance in progress and no other equipment out of service, however maintenance has just notified the control room that the 'A' TBCCW pump should be secured and the spare started in its place due to a chirping noise in the pump end of the motor which is believed to be a failing bearing.

Shortly after the crew shifts TBCCW pumps the Channel 'C' RPS lower power range NI will fail low. This will actuate a number of annunciators associated with RPS 'C' trips as well as a "CEA Dropped - NIS" alarm. The crew will need to diagnose the cause of the alarms, bypass affected bistables on RPS 'C' and enter Tech Spec 3.3.1.1, table 3.3-1, Action 2.

A small condenser tube leak will develop in 'C' waterbox. The crew will enter AOP 2516, Condenser Tube Leak and take action to secure 'C' circulating water pump, isolate and drain the 'C' waterbox, and monitor vacuum. After the waterbox is isolated the tube leak will become a small vacuum leak and the crew should enter AOP 2574, Loss of Vacuum. By starting the mechanical vacuum pumps the vacuum loss will be slowed, but not stopped. The crew will need to enter AOP 2575 to perform a rapid downpower. When the SPO is reducing turbine load, a relay for the load set motor will stick, driving load set downscale. The unit will trip on high pressurizer pressure due to the rapid backing up of RCS heat. PORV(s) will open on high pressure with the #2 PORV sticking open. The RSST will fault on the trip. Additionally, the PPC will be lost on the trip. With the 'B' EDG out of service only bus 24C/22E will be energized, therefore the PORV cannot be isolated. SIAS will actuate (manual or auto) as pressure drops, but actuation module AM514 fails to actuate. This prevents the 'A' HPSI pump from starting on the SIAS signal, but it can be started manually once the failure is identified.

After performing EOP 2525 the US should diagnose a LOCA and transition to EOP 2532. In the LOCA EOP the crew should identify that the leak may be isolated by restoring power to bus 24D/22F, 4160 V power should be cross-tied from MP3 and the PORV block valve should be closed. Once the leak has been secured the crew will need to take actions to avoid PTS.

When the above have been completed, the exam scenario may be terminated.

Title: Simulator Evaluation

ID Number: ES02LI4

Revision: 0

3. Plant/Simulator differences that may affect the scenario are:

None

4. Duration: 1.5 hours

All Control Room Conduct, Operations and Communications shall be in accordance with Master Manual 14 (MP-14). Review the Simulator Operating Limits (design limits of plant) and Simulator Modeling Limitations and Anomalous Response List prior to performing this training scenario. The instructor should be aware if any of these limitations may be exceeded.

SECTION 4

ID Number ES02114

Revision: 0

Time	ID/A/Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
T ₀	IC-24 or equivalent	<u>Simulator Setup and Initial Conditions:</u> 100 % Power, MOL., Equilibrium Xenon, RCS Boron 821 ppm, 'B' EDG OOS	Inst.		
		Ensure 'A' & 'C' TBCCW pumps running. Remove yellow caution tag from the 'B' TBCCW pump.	Inst.		
	EGR13 Closed	Use remote function to close the air starts for the 'B' EDG.	Inst.		
	EGR18 RO	Use remote function to rack out the 'B' EDG output breaker.	Inst.		
	EGR21 Reset	Place simulator in RUN, use remote function to reset the local trouble alarm for the 'B' EDG, acknowledge and reset all alarms, and hang yellow tags on the 'B' EDG start switch and output breaker handswitch.	Inst.		
	EDR14 RO EDR15 RI SWR22 22F	With the simulator in Run, open 24E feed from 24C, use remotes to rack down 24C-E feeder and rack in 24D-E feeder, then close 24D to 24E feed breaker. Swap power for 'B' SW Stirr to 22F. Swap SW, RB, & HPSI X-ties to Z2.	Inst.		

SECTION 4

ID Number ES02114

Revision: 0

Time	ID# Malfunction	Instructor Information / Activity	Task Assign	Expected Actions	Standard
	PC01 BFI	Enter malfunction to cause the Plant Process Computer (PPC) to fail at the time the plant trips.	Inst.		TM8, EM4
	ED02 BFI	Enter malfunction for loss of the RSST on a plant trip.	Inst.		TM1, EM1,
	ES031	Enter malfunction to cause actuation module AM514 to fail to actuate. On a SIAS the 'A' HPSI pump and the 'A' Battery Room Exhaust fan will fail to auto start. They may be manually started. There are no indications prior to the accident signal.	Inst.		TM2, EM2
	RC06B 100% BFI	Enter malfunction to cause the #2 PORV to fail full open on a plant trip.	Inst.		TM3, EM3, MAI
		<p><u>For Turnover Brief:</u></p> <ul style="list-style-type: none"> ◇ 100% power, MOL, Equilibrium Xenon ◇ 821 ppm boron / Blend ratio - 6.3:1 ◇ SCG Blowdown - 25 gpm each ◇ 24E aligned to bus 24D ◇ 'B' EDG out to clean & fill oil sump 			

SECTION 4

ID Number ES02L14

Revision: 0

Time	IDA/Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
		<ul style="list-style-type: none"> ◇ In TSAS 3.8.1.1.b ◇ No other equip OOS ◇ Off-site lines surveillance due in 3 hours <p>Maintenance has just notified the control room that the 'A' TBCCW pump should be secured and the spare started in its place due to a chirping noise in the pump end of the motor which is believed to be a failing bearing</p>			
Initial		Using the info above and T/O sheet, provide the crew with turnover info. allow the crew to walk-down the boards, and perform briefing. The crew should indicate that they have 'taken the watch'.	Inst.		
			US	Direct SPO to shift TBCCW pumps IAW OP 2330B.	
			SPO	Secure 'A' TBCCW & start 'B' by: <ul style="list-style-type: none"> • Dispatch PEO to monitor pump start • Start 'B' TBCCW pump <ul style="list-style-type: none"> • Check amps & discharge pressure on 	OP2330B

SECTION 4

ID Number FS02114

Revision: 0

Time	IDA/Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
				C06 <ul style="list-style-type: none"> • Direct PEO to check for noise, vibration, & normal flow (locally) • Place 'A' TBCCW pump HS in stop • Release PEO 	
11	RP19C 0%	Enter malfunction to cause the Channel 'C' RPS linear range lower NI detector to suddenly fail low.	Inst.		TM4
			PPO	Respond to annunciators for: <ul style="list-style-type: none"> • 'CEA Dropped-NIS' • 'RPS 'C' LPD Trip' • 'RPS Channel Hi-Hi Deviation' Determine absence of a dropped CEA and reference ARP.	MM-14
			Crew	Diagnose failed lower NI on RPS 'C'	ARP 2590C

SECTION 4

ID Number FS02114

Revision: 0

Time	IDA/Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
			PPO	Per ARP 2590C Bypass RPS 'C': <ul style="list-style-type: none"> • TM/LP • Hi-Pwr • LPD 	ARP 2590C
			US	Log TSAS 3.3.1.1, table 3.3-1, Action 2	ARP 2590C
T2	CW04C 100% 240 sec ramp	Insert malfunction for a 10 gpm tube leak in the 'C' waterbox to ramp in over 4 minutes.	Inst.		TM5, AE1
			SPO	Respond to annunciator C05*BA17, 'C' Hotwell Cond High and diagnose condenser tube leak in 'C' waterbox.	MM-14
			US	Enter AOP 2516 to respond to condenser tube leak in 'C' waterbox.	ARP 2590D
			SPO	Perform actions to halt Chloride intrusion: <ul style="list-style-type: none"> • Secure 'C' Circ Pp. Dispatch PEO to secure vacuum priming, vent the waterbox, and secure SJAE suction from 'C'	AOP 2516

SECTION 4

ID Number: ES02114

Revision: 0

Time	IDA/Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
	CWR04 Vent FWR53 Closed	When requested as PEO, use remotes to secure vacuum priming and vent "C" waterbox and secure the SJAE suction.	Inst.		
13	FW01 20%	When the waterbox is vented, insert malfunction to cause the tube leak to become a vacuum leak.	Inst.		TM6, AE2
			Crew	Identify decreasing vacuum by lowering Mwe. higher vacuum reading, or alarm.	MM-14

SECTION 4

ID Number: ES02114

Revision: 0

Time	IDA/Malf	Instructor Information	Activity	Task Assign	Expected Actions	Standard
				US	Enter AOP 2574, Loss of Condenser Vacuum and direct actions: <ul style="list-style-type: none"> • Start Mech. Vac. Pps. • 2nd set SJAE • Start F-55A and ensure fan discharge aligned. • Check Circ. Pp. Operation, gland seal, Atmospheric Drain Collecting Tank, and Cond. Surge Tank • Check vacuum breaker and boot seal filled • In-plant visual checks, etc. 	AOP 2574
	FWR19 OP FWR20 OP		When requested, use remote functions to align mechanical vacuum pumps.	Inst.		
			Adjust malfunction severity to avoid manual trip criteria (~6" backpressure).	Inst.		
			*SM may be requested to make some or all of the required notifications	US	Enter AOP 2575 and direct a rapid downpower to attempt to maintain vacuum and avoid a plant trip: <ul style="list-style-type: none"> • Direct/remind crew to refer to Attachments 1, 5, & 6 during downpower (Rapid 	AOP 2574

Time ID/Title Instructor Information Activity Task Assign Expected Actions Standard

Time	ID/Title	Instructor Information	Activity	Task	Assign	Expected Actions	Standard
						<p>Downpower Parameters, Temperature vs. Power Program, & Rapid Power (Overview)</p> <ul style="list-style-type: none"> • *Make notifications regarding downpower • HP re: charging/oldown increase • CONVEX & ISO-NE • MP3 • Management <ul style="list-style-type: none"> • Direct PPO to initiate downpower of reactor and SPO to follow with turbine load 	
				PPO		<p>Initiate forcing sprays, (if not already in progress), by starting all available backup heaters and lowering Pzr pressure controller setpoint to ~2200 psia.</p> <p>May use boration to chg. Pp. Suction or align to RWST for suction to achieve recommended S/D rate.</p> <p>If using RWST suction:</p> <ul style="list-style-type: none"> • Power reduction rate with 1 charging pump will be ~32% per hour (MOC) • Ensure VCT bypass CH-192 closed • Ensure CH-504 RWST suction to charging open. 	AOP 2575

SECTION 4

ID Number: ES02114

Revision: 0

Time	IDA-Matf	Instructor Information - Activity	Task Assign	Expected Actions	Standard
				<ul style="list-style-type: none"> • Close CH-501, VCT outlet isolation • Check proper flow rate for 2 pumps: <p style="text-align: center;">OR</p> <p>If using boration from BAST tanks:</p> <ul style="list-style-type: none"> • Insert CEAs an initial 5 to 10 steps • Determine desired boration rate • Borate to charging pp. suction by: <ul style="list-style-type: none"> • Ensure M/U Mode Select switch in Dilute • Ensure valves M/U Stop Valve CH-512, VCT M/U Bypass CH-196, and RWST Isol. CH-192 all closed. • Ensure BA Controller FC-210Y in Auto • Adjust FC-210Y for selected boration rate • Open CH-504 • Place M/U Mode Select switch in Manual • Start a Boric Acid pp. & verify discharge pressure >98 psig • Open VCT M/U Bypass CH-196 	

SECTION 4

ID Number: FS02114

Revision: 0

Time	IDA/Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
			SPO	Decrease turbine load in response to lowering RCS temperature.	AOP 2575
T1	TC04 0%	When SPO uses the Load Limit pot to lower turbine load, enter malfunction to cause a turbine load shed, simulates a stuck contact driving CVs closed. Load shed occurs at a rate of 133% per minute due to speed of load set motor. It is unlikely that examinees will identify exactly what is occurring.	Inst.		TM7, MA2
			Crew	Identify rapidly rising RCS temperatures and pressures. May initiate a manual trip if quick enough. Respond to trip IAW EOP 2525.	
		Note: US will pose questions regarding these aspects of each safety function. PPO and SPO responses critical to proper diagnosis and key actions are contained in their individual sections, immediately following.	US	Query PPO and SPO on the status of Safety Functions as delineated in EOP 2525: <ul style="list-style-type: none"> • Reactivity Control (PPO) <ul style="list-style-type: none"> • Reactor • Maintenance of Vital Auxiliaries (SPO) <ul style="list-style-type: none"> • Turbine • Electrical buses 	EOP 2525

SECTION 4

ID Number ES02L14

Revision: 0

Time	IDA Mail	Instructor Information / Activity	Task Assign	Expected Actions	Standard
				<ul style="list-style-type: none"> • SW & RBCCW • RCS Inventory Control (PPO) <ul style="list-style-type: none"> • Pzr level & Subcooled margin (SCM), value & trend • RCS Pressure Control (PPO) <ul style="list-style-type: none"> • Pzr pressure, value & trend • Core Heat Removal (PPO) <ul style="list-style-type: none"> • RCP status • Loop delta-T • Th SCM • RCS Heat Removal (SPO) <ul style="list-style-type: none"> • SG pressures 880-920# • RCS Tc 530-535 °F • SG levels, value & trend • RCS SCM • Containment (CTMT) Isolation (PPO) <ul style="list-style-type: none"> • Radmonitors inside CTMT, outside CTMT, steam plant, not in alarm or rising. • CTMT pressure <1# • CTMT Temperature & Pressure Control 	

SECTION 4

ID Number 1802114

Revision: 0

Time	IDA Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
				(PPO) <ul style="list-style-type: none"> • CTMT temperature < 120° F • CTMT pressure < 1# • CTMT Combustible Gas Control (PPO) <ul style="list-style-type: none"> • CTMT temperature < 120° F • CTMT pressure < 1# 	
			Crew	During EOP 2525, the loss of PPC should be identified by plant parameters not changing. Operators will need to use alternate indications.	
		CT1 (LOCA-2): Establish primary-to-secondary heat sink. Start TDAFP due to inability to feed SGs with both MDAFPs during a SBLOCA. (Should be accomplished within 10 minutes)	SPO	Perform actions of EOP 2525, identify the following: <ul style="list-style-type: none"> • RSST lost • 24C energized on EDG • 24D de-energized • Establish AFW, A MDAFP & TDAFP in ≤ 10 minutes 	EOP 2525 EU1, CT1
			PPO	Perform actions of EOP 2525, identify the following: <ul style="list-style-type: none"> • #2 PORV stuck open and no power to 	EOP 2525

ID Number: ESO2114

SECTION 4

Revision: 0

Time IDA Matri Instructor Information / Activity Task Assign Expected Actions Standard

					Manually initiate SIAS when RCS pressure <1800 psia and verify actuation via alarm window on C01. (may identify failure of 'A' HPSI pump to start and manually start)	
			US	Query PPO & SPO regarding the status of EOP 2525 subsequent actions	EOP 2525	
			SPO	Report subsequent actions complete and verified when accomplished.	EOP 2525	
			PPO	Report subsequent actions complete and verified when accomplished.	EOP 2525	
		Note: SM should classify the event as Alert/C-1 based on potential loss of RCS barrier. RCIB4	US	Query board operators re: safety function status, perform diagnostic flowchart, and diagnose small break LOCA transition to EOP 2532.	EOP 2525 EU2, EC1	

SECTION 4

ID Number: ESO2114

Revision: 0

Time	DDA/Mall	Instructor Information / Activity	Task Assign	Expected Actions	Standard
			US	Perform initial steps of EOP 2532: <ul style="list-style-type: none"> • Confirm diagnosis • Initiate placekeeping • Restore from alarm silence • Ensure SIAS/CIAS/EBFAS and CRACS on recirc • Optimize SI (ID & start 'A' HPSI if not done earlier). • Ensure all available charging • Ensure switchgear cooling in operation. • Perform steps to locate/isolate LOCA 	EOP 2532
			PPO	Identify actuation module failure and start 'A' HPSI pump, (if not done earlier), while performing actions to verify and optimize SI flow.	EOP 2532
			Crew	Determine that the RCS leak is via the #2 PORV and can be isolated by restoring power to bus 24D/22F. Review board alarms and conditions to determine bus 24D not faulted.	EOP 2532

ID Number: ESO2114

SECTION 1

Revision: 0

Time: IDA: Staff: Instructor Information / Activity: Assign: Task: Expected Actions: Standard:

		*Directions are located at step 35, but may be "pulled forward" to "protect/restore" a safety function.	SPO	<ul style="list-style-type: none"> *Perform actions to power 24D from MPP3: • Power 24E • Bypass UV & reset HSAS <ul style="list-style-type: none"> • Using bypass keys, bypass 4 sensor cabinets for UV on bus A4 (24D) then reset UV on actuation cabinet AC-6 • Override & align equipment on 24D • Energize bus 24D and 22F • Start/align equipment as desired. 	EOP 2532
			US	Direct PPO to isolate RCS LOCA by closing #2 PORV block valve.	EOP 2532
			US	Direct crew to perform a controlled cooldown to minimize RCS pressure and temperature.	EOP 2532

SECTION 4

ID Number: ES02L14

Revision: 0

Time	IDA/Malf	Instructor Information / Activity	Task Assign	Expected Actions	Standard
			US	Direct follow-up actions of EOP 2532: <ul style="list-style-type: none"> • Verify no RBCCW in-leakage <ul style="list-style-type: none"> • RM-6038 for RBCCW • RBCCW surge tank level • Verify no LOCA outside CTMT: <ul style="list-style-type: none"> • Area radmonitors • Area sump levels • Place H2 analyzer (s) in service 	EOP 2532
		CT2(LOCA-1): Establish RCS pressure control. Prevent or correct 200°F subcooled margin PTS LAW EOP) Note: SCM & PTS criteria must be plotted manually due to PPC loss. SFA may be used to obtain values and perform plots.	Crew	Monitor pressurizer level and pressure response and perform action as necessary to avoid PTS: <ul style="list-style-type: none"> • Restore letdown • Secure HPSI/charging pumps • Initiate pressurizer spray • Perform cooldown. 	EOP 2532 CT2
		The scenario may be terminated when the above is complete or at the discretion of the lead examiner.	Inst.		

SECTION 4
SUMMARY

Title: Simulator Evaluation

ID Number: ES02LH

Revision: 0

CRITICAL TASKS

- CT1 (LOCA-2): Establish primary-to-secondary heat sink. Start TDAFP due to inability to feed SGs with both MDAPs during a SBLOCA. (Should be accomplished within 10 minutes)
- CT2(LOCA-1): Establish RCS pressure control. Prevent or correct 200°F subcooled margin
PTS IAW EOP)

SECTION 5
SCENARIO INITIAL CONDITIONS

Title: Simulator Evaluation

ID Number: ES02114

Revision: 0

Initial Conditions

- ◇ 100% power. MOL equilibrium Xenon
- ◇ 821 ppm boron. Blend ratio - 6.3 : 1
- ◇ SG Blowdown - ~25 gpm each
- ◇ 24E aligned to bus 24D
- ◇ 'B' EDG out of service. cleaning & refilling oil sump. TSAS 3.8.1.1.b is in effect
- ◇ Off-site lines surveillance due in 3 hours
- ◇ No other equipment out of service

Out of Service Equipment

'B' EDG

Crew Instructions

Perform actions required to respond to events.

ATTACHMENT
VALIDATION CHECKLIST

Title: Simulator Evaluation

ID Number: ES02LI4

Revision: 0

Remote functions:

All remote functions contained in the guide are certified.

Verified By:

RNS

Malfunctions:

All malfunctions contained in the guide are certified

RNS

Initial Conditions:

The initial condition(s) contained in the guide are certified or have been developed from certified ICs.

RNS

Simulator Operating Limits:

The simulator guide has been evaluated for operating limits and/or anomalous response.

RNS

Test Run:

The scenario contained in the guide has been test run on the simulator. Simulator response is reasonable and as expected.

RNS



Actions Completed

11/22/02

Date

MP2 SIMULATOR TRAINING SHIFT TURNOVER REPORT

FOR TRAINING USE ONLY

Simulator Scenario: ES02L14

PLANT STATUS:	
MODE: <u>1</u> MEGAWATTS: Thermal: <u>2695</u> MWTH Electric: <u>900</u> MWE RCS LEAKAGE: Identified: <u>0.024</u> gpm Unidentified: <u>0.147</u> gpm BLEND RATIO: BAST <u>6.3 : 1</u> XENON TREND: <u>stable</u> ASI TREND: <u>stable</u> ESI Value: <u>-0.005</u>	RX POWER: <u>100%</u> PZR PRESS: <u>2250</u> psia RCS T-AVE: <u>572</u> degrees F S/G BLOWDOWN: # <u>1</u> <u>25</u> gpm <u>1 1/2</u> turns small # <u>2</u> <u>25</u> gpm <u>1 1/2</u> turns small RCS BORON: <u>821</u> ppm UNIT 1/2 SA CROSSTIE: <u>Isolated</u> HOUSE HEATING: <u>Supplied by U3 Aux. Boiler</u> Water Treatment Vendor: <u>CST @ 50</u>

TS LCO and TRM ACTION Statements Coming Due						
Date	Time	LCO	ACTION	ACTION REQUIREMENT	EQUIPMENT	REASON
X XX-01	5 hrs ago	3.8.1.1	b.	Verify off-site lines every 8 hrs., TDAFP verified operable. restore DG to operable in 72 hrs or HSB in next 6 hrs & CSD next 30 hrs.	'B' EDG	oil sump clean & refill

Continuous TS LCO and TRM ACTION Statements in effect				
ACTION REQUIREMENT	LCO	ACTION	EQUIPMENT	REASON
Maintain the inoperable vent path closed with power removed from the valves. Maintain one PORV & block valve operable.	TRMAS 3.4.11.b	a	PZR vent solenoids	Manually isolated due to leakage (2-RC-440 is closed).

SYSTEM/COMPONENT AVAILABILITY: (systems, components out of service, deviations from required system alignments, the need for valve lineups or other restoration activities)	
SYSTEM/COMPONENT	STATUS
'B' EDG	Out of service for oil sump clean & refill

U-1/U-2/U-3 CROSS UNIT EQUIPMENT STATUS List the status of all Unit 1 and Unit 3 equipment alignments that effect Unit 2, i.e., fire protection, Bus 34A/B, Circulating Water (dilution flow) etc.	
SYSTEM	STATUS
Aux Steam	U-3 supplying U-2 aux steam (from Unit #3 Aux. Boiler).

RADWASTE SYSTEM STATUS (ARW, CLRW, CPF, GRW) (identify water/gaseous inventory problems, discharges in progress or planned.)	
SYSTEM	STATUS
N/A	

SRVEILLANCES/EVOLUTIONS IN PROGRESS	Lead Dept
Off-site line verification every 8 hours	OPS

FOR TRAINING USE ONLY

Attachment

SCENARIO ATTRIBUTES CHECKLIST

Scenario Title: Simulation Evaluation Number: ES02L14
Technical Reviewer: Richard N Spurr Date: 11/22/2002

QUALITATIVE ATTRIBUTES

- Y 1. The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue the crew into expected events.
- Y 2. The scenario consists mostly of related events.
- Y 3. Each event description consists of:
- the point in the scenario when it is to be initiated
 - the malfunction(s) that are entered to initiate the event
 - the symptoms/cues that will be visible to the crew
 - the expected operator actions (by shift position)
 - the expected Emergency Plan classification
 - the event termination point (if applicable)
- Y 4. No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.
- Y 5. The events are valid with regard to physics and thermodynamics.
- Y 6. Sequencing/timing of events is reasonable, and allows for the examination team to obtain complete evaluation results commensurate with the scenario objectives.
- N/A 7. If time compression techniques are used, scenario summary clearly so indicates. Operators have sufficient time to carry out expected activities without undue time constraints. Cues are given.
- Y 8. The simulator modeling is not altered.
- Y 9. The scenario has been validated. Any open simulator performance deficiencies have been evaluated to ensure that functional fidelity is maintained while running the scenario.

Attachment Guide No.: ES02LI4
SCENARIO ATTRIBUTES CHECKLIST

Note: Following criteria list scenario traits that are numerical (quantitative) in nature. Credited malfunctions tasks and procedures should be bolded in the evaluation guide.

1. Total Malfunctions (TM) - Include EMs – (5 – 8) 8
 1. Loss of RSST
 2. ESAS Module AM514 Failure
 3. #2 PORV Stuck Open
 4. 'C' RPS Lower NI Failure
 5. Condenser Tube Leak
 6. Condenser Vacuum Leak
 7. Turbine CV's Ramp Closed
 8. Loss of PPC

2. Malfs after EOP entry (EMs) – (1 – 2) 4
 1. Loss of RSST
 2. ESAS Module AM514 Failure
 3. #2 PORV Stuck Open
 4. Loss of PPC

3. Abnormal Events (AE) – (2 – 4) 2
 1. Condenser Tube Leak
 2. Condenser Vacuum Leak

4. Major Transients (MA) – (1 – 2) 2
 1. #2 PORV Stuck Open-SBLOCA
 2. Turbine CV's Ramp Closed-Full Load Shed

5. EOPs entered requiring substantive actions (EU) - (1 – 2) 2
 1. EOP 2525
 2. EOP 2532

SCENARIO ATTRIBUTES CHECKLIST

6. EOP Contingencies requiring substantive actions (EC) – (0-2) 1
1. EOP 2532
7. Critical Tasks (CT)- (2 – 3) 2
1. Establish Primary to Secondary Heat Sink
2. Establish RCS Pressure Control
8. Approximate Scenario Run Time: 60 to 90 min. Total 90
9. Technical Specifications exercised during the scenario. (Y/N) Y