Final Submittal

- 1. Scenario Outline (ES-D-1) and Simulator Scenario Operator Actions (ES-D-2)
- 2. Final Operating Test Simulator Scenarios
 - A. ES-D-1
 - B. ES-D-2

SURRY EXAM 2002-301

50-280, 281/2002-301 MARCH 18 - 28, 2002 Appendix D Scenario Outline

Form ES-D-1 (R8, S1)

Facility:	Suri	ry So	cenario No.: <u>1</u> Op-Test No.: <u>1</u>
Examiners	3:		Operators:
Very high (Note: FC Turnover: Inservice s	Power akage in 1A grid demand 1113 can b surveillance	d e input ear 1-PT-18.6l	ly) on PORV Block valves service for calibration
Event	Malf. No.	Event	Event
No.		Type*	Description
1	TBD	N(BOP, SRO)	In-service valve stroke test surveillance (PORV Block valves strokes closed and will not reopen Tech Spec 3.1.6 (Block valves PCV-1456)) Team will prebrief evolution prior to entering Sin but while sequestered.
2	MMS-08	C(BOP)	Steam Generator 1C (CH 4 selected to control) Steam flow transmitter fails low (ARP 1F-G6, 1F-D,) slowly enough for Operators to diagnose. Operator will take manual control of MFRV and control "C" SG level. Time compression will take to correct channel failure and allow "C" MFRV auto control
3	MTU-14	C(BOP)	Loop seal failure causing degrading condenser vacuum (AR (1F-B6). Crew performs AP-14 Loss of Condenser Vacuum 10% load reduction, vacuum loss cause can be found and corrected.
4		R(RO)	Power Reduction due to degrading vacuum. Slowly enough ramp stabilize vacuum after about 10% ramp.
5	MCH-26	C(RO)	FC 1113A fails high (ARP 1D-A5), requiring an alternate bor method. This failure takes place during the 10% ramp.
6	MRC-48	C(RO)	PZR Pressure Controller (PC-444A) fails high (ARP 1C-A8) enough to take manual control without tripping.
7	MRM-02	I(BOP)	 "C" Steam Generator Tube Leak increasing to setpoint of Condenser Air Ejector Rad Monitor w/ auto actions of Rad M not occurring. Note: Malfunction may need tweaking to make rad monitor
			respond to Tube leak ramp in and fail to reposition TV-SV-1
8	MRC-24	M(All)	S/G Tube rupture
	MEL-01	M(All)	LOSP (after cooldown completed and prior to pressure redu
9 10	??	M(All)	PORV 1455 fails to open when demanded

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

Op-Tes	st No.:	Scenario No.: _1 Event No.: _1 Page 2 of 21
Event l	Description:	Surveillance test 1-PT-18.6I in progress on PORV Block valves. Block valve for PCV 1456 fails to reopen.
Time	Position	Applicant's Actions or Behavior
	RO	Verify closed or close PRZR PORV 1-RC-PCV-1456.
		Verify key switch for PRZR PORV 1-RC-PCV-1456 OVPRESS Mitigating System is in DISABLE.
		Verify PRZR PORV Block Valve 1-RC-MOV-1535 is open.
		Stroke PRZR PORV Block Valve 1-RC-MOV-1535 through one complete cycle, timing valve movement in each direction. Time from signal initiation to complete valve travel.
	·····	Valve closes and fails to reopen.
	SRO	Refer to Technical Specification 3.1.A.6 for required actions.
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Op-Tes	st No.: <u>1</u> So	cenario No.: <u>1</u> Event No.: <u>2</u> Page 3 of 21
Event (Description:	Steam Generator 1C (CH 4 selected to control) Steam flow transmitter fails low (ARP 1F-G6, 1F-D,) slowly enough for Operators to diagnose. Operator will take manual control of "C" MFRV and control "C" SG level. Time compression will take place to correct channel failure and allow "C" MFRV auto control
Time	Position	Applicant's Actions or Behavior
	BOP	BOP diagnoses low failure of 1C Channel 4 steam flow transmitter
		Alarms: STM GEN 1C (CH 4) FW STM FLOW (ARP ???) STM GEN 1C FW < STM FLOW (ARP 1F-D9) STM GEN 1C (CH 4) HI STM LINE FLOW (ARP 1F-G6) Takes action IAW ARP 1F-D9 (Note: actions taken for any other ARP
		will be too late to avoid low S/G level)1) Manually control SG C FEED REG valve IAW Shift Supervisor direction.
	RO	Monitors plant conditions
	SRO	Direct manual control of 1C SG Feed Reg Valve Provide notifications: OMOC STA
		Direct 1C SG FRV placed in auto on functional channel
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Op-Test	No.: <u>1</u> Sce	enario No.: <u>1</u> Event No.: <u>3</u> Page 4 of 21
Event De	escription:	Loop seal failure causing degrading condenser vacuum (ARP 1 (1F- B6). Crew performs AP-14 Loss of Condenser Vacuum). After 10% load reduction, vacuum loss cause can be found and corrected.
Time	Position	Applicant's Actions or Behavior
	BOP	BOP diagnoses degraded vacuum
		Alarms:
		TURB LO VAC (1F-B6)
		Indications:
		Decreasing trend as indicated on CN-PR-101A or CN-PR-101B
		Decreasing trend as indicated on P-250 points P2500A or P2510A
	000	Decreasing MW output due to degrading vacuum
	SRO	Implements AP-14, LOSS OF MAIN CONDENSER VACUUM
	BOP	Checks turbine power > 30%
		Monitors condenser vacuum and reports to SRO if vacuum decreases to a value > 24.5 IN-HG
	SRO/BO	Dispatches operator to check air ejector operation and place hoggers in
	P	service IAW Attachment 1, AP-14 (hoggers effective only when vacuum
		<26.5 IN-HG
	SRO	Direct turbine ramp IAW Attachment 2, AP 14
		Utilize conservative decision making during load reductions
		Control RCS Tav <= 577 degrees F and RCS pressure >= 2205 psig
		(TS review required if either parameter exceeded)
		Directs investigation of source of air inleakage IAW Attachment 4, AP 14
		Contacts OMOC with status
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Op-Test	No.: <u>1</u> Sce	enario No.: <u>1</u> Event No.: <u>4</u> Page 5 of 21
Event D	escription:	Ramp of unit to maintain vacuum
Time	Position	Applicant's Actions or Behavior
	SRO	Coordinates RO and BOP actions
		Dispatch Personnel to check for air ejector ops and place Hoggers in service.
		Dispatch an operator to check High Level Status
		Direct actions of Attachment 2.
	BOP	Reduce power IAW Attachment 2, AP-14
	·····	Check Turbine ramp rate greater than or equal to 1% / min required to maintain vacuum
		Initiate attachment 2
		Remove the turbine from limiter.
		Coordinate with RO turbine load reduction
		In ant Control Dada in AUTO or Menual op poppoppy to maintain Tayo
	RO	Insert Control Rods in AUTO or Manual as necessary to maintain Tave and Tref matched.
		Coordinate with BOP a turbine load reduction.
		 Perform an RCS boration: 1. Place in service BATP in Fast 2. Open 1-CH-MOV-1350 and verify that charging flow is greater
		 than emergency boration flow. Close 1-CH-MOV-1350 after 30 to 60 seconds.
		 Place the in-service BATP in AUTO. Initiate a continuous normal boration at 10 gpm.
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Op-Test	No.: <u>1</u> Sce	nario No.: <u>1</u> Event No.: <u>5</u>	Page 6 of 21
Event De	escription:	FC 1113 A fails closed affecting the ability to use the BC of blender system while power reduction in progress.	ORATE Mode
Time	Position	Applicant's Actions or Behavior	
	RO	Diagnoses controller 1113 A fails closed, 1113B also clos deviation alarm. Alarms: BA TO BLEND DEVIATION FLOW (1D-A5) Indications: No flow on flow recorder FR-1113	ses due to the
	SRO	Directs RO to use Emergency Boration flowpath to main Tref match and maintain control rods above the LO-LO in Note: There is no procedural guidance in the ARP to do the initial boration IAW Attachment 2, AP-14 is an Emerg followed by using the BORATE Mode at 10 gpm. This sa provides guidance to only use Emergency borate for ram RO may do this without SRO guidance. (What are OPS e	this. However, ency Boration me procedure ps > 1%/Min. expectations?)
	All	Stabilizes condenser vacuum at ~ 90% power level and s reduction.	stops power
	RO	Verifies rods step in auto	
	SRO /RO	 Two ways to do this: 1. Manually open FCV 1113 A and 1113 B establish OR 2. Open 1-CH-MOV-1350 and establish 100 gpm flo 	
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Op-Test	No.: <u>1</u> Sce	enario No.: <u>1</u> Event No.: <u>6</u> Page 7 of 21
Event De	escription:	Pressurizer Pressure Controller (PC-444A) (Channel 1) fails HIGH slowly enough for crew to take manual control prior to trip
Time	Position	Event 6
		Applicant's Actions or Behavior Page 7 of 21
	RO	Diagnoses high failure of either PZR Pressure Transmitter PT 444 or Master Controller
		Alarms: PRZR PRESS CONTR HI (1C-A8) PRZR LO PRESS (1C-B8) PRZR SFTY VV PWR RELIEF VV OPEN (1D-H4) PRZR LO LVL PRZR PWR RELIEF LINE HI TEMP (1C-D7) PRZR RELIEF TK HI PRESS OVTEMP DELTA T TURB RNBK & ROD STOP (1G-F3,F4) Indications: MCB meter for PT 444 reads maximum pressure PRZR Master Controller goes to maximum output PRZR Spray valves go full open PORV 1455C opens Actual RCS pressure as indicated by MCB for PT 445 decreasing rapidly
		Takes action IAW ARP 1C-A8 (Note: actions taken for any other ARP will delay actions necessary to avoid a Rx Trip or SI)
		Place Master Controller in MANUAL and decrease output.
		Verify closed or close 1-RC-PCV-1455C
		Verify closed or close PZR spray valves.
	SRO	Directs RO to control pressure IAW 1-AP-31.00. Should note that 1-RC- PCV-1455C is inoperable while control is in manual. This makes BOTH PORV's inoperable. SRO should re-review TS 3.1.6
		Directs closure of Block valve

Time	Position	Event 6
	<u> </u>	Applicant's Actions or Behavior Page 8 of 21
	RO	Maintains RCS pressure IAW 1-AP-31.00
		Check BCS pressure decreasing
		Check RCS pressure decreasing
		Place 1-CH-PC-1444J in Manual
		Decrease demand on PRZR Press master control to raise RCS press.
		Close or verify close PRZR PORVs
		Close the Block Valve to isolate a PORV that wil not close.
		Turn on pressurizer heaters.
	BOP	1. Check Turbine load stable
	0.00	Drevide patifications:
	SRO	Provide notifications: OMOC
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Op-Test	No.: <u>1</u> Sce	nario No.: <u>1</u> Event No.: <u>7</u>	Page 9 of 21
Event De	escription:	Steam Generator Tube Leak increasing to setpoint of C Ejector Rad Monitor w/ auto actions of Rad Monitor not Steam generator 1C rad monitor fails as is at this point (occurring.
Time	Position	Event 7	
		Applicant's Actions or Behavior	Page 9 of 21
	BOP	Diagnose worsened Steam Generator Tube leak as evide Condenser Air Ejector alarm.	enced by
		Alarms: 1. PRZR Lo Press (1-CB-8)	
		2. PRZR Lo Level () 3. CONDENSER AIR EJECTOR ALERT/FAILURE (1-RM-G8)
		Indications:	
		Upscale on 1-SV-RI-111	
		Upscale on 1-RM-RR-150B Pen 4	
		Verifies alarm reading greater than background or radiation trended up by reading 1-SV-RI-111 or 1-RM-RR-150B Period	
		Checks ERFCS points using Group 80 Review:	
		R1RM204C, MS-RI-124	
		R1RM205C, MS-RI-125	
		R1RM206C, MS-RI-126 Monitor SG Blowdown Monitors:	
		1-SS-RI-112 1-SS-RI-113	
	SRO	Directs verification of automatic actions associated with C Ejector alarm.	Condenser Air
		AP-16, Excessive RCS leakage	
		Directs compensatory actions or physical positioning of T TV-SV-103 per ARP 1-RM-G8 Attachment 1	V-SV-102 and
	BOP/RO	Repositions TV-SV-102 and TV-SV-103 per ARP 1-RM-0 1	38 Attachment

RO	Applicant's Actions or Behavior Page 10 of 21 Checks RCS leakrate
	PRZR level decreasing (slight) Ann 1D-E5 LIT (CHG PP TO REGEN HX HI-LO FLOW) A discernable negative change in VCT level trend has developed. Note: At this point, these indications will be inconclusive due to small
	magnitude of leak. Also if previous failure of controller 1113 overly complicates controlling primary inventory, we can let I&C repair it before this event.
SRO	Directs the following procedures:
	Initiates 0-OSP-RC-002, STEAM GENERATOR PRIMARY TO SECONDARY LEAKAGE MONITORING
	Directs Performance of RCS leak rate IAW 1-OPT-RC-10.0, REACTOR COOLANT LEAKAGE - COMPUTER CALCULATED
	AP-16, Excessive RCS leakage. Step 2 Isolates Letdown Step 3 Verifies CHG Pump Suction adequate VCT level Maintained by blender, this will not be the case.
	Directs Air Ejector flow rate measuring device to be verified OPERABLE.
	Notifies OMOC and STA
RO	Isolates Letdown at Step 2 of AP-16 Closes Normal and excess letdown valves.
	1460 A, B HCV 1142 HCV 1557A, B, and C
	No blender operations may use emergency borate valve
SRO	Directs the RO to emergency borate the plant using MOV 1350 or opening 1113A and 1113 B. This is not proceduralized.
	RO

Op-Test	No.: <u>1</u> Sce	nario No.: <u>1</u> Event No.: <u>8</u> Page 11 of 21
Event De	escription:	Significant ramp up of S/G leak leads to S/G Tube rupture in 1C SG
Time	Position	Event # 8
		Applicant's Actions or Behavior Page 11 of 21
	All	Diagnose requirement to trip Rx and SI
		Alarms:
		PRZR Lo Press
		PRZR Lo Level
		STM GEN 1A LVL ERROR
		CHRG PP TO REGEN HX HI-LO FLOW
		Indications: (pre trip)
		PRZR pressure and level decreasing
		Tavg stable
		Charging line flow increasing
		Decreasing feed flow to 1A SG
		Indications: (post trip)
		Rx trips on OTDT or Low PRZR Pressure
		Turbine trip by Rx Trip
		Rx trip and bypass breakers open
		Rod bottom lights are lit
		Generator trip 30 seconds after Rx trip
		All AFW pumps start
		HP & LP Heater Drain pumps trip
		Safety Injection on Low PRZR pressure
		Phase 1 isolation
	SRO	Directs Rx Trip and Safety Injection Initiates E-0
		Note manual Rx Trip and SI are functions of how rapidly plant
		conditions deteriorate and the crew reacts. Would like for transient to
		be slow enough for crew to manually trip, then manually SI upon
		evaluation of E-0, step 4
	RO	Verifies Rx tripped
	BOP	Verifies Turbine tripped
		Verifies both AC emergency buses energized
	RO/BOP	Manually initiates SI then Verifies SI initiated
	SRO	Directs manual initiation of SI after Rx Trip
		Expect an SRO brief after step 4 of E-0
	BOP	Verify feedwater isolation
		MFP discharge valves closed MOV 150 A and B
		MFP tripped
		Feed Reg & bypass valves closed (demand at 0)
		SG Blowdown valves closed

Time	Position	Event # 8 Applicant's Actions or Behavior Page 12 of 2
	RO	Verify CTMT isolation Phase I
		Phase I TV's closed
		1-CH-MOV-1381 closed
	[1-SV-TV102A closed
		PAM Isolation valves closed 1-DA-TV-103A
		1-DA-TV-103A 1-DA-TV-103B
		1-DA-1V-103B
	BOP	Verify AFW pumps running:
		MD AFW pumps (Time delayed)
		TDAFW pump (If necessary)
		May discuss with SRO at this time, or prior to isolate AFW flow to the
		1C S/G.
	RO	Verify SI Pumps running:
		CHG pumps
		LHSI pumps
		Check CHG pump auxiliaries:
		CHG pump CC pump
		CHG pump SW pump
	BOP	Step 10: Check intake canal level >24 ft and being maintained
		Step 11: Check Main Steam Isolation required:
		1E-F10 – Off
		1B-C4 – Off
		1B-C5 – Off
		1E-H10 – Off
	RO	Step 12: Check if CTMT Spray required:
		CTMT pressure should be near pre-event'
	_	Goes to the RNO of Step 12.
		Step 13: Verify SI flow:
		1-SI-FI-1961
		1-SI-FI-1962
		1-SI-FI-1963
		1-SI-FI-1943 or 1943A
		Block HSF SI.
		Check THREE charging pumps running
		Reset SI
		Stop one charging pump and place in AUTO
		Check RCS pressure > 185
		Note: RCS pressure should be greater than 185
		Verify SI reset
		Stop one LHSI pump and place in AUTO
	BOP	Verify AFW flow > 350 GPM
		Check AFW MOV's open, These will NOT be open will have to go to
		RNO and will require manual alignment of the valves for the C S/G

Time	Position	Event # 8
		Applicant's Actions or Behavior Page 13 of 21
	RO/	Step 17 Verify SI alignment
	SRO	Open: CH MOV 1115 B and D
		Closed: CH MOV 1115 C and E
		Closed: CH MOV 1289 A and B
		Closed: CH HCV 1200 A, B and C
		Open: SI MOV 1876 C and D Open: SI MOV 1862 A and B
		Open: SI-MOV 1862 A and B
	Unit 2	Step 17
	Ops	Verify ventilation alignment and AC power alignment IAW Attachment 2
	Ops	Note: See attached E-0, attachment 2,
		Only one switch to be manipulated on the Ventilation panel.
	RO/	Step 18
	SRO	Check RCS Average Temperature stable at or trending toward 547
		degrees F
		If greater than 547, then dump steam through Steam Dumps or
		Atmospherics.
		If less than 547, then secure dumping steam and reduce AFW if SG
		levels
		Permit. (SG levels >11% in at least one SG)
		Step 19
		Check PRZR PORV and Spray Valve status:
1		PORV – closed
		Spray valves – closed
		At least one PORV block valve open
		Step 20
		Check RCP trip and miniflow recirc criteria
		HHSI flow > 0
		RCS subcooling > 30 degrees F
		RCS pressure > 1275
	BOP/ SRO	Step 21 Check SG's NOT faulted:
	SRU	Pressure in all SG's stable or increasing
	1	Pressures in all SG's > 100 psig
 	4	Step 22
		Check SG tubes ruptured:
		Condenser air ejector radiation > normal
		SG radiation > normal
		SG MS radiation > normal
		TDAFW pump exhaust radiation > normal (if running)
		1A SG level increasing in an uncontrolled manner
	SRO	Directs transition to E-3
	RO/	Step 1 E-3
	SRO	Check RCP trip and miniflow recirc criteria
		HHSI flow > 0
		RCS subcooling < 30 degrees F (NO) will go to RNO and directs to
		Step 2.
		RCS pressure > 1275 psig

Time	Position	Event # 8			
		Applicant's Actions or Behavior Page 14 of 21			
	Crew	Identifies ruptured 1C SG			
		Level rise			
		SG MS line monitor high			
		SG Blowdown monitor high			
	BOP/	Step 2			
	SRO	Isolates 1C SG			
		Adjusts SG PORV controller to 1035 Verifies 1C SG PORV closed			
		Verifies 1C SG blowdown TV's closed			
l		Directs closure of 1-MS-87 (1A supply to TDAFW)			
		Critical Task to isolate the 1C S/G prior to exiting E-3			
		Step 3: Isolates 1C SG MSTV			
		Step 4: Checks ruptured SG level > 11%			
		Maintains AFW flow until 1C SG level > 11%			
	SRO/	Step 5: Checks status of PRZR PORV's and block valves			
	RO	Power to block valves (Note power should NOT be available for			
		Block			
		valve for PCV-1456			
		PORV's closed			
	000	At least ONE block valve open			
	SRO BOP	Step 6: Check if SGs are not faulted: Pressure stable or increasing in ALL SG's			
	BUF	Pressure > 100 psig in ALL SG's			
		Step 7:			
		Check intact SG level:			
		Any narrow range level > 11%			
		Check BOTH emergency busses energized			
		Control feed flow to maintaing narrow range level between 17% and			
		50%.			
	RO	Step 8: Reset BOTH trains of SI			
	BOP	Step 10: Verify Instrument Air available			
		Annunciator 1B-E6 not lit			
		Check at least ONE CTMT Instrument Air compressor running			
		Verify 1-IA-TV-100 - OPEN			
*		Align Condenser Air Ejector to CTMT:			
		Verify 1-SV-TV-102 - OPEN			
		1-SV-TV-103 – CLOSED OPEN:			
		OPEN: 1-SV-TV-102A			
	BOP/RO	Step 12: Verify ALL AC busses – Energized by Offsite power			
	RO	Step 12: Verify ALL AC busses - Energized by Onsite power Step 13: Check is LHSI pumps should be stopped:			
		RCS pressure > 250 psig			
		Stop LHSI pumps and put in AUTO			
	BOP	Step 14 : Check 1C SG isolated from 1B or 1A SG's			
		1C SG MSTV or NRV – CLOSED			
		Check 1A SG pressure > 350 psig			
	RO	Stops an LHSI pump and places in automatic.			

Time	Position	Event # 8
		Applicant's Actions or Behavior Page 15 of 21
	Ops Notes	Flow from each stream line should be maintained < 1E6 PPH to prevent Main Steam line isolation during cooldown.
		Low PRZR pressure SI signal should be blocked when PRZR pressure decreases to less than 2000 psig
		HI stm flow SI signal should be blocked when Tave < 543 degrees
		RCP trip criteria DOES NOT APPLY after initiation of an operator controlled cooldown.
	BOP/ SRO	 Initiate RCS Cooldown (SRO) Determine required core exit temperature from table Place Steam Dump Mode Select switch in Steam Pressure Mode Dump steam to the condenser at the maximum rate from 1A and 1B SG's Check CETC – Less that required temperature (from table)
		Stop RCS cooldown Maintain CETS – Less that required temperature
		NOTE: This step should be complete before depressurizing
	RO	Check 1C SG pressure stable or increasing Check subcooling > 50 degrees F
		DEPRESSURIZE RCS TO MINIMIZE BREAK FLOW AND REFILL PRZR Check normal spray available Spray valves available AND RCP's A and C running
	CREW	LOSP occurs
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Op-Test No.: 1 Scenario No.: 1 Event No.: 9 Page			
Event Description:		Loss of Offsite Power for both units, all EDG's start and load per design and all equipment starts and runs per design	
Time	Position	Event # 9 Applicant's Actions or Behavior Page 16 of 21	
*	CREW	Diagnose that an LOOP has occurred. Significant alarms: Steam Dump valves trip open (Do these valves really open?) Main transformer trouble 4 KV EMERG BUS TIE STUB BUS BKER TRIP 4 KV RES SUP BKR OPEN CC PPS DISCH HDR LO PRESS DIESEL FIRE PUMP AUTO START Significant indications: Breakers 15A1, 15B1, 15C1, 15D1, 15E1, 15F1, 15A2, 15B2 and 15C2 - OPEN EDG's 1 & 3 auto start and energize the emergency busses. Emergency stub bus breakers open All station service loads are deenergized. RCP's trip CC pumps trip	
	SRO	Directs entry to 1-AP-10.07, Loss of Unit 1 Power, RO continues in E-3.	
	BOP	Checks that Transfer buses D and F are DE-ENERGIZED AND All Station Service Buses are DE-ENERGIZED Verify 4160V Emergency buses are BOTH ENERGIZED Secure AAC DG unless required by Unit 2 Check Emergence bus 1J voltage > 4280V Verify AFW pumps running MD AFW TD AFW, if necessary	
*	RO	Check charging pumps running (2?)	
	BOP	Check Charging pump auxiliaries running CHG pump CC Pump Chg pump SW pump	
	SRO	Initiate attachment 3	
	BOP	Verify communications capability: Gaitronics OR Station Radios	
	SRO	Restore Instrument Air CLOSE 1-SA-SOV-175 Initiate Attachment 4	

Time	Position	Event # 9
		Applicant's Actions or Behavior Page 17 of 21
	BOP	Restore emergency stub bus
		CC PUMP control switches in PTL
		RHR PUMP control switches in PTL
		Direct local closing of Stub Bus feeder breakers on energized
		Emergency
		Buses 15J9 or 15H9
	RO	Verify at least one CC pump running Check either SFP pump running
		1-FC-P-1A or 1-FC-P-1B
	BOP	Verify Intake Canal Level – stable or increasing
	001	Check CHG pump auxiliaries:
		CHG pump CC pump – running
		CHG pump SW pump - running
		••••••••••••••••••••••••••••••••••••••
		Check Semi-Vital Bus - Power has been interrupted
	SRO	Direct performance of 1-AP-10.7, Attachment 3
	BOP	Verify 1A System Annunciators- Not Lit
		1B-E6, IA 36 HDR PRESS/IACOMPR 1 TRBL
		1B-G5, INST AIR DRYER TRBL
		1B-E5, SA COMPR TRBL
		1B-F5, CTMT INST AIR COMPR TRBL
	RO	Verify Unit Conditions
		PRZR level - STABLE
		PRZR pressure –STABLE RCS Tave – STABLE
**	SRO	Direct return to 1-E-3, step18
	SRU	
	RO	DEPRESSURIZE RCS TO MINIMIZE BREAK FLOW AND REFILL
		PRZR
		Check normal spray available
		Spray valves available AND RCP's A and C running
		DEPRESSURIZE RCS USING PRZR PORV TO MINIMIZE BREAK
		FLOW AND REFILL PRZR
		At least one PRZR PORV available
		Open 1-PCV-1455 (only PORV available)
		1-PCV-1455 FAILS to open
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Op-Te:	Op-Test No.: 1 Scenario No.: 1 Event No.: 10 Page 18 of 21				
Event Description: Only available PORV, 1-PCV-1455, FAILS to open, sending crew to 1-ECA-3.3					
Time	Position	Event # 10 Applicant's Actions or Behavior Page 18 of 21			
*	All	Diagnose that all pressure control is lost, requiring entry to 1-ECA-3.3.			
· · · ·	SRO	Directs ENTRY to 1-ECA-3.3			
	BOP	Step 1: Check 1C SG narrow range level < 75% Note: If 1C SG level > 75%, skip down to step that determines if SI can be terminated			
*	SRO/ RO	 Step 2: Try to establish Normal Spray Flow: This should be answered NO RCP are running go to the RNO then to Step 3. If crew attempts to open block valve for PCV 1456, delay restoring power to force continuation of ECA 3.3 Will require Crew to go to Step 4 (there is no way to depressurize) 			
	BOP	Step 4: Check 1A and 1B SG levels Either above 11% Check emergency busses energized Control feed flow to maintain narrow range level between 17% and 50%			
	RO,	Check PRZR level > 22% NOTE: If condition not met, return to step that checks 1A SG level and cycle back through to this step.			
	CREW, RO	Step 6: Check if SI can be terminated: Check RCS subcooling based on CETCs >30 degrees F Check secondary heat sink AFW>350 gpm OR either 1B or 1C SG > 11% Check RVLIS indication > 63% on Full Range detector Check 1A SG narrow range rising in an uncontrolled manner or off scale high NOTE: On LOSP the C TDAFW pump valves will open causing			
		Step 7: Stop all but one chg pump and put in auto			

Time	Position	Event # 10 Applicant's Actions or Behavior Page 19 of 21	
	RO	Step 8:	
		Isolate HHSI to Cold Legs Verify: Charging pump suctions from the RWST- OPEN- 1-CH-MOV-1115B 1-CH-MOV-1115D Charging pump miniflow recirc valves OPEN 1-CH-MOV-1275A	
		1-CH-MOV-1275B 1-CH-MOV-1275C 1-CH-MOV-1373 Close HHSI to Cold Leg 1-SI-MOV-1867C 1-SI-MOV-1867D 1-SI-MOV-1842	
		Step 9: Establish Charging Flow Close CHG flow control: 1-CH-MOV-1122 Verify CHG line isolation – OPEN 1-CH-HCV-1310A Open CHG line isolation MOV's 1-CH-MOV-1289A 1-CH-MOV-1289B Establish at least 40 gpm charging flow using CHG flow control	
	RO/ SRO	Step 10: Verify SI flow not required: RCS subcooling based on CETC's > 30 degrees F Check RVLIS indication > 63% , full range channel	
		Step 11: Check CC system Status SW to RS HX's – ISOLATED SW to CC HX's – IN SERVICE CC pumps – AT LEAST ONE RUNNING	
		Step 12: Check RCP Cooling: NOTE: RCP's not running (Should adjust to approximately 8 GPM per pump. Step 14:	
		Check if Letdown can be established Put PRZR heaters in PTL	
	SRO	Direct OUTPUT fuses be removed: 1-RP-CAB-7, LC -1- 460C 1-RP-CAB-21, LC-1-459C	

Time	Position	Event # 10
		Applicant's Actions or Behavior Page 20 of 21
	RO	Establish letdown
		Adjust charging line flow > 40 gpm
		Open letdown line pressure control valve
		1-CH-PCV-1145
		Close or verify closed letdown orifice isolation valves
		1-CH-HCV-1200A
		1-CH-HCV-1200B 1-CH-HCV-1200C
		Open letdown isolation valves
li i		1-CH-TV-1204A
		1-CH-TV-1204B
		1-CH-LCV-1460A
		1-CH-LCV-1460B
1		Open letdown orifice isolation valve(s)
		Adjust 1-CH-PCV-1145 to maintain letdown pressure
		Adjust NRHX outlet temperature control valve to control letdown
		temperature,
		1-CC-TCV-103
		Check VCT Makeup controls:
		Verify on BATP operating and aligned to Unit 1
		Verify at least on PG pump operating Verify Boric Acid and PG flow controls set for one of the
		following:
		>RCS boron concentration
		2300 ppm
		Verify makeup set for AUTO control
		Align CHG pump suction to VCT
		Verify VCT level > 27%
		Open CHG pump suction from VCT MOV's
		1-CH-MOV-1115C
		1-CH-MOV-1115E
		Close CHG pump suction from RWST MOV:
		1-CH-MOV-1115B 1-CH-MOV-1115D
		Check RWST crosstie valves - CLOSED
		1-SI-TV-102A
		1-SI-TV-102B
		2-SI-TV-202A
		2-SI-TV-202A
		Check if CS should be Stopped
	<u> </u>	NOTE: CS not running
 *		Step 18: TRY (???) to establish auxiliary spray:
		Verify normal letdown – IN SERVICE
		Establish auxiliary spray flow:
		Close normal PRZR spray
		Open HCV-1311, CHG AUX Spray Valve
L		Close 1-CH-HCV-1310A, CHG Line ISOL Valve

Time	Position	Event # 10
		Applicant's Actions or Behavior Page 21 of 21
	RO	Depressurize RCS to Minimize Break Flow and Refill PRZR: Spray PRZR with maximum available spray until any of the following are satisfied:
		PRZR level >68% OR
		RCS subcooling based on CETC's<30 degree's F OR
		BOTH of the following exist: RCS pressure < 1A SG pressure PRZR level > 22%
		OPEN 1-CH-HCV-1310A, CHG Line Isol valve Close 1-CH-HCV-1311, CHG AUX Spray Valve
		<u>Critical Task: Depressurize to minimize break flow decrease RCS pressure to or below S/G pressure.</u>
	SRO	GO TO 1-E-3, STEAM GENERATOR TUBE RUPTURE, STEP 32
		FREEZE

Conduct shift turnover:

Provide normal shift turnover materials reflecting the below initial conditions: Initial conditions are as follows:

Unit 1 is at 100% power with the following off-normal conditions present:

- It is a normal day shift.
- The grid is experiencing high demand
- The "A" Steam Generator is experiencing .02 gallons per day primary to secondary leakage. Chemistry is periodically monitoring leak rate.
- You have been requested to perform Periodic Test 1-PT-18.6L Pressurizer Block Valve Stroke Test. The normal control room timers qualify as an SQC calibrated stopwatch.
- The "C" Steam Generator NRC Rad Monitor is out of service.

Unit 2 is at 100% power with all systems available and operable.

When the team has accepted the shift, proceed to the Session Conduct Section.

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actit	y: Surry	Sce	enario No.: 2 Op-test No.:	
Ixamine	rs:			
in serv control	ice, due	to Main Turl	power at 50% just after placing second feed pump bine vibration problem. PT-446 selected for	
furnove /ibrati	r: Rampin on noted	g to 100%, 1 on Main Turk	leak in 1A SG, high grid demand, increased bine during ramp up.	
Event No.	Malf. No.	Event Type*	Event Description	
1	MMS-14	RO(I)	PT-446 fails low (selected channel)	
2	M1502	BOP(C)	B S/G PORV lifts in advertently	
3	MMC-04	RO(C)	(C) Loss of CC to NRHX requiring normal letdown to be secured.	
4		BOP(N)	Place excess letdown in service	
5		BOP (C)	Loss of C Condensate pump, A does not automatically restart.	
6	MTU-09	BOP(C)	Main Turbine Governor valve goes shut (Max rate	
	MTU-02	RO&BOP(R)	Main Turbine vibration requiring ramp down per 23.	
7	MMS-03	M(ALL)	Major SG fault on 1B SG (Max rate)	
			Post major event failures	
	MEL-11		1FW MOV-151 "C" will thermal out when the operator takes control of the valve to close.	
			1-CSP-1A starts with low amps with no discharge pressure.	
			1-CSP-1B Containment Spray pump fails to auto start, but can be manually started in the contr room.	
1-SIFI963 fails low		1-SIFI963 fails low		

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

Event: Loss of CC to the NRHX

Expected Responses, the team should:

- The RO acknowledges D-G-3, Demin Inlet Hi Temp.
- The BOP reviews annunciator D-G-3.
 - Verifies letdown diverted.
 - Identifies full demand on 1-CC-TCV-103.
 - Removes letdown from service.
 - o Closes 1-CH-LCV-1460A.
 - o Closes 1-CH-LCV-1460B.
- The RO minimizes charging flow using 1-CH-FCV-1122 in Manual.
- The team dispatches the Aux Building Operator to locally investigate 1-CC-TCV-103.
- The SRO notifies the Shift Supervisor.

Evaluator Notes:

NRC 2002 Exam Scenario #2

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Oper	Observation Aid:	
Event	Event: Place Excess Leidown in Service	
Espec	Expected Responses, the team should:	
•	The BOP obtains a copy of OP-CH-006.	
•	Reviews Precautions and Limitations.	
•	Places 1-CH-HCV-1389 to the PDTT position.	
•	Opens 1-CH-HCV-1201 excess letdown HX isolation.	
•	Records charging flow.	
•	Opens 1 Loop drain isolation valve 1-RC-HCV-1557A, B, or C.	
•	Opens 1-CH-HCV-1137 to establish 15 gallons per minute flow.	
•	Places 1-CH-HCV-1389 to VCT position.	
•	Varifies or places 1-CH-PCV-1145 in MANUAL.	
•	Verifies or closes 1-CH-LCV-1460A and B.	
٠	Varifies or closes 1-CH-PCV-1122.	
•	Varifies or closes 1-CH-HCV-1200A, B, and C.	
٠	Fully opens 1-CH-PCV-1145.	
Eval	Evaluator Notes:	
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NR	NRC 2002 Exam Scenario #2 Page 5	Revision 0

Event: Loss of Running Condensate Pump

Expected Responses, the team should:

- The BOP acknowledges annunciator K-D-4, 4KV Breaker Auto-Trip.
- The RO reviews annunciator K-D-4.
- The team identifies "C" condensate pump tripped.
- The team identifies "A" condensate pump suto-start failure.
- The BOP starts "A" condensate pump.
- The team dispatches operators to the trip breaker and to the pumps.
- SRO notifies SS.

Evaluator Notes:

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Event: Excessive Turbine Vibrations requiring Unit Ramp

Expected Responses, the team should:

- The BOP acknowledges annunciator J-E-5, Rotor Eccentricity/Vibes.
- The RO looks at turbine supervisory vibration module.
- The RO displays P250 turbine vibration points and identifies increasing vibrations on bearing #1 and #2.
- The BOP implements the J-E-5.
 - Initiate a ramp in accordance with AP-23.00 in order to reduce vibrations.
 - Notifies STA, OMOC.

Evaluator Notes:

NRC 2002 B					Evaluator Notes:	1					•							•	•	r 	• Temin	Event: Excents	
NRC 2002 Exam Scenario #2						The team monitors plant performing a load reduction.	° OMOC	o Chemistry	o Polishing Building	o System Operator	Notifies the following:	o Initiates 10-gallon conti	 Stops emergency bornti 	 Increases charging flow 	o Monitors emergency bo	o Opens 1-CH-MOV-1350.	 Inservice boric acid transfer pump to flast. 	Performs energency boration.	Initiates load reduction at 1% per minute.	Reviews precautions and notes.	Team implements AP-23.00, Rapid Load Reduction.	re Turbiae Vibrations retu	
Page 8					512	rforming a load reduction.						Initiates 10-gallon continuous normal boration, as required to maintain Tave.	Stops emergency boration and return lineup to normal.	Increases charging flow by opening 1-CH-FCV-1122 in Manual.	Monitors emergency borate flow on 1-CH-FI-1110.	Ģ	after pump to flast.	P	6 par minute.	ġ,	Load Reduction.	Event: Excessive Turbine Vibrations requiring Unit Ramo (CONT)	
Revision 0) maintain Tave.		ual									•

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Event: Faulted "B" Steam Generator/Reactor Trin/Safety Injection

Expected Responses, the team should:

- The RO acknowledges annunciators B-A-7 and B-B-7, Containment Partial Pressure positive alarms.
- The RO identifies increasing containment pressure.
- The BOP acknowledges annunciators H-G-6, "B" Steam Generator Level Error.
- The BOP identifies decreasing steam flow on "B" steam generator.
- The SRO directs a Manual trip and safety injection.
- The RO trips the reactor by pushing the reactor trip pushbuttons
- The RO trips the turbine by depressing both turbine trip buttons
- The RO verifies Emergency buses energized
- The RO initiates/verifies SI.
- . The RO note 1-SIFI963 fuiled low

Evaluator Notes:

NRC 2002 Exam Scenario #2

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NRC 2002 Exam Scenario #2

Event: Faulted "B" Steam Generator/Reactor Trin/Safety Injection (CONT)

- The team identifies high containment pressure.
- The RO backs up the Hitti CLS signal
- The RO trips all Reactor coolent pumps.
- Critical Step, The RO starts the "B" Contain ment Spray Pump
- The BOP performs Attachment 1 for CLS Component Verification
- The RO blocks Low Pressurizer Pressure/HDR-Line SI
- The RO blocks High Steam Flow SI
- The RO secures one charging pump
- The RO secures one LHSI pump
- The BOP throttles AFW flow to minimize RCS cooldown
- The BOP performs Attachment 2 to Verify Ventilation and AC Power Alignment
- The RO closes MSTVs to minimize RCS cooldown

Evaluator Notes:

Trent: Fruited "P" Steam Generator/Banctor Toto/Safter Jaitectian The SRUBOP clocia if the SGs are faulted Team transitions to 1-E-3, Faulted Steam Generator Isolation BOP closes or verifies closed MSTV on "P" SG Team identifies "P" SG as flashed Created Steam Trip Valve (1-IWV-MOV-15)IC & ID) Directs massail isolations of "J" ATW Isolator. Main Steam Trip Valve (1-IMS-TV-101B) BOP directs down of 1-B-1, Loss of Reactor of Secondary Coollant. Team transitions to 1-E-1, Loss of Reactor of Secondary Coollant. Evaluator. Note: Reattor Note: Parter:		ion							WP	' SG is blown dry	Coolers		. 15 (æ					
Faulted "B" Steam Generate The SRO/BOP checks if the S(Team transitions to 1-E-2, Fau BOP closes or varifies closed h Team identifies "B" SG as fluit Critical Step, The BOP isolate Aux Feedwater Isolation (1-1 Directs manual isolation (1-1 Directs (1-1) Directs manual isolation (1-1 Directs (1-1) Directs manual isolation (1-2-1), Los Team transitions to 1-E-1, Los Team transitions to 1-E-1, Los Team transitions to 1-E-1, Los	r/Reactor Trip/Safety Lai	Ga are faulted hed Steam Generator Isolati	STV on "B" SG	per	s the "B" Steam Generator	W-MOV-151C & D)	J" AFW heador.	(B-TV-101B)	(20, steam supply to TDAF	imit RCS heatup after "B"	s of Reactor or Secondary (:	Page 11
	Faulted "B" Steam Generato	The SRO/BOP checks if the S(Transitions to 1-E-2. Fast	BOP closes or varifies closed h	Team identifies "B" SG as fluit	Critical Step , The BOP isolate	Aux Feedwater Isolation (1-1	Directs manual isolation of "	Maia Steam Trip Valve (1-N	BOP directs closure of 1-MS-1	BOP adjusts "B" SG PORV to	Team transitions to 1-E-1, Lot	Evaluator Notes:				-			2002 Exam Scenario #2

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	BOP controls AFW flow to maintain unaffected SG levels 22% to 50%
	Team verifies SI Termination criteria are met and transitions to 1-ES-1.1, SI Termination
	RO reacts or verifies react SI
	RO opens IA-TV-100 to establish IA to containment
	RO stops all but one charging pump and places it in AUTO
	R.O abuts SI-MOV-1867C & D to isolate HHSI flow
	RO opens CH-MOV-1289A & B and CH-FCV-1122 to establish normal charging flow
	RO stops LHSI pump
	RO gtops OSRS, ISRS and CS pumps
	RO doses 1-CS-MOV-101A,B,C,D and 1-CS-MOV-102A,B
	RO stops 1-SW-P-5A,B,C,D and closes 1-SW-MOV-103A,B,C,D
•	R.O. establishes letdown
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Evaluator Notes:

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NRC 2002 Exam Scenario #2	•.	D ES-1.1	o B-1	o B-2	a AP-23.00	G OP-RP-001	a OP-CH-006	 Verify clean copies of the following procedures are in place: 	C Radiation Monitors	Power Range Recorders	D NR-45	S/G Pressure Recorders	a Main Control Board Master Advance	a Advance Charts	 Verify Turnover materials in place: 	a Verify S/G PORVs set for 1035 ping	D Verify Component Switch Flags	a Reset ICCMs	a Verify ERPCS and PRODAC operating.	Place RIRM206C out for maintenance.	c Place the simulator in RUN and verify normal 50% power operation indications.	Verify the following control recent actual:	Simulator Setup		
Page 14					 ·			edures are in place:													mal 50% power operation indicatio		·		
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Conduct shift turnover.

Provide normal shift turnover materials reflecting the below initial conditions: Initial conditions are as follows:

Unit 1 is at 50% power performing a normal startup following maintenance with the following off-normal conditions present:

- It is a normal day shift.
- The grid is experiencing high demand
- The "A" Steam Generator is experiencing .02 gallons per day primary to secondary bestage. Chemistry is periodically monitoring leak rate. ۰
- The "C" Steam Generator NRC Rad Monitor is out of nervice. •
- The ramp on Unit 1 is being held at 50 % power while the turbine group is evaluating increased local vibration readings on the main turbine. ٠

Unit 2 is at 100% power with all systems available and operable.

When the team has accepted the shift, proceed to the Session Conduct Section.

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Session Conduct

• Ensure conditions in Simulator Set-up are established.

Event: First Stage Impulse Pressure (Selected). PT446 Fails Low

• When the lead evaluator indicates ready, initiate Trigger 1.

ROLE-PLAYING INFORMATION

- If contacted as Instrument Techs, will gather procedures and come to the Control Room.
- If contacted as SS, acknowledge failure.

Event: "B" Steam Generator PORV Fails Open

• When the lead evaluator indicates ready, initiate Trigger 2.

ROLE- PLAYING INFORMATION

 After 2 minutes as Security, notify the Control Room steam coming out of the top of Unit 1 Safeguards.

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- If contacted as the Instrument Techs, report that they will report shortly.
- As SS, acknowledge failure.

NBC 2002 Exam Scenario #2	 ROLE- FLAXING INFORMATION As turbine building operator, report no abnormalities noted at the condensate pumps. As service building operator, report 15C4 has a "C" phase ground overcurrent. As SS, acknowledge failure. 	• When the lead evaluator indicates ready, initiate Trigger 4.	Event: Loss of Running Condensate Pump	 Respond as requested. 	ROLE- PLAYING INFORMATION	Event: Place Except Letdern in Service	 If dispatched as Aux Building Operator, report 1-CC-TCV-103 is full closed. As SS, acknowledge failure. After excess letdown is placed in service, report as the L&C Department the problem with the TCV has been found and corrected. 	ROLE- PLAYING INFORMATION
Page 2	no abnormalities noted at the con 15C4 has a "C" phase ground ov	ady, initiate Trigger 4.					or, report 1-CC-TCV-103 is full o rice, report as the L&C Departmen id.	
Revision 0	idensate pumps. erourrent.						:losed. .t the problem with	

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When the lead evaluator indicates ready, initiate Trigger 3.

Event: Loss of CC to the NRHX

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NRC 2002 Exam Scenario #2

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Event: Excessive Turbine Vibrations requiring Unit Ramp

• When the lead evaluator indicates ready, initiate Trigger 5.

ROLE- PLAYING INFORMATION

- As SS, acknowledge ramp required. If needed, direct 1% ramp per AP-23.00.
- As turbine building operator, report no abnormalities of the turbine.

Event: Faulted "B" Steam Generator/Reactor Trip/Safety Injection

When the lead evaluator indicates ready, initiate Trigger $\underline{\mathbf{6}}$.

ROLE- PLAYING INFORMATION

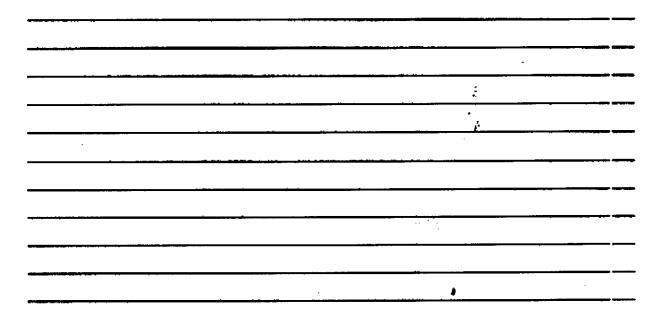
- When directed to isolate the "J" header, use P&ID (AFW 1) to close 1-FW-141/156/171
- When directed to isolate the "B" FW bypass line used P&ID screen MFW2, to close 1-FW-57.
- When directed to isolate the Terry Turbine, use P&ID screen MS2, to close 1-MS-120
- When directed to investigate "A" CS pump, report the motor to pump coupling is sheared.

Event: First Stage Impulse Pressure (Selected), PT446 Fails Low

Expected Responses, the team should:

- The BOP identifies Annunciators H-A-4, Tave Tref Deviation; H-G-5/6/7, Steam Generator level errors; and H-H-7 steam dump trip open.
- The team identifies failure of channel III Pimp.
- The RO places rod control in manual.
- BOP may place main feed reg valves in manual.
- Team identifies the following systems affected:
 - Main Feed Reg Valves will trend to 33% in Auto.
 - AMSAC will be defeated after 6 minutes.
 - Steam dumps have a trip open demand.
 - Rod control has demand to drive in at max rate.

Evaluator Notes:



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Event: First Stage Impulse Pressure (Selected), PT446 Fails Low (CONT.)

- SRO reviews Tech Spece and identifies Table 3.7-1, Item 20.e, Operator Action 13 (verifies permissives), Table 3.7-2, Item 1.e, Operator Action 20, (place channel III high steam flow in trip.)
- BOP obtains copy of OP-RP-001. Shifts control channel to channel IV by doing the following:
 - . Verifics rode in manual
 - . Steam dumps to off
 - Polishing building to defeat
 - Feed reg valves to manual
 - Piaces A/B/C steam flow and feed flow to channel IV
 - Places first stage impulse pressure to channel IV
 - SRO notifies Shift Supervisor.

Evaluator Notes:

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