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Scenario Outline

Facility:	Sequoyah		Scenario No.:	1	Op Test No.:	2010302
Examiners:			Op	erators:		
		778 d. 1. 1. 1				
					<u></u>	
Initial Condition	ons: ≈42% F	RTP				
Turnover:	Increase power a	according to 0-G	0-5, Normal Power	Operatior	1	
Target CTs:			aulted SGs in order t s to the PTS CST	o minimiz	e RCS cooldowr	n rate before a severe
Event No.	Malf. No.	Event Type*		Eve	ent Description	
1. T+0	N/A	R - RO N – SRO/BOP	Normal Power Incr	ease	Administration of the second	
2. T+20	CV06B CV01B	C - RO TS - SRO	1B-B CCP Aux LO operator response	Pump Ac	tuates w/1B-B C	CP Trip- Delayed for
2.a		N – RO/BOP	Letdown Restoratio	on		
3. T+35	CC14 CC20	C - BOP TS - SRO	Component Coolin 1-FCV-70-63, Mak	-		
4. T+50	CV18B	C – RO TS - SRO	#2 RCP #2 Seal Fa	ilure		
5. T+65	ZAITIC2448	C – BOP*	Gen H2 Temp Hx (Cooling W	/ater Controller f	ailure
5.a*	RW09 ZDITIC2448SW1 ZDITIC2448SW3	R – R0*	H2 Cooler/Stator C	ooling Lo	ss - MT Trip, No	Rx Trip*
6. T+70	MS03A MS03B MS03C MS03D	M - Crew	MS Safety Valves I	ift 1 per S	G on all SGs	
* (N)orr	nal, (R)eactivity, (I)nstrument, (C)	omponent, (M)ajor			

* - If crew chooses to Rx Trip vs. MT, insert Event 6 immediately following the Rx Trip

Appendix D

Scenario 1 Summary

The crew will assume the shift with the unit at ~42% RTP in MODE 1 in 0-GO-5 Section 5.1 Power Ascension From 30% to 100%. Shift directions are to continue power escalation to 100% RTP.

Following completion of crew turnover, at the SRO's direction, continue plant power escalation (Section 5.1 Power Ascension From 30% to 100% Step 23).

Following the plant power increase, at the direction of the Lead Examiner, initiate the next event, 1B-B CCP Aux LO Pump Actuates w/1B-B CCP Trip. The crew may respond to the Auxiliary Lube Oil Pump actuation using 1-SO-62-1, Section 8.18, CCP Low Lube Oil Pressure or using alarm response procedures (ARPs) 1-AR-M6-C, D-3 and 1-AR-M1-B, E-3 that directs entry into AOP-M.09 for the CCP trip. The CCP trip will initiate Letdown isolation. After charging is restored and normal letdown returned to service, the SRO will identify Tech Specs: 3.5.2, TRM items: 3.1.2.4.

At the Lead Examiner direction, initiate the next event, a Component Cooling System leak occurs within the capacity of make-up however, the make-up flow control valve, 1-FCV-70-63 fails to open automatically requiring the operator action. Crew will respond by using ARPs 0-AR-M27B-B C-2, C-3 and, as necessary, AOP-M-03, Loss of Component Cooling Water, Section 2.4 to stabilize CCS inventory while continuing to identify the leak, which is outside containment. SRO will identify Tech Specs: 3.5.2, 3.6.2.1, 3.7.3.

Following TS identification, at Lead Examiner direction, initiate the next event, #2 RCP #2 Seal Failure- excessive seal leakage. The crew will respond using ARPs 1-AR-M5-B, A-3, B-2. The RO will follow the ARP directing #2 RCP Standpipe fill directing entry into AOP-R.04, Reactor Coolant Pump (RCP) Malfunctions Section 2.4 and 1-SO-68-2, RCP Ops for the failure. The SRO will identify Tech Specs 3.4.6.2.

Following TS identification, at Lead Examiner direction, initiate the next event, Main Generator (MG) high hydrogen gas temperatures due to Stator Water Cooling and Hydrogen Cooling RCW TCVs failing. The crew will respond to ICS and annunciator alarms. After determining that the H2 cooling water valve, 1-TIC-24-48 is not functioning in AUTOMATIC, the operators will take manual control and attempt to restore H2 temperature. Subsequently, 1-TIC-24-48 manual control will fail resulting in MG Stator temperature increase. The crew will respond using ARPs 1-AR-M1-A, A-1, B-4, that direct entry into AOP-S.06, Turbine Trip, Section 2.0 for the failure. If the unit is not reduced to <15% power within 45 seconds, an automatic MT trip will occur. Expectation is that the crew will trip the MT, stabilize plant power using manual Rod Control and Steam Dumps following the MT trip but prior to exceeding Reactor Trip conditions. Crew consideration to reduce power to<15% is not anticipated.

When the plant is stable, at Lead Examiner direction, initiate the next event, MS Safety Valves spurious actuation on (1 SV per SG) all SGs. The crew will respond using ARPs 1-AR-M5-A, A-6; 1-AR-M6-B A-7, B-7, C-7, D-7 directing entry into AOP-S.05, Steam or Feedwater Leak, Section 2.0. Once the steam leak is identified, the crew should trip the reactor and close the MSIVs as directed in AOP-S.05 since the MT is off line. If alarm 1-AR-M6-A E-2 actuates, indicating an excessive cooldown, the crew will manually trip the reactor.

Following the Reactor Trip, the crew will enter E-0, Reactor Trip or SI to stabilize the plant and diagnose the steam leak event. They should transition to E-2, Faulted Steam Generator Isolation then to ECA-2.1, Uncontrolled Depressurization of All Steam Generators to stabilize RCS cooldown by minimizing feedwater flow to affected SGs.

EOP flow: E-0 - E-2 - ECA-2.1.

Scenario Termination: as directed by the Lead Examiner; following completion of ECA-2.1, Step 14, SI termination determination.

PSA significant task: Start EDG, 1B-B CCP and RCP Seal Leak determination PSA significant DAS: Multiple MSLB PSA significant component failure: Secondary Safety Valve failure

Appendix D			Scenario Outlin	e	Δ	ttachment 1
Op Test No.:	NRC 2010302 n: 42%	Scenario Plant Power		1	Page	10f
Time	Position		Applica	ant's Actions or b	ehavior	
Simulator Op	perator: No ac	tion requi	ired for Event 1			
Indications a	vailable: Non	e, Crew wi	Il perform plant pov	wer increase IAW	0-GO-5, Sect	ion 5.1.
T = 0	Following cor power using \$	npletion of Section 5.1	crew turnover, at the Power Ascension F	SRO's direction, trom 30% to 100%	the crew will in starting at Ste	crease plant o 23.
	SRO	Section 5 According reactivity increase	oad increase in acco 5.1, Power Ascension g to shift briefing, the spreadsheet to cont using 0-SO-62-7 Bon Rods using 0-SO-85-	RO will use the re rol Tave-Tref devia on Concentration	% actor Enginee ttion during the Control, Sectic	ring-provided power n 6.2 and
Evaluator No	te: Turbine lo	ad at scen 1-PI-1-72	ario initiation is ~38% & 1-73	6 indicated by HP	Turbine Impuls	e Pressure
	SRO		HEN approximately	40% turbine load:		
		[23.1]	VERIFY annunciat	or XA-55-4A, wind	ow E-7:	
	BOP		C-20 AM ARME	D	LIT.	
	BOP		CLOSE the drains I/A other pump).	on the operating n	nain feedwater	pump turbine
		MFPT	DESCRIPTION	HANDSWITCH	POSITION	INITIALS
		A	DRAIN VALVES	HS-46-14	CLOSED	
		В	DRAIN VALVES	HS-46-41	CLOSED	

Appendix D			Scenar	rio Outline			Atta	ichme	ent 1
Op Test No.:	NRC 2010302	Scenario #	1	Event #	1	Page	2	of	53
Event Description	1: 42%	Plant Power Inci	rease						

Time	Position	Applicant's Actions or behavior							
		NOTES							
	feed pu or 65%	feed pump in service may be deferred until power is approximately 55% (Unit 1) or 65% (Unit 2). Logic prevents opening the standby MFPT condenser isolation valves if the pump is NOT reset prior to exceeding 9 million lbs/hr flow on the running pump.							
	allows of	9 3.3.2.1 (3.3.2) functional unit 6.f (AFW start function for the trip of both MFPT) vs one channel to be inoperable in Mode 1 for up to 4 hours when starting up or ting down the second MFPT.							
	BOP	[24] WHEN approximately 40 to 45% turbine load, THEN PLACE second MFPT in service by performing the following:							
Lead Examin	er: when pow	er change is sufficient for a reactivity manipulation, cue the next event.							

Appendix D		Scenar	io Outline			Atta	achme	ent 1
Op Test No.:NRC 2010302	Scenario #		Event #	1	Page	3	of	53
Event Description: 42	% Plant Power Inc	rease					_	

Time	Position		Α	pplicant's Actions o	r behavior	
	0-SO-	62-7 Boro	n Concentratio	on Control. Section 6	5.2 Dilute	
Evaluator Not	e: Dilutions p power esc determine	erformed u alation, lai d by the cr	using the RE-pr ge volume dilu ew.	ovided Reactivity Spre tions will be divided ev	eadsheet; durin venly over each	hour as
	Approxima reactor po	ately 15 mi wer/RCS t	nutes delay is i emperature.	normal for Normal Dilu	ution/Boration ef	fects to affect
	An extra b procedura concentrat	l direction ion equali	to cause press zation.	s (Back-up Group 1C) urizer spray operation	for RCS/Pzr bo	pron
	RO	[1] ENS posit	URE unit is <u>NC</u> ive reactivity ac	<u>oT</u> in a Tech Spec or T dditions. [C.1]	RM action that	prohibits
	NOTE H					
	RO		crease of 1% is	s equal to 1380 gallon	s (TI-28 fig. C.2	1).
		expe	cted amounts o	capacity available in the formation of CVCS letdown: (N/	he HUT selecte A if <u>not</u> used)	d to receive
			HUT	LEVEL	INITIALS	
			A	%		
			В	%		
	RO	[3] ENS with s	URE makeup s Section 5.1.	ystem is aligned for A	UTO operation	in accordance
	RO	[4] REC boror	ORD the quant concentration gals	ity of dilution water red using Appendix D. (I	quired to achiev V/A for minor po	e desired wer changes)
	ini	tial calcula	tion. The follow	the verified calculatio ving signoff indicates t d and are close enoug	hat any differen	ices in the two
	RO	[5] PERI Amou	FORM Appendi ant of Boric Aci	x I Independent Verifi d or Primary Water. (N rom Rx Engineering)	cation of Calcul	ation for
	RO		E [HS-62-140 STOP position	A], Boric Acid Supply	to Blender Flow	/ Control Switch

Appendix D		Scenari	io Outline			Atta	chme	ənt 1
Op Test No.: NRC 2010302	Scenario #	1	Event #	1	Page	4	of	53
Event Description: 42%	Plant Power Inc	crease			-	<u> </u>		

Time	Position	Applicant's Actions or behavior
	0-SO-	-62-7 Boron Concentration Control, Section 6.2 Dilute
	RO	[7] PLACE [HS-62-140B], CVCS Makeup Selector Switch to the DILUTE position.
	RO	[8] ENSURE [<u>HS-62-140D</u>], Boric Acid Valve to the Blender is CLOSED (Green light is LIT).
	RO	[9] SET [FQ-62-142], Batch Integrator for the desired quantity
	NOTE P	rimary Water Flow Controller [FC-62-142] receives its reference signal (70 pm) from setpoint potentiometer (dial indicator) located on panel M-6. A
	Se	spont of 35% corresponds to a 70 gpm primary water flow rate
		[10] ADJUST [FC-62-142], Primary Makeup Water Flow Controller for the desired flow rate
	RO	[11] PLACE [<u>HS-62-140A</u>], Boric Acid Supply to Blender Flow Control Switch to the START position.
	1 04	ow oscillations and/or erratic controller response may require manual peration of Primary Water Flow Controller [FC-62-142] until stable conditions ist.
	RO	[12] VERIFY the following;
		[a] Inlet to top of VCT [FCV-62-128] is OPEN.
		[b] Primary Water flow by [FI-62-142A] OR [FQ-62-142]
	to 1 30	ernate dilution in small amounts is acceptable on a regular basis, provided no nificant changes in seal water temperature or seal leakoff are indicated. Batches of 8 10 gallons may be added through FCV-62-144 on a frequency not to exceed once pe minutes. ICS points for No. 1 seal leakoffs and seal water temperatures on the Ps should be monitored during and after dilution.
	RO	[13] IF primary water addition to the bottom of the VCT [FCV-62-144] is desired, THEN
		[a] CLOSE [FCV-62-128] with [HS-62-128].
		[b] OPEN [FCV-62-144] with [HS-62-144].
· · · · · · · · · · · · · · · · · · ·		[c] VERIFY Primary Water flow by [FI-62-142A] OR [FQ-62-142].

Appendix D	Scen	ario Outline			Atta	chme	ent 1
Op Test No.:NRC 2010302	Scenario #1	Event #	1	Page	5	of	53
Event Description: 42%	Plant Power Increase						

	Position	Applicant's Actions or behavior
	0-SO	-62-7 Boron Concentration Control, Section 6.2 Dilute
	NOTE I	t may take approximately 15 minutes before any changes to reactivity are ndicated on nuclear instrumentation or RCS temperature indication.
	RO	[14] MONITOR nuclear instrumentation and reactor coolant temperature to ensure the proper response from dilution.
	RO	[15] IF [LI-62-129], Volume Control Tank Level, increases to 63 percent, THEN ENSURE [LCV-62-118], Volume Control Tank Divert Valve OPENS to divert excess water to the Holdup Tanks.
	RO	[16] WHEN dilution is complete, THEN
		[a] PLACE [HS-62-140A], Boric Acid to Blender Flow Control Switch to the STOP position.
		[b] IF [FCV-62-144] was previously OPENED, THEN CLOSE [FCV-62- 144] with [HS-62-144].
		[c] VERIFY no primary water flow on either [FI-62-142A] OR [FQ-62- 142].
Lead Exami	pages are a	initiation of the next event at his discretion. Steps on the next several associated with performance of repetitive dilutions and control rod
	motion wh	
	RO	Inich are performed until all manipulations specified are complete.[17] IF power increase in progress and additional dilutions will be required, THEN use this table to re-perform steps [4] through [18] (next page)
	RO	[17] IF power increase in progress and additional dilutions will be required, THEN use this table to re-perform steps [4] through [18] (next page)
		 [17] IF power increase in progress and additional dilutions will be required, THEN use this table to re-perform steps [4] through [18] (next page) [19] REALIGN the blender controls for AUTO makeup to the CVCS in accordance with Section 5.1.
	RO	 [17] IF power increase in progress and additional dilutions will be required, THEN use this table to re-perform steps [4] through [18] (next page) [19] REALIGN the blender controls for AUTO makeup to the CVCS in accordance with Section 5.1. [20] ENSURE dilution(s) is logged in Unit Narrative Log.
	R0 R0 NOTE S	 [17] IF power increase in progress and additional dilutions will be required, THEN use this table to re-perform steps [4] through [18] (next page) [19] REALIGN the blender controls for AUTO makeup to the CVCS in accordance with Section 5.1. [20] ENSURE dilution(s) is logged in Unit Narrative Log.
	R0 R0 NOTE S	 [17] IF power increase in progress and additional dilutions will be required, THEN use this table to re-perform steps [4] through [18] (next page) [19] REALIGN the blender controls for AUTO makeup to the CVCS in accordance with Section 5.1. [20] ENSURE dilution(s) is logged in Unit Narrative Log. Sample may be obtained at normal RCS sample intervals provided the unit is at a standard stand

Appendix D		Scenario Outline		Attachm	ent 1
Op Test No.:	NRC 2010302	Scenario # _ 1 Event # 1	Page	<u>6</u> of	53
Event Descriptio	n: 42% F	Plant Power Increase			
Time	Position	Applicant's Actions or beha	vior		
	0-SO-6	2-7 Boron Concentration Control, Section 6.2 Dil	ute		
		STEP	1 st	2 nd	3 rd
[4] RECORD th concentration	ne quantity of dilut on using Appendi	ion water required to achieve desired boron x D.	Quantity	Quantity	Quantity
[5] PERFORM	Appendix I, IV of	Calculation for amount of BA or PW.	Genary	Guartary	Quantity
			SRO	SRO	SRO
[6] PLACE [HS STOP posi	5-62-140A] , Boric tion.	Acid Supply to Blender Flow Control Switch to the	$\frac{1}{1^{st}CV}$	$\frac{1}{1^{\text{st}}}$ CV	
[7] PLACE [HS	5 -62-140B], CVCS	Makeup Selector Switch to the DILUTE position.			
[8] ENSURE [H	IS-62-140D] Borid	c Acid Valve to Blender is CLOSED (Green light LIT).			
[9] SET [<u>FQ-62</u>	2-142], Batch Integ	grator for the desired quantity.		· · ·	
					1 st CV
[10] ADJUST [rate.	FC-62-142] , Prim	ary Makeup Water Flow Controller for the desired flow	///	/	/ 1 st CV
[11] PLACE [<u>H</u>	S-62-140A] , BA S	Supply to Blender Flow Control Switch to START.	,	1	1
[12] VERIFY th	e following:				1 st CV
[a] Inlet to	top of VCT [FCV	-62-128] is OPEN.			
		FI-62-142A] or [FQ-62-142].			Π
[13] IF PW add bottom of	ition to top of VCT the VCT [FCV-62	[FCV-62-128] is not warranted, but PW addition to the -144] is desired, THEN			
[a] CLOSI	E [FCV-62-128]wi	th [HS-62-128]		LJ	
	[FCV-62-144] wit				
		low by [FI-62-142A] or [FQ-62-142].			
proper res	ponse from dilutio				
		creases to 63 percent, THEN ENSURE			

/ 1st CV

T I

CV

1st

/ 1st CV

[b] PLACE [HS-62-140A], BA to Blender Flow Control Switch to START position.

[a] PLACE [HS-62-140B], CVCS Makeup Selector Switch to the AUTO position. _

[a] PLACE [HS-62-140A], Boric Acid to Blender Flow Control Switch to STOP
 [b] IF [FCV-62-144] was previously OPENED, THEN CLOSE [FCV-62-144]

[c] VERIFY no primary water flow on either [FI-62-142A] or [FQ-62-142].

[c] ENSURE dilution is logged in Unit Narrative Log.

[16] WHEN dilution is complete, THEN

with [HS-62-144].

[d] ENSURE [FCV-62-128] is CLOSED.

[18] IF Step [17] will be repeated, THEN PERFORM the following:

Appendix D			Attachment 1						
Op Test No.:	NRC 2010302	Scenario #		Event #	1	Page	7	of	53
Event Descriptio	on: 42%	Plant Power Inci	rease						

Time	Position	Applicant's Actions or behavior							
		0-SO-85-1, Control Rod Drive System,							
	Sectior	n 6.4, Transferring from Manual to Auto Rod Control; &							
	Sectio	on 6.5, Transferring from Auto to Manual Rod Control							
Evaluator Not	laminate M-4. It i	ed in each section's procedural Step 1 Note 1, the operators will use a ed copy of Sections 6.4 & 6.5 available on the book desk under the glass at 1- is verified as current, in-effect revision routinely to assure currency.							
	NOTE 1: A	aminated copy of this section can be maintained in the Unit Control Room repetitive use for routine rod manipulations.							
	ا د	Defeating or restoring Tavg/Delta T or NIS channel may cause step change in nput to rod control. A delay of at least 3 minutes prior to returning rod control to automatic will allow lead/lag signal to decay off.							
	NOTE 3: 1 t	This Section may be N/A if Rod Control is being returned to AUTO in response o a transient (runback) condition.							
	RO	[1] ENSURE turbine power is greater than 15 percent.							
	RO	[2] ENSURE Window 31 (E-3), LOW TURB IMPULSE PRESS ROD WITHDRAWAL BLOCKED C-5, Permissive light on panel [XA-55-4A] is NOT LIT.							
	RO	[3] ENSURE less than 1 degree Tavg/Tref mismatch.							
	RO	[4] PLACE [HS-85-5110], Rod Control Mode Selector in the AUTO position.							
	RO	[5] VERIFY Rod Speed Indicator [SI-412], indicates 8 Steps/minute.							
		End of Section 6.4							
		Section 6.5, Transferring from Auto to Manual Rod Control							
	NOTE 1: A	laminated copy of this section can be maintained in the Unit Control Room or repetitive use for routine rod manipulations.							
	NOTE 2: M A B C	Anual rod withdrawal is inhibited by any of the following signals: . C-1, High Flux Intermediate Range Monitor . C-2, High Flux Power Range Monitor . C-3, Overtemperature Delta-T . D. C-4, Overpower Delta-T							

Appendix D			Scena	rio Outline			Atta	chme	ent 1
Op Test No.:	NRC 2010302	Scenario #	1	Event #	1	Page	8	of	53
Event Description	on: 42%	Plant Power Inc	rease						

Time	Position	Applicant's Actions or behavior
		0-SO-85-1, Control Rod Drive System,
		6.4, Transferring from Manual to Auto Rod Control; &
		n 6.5, Transferring from Auto to Manual Rod Control
	RO	[1] PLACE [HS-85-5110], Rod Control Mode Selector in the MANUAL position.
	RO	[2] VERIFY Rod Speed Indicator [SI-412], indicates 48 Steps/minute.
	RO	[3] IF control rod movement is required, THEN ADJUST position using [HS- 85-5111], Rod Control Switch.
	RO	[4] IF it is desired to leave [HS-85-5110], Rod Control Mode Selector in
		Manual for an extended period of time, THEN PLACE this Section in the Active Procedures Book.
	RO	[5] WHEN it is desired to place [HS-85-5110], Rod Control Mode Selector to Automatic, THEN
		GO TO Section 6.4.
		End of Section 6.5

Appendix D		Scer	cenario Outline Attachment							
Op Test No.:	NRC 2010302	Scenario #1	Event #	2 F	^D age <u>9</u> of <u>53</u>					
Event Descriptio	on: 1B	B CCP Aux LO Pump A	ctuates w/1B-B CCP Trip							
Time	Position		Applicant's Actio	ns or Behavior						
Simulator O	perator: When	directed, initiate l	Event 2							
Annuncia 1-M-1 ● 1-AR- 1-M-6	М1-В, Е-3, МОТ(OR TRIPOUT PNL 1-	M-1 THRU 1-M-6 LINE FLOW ABNORMA	۱L						
Indication 1-M-5		CP Handowitch Ded								
T = 20	02-104A, 1B-B C		Lube Oil Pressure Lo		es					
	RO	Identifies Red Lube Oil Pressure Lo Light, notifies SROTS 3.5.2 Action a: w/ 1 or more trains inoperable & w/ at least 100% ECCS flow equivalent to a single OPERABLE ECCS train available, restore to OPERABLE status w/i 72 hrs or HT STBY w/i next 6 hrs & in HT SHDN w/i following 6 hrs.								
		Action: w/ only 1 Co borated to a SDM e	2 CCPs shall be OPER CP OPERABLE, restore quivalent to at least 1% CPs to OPERABLE w/i n	at least 2 w/i 72 delta k/k at 200°	2 hrs or HT STBY & °F w/i next 6 hrs; T SHDN w/i next 30 hrs.					
Evaluator No	Section 8. the 5-minu	tifies the lube oil con 10, (following); if the	ndition, the crew shoul e crew fails to identify t will trip. ARPs will di	d transfer CCI he 1B-B CCP	Ps using 1-SO-62-1, lo lube oil condition, at					
		1-SO-62-1, Section 8.18 "CCP Low Lube Oil Pressure"								
	SRO	Directs implement	Directs implementation of 1-SO-62-1, Section 8.18 starting at Step 1							
	dui	ring solid water oper	not be immediately st rations), then an opera oil reservoir level with	tor should be						
		P oil reservoir sight	glass level guidance:		• .					
	•		ween 1/3 and 2/3 of s I between 1/4 and 2/3							
	BOP	[1] IF plant condit	ions do NOT allow swa ify adequate oil press	apping CCPs,	THEN DISPATCH					
		PUMP	OIL PRESSURE INDICATOR	≥8.5 psig						
		1A-A CCP	1-PI-62-247A							
		1B-B CCP	1-PI-62-244A							

Appendix D			Attachment 1						
Op Test No.:N	NRC 2010302	Scenario #	1	Event #	2	Page	_10	of	53
Event Description:	1B-B (CCP Aux LO Pu	Imp Actua	tes w/1B-B C	CP Trip				

Time	Position	Applicant's Actions or Behavior						
	CAUTION:	Stopping a CCP during a boration or dilution will trap water in idle pump and stagnant piping which may cause a reactivity event when pump is restarted later.						
	pui cha	rting idle CCP may cause a small reactivity change if boron concentration in np casing and suction/discharge piping is different than RCS. This reactivity inge is normally negative due to drop in RCS boron over core life, but could positive if RCS boron was lower when idle CCP was stopped.						
	BOP	 [2] – [7.b] IF 1A-A CCP red light for low lube oil pressure illuminates Steps are N/A; Step [8] begins section for 1B-B CCP low lube oil conditions. 						
		Cop [0] begins section for TB-B CCP low lube on conditions.						
		[8] IF 1B-B CCP red light for low lube oil pressure illuminates while pump is in service, AND 1A-A CCP is available, THEN ENSURE "A" Train CCS and ERCW in service.						
	incap	n RCS temperature is less <350°F, LCO 3.4.12 requires one CCP to be bable of injection into RCS. While swapping running CCPs, two CCPs may be ble of injecting for <u>no more than one hour</u> .						
	SRO	[9] IF RCS temperature is <350°FN/A						
	• S	P oil reservoir sight glass level guidance: Static Oil Level between 1/3 and 2/3 of sight glass height Operating Oil Level between 1/4 and 2/3 of sight glass height						
		[10] DISPATCH appropriate operator to locally inspect 1A-A CCP to ensure it is ready for operation.						
	RO	[11] WHEN ready to start 1A-A CCP, THEN PLACE [1-HS-62-108A] 1A-A CCP in START.						
	mor	 pping a CCP may result in receipt of a motor overload annunciation and a mentary white indication light on 1-HS-62-104A. The white light NOT naining on indicates proper relay operation. [12] WHEN ready to shutdown 1B-B CCP, THEN PLACE [1-HS-62-104A] 1B-B CCP in STOP. 						
	RO							
	NOTE: If R	CS temperature is <350°F, the following step, [13] N/A						

Appendix D	ndix D Scenario Outline								Attachment 1		
Op Test No.:	NRC 2010302	Scenario #	1	Event #	2	Page	11	of	53		
Event Description	on: 1B-B	CCP Aux LO Pu	mp Actu	ates w/1B-B C	CP Trip						

Time	Position	Applicant's Actions or Behavior						
	CREW	[14] IF reactor is critical, THEN MONITOR core thermal power and T-avg.						
		[15] EVALUATE CCP operability.						
		[16] INITIATE maintenance on affected CCP.						
		END OF SECTION						
Evaluator No	te: The follow	ving CREW Brief and Notification actions are not contained in the procedure.						
		CREW Brief would typically be conducted for this event as time allows prior to the next event.						
		Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.						
		Operations Management - Typically Shift Manager.						
		Maintenance Personnel – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).						
Lead Examin	ier may cue ne	ext event when 1A-A CCP is in service and 1B-B CCP stopped.						

Appendix D	D Scenario Outline								Attachment 1		
Op Test No.:	NRC 2010302	Scenario #		Event #	2	Page	12	of	53		
Event Descriptio	n: 1B-B	CCP Aux LO Pu	Imp Actuat	tes w/1B-B C	CP Trip						

Time	Position	Applicant's Actions or Behavior					
		AOP-M.09, Loss Of Charging					
	RO	Identifies Red Lube Oil Pressure Lo Light, notifies SRO					
		TS 3.5.2 Action a: w/ 1 or more trains inoperable & w/ at least 100% ECCS flow equivalent to a single OPERABLE ECCS train available, restore to OPERABLE status w/i 72 hrs or HT STBY w/i next 6 hrs & in HT SHDN w/i following 6 hrs.					
		TR 3.1.2.4: At least 2 CCPs shall be OPERABLE Action: w/ only 1 CCP OPERABLE, restore at least 2 w/i 72 hrs or HT STBY & borated to a SDM equivalent to at least 1% delta k/k at 200°F w/i next 6 hrs;					
		Restore at least 2 CCPs to OPERABLE w/i next 7 days or HT SHDN w/i next 30 hrs.					
Evaluator No	te: The crew AOP-M.09	did not identify the 1B-B CCP lo lube oil condition, 1B-B CCP will tripped, of for the tripped CCP.					
	SRO	Directs implementation of AOP-M.09 Section 2.0:					
	RO	[1] CHECK any CCP RUNNING.					
	RO	[2] MONITOR if CCP(s) should be stoppedN/A					
	RO	[3] CHECK BOTH CCPs STOPPED.					
	RO	[4] ENSURE normal letdown ISOLATED:					
		FCV-62-72 CLOSED					
		FCV-62-73 CLOSED					
		FCV-62-74 CLOSED.					
	RO	[5] ENSURE excess letdown ISOLATED:					
		FCV-62-54 CLOSED					
		FCV-62-55 CLOSED.					

Appendix D	ndix D Scenario Outline						Attac	achment 1				
Op Test No.:	NRC 2010302	Scenario #	1	Event #	2	Page	13	of	53			
Event Description	n: 1B-B (CCP Aux LO P	ump Actual	tes w/1B-B C	CP Trip							

Time	Position	Applicant's Actions or Behavior
	CAUTION	If both RCP thermal barrier cooling flow and seal injection flow have been lost, RCP seals will overheat rapidly.
	NOTE	If all RCP seal cooling has been lost, this AOP takes precedence over AOP-R.04, RCP Malfunctions, and AOP-M.03, Loss of Component Cooling Water.
	RO	[6] MONITOR RCP lower bearing and seal water temperatures:
		 If any RCP lower bearing temp or seal water temp is greater that 225°F, THEN GO TO Notes prior to Step 18.
		[7] CHECK charging/seal injection header INTACT.
	RO	(NO indication of rupture)
	RO	[8] ENSURE CCP suction path established:
		a. CHECK SI signal NOT actuated.
		b. ENSURE suction from VCT established:
		VCT level greater than 13%
		LCV-62-132 and LCV-62-133 VCT Outlet to CCP OPEN.
	CAUTION:	If gas intrusion is suspected, NO CCP should be started UNTIL CCP has been vented (addressed in later steps).
·	RO	[9] CHECK if any CCP available for immediate start:
		CCP available
		AND
		gas intrusion is NOT suspected.
	CREW	[10] DISPATCH AUO to locally verify CCP is ready to be started.

Appendix D	Scenario Outline						Attachment 1		
Op Test No.:	NRC 2010302	Scenario #	1	Event #	2	Page	14	of	53
Event Descriptio	on: 1B-1	B CCP Aux LO F	Pump Actua	ates w/1B-B CCP 1	Frip				
Time	Position			Applicant's A	Actions or Beha	avior			
	NOTE	local inspe	ction of th	er cooling is es le standby pum spection is con	p, then CCP				
	RO	[11] STA Operator St		able CCP. \ CCP					
	RO	[12] CHE	CK SI si	gnal NOT actua	ated.				
	RO	[13] MOI	NITOR C	CP suction alig	ned to VCT.	· · · · · · · · · · · · · · · · · · ·			
	SRO	Establis	hing Nori	mal charging a mal Charging a ows this event o	nd Letdown.	stablished	USING	G EA-	62-5
	CREW		IFY STA	or other availa ots.	ble licensed	operator to	refer	to App	p. A,
	SRO	[16] NOT	IFY SM	o evaluate OP	DP-9, Emerg	ent Issue F	Respor	nse.	
	SRO	[17] GO	TO appro	priate plant pro	ocedure.				
				END	OF TEXT				

Appendix D		S	cenario	o Outline			Atta	chme	nt 1
Op Test No.:	NRC 2010302	Scenario #	1	Event #	2	Page	15	of	53
Event Descriptio	n: 1B-B	CCP Aux LO Pur	mp Actua	tes w/1B-B C	CP Trip				

Time	Position		Applicant's Actions or Behavior						
Lead Exar	niner Note: N re	ote, dire estoratio	ect as necessary, which operator, RO or BOP p on.	performs L/D					
	EA	\-62-5 , E	Establishing Normal Charging and Letdown.						
		4.0	OPERATOR ACTIONS						
		4.1	Section Applicability						
	SRO	2. IF 1	normal letdown flow is to be established, THEN G	D TO Section 4.3.					
		4.3	Establishing Normal Letdown Flow						
	NOTE	EA-62 Norma	2-3, Establishing Excess Letdown, may be utilized al Letdown cannot be established.	if					
	RO/BOP	1. IF	charging flow NOT established, THEN PERFORM	Section 4.2.					
	RO/BOP	2. VI	ERIFY pressurizer level greater than 17%.						
		3. EI	3. ENSURE letdown orifice isolation valves CLOSED:						
			LETDOWN ORIFICE ISOLATION VALVES	CLOSED √					
			FCV-62-72						
			FCV-62-73						
			FCV-62-74						
	RO/BOP	4. O	PEN letdown isolation valves:						
			LETDOWN ISOLATION VALVES	OPEN √					
			FCV-62-69						
			FCV-62-70						
			FCV-62-77						

Appendix D)		Scenario Outline	9	Attachmen	it 1					
Op Test No.: Event Descript		Scenario #			Page <u>16</u> of	53					
			Pump Actuates w/1B-E								
Time	Position		Applic	ant's Actions or Behavior							
	NOTE	to resto	Placing cooling water on the Letdown Heat Exchanger prior to restoring letdown flow should prevent TIS-62-79B/A from actuating and fully opening TCV-70-192.								
	RO/BOP			NUAL, AND OPEN [TO	CV-70-192] to ~50%	%					
	RO/BOP	6. PLACE ADJUS	letdown pressure T output between 4	controller [PCV-62-81] i 40% and 50%, (50%-60%	n MANUAL and % open).						
	RO/BOP	7. ADJUS line.	r charging flow as	ashing in the letdow	vn						
	RO/BOP	8. OPEN le	etdown orifice i	isolation valves as ne	eded:						
		LE	TDOWN ORIFICE	ISOLATION VALVES	OPEN √						
	l		FCV	-62-72							
			FCV	-62-73							
			FCV	-62-74							
	NOTE	Normal tempera		is 325 psig at normal op	perating						
	RO/BOP	9. ADJUST		e controller [PCV-62-81]	output to obtain						
	RO/BOP		letdown pressure pressure.	e controller [PCV-62-81]	setpoint to match						
	RO/BOP		letdown pressure (controller [PCV-62-81] ir							
			letuown pressure (14010.						

Appendix D	No.: NRC 2010302 Scenario # 1 Event # 2 Page 17 of escription: 1B-B CCP Aux LO Pump Actuates w/1B-B CCP Trip 100°F. 100°F. 100°F. 100°F. e Position Applicant's Actions or Behavior 12. ADJUST [HIC-62-78A] to obtain desired letdown temperature, as indicated on [TI-62-78]. RO/BOP 13. PLACE [HIC-62-78A] in AUTO. NOTE Letdown temperature may swing due to repeated actuation of TIS-62-79B/A, which causes letdown temperature control valve TCV-70-192 to fully open. BO/BOP 14. IF necessary to stabilize letdown temperature, THEN PERFORM	chme	nt 1						
Op Test No.:	NRC 2010302	Scenario #	1	Event #	2	Page	17	of	53
Event Description	on: 1B-	B CCP Aux LO Pu	mp Actua	ites w/1B-B CCP ⁻	Ггір			_	
Time	Position			Applicant's A	Actions or Beh	avior			
	NOTE	Normal letdown temperature is ~100°F.							
	RO/BOP	 ADJUST [HIC-62-78A] to obtain desired letdown temperature, as indicated on [TI-62-78]. 							
	RO/BOP	13. PLACE [H	IIC-62-7	78A] in AUTO.					
	NOTE	of TIS-62-79B/A, which causes letdown temperature control							
	RO/BOP	14. IF necessary to stabilize letdown temperature, THEN PERFOR following:							e
		 a. PLACE [HIC-62-78A] in MANUAL and ADJUST controller output in OPEN direction. 							
				n heat exchang 100°F, THENI					at
	RO/BOP	15. ENSURE high temperature divert valve [HS-62-79A] in DEMIN position.							
	RO/BOP			and letdown a pressurizer lev		[,] to maintai	n RCP	' seal	
				END	OF TEXT				

Event Description: Component Cooling Line Break (within make-up capacity) 1-FCV-70-63 fails to open automatically Time Position Applicant's Actions or Behavior Simulator Operator: When directed, initiate Event 3 Indications/Alarms Annunciator: 0-M.27B 0.XA-55-27B-B C-2, "UNIT 1 CCS SURGE TANK LEVEL ABNORMAL" 0-XA-55-27B-D C-2, "UNIT 2 CCS SURGE TANK LEVEL ABNORMAL" 0-XA-55-27B-D C-2, "UNIT 2 CCS SURGE TANK LEVEL ABNORMAL" 0-XA-55-27B-D C-2, "UNIT 2 CCS SURGE TANK LEVEL ABNORMAL" 0-XA-55-27B-D C-2, "UNIT 2 CCS SURGE TANK LEVEL ABNORMAL" 0-XA-55-27B-D C-2, "UNIT 2 CCS SURGE TANK LEVEL ABNORMAL" 0-XA-55-27B-D C-2, "UNIT 1 CCS SURGE TANK LEVEL ABNORMAL" 0-XA-55-27B-D C-2, "UNIT 2 CCS SURGE TK A OUTLET LEVEL (BORMAL") 1-L1-70-93A CCS SURGE TK A OUTLET LEVEL ("A" Header) indicates a lowering level 2-L1-70-93A CCS SURGE TK A OUTLET LEVEL indicates a lowering level 2-L1-70-63A CCS SURGE TK A INLET LEVEL indicates a lowering level Significant Resultant Alarms/Indications: Annunciator: • 1-XA-55-15 D-3, "TURB AUX OR REAC BLDG FLOODED" • E-3, "LS-59-180A/B DEM WTR AND CASK DECON SYS ABN CONDITION" T + 35 BOP Respond to 0-M-27 alarms in accordance with Alarm Response Procedures and make-up alarms, expected make-up to the U	-D-2								
Op Test No.:	NRC 2010302	Scenario #	1	Event #	3	Page	18	of	53
Event Descriptio	n: Cor	nponent Cooling L	ine Break	(within make	-up capacity) 1-FC\	√-70-63 fails t	o open aut	oma	tically
Time	Position			Applican	t's Actions or Beh	navior			
Indications/A Annunciat 0-M-27B • 0-XA-5 • 0-XA-5 Indications 1-LI-70-99A CC 2-LI-70-63A CC 2-LI-70-63A CC Significant R Annunciat	Narms or: 5-27B-B C-2, "U 5-27B-D C-2, "U s CS SURGE TK A CS SURGE TK A CS SURGE TK A CS SURGE TK A esultant Alarm	INIT 1 CCS SUR INIT 2 CCS SUR OUTLET LEVE INLET LEVEL OUTLET LEVEL INLET LEVEL	GE TAN D-2, "UN D-2, "UN L ("B" H ("A" Hea L indicate	IK LEVEL A IIT 1 CCS C IK LEVEL A IIT 1 CCS C leader) indica ites a lowering s a lowering	URGE TK LVL L BNORMAL" URGE TK LVL L cates a lowering tes a lowering le ing level g level	O AUTO MA			
• I-AA-5 •							N"		
T + 35	BOP	Respond to 0	-M-27 a	larms in ac	cordance with A	larm Resp	onse Pro	ced	ures
Evaluator No	Cooling W and make- Prompts to	ater System op up alarms, exp b be provided b	erating ected m y the Si	alignment. hake-up to t mulator ope	If the BOP resp he U2 surge tar	ponds to U 2 nk is operat	2 surge ta ting as ex	ank kpec	cted.
	BOP	[3] IF surge ta	ank leve	l is low, TH	EN				
	SRO	THEN			e maintained, omponent Cool	ing Water.			
	BOP				will inform SRC				
	BOP	[2] VERIFY 1	-					In	

Appendix D		Requ	ired Op	erator Actions	;		Forr	n ES	-D-2
Op Test No.:	NRC 2010302	Scenario #	1	Event #	3	Page	19	of	53
Event Descriptio	n: Cor	nponent Cooling Li	ne Break	(within make-up	capacity) 1-FC\	/-70-63 fails to	o open a	utomat	ically
Time	Position			Applicant's	Actions or Beh	avior			
Evaluator No	ote: BOP ident light lit, RE 0-M-27B.	ifies U1 make-u ED light dark), n	ıp valve otifies S	1-FCV-70-63 RO and oper	a failed to ope s valve using	n automatic handswitc	ally (G h 1-HS-	REEI -70-6	N 3 at
Evaluator No	te: SRO/BOP determines	identifies CCS s make-up cont	Surge T rolled to	Fank level sta maintain leve	bilizing/level r el.	returning to	normal	;	
	Refer to A event guid	ppendix G for e.	CCS S	urge Tank Le	evel Switch S	Setpoints fo	ollowing	this	
	CREW	[3] DISPATCH	l opera	tor for local in	spection to d	etermine pr	oblem.		
	SRO	[4] VERIFY pr Compone Cooling V	ent Coo		<i>stem</i> Train A,				nent
	BOP	[5] MONITOR problems	level in	both surge ta	anks to deterr	mine seal le	akage	returr	1
	RO/BOP	[6] MONITOR containm		crease in poc	ket sump for	possible C	CS leak	insid	e
	SRO/BOP	[7] IF sufficien of Compo	t level c onent Co	annot be mai poling Water t	ntained, THE for emergenc	N GO TO A y makeup ir	OP-M.	03, <i>L</i> i ons. [oss C.1]
Evaluator No	applicable. to dispatch	may go to AOF Since the leak AUOs to make or the CCS Syst	is withi up to tl	n the capacit	y of make-up	water flow,	the cre	w ne	eds
	US	US may use o Section 2.4 Tra this event. Ba ("B" Header) is	ain B C sed on	CS Header Faindications of	ailure; Steps [:]	1-4 are ade	quate to	o add	
	CAUTION:	If any Containr pump may exp					oling, s	pray	

Appendix D	Required Operator Actions	Form ES-D-2

1

Op Test No.:

NRC 2010302

Scenario #

Event # 3

Page

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53

Event Description: Component Cooling Line Break (within make-up capacity) 1-FCV-70-63 fails to open automatically

Time	Position	Applicant's Actions or Behavior
	ВОР	1. DISPATCH operators with radios to Auxiliary Building to LOCATE failure and PERFORM valve manipulations.
	ВОР	 DISPATCH an operator with radio to perform Appendix B, Operation of App. R Valves Required by Section 2.4.
	SRO/BOP	3. CHECK ERCW flows NORMAL for plant conditions: ERCW Flows are normal- crew moves on
	NOTE: I	n the event of a "B" train line break the surge tank baffle prevents the "A" train
	fr	rom draining to less than 57% indicated level.
	NOTE: A	ppendix G lists expected responses to various CCS surge tank levels.
	SRO/BOP	 4. MONITOR Train B CCS surge tank level between 65% and 85%. 1(2)-LI-70-99A, Unit 1(2) B CCS Surge Tank Level. (RNO Required)
	SRO/BOP	RNO: IF CCS surge tank level is less than 64%, THEN ENSURE surge tank auto makeup starts.
	BOP	 IF necessary to locally initiate surge tank makeup, THEN DISPATCH operator to perform the following: Manually make up from demin water, OR
		ALIGN ERCW supply USING Appendix E, Aligning ERCW Emergency Makeup. [C.1]
		ressure range provided is expected value based on one Train B CCS pump in
	BOP	 5. MONITOR the following: Train B CCS Surge Tank levels greater than 20%. 0B1/0B2 CCS HX inlet pressure NORMAL (between 90 and 118 psig). (RNO Required)

Appendix D		Required Operator Actions	Form ES-D-2					
Op Test No.:	NRC 2010302	Scenario # <u>1</u> Event # <u>3</u> Page	21 of <u>53</u>					
Event Descriptio	n: Cor	nponent Cooling Line Break (within make-up capacity) 1-FCV-70-63 fails to	open automatically					
	· · · · · · · · · · · · · · · · · · ·							
Time	Position	Applicant's Actions or Behavior						
Evaluator No	ote: Train B CO the leak pe	CS Pump cavitation is not expected if the crew initiates make-u er the following step RNO.	p and isolates					
		RNO:						
		IF any Train B CCS pump is cavitating OR has lost suction, THEN STOP affected pump.						
		IF any of the following conditions exists:						
	BOP	loss of surge tank level is imminent						
		OR						
		Train B header break is indicated						
		which requires isolation						
		OR						
		Train B CCS flow has been lost,						
	BOP	THEN PERFORM the following:						
		a. STOP and LOCK OUT Train B pumps:						
		CCS Pump currently aligned to Train B (C-S, 1B-B, or	r 2B-B)					
		1B-B Containment Spray Pump						
		2B-B Containment Spray Pump						
	DOD							
	BOP	b. CLOSE Train B ESF Header Isol Valves:						
		 0-FCV-70-12, 0B1/0B2 HX Outlet [Rx MOV Bd 1B2-B 	· -					
		 1-FCV-70-75, RHR HX B Return Isol [Rx MOV Bd 1B 14B] 	2-B Compt.					
		 14B] 2-FCV-70-75, RHR HX B Return Isol [Rx MOV Bd 2B] 	2-B Compt					
		14B]	2-b Compt.					
	SRO	c. IF in Mode 4, 5, or 6, THEN N/A						
	NOTE 1: Wh	en Train B CCS is out of service, the associated CCPs, SI Pur	nps, and RHR					
	Pur	nps are INOPERABLE for ECCS purposes due to not being al	ole to fulfill their					
		ign function for sump recirculation.						
		en CCS is out of service to mechanical seal HXs, the affected nps, and RHR Pumps have been evaluated to be AVAILABLE						
		run indefinitely without CCS cooling water to mechanical seal						

		Requ	lired Op	erator Actions			Foi	m ES	-D-2
Op Test No.:	NRC 2010302	Scenario #	1	Event #	3	Page	22	of	53
Event Descriptio	on: Cor	mponent Cooling L	ine Brea	< (within make-up	capacity) 1-FC	/-70-63 fails t	o open a	automa	tically
Time	Position			Applicant's	Actions or Beh	avior			
	SRO	6. EVALUA	TE Tec	n Specs and El	PIP-1 USING	Appendix	Н.		
		ACTION a.: w/ equivalent to a status w/i 72 hr • 3/4.6.2 DEI 3.6.2.1- 2 indep each su a. A Contai 1. One 2. One 3. An 0 suc the W/ 1 CSS subs next 6 hrs; rest SHDN w/i next • 3/4.7.3 COI	1 or mo single C s or HT PRESSI bendent bsysten nment S OPERA OPERA tion fron contain system in ore inop 30 hrs. MPONE	E 3 applicable re trains inopera DPERABLE ECC STBY w/i next 6 JRIZATION AND containment spr n comprised of: Dray train with: ABLE Containment ABLE Containment n the refueling work the refueling work of the refueling work of the restored on the sump noperable, restored erable subsystem NT COOLING W	ble and w/ at S train availa hrs & HT SH O COOLING S ay subsystem ent Spray pun ater storage ta te to OPERAE to OPERAE to OPERAE	ble, restore f DN w/i follow SYSTEMS is shall be O np. t exchanger o flow path c ank and tran BLE w/i 72 hr BLE w/i next	to OPE ving 6 h PERAE apable sferring rs or H1 48 hrs	RABLE Irs. BLE with of taking suction or CLD	th ng on to
		3.7.3- 2 independent component cooling water loops shall be OPERABLE. W/ 1 CCS water loop OPERABLE, restore 2 OPERABLE w/i 72 hrs or HT STBY w/i 6 hrs & CLD SHDN w/i following 30 hrs.							
		6 hrs & CLD SF	HDN w/i	following 30 hrs	ore 2 OPERA	BLE w/i 72 h	irs or H	T STB	Y w/i

		SRO	10. GO TO appropriate plant procedure
			END OF SECTION
Evaluator No	te:	SRO/BOP required to	determines CCS Surge Tank manual make-up is adequate and will be maintain tank level (for the remainder of the scenario).
Evaluator No	te:	The followi	ing CREW Brief and Notification actions are not contained in the procedure.

9. **INITIATE** Maintenance as required.

SRO

CREW

CREW Brief would typically be conducted for this event as time allows prior to the next event.
Notifications should be addressed as applicable if not specifically

8. NOTIFY SM to evaluate OPDP-9, Emergent Issue Response.

Appendix D		Req	uired Ope	erator Actio	ons		Foi	rm ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #		Event #	3	Page	23	of	53
Event Descriptio	n: Con	nponent Cooling	Line Break	(within make	-up capacity) 1-FCV	-70-63 fails to	o open a	automa	atically
Time	Position			Applicar	it's Actions or Beha				
		addressed b	v the pro		n the CREW brie				
					ally Shift Manag				
		Maintenance	Personr	<u>nel</u> – Typic	ally Maintenance may be delegate	Shift Supe			
Lead Examin	Lead Examiner may cue next event when CCS Surge Tank level controlled, leak isolated and Tech Specs identified.								

Op Test No.: NRC 20	 	Event #	3 p capacity) 1-FCV	Page	24		53
SQN			LING WATE		AO)P-M.(03

Page 1 of 1

APPENDIX G

CCS SURGE TANK LEVEL SWITCH SETPOINTS

TANK LEVEL (INCHES)	TANK LEVEL (PERCENT)	EXPECTED RESPONSE
124"	100%	NONE (Upper tap)
105"	85%	LS-70-99A/B ANN. "Surge Tank Level Abnormal" (high level)
90"	73%	LS-70-63B/A or LS-70-63C/B- Closes Demin. Auto Make Up Valve
105" to 79"	85% to 64%	Normal Operating Range
79‴	64%	LS-70-63D Ann. "Surge Tank Level Low Auto Makeup Initiated" LS-70-63A/B or LS-70-63CA Open Demin. Auto Makeup Valve LCV-70-63
75*	61%	LS-70-99B/A ANN. "Surge Tank Level Abnormal" (low level)
71≊	57%	NONE (TOP OF BAFFLE)
0"	0%	NONE (LOWER TAP)

Appendix D		Required Operator Actions Form ES-D-2
Op Test No.: Event Description	NRC 2010302 on: #2	Scenario # <u>1</u> Event # <u>4</u> Page <u>25</u> of <u>53</u> RCP #2 Seal Failure
Time	Position	Applicant's Actions or Behavior
Simulator O	perator: When	directed, initiate Event 4
	cations availab	
•	55-5B A-3, "FS-6 B-2, "LS-(2-10 REAC COOL PMPS SEAL LEAKOFF LOW FLOW" 62-19A REAC COOL PMP 2 STANDPIPE LVL HIGH-LOW"
Indicatior Indication I-FR- I-FR-	62-23, "RCP SEA	L LEAKOFF-LOW RANGE" trend indicates >0.9 gpm L LEAKOFF-LOW RANGE" trend indicates ≈1-2 gpm
T = 35	CREW	Respond in accordance with Alarm Response Procedures
	RO	 Refer to ARP 1-AR-M5B A-3, verifies: leakoff and #1 Seal △P less than 275 psid, #1 Seal return isolation valve open Acknowledges MODE 1 or 2 operation and refers SRO to AOP-R.04 AND continues ARP review.
		Pofer to APD 1 AD MED D 2 working Compating Actions Matching to the
	RO	 Refer to ARP 1-AR-M5B B-2, verifies Corrective Actions [1] not applicable: [1] IF window 3 (A-3), REAC COOL PMPS SEAL LEAKOFF LOW FLOW is in alarm state in conjunction with this alarm (REAC COOL PMP STANDPIPE LVL HIGH-LOW), THEN GO TO window 3 (A-3) for Corrective Actions.
Evaluator No	ote: RO determ	nines #2 seal leakoff is high; #1 & 3 normal and continues with ARP (following).
	NOTE 1 The doe	Hi-Low alarm can be determined by making up to the RCP standpipe. If the alarm is not clear, then it can be assumed the level is high or the level switch has failed. If alarm clears, then it can be assumed the level was low.
		ligh RCP standpipe level in conjunction with reduced No. 1 Seal Leakoff flow and reasing flow to the RCDT is indicative of a failed No. 2 Seal.
		v standpipe level with increased flow to the Cntmt FI & Eq Sump is indicative of a ed No. 3 seal.
	RO	[2] ATTEMPT to clear alarm by performing the following:
		[a] OPEN [1-FCV-81-14] RCP 2 Standpipe Makeup Water.
		[b] IF alarm clears, THEN CONTINUE standpipe fill for ~15 seconds OR until high alarm is actuated AND
		CLOSE [1-FCV-81-14] RCP 2 Standpipe Makeup Water.

Appendix D		Req	uired Ope	erator Actic	ons		Fo	rm ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	1	Event #	4	Page	26	of	53
Event Description	on: #2 R	CP #2 Seal Fa	ailure						

Time	Position	Applicant's Actions or Behavior
	RO	[c] IF alarm does not clear, THEN CLOSE [1-FCV-81-14] RCP 2 Standpipe Makeup Water after ~3-4 minutes.
	RO	[3] CHECK [1-FR-62-24], RCP Seal Leakoff High Range, to determine if any changes in seal return flow
		RO checks, determines no change in seal leakage rate
	RO	[4] NOTIFY Radwaste to MONITOR RCDT parameters (level, temperature and pressure).
	RO	[5] IF RCP Standpipe Level Alarm fails to clear (high standpipe level) OR clears and reoccurs (low standpipe level), THEN GO TO AOP-R.04, <i>Reactor Coolant Pump Malfunctions.</i>
	SRO	Determines AOP-R.04, Reactor Coolant Pump Malfunctions Section 2.4, "#2 Seal Leakoff High Flow (high RCP standpipe level) on ANY RCP" entry is appropriate
Se		AOP-R.04, Reactor Coolant Pump Malfunctions Seal Leakoff High Flow (high RCP standpipe level) on ANY RCP"
	RO	1. EVALUATE RCP standpipe alarms:
		a. CHECK RCP standpipe level alarm(s) LIT [M-5B, window A-2, B-2, C 2, D-2].
	CREW	b. MONITOR RCDT parameters at Radwaste Panel [Aux Bldg, el. 669']
		Level, LI-77-1
		Pressure, PI-77-2
		Temperature, TI-77-21

Appendix D		Required Operator Actions Form ES-D-2
Op Test No.:	NRC 2010302	
Event Descript	ion: #2	RCP #2 Seal Failure
Time	Position	Applicant's Actions or Behavior
	RO	 c. FILL affected RCP standpipe USING AR-M-5B, Annunciator Response: RO reviews RCP 2 [window B-2] ARP; may/may not re-perform.
Evaluator N	lote: Appendix	A, RCDT Level Rate-of-Change follows this event guide
	RO	2. MONITOR #2 seal INTACT on affected RCP:
		 VERIFY #2 seal leakoff less than or equal to 0.5 gpm USING Appendix A, RCDT Level Rate-of-Change. (RNO Required)
		 VERIFY RCP vibration is within limits of annunciator response 1-AR- M5-A (window D-3) VIBRATION & LOOSE PARTS MONITORING ALM. (RNO NOT Required)
		RNO: PERFORM the following within 8 hours: a. PERFORM normal plant shutdown USING appropriate plant procedure.
Evaluator N		
	Operator r b. below a reactor trip The remain	nder of AOP-R.04 will be performed in the single-performer mode as defined
	RO	User's Guide. b. WHEN reactor is shutdown or tripped, THEN PERFORM the following:
		1) STOP and LOCK OUT affected RCP
		 2) PULL TO DEFEAT affected loop ΔT and T-avg: XS-68-2D (ΔT) XS-68-2M (T-avg)

Appendix D		Requ	ired Ope	erator Actio	ons		For	rm ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	1	Event #	4	Page	28	of	53
Event Descriptio	on: #2 R	CP #2 Seal Fa	ilure						

Time	Position	Applicant's Actions or Behavior
	SRO	3. CONSULT Engineering:
		a. NOTIFY Engineering to provide recommendations.
		 EVALUATE need to consult with Westinghouse for continued RCP operation.
Evaluator N		g the reactor shutdown, as directed by the SRO the operator responsible for ng Step 4 RNO from AOP-R.04 Section 2.4 will complete RNO Step b.
	RO	4. CHECK RCPs 1 and 2 RUNNING.
	RO	RNO: CLOSE affected loop's pressurizer spray valve. RO takes 1-PIC-68-340B, LOOP 2 PZR SPRAY CONTROL toggle switch to MANUAL and CLOSE
		5. EVALUATE EPIP-1, Emergency Plan Initiating Conditions Matrix.
		 6. EVALUATE the following Tech Specs for applicability: 3.4.6.2, RCS Operational Leakage <u>ACTION b.</u>: w/ any RCS leakage >the above limits, excluding PRESSURE BOUNDARY LEAKAGE or primary-to-secondary leakage, reduce w/i limits w/i 4 hrs or HT STBY w/i next 6 hrs & CLD SHDN w/i following 30 hrs.
		7.00.70
		7. GO TO appropriate plant procedure.
Evaluator No	ote: The followi	ng CREW Brief and Notification actions are not contained in the procedure.
		CREW Brief would typically be conducted for this event as time allows prior to the next event.
		Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.
		Operations Management - Typically Shift Manager.
		<u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).

Appendix D		Required Operator Actions Form ES-D-2
Op Test No.:	NRC 2010302	Scenario #1Event #5Page29of53
Event Descript	ion: H2	Cooler/Stator Cooling Loss- MT Trip, No Rx Trip
Time	Position	Applicant's Actions or Behavior
		directed, initiate Event 5
		w chooses to Rx Trip vs. MT, insert Event 6 immediately following the Rx Trip.
Evaluator N	Steam o	g AOP-S.06 MT trip and power stabilization, the crew should enter AOP-S.05, r Feedwater Leak. It starts Event Guide 6.
	cations availab	
Multiple	ICS H2 Cooler Ou	itlet Gas Temperature Alarms
Annuncia 1-M-1	ators:	
	-55-1A A-1, "GE	N STATOR TEMPERATURE HIGH"
		N STATOR COOL SYS FAILURE"
Indicatio 1-M-2		
• Indic	ator 1-TI-35-76 "C	SENERATOR H2 TEMP" trending to top of scale (indicator scale: 50-150°F)
T = 65	BOP	Respond to ICS alarm, HYDROGEN COOLER OUTLET GAS TEMP (2 monitoring points) or MAIN GENERATOR window, TEMP's FOR HYDROGEN CLR
		Transfer 1-TIC-24-48, GENERATOR H2 COOLER REMP CONTROLLER, to
	BOP	MANUAL; manually control H2 cooling water flow to restore H2 temperature to normal (95-115°F)
	CREW	Respond using ARPs 1-AR-M1-A, A-1, B-4, that direct entry into AOP-S.06, Turbine Trip, Section 2.0 for the failure.
		If the unit is not reduced to <15% power within 45 seconds, an automatic MT trip will occur.
Evaluator N	the MG	w may respond to a H2 Cooler temperature alarm from ICS & discover H2 TCV not responding in the AUTO mode. The BOP places controller 1- 8 in manual to restore MG H2 temperature.
	1-AF	R-M1-A A-1, "GEN STATOR TEMPERATURE HIGH"
		applicable computer points may be viewed by typing [show60 STATALM]. U' points are the delta-T's between the inlet and each applicable outlet.
	BOP	[1] CHECK Plant computer to DETERMINE Thermocouple in alarm state or if instrument failure has occurred.

Appendix D		Requ	ired Op	erator Actions		Form ES-D-2				
Op Test No.:	NRC 2010302	Scenario #	1	Event #	5	Page	30	of	53	

Event Description:

H2 Cooler/Stator Cooling Loss- MT Trip, No Rx Trip

Time	Position	Applicant's Actions or Behavior							
	obtai	rm occurs and the Plant computer is inoperable THEN dispatch personnel to in TC temperatures locally (temporary instrumentation connected to local inal board) in accordance with 0-SO-35-4 <i>Monitoring Generator Parameters</i>							
	BOP	[2] MONITOR Stator Coil Temperatures in accordance with 0-SO-35-4, Monitoring Generator Parameters.							
	BOP	[3] IF Generator Cooling Failure alarm (window B-4) is also present, THEN REFER to Alarm Response B-4 for Corrective Actions while continuing with this instruction.							
Evaluator No	ote: Alarm Re	esponse B-4 Actions follow this ARP.							
	BOP	[4] IF △T is greater than or equal to 55°F (31°C) or Stator Outlet temperature is greater than or equal to 183°F (84°C), THEN REDUCE generator loading to limit Stator Temperature to less than alarm setpoint.							
	BOP/	[5] IF Stator Outlet temperatureand Reactor Power is greater than 50%							
	SRO	(P-9) N/A							
Evaluator No		decides AOP-S.06, Turbine Trip is appropriate; it follows this portion of event P-S.06 follows this.							
	BOP	[6] IF Stator Outlet temperature is greater than or equal to 192°F(89°C). and Reactor Power is less than 50% (P-9), THEN TRIP turbine and GO TO AOP-S.06, <i>Turbine Trip.</i>							
	BOP	[7] IF SCW temps are greater than 50 deg. C (122 deg. F) AND 1- TCV-24- 52 is NOT controlling properly, THEN:							
		[a] OPEN [1-VLV-24-541] TCV Bypass as required to maintain SCW temperatures 35 - 50 deg. C (86 - 122 deg. F)							
		[b] PERFORM 0-SO-35-4 Monitoring Generator Parameters to BYPASS and ISOLATE 1-TCV-24-52							
	1-A	R-M1-A B-4, "GEN STATOR COOL SYS FAILURE"							
		Unit is greater than 15% power then Unit Trip will occur after 45-second time elay.							
	SRO/ Crew	[1] IF possible REDUCE load to less than 15% within 45 seconds in accordance with appropriate procedure: E-0, <i>Reactor Trip or Safety Injection</i> AOP-C.03, <i>Rapid Shutdown or Rapid Load Reduction</i> AOP-S.06, <i>Turbine Trip</i> .							

Operator Actions Form ES-D-					uired Ope	Requ		Appendix D
of5	31	Page	5	Event #	1	Scenario #	NRC 2010302	Op Test No.:
-	31	Page	5	Event #	1	Scenario #	NRC 2010302	Op Test No.:

Event Description: H2 Cooler/Stator Cooling Loss- MT Trip, No Rx Trip

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Time	Position	Applicant's Actions or Behavior
	BOP	[2] DISPATCH personnel to Stator Cooling System.
		[a] ENSURE one Stator Cooling Water Pump RUNNING.
		[b] EVALUATE Start of Reserve Stator Cooling Water Pump in
		accordance with 0-SO-35-2, Stator Cooling Water System.
		[c] ENSURE Raw Cooling Water Aligned to Heat Exchangers in accordance with 0-SO-35-2, Stator Cooling Water System.
	BOP	[3] CHECK Stator Cooling System Operation within normal operating parameters of 0-SO-35-2.
	BOP	[4] IF Unit is greater than 15% power AND alarm has been lit for greater than 45 seconds, THEN ENSURE Unit Trip.
Evaluator No		g AOP-S.06 MT trip and power stabilization, the crew should enter AOP-S.05, or Feedwater Leak. It starts Event Guide 6.
Evaluator No	ote: The follow	ving CREW Brief and Notification actions are not contained in the procedure.
		CREW Brief would typically be conducted for this event as time allows prior to the next event.
		Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.
		Operations Management - Typically Shift Manager.
		<u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Load Examin	or may ave th	a part avant when the arow determines a start shutdow is not in t
	ici may cue til	e next event when the crew determines a plant shutdown is required.

Appendix D		Requ	ired Op	erator Actions			Form ES-D-2			
Op Test No.:	NRC 2010302	Scenario #	1	Event #	5	Page	32	of	53	
Event Description	n: H2 C	ooler/Stator C	ooling Lo	ss- MT Trip, No	Rx Trip					

Time	Position	Applicant's Actions or Behavior
	A	OP-S.06, Turbine Trip Below P-9 (50% Power)
	Crew	Diagnose conditions; determine Turbine Trip caused by Stator Cooling Wate problem. SRO directs AOP-S.06 implementation.
	BOP	 1. VERIFY turbine TRIPPED: • CHECK turbine stop valves CLOSED.
	RO	2. CHECK reactor power less than 20%.
	SRO/RO	 WHEN reactor power is less than 20%, THEN ENSURE rod control in MANUAL.
	RO	RNO: ENSURE control rods inserting in AUTO or MANUAL to reduce Tave and power.
	BOP	4. CHECK main generator PCBs OPEN after 30 second time delay [M-1].
	BOP	5. MONITOR feedwater and condensate system:
		a. CHECK at least one Main Feedwater Pump RUNNING.
		b. MONITOR at least two Intermediate Pressure Feedwater Heaters IN SERVICE. (No more than one heater string isolation).
		c. MONITOR at least two Low Pressure Feedwater Heaters IN SERVICE. (No more than one heater string isolation).
		Excessive feedwater flow may cause an ESF actuation due to rapidly decreasing steam generator pressure.
	BOP	 6. CHECK S/G narrow range levels STABLE at or trending to program value.

Appendix D		Requ	iired Op	erator Actio	ons		Form ES-D-2			
Op Test No.:	NRC 2010302	Scenario #	1	Event #	5	Page	33	of	53	
Event Descriptio	n: H2 C	Cooler/Stator Co	ooling Lo	oss- MT Trip	, No Rx Trip					

Time	Position	Applicant's Actions or Behavior
	A	OP-S.06, Turbine Trip Below P-9 (50% Power)
	RO	 MAINTAIN T-avg and reactor power USING manual rod control and steam dumps:
		a. CHECK steam dumps OPERATING to control T-avg.
		 b. CHECK reactor power within steam dump and feedwater system capabilities.
	RO/BOP	8. ANNOUNCE turbine trip USING PA system.
	RO	9. MONITOR pressurizer level control
		a. CHECK pressurizer level greater than 17%.
		b. VERIFY letdown IN SERVICE
		c. CHECK pressurizer level trending to program level.
	RO	10. MONITOR Pressurizer Pressure control:
		Pressurizer pressure stable at or trending to 2235 psig (normal range 2210 psig to 2260 psig)
	NOTE: Faili heat	ng open the # 3 heater drain tank bypass LCV-6-105A and 105B may prevent ter string isolation.
	BOP	11. IF #3 Heater Drain Tank Pumps running, THEN PERFORM the following
		 a. STOP all #3 Heater Drain Tank Pumps and PLACE in PULL-TO- LOCK position.
		 b. DISPATCH operator to perform Appendix A to fail open #3 Heater Drain Tank bypass valves.
		c. CLOSE the following #3 Heater Drain Tank pump discharge valves:
		• FCV-6-108
		• FCV-6-109
		• FCV-6-110

Appendix D		Req	uired Op	erator Acti	ons	Form ES-D-2			
Op Test No.:	NRC 2010302	Scenario #		Event #	5	Page	34	of	53
Event Description	n: H2 (Cooler/Stator C	ooling Lo	ss- MT Trip	, No Rx Trip				

Time	Position	Applicant's Actions or Behavior
·····	A	OP-S.06, Turbine Trip Below P-9 (50% Power)
	BOP	12. ENSURE moisture separator reheaters ISOLATED:
		a. DEPRESS RESET on MSR control panel XX-47-3000.
		 b. CLOSE HP steam isolation valves to MSRs and VERIFY status on panel XX-1-145:
		• FCV-1-141
		• FCV-1-241
		• FCV-1-135
		• FCV-1-235
		• FCV-1-143
		• FCV-1-243
		• FCV-1-137
		• FCV-1-237
		• FCV-1-145
		• FCV-1-245
		• FCV-1-139
		• FCV-1-239
1		c. CLOSE MSR Operating Vents.
		d. OPEN MSR Startup Vents.
	NOTE: 0-G	O-4 requires Reactor power at approximately 13-15% for Turbine Roll.
	SRO	13. EVALUATE Reactor power reduction to less than 15%.
		14. IF Reactor Power drops by greater than 15% in one hour, THEN NOTIFY Chemistry to initiate conditional portions of SI-53, SI-407.2 and 0-SI- CEM-000-415.
		15. SHUT DOWN unnecessary plant equipment USING 0-GO-12,
	BOP	Realignment of Secondary Equipment Following Reactor/Turbine Trip.

Appendix D		Requ	uired Op	perator Actions	;		For	rm ES	3-D-2
Op Test No.:	NRC 2010302	Scenario #	1	Event #	5	Page	35	of	53
Event Description	n: H2 C	cooler/Stator Co	ooling La	oss- MT Trip, No	o Rx Trip				

Time Position **Applicant's Actions or Behavior** AOP-S.06, Turbine Trip Below P-9 (50% Power) 16. CHECK the following to determine cause of trip: CREW a. Electrical trip: Electrical Control Board Relay targets [relay room] b. Fault inside generator: CREW Generator H2 pressure **Generator Core Condition Monitor** • 17. IF Turbine to be returned to service, THEN PERFORM one of the SRO following: GO TO 0-GO-4, Power Ascension from less than 5% Reactor Power 0 to 30% Reactor Power. OR GO TO 0-GO-11, Turbine Shutdown Without Reactor Shutdown. SRO **CAUTION:** Reactor operation at low power levels for extended periods may challenge reactivity control due to xenon changes. 18. CHECK Reactor power greater than 5%. RO 19. IF Reactor to be shutdown OR power reduced to less than 15%, THEN GO TO 0-GO-6, Power Reduction from 30% Reactor Power to Hot SRO Standby. **END OF SECTION** Evaluator Note: SRO/CREW may conduct a brief at this time and should return/insure reactor power is stable per AOP-S.06, Turbine Trip Below P-9 (50% Power). **Evaluator Note:** Following AOP-S.06 MT trip and power stabilization, the crew should enter AOP-S.05, Steam or Feedwater Leak. It starts Event Guide 6.

Lead Examiner may cue next event when the CREW has stabilized plant power.

Appendix D		Required Operator Actions Form ES-D-2							
Op Test No.: Event Descript		NRC 2010302 Scenario # 1 Event # 6 Page 36 of 53 on: MS Safety VIvs lift 1 per SG on all SGs							
Time	Position			Applicant's A	ctions or Beha	vior			
Simulator C	Operator: Whe	n directed, initi	ate Eve	nt 6					
Lead Evalu	ator Note: If ci	ew chooses to Rx	Trip vs.	MT, <u>insert Eve</u> i	nt 6 immediat	ely following	g the R	x Trip.	
 1-FI- 1-FI- 1-FI- 1-FI- 1-XI-3 1-XR-3 1-M-5 1-TR-4 1-TR-4 1-AR-4 	Arrs: 1-3A, 3B, SG-1 S 1-10A, 10B, SG-1 1-21A, 21B, SG-1 1-28A, 28B, SG-1 92-5005C, 50060 asing reactor pro- 92-5001, NUCL asing reactor pro- 92-5001, NUCL asing reactor pro- 92-5001, NUCL asing reactor pro- 92-5001, NUCL asing reactor pro- 92-5005C, 50060 asing reactor pro- 92-5001, NUCL asing reactor pro- 92-5001, N	STEAM FLOW CH 2 STEAM FLOW (3 STEAM FLOW (4 STEAM FLOW (5, 5007C, 5008C, 1 ower EAR POWER NR- 67E LOOPS 1-4 1 RBINE TEMP Rec 68-2M/N RC LOOF 3-35B STM GEN L 3-35B STM GEN L 3-90B STM GEN L 3-103B STM GEN L	CH-1 & 2 CH-1 & 2 CH-1 & 2 RX POW 45: Incro 45: Incro 45: Incro 45: Incro 00P 1 & 00P 1 & 00P 2 & 00P 3 & LOOP 4	: Increasing sta : Increasing sta : Increasing sta /ER CH-I-IV N-4 easing trends of ecreasing temp ending away fra G /AUCT T AVG STEAMFEEDW/ STEAMFEEDW/ STEAMFEEDW/	eam flow eam flow am flow 1 – 44, NOS P on power rang erature indica om programm DEVN HIGH- ATER FLOW M ATER FLOW M	ges selecte ations (w/ n ned value LOW" AISMATCH AISMATCH	d. o rod r		
• Annu T = 70	CREW	-6A Window E-1:							
Evaluator N	ote: If alarm 1	Refer to alarm -AR-M6-A E-2, T indicating an exc	Г S- 68-2	J REACTOR C	COOLANT LC	OPS LO L	.0 TA\	/G	
Evaluator N		el safety is not a ning conditions l							
			AO	P-S.05, Stean	n or Feedwa	ter Leak			
·	Crew	Diagnose cond	litions; S	RO directs AC	P-S.05 imple	ementation	•		
	Crew	1. MONITOR	•						
				dwater lines ne N PERFORM		-	solated	to pro	otect
	RO	1) TRI	P the re	actor.					
	BOP	2) IF le MSI		n steam lines C	DR source is i	unknown,	THEN	CLOS	E

Appendix D		Required Operator Actions Form ES-D-2
Op Test No.:	NRC 2010302	Scenario # Event #6 Page37 of53
Event Description	on: Ms	S Safety VIvs lift 1 per SG on all SGs
Time	Position	Applicant's Actions or Behavior
	BOP	 IF leak is on feedwater lines OR source is unknown, THEN PERFORM the following:
		a) TRIP MFW pumps.
		b) CLOSE Feed Reg Valves.
	RO	4) GO TO E-0, Reactor Trip or Safety Injection.
	BOP	2. MONITOR steam generator levels STABLE on program.
	BOP	3. CHECK the following:
		 S/G atmospheric relief valves CLOSED steam dumps CLOSED.
	BOP	4. CHECK main turbine on line. (RNO required)
		 RNO a. is required: MONITOR the following actions: a. IF unit is in Mode 1 or 2 AND reactor power is rising due to uncontrolled cooldown, THEN PERFORM the following:
		1) TRIP the reactor.
		2) WHEN reactor is tripped, THEN CLOSE MSIVs.
		3) GO TO E-0, Reactor Trip or Safety Injection.
		END OF SECTION
	SRO	IF a reactor trip is directed, THEN GO TO E-0, <i>Reactor Trip or Safety Injection.</i>
	SRO	Direct Manual Rx Trip/MSIV closing
	SRO	Enter and Direct E-0 Immediate Operator Actions (IOAs)

LEAD EXAMINER: Crew will trip the reactor and transition to E-0 as previously stated.

Appendix D		Requ	ired Op	erator Actio	ns		For	m ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	1	Event #	6	Page	38	of	53
Event Descriptio	n: MS S	afety VIvs lift 1 p	er SG or	all SGs					

Time	Position	Applicant's Actions or Behavior
		E-0, Reactor Trip or Safety Injection
Evaluator No	surveys l discover event in	g IOA performance, prior to Steps 1-4 immediate action verification, RO/BOP MCBs for any expected automatic system response that failed to occur. Upon y, they may take manual action(s) to align plant systems as expected for the progress. (Ref. EPM-4, Prudent Operator Actions)
Annunicator	s/Indications a	s specified at Event 6 initiation
	Note 1 Steps	s 1 through 4 are immediate action steps
	Note 2 This	procedure has a foldout page
	RO	 VERIFY reactor TRIPPED: Reactor trip breakers OPEN Reactor trip bypass breakers DISCONNECTED or OPEN Neutron flux DROPPING Rod bottom lights LIT Rod position indicators less than or equal to 12 steps.
	BOP	2. VERIFY turbine TRIPPED:Turbine stop valves CLOSED.
	BOP	 3. VERIFY at least one train of shutdown boards ENERGIZED. Attempt to restore power to at least ONE train of shutdown boards Place DG 1A-A control switch in START Verify Train A Shutdown Boards ENERGIZED
	RO	 4. DETERMINE if SI actuated: ECCS pumps RUNNING. Any SI alarm LIT [M-4D] (SI will be actuated) (RNO Required)
	RO/BOP	 RNO: DETERMINE if SI required: a. IF any of the following conditions exists: S/G pressure less than 600 psig, OR RCS pressure less than 1870 psig, OR Containment pressure greater than 1.5 psig, THEN ACTUATE SI.

Appendix D		Required Operator Actions	Form ES-D-2
Op Test No.: Event Descripti	NRC 2010302	Scenario #Event #6 Page Safety VIvs lift 1 per SG on all SGs	39 of 53
Time	Position	Applicant's Actions or Behavior	
		E-0, Reactor Trip or Safety Injection	
Evaluator N		w should exercise FOLDOUT PAGE EVENT DIAGNOSTICS irrization during performance of the prudent operator actions (F	for SG POAs)
	Correct F	POAs implemented would then result in ALL MSIVs closed and	d SI actuated.
		FOLDOUT PAGE	
		RCP TRIP CRITERIA – N/A	
		EVENT DIAGNOSTICS	
		• IF any S/G pressure is dropping uncontrolled, THEN following:	PERFORM the
	RO/BOP	a. CLOSE MSIVs and MSIV bypass valves	
		 b. IF any S/G pressure continues to drop uncontrolled, T PERFORM the following: 	HEN
	RO	1) ENSURE SI actuated.	
		 IF at least one S/G is intact (S/G pressure cont THENContinuing Actions N/A 	rolled or rising),
			· · · · · · · · · · · · · · · · · · ·
Evaluator N	ote: Actions f	or ES-0.5 are contained in attachment at back of scenario guid	10
	Following	the reactor shutdown, the operator responsible for performing .4 Step 4 RNO Step b as directed.	
	RO	b. WHEN reactor is shutdown or tripped, THEN PERFORM	the following:
		1) STOP and LOCK OUT affected RCP	
		 2) PULL TO DEFEAT affected loop ∆T and T-avg: XS-68-2D (∆T) XS-68-2M (T-avg) 	
	BOP	 PERFORM ES-0.5, Equipment Verifications WHILE cont procedure. 	inuing in this
	RO	 DETERMINE if secondary heat sink available: CHECK total AFW flow greater than 440 gpm. CHECK narrow range level greater than 10% [25 AD one S/G. CONTROL feed flow to maintain narrow range level to [25% ADV] and 50% in all S/Gs. 	-

Appendix D		Requ	uired Op	perator Action	ons		For	m ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	1	Event #	6	Page	40	of	53
Event Descriptio	n: MS Sa	afety Vlvs lift 1 p	er SG or	n all SGs					

Time	Position	Applicant's Actions or Behavior
		E-0, Reactor Trip or Safety Injection
		(Heat Sink is available from AFW:>440 gpm available.)
	RO	7. CHECK if main steam lines should be isolated:
		a. CHECK if any of the following conditions have occurred:
		 Any S/G pressure less than 600 psig OR
		Any S/G pressure dropping UNCONTROLLED.
		OR Descention
		Phase B actuation
		b. ENSURE MSIVs and MSIV bypass valves CLOSED
		c. ENSURE applicable Foldout Page actions COMPLETED
	RO	8. CHECK RCP trip criteria: a. CHECK the following:
		RCS pressure less than 1250 psig.
		AND At least one CCR OR SL nump RUNNING
		At least one CCP OR SI pump RUNNING b. STOP RCPs
<u></u>		
	RO	9. MONITOR RCS temperatures:
		 IF any RCP running, THEN CHECK T-avg stable at or trending between 547°F and °F.
		OR
		 IF RCPs stopped, THEN CHECK T-cold stable or trending to betwee 547°F and 552°F.
		10. CHECK pressurizer PORVs, safeties, and spray valves:
	50	a. Pressurizer PORVs CLOSED.b. Pressurizer safety valves CLOSED.
	RO	c. Normal spray valves CLOSED.
		d. Power to at least one block valve AVAILABLE.e. At least one block valve OPEN.

Appendix D		Requ	uired Op	perator Actior	าร		For	m ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #		Event #	6	Page	41	of	53
Event Descriptio	n: MS S	afety VIvs lift 1 p	er SG or	n all SGs					

Time	Position	Applicant's Actions or Behavior
		E-0, Reactor Trip or Safety Injection
	CREW	 11. DETERMINE S/G secondary pressure boundaries are INTACT: CHECK all S/G pressures CONTROLLED or RISING. CHECK all S/G pressures greater than 140 psig. (RNO Required)
	SRO	RNO: PERFORM the following:
Evaluator Not	via SPDS designate condition	1.a, MONITOR status trees, the crew will implement status tree monitoring 6. When a RED or ORANGE path status tree is observed, the SRO will be one of the Board operators (typically the BOP) to verify status tree is using 1-FR-0, UNIT 1 STATUS TREES . Once verified, the SRO should be crew to transition to the appropriate RED and/or ORANGE path e(s).
	Crew	a. MONITOR status trees.
	SRO	b. GO TO E-2, Faulted Steam Generator Isolation.
		Crew transitions to E-2, Faulted Steam Generator Isolation.

Appendix D		Requ	ired Op	erator Actior	าร		For	m ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	1	Event #	66	Page	42	of	53
Event Descriptio	n: MS S	afety Vlvs lift 1 p	er SG on	all SGs					

	E-2, Faulted Steam Generator Isolation
CAUTION: U	nisolating a faulted S/G or secondary break should NOT be considered NLESS needed for RCS cooldown.
RO	1. CHECK MSIVs and MSIV bypass valves CLOSED.
RO	2. CHECK ANY S/G secondary pressure boundary INTACT:
	 Any S/G pressure CONTROLLED or RISING. (RNO required)
	RNO:
	IF all S/G pressures dropping in an uncontrolled manner, THEN GO TO ECA-2.1, Uncontrolled Depressurization of All Steam Generators.
SRO	Directs transition to ECA-2.1 Uncontrolled Depressurization of All Steam Generators
	END OF TEXT

Appendix D		Requ	lired Op	erator Actio	ons		For	m ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	1	Event #	6	Page	43	of	53
Event Descriptio	n: MS S	afety VIvs lift 1 p	er SG on	all SGs					

Time	Position	Applicant's Actions or Behavior						
	EC	A-2.1, Depressurization of All Steam Generators.						
	CAUTION: Is	solating both steam supplies to the TD AFW pump when it is the only source feed flow will result in loss of secondary heat sink.						
		procedure has a foldout page.						
		1. CHECK secondary pressure boundary:						
		a. CHECK the following:						
		 MSIVs and MSIV bypass valves CLOSED 						
		 MFW regulating valves and reg bypass valves CLOSED 						
		MFW isolation valves CLOSED						
		Atmospheric reliefs CLOSED						
		S/G blowdown valves CLOSED						
		b. CHECK MD AFW pumps RUNNING.						
		c. CLOSE TD AFW pump steam supply valve FCV-1-17 or FCV-1-18.						
Critical Task		N Flow to Multiple Faulted SGs in order to minimize RCS cooldown rate before a nge-path) challenge develops to the PTS CST						
	NOTE Redu NOT	icing total feed flow to less than 440 gpm, as directed in this procedure, does require implementation of FR-H.1, Loss of Secondary Heat Sink, as long as a feed flow capability of 440 gpm is available.						
	CREW	2. CONTROL feed flow to minimize RCS cooldown:						
	RO	a. CHECK T-cold cooldown rate less than 100°F/hr. (RNO required)						
Critical		RNO:						
Task	BOP	a. REDUCE feed flow to 50 gpm to each S/G.						
	BOP	OPEN MD AFW pump recirc valves FCV-3-400 and FCV-3-401 as necessary to control flow.						
	SRO	GO TO Substep 2.c (AER column).						
L								
	BOP	AER 2.c. MONITOR S/G narrow range levels greater than 10% [25% ADV]. (RNO required)						
		RNO:						
	BOP	 c. MAINTAIN feed flow to affected S/G(s) greater than or equal to 50 gpm UNTIL level greater than 10% [25% ADV]. 						

Appendix D		Requ	uired Op	erator Actio	ons		For	m ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	1	Event #	6	Page	44	of	53
Event Descriptio	n: MS S	afety Vlvs lift 1 p	per SG on	all SGs					

Time	Position	Applicant's Actions or Behavior					
	RO	d. MONITOR T-hot indications STABLE or DROPPING.					
	SRO/ RO	3. MAINTAIN shutdown margin adequate:					
		a. NOTIFY Chem Lab to sample RCS boron concentration.					
		 b. CHECK shutdown margin ADEQUATE USING 0-SI-NUC-000-038.0 Shutdown Margin. 					
	RO	4. MONITOR if RCPs should be stopped:					
		a. CHECK if the following conditions exist:					
		 RCS subcooling based on core exit T/Cs less than 40°F AND 					
		RCS pressure less than 1250 psig AND					
		At least one CCP OR SI pump RUNNING.					
·		b. STOP RCPS.					
		5. CHECK CST level greater than 5%.					
		Any time a pressurizer PORV opens, there is a possibility that it may stick open.					
		6. MONITOR pressurizer PORVs and block valves:					
		a. Power to block valves AVAILABLE					
		b. Pressurizer PORVs CLOSED					
		c. At least one block valve OPEN.					
		7. VERIFY secondary radiation NORMAL:					
		 a. CHECK secondary radiation NORMAL USING Appendix A, Secondary Rad Monitors. 					
		b. NOTIFY Chem Lab to take periodic S/G activity samples.					
·····		c. WHEN Chem Lab is ready to sample S/Gs, THEN PERFORM the following:					
		1) ENSURE Phase A RESET.					
		 ENSURE FCV-15-43 Blowdown Flow Control valve CLOSED. 					

Appendix D		Form ES-D-2							
Op Test No.:	NRC 2010302	Scenario #	1	Event #	6	Page	45	of	53
Event Descriptio	n: MSS	afety Vlvs lift 1 p	per SG on	all SGs					

Time	Position	Applicant's Actions or Behavior
		3) OPEN blowdown isolation valves.
		d. NOTIFY RADCON to survey main steamlines and S/G blowdown.
		 e. WHEN S/G samples completed, THEN CLOSE blowdown isolation valves
		8. DETERMINE if RHR pumps should be stopped:
		a. CHECK RHR pump suction aligned to RWST.
		b. CHECK RCS pressure:
		1) Greater than 300 psig
		2) STABLE or RISING.
		c. RESET SI signal.
		d. STOP RHR pumps and PLACE in A-AUTO.
		e. MONITOR RCS pressure greater than 300 psig.
		9. MONITOR shutdown boards continuously energized.
		10. MONITOR if containment spray should be stopped:
		a. CHECK any containment spray pump RUNNING.
		b. CHECK containment pressure less than 2.0 psig.
		c. CHECK containment spray suction aligned to RWST.
		d. RESET Containment Spray.
		e. STOP containment spray pumps and PLACE in A-AUTO. f. CLOSE containment spray discharge valves:
		• FCV-72-2.
		11. MONITOR if containment vacuum control should be returned to norma
		a. CHECK containment pressure less than 1.0 psig.
		 b. VERIFY containment vacuum relief isolation valves OPEN: [Panel 6K]
		• FCV-30-46
		• FCV-30-47
		• FCV-30-48.
		12. CHECK RWST level greater than 27%.

Appendix D		Required Operator Actions					Form E		3-D-2
Op Test No.:	NRC 2010302	Scenario #	1	Event #	6	Page	46	of	53
Event Description	on: MS Sa	afety VIvs lift 1 p	er SG on	all SGs					

Time	Position	Applicant's Actions or Behavior				
		13. DETERMINE if CLAs should be isolated:				
		a. CHECK RCS pressure less than 100 psig.				
		b. CHECK power to CLA isolation valves AVAILABLE.				
		c. RESET SI signal.				
		d. CLOSE CLA isolation valves.				
		14. MONITOR SI termination criteria:				
		a. RCS subcooling based on core exit T/Cs greater than 40°F.				
		b. RCS pressure STABLE or RISING.				
		c. Pressurizer level greater than 10% [20% ADV].				
	ls	teps 15 through 25 terminate SI. Transition to E-2, Faulted Steam Generator solation, via the Foldout Page is NOT appropriate UNTIL after completion of tep 25.				
Lead Exam	Lead Examiner may terminate the scenario following completion of ECA-2.1, Step 14, SI termination determination.					

Appendix D		Required Operator Actions						Form ES-D-2		
Op Test No.: Event Descript	<u>NRC 2010302</u> tion: Equ	Scenario #		Event #	ES-0.5	Page	47	of	53	
Time	Position			Applicant's	Actions or Beha	avior				
		ES-0.5, E(QUIPN	IENT VERIFIC	ATIONS					
Evaluator N	Note: BOP com (including	pletes ES-0.5 i g any discrepa	ncludi ncies	ng Appendice and actions ta	∋s A & B and aken) to SRO.	reports co	omple	tion		
	BOP 1. VERIFY D/Gs RUNNING.									
	BOP	2. VERIFY L)/G EH	RCW supply va	Ives OPEN.				<u></u>	
	BOP	3. VERIFY a	at least	t four ERCW p	umps RUNNIN	IG				
	BOP		· · ·		G					
		Pump 1 Pump 1 Pump 1 Pump 0	1B-B (2	-						
	BOP	5. VERIFY E	EGTS f	fans RUNNING	Э.					
	BOP	6. VERIFY g	jeneral	tor breakers O	PEN.					
	Crew	7. NOTIFY a actions.	at least	t two AUOs to	report to MCR	to be avai	ilable f	or loc	al	
	BOP	8. VERIFY A a. MD AI b. TD AF	FW pu	•	IG:					

Appendix D		Required Operator Actions Form ES-D-2
Op Test No.:	NRC 2010302	Scenario # <u>1</u> Event # ES-0.5 Page <u>48</u> of <u>53</u>
Event Descriptio	on: ⊏qui	ipment verifications
Time	Position	Applicant's Actions or Behavior
		ES-0.5, EQUIPMENT VERIFICATIONS
		level control valves should NOT be repositioned if manual action has been to control S/G levels, to establish flow due to failure, or to isolate a faulted
	BOP	 9. CHECK AFW valve alignment: a. VERIFY MD AFW LCVs in AUTO. b. VERIFY TD AFW LCVs OPEN. c. VERIFY MD AFW pump recirculation valves FCV-3-400 and FCV-3-
		401 CLOSED.
	BOP	 10. VERIFY MFW Isolation: a. MFW pumps TRIPPED b. ENSURE the following: MFW regulating valves CLOSED MFW regulating bypass valve controller outputs ZERO MFW isolation valves CLOSED
		11. MONITOR ECCS operation:
	BOP	 a. VERIFY ECCS pumps RUNNING: CCPs: RHR pumps SI pumps
		b. VERIFY CCP flow through CCPIT.
		c. CHECK RCS pressure less than 1500 psig.d. VERIFY SI pump flow.
		e. CHECK RCS pressure less than 300 psig.
		f. VERIFY RHR pump flow.
	BOP	12. VERIFY ESF systems ALIGNED:
		 a. Phase A ACTUATED: PHASE A TRAIN A alarm LIT [M-6C, B5]. PHASE A TRAIN B alarm LIT [M-6C, B6].

Appendix D		Required Operator Actions	Form ES-D-2
Op Test No.: Event Descriptio	NRC 2010302	_ Scenario # Event #ES-0.5 Page	49 of <u>53</u>
Time	Position	Applicant's Actions or Behavior	
		ES-0.5, EQUIPMENT VERIFICATIONS	
		 b. Cntmt Vent Isolation ACTUATED: CNTMT VENT ISOLATION TRAIN A alarm LIT [I CNTMT VENT ISOLATION TRAIN B alarm LIT [I 	VI-6C, C5]. VI-6C, C6].
		 c. Status monitor panels: 6C DARK 6D DARK 6E LIT OUTSIDE outlined area 6H DARK 6J LIT. 	
		 d. Train A status panel 6K: • CNTMT VENT GREEN • PHASE A GREEN 	
		e. Train B status panel 6L: • CNTMT VENT GREEN • PHASE A GREEN	
	BOP	13. MONITOR for containment spray and Phase B actuation	1:
		 a. CHECK for any of the following: Phase B ACTUATED OR 	
		Containment pressure greater than 2.8 psig	
		b. VERIFY containment spray INITIATED:	
		1) Containment spray pumps RUNNING.	
		 Containment spray header isolation valves FCV-7 72-2 OPEN. 	2-39 and FCV-
		 Containment spray recirculation valves to RWST FCV-72-13 CLOSED. 	FCV-72-34 and
		4) Containment spray header flow greater than 4750) gpm per train.

Appendix D		Required Operator Actions Form ES-D-2
Op Test No.: Event Descriptio	NRC 2010302 on: Equ	Scenario #1Event #ES-0.5Page50of53
Time	Position	Applicant's Actions or Behavior
		ES-0.5, EQUIPMENT VERIFICATIONS
		5) Panel 6E LIT.
		 c. VERIFY Phase B ACTUATED: PHASE B TRAIN A alarm LIT [M-6C, A5]. PHASE B TRAIN B alarm LIT [M-6C, A6].
	1	d. ENSURE RCPs STOPPED.
		 e. VERIFY Phase B valves CLOSED: Panel 6K PHASE B GREEN. Panel 6L PHASE B GREEN.
		f. WHEN 10 minutes have elapsed, THEN ENSURE containment air return fans RUNNING.
		14. MONITOR if containment vacuum relief isolation valves should be closed:
		a. CHECK containment pressure greater than 1.5 psig.
		 b. CHECK cntmnt vacuum relief isolation valves CLOSED: [Pnl 6K MANUAL] FCV-30-46 FCV-30-47 FCV-30-48.
	BOP	 15. CHECK secondary and containment rad monitors USING the following: Appendix A, Secondary Rad Monitors (attached) Appendix B, Containment Rad Monitors. (attached)
	BOP	 WHEN directed by E-0, THEN PERFORM Appendix D, Hydrogen Mitigation Actions.

Appendix D		Required Operator Actions Form ES-D-2
Op Test No.:	NRC 2010302	Scenario #1Event #ES-0.5Page51of53
Time	Position	Applicant's Actions or Behavior
		ES-0.5, EQUIPMENT VERIFICATIONS
		 17. CHECK pocket sump pumps STOPPED: [M-15, upper left corner] HS-77-410, Rx Bldg Aux Floor and Equipment Drain Sump pump A HS-77-411, Rx Bldg Aux Floor and Equipment Drain Sump pump B.
	BOP	18. DISPATCH personnel to perform EA-0-1, Equipment Checks Following ESF Actuation.
	BOP	19. ENSURE plant announcement has been made regarding Reactor Trip and SI.
Evaluator No	(including	pletes ES-0.5 including Appendices A & B and reports completion g any discrepancies and actions taken, i.e.: containment Spray operating ncies per ES-0.5 Step 13) to SRO.
		END (ES-0.5, EQUIPMENT VERIFICATIONS)

Appendix D		Requ	uired Ope	erator Actio	ns		For	m ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	1	Event #	ES-0.5	Page	52	of	53
Event Descriptio	on: Equip	ment verification	ns						

(ES-0.5, EQUIPMENT VERIFICATIONS)					
	APPENDIX A SECONDARY RAD MONITORS				
ВОР	 CHECK following rad monitors including available trends prior to isolation: 				
	 Condenser exhaust recorder RR-90-119 S/G blowdown recorder RR-90-120 Main steam line rad monitors Post-Accident Main Steam Line rad recorder RR-90-268B points 3 (blue), 4 (violet), 5 (black), and 6 (brown). [M-31 (back of M-30)] 				
BOP	 IF secondary radiation is HIGH, THEN ENSURE Unit Supervisor notified. 				
	END OF TEXT				

APPENDIX B					
	CONTAINMENT RAD MONITORS				
BOP	 CHECK following rad monitors: Upper containment high range rad monitors RM-90-271 and RM-90-272 NORMAL [M-30] Lower containment high range rad monitors RM-90-273 and RM-90-274 NORMAL [M-30] Containment rad recorders RR-90-112 and RR-90-106 NORMAL [M-12] (prior to isolation). 				
BOP	 IF secondary radiation is HIGH, THEN ENSURE Unit Supervisor notified. 				
	END OF TEXT				

Appendix D		Req	uired Ope	erator Actio	ons		For	m ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	1	Event #	Critical Task(s)	Page	53	of	53
Event Descriptio	n: Critica	al Task Listing							

Critical Tasks:	Critical Task Statement	Action Location	ESG pg #
1.	Throttle AFW Flow to Multiple Faulted SGs in order to minimize RCS cooldown rate before a severe (orange- path) challenge develops to the PTS CST Orange-path conditions: 1- All Tcold points dropped more than 100°f in <1 hour; 2- ALL RCS PRESSURE vs. T-COLD POINTS to the right of Limit A on Curve 1 3- All Tcold points <285°F. (to the left of T1)	ECA-2.1 Step 2.a.RNO	43

NRC 1009 ESG-1 Booth Instruction File

EVENT	IC/MF/RF/OR #	DESCRIPTION/EXPECTED ACTIONS/BOOTH FEEDBACK
Simulator IC	IC-118 Perform switch check. Allow the simulator to run for at least 3 minutes before loading SCEN file or starting the exercise. This will initialize ICS. Load SCENS: <u>1009 NRC ESG-1</u> • Place simulator in RUN. • Place OOS equipment in required position with tags. Clear alarms	 ~42%, BOL ~150 MWD/MTU CB 'D' Rods @ 180 steps, all others @ 228 steps; [B] = 1350ppm; Ba Blender setting: 28% Xe/Sm @ equilibrium <u>Console Operator actions: Place simulator in run and perform</u> <u>the following:</u> Allow the simulator to run before loading SCEN file. Place the MODE 1 sign on 1-M-4 Place Train Week A sign Set Ranges on Tave/Tref Recorder on 1-M-6 to ± 3 degrees for current conditions (System Menu/Strip Chart Assign Tab through to fix) 1C Pzr Htrs energized
MFs, RFs, ORs active when SCN file loaded:	- none -	
1.	N/A	Normal Power Increase: perform 0-GO-5 Section 5.1 Step 23
		Support staff: as expected for power increase per 0-GO-5
2.	IMF CV06B f:1 k:2 IMF CV01B f:1 d:300 k:2	 1B-B CCP Aux LO Pump Actuates 1B-B CCP Trip <u>1)- Support staff:</u> wait ~1 minutes, report as AB AUO some oil leaking from an oil supply line on 1B-B CCP, local oil pressure indication stable but lower than normal. <u>2)- Support staff:</u> CCP trip: report as AB AUO- pump motor is hot to the touch; If MCR AUO dispatched, wait ~ 1 minute, report breaker is tripped on Instantaneous over current. If SM notified, give no direction; ask: "what's your recommendation?"
3.	IMF CC20 f:1 k:3	1-FCV-70-63 fails to open automatically
	IMF CC14 f:32 k:3	Component Cooling Line Break- C-S Pp Disch Hdr (within make-up capacity) Support staff: If requested, report U2 make-up is in progress as expected.
	IRF CCR15 f:1 k:13	Demin Head Tank Make-up @ ~400 gpm
		<u>Support staff:</u> if dispatched to respond 1-AR-M15-B, E-3, wait 2 minutes insert k: 13 and report DI Head Tank make-up is in progress.

NRC 1009 ESG-1 Booth Instruction File

EVENT	IC/MF/RF/OR #	DESCRIPTION/EXPECTED ACTIONS/BOOTH FEEDBACK
When Appx B performance requested,	IMF AN_OV_604 f:2 k:23	1-XA-55-M6-E A-4, "480V REAC MOV BD 1B1-B/1B2-B TRANSFER SWITCH IN AUX MODE": Any mode selector switch or Reactor MOV Bd 1B1-B or 1B2-B in 'Auxiliary' position.
		<u>Support staff:</u> When dispatched, wait 1 minute, insert k:23 and report as AUO, Appendix B valves transferred to 'AUXILIARY", standing by.
		<u>Support staff:</u> When directed by the MCR staff, insert k:33 to sequentially close specified valves; report as AUO valves are positioned to 'CLOSE'.
		<u>Support staff:</u> If requested, report as AB AUO water flow from CCS piping break subsiding.
When MCR staff directs,	IRF CCRV12 f:0 k:33 IRF CCRV75 f:0 d:5 k:33 IRF CCR2V75 f:0 d:10 k:33	Closes the following Appendix B Valves: 1-FCV-70-12, CCS HX 0B1 and 0B2 Outlet 1-FCV-70-75- U1 B-Trn to C-S Pump. 2-FCV-70-75- U2 B-Trn to C-S Pump.
INSTRUCTOR	NOTE: delete AN_OV_604 when	directed by the MCR staff to remove power from Appx. B Valves.
		<u>Support staff</u> : If dispatched, wait ~2 minutes, report as the AB AUO, water on the floor around the CC Hxs on AB EI. 714' and running down the stairs; location appears to be on the common inlet to the 0B1/0B2 CCS Hx.
		If requested to check the Flood Mode Pnl, report LS-40-54, 55 @714'3" increasing;
		If requested to TB 685'local panel, report LS-59-180A/B Demin Water Storage Tank level low is the cause
4.	IMF CV18B f:10 r:30 k:4	#2 RCP #2 Seal Failure
		<u>Support staff:</u> respond as requested for normal plant shutdown per the GOs.
5.	IOR ZAITIC2448 f:1 k:5	Gen H2 Temp Hx Cooling Water Controller failure
		<u>Support staff:</u> if dispatched, TB AUO reports no apparent, visible cause for malf.
5.a.	IMF RW09 f:1 k:15	RCW to Stator Cooling & H2 Cooling Loss- MT Trip, No Rx Trip
	IOR ZDITIC2448SW1 f:1 k:15	RCW to H2 Coolers fail
	IOR ZDITIC2448SW3 f:2 k:15	
		<u>Support staff:</u> if requested, TB AUO reports 1-TCV-24-48 indicates closed; bypass jammed- will not open; local SCW temperature is increasing.
6.	IMF MS03A f:100 r:20 k:6	MS Safety VIvs lift 1 per SG on all SGs
	IMF MS03B f:100 r:21 k:6	
	IMF MS03C f:100 r:22 k:6 IMF MS03D f:100 r:23 k:6	<u>Support staff</u> : if requested, OS AUO, Security, etc. reports steam discharging from the roof of East & West Valve Vaults and is not a safety issue at this time.

Page 1

					EXPECTED	DELTA RHC	BORON	DELTA		IIRECOMMENI	IODINE
TIME	POWER	DEFECT	ROD HT	WORTH	XENON	BORON	CONC	PPM	DILUTION	BORATION	CONC
(hrs)	(%)	(pcm)	(steps)	(pcm)	(pcm)	(pcm)	(ppm)	(ppm)	(gal)	(gal)	(% eq)
0	42.0	740.7	180.0	-315.7	-2020.0		1350.0				42.0
1	46.5	810.9	184.0	-279.6	-2000.3	14.3	1347.7	-2.3	109	0	42.2
2	50.0	866.0	188.0	-245.9	-1974.2	-4.7	1348.5	0.7	0	9	42.8
3	50.0	865.8	188.0	-246.2	-1951.2	-22.8	1352.1	3.6	0	42	43.5
4	54.5	933.4	190.0	-226.2	-1929.6	26.0	1348.0	-4.1	197	0	44.4
5	59.0	1003.2	192.0	-206.7	-1905.0	25.7	1343.9	-4.1	196	0	45.6
6	63.5	1072.9	194.0	-187.7	-1880.2	26.0	1339.8	-4.1	199	0	47.1
7	68.0	1143.0	196.0	-169.3	-1857.6	29.0	1335.2	-4.6	222	0	49.0
8	72.5	1213.4	198.0	-151.7	-1838.6	33.9	1329.8	-5.4	261	0	51.1
9	75.0	1253.5	211.0	-64.7	-1826.8	-58.8	1339.1	9.3	0	108	53.3
10	75.0	1250.5	214.0	-47.1	-1827.0	-20.4	1342.3	3.2	0	37	55.4
11	75.0	1249.5	216.0	-36.1	-1838.9	-0.2	1342.4	0.0	0	0	57.4
12	75.0	1249.4	216.0	-36.0	-1859.2	20.3	1339.1	-3.2	155	0	59.1
13	75.0	1250.5	216.0	-36.0	-1885.2	27.0	1334.9	-4.3	207	0	60.7
14	75.0	1251.8	216.0	-36.0	-1914.9	31.0	1329.9	-4.9	239	0	62.1
15	75.0	1253.4	216.0	-36.0	-1946.7	33.3	1324.6	-5.3	257	0	63.3
16	75.0	1255.1	216.0	-35.9	-1979.4	34.4	1319.2	-5.5	267	0	64.5
17	75.0	1256.9	216.0	-35.9	-2012.2	34.5	1313.7	-5.5	269	0	65.5
18	75.0	1258.6	216.0	-35.8	-2044.4	33.9	1308.3	-5.4	265	0	66.5
19	75.0	1260.3	216.0	-35.8	-2075.6	32.9	1303.1	-5.2	258	0	67.3
20	75.0	1262.0	216.0	-35.8	-2105.5	31.5	1298.1	-5.0	248	0	68.1
150	MWD/MTU	J	Hold Tavg	= Tref +/- 1	.5F			Total	3348	197	
6820	BAT ppm		0						part concerns	v boration/dilutior	n
L	_									y be accumulate	
										gle additions	
-	<i>c</i>								-	-	
	n for Maneu	ver		ant restart to	ollowing for	ced outage-	50% hold	(5% hold			
Date DyEng	Nome		Today								
RxEng			J. Sidekick	<u></u>							
Comme	1118		none								

1009 ESG-1 Page 1 of 5

0.	IIFT TURNOVER CHECKLIST	Page 1. c	f 3 Today
Pa	rt 1 - Completed by Off-going S	Shift / Reviewed by	/ On-comina Shift
Mo	de 1, 42% RTP		NRC phone Authentication Code
	A Risk: Green d Risk: Green		
	u Risk: Green		Until 0800 XXXX
RC	S Leakage ID .02 gpm, UNID .02 gpn	n	After 0800 YYYY
		Common Tech	Spec Actions
•	None		
		U-1 Tech S	Dec Actions
•	None		
		Protected	Equipment
•	None		
Contract designed		Ware a second state of the	
		Shift P	
•	Continue power increase to 100°	% RTP starting at 0	-GO-5 Section 5.1 Step 23.
•	Rx Engineering Spreadsheet for	power increase is o	complete and ready for SRO verification.
•	Use TI-40 Pre-Conditioned powe	r level as applicabl	complete and ready for SRO verification.
•	Use TI-40 Pre-Conditioned power Note: This restart is 24 hours for	r level as applicabl llowing a shutdowr	complete and ready for SRO verification.
	Use TI-40 Pre-Conditioned powe	r level as applicabl llowing a shutdowr	complete and ready for SRO verification.
	Use TI-40 Pre-Conditioned power Note: This restart is 24 hours for	r level as applicabl llowing a shutdowr	complete and ready for SRO verification.
	Use TI-40 Pre-Conditioned power Note: This restart is 24 hours for	r level as applicabl llowing a shutdowr	complete and ready for SRO verification.
	Use TI-40 Pre-Conditioned power Note: This restart is 24 hours for	r level as applicabl llowing a shutdowr	complete and ready for SRO verification.
	Use TI-40 Pre-Conditioned power Note: This restart is 24 hours for	r level as applicabl llowing a shutdowr	complete and ready for SRO verification.
	Use TI-40 Pre-Conditioned power Note: This restart is 24 hours for	r level as applicabl llowing a shutdowr	complete and ready for SRO verification.
	Use TI-40 Pre-Conditioned power Note: This restart is 24 hours for	r level as applicabl llowing a shutdowr	complete and ready for SRO verification.
•	Use TI-40 Pre-Conditioned power Note: This restart is 24 hours for 100% RTP. There are no fuel de	r level as applicabl llowing a shutdowr efects.	complete and ready for SRO verification.
•	Use TI-40 Pre-Conditioned power Note: This restart is 24 hours for	r level as applicabl llowing a shutdowr efects.	complete and ready for SRO verification.
• Pa	Use TI-40 Pre-Conditioned power Note: This restart is 24 hours for 100% RTP. There are no fuel de	r level as applicabl llowing a shutdowr efects.	complete and ready for SRO verification.
• Pa	Use TI-40 Pre-Conditioned power Note: This restart is 24 hours for 100% RTP. There are no fuel de rt 2 – Performed by on-coming Verify your current qualifications	r level as applicabl Ilowing a shutdowr efects. shift	complete and ready for SRO verification. e. In that occurred after 5 days of continuous operation at
• Pa	Use TI-40 Pre-Conditioned power Note: This restart is 24 hours for 100% RTP. There are no fuel de	r level as applicabl llowing a shutdowr efects.	complete and ready for SRO verification. e. that occurred after 5 days of continuous operation at ⊠ Review Operating Log since last held shift or 3
• Pa	Use TI-40 Pre-Conditioned power Note: This restart is 24 hours for 100% RTP. There are no fuel de rt 2 – Performed by on-coming Verify your current qualifications	r level as applicabl Ilowing a shutdowr efects. shift	complete and ready for SRO verification. e. that occurred after 5 days of continuous operation at Mark Review Operating Log since last held shift or 3 days, whichever is less
• Pa	Use TI-40 Pre-Conditioned power Note: This restart is 24 hours for 100% RTP. There are no fuel de rt 2 – Performed by on-coming Verify your current qualifications Standing Orders / Shift Orders LCO Actions	er level as applicabl Ilowing a shutdowr efects. shift	 complete and ready for SRO verification. e. a that occurred after 5 days of continuous operation at Ithat occurred after 5 days of continuous operation at
• Pa	Use TI-40 Pre-Conditioned power Note: This restart is 24 hours for 100% RTP. There are no fuel de rt 2 – Performed by on-coming Verify your current qualifications Standing Orders / Shift Orders	er level as applicabl Ilowing a shutdowr efects. shift I TACF	 complete and ready for SRO verification. e. a that occurred after 5 days of continuous operation at Ithat occurred after 5 days of continuous operation at

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1009 ESG-1 Page 2 of 5

SHIFT TURNOVER CHECKLIST	Page 2. of 3	Today
Train <u>A</u> Week	MAIN CONTROL ROOM (7690)	
Vitani _A_Week		
	OUTSIDE (7666) [593-5214]	
None		
	AUXILIARY BUILDING (7775)	
None		
T	JRBINE BUILDING (7771) (593-84	55)
None		

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SHIFT TURNOVER CHECKLIST

Page 3. of 3

Today

Disabled Annunciators					
PANEL	WINDOW	ANNUNCIATOR	WO / PER Number		
······					

Equipment Off-Normal (Pink Tags)

UNID And Noun Name	Panel	Problem Description	WO / PER Number
·······			

MCR WO LIST

ID And Noun Name	Panel	Problem Description	WO/PER Number
······································			
			······································
			1

UNIT ONE REACTIVITY BRIEF Date: Today Time: Now

Date: reday Time: Now

General Information

RCS Boron:1452 ppmTodayBA Controller Setpoint:37.4% *RCS B-10 Depletion:2 ppmOperable BAT:ABAT A Boron:6850 ppmBAT C Boron:6850 ppmRWST Boron:2601 ppmNominal Gallons per rod step from 189:17 gallons of acid,75 gallons of water

* Verify boric acid flow controller is set at Adjusted BA Controller Setting iaw 0-SO-62-7 section 5.1

Estimated values for a 1° Change in Tave **

Gallons of acid: 22

Gallons of water: 94

Rod Steps: 1

Estimated rods/boron for emergency step power reduction ** (Assuming Xenon equilibrium and no reactivity effects due to Xenon. 2/3 total reactivity from rods, 1/3 from boron)

Power reduction amount	Estimated Final Rod Position	Estimated boron addition	
10%	181 Steps on bank D	93 gallons	
30%	161 Steps on bank D	291 gallons	
50%	n/a	n/a	

**

These values are approximations and not intended nor expected to be exact. The values may be superceded by Rx Engineering or SO-62-7 calculated values. These values are calculated assuming 100% steady state power operation only. Engineering data last updated one week ago. Data Valid until three weeks from now.

Previous Shift Reactivity Manipulations

Remarks: Use Reactivity Manipulation spread sheet from Rx Eng.

Current Shift Estimated Reactivity Manipulations							
Remarks: Use Reactivity Manipulation spread sheet from Rx Eng. Verify data using 0-SO-62-7.							
Rx Power – 42%	MWD/MTU – 1000	Xenon – 1842 PCM Equilibrium Samarium ~972 PCM					

Last Dilution Complete ~1 hour ago.

Next Unit 1 Flux Map is scheduled: three weeks from now

Unit Supervisor:

Name/Date

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Operations Chemistry Information					
Boron Results					
Sample Point	Units	Boron	Date / Time	Goal	Limit
U1 RCS	ppm	1465	Today / Now	Variable	Variable
U2 RCS	ppm	816	Today / Now	Variable	Variable
U1 RWST	ppm	2601	Today / Now	2550 - 2650	2500 - 2700
U2 RWST	ppm	2569	Today / Now	2550 - 2650	2500 - 2700
BAT A	ppm	6850	Today / Now	Variable	Variable
BAT B	ppm	6850	Today / Now	Variable	Variable
BAT C	ppm	6850	Today / Now	Variable	Variable
U1 CLA #1	ppm	2556	Today / Now	2470-2630	2400-2700
U1 CLA #2	ppm	2575	Today / Now	2470-2630	2400-2700
U1 CLA #3	ppm	2591	Today / Now	2470-2630	2400-2700
U1 CLA #4	ppm	2589	Today / Now	2470-2630	2400-2700
U2 CLA #1	ppm	2531	Today / Now	2470-2630	2400-2700
U2 CLA #2	ppm	2650	Today / Now	2470-2630	2400-2700
U2 CLA #3	ppm	2522	Today / Now	2470-2630	2400-2700
U2 CLA #4	ppm	2526	Today / Now	2470-2630	2400-2700
Spent Fuel Pool	ppm	2547	Today / Now	<u>></u> 2050	<u>≥</u> 2000
L	ithium Res	ults		Goal	Midpoint
U1 RCS	ppm	1.1	Today / Now	>1	>1
U2 RCS	ppm	2.43	Today / Now	2.18-2.48	2.33

Primary to Secondary Leakrate Information (Total CPM RM-90-99/119)					
Indicator	Units	U1	Date / Time	U2	Date/Time
SI 50 S/G Leakage?	Yes/No	No	Today / Now	No	Today / Now
SI 137.5 CVE Leakrate	gpd	< 0.1	Today / Now	< 0.1	Today / Now
5 gpd leak equivalent	cpm	115	Today / Now	68	Today / Now
15 gpd (30 min increase)	cpm	265	Today / Now	83	Today / Now
30 gpd leak equivalent	cpm	490	Today / Now	206	Today / Now
75 gpd leak equivalent	cpm	1165	Today / Now	455	Today / Now
150 gpd leak equivalent	cpm	2290	Today / Now	870	Today / Now
CVE Air Inleakage	cfm	10	Today / Now	12.5	Today / Now
Bkgd on 99/119	cfm	40	Today / Now	40	Today / Now
Steady state conditions are necessary for an accurate determination of leak rate using the CVE Rad Monitor					

Operations Chemistry Information

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Sequoyah Nuclear Plant

Unit 1 & 2

General Operating Instructions

0-GO-5

NORMAL POWER OPERATION

Revision 0065

Quality Related

yfa folgs dats

Level of Use: Continuous Use

Effective Date: 03-12-2010 Responsible Organization: OPS, Operations Prepared By: W. T. Leary

Approved By: P. R. Simmons

Current Revision Description

Revised to address requirements overlooked in the initial issuance of the guidance for compliance with NERC Reliability Standards, VAR-002. These changes make no alteration to the operation of any equipment and are changes to required administrative notifications only. These changes are therefore minor editorial changes as defined in SPP-2.2.

PERFORMANCE OF THIS PROCEDURE IMPACTS REACTIVITY.

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ATTACHMENTS

Attachment 1: NORMAL POWER OPERATION

3

1.0 INTRODUCTION

1.1 Purpose

This General Operating (GO) Instruction provides guidance for power ascension from approximately 30 to 100% power, at power conditions, power reduction from 100 to 30% power, Power Coastdown at End of Life operations, and Load Follow operations.

This instruction provides additional guidance for turbine control restoration following a turbine runback.

1.2 Scope

This GO contains the following sections:

5.1 Power Ascension From 30% Power to 100%

5.2 At Power Conditions

5.3 Power Reduction From 100% to 30%

5.4 Power Coastdown at End of Life

5.5 Load Follow Operations

2.0 **REFERENCES**

2.1 Performance References

- A. 1,2-SO-5-1, Feedwater Heaters and Moisture Separator Reheaters
- B. 1,2-SO-5-2, No. 3 Heater Drain Tank and Pumps
- C. 1,2-SO-5-3, No. 7 Heater Drain Tank and Pumps
- D. 1,2-SO-2/3-1, Condensate and Feedwater System
- E. 1,2-SO-2-9, Condenser Vacuum and Turbine Steam Seal Systems Operation
- F. 0-SO-12-1, Auxiliary Boiler System
- G. 0-SO-35-4, Monitoring Generator Parameters
- H. 0-SO-58-1. Main Generator Bus Duct Cooling System
- I. 0-SI-NUC-000-038.0, Shutdown Margin
- J. 1,2-SO-62-1, Chemical and Volume Control System
- K. 0-SO-62-7, Boron Concentration Control
- L. 1,2-SO-62-9, CVCS Purification System
- M. 0-SO-68-3, Pressurizer Spray and Heater Pressure Control System
- N. 0-SO-85-1, Control Rod Drive System
- O. 0-PI-OPS-000-666.0, River Temperature Limits Specified by NPDES permit
- P. 0-SI-OPS-092-078.0, Power Range Neutron Flux Channel Calibration By Heat Balance Comparison
- Q. 0-SI-CEM-000-050.0, 72-Hour Chemistry Requirements
- R. 0-SI-CEM-030-407.2, Radioactive Gaseous Waste Effluent Particulate and Iodine Dose Rates from Shield and Auxiliary Building Exhausts (Weekly/Special) and Condenser Vacuum Exhausts (Special)
- S. 0-SI-CEM-030-415.0, Gaseous Effluent Requirements (Gross Alpha, Noble Gas and Tritium
- T. 0-SI-OPS-000-001.0, Initial Startup System Parameter Log
- U. TI-40, Determination of Preconditioned Reactor Power

2.1 Performance References (continued)

V. 2-SO-98-1, Distributed Control System

2.2 Developmental References

- A. Memorandum from System Engineering concerning MSR operation RIMS S57 880322 999
- B. Memo from Reactor Engineering RIMS S57 941219 934
- C. S57-880322-999 and S57-880808-851
- D. <u>W</u> Letter GP89-076 (RIMS No. S53 890427 984)
- E. <u>W</u> Letter GP 89-155 (RIMS S57 891026 972)
- F. <u>W</u> Letter GP 86-02(B44 861112 002)
- G. SSP-2.3, Administration of Site Procedures
- H. TVA-NQA-PLN89-A
- I. GOI-10, *Reactivity Control at End of Cycle Life* (Trojan Nuclear Plant)
- J. FSAR, Section 13.5
- K. Memo from Reactor Engineering August 6, 1996 (G Bair)
- L. NERC Reliability Standard, VAR-002-1.1b

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Precautions

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) To ensure that NIS Reactor Power level indications remain within 2% of true power during power level changes, a check should be performed about every 20% power level change, when greater than 15% power, by comparing calorimetric power to each NIS Power Range drawer. The 20% power level check does not preclude the operating crews from making necessary changes in response to changing plant conditions.



TRM 3.3.3.15 requires LEFM core thermal power (U2118) to be used to perform 0-SI-OPS-092-078.0 above 15% reactor power. LEFM indication is available if the following conditions are met:

- LEFM status NORMAL on ICS Calorimetric Data screen.
- LEFM core thermal power (ICS point U2118) shows good (green) data.
- LEFM MFW header temp (ICS point T8502MA) greater than or equal to 250°F.

If LEFM indication is NOT available above 15% reactor power, then TR 3.3.3.15 action must be entered.

C.) The following should be used to determine the most accurate reactor power indication for comparison with NIS:

- When reactor power is greater than 15%, use LEFM calorimetric power indication (U2118).
- If LEFM is NOT available, then use average loop ∆T (UO485 or M-5 indicators) up to 40%. Above 40%, use computer point U1118.

The turbine should be operated in "IMP OUT" control during normal unit operation. "IMP IN" operation results in system swings and should only be used during the performance of valve tests. (W Ltr GP 89-155; RIMS S57 891026 972)

Pressurizer heaters and sprays may be operated as required to maintain pressurizer and RCS boron concentration within 50 ppm. If loop boron concentration is changed by 20 ppm or greater, use the pressurizer backup heaters to initiate automatic spray (if available). If Normal Spray is NOT available, then use Auxiliary Spray (1, 2-SO-62-1, Section 8.7) in conjunction with pressurizer backup heaters.

3.1 **Precautions (continued)**

Condensate DI polishing operations during power ascension are controlled by staying within system parameters and by recommendations from the Chemistry Section.

) The valve position limiter should be periodically positioned approximately 10% above the current governor control indications (keeps governor valves off of the limiter) as turbine load is changed. This prevents inadvertent load increases by limiting governor valve opening and allows a faster response of the runback feature which ensures main feedwater system will supply the required amount of flow.

Any off-frequency turbine operation is to be reported to Engineering for record keeping. The report will include duration and magnitude of off-frequency operation.

Operation at off-frequencies is to be avoided in order to prevent the probable occurrence of turbine blade resonance. Prolonged periods of operation at certain off-design frequencies could cause excessive vibratory stresses which could eventually generate fatigue cracking in the blades. Off-frequency operation is permitted to the degree and time limit specified on the chart "Off-Frequency Turbine Operation", Figure A.26 of TI-28.

The potential exists for condensation formation in steam extraction lines when feedwater heaters are isolated.

Initial Startup After Refueling - After refueling operations, the NIS indications may be inaccurate until calibration at higher power levels. The NIS calibration procedures will adjust the PRM trip setpoints to ensure that the excore detectors do not contribute to an overpower condition at the following RTP hold points. Reactor Engineering and/or Systems Engineering will determine procedure performance. [C.3]

At < 50% RTP a flux map and single point alignment, a hot channel factor determination, an axial imbalance comparison, and a PR NIS calibration will be performed. The PR high range trip setpoint will then be increased to its normal value of 109%.

 At < 75% RTP, calorimetric calculations and RCS flow verification may be performed, EAGLE-21 updated prior to increasing power, a flux map, a hot channel factor determination, an axial imbalance comparison may be required if not performed at < 50%, a detector calibration (if △ AFD ≥ 3%), and a PR NIS calibration may be performed.

3.1 **Precautions (continued)**

3/

If not performed at 75% hold point, an axial imbalance comparison and a detector calibration (if \triangle AFD \ge 3%) should be performed at ~ 100% RTP. Engineering will determine if PR NIS calibration must be performed. Calorimetric calculations, RCS flow verification, a hot channel factor determination, and a reactivity balance will be performed and EAGLE-21 updated. Reactor Engineering will notify Operations that normal full power operations may proceed.



Preconditioned Power Levels and Maximum Allowable Rates of Power Increase are specified in TI-40, *Determination of Preconditioned Reactor Power*.



During initial startups, based on Westinghouse recommendations, a lower Apower ramp rate limit has been implemented for power levels above the intermediate power threshold. The Intermediate Power Threshold is unit/cycle dependent and is determined by the Vendor. Refer to TI-40.



ICS will automatically monitor pre-conditioned power level as follows:



Point U1127 is reactor power in percent of RTP based on either secondary calorimetric or RCS ΔT depending on power level.



Point UO103 is a 20 minute rolling average of reactor power rate-of-change fitted over a 20 minute period. UO103 is a leading indicator of %/hour power ramp rate and can be used in deciding to speed up or slow down the ramp rate.



Point UO104 is a 1 hour rolling average of reactor power rate-of-change fitted over a 1 hour period. *UO104 is used in demonstrating compliance with fuel pre-conditioning power ramp rate limits*.

Point K0058 is the currently qualified (or pre-conditioned) power level.



These points can all be monitored with the ICS group display "TI40". Appendix A may be used if the ICS is unavailable.

Declared fuel defects, as determined by the Fuel Reliability Assessment Team A or the Shift Manager, have limited ramp rates during Reactor Power increases as specified in TI-40.



TI-40 power increase limits that are exceeded, in any one hour, are evaluated in accordance with SPP-3.1.

3.1 **Precautions (continued)**

- N. Power Coastdown At End Of Life:
- 1. Reactor power changes should be limited to less than or equal to 1% per hour to avoid causing xenon peaking which could force a plant shutdown.
 - 2. Do not perform unnecessary unit power maneuvers or testing (e.g., turbine valve testing). Such testing could result in an uncontrollable Xenon oscillation.
 - 3. Nonessential work on systems which could cause a plant upset should be deferred.
 - 4. Secondary Plant runbacks such as Main Feed Pump Turbine trip or #3 Heater Drain Tank runback will require a unit shutdown if Reactor power is not promptly returned to pre-transient level due to the resulting severe Xenon transient. If a system power alert is in effect, and electrical generation is critical, unit load should be reduced as necessary keeping T_{AVG} on program. Contact Reactor Engineering for an evaluation and guidance concerning unit shutdown or reduction of load.
 - 5. Management should be consulted to evaluate the feasibility of a unit restart if a reactor trip occurs with RCS equilibrium boron concentration less than 50 ppm. If the reactor is to be restarted, the power level shall be limited to nominal pre-trip power level.

Axial Flux Difference Management:

When the reactor is operating at a steady power or during normal load changes, maintain ΔI within the operating limits of the Core Operating Limits Report (COLR). It is recommended that the core axial flux difference (AFD) be maintained within \pm 5% of the target band at all times, excluding the performance of 0-PI-NUC-092-036.0, "Incore - Excore Calibration," and End of life power coast downs. Operating time outside the band, which is given in TI-28 Attachments 1 and 2, should be minimized. Reactor Engineering should be contacted if time out of the \pm 5% target band exceeds approximately 30 minutes.

The position of control bank D should normally be \geq 215 steps when power level is steady state at or above 85% RTP. At steady state power levels below 85%, control bank D should normally be \geq 165 steps. If rod position is more than 5 steps below this guidance for long term, then impact may occur to safety analysis assumptions.



During heatup and cooldown transients, RCS density changes will cause changes in NIS indicated power. At constant reactor power, a 1°F change in T_{AVG} may cause as much as a 1% (or more) change in indicated NIS power.

3.1 **Precautions (continued)**

R. The following limitations are applicable to Unit Two ONLY.

- In winter months #7 HDTP capacity is not adequate to pump #6 Heater drains when all Condensate Demineralizer pumps are in service. Current practice is to run two Cond DI Pumps and / or throttle the condensate system to reduce backpressure. The preferred method is to throttle condensate pressure instead of running only two Condensate Demineralizer booster pumps at full power due to pump runout concerns.
 - 2. Siemens-Westinghouse analysis has determined that the maximum unit power with one MFP operation is 65% under worst case conditions. The plant could operate higher if plant conditions permit.
 - 3. MFP flow from the lead MFP should not exceed 53.7% of the total flow. Flow rates above this would result in HP steam flow to the lead MFPT. Computer points 1(2)UO504 and UO505 can be used to monitor.

/ Voltage Control

NOTE

Failure to comply with the NERC VAR-002 requirement could result in a Utility Violation and / or monetary penalties.



Operation of the Main Generator without Automatic Voltage Control could impact grid voltage requirements. Refer to GOI-6 for MVAR limits.



When the Main Generator is connected to the grid, the voltage regulator shall be operated in Automatic, unless coordinated with the Transmission Operator (SELD).



Main Generator operation outside of the Transmission Voltage Schedule requires coordination with the Transmission Operator, and notation in the operator's Log of time, reason, and that the Transmission Operator notification was made.



When directed to modify voltage, the Generator Operator shall comply (within plant procedural requirements) or provide an explanation of why the schedule cannot be met.



While the Main Generator is tied to the grid perform the following:



The Transmission Operator (SELD) shall be notified of any Voltage Regulator automatic trips to Manual or urgent Manual Transfers between AUTO and Manual as soon as practical but notification shall be within 30 minutes.

3.1 **Precautions (continued)**



The Transmission Operator (SELD) shall be notified prior to a planned Voltage Regulator transfers between Manual and Auto.

All position changes (to and from Auto or Manual) of the Voltage Regulator shall be entered into the Narrative Log along with the date, time of position change, reasons, anticipated duration and notifications made.

Reliability Directives and Protective Relay/Equipment Failures

Failure to comply with the NERC VAR-002 requirement could result in a Utility Violation and / or monetary penalties.

NOTE

Plant Operations shall notify the Transmission Balancing Authority (BA) or Transmission Operator of protective relay or equipment failures that creates a creditable risk to Plant Generation. A creditable risk to generation represents a potential reduction in transmission system reliability.

Reliability Directives to the Generator Operator are via the Balancing Authority or Transmission Operator. Required action time may range from immediate to no longer than 30 minutes. Actions shall be taken without delay. The directives may be associated with preventing or clearing Local System issues, or neighboring system issues.



Plant operations shall take timely actions as directed by the Balancing Authority or Transmission Operator to mitigate critical conditions to return the bulk electrical system to a reliable state. Plant operations shall comply with Balancing Authority or Transmission Operator directives unless such actions would violate safety, equipment, or regulatory or statutory requirements.



Plant Operations shall immediately inform the Balancing Authority or Transmission Operator of the inability to perform directives so that the TVA Reliability Entities may implement alternate remedial actions.

3.2 Limitations

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When the axial flux difference monitor alarm is inoperable, the AFD must be logged every hour by performing 0-SI-NUC-000-044.0.

(SR 4.2.1.1.a.2 & 4.2.1.1.b)

When both the plant computer and NIS QPTR alarm systems are inoperable, the QPTR must be calculated every 12 hours by performing 0-SI-NUC-000-133.0. (SR 4.2.4.1.b)



Do not exceed a load change rate of plus or minus 5% per minute or a step change of 10%.



River water temperatures shall be maintained within the limitations of the NPDES permit as specified in 0-PI-OPS-000-666.0.

NOTE

Westinghouse should be contacted if the turbine is operated outside of its operating limits as stated below.

) To prevent high vibratory stresses and fatigue damage to the last stage turbine blading, do not operate the turbine outside of limits listed below: [W Ltr GP 86-02 (B44 861112 002)]



At loads less t<u>han or equal to 30% (</u>350 MW), the maximum permissible backpressure is 1.72 psia. (3.5" Hg)



At loads greater than 30%, the maximum permissible backpressure is 2.7 psia (5.5" Hg) with a 5 minute limitation before tripping the turbine.



Do not allow the generator to become underexcited.

In the event of a change in the rated thermal power level exceeding 15% in one hour, notify Chemistry to initiate the conditional portions of 0-SI-CEM-000-050.0, 0-SI-CEM-030-407.2 and 0-SI-CEM-000-415.0 due to the thermal power change.

3.2 Limitations (continued)

- The following Main Turbine vibration limitations and actions should be adhered to:
 - Vibration levels which exceed 7 mils (alarm setpoint) should be verified by Predictive Maintenance Group.

Vibration levels greater than 7 mils and less than 14 mils should be continuously monitored by Predictive Maintenance Group.



(X.)

IF vibration level is greater than or equal to 14 mils, THEN TRIP the turbine.

Westinghouse recommends that if any throttle valve is held closed for more than 10 minutes, then it should be re-tested immediately upon reopening in accordance with 1,2-PI-OPS-047-002.0.

The generator may be operated without a bus duct cooler up to approximately 729 MW turbine load.

To ensure sufficient voltage for a safe shutdown after loss of both units, voltage and reactive power should be maintained within the limits of GOI-6.

With LEFM calorimetric power indication available, full power operation is defined as approximately 3455 MW_T not to exceed 3455.0 MW_T averaged over a 8-hour period. [C.1] If LEFM is available, power shall be monitored using plant computer point U2118 Instantaneous Value. **DO NOT** allow average thermal power to exceed 3455 MW thermal for two consecutive hours. Every effort should be made to maintain core thermal power 10 minute average less than 3455 MWt.

The following restrictions apply if LEFM calorimetric power indication (U2118) is unavailable:

Applicable action of TRM 3.3.3.15 must be entered.

AFD limits in COLR and TI-28 must be made more restrictive by 1%.



Rod insertion limits in COLR must be raised by 3 steps.



If reactor power is greater than 40%, power should be monitored using U1118. If U1118 is also unavailable, use the highest reading NIS channel.

If reactor power is less than 40%, use the RCS average ΔT as the preferred method for determining power level.

3.2 Limitations (continued)

F equilibrium conditions are achieved, after exceeding by 10% or more of rated thermal power the thermal power at which the heat flux hot channel factor was last determined, THEN conditional performance of 0-SI-NUC-000-126.0, Hot Channel Factor Determination is required.

At low power levels, the LP Heaters may be unbalanced in extraction steam supply use and heat pickup across the condensate side of the heater string. This condition should correct itself as the unit approaches 45-50% Turbine Power. (Ref: PER 99-003789-000)

B

With one LP heater string out of service (isolated), power is limited to 86% (Unit 1) or 90% (Unit 2). This is based on LP turbine blading limitations. (Ref: DCN E21203A).

#3 heater drain tank should remain drained with LCV-6-105A and B failed open (per 1, 2-SO-5-2) until reactor power exceeds ~45-50%. This will prevent intermediate heater string isolations if a turbine trip occurs at lower power levels. If a level is established in the number 3 Heater Drain Tank prior to exceeding P-9 setpoint (50% power), a turbine trip will result in Intermediate Pressure Heater string isolation(s).

SQN Unit 1 & 2	NORMAL POWE	ROPERATION	0-GO-5 Rev. 0065 Page 15 of 10	0
STARTUI .0 PREREQ	l	Unit/		Date <u>Toda</u>
		NOTES		
<i>4 '/</i>	this Instruction where a condition does not exist		t exists, the step	should be
Prerequisites	s may be completed in	any order.		
EN EN	ISURE Instruction to be	e used is a copy of et	ffective version.	POI Tocky
HZT TA	_{VG} is being maintained	within 1.5°F of T _{REF} .		Ð
	Glevel controls are beir /A if auto control NOT a	-	0	Ð
Co	ontrol rods are being ma ore Operating Limits Re / A if shutting down due	port (COLR)		f d
	eam dump control syste / A if Tavg Mode NOT a		de	Ð
	e EHC system should ushbutton lit).	be in OPER AUTO		G
	enerator pressurized wi rve. (TI-28, Fig. A.I4)	th hydrogen accordir	ng to capability	B
	RMs are being maintair adings.	ied within ±2% of cor	e thermal power	

NOTE

During start up after a cold shutdown the Condensate DI normally will be aligned for full flow polishing until the MSRs are in service.



ENSURE Condensate DI polishing operation in accordance with RCL recommendations.

MENI Seyer

L	SQN Jnit 1 & 2	NORMAL POWER OPERATIO	ON 0-GO-5 Rev. 0065 Page 16 of 1	00
4.0		TUP No/ Unit EQUISITES (continued)	(Date <u>To c</u>
	[10]	ENSURE each performer documents th	eir name and initials:	
		Print Name	Initials	
		Rorcher Openanter 1	POI	
	<i>.</i>	Restely Eperator 2	POR	
		Sr Reactor Operator	SAL	
		Shift Manuer	SAM	
		ALACTIN ENJEWEDR.	26	
		Chemistry Superviser	ab	
				¥.

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5.0 INSTRUCTIONS

CAUTION

Steps of this procedure must be performed sequentially, unless specifically stated otherwise.

NOTES

Radiation Protection should be notified during normal plant operations if power level increases or decreases are either stopped or started.

Guidance on restoration of EHC Controls after a BOP runback is contained in Appendix B, *Turbine Runback Restoration*. [C.4]

	SQN Unit 1 & 2	NORMAL POWE	ROPERATION	0-GO-5 Rev. 0065 Page 18 of 100
		° No(Unit _ /	Date Joda
.1	Power As	cension From 30% to	o 100%	
\sim	·		NOTES	
Ð	Failure to cor Violation and	mply with the NERC VA /or monetary penalties.	AR-002 requirement	s could result in a Utility
Ð	automatic trip		Manual Transfers b	any Voltage Regulator etween Auto and Manual as
3)		ssion Operator (SELD) nsfer between Auto an		or to a planned Voltage
Ð	the Narrative	hanges (Auto or Manua Log along with the dat notifications made.	al) of the Voltage Re e, time of position c	egulator shall be entered into hange, reasons, anticipated
57		main generator withour rements. Refer to GOI		control could impact gird
6)	notification be	e made to the Transmis g entries shall be made	ssion Operator (SEI	lule in GOI-6 requires that _D) within 30 minutes. late, reason & duration, and
Ð	Log entries b		ason & duration) an	ontrol requires that Narrative d that notification be made to
9)-	Confirmation reactor powe		n SHALL be obtain	ed prior to exceeding 30 %

ENSURE Section 3.0 Precautions and Limitations has been reviewed and Section 4.0, Prerequisites complete.

VERIFY from Chemistry Section that SG and feedwater secondary chemistry is within acceptable limits.

Chemistry personnel contacted

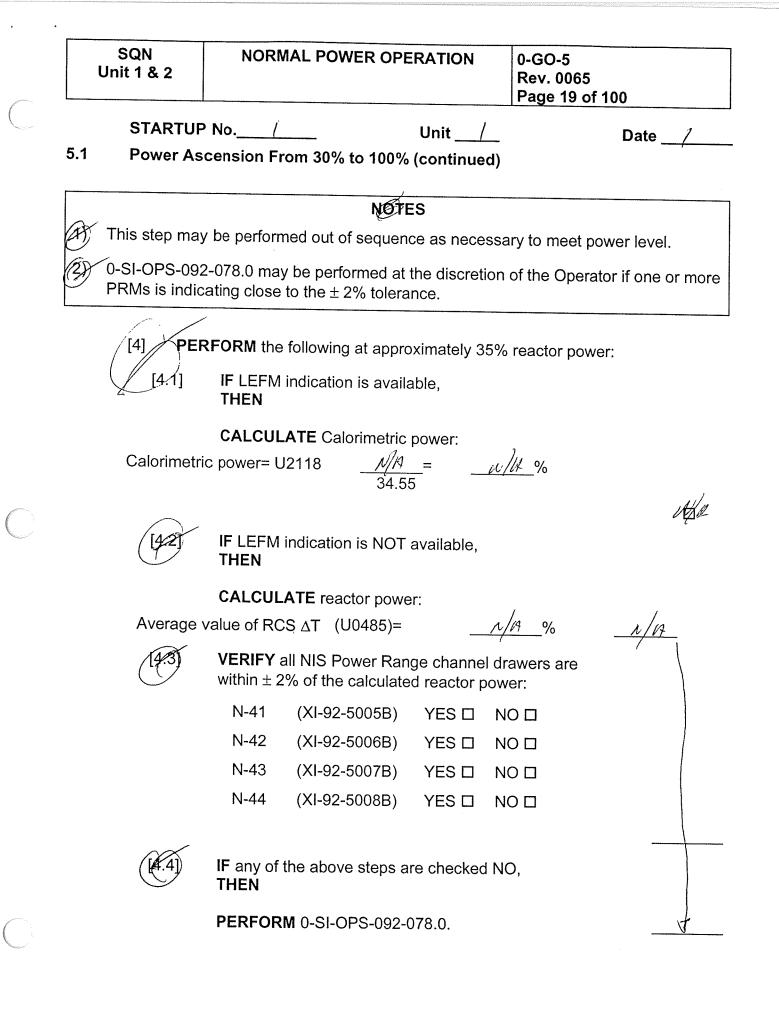


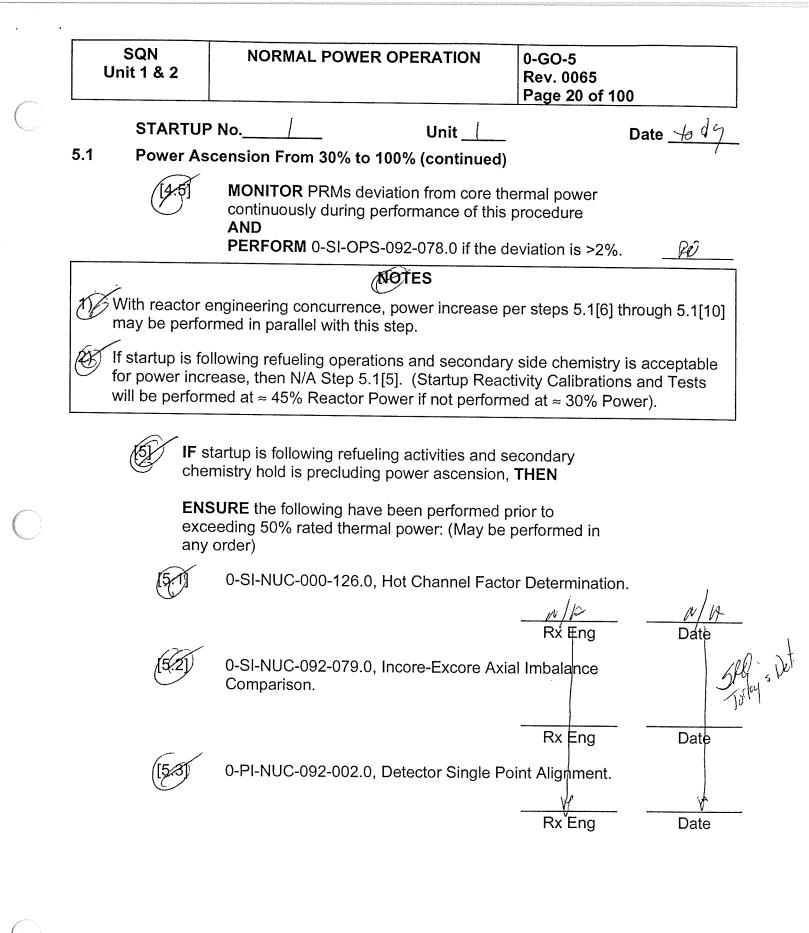
(3)

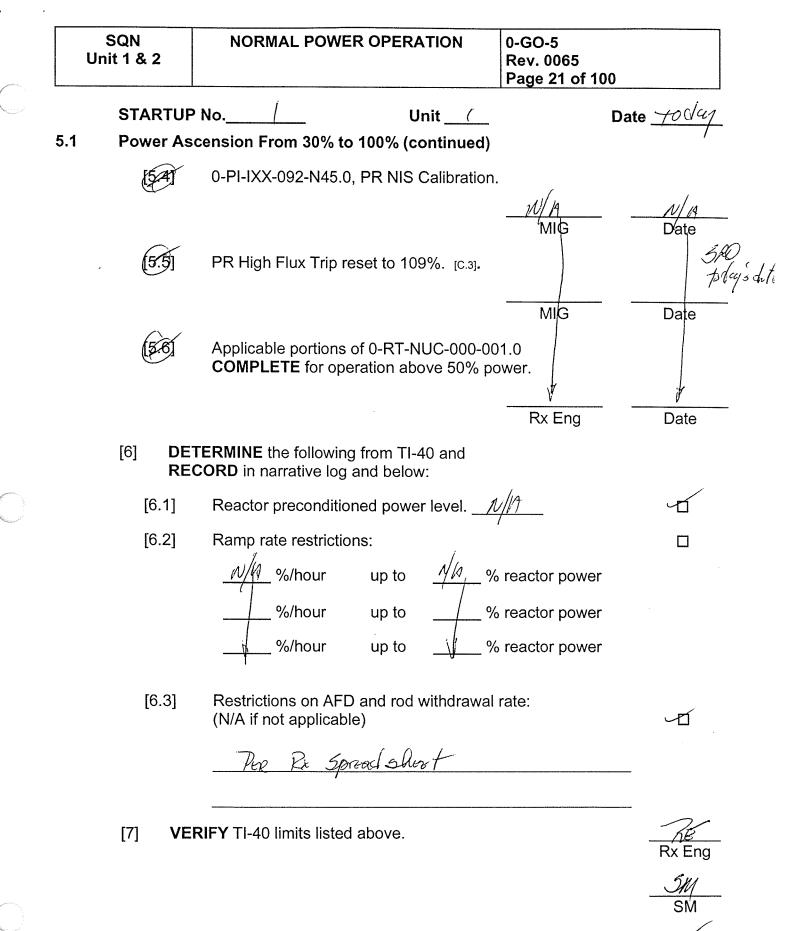
IF this is a startup following refueling, THEN

ENSURE applicable portions of 0-RT-NUC-000-001.0 are **COMPLETE** for operation above 35% power.

Rx Engr.







[8] MONITOR TI-40 limits (using ICS trend features if available).

Ø

SQN Unit 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 22 of 100
STARTU	P No/ Unit _/	Date Joda
5.1 Power A	scension From 30% to 100% (continued	, , ,
	NOTE	
Raising load on t	he Main Generator will cause VARs to tren	d in the negative direction
MVAR limits for g). This will require raising generator voltage generator stability. Refer to precautions R,	e. Refer to GOI-6 Section E for S, T, and V.
	······································	
(9) PE	RFORM the following as required:	
(Q.T)	IF Automatic Voltage Control is in servi	ce,
	THEN ADJUST Main Generator VARs USING	
	[HS-57-22] Exciter Voltage Auto Adjust	
	during power escalation.	<u> </u>
[9.2]	IF necessary to remove Automatic Volt from service,	age Control
	THEN PERFORM required steps in Appendix	Е
[19:3])	IF Automatic Voltage Control is NOT in THEN	service,
	ADJUST Main Generator VARs USING	
	[HS-57-23] Exciter Voltage Base Adjus	ter as necessary
	during power escalation.	
	NOTES	
H Steps 5.1[10] through 5.1[16] may be performed concu	rrently or out of sequence.
2) Valve positio	on limit and governor control meter are disp (-047-2000 (M-2).	
3 Actions offer	ting reactivity are directed in the following	otop 0 CO 60 7
shall be adh	cting reactivity are directed in the following ered to for reactivity changes (i.e. reactivity	balance, amounts of boric acid
or water). A	Il appropriate verifications and peer checks	shall be utilized during

performance.

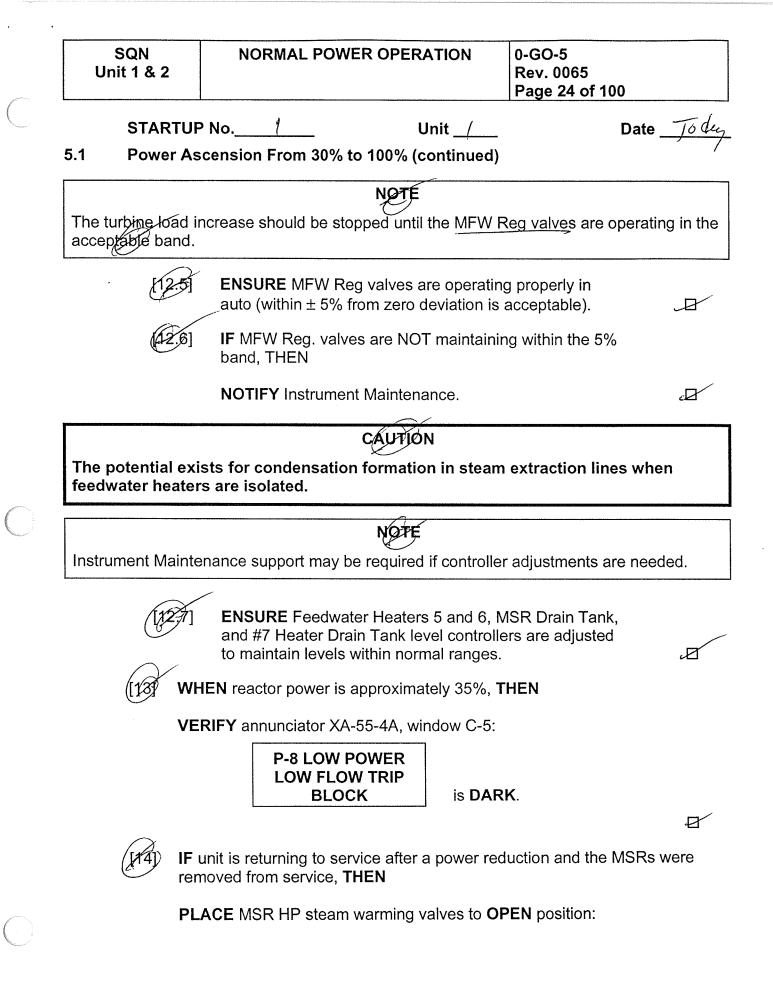
(JO)

INITIATE power increase to between 45 and 49% and

MAINTAIN valve position limit approximately 10% above current governor control indication as turbine load is changed.

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l	SQN Jnit 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 23 of 100
	STARTUP	• No/ Unit _/	Date
5.1	Power As	cension From 30% to 100% (continued)	
		NOTE	
Con AFD	tr <u>ol rods m</u> ay within the tar	be used along with dilution during reactor p get control band.	power increase to maintain
	IF c	liluting the RCS to increase T_{AVG} , THEN	
		NTINUE dilution and increase turbine load T _{AVG} .(0-SO-62-7)	to maintain T _{REF}
	F2 PEI	RFORM the following during power increas	se:
		NOTE	
T _{AVG} 0.31	s will be progra 2°F per % poໂ	ammed from 547°F at no load to 578.2°F a wer.	t 100% load at a rate of
	(12.1)	MONITOR TAVG following TREF on prog	gram. 🗹
	[12.2]	MONITOR pressurizer level on program (25 to 60% as a function of T_{AVG}).	
		NOTE	
IS N	EFM is availab OT available, ΔT when less	le, computer point U2118 should be used a use U1118 when greater than or equal to 4 s than 40%.	as true reactor power. If LEFN 40% and the average value of
	[12:3]	MONITOR all RPIs, group step counters limits and inoperable rods or rod misalig and NIS for correct power distribution a power tilts.	gnment, Loop ∆T,
		NQTÉ	<u></u>
appi		arm value of 50%. Refer to <u>GOI-6 Secti</u> on	
L	[12.4]	MONITOR generator conditions in acco 0-SO-35-4, Monitoring Generator Parar	



SQN Unit 1 & 2

0-GO-5 Rev. 0065 Page 25 of 100

STARTUP No.

Unit

Date 10 day

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5.1

Power Ascension From 30% to 100% (continued)

MSR	HANDSWITCH	WARMING VALVE	INITIALS
A1	HS-1-142	FCV-1-142	<u></u>
· B1	HS-1-144	FCV-1-144	<u></u>
C1	HS-1-146	FCV-1-146	<u> /u/ /un</u> 1st CV
A2	H8-1-136	FCV-1-136	<u></u>
B2	(HS-1-138	FCV-1-138	<u></u>
C2	HS-1-140	FCV-1-140	<u></u>

NOTE

#3 heater drain tank should remain drained with LCV-6-105A and B full open until reactor power exceeds ~45-50%.

> ENSURE #7 heater drain tank is on recirc in accordance with 1,2-SO-5-3.

ENSURE the remaining available pumps are aligned and ready for service in accordance with 1,2-SO-2/3-1:



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Condensate booster pumps.



Hotwell pump.

•	SQN Unit 1 & 2	NORMAL POWER OPER	RATION	0-GO-5 Rev. 0065 Page 26 of 100	
~	STARTU		Unit	Da	ate <u>To du</u>
5	5.1 Power As	cension From 30% to 100% (continued)		,
		NOTES	S		
	ensure that the acceptable b	g additional condensate pumps ne MFW Reg. valves respond c and.	in service, of correctly and	r HDT pumps in se then stabilize in the	ervice, e
	The following was previous	step may be performed out of ly performed in 0-GO-4.	sequence ar	nd may be marked	N/A if it
	140	IEN the condensate booster pu) amps, THEN ART the following pumps in acc		·	
	[17.]]	Third HW pump (if available			Paro
	[117.2]	Second CBP.			RO1
		NØTES	S		
	When placing MFW Reg. va	additional condensate pumps alves respond correctly and the	or HDT pum n stabilize in	ps in service, ensu the acceptable ba	ire that the nd.
	With approva may be defer	l from Ops Superintendent, pur red until turbine load is approxi	mping forwar	d of #7 Heater Dra if system conditior	in System s warrant
Ć	3) Steps 5.1[18]	through 5.1[23] may be perfor	med out of se	equence.	
		IEN confirmation obtained from t #7 heater drain tank chemistry			
		ART pumping forward using the ng 1,2-SO-5-3.	e #7 heater d	rain tank pumps	Rel
		INTAIN Condensate Booster F ater than or equal to 75 psig(F		pressure	'n
		INTAIN Main Feedwater Puḿp n 330 psig (PI-2-129).	suction pres	ssure greater	Ъ

SQN Unit 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 27 of 100
STARTU	P No Unit	Date <u></u>
5.1 Power As	scension From 30% to 100% (continued	
	CAUTIONS	
MSR heatup (automatic r contract 85F	b limits are restricted to 100°F per hour mode) or 50°F in a 30-minute period (ma P62-836839)	or 25°F in a 15-minute perio anual mode). (SECO limits,
<u> </u>		
2) On the LP tu	urbine inlet, do NOT exceed an instanta	neous change of 50°F or a
2) On the LP to rate of chan	urbine inlet, do NOT exceed an instanta ge of 125°F/Hr for turbine expansion co	neous change of 50°F or a onsiderations.
rate of chan For a cold s	ge of 125°F/Hr for turbine expansion co tart, the HP bundle warming valves sho	onsiderations.
rate of chan For a cold s	ge of 125°F/Hr for turbine expansion co	onsiderations.
rate of chan For a cold s	ge of 125°F/Hr for turbine expansion co tart, the HP bundle warming valves sho	onsiderations.
For a cold s 15 minutes	ge of 125°F/Hr for turbine expansion co tart, the HP bundle warming valves sho	onsiderations. ould be opened at least
For a cold s 15 minutes Placing MSR	ge of 125°F/Hr for turbine expansion co tart, the HP bundle warming valves sho before bringing the MSR in service.	onsiderations. ould be opened at least
rate of chan For a cold s 15 minutes Placing MSR Step 5.1[21]	ge of 125°F/Hr for turbine expansion co tart, the HP bundle warming valves sho before bringing the MSR in service. NOTES As in service before 35% turbine load can	onsiderations. ould be opened at least
rate of chan For a cold s 15 minutes Placing MSR Step 5.1[21]	ge of 125°F/Hr for turbine expansion co tart, the HP bundle warming valves sho before bringing the MSR in service. NOTES Rs in service before 35% turbine load can may be N/A'd if MSRs are in service.	onsiderations. ould be opened at least

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U	SQN nit 1 & 2	NO	RMAL POWE	ER OPERATION	N	0-GO-5 Rev. 0065 Page 28 of	100
	STARTUP	No		Unit _	(Date <u>to de</u>
5.1	Power As	cension	From 30% to		ued)		
	[21.2]	CLOS	E the followir	ng steam inlet le	akoff i	solation valv	/es:
		MSR	VALVE	POSITION	IN	ITIALS	
		A-1	(1-679	CLOSED	_[0	201	
			(17)14	CLOSED			
	-	B-1	(<i>A</i>)680	CLOSED			
		D-1	(1-7715	CLOSED			
		C-1	15681	CLOSED			
		<u> </u>	7716	CLOSED			
		A-2	1-682	CLOSED			
			12717	CLOSED			
		B-2	6683	CLOSED			
			1718	CLOSED			
	•	C-2	4-684	CLOSED			
		0-2	0719	CLOSED		Ą.	

NOTE

Due to interlocks on MSR valves, bypass valves must be opened prior to main isol valves. For example: Open FCV-1-241 and when full open, then open FCV-1-141.

[21:3] **ENSURE** MSR HP steam supplies ALIGNED as follows:

MSR	EQUIPMENT	HANDSWITCH	POSITION	√
R	MSR BYPASS ISOL	HS-1-241A	OPEN	Ŀ
(e)	MSR MAIN ISOL	HS-1-141A	OPEN	,Ð
BA	MSR BYPASS ISOL	HS-1-243A	OPEN	Ø
Cer	MSR MAIN ISOL	HS-1-143A	OPEN	Ø
R	MSR BYPASS ISOL	HS-1-245A	OPEN	لک ل
er	MSR MAIN ISOL	HS-1-145A	OPEN	Æ
(NG)	MSR BYPASS ISOL	HS-1-235A	OPEN	Ð
(Je	MSR MAIN ISOL	HS-1-135A	OPEN	æ
67	MSR BYPASS ISOL	HS-1-237A	OPEN	Ð
64	MSR MAIN ISOL	HS-1-137A	OPEN	Ð
62	MSR BYPASS ISOL	HS-1-239A	OPEN	Ъ
(the	MSR MAIN ISOL	HS-1-139A	OPEN	Ð

	SQN Unit 1 & 2	NORMAL POWER	ROPERATION	0-GO-5 Rev. 0065 Page 29 of 10	0
5.1		UP No Ascension From 30% to	Unit		Date <u>78 (</u>
	Control		NOTES		
Ø	Control va	lves ramp open for 120 mi	nutes for turbine co	ld start.	
Ž)	MSR Cont	rol valves ramp open from outton was previously depr	the 400°F position	to full open in or	he hour when
					4 01 0-GO-1
	27.	[4] DEPRESS the RAMI separator reheater co the reheater.			ß
	12 T.	[5] IF MSR controls will THEN PERFORM the follow		MP mode,	
		MAA. DEPRESS MAN on MSR control	IUAL pushbutton panel.		NA
		B. ADJUST manual MSR TCVs over continuing in thi	al potentiometer to r approx. 120 minut s procedure.	gradually open tes WHILE	N/14
	EF.	[6] OPEN all MSR OPE (6-3 thru 6-93) on pa			[CÉ)
	P.	 CLOSE all MSR STA (6-1 thru 6-91) on pa 			_Pel
	(P)	8] PERFORM App. C to	o locally isolate MS	R startup vents.	Kal
	27	9] ENSURE MSR HP s	team warming valv	es are CLOSED	:
	MSR	EQUIPMENT	HANDSWITCH	POSITION	\checkmark
	A	MSR WARMING LINE	HS-1-142	CLOSED	Ł
	E	MSR WARMING LINE	HS-1-144	CLOSED	Æ
	Ø	MSR WARMING LINE	HS-1-146	CLOSED	Ø
	Ø	MSR WARMING LINE	HS-1-136	CLOSED	Ø
	<u>B</u>	MSR WARMING LINE	HS-1-138	CLOSED	<u> </u>
	62	MSR WARMING LINE	HS-1-140	CLOSED	E E

U	SQN nit 1 & 2	NORMAL POWE	ROPERATION	0-GO-5 Rev. 0065 Page 30 of 100	
	STARTUF	P No/	Unit/	. 1	Date <u>To du</u>
5.1	Power As	cension From 30% to	o 100% (continued)	/
	[2[-10]	IF this power ascen 1 through March 31	sion is during the m , THEN	onths of October	
		REFER to 0-PI-OPS Engineer for positio		-	N/A
	[20.11]	IF this power ascer through September		nonths of April 1	
		OPEN MSR doghou	ises' vent dampers		CO.
		0		•	
			MOTE		
		uments PI-5-87A for #7 shell side pressure.	NOTE		ay be used to
	mine heater	uments PI-5-87A for #7	heater and PI-5-84	IA for #6 heater ma	ay be used to
	rmine heater	uments PI-5-87A for #7 shell side pressure. #7 heater drain tank (H	DT) pressure is ind HEN	IA for #6 heater ma	ay be used to
	mine heater	uments PI-5-87A for #7 shell side pressure. #7 heater drain tank (H erpressure condition, T RFORM 1,2-SO-5-3, S	DT) pressure is ind HEN Section 8.0, Infreque surization.	IA for #6 heater ma	ay be used to
	mine heater	uments PI-5-87A for #7 shell side pressure. #7 heater drain tank (Herpressure condition, T RFORM 1,2-SO-5-3, Sevent #7 HDT overpres	A heater and PI-5-84 IDT) pressure is ind HEN Section 8.0, Infreque surization. % turbine load:	A for #6 heater ma icating an ent Operation to	ay be used to
	Timine heater	uments PI-5-87A for #7 shell side pressure. #7 heater drain tank (Herpressure condition, T RFORM 1,2-SO-5-3, Sevent #7 HDT overpres	DT) pressure is ind HEN Section 8.0, Infreque surization. % turbine load: or XA-55-4A, window	A for #6 heater ma icating an ent Operation to w E-7:	ay be used to

CLOSE the drains on the operating main feedwater pump turbine (N/A other pump).

MFPT	DESCRIPTION	HANDSWITCH	POSITION	INITIALS
А	DRAIN VALVES	HS-46-14	CLOSED	
В	DRAIN VALVES	HS-46-41	CLOSED	

[23.2]

	SQN Unit 1 & 2		NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 31 of 100
	STARTUF	• No. <u>.</u>	Unit	Date
5.1	Power As	cens	ion From 30% to 100% (continued)	
			NOTES	
1)	or 65% (Unit	servı 2). L	val from the Operations Superintender ce may be deferred until power is app ogic prevents opening the standby MF reset prior to exceeding 9 million lbs/	roximately 55% (Unit 1) PT condenser isolation valve
2)	LCO 3.3.2.1 (allows one ch	3.3.2 ianne) functional unit 6.f (AFW start function I to be inoperable in Mode 1 for up to second MFPT.	o for the trip of both MFPT)
	[24] WH	EN a	pproximately 40 to 45% turbine load,	THEN
			second MFPT in service by performing	
	[24.1]	IF	the Operations Superintendent has ap P operation during the power ascens	proved one
		Α.	RECORD which MFPT is in service MFPT	
		В.	MONITOR loading of the MFP in se increased.	rvice as load is □
	[24.2]	Wł	HEN second MFPT is to be placed in s	service, THEN
			ACE second MFPT in service in acco -SO-2/3-1.	rdance with □
			NOTE	
This	s step and indiv	vidual	substeps may be performed out of se	equence.
	[25] PE F	RFOR	M the following as system parameters	s permit:

[25.2] VERIFY two (2) Condensate booster pumps running.

[25.3] **VERIFY** MFW pump(s) in service (only 1 required if approved by Operations Superintendent).

SQN Unit 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 32 of 100
OTADTUS		

STARTUP No._____ Unit ____

- 5.1 Power Ascension From 30% to 100% (continued)
 - [25.4] **VERIFY** one (1) #7 Heater Drain Tank pump in service.
 - [25.5] **ENSURE** one gland steam exhauster running and one stopped in AUTO position:

EXHAUSTER	HANDSWITCH	(√)	(√)
Α	HS-47-209A	AUTO 🗆	START 🗆
B	HS-47-209B	AUTO 🗆	START 🗆

[25.6] **IF** gland seal water is being supplied from opposite unit, **THEN**

RESTORE normal gland seal water alignment (supplied from this unit) in accordance with 1,2-SO-37-1, Gland Seal Water System.

NOTE

Steps 5.1[26] through 5.1[31] may be performed out of sequence.

[26] **IF** the second #7 heater drain tank pump has not been started, **THEN**

START the second #7 heater drain tank pump in accordance with 1,2-SO-5-3.

NOTE

Hydrogen pressure should be maintained greater than or equal to 66 psig.

- [27] **ENSURE** generator hydrogen pressure is sufficient for anticipated load in accordance with TI-28, Figure A.14, Generator Capability Curve.
- [28] **VERIFY** river water temperature within the limitations of the NPDES permit as specified in 0-PI-OPS-000-666.0.

U	SQN nit 1 & 2	2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 33 of 10	0
5.1			P No Unit cension From 30% to 100% (continued)		Date
Γ		Cultura în g a	CAUTION	7. 20. 4. T. W. M.	
high	er powe	r lev	perations, NIS indications may be inaccu els. DO NOT increase power greater that applicable portions of 0-RT-NUC-000-00	an 50% until Rx	Engineer
	[29]	for TH	applicable portions of 0-RT-NUC-000-001.0 power increase above 50% of rated therma EN A the following Step 5.1[30]. (Reactor Engin	al power,	
	[30]	EN	startup is following refueling activities, THE SURE the following performed prior to exce rmal power: (may be performed in any orde	eding 50%	
		A.	0-SI-NUC-000-126.0, Hot Channel Factor	r Determination.	
				Rx Eng	D
		В.	0-SI-NUC-092-079.0, Incore-Excore Axia Comparison.	I Imbalance	
				Rx Eng	D
		C.	0-PI-NUC-092-002.0, Detector Single Poi	int Alignment.	
				Rx Eng	D
		D.	0-PI-IXX-092-N45.0, PR NIS Calibration.		
				MIG	D
		E.	PR High Flux Trip reset to 109%. [C.3].		
				MIG	Da
		F.	Applicable portions of 0-RT-NUC-000-00 for operation above 50% power.	1.0 COMPLETE	

SQN Unit 1 & 2		NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 34 of 100	
	STARTUP	No Unit	ate	
5.1	Power As	cension From 30% to 100% (continued)	
	[31] WH	EN reactor power is approximately 49%,	THEN	
	PEF	RFORM the following: (in any order).		
	[31.1]	ENSURE indicated Axial Flux Difference limits specified in the COLR (TS 3.2.1.		
	[31.2]	PERFORM a conditional 0-SI-NUC-00 <i>Flux Difference</i> .	0-044.0, <i>Axial</i>	
		NOTE		
QPTF C-3, a	R alarms pertand D-4. Ala	ain to the plant computer and annunciato rms may sporadically occur at 1.5% wher	r panel AR-M4-B, wir a the setpoint is 2%.	ndows B-3,
	[31.3]	PERFORM a conditional 0-SI-NUC-00 <i>Power Tilt Ratio</i> .	0-133.0, Quadrant	
	[31.4]	IF QPTR exceeds 1.015,		
		THEN CONTACT Reactor Engineering for ev	aluation.	
			aluation.	
		CONTACT Reactor Engineering for ev		
	REC	CONTACT Reactor Engineering for ev TERMINE the following from TI-40 and CORD in narrative log and below:		
	[32.1]	CONTACT Reactor Engineering for ev TERMINE the following from TI-40 and CORD in narrative log and below: Reactor preconditioned power level Ramp rate restrictions:		
	[32.1]	CONTACT Reactor Engineering for ev TERMINE the following from TI-40 and CORD in narrative log and below: Reactor preconditioned power level Ramp rate restrictions:	% reactor power	
	[32.1]	CONTACT Reactor Engineering for ever TERMINE the following from TI-40 and CORD in narrative log and below: Reactor preconditioned power level Ramp rate restrictions: %/hour up to	% reactor power	

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SQN Unit 1 & 2		2	NORMAL POWER OPERATION		0-GO-5 Rev. 0065 Page 35 of 100	
	STA	RTUP	No	Unit	Dat	te
5.1	Powe	er As	cension From 30% to 100%	(continued)		
	[33]	VEF	RIFY TI-40 limits listed above.			
						Rx Eng
						SM
	[34]	COI	NTINUE reactor power ascen	sion to 74%.		
			NOT			·····
Cont AFD	rol rods within th	may t ie tarę	be used along with dilution du get control band.	ing reactor p	oower increase to ma	aintain
	[35]	IF d	iluting the RCS to increase T	.∨G, THEN		
		COI with	NTINUE dilution and increase T _{AVG} . (0-SO-62-7)	turbine load	to maintain T _{REF}	
			NOT			
Valve pane	e positio I 1,2-XX	n limit -047-	and governor control meter a 2000 (M-2).	re displayed	on EHC Display	
	[36]	MO	NITOR the turbine load increa	sing and		

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MAINTAIN valve position limit approximately 10% above current governor control indication as turbine load is changed. □

U	SQN nit 1 & 2	NORMAL POWER OPER	RATION	0-GO-5 Rev. 0065 Page 36 of 100	
	STARTUP	No	Unit	Date	
5.1	Power Ase	cension From 30% to 100% (continued)		
	<u> </u>	NOTE			en angeleter
Step	s 5.1[37] throu	ugh 5.1[40] may be performed	out of seque	ence.	
	[37.1]	VERIFY annunciator XA-55 P-9 LOW POWER TURB TRIP-REAC TRIP BLOCK	4A, window is DAR		
	[0 7 0]	PLACE #3 Heater Drain Ta	nk Pumps or	n recirc	
	[37.2]	USING 1, 2-SO-5-2, No. 3 F Pumps.	leater Drain	Tank and	
	[37.2]	USING 1, 2-SO-5-2, No. 3 H			
		USING 1, 2-SO-5-2, No. 3 H Pumps.		B-3:	

[37.4] **VERIFY** annunciator XA-55-4B, window C-3:

NIS POWER RANGE
LOWER DETECTOR
HI FLUX DEVN OR
AUTO DEFEAT

is DARK.

[37.5] **VERIFY** annunciator XA-55-4B, window D-4:

COMPUTER ALARM ROD DEV & SEQ	
NIS PWR RANGE	I
TILTS	
	L

is DARK.

[37.6] **U2 ONLY: ENSURE** MFW Bypass valves in MANUAL and CLOSED.

1	SQN Unit 1 & 2		NORMAL POW	ER OPERATION	0-GO-5 Rev. 0065 Page 37 of 100	
	STAF	TUP	No	Unit	Da	ite
5.1	Powe	r Aso	cension From 30% (to 100% (continued	(k	
				CAUTION		
Valves pump s	106A tart.	and	106B shall be verifi	ed to be controllin	g properly after eacl	າ #3 HDT
-	[38]		EN confirmation obta			
	[38	3.1]	START pumping for tank pumps using	orward using two (2 1, 2-SO-5-2.) #3 heater drain	
	[38	3.2]	IF pumping forward	d with #3 HDT, THE	N	
			ENSURE 1,2-LCV- heater drain tank le	-6-106A and B are r evel.	maintaining #3	
	[39]	ENS vacu	URE MFPTC vacuu uum) using PI-2-331/	m normal (greater tl A and PI-2-331B on	nan 20 inches HG Panel L-69.	

NOTE

During power operation above 50%, condenser air inleakage should be maintained less than 6 CFM.

[40] IF condenser air in-leakage exceeds 15 CFM, THEN

INITIATE actions to identify the source of in-leakage and **NOTIFY** Engineering and Ops Supt or Plant Manager.

NOTES

- 1) Steps 5.1[41] through 5.1[43] may be performed out of sequence.
- 2) 0-SI-OPS-092-078.0 may be performed at the discretion of the Operator if one or more PRMs is indicating close to the \pm 2% tolerance.

[41] **PERFORM** the following at approximately 55% reactor power:

[41.1] IF LEFM indication is available, THEN

CALCULATE Calorimetric power:

Calorimetric power= U2118

34.55

%

U	SQN Init 1 & 2	NORMA	L POWER OPERAT	F	9-GO-5 Rev. 0065 Page 38 of 1	00
	STARTUP	' No	Uni	t		Date
5.1	Power As	cension Fror	n 30% to 100% (cor	itinued)		
	[41.2]	IF LEFM in	dication is NOT avai	able, THE	4	
		CALCULA	TE reactor power:			
	Calorimetr	ic power= U1	118=	••••••••••••••••••••••••••••••••••••••	_%	
			34.11			
	[41.3]	VERIFY that drawers are power.	at all operable NIS Pereception \pm 2% of the c	ower Range calculated c	e channel alorimetric	
		N-41	(XI-92-5005B)	YES 🗆	NO 🗆	
		N-42	(XI-92-5006B)	YES 🗆	NO 🗆	
		N-43	(XI-92-5007B)	YES 🗆	NO 🗆	
		N-44	(XI-92-5008B)	YES 🗆	NO 🗆	
	[41.4]	IF any of th	e above steps are ch	necked NO,	THEN	
		PERFORM	0-SI-OPS-092-078.0	J		

NOTES

- 1) More restrictive turbine load limit for Unit 1 is based on ensuring adequate MFP suction pressure to allow pumping against higher S/G pressures following S/G replacement. (Ref: DCN E21203A).
- 2) Siemens Westinghouse analysis has determined that the maximum Unit Two unit power with 1 MFP operation is 65% under worst case conditions. Operation at higher power levels are dependent on current conditions. This would require System Engineering evaluation.(Ref: DCN D21732A).
 - [42] **ENSURE** second MFPT is in service <u>PRIOR TO</u> increasing turbine load above 55% (Unit 1) or 65% (Unit 2).

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STARTUP No.____

Unit

5.1 Power Ascension From 30% to 100% (continued)

CAUTION

#3 and #7 heater drains must be pumping forward prior to exceeding 60% turbine load. This load limit assumes that both MFW pumps are in service. If only one MFWP is running, turbine load must be further limited to maintain adequate MFWP suction pressure.

- [43] **PERFORM** the following <u>PRIOR TO</u> increasing turbine load above 60%.
 - [43.1] **ENSURE** #3 Heater Drain Tank pumping forward **USING** 1, 2-SO-5-2.
 - [43.2] **ENSURE** #7 Heater Drain Tank pumping forward **USING** 1, 2-SO-5-3.
- [44] **ENSURE** at least one bus duct cooler is in service **USING** 0-SO-58-1 <u>PRIOR TO</u> increasing load above 729 MWe.

NOTES

- 1) TI-40 ramp rate restrictions are recorded in Step 5.1[32].
- 2) The following step may be marked N/A if intermediate power threshold is NOT applicable.
 - [45] **WHEN** Reactor Power approaches the Intermediate Power Threshold for the respective unit, **THEN**

ENSURE Reactor Power ramp rate target is **ESTABLISHED** at 2% / hr.

Intermediate Power Threshold value

SQN	NORMAL POWER OPERATION	0-GO-5
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STARTUP No.____

Unit

5.1 Power Ascension From 30% to 100% (continued)

CAUTIONS

- 1) Valves 106A and 106B shall be verified to be operating properly after each #3 HDT pump start.
- 2) At approximately 79% turbine load with LCV-6-105A or B open and only two #3 HDT pumps are in service, the available NPSH for the MFP will be insufficient.

NOTES

- 1) When placing HDT pumps in service, ensure main feedwater pumps and main regulater valves respond correctly and then stabilize in an acceptable band.
- 2) LCV-6-105A will come open at about 70% turbine load if condensate discharge pressure is high. Minimize duration at this load to reduce wear on the valve. As load is increased to 100% condensate pressure will gradually decrease allowing the #3 HDT pumps to pump forward and the condenser bypass valve(s) to close.
- 3) Steps 5.1[46] through 5.1[49] may be performed in any order.

[46] WHEN approximately 70% turbine load, THEN

- [46.1] **PLACE** the third #3 heater drain pump in service in accordance with 1,2-SO-5-2. [C.2]
- [46.2] **ENSURE** valves LCV-6-106A and LCV-6-106B are controlling #3 heater drain tank level properly.

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Unit 1 & 2		Rev. 0065
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STARTUP No.____

Unit _____

5.1 Power Ascension From 30% to 100% (continued)

CAUTION

Evaluate starting and stopping of Condensate Demineralizer pumps using condensate pressure, MFP inlet pressure, condensate booster pump inlet pressure, and #3 and #7 HDT pump and bypass valve operation. The US/SRO may start or stop Condensate Demineralizer pumps at his discretion, but if any of the following occurs the pumps must be started:

- 1) Condensate Booster Pump suction pressure is less than 125 psig, as indicated on [PI-2-77].
- 2) Main Feedwater Pump suction pressure less than 420 psig, as indicated on [PI-2-129].
- 3) Injection Water Pump discharge pressure is less than 265 psig, as indicated by an alarm on XA-55-3B window E-1.

NOTES

- Should #7 heater drain tank pump(s) amps swing or if system pressure needs to be increased by approximately 40 psig, then Cond DI Booster pumps can be started; however, two of the three pumps must be started at the same time.
- 2) When placing condensate pumps in service, ensure MFW Reg. valves respond correctly and then stabilize in an acceptable band.
 - [47] **EVALUATE** starting two condensate demineralizer booster pumps in accordance with 1,2-SO-2/3-1 (This step can be N/A'd or signed-off at time when pumps are started).

NOTE

If starting up following refueling operations and reactivity calculations and tests were completed at \approx 30% reactor power, then reactivity calculations and tests must be performed again at \approx 75% RTP.

[48] **IF** all applicable portions of 0-RT-NUC-000-001.0 are complete for power increase above 75% of rated thermal power, **THEN**

N/A the following Step 5.1[49]. (Reactor Engineering)

SQN Unit 1 & 2		NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 42 of 100	
STARTUF	• No	Unit	_ D	ate
Power As	censi	on From 30% to 100% (continued)	
		CAUTION		
fter refueling, N vels. DO NOT •RT-NUC-000-00	increa	dications may be inaccurate until ase power above 75% until applica re complete.	calibration at high able portions of	er power
[49] IF s	startup	is following refueling, THEN		
		M the following prior to operation at performed in any order)	oove 75% power:	
[49.1]	N/A	SURE the following have been perfo A'd by Reactor Eng. and Instrument uired):		
	A.	0-SI-NUC-000-126.0, Hot Channe Determination.	l Factor	
			Rx Eng	Date
	B.	0-SI-NUC-092-079.0, Incore-Exco Imbalance Comparison.	re Axial	
			Rx Eng	Date
	C.	0-PI-NUC-092-036.0, Incore/Exco Calibration (N/A if NOT required o		
			Rx Eng	Date
	D.	0-PI-NUC-092-002.0, Detector Sir Alignment.	ngle Point	
			Rx Eng	Date

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Rx Eng

Date

	SQN Unit 1 & 2	NORMAL P	OWER OPERATION		9-5 0065 43 of 100	
	STARTUP	No	Unit		Da	ate
5.1	Power As	cension From 30	% to 100% (continued	d)		
	[49.2]	NOTIFY System check RCS Loc	ms Eng to perform 0-PI op ∆T Zeros. [C.7]	-SXX-000	0-022.2 to	
	[49.3]	ENSURE appli are complete fo	cable portions of 0-RT- or operation above 75%	NUC-000 RTP.)-001.0	
						Rx Eng
			NOTES			- 494 (martine and a state of a st
1)	0-SI-OPS-092 PRMs is indic	2-078.0 may be pe ating close to the	erformed at the discreties $\pm 2\%$ tolerance.	on of the	Operator if c	one or mor
2)	Steps 5.1[50]	and 5.1[51] may	be performed out of sec	quence.		
	[50] PEF [50.1]		ring at approximately 75 tion is available, THEN		or power:	
	[50.1]	IF LEFM indica	ing at approximately 75 tion is available, THEN Calorimetric power:		·	
	[50.1]	IF LEFM indica	tion is available, THEN		or power:	
	[50.1]	IF LEFM indica CALCULATE (ic power= U2118	tion is available, THEN Calorimetric power: =	%	·	
	[50.1] Calorimetri	IF LEFM indica CALCULATE (ic power= U2118	tion is available, THEN Calorimetric power: = 34.55 tion is NOT available, 1	%	·	
	[50.1] Calorimetri [50.2]	IF LEFM indica CALCULATE (ic power= U2118 IF LEFM indica	tion is available, THEN Calorimetric power: = 34.55 tion is NOT available, 1	%	·	
	[50.1] Calorimetri [50.2]	IF LEFM indica CALCULATE (ic power= U2118 IF LEFM indica CALCULATE r ic power= U1118 VERIFY that all	tion is available, THEN Calorimetric power: = 34.55 tion is NOT available, 1 eactor power: =	% [HEN % hannel di	□ □ rawers	
	[50.1] Calorimetri [50.2] Calorimetri	IF LEFM indica CALCULATE (ic power= U2118 IF LEFM indica CALCULATE r ic power= U1118 VERIFY that all	tion is available, THEN Calorimetric power:	% [HEN % hannel di	□ □ rawers	
	[50.1] Calorimetri [50.2] Calorimetri	IF LEFM indica CALCULATE (ic power= U2118 IF LEFM indica CALCULATE r ic power= U1118 VERIFY that all are within ± 2%	tion is available, THEN Calorimetric power: = 34.55 tion is NOT available, T eactor power: = 34.11 NIS Power Range A c of the calculated calor (XI-92-5005B)	% FHEN % hannel di imetric po	Tawers	
	[50.1] Calorimetri [50.2] Calorimetri	IF LEFM indica CALCULATE (ic power= U2118 IF LEFM indica CALCULATE r ic power= U1118 VERIFY that all are within ± 2% N-41	tion is available, THEN Calorimetric power:	% ſHEN % hannel di imetric po YES □	Tawers pwer. NO	

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	SQN Unit 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 44 of 100	
	STARTUP	No Unit	_ Date	
5.1	Power Asc	ension From 30% to 100% (continued)	
	[50.4]	IF any of the above steps are checked	NO, THEN	
		PERFORM 0-SI-OPS-092-078.0.		
2.04 Non 1.1		CAUTIONS	n an	
1)	pressure being higher than #3 HDT pump discharge pressure.			
2)				
	[51] PRIC	P to increasing turbing load above 77%		
		DR to increasing turbine load above 77%		
	ENS	URE the following:		
	[51 1]	CV-6-106A and -106B are controlling	proporty	

[51.1] LCV-6-106A and -106B are controlling properly.

[51.2] LCV-6-105A and -105B are **CLOSED**.

NOTES

1) Ramp load rate increases shall be within the limits of TI-40

2) Intermediate Power Threshold ramp rate target value of 2% / hr may apply.

[52] **RECORD** power ascension ramp rate from TI-40.

NOTES

- 1) Operation above 75% Load with only two Hotwell Pumps in service requires further evaluation.
- 2) Steps 5.1[53] through 5.1[56] may be performed out of sequence.

[53] **CONTINUE** the power ascension to 90% reactor power.

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Unit 1 & 2		Rev. 0065
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STARTUP No.

Unit _____

5.1 Power Ascension From 30% to 100% (continued)

NOTE

Control rods may be used along with dilution during reactor power increase to maintain AFD within the target control band.

[54] **IF** diluting the RCS to increase T_{AVG}, **THEN**

CONTINUE dilution and increase turbine load to maintain T_{REF} with T_{AVG} . (0-SO-62-7)

NOTE

Guidance on restoration of EHC Controls after a BOP runback via the valve position limiter is contained in Appendix B, *Turbine Runback Restoration*. [C.4]

[55] **MONITOR** the turbine load increasing and

MAINTAIN valve position limit approximately 10% above the current governor control indication as turbine load is changed.

NOTE

When the turbine impulse pressure relay number is illuminated on Panel L-262, the relay is closed and Runback circuit is armed.

[56] WHEN greater than 77% Turbine Load, THEN

VERIFY [**PIS-47-13RLY1**] light [1], 'Turbine Runback From Loss of 1 MFP' is illuminated on Panel L-262.

[57] WHEN greater than 82% Turbine Load, THEN

VERIFY the following relay lights are illuminated on Panel L-262:

- [57.1] [PIS-47-13RLY2], Turbine Runback From #3HDT.[2]
- [57.2] [PIS-47-13RLY 3], NPSH Protection VLV-6-106B closes on #3 HDT pump trip. [3]

SQN	NORMAL POWER OPERATION	0-GO-5	
Unit 1 & 2		Rev. 0065	l
		Page 46 of 100	

STARTUP No.

Unit _____

5.1 **Power Ascension From 30% to 100% (continued)**

NOTES

- 1) Reactor power can be increased greater than 90% as long as adequate MFP suction is maintained.
- 2) Steps 5.1[58] through 5.1[62] may be performed out of sequence.
 - [58] WHEN approximately 85 to 90% reactor power

OR when determined by Unit SRO (if power raised above 90%), **THEN**

ENSURE third condensate booster pump in service in accordance with 1,2-SO-2/3-1. [C.2]

NOTE

A nominal CBP suction pressure of approximately 180 psig, as indicated on [PI-2-77], will alleviate bypassing to the condenser at full power.

- [59] **IF** condensate pressure is high resulting in #3 or #7 heater drain tank bypassing to the condenser, **OR** the normal level control valves are near full open, **THEN**
 - [59.1] **THROTTLE [14-550]** to attain desired condensate pressure.
 - [59.2] **IF** unable to throttle **[14-550]**, **THEN**
 - **REFER** to 1,2-SO-5-2, Section 8.0 to adjust condensate pressure.

OR

EVALUATE removal of the condensate demineralizer booster pumps (N/A if NOT in service).

SQN Unit 1 & 2	NORMAL POV	VER OPERATION	0-GO-5 Rev. 0065 Page 47 of 10	0
STARTUP	'No	Unit	-	Date
5.1 Power As	cension From 30%	to 100% (continued)	
		NOTE		
Two Cond DI Boos	ster pumps must be	started at the same t	me.	
		ailable condensate de e system pressure ~ -		
Pump St	arted YES 🗆	NO 🗆		
[61] WH THE		s approximately 90%,		
PEI	RFORM the followin	ıg:		
[61.1]	ADJUST Power with 0-SI-OPS-09	Range instrumentatio 92-078.0.	n in accordance	
[61.2]	•	nance of 1-PI-OPS-0(-022.1, Appendix B.	00-020.1	

CAUTION

The potential exists for condensation formation in steam extraction lines when feedwater heaters are isolated.

- [61.3] **ENSURE** the following level controllers are maintaining levels within normal ranges:
 - A. Secondary plant heaters.
 - B. MSR drain tanks.

CAUTION

DO NOT exceed an average of 3455.0 MWT during an 8-hour period. [C.1]

[62] **MONITOR** NIS, ΔT and calorimetrics on plant computer (pt. U2118) while increasing reactor power.

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	SQN NORMA Unit 1 & 2			
	START	UP No	Unit	Date
5.1	Power	Ascension From 30 ^o	% to 100% (continued	(k
		<u> </u>	NOTES	
1)	Feedwater (U2118) is	venturi unfouling may not affected by ventu	y impact U1118 indica ıri unfouling.	tion. LEFM calorimetric power
2)	lf U1118 is Calorimetri	being used to monito	or reactor power due to be performed prior to e	LEFM unavailable, then exceeding 97% reactor power.
3)	Steps 5.1[6	63] through 5.1[67] m	ay be performed out or	f sequence.
	to A	o less than 50%	full power after a turbir used to monitor power,	
	F	PERFORM the followi	ng prior to exceeding §	97% power:
	[63.1	- /	ns Engineering to (X-000-022.2, Calorime ecessary.	etric Calculation,
	[63.2		licable sections of 0-Pl ater Flow Constant.(I	

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NOTES

- 1) Ramp load rate increases shall be within the limits of TI-40
- 2) Intermediate Power Threshold ramp rate target value of 2% / hr may apply.
 - [64] **RECORD** power ascension ramp rate from TI-40.
 - [65] **CONTINUE** power ascension to 100% RTP.

SQN	NORMAL POWER OPERATION	0-GO-5
Unit 1 & 2		Rev. 0065
		Page 49 of 100

STARTUP No.

Unit ____

Date ____

5.1 Power Ascension From 30% to 100% (continued)

NOTE

Control rods may be used along with dilution during reactor power increase to maintain AFD within the target control band.

[66] **IF** diluting the RCS to increase T_{AVG}, **THEN**

CONTINUE dilution and increase turbine load to maintain T_{REF} with T_{AVG} . (0-SO-62-7)

NOTE

Valve position limit and governor control meter are displayed on EHC Display panel 1,2-XX-047-2000 (M-2).

[67] MONITOR the turbine load increasing AND

MAINTAIN valve position limit approximately 10% above the current governor control indication as turbine load is changed.

NOTE

Steps 5.1[68] through 5.1[71] may be performed out of sequence.

[68] WHEN reactor power approaches 100%, THEN

ADJUST governor valve position limiter ~ 2% above governor valve position.

NOTE

Engineering recommends placing the 3rd Condensate Demineralizer Booster Pump in service when at full power. Operation of only 2 Condensate Demineralizer Booster Pumps is allowed but reduces the operating margin in the event of a condensate transient based on the lower suction pressure to the MFPs.

 [69] IF it is desired to place the 3rd condensate demineralizer booster pump in service, THEN
 START 3rd condensate demineralizer booster pump in accordance with 1,2-SO-2/3-1.

S	QI	Ν		
Unit	1	&	2	

STARTUP No.

Unit _____

Date

5.1 Power Ascension From 30% to 100% (continued)

CAUTION

Governor valve position limit meter may NOT match the governor valve position meter; therefore, monitor the megawatt meter and valve position limit light continuously during the following step.

NOTES

- 1) Operation with the VALVE POS LIMIT light LIT is acceptable if unsatisfactory load swings are experienced.
- 2) Actions effecting reactivity are directed in the following step. All appropriate verifications and peer checks shall be utilized during performance.
 - [70] **IF** unsatisfactory load swings are experienced as the unit approaches full power, **THEN**
 - [70.1] WITH turbine load set for maximum of 100% power, SLOWLY and CAUTIOUSLY PULSE the governor VALVE POSITION LIMIT in LOWER direction while monitoring megawatts for a decrease and VALVE POS LIMIT light to ILLUMINATE.
 - [70.2] WHEN the limiter just reaches the governor valve position, THEN

STOP limiter adjustment.

SQN Unit 1 & 2	NORMAL POWER OPERATION	

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STARTUP No.

Unit_

Power Ascension From 30% to 100% (continued) 5.1

CAUTION

Do not raise the limiter position unless the turbine control is positively controlling the turbine (limit light NOT LIT).

NOTE

Actions effecting reactivity are directed in the following step. All appropriate verifications and peer checks shall be utilized during performance.

- **PERFORM** the following if the limiter prevents reactor [71] operation at approximately 100%:
 - ADJUST SETTER/REFERENCE controls to reduce [71.1] turbine loading until the VALVE POS LIMIT light is NOT LIT.
 - [71.2] **INCREASE VALVE POSITION LIMIT to allow a load** increase using the SETTER/REFERENCE controls, NOT to exceed 3455.00 MWT.

SQN Unit 1 & 2				0-GO-5 Rev. 0065 Page 52 of 100			
	STARTUP	9 No	Unit	_ Date			
5.1	Power As	cension From 30% t	to 100% (continued)			
		·····	NOTES				
1)	Full power op instantaneous 8-hour period	s value, U2118 not to	100% power operati exceed 3455.00 MV	on at approximately 3455 MW_T V_T average thermal power in an			
2)	Do not intentionally operate the reactor at greater than 100% power (e.g., if reactor power is less than 100% for any time period then operation at slightly greater than 100% to "make up" for "lost" power is not permissible). [C.1]						
3)	and monitored	d for increasing reactor to decrease reactor	or power trends abo	ecorder in the unit horseshoe ve 3455 MW⊤. Prompt action increasing power trend is			
	Do not exceed	d an 8-hour average v	value (U2126) of 34	55.00 MW⊤. Do not allow U2125			
4)	(one hour avg	1) to exceed 3455.00	MW_T (100%) for mo	re than one hour. [C.1]			

PERFORM the following: (may be performed in any order)

[72.1]	ADJUST Governor Valve position, rod height, and/or RCS boron concentration as necessary to establish core thermal power at desired value and Auctioneered Hi T-avg approximately equal to T-ref.	
[72.2]	NOTIFY load coordinator that the power increase is complete.	
[72.3]	NOTIFY Radiation Protection that power has stabilized at 100%.	
	(step continued on next page)	

SQN Unit 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 53 of 100
STARTUP	• No Unit	Date
5.1 Power As	cension From 30% to 100% (continued	
	NOTE	
Use of seal steam unit trip on seal st	spillover bypass FCV-47-191 should be r eam pressure.	ninimized to reduce the effect of
[72.4]	IF Seal Steam spillover bypass [FCV-4 SERVICE, THEN	<u>7-191]</u> is IN
	THROTTLE Seal Steam spillover bypa [FCV-47-191] as required to control se pressure.	ss to control al steam □
[72.5]	IF river temperature is less than 45°F, ⁻	ſHEN
	CONSULT Engineering to determine if should be removed from service.	third CCW pump □
[72.6]	CONTACT vibration engineer in Predic Group to monitor MFWP vibration.	tive Maintenance □
	CAUTION	an a

A bias adjustment in the upward direction (> 50% , Unit 1)(> +0, Unit 2) should NOT be used unless evaluated by Systems Engineering since this could impact a MFPT's maximum speed and the ability to fully load in the event the other MFPT trips.

[72.7]	IF feed pump vibration is above desired levels, THEN CONSULT with vibration engineer and system engineer to determine which feed pump to bias to reduce vibration.	
[72.8]	IF MFPT master controller output is NOT indicating 45% to 55% THEN CONSULT with MFPT controls system engineer to evaluate if adjustment is required per 1,2-SO-2/3-1.	

14a	U	SQN nit 1 & 2	1	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 54 of 100	
3.4		STARTUP	No	Unit	C	Date
	5.1	Power As	censi	on From 30% to 100% (continued)		
		[72.9]	TH DE	start up on Unit 2, EN TERMINE if CBP seal backpressure r ustment:	requires	
		. [72.	9.1]	NOTIFY Systems Engineering (BOF if adjustments are required on back valve 2-VLV-54-689.		
		[72.	9.2]	IF System Engineer determines adju of 2-VLV-54-689 is needed, THEN ADJUST [<u>2-VLV-54-689]</u> as require		

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U	SQN nit 1 & 2	NORMAL P	OWER OPERATION	0-GO-5 Rev. 0065 Page 55 of 10	D
	STARTUP	P No	Unit		Date
5.1	Power As	cension From 30	0% to 100% (continued		
	[73] IF s	startup is following	refueling activities, THE	EN	
	EN Rat	SURE the followir ed Thermal Powe	ng are performed at appr er: (may be performed in	oximately 100% any order)	
	. [73.1]	0-PI-SXX-000-	022.2, Calorimetric Calc	ulation.	
					Systems Eng
	[73.2]	0-PI-SXX-000-(022.1, Delta T and Tavg	Update. [C.7]	Curtan E
	[73.3]	0-SI-NUC-000-	126.0, Hot Channel Fac	tor Determination.	Systems Eng
				Rx Eng	Date
	[73.4]	0-SI-NUC-000-	120.0, Reactivity Balanc	e.	
				Rx Eng	Date
	[73.5]	0-SI-NUC-092-0 Comparison.	079.0, Incore-Excore Ax	ial Imbalance	
				Rx Eng	Date
	[73.6]	0-PI-NUC-092-(Calibration.	036.0, Incore-Excore De	tector	
				Rx Eng	Date
	[73.7]	(May be N/A'd i	45.0, PR NIS Calibration f Engineering determine: 75% RTP is adequate.)	n s calibration	
					Inst Maint
	[73.8]	Applicable portion complete for full	ons of 0-RT-NUC-000-00 power operations.	01.0 are	
					Rx Engr

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	SQN Unit 1 & 2	NORMAL POWER OPER	RATION	0-GO-5 Rev. 0065 Page 57 of 100
	STARTU	P No	Unit	Date
5.2	At Power	Conditions		
		CAUTIO	NS	a a succession in the product limiting of the construction of the succession of the
1)	Full power o 3455.0 MWT	peration is defined as approx averaged over an 8-hour per	ximately 345 iod. [C.1]	5 MWT NOT to exceed
2)	Power shall	NOT exceed one hour average	ge (U2125) o	f 3455.00 MWT.
3)	Power shall (readings at	NOT exceed an 8-hour avera 0700, 1500 and 2300 hours).	ge value (U2	2126) of 3455.00 MWT
		NOTE	S	
1)	Failure to con Utility Violation	mply with the following NERC \ on and/or monetary penalties.	/AR-002 requ	uirements could result in a
2)	to Manual or	ission Operator shall be notified urgent Manual Transfers betwe minutes [C.8]	d of any Volta een Auto and	age Regulator automatic trips I Manual as soon as practical,
3)		ssion Operator shall be notified een Auto and Manual.	prior to a pla	anned Voltage Regulator
4)	the Narrative	hanges (Auto or Manual) of the Log along with the date, time of I notifications made.	Voltage Reg of position ch	gulator shall be entered into ange, reasons, anticipated
5)		main generator without automa rements. Refer to GOI 6 for M\		ontrol could impact gird
6)	notification b	tor operation outside of the Vole e made to the Transmission Op hall be made that include time,	perator (SELI	D) within 30 minutes. Narrative
7)	Log entries b	tor operation without Automation we made (time, date, reason & c Duty Specialist (ODS) within 30	duration) and	
8)	Steps in this	section may be performed out	of sequence.	

[2] **TREND** Computer point U2118 on a trend recorder in the unit horseshoe and monitor for increasing reactor power trends above 3455 MW_T.

Appendix	D		Scenario Outline			Attachment 1	
Facility: Examiners:	Sequoyah		Scenario No.: Operators:	2	Op Test No.:	2012302	
Initial Condit	ions: 100%	stable					
Turnover:	0-GO-5 Sect	tion 5.2, 'At Pov	wer Conditions' is in effect				
Target CTs	Manually act	uate at least th	e transition out of E-2 (Time Crit e minimum complement of conta le develops to the containment C	inm		,	
Event No.	Malf. No.	Event Type*	Ev				
1. T+0	RW02A	C – BOP	A RCW Pp Trip w/ EHC Fluid 1	anl	k Temp Abnorma	l (High)	
2. T+10	CV09	I – RO	VCT Level Transmitter 62-130-	A F	ails High		
3. T+25	RX26G	I – BOP TS – SRO	#4 SG Press Ch 1 PT-1-27A Fails Low				
4. T+35	AN_OV_179 ZDIHS255A ZDIHS245A	R – RO N – Crew	LP FW Htr String Isolation (Fat	ılty	High Level Switcl	n)	
5. T+20	SI11C	TS – SRO	RWST Level Channel LT-63-52	2 Fa	ils Low (Tech Sp	ec only)	
6. T+55	CV04	C – RO N – Crew	CVCS Leak in Aux Building (or	Le	tdown line; 90 gp	m)	
7. T+70	MS01B	M – All	#2 Main Steam Line Break Insi	de (Containment		
8. T+70	CS02A RP16K644B [pre-insert]	C – RO	1A Containment Spray Pump S Containment Spray Pump 1B-E			to Open Fails	
* (N)o	rmal, (R)eactivity,	(I)nstrument,	(C)omponent, (M)ajor				

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Appendix D

Scenario 2 Summary

The crew assumes shift with the unit at 100% RTP, all systems' controls normal and in automatic as expected. 0-GO-5 Section 5.2, 'At Power Conditions' is in effect. Crew directions are to maintain 100% RTP.

Following completion of crew turnover and at the direction of the Lead Examiner, initiates 'A' RCW Pp Trip w/ EHC Fluid Tank Temp Abnormal (High). The crew will respond using alarm response procedure (ARP) 1 AR-M2-A B-2, 1-AR-M15-A B-7 that will direct the crew to AOP-M.05, Loss of Raw Cooling Water.

When the plant is stable, at Lead Examiner direction, initiate the next event, VCT Level Transmitter 62-130-A Fails High. The crew will respond using ARP 1-AR-M6-C A-3, which directs the actions for this failure including 1-SO-62-1 for manual make-up and VCT Divert Valve 1-LCV-62-118 control.

At Lead Examiner direction, initiate the next event, #4 SG Ch 1 PT-1-27A Fails Low The crew will respond using ARPs 1-AR-M6-B, D-2, D-3, D-7 directing entry into AOP-I.06, Steam Generator Instrument Malfunction, Section 2.1 for the instrument failure. The crew may respond to 1-AR-M5-A A-7, B-7 that will direct entry into AOP-S.01, Main Feedwater Malfunctions, Section 2.1, Unit 1 Failure of Automatic S/G Level Control; which will transition to AOP-I.06; this is also an acceptable procedural path in response to the alarms and indications presented. The SRO will identify Tech Specs: 3.3.2.1 Functional Unit 4.d, Action 17, 3.3.3.7 Functional Unit 8, Action 1.

At the Lead Examiner direction, initiate the next event, LP Feedwater Heater String Isolation. The crew will respond using alarm response procedures (ARPs) 1-AR-M2-C E-1 directing entry into AOP-S.04, Condensate or Heater Drains Malfunction, Section 2.3, Feedwater Heater String Isolation. The crew is expected to perform a plant power reduction to <86% power using either 0-GO-5, Normal Power Operation or AOP-C.03, Rapid Shutdown or Load Reduction for the LP heater string isolation.

At Lead Examiner direction, initiate the next event, RWST Level Channel LT-63-52 Fails Low. The crew will respond using ARPs 1-AR-M6-E E-3, E-4 that will direct entry into AOP-I.09, RWST Level Instrument Malfunction. Tech Spec event only, no crew action expected. The SRO will identify Tech Specs: 3.3.2.1 Functional Unit 9.a, Action 18.

When the plant is stable, at Lead Examiner direction, initiate the next event, CVCS Leak in Aux Building (on Letdown line). The crew will respond using ARPs 1-AR-M5-A C-3 and/or 1-AR-M6-C A-4, B-4, C-3 directing entry into AOP-R.05, Section 2.1, RCS Leak in Mode 1-3. The leak also challenges VCT inventory; therefore, the crew may decide to trip the plant once VCT inventory is depleted. If letdown isolation occurs first, terminating the leak, the crew may place Excess Letdown in service according to 1-SO-62-6, Excess Letdown as directed by the ARP for letdown line leak; or use EA-62-3, Establishing Excess Letdown directed by the AOP.

Insert the next event at the Lead Examiner direction, #2 Main Steam Line Break inside Containment occurs resulting in the crew decision to manually trip the reactor based on increasing reactor power with automatic rod motion, decreasing MG megawatts-electric and increasing Main Steam flow. If the crew tripped due to VCT inventory loss in AOP-R.05, the Main Steam Break should be inserted at the E-0 to ES-0.1 transition. The crew will carry out the immediate operator actions (IOAs) of E-0, Reactor Trip or Safety Injection proceed to ES-0.1 and back to E-0 based on either containment pressure or RCS pressure conditions and then transition to E-2, Faulted Steam Generator Isolation.

Following the Steam Break, containment pressure conditions will meet the automatic containment spray actuation setpoint. 1A -A Containment Spray Pump start results in a sheared-shaft condition; 1B-B Containment Pump will start but its discharge valve fails to open automatically requiring recognition and manual action to place at least 1 spray train in service.

Following the Reactor Trip the crew will identify a high containment pressure condition while monitoring Critical Safety Function Status Trees and transition from procedure/step currently in effect to FR-Z.1, High Containment Pressure. The crew will proceed through FR-Z.1 return to previous procedure/step in effect.

EOP flow: E-0 – ES-0.1 – E-0 – E-2 – FR-Z.1 – E-2

Appendix D

Scenario Termination: as directed by the Lead Examiner; Completion of E-2 Step 7.e, SI Termination criteria determination.

PSA significant task: Isolate Faulted Steam Generator Isolate AFW to the faulted SG within 10 minutes after a steam line break PSA significant component failure: 1A-A Containment Spray Pump Steam line

NRC 1009 ESG-2 Booth Instruction File

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EVENT	IC/MF/RF/OR #	DESCRIPTION/EXPECTED ACTIONS/BOOTH FEEDBACK
Simulator IC MFs, RFs, ORs are active when the SCN	IC-16 Perform switch check. Allow the simulator to run for at least 3 minutes before loading SCEN file or starting the exercise. This will initialize ICS. Load SCENS: <u>1009 NRC ESG-2</u> Place simulator in RUN. Place OOS equipment in required position with tags. Clear alarms. IMF CS02A f:1	 100%, BOL ~150 MWD/MTU CB 'D' Rods @ 216 steps, all others @ 228 steps; [B] = 1120 ppm; Ba Blender setting: 27.5% Xe/Sm @ equilibrium <u>Console Operator actions: Place simulator in run</u> <u>and perform the following:</u> Allow the simulator to run before loading SCEN file. Place the MODE 1 sign on 1-M-4 Place Train Week A sign Ensure A & B RCW Pumps in service. 1A-A Containment Spray Pump Sheared Shaft
file is loaded.	IMF RP16K644B f:1	1B-B Containment Spray Pump Discharge Valve Auto Open Fails
1.	IMF RW02A f:1 k:1 IMF AN_OV_84 f:2 d:60 k:1	 A RCW Pp Trip w/ TS-47-5 ELECTRO-HYD FLUID TANK TEMP ABNORMAL Support staff report: if dispatched, wait ~3 minutes, report as TB AUO from: No apparent RCW Sys. water ruptures/leakage; 'A' RCW Pp- pump motor is hot to the touch; 480V UtBD area- A RCWP breaker open, Amptector Relay fault. Local EHC Reservoir temperature ~135°F and heaters are off. Support staff report: If dispatched, AB AUO to AB EI 734' behind the CCS Surge Tank to inspect the RCW Booster Pumps; field evaluation feedback - no problems
INTRUCTOR NOTE: delete Malf after one standby RCW Pp is started	DMF AN_OV_84 d:60	Simulates RCW system restoration. <u>Support staff report</u> : if dispatched, wait ~5 minutes, report as TB AUO that RCW system conditions are returning to normal (~110-115°F on EHC Temp.).
2.	IMF CV09 f:1 k:2	 VCT Level Transmitter 62-130-A Fails High <u>Support staff report</u>: If dispatched to the Aux Control Room, report VCT Ch LT-62-129C reading '38'% (same as MCR indicator LI-62-129); If MSS is contacted, inform the crew that I&C techs will report to the MCR in ~25 minutes.
3.	IMF RX26G f:0 r:30 k:3	#4 SG Ch 1 PressureTransmitter-1-27A Fails Low <u>Support staff report</u> : When MSS is contacted, inform the crew that I&C will report to the MCR in ~35 minutes.

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EVENT	IC/MF/RF/OR #	DESCRIPTION/EXPECTED ACTIONS/BOOTH FEEDBACK
4.	IOR AN_OV_179 f:2 k:4 IOR ZDIHS255A f:0 d:10 k:4 IOR ZDIHS245A f:0 d:10 k:4	LP FW Htr String Isolation <u>Support staff report</u> : When MSS is contacted, inform the crew that Mechanical or Electrical maintenance (whichever is requested) will report to the MCR in ~25 minutes.
5.	IMF SI11C f:0 r:30 k:5	RWST Level Channel LT-63-52 Fails Low <u>Support staff report</u> : When MSS is contacted, inform the crew that I&C will report to the MCR in ~35 minutes
6.	IMF CV04 f:18 r:300 k:6 MMF CV04 f:100 r:600	CVCS Leak in Aux Building (on Letdown line outside Containment) Support staff report: If dispatched, report as AB AUO
7.	IMF MS01B f:10 r:120 k:7	#2 Main Steam Line Break Inside Containment <u>Support staff report</u> : none
8.	IMF CS02A f:1 IMF RP16K644B f:1 [Pre-insert]	1A Containment Spray Pump Sheared Shaft Containment Spray Pump 1B-B discharge Valve Auto Open Fails <u>Support staff report</u> : none
If dispatched to perform EA-32-1:	IRF IAR01 f:1 k:18 IRF IAR02 f:1 d:10 k:18	Re-start A & B CACs
If dispatched to perform EA-32-2:	IRF IAR06 f:1 d:15 k:28 IRF IAR07 f:1 d:20 k:28 IRF IAR08 f:1 d:25 k:28	Restore Essential, Non-Essential CA to Containment, 1-FCVs-32-80, 102 and 110
Termination Criteria	: Completion of E-2 Step 7.e	e, SI Termination criteria determination

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SHIFT TURNOVER CHECKLIST

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Today

Part 1 - Completed by Off-going Shift / Reviewed by On-coming Shift								
Mode 1, 100% Power PSA Risk: Green				hone Authenticatio	n Code			
Grid Risk: Green								
RCS Leakage ID .14 gpm, UN	ID .05 gpm			Until 0800 XXXX				
				After 0800 YYYY				
	Comme	on Tech Spec Ad	ctions					
LCO/TRM	Equipment			Time INOP	<u>Owner</u>			
- none -	- none -	-	-					
	U-1 [·]	Tech Spec Actio	ons					
LCO/TRM	Equipment	LINOP		Time INOP	Owner			
- none -	- none -	•	-					
	Dro	tected Equipme	-					
	- FIO	rected Equipine	nt –					
		Shift Priorities						
 Daily and Shiftly SIs per week 								
Dent () Dent ()								
Part 2 – Performed by on-	and the second							
Verify your current qualit	fications	Review Ope	erating I	_og since last held sh	ift or 3 days,			
D ODMin / Standing Order		whichever is les	S	· · · · · · · · · · · · · · · · · · ·				
ODMIs / Standing Order	s / Shift Orders	TACFs		Immediate requi	ired reading			
LCO Actions	Integrated So	chedule		tive procedures file (\	within 1 hour of			
	Reviewed for the			ning shift)				
	only)			· ·				
PERs (applicable to this	unit)	Corrector wo	orkarour	nds, burdens, and cha	allenges			
Part 3 – Performed by both	n off-going and or	n-coming shift		n Na sana ang ang ang ang ang ang ang ang ang				
Walk down of MCR Cont								

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SHIFT TURNOVER CHECKLIST

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Today

MAIN CONTROL ROOM (7690) Train <u>A</u> Week	
	ĺ
OUTSIDE (7666) [593-5214]	
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AUXILIARY BUILDING (7775)	
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TURBINE BUILDING (7771) (593-8455)	

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SHIFT TURNOVER CHECKLIST

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Page 3. of 3

Today

PANEL	WINDOW	ANNUNCIATOR	WO / PER Numbe

Equipment Off-Normal (Pink Tags)

UNID And Noun Name	Panel	Problem Description	WO / PER Number

MCR WO LIST

ID And Noun Name	Panel	Problem Description	WO/PER Number

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Operations Chemistry Information							
		Borc	n Results				
Sample Point	Units	Boron	Date / Time	Goal	Limit		
U1 RCS	ppm	1120	Today / Now	Variable	Variable		
U2 RCS	ppm	648	Today / Now	Variable	Variable		
U1 RWST	ppm	2601	Today / Now	2550 - 2650	2500 - 2700		
U2 RWST	ppm	2569	Today / Now	2550 - 2650	2500 - 2700		
BAT A	ppm	6850	Today / Now	Variable	Variable		
BAT B	ppm	6850	Today / Now	Variable	Variable		
BAT C	ppm	6850	Today / Now	Variable	Variable		
U1 CLA #1	ppm	2556	Today / Now	2470-2630	2400-2700		
U1 CLA #2	ppm	2575	Today / Now	2470-2630	2400-2700		
U1 CLA #3	ppm	2591	Today / Now	2470-2630	2400-2700		
U1 CLA #4	ppm	2589	Today / Now	2470-2630	2400-2700		
U2 CLA #1	ppm	2531	Today / Now	2470-2630	2400-2700		
U2 CLA #2	ppm	2650	Today / Now	2470-2630	2400-2700		
U2 CLA #3	ppm	2522	Today / Now	2470-2630	2400-2700		
U2 CLA #4	ppm	2526	Today / Now	2470-2630	2400-2700		
Spent Fuel Pool	ppm	2547	Today / Now	<u>≥</u> 2050	<u>≥</u> 2000		
Li	ithium Res	ults		Goal	Midpoint		
U1 RCS Lithium	ppm	1.8	Today / Now	1.69-1.89	1.79		
U2 RCS Lithium	ppm	3.49	Today / Now	3.39-3.69	3.54		

Primary to Secondary Leakrate Information (Total CPM RM-90-99/119)									
Indicator	Units	U1	Date / Time	U2	Date/Time				
SI 50 S/G Leakage?	Yes/No	No	Today / Now	No	Today / Now				
SI 137.5 CVE Leakrate	gpd	< 0.1	Today / Now	< 0.1	Today / Now				
5 gpd leak equivalent	cpm	115	Today / Now	68	Today / Now				
15 gpd (30 min increase)	cpm	265	Today / Now	83	Today / Now				
30 gpd leak equivalent	cpm	490	Today / Now	206	Today / Now				
75 gpd leak equivalent	cpm	1165	Today / Now	455	Today / Now				
150 gpd leak equivalent	cpm	2290	Today / Now	870	Today / Now				
CVE Air Inleakage	cfm	10	Today / Now	12.5	Today / Now				
Bkgd on 99/119	cfm	40	Today / Now	40	Today / Now				
Steady state conditions	are necessary	for an accurat	e determination of leak r	ate using the CVI	E Rad Monitor				

Operations Chemistry Information

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Appendix D			Scenario	Event #1 Page1 of61 o-Start Failure w/ EHC Fluid Tank Temp Abnormal (High)	nt 1				
Op Test No.:	NRC 2010302	Scenario #	2	Event #	1	Page	1	of	61
Event Descripti	on: 1A	RCW Pp Trip, Stb	y Pump Aı	uto-Start Failure v	// EHC Fluid Tar	nk Temp Abno	ormal (High)	
Time	Position	1		Applicant's A	ctions or be	havior			
Simulator O	perator: at Lea	d Examiner di	rection,	insert Event	1				
Indications/ Annunci 1-M-1 • 1-	ators:	"MOTOR TRIPC)UT"						
Significa	5 -PI-24-22, RCW ant Resultant A			creased to ~60	-63 psig				
1-M-2 • 1- 	XA-55-2A B-2, "						ew dir	rections	sare
		to maintain 100% RTP							
	BOP								
		Diagnoses 'A	RCW P	ump trip, stand	dby RCW Pu	mp start no	t requ	ired.	
	BOP	On 1-M-15, 0	-PI-24-22	2: 70-78 psig N	Iormal RCW	Header Pre	essure) ;	
		S	ystem pr	essure will fall	to 60-63 psig	g;			
		Refers to and	impleme	ents Motor Trip	out alarm AF	RP Step 3:			
			umn is tr	inned THEN					
	BOP		•	••	iece of equip	ment or bre	eaker		
		[b] REFE	R to AOF	P-M.05, Loss o	f Raw Coolin	g Water.			
	SRO							<u> </u>	
		following:	-				to pe	rtorm	the
		b. EVAL [TB el		eed to START	additional Tu	Irbine Build	ing su	ւտք քւ	umps.

Appendix D		Scenario Outline							
Op Test No.:	NRC 2010302	Scenario #	2	Event #	1	Page	2	of	61

Event Description: 1A RCW Pp Trip, Stby Pump Auto-Start Failure w/ EHC Fluid Tank Temp Abnormal (High)

Time	Position	Applicant's Actions or behavior
		LCO 3.7.15 (for Train A MCR Chiller) and TR 3.7.14 (for Train A EBR Chiller) may apply if 0-FCV-67-205, Train A ERCW to Station Air Compressors, is open with ERCW temperature greater than 81°F.
		col chiller package operation is interlocked with raw cooling water pressure. ler packages may stop and start if pressure is oscillating.
		2. CHECK PI-24-22, RCW header pressure greater than or equal to 68 psig. (RNO required)
		RNO: PERFORM the following:
	BOP	a. START additional RCW pumps as necessary. [1-M-15]
Evaluator No	te: Following	the RCW Pump start, restoring system conditions to normal, SRO may choose
		in ERCW due to Tech Spec implications.
	BOP	b. ENSURE ERCW cooling aligned to Station Air Compressors:
		1) OPEN [0-FCV-67-208] 1B ERCW Supply Header Isolation [M-27A].
		 IF 1B ERCW Supply to Station Air Compressors is unavailable, THEN OPEN [0-FCV-67-205] 1A Supply Header Isolation
	BOP	c. DISPATCH operators to the glycol chillers and EVALUATE need for chiller(s) SHUTDOWN.
	BOP	 MONITOR control air header pressure greater than 88 psig. [0-PI-32-200, 1-M-15]
		4. MONITOR GEN STATOR TEMPERATURE HIGH alarm DARK
	BOP	[M-1A, A-1]. Annunciator Dark
	L	

Appendix D	· · · · · · · · · · · · · · · · · · ·	Scenario Outline						Attachment 1				
Op Test No.:	NRC 2010302	Scenario #	2	Event #	1	Page	3	of	61			
Event Descriptio	n: 1A F	RCW Pp Trip, Stb	y Pump A	Auto-Start Failur	re w/ EHC Fluid Tan	k Temp Abn	ormal (High)				

BOP	5. MONITOR GEN LEADS BUS CLR AIR TEMP HIGH alarm DARK [M-1B, E-2].
	Annunciator Dark
BOP/ SRO	6. MONITOR ability to maintain unit operation based on RCW capabilities. RCW Sys Capabilities restored by pump start in Step 2 RNO a.
SRO	7. SHUTDOWN equipment cooled by RCW as necessary. Determines further equipment shutdown not necessary
CREW	 MONITOR temperatures associated with the following equipment NORMAL: Determines load reduction not necessary
	P dispatched the AB AUO to AB EI 734' behind the U1 side CCS Surge Tank to e RCW Booster Pumps; field evaluation feedback - no problems
SRO	9. CHECK RCW booster pumps for PROPER OPERATION.
	 Suction pressure. Discharge pressure. No signs of cavitation. No signs of pump run out.
SRO	10. DETERMINE whether CCW pump(s) are feeding a rupture and should be stopped.
	SRO SRO CREW

Appendix D	Scenario Outline							Attachment 1		
Op Test No.:	NRC 2010302	Scenario #	2	Event #	1	Page	4	of	61	
Event Descriptic	on: 1A F	CW Pp Trip, Stb	y Pump A	Auto-Start Failure	w/ EHC Fluid Tanl	< Temp Abn	ormal (High)		

Time	Position	Applicant's Actions or behavior
	SRO	11. INITIATE repairs, and GO TO appropriate plant procedure.
Evaluator No	o te: The fo	llowing CREW Brief and Notification actions are not contained in the Jure.
		CREW Brief would typically be conducted for this event as time allows prior to the next event.
		Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.
		Operations Management - Typically Shift Manager.
		<u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Lead Examin returns to no		ext event when the CREW has restored RCW and EHC temperature

Appendix D	Scenario Outline							Attachment 1		
Op Test No.:	NRC 2010302	Scenario #	2	Event #	2	Page	5	of	61	
Event Descriptio	n: VCT	_evel Transmitte	r 62-130-	A Fails High						

Time	Position	Applicant's Actions or Behavior							
Simulator Op	perator: Whe	n directed, initiate Event 2							
Indications 1-M-6 • 1-L	ors: (X-55-6C A-3, ' s: _I-62-129, VCT	'LS-62-129A/B VOLUME CONTROL TANK LEVEL HI-LOW LEVEL indicates full scale, 100%							
1-HS-62-118A, LETDOWN DIVERT TO HUT T = 10 RO Identifies 1-XX-55-6C A-3, "LS-62-129A/B VOLUME CONTROL TANK LEVEL HI-LOW" acknowledges alarm and, notifies SRO:									
	RO	 Diagnoses VCT Level instrument failure, Probable Causes: 1. High Level [a] VCT divert valve malfunction or misaligned. [b] Letdown flow rate greater than makeup flow rate. 							
		[c] 1-LT-62-130A failing high.							
	RO	Refers to and implements Volume Control Tank Level alarm ARP starting at Step 1:							
	CAUTION:	If actual level is permitted to become low, charging pump gas intrusion could occur. [C.5]							
	NOTE 1:	High failure of 1-LT-62-129A or 1-LT-62-130A defeats auto switch over to RWST on low level.							
	NOTE 3:	High failure of 1-LT-62-130A will divert letdown and prevent Auto makeup. 1- LI-62-129 will indicate actual level.							
	NOTE 5:	Symptom of partial loss of reference leg 1-LT-62-130A and -130C. Log point L0112A (1-LT-62-130A) indicating higher than 1-LI-62-129 (1-M-6) and 1-LI-62-129C (1-L-10). [C.5]							
		[1] COMPARE indicated level between [1-LI-62-129] (1-M-6) and ICS computer point L0112A (1-LT-62-130).							

Appendix D		Scenario Outline						Attachment 1			
Op Test No.:	NRC 2010302	Scenario #	2	Event #	2	Page	6	of	61		
Event Descriptio	n: VCT	_evel Transmitte	r 62-130-	A Fails High							

Time	Position	Applicant's Actions or Behavior
	RO	[3] IF 1-LT-62-129A or 130A failed high, THEN ENSURE [1-LCV-62-118] in VCT position USING [1-HS-62-118A] AND manually operate as required to maintain VCT level.
		Operator places 1-HS-62-118A in the 'V.C. Tk' position
		[6] IF HIGH level, THEN
	RO	[a] ENSURE [1-LCV-62-118] aligned to HUT. [b] STOP VCT makeup
		Operator verifies 1-HS-62-118A in the 'V.C. Tk' position, proper VCT level (~20-44%) and no make-up in progress.
		[8] IF a small RCS leak is indicated, THEN GO TO AOP-R.05, RCS Leak
	SRO/ Crew	and Leak Source Identification. [9] EVALUATE EPIP-1, Emergency Plan Class Matrix.
		No action required.
Evaluator Not	te: The for proce	ollowing CREW Brief and Notification actions are not contained in the dure.
		CREW Brief would typically be conducted for this event as time allows prior to the next event.
		Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.
		<u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Lead Examin	er may cue n	ext event when VCT level stable and make-up capability determined.

Appendix D		Required Operator Actions Form ES-D-2						
Op Test No.:	NRC 2010302	Scenario # _ 2 Event # _ 3 Page _ 7 of _ 61						
Event Descriptic	on: #4 S	G Ch 1 PT-1-27A Fails High						
Time	Position	Applicant's Actions or Behavior						
Simulator O	perator: When	directed, initiate Event 3						
Indications// Annuncia 1-M-5								
• 1-XA-: •		3-35A STEAM GEN FEEDWATER FLOW HIGH" 3-42D STEAM GEN LVL HIGH-LOW DEVIATION"						
1-M-6 ● 1-XA- ●		1-27AN LOW STEAMLINE PRESSURE LOOP 4" 1-27AR HIGH NEGATIVE RATE STEAMLINE PRESSURE LOOP 4						
		SURE: indicator trending to or at '0' scale; 4 INLET FLOW CH-1, 2: increasing feed flow greater than steam flow trend;						
T + 20	BOP	Identifies 1-PI-1-27A, SG-4 PRESSURE indicator trending upscale, and #4 SG Feed flow increasing and notifies SRO:						
	RO	Monitors reactor stable and refers to and assists with associated ARP implementation (for alarms listed above).						
	ВОР	Diagnoses #4 SG Pressure instrument upscale failure;						
		On 1-M-3, identifies #4 SG FRV demand increasing and position indication moving 'OPEN'						
	BOP	Implements AOP-S.01 Section 2.1 Step 1 Immediate Operator Actions (IOAs) as defined in EPM-4, User's Guide						
		AOP-S.01, Main Feedwater Malfunctions,						
		Section 2.1, Unit 1 Failure of Automatic S/G Level Control;						
	NOTE Ste	ep 1 is an IMMEDIATE ACTION.						
	BOP	1. RESTORE steam generator level(s):						
		a. PLACE affected feedwater reg valve controller(s) in MANUAL.						
		 b. CONTROL feedwater flow on affected S/G(s) to restore level to program. 						
	BOP	 CHECK S/G pressure instruments NORMAL. (RNO required) 						

Appendix D		ns	<u></u>	Foi	rm ES	S-D-2			
Op Test No.:	NRC 2010302	Scenario #	2	Event #	3	Page	8	of	61
Event Description	on: #4 S0	G Ch 1 PT-1-27A	Fails Hig	jh					

Time	Position	Applicant's Actions or Behavior
		RNO:
		IF any S/G pressure instrument has failed, THEN GO TO AOP-I.06, Steam Generator Instrument Malfunction
	SRO	Transitions to AOP-I.06, Steam Generator Instrument Malfunction Section 2.1, Unit 1 S/G (Steamline) Pressure Instrument Malfunction
		AOP-I.06, Steam Generator Instrument Malfunction Unit 1 S/G (Steamline) Pressure Instrument Malfunction
		inels I and II steam pressure instruments provide compensation to steam flow als which input to S/G Water Level Control.
	BOP	1. VERIFY unaffected steam flow channel SELECTED:
		• S/G #1: 1-XS-1-3D
		• S/G #2: 1-XS-1-10D
		• S/G #3: 1-XS-1-21D
		• S/G #4: 1-XS-1-28D.
		(RNO required)
	BOP	RNO: PERFORM the following:
		a. ENSURE affected level controller(s) in MANUAL:
		• S/G #1: 1-FIC-3-35A
		• S/G #2: 1-FIC-3-48A
		 S/G #3: 1-FIC-3-90A
		• S/G #4: 1-FIC-3-103A.
	BOP	b. MATCH steam flow and feedwater flow on affected S/G USING MFW reg valve

Appendix D		Requ	uired Op	erator Actic	ons		Fo	rm ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	2	Event#	3	Page	9	of	61
Event Descriptio	on: #4 S0	G Ch 1 PT-1-27/	A Fails Hig	lh					

Time	Position	Applicant's Actions or Behavior							
	BOP	c. TRANSF	ER associate	ed Steam Flow sel	ector switch to alternat	e channel:			
			LOOP	TRANSFER SWITCH	FLOW INDICATOR				
			S/G #1	1-XS-1-3D	FI-1-3A				
		~			FI-1-3B				
			S/G #2	1-XS-1-10D	FI-1-10A				
					FI-1-10B				
			S/G #3	1-XS-1-21D	FI-1-21A				
					FI-1-21B				
			S/G #4	1-XS-1-28D	FI-1-28A				
					FI-1-28B				
	BOP	MFW re	g valve(s) in . ATE the follo	AUTO. wing Tech Specs f	ve(s) is available, THE or applicability: 4.d Steam Line Pressur				
		Action 17: w/ provided: a. however, INC Chs per 4.3.2	 3.3.2.1, ESFAS Instrumentation Functional Unit 4.d Steam Line Pressure-Low- Action 17: w/ OPERABLE Chs 1 less than Total, SU and/or PWR OPs may proceed provided: a. INOPERABLE Ch tripped w/i 6 hrs. b. Minimum Chs OPERABLE met; however, INOPERABLE Ch bypassed up to 4 hrs for surveillance testing of other Chs per 4.3.2.1.1. 3.3.3.5, Remote Shutdown Instrumentation – NOTE 1- Not Applicable 						
		• 3.3.3.7, A	ccident Monito	pring Instrumentation w/ # of chs 1 less the		store to			
		erforming AOF			or Eagle LCP failure				

Appendix D	Required Operator Actions							Form ES-D-2					
Op Test No.:	NRC 2010302	Scenario #	2	Event #	3	Page	10	of	61				
Event Descriptio	n: #4 S0	G Ch 1 PT-1-27A	A Fails Hig	jh		-		•					

Time	Position			Applicant's	Actions or Be	havior	
	SRO	1		I&C to remove failed Sappropriate Appendix:	/G pressure	instrument fro	m service
			LOOP	INSTRUMENT NUMBER	PROT CH	APPENDIX	
				P-1-2A (P-514)	l	Α	
			1	P-1-2B (P-515)		В	
				P-1-5 (P-516)	IV	С	
				P-1-9A (P-524)	1	D	
			2	P-1-9B (P-525)	11	Е	
				P-1-12 (P-526)	111	F	
				P-1-20A (P-534)	l	G	
			3	P-1-20B (P-535)		Н	
				P-1-23 (P-536)		1	
				P-1-27A (P-544)	I	j	
			4	P-1-27B (P-545)	New York Street St	к	
				P-1-30 (P-546)	IV	L	
				er indication (U1118 an e of a single steam pres			d to be
		4.	CHECK	ICS point U2118 OPE	RABLE.		
	SRO	5.	GO TO	appropriate plant proce	dure.		
F	lata, The fa			END (V Brief and Notification	OF SECTIONS are		in the
Evaluator N	proce	dure.					
			EW Brie he next	of would typically be cor event.	nducted for	this event as ti	me allows prior
		No	tificatio	ns should be addressed by the procedure or in t	d as applica he CREW b	ble if not speci rief.	fically
				Management - Typicall			

Appendix D		Required Operator Actions							
Op Test No.:	NRC 2010302	Scenario #	2	Event #	3	Page	11	of	61
Event Descriptio	n: #4 SG	GCh 1 PT-1-274	A Fails Hig	gh					

Time	Position	Applicant's Actions or Behavior
		<u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
		ext event when an OPERABLE steam flow channel is selected, affected of automatic control and Tech Specs have been identified.

Appendix D		Required Operator Actions Form ES-D-2
Op Test No.:	NRC 2010302	Scenario # 2 Event # 4 Page 12 of 61
Event Descriptio	n: LP F	W Htr String Isolation (Faulty High Level Switch)
Time	Position	Applicant's Actions or Behavior
Indications/A Annunciat 1-M-2	Alarms tors:	directed, initiate Event 4 _S-6-138A HEATER NO A6 LEVEL ABNORMAL"
	·	arms/Indications:
		LET PRESS indicator trending down CTION PRESS indicator trending down
T = 30	BOP	Identifies 1-XA-55-2-C E-1, "LS-6-138A HEATER NO A6 LEVEL ABNORMAL" acknowledges alarm and LP FW Htr String Isolation Valves 1- FCV-2-45 & 55 in mid-position/closed on 1-HS-2-45A & 55A RED/GREEN lights and notifies SRO
	BOP	Diagnoses (on 1-M-3) 1 train of Low Pressure Heaters isolated & Implements 1-AR-M2-C E-1 ARP:
	BOP	[1] DISPATCH operator to heater to determine if level is high or low via sightglass.
	RO	Monitors reactor power stable and refers to/assists with associated ARP implementation.
	BOP	[2] VERIFY proper operation of LCV's and controllers.
	BOP	 [3] IF level is high, THEN (waits on report from field operator) [4] IF heaters A-5, A-6, and A-7 isolate, THEN GO TO AOP-S.04, Condensate or Heater Drains Malfunction.
	SRO/BOP	Implements AOP-S.04, Condensate Or Heater Drains Malfunction
		AOP-S.04, Condensate or Heater Drains Malfunction, Section 2.3 Feedwater Heater String Isolation 1. ENSURE affected heater string ISOLATED:
	BOP	Condensate inlet isolation valve CLOSED. Positions 1-HS-2-45A to CLOSE to comply

Appendix D		Required Operator Actions					For	m ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	2	Event #	4	Page	13	of	61
Event Descriptio	n: LP FV	V Htr String Isola	ition (Fau	llty High Level	Switch)				

Time	Position	Applicant's Actions or Behavior						
	BOP	Condensate outlet isolation valve CLOSED.						
		Extraction steam isolation valve(s) CLOSED. (NOT applicable for low						
	SRO	pressure heater strings)						
		Step not applicable						
	BOP	2. MONITOR condensate flowpath:						
		a. CHECK for isolation of all three heater strings.						
		(RNO required)						
		RNO:						
		a. GO TO Caution prior to Step 3.						
	CAUTION: F	eedwater temperature changes may impact core thermal power.						
	BOP	3. MONITOR Steam generator levels returning to program. [M-4]						
	RO	4. MONITOR reactor power:						
		a. CHECK ICS thermal power indication AVAILABLE.						
	RO	 REDUCE turbine load as necessary to maintain 10 minute average power less than applicable limit (3455 or 3411 MWt). 						
		Notifies SRO actual core power exceeding RTP limits indicated on ICS						
		• • • • • • • • • • • • • • • • • • • •						
Evaluator N	power will	e loss of the single string of low pressure feedwater heaters, core thermal exceed the 100% RTP limit. Load adjustment will be necessary. The crew se to lower plant power now by small MT load decreases.						
	CAUTION: F	Reducing turbine load too rapidly could result in further drop in condensate						
		ressure due to reduction in heater drain flow. Recommended load rate is 1%						
		er minute if turbine load reduction is needed.						
	NOTE: Seve	ere MFW pump cavitation is likely if inlet pressure is less than 250 psig.						
		5. MONITOR Feedwater pump inlet pressure greater than 320 psig. [M-3, PI-2-129]						
		 MONITOR Condensate Booster pump suction pressure greater than 100 psig. [M-3, PI-2-77] 						
Evaluator N	Note: Plant powe	r reduction to <86% will be required to comply with the following step. The						
		Id chose AOP-C.03, Rapid shutdown or Load Reduction. AOP-C.03 steps event guide.						
	NOTE: Powe	er reduction is required based on LP turbine limitations. Recommended load						
	Iale	is 1% per minute if turbine load reduction is needed.						

Appendix D	Required Operator Actions						For	m E\$	S-D-2
Op Test No.:	NRC 2010302	Scenario #	2	Event #	4	Page	14	of	61
Event Descriptio	n: LP F\	N Htr String Isola	tion (Fau	ulty High Level	Switch)				

Time	Position	Applicant's Actions or Behavior
	SRO/ Crew	 IF Low Pressure Heater String has isolated, THEN INITIATE turbine load reduction to less than 86% (Unit 1) or 90% (Unit 2) USING one of the following:
		 0-GO-5, Normal Power Operation
		OR
		AOP-C.03, Rapid shutdown or Load Reduction.
	BOP	 DISPATCH an operator to check heater levels and investigate cause of isolation. [TB el. 706' and 685']
	Crew	 NOTIFY Maintenance to investigate and initiate repair of affected equipment.
	SRO/ BOP	 REFER TO applicable section of 1,2-SO-5-1, Feedwater Heaters and Moisture Separator Reheaters.
	SRO	11. GO TO appropriate plant procedure.
		END OF SECTION
Evaluator Note	: The follow	ing CREW Brief and Notification actions are not contained in the procedure.
		CREW Brief would typically be conducted for this event as time allows prior to the next event.
		Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.
		Operations Management - Typically Shift Manager.
		Maintenance Personnel – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Lead Examine	r may cue th	e next event when plant power is lowered to <86% RTP.

Appendix D	Required Operator Actions						Form ES-D-2			
Op Test No.:	NRC 2010302	Scenario #	2	Event #	4	Page	15	of	61	
Event Description: LP FW Htr String Isolation (Faulty High Level Switch)										

	AOP-C.03, Rapid Shutdown or Load Reduction						
Time	Position	Applicant's Actions or Behavior					
	SRO	1. ENSURE CREW has been briefed on reactivity management expectations USING Appendix E.					
		SRO determines plant power reduction rate. According to AOP-C.03, that rate may be 1-4%/minute; and may be varied during the power reduction/ shutdown based on SRO determination/direction.					
Evaluator N		4 Section 2.3 Step 7 NOTE: Power reduction is required based on LP mitations. Recommended load rate is 1% per minute if turbine load reduction d.					
	SRO, cre	ew should select 1% load rate change for this power change.					
С							
	CREW	 2. NOTIFY following personnel of rapid shutdown or load reduction: Load Coordinator Chemistry RADCON Plant Management 					
	CREW	3. MONITOR reactor/turbine trip NOT required USING Appendix A, Reactor and Turbine Trip Criteria.					
	BOP	4. CHECK VALVE POSITION LIMIT light DARK on EHC panel. [M-2]					
	If Necessary: BOP	RNO: RESTORE turbine control USING Appendix C, Turbine Runback Restoration.					
		TE: BAT is preferred boration source. Boration volume and flowrates listed in followi step are recommendations and may be adjusted as necessary.					
	RO	5. IF borating from BAT, THEN PERFORM the following:					
		a. DETERMINE recommended boration volume:					
		 ~800 gal to reduce power from 100% to 20% OR 					
		 10 gal for each 1% power reduction OR 					
		 volume recommended by Reactor Engineering 					

Appendix D		Form ES-D-2							
Op Test No.:	NRC 2010302	Scenario #	2	Event #	4	Page	16	of	61
Event Descriptio	on: LP FV	V Htr String Isola	ation (Fau	ulty High Level Sv	vitch)				

Time	Position	AOP-C.03, Rapid Shutdown or Load Reduction Applicant's Actions or Behavior							
	RO/	b. DETERMINE recommended boration flowrate from table below or from							
	SRO	Reactor Engineering:							
		TURBINE LOAD							
		REDUCTION RATE							
		(%/min)	FLOWRATE						
		1%	~15 gpm						
		2%	~30 gpm						
		3%	~45 gpm						
		4%	~70 gpm						
	SRO	and flowrate.	ned from US and STA for boration volum						
		and nowrate.							
	RO	d. PLACE boric acid transfer p	ump aligned to blender in FAST speed.						
			1 5						
	RO	e. ADJUST FCV-62-138 to esta	ablish desired flow rate.						
		f CONTROL borstion flow on	used to inicat desired having and						
		f. CONTROL boration flow as volume.	required to inject desired boric acid						
		volume.							
	RO	g. GO TO Step 7.							
	SRO	7. INITIATE load reduction as follow	WS:						
	BOP	a. ADJUST load rate to desired	d value:						
		between 1% and 4% per	r minute if borating via FCV-62-138						
		OR	-						
		 between 1% and 3% per 	r minute if borating via normal boration						
		(App. D)							
		OR							
		 2% or 3% per minute if be 	orating from RWST.						

Appendix D	ix D Required Operator Actions							m ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	2	Event #	4	Page	17	of	61
Event Descriptio	n: LP F\	N Htr String Isola	ation (Fau	ulty High Leve	l Switch)				

ţ

	<u> </u>	AOP-C.03, F	AOP-C.03, Rapid Shutdown or Load Reduction					
Time	Position		Applicant'	s Actions or Behavior				
	BOP	b. ADJ	UST setter for desired	power level:				
			DESIRED	RECOMMENDED]			
			RX POWER LEVEL	SETTER VALUE				
			90%	76				
			80%	56				
			70%	46				
			60%	40				
			50%	35				
			40%	30				
			30%	25				
			20% or less	15				
	BOP	c. INIT	IATE turbine load redu	iction by depressing GC) pushbutton.			
	SRO/ BOP	d. CON desi	ITROL turbine load rec red level.	duction as necessary to	reduce power to			
	RO	a. CHE	OR T-avg/T-ref mismato CK T-ref indication AV		g/T-ref micmatch			
			than 3°F.					
	BOP	9. MONITC	R automatic control of	MFW pump speed AV	AILABLE.			
	BOP	10. STOP s Equipme		nent USING Appendix I	3, Secondary Plan			
	NOTE: if LE	EM thormal r		rable 3 stone must reis	o red incertion lim			
	curv		on limit alarms and IC	rable, 3 steps must rais S display are NOT auto				
	RO	11. MONIT COLR.	OR control rods above	low-low insertion limit l	JSING ICS or			

Appendix D		erator Actions	· · · · · · · · · · · · · · · · · · ·		For	m ES	S-D-2		
Op Test No.:	NRC 2010302	Scenario #	2	Event #	4	Page	18	of	61
Event Descriptio	on: LP FV	V Htr String Isola	ation (Fau	ulty High Level Sw	vitch)				

AOP-C.03, Rapid Shutdown or Load Reduction Time Position Applicant's Actions or Behavior							
Time	Position	Applicant's Actions or Behavior					
	NOTE: Initi per	ating plant shutdown required by Tech Specs requires 4-hour NRC notification SPP-3.5, Regulatory Reporting Requirements.					
	SRO	 12. EVALUATE Tech Specs/TRM for applicability: 3.2.1, Axial Flux Difference 3.1.1.1, Shutdown Margin 3.1.3.6, Rod Insertion Limits TRM 3.1.2.2, Boration Flowpaths 					
		13. EVALUATE EPIP-1, Emergency Plan Initiating Conditions Matrix.					
	RO	14. PERFORM the following to reduce boron concentration difference between Pzr and RCS loops:					
	RO	a. CHECK at least one normal spray valve AVAILABLE					
	RO	b. ENSURE at least one backup heater group ENERGIZED.					
	RO	c. ENSURE spray valve(s) responds to control RCS pressure.					
	CREW	15. WHEN reactor power change exceeds 15% within one hour, THEN NOTIFY Chemistry to initiate sampling as required by 0-SI-CEN 000-050.0, 0-SI-CEM-030-407.2 and 0-SI-CEM-030-415.0.					
	CREW	16. MONITOR if turbine load reduction can be stopped:					
	SRO	a. CHECK the following conditions met:					
		 reactor shutdown is NOT needed turbine shutdown is NOT needed turbine load at desired power level (further load reduction NOT needed) 					
	BOP	b. STOP turbine load reduction by depressing HOLD.					
	RO	c. WHEN control rods are above the low-low insertion limit, THEN STOP boration flow.					

Appendix D		Required Operator Actions							S-D-2
Op Test No.:	NRC 2010302	Scenario #	2	Event #	4	Page	19	of	61
Event Descriptio	on: LP FV	/ Htr String Isol	ation (Fau	Ilty High Level	Switch)				

Time	Position	Applicant's Actions or Behavior				
	CREW	d. NOTIFY Chem Lab to sample RCS for boron concentration.				
		e. T-avg within 3°F of T-ref USING one of the following:				
		AUTO or MANUAL rod control				
		 dilution or boration USING 0-SO-62-7. 				
	RO	f. CHECK reactor power greater than 50%.				
	RO/	g. DETERMINE Tech Spec AFD limits for current power level USING				
	SRO	ICS (Primary Mimics, Doghouse Display) or COLR.				
	RO	 CHECK AFD within Tech Spec limits on at least three operable powerange NIS channels. 				
	RO/	I. IF AFD is outside target band, THEN INITIATE 0-SI-NUC-000-044.0				
	SRO	Axial Flux Difference.				
	SRO	J. INITIATE performance of 0-SI-OPS-092-078.0, Power Range Neutro Flux Channel Calibration By Heat Balance Comparison.				
	BOP	k. CHECK C-7 LOSS OF LOAD INTERLOCK [M-4A window E-5] DAR				
	NOTE: Time cons	in core life, expected Xenon changes, and planned power changes should k idered when evaluating need for boration or dilution.				
	SRO	L. CONSULT Reactor Engineering and STA regarding ΔI control and compensating for Xe changes.				
	SRO/	m. PERFORM the following as necessary to control ΔI and maintain T-				
	RO	avg on program:				
		 INITIATE boration or dilution as necessary USING 0-SO-62-7, Boro Concentration Control 				
		OR				
		OPERATE control rods as necessary.				

Appendix D		Required Operator Actions							Form ES-D-2				
Op Test No.:	NRC 2010302	Scenario #	2	Event #	4	Page	20	of	61				
Event Descriptio	on: LP FV	V Htr String Isola	ation (Fau	Ilty High Level Sv	vitch)								

		AOP-C.03, Rapid Shutdown or Load Reduction			
Time	Position	Applicant's Actions or Behavior			
	RO	n. CHECK at least one normal Pzr spray valve OPERABLE			
	SRO	 DETERMINE appropriate procedure based upon power level and cause of rapid shutdown: 			
		Other applicable AOP			
		OR			
		0-GO-5, Normal Power Operation			
		(if greater than approximately 30% power)			
		OR			
		O-GO-4, Power Ascension from Less than 5% to 30% Power (if less than approximately 30%)			
	SRO p. GO TO appropriate plant instruction.				
Evaluator N	ote: SRO/CRE	N may conduct a brief at this time and should return/ensure reactor power is AOP-S.06, Turbine Trip Below P-9 (50% Power).			
Evaluator N	ote: The followi	ng CREW Brief and Notification actions are not contained in the procedure.			
		CREW Brief would typically be conducted for this event as time allows prior to the next event.			
		Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.			
		Operations Management - Typically Shift Manager.			
		<u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS) (Note: Maintenance notification may be delegated to the Shift Manager).			
		xt event when the CREW has stabilized plant power.			

Event Description: RWST Level Channel LT-63-52 Fails Low (Tech Spec only) Time Position Applicant's Actions or Behavior Simulator Operator: When directed, initiate Event 4				
Time Position	Applicant's Actions or Behavior			
Simulator Operator: Wh				
1-M-6 • 1-XA-55-6-E, E-3 "L • 1-XA-55-6-E, E-4 "L Indications: 1-M-6	S-63-50A RWST LVL LO-LO"			
RO				
SRO	Direct entry to AOP-L09, RWST Level Instrument Malfunction			
SDO				
	• 3.3.2.1, ESFAS Instrumentation Table 3.3-3 Functional Unit 9.a, <u>Action 9.a</u> : w/ number of OPERABLE Chs 1 less than total, ops may proceed provided inoperable Ch in bypassed condition w/i 6 hrs & Min Chs OPERABLE rqt met; 1 additional Ch may be bypassed up to 4 hrs for surveillance testing per Spec 4.3.2.1.1.			
Crew				
SRO When Technical Specific:	3. GO TO appropriate plant procedure.			

Appendix D		Required	Operator Actions		For	Form ES-D-2			
Op Test No.: Event Descripti	NRC 2010302		Event #		Page 22	of	61		
		/CS Leak in Aux Building) (on Letdown line; ~9() gpm)					
Time	Position		Applicant's A	Actions or Behavior					
Simulator O	perator: Whe	n directed, initiate	Event 5						
Indications/ Annuncia 1-M-5 • 1-	ators:	"LS-68-335D/E PRE	SSURIZER LEVEL I	HGH-LOW"					
1-M-6 • 1· •	-XA-55-6C A-4 B-4	"TS-62-78 LTDN HX "FS-62-82 LOW PRE "PS-62-122A/B VOL	SS LTDN FLOW H	IGH PRESSURE H					
• 1- • 1- Significa 1-M-6 • 1-	PI-62-81, LETD FI-62-82, LETD Int Resultant / LI-62-129, VCT	OWN HX OULTLET T OWN HX OUTLET PR OWN HX OUTLET FL Alarms/Indications: LEVEL trending down "LS-62-129A/B VOLU	ESSURE decreasir OW decreasing; n		N "				
T = 65	RO	Identifies lowering	VCT level and inc	reasing charging	flow; notifies	; SRO			
	ВОР	Monitors plant sta implementation.	ble and refers to/a	ssists with associ	ated ARP				
	RO	Determines loss of RCS inventory, implements 1-AR-M5-A C-3 ARP and refers SRO to AOP-R.05, RCS Leak and Leak Source Identification.							
	SRO	Enters AOP-R.05, RCS Leak in MOI	RCS Leak and Le DE 1-3	ak Source Identif	fication Section	on 2.1,	,		

Appendix D		Required Operator Actions						Form ES-D-2				
					······································							
Op Test No.:	NRC 2010302	Scenario #	2	Event #	6	Page	_23	of	61			

Event Description: CVCS Leak in Aux Building (on Letdown line; ~90 gpm)

Time	Position	Applicant's Actions or Behavior
	RO	1. CONTROL charging flow using one CCP:
		 ADJUST FCV-62-93 and FCV-62-89 as necessary to maintain pzr level on program.
		MAINTAIN seal injection flow at least 6 gpm to each RCP.
	RO	2. MONITOR pressurizer level STABLE or RISING. <i>(RNO required)</i>
	RO	RNO: IF sufficient time is available, THEN ISOLATE normal and excess letdown:
		a. ENSURE FCV-62-72, 73, and 74 CLOSED.
		 b. CLOSE FCV-62-69 and 70. c. ENSURE FCV-62-54 and 55 CLOSED.
	RO/ SRO	IF loss of pressurizer level is imminent OR low pressure reactor trip (1970 psig) is imminent, THEN PERFORM the following:
		a. TRIP the reactor.
		b. INITIATE Safety Injection.
		c. GO TO E-0, Reactor Trip or Safety Injection.
	RO	3. MONITOR containment pressure STABLE or DROPPING. Determines no effect on containment pressure
		If Unit is in Mode 3 with low pressurizer pressure SI NOT blocked, SI should NOT be manually blocked to prevent safety injection.

Appendix D		Required Operator Actions Form ES-D-2							
Op Test No.:	NRC 2010302	Scenario #2 Event #6 Page24 of61							
Event Descripti	ion: CV	CS Leak in Aux Building (on Letdown line; ~90 gpm)							
Time	Position	Applicant's Actions or Behavior							
-	RO	4. MONITOR RCS pressure STABLE or RISING.							
Evaluator N		el is above 13%, crew continues; since this is a " MAINTAIN " step, crew will and take the actions of this step should VCT level go below the prescribed							
	RO	 MAINTAIN VCT level greater than 13% USING automatic or manual makeup. 							
		RNO: IF leak is on charging headerN/A							
	RO	IF VCT level CANNOT be maintained, THEN PERFORM the following:							
		a. ENSURE CCP suction aligned to RWST:							
		1) OPEN LCV-62-135 and -136.							
		2) CLOSE LCV-62-132 and 133.							
		Determines 13% cannot be maintained and:							
	RO	Manually opens LCV-62-135 and -136;							
		Manually closes LCV-62-132 and 133.							
	SRO	b. IF in MODE 1 or 2, THEN TRIP the reactor and GO TO E-0, Reactor Trip or Safety Injection.							
		Directs operator to trip the reactor and enters E-0							
Evaluator No	ote: SRO assig	gns BOP to perform appendices (attached at the end of this event guide) as e.							
		pendix I or J may be used to estimate RCS leak rate.							
		etdown was isolated in Step 2, the leak rate may have exceeded capacity of e CCP in the normal charging alignment (EAL 1.2.2P).							
		6. EVALUATE EPIP-1, Emergency Plan Classification Matrix.							
	SRO	7. EVALUATE Tech Spec/TRM LCOs USING Appendix K, Evaluating Tech Specs and TRM (attached at the end of this event guide).							
	BOP	8. CHECK secondary side radiation NORMAL							
	Crew	9. STOP containment purging and venting:							

Crew

Appendix D		Required Operator Actions Form ES-D-2							
Op Test No.:	NRC 2010302	Scenario # _ 2 Event # 6 Page _ 25 of _ 61							
Event Description	on: CV	CS Leak in Aux Building (on Letdown line; ~90 gpm)							
Time	Time Position Applicant's Actions or Behavior								
	BOP	10. CHECK containment airborne activity RISING. (RM-90-106 or 112)							
Evaluator N	RNO tra	ould have identified leak source in Step 2 when Letdown was isolated; Step 11 nsitions the crew to step 23 or allows using selected step(s) from steps 12-22 a thee identified leakage source; in this case step 13.							
	Crew	11. CHECK leakage source UNKNOWN. (RNO required)							
		RNO: IF leakage source is KNOWN, THEN PERFORM the following: a. REFER TO applicable action in Steps 12 through 22.							
		b. IF leakage source can be isolated, THEN ENSURE leak ISOLATED.							
		c. GO TO Step 23.							
	RO	12. CHECK pressurizer PORVs NORMAL:							
	RO/	13. ISOLATE letdown							
	Crew	Crew should have identified leak source as Letdown when it is isolated.a. ENSURE the following letdown orifice valves CLOSED:							
	RO	FCV-62-72							
		• FCV-62-73							
		• FCV-62-74							
	RO	b. ENSURE the following letdown isolation valves CLOSED:							
		• FCV-62-69							
		• FCV-62-70							
		• FCV-62-77							
	RO	c. CHECK leak ISOLATED based upon the following:							
		containment parameters							
	BOP	estimated leak rate USING Appendix I or J.							

Appendix D		Required Operator Actions								
Op Test No.:	NRC 2010302	Scenario #	2	Event #	6	Page	26	of	61	

Event Description: CVCS Leak in Aux Building (on Letdown line; ~90 gpm)

Time	Position	Applicant's Actions or Behavior
	RO	d. ENSURE the following charging header isolation valves CLOSED:
		• FCV-62-90
		• FCV-62-91
	SRO	e. GO TO Step 23.
	BOP	23. MONITOR auxiliary building radiation and HELB recorders NORMAL.
		24. CHECK leak IDENTIFIED and ISOLATED USING available methods
	BOP	Leak identified and isolated; leak rate determination being tracked from previous Appendices implementation.
	SRO/ Crew	25. MONITOR if charging and letdown should be restored:
	SRO	a. CHECK letdown ISOLATED.
		(RNO required)
		b. CHECK pzr level:
		level greater than or equal to program level
		level RISING.
		c. CHECK charging and normal letdown AVAILABLE:
		piping INTACT
		valves OPERABLE
		Train A CCS in service.
		(RNO required)
		RNO:
	SRO	c. IF Train A CCS is in service, THEN EVALUATE placing excess letdown in service USING EA-62-3, Establishing Excess Letdown.
		GO TO Step 26.

Appendix D		Required Operator Actions							
Op Test No.:	NRC 2010302	Scenario #	2	Event #	6	Page	_27	of	61

Event Description: CVCS Leak in Aux Building (on Letdown line; ~90 gpm)

Time	Position	Applicant's Actions or Behavior
		26. MONITOR if pressurizer heaters should be restored:
		a. CHECK pressurizer level greater than 20% and rising.
		b. ENSURE pressurizer heaters in service as required.
		27. IF containment purging or venting is needed…N/A
		28. INITIATE leak repairs.
		29. GO TO appropriate plant procedure.
		END OF SECTION
Evaluator No	ote: The follo	owing CREW Brief and Notification actions are not contained in the procedure.
		CREW Brief would typically be conducted for this event as time allows prio to the next event.
		Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.
		Operations Management - Typically Shift Manager.
		<u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).

Appendix D	Required Operator Actions						Form ES-D-2					
	RC 2010302	Scenario #	2	Event #	6	Page	28	of	61			
Event Description:	CVC	S Leak in Aux Bu	ilding (oi	n Letdown line; ~9	0 gpm)							
SQN	F	RCS LEAK AND LEAK SOURCE IDENTIFICATION					OP-R.0 ≥v. 14	5				

APPENDIX I

Page 1 of 1

ESTIMATING RCS LEAK RATE USING CVCS FLOW BALANCE

NOTE 2 This appendix assumes RCS temperature and charging flow are approximately constant.

	INITIAL FINAL		CHANGE
PZR Level			[1] (negative for level decrease)
Time			[2]
Charging Flow		[3]	
Letdown Flow		[4]	
Total RCP Seal Return Flow		[5]	

Pressurizer	Level	Conve	rsion

Pressurizer level change		conversion factor	factor			Pzr Level F		
	% X	62 gal / %	÷		min	=		gpm
step	1] above	·····		step [2] above			[6]	
		Leak	Rat	e Calculation				
Charging Flow	Letdown Flow	, Seal Return Flow		Pzr Level Rate of Change	÷	Instrument error correction factor 3 gpm	=	RCS Leak Rate gpm
step [3] above	step [4] above	e step [5] above		step [6] above	•	2.	-	

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NOTE 1 This method is recommended when leak requires rise in charging flow greater than ~10 gpm. Appendix J is more accurate for smaller leak rates.

Appendix D	Requ	uired Op	perator Actions	·····		Fo	rm ES	S-D-2
Op Test No.:NRC 2010 Event Description:	0302 Scenario # CVCS Leak in Aux Bu	2 uilding (or	Event #	6 0 gpm)	Page	29	of	61
SQN	RCS LEAK AN			NTIFICATION	AOP-I	₹.05		

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Rev. 14

APPENDIX J

ESTIMATING RCS LEAK RATE USING VCT AND PZR LEVEL

CAUTION This appendix CANNOT be used during VCT makeup, boration, or dilution.

NOTE This appendix assumes RCS temperature is approximately constant.

	VCT LEVEL (%)	PZR LEVEL (%)	TIME (min)
INITIAL			
FINAL	and a second		
CHANGE	[1]	[2]	[3]
C	(positive for level decrease)	(positive for level decrease)	

VCT Level Conversion

VCT level change	conversion factor		Time Change		VCT Level Rate of Change (positive for level lowering)
% X	20 gal / %	÷	min		gpm
step [1] above			step [3] above		[4]
	Pressuri	zer Le	evel Conversion		
Pressurizer level change	conversion factor		Time Change		Pzr Level Rate of Change (positive for level lowering)
<u> </u>	62 gal / %	÷	min	=	gpm
step [2] above			step [3] above	_	[5]
	Leal	k Rate	Calculation		
VCT Level Rate of Change	Pzr Rate o	Level f Chan		:S Le	eak Rate
·····	+		=		gpm
step [4] above	step [5] abov	/e		

Appendix D	Required Operator Actions		For	m ES	S-D-2
Op Test No.: <u>NR</u> Event Description:	C 2010302 Scenario # 2 Event # 6 CVCS Leak in Aux Building (on Letdown line; ~90 gpm)	Page	30	of	61
SQN	RCS LEAK AND LEAK SOURCE IDENTIFICATION	AOP-R.05 Rev. 14			

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APPENDIX K

EVALUATING TECH SPECS AND TRM

EVALUATE the following Tech Spec/TRM LCOs for applicability:

- 3.2.5, DNB parameters may be applicable depending on Letdown isolation: 3.2.5.b. Pressurizer Pressure would be applicable ACTION: w/ any of the above parameters exceeding its limit, restore w/i its limit w/i 2 hrs or reduce THERMAL POWER <5% of RTP w/i next 4 hrs.
- 3.4.3.1, Safety and Relief Valves-Operating N/A
- 3.4.3.2, Relief Valves-Operating- N/A

3.4.6.2.a, RCS Leakage - PRESSURE BOUNDARY LEAKAGE: - N/A

- 3.4.6.3, RCS Pressure Isolation Valve Leakage N/A
- TRM 3.4.11, Reactor Coolant System Head Vents N/A
- 3.4.12, Low Temperature Overpressure Protection Systems N/A
- 3.6.1.4, Containment Pressure N/A
- 3.6.1.5, Containment Air Temperature N/A

				perator Actions			For	m ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	2	Event #	6	Page	31	of	61
Event Description:	CVCS	S Leak in Aux Bu	ilding (or	n Letdown line; ~9	0 gpm)				

Time	Position	Applicant's Actions or Behavior
		4.0 OPERATOR ACTIONS
	be	4.1 Placing Excess Letdown in Service eal return valves FCV-62-61 or FCV-62-63 are closed, excess letdown flow will routed to PRT via relief valve 62-636. Reopening FCV-62-61 and FCV-62-63 owing a Phase A Isolation is addressed in applicable EOP steps.
		1. IF excess letdown is only letdown flowpath, THEN CONTROL charging flow as necessary to prevent high pressurizer level.
		 IF high activity levels in RCS are suspected, THEN NOTIFY Radiological Control (Radcon) section to monitor plant radiological conditions as required.
		3. ENSURE CCS inlet to excess letdown heat exchanger [FCV-70-143] OPEN.
		4. ENSURE CCS outlet to excess letdown heat exchanger [FCV-70-85] OPEN.
		 VERIFY CCS flow to excess letdown heat exchanger greater than 230 gpm, as indicated on.[FI-70-84].
		6. ENSURE excess letdown divert valve [FCV-62-59] in NORMAL.
		7. OPEN excess letdown isolation valve [FCV-62-54].
		8. OPEN excess letdown isolation valve [FCV-62-55].
	200	T 1 ONLY Normally the temperature read on 1-TI-62-58 should be less than °F. If operation requires temperatures greater than 200°F, the pressure at 1-P 64 (local indicator El. 690 Pnl. L-46) should be less than 100 psig to protect the

.

Appendix D		Requ	ired Op	erator Actions	;	Form ES-D				
Op Test No.:	NRC 2010302	Scenario #	2	Event #	6	Page	32	of	61	
Event Descriptio	on: CVCS	Leak in Aux Bu	ilding (on	Letdown line; ~	90 gpm)					

Time	Position	Applicant's Actions or Behavior
		 ADJUST excess letdown flow control valve [FCV-62-56] as necessary to control flow WHILE maintaining heat exchanger outlet temperature less than 200°F (240°F on Unit 1), as indicated on [TI-62-58].
		10. NOTIFY RADCON excess letdown has been placed in service.
		11. RETURN TO procedure and step in effect.
		END OF SECTION

service and the crew has stabilized Pzr Level.

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Appendix D		Requ	ired Op	perator Actions			Fo	rm ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	2	Event #	6	Page	33	of	61
Event Descriptio	on: CVC	S Leak in Aux Bu	iilding (o	n Letdown line; ~9	0 gpm)				

		1-SO-62-6, Excess Letdown
Time	Position	Applicant's Actions or Behavior
	ARP 1-AR-M6 7.b.: Place Ex	-C B-4, FS-62-82 LOW PRESS LTDN FLOW HIGH PRESSURE HIGH step ccess Letdown in service in accordance with 1-SO-62-6, Excess Letdown
		5.0 STARTUP/STANDBY READINESS
		nen excess letdown is placed in service the containment radiation monitors by show some changes in particulate reading.
	NOTE 2: Co pui	ordinate the following steps with AUO stationed at 0-L-2 to monitor RCDT for monomore and the station as required during the 50 gallon flush.
		[1] ENSURE [1-FCV-62-93] is in MANUAL and
		[a] OPERATE [1-FCV-62-93] USING [1-HIC-62-93A] as required to regulate charging flow to keep pressurizer level on program.
		[b] OPERATE [1-FCV-62-89] USING [1-HIC-62-89A] as required to maintain RCP seal flows in limits.
		[2] NOTIFY RADCON that Excess Letdown is being placed in service
		[3] ENSURE [1-FCV-70-143] CCS water to the excess letdown heat exchanger is OPEN.
		[4] ENSURE [1-FCV-70-85] Excess Letdown
		ep [5] will prevent subjecting the CVCS piping downstream of the cess Letdown HX to a temperature above the design value.
		[5] ENSURE [1-FI-70-84] is indicating greater than 230 gpm.
		[6] PLACE [1-FCV-62-59] Excess Letdown 3-way Divert Valve in DIVERT.

Appendix D		Requ	ired Ope	erator Actio	ns		Form ES-D-2			
Op Test No.: NF	RC 2010302	Scenario #	2	Event #	6	Page	34	of	61	
Event Description:	CVCS	Leak in Aux Bui	ilding (on	Letdown line;	~90 gpm)					

Time	Position Applicant's Actions or Behavior									
	<u> </u>		Applicant's Actions or Behavior =CV 62-63 has replaced RCP seal leak-off isolation valves as the primary							
	CAUTION:	means f	os nas replaced RC	v. The normal letdown pa	alves as the prin th for excess letd	nary				
40.4	1	not be a	vailable if FCV-62-6	3 is CLOSED.						
	NOTE: Bac	k flow t	hrough the RCP s	eals will occur should t	he RCP seal lea	akoff				
	13016		ion valves fail to their OPEN position on loss of air or electrical pow [7] IF less than 100 psig in RCS and [1-FCV-62-63] is CLOSED a							
				I be aligned for NORM						
		[4	a] ENSURE the fo	ollowing are CLOSED :						
			VALVE ID	FUNCTION	INITIALS]				
			1-FCV-62-53	RCP's Seal Bypass		1				
			1-FCV-62-9	No. 1 Seal Return		1				
			1-FCV-62-22	No. 2 Seal Return						
			1-FCV-62-35	No. 3 Seal Return						
			1-FCV-62-48	No. 4 Seal Return		1				
				:V-62-63] is OPEN.		-1				
			DPEN [1-FCV-62- alve.	54] Cold Leg Loop #3 E	Excess Letdown	isola				
			DPEN [1-FCV-62- alve.	55] Excess Letdown co	ntainment isolat	ion				
		[10] C	OPEN [1-FCV-62-	56] slowly to flush pipin	g to RCDT.					
				ely 50 gallons have flus		OSE				

Appendix D		Required Operator Actions							S-D-2
Op Test No.:	NRC 2010302	Scenario #	2	Event #	6	Page	35	of	61
Event Descriptio	n: CVCS	Leak in Aux Bu	ilding (on	Letdown line; ~	90 gpm)				

Time	Position	Applicant's Actions or Behavior						
		[12] PLACE [1-FCV-62-59] Excess Letdown 3-way Divert Valve in NORMAL.						
	NOTE 1:	Normally the temperature read on 1-TI-62-58 should be less than 200°F.						
		If operation requires temperatures greater than 200°F, the pressure at 1 PI-62-64 (local indicator El. 690 PnI L-46) should be less than 100 psig to protect the Grinnell valves.						
	NOTE 2: Operation above 200°F will require that Systems Engineering be notified to allow an evaluation of the need for valve maintenance.							
		[13] OPEN [1-FCV-62-56] slowly to increase excess letdown flow to desired amount, not to exceed 240°F heat exchanger outlet temperature, as indicated on 1-TI-62-58.						
		[14] NOTIFY RADCON that Excess Letdown has been placed in service.						
		END OF TEXT						

and Pzr Level stabilized.

Appendix D	Appendix D Required Operator Actions								
Op Test No.:	NRC 2010302	Scenario #	2	Event #	7, 8	Page	36	of	61
Event Descrip	n-	2 Main Steam Line E pray Pump 1B-B Dis	Break Ins sch Viv A	ide Containment w uto Open Failure	// 1A Cntmt Spra		ared Sh	aft & C	ntmnt
Time	Position			Applicant's A	ctions or Behav	vior			
Simulator (Indications		n directed, initi	ate Eve				<u></u>		
 1-FI- 1-FI- 1-FI- 1-FI- 1-XI- 1-TI- 1-TI- 1-TI- 1-TI- 1-TI- 1-AR- <	1-3A, 3B, SG-1 S 1-10A, 10B, SG-1 1-21A, 21B, SG-1 1-28A, 28B, SG-1 92-5005C, RX PG 92-5006C, RX PG 92-5007C, RX PG 92-5008C, RX PG -92-5001, NUCL cators: -M5A A-6, "TS- C-6, "TS- rs: 58-2E, 25E, 44E, -68-2B, RCS/TUI cators: -M6B A-7, "FS-3 -M6B B-7, "FS-3 -M6B C-7, "FS-3 -M6B D-7, "FS-3 -M6B D-7, "FS-3 -M6B D-7, "FS-3 -30-42, 43, 44, 4 ant Resultant A	STEAM FLOW CH 2 STEAM FLOW (3 STEAM FLOW (3 STEAM FLOW (0 WER CH-I N-41: 0 WER CH-I N-42: 0 WER CH-II N-42: 0 WER CH-II N-42: 0 WER CH-II N-42: 0 WER CH-II N-44 EAR POWER CH-II N-44 EAR POWER NR- 68-2M/N RC LOO 68-2P/Q REAC C 67E LOOPS 1-4 T RBINE TEMP Rec -35B STM GEN L -35B STM GEN L -35B STM GEN L -103B STM GEN L 5, CNTMT PRESS Narms/Indicatio -6A Window E-1:	CH-1 & : CH-1 & : CH-1 & : Increas Inc	2: Increasing st 2: Increasing st 2: Increasing st sing reactor power sing reactor power asing reactor pow	eam flow eam flow eam flow ver wer ower on power rang G DEVN HIGH OUCT HIGH-LO erature indicator om programma ATER FLOW M ATER FLOW M ATER FLOW M ATER FLOW M	-LOW" W tions (w/ n ed value IISMATCH' IISMATCH' NISMATCH NISMATCH	o rod r		
T = 70	CREW	Defende alema							
Evaluator N	ote: If alarm 1 actuates reactor.	Refer to alarm r -AR-M6-A E-2, T indicating an exc	S-68-2 essive	J REACTOR C cooldown, the	COOLANT LOC	OPS LO L ide to mar	O TAV lually t	G rip the	9
Evaluator N	crew shou	I safety is not a c uld monitor for wo at this time.	concerr orsenin	n since this stea g conditions bu	im break is ins it no personne	side the co el safety-ba	ntainn ased a	nent; t ctions	he are

SRO	May choose to enter AOP-S.05	, Steam Or Feedwater	Leak. However, safety

Appendix D		Requ	uired Op	erator Actic	ons	Form ES-D-2				
Op Test No.:	NRC 2010302	Scenario #	2	Event #	7, 8	Page	37	of	61	
Event Description:	<i>n</i> ∠ 1	Main Steam Line I	Break Insid	le Containme	ent w/ 1A Cntmt Spray F	oump She	ared Sh	iaft & C	ntmnt	

#2 Main Steam Line Break Inside Containment w/ 1A (Cntmt Spray Pump Sheared Shaft & Cntr
Spray Pump 1B-B Disch Vlv Auto Open Failure	

Time	Position	Applicant's Actions or Behavior
		injection actuation conditions based on either containment pressure or steamline pressure should cause the crew to manually trip the reactor and initiate SI shortly after the event is initiated
		AOP-S.05, Steam Or Feedwater Leak
		1. MONITOR personnel safety:
		a. IF steam or feedwater lines need to be immediately isolated to protect personnel, THEN PERFORM the following:
		1) TRIP the reactor.
		 IF leak is on steam lines OR source is unknown, THEN CLOSE MSIVs.
		 IF leak is on feedwater lines OR source is unknown, THEN PERFORM the following:
		a) TRIP MFW pumps.
		b) CLOSE Feed Reg Valves.
		4) GO TO E-0, Reactor Trip or Safety Injection.
		2. MONITOR steam generator levels STABLE on program.
		3. CHECK the following:
		S/G atmospheric relief valves CLOSED
		steam dumps CLOSED.
		4. CHECK main turbine on line.
Evaluator N	developi should b impleme	ep 5 is a "MONITOR" step, the crew may continue in the procedure while ng a reactor vs. turbine power trend (RNO second bullet). If so, steps 6 or 7 e the decision point and therefore transition to reactor trip and E-0 ntation. If an excessive delta between reactor and secondary power develops, may decide to trip the reactor and transition to E-0 here.

Appendix D		Requ		Form ES-D-2					
Op Test No.:	NRC 201030	2 Scenario #	2	Event #	7, 8	Page	38	of	61
Event Descriptio	n:	#2 Main Steam Line I	Break Insi	de Containment	w/ 1A Cotmt Spra	w Pump She	arod Sh	off & C	ntmnt

.

#2 Main Steam Line Break Inside Containment w/ 1A Cntmt Spray Pump Sheared Shaft & Cntmnt Spray Pump 1B-B Disch VIv Auto Open Failure

Time	Position	Applicant's Actions or Behavior
	RO	5. MONITOR the following:
		reactor power STABLE
		(RNO required)
		reactor power less than or equal to 100% (3455 MWt).
	BOP	RNO: REDUCE turbine load as necessaryN/A
		IF any of the following conditions exist:
	Crew	 greater than 35 MWe load drop is required to maintain reactor power less than or equal to 100% OR
	Crew	 steam leak results in reactor power rising by 3% or more OR
	Crew	reactor power CANNOT be controlled by turbine load reduction
		THEN PERFORM the following:
	RO	a. TRIP the reactor.
	BOP	b. WHEN reactor is tripped, THEN CLOSE MSIVs.
	SRO	c. GO TO E-0, Reactor Trip or Safety Injection.
Evaluator N	developir ave, and restoring transient normal ra	ep 6 is a "MONITOR" step, the crew may continue in the procedure while ng a T-ave vs. T-ref trend. The 3° delta between actual RCS temperature, T- programmed reference temperature, T-ref is the range the system is capable of following a normal load change. 5° delta is based on the maximum load for the RCS. Step 6 insures that RCS temperature is controlled within these anges; if the crew cannot control these limits, they should decide to trip the nd transition to E-0.
	RO	6. MONITOR T-avg within 3°F of T-ref. (RNO required)
	SRO/ BOP	RNO: REDUCE turbine load as necessary to maintain T-avg within 3°F of T-ref (or program value).
	SRO	IF T-avg CANNOT be maintained within 5°F of T-ref (or program value),

Appendix D		Requ	ired Op	erator Actio	ns	Form ES-D-2				
Op Test No.:	NRC 2010302	Scenario #	2	Event #	7, 8	Page	39	of	61	
Event Descriptio	112. 14	lain Steam Line E y Pump 1B-B Dis	Break Insid sch VIv Au	le Containme to Open Failu	nt w/ 1A Cntmt Spray P re	ump She	ared Sh	aft & C	ntmnt	

	Position	Applicant's Actions or Behavior
		THEN PERFORM the following:
	RO	a. TRIP the reactor
	BOP	b. WHEN reactor is tripped, THEN CLOSE MSIVs.
····	Crew	c. GO TO E-0, Reactor Trip or Safety Injection.
	SRO	IF a reactor trip is directed, THEN GO TO E-0, <i>Reactor Trip or Safety Injection</i> .
	SRO	Direct Manual Rx Trip
	SRO	Enter and Direct E-0 Immediate Operator Actions (IOAs)
Evaluator N	develop pressure	tep 7 is a " MONITOR " step, the crew may continue in the procedure while ing a containment pressure trend. SI actuation is at 1.5 psig containment e. The SRO should set a trigger value, which is variable depending on the rate
	E-0.	ure rise. If attained, the crew should decide to trip the reactor and transition to
	E-0.	ch Spec LCO 3.6.1.4 is applicable if containment pressure exceeds 0.3 psig.
	E-0.	
	E-0. NOTE: Te	ch Spec LCO 3.6.1.4 is applicable if containment pressure exceeds 0.3 psig.
	E-0. NOTE: Te RO	 ch Spec LCO 3.6.1.4 is applicable if containment pressure exceeds 0.3 psig. 7. MONITOR containment pressure STABLE RNO: IF containment pressure is approaching 1.5 psig, THEN PERFORM the
	E-0. NOTE: Te RO	 ch Spec LCO 3.6.1.4 is applicable if containment pressure exceeds 0.3 psig. 7. MONITOR containment pressure STABLE RNO: IF containment pressure is approaching 1.5 psig, THEN PERFORM the following:
	E-0. NOTE: Te RO	 ch Spec LCO 3.6.1.4 is applicable if containment pressure exceeds 0.3 psig. 7. MONITOR containment pressure STABLE RNO: IF containment pressure is approaching 1.5 psig, THEN PERFORM the following: a. TRIP the reactor.
	E-0. NOTE: Te RO	 ch Spec LCO 3.6.1.4 is applicable if containment pressure exceeds 0.3 psig. 7. MONITOR containment pressure STABLE RNO: IF containment pressure is approaching 1.5 psig, THEN PERFORM the following: a. TRIP the reactor. b. WHEN reactor is tripped, THEN PERFORM the following: 1) INITIATE Safety Injection.
	E-0. NOTE: Te RO	 ch Spec LCO 3.6.1.4 is applicable if containment pressure exceeds 0.3 psig. 7. MONITOR containment pressure STABLE RNO: IF containment pressure is approaching 1.5 psig, THEN PERFORM the following: a. TRIP the reactor. b. WHEN reactor is tripped, THEN PERFORM the following: 1) INITIATE Safety Injection. 2) CLOSE MSIVs.
	E-0. NOTE: Te RO	 ch Spec LCO 3.6.1.4 is applicable if containment pressure exceeds 0.3 psig. 7. MONITOR containment pressure STABLE RNO: IF containment pressure is approaching 1.5 psig, THEN PERFORM the following: a. TRIP the reactor. b. WHEN reactor is tripped, THEN PERFORM the following: 1) INITIATE Safety Injection. 2) CLOSE MSIVs.
	E-0. NOTE: Te RO RO	 ch Spec LCO 3.6.1.4 is applicable if containment pressure exceeds 0.3 psig. 7. MONITOR containment pressure STABLE RNO: IF containment pressure is approaching 1.5 psig, THEN PERFORM the following: a. TRIP the reactor. b. WHEN reactor is tripped, THEN PERFORM the following: 1) INITIATE Safety Injection. 2) CLOSE MSIVs. c. GO TO E-0, Reactor Trip or Safety Injection. IF a reactor trip is directed,

Appendix D		Required Operator Actions							Form ES-D-2				
Op Test No.:	NRC 2010302	Scenario #	2	Event #	7, 8	Page	40	of	61				
Event Descriptio	<i>n</i> – N	/lain Steam Line E ay Pump 1B-B Dis	Break Insi sch VIv Au	ide Containment v uto Open Failure	w/ 1A Cntmt Spray	[/] Pump Shea	ared Sha	aft & C	ntmnt;				

Time	Position	Applicant's Actions or Behavior						
Evaluator No	te: When the	e crew enters ES-0.1, Reactor Trip Response, insert Event 7.						
Evaluator No	Evaluator Note: Following IOA performance, prior to Steps 1-4 immediate action verification, RO/BOP surveys MCBs for any expected automatic system response that failed to occur. Upon discovery, they may take manual action(s) to align plant systems as expected for the event in progress. [Ref. EPM-4, Prudent Operator Actions (POAs)]							
		E-0, Reactor Trip or Safety Injection						
Annunicators	s/Indications as	s specified at Event 6 initiation						
	Note 1 Steps	1 through 4 are immediate action steps						
	Note 2 This p	procedure has a foldout page						
	RO	 VERIFY reactor TRIPPED: Reactor trip breakers OPEN Reactor trip bypass breakers DISCONNECTED or OPEN Neutron flux DROPPING Rod bottom lights LIT Rod position indicators less than or equal to 12 steps. 						
	BOP	 2. VERIFY turbine TRIPPED: Turbine stop valves CLOSED. 						
	BOP	 3. VERIFY at least one train of shutdown boards ENERGIZED. Attempt to restore power to at least ONE train of shutdown boards Place DG 1A-A control switch in START Verify Train A Shutdown Boards ENERGIZED 						
	RO	 4. DETERMINE if SI actuated: ECCS pumps RUNNING. Any SI alarm LIT [M-4D] (SI will be actuated) 						
	RO/BOP	RNO: DETERMINE if SI required: a. IF any of the following conditions exists:						

Appendix D		Req	uired Op	erator Actic	ons		Fo	rm ES	5-D-2
Op Test No.:NRC 2	2010302	Scenario #	2	Event #	7, 8	Page	41	of	61
Event Description:	#2 M		Break Insid		nt w/ 1A Cntmt Spray	Pump Shea	ared Sh	ıaft & C	ntmnt

Spray Pump 1B-B Disch VIv Auto Open Failure	in a main o toam Eirio Broak molac	oontainnont w/	
	Spray Pump 1B-B Disch VIv Auto	o Open Failure	

Time	Position	Applicant's Actions or Behavior
		S/G pressure less than 600 psig,
		OR
		 RCS pressure less than 1870 psig,
		OR
		 Containment pressure greater than 1.5 psig,
		THEN ACTUATE SI.
	CREW	Determines SI Actuation not required; transitions to ES-0.1, Reactor Trip Response
		RNO:
		b. IF SI is NOT required, THEN PERFORM the following:
		1) MONITOR status trees.
		2) GO TO ES-0.1, Reactor Trip Response
		ES-0.1, Reactor Trip Response
	NOTE: This	procedure has a foldout page.
		1. MONITOR SI NOT actuated:
		SI ACTUATED permissive DARK [M-4A, D4]
		2. VERIFY generator breakers OPEN.
Evaluator N		3 is a " MONITOR " step, the crew may continue in the procedure while
		a temperature trend. SI actuation is at 1.5 psig containment pressure. The
	BCS coold	d set a trigger value for MSIV closure/SI Actuation depending on the rate own is affecting RCS pressure and the containment pressure rise. If attained,
	the crew st	nould decide to trip the reactor and return to E-0 step 1.
		3. MONITOR RCS temperatures:
	RO	(RNO Required)
	*	• IF any RCP running.
		THEN
		CHECK T-avg stable at or trending to
		between 547°F and 552°F.
		OR

Appendix D		Req	uired Ope	erator Actio	ons		For	m ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	2	Event #	7, 8	Page	42	of	61
Event Description	: #2 M	ain Steam Line	Break Insid	e Containme	ent w/ 1A Cntmt Spray F	oump Shea	ared Sh	aft & C	ntmnt

Spray Pump 1B-B Disch VIv Auto Open Failure

Time	Position	Applicant's Actions or Behavior
		IF RCPs stopped,
		THEN
		CHECK T-cold stable at or trending
		to between 547°F and 552°F.
		RNO:
	BOP	IF temperature less than 547°F and dropping, THEN PERFORM the following:
		a. ENSURE steam dumps and atmospheric reliefs CLOSED.
		b. ENSURE S/G blowdown isolation valves CLOSED
		c. IF cooldown continues, THEN PERFORM the following:
		1) CONTROL total feed flow
		USING EA-3-8, Manual Control of
		AFW Flow.
		2) MAINTAIN total feed flow
		greater than 440 gpm
		UNTIL narrow range level
		greater than 10%
		in at least one S/G.
		 DEPRESS RESET on MSR control panel.
		4) IF any MSR temp control valve
		fails to close,
		THEN
		ISOLATE HP steam to MSRs.
		d. IF cooldown still continues, THEN CLOSE MSIVs and bypass valves
		IF temperature greater than 552°F N/A
	BOP	4. CHECK feedwater status:
· · · · · · · · · · · · · · · · · · ·		a. T-avg less than 550°F.
		b. MFW pumps TRIPPED.
		c. MFW regulating valves CLOSED.
		d. MFW regulating bypass valve controller outputs ZERO.
		e. MFW isolation valves CLOSED.
	BOP	5. CHECK total feed flow to S/Gs greater than 440 gpm.

Appendix D		Required Operator Actions					For	m ES	-D-2
Op Test No.: N	IRC 2010302	Scenario #	2	Event #	7, 8	Page	43	of	61
Event Description:	#2 M	ain Steam Line F	Rreak Insi	de Containment v	w/ 1A Cotot Spra	v Pump Sho	arod Sh	-# 8 C	ntmnt

#2 Main Steam Line Break Inside Containment w/ 1A Cntmt Spray Pump Sheared Shaft & Cntmnt Spray Pump 1B-B Disch VIv Auto Open Failure

Time	Position	Applicant's Actions or Behavior
	RO	6. CHECK if emergency boration is required:
		a. VERIFY all control rods fully inserted:
		Rod bottom lights LIT
		 Rod position indicators less than or equal to 12 steps.
		b. MONITOR RCS temperature:
		T-avg greater than 540°F if any RCP running
		OR Taski wasta ili 54005 ili BOD ili ali
		T-cold greater than 540°F if all RCPs stopped.
	CREW	7. ANNOUNCE reactor trip USING PA system.
	RO	8. MONITOR pressurizer level control:
		a. CHECK pressurizer level greater than 17%.
		b. CHECK non-essential control air established to containment:
		 Unit 1 Only: 1-FCV-32-110 OPEN. [Pnl 6K]
		Unit 2 Only: 2-FCV-32-111 OPEN. [Pnl 6L]
		c. VERIFY charging IN SERVICE
		d. VERIFY letdown IN SERVICE.
		e. CHECK pressurizer level trending to 25% (normal range 20% to 30%).
Evaluator Not	developing pressure. RNO could trigger valu pressure a tripped the	& 9 are all " MONITOR " steps, the crew may continue in the procedure while RCS temperature and/or Pzr level trends as well as monitoring containment Since SI actuation is at 1.5 psig containment pressure, the following step I be the ES-0.1 exit point. However, the SRO may have previously set a le for MSIV closure/SI Actuation depending on the rate RCS cooldown/RCS nd the containment pressure rise. If attained, the crew may have previously reactor based on Prudent Operator Actions (POAs) and rules of usage from er's Guide and returned to E-0 step 1.
	RO	9. MONITOR pressurizer pressure control:
		a. Pressurizer pressure greater than 1870 psig (RNO Required)
	SRO	RNO: a. ENSURE SI ACTUATED. GO TO E-0, Reactor Trip or Safety Injection.

Appendix D		Requ	uired Op	erator Actions	;	<u></u>	Fo	rm ES	;-D-2
Op Test No.:	NRC 2010302	Scenario #	2	Event #	7, 8	Page	44	of	61
Event Descriptio	# Z IVI	lain Steam Line I y Pump 1B-B Dis	Break Insid sch Vlv Au	de Containment v to Open Failure	w/ 1A Cntmt Spray	Pump Shea	ared Sh	aft & C	ntmnt

Time	Position	Applicant's Actions or Behavior					
		E-0, Reactor Trip or Safety Injection					
	SRO	(Re-entry from ES-0.1 Reactor Trip Recovery)					
Evaluator No	te: SRO sho	build direct/verify FOLDOUT PAGE EVENT DIAGNOSTICS for SG					
depressurization during performance of the POAs							
	_						
	impleme	POAs implemented would then result in ALL MSIVs closed, SI actuation and ntation of Appendix E, Isolating AFW to Faulted S/G. Complete isolation is in is 1-4 inclusive. (Appendix E is attached following this event guide.)					
		(E-0) FOLDOUT PAGE					
Evaluator No	After ver	containment pressure is φB and Containment Spray (CSS) actuation setpoint. ifying CSS actuation & flow, operators should immediately stop RCPs.					
Evaluator No	opens 1-	2-2A, 1B CNTMT SPRAY HDR ISOL fails to open automatically. RO/BOP FCV-72-2A, 1B CNTMT SPRAY HDR ISOL on CSS actuation and verifies Jation & flow. Following this, RO/BOP should immediately stop RCPs.					
CRITICAL TA	SK #2: Manua equipme	Ily actuate at least the minimum complement of containment cooling nt before an extreme (red-path @ 12.0 psig) challenge develops to the pent CSF.					
		<u>RCP TRIP CRITERIA</u> IF any of the following conditions occurs:					
	0.7.0/	 RCS pressure less than 1250 psig AND at least one CCP or SI 					
	SRO/	pump running					
	RO	 OR Phase B isolation. 					
		THEN					
		STOP all RCPs.					
		EVENT DIAGNOSTICS					
		• IF any S/G pressure is dropping uncontrolled, THEN PERFORM the following:					
	RO/BOP	a. CLOSE MSIVs and MSIV bypass valves					
		 IF any S/G pressure continues to drop uncontrolled, THEN PERFORM the following: 					
	RO	1) ENSURE SI actuated.					
		 IF at least one S/G is intact (S/G pressure controlled or rising), THEN ISOLATE AFW to faulted S/G(s): 					
		CLOSE AFW level control valves for faulted S/G(s)					
		 IF any AFW valve for faulted S/G CANNOT be CLOSED, THEN PERFORM Appendix E, Isolating AFW to Faulted S/G. 					

Appendix D		Required Operator Actions							S-D-2
Op Test No.:	NRC 2010302	Scenario #	2	Event #	7, 8	Page	45	of	61

Event Description:

#2 Main Steam Line Break Inside Containment w/ 1A Cntmt Spray Pump Sheared Shaft & Cntmnt Spray Pump 1B-B Disch Vlv Auto Open Failure

Time	Position	Applicant's Actions or Behavior
		 ENSURE at least one of the following conditions met: THEN ISOLATE AFW to faulted S/G(s):
		 total AFW flow greater than 440 gpm OR
		 Narrow Range level greater than 10% [25% ADV] in at least one intact S/G.
	SRO	Directs High level step performance/verification Starting with E-0 Step 1:
	RO	1. VERIFY reactor TRIPPED
	RO/BOP	2. VERIFY turbine TRIPPED
	RO/BOP	3. VERIFY at least one train of shutdown boards ENERGIZED
	RO/BOP	 4. DETERMINE if SI actuated: ECCS pumps RUNNING. Any SI alarm LIT [M-4D] (SI will be actuated)
		(RNO Required)DETERMINE if SI actuated
	RO/BOP	 RNO: DETERMINE if SI required: b. IF any of the following conditions exists: S/G pressure less than 600 psig, OR RCS pressure less than 1870 psig, OR Containment pressure greater than 1.5 psig, THEN ACTUATE SI.
Evaluator N	perform ES	os/actions appear attached to back of event guide. SRO assigns the BOP to S-0.5; therefore, all subsequent MCB actions will be performed by the RO until
	BOP	 PERFORM ES-0.5, Equipment Verifications WHILE continuing in this procedure.
	RO	 DETERMINE if secondary heat sink available: a. CHECK total AFW flow greater than 440 gpm.

Appendix D		Required Operator Actions					Form ES-D-2			
Op Test No.: NRC 2	2010302	Scenario #	2	Event #	7, 8	Page	_46	of	61	
Event Description:	#2 M	ain Steam Line E	Break Insi	de Containme	ent w/ 1A Cntmt Sprav I	Pump She	ared Sh	aft & C	ntmot	

#2 Main Steam Line Break Inside Containment w/ 1A Cntmt Spray Pump Sheared Shaft & Cntmnt Spray Pump 1B-B Disch VIv Auto Open Failure

Time	Position	Applicant's Actions or Behavior
		 b. CHECK narrow range level greater than 10% [25 ADV] in at least one S/G. c. CONTROL feed flow to maintain narrow range level between 10%
		[25% ADV] and 50% in all S/Gs.
		(Heat Sink is available from AFW:>440 gpm available.)
	RO	7. CHECK if main steam lines should be isolated:
		a. CHECK if any of the following conditions have occurred:
		 Any S/G pressure less than 600 psig OR
		 Any S/G pressure dropping UNCONTROLLED. OR
		Phase B actuation
		b. ENSURE MSIVs and MSIV bypass valves CLOSED
		c. ENSURE applicable Foldout Page actions COMPLETED
	RO	8. CHECK RCP trip criteria:
		a. CHECK the following:RCS pressure less than 1250 psig.
		AND
		 At least one CCP OR SI pump RUNNING b. STOP RCPs
		5. 510F 1(6F3
	RO	 9. MONITOR RCS temperatures: IF any RCP running, THEN CHECK T-avg stable at or trending between 547°F and °F OR
		 IF RCPs stopped, THEN CHECK T-cold stable or trending to between 547°F and 552°F
	RO	10. CHECK pressurizer PORVs, safeties, and spray valves: a. Pressurizer PORVs CLOSED.
		b. Pressurizer safety valves CLOSED.c. Normal spray valves CLOSED.

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Appendix D		Required Operator Actions						Form ES-D-2				
Op Test No.:	NRC 2010302	Scenario #	2	Event #	7, 8	Page	47	of	61			
Event Description	on: #	2 Main Steam Line F	Break Insi	de Containment	w/ 1A Cotmt Spra	W Pump Sho	arad Sh	off & C	ntmnt			

#2 Main Steam Line Break Inside Containment w/ 1A Cntmt Spray Pump Sheared Shaft & Cntmnt Spray Pump 1B-B Disch VIv Auto Open Failure

Time	Position	Applicant's Actions or Behavior						
		d. Power to at least one block valve AVAILABLE.e. At least one block valve OPEN.						
	CREW	 11. DETERMINE S/G secondary pressure boundaries are INTACT: CHECK all S/G pressures CONTROLLED or RISING. CHECK all S/G pressures greater than 140 psig. 						
		(RNO Required)						
		RNO:						
	SRO	PERFORM the following:						
Evaluator No	When a F the Board UNIT 1 S	E-2 transition, the crew will implement status tree monitoring via SPDS. RED or ORANGE path status tree is observed, the SRO will designate one of d operators (typically the BOP) to verify status tree conditions using 1-FR-0 , TATUS TREES . Once verified, the SRO should direct the crew to transition propriate RED or ORANGE path procedure(s).						
	During E	$-0 \rightarrow E-2$ performance in this scenario, containment pressure will meet entry s for FR-Z.1, High Containment Pressure. It follows this event guide.						
		a. MONITOR status trees.						
		b. GO TO E-2, Faulted Steam Generator Isolation.						
		Crew transitions to E-2, Faulted Steam Generator Isolation.						

Appendix D		Required Operator Actions C 2010302 Scenario # 2 Event # 7, 8							S-D-2
Op Test No.:	NRC 2010302	Scenario #	2	Event #	7, 8	Page	48	of	61
Event Description		1ain Steam Line B	Break Insi	ide Containmen	it w/ 1A Cntmt Spray	_ 0		•	
	Spra	ay Pump 1B-B Dis	ch Vlv Ai	uto Open Failur	e	•			

Time	Position	Applicant's Actions or Behavior
		E-2, Faulted Steam Generator Isolation
Evaluator No	ote: Critical Ta isolation)	ask #1: Isolate the faulted SG before transition out of E-2 (Time Critical Action: AFW
START TIME		_ (From E-0 Entry)
END TIME:		
	CAUTION: U U	Inisolating a faulted S/G or secondary break should NOT be considered INLESS needed for RCS cooldown.
Critical Task	BOP	1. CHECK MSIVs and MSIV bypass valves CLOSED.
	BOP	2. CHECK ANY S/G secondary pressure boundary INTACT:
		Any S/G pressure CONTROLLED or RISING
	BOP	3. IDENTIFY Faulted S/G(s):
		a. CHECK S/G pressures:
		Any S/G pressure DROPPING in an uncontrolled manner.
		OR
		Any S/G pressure less than 140 psig.
	CAUTIONS:	 Secondary heat sink requires at least one S/G available.
		 If the TD AFW pump is the only source of feed flow, isolating both steam supplies will result in loss of secondary heat sink.
		4. ISOLATE Faulted S/G(s):
	BOP	a. ENSURE MFW isolated to faulted S/G(s) by any of the following:
		feedwater isolation valve CLOSED [M-4]
		OR

Appendix D	Re	Required Operator Actions						Form ES-D-2				
Op Test No.: NRC :	2010302 Scenario #	2	Event #	7, 8	Page	49	of	61				
Event Description:	#2 Main Steam Line	e Break Ins	ide Containment v	w/ 1A Cotmt Sora	W Pump She	ared Sh	off 8 C	ntmat				

#2 Main Steam Line Break Inside Containment w/ 1A Cntmt Spray Pump Sheared Shaft & Cntmnt Spray Pump 1B-B Disch VIv Auto Open Failure

Time	Position	Applicant's Actions or Behavior
		E-2, Faulted Steam Generator Isolation
		 feedwater regulating valve and bypass valve CLOSED [M-3].
	BOP	b. ENSURE AFW isolated to faulted S/G(s):
		CLOSE MD AFW LCV
		CLOSE TD AFW LCV and PLACE in PULL TO LOCK.
	BOP	c. CHECK S/G #1 or #4 faulted.
	BOP	(RNO required)
		RNO:
		c. GO TO Substep 4.e.
	BOP	d. VERIFY S/G blowdown valves CLOSED.
<u> </u>		
	BOP	e. VERIFY atmospheric relief CLOSED.
	BOP	5. CHECK CST level greater than 5%.
	BOP	6. VERIFY secondary radiation NORMAL:
		 a. CHECK secondary radiation NORMAL USING Appendix A, Secondary Rad Monitors. (App. A also contained in ES. 0.5)
		(App. A also contained in ES-0.5)
		b. NOTIFY Chem Lab to take S/G activity samples.

Appendix D	Required Operator Actions						Form ES-D				
Op Test No.:	NRC 2010302	Scenario #	2	Event #	7, 8	Page	50	of	61		
Event Description	:: #2 M	ain Steam Line E	Break Insi	de Containme	nt w/ 1A Cntmt Spray I	Pump Shea	ared Sh	aft & C	ntmnt		

#2 Main Steam Line Break Inside Containment w	/ 1A Cntmt Spray	Pump Sheare
Spray Pump 1B-B Disch Vlv Auto Open Failure		•

Time	Position	Applicant's Actions or Behavior
		E-2, Faulted Steam Generator Isolation
	BOP	c. WHEN Chem Lab is ready to sample S/Gs, THEN PERFORM the following:
		1) ENSURE FCV-15-43 Blowdown Flow Control valve CLOSED.
		2) ENSURE Phase A signal RESET.
		3) OPEN blowdown isolation valves.
		d. NOTIFY RADCON to survey main steam lines and S/G blowdown.
		e. WHEN S/G samples completed, THEN CLOSE blowdown isolation valves.
	RO/ SRO	7. CHECK SI termination criteria:
		a. RCS subcooling based on core exit T/Cs greater than 40°F.
	BOP	b. Secondary heat sink:
		 Narrow range level in at least one Intact S/G greater than 10% [25% ADV]
		OR
		Total feed flow to Intact S/Gs greater than 440 gpm.
	RO	c. RCS pressure stable or rising.
	RO	d. Pressurizer level greater than 10% [20% ADV].
	SRO	e. GO TO ES-1.1, SI Termination.

Appendix D		Required Operator Actions							
Op Test No.:	NRC 2010302	Scenario #	2	Event #	7, 8	Page	51	of	61
Event Descriptio	//	Main Steam Line E ay Pump 1B-B Dis			w/ 1A Cntmt Spra	ay Pump She	ared Sh	aft & C	ntmnt
Time	Position			Applicant's	Actions or Beh	avior			
		E-2, Faulte	ed Stea	m Generator	Isolation				
	SRO	8. GO TO E	-1, Los	s of Reactor o	r Secondary (Coolant.			
			•						
					END				

Lead Examiner may terminate the scenario at E-2 Step 7.e, SI Termination criteria determination.

Appendix D		Requ	iired Op	perator Action	IS		For	rm ES	3-D-2
Op Test No.:	NRC 2010302	Scenario #	2	Event #	7, 8	Page	52	of	61
Event Descriptio	·····	Main Steam Line E ay Pump 1B-B Dis	Break Ins sch Vlv A	ide Containment uto Open Failure	t w/ 1A Cntmt Spray F e	^v ump Shea	ared Sh	aft & C	ntmnt

(Los:	FR-Z.1, High Containment Pressure s procedure has been entered for an orange path and performance of ECA-1. s of RHR Sump Recirculation) is required, FR-Z.1 may be performed surrently with ECA-1.1.
(Los: conc	s of RHR Sump Recirculation) is required, FR-Z.1 may be performed
RO	
	1. MONITOR RWST level greater than 27%.
RO	2. VERIFY Phase B valves CLOSED:
	Panel 6K PHASE B GREEN
	Panel 6L PHASE B GREEN.
RO	3. ENSURE RCPs STOPPED.
SRO	4. DETERMINE if this procedure should be exited:
BOP	a. CHECK for faulted S/G:
	 Any S/G pressure DROPPING in an uncontrolled manner OR
	 Any S/G pressure less than 140 psig.
RO	b. CHECK containment pressure less than 12 psig.
cooling eq containme	
(ES-0.5 St	ep 13 directs completion by BOP during procedure performance.)
RO	c. CHECK at least one containment spray pump RUNNING and delivering flow.
BOP	d. CHECK at least one containment air return fan RUNNING. <i>(RNO required)</i>
	RNO:
BOP	d. WHEN 10 minutes have elapsed from Phase B actuation, THEN ENSURE air return fans RUNNING.
SRO	e. RETURN to procedure and step in effect.
	SRO BOP RO Critical Ta cooling equ containmen (ES-0.5 Sta RO BOP BOP

Appendix D	Requ		Form E	orm ES-D-2		
Op Test No.: <u>NRC 20</u> Event Description:	#2 Main Steam Line I	2 Event # Break Inside Containment v sch VIv Auto Open Failure	7, 8 v/ 1A Cntmt Spra	Page	53 of	<u>61</u> Cntmnt
SQN	REACTOR	TRIP OR SAFETY INJ	ECTION	E-0		

,	MICOTION	E-V		
	INJECTION	Rev.	32	

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APPENDIX E

ISOLATING AFW TO FAULTED S/G

1.	THE	notor-driven AFW LCV for faulted S/G CANNOT be closed, EN RFORM the following:	
	a.	IF at least one <u>other</u> AFW pump is available, THEN PLACE affected MD AFW pump in PULL TO LOCK.	
	b.	ENSURE at least one of the following:	
		total AFW flow greater than 440 gpm	
		OR	
		 narrow range level greater than 10% [25% ADV] in at least one intact S/G. 	
	C.	DISPATCH personnel to locally isolate MD AFW to faulted S/G USING EA-3-11, Local Isolation of MD and TD AFW.	
	d.	WHEN MD AFW flowpath to faulted S/G is locally isolated, THEN	
		ENSURE affected MD AFW pump RUNNING.	

					;		101		-D-2
Op Test No.: NR	C 2010302	Scenario #	2	Event #	7,8	Page	54	of	61
Event Description:	#2 N Spra	lain Steam Line E y Pump 1B-B Dis	Break Insid sch VIv Au	de Containment v ito Open Failure	w/ 1A Cntmt Spra	y Pump Shea	ared Sha	aft & C	ntmnt

SQN	REACTOR TRIP OR SAFETY INJECTION	E-0 Rev. 32
JUN	REACTOR TRIP OR SAFETY INJECTION	Rev. 3

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APPENDIX E

ISOLATING AFW TO FAULTED S/G

NOT	Έ	TI to	DAFW pump steam supply will automatically swap from S/G #1 S/G #4 after 60 second time delay when FCV-1-17 or -18 is closed.	
2.	THE	EN	-driven AFW LCV for faulted S/G CANNOT be closed, If the following:	
	а.	an in THE	least one MD AFW pump is available to supply tact S/G, N SE FCV-1-17 or FCV-1-18 to stop TD AFW flow.	
	b.	ENS	URE at least one of the following:	
			total AFW flow greater than 440 gpm OR	
		•	narrow range level greater than 10% [25% ADV] in at least one intact S/G.	
	C.	DISP USIN	ATCH personnel to locally isolate TD AFW to faulted S/G G EA-3-11, Local Isolation of MD and TD AFW.	
	d.	THE	N TD AFW flowpath to faulted S/G is locally isolated, N FORM the following:	
		T E	⁵ S/G #1 or 4 is faulted, HEN NSURE steam supply from faulted S/G isolated y closing FCV-1-15 (S/G #1) or FCV-1-16 (S/G #4).	
		2) E	NSURE FCV-1-17 and FCV-1-18 OPEN.	
		3) E	NSURE TD AFW pump RUNNING.	

END OF TEXT

Appendix D		Requ	ired Ope	rator Actions	;		For	m ES	i-D-2
Op Test No.: Event Descript	NRC 2010302 tion: Equ	Scenario #	 IS	Event #	ES-0.5	Page	55	of	61
Time	Position			Applicant's	Actions or Beha	avior			
		ES-0.5, E	QUIPME	NT VERIFIC	ATIONS				
Evaluator N	Note: BOP com (including	pletes ES-0.5 i any discrepa	ncludin ncies ar	g Appendice Id actions ta	es A & B and i sken) to SRO.	reports co	omplet	ion	<u></u>
	BOP	1. VERIFY [D/Gs RU	NNING.					
	BOP	2. VERIFY [)/G ERC	W supply va	lves OPEN.				
	BOP	3. VERIFY a	at least fo	our ERCW pu	umps RUNNIN	G			
	BOP		1A-A (2A 1B-B (2B	-A)	G				
	BOP	5. VERIFY E	GTS far	ns RUNNING	i.				
	BOP	6. VERIFY g	enerator	breakers Of	PEN.				
	Crew	7. NOTIFY a actions.	ıt least tv	vo AUOs to r	report to MCR	to be avai	lable fo	or loca	¥
	ВОР	8. VERIFY A a. MD Af b. TD AF	FW pump	os	G:				

Appendix D		Required Operator Actions Form ES-D-2
Op Test No.: Event Descriptio	NRC 2010302	Scenario # <u>2</u> Event # <u>ES-0.5</u> Page <u>56</u> of <u>61</u>
Time	Position	Applicant's Actions or Behavior
		ES-0.5, EQUIPMENT VERIFICATIONS
	NOTE: AFW taken S/G.	level control valves should NOT be repositioned if manual action has been to control S/G levels, to establish flow due to failure, or to isolate a faulted
	BOP	 9. CHECK AFW valve alignment: a. VERIFY MD AFW LCVs in AUTO. b. VERIFY TD AFW LCVs OPEN. c. VERIFY MD AFW pump recirculation valves FCV-3-400 and FCV-3-401 CLOSED.
	BOP	 10. VERIFY MFW Isolation: a. MFW pumps TRIPPED b. ENSURE the following: MFW regulating valves CLOSED MFW regulating bypass valve controller outputs ZERO MFW isolation valves CLOSED
	BOP	 11. MONITOR ECCS operation: a. VERIFY ECCS pumps RUNNING: CCPs: RHR pumps
		SI pumps
		b. VERIFY CCP flow through CCPIT.
		c. CHECK RCS pressure less than 1500 psig.
		 d. VERIFY SI pump flow. e. CHECK RCS pressure less than 300 psig.
		f. VERIFY RHR pump flow.
	BOP	 12. VERIFY ESF systems ALIGNED: a. Phase A ACTUATED: PHASE A TRAIN A alarm LIT [M-6C, B5]. PHASE A TRAIN B alarm LIT [M-6C, B6].

Appendix D	······	Required Operator Actions				Form ES-D-2			
Op Test No.: _	NRC 2010302 n: Equi	Scenario # pment verificatior	 ns	Event #	ES-0.5	Page	57	of _	61
Time	Position			Applicant's	Actions or Beha	vior			
		ES-0.5, E	QUIPM		ATIONS				
		• C	NTMT		UATED: TION TRAIN A TION TRAIN B				
		• 6 • 6 • 6 • 6	C DARI D DARI	≺ ∕UTSIDE outli	ned area				
		• C	NTMT '	is panel 6K: VENT GREEI A GREEN	N				
		• 0	NTMT	is panel 6L: √ENT GREEI ∖ GREEN	N				
Evaluator Not	cooling equ CSF	ipment before	an extr	eme (red-patl	e minimum con n) challenge de	velops to	the cor		
					ring procedure ray and Phase				
	BOP	a. CHE • P OR	C K for a hase B	any of the follo ACTUATED	-		л . .		

Appendix D		Required Operator Actions	Form ES-D-2
Op Test No.:	NRC 2010302 : Equi	Scenario # _ 2 Event # _ ES-0.5 Page	<u>58</u> of <u>61</u>
Time	Position	Applicant's Actions or Behavior	
		ES-0.5, EQUIPMENT VERIFICATIONS	
		b. VERIFY containment spray INITIATED:	······································
Critical Task:	1-FCV-72-2, manually ope	1B Containment Spray Pump Discharge Valve, fails to ope ons 1-FCV-72-2	en; RO/BOP
Critical Task		 Containment spray pumps RUNNING. Containment spray header isolation valves FCV-72-2 OPEN. Containment spray recirculation valves to RWS FCV-72-13 CLOSED. 	
		 4) Containment spray header flow greater that train. 5) Panel 6E LIT. 	n 4750 gpm per
		 c. VERIFY Phase B ACTUATED: PHASE B TRAIN A alarm LIT [M-6C, A5]. PHASE B TRAIN B alarm LIT [M-6C, A6]. d. ENSURE RCPs STOPPED. 	
		 e. VERIFY Phase B valves CLOSED: Panel 6K PHASE B GREEN. Panel 6L PHASE B GREEN. f. WHEN 10 minutes have elapsed, THEN ENSURE return fans RUNNING.	containment air
		14. MONITOR if containment vacuum relief isolation valve closed:	
		 a. CHECK containment pressure greater than 1.5 ps b. CHECK cntmnt vacuum relief isolation valves CLC [PnI 6K MANUAL] FCV-30-46 FCV-30-47 FCV-30-48. 	-

Appendix D		Required Operator Actions Form ES-D-2
Op Test No.:	NRC 2010302	Scenario #Event #ES-0.5 Page 59 of 61
Event Description	on: Equ	ipment verifications
	1	
Time	Position	Applicant's Actions or Behavior ES-0.5, EQUIPMENT VERIFICATIONS
	BOP	 15. CHECK secondary and containment rad monitors USING the following: Appendix A, Secondary Rad Monitors (attached) Appendix B, Containment Rad Monitors. (attached)
	BOP	 WHEN directed by E-0, THEN PERFORM Appendix D, Hydrogen Mitigation Actions.
		 17. CHECK pocket sump pumps STOPPED: [M-15, upper left corner] HS-77-410, Rx Bldg Aux Floor and Equipment Drain Sump pump A HS-77-411, Rx Bldg Aux Floor and Equipment Drain Sump pump B.
	BOP	18. DISPATCH personnel to perform EA-0-1, Equipment Checks Following ESF Actuation.
	ВОР	19. ENSURE plant announcement has been made regarding Reactor Trip and SI.
Evaluator No	(including	bletes ES-0.5 including Appendices A & B and reports completion any discrepancies and actions taken, i.e.: containment Spray operating
	aiscrepan	cies per ES-0.5 Step 13) to SRO. END (ES-0.5, EQUIPMENT VERIFICATIONS)

Appendix D		Req	uired Ope	erator Actio	ons		For	m ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	2	Event #	ES-0.5	Page	60	of	61
Event Descriptio	on: Equip	ment verificatio	ns						

	(ES-0.5, EQUIPMENT VERIFICATIONS)
	APPENDIX A SECONDARY RAD MONITORS
BOP	1. CHECK following rad monitors including available trends prior to isolation:
	 Condenser exhaust recorder RR-90-119 S/G blowdown recorder RR-90-120 Main steam line rad monitors Post-Accident Main Steam Line rad recorder RR-90-268B points 3 (blue), 4 (violet), 5 (black), and 6 (brown). [M-31 (back of M-30)]
BOP	2. IF secondary radiation is HIGH, THEN ENSURE Unit Supervisor notified.
	END OF TEXT

	APPENDIX B
	CONTAINMENT RAD MONITORS
BOP	 CHECK following rad monitors: Upper containment high range rad monitors RM-90-271 and RM-90-272 NORMAL [M-30] Lower containment high range rad monitors RM-90-273 and RM-90-274 NORMAL [M-30] Containment rad recorders RR-90-112 and RR-90-106 NORMAL [M-12] (prior to isolation).
BOP	 IF secondary radiation is HIGH, THEN ENSURE Unit Supervisor notified.
	END OF TEXT

Appendix D	Required Operator Actions	Fc	orm ES-D-2
Op Test No.:	NRC 2010302 Scenario # 2 Event # Critical T	asks Page <u>61</u>	of <u>61</u>
Event Description:	Critical Task Listing		
		I	r
Critical Tasks:	Critical Task Statement	Action Location	ESG pg #
1.	Isolate the faulted SG before transition out of E-2	E-2 Steps 1-4	48
2. Manually actuate at least the minimum complement of E-0 F containment cooling equipment before an extreme (red-path) Page		E-0 FOLDOUT Page response	44*
		ES-0.5 Step 13	58

Procedure and step that operator actions satisfy this Critical Task are expected to be performed; similar actions are directed several times in the expected procedural path for this Critical Task. *

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FR-Z.1 Step 4.c

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Sequoyah Nuclear Plant

Unit 1 & 2

Bh-2

General Operating Instructions

0-GO-5

NORMAL POWER OPERATION

Revision 0065

Quality Related

Level of Use: Continuous Use

Effective Date: 03-12-2010

Responsible Organization: OPS, Operations

Prepared By: W. T. Leary

Approved By: P. R. Simmons

Current Revision Description

Revised to address requirements overlooked in the initial issuance of the guidance for compliance with NERC Reliability Standards, VAR-002. These changes make no alteration to the operation of any equipment and are changes to required administrative notifications only. These changes are therefore minor editorial changes as defined in SPP-2.2.

PERFORMANCE OF THIS PROCEDURE IMPACTS REACTIVITY.

1

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ATTACHMENTS

Attachment 1: NORMAL POWER OPERATION

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1.0 INTRODUCTION

1.1 Purpose

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This General Operating (GO) Instruction provides guidance for power ascension from approximately 30 to 100% power, at power conditions, power reduction from 100 to 30% power, Power Coastdown at End of Life operations, and Load Follow operations.

This instruction provides additional guidance for turbine control restoration following a turbine runback.

1.2 Scope

This GO contains the following sections:

- 5.1 Power Ascension From 30% Power to 100%
- 5.2 At Power Conditions
- 5.3 Power Reduction From 100% to 30%
- 5.4 Power Coastdown at End of Life
- 5.5 Load Follow Operations

2.0 **REFERENCES**

SQN

Unit 1 & 2

2.1 Performance References

- A. 1,2-SO-5-1, Feedwater Heaters and Moisture Separator Reheaters
- B. 1,2-SO-5-2, No. 3 Heater Drain Tank and Pumps
- C. 1,2-SO-5-3, No. 7 Heater Drain Tank and Pumps
- D. 1,2-SO-2/3-1, Condensate and Feedwater System
- E. 1,2-SO-2-9, Condenser Vacuum and Turbine Steam Seal Systems Operation
- F. 0-SO-12-1, Auxiliary Boiler System
- G. 0-SO-35-4, Monitoring Generator Parameters
- H. 0-SO-58-1. Main Generator Bus Duct Cooling System
- I. 0-SI-NUC-000-038.0, Shutdown Margin
- J. 1,2-SO-62-1, Chemical and Volume Control System
- K. 0-SO-62-7, Boron Concentration Control
- L. 1,2-SO-62-9, CVCS Purification System
- M. 0-SO-68-3, Pressurizer Spray and Heater Pressure Control System
- N. 0-SO-85-1, Control Rod Drive System
- O. 0-PI-OPS-000-666.0, River Temperature Limits Specified by NPDES permit
- P. 0-SI-OPS-092-078.0, Power Range Neutron Flux Channel Calibration By Heat Balance Comparison
- Q. 0-SI-CEM-000-050.0, 72-Hour Chemistry Requirements
- R. 0-SI-CEM-030-407.2, Radioactive Gaseous Waste Effluent Particulate and Iodine Dose Rates from Shield and Auxiliary Building Exhausts (Weekly/Special) and Condenser Vacuum Exhausts (Special)
- S. 0-SI-CEM-030-415.0, Gaseous Effluent Requirements (Gross Alpha, Noble Gas and Tritium
- T. 0-SI-OPS-000-001.0, Initial Startup System Parameter Log
- U. TI-40, Determination of Preconditioned Reactor Power

2.1 Performance References (continued)

V. 2-SO-98-1, Distributed Control System

2.2 Developmental References

- A. Memorandum from System Engineering concerning MSR operation RIMS S57 880322 999
- B. Memo from Reactor Engineering RIMS S57 941219 934
- C. S57-880322-999 and S57-880808-851
- D. <u>W</u> Letter GP89-076 (RIMS No. S53 890427 984)
- E. <u>W</u> Letter GP 89-155 (RIMS S57 891026 972)
- F. <u>W</u> Letter GP 86-02(B44 861112 002)
- G. SSP-2.3, Administration of Site Procedures
- H. TVA-NQA-PLN89-A
- I. GOI-10, Reactivity Control at End of Cycle Life (Trojan Nuclear Plant)
- J. FSAR, Section 13.5
- K. Memo from Reactor Engineering August 6, 1996 (G Bair)
- L. NERC Reliability Standard, VAR-002-1.1b

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Precautions

To ensure that NIS Reactor Power level indications remain within 2% of true power during power level changes, a check should be performed about every 20% power level change, when greater than 15% power, by comparing calorimetric power to each NIS Power Range drawer. The 20% power level check does not preclude the operating crews from making necessary changes in response to changing plant conditions.



TRM 3.3.3.15 requires LEFM core thermal power (U2118) to be used to perform 0-SI-OPS-092-078.0 above 15% reactor power. LEFM indication is available if the following conditions are met:

- LEFM status NORMAL on ICS Calorimetric Data screen.
- [LEFM core thermal power (ICS point U2118) shows good (green) data.
- (XEFM MFW header temp (ICS point T8502MA) greater than or equal to 250°F.

IFLEFM indication is NOT available above 15% reactor power, then TR 3.3.3.15 action must be entered.

The following should be used to determine the most accurate reactor power indication for comparison with NIS:



When reactor power is greater than 15%, use LEFM calorimetric power indication (U2118).



✓If LEFM is NOT available, then use average loop △T (UO485 or M-5 indicators) up to 40%. Above 40%, use computer point U1118.

The turbine should be operated in "IMP OUT" control during normal unit operation. "IMP IN" operation results in system swings and should only be used during the performance of valve tests. (W Ltr GP 89-155; RIMS S57 891026 972)



Pressurizer heaters and sprays may be operated as required to maintain pressurizer and RCS boron concentration within 50 ppm. If loop boron concentration is changed by 20 ppm or greater, use the pressurizer backup heaters to initiate automatic spray (if available). If Normal Spray is NOT available, then use Auxiliary Spray (1, 2-SO-62-1, Section 8.7) in conjunction with pressurizer backup heaters.

Condensate DI polishing operations during power ascension are controlled by staying within system parameters and by recommendations from the Chemistry Section.

The valve position limiter should be periodically positioned approximately 10% above the current governor control indications (keeps governor valves off of the limiter) as turbine load is changed. This prevents inadvertent load increases by limiting governor valve opening and allows a faster response of the runback feature which ensures main feedwater system will supply the required amount of flow.

Any off-frequency turbine operation is to be reported to Engineering for record keeping. The report will include duration and magnitude of off-frequency operation.

Operation at off-frequencies is to be avoided in order to prevent the probable occurrence of turbine blade resonance. Prolonged periods of operation at certain off-design frequencies could cause excessive vibratory stresses which could eventually generate fatigue cracking in the blades. Off-frequency operation is permitted to the degree and time limit specified on the chart "Off-Frequency Turbine Operation", Figure A.26 of TI-28.

The potential exists for condensation formation in steam extraction lines when feedwater heaters are isolated.



Initial Startup After Refueling - After refueling operations, the NIS indications may be inaccurate until calibration at higher power levels. The NIS calibration procedures will adjust the PRM trip setpoints to ensure that the excore detectors do not contribute to an overpower condition at the following RTP hold points. Reactor Engineering and/or Systems Engineering will determine procedure performance. [C.3]

At < 50% RTP a flux map and single point alignment, a hot channel factor determination, an axial imbalance comparison, and a PR NIS calibration will be performed. The PR high range trip setpoint will then be increased to its normal value of 109%.



At < 75% RTP, calorimetric calculations and RCS flow verification may be performed, EAGLE-21 updated prior to increasing power, a flux map, a hot channel factor determination, an axial imbalance comparison may be required if not performed at < 50%, a detector calibration (if \triangle AFD \ge 3%), and a PR NIS calibration may be performed.

If not performed at 75% hold point, an axial imbalance comparison and a detector calibration (if \triangle AFD \ge 3%) should be performed at ~ 100% RTP. Engineering will determine if PR NIS calibration must be performed. Calorimetric calculations, RCS flow verification, a hot channel factor determination, and a reactivity balance will be performed and EAGLE-21 updated. Reactor Engineering will notify Operations that normal full power operations may proceed.



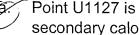
Preconditioned Power Levels and Maximum Allowable Rates of Power Increase are specified in TI-40, Determination of Preconditioned Reactor Power.



During initial startups, based on Westinghouse recommendations, a lower power ramp rate limit has been implemented for power levels above the intermediate power threshold. The Intermediate Power Threshold is unit/cycle dependent and is determined by the Vendor. Refer to TI-40.



ICS will automatically monitor pre-conditioned power level as follows:



Point U1127 is reactor power in percent of RTP based on either secondary calorimetric or RCS ΔT depending on power level.



Point UO103 is a 20 minute rolling average of reactor power rate-of-change fitted over a 20 minute period. UO103 is a leading indicator of %/hour power ramp rate and can be used in deciding to speed up or slow down the ramp rate.



Point UO104 is a 1 hour rolling average of reactor power rate-of-change fitted over a 1 hour period. UO104 is used in demonstrating compliance with fuel pre-conditioning power ramp rate limits.



Point K0058 is the currently qualified (or pre-conditioned) power level.

These points can all be monitored with the ICS group display "TI40". Appendix A may be used if the ICS is unavailable.

Declared fuel defects, as determined by the Fuel Reliability Assessment Team or the Shift Manager, have limited ramp rates during Reactor Power increases as specified in TI-40.

TI-40 power increase limits that are exceeded, in any one hour, are evaluated in accordance with SPP-3.1.

Power Coastdown At End Of Life:

Reactor power changes should be limited to less than or equal to 1% per hour to avoid causing xenon peaking which could force a plant shutdown.

⁹ Do not perform unnecessary unit power maneuvers or testing (e.g., turbine valve testing). Such testing could result in an uncontrollable Xenon oscillation.



Nonessential work on systems which could cause a plant upset should be deferred.

Secondary Plant runbacks such as Main Feed Pump Turbine trip or #3 Heater Drain Tank runback will require a unit shutdown if Reactor power is not promptly returned to pre-transient level due to the resulting severe Xenon transient. If a system power alert is in effect, and electrical generation is critical, unit load should be reduced as necessary keeping T_{AVG} on program. Contact Reactor Engineering for an evaluation and guidance concerning unit shutdown or reduction of load.

Management should be consulted to evaluate the feasibility of a unit restart if a reactor trip occurs with RCS equilibrium boron concentration less than 50 ppm. If the reactor is to be restarted, the power level shall be limited to nominal pre-trip power level.

Axial Flux Difference Management:

When the reactor is operating at a steady power or during normal load changes, maintain ΔI within the operating limits of the Core Operating Limits Report (COLR). It is recommended that the core axial flux difference (AFD) be maintained within \pm 5% of the target band at all times, excluding the performance of 0-PI-NUC-092-036.0, "Incore - Excore Calibration," and End of life power coast downs. Operating time outside the band, which is given in TI-28 Attachments 1 and 2, should be minimized. Reactor Engineering should be contacted if time out of the \pm 5% target band exceeds approximately 30 minutes.

The position of control bank D should normally be ≥ 215 steps when power level is steady state at or above 85% RTP. At steady state power levels below 85%, control bank D should normally be ≥ 165 steps. If rod position is more than 5 steps below this guidance for long term, then impact may occur to safety analysis assumptions.

During heatup and cooldown transients, RCS density changes will cause changes in NIS indicated power. At constant reactor power, a 1°F change in T_{AVG} may cause as much as a 1% (or more) change in indicated NIS power.



The following limitations are applicable to Unit Two ONLY.

In winter months #7 HDTP capacity is not adequate to pump #6 Heater drains when all Condensate Demineralizer pumps are in service. Current practice is to run two Cond DI Pumps and / or throttle the condensate system to reduce backpressure. The preferred method is to throttle condensate pressure instead of running only two Condensate Demineralizer booster pumps at full power due to pump runout concerns.

Siemens-Westinghouse analysis has determined that the maximum unit power with one MFP operation is 65% under worst case conditions. The plant could operate higher if plant conditions permit.

MFP flow from the lead MFP should not exceed 53.7% of the total flow. Flow rates above this would result in HP steam flow to the lead MFPT. Computer points 1(2)UO504 and UO505 can be used to monitor.

Voltage Control



Failure to comply with the NERC VAR-002 requirement could result in a Utility Violation and / or monetary penalties.



Operation of the Main Generator without Automatic Voltage Control could impact grid voltage requirements. Refer to GOI-6 for MVAR limits.



When the Main Generator is connected to the grid, the voltage regulator shall be operated in Automatic, unless coordinated with the Transmission Operator (SELD).



Main Generator operation outside of the Transmission Voltage Schedule requires coordination with the Transmission Operator, and notation in the operator's Log of time, reason, and that the Transmission Operator notification was made.



When directed to modify voltage, the Generator Operator shall comply (within plant procedural requirements) or provide an explanation of why the schedule cannot be met.



While the Main Generator is tied to the grid perform the following:

The Transmission Operator (SELD) shall be notified of any Voltage Regulator automatic trips to Manual or urgent Manual Transfers between AUTO and Manual as soon as practical but notification shall be within 30 minutes.

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The Transmission Operator (SELD) shall be notified prior to a planned Voltage Regulator transfers between Manual and Auto.

É. I

All position changes (to and from Auto or Manual) of the Voltage Regulator shall be entered into the Narrative Log along with the date, time of position change, reasons, anticipated duration and notifications made.

Reliability Directives and Protective Relay/Equipment Failures

Failure to comply with the NERC VAR-002 requirement could result in a Utility Violation and / or monetary penalties.

NOTE

Plant Operations shall notify the Transmission Balancing Authority (BA) or Transmission Operator of protective relay or equipment failures that creates a creditable risk to Plant Generation. A creditable risk to generation represents a potential reduction in transmission system reliability.

Reliability Directives to the Generator Operator are via the Balancing Authority or Transmission Operator. Required action time may range from immediate to no longer than 30 minutes. Actions shall be taken without delay. The directives may be associated with preventing or clearing Local System issues, or neighboring system issues.

8.

Plant operations shall take timely actions as directed by the Balancing Authority or Transmission Operator to mitigate critical conditions to return the bulk electrical system to a reliable state. Plant operations shall comply with Balancing Authority or Transmission Operator directives unless such actions would violate safety, equipment, or regulatory or statutory requirements.

A.

Plant Operations shall immediately inform the Balancing Authority or Transmission Operator of the inability to perform directives so that the TVA Reliability Entities may implement alternate remedial actions.

3.2 Limitations



When the axial flux difference monitor alarm is inoperable, the AFD must be logged every hour by performing 0-SI-NUC-000-044.0.

(SR 4.2.1.1.a.2 & 4.2.1.1.b)



When both the plant computer and NIS QPTR alarm systems are inoperable, the QPTR must be calculated every 12 hours by performing 0-SI-NUC-000-133.0. (SR 4.2.4.1.b)



Do not exceed a load change rate of plus or minus 5% per minute or a step change of 10%.

River water temperatures shall be maintained within the limitations of the NPDES permit as specified in 0-PI-OPS-000-666.0.



Westinghouse should be contacted if the turbine is operated outside of its operating limits as stated below.

To prevent high vibratory stresses and fatigue damage to the last stage turbine blading, do not operate the turbine outside of limits listed below:
 [W Ltr GP 86-02 (B44 861112 002)]



At loads less than or equal to 30% (350 MW), the maximum permissible backpressure is 1.72 psia. (3.5" Hg)



At loads greater than 30%, the maximum permissible backpressure is 2.7 psia (5.5" Hg) with a 5 minute limitation before tripping the turbine.

Do not allow the generator to become underexcited.

In the event of a change in the rated thermal power level exceeding 15% in one hour, notify Chemistry to initiate the conditional portions of 0-SI-CEM-000-050.0, 0-SI-CEM-030-407.2 and 0-SI-CEM-000-415.0 due to the thermal power change.

3.2 Limitations (continued)

The following Main Turbine vibration limitations and actions should be adhered to:

Vibration levels which exceed 7 mils (alarm setpoint) should be verified by Predictive Maintenance Group.

Vibration levels greater than 7 mils and less than 14 mils should be continuously monitored by Predictive Maintenance Group.

IF vibration level is greater than or equal to 14 mils, THEN TRIP the turbine.

Westinghouse recommends that if any throttle valve is held closed for more than 10 minutes, then it should be re-tested immediately upon reopening in accordance with 1,2-PI-OPS-047-002.0.

The generator may be operated without a bus duct cooler up to approximately 729 MW turbine load.

To ensure sufficient voltage for a safe shutdown after loss of both units, voltage and reactive power should be maintained within the limits of GOI-6.

With LEFM calorimetric power indication available, full power operation is defined as approximately 3455 MW_T not to exceed 3455.0 MW_T averaged over a 8-hour period. [C.1] If LEFM is available, power shall be monitored using plant computer point U2118 Instantaneous Value. **DO NOT** allow average thermal power to exceed 3455 MW thermal for two consecutive hours. Every effort should be made to maintain core thermal power 10 minute average less than 3455 MWt.

The following restrictions apply if LEFM calorimetric power indication (U2118) is unavailable:

Applicable action of TRM 3.3.3.15 must be entered.

f AFD limits in COLR and TI-28 must be made more restrictive by 1%.

Nod insertion limits in COLR must be raised by 3 steps.

If reactor power is greater than 40%, power should be monitored using U1118. If U1118 is also unavailable, use the highest reading NIS channel.

If reactor power is less than 40%, use the RCS average ΔT as the preferred method for determining power level.

3.2 Limitations (continued)

F equilibrium conditions are achieved, after exceeding by 10% or more of rated thermal power the thermal power at which the heat flux hot channel factor was last determined, THEN conditional performance of 0-SI-NUC-000-126.0, Hot Channel Factor Determination is required.

At low power levels, the LP Heaters may be unbalanced in extraction steam supply use and heat pickup across the condensate side of the heater string. This condition should correct itself as the unit approaches 45-50% Turbine Power. (Ref: PER 99-003789-000)

With one LP heater string out of service (isolated), power is limited to 86% (Unit 1) or 90% (Unit 2). This is based on LP turbine blading limitations. (Ref: DCN E21203A).

#3 heater drain tank should remain drained with LCV-6-105A and B failed open (per 1, 2-SO-5-2) until reactor power exceeds ~45-50%. This will prevent intermediate heater string isolations if a turbine trip occurs at lower power levels. If a level is established in the number 3 Heater Drain Tank prior to exceeding P-9 setpoint (50% power), a turbine trip will result in Intermediate Pressure Heater string isolation(s).

	SQN Unit 1 & 2	NORMAL POWER	OPERATION	0-GO-5 Rev. 0065 Page 15 of 100	
4.0	STARTU PREREQ	P No UISITES	Unit(Date	today
		· · · · · · · · · · · · · · · · · · ·	NOTES		
1)	Throughout t N/A'd if the c	this Instruction where an l condition does not exist.	IF/THEN statement	exists, the step shou	ld be
2)	Prerequisites	s may be completed in an	y order.		
	EN EN	ISURE Instruction to be u	ised is a copy of eff	ective version.	<u>201</u>
	TAV	T_{AVG} is being maintained within 1.5°F of T_{REF} .			B
	(B) (N/	G level controls are being A if auto control NOT ava	maintained in AUT(ailable).	C	8
	Co	ntrol rods are being main re Operating Limits Repo ⁄A if shutting down due to	ort (COLR)		Ð
	(5) Ste (N/	eam dump control system A if Tavg Mode NOT ava	i is in the T _{AVG} mod illable).	е	YE -
		The EHC system should be in OPER AUTO (pushbutton lit).			-
		Generator pressurized with hydrogen according to capability curve. (TI-28, Fig. A.I4)			Ŧ
		RMs are being maintained adings.	within ±2% of core	thermal power	-8-

NOTE

During start up after a cold shutdown the Condensate DI normally will be aligned for full flow polishing until the MSRs are in service.



ENSURE Condensate DI polishing operation in accordance with RCL recommendations.

1a) [

SQN	NORMAL POWER OPERATION	0-GO-5
Unit 1 & 2		Rev. 0065
		Page 16 of 100

STARTUP No.

Unit __/__

Date <u>forden</u>

4.0 PREREQUISITES (continued)

[10] **ENSURE** each performer documents their name and initials:

Print Name	Initials
· · · · · · · · · · · · · · · · · · ·	
	,

SQN Unit 1 & 2	NORMAL POWER	OPERATION	0-GO-5 Rev. 0065 Page 57 of 100	
STARTUP	No	Unit	Date <u>+0d 4</u>	
.2 At Power	Conditions		/	
-	c	AUTIONS		
	peration is defined as averaged over <u>an 8-hc</u>		55 <u>MWT NOT to exce</u> ed	
Power shall	NOT exceed one hour	average (U2125)	of 3 <u>455.00 M</u> WT.	
Power shall (readings at	NOT exceed an 8-hour 0700, 1500 and 2300 h	average value (U ours).	2126) of 3455.00 MWT	
		NØTES		
	nply with the following N n and/or monetary pena		uirements could result in a	
	urgent Manual Transfer		tage Regulator automatic trips d Manual as soon as practical,	
	ssion Operator shall be r een Auto and Manual.	notified prior to a p	lanned Voltage Regulator	
All position changes (Auto or Manual) of the Voltage Regulator shall be entered into the Narrative Log along with the date, time of position change, reasons, anticipated duration, and notifications made.				
	main generator without a rements. Refer to GOI 6		control could impact gird	
notification be	e made to the Transmiss	sion Operator (SEI	ule in GOI-6 requires that _D) within 30 minutes. Narrative on & duration, and notifications	
	tor operation without Au	tomatic Voltage co	ontrol requires that Narrative	
Log entries b	•	son-&-duration) an	d that notification be made to	

ENSURE Section 3.0, Precautions and Limitations, have been reviewed.

<u> 300</u>



TREND Computer point U2118 on a trend recorder in the unit horseshoe and monitor for increasing reactor power trends above 3455 MW_T.

U	SQN nit 1 & 2	2	NORMAL POWE	ROPERATION	0-GO-5 Rev. 0065 Page 58 of 100
			P No	Unit _/	Date
5.2	At Po	ower	Conditions (continue	a)	
	[3]	IF i	ncreasing power trend	is observed, THEN	
			SURE PROMPT action	is taken to decreas	e reactor power
	-				1st
					CV
				NOTE	
Exan	nples of	activ	ities which may cause	a rise in Reactor pov	wer include, but are not limite

to RCS dilution, S/G flow changes, TDAFWP testing, secondary plant activities which impact feed flow or temperature and/or RCS pressure changes.

 [4] IF any preplanned activity will be performed which is expected to cause a transient increase in thermal power, THEN REDUCE turbine load and/or insert negative reactivity (using control rods or boration) prior to starting activity as necessary to ensure 10 minute average power (U2221RA or U1118RA) will not exceed 3455 MWt.

1st

CV

SQN Unit 1 &		MAL POWER OP	ERATION	0-GO-5 Rev. 0065 Page 59 of 100	
	RTUP No		Unit(Date 💢	to de
5.2 At F	ower Condition	ns (continued)			/
	an a chuir a chuir an ann an ann an ann ann ann ann ann a	CAUT	ION		
			core thermal p	oower should NOT be r	aised
		8 reading lower.		Ann Mali I a' ann an gugagag ann an	
		NO	TE		
The followir	g restrictions ap	ply if LEFM calorin	netric power (U	2118) is unavailable:	
• Ap	plicable action of	of TRM 3.3.3.15 mi	ust be entered.		
• AF	D limits in COL	R and TI-28 must b	e made more	restrictive by 1%.	
• Ro	od insertion limit	s in COLR must be	raised by 3 st	eps.	
[5]	THEN PERFORM th	J2118 is unreliable ne following: `OR thermal power			
	-			or the following.	
	• IC	S point U1118 (if a	vailable)		
	• hig	ghest reading NIS	power range cl	nannel. [C.1]	

- [5.2] **RESTORE** calorimetric power indication prior to next required performance of 0-SI-OPS-092-078.0.
- [5.3] **IF** LEFM CANNOT be restored prior to 0-SI-OPS-092-078.0 being required, **THEN**

ENSURE power is less than or equal to 98.7% (3411 MW_T) prior to performing 0-SI-OPS-092-078.0:

■ REDUCE turbine load as necessary.
 ■ MAINTAIN T_{AVG} and AFD on program using boration and/or rod insertion as necessary.

[5.4] **PERFORM** 0-SI-OPS-092-078.0 using U-1118 or alternate method.

SQN Unit 1 & 2		NORMAL POWE	NORMAL POWER OPERATION			
	START	「UP No/	Unit/	Da	ite <u>78 dy</u>	
5.2	At Pow	ver Conditions (continue	ed)		. /	
	[5.5	(3411 MWT) UNTIL	ess than or equal to 9 _ LEFM is restored 078.0 is re-performed			
		MAINTAIN rod control sy plant response to load re		• •		
		DURING steady state op bank D greater than 215 nominal ± 5% target band specified in the COLR.	steps if possible and A	AFD within the		
		DURING steady state op bank D greater than 165 difference (AFD) within th within the AFD limits spe	steps if possible and t ne nominal \pm 5% targe	he axial flux		
		OPERATE the turbine in swings during operation i permitted during governo	in IMP IN. (Operation	•		
			NOTE			

[10] IF unsatisfactory load swings are observed, THEN

ADJUST governor valve position limiter as necessary to limit governor valve motion.

1st CV

SQN Unit 1 & 2 STARTUP I 5.2 At Power C		NORMAL POWER OPERATION No/Unit/ Conditions (continued)		0-GO-5 Rev. 0065 Page 61 of 100	
				Date <u>Tub</u>	
di dan deserte anna da		CAUT	ION		
Do N the tu	OT raise th urbine (lim	e limiter position unless the t light NOT LIT).	turbine contro	ol is positively controlling	
		governor valve motion limiting	j is no longer ne	eeded,	
	[11.1]	ADJUST SETTER/REFER turbine loading until the V/ LIT.			
	[11.2]	INCREASE VALVE POS ~ 2% above current load, change.			
		an axial xenon oscillation dev Ippression, THEN	elops and requi	ires	
	[12.1]	MOVE control bank inwar above target AFD, OR	d when AFD is	moving positive	
	[12.2]	MOVE control bank outwan negative below target AFE		s moving	
		HOLD AFD at target until	oscillation is su	ppressed.	
	[12.3]	IF this basic first overtone THEN	control is insuf	ficient,	

 \bigcirc

SQN Unit 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 62 of 100
STARTUP	No Unit	_ Date <u>7</u> 8
5.2 At Power	Conditions (continued)	
	NOTE	
Lowering load on t	he Main Generator will cause VARs to t	end in the positive direction
(toward outgoing).	This will require lowering generator vol cause VARs to trend in the negative dir	age. Conversely, raising
generator voltage.	Refer to GOI-6 Section E for MVAR lim	its for generator stability. Re
to precautions R, S		
[13] PE	RFORM the following as required:	
[13.1]	IF Automatic Voltage Control is in ser	vice.
C	THEN ADJUST Main Generator VARs USIN	
	[HS-57-22] Exciter Voltage Auto Adju	
\bigcirc	during power escalation.	
[13.2]	IF necessary to remove Automatic Vc from service,	Itage Control
	THEN	
\bigcirc	PERFORM required steps in Appendi	x E
[13.3]/	IF Automatic Voltage Control is NOT THEN	n service,
0	ADJUST Main Generator VARs USIN	
	[HS-57-23] Exciter Voltage Base Adju	ister as necessary
	during power escalation.	lotor do hobobodiy

	SQN Unit 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 63 of 100
	STARTUP	• No(Unit(Date <u>Today</u>
5.2	At Power	Conditions (continued)	/
		NOTES	
1)	be used betw	sing a mixed bed demin is normally used v een 50-100 ppm if recommended by Che pility NOT available.	
2)	-	o maintain core thermal power 10 minute de. Core thermal power one hour averag	
		RFORM the following as necessary to ma rmal power at desired value:	intain T-avg and
	(14.1])	ADJUST RCS boron concentration in a 0-SO-62-7, Boron Concentration Contr	
	[14.2]	ADJUST control rod position in accord 0-SO-85-1, Control Rod Drive System OR	lance with
	[14.3]	ADJUST turbine load slightly OR	
	[[14.4]]	DEBORATE RCS periodically using a in accordance with 1,2-SO-62-9 (if RC 100 ppm)	
	OR obs EN	core thermal power 10 minute average ex an increasing power trend which will exc served, THEN SURE PROMPT action is taken to decrea	eed 3455 MWt is
	as	necessary. [C.1]	
			CV

SQN Unit 1 &	NORMAL P	OWER OPERATION	0-GO-5 Rev. 0065 Page 64 of 100
	RTUP No	Unit/	_ Date <u></u>
5.2 At P	ower Conditions (con	tinued)	/
		NOTE	
	ULUVICIES LECOMMENDO	1 howor volues tor manini	
secondary p [16]	ant equipment must be	power values for maint e removed from service f	
	ant equipment must be	e removed from service f	for maintenance.
	IF unit shutdown or lo	e removed from service f	for maintenance.
[16]	IF unit shutdown or lo GO TO Section 5.3 o IF Load Follow is req	e removed from service f	for maintenance.
[16]	IF unit shutdown or lo GO TO Section 5.3 o IF Load Follow is req PERFORM Section 5	e removed from service f bad reduction is required of this instruction.	or maintenance.

ş%

END OF TEXT

Appendix D			Scenario Outline	Form ES-I	
Facility: Sequoya Examiners:			Scenario No.: 3 Op Test No.: 2010302 Operators:		
Initial Condition	ons: ≈3-4	% RTP, 1A Ma	ain Feedwater Pump is in service.		
Turnover:	Continue p	lant startup.	Operations are complete thoug	n 0-GO-4.Section	5.2 Step 2
Target CTs:	Start at leas	t 1 EDG prior t	o placing equipment PTL in ECA.0	-0	
	Start at leas	t 1 CCP (high-	head injection pump)		
	Start at leas	t 1 'A' Train EF	RCW Pump in an operating safegua	ards train	
Event No.	Malf. No.	Event Type*	Eve	nt Description	
1 . T+0	N/A	R - RO N - BOP	Continue Power Increase to MC	DE 1	
2. T+20	NI04A	I - RO TS - SRO	Intermediate Range channel N-35 failure low (>5% RTP at initiation)		
3. T+30	RW01G	C - BOP TS - SRO	Q-A ERCW Pump Over current trip		
4. T+40	RX21	I - BOP	PT-1-33, Main Steam Hdr Pressure Transmitter Lo Failure		
5. T+50	RC07A	C - RO TS - SRO	PORV 68-334 fails open. PORV cannot be closed manually; Block Valve is closed.		
6. T+60	TH02B	M - All	RCS Leak		
7 . T+65	TH02B	M - All	RCS Leak - SBLOCA		
8. T+65	ED01 EG08A- EG03B- pre-insert	C - BOP	Loss of offsite power(delayed) resulting in a loss of power to both 6.9 Shutdown Boards 1A-A EDG fails to start in Automatic 1B-B EDG trips and cannot be restarted		
9 . T+65	CV35 pre-insert	C - RO	1A-A CCP fails to start in Autom	atic	
10.	RP16K611A pre-insert	C - BOP	Selected 'A' Train Safety Injection	n Loads fail to star	t automatically

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Appendix D

Scenario 3 Summary

The crew will assume the shift with the unit in startup after a 7-day forced outage maintaining \approx 3-4% RTP, controlling SG levels with main feedwater, ready to proceed to MODE 1. Following the briefing summary, the crew will raise reactor power starting in 0-GO-4 Section 5.2 Step 3.

After the crew has entered MODE 1, and at the direction of the Lead Examiner, an Intermediate Range NI will fail requiring action to remove it from service in accordance with AOP-I.01, Section 2.2. SRO will identify Technical Specifications 3.3.1.1 Table 3.3-1 functional unit 5 Action 3, 3.3.3.7 Table 3.3.10 instrument 17 Action 1.

At the direction of the Lead Examiner, Q-A ERCW Pump will trip. The crew will refer to alarm response procedures (ARPs) 0-AR-M27-A A-1, C-2, 0-AR-M27-B-A E-3, E-4 and should go to AOP-M.01, Section 2.1 that directs manually starting J-A ERCW Pump and repositioning the DG Power Selector, 0-XS-67-285 for proper safeguards actuation. SRO will identify Technical Specifications 3.7.4.

At the direction of the Lead Examiner, PT-1-33, Main Steam Header Pressure Transmitter will fail low affecting the Steam Dumps, which will all close and Main Feed Pump Control that will cause the 1A Main Feed Pump to go to minimum speed. The crew will maintain RCS temperature on the SG atmospheric relief valves according to 1-SO-1-2, Section 7.1, Steam Dump System Shutdown and respond to annunciators for SG level deviation using 1-AR-M5-A, B-7-LS-3-42D STEAM GEN LVL HIGH-LOW DEVIATION directing implementation of AOP-S.01, Loss of Normal Feedwater Section 2.3, Loss of Main Feedwater Pump Control.

At the direction of Lead Examiner direction, a Pzr PORV will fail open and cannot be closed causing an uncontrolled RCS Pressure drop. The crew should close the block valve (PORV will remain in mid-position), refer to ARPs 1-AR-M5-A E-2 and 1-AR-M5-C B-6 and SRO direct entry into AOP-I.04, section 2.1. The crew should also refer to 0-SO-68-3, section 8.3 to close the associated block valve. SRO will identify Technical Specifications 3.2.5.b and LCO 3.4.3.2 action b (according to TS Bases for PORV OPERABILITY- not OPERABLE).

The RCS leak occurs and progresses into a SBLOCA. The crew responds to alarms by referring to ARPs 1-AR-5-C B-1, B-3, 1-AR-M6-E C-6 directing them to AOP-R.05 Section 2.1 for lowering Pzr level and a challenge to VCT Make-up capability. Subsequently the crew will initiate a reactor trip and enter E-0.

1A-A EDG automatic start fails and must be manually started. 1B-B EDG trips and cannot be re-started. The crew must manually start 1A-A EDG to avoid entering ECA-0.0 [Note; ECA-0.0 MAY be entered briefly (through Step 8) prior to starting EDG].

Additionally, selected 'A' Train Safety Injection Loads: 1A-A CCP, 1A-A MD AFW Pump, Train A SI signal to TDAFW Pump and ERCW Pumps J-A, Q-A, K-A and R-A (if selected) fail to automatically start. Starting the CCP is critical to a SBLOCA with the unavailability of the 2nd CCP due to the loss of AC power. Re-starting the J-A ERCW Pump is critical for long term cooling of 1A-A EDG and 1A Header ECCS loads due to the previous Q-A Pump loss.

EOP flow: E-0 – E-1 – FR-Z.1 – E-1 – ES-1.1

The scenario may be terminated at the direction of the Lead Examiner, when ES-1.1, Post LOCA Cooldown transition is determined.

PSA significant task: Start EDG, 1A-A CCP and J-A ERCW Pump PSA significant DAS: SBLOCA PSA significant component failure: Pzr PORV, 1A-A EDG, Q-A ERCW Pump Page 1

DELTA	REACTOR	POWER	ASSUMED	INSERTED	EXPECTED	DELTA RHC	BORON	DELTA	RECOMMEN	IRECOMMEN	IODINE
TIME	POWER	DEFECT	ROD HT	WORTH	XENON	BORON	CONC	PPM		BORATION	CONC
(hrs)	(%)	(pcm)	(steps)	(pcm)	(pcm)	(pcm)	(ppm)	(ppm)	(gal)	(gal)	(% eq)
0	4.0	73.1	180.0	-430.8	-54.7		1710.0				0.1
1	9.0	160.6	184.0	-381.6	-55.6	39.3	1703.7	-6.3	249	0	0.7
2	15.0	261.9	186.0	-351.2	-63.8	79.0	1691.0	-12.7	502	0	1.8
3	15.0	262.7	188.0	-332.1	-79.9	-2.1	1691.3	0.3	0	4	3.1
4	18.0	310.6	190.0	-306.7	-102.9	45.5	1684.0	-7.3	290	0	4.5
5	20.0	343.2	192.0	-283.4	-132.7	39.0	1677.8	-6.3	250	0	5.9
6	22.0	374.5	194.0	-260.4	-168.7	44.4	1670.7	-7.1	285	0	7.4
7	27.0	451.7	196.0	-233.7	-211.0	92.7	1655.8	-14.9	598	0	9.1
8	30.0	498.7	200.0	-191.5	-259.7	53.6	1647.2	-8.6	347	0	11.0
9	30.0	499.8	200.0	-190.8	-314.3	55.0	1638.4	-8.8	357	0	12.8
10	30.0	500.8	201.0	-180.8	-373.0	49.8	1630.4	-8.0	324	0	14.5
11	30.0	501.8	202.0	-170.8	-434.3	52.3	1622.0	-8.4	342	0	16.1
12	30.0	502.8	203.0	-160.8	-496.9	53.7	1613.4	-8.6	352	0	17.4
13	30.0	503.8	204.0	-150.9	-559.9	54.0	1604.7	-8.7	356	0	18.7
14	30.0	504.8	205.0	-141.3	-622.2	53.8	1596.1	-8.6	356	0	19.8
15	30.0	505.9	207.0	-122.9	-683.5	43.8	1589.1	-7.0	291	0	20.8
16	30.0	506.7	208.0	-113.5	-743.0	51.0	1580.9	-8.2	339	0	21.7
17	30.0	507.7	209.0	-104.2	-800.6	49.2	1573.0	-7.9	328	0	22.5
18	30.0	508.6	209.0	-103.8	-855.9	55.8	1564.1	-8.9	373	0	23.2
19	30.0	509.6	209.0	-103.3	-908.7	53.4	1555.5	-8.6	359	0	23.9
20	30.0	510.7	209.0	-102.9	-958.9	50.8	1547.4	-8.1	342	0	24.5
	MWD/MTU	J	Hold Tavg	= Tref +/- 1.	5F			Total	6642	4	
6820	BAT ppm								Small hourly	boration/dilution	
	-								•	y be accumulate	
										gle additions	-
Reason for Maneuver Reactor/Plant restart following forced outage- 30% hold											
Date		· -	Today								
RxEng I	Name		J. Sidekick							·····	
Comme			none								

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Page 1. of 3

Part 1 -	Part 1 - Completed by Off-going Shift / Reviewed by On-coming Shift								
Mode 2, PSA Risk	3-4% Power MWe : Green			NR	RC p	hone Authentica	tion <u>Code</u>		
Grid Risk	Grid Risk: Green				Until 0800 XXXX				
RC5 Lear	RCS Leakage ID .02 gpm, UNID .01 gpm					After 0800 YYY			
Common Tool			Conce Andre						
	.CO/TRM	Fauinn	Common Tech nent INOP	Time IN			Ownor	DTO	
		None		<u></u>			<u>Owner</u>	<u>RTS</u>	
			U-1 Tech Si	nec Actions					
L	CO/TRM	Fauinn	nent INOP	<u>Time IN</u>			Ownor	DTC	
		None		<u></u>			<u>Owner</u>	RTS	
N.			Protected	Equipment					
• Non	e								
			Shift Pr	iorities					
Folle	owing a 7-day forced	l outag	ie, raise power t	o 13-15%; pr	ера	re for Main Gene	rator		
-	chronization.								
Acco Sect	ording to TI-40, no fu tion 5.2 Step 3, Perfo	iei taill	tres, CPL trendi	ng not requi	red	prior to 50%.	l/hwiefed l		
anot	her SRO/RO;			e Kon în par	ane	i is being prep et	vorierea r	ע אי	
David O	D-4-11								
Part 2 -	Performed by on-co	ming	shift						
	Verify your current quality	ications	(re: OPDP-1 Section	7.3 F.)					
	Review Operating Log s	ince last	held shift or 3 days,	whichever is les	s.				
Revi	ew the following for chang	es since	last shift turnover:						
	ODMIs/Standing Orders/ Shift Orders		LCO actions			PERs (applicable to	unit)		
	TACFs		Operator workarou and challenges	nds, burdens,		Immediate required r	reading		
-									
	Performed by both		ng and on-comi	ng shift					
Walk	down of MCR Control E	Boards							

Today

SHIFT TURNOVER CHECKLIST

.

5

Page 2. of 3

Today

	MAIN CONTROL ROOM (7690)
 Train A Week 0-SI-SXX-068-127.0 Appx. E Sect. 1.2.1.E. 	, RCS & Pressurizer Temperature & Pressure Limits in progress per
	OUTSIDE (7666) [593-5214]
• None	
	AUXILIARY BUILDING (7775)
• None	
	TURBINE BUILDING (7771) (593-8455)
• None	

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SHIFT TURNOVER CHECKLIST

Page 3. of 3

Today

PANEL	WINDOW	ANNUNCIATOR	WO / PER Number

Equipment Off-Normal (Pink Tags)

UNID And Noun Name	Panel	Problem Description	WO / PER Number

MCR WO LIST

ID And Noun Name	Panel	Problem Description	WO/PER Number
			100 - 11 - 11 - 11 - 11 - 11 - 11 - 11

UNIT ONE REACTIVITY BRIEF

Date: Today Time: Now

		Genera	al Information	
RCS Boron: 1710 ppr	n Today	BA Cor	ntroller Setpoint: 46.3%	RCS B-10 Depletion: 52
Operable BAT: A	BAT A Boron: 685	0 ppm	BAT C Boron: 6850 ppm	RWST Boron: 2601 ppm
Nominal	Gallons per rod ste	p from 2	19: 7 gallons of acid, 50	gallons of water

Verify boric acid flow controller is set at Adjusted BA Controller Setting iaw 0-SO-62-7 section 5.1

Estimated values for a 1° Change in Tave **

Gallons of acid: 26	Gallons of water: 136	Rod Steps: 3
	Galions of water. 130	KOU Steps: 3

Estimated rods/boron for emergency step power reduction ** (Assuming Xenon equilibrium and no reactivity effects due to Xenon. 2/3 total reactivity from rods, 1/3 from boron)

Power reduction amount	Estimated Final Rod Position	Estimated boron addition
10%	196 Steps on bank D	99 gallons
30%	173 Steps on bank D	292 gallons
50%	151 Steps on bank D	481 gallons

** These values are approximations and not intended nor expected to be exact. The values may be superseded by Rx Engineering or SO-62-7 calculated values. These values are calculated assuming 100% steady state power operation only. Engineering data last updated **one week ago**. Data Valid until **one week from now**.

Previous Shift Re

Previous Shift Reactivity Manipulations

Number of dilutions: 1	Number of borations: 0	Rod steps in: 0
Gallons per dilution: 12	Gallons per boration: 0	Rod steps out: 0
Total amount diluted: 12	Total amount borated: 0	Net change: 0 IN/Out

Current Shift Estimated Reactivity Manipulations

Number of dilutions: *	Number of borations: 0	Rod steps in: 0
Gallons per dilution: *	Gallons per boration: 0	Rod steps out: 0
Total expected dilution: *	Total expected boration: 0	Net change: 0 In/Out

Remarks: * Per the RE Reactivity Spreadsheet Rx Power: 3-4% Burnup: 10,000 Mwd/mtU

Xenon: -54.7 pcm, equilibrium Samarium: 544 pcm

Last Dilution Completed: *

Next Unit 1 Flux Map is scheduled - three weeks from now Unit 1 M-P is 0 PPM

Unit Supervisor:

Name/Date

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Operations Chemistry Information							
		Boro	on Results				
Sample Point	Units	Boron	Date / Time	Goal	Limit		
U1 RCS	ppm	1710	Today / Now	Variable	Variable		
U2 RCS	ppm	816	Today / Now	Variable	Variable		
U1 RWST	ppm	2601	Today / Now	2550 - 2650	2500 - 2700		
U2 RWST	ppm	2569	Today / Now	2550 - 2650	2500 - 2700		
BAT A	ppm	6850	Today / Now	Variable	Variable		
BAT B	ppm	6850	Today / Now	Variable	Variable		
BAT C	ppm	6850	Today / Now	Variable	Variable		
U1 CLA #1	ppm	2556	Today / Now	2470-2630	2400-2700		
U1 CLA #2	ppm	2575	Today / Now	2470-2630	2400-2700		
U1 CLA #3	ppm	2591	Today / Now	2470-2630	2400-2700		
U1 CLA #4	ppm	2589	Today / Now	2470-2630	2400-2700		
U2 CLA #1	ppm	2531	Today / Now	2470-2630	2400-2700		
U2 CLA #2	ppm	2650	Today / Now	2470-2630	2400-2700		
U2 CLA #3	ppm	2522	Today / Now	2470-2630	2400-2700		
U2 CLA #4	ppm	2526	Today / Now	2470-2630	2400-2700		
Spent Fuel Pool	ppm	2547	Today / Now	<u>></u> 2050	<u>≥</u> 2000		
L	ithium Res	ults		Goal	Midpoint		
U1 RCS Lithium	ppm	1.1	Today / Now	>1	>1		
U2 RCS Lithium	ppm	2.43	Today / Now	2.18-2.48	2.33		

Indicator	Units	U1	Date / Time	U2	Date/Time
SI 50 S/G Leakage?	Yes/No	No	Today / Now	No	Today / Now
SI 137.5 CVE Leakrate	gpd	< 0.1	Today / Now	< 0.1	Today / Now
5 gpd leak equivalent	cpm	115	Today / Now	68	Today / Now
15 gpd (30 min increase)	cpm	265	Today / Now	83	Today / Now
30 gpd leak equivalent	cpm	490	Today / Now	206	Today / Now
75 gpd leak equivalent	cpm	1165	Today / Now	455	Today / Now
150 gpd leak equivalent	cpm	2290	Today / Now	870	Today / Now
CVE Air Inleakage	cfm	10	Today / Now	12.5	Today / Now
Bkgd on 99/119	cfm	40	Today / Now	40	Today / Now

Operations Chemistry Information

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Sequoyah Nuclear Plant

Unit 1 & 2

General Operating Instructions

0-GO-4

POWER ASCENSION FROM LESS THAN 5% REACTOR POWER TO 30% REACTOR POWER

Revision 0067

Quality Related

Level of Use: Continuous Use

Effective Date: 04-08-2010 Responsible Organization: OPS, Operations

Prepared By: Olivia Taylor

Approved By: W. T. Leary

Current Revision Description

Added guidance to Section 5.3 pertaining to requirements for turbine roll with turning gear secured for a period of time. Also outlined Limitations of turning gear time requirements and turbine shaft eccentricity limits (PER 118536, PCR 10000256)

THIS PROCEDURE HAS THE POTENTIAL TO IMPACT REACTIVITY.

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ATTACHMENTS

Attachment 1: UNIT START UP FROM LESS THAN 5% REACTOR POWER TO 30% REACTOR POWER

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1.0 INTRODUCTION

1.1 Purpose

This General Operating (GO) Instruction provides necessary instructions to perform a unit startup from less than 5% Reactor Power with MFW Bypass valves in **AUTO** to 30% Reactor Power with MFW Reg. valves in **AUTO**.

1.2 Scope

- A. This GO contains the following sections:
 - 5.1 Actions To Be Performed Prior To Increasing Reactor Power
 - 5.2 Reactor Power Ascension to Between 13% and 15% RTP
 - 5.3 Turbine Roll
 - 5.4 Placing Main Generator In Service
 - 5.5 Reactor Power Ascension to 30% RTP

2.0 REFERENCES

2.1 **Performance References**

- A. 0-PI-NUC-092-002.0, Incore Excore Detector Single Point Alignment
- B. 0-PI-NUC-092-081.0, Prestartup NIS Calibration Following Core Load
- C. 0-PI-NUC-092-082.0, Poststartup NIS Calibration Following Core Load
- D. 0-PI-OPS-047-760.1, Main Turbine Actual Overspeed (Annual and 18 Month Tests)
- E. 0-PI-SXX-000-022.0, Calorimetric Calculations
- F. 0-RT-NUC-000-001.0, Restart Test Program
- G. 0-SO-35-1, Generator Hydrogen Cooling System
- H. 0-SO-35-2, Stator Cooling Water System
- 1. 0-SO-35-4, Monitoring Generator Parameters
- J. 0-SO-35-6, Generator Core Condition Monitor
- K. 0-SO-35-7, Hydrogen Dryer Operation
- L. 0-SO-27-1, Condenser Circulating Water System
- M. 0-SI-NUC-092-079.0, Power Range Monitor Channel Calibration By Incore-Excore Axial Imbalance Comparison
- N. 0-SI-OPS-092-078.0, Power Range Nuclear Flux Channel Calibration by Heat Balance Comparison
- O. 1,2-PI-OPS-057-002.0, Cycling of Unit PCBs Prior to Placing PCB in Service
- P. 1,2-SO-5-1, Feedwater Heaters and Moisture Separator Reheaters
- Q. 1,2-SO-5-2, No. 3 Heater Drain Tank and Pumps
- R. 1,2-SO-5-3, No. 7 Heater Drain Tank and Pumps
- S. 0-SO-1-2, Steam Dump System
- T. 0-SI-NUC-000-038.0, Shutdown Margin
- U. 1-PI-OPS-000-020.1, OATC MCR Duty Station Shift Relief and System Status Checklists Modes 1-4

2.1 **Performance References (continued)**

- V. 1-PI-OPS-057-001.0, Functional Testing of Low Voltage Bus Cooling Pumps
- W. 2-PI-OPS-0-00-022.1, OATC MCR Duty Station Shift Relief and System Status Checklists Modes 1-4
- Х. 0-GO-5, Normal Power Operation
- Υ. 0-SO-24-1, Raw Cooling Water System
- Ζ. 1,2-SO-47-2, Electro-Hydraulic Control System
- AA. 0-SO-85-1, Control Rod Drive System
- BB. SSP-6.24, Maintenance Management System Configuration Control
- CC. Switchyard Letter 14, Visual Confirmation of Motor Operated Disconnects and Power Circuit Breaker Operation
- DD. Switchyard Letter 32, Delle-Alsthom Airblast Circuit Breakers
- EE. TI-28, Curve Book
- FF. TI-40, Determination of Reconditioned Reactor Power
- GG. 0-PI-OPS-000-666.0, River Temperature Limits Specified by NPDES permit
- HH. SI-53, Specific Iodine Isotopic Activity Concentration and/or DEI-131 Determination
- SI-407.2, Radioactive Gaseous Waste Effluent Particulate and Iodine Dose 11. Rates from Shield and Auxiliary Building Exhausts (Weekly/Special) and Condenser Vacuum Exhausts (Special)
- JJ. 0-SI-CEM-030-415.0, Gaseous Effluent Requirements (Gross Alpha, Noble Gas and Tritium
- KK. 0-SO-57-1, Main Bank Transformer Cooling
- LL. 0-SO-58-1, Main Generator Bus Duct Cooling System

MM. 2-SO-98-1, Distributed Control System (DCS)

2.2 Developmental References

- A. FSAR Sections 10.2.2, 13.5
- B. 0-GO-2-3, Plant Startup From Less Than 5% Reactor Power To 30% Reactor Power
- C. <u>W</u> letter GP 89-155, RIMS S57 891026 972
- D. <u>W</u> letter 86-02/B44 861112 002
- E. W FAR 5-SQ-3771-075 Response
- F. VTD-W120-6510, Main Steam Turbine Operation Instructions.
- G. NERC Reliability Standard, VAR-002-1.1b

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Precautions

NOTE

Adherence to Precautions and Limitations is referenced in SPP-2.2.

Reactor Engineering should be contacted for guidance on core operating recommendations during unusual power maneuvers such as startup during end of core life. [C.11]

TRM 3.3.3.15 requires LEFM core thermal power (U2118) to be used to perform 0-SI-OPS-092-078.0 above 15% reactor power. LEFM indication is available if the following conditions are met:

LEFM status NORMAL on ICS Calorimetric Data screen

LEFM core thermal power (ICS point U2118) shows good (green) data.

LEFM MFW header temp (ICS point T8502MA) greater than 250°F.

If LEFM indication is NOT available above 15% reactor power, then TR 3.3.3.15 action must be entered.

During startup, NIS power range indication may be reading significantly higher than true power until calibration adjustments are made. The following should be used to determine the most accurate indication for comparison with NIS:

• When reactor power is less than or equal to 15%, use average loop ΔT (UO485).

 When reactor power is greater than 15%, use LEEM core thermal power indication (U2118). If LEEM is NOT available, then continue using average loop ΔT up to 40% (U1118 will be used above 40% with LEFM unavailable).

The boron concentration in the pressurizer should be maintained within 50 ppm of the RCS by use of pressurizer heaters and spray.



Pressurizer enclosure temperature should be maintained less than 150°F. Rapid changes in pressurizer enclosure temperature may result in pressurizer safety valve simmer.

3.1 **Precautions (continued)**

The low pressure turbine steam inlet temperature should be limited to 400°F when unit load is less than 10%. When reducing load, the reheater control valves should be adjusted to limit reheater outlet temperature to a maximum of 400°F within approximately 15 minutes after reaching 10% load.

(8.)

Do **<u>NOT</u>** pass steam through the turbine with the rotor at rest. The turbine should be on turning gear anytime the main steam lines are pressurized up to turbine stop valves.

Change in load should be controlled in accordance with load changing curves of TI-28, Figures A.15 and A.16. TI-28, Figure A.15 is designed to limit the maximum rotor stress during the entire program of acceleration, synchronizing, holding at minimum load, followed by increasing load to full capability. The recommended time periods for each phase of the program are determined by the measured first-stage metal temperature at the time of starting.

The turbine should be operated in 'IMP OUT" control during normal unit operation. "IMP IN" operation results in system swings and should only be used during the performance of valve tests. (W letter GP 89-155, RIMS S57 901-26 972)

The Predictive Maintenance Engineer (PDM) should be contacted following a unit trip so that he may determine if local vibration monitoring of the Turbine-Generator, by the PDM staff should be performed when the unit is restarted. Normally, monitoring is necessary following a refueling outage, a major maintenance outage on the turbine-generator, or after a plant trip which was due to a turbine initiated trip or a generator electrical initiated trip. Two hours lead time prior to the initial turbine roll is necessary to ensure that the PDM staff is onsite to monitor the start-up. The Maintenance Shift Supervisor (MSS) has the telephone numbers and pager numbers for the Predictive Maintenance Engineer and the Supervisor for the PDM staff.

Any off frequency turbine operation is to be reported to the Component Engineering Group Vibration Engineer for record keeping. The report will include duration and magnitude of off-frequency operation.

Operation at off-frequencies is to be avoided in order to prevent the probable occurrence of turbine blade resonance. Prolonged periods of operation at certain off-design frequencies could cause excessive vibratory stresses which could eventually generate fatigue cracking in the blades. Off-frequency operation is permitted to the degree and time limit specified on the chart "Off-Frequency Turbine Operation", Figure A.26 of TI-28.

3.1 **Precautions (continued)**

The valve position limiter should be periodically positioned approximately 10% above governor control indications (keeps governor valves off of the limiter) as turbine load is increased. This prevents inadvertent load increases by limiting governor valve opening and allows a faster response of the runback feature which ensures main feedwater system will supply the required amount of flow.

The position of control rod bank D should normally be \geq 215 steps when power level is steady state at or above 85% RTP. At steady state power levels below 85%, control bank D should normally be \geq 165 steps. If rod position is more than 2 steps below this guidance for long term, then an impact to safety analysis assumptions may occur. Long term will be defined/determined by Reactor Engineering and the Fuel Vendor.

At low power levels, the LP Heaters may be unbalanced in extraction steam supply use and heat pickup across the condensate side of the heater string. This condition should correct itself as the unit approaches 45-50% Turbine Power. (REF. PER 99-003789-000)

0-PI-OPS-035-001.0 should be performed prior to turbine restart when recommended by engineering, following maintenance or plant activities in which the generator was depressurized during a forced outage, or after a refueling outage. 0-PI-OPS-035-001.0 provides verification and adjustment of the Seal Oil System normal and backup regulators. (REF PER-04-24237-000)



The turbine should not be on hold at 1800 rpm for longer than 2 hours when the generator is not synchronized to the grid. Longer than 2 hours will cause overheating of the turbine blading (last row).

3.1 **Precautions (continued)**

Voltage Control

NOTE

Failure to comply with the NERC VAR-002 requirement could result in a Utility Violation and / or monetary penalties.

Operation of the Main Generator without Automatic Voltage Control could impact grid voltage requirements. Refer to GOI-<u>6 for MVAR limits.</u>



When the Main <u>Generator is connected to the grid</u>, the voltage regulator shall be operated in Automatic, unless coordinated with the Transmission Operator (SELD).



Main Generator operation outside of the Transmission Voltage Schedule requires coordination with the Transmission Operator, and notation in the operator's Log of time, reason, and that the Transmission Operator notification was made.

When directed to modify voltage, the Generator Operator shall comply (within plant procedural requirements) or provide an explanation of why the schedule cannot be met.



While the Main Generator is tied to the grid perform the following:



The Transmission Operator (SELD) shall be notified of any Voltage Regulator automatic trips to Manual or urgent Manual Transfers between AUTO and Manual as soon as practical but notification shall be within 30 minutes.



The Transmission Operator (SELD) shall be notified prior to a planned Voltage Regulator transfers between Manual and Auto.

E.

All position changes (to and from Auto or Manual) of the Voltage Regulator shall be entered into the Narrative Log along with the date, time of position change, reasons, anticipated duration and notifications made. SQN Unit 1 & 2

3.1 **Precautions (continued)**

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Reliability Directives and Protective Relay/Equipment Failures

Failure to comply with the NERC VAR-002 requirement could result in a Utility Violation and / or monetary penalties.

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Plant Operations shall notify the Transmission Balancing Authority (BA) or Transmission Operator of protective relay or equipment failures that creates a creditable risk to Plant Generation. A creditable risk to generation represents a potential reduction in transmission system reliability.

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Reliability Directives to the Generator Operator are via the Balancing Authority or Transmission Operator. Required action time may range from immediate to no longer than 30 minutes. Actions shall be taken without delay. The directives may be associated with preventing or clearing Local System issues, or neighboring system issues.

Plant operations shall take timely actions as directed by the Balancing Authority or Transmission Operator to mitigate critical conditions to return the bulk electrical system to a reliable state. Plant operations shall comply with Balancing Authority or Transmission Operator directives unless such actions would violate safety, equipment, or regulatory or statutory requirements.



Plant Operations shall-immediately inform the Balancing Authority or Transmission Operator of the inability to perform directives so that the TVA Reliability Entities may implement alternate remedial actions.

3.2 Limitations (continued)

To prevent high vibratory stresses and fatigue damage to the last stage turbine blading, do <u>NOT</u> operate the turbine for even brief periods outside of limits listed below: [W Ltr GP 86-02 (B44 861112 002)]

At loads less than or equal to 30% (350 MW), the maximum permissible backpressure is 1.72 psia. (3.5" Hg). The ICS Computer alarm point UP5007 which will identify the condition of condenser pressure > 1.72 psia in conjunction with MW being < 350.

At loads greater than 30%, the maximum permissible backpressure is 2.7 psia (5.5" Hg) with a 5 minute limitation before tripping the turbine.

Generator voltage shall **NOT** exceed 24.8 kV.

The main generator field shall **<u>NOT</u>** be energized at less than 90% rated speed.

Do **<u>NOT</u>** allow the generator to become under-excited.

The #3 Heater Drain Tank should remain drained with LCV-6-105A and B failed open (per 1,2-SO-5-2) until reactor power exceeds ~45-50%. This will prevent intermediate heater string isolations if a turbine trip occurs at lower power levels. If a level is established in the #3 Heater Drain Tank prior to exceeding P-9 setpoint (50% power), a turbine trip will result in Intermediate Pressure Heater string isolation(s).



The following Main Turbine vibration limitations and actions should be adhered to:

Vibration levels which exceed 7 mils (alarm set-point) should be verified by Predictive Maintenance Group.



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Vibration levels greater than 7 mils and less than 14 mils should be continuously monitored by Predictive Maintenance Group.



IF vibration level is greater than or equal to 14 mils, THEN TRIP the turbine.



Limit temperature differential between any condensers to less than 50°F. Exceeding this limit results in improper bearing loading and misalignment, thus potentially increasing main turbine vibration. Limitation is based on the temperature as measured in the LP turbine exhaust hood. (PER 178439)



IF temperature differential between the condensers is greater than or equal to 50°F, based on the temperature as measured in the LP turbine exhaust hood, **THEN TRIP** the turbine.(FSAR 10.2.2, VTD-W120-6510, PER 178439)

3.2 Limitations (continued)

5. If Turbine seals have been in service with Turbine Turning Gear secured and unit is to be returned to operation, then both of the following limitations apply:



Turbine is required to be placed on turning gear for 10 times as long as period it was stopped (up to a maximum of 4 hours).

2/11

If eccentricity is higher than normal, turbine is required to be left on turning gear until eccentricity indication has reached and has been maintained at its normal minimum value for at least one hour.

SQN Unit 1 & 2

POWER ASCENSION FROM LESS THAN 5% REACTOR POWER TO 30% REACTOR POWER POWER Page 16 or

Page 16 of 115 Date <u>To duy</u>

4.0 PREREQUISITES

Throughout this Instruction where an **IF/THEN** statement exists, the step should be **N/A'd** if the condition does **NOT** exist.

NOTE

Unit _/____

ENSURE Instruction to be used is a copy of effective version.



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ENSURE Precautions & Limitation of Section 3.0 have been reviewed.



ENSURE Reactor Power is between 1 and 4%

UNIT 1 ONLY- ENSURE four MFW Bypass valves in **AUTO**. (**N/A** if manual MFW Bypass valve operation is allowed by Plant Manager)

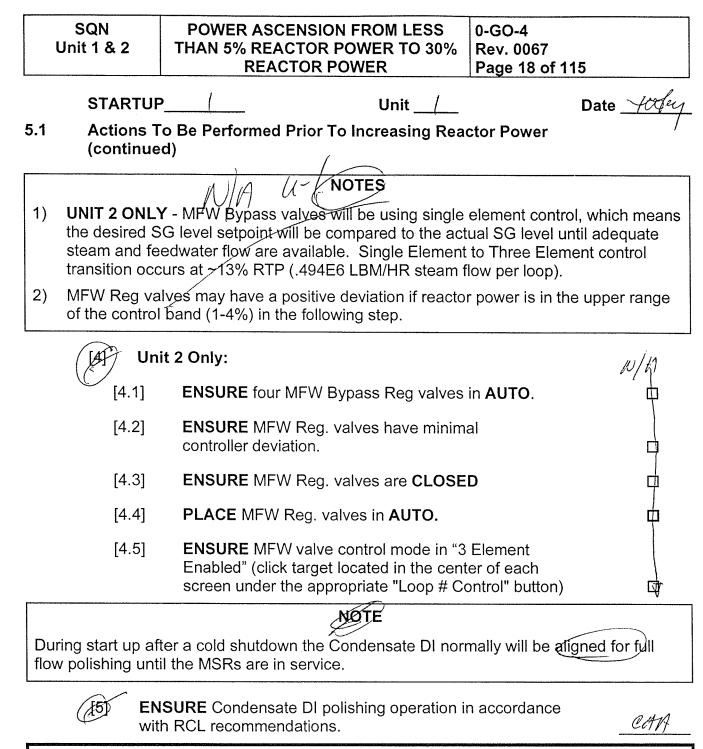
[5] **ENSURE** each performer documents their name and initials:

Print Name	Initials
Abrior Renther Openale	5
REACON Cholafr (ROC
Rencha Enorate 2	RA? 9
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Shill Toolice Adison	.57
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•	SQN Unit 1 & 2	THAN 5% REAC	NSION FROM LESS FOR POWER TO 30% OR POWER	0-GO-4 Rev. 0067 Page 17 of 115	
(STAF 5.0 INSTI	RTUP/ RUCTIONS	Unit	Date	5 day
	5.1 Actio	ns To Be Performed Pr ENSURE Prerequisites	rior To Increasing Read	ctor Power	5
	Steps 5.1[2] t	hrough5.11121 can be pe	NOTE erformed out of sequenc	е.	
	(131)	Approval is NOT curren	a, Mode 2 to Mode 1 Rev nt for this startup, ー ろっかん	/iew And	,
		IF the Mode 3 to Mode	while continuing with thi 2 to Mode 1 surveillanc artup for Mode 1 entry,		¢ 14
	-		est Coordinator to issue veillance checklists to th Date		

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CAUTION

After refueling operation, NIS indications may be inaccurate until calibration at higher power levels has been performed. RTP shall NOT be allowed to exceed 4% prior to the verification of the proper (or conservative) IR and PR setpoints.

IF startup is following a refueling, **THEN**

MAINTAIN reactor power between 3 to 4%.

	SQN Unit 1 & 2	THAN 5% REACTO	SION FROM LESS DR POWER TO 30% R POWER	0-GO-4 Rev. 0067 Page 19 of 115	
	STARTUP	(Unit/	Dat	te <u>fo</u> dry
5.1	Actions To (continued		or To Increasing Read	ctor Power	I
	62		ermissive setpoints are -PI-NUC-092-082.0. [c		
			N/A Rx Enginee	ering Date	Time
	<u>168</u>	ENSURE P-10 act power level setpoi	uation setpoint is less nt. [C.2]	than the IR trip	
			$\frac{N/2}{Rx Engineer}$	ering Date	
	16A)	ENSURE all applicate are complete.	cable portions of 0-RT-	0	Time
			W/19		
			Rx Enginee	ering Date	— — Time
				ering Date	Time
B			NOTES d reactor power with S	team Dumps in Pre	
To a construction of the c	Mode while m Due to instrur	naintaining <u>Steam Pro</u> nent inaccuracies, th	NOTES	team Dumps in Pre %	
Ð	Mode while m Due to instrur setpoint of 84 MA mod	naintaining <u>Steam Pro</u> nent inaccuracies, th % or 1005 psig may INTAIN T _{AVG} stable v	NOTES d reactor power with S essure is 0.52deg. F / e steam dump or SG a	team Dumps in Pre atmospheric relief v f. in the pressure	ssure
Ð	Mode while m Due to instrur setpoint of 84 MA mod or 1	naintaining <u>Steam</u> Pro nent inaccuracies, th % or 1005 psig may INTAIN T _{AVG} stable v de or with the SG atn 005 psig.	NOTES d reactor power with S essure is 0.52deg. F / e steam dump or SG a be ±1% or ±12 psig of with the steam dumps nospheric relief valves	team Dumps in Pre atmospheric relief v f. in the pressure set at 84%	ssure
Ð	Mode while m Due to instrur setpoint of 84 MA mod or 1 ENS com	aintaining <u>Steam Pro</u> nent inaccuracies, th % or 1005 psig may INTAIN T _{AVG} stable v de or with the SG ath 005 psig. SURE 0-SI-NUC-000 nplete (N/A if <u>NOT</u> re SURE containment a	NOTES d reactor power with S essure is 0.52deg. F / e steam dump or SG a be ±1% or ±12 psig of with the steam dumps nospheric relief valves	team Dumps in Pre 2 atmospheric relief v f. in the pressure set at 84% gin calculation is thin limits in	ssure
B	Mode while m Due to instrur setpoint of 84 MA mod or 1 ENS com	nent inaccuracies, th % or 1005 psig may INTAIN T _{AVG} stable v de or with the SG ath 005 psig. SURE 0-SI-NUC-000 nplete (N/A if <u>NOT</u> re SURE containment a ordance with 1,2-SI-	NOTES d reactor power with S essure is 0.52deg. F / e steam dump or SG a be ±1% or ±12 psig of with the steam dumps nospheric relief valves 0-038.0 shutdown marg equired).	team Dumps in Pre w atmospheric relief v f. in the pressure set at 84% gin calculation is thin limits in . B. (TS 3.6.1.5)	ssure

SQN Unit 1 & 2	2		R ASCENSION REACTOR P	POWER		-	0-GO-4 Rev. 0 Page 2	067	15	
STAI	RTUP	(_	U	nit	<u> </u>			Date	today
	ons Te		rmed Prior T	o Incre	asing	Reac	tor Po	wer		/
(172)			to determine ximum Allowa						er -	5
(13)		RIFY all apprintiated.	plicable action	i steps i	n Sect	tion 5	.1 are c	omple	ete	5
(FA)	Арр	<i>roval</i> com	endix A, <i>Mode</i> pleted to verif olved and app	y all res	straints	to M	ode 1 e			
					SM S	<u>SM</u> ignati	ure	_ 7	Date	<u>∼2hr3</u> Time
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Unit	1	&	2

POWER ASCENSION FROM LESS 0-GO-4 THAN 5% REACTOR POWER TO 30% **REACTOR POWER**

Rev. 0067 Page 21 of 115

STARTUP

Unit /

Date 4 4

5.2 Reactor Power Ascension To Between 13% And 15% RTP

The steam generator level operator is in control of unit startup until the MFW Reg. valves are in AUTO and controlling level. [C.5]

NOTE

REVIEW plant parameters and indications, AND

VERIFY stability prior to reactor power escalation.

P

NOTES

Adjusting blowdown flow will provide an additional method of controlling SG water inventory. (Close blowdown isolation valves only if level cannot be maintained)

Prior to increasing reactor power above 5%, SG blowdown should be in service.

Maximum blowdown rate is less than or equal to 270 gpm. Each steam generator flow, up to 60 gpm is indicated on panel L-357 located in the A.B. Supply Fan Rm. Minimum blowdown rate equals 5 gpm for each steam generator. Final blowdown rate should be determined by chemical analysis.

Computer points require a prefix 0, 1, or 2 be placed in front of the point number; for example, 1F2261A.



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ΑV

IF SG blowdown is in service, THEN ADJUST FIC-15-43 as desired. (plant computer pt. F2261A)

S	QI	N		
Unit	1	&	2	

POWER ASCENSION FROM LESS THAN 5% REACTOR POWER TO 30% REACTOR POWER Page

0-GO-4 Rev. 0067 Page 22 of 115

STARTUP_

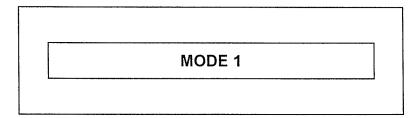
Unit _____

Date ____

5.2 Reactor Power Ascension To Between 13% And 15% RTP (continued)

NOTES

- Actions effecting reactivity are directed in the following step. 0-SO-62-7 requirements shall be adhered to for reactivity changes (i.e. reactivity balance, amounts of boric acid or water). All appropriate verifications and peer checks shall be utilized during performance.
- Recommended dilution rate is 50 to 75 gallon batches every 12 to 15 minutes for a steady power increase. Rod movement should be limited to 1/2 step increments approximately every 1 1/2 minutes. Dilution and rod movement rates may be adjusted depending on SG level control stability.
- 3) Control Rod withdrawal and / or dilution requirements may be significantly impacted by the change in core reactivity due to changing Xenon concentration.
 - [3] **INITIATE** a methodical and deliberate reactor power increase by manual adjustment of the control banks or by diluting the RCS.



[4] WHEN reactor power is above 5%, THEN LOG Mode 1 entry in the Unit Narrative Log.

[5] UNIT 1 ONLY: MAINTAIN the SG levels on program by periodically adjusting the MFW Bypass controller level setpoints using Appendix B and C.

[6] **UNIT 2 ONLY**:

MAINTAIN the SG levels on program by periodically adjusting the MFW Bypass controller level setpoints using Appendix B and 2-SO-98-1, *Distributed Control System (DCS)*.

U	SQN Init 1 & 2	POWER ASCENSIO THAN 5% REACTOR REACTOR F	POWER TO 30%	0-GO-4 Rev. 006 Page 23		
	STARTU	D	Unit		Date _	
5.2	Reactor F (continue	Power Ascension To Be d)	tween 13% And 1	5% RTP		
	TH PE	Furbine roll in parallel with EN RFORM Section 5.3 in part In the remainder of this se	arallel	s desired,	_	
		he intermediate range ro 0 energizes, THEN	d stop setpoint is r	eached be	fore	
	[8.1]	STOP the power esca	llation.			
	[8.2]	CONTACT Reactor E range calibration. [C.3]		uate powei	r	
				nitials	Time	Da
		IEN reactor power is great least 2 out of 4 PRMs,	ater than or equal i		Time	Da
		· •	ater than or equal t THEN [C.1] [C.3]	to 10%	Time	Da
	on	at least 2 out of 4 PRMs,	ater than or equal t THEN [C.1] [C.3] XA-55-4A, window	to 10%	Time	Da
	on	at least 2 out of 4 PRMs, VERIFY annunciator 2 P-10 NUCLEAR AT POWER	ater than or equal t THEN [C.1] [C.3] XA-55-4A, window	to 10%	Time	Da
	on	at least 2 out of 4 PRMs, VERIFY annunciator 2 P-10 NUCLEAR AT POWER	Ater than or equal to THEN [C.1] [C.3] XA-55-4A, window R R Is LIT.	to 10% D-5:	Time	
	on [9.1]	at least 2 out of 4 PRMs, VERIFY annunciator 2 P-10 NUCLEAR AT POWER PERMISSIV	Ater than or equal f THEN [C.1] [C.3] XA-55-4A, window R Is LIT. YE XA-55-4A, window	to 10% D-5: B-5:	Time	
	on [9.1]	at least 2 out of 4 PRMs, VERIFY annunciator 2 P-10 NUCLEAF AT POWEF PERMISSIV VERIFY annunciator 2 P-7 LO POWER	Ater than or equal f THEN [C.1] [C.3] XA-55-4A, window R Is LIT. YE XA-55-4A, window	to 10% D-5: B-5:	Time	
	on [9.1]	at least 2 out of 4 PRMs, VERIFY annunciator 2 P-10 NUCLEAF AT POWEF PERMISSIV VERIFY annunciator 2 P-7 LO POWER	Ater than or equal to THEN [C.1] [C.3] XA-55-4A, window R R XA-55-4A, window XA-55-4A, window W TRIP K is DARK. st reading PRM wi	to 10% D-5: B-5: th the high	nest	

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U	SQN Init 1 & 2	POWER ASCENSION FROM THAN 5% REACTOR POWER REACTOR POWER		0-GO-4 Rev. 0067 Page 24 of 1	15
	STARTUP	U	nit		Date
5.2	Reactor Po (continued	ower Ascension To Between 1)	I3% And 1	5% RTP	
	[9.4]	IF the above conditional respo THEN	onse is NO	T attained,	
	[9.4.	1] STOP the power increas	e.		
	[9.4.	2] NOTIFY the SRO			
		In	itials	Date	Tim
		NOTE			
The	following step	will block both IR (25%) and PF	R (25%) lov	v power reactor	· trips.
	[10] BLC	CK the IR HI ELLIX reactor trin	and PR I		
		OCK the IR HI FLUX reactor trip X reactor trip by performing the PLACE IRM TRIP BLOCK P- AND [<u>HS-92-5004]</u> to BLOCI	following: 10 [HS-92	-	
	FLU	X reactor trip by performing the PLACE IRM TRIP BLOCK P-	following: 10 [HS-92 < .	<u>-5003</u>]	
	FLU [10.1]	X reactor trip by performing the PLACE IRM TRIP BLOCK P- AND [HS-92-5004] to BLOCI	following: 10 [HS-92 < . A, window	<u>-5003]</u> [,] C-2:	
	FLU [10.1]	X reactor trip by performing the PLACE IRM TRIP BLOCK P- AND [HS-92-5004] to BLOCI VERIFY annunciator XA-55-4 INTERMED RANGE TRAINS A & B TRIF	following: 10 [<u>HS-92</u> < . A, window	<u>-5003]</u> [,] C-2:	
	FLU [10.1]	X reactor trip by performing the PLACE IRM TRIP BLOCK P- AND [HS-92-5004] to BLOCI VERIFY annunciator XA-55-4 INTERMED RANGE TRAINS A & B TRIF	following: 10 [HS-92 K . A, window is LIT	<u>-5003]</u> [,] C-2:	
	FLU [10.1] [10.2]	X reactor trip by performing the PLACE IRM TRIP BLOCK P- AND [HS-92-5004] to BLOCI VERIFY annunciator XA-55-4 INTERMED RANGE TRAINS A & B TRIF BLOCKED	following: 10 [HS-92 〈 . A, window is LIT	<u>-5003]</u> C-2: 5004].	
	FLU [10.1] [10.2] [10.3]	X reactor trip by performing the PLACE IRM TRIP BLOCK P- AND [HS-92-5004] to BLOCI VERIFY annunciator XA-55-4 INTERMED RANGE TRAINS A & B TRIF BLOCKED RELEASE [HS-92-5003] AN PLACE PRM LOW POWER [HS-92-5005] AND	following: 10 [HS-92 K . A, window is LIT D [HS-92-4 TRIP BLO	<u>-5003]</u> · C-2: 5 004] . CK P-10	

5	SQN Unit 1 & 2		POWER ASCENSION FROM LESS THAN 5% REACTOR POWER TO 30% REACTOR POWER	0-GO-4 Rev. 0067 Page 25 of 115			
	STARTU		0 Unit	Date			
	5.2	2 Reactor Power Ascension To Between 13% And 15% RTP (continued)					
		[10.6]	RELEASE [<u>HS-92-5005</u>] AND [<u>HS-92-5</u> 6	<u>006]</u> .			
	NOTES						
	1)	UNIT 2 ONLY - SG MFW Bypass and MFW Reg. valve controllers are controlled by one of the following:					
		 Single element control - desired SG level setpoint will be compared to the actual SG level. Control is based only on SG level as the feedback for controlling the valve operation. 					
		 Three element control - uses SG level, feedwater flow, and steam flow as inputs for controlling the MFW Bypass and MFW Reg. valves. Desired mode of operation. 					
	2)	2) UNIT 2 ONLY - The change from single element to three element control:					
		• Observed on the DCS Operator Display monitors by accessing the Feedwater Valve Control screen and looking below the loop Main Feedwater Valve display. The Control Status text will change from "Single Element" to "Three Element".					
	 Uses Total Steam Flow demand as the input for three element control. The swap over to three element control may occur before or after the following step. 						
	[11] WHEN reactor power is between 13 and 15%, THEN						
		[11.1]	STOP power increase.				
		[11.2]	STABILIZE the plant.				
		[11.3]	UNIT 2 ONLY:				
			• MONITOR for swap over from single three element control in the DCS Fee				
			IF damping of SG level oscillations is REFER TO 2-SO-98-1	s required, THEN			
		for	rolling of second MFWP on recirc without p • testing or maintenance is desired, IEN	umping forward			
			ACE second MFPT in service by performin	g the following:			
		[12.1]	RECORD which MFPT is to be tested.				
			MFPT				

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	iit 1 & 2		TOR POWER TO 30%	Rev. 0067 Page 26 of 115	
	STAR	TUP	Unit	Date	
5.2	Reacto (contin		To Between 13% And 1	5% RTP	
	[12	.2] PLACE second 1,2-SO-2/3-1	MFPT in service in acco	rdance with	
		IF unit shutdown is rea THEN GO TO 0-GO-6, Powe To Hot Standby.	quired, er Reduction From 30% I	Reactor Power	
		ENSURE steps 5.2[1] (applicable steps)	through 5.2[12] of this se	ection complete.	
		· · · · · · · · · · · · · · · · · · ·	NOTE		

[15] **IF** rolling the turbine, **THEN GO TO** Section 5.3.

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END OF TEXT

Appendix A (Page 1 of 3) MODE 2 TO MODE 1 REVIEW AND APPROVAL **STARTUP** Unit Date 1.0 REVIEW AND ARPROVAL PRIOR to entering Mode 1, an SRO shall review the following: [1] [1.1] Active clearances for mode change restraints. Time N.2] Books. Date Time Ø-TI-EXX-000-001.0, Electrical Jumper Control Log Time Date [1.4] Active Procedures Book. Time Date IF applicable, OBTAIN and REVIEW the Mode 3 to [1.5] Mode 2 to Mode 1 checklists from the responsible departments and ENSURE required surveillance testing for Mode 1 entry has been completed. Time Date [1.6] **REVIEW** the Unit Configuration Log for impacts into Mode 1. Time Date

[1.7] **REVIEW** Annunciator Disablement Log, OPDP-4.

Time Date

SQN					
Unit	1	&	2		

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POWER ASCENSION FROM LESS0-GO-4THAN 5% REACTOR POWER TO 30%Rev. 0067REACTOR POWERPage 90 of 115

Appendix A (Page 2 of 3)

	STARTUP_	Unit	Date _		
1.0	REVIEW A	ND APPROVAL (continued)			
	[1.8]	REVIEW Plant Computer Point Disablement Log 0-PI-OPS-301-001.0.			
			Time	Date	
	[1.9]	ENSURE a board walk-down is performed by a designated SRO to verify proper equipment alignme (REFER TO appropriate CRO and OATC PIs for guidance) [C.8]	ent.		
			Time	Date	
		NOTE			
Tech Spec and TRM LCO 3.0.4 govern entering Mode 1 if any LCO requirement applicable in Mode 1 is NOT met. Therefore, mode change is NOT allowed while in a Tech Spec or TRM action UNLESS the exceptions and/or allowances stated in LCO 3.0.4 can be applied. [1.10] REVIEW all Tech Spec and TRM actions which have been entered on affected unit and common equipment to verify that mode change is acceptable.					
		SRO	Time	Date	
		SM	Time	Date	
	[1.11]	IF Tech Spec or TRM LCO 3.0.4 will be invoked for mode change, THEN ENSURE requirements of 0-TI-OPS-000-911.0, <i>Instructions for Using LCO 3.0.4 (b)</i> , for use of LCO 3.0.4 are satisfied.			
		SRO	Time	Date	

POWER ASCENSION FROM LESS
THAN 5% REACTOR POWER TO 30%
REACTOR POWER0-GO-4
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1.0		RTUF	OUnit AND APPROVAL (continued)		Date	
	[2]	SH	IFT MANAGER (SM) HOLD POINT			
		A.	SM has conferred with Unit Outage M Tech Spec and non-Tech Spec work completed or will <u>NOT</u> prohibit entry of operation in Mode 1.	related activities	s are	
				SM	Time	Date
		В.	SM has conferred with the Modification designee to ENSURE that there are restrict that would prohibit entry into Mode 1.	no open DCN/E		
				SM	Time	Date
		C.	SM has conferred with the Fire Protecter designee to ensure limitations as state 0-TI-SXX-000-016.0 are NOT exceed	ted in	or his	
				SM	Time	Date
		D.	SM has reviewed above and grants a Mode 1.	pproval for entr	ry into	
				SM	Time	Date
	[3]	OP	ERATIONS SUPERINTENDENT HOL	D POINT		
		A.	Operations Superintendent or his des grants approval to proceed to Mode ?		and	
			Operations Su	perintendent	Date	Time

SQN Unit 1 & 2

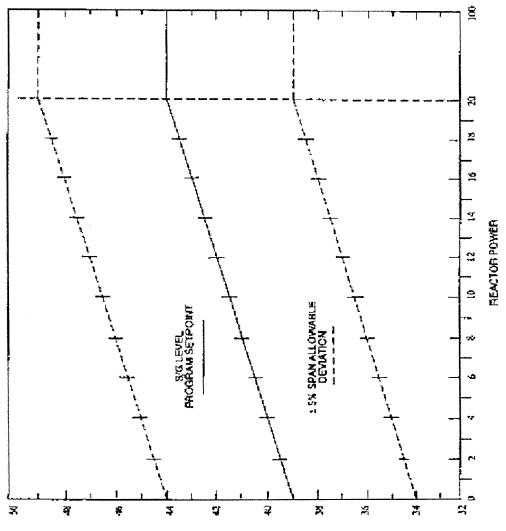
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Appendix B (Page 1 of 1)

FIGURE 1 STEAM GENERATOR LEVEL SETPOINT VS REACTOR POWER

NOTE

This figure does **NOT** represent the automatic S/G level program. The operating band provides a guide for Operators during Unit start-up and is intended to enhance S/G level control during transition from AFW level control to Bypass Reg valve control to Main Reg Valve control.



S/G NARROW RANGE LEVEL

Appendix C (Page 1 of 5)

MFW REG AND MFW BYPASS VALVE INSTRUCTIONS

1.0 MFW BYPASS CONTROLLER LEVEL SETPOINT ADJUSTMENTS

CAUTION

It is VERY important that adjustments to MFW Reg valves are made SLOWLY with the operator observing indicators to verify the desired results. This point cannot be over stressed as it is a key point to a successful startup.

NOTES

1) The SG MFW Bypass controller should be adjusted on only ONE SG at a time. [C.5]

- 2) The MFW Bypass controller should be in MANUAL prior to adjusting setpoint value to prevent controller gain input change.
 - [1] WHEN MFW Bypass controller level setpoint requires adjustment, THEN

PERFORM the following steps on one MFW Bypass valve at a time: [C.5] (N/A valves <u>NOT</u> adjusted)

[1.1] **REFER TO** Appendix B for allowable setpoint.

		SG-1 □	SG-2 □	SG-3 □	SG-4 □
[1.2]	PLACE MFW Bypass controller in MA	ANUAL.			
		SG-1	SG-2	SG-3	SG-4
	NOTE				

Allow sufficient time for the MFW Bypass to respond.

[1.3] **STABILIZE** SG level at a desired level.

		SG-1 □	SG-2 □	SG-3 □	SG-4 □
[1.4]	ADJUST controller setpoint in sn monitoring SG level.	nall increment	s while		
		SG-1 □	SG-2 □	SG-3 □	SG-4 □

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Appendix C (Page 2 of 5)

1.0	STARTUF MFW BYF (continue	ASS CONTROLLER L	Unit EVEL SETPOINT AD	JUS	TMENTS	Date S	
	[1.5]	PLACE MFW Bypass	s controller in AUTO .				
			SG		SG-2 □	SG-3 □	SG-4 □
	[1.6]	ALLOW the plant to valve setpoint.	stabilize before adjust	ing a	nother		
			SG E		SG-2 □	SG-3 □	SG-4 □

2.0 DAMPENING SG LEVEL OSCILLATIONS WITH MFW BYPASS VALVES IN SERVICE

	NOTES
1)	Perform adjustments to one SG at a time. <u>Allow Plant Parameters to Stabilize</u> between valve adjustments. [C.5]
2)	The wide range level recorders may respond to a change in level before the narrow range indicators. [C.5]
3)	Indicated flowrate on the feed flow indicators may NOT reflect an accurate value of flow. The flow indication is to be used as a <u>reference value only</u> . [C.5]
4)	The following step may be performed any time SG level oscillates outside the SG level setpoint operating band of ± 5 percent.

[1] IF required to dampen SG level oscillations at any time during SG level control with the MFW bypass controllers in AUTO, THEN

PERFORM the following: [C.5]

[1.1]	PLACE the MFW Bypass controller in MANUAL.	
[1.2]	CHANGE valve demand position LESS THAN 10 percent in the opposite direction of valve travel.	

[1.3] PLACE the MFW Bypass controller in AUTO. SQN Unit 1 & 2

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STARTUP____

Unit

Date _____

3.0 POSITIONING MFW REG VALVES OFF SEAT DURING UNIT STARTUP

NOTES

- After a MFW Reg is adjusted DO <u>NOT</u> increase reactor power or open MFW Reg further until plant stabilizes and SG level returns to program. ALLOWING PLANT PARAMETERS TO STABILIZE BETWEEN REG VALVE ADJUSTMENTS IS THE KEY TO SMOOTH POWER ASCENSION.
- 2) Anticipate level shrink when the MFW Reg comes off its seat. [C.5]
- 3) Use main feedwater flow indication to determine when MFW Reg valves come off seat.
 - [1] **PERFORM** the following steps to position MFW Reg valves off seat:
 - [1.1] **REVIEW** plant parameters and indications prior to initial opening.

		SG-1	SG-2 □	SG-3 □	SG-4 □
[1.2]	OPEN the MFW Reg valve in small inc maintaining the MFW Bypass valve be and 60 percent open.				
		SG-1 □	SG-2 □	SG-3 □	SG-4 □
[1.3]	ENSURE MFW Bypass valve starts clo Reg valve is opened.	osing wh	en MFW	,	
		SG-1 □	SG-2 □	SG-3 □	SG-4 □
[1.4]	ENSURE SG level returns to MFW By setpoint when MFW Reg valve is adjusted		ntroller		
		SG-1 □	SG-2 □	SG-3 □	SG-4 □
[1.5]	ENSURE SG level and MFW system sperforming subsequent valve adjustme		before		
		SG-1	SG-2	SG-3	SG-4

	SQN Unit 1 & 2	POWER ASCENSION FROM LESS THAN 5% REACTOR POWER TO 30% REACTOR POWER	0-GO Rev. Page		15	
		Appendix C (Page 4 of 5)				
	STARTU	P Unit			Date	
3.0		NING MFW REG VALVES OFF SEAT DUR P (continued)	NG U	NIT		
4.0	PLACING	G MFW REG VALVES IN AUTOMATIC				
		CAUTIONS				
1)	DO NOT pla	ice a MFW Reg valve in AUTO without su	fficien	t flow be	eing indi	cated
	on the conti	rolling steam/feed flow indicators.				cated
1)	on the cont Both MFW F	ice a MFW Reg valve in AUTO without sur rolling steam/feed flow indicators. Reg and MFW Bypass controllers should usly for an extended period. [C.5].				cated
	on the contr Both MFW F simultaneou [1] Wł	rolling steam/feed flow indicators. Reg and MFW Bypass controllers should	NOT b	e left in		cated
	on the contr Both MFW F simultaneou [1] Wł	rolling steam/feed flow indicators. Reg and MFW Bypass controllers should usly for an extended period. [C.5]. HEN desired to place MFW Reg valves in A ERFORM the following: ADJUST SG level to SG program level s	NOT 1	De left in		cated
	on the contr Both MFW F simultaneou [1] WF PE	rolling steam/feed flow indicators. Reg and MFW Bypass controllers should usly for an extended period. [C.5]. HEN desired to place MFW Reg valves in A ERFORM the following:	NOT to UTO, 1 setpoin	THEN		cated
	on the contr Both MFW F simultaneou [1] WF PE	rolling steam/feed flow indicators. Reg and MFW Bypass controllers should usly for an extended period. [C.5]. HEN desired to place MFW Reg valves in A ERFORM the following: ADJUST SG level to SG program level s and ADJUST the MFW Reg valve to obtain r deviation (between -5 percent and +5 per while matching steam and feed flows.	NOT to UTO, 1 setpoin	THEN		
	on the contr Both MFW F simultaneou [1] WF PE	rolling steam/feed flow indicators. Reg and MFW Bypass controllers should usly for an extended period. [C.5]. HEN desired to place MFW Reg valves in A ERFORM the following: ADJUST SG level to SG program level s and ADJUST the MFW Reg valve to obtain r deviation (between -5 percent and +5 per while matching steam and feed flows.	NOT to UTO, 1 setpoin near ze ercent) SG-1	THEN t, sro	AUTO SG-3	SG-
	on the contr Both MFW F simultaneou [1] WF PE [1.1]	rolling steam/feed flow indicators. Reg and MFW Bypass controllers should usly for an extended period. [C.5]. HEN desired to place MFW Reg valves in A ERFORM the following: ADJUST SG level to SG program level s and ADJUST the MFW Reg valve to obtain r deviation (between -5 percent and +5 per while matching steam and feed flows.	NOT to UTO, 1 setpoin near ze ercent) SG-1	THEN t, sro	AUTO SG-3	 SG-4
	on the contr Both MFW F simultaneou [1] WF PE [1.1]	 rolling steam/feed flow indicators. Reg and MFW Bypass controllers should usly for an extended period. [C.5]. HEN desired to place MFW Reg valves in A ERFORM the following: ADJUST SG level to SG program level s and ADJUST the MFW Reg valve to obtain r deviation (between -5 percent and +5 percent and +5 percent and the following steam and feed flows. WHEN controller deviation is near zero, PLACE the MFW Reg valve in AUTO. 	NOT to UTO, 1 setpoin near ze ercent) SG-1	THEN t, sro	AUTO SG-3	SG-4
	on the contr Both MFW F simultaneou [1] WF PE [1.1]	 rolling steam/feed flow indicators. Reg and MFW Bypass controllers should usly for an extended period. [C.5]. HEN desired to place MFW Reg valves in A ERFORM the following: ADJUST SG level to SG program level s and ADJUST the MFW Reg valve to obtain r deviation (between -5 percent and +5 percent and +5 percent and the following steam and feed flows. WHEN controller deviation is near zero, PLACE the MFW Reg valve in AUTO. 	NOT k UTO, 1 setpoin hear ze ercent) SG-1 THEN SG-1	THEN THEN t, ero SG-2 SG-2	AUTO SG-3 SG-3	SG-4

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SG-1	SG-2	SG-3	SG-4

SQN Unit 1 & 2

POWER ASCENSION FROM LESS
THAN 5% REACTOR POWER TO 30%
REACTOR POWER0-GO-4
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	STARTUP_	Unit	_		Date	<u></u>
4.0	PLACING N	/IFW REG VALVES IN AUTOMATIC (c	ontinue	d)		
	[1.4]	PLACE the associated MFW Bypass v	valve in I	MANUAL		
			SG-1	SG-2 □	SG-3 □	SG-4 □
	[1.5]	CLOSE the MFW Bypass valve in sma AND	all incren	nents,		
		ENSURE the MFW Reg valve respond level.	ls to con	trol SG		
			SG-1 □	SG-2 □	SG-3 □	SG-4 □
	[1.6]	WHEN MFW Reg valve is controlling S	SG level,	THEN		
		PROCEED TO another SG loop.				
			SG-1 □	SG-2 □	SG-3 □	SG-4 □

	TENNESSEE VALLEY AUTHORITY
	SEQUOYAH NUCLEAR PLANT
	SYSTEM OPERATING INSTRUCTIONS
	0-SO-62-7 VFd
	BORON CONCENTRATION CONTROL
	Revision 58
	QUALITY RELATED
F	PREPARED BY: Olivia Taylor
F	RESPONSIBLE ORGANIZATION: OPERATIONS
	APPROVED BY: <u>A. BERGERON</u>
	EFFECTIVE DATE: 02/08/10
	LEVEL OF USE: CONTINUOUS USE
	REVISION DESCRIPTION: Added step to Prerequisite actions to ensure crew has been briefed on expected reactivity changes (1000079).
	PERFORMANCE OF THIS PROCEDURE MAY IMPACT REACTIVITY

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1.0 INTRODUCTION

1.1 Purpose

To provide instructions for operation of the Boron Control System.

1.2 Scope

This instruction provides detailed steps for the following modes of operation:

Automatic Makeup

At Power Routine Dilution

Dilute and Alternate Dilute

Borate

Manual Makeup Control (preferred method for VCT makeup in Modes 1 and 2)

Blending to Spent Fuel Pit Using Boric Acid Blender via SFP Cooling Pump Suction Pressure Indicators

Blending to Spent Fuel Pit Using Boric Acid Blender via Bull Hose Directly to Spent Fuel Pit

Blending to RWST Using Boric Acid Blender

Makeup to the Reactor Coolant System from the RWST in modes 1-4 when the Automatic/Manual Makeup is unavailable.

Manual Makeup to the Reactor Coolant System from the RWST in modes 5 or 6

Blending to Transfer Canal Using Boric Acid Blender

Blending to the Holdup Tank using Boric Acid Blender

Flushing Unit 1 Blender/Piping Using Primary Water (Maintenance Activities)

Flushing Unit 2 Blender/Piping Using Primary Water (Maintenance Activities)

UNIT 2 Alternate divert path using RCL sampling system

2.0 REFERENCES

2.1 Performance References

- A. Procedures
 - 1. 0-SO-62-10, Boric Acid Batch, Transfer, and Storage System
 - 2. 0-SO-78-1, Spent Fuel Pit Cooling System
- B. Technical Instructions TI-44, Boron Tables

1

2.2 Developmental References

- A. Procedures
 - 1. SOI-62.2, Boron Concentration Control
 - 2. 0-PI-OPS-000-633.0, Aux. Cont. Rm. Switch Alignment Verification
 - 3. Westinghouse Vendor Manual SQN-VM 4990
- B. Technical Specifications
 - 1. 3.1.1.1
 - 2. 3.1.1.2
 - 3. 3.9.1
 - 4. 3.10.1
 - 5. Bases 3/4.1.3
- C. Technical Requirements Manual
 - 1. 3.1.2.1
 - 2. 3.1.2.2
 - 3. 3.1.2.3
 - 4. 3.1.2.4
 - 5. 3.1.2.5
 - 6. 3.1.2.6
 - 7. Bases 3/4.1.2
- D. FSAR
 - 1. 9.3.4.2.5
 - 2. 9.3.4.2.2
 - 3. 9.3.4.2.6
 - 4. 15.2.4
 - 5. 15.2.14.1
 - 6. 15.4.6.1
- E. TVA Drawings
 - 1. 47W809-1
 - 2. 47W809-2
 - 3. 47W809-5

3.0 PRECAUTIONS AND LIMITATIONS

- A. The mode selector switch should be returned to the **AUTO** makeup mode after any dilution or boration operation. The control switch must be turned to **START** in order for the auto makeup to function.
- B. At least one Reactor Coolant Pump or one RHR Pump must be in operation during dilution operations. **[C.6]**
- C. Maintain Pressurizer boron concentration within 50 ppm of reactor coolant loop boron concentration. This can be accomplished by turning pressurizer heaters on and allowing sprays to maintain RCS pressure within program. If Normal Spray is NOT available, then Auxiliary Spray should be used (1, 2-SO-62-1) in conjunction with pressurizer backup heaters.
- D. Axial flux difference should be maintained within limits by using the control bank of rods while changing boron concentration.
- E. Prior to making a positive reactivity change, Tech Specs and TRM should be referenced to ensure the unit is not in a LCO action that prohibits a positive reactivity change. **[C.1]**
- F. A boron sample should be obtained whenever reactor makeup water is added to the VCT, unless the unit is at power and results of the makeup are as expected.
- G. When making an RCS dilution of ≥ 3000 gallons, it should be done in batches with an RCS boron concentration verification at the halfway point (e.g., 1500 gallons). Allow at least 15 minutes between batches. [C.5] [C.7]
- H. Simultaneous makeup to the RWST and the RCS should be avoided to prevent the possibility of injecting unborated (or under borated) water into the core. [C.4]
 [C.6] [C.7]
- I. Reactivity balance calculations are required for any power changes more than 1%, except when immediate boration is required to maintain rods above the insertion limit or as required during an Rapid Shutdown or Load Reduction (AOP-C.03) or dropped/misaligned rod recovery (AOP-C.01). Although stated in the procedure that only one calculation is required for a major change in Reactor Power, calculations should be current and take into account the time dependency of parameters used in the calculation. [e.g. one calculation to decrease RX power to 70% power to remove a MFP is acceptable]. In the event of a large power manipulation (GO startup or shutdown) several calculations will be required. A calculation should be performed for the increase to 30% Reactor power, another for an increase to 50%, and so on. These calculations may be correlated to GO plateaus.

3.0 PRECAUTIONS AND LIMITATIONS (CONTINUED)

- J. Boric Acid Controller adjustment is required for B-10 depletion for automatic and manual makeup to improve the accuracy of the blend. The B-10 depletion value for each unit can be obtained from the Rx Eng Information file located on the site intranet. Reactor Eng Information ICON can be found on the control room PC's.
- K. An unanticipated power change greater than 5 MWT, rod motion greater than 1 step (in or out), or T_{AVG} greater than 0.5°F, require a PER and should be evaluated as a potential reactivity management event per SPP-10.4, Reactivity Management Program.
- L. Boron concentration measurement inaccuracies and integrator calibration tolerance may result in a small difference between RCS boron concentration and blend boron concentration. This may result in a small change in Tavg (~1/4°F) and thermal power (by a few megawatts) after makeup.
- M. Manual Makeup (Section 6.5) of approximately 200 gallons or less is preferred over allowing the system to automatically make up in Modes 1 and 2. Performing manual makeup and limiting the volume of makeup is preferred to reduce the impact on reactivity, RCP seal performance (due to reduced pressure/temperature transients) and RCS chemistry (due to reduced VCT pressure changes). During transient conditions, emergencies, or during plant cooldown, automatic makeup may be used as necessary.
- N. The potential exists that the blender piping contains primary water. This will result in a dilution and a small reactivity addition.
- O. Completely emptying the BAT's for all valve work is not required to establish a safe work boundary. The valves on the lower portions the tanks require an empty tank to establish safe conditions. The tank drain, level instrument isolation and pump suction line are all at or near the bottom of the tank. These are listed in the table below:

BAT A	BAT C	BAT B
1-VLV-62-1049	0-VLV-62-1049	2-VLV-62-1049
1-VLV-62-1058	0-VLV-62-1058	2-VLV-62-1058
1-VLV-62-1088	0-VLV-62-1088	2-VLV-62-1088

The other valves associated with the Boric Acid Transfer Pumps can be worked with some level remaining in the tanks. As a margin of safety, a maximum of 85% should be used to establish safe working conditions.

Uni	t
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Date

4.0 PREREQUISITE ACTIONS

NOTE Throughout this Instruction where an **IF/THEN** statement exists, the step should be **N/A** if condition does <u>not</u> exist.

- [1] **ENSURE** the instruction to be used is a copy of the effective version.
- [2] ENSURE Precautions and Limitations, Section 3.0, has been reviewed.
- [3] **REVIEW** the following Status Files for any off-normal alignments that may impact performance:

Status File	\checkmark
Unit 1	
Unit 2	
Radwaste	

- [4] ENSURE Chemical and Volume Control System is in operation.
- [5] ENSURE the operating crew has been briefed for any reactivity changes that will occur due to performance of the applicable procedure section.
- [6] IF in modes 1, 2, or 3, THEN

ENSURE requirements of TRM L.C.O. 3.1.2.6 are met, **OR COMPLY** with applicable actions.

[7] IF in modes 4, 5, or 6, THEN

ENSURE requirements of TRM L.C.O. 3.1.2.5 are met, **OR COMPLY** with applicable actions.

[8] IF Primary Water required for the evolution to be performed, THEN

ENSURE Primary Makeup Water system in service.

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Unit				Date
4.0 PRE	REQUISITE	EACTIONS (Continued)		
	NOTE	The following step is perfo of the RO and/or SRO.	rmed at the discr	etion
	[9] WH	EN performing a dilution or borat	tion, THEN	
	[a]	IF Normal pressurizer spray ENERGIZE pressurizer I equalize the boron conce pressurizer and the RCS	neaters so sprays entration betweer	can
	[b]	IF Normal pressurizer spray THEN PLACE Auxiliary Spray i (1, 2-SO-62-1) in conjun backup heaters. (N/A if r	in service ction with pressu	
		SURE appropriate Valve Checklis A if <u>not</u> applicable).	st has been comp	leted
		VALVE CHECKLIST	INITIALS	
		1-62-7.03		
		2-62-7.04		
		SURE appropriate Power Checkl A if <u>not</u> applicable).	ist had been com	pleted
		POWER CHECKLIST	INITIALS	
		1-62-7.01		
		2-62-7.02		
	[12] IF B	Boric Acid Tank is the borated wa	ater source, THEN	i
		SURE Boric acid pump aligned p n 0-SO-62-10.	roperly in accord	ance
	[13] IF u	sing the RWST for the borated v	vater source, TH	EN
	ENS	SURE LCV-62-135 and/or LCV-6	2-136 OPERABL	-E.

- **NOTE** Step **[14]** may be marked N/A if boration must be immediately initiated to maintain shutdown margin OR if performing a rapid boration using FCV-62-138 in preparation for RCS cooldown.
- [14] IF reactor is subcritical AND an RCS boration or dilution is required, THEN PERFORM Appendix D.

S	QN
1	,2

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Unit		Date
4.0	PREREQUI	SITE ACTIONS (Continued)
	NOTE 1	Step [15] may be marked N/A for any of the following conditions:
		 Minor power changes (Reference Section 3.0)
		 If boration must be immediately initiated to maintain control rods above the insertion limit
		 During an emergency shutdown (AOP-C.03)
		 Recovery of a dropped or misaligned rod (AOP-C.01).
		 If initiating a rapid boration using FCV-62-138 immediately prior to reactor shutdown in preparation for RCS cooldown.
		 During low power physics testing per 0-RT-NUC-000-003.0 if boration/dilution values have been provided and verified by Reactor Engineering.
	NOTE 2	Appendix D and E may be used to verify data provided by Reactor Engineering. IV is not required if Appendices are performed by an SRO to verify Rx. Engineering data.
		ctor is critical AND RCS boration or dilution performed, THEN
	PERF	DRM the following:
	[a] A	ppendix E Reactivity balance calculation.
		ppendix D Calculation for amount of boric acid or imary water (TI-44).
	[16] IF perf THEN	orming a Spent Fuel Pit boration,
	ENSU	RE RCL has provided supporting data.

Unit

Date

4.0 PREREQUISITE ACTIONS (Continued)

[17] **REVIEW** Unit and Radwaste Status Files for any off normal alignments that may impact performance.

[18] ENSURE each performer and verifier documents their name and initials:

Print Name	Initials

[19] INDICATE below which performance section of this instruction will be used and the reason for this performance:

- 5.0 STARTUP/STANDBY READINESS
- 6.0 NORMAL OPERATION
- 7.0 SHUTDOWN

8.0 INFREQUENT OPERATION

REASON:_____

End of Section 4.0

BORON CONCENTRATION CONTROL

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Date

Unit____/

6.2 Dilute



When making an RCS dilution of \geq 3000 gallons, it should be done in batches with an RCS boron concentration verification at the halfway point (e.g., 1500 gallons). Allow at least 15 minutes between batches. [C.5] [C.7]



Returning the Boric Acid Blender to service after unplugging, cleaning, or maintenance on the Boric Acid System could introduce debris, sludge, air or chunks of solidified boron into the CCP suction resulting in pump damage. Extreme care must be exercised to properly flush the Boric Acid Blender system following an outage. [C.2]



If an excessive amount of dilution is required (plant startup), the pressurizer heaters should be energized to cause pressurizer spray operation for equalizing boron concentration in RCS and pressurizer.

NOTÉ 2

Dilute mode will be used anytime a long-term positive reactivity addition is desired. The operator should use the normal dilute mode whenever conditions permit.



ENSURE unit is <u>NOT</u> in a Tech Spec or TRM action that prohibits positive reactivity additions. **[C.1]**



HUT level increase of 1% is equal to 1380 gallons (TI-28 fig. C.21).

ENSURE sufficient capacity available in the HUT selected to receive expected amounts of CVCS letdown: (**N/A** if <u>not</u> used)

HUT	LEVEL		INITIALS
A	N/A ····································	%	A
В		%	

BORON CONCENTRATION CONTROL

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Unit

Date

Dilute (Continued) 6.2



ENSURE makeup system is aligned for **AUTO** operation in accordance with Section 5.1.

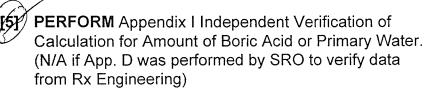


RECORD the quantity of dilution water required to achieve desired boron concentration using Appendix D. (**N/A** for minor power changes)

XXXX gals



Due to eyeball interpolation the verified calculation may slightly differ from the initial calculation. The following signoff indicates that any differences in the two results have been discussed and are close enough to be considered validated.



- [6] PLACE [HS-62-140A], Boric Acid Supply to Blender Flow Control Switch to the STOP position.
- [7] PLACE [HS-62-140B], CVCS Makeup Selector Switch to the DILUTE position.
- [8] ENSURE [HS-62-140D], Boric Acid Valve to the Blender is CLOSED (Green light is LIT).
- [9] SET [FQ-62-142], Batch Integrator for the desired quantity.

WW.



CV

____/______1st CV

BORON CONCENTRATION CONTROL

0-SO-62-7 Rev. 58 Page 21 of 201

	-
11	nit
U	nit

Date

6.2 Dilute (Continued)

NOTE Primary Water Flow Controller [FC-62-142] receives its reference signal (70 gpm) from setpoint potentiometer (dial indicator) located on panel M-6. A setpoint of 35% corresponds to a 70 gpm primary water flow rate.

[10] ADJUST [FC-62-142], Primary Makeup Water Flow Controller for the desired flow rate.

[11] PLACE [HS-62-140A], Boric Acid Supply to Blender Flow Control Switch to the START position.

- **NOTE** Flow oscillations and/or erratic controller response may require manual operation of Primary Water Flow Controller [FC-62-142] until stable conditions exist.
- [12] VERIFY the following;
 - [a] Inlet to top of VCT [FCV-62-128] is OPEN.
 - [b] Primary Water flow by [FI-62-142A] OR [FQ-62-142].
- **NOTE** Alternate dilution in small amounts is acceptable on a regular basis, provided no significant changes in seal water temperature or seal leakoff are indicated. Batches of 5 to 10 gallons may be added through FCV-62-144 on a frequency not to exceed once per 30 minutes. ICS points for No. 1 seal leakoffs and seal water temperatures on the RCPs should be monitored during and after dilution.
- [13] IF primary water addition to the bottom of the VCT [FCV-62-144] is desired, THEN
 - [a] CLOSE [FCV-62-128] with [HS-62-128].
 - [b] OPEN [FCV-62-144] with [HS-62-144].
 - [c] VERIFY Primary Water flow by [FI-62-142A] OR [FQ-62-142].

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Unit		Date	
6.2	Dilute (C	Continued)	
	NOTE	It may take approximately 15 minutes before any changes to reactivity are indicated on nuclear instrumentation or RCS temperature indication.	D
		NITOR nuclear instrumentation and reactor coolant perature to ensure the proper response from dilution.	
	63 p ENS	LI-62-129], Volume Control Tank Level, increases to bercent, THEN SURE [LCV-62-118], Volume Control Tank Divert Valve ENS to divert excess water to the Holdup Tanks.	
	[16] WH	EN dilution is complete, THEN	
	[a]	PLACE [HS-62-140A], Boric Acid to Blender Flow Control Switch to the STOP position.	
	[b]	IF [FCV-62-144] was previously OPENED, THEN CLOSE [FCV-62-144] with [HS-62-144].	
	[c]	VERIFY no primary water flow on either [FI-62-142A] OR [FQ-62-142].	
	[d]	ENSURE [FCV-62-128] is CLOSED.	

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Unit_

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BORON CONCENTRATION CONTROL

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Date_____

6.2 Dilute (Continued)			
[17] IF power increase in progress and additional dilutions will be requir	ed.		
THEN use this table to re-perform steps [4] through [18].			
STEP	1 st	2 nd	3 rd
[4] RECORD the quantity of dilution water required to achieve desired boron concentration using Appendix D.	Quantity	Quantity	Quantity
[5] PERFORM Appendix I, IV of Calculation for amount of BA or PW.	SRO	SRO	SRO
[6] PLACE [HS-62-140A], Boric Acid Supply to Blender Flow Control Switch to the STOP position.	1 st CV	/ 1 st CV	
[7] PLACE [HS-62-140B], CVCS Makeup Selector Switch to the DILUTE position.			
[8] ENSURE [HS-62-140D] Boric Acid Valve to Blender is CLOSED (Green light LIT).			
[9] SET [FQ-62-142], Batch Integrator for the desired quantity.	/ 1 st CV	/	
[10] ADJUST [FC-62-142], Primary Makeup Water Flow Controller for the desired flow rate.	/	/	1 CV
[11] PLACE [HS-62-140A], BA Supply to Blender Flow Control Switch to START.	1 st CV	/	/
 [12] VERIFY the following: [a] Inlet to top of VCT [FCV-62-128] is OPEN. [b] Primary Water flow by [FI-62-142A] or [FQ-62-142]. 			
 [13] IF PW addition to top of VCT [FCV-62-128] is not warranted, but PW addition to the bottom of the VCT [FCV-62-144] is desired, THEN [a] CLOSE [FCV-62-128] with [HS-62-128] 			
[b] OPEN [FCV-62-144] with [HS-62-144].			
[c] VERIFY Primary Water flow by [FI-62-142A] or [FQ-62-142].			
[14] MONITOR nuclear instrumentation and reactor coolant temperature to ensure the proper response from dilution.			
[15] IF [LI-62-129], VCT level, increases to 63 percent, THEN ENSURE [LCV-62-118], VCT Divert Valve, OPENS to divert excess water to the HUTs.			
 [16] WHEN dilution is complete, THEN [a] PLACE [HS-62-140A], Boric Acid to Blender Flow Control Switch to STOP 	/	/	/
 [b] IF [FCV-62-144] was previously OPENED, THEN CLOSE [FCV-62-144] with [HS-62-144]. [c] VEREV as a sime as unstan flow on either [El 62 1420] or [EO 62 142]. 			
 [c] VERIFY no primary water flow on either [FI-62-142A] or [FQ-62-142]. [d] ENSURE [FCV-62-128] is CLOSED. 			
[18] IF Step [17] will be repeated, THEN PERFORM the following: [a] PLACE [HS-62-140B], CVCS Makeup Selector Switch to the AUTO performance of the AUT	osition.	/	
 [b] PLACE [HS-62-140A], BA to Blender Flow Control Switch to START position. [c] ENSURE dilution is logged in Unit Narrative Log. 		[

SQN 1,2		BORON CONCENTRATION CONTROL	0-SO-62-7 Rev. 58 Page 24 of 201
Unit			Date
6.2 Dilute (Continued)			
		LIGN the blender controls for AUTO makeup to the S in accordance with Section 5.1.	ne
[20] ENSURE dilution(s) is logged in Unit Narrative Log.		URE dilution(s) is logged in Unit Narrative Log.	
	NOTE Sample may be obtained at normal RCS sample intervals provided the unit is at power and the unit response following the dilution is as expected.		
		CS boron sample is required, THEN TFY Chem Lab to obtain RCS boron sample.	

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APPENDIX D

Page 1 of 1

CALCULATION FOR AMOUNT OF BORIC ACID OR PRIMARY WATER (TI-44)

- **NOTE 1** One calculation is required for each major change.
- **NOTE 2** Boric acid amounts to achieve required RCS boron concentration may be significantly higher than calculated amounts if CVCS demin resins are removing boron. Amount of boron removal by mixed bed resins will depend on RCS boron, resin age, whether demin bed was previously borated, and letdown temperature. Chemistry should be consulted if required to evaluate resin bed removal.
- [1] IF REACTF not used,

THEN

CALCULATE amount of primary water or boric acid required using TI-44.

RCS BORON	PPM CHANGE	AMOUNT PRIMARY WATER OR BORIC ACID
ppm Current		
N/A		
3		
ppm Target		
arget		
		TOTAL GAL(s)

NOTE REACTF data sheets are to be signed by the preparer and reviewer.

[2] IF REACTF used attach printout to procedure.

NOTE IV is not required if appendix is performed by an SRO to verify data provided by Rx. Eng.

[3]

ENSURE independently verified by an SRO in accordance with Appendix I.

END OF TEXT

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT

SURVEILLANCE INSTRUCTION

0-SI-SXX-068-127.0

RCS AND PRESSURIZER TEMPERATURE AND PRESSURE LIMITS

Revision 11

QUALITY RELATED

PREPARED BY: Wayne H. Brewer

RESPONSIBLE ORGANIZATION: <u>SE/NSSS</u>

APPROVED BY: Michael Cooper

EFFECTIVE DATE:06/08/2006

SFVit 1 den

LEVEL OF USE: CONTINUOUS USE

SQN 1 & 2	RCS AND PRESSURIZER TEMPERATURE AND PRESSURE LIMITS	0-SI-SXX-068-127.0 Rev 11 Page 2 of 38
REVISION		

DESCRIPTION

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RIPTION Revised to add note to contact the computer engineering group when changes are made to this procedures. Added note to Appendix F to allow the use of points derived from listed computer points for plant computer use.

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1.0 INTRODUCTION

1.1 Purpose

This Surveillance Instruction (SI) provides detailed steps for ensuring compliance with RCS and pressurizer temperature and pressure limits.

1.2 Scope

1.2.1 Surveillance Tests to be Performed

This Instruction verifies RCS and pressurizer temperature and pressure are maintained within Technical Specification limits during the following plant conditions.



Cooldown and heatup transients that exceed 30°F in a twelve-hour period or less.



Pressure transients in which pressurizer pressure fluctuations exceed 300 psig in a twelve-hour period or less. This instruction should be considered whenever operating auxiliary spray or when increasing/decreasing pressurizer level.



Inservice leak and hydrostatic testing operations above the Pressure Temperature Limit Report heatup and cooldown limit curves.

D. Prior to reactor criticality.



Reactor is critical and the RCS temperature is less than 551°F with the T_{avg} - T_{Ref} Deviation Alarm not reset.

1.2.2 Requirements Fulfilled

The Surveillance Requirements (SR) listed below are satisfied (in the manner specified) by completion of the associated performance section.

	Performance Section	Surveillance Requirements Satisfied	
į	6.1 or 6.2	TS SR 4.4.9.1.1 (full)	
:r)		TRM SR 4.4.9.2.1 TRM SR 4.4.9.2.2	
	6.3	SR 4.4.9.1.1 (full)	
	6.4	SR 4.1.1.4.a (full)	
	6.5	SR 4.1.1.4.b (full)	

1.2.3 Modes

Unit operating modes for which Surveillance Requirements covered by this Instruction must be satisfied (applicable modes) and during which tests may be performed (performance modes) are:

		Performance Mode	Applicable Mode	
	6.1N/A	All	All	
	6.2	All	All	
	6.3 +	All	All	
	6.4	Modes 1, 2 and 3	Modes 1 and 2 with K _{eff} greater than or equal to 1.0	
	6.5 µ/A	Modes 1, 2 and 3	Modes 1 and 2 with K _{eff} greater than or equal to 1.0	

SQN 1 & 2

1.3 Frequency/Conditions



A heatup or cooldown is defined as a temperature change of greater than 30°F in a twelve-hour period or less, <u>OR</u> a pressure change of greater than 300 psi in a twelve-hour period or less.



Section 6.1 or 6.2 must be performed every 30 minutes any time a RCS and/or pressurizer heatup or cooldown (as defined above) occurs.



Section 6.3 must be performed every 30 minutes during inservice leak and hydrostatic testing operations above the heatup and cooldown limit curves.



Section 6.4 must be performed within 15 minutes PRIOR to achieving reactor criticality.



Section 6.5 must be performed every 30 minutes when the reactor is critical and the RCS temperature is less than 551°F with the T_{Avg} - T_{Ref} Deviation Alarm not reset.

2.0 REFERENCES

2.1 Performance References

- A. SPP 8.1, Conduct of Testing.
- B. SPP 8.2, Surveillance Test Program.

2.2 Developmental References

- A. SQN Unit 1 and Unit 2 Technical Specifications.
- B. SQN Final Safety Analysis Report (FSAR), Chapter 5.
- C. Memorandum from J. H. Miller to P. R. Wallace dated February 4, 1986 (L29 860131 884).

2.2 Developmental References (Continued)

- D. Memorandum from J. B. Hosmer to S. J. Smith dated June 8, 1988 (B29 880606 002).
- E. Memorandum from Richard G. Simmons, Wyle Labs, to C. R. Favreau dated February 6, 1989 (W01 890203 934).
- F. ASME Section III, Appendix G.
- G. 10 CFR 50, Appendix H.
- H. NRC Bulletin 88-11.
- I. DCN-Q06168-A.
- J. NER 901398001 (TVA-90-1130) Stepwise Temperature Changes.

K. Integrated Computer System (ICS) Operators Guide and Critical Design Review.

L. TSC 00-14.

3.0

PRECAUTIONS AND LIMITATIONS

Stepwise heatup and cooldown should be avoided. The heatup and cooldown rates assume uniform heatup and cooldown transients, not step changes. Restricting a heatup or cooldown to an even rate of change and half the temperature limit in a 30-minute period will provide reasonable assurance that on an hourly basis, the "...in any one-hour period..." part of the applicable limit will be satisfied.



The pressurizer surge line thermocouple TI-68-318 [plant computer point T0482A] and the pressurizer liquid space thermocouple TI-68-319 [plant computer point T0480A] should be monitored continuously during letdown and makeup operations to ensure thermal transients on the pressurizer surge line thermal sleeve are minimized. Thermal transients may be caused by the following actions:



Rapidly increasing pressurizer level: This action is usually indicative of the cooler RCS liquid being forced up the surge line at a rate the pressurizer heaters can not keep up with.

3.0

PRECAUTIONS AND LIMITATIONS (Continued)

Rapidly decreasing pressurizer level: This action may result in a mismatch between the output of the pressurizer heaters and the volume of liquid available to absorb the energy.



The liquid space temperature sensor is located approximately three feet above the surge line thermal sleeve to give indication of thermal cycling of the sleeve. This location is approximately one-third up the length of the pressurizer immersion heaters.



Changes in pressurizer level may result in rapid changes in pressurizer liquid temperatures when the RHR system is in operation and a steam bubble has been pulled in the pressurizer.



Pressurizer vapor temperature will be equal to the saturation temperature at a given pressurizer pressure. Hence changes in vapor temperature indicate a corresponding change in pressurizer pressure.



High pressurizer spray line ∆Ts may result from rapid cooldown/depressurization of secondary side, or operation of auxiliary pressurizer spray, or operation with RHR controlling RCS temperature and a steam bubble in pressurizer at saturated temperature.



An additional unit operator may be required to ensure applicable requirements are satisfied during heatup or cooldown that result in mode changes.



During operation in cold shutdown, a steam bubble shall NOT be pulled in the pressurizer unless chemistry specifications (dissolved oxygen or hydrazine) in the Reactor Coolant System are within applicable limits.



Measured temperature changes during cooldown will generally be negative. When comparing these values to PTLR or calculated limits, only the absolute magnitudes are to be considered.



The use of pressurizer auxiliary spray should trigger the performance of this procedure especially in mode 5 with a pressurizer steam bubble and in mode 4.

3.0 PRECAUTIONS AND LIMITATIONS (Continued)

Unit____/

Termination of this procedure should consider plant conditions approaching acceptance criteria such as pressurizer spray line delta T and pressurizer surge line delta T (high limit: 320° F and pressurizer surge line delta T (low limit: 250° F).



Limiting the pressurizer heatup rate to less than or equal to 50°F per hour when pressurizer pressure is between 1500 and 2300 psig will reduce pressurizer safety valve leakage.



If data taking is being performed using the ICS and the computer system becomes inoperable, then manual data taking in accordance with data sheets has to be performed and evaluated until the required data is completed for the pressure-temperature transient.

If applicable, contact the Corporate Computer Engineering Group to notify them of changes made to this procedure via the SPP-2.6 Software Service Request form.

4.0

PREREQUISITE ACTIONS



During the performance of this Instruction, any "IF-THEN" statement may be marked N/A when the corresponding stated condition does not occur.



The appropriate unit, 1 or 2, for which this instruction is being performed should be entered on the top of each page.

4.1 Preliminary Actions

- [1] **RECORD** the following information on Surveillance Task Sheet:
 - A. Unit and operational mode
 - B. Printed name, signature, and initials of test participants

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SQN 1 & 2		RCS AND PRESSURIZER TEMPERATURE AND PRESSURE LIMITS	0-SI-SXX-068-127.0 Rev 11 Page 11 of 38
4.1	Prel	iminary Actions (Continued)	Unit
	[2]	OBTAIN a copy of the applicable unit's heatup or hydrostatic leak test curve (PTLR Figure 2-1) and/c cooldown curve (PTLR Figure 2-2), AND LIST the applicable figure:	N/A-
	[3]	ENSURE NO clearances or system off normal configurations exist which would prevent completio test performance.	n of
	[4]	IF a configuration or clearance prevents test perfor THEN NOTIFY Unit SRO and Supervisor	rector Date Time
4.2	Me	asuring and Test Equipment, Parts, and Supplies	S
	Noi	ne	
4.3	Fie	Id Preparations	
	No	ne	
4.4	Ар	provals and Notifications	

None

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C

C

4

5.0 ACCEPTANCE CRITERIA

- A. The RCS temperature and pressure (not including the pressurizer) shall be determined to be within the limit line and applicable rates shown in PTLR Figures 2-1 and 2-2 at least once per 30 minutes during heatup, cooldown and inservice hydrostatic leak testing.
- B. A maximum RCS heatup of 100°F and cooldown of 100°F shall NOT be exceeded in ANY one hour period, and a maximum temperature change of 5°F shall NOT be exceeded in ANY one hour period during inservice leak and hydrostatic testing operations ABOVE the heatup and cooldown limit curves shown in PTLR Figures 2-1 and 2-2.
- C. If either criterion (A) or (B) is NOT satisfied, the SRO must be notified and the action requirement of LCO 3.4.9.1 satisfied.
- D. The pressurizer heatup shall be limited to 100°F in ANY one hour period, the pressurizer cooldown shall be limited to 200°F in ANY one hour period, and the spray water differential temperature shall be limited to less than or equal to 560°F. These temperatures shall be determined to be within limits at least once per 30 minutes during a pressurizer heatup or cooldown. If these limits are NOT satisfied, the SRO must be notified and the action requirement of TRM LCO 3.4.9.2 satisfied.
- E. Any occurrence of pressurizer spray operation and/or surge line with a differential temperature greater than 320°F shall be reported to the SRO as soon as practical.
- F. The lowest RCS operating loop temperature (T_{Avg}) shall be determined to be greater than or equal to 541°F within 15 minutes before criticality. In addition, if the T_{Avg}-T_{Ref} deviation alarm has NOT been reset, T_{Avg} should be determined to be greater than 541°F every 30 minutes while T_{Avg} is less than 551°F. If these criteria are NOT satisfied, the SRO must be notified and the action requirements of LCO 3.1.1.4 satisfied.

RCS AND PRESSURIZER TEMPERATURE AND PRESSURE LIMITS

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Unit_

6.0 PERFORMANCE

The performance section is organized into five separate sections (or modules). Each section corresponds to one of the plant conditions that initiated performance of this Instruction. The performance data package needs to contain only the section which corresponds to that plant condition. A list of the different sections and their respective purpose is shown below.

	Section	Purpose	
A L	¢Ω1	This section is performed during unit heatup.	TS SR 4.4.9.1.1 TRM SR 4.4.9.2.1
101			TRM SR 4.4.9.2.2
n:1	¢12	This section is performed during unit	TS SR 4.4.9.1.1 TRM SR 4.4.9.2.1
<i>[</i> /0]		cooldown.	TRM SR 4.4.9.2.2
M	6.3 7	This section is performed during inservice hydrostatic and leak testing operations ABOVE the heatup and cooldown limit curves.	TS SR 4.4.9.1.1
N	\$74	This section is performed to ensure minimum RCS temperature (T _{Avg}) 15 minutes prior to criticality	TS SR 4.1.1.4.a
$\left(\right)$	6.5	This section is performed to ensure minimum RCS temperature (T_{Avg}) when the RCS is critical and T_{Avg} is less than 551°F with the T_{Avg} - T_{Ref} deviation alarm not reset	TS SR 4.1.1.4.b

SQN 1 & 2	RCS AND PRESSURIZER TEMPERATURE AND PRESSURE LIMIT	0-SI-SXX-068-127.0 Rev 11 Page 37 of 38	

APPENDIX E Page 1 of 1 Sheet / of

Date 13 day

MINIMUM TEMPERATURE FOR CRITICALITY

Acceptance Criteria Failure Actions: Action 1 - IF Acceptance Criteria is not Satisfied, THEN [a] NOTIFY SRO, [b] REFER to LCO 3.1.1.4.

[1]	Reason for Test:	Prior to Critica	ality N	IA		T _{Avg} minus T _R , & T _{Avg} less tha	_f Deviation Alarn an 551°F	n NOT Reset		i
		Tim	ne (15 minute p	rior to Criticali	ty tracking or	30 minute (T _{Avg}	minus T _{Ref}) Devi	ation Alarm NC	T Reset interva	als)
[2]	Time (24 hour clock)									
[3]	RCS Lowest T _{Avg} Temp.(² F) & Instrument/Computer Point (*) (Reference Appendix F)									
[4]	RCS Next Lowest T _{Avg} Temp.([°] F) & Instrument/Computer Point ([*]) (Reference Appendix F)									
[5]	Acceptance Criteria RCS T_{Avg} for [3] and [4] are greater than or equal to 541°F within 15 minutes of criticality. IF NO, THEN REFER to Action 1	Yes No	□ Yes □ No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
[6]	Criticality Achieved or (T _{Avg} minus T _{Ref}) Deviation Alarm Reset?	☐ Yes ^{Time:} Date: ☐ No	☐ Yes ^{Time:} Date: ☐ No	☐ Yes Time: Date: ☐ No	☐ Yes ^{Time:} Date: ☐ No	☐ Yes Time: Date: ☐ No	☐ Yes ^{Time:} Date: ☐ No	☐ Yes ^{Time:} Date: ☐ No	☐ Yes ^{Time:} Date: ☐ No	☐ Yes ^{Time:} Date: ☐ No
	Initials									

[1] RECORD reason for this performance.

Unit

PERFORM the following sequence every 15 minutes to document prior to criticality temperature tracking or every 30 minutes until (t_{avg} minus t_{rel}) deviation alarm is reset:

- [2] RECORD current time (24 hour clock).
- [3] RECORD instrument (Ref. Appendix F) selected for lowest RCS temperature (T_{A-g)} tracking (*) AND RECORD current RCS temperature to nearest whole number.
- [4] RECORD instrument (Ref. Appendix F) selected for next lowest RCS (T_{Avg}) tracking (*) AND RECORD current next lowest RCS temperature to nearest whole number.

- [5] VERIFY RCS T_{Avg} is Acceptable by checkoff in row [5].
- [6] RECORD whether Criticality is achieved or whether (T_{Avg} minus T_{Ref}) Deviation Alarm is Reset by checkoff in row [6] AND RECORD Date & Time when accomplished.

Use additional sheets as required. (*)-Additional Instrument ID recording needs entering only when changed within test progress.

SQN 1 & 2

RCS AND PRESSURIZER TEMPERATURE AND PRESSURE LIMITS

APPENDIX F

Page 1 of 1

INSTRUMENT ID'S AND COMPUTER POINTS

RCS Temperature Instruments and Computer Points For Monitoring:

	RCPs Running (RTD)s Avail.)	RC	Ps NOT Running/RH	R in Service		
RCS Loop	Temperature Instrument			Temperature Instrument	Plant Computer Point		
1	TR-68-1 P001	T0419A	A	TR-74-14 P001	T0630A		
2	TR-68-24 P001	T0439A	В	TR-74-25 P001	T0631A		
3	TR-68-43 P001	T0459A	RCPs NOT Running/RHR not in Servic				
4	TR-68-65 P001	T0479A	RCS Loop	Temperature Instrument	Plant Computer Point		
R	CPs Running (RTDs	NOT Avail.)	1	TR-68-1 P002	T0406A		
1	TI-68-1C	N/A	2	TR-68-24 P002	T0426A		
2	TI-68-24C	N/A	3	TR-68-43 P002	T0446A		
3	TI-68-43C	N/A	4	TR-68-65 P002	T0466A		
4	TI-68-65C	N/A	must be select loop with a run available, then with a running RCPs are runr should be mor	are indication chosen for mo ted in the following sequence uning RCP. If RCPs are runt o use the HL RTDs. If no R' RCP, hot leg thermocouple ning and RHR is in service, nitored using RHR HX inlet n use T-cold RTDs.	e to correspond to a RCS hing and HL RTDs are FDs are available in a loop s must be used. If no the RCS temperature		

Pressure Instrument	Plant Computer Point ID
P-68-68	P0499A
PI-68-66	N/A
P-68-66A	P0129A
PR-68-69	N/A

Pressurizer Spray Line Temperature Instruments and Computer Points

Source of Pzr Spray	Temperature Instrument	Plant Computer Point ID
Loop 1	TI-68-317	T0484A
Loop 2	TI-68-316	T0483A
Aux Spray	TI-62-87	T0126A

RCS Tavg Temperature Instruments and Computer Points

RCS Loop	Temperature Instrument	Plant Computer Point ID
1	TI-68-2E	T0400A
2	TI-68-25E	T0420A
3	TI-68-44E	T0440A
4	TI-68-67E	T0460A

Note: Analog points are notated on this appendix. Computer points derived from these analog points are acceptable for use by the plant computer.

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APPENDIX E

Page 1 of 1 Sheet of

Unit

Date

MINIMUM TEMPERATURE FOR CRITICALITY

Acceptance Criteria Failure Actions: Action 1 - IF Acceptance Criteria is not Satisfied, THEN [a] NOTIFY SRO, [b] REFER to LCO 3.1.1.4.

[1]	Reason for Test:	Prior to Critic	ality			T _{Avg} minus T _R & T _{Avg} less th	₀r Deviation Aları an 551°F	n NOT Reset		
urration C.S.		Tir	ne (15 minute p	prior to Criticali	ty tracking or	30 minute (T _{Avg}	minus T _{Ref}) Dev	iation Alarm NC	OT Reset interv	ais)
[2]	Time (24 hour clock)									
[3]	RCS Lowest T _{Avg} Temp.(°F) & Instrument/Computer Point (*) (Reference Appendix F)									
[4]	RCS Next Lowest T _{Avg} Temp.(°F) & Instrument/Computer Point (*) (Reference Appendix F)									
[5]	Acceptance Criteria RCS T _{Avg} for [3] and [4] are greater than or equal to 541°F within 15 minutes of criticality. IF NO, THEN REFER to Action 1	Yes No	□ Yes □ No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
[6]	Criticality Achieved or (T_{Avg}) minus T_{Ref} Deviation Alarm Reset?	☐ Yes ^{Time:} Date: ☐ No	☐ Yes ^{Time:} Date: ☐ No	☐ Yes ^{Time:} Date: ☐ No	☐ Yes ^{Time:} Date: ☐ No	Yes Time: Date: No	☐ Yes ^{Time:} Date: ☐ No	☐ Yes ^{Time:} Date: ☐ No	☐ Yes ^{Time:} Date: ☐ No	☐ Yes ^{Time:} Date: ☐ No
	Initials									

[1] **RECORD** reason for this performance.

PERFORM the following sequence every 15 minutes to document prior to criticality temperature tracking or every 30 minutes until (t_{avg} minus t_{ref}) deviation alarm is reset:

- [2] RECORD current time (24 hour clock).
- [3] RECORD instrument (Ref. Appendix F) selected for lowest RCS temperature (T_{Avg}) tracking (*) AND RECORD current RCS temperature to nearest whole number.
- [4] RECORD instrument (Ref. Appendix F) selected for next lowest RCS (T_{Avg}) tracking (*) AND RECORD current next lowest RCS temperature to nearest whole number.

[5] VERIFY RCS T_{Avg} is Acceptable by checkoff in row [5].

[6] RECORD whether Criticality is achieved or whether (T_{Avg} minus T_{Ref}) Deviation Alarm is Reset by checkoff in row [6] AND RECORD Date & Time when accomplished.

Use additional sheets as required. (*)-Additional Instrument ID recording needs entering only when changed within test progress.

Appendix D		Requ	ired Op	perator Actions	;		Fo	rm ES	-D-2
Op Test No.:	NRC 2010302	Scenario #	3	Event #	1	Page	1	of	88
Event Descriptio	on: Ra	ise plant power to 2	13-15% F	RTP					
Time	Position			Applicant's	Actions or Beh	avior			
Simulator O		tion required f	for eve						
Indications	Available: Nor	ne Applicable							
T = 0	Crew will perf Between 13%	orm power char And 15% RTP	nge IAW	0-GO-4, Secti	on 5.2 Reacto	or Power Asc	censio	n To	
	SRO	Direct a load i To Between 1 Concentration	3% An	15% RTP, S	ection 5.2, ar	nd 0-SO-62-			nsion
	2.	Actions effecting shall be adhere acid or water). A performance. Recommended steady power in approximately e adjusted dependent Control Rod wit by the change in	d to for All appro dilution crease. every 1 ding on hdrawal	reactivity chang opriate verification rate is 50 to 75 Rod movement I/2 minutes. Dilution SG level contro and / or dilution	es (i.e. reactiv ons and peer of gallon batches t should be lim ution and rod r I stability.	ity balance, a checks shall I s every 12 to ited to 1/2 st novement rat s may be sigr	amount be utiliz 15 mir ep incr es ma ificantl	ts of bo zed dui nutes fo rements y be	oric ring for a s
	CREW	INITIATE a me adjustment of					se by r	nanua	al I
	CREW	WHEN reactor Narrative Log.	r power	is above 5%,	THEN LOG	Mode 1 enti	y in th	ie Unit	t
	CRO	MAINTAIN the bypass reg co						feedv	vater
Evaluator No	ote: The follow	ing Steps are fr	om 0-S	O-62-7 Boron	Concentratio	on Control, S	Sectior	ו 6.2, <i>ו</i>	Dilute
	CAUTION 1:	When making with an RCS b gallons). Allow	oron c	oncentration v	erification at t	the halfway	e done point (in ba (e.g., ′	tches 1500
	CAUTION 2:	Returning the maintenance of chunks of solid Extreme care system followi	on the I dified b must b	Boric Acid Sys oron into the C e exercised to	tem could int CCP suction r	roduce debi	ris, slu oump (ldge, a damag	air or ge.
	he	an excessive an aters should be ron concentration	energi	zed to cause p	bressurizer sp				
	de	ute mode will be sired. The opera rmit.							ins

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Appendix D		Requ	uired Op	erator Actio	ons		Fo	rm E	S-D-2
 Op Test No.:	NRC 2010302	Scenario #	3	Event #	1	Page	2	of	88
Event Description	on: Raise	plant power to	13-15% R	TP					

Time	Position			Applicant's Actions or E						
Evaluator No	te: Dilutions	will be per	formed based o	n the RE-provided Rea	activity Spread	sheet; based on				
	0-GO-4 I	Notes, reco	ommended dilut	ion rate is 50 to 75 gal	Ion batches ev	ery 12 to 15				
	minutes	for a stead	y power increas	se. During subsequen	t power escala	tion, large				
	volume c	lilutions wil	ll be divided eve	enly over each hour as	determined by	the crew li.e.:				
				e over each hour's pe						
	per hour	for 963 ga	llons for the firs	t hour)]		e ganorio, i arroc				
	RO				DM action that					
			tivity additions.	T in a Tech Spec or T [C.1]		pronibits positive				
	NOTE: H	UT level ir	ncrease of 1% is	s equal to 1380 gallons	s (TI-28 fig. 34).				
	RO	[2] ENS	URE sufficient	capacity available in th	e HUT selecte	d to receive				
		expe	[2] ENSURE sufficient capacity available in the HUT selected to receive expected amounts of CVCS letdown: (N/A if <u>not</u> used)							
			HUT	LEVEL	INITIALS					
			A	<u> </u>		-				
			B	%						
	RO	[2] ENG								
			[3] ENSURE makeup system is aligned for AUTO operation in accordance with Section 5.1.							
	 			:	······					
	RO	[4] RECORD the quantity of dilution water required to achieve desired boron								
		concentration using Appendix D. (N/A for minor power changes)								
	NOTE D	ue to eye	e to eyeball interpolation the verified calculation may slightly differ from							
	tł	ne initial c	alculation. The	e following signoff inc	dicates that a	ny differences ir				
				n discussed and are						
			validated.							
	RO	· · · · · · · · · · · · · · · · · · ·		iv Lindonondont Vorifi	action of Colou	lation for America				
	RU			ix I Independent Verifi						
				nary Water. (N/A if App	b. D was perior	med by SRU to				
			y data from Rx I	• •/						
		(Step no	ot required pro	vided in shift turnov	er package)					
	RO		CE [<u>HS-62-140</u> e STOP position	A], Boric Acid Supply	to Blender Flor	w Control Switch				
	RO	[/] PLA	CE [H5-62-140	B], CVCS Makeup Se	lector Switch to	o the DILUTE				

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Appendix D		Required Op	erator Actions			Forr	n ES-D)-
Op Test No.:	NRC 2010302	Scenario # 3	Event #	1	Page	3	of	8
Event Descripti	tion: Raise plant power to 13-15% RTP							
Time	Position		Applicant's A	ctions or Beh	avior			
	RO	[8] ENSURE [HS-62-140D], Boric Acid Valve to the Blender is CLOSED (Green light is LIT).						
	RO	[9] SET [FQ-62-142],	Batch Integrate	or for the de	sired quan	itity		
	gp	mary Water Flow Cont m) from setpoint poten point of 35% correspo	tiometer (dial in	dicator) loca	ated on pa	nel M-6.	al (70 A	
	RO		62-142], Primai				ler for	tł
	RO	[11] PLACE [<u>HS-6</u> Switch to the STA	2-140A] , Boric . RT position.	Acid Supply	∕ to Blende	r Flow C	ontrol	
	RO	[12] VERIFY the fo						
		[a] Inlet to top of \ [b] Primary Water				2].		
	sig Ba no	ernate dilution in small nificant changes in sea tches of 5 to 10 gallons to exceed once per 30 ter temperatures on the	Il water tempera s may be added) minutes. ICS	ature or sea I through F0 points for N	II leakoff ar CV-62-144 Io. 1 seal le	e indicat on a fre eakoffs a	ted. quency and sea	y al
	RO	[13] IF primary wate desired, THEN	er addition to th	e bottom of	the VCT [FCV-62-	144] is	5
	RO	[a] CLOSE [FCV-	62-128] with [H	S-62-128].				
	RO	[b] OPEN [FCV-6						
	RO	[c] VERIFY Prima	ry Water flow b	y [FI-62-14 2	2A] OR [F(Q-62-142	2] .	
		nay take approximate icated on nuclear ins	trumentation of	or RCS ter	nperature	indicati	on.	
		[14] MONITOR nuc ensure the proper	clear instrument		eactor cool	ant temp	peratur	e

	Appendix D		Required Operator Actions	Form ES-D-2				
et 12. 1 No	Op Test No.: Event Descriptio	NRC 2010302	Scenario # Event # Page ise plant power to 13-15% RTP	4of88				
	Time	Position	Applicant's Actions or Behavior					
			[15] IF [LI-62-129], Volume Control Tank Level, increase THEN ENSURE [LCV-62-118], Volume Control Tank D OPENS to divert excess water to the Holdup Tanks.					
			[16] WHEN dilution is complete, THEN					
			[a] PLACE [<u>HS-62-140A</u>], Boric Acid to Blender Flow C the STOP position.	Control Switch to				
			[b] IF [FCV-62-144] was previously OPENED, THEN C [FCV-62-144] with [HS-62-144].	LOSE				
			[c] VERIFY no primary water flow on either [FI-62-142A [FQ-62-142].] OR				
			[d] ENSURE [FCV-62-128] is CLOSED					
eterne, s.			 [17] IF power increase in progress and additional dilution THEN use this table to re-perform steps [4] through [18] 					
****			[19] REALIGN the blender controls for AUTO makeup to accordance with Section 5.1.	the CVCS in				
			[20] ENSURE dilution(s) is logged in Unit Narrative Log.					
		NOTE Sa	mple may be obtained at normal RCS sample intervals provi wer and the unit response following the dilution is as expected	mple intervals provided the unit is at				
			[21] IF RCS boron sample is required, THEN NOTIFY Cl RCS boron sample.					

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	Appendix D Requi	Appendix D Required Operator Actions							
C	Op Test No.: <u>NRC 2010302</u> Scenario # Event Description: Raise plant power to 1	3 Event #	1	Page	<u>5</u> of	88			
	Time Position	Applicant's Action	s or Bohavior	•					
	STEP	Applicant's Action	s of benavior	1 st	2 nd	3 rd			
	[4] RECORD the quantity of dilution water require concentration using Appendix D.								
	[5] PERFORM Appendix I, IV of Calculation for a	mount of BA or PW		Quantity	Quantity	Quantity			
			SRO	SRO	SRO				
	STOP position.								
	[7] PLACE [HS-62-140B], CVCS Makeup Select	ition.							
	[8] ENSURE [HS-62-140D] Boric Acid Valve to E	ght LIT).							
	[9] SET [FQ-62-142], Batch Integrator for the deal		/	/ 1 st CV	$\frac{1}{1^{st}CV}$				
	[10] ADJUST [FC-62-142], Primary Makeup War rate.	er Flow Controller for the des	ired flow	_////	/ 1 st CV				
	[11] PLACE [HS-62-140A], BA Supply to Blende	r Flow Control Switch to STA	RT.	//	$\frac{1}{1^{\text{st}} \text{CV}}$	1			
	 [12] VERIFY the following: [a] Inlet to top of VCT [FCV-62-128] is OPE [b] Primary Water flow by [FI-62-142A] or [I 								
C	 [13] IF PW addition to top of VCT [FCV-62-128] bottom of the VCT [FCV-62-144] is desired, [a] CLOSE [FCV-62-128] with [HS-62-128] 	ition to the							
	 [b] OPEN [FCV-62-144] with [HS-62-144]. [c] VERIFY Primary Water flow by [FI-62-14]. 								
	[14] MONITOR nuclear instrumentation and read		sure the						
	proper response from dilution. [15] IF [LI-62-129], VCT level, increases to 63 per IL CV 62 119] VCT Direct Value OPENIA for								
	[LCV-62-118], VCT Divert Valve, OPENS to [16] WHEN dilution is complete, THEN [a] PLACE [HS-62-140A], Boric Acid to Ble			/	/	/			
	[b] IF [FCV-62-144] was previously OPENE								
	with [HS-62-144]. [c] VERIFY no primary water flow on either	[FI-62-142A] or [FQ-62-142]							
	[d] ENSURE [FCV-62-128] is CLOSED.								
	[18] IF Step [17] will be repeated, THEN PERFORM the following:					<u></u>			
	[a] PLACE [HS-62-140B], CVCS Makeup S	Selector Switch to the AUTO	position	/ 1 st CV					
	[b] PLACE [<u>HS-62-140A</u>], BA to Blender F [c] ENSURE dilution is logged in Unit Narra	ow Control Switch to START							
		live Log.			L				

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	Appendix D		Requ	ired Op	erator Actio	ns		Fo	rm ES	S-D-2
\sim	Op Test No.:	NRC 2010302	Scenario #	3	Event #	1	Page	6	of	88
	Event Description: Raise plant power to 13-15% RTP									

Time	Position	Applicant's Actions or behavior					
		0-SO-85-1, Control Rod Drive System,					
		6.4, Transferring from Manual to Auto Rod Control; &					
		n 6.5, Transferring from Auto to Manual Rod Control					
Evaluator Not	laminate	d in each section's procedural Step 1 Note 1, the operators will use a d copy of Sections 6.4 & 6.5 available on the book desk under the glass at 1- s verified as current, in-effect revision routinely to assure currency.					
		aminated copy of this section can be maintained in the Unit Control Room repetitive use for routine rod manipulations.					
NOTE 2: Defeating or restoring Tavg/Delta T or NIS channel may cause step change input to rod control. A delay of at least 3 minutes prior to returning rod control automatic will allow lead/lag signal to decay off.							
		his Section may be N/A if Rod Control is being returned to AUTO in response of a transient (runback) condition.					
	RO	[1] ENSURE turbine power is greater than 15 percent.					
	RO	[2] ENSURE Window 31 (E-3), LOW TURB IMPULSE PRESS ROD WITHDRAWAL BLOCKED C-5, Permissive light on panel [XA-55-4A] is NOT LIT.					
	RO	[3] ENSURE less than 1 degree Tavg/Tref mismatch.					
	RO	[4] PLACE [HS-85-5110], Rod Control Mode Selector in the AUTO position.					
	RO	[5] VERIFY Rod Speed Indicator [SI-412], indicates 8 Steps/minute.					
		End of Section 6.4					
		Section 6.5, Transferring from Auto to Manual Rod Control					
		laminated copy of this section can be maintained in the Unit Control Room or repetitive use for routine rod manipulations.					
	NOTE 2: N	lanual rod withdrawal is inhibited by any of the following signals:					
	A	. C-1, High Flux Intermediate Range Monitor					
	B	. C-2, High Flux Power Range Monitor					
	C	. C-3, Overtemperature Delta-T					
	D	. D. C-4, Overpower Delta-T					

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Appendix D	endix D Required Operator Actions							Form ES-D-2		
Op Test No.:	NRC 2010302	Scenario #	3	Event #		1	Page	7	of	88
Event Descriptior	1: Raise	e plant power to	13-15% R ⁻	TP						

Time	Position	Applicant's Actions or behavior
		0-SO-85-1, Control Rod Drive System,
		6.4, Transferring from Manual to Auto Rod Control; &
	1	n 6.5, Transferring from Auto to Manual Rod Control
	RO	[1] PLACE [HS-85-5110], Rod Control Mode Selector in the MANUAL position.
	RO	[2] VERIFY Rod Speed Indicator [SI-412], indicates 48 Steps/minute.
	RO	[3] IF control rod movement is required, THEN ADJUST position using [HS- 85-5111], Rod Control Switch.
	RO	[4] IF it is desired to leave [HS-85-5110], Rod Control Mode Selector in
		Manual for an extended period of time, THEN
		PLACE this Section in the Active Procedures Book.
	RO	 [5] WHEN it is desired to place [HS-85-5110], Rod Control Mode Selector to Automatic, THEN GO TO Section 6.4.
		End of Section 6.5

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	Appendix D		Required Operator Actions					Form ES-D-2				
~~~~	Op Test No.:	NRC 2010302	Scenario #	3	Event #	1	Page	8	of	88		
	Event Descriptio	plant power to 1	13-15% F	RTP								

Time	Position	Applicant's Actions or Behavior						
	0-GO-4, Sec	ction 5.2 Reactor Power Ascension To Between 13% And 15% RTP						
		The steam generator level operator is in control of unit startup until the main eedwater reg valves are in AUTO. [C.5]						
	SRO	[1] <b>REVIEW</b> plant parameters and indications, <b>AND</b> <b>VERIFY</b> stability prior to reactor power escalation.						
		NOTES:						
		blowdown flow will provide an additional method of controlling SG water inventory. pwdown isolation valves only if level cannot be maintained)						
	2) Prior to increasing reactor power above 5%, SG blowdown should be in service.							
	3) Maximum blowdown rate is less than or equal to 270 gpm. Each steam generator flow, up to 60 gpm is indicated on panel L-357 located in the A.B. Supply Fan Rm. Minimum blowdown rate equals 5 gpm for each steam generator. Final blowdown rate should be determined by chemical analysis.							
	4) Computer 1F2261A.	r points require a prefix 0, 1, or 2 be placed in front of the point number; for example,						
	BOP	<ul> <li>[2] IF SG blowdown is in service, THEN ADJUST FIC-15-43 as desired. (plant computer pt. F2261A)</li> </ul>						
	NOTES: 1	) Actions effecting reactivity are directed in the following step. 0-SO-62-7 requirements shall be adhered to for reactivity changes (i.e. reactivity balance, amounts of boric acid or water). All appropriate verifications and peer checks shall be utilized during performance.						
		2) Recommended dilution rate is 50 to 75 gallon batches every 12 to 15 minute for a steady power increase. Rod movement should be limited to 1/2 step increments approximately every 1 1/2 minutes. Dilution and rod movement rates may be adjusted depending on SG level control stability.						
	3	B) Control Rod withdrawal and/or dilution requirements may be significantly impacted by the change in core reactivity due to changing Xenon concentration.						

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	Appendix D Required Operator Actions							Form ES-D-		
*** 	Op Test No.: Event Descriptio	NRC 2010302	Scenario #	<u>3</u> 3-15% F	Event #	1	Page	9	of	88
	Time Position Applicant's Actions or Behavior						avior			
		RO	[3] <b>INITIATE</b> a adjustment RO initiates a c	of the	control banks o	or by diluting	the RCS.		-	nual
	Evaluator Note: Crew will coordinate control rod withdrawal and dilutions based on the RE-provided Reactivity Spreadsheet and would coordinate rod withdrawal and dilutions observing the guidance the Step 3 NOTES above.									
					M	IODE 1				
	<ul> <li>Evaluator Note: Mode change call is made using Loop ∆T indications on the MCB and ICS, not NIs; NIs may be referred to during the MODE change determination</li> <li>Refer to 0-GO-4 Section 3.1, Precaution C, specifically bullets 2 &amp; 3 (below):</li> <li>When reactor power is less than or equal to 15%, use average loop ∆T (UO485).</li> <li>When reactor power is greater than 15%, use LEFM core thermal power indication (U2118). If LEFM is NOT available, then continue using average loop ∆T up to 40%. (U1118 will be used above 40% with LEFM unavailable).</li> </ul>									
		RO	[4] WHEN read THEN LOO	•	wer is above 5 1 entry in the	•	e Loa.			
		SRO	RO would be m identification ho on Loop ∆T ind for MODE trans	nonitori owever lication	ng this; any cre the SRO shou . Normally, bot	ew member n Ild announce	nay make t transition t	o MOI	DE 1 b	
			Crew member the clock.	replace	es the MODE 2	sign with MC	DDE 1 sign	on 1-I	M-4 ur	nder
					NLY: N the SG levels on program by periodically adjusting the r bypass reg controller level setpoints using Appendix B and C.					
			BOP refers to a maintains SG lo							d 
					Y					
			[6] UNIT 2 O	NLY:						

Appendix D		Required Operator Actions Form ES-D-							
 Op Test No.: Event Descripti	NRC 2010302	Scenario # <u>3</u> Event # <u>1</u> Page <u>10</u> of <u>8</u> aise plant power to 13-15% RTP							
Time	Position	Applicant's Actions or Behavior							
Evaluator N		to turnover information, the crew will not prepare for nor perform MT roll; I/A for this exam.							
	N/A	<ul> <li>[7] IF Turbine Roll in parallel with power increase is desired, THEN PERFORM Section 5.3 in parallel with the remainder of this section.</li> </ul>							
	RO	<ul> <li>[8] IF the intermediate range rod stop setpoint is reached before P-10 energizes, THEN</li> <li>[8.1] STOP the power escalation.</li> </ul>							
		[8.2] <b>CONTACT</b> Reactor Engineering to evaluate power range calibration. <b>[C.3]</b>							
 	BOP	<ul> <li>[9] WHEN reactor power is greater than or equal to 10% on at least 2 out or PRMs, THEN [C.1] [C.3]</li> </ul>							
		[9.1] VERIFY annunciator XA-55-4A, window D-5:							
		P-10 NUCLEAR AT POWER is LIT. PERMISSIVE							
	200								
	BOP	[9.2] VERIFY annunciator XA-55-4A, window B-5: P-7 LOW POWER TRIP BLOCK is DARK.							
	RO	[9.3] <b>COMPARE</b> the highest reading PRM with the highest reading loop ΔT indication to be within 5% of each other. <b>IC.11 IC.31</b>							

RO	[9.4] IF the above conditional response is N THEN	
	A. <b>STOP</b> the power increase.	
	B. NOTIFY the SRO.	
	Initials	Time Date

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	Appendix D		Requ	ired Op	erator Actio	ns		Forr	n ES	-D-2
$\sim$	Op Test No.:	NRC 2010302	Scenario #	3	Event #	1	Page	11	of	88
	Event Descriptio	n: Raise	e plant power to ²	13-15% F	RTP					

Time	Position Applicant's Actions or Behavior									
	NOTE: T	he following step will block both IR (25%) and PR (25%) low power reactor trips.								
	RO	[10] BLOCK the IR HI FLUX reactor trip and PR LO Range HI FLUX reactor trip by performing the following:								
	RO	[10.1] PLACE IRM TRIP BLOCK P-10 [HS-92-5003] AND [HS-92-5004] to BLOCK.								
	BOP	[10.2] <b>VERIFY</b> annunciator XA-55-4A, window C-2:								
		INTERMED RANGE TRAINS A & B TRIP BLOCKED is LIT.								
	RO	[10.3] <b>RELEASE [HS-92-5003] AND [HS-92-5004]</b> . [10.4] <b>PLACE</b> PRM LOW POWER TRIP BLOCK P-10 <b>[HS-92-5005] AND</b> <b>[HS-92-5006]</b> to <b>BLOCK</b> .								
	ВОР	[10.5] <b>VERIFY</b> annunciator XA-55-4A, window D-1:								
		POWER RANGE LOW SETPOINT TRAINS A & B TRIP BLOCKED is LIT.								
		[10.6] RELEASE [HS-92-5005] AND [HS-92-5006].								
		Step 11 NOTES: U2 Applicable Only								
	CREW	[11] WHEN reactor power is between 13 and 15%, THEN								
		[11.1] <b>STOP</b> power increase.								
		[11.2] <b>STABILIZE</b> the plant. [11.3] <b>UNIT 2 ONLY:</b>								
	SRO	[12] IF rolling of second MFWP This step N/A								

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Appendix D		Required Operator Actions Form ES-D-2
Op Test No.:	NRC 2010302	Scenario # <u>3</u> Event # <u>1</u> Page <u>12</u> of <u>88</u>
Event Descript	ion: R	aise plant power to 13-15% RTP
Time	Position	Applicant's Actions or Behavior
	SRO	[13] IF unit shutdown is required This step N/A
	SRO	[14] <b>ENSURE</b> steps 5.2[1] through 5.2[11] of this section complete. (applicable steps)
		NOTE If Section 5.3 has already been initiated, then performance should continue at the step in effect.
	SRO	[15] IF rolling the turbine, THEN GO TO Section 5.3.

END OF TEXT

Lead examiner may cue the next event after CREW has entered MODE 1

Constraint of the second secon

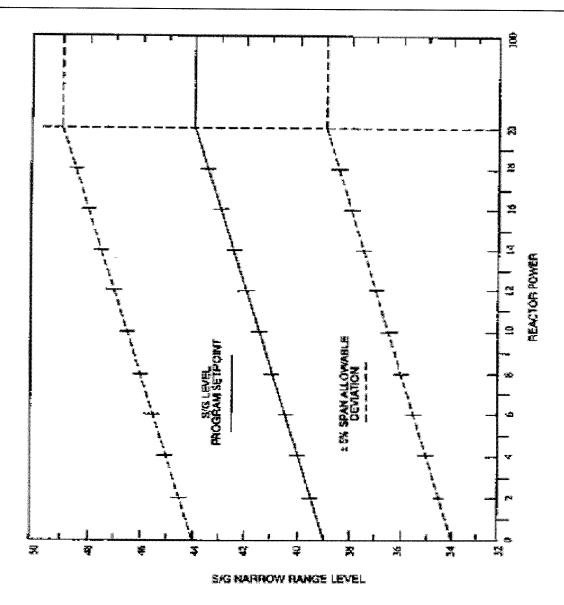
Appendix D		Requ	uired Op	erator Actio	ons			Fo	rm ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	33	Event #		1	Page	13	of	88
Event Description	n: Raise	plant power to	13-15% R	TP						

# Appendix B (Page 1 of 1)

# FIGURE 1 STEAM GENERATOR LEVEL SETPOINT VS REACTOR POWER

## NOTE

This figure does <u>NOT</u> represent the automatic S/G level program. The operating band provides a guide for Operators during Unit start-up and is intended to enhance S/G level control during transition from AFW level control to Bypass Reg valve control to Main Reg Valve control.



Appendix D

Appendix D		Requ	ired Ope	red Operator Actions Forr					ES-D-
Dp Test No.: <u>N</u>	RC 2010302 Rais	Scenario #	3  3-15% RTI			1	Page	<u>14</u> o	f <u>8</u>
STARTUP		-	ι	Jnit			Di	ate	
			•••	ndix C 1 of 5)					
1.0 MFW		EG AND MF						i P	
	<u></u>		CAU	TION					
It is VERY in the operator over stresse	observing	indicators t	o verify a succ	the des essful s	ired re	sults.	This poi	nt canno	ot be
			NO	тее					
				TES					
1) The SG	MFW Bypa	ss controller			ed on c	only <u>ON</u>	<u>E</u> SG at	a time. _I o	0.5]
2) The MFV	V Bypass c	ss controller s controller shou ain input char	should b uld be in	e adjust					
2) The MFV	V Bypass c controller ga WHEN M	ontroller shou	should b uld be in nge.	e adjust MANUA	L prior	to adju	sting set		
2) The MFV prevent of	V Bypass c controller ga WHEN M adjustme PERFOR	ontroller shou ain input char	should b uld be in nge. controlle	e adjust MANUA er level s	L prior	to adju require	sting set	point valı	
2) The MFV prevent ( [1]	V Bypass c controller ga WHEN M adjustme PERFOR time: [c.s	ontroller shou ain input char IFW Bypass ent, <b>THEN</b> RM the followi	should b uld be in nge. controlle ing step: s <u>NOT</u> a	e adjust MANUA er level s s on one djusted)	L prior etpoint MFW	to adju require Bypass	sting set	point valı	
2) The MFV prevent ( [1]	V Bypass c controller ga WHEN M adjustme PERFOR time: [c.s	ontroller shou ain input char /IFW Bypass ent, <b>THEN</b> RM the followi g ( <b>N/A</b> valves	should b uld be in nge. controlle ing step: s <u>NOT</u> a	e adjust MANUA er level s s on one djusted)	L prior etpoint MFW	to adju require Bypass	sting set	point valı	ue to
2) The MFV prevent ( [1]	V Bypass c controller ga WHEN M adjustme PERFOR time: [c.s	ontroller shou ain input char /IFW Bypass ent, <b>THEN</b> RM the followi g ( <b>N/A</b> valves	should b uld be in nge. controlle ing step: s <u>NOT</u> a pendix B	e adjust MANUA or level s s on one djusted) for allow	L prior etpoint MFW vable s	to adju require Bypass etpoint. <b>SG-1</b>	sting set s valve at <b>sG-2</b>	point valu a sg-3	ue to
2) The MFV prevent o [1]	V Bypass c controller ga WHEN M adjustme PERFOR time: [c.s	iontroller shou ain input char IFW Bypass o ent, THEN RM the followi og (N/A valves EFER TO App	should b uld be in nge. controlle ing step: s <u>NOT</u> a pendix B	e adjust MANUA or level s s on one djusted) for allow	L prior etpoint MFW vable s	to adju require Bypass etpoint. <b>SG-1</b>	sting set s valve at <b>sG-2</b>	point valu a sg-3	
2) The MFV prevent ( [1]	V Bypass c controller ga WHEN M adjustme PERFOR time: [c.s	iontroller shou ain input char IFW Bypass o ent, THEN RM the followi og (N/A valves EFER TO App	should b uld be in nge. controlle ing step: <u>NOT</u> a bendix B	e adjust MANUA or level s s on one djusted) for allow	L prior etpoint MFW vable s	to adju require Bypass etpoint. SG-1 UAL. SG-1	sting set s valve at SG-2 C SG-2	a SG-3 D SG-3	so so

Appendix D			Requ	uired Op	erator Actio	ns			Form	ES-D-2
Op Test No.:	NRC 2010	0302	Scenario #	3	Event #		1	Page	of	88
Event Description	on:	Raise	plant power to	13-15% F	RTP					
	[1.3]	ST/	ABILIZE SO	3 level	at a desire	d level	•			
							SG-1	SG-2	SG-3	SG-4
								Π		
	[1.4]		JUST contr nitoring SG		etpoint in s	mall ind	crement	ts while		
							SG-1	SG-2	SG-3	SG-4
										D
	[1.5]	PLA	<b>CE</b> MFW E	3ypass	controller	in AUT	Ο.			
							SG-1	SG-2	SG-3	SG-4
								D		
	[1.6]		.OW the pla e setpoint.	int to s	tabilize bet	iore ad	justing a	another		
							SG-1	SG-2	SG-3	SG-4
								D	D	

# 2.0 DAMPENING SG LEVEL OSCILLATIONS WITH MFW BYPASS VALVES IN SERVICE

### NOTES

- 1) Perform adjustments to one SG at a time. <u>Allow Plant Parameters to Stabilize</u> between valve adjustments. [C.5]
- 2) The wide range level recorders may respond to a change in level before the narrow range indicators. [c.5]
- Indicated flowrate on the feed flow indicators may <u>NOT</u> reflect an accurate value of flow. The flow indication is to be used as a <u>reference value only</u>. [c.5]
- The following step may be performed any time SG level oscillates outside the SG level setpoint operating band of ±5 percent.
  - [1] IF required to dampen SG level oscillations at any time during SG level control with the MFW bypass controllers in AUTO, THEN

PERFORM the following: [c.s]

	Appe	ndix D		Requ	uired Op	perator Actions			Form	ES-D-2
$\cap$	Op Tes	st No.:	NRC 2010:	302 Scenario #	3	Event #	1	Page	<u>16</u> of	f <u>88</u>
	Event I	Descriptior	ו:	Raise plant power to	13-15% F	RTP				
			[1.1]	PLACE the MF	W Byp	ass controller	in MANUA	L.		
			[1.2]	CHANGE valve 10 percent in th		•		avel.		
			[1.3]	PLACE the MF	W Byp	ass controller	in AUTO.			
	3.0			NG MFW REG V	ALVE	S OFF SEAT	DURING U	NIT		
					N	OTES				
	1)	further PARA	⁻ until plar METERS	eg is adjusted DC at stabilizes and s TO STABILIZE I TH POWER ASC	SG lev BETWI	el returns to p EEN REG VAI	rogram. Al	LOWIN	G PLANT	-
	2)	Anticip	ate level	shrink when the	MFW I	Reg comes off	f its seat. _I o	2.5]		
	3)	Use m seat.	ain feedw	ater flow indicati	ion to c	letermine whe	en MFW Re	g valves	come of	F
		[1]	PERI seat:	FORM the follow	ing ste	ps to position	MFW Reg	valves o	ff	
			[1.1]	REVIEW plant popening.	parame	eters and indic	ations prio	r to initia		
							SG-1 □	SG-2 □	SG-3 □	SG-4 □
			[1.2]	<b>OPEN</b> the MFW maintaining the and 60 percent	MFW					
							SG-1 □	SG-2 □	SG-3	SG-4 □
			[1.3]	ENSURE MFW Reg valve is op		s valve starts	closing wh	en MFW		
~~~							SG-1	SG-2 □	SG-3 □	SG-4 □

	Appe	Appendix D Required Operator Actions								For	m E	S-D-2
\bigcirc		st No.: <u>NRC 2010</u> Description:		Scenario # plant power to	 o 13-15% R	Event # TP		1	Page	_17	of	88
		[1.4]				irns to MF\ eg valve is			troller			
							:	SG-1	SG-2 □	SG-3 □		SG-4
		[1.5]				l MFW sys t valve adju			before			
							:	SG-1	SG-2	SG-3		SG-4
	3.0	POSITIONII STARTUP (ALVES/	OFF SEA	T DURI	NG UN	IIT			
								0	D	Π		D
	4.0	PLACING N	AFW R	EG VALV	ES IN A	UTOMATI	С					
					CAL	TIONS						
0	1)	DO NOT place on the control	a MF lling si	W Reg va team/feed	lve in A I flow in	UTO witho dicators.	out suff	icient	flow bei	ng ind	licat	ted
	2)	Both MFW Reg	g and ly for a	MFW Byp an extend	bass cor led perio	ntrollers s od. [c.5].	hould N	NOT be	e left in /	Αυτο		
				sired to pla I the follow		V Reg valv	es in Al	UTO, T	HEN			
		[1.1]	ADJ and	UST SG I	evel to S	G program	n level s	setpoin	t,			
			ADJ devia	ation (betw	veen -5 j	g valve to o percent an and feed fl	d +5 pe		ro			
								SG-1 □	SG-2 □	SG-3 □		SG-4 □
		[1.2]	WHE	EN control	ler devia	tion is nea	r zero, [°]	THEN				
			PLA	CE the MI	FW Reg	valve in A l	UTO.					
()								SG-1	SG-2	SG-3		SG-4

Appendix D

	Appendix D			Requ	iired Ope	rator Acti	ons			Form E	S-D-2
1 1 1 2 1 2	Op Test No.:NF Event Description:	RC 2010302 F	2 Scena Raise plant po		<u>3</u> 13-15% RTI	Event #	Proposition in the second s	1	Page	<u>18</u> of	88
	[1	1.3]	VERIFY	the MI	-W Reg	valve is	controll	ing SG l	evel.		<u> </u>
								SG-1	SG-2 □	SG-3	SG-4 □
	[1.4]	PLACE	the as	sociated	MFW E	lypass v	alve in N	IANUAL	• ~	
								SG-1 □	SG-2 □	SG-3 □	SG-4 □
	[1.5]	CLOSE 1 AND	the MI	FW Bypa	iss valv	e in sma	ll increm	ients,		
			ENSURE level.	E the N	//FW Re	g valve	respond	s to con	trol SG		
								SG-1	SG-2 □	SG-3	SG-4 □
		1.6]	WHEN M	1FW F	keg valve	e is cont	rolling S	G level,	THEN		
			PROCE	ED TO	anothei	SG loo	p.				
				[End of /	Append	ix]	SG-1	SG-2	SG-3	SG-4 □

Appendix D	Appendix D Required Operator Actions						S-
Op Test No.:	NRC 2010302	<u> </u>	3Event #	2 5% RTP at initiation)		<u>19</u> of	
Time							
	Position		Applicant's A	Action or Behaviors			
• 1-XI-92 • 1-XR-9 1-M-13	s 2-5003A IRM % 2-5011C, IRM-S 2-5001, NUCLE	ARTUP RATE N-35 AR POWER NR-45	ator fails downscale 5 indicator trends do Recorder selected t	own then stabilize race goes to '0'	es at '0'.		
• 1-XI-92 T = 20	Crew	Respond to MCR failure will be iden	DIATE RANGE indi	rms associated v	with this fa nitoring.	ailure; N-	3
		1. DIAGNOSE t	he failure:		GO TO SECTION	PAGE	
		Source Range F	ailure		2.1	4	
		Intermediate Rar	nge Failure		2.2	9	
		Power Range Fa	illure		2.3	14	
	SRO	Intermediate Ran	×				
	SRO		w reactivity spread his instrument malf			tain MOE	C
	CAUTION 1		is below P-6 (10 ⁻⁴ 9 mel prior to raising			storing	
	CAUTION 2		is above P-6 but bo rable channel prior				3
	NOTE 1	If Intermediate Ra P-10 (10%) will res	nge channel is failed sult in a reactor trip. when the channel is t	I high, reducing re If control power is	actor pow s available	er to less	
	NOTE 2		has failed high, then disabled. (SRMs m				
	NOTE 3	Failure of Intermed	diate Range Channe	el may affect asso	ciated Sou	Irce Rang	ļe

	Appendix D		Required Op	erator A	Actions			For	m ES	S-D-2
<i>(</i>	Op Test No.:	NRC 2010302	Scenario #	3	Event #	2	Page	20	of	88
	Event Descriptio	on: Interr	nediate Range cl	hannel N-	-35 failure low	(>5% RTP at initiation))			

Time	Position	Applicant's Action or Behaviors
	RO	1. IF unit is in Mode 2, THEN STABILIZE reactor power at current level.
		2. EVALUATE the following Tech Specs for applicability:
	SRO	 3.3.1.1 (3.3.1), Reactor Trip System Instrumentation Actions 3c & d, (From Table 3.3-1 functional unit 5) Applies – Above 5% & 10% of RATED THERMAL POWER, POWER OPERATION may continue;
		TS 3.0.3. is N/A
		AND
		3.3.3.7, Accident Monitoring Instrumentation
		Action 1 (From Table 3.3-10 Instrument 17) Applies - within 30 days, return the affected instrument or Ht Stby w/i 6 hrs. & Ht SD w/i following 6 hrs.
Evaluator No	ote: TSs 3.3.3 Source R	5 and 3.9.2 would not be applicable with this failure since the associated ange is not affected.
		3. CHECK at least one Intermediate Range channel OPERABLE.
	RO	RO should indicate N36 is reading accurately and also re-select or indicate NR-45 Recorder is re-selected to an operating channel.
		CAUTIONS: • Loss of instrument OR control nower will cause a single channel reactor
		CAUTIONS: Loss of instrument OR control power will cause a single channel reactor trip signal.
		 For loss of control power only, the reactor trip signal cannot be bypasse Reducing reactor power below P-10 will result in a reactor trip.
		NOTE: The following table lists Intermediate Range NIS power supplies N/A-
		RO verifies Instr Pwr and Cont Pwr indicators lit and Instr and Cont Pwr fuses not blown on M-13 N35 drawer.
	RO	 CHECK power available to failed Intermediate Range channel: [M-13] INSTRUMENT POWER ON indicator LIT
		AND
		CONTROL POWER ON indicator LIT

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	Appendix D		Required Operator Actions Form ES-D-2
tina. I	Op Test No.:	NRC 2010302	Scenario #3 Event #2 Page21 of88
	Event Description	: Inte	ermediate Range channel N-35 failure low (>5% RTP at initiation)
	Time	Position	Applicant's Action or Behaviors
		RO	5. IF required to monitor IR channel on NR-45 recorder, THEN ENSURE OPERABLE IR channel selected on NR-45 Recorder. [M-4]
		RO	6. PLACE Level Trip switch for failed channel in BYPASS [M-13, N35/N36]
	Lead Evaluate	or Note: Er	nsure RO performs following actions at NI Panel, M-13.
		RO	 7. If control power is available, THEN PREFORM the following: a. VERIFY NIS TRIP BYPASS annunciator LIT [M-6A, A-1]. b. VERIFY appropriate annunciator LIT: 1. INTERMEDIATE RANGE TRIP BYPASS CHANNEL I [M-4A, A-2] OR 2. INTERMEDIATE RANGE TRIP BYPASS CHANNEL II [M-4A, B-2]
× 		SRO	SRO directs as the RO performs steps 6 - 9:
		RO	8. CHECK associated Source Range Channel NOT affected
		SRO	9. GO TO appropriate plant procedure.
			END OF SECTION
	Evaluator Not	e: The follow	ring CREW Brief and Notification actions are not contained in the procedure.
			CREW Brief would typically be conducted for this event as time allows prior to the next event.
			Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief. Operations Management - Typically Shift Manager.
			<u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
	Lead Examine	er may cue ne	ext event when Technical Specifications are identified.

	Appendix D		Requ	lired Op	erator Actions	5		F	form E	S-D-2
Ċ	Op Test No.: Event Description:	NRC 2010302	Scenario # Q-A ERCW Pump	3 Over cu		3) Sequence	Page er Failure	22	of	88
Op Test No.: NRC 2010 Event Description: Indications/Alarms Simulator Operator: a Indications/Alarms Annunciators: 0-M-27A 0-M-27B : 0-XA-55-27B-A E Indications 0-M-27B : 0-M-27B : 0-XA-55-27B-A E Indications 0-M-27A 0-M-27A ERCW HDR 1A S 0-M-27A ERCW HDR 2A S 0-M-27A ERCW HDR 2A S 0-M-27A ERCW PUMP Q-//					- 		<u></u>			
	f	Position			Applicant's		Behavior			
			d Examiner di	rection	, insert Event	: 3				
	Annunciato 0-M-27A	A A-1: "UNIT 1	I HEADER A PR Q-A DISCH PRE							
	1	-27B-A E-4:"I	ERCW/CCS PUN	ир мот	OR TRIP"					
	0-M-27A									
	ERCW H ERCW H ERCW H ERCW F ERCW F	IDR 1A SUPPL IDR 2A SUPPL IDR 2A SUPPL PUMP Q-A MO	_Y PRESS, 1-PI- _Y FLOW 2-FI-6 _Y PRESS, 2-PI- TOR AMPS, 0-E	-67-493A 7-61: sh -67-493A I-67-459	A: shows decre ows normal st A: shows norm A: shows '0' a	easing trer eady trenc al steady t mps.	nd (to single I. trend.	e pump c	onditio	ons)
C	T = 30	CREW	Respond in accordance with Alarm Response Procedu Refers US to AOP-M.01 as determined in 0-AR-M27-A, (other ARPs may also apply)							
		SRO	US may use A Section 2.1, E					OOLINC	3 WATI	ER
		BOP	1. IDENTIFY	' and L(OCK OUT faile	ed ERCW	pump.			
		BOP	2. START ac pressure b	ditiona betweer	I ERCW pump 78 psig and	os as requ 124 psig.	ired to mair	ntain sup	oply he	ader
		BOP	3. CHECK tv	vo Trair	n A ERCW Pu	mps AVAI	LABLE.			
C		BOP	• 1-PI-		pressures [bet A				ws NOF	RMAL:

Appendix D		Required Operator Actions Form ES-D-2
Op Test No.:		Scenario #3Event #3 Page23 of88
[1	
Time	Position	Applicant's Actions or Behavior b. Supply header flows [expected value]: • 1-FI-67-62 [expected value:2500-3000 gpm] • 2-FI-67-62 [expected value:11000-12000 gpm]
	BOP	 CHECK 1B and 2B ERCW supply header pressures and flows NORMAL a. Supply header pressures [between
		78 psig and 124 psig]: • 1-PI-67-488A
		• 2-PI-67-488A
		 b. Supply header flows [expected value]: 1-FI-67-62
		 2-FI-67-62 [Similar parameter values to those above]
	CREW	 DISPATCH personnel to inspect failed pump(s) and determine cause for failure.
	SRO	 NOTIFY STA to evaluate Tech Spec LCO 3.7.4, ERCW System, for both units.
		 3.7.4, Essential Raw Cooling Water System Restore inoperable pump w/i 72 hrs. or Ht Stby w/i next 6 hrs and Cld SD w/i the following 30 hrs. (Action applicable until Transfer Switch 0-XS-67-285, ERCW PUMPS J-A & Q-A DG POWER SEL is re-selected to the OPERABLE pump, in this case the J-A position.
	BOP	8. CHECK ERCW pump loading amps NORMAL.
Evaluator No		9. TRANSFER emergency power selector switch away from failed pump. mp Select Sw XS-67-285 is overridden to the 'Q-A position' which simulates nce failure preventing J-A ERCW Pump automatic start later in this scenario.
	Event Descriptio	Event Description: Q Time Position Image: Construction BOP Image: Construction Image: Construction Image: Construction <

Appendix D		Requ	ired Op	erator Actions	5		F	orm E	ES-D-2
Op Test No.:	NRC 2010302	Scenario #	3	Event #	3	Page	24	of	88
Event Description:	Q-A	ERCW Pump	Over cu	rrent trip w/ B0) Sequence	er Failure			

Time	Position	Applicant's Actions or Behavior
	SRO	 EVALUATE need to close and place clearance on manual discharge valve for failed pump.
	SRO	11. GO TO appropriate plant procedure.
Evaluator Not	e: The follow	ing CREW Brief and Notification actions are not contained in the procedure.
		CREW Brief would typically be conducted for this event as time allows prior to the next event.
		Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.
		Operations Management - Typically Shift Manager.
		<u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Lead Examine	r may cue the	e next event when US directs return to appropriate plant procedures.

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Appendix D		Required Operator Actions	Form ES-D-2								
Op Test No.:	NRC 2010302 n: F	Scenario #3 Event #4 Page5	50f88								
Time	Position	Applicant's Actions or Behavior									
	Ш	ad Examiner direction, insert Event 4									
Indications 1-M-3: • 1-SI-46 • 1-PI-3-6	 1-SI-46-20A, MFPT 1A Speed Indication decreasing; 1-PI-3-66A, MFP 1A Outlet Pressure indication decreasing; 										
 LOOPS LOOPS down; LOOPS down; 1-XI-1-3 1-PIC-1 Annunciato 	5 1-4 SG-1,2,3,4 5 1-4 SG-1,2,3,4 5 1-4 SG-1,2,3,4 33, Steam Dum -33, Steam Du	ump Valve Status Panel: all 12 Steam Dump Valves going closed/ STM Flow indicators: 2 Channels per SG (8 total indicators) flow FW Inlet Flow indicators: 2 Channels per SG (8 total indicators) LEVEL -NR indicators: 3 Channels per SG (12 total indicators) la p Demand Indicator going down mp Pressure Controller Green (dim) indicator bar graph going do	w going down; flow going evel going								
		3-7, LS-3-42D STEAM GEN LVL HIGH-LOW DEVIATION									
Other Sympton	normal fee	or unexpected indications on any of the following may indicate a malfi dwater system: rater flow dropping to all steam generators dropping in all steam generators	unction of the								
T = 30	CREW	Observes indications/symptoms specified above and diagnose	event;								
Evaluator Not	1A Main F result late DEVIATIC restore/cc go closed SG atmos 0-SO-1-2,	e affects Steam Dumps, which close, and Main Feed Pump Con Feed Pump to minimum speed. There are no initiating alarms; or r (i.e.: 1-AR-M5A, B-7, LS-3-42D STEAM GENERATOR LEVEL DN). Crew's primary efforts will be to gain control of Main Feed ontrol SG levels followed by RCS temperature control as the Ste . Then, the slower moving RCS temperature change will be ide spheric relief valves' operation. STEAM DUMP SYSTEM Section 7.1 Steam Dump System S berature control on the SG atmospheric relief valves follows AO	only alarms that _ HIGH-LOW Pump flow and eam Dumps will entifiable by the Shutdown for								

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Appendix D		Required Operator Actions Form ES-D
Op Test No.:	NRC 2010302	Scenario # 3 Event # 4 Page26 of8
Event Description	n:	PT-1-33, Main Steam Hdr Pressure Transmitter Lo Failure
Time	Position	Applicant's Actions or Behavior
99 Maria II.	SRO	SRO implements AOP-S.01, Loss Of Normal Feedwater Section 2.3, Loss Main Feedwater Pump Control:
	SRO	SRO directs Section 2.3 Immediate Operator Actions (IOAs)
		NOTE: Step 1 is an IMMEDIATE ACTION.
	BOP	1. RESTORE feedwater pressure:
		a. PLACE affected MFP speed controller(s) in MANUAL:
		MFPT 1A(2A) & 1B(2B) Speed Control
		OR
		MFPT 1A(2A) Speed Controller
		OR
		MFPT 1B(2B) Speed Controller
	BOP	 ADJUST speed on affected MFP(s) to restore feedwater pressure t normal (~1040 psig at full power).
	BOP	2. DETERMINE if MFP trip is needed:
		a. CHECK BOTH MFWPs in service. (RNO Required)
		RNO:
		RNO 1 st condition N/A- adequate MFW is available:
		a. IF reactor power is greater than AFW flow capability (~ 3%) AND adequate feedwater flow CANNOT be maintained
	BOP/	RNO 2 nd condition N/A- adequate MFW is available:
	Crew	IF reactor power less than or equal to AFW flow capability (~ 3%), AND S/G levels CANNOT be controlled with main feedwater
		RNO 3 rd condition implemented:
		IF only one MFWP is in service, THEN GO TO Caution prior to Step

Appendix D

	Appendix D		Requ	ired Op	erator Action	S		F	orm E	S-D-2
/~ .	Op Test No.:	NRC 2010302	Scenario #	3	Event #	4	Page	27	of	88
A CARACTER STATE	Event Description	on: PT	-1-33, Main Ste	am Hdr I	Pressure Tran	smitter Lo F	ailure		-	

Time	Position	Applicant's Actions or Behavior
	BOP	3. MAINTAIN steam generator level(s) on program. [with manual MFP Cont]
	NOTE: Ap	pendix C may be used to determine program feedwater D/P for current power.
	[Ai	opendix C attached to end of this event guide]
		4. MAINTAIN MFP discharge pressure on program USING ICS or available control board indications.
	BOP	Places 1-PC-46-20, MFPT 1A & 1B SPEED CONTROL, to MANUAL and raises output
	CAUTION:	Reactor operation at low power levels for extended periods may challenge reactivity control due to xenon changes.
	RO	5. CHECK Reactor power greater than 5%.
	CREW	6. INITIATE repairs on failed equipment.
	SRO	7. GO TO appropriate plant procedure.
		END OF SECTION - AOP-S.01 Section 2.3

	Appendix D		Requ	ired Op	erator Action	IS		F	orm E	S-D-2
P	Op Test No.:	NRC 2010302	Scenario #	3	Event #	4	Page	28	of	88
	Event Descriptio	on: PT	-1-33, Main Ste	am Hdr I	Pressure Trar	nsmitter Lo Fa	ailure			

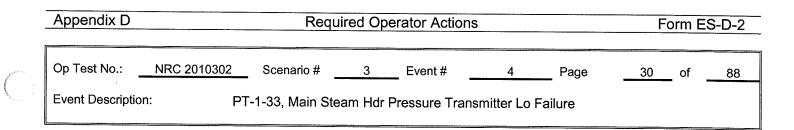
Time	Position Applicant's Actions or Behavior								
			Sect	0-SO-1-2, Stea tion 7.1, Steam D	0-SO-1-2, Steam Dump System on 7.1, Steam Dump System Shutdown				
		BOP	 [1] IF necessary to transition from steam dumps to S/G atmospheric relief valves for RCS temp control, THEN PERFORM the following: [1.1] ENSURE S/G atmospheric relief valve controllers set at 84% (1005 psig) or as required for current RCS temp and output signal approximately zero: 						
		BOP							
		S/G	PIC	SETF	POINT	OUTPUT	INITIALS		
		#1	PIC-1-6A)05 pisg) equired	~ 0			
		#2	PIC-1-13A)05 pisg) equired	~ 0			
		#3	PIC-1-24A)05 pisg) equired	~ 0			
		#4	PIC-1-31A)05 pisg) equired	~ 0			
		BOP	[1.2] SLOWLY I setpoint. Step is N/A due to	RAISE [PIC-1-33] PT-1-33 failure	Steam Du	Imp Pressure C	Control		
Evaluator No	ote:	SRO direc to mainta	cts <u>OR</u> BOP operato in unit in MODE 1.	or adjusts SG Atr	mospheric	Relief Valves	as necessary		
		BOP	[1.3] ADJUST S RCS temper	/G atmospheric r ature.	elief valve	setpoints to ma	iintain desired		
		BOP		am dump valves f ontrolling RCS ter			eric relief		
			[1.4.1] PLA	CE [HS-1-103A] \$	Steam Dun	np Control in O	FF position.		

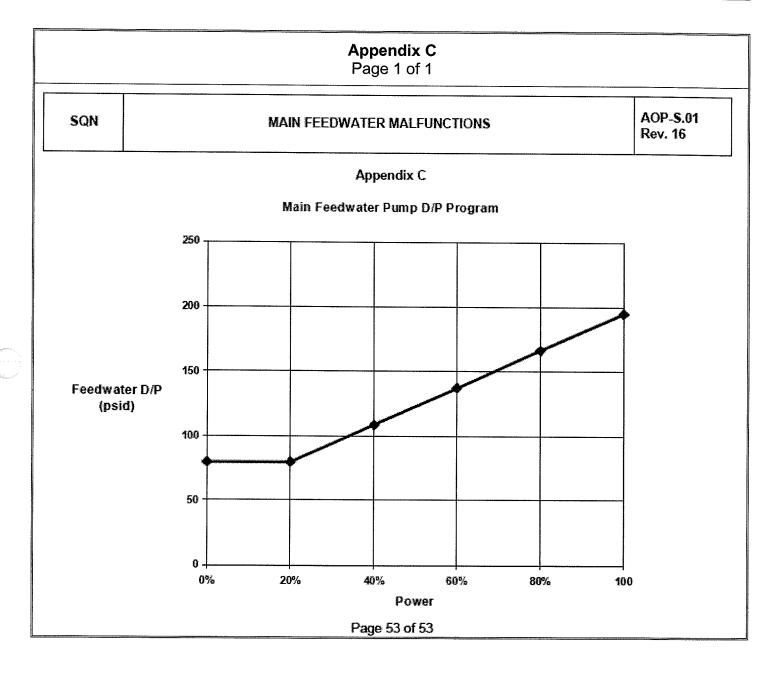
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-	Appendix D	·····	Required Operator Actions	Form ES-D-2				
	Op Test No.:	NRC 2010302	Scenario #3 Event #4 Page PT-1-33, Main Steam Hdr Pressure Transmitter Lo Failure	of88				
	Time	Desition						
	Time	Position	Applicant's Actions or Behavior	and the second secon				
			0-SO-1-2, Steam Dump System Section 7.1, Steam Dump System Shut	down				
			[1.4.2] PLACE [HS-1-103B] Steam Dump Contro	I in OFF position.				
			[2] IF RHR cooling is established					
			Step is N/A (including NOTE preceding step and following substeps)					
			END OF TEXT	END OF TEXT				
	Evaluator Note	: The follow	ving CREW Brief and Notification actions are not contained	in the procedure.				
			CREW Brief would typically be conducted for this event a to the next event.	as time allows prior				
	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.							
			Operations Management - Typically Shift Manager. Maintenance Personnel – Typically Maintenance Shift Su (Note: Maintenance notification may be delegated to the	ipervisor (MSS). Shift Manager)				

are stabilized in manual control.

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Appendix D

Appendix D		Requ	lired Op	erator Actions		·····	Forr	n ES-	-D-2
Op Test No.:	NRC 2010302	Scenario #	3	Event #	5	Page	31	of _	88
Event Descriptio	n: PO	RV 68-334 fails op	en (can	be closed manua	lly)				
Time	Position			Applicant's	Actions or Behav	vior			<u></u>
Simulator Op	perator: at Lea	d Examiner di	rection	, insert Event	5				
Indications/A Indications 1-M-4: • 1-XX-6 noise;	larms:	RV ACOUSTIC	MONIT	ORS: XI-68-33		levated ac	oustic (f	low)	
 PRT LI open) PRT Pl remain PRT TI remain RCS P. PORV RCS L0 	R PRESS (Chs EVEL, 1-LI-68-30 RESSURE, 1-PI- bed open) EMPERATURE, bed open) ZR PRESS Reco remained open OOP 1 HL WIDE tional to time P	00 shows an inc 68-301 shows a 1-TI-68-309 sho order 1-PR-68-3 RANGE PRESS	creasing an increa ws an in 40 shov S Recor	i trend (magnit asing trend (m ncreasing trend vs a decreasing	ude proportion agnitude prop d (magnitude p g pressure tree	nal to time ortional to proportion nd proport	PORV re time PO al to time ional to	emain PRV e POF time	
 RCS H RCS H Annunciate 1-M-5 1-XA-5 • 	5-5A D-4: "PS	RANGE 1-PI-68 RANGE 1-PI-68 68-340G/F PRE -68-331 PRESS	-62, sho -69, sho SSURIZ URIZER	ows a decreasi ows a decreasi CER PRESSUR POWER RELI	ng pressure va ng pressure va E LOW BACKU EF LINE TEMP	alue; alue; JP HTRS C	N"		
T = 40	CREW	Refers US to	AOP-I.	nce with Alarm 04 as determir may also app	ned in 1-AR-M			1-AR	₹-M5-
	SRO			04, Pressurizer olled RCS pre					

Appendix D

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Appendix D	Required Operator Actions						Form ES-D-2				
Op Test No.:	NRC 2010302	Scenario #	3	Event #	5	Page	32	of	88		
Event Description: PORV 68-334 fails open (can be closed manually)											

Time	Position										
		ent failure, th	ien								
	Section 2.3 is the appropriate entry point.										
	1. DIAGNOSE the failure:										
		IF	GO TO SECTION	PAGE							
		Uncontrolled RCS pressure drop due to open PORV in Modes 1-3	2.1	4							
		Uncontrolled RCS pressure drop due to stuck open spray valve	2.2	7							
		Pressurizer Pressure Instrument OR Controller Malfunction	2.3	11							
		Pressurizer Level Instrument Malfunction	2.4	20							
	CAUTION Partially open PORV may display no light indications.										
		NOTE Step 1 is an IMMEDIATE ACTION.	V								
	RO	1. CHECK Pzr PORVs CLOSED:									
		 valve position indication acoustic monitors. (RNO Required) 									
	RO	 RNO: CLOSE affected PORV and/or block valve as necessary to stop RCS pressure drop. Expected RO actions are to close/attempt to close BOTH PORV, (w/ 1-HS-68-334A), AND Associated Block Valve (w/ 1-HS-68-333A) Places 1-HS-68-334A, PZR PORV to CLOSE (PORV does not respond Places 1-HS-68-333A, BLOCK Valve FOR PORV 334, to CLOSE (Valve closes) 									
	RO	2. MONITOR RCS pressure STABLE or RISING.									
	RO	3. CHECK SI signal NOT actuated.									
	RO	4. ENSURE available Pzr heaters ENERGIZED as ne	ecessarv.:								

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Appendix D	Required Operator Actions						Form ES-D-2						
Op Test No.:	NRC 2010302	Scenario #	3	Event #		5	Page	33	of	88			
Event Description	n: POR	V 68-334 fails ope	en (can	be closed ma	nually)								

Time	Position	Applicant's Actions or Behavior
	CAUTION	RCS pressure changes and changes in RCS boron concentration (due to differences between pzr and RCS boron) may impact core reactivity.
	RO	5. MONITOR reactor power:
		a. CHECK reactor in Mode 1 or 2.
		b. MONITOR core thermal power for unexpected changes.
		EVALUATE EPIP-1, Emergency Plan Classification Matrix.
		 7. EVALUATE the following Tech Specs for applicability: 3.2.5, DNB Parameters 3.2.5 LCO states: The following DNB related parameters shall be maintained within the limits shown on Table 3.2-1: a. Reactor Coolant System (RCS)Tavg b. Pressurizer Pressure c. RCS Total Flow Rate 3.4.3.2 LCO states: Two power relief valves (PORVs) and their associated block valves shall be OPERABLE. TS 3.4.3.2 Action b.: w/ 1 PORV inoperable & incapable of RCS pressure control, w/i 1 hr restore PORV to OPERABLE or close of the block valves of the block walves of the block walve
		associated block valve & remove power from the block valve; restore PORV to OPERABLE w/i following 72 hrs or HT STBY w/i next 6 hrs & HT SHDN w/i following 6 hrs.
Evaluator No	≥2220 psi a Tech Spec	related parameter on Table 3.2-1.b. Pressurizer Pressure is stated as a* (or entry required @ ≤2205 psig as indicated on the MCB instrumentation) Bases for 3.4.3.2, PORV OPEABILITY follows this event guide; PORV
	OPERABIL	ITY discussion needs to include this.
		 3.2.5.b DNB Parameters: The following DNB related parameters shall be maintained within the limits shown on Table 3.2-1: a. Reactor Coolant System (RCS) Tavg: ≤583°F b. Pressurizer Pressure: ≥2220 psia* c. RCS Total Flow Rate: Figure 3.2-1 d. Total Flow: [Figure 3.2-1]
		Applies – restore the parameter (Pressurizer Pressure) w/i 2 hrs. or reduce to \leq 5% RTP w/i the next 4 hrs.

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Appendix D		Requ	lired Op	erator Actions			For	m ES	-D
Op Test No.:	NRC 2010302	Scenario #	3	Event #	5	Page	34	of	5
Event Descriptio	n: POF	RV 68-334 fails op	en (can b	e closed manual	ly)				
Time	Position			Applicant's	Actions or Beha	avior			
		block valv	ve to cor	alve must be o nply with LCC	3.4.3.2,				
				0-SO-68-3, F ng this event		ressure Cor	ntrol Sy	ystem	•
		9. CHECK t	he follov					X	
				iated on failed					
		11. GO TO a	ppropria	te plant proce	dure.				
Evaluator No procedure.	te: The fol	lowing CREW	Brief an	d Notification	actions are n	ot containe	d in the	9	
		CREW Brief allows prior to		/pically be cor xt event.	ducted for th	nis event as	time		
				be addressed d by the proce			ief.		
		Operations M	lanagen	<u>nent</u> - Typicall <u>y</u>	y Shift Mana	ger.			
			e: Maint	<u>nel</u> – Typically enance notific					
Lead Examin to appropriat	er may cue the	e next event w		completes T	ech Spec ev	valuation o	r direc	ts ret	tur

Time	Position	Applicant's Actions or Behavior
0-50	O-68-3, Secti	on 8.3 Isolation of a Leaking or Inoperable Pressurizer PORV
		NOTES
		section may be used to isolate a PORV which is leaking or inoperable to remove power from PORV and/or block valve to comply with LCO 3.4.3.2.
	if PC	os 8.3[5] and/or 8.3[6] may be performed prior to Steps 8.3[1] - 8.3[4] DRV must be isolated promptly due to leakage OR if necessary to meet h Spec action time limits.
	the	CS is or has been water solid, water in the bonnet of PORVs will significantly slow valve stroke time due to hydraulic locking. Several valve strokes may be required lear the water from valve bonnet following solid water operations.

Appendix D		Required Operator Actions Form E	S-D-2					
Op Test No.:	NRC 2010302	Scenario #3 Event #5 Page35 of	88					
Event Descriptio	o.: NRC 2010302 Scenario #3Event #5Page35of ccription: PORV 68-334 fails open (can be closed manually) Position Applicant's Actions or Behavior SRO [1.] IF unit is in Modes 1-3, THEN REFER TO Tech Spec LCO 3,4,3,2 basis section to evaluate impact on PORV and block valve operable [2.] IF unit is in Mode 4 or 5,N/A [3.] NOTIFY Work Week Manager to evaluate impact of inoperable PC and/or closed block valve on overall plant risk CAUTION Closure of PORV block valve may conflict with App. R fire safe shutdown analysi for AB el. 714 General Area and 6.9KV Shutdown Board Rm A or B. In these area one PORV is credited with NO power available to block valve [i.e. block valve is assumed to remain open without power). If 1-FCV-68-333 or 2-FCV-68-332 is clos the credited PORV may NOT be available. NOTES 1) If applicable, the following step directs establishing fire watch in affected areas. Continuous or hourly fire watch should be used consistent with FOR 3.7.12. Fire watch may be terminated or marked N/A if acceptable alternate comp measures							
Time	Position	Applicant's Actions or Behavior						
	SRO	[1.] IF unit is in Modes 1-3, THEN REFER TO Tech Spec LCO 3.4.3.	2 and bility.					
		and/or closed block valve on overall plant risk						
		CAUTION						
	for AB el one POR assumed	I. 714 General Area and 6.9KV Shutdown Board Rm A or B. In these are RV is credited with NO power available to block valve (i.e. block valve is d to remain open without power). If 1-FCV-68-333 or 2-FCV-68-332 is clo	as,					
	Conti watcl evalu 2) Unav wouk	plicable, the following step directs establishing fire watch in affected areas. tinuous or hourly fire watch should be used consistent with FOR 3.7.12. Fire	s but					
			·					
		[4.] IF unit is in Mode 1-4, THEN PERFORM the following:[4.1] ENSURE SR initiated to document condition and evaluate impression	a a a t					
		 [4.1] ENSORE SK initiated to document condition and evaluate imp App. R fire safe shutdown. [4.2] Unit 1 Only: IF 1-FCV-68-333 will remain closed in Mode 1-4, THEN ESTABLISH fire watch in the following areas: AB el. 714 General Area (Unit 1 side). 6.9KV Shutdown Board Room A. 						
		[4.3] Unit 2 OnlyN/A						

Appendix D		Required Op	perator Ac	tions	F	Form ES-D-2
Op Test No.: Event Descript	<u>NRC 2010302</u> tion: PO	Scenario # <u>3</u> RV 68-334 fails open (can			Page <u>36</u>	6 of <u>88</u>
Time	Position		Appli	icant's Actions or Behav	ior	
		[5.] IF block valve m with LCO 3.4.3.	nust be clo 2 action, 1	osed to isolate leak THEN PERFORM t	ing PORV OR he following:	to comply
		[5.1] CLOSE affe	ected valve	e: (N/A valve not cl	osed)	
		VALVE		SWITCH UNID	INITIALS	IV
		Block Valve for PORV (FCV-68-332)	340A	HS-68-332A		
		Block Valve for PORV (FCV-68-333)	334A	HS-68-333A		
~				BREAKER UNID	INITIALS	cv
		r VALVE 1-FCV-68-332	1-BC 480V	BREAKER UNID TD-68-332-B 7 Rx MOV Bd 1B1-B pt 12E		
	1	1-FCV-68-333	1-BC	TD-68-333-A ' Rx MOV Bd 1A1-A		
		2-FCV-68-332	480∨	TD-68-332-B ' Rx MOV Bd 2B1-B pt 12E		······
	2	2-FCV-68-333	1	TD-68-333-A ' Rx MOV Bd 2A1-A pt 9D		
	To compl	y with OPDP-7 (Fuse C		NOTE	e bagged, label	ed, and

-	Appendix D		Requi	Form ES-D-2						
	Op Test No.:	NRC 2010302	Scenario #	3	Event #	5	Page	37	of	88
	Event Description	: PORV	' 68-334 fails ope	en (can t	e closed man	iually)				

Time	Position	Applicant's Actions or Behavior
		[6.] IF PORV solenoid valve must be de-energized to comply with Tech Spec LCO 3.4.3.2, THEN REMOVE fuses for affected valve: (N/A the others)
		[7.] ENSURE caution order or off-normal tag is placed on affected block
		valve or PORV handswitch. (N/A if handswitch will be danger-tagged)
		[8.] ENSURE SR initiated. SR #
		[9.] PLACE this procedure in active procedures book UNTIL ready to restore block valve/PORV to normal.
		End of Section 8.3, 0-SO-68-3

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Appendix D		Requ	Form ES-D-2						
Op Test No.:	NRC 2010302	Scenario #	3	Event #	5	Page	38	of	88
Event Descriptior	n: POR\	/ 68-334 fails op	en (can	be closed manuall	y)				
3/4 4 REACT(DR COOLANT S								

3/4.4.3 SAFETY AND RELIEF VALVES - OPERATING

The power operated relief valves (PORVs) and steam bubble function to relieve RCS pressure during all design transients up to and including the design step load decrease with steam dump. Operation of the PORVs minimizes the undesirable opening of the spring-loaded pressurizer code safety valves. Each PORV has a remotely operated block valve to provide positive shutoff capability should a relief valve become inoperable. The PORVs also function to remove non-condensable or steam from the pressurizer.

The OPERABILITY of the power-operated relief valves (PORVs) and block valves is determined on the basis of their being capable of performing the following functions:

- a. Manual control of PORVs to control reactor coolant system pressure. This is a function that is used for a steam generator tube rupture accident.
- b. Maintaining the integrity of the reactor coolant pressure boundary. This is a function that is related to controlling identified leakage and ensuring the ability to detect unidentified reactor coolant pressure boundary leakage.
- c. Manual control of the block valve to: (1) unblock an isolated PORV to allow it to be used for manual control of reactor coolant system pressure (Item A), and (2) isolate a PORV with excessive seat leakage (Item B)
- d. Manual control of a block valve to isolate a stuck-open PORV.

Surveillance requirements (SR) provide assurance that the PORVs and block valves can perform their functions. The block valves are exempt from the SR to cycle the valves when they have been closed to comply with the ACTION requirements. This precludes the need to cycle the valves with full system differential pressure or when maintenance is being performed to restore an inoperable PORV to operable status.

Testing of PORVs with a steam bubble in the pressurizer is considered to be a representative test for assessing PORV performance under normal operating conditions.

From: SEQUOYAH - UNIT 1, Amendment No. 12, 133, 157, 308, June 16, 2006, Page B 3/4 4-2

Appendix D

Appendix D	Required Operator Actions Form ES-D-2											
Op Test No.: N	RC 2010302	Scenario #	3	Event #	6	Page	39	of _	88			
Event Description:	RCS	S Leak										
Time	Position	[Applicant	s Actions or Behavior	•						
Simulator Opera	ator: at Lead	f Examiner di	rection.									
RCS PZR RCS PZR	LVL, 1-LI-68- LVL, 1-LI-68- LVL, 1-LI-68-)1/102, Core B	339A, shows a 335A, shows a 320, shows a d Exit Temp Marg	decreas lecreasin	ing level valu g level value	le	B) pressi	ure ind	icatio	าร			
 1-M-5: RCS PR PRESS (Chs 1-4), 1-PI-68-340A, 334, 323, 322: showing RCS (Pzr) pressure going down; RCS PZR PRESS Recorder 1-PR-68-340 shows a decreasing pressure trend; RCS LOOP 1 HL WIDE RANGE PRESS Recorder 1-PR-68-69 shows a decreasing pressure trend. 1-M-6: RCS WR HL PRESSURE LOOP 3 1-PI-68-66A, shows a decreasing pressure value; RCS HL PRESS WIDE RANGE 1-PI-68-62, shows a decreasing pressure value; RCS HL PRESS WIDE RANGE 1-PI-68-69, shows a decreasing pressure value; Annunciators 1-M-5; 												
• 1-XA-55-5		-1: "TS-30-31 L -3: "TS-30-241										
•		-4: "TS-30-240										
1-M-6: ● 1-XA-55-6	E Window C-	6: "ZS-61-186 I	CE CONI	DENSER LOI	VER INLET DOOF	R OPEN"						
T = 50	CREW	Respond in a	ccordan	ce with Alarr	n Response Proc	edures						
Evaluator Note:	procedure, Containme capability. MAINTAIN	ak occurs and AOP-R.05 Se nt pressure; th MONITOR ste	progres ction 2.1 is situati ps 2, Pz lake-up	ses into a SI for lowering on could als r Level, 3, C capability are		w respor ressure a enge to \ sure, 4, I	and inc /CT M RCS P	creasir ake-u ressu	ng p re or			
Evaluator Note:	At the Lead		rection,		increase requirir	ng the cr	ew to i	nitiate	а			
		p criteria conta should determ			teps 2, 3, 4 and/c	or MAIN	ſ AIN s	tep 5.				

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Appendix D		Req	uired Ope	erator Actions			Form ES-D-				
Op Test No.:	NRC 2010302	Scenario #	3	Event #	6	Page	40	of	88		
Event Descript	ion: RC	S Leak									
Time	Position			Applicant's	Actions or Behav	ior					
	SRO	SRO uses A Section 2.1,	OP-R.05 RCS Lea	, RCS LEAK / ak in Mode 1-3	AND LEAK SC	URCE ID	ENTIF	ICATI	ON		
T = 50	CREW	Respond in	accordan	ce with Alarm	Response Pr	ocedures					
	RO			ing flow using							
		ADJU level c	IST FCV- on progra	62-93 and FC m.	V-62-89 as ne	ecessary t	o main	itain p	zr		
		MAIN	TAIN sea	al injection flow	v at least 6 gp	m to each	RCP.				
	RO	2. MONITO (RNO requi		ırizer level ST	ABLE or RISI	NG.					
	SRO			ne is available	, THEN ISOL	ATE norm	al and	exces	SS		
	RO	b. CLOSE F	-CV-62-6								
		C. ENSURE	FUV-02-	-54 and 55 CL	.05ED.						
Evaluator N	therefore in	is a " MONITO g a Pzr/RCS pr nitiate the read the crew may	ressure tr ctor trip a	end. If so, stend nd E-0 implen	eps 3 or 4 cou nentation. If a	Id be the of loss of R	decisio CS pre	n poin ssure			
	SRO	IF loss of pre psig) is immi a. TRIP the	essurizer nent, TH reactor.	level is immin EN PERFORI	ent OR low pr I the following	essure rea					
		b. INITIATE c. GO TO E	•	or Trip or Safe	ety Injection.						
	RO	3. MONITO (RNO requir		nment pressu	re STABLE or	DROPPIN	NG.				
		RNO: IF containme following: a. TRIP the		ure is approac	hing 1.5 psig,	THEN PE	RFOR	tM the)		
		b. INITIATE	Safety In	jection. tor Trip or Sa	fetv Iniection.						

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	Appendix D	Form ES-D-2								
1 miles	Op Test No.:	NRC 2010302	Scenario #	3	Event #	6	Page	41	of	88
	Event Descripti									

	Position	Applicant's Actions or Behavior
	CAUTION:	f Unit is in Mode 3 with low pressurizer pressure SI NOT blocked, SI should NOT be manually blocked to prevent safety injection.
		4. MONITOR RCS pressure STABLE or RISING.
	RO	(RNO required)
		RNO:
		IF Unit is in Mode 1 or 2 AND RCS pressure is approaching 1970 psig (dropping), THEN TRIP the reactor and GO TO E-0, Reactor Trip or Safety Injection.
		IF Unit is in Mode 3 N/A
Evaluator No	Section challeng	k will progress into a SBLOCA. As the crew responds using AOP-R.05 2.1, the lowering Pzr level and increased charging flow may result in a e to VCT Make-up capability. Subsequently the crew may initiate a reactor enter E-0 based on this step.
	RO	 MAINTAIN VCT level greater than 13% USING automatic or manual makeup.
		 RNO: IF leak is on charging header in Aux Bldg N/A. IF VCT level CANNOT be maintained, THEN PERFORM the following: a. ENSURE CCP suction aligned to RWST: 1) OPEN LCV-62-135 and -136.
		 2) CLOSE LCV-62-132 and 133. b. IF in MODE 1 or 2, THEN TRIP the reactor and GO TO E-0, Reactor Trip or Safety Injection.
	RO/BOP	RO and/or BOP operator should monitor pocket sump level (1-M-15, indicators 1-LI-77-410 & 77-411).
	RO/BOP	RO and/or BOP operator should containment radiation levels (on (0-M-12, recorders and modules 1-RR-90-105 and 1-RR-90-112 for lower and upper

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	Appendix D	······································	Requ	uired Op	erator Actions			Foi	rm ES	-D-2
20	Op Test No.:	NRC 2010302	_ Scenario #	3	Event #	6	Page	42	of	88
	Event Description	on: RCS	S Leak							
	Time	Position		······	Applicant's	Actions or Behav	ior			
		SRO			OP operator] to operator] to operator] to operator]		pendices I	and/o	r J;	
		BOP			I and/or J, as					
			pendix I or J m				te			
		NOTE 2: If le	etdown was isc e CCP in the no	lated in	Step 2, the lea	ak rate may ha	ave excee	ded ca	pacity	′ of
		SRO	6. EVALUA	TE EPI	P-1, Emergenc	v Plan Classif	ication Ma	atrix		
		SRO	7. EVALUA Specs an	TE Tec d TRM.	h Spec/TRM L	COs USING A	ppendix k	(, Eval	-	Tec
			Action a: w/ ar	iy PRES	AGE TS 3.4.6.2 SURE BOUNDA De in HT STDY \	ARY LEAKAGE	or primary	-to-sec	ondary	, 0 hrs
		BOP	8. CHECK s	seconda	ry side radiatio	on NORMAL:				
					n rad monitor		· · · · · · · · · · · · · · · · · · ·			
			Conde	enser va	cuum exhaust	rad monitor				
			 Main s 	steam lir	ne rad monitors	5.				
		BOP	9. STOP co	ntainme	nt purging and	ventina:				
			a. IF cont		t purge in prog		NSURE o	ontain	ment	purg
			b. ENSU	RE cont	ainment purge	and vent dam	pers CLC	SED.		
		BOP	10. CHECK o	ontainn	nent airborne a	activity RISING	6. (RM-90-	106 or	· 112)	
	Evaluator No		source is not							re th
		ultimately unidentifi	continue with t / arriving at the ed leakage lim g to the scenar	e conclu it (or ur	sion that RCS til the Lead Ex	leakage excee	eds the Te	ech Sp	ec	
		CREW			;). source UNKN(•.•	
				Janaye						
		RO	12 CHECK	ressuri	zer PORVs NC		·			

	Appendix D		Required Operator Actions Form ES-D-2
	Op Test No.:	NRC 2010302	Scenario #3 Event #6 Page43 of88 S Leak
	Time	Position	Applicant's Actions or Behavior
			Tailpipe temperature
			Acoustic monitors
			13. ISOLATE letdown:
		RO	 a. ENSURE the following letdown orifice valves CLOSED: FCV-62-72 FCV-62-73 FCV-62-74
		RO	b. ENSURE the following letdown isolation valves CLOSED:
			 FCV-62-69 FCV-62-70 FCV-62-77
		RO/	 c. CHECK leak ISOLATED based upon the following containment parameters
C		BOP	 estimated leak rate USING Appendix I or J. (RNO required)
		SRO	RNO: c. IF leak is NOT isolated, THEN GO TO Step 14.
		RO	14. ISOLATE charging:
		······································	a. ENSURE letdown orifice valves CLOSED:
			• FCV-62-72
			• FCV-62-73
			• FCV-62-74
		RO	 b. ENSURE the following charging header isolation valves CLOSED: FCV-62-90 FCV-62-91 FCV-62-85 FCV-62-86.
		RO/	 c. CHECK leak ISOLATED based upon the following containment parameters astimated look rate USINC Appendix Let 1
\bigcirc		BOP	 estimated leak rate USING Appendix I or J. (RNO required)

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	Appendix D		Requir	red Oper	rator Action	S		For	m ES	-D-2
1	Op Test No.:	NRC 2010302	Scenario #	3	Event #	6	Page	44	of	88
	Event Description	: RCS	S Leak							
	Time	Position			Applicant	's Actions or Behavio	r			
		SRO	RNO:							
	Evaluator Not	e: EA-62-5 fc	C. IF leak is llows this event	NOT iso auide.	lated, THEI	N PERFORM the	; followin	g:		
		RO/			araina is ro	quired to mainta	in Dar los			
		BOP	RES	STORE r	ormal char	ging USING EA-	62-5.	/ei, I n		
		SRO	2) IF ru	unning C	CP must be	e stopped N/A				
		SRO	3) GO	TO Step	15.					
		DO								
		RO	15. CHECK Pz			RMAL:				******
				e tempei						
			Acoust	ic monite	ors					
for a		RO	16. CHECK PF	RT cond	tions NOR	MAL:	<u></u>	•••••••		
		· · · · · · · · · · · · · · · · · · ·	Level							
			Pressu	re						
		· · · · · · · · · · · · · · · · · · ·	Temper	rature						
		BOP	17. NOTIFY Cł [Hot Sampl	hemistry le Room	to ensure a	all primary side s	ample va	alves C	LOSE	D.
		POD			()) ()	~~~				
		BOP	18. CHECK CC							
					nonitors NC					
-			000 30	ige tan		JLC.	<u></u>			
		RO	19. CHECK all	CLA lev	els NORM	AL.				
_		RO	20. CHECK ex	cess let	down heat e	exchanger NORM	/AL (if a	oplicab	le):	
			Temper							
-			 Pressur 	re						
$^{\frown}$				68 200	Popotor \/	essel Head Vent	Tompor			
		RO	[M-4]	-00-080,	INCOLUTI VE	SSSCI I TEAU VEIIL	rempera			٦Ļ.

	Appendix D		Requ	ired Op	erator Action	IS		For	m ES	-D-2
<u> </u>	Op Test No.:	NRC 2010302	_ Scenario #	3	Event #	6	Page	45	of _	88
1994 - 1997 - 19	Event Description	n: RC	S Leak							
	Time	Position			Applicant	's Actions or Behavi	or			
		RO	22. CHECK ⁻ [M-5]	Г І- 68-21	, reactor ves	sel flange leakof	ff tempera	ature N	ORM	AL.
		BOP	23. MONITO	R auxilia	ary building r	adiation and HEI	LB record	lers NC	ORMA	L.
	Evaluator No	te: RCS leal	k is ≈90 gpm a	nd NOT	isolated.					
		RO/BOP		OP oper	ator should r	monitor pocket s	ump leve	l (1-M-	15,	
		RO/BOP	RO and/or BO recorders and containment,	d modul	ator should o es 1-RR-90-	containment radi 106 and 1-RR-90	ation leve 0-112 for	ls (on lower a	(0-M-' and up	12, oper
\bigcirc		SRO	Expected to a (Included at e			to perform App	endices I	and/or	J;	
		BOP	Perform Appe		free and the second					
		SRO				ISOLATED US	ING avail	able m	ethod	s:
		BOP	 Appendict contair pocket U0965 Rx Bld 	dix I or with the sump let sump let , 15 min g (racev	J (Estimating arameters (ra evel rate of ri avg. point L	Leak Rate) adiation, pressur se on ICS (insta 10967 or U0968) ite of rise (ICS po	e, humidi ntaneous	ty) point l		
			(RNO Requir							
			RNO: IF leak is NO	T isolate	ed. THEN PE	RFORM the follo	owina:			
			a. IF add	litional o		uired, THEN PE	the second se	Append	,H xit	
	Evaluator Not	te: SRO/RO n trends follo	nay choose to r	not start	additional co	ooling fans based Evaluation, how	d on cont ever, is e	ainmer xpecte	nt pres d.	sure
		RO	adequate hea (1-M-4: Pzr 1	iter ope EMP in	ration to main dicators 1-TI	ated conditions ir ntain Pzr Vapor/I -68-324 & 1-TI-6	Liquid ten 58-319)	nps eq	uivale	
			u. Ir pre	ssunzer	ievel is abov	/e program AND	rising, II	пси Р	EKFC	ıК

	Appendix D		Required O	perator Actions		······	For	m ES	-D-2
	Op Test No.:	NRC 2010302	Scenario # <u>3</u>	Event #	6	Page	46	of	88
		n. Ku	Leak						····
	Time	Position			Actions or Behavi	ior			
			Establish	<u>;</u> RE CVCS charg hing Normal Cha E pressurizer he	arging and Let	down.		-5,	
			2) LNOON			e as iequ	neu.		
	Evaluator No	ote: RCS le	ak is ≈90 gpm and N						
			c. ATTEMPT to						
			 Appendi: gpm) OR 	x I (if leak requi	res rise in cha	rging flow	greate	r thar	10~10
				x J (requires NC	O VCT makeup	o, dilution,	or bora	ation	flow)
			d. IF conditions OPS-068-13	s permit, THEN 37.0, Reactor Co					0-SI-
6			This step N/A		-				
			e. IF leak rate THEN INITI	exceeds Tech S ATE plant shutd					lated,
			 AOP-C.0 OR 	03, Rapid Shutd	lown or Load F	Reduction			
			• 0-GO-5,	Normal Power	Operation.				
			OR • 0-GO-6,	Power Reduction	on from 30% to	o Hot Star	ıdbv.		
							y		
		RO	f. IF containme following:	ent purging or v	enting is desire	ed, THEN	PERF	ORM	the
			1) NOTIFY	Chem Lab to e 0.1 or 410.2, as		e dose US	SING 0	-SI-C	EM-
			2) EVALU	ATE resuming of or 0-SO-30-8,	containment pi		/enting	USIN	IG 0-
			This step N/A					Anno 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1	
		SRO		ce has NOT bee ource Identifica		, THEN G	D TO S	Sectio	_' n 2.3,
Ċ									

Appendix D		Required Operator Actions Form ES-D-2
Op Test No.:	NRC 2010302	Scenario # <u>3</u> Event # <u>6</u> Page <u>47</u> of <u>88</u>
Event Descriptior	n: R(CS Leak
Time	Position	Applicant's Actions or Behavior
	RO	25. MONITOR if charging and letdown should be restored:
		a. CHECK letdown ISOLATED.
		b. CHECK Pzr level:
		level greater than or equal to program level
		 level RISING.
		c. CHECK charging and normal letdown AVAILABLE:
		piping INTACT
		valves OPERABLE
		Train A CCS in service.
		d. RESTORE CVCS charging and letdown USING EA-62-5, Establishing Normal Charging and Letdown.
	RO	26. MONITOR if pressurizer heaters should be restored:
		a. CHECK pressurizer level greater than 20% and rising.
		b. ENSURE pressurizer heaters in service as required.
	SRO	27. IF containment purging or venting is needed, THEN PERFORM the following:
		 a. IF leak was inside containment, THEN NOTIFY Chem Lab to evaluate off-site dose USING 0-SI-CEM-030-410.1 or 410.2, as applicable.
		 b. EVALUATE resuming containment purging or venting USING 0-SO 30-3 or 0-SO-30-8, as applicable.
	SRO	28. INITIATE leak repairs.
	SRO	29. GO TO appropriate plant procedure.
		END OF SECTION
Valuator Not	e: The follow	ving CREW Brief and Notification actions are not contained in the procedure.
		CREW Brief would typically be conducted for this event as time
		allows prior to the next event.
		Notifications should be addressed as applicable if not
		specifically addressed by the procedure or in the CREW brief.
		Operations Management - Typically Shift Manager.
		Maintenance Personnel – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the

Appendix D		Requ	ired O	perator Actio	ons		Foi	rm ES	6-D-2
Op Test No.:	NRC 2010302	Scenario #	3	Event #	6	Page	48	of	88
Event Descriptio	n: RCS	S Leak							
1									
Time	Position			Applica	nt's Actions or Behavior	•			
		Shift Manage	r).						
Lead Examin	ner may cue the			red.					

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Appendix D		Req	uired Ope	erator Actio	ons		For	m ES	5-D-2
Op Test No.:	NRC 2010302	Scenario #	3	Event #	6	Page	49	of	88
Event Descriptio	on: RCS	_eak							

Time	Position	Applicant's Actions or Behavior
		EA-62-5,
-		Establishing Normal Charging and Letdown
		4.0 OPERATOR ACTIONS
		4.1 Section Applicability
		1. IF normal charging flow is to be established, THEN GO TO Section 4.2.
		2. IF normal letdown flow is to be established, THEN GO TO Section 4.3.
		4.2 Establishing Normal Charging Flow
		1. VERIFY at least one CCP RUNNING.
		2. CLOSE seal water flow control valve [FCV-62-89].
		3. OPEN charging header isolation valves:
		• [FCV-62-90]
		• [FCV-62-91]
		4. OPEN one of the following charging isolation valves:
		CHARGING ISOLATION VALVES
		FCV-62-86 (normal charging)
		FCV-62-85 (alternate charging)
		 ESTABLISH at least 55 gpm charging flow USING seal water and charging flow control valves [FCV-62-89] and [FCV-62-93].
		6. ADJUST seal injection flow to each RCP to between 6 gpm and 13 gpm.
		If emergency boration is in progress, the automatic control of FCV-62-93 may result in reduced boration flow.
		7. IF automatic level control desired AND pressurizer level greater than 25% THEN PLACE charging flow control valve [FCV-62-93] in AUTO.

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Appendix D		Requi	red Operator Actio	ns		Form	ES-D
Op Test No.:	NRC 2010302	Scenario #	3 Event #	6	Page	50 o	f
Event Descript	on: RC	S Leak		·····			
Time	Position		Applicant	's Actions or Beha	vior		
			Fotoblickie – No.	EA-62-5,			
			Establishing Nor tion 4.1, step in ef		nd Letdowi	<u>n</u>	
	NOTE EA-6	2.2 Establishin		ng Normal Letd			
		stablished.	g Excess Letdown	, may be utilized	IT Normal Le	etdown	canne
		1. IF charging	flow NOT establis	hed, THEN PER	FORM Sect	tion 4.	
		2. VERIFY pre	essurizer level grea	ater than 17%			
		<u>P.</u>					
·			tdown orifice isola	ition valves CLO	П		
		LETDOW	N ORIFICE ISOLAT	ION VALVES	CLOSED √		
			FCV-62-72				
			FCV-62-73				
			FCV-62-74				
		4. OPEN letdo	own isolation valve	S:	······		
		LETI	DOWN ISOLATION	VALVES	OPEN √		
			FCV-62-69				
			FCV-62-70				
			FCV-62-77				
						l	
			on the Letdown H				
			IS-62-79B/A from C-62-78] in MANU				
		·····		, VI H I	<u></u>		/ 0.

Event Description: RCS Leak Time Position Applicant's Actions or B EA-62-5, Establishing Normal Charging 6. PLACE letdown pressure controller [PCV-ADJUST output between 40% and 50%, (4) 7. ADJUST charging flow as necessary to proline.			For	m ES	-D-							
Op Test No.:	NRC 2010302	Scenario #	3	Event #	6	Page	51	of	6			
Event Descripti	on: RC	S Leak										
Time	Position			Applicant's A	ctions or Bel	navior						
			F -4-1		-							
		6 PLACE										
		ADJUST	output b	etween 40% a	nd 50%, (50	0%-60% oper	n).					
		LETDO	WN ORIF	TICE ISOLATION	VALVES	OPEN √]					
			F	-CV-62-72	Ī							
			F	-CV-62-73			1					
			F	-CV-62-74								
	NOTE											
	NOTE: Norn	9. ADJUST	letdown					tain				
		desired p	pressure.									
		10. ADJUST existing p	letdown pressure.	pressure contr	oller [PCV-6	52-81] setpoi	int to n	natch				
		11. PLACE	etdown p	ressure control	ler [PCV-62	2-81] in AUT	0.					
		al letdown ter	mperatur	e is ~100°F.								
		12. ADJUST	[HIC-62-	78A] to obtain	desired leto	lown temper	ature,	as				
			HIC-62-7						····.			
	-		110-02-1		·							

Appendix D		Required Op	perator Actions			For	n ES	;-				
Op Test No.:	NRC 2010302	Scenario # <u>3</u>	Event #	6	Page	52	of .	_				
Event Description	on: RCS	Leak										
Time	Position		Applicant's	Actions or Behavi	ior			-				
				A-62-5,				-				
				al Charging an								
	cause	down temperature may swing due to repeated actuation of TIS-62-79B/A, whicuses letdown temperature control valve TCV-70-192 to fully open.										
		14. IF necessary to stabilize letdown temperature, THEN PERFORM the following										
		a. PLACE [HIC- OPEN direction	•62-78A] in MA on.	NUAL and AD	JUST conti	roller	outpu	l I				
		 b. WHEN letdown heat exchanger outlet temperature is stabilized at approximately 100°F, THEN PLACE [HIC-62-78A] in AUTO. 										
		approximately	/ 100°F, THEN	PLACE [HIC-6	52-78A] in	AUTC).					
		15. ENSURE high ter	mperature dive	rt valve [HS-62	-79A] in D	EMIN	posi	t				
				•	-							
		16. ADJUST chargin	a and letdown :	e necessary to	maintain		coal	-				
		injection flow and	pressurizer lev	/el.	Jinaintain		Sear					
<u></u>		17. IF CCP suction is	aligned to the	RWST and rea	ligning CC	P suc	tion	t				
		VCT is desired, T				operat	ion:					
		a. ESTABLISH b. ENSURE V(-		%.							
		COMPONEN				—]		-				
				POSITION √								
		LCV-62-13	_	OPEN								
		HS-62-132	PL	JLL A-P AUTO								
		LCV-62-13	3	OPEN								
		HS-62-133	PULL	A-P AUTO								
		-		······			<u></u> -					
								_				
		c. ENSURE RW operation:	ST supply to C	CP suction valv	es ALIGN	ED fo	r nor	n				

	Appendix D			Required Ope	Form ES-D-2					
j.	Op Test No.:	NRC 2010302		rio # <u>3</u>	Event # 6		Page _	53	of _	88
	Event Description		Leak							
	Time	Position			Applicant's Actions o	r Behavi	or			
					EA-62-5,					
			Tr	Establi	shing Normal Charg	jing an	d Letdow	n		
				COMPONENT	POSIT	TON √				
				LCV-62-135	CLO	SED				
				HS-62-135	PULL A-P A	UTO	Π			
				LCV-62-136	CLO	SED				
				HS-62-136	PULL A-P A	υτο				
			d. E	NSURE VCT r	nakeup control syste	m set fo	or automat	tic ope	ratior	<u></u> ו
			V							
16-n			e. E	NSURE Prim	ary Water system i	n servi	ce.			
			18. GO 1	FO Section 4.1	step in effect.					
-					END OF TE	VT				

6 Pa	ge <u>54</u>	of
	1	
TIFICATION	1	
	Pa	ge 1 of 1
		Pag

- 3.2.5, DNB parameters
- 3.4.3.1, Safety and Relief Valves-Operating
- 3.4.3.2, Relief Valves-Operating
- 3.4.6.2, RCS Leakage
- 3.4.6.3, RCS Pressure Isolation Valve Leakage
- TRM 3.4.11, Reactor Coolant System Head Vents
- 3.4.12, Low Temperature Over Pressure Protection Systems
- 3.6.1.4, Containment Pressure
- 3.6.1.5, Containment Air Temperature

END

.

Op Test No.: NRC 2010302 Scenario # 3 Event # 6 Page 55 of	S-D-2
	88
Event Description: RCS Leak	

SQN	RCS LEAK AND LEAK SOURCE IDENTIFICATION	AOP-R.05 Rev. 14	
SQN	RCS LEAK AND LEAK SOURCE IDENTIFICATION		

Page 1 of 1

APPENDIX I

ESTIMATING RCS LEAK RATE USING CVCS FLOW BALANCE

NOTE 1 This method is recommended when leak requires rise in charging flow greater than ~10 gpm. Appendix J is more accurate for smaller leak rates.

NOTE 2 This appendix assumes RCS temperature and charging flow are approximately constant.

	INITIAL	FINAL	CHANGE
PZR Level			[1] (negative for level decrease)
Time			[2]
Charging Flow		[3]	
Letdown Flow		[4]	
Total RCP Seal Return Flow		[5]	

Pressurizer Level Conversion

Pressurizer lev change			conversion factor		Time Change				of Change el rísing)
	%	Х	62 gal / %		n	nin			gpm
step [1] above	9				step [2] above			[6]	
				Leak Rat	e Calculation				
Charging Flow		Letdown Flor	w Seal F Fic		Pzr Level Rate of Change	+	Instrument error correction factor 3 gpm	_	RCS Leak Rate
step [3] above		step [4] abov	re step abo		step [6] above	т	o âbin	= _	<u>gpm</u>

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Appendix D		Required Operator Actions							
Op Test No.:	NRC 2010302	Scenario #	3	Event #	6	Page	56	of	8
Event Descriptio	n: RCS	Leak							
S		CS LEAK AN	AOP-R.05 Rev. 14						
	·····		۵		J	F	Page 1	of 1]
	EST	MATING RC	S LEAK	RATE USIN	NG VCT AND PZR	LEVEL			

CAUTION This appendix CANNOT be used during VCT makeup, boration, or dilution.

NOTE This appendix assumes RCS temperature is approximately constant.

	VCT LEVEL (%)	PZR LEVEL (%)	TIME (min)
INITIAL			
FINAL			
CHANGE	[1]	[2]	[3]
	(positive for level decrease)	(positive for level decrease)	

VCT Level Conversion

Ū.		conversion factor					VCT Level Rate of Change		
							(positive for level lowerin	g)	
%	Х	20 gal / %	+		min	=	gp	m	
step [1] above			_	step [3] a	bove		[4]		
		Pressu	rizer L	evel Conv	ersion				
Pressurizer level change		conversion factor		Time Cha	nge		Pzr Level Rate of Change (positive for level lowering	g)	
%	Х	62 gal / %	÷		min	-	gp	m	
step [2] above				step [3] at	ove	-	[5]		
			Lea	ak Rate Ca	Iculatio	on			
	Levi				I	RCS Leak Rate			
Rate o	n Chs	nge +	Rate	of Change			gpm		
step [4] ab	ove	step	5] above	_				
			Page	74 of 80					

Appendix	ppendix D Required Operator Actions Form ES									
Op Test No Event Desc		Scenario #	3	Event #	ES-1.1	Page <u>57</u> of <u>88</u>				
Indicatio 1-M-4	-			insert Even		ors B) pressure indications				
tre • 1 1-M-5 • 1 to • 1 • 1	ending to SI actuation LI-68-339A, 335A, 32 PI-68-340A, 1-PI-68- Rx Trip/SI actuation PR-68-69, RCS LOO Ilue. PR-68-340, RCS PZF PR-68-69, RCS LOO LR-68-339, RCS PZF FI-68-93A, CHARGIN	on pressure val 20A, RCS PZR I 334, 1-PI-68-323 o pressure valu P 1 HL WIDE R R PRESS Recor P 1 HL WIDE R R LEVEL Record IG HDR FLOW EL Indicator tre ACID TO BLENI Y WATER TO E ure LOOP 3 ind	ue. -EVEL inc -EVEL inc 3, 1-PI-68- es. ANGE PR der trendi ANGE PR der trendi Indicator DER Indic BLENDER licator tre	licators tren 322, RCS PZ ESS indicato ing down; ESS Record ng down; indicating 1 wn w/ VCT M ator stable a Indicator sta ndicator sta	ding down (<5%) R PRESS narrow or trending to Rx er trending down I5-120 gpm (1 CC -U in progress; t ~20-25 gpm; able at ~70 gpm; uation pressure y	range indicators trending Trip/SI actuation pressure ; P at maximum flowrate); ralue.				
• 1-1	PI-68-69, RCS HL Pr	ess WR indicat	or trendin	g to actuation	on pressure value	s. e. g up (1.5 psi-SI Actuation)				
	CREW	Identifies Re MAINTAIN s SRO/Crew s	step 5.			OR steps 2, 3, 4 and/or				
	SRO				actor and manua	llv actuate SI				
	SRO		to E-0, F	eactor Trip		n and perform Immediate				
	RO	Manually trip directions.	s reactor	, verifies rea	ictor tripped and	actuates SI per SRO				
Evaluato	MCBs for a may take m	ny expected aut	omatic sys to align pla	tem respons	e that failed to occ	ication, RO/BOP surveys ur. Upon discovery, they event in progress. (Ref.				

.

	Appendix D		Requ	uired Ope	erator Action	S		Foi	rm ES	S-D-2
5.	Op Test No.:	NRC 2010302	Scenario #	3	Event #	ES-1.1	Page	58	of	88
	Event Descriptio									
	Time	Position			Applicant's	Actions or Behav	/iors			

	1031001	Applicant's Actions of Benaviors	
Internet Applicant's Actions or Behaviors Evaluator Note: High Containment Pressure is expected (2.8 psig) during the course of EOP conduct; the crew should identify the ORANGE PATH condition and enter FR-Z.1, High Containment Pressure (attached following this event guide). Note 1 Steps 1 through 4 are immediate action steps Note 2 This procedure has a foldout page 1 VERIFY reactor TRIPPED: • • RO • Rod obstion indicators less than or equal to 12 steps. BOP • VERIFY turbine TRIPPED: • • • Turbine stop valves CLOSED. Evaluator Note: Loss of offsite power occurs 5 Minutes after SI actuation; Crew should attempt to start both EDGs at this point ensuring at least 1 EDG is running following the loss of offsite power. BOP 3. VERIFY at least o			
Evaluator	should iden	inment Pressure is expected (2.8 psig) during the course of EOP conduct; the crew tify the ORANGE PATH condition and enter FR-Z.1, High Containment Pressure	
Note 1	Steps 1 throug	gh 4 are immediate action steps	
Note 2	This procedur	e has a foldout page	
		1. VERIFY reactor TRIPPED:	
		Reactor trip breakers OPEN	
	BO	 Reactor trip bypass breakers DISCONNECTED or OPEN 	
		Neutron flux DROPPING	
		Rod bottom lights LIT	
		 Rod position indicators less than or equal to 12 steps. 	
	BOP	2. VERIFY turbine TRIPPED:	
		Turbine stop valves CLOSED.	
Evaluator I	start both	EDGs at this point ensuring at least 1 EDG is running following the loss	
	BOP		
	BOP		
	PO		
	KU		
M.H.W.		Any SI alarm LIT [M-4D] (SI will be actuated)	
	BOP	 PERFORM ES-0.5, Equipment Verifications WHILE continuing in this procedure 	
		(attached following EOPs).	

Appendix D		Req	Form ES-D-2						
Op Test No.:	NRC 2010302	Scenario #	3	Event #	ES-1.1	Page	59	of	88
Event Description	on: SI Te	rmination							

Time	Position	Applicant's Actions or Behaviors					
	RO	 6. DETERMINE if secondary heat sink available: a. CHECK total AFW flow greater than 440 gpm. b. CHECK narrow range level greater than 10% [25 ADV] in at least one S/G. c. CONTROL feed flow to maintain narrow range level between 10% [25% ADV] and 50% in all S/Gs. (Heat Sink is available from Train A and TDAFW) 					
	RO	 7. CHECK if main steam lines should be isolated: a. CHECK if any of the following conditions have occurred: Any S/G pressure less than 600 psig AND STEAMLINE PRESS ISOL SI BLOCK RATE ISOL ENABLE permissive DARK [M-4A, A4] OR Any S/G pressure dropping UNCONTROLLED. OR Phase B actuation b. ENSURE MSIVs and MSIV bypass valves CLOSED. [Main Steam lines will isolate on Phase B (actuation setpoint- 2.8 psig)] 					
	SRO	c. ENSURE applicable Foldout Page actions COMPLETED.					
Evaluator N	ote: ØB actuati	on time:					
	NOTE: L	and of applicition flow could advergely offect DCD cools					
	RO RO	 oss of seal injection flow could adversely affect RCP seals. 8. CHECK RCP trip criteria: a. CHECK the following: RCS pressure less than 1250 psig. AND At least one CCP OR SI pump RUNNING STOP RCPs 					
Appendix D	RO	 9. MONITOR RCS temperatures: IF any RCP running, THEN CHECK T-avg stable at or trending between 547°F and 552°F OR IF RCPs stopped, THEN CHECK T-cold stable or trending to between NUREG 1021 Revision 9 					

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	Appendix D		Required Operator Actions					Form ES-D-2				
	Op Test No.:	NRC 2010302	Scenario #	3	Event #	ES-1.1	Page	60	of	88		
	Event Description:		ermination									

Time	Position	Applicant's Actions or Behaviors
		547°F and 552°F.
	RO	 10. CHECK pressurizer PORVs, safeties, and spray valves: a. Pressurizer PORVs CLOSED. b. Pressurizer safety valves CLOSED. c. Normal spray valves CLOSED. d. Power to at least one block valve AVAILABLE. e. At least one block valve OPEN.
	RO/BOP	 11. :DETERMINE if S/G secondary pressure boundaries are INTACT: CHECK all S/G pressures CONTROLLED or RISING. CHECK all S/G pressures greater than 140 psig.
	RO/BOP	 12. DETERMINE if S/G tubes are INTACT: All S/G narrow range levels CONTROLLED or DROPPING Secondary radiation NORMAL USING Appendix A, Secondary Rad Monitors. (App. A performed in ES-0.5).
	RO	 13. DETERMINE if RCS is INTACT: Containment pressure NORMAL Containment sump level NORMAL LOWER COMPT TEMP HIGH alarm DARK. [M-5C, B1] Containment radiation NORMAL USING Appendix B, Containment
	BOP	Rad Monitors. (App. B performed in ES-0.5) (RNO Required)
	SRO	 RNO: PERFORM the following: a. INITIATE ES-0.5 Appendix D, Hydrogen Mitigation Actions. b. MONITOR status trees. c. GO TO E-1, Loss of Reactor or Secondary Coolant.
	SRO	Directs entry to E-1, Loss of Reactor or Secondary Coolant

	Appendix D	· · · · · · · · · · · · · · · · · · ·	Form ES-D-2							
\sim	Op Test No.:	NRC 2010302	Scenario #	3	Event #	ES-1.1	Page	61	of	88
	Event Description: SI		ermination							

CRITICAL TASK RO Start at least 1 CCP delivering hi-head injection via the CCPIT to RCS. Start 1A-A CCP (following loss of offsite power) CRITICAL TASK BOP Start at least 1 'A' Train ERCW Pump (J-A ERCW Pump) on an operating safeguards train (following loss of offsite power) E-1, LOSS OF REACTOR OR SECONDARY COOLANT NOTE This procedure has a foldout page. RO 1. CHECK RCP trip criteria: a. CHECK the following: • At least one CCP OR SI pump RUNNING AND • RCS pressure								
Evaluator No	monitorir SRO will conditior direct the procedur During th FR-Z.1, I	ing via SPDS. When a RED or ORANGE path status tree is observed, the Il designate one of the Board operators (typically the BOP) to verify status tree ns using 1-FR-0, UNIT 1 STATUS TREES . Once verified, the SRO should e crew to transition to the appropriate RED and/or ORANGE path ire(s). he progress of the LOCA, containment pressure will reach entry conditions for High Containment Pressure (>2.8 psig). Expected FR-Z-1 actions are						
	SRO	Directs entry to E-1, Loss of Reactor or Secondary Coolant						
Evaluator No	members s	should include in their response POAs which will include verifying at least one						
· · · · · · · · · · · · · · · · · · ·		Start at least 1 EDG prior to placing equipment PTL in ECA.0-0. 1A-A EDG started (following SI actuation), supplying 1A-A 6.9 kV Shutdown Board voltage. (AOP-P.01, Loss of Offsite Power contains IOAs that should be performed in response to the loss of offsite power. AOP-P.01 actions are following this						
	RO							
	BOP	Start at least 1 'A' Train ERCW Pump (J-A ERCW Pump) on an						
	E-1,							
NOTE	This procedure	e has a foldout page.						
	RO	1. CHECK RCP trip criteria:						
		At least one CCP OR SI pump RUNNING AND						
Appendix D								

	Appendix D		Rec	quired Ope	erator Actions	5		For	m ES	-D-2
(Op Test No.:	NRC 2010302	Scenario #	3	Event #	ES-1.1	Page	62	of	88
A second	Event Descriptio	on: SIT	Fermination							
		BOP			ainment hydr 1 less than 6%					
		BOP	e. WH hav TH EN	HEN ice co ve been op EN	ndenser AHL bened, lydrogen ignit	J breakers	-,-,-			
		BOP			ainment hydr n less than 0.	~				
		ВОР	• S/G		ondary pressu s CONTROLI	ure boundaries LED	INTACT:			
~				epressure ater than						
U)		D OD								
		BOP			S/G narrow r		****			
					<u>10% [25% AE</u> [25% [ADV]					
			D. Detv							
		BOP	4. VERIFY	' seconda	ry radiation N	IORMAL:				
			a. Chi U s i	ECK secon	dary radiation f fix A, Seconda	NORMAL				
			b. NOT sam		Lab to take S/	G activity				
			to sa THE	ample S/Gs						
					CV-15-43 Blow e CLOSED.	down Flow				
			2) E	ENSURE PI	nase A RESET	•				
\cap			3) (OPEN blow	down isolation	valves.				

	Requ	uired Ope	rator Actions			Foi	m ES	6-D-2
NRC 2010302	Scenario #	3	Event #	ES-1.1	Page	63	of	88
on: SI 1	Fermination							
				nain steam				
	THE	Ν						
CAUTION			izer PORV oj	pens, there is	a possibi	lity tha	ıt ît	
RO		·····	rizer PORVs	and block value	ves:		A	
	a. Powe	er to block	valves AVA	ILABLE.				
	b. Pres	surizer PC	DRVs CLOSE	ED.				
	c. At lea	ast one bl	ock valve OF	PEN.				
RO	6. MONITO	R SI term	nination criter	ia:	*****			
	a. RCS	subcoolir	ng based on o	core exit T/Cs	greater th	an 40°	F.	
BOP	b. Seco	ndary hea	at sink:				<u></u>	
	• N	arrow rang at least on	e level ne Intact S/G	V].				
	0	R						
				∂s				
RO	c. RCS	pressure	STABLE or I	RISING.				
	d Pros		al greater th	an 10% [200/				
		JUNZEI IEV	iei greater th	an 1070 [2070 .	<u>~~vj.</u>			
ote: depending	I on crew pace	to this stu	on transition	critoria may o	vist FS-		ows F	-1 ir
this guide.				cillena may e				
	on: SI ⁻	NRC 2010302 Scenario # DN: SI Termination Image: SI Termination Image: SI Terminaterminatermination I	NRC 2010302 Scenario # 3 on: SI Termination d. NOTIFY RADC lines and S/G biological states and S/G biologica	NRC 2010302 Scenario # 3 Event # on: SI Termination Image: SI Termination Image: SI Termination value Image: SI Termination value Image: SI Termination value Image: SI Termination value <t< td=""><td>on: SI Termination d. NOTIFY RADCON to survey main steam lines and S/G blowdown. e. WHEN S/G samples completed, THEN CLOSE blowdown isolation valves. CAUTION Any time a pressurizer PORV opens, there is may stick open. RO 5. MONITOR pressurizer PORVs and block valve a. Power to block valves AVAILABLE. b. Pressurizer PORVs CLOSED. c. At least one block valve OPEN. RO 6. MONITOR SI termination criteria: a. RCS subcooling based on core exit T/Cs </td><td>NRC 2010302 Scenario # 3 Event # ES-1.1 Page on: SI Termination d. NOTIFY RADCON to survey main steam lines and S/G blowdown. e. WHEN S/G samples completed, THEN CAUTION Any time a pressurizer PORV opens, there is a possibil may stick open. RO 5. MONITOR pressurizer PORVs and block valves: a. Power to block valves AVAILABLE. b. Pressurizer PORVs CLOSED. c. At least one block valve OPEN. RO 6. MONITOR SI termination criteria: a. RCS subcooling based on core exit T/Cs greater the line stat one intact S/G greater than 10% [25% ADV]. OR • Total feed flow to Intact S/G greater than 440 gpm. RO c. RO c. RO c. RO c. RO c. RO c. RO flow to Intact S/G greater than 10% [20% ADV]. OR • RO c. RO c. RO c. RO c.<td>NRC 2010302 Scenario #</td><td>NRC 2010302 Scenario # </td></td></t<>	on: SI Termination d. NOTIFY RADCON to survey main steam lines and S/G blowdown. e. WHEN S/G samples completed, THEN CLOSE blowdown isolation valves. CAUTION Any time a pressurizer PORV opens, there is may stick open. RO 5. MONITOR pressurizer PORVs and block valve a. Power to block valves AVAILABLE. b. Pressurizer PORVs CLOSED. c. At least one block valve OPEN. RO 6. MONITOR SI termination criteria: a. RCS subcooling based on core exit T/Cs	NRC 2010302 Scenario # 3 Event # ES-1.1 Page on: SI Termination d. NOTIFY RADCON to survey main steam lines and S/G blowdown. e. WHEN S/G samples completed, THEN CAUTION Any time a pressurizer PORV opens, there is a possibil may stick open. RO 5. MONITOR pressurizer PORVs and block valves: a. Power to block valves AVAILABLE. b. Pressurizer PORVs CLOSED. c. At least one block valve OPEN. RO 6. MONITOR SI termination criteria: a. RCS subcooling based on core exit T/Cs greater the line stat one intact S/G greater than 10% [25% ADV]. OR • Total feed flow to Intact S/G greater than 440 gpm. RO c. RO c. RO c. RO c. RO c. RO c. RO flow to Intact S/G greater than 10% [20% ADV]. OR • RO c. RO c. RO c. RO c. <td>NRC 2010302 Scenario #</td> <td>NRC 2010302 Scenario # </td>	NRC 2010302 Scenario #	NRC 2010302 Scenario #

Appendix D		Required Operator Actions	For	m ES	5-D-
Op Test No.:	NRC 2010302	Scenario # <u>3</u> Event # ES-1.1 Page	64	of	8
Event Description:	SI	Termination			
	RO	7. MONITOR if containment spray should be stopped:			
		a. CHECK any containment spray pump RUNNING.			
		 b. CHECK containment pressure less than 2.0 psig. 			
		c. CHECK containment spray suction aligned to RWST.			
		d. RESET containment spray signals.			
		e. STOP containment spray pumps and PLACE in A-AUTO.			
	RO	 f. CLOSE containment spray discharge valves: 			
		• FCV-72-39, Train A			
		FCV-72-2, Train B.			
	POD				
	BOP	8. MONITOR shutdown boards continuously energized.			
	RO	9. DETERMINE if RHR pumps should be stopped: a. CHECK RCS pressure:			
		1) Greater than 300 psig			
		2) STABLE or RISING.			
		b. CHECK RHR pump suction			
		aligned from RWST.			
		c. ENSURE SI signal RESET.			
		d. STOP RHR pumps and PLACE in A-AUTO.			
		e. MONITOR RCS pressure			_

	Appendix D		Requ	uired Op	perator Actions			Form ES-D-2		
	Op Test No.:	NRC 2010302	Scenario #	3	Event #	ES-1.1	Page	65	of	88
		NOTE 1 NOTE 2	S/G pressures dropping slowly during a LOCA with no faulted S/G should be considered "stable" in the following step. RCS pressure rising slightly during a LOCA which is NOT isolated should be considered "stable" in the following step.							
		RO/SRO	10. DETERM a. CHEC STAB b. CHEC or DR	d agai	n:					
\bigcirc		SRO	11. DETERN a. VERIF from s b. ENSU c. STOP and PI USING Standt							
		BOP	a. ENSURE opened L Room Br b. CHECK I measure • Hydro	ice cond JSING E eaker Ali hydroger ment AV ogen ana ALYZE t	rogen igniters denser AHU bre A-201-1, 480 V ignments. n concentration AILABLE: alyzers have be for at least	Board	ers should	be tur	ned c	on:
(²¹⁰⁴)			c. CHECK c concentra d. WHEN icc have bee THEN ENSURE	containm ation less e conder n opene hydroge	ent hydrogen s than 6%. nser AHU break d, en igniters NG Appendix D					

	Appendix D		Requ	uired Ope	erator Actior	IS		For	m ES	-D-2
							<u> </u>			
	Op Test No.:	NRC 2010302	Scenario #	3	Event #	ES-1.1	Page	66	of _	88
New Yorks	Event Descriptio	on: SI T	ermination							
	¢.									
					ent hydroger s than 0.5%.					
		RO				uum control sho	uld be ret	urned	to nor	mal:
			less that	an 1.0 psi						
					nent vacuum OPEN: [Panel					
			• FC\	√-30-46						
				√-30-47						
			• FC\	√-30-48.						
		SRO								
Jan		SRU	14. INITIATE		eg recirculation					
\bigcirc			capabi		ey recirculatio	лт				
				wer to at I AILABLE	least one RH	R pump				
			2) Ca val	pability to ves AVA	o operate the ILABLE:	following				
			•		-72 and FCV R Pump A-A)					
				OR						
			•		-73 and FCV R Pump B-B)					
				#****						
		BOP			ry Building ra	diation:				
			RR-		on Monitors Ind RR–90–1	В				
			0-R		nt monitor re 1 NORMAL ation).	corder				
()										

	Appendix D		Required Operator Actions Form ES-D)-2								
6	Op Test No.:	NRC 2010302	Scenario # <u>3</u> Event # ES-1.1 Page <u>67</u> of	88								
	Event Description: SI Termination											
		Т										
		RO	c. MONITOR containment sump level less than 68%.									
		CREW	 NOTIFY TSC to initiate post-accident sampling as necessary. 									
		BOP	e. EVALUATE plant equipment status USING EA-0-4, Evaluation of Equipment Status.									
		SRO	15. DETERMINE if RCS cooldown and depressurization is required:									
		RO	a. CHECK RCS pressure greater than 300 psig.									
		SRO	b. GO TO ES-1.2, Post LOCA Cooldown and Depressurization.									
		SRO	16. DETERMINE if transfer to cold leg recirculation is required:									
		RO	a. CHECK RWST level less than 27%.									
C		SRO	 b. IF ES-1.3 has NOT been performed, THEN GO TO ES-1.3, Transfer to RHR Containment Sump. 									
		RO	17. MONITOR if RHR spray should be placed in service:									
			a. CHECK the following conditions met:									
			Containment pressure greater than 9.5 psig									
			AND									
			At least 1 hour has elapsed since beginning of accident									
			AND									
			RHR suction aligned to containment sump									
			AND									
			 At least one CCP AND one SI pump RUNNING. 									
		RO	b. CHECK both RHR pumps RUNNING.									

	Appendix D		Rec	Required Operator Actions					Form ES-D-2			
									<u></u>			
\bigcirc	Op Test No.:	NRC 2010302	Scenario #	3	Event #	ES-1.1	Page	68	of .	88		
Sec. 1	Event Description: SI Termination											
			c. ESTA	BLISH Tra	iin B RHR spra	ıy:						
				HECK Train UNNING.	n B RHR pump)						
		RO		 ENSURE RHR crosstie FCV-74-35 CLOSED. 								
				LOSE RHR CV-63-94.	linjection							
			4) O									
		RO		TOR contai er than 4 psi	nment pressur ig.	e						
		RO	18. MONIT									
C				C <mark>K</mark> RCS pr han 100 ps								
			AVAI	LABLE.	to CLA isolati	on valves						
					nal RESET.							
		-	d. CLO	SE CLA is	olation valves	i						
		SRO	10 INUTIAT	<u>E ovolucti</u>	on of plant o		<u>.</u>					
					on of plant s							
		RO	a. ENSURE cold leg recirculation capability:									
			1) Po A\	wer to at le /AILABLE.	east one RHR	pump						
			2) Ca va	apability to o lves AVAIL	operate the fol ABLE:	lowing						
			•		2 and FCV-74 Pump A-A).	-3						
				OR								
			•		3 and FCV-74 Pump B-B).	-21						

	Appendix D		Required Operator Actions		Form ES-D-2		
	Op Test No.:	NRC 2010302	Scenario # <u>3</u> Event #	ES-1.1 Page	e <u>69</u> of <u>88</u>		
· · ·	Event Descriptio	on: SI T	mination				
		BOP SRO SRO	 b. CHECK Auxiliary Building radia 1) Area Radiation Monitors RR-90-1A and RR-90-1B NORMAL. 2) Aux Bldg Vent monitor reco 0-RR-90-101 NORMAL (prior to isolation). c. CONSULT TSC to determine dose projection for steaming S d. CHECK dose projection for ea acceptable. e. DUMP steam to condenser from Intact S/Gs UNTIL S/G pt 	rder 0/Gs. ch S/G			
		SRO	 less than RCS pressure. 20. DETERMINE if reactor vessel for evaluation head venting. 		l:		
		SRO	 21. WHEN 4 hours have elapsed s hot leg recirculation: DISPATCH personnel to resta power to FCV-63-22 USING EA-201-1, 480V Boar Room Breaker Alignments. 	pre	HEN PREPARE for		
		SRO	22. WHEN 5 hours have elapsed s 1.4, Transfer to Hot Leg Recirc	ulation.	HEN GO TO ES-		
		SRO	 EVALUATE long term plant state CONSULT TSC. 	tus:			
	Case		END upon transition to ES-1.1 Step 10				

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	Appendix D		Req	uired Ope	erator Actic	ons		For	m ES	S-D-2
	Op Test No.:	NRC 2010302	Scenario #	3	Event #	ES-1.1	Page	70	of	88
	Event Description	on: SI Te	rmination							

Time	Position	Applicant's Actions or Behavior
· · · · · · · · · · · · · · · · · · ·		ES-1.1, SI TERMINATION
	NOTE: Thi	s procedure has a foldout page.
	RO	1. MONITOR if containment spray should be stopped:
		a. CHECK any containment spray pump RUNNING.
		b. CHECK containment pressure less than 2.0 psig.
		(RNO reference)
		 RNO: b. WHEN containment pressure is less than 2.0 psig, THEN PERFORM remainder of Step 1.
		c. CHECK containment spray suction aligned to RWST.
		d. RESET containment spray signal.
		e. ENSURE containment spray pumps STOPPED in A-AUTO.
		f. CLOSE containment spray discharge valves FCV-72-2 and FCV-72-39.
	RO	DETERMINE if one cntmt spray pump should be stopped:
		a. CHECK BOTH cntmt spray pumps RUNNING
		b. CHECK any S/G faulted… N/A
		(RNO Required)
		RNO:
		c. CO TO Step 3.
	RO	3. RESET SI signal.
dinanana		
	BOP	4. MONITOR shutdown boards continuously energized.
Evaluator No	te: If off-site po be in P-T-L	ower loss occurred previous to reaching the following step, 1B-B CCP should , not available since 1B-B EDG failed.
	RO	5. ENSURE only one CCP RUNNING:
		a. CHECK offsite power supplying shutdown boards. (RNO Required)
·		RNO: a. ENSURE one CCP in PULL TO LOCK.
Evaluator No	te: Depending	on procedural pace, the crew may arrive at this step and determine to
Appondix D	······································	

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Appendix D	Requ	uired Ope	rator Actic	ons		For	m ES	S-D-2
Op Test No.:NRC 2010	0302 Scenario #	3	Event #	ES-1.1	Page	71	of	88
Event Description:	SI Termination							

Time	Position	Applicant's Actions or Behavior				
		ES-1.1, SI TERMINATION				
	transition t	o ES-1.2. If so, scenario may be terminated based on this transition				
	determinat	ion (step 6 RNO determination).				
	RO	6. CHECK RCS pressure STABLE or RISING				
		(RNO reference)				
		RNO:				
		ENSURE pressurizer spray valves CLOSED.				
	SRO	IF RCS pressure continues to drop, THEN GO TO ES-1.2, Post LOCA				
		Cooldown and Depressurization.				
		7. ISOLATE CCPIT:				
		a. CLOSE CCPIT inlet valves FCV-63-39 and FCV-63-40.				
		b. CLOSE CCPIT outlet valves FCV-63-25 and FCV-63-26.				
		· · · · · · · · · · · · · · · · · · ·				
		8. ESTABLISH charging flow:				
		a. CLOSE seal water flow control valve FCV-62-89.				
		b. OPEN charging isolation valves FCV-62-90 and FCV-62-91.				
		c. ENSURE normal charging isolation valve FCV-62-86 OPEN.				
		d. ESTABLISH desired charging flow USING seal water and charging				
		flow control valves FCV-62-89 and FCV-62-93.				
		9. CONTROL charging flow to maintain pressurizer level.				
Evaluator Note:	Depending	on procedural pace, the crew may arrive at this step and determine to				
	transition to	ES-1.2. If so, scenario may be terminated based on this transition				
	determinat	ion (step 10.a RNO determination)				
	······	10. DETERMINE if SI pumps should be stopped:				
		a. CHECK RCS pressure:				
		RCS pressure STABLE or RISING				
		RCS pressure greater than 1500 psig.				
		(RNO reference)				
		RNO:				
		a. IF NO S/G is Faulted, THEN GO TO ES-1.2, Post LOCA Cooldown				
		and Depressurization.				

Appendix D	Required Operator Actions						Form ES-D-2			
Op Test No.:	NRC 2010302	Scenario #	3	Event #	FR-Z.1	Page	72	of	88	
Event Description	n: High	Containment Pre	essure Fur	ction Restor	ation (Orange Path)					

Time	Position	Applicant's Actions or Behavior
		FR-Z-1, High Containment Pressure
	1.1	his procedure has been entered for an orange path and performance of ECA- (Loss of RHR Sump Recirculation) is required, FR-Z.1 may be performed neurrently with ECA-1.1.
	RO	1. MONITOR RWST level greater than 27%.
		2. VERIFY Phase B valves CLOSED:
	RO	Panel 6K PHASE B GREEN
		Panel 6L PHASE B GREEN.
·······	RO	3. ENSURE RCPs STOPPED
		4. DETERMINE if this procedure should be exited:
	BOP	a. CHECK for faulted S/G:
		Any S/G pressure DROPPING
		in an uncontrolled manner
		OR
		Any S/G pressure
		less than 140 psig.
		RNO Required)
		RNO:
		a. GO TO Step 5.
	RO	b. CHECK containment pressure less than 12 psig.
	RO	 c. CHECK at least one containment spray pump RUNNING and delivering flow.
	BOP	d. CHECK at least one containment air return fan RUNNING.
	SRO	e. RETURN to procedure and step in effect.
	RO	5. VERIFY containment spray operation:
		a. CHECK RHR sump recirculation capability AVAILABLE.
		b. VERIFY containment spray pumps RUNNING.
		c. CHECK RWST level greater than 27%.

Appendix D		Required Operator Actions					Form ES-D-			
Op Test No.:	NRC 2010302	Scenario #	3 Event #	FR-Z.1	Page	73 (of 8			
Event Description	on: Hig	h Containment Pre	ssure Function Restorat	tion (Orange Path)						
Time	Position		Applican	t's Actions or Behav	ior					
		FR-Z-1, H	igh Containment	Pressure						
	RO	d. VERI	FY containment spra	ay suction ALIG	NED to RW	/ST:				
			√-72-22 OPEN							
		• FC	V-72-21 OPEN.							
		e. VERII	e. VERIFY containment spray discharge valves OPEN:							
		• FC	V-72-39							
		• FC	V-72-2.							
		f. VERI	-Y containment spra	ay recirc valves	CLOSED					
		• FC	V-72-34							
		• FC	V-72-13.							
		g. VERII train.	FY containment spra	ay flow greater t	han 4750 g	ipm on e	ach			
	ВОР									
	BUP		Containment air re at least 10 minutes							
			elapsed from Phase							
		THEN								
			IRE containment air	return fans						
		RUNN	ING.							
	RO	7. VERIFY o	ontainment ventilati	ion dampers CL	OSED:		u			
		Panel	6K CNTMT VENT (GREEN						
		Panel	6L CNTMT VENT G	GREEN.						
	RO		hase A valves CLC							
			6K PHASE A GREE							
			6L PHASE A GREE		01 0050		·			
	RO	MANUAL		i isolation valves	S CLOSED	: [Pni 6K				
		• FCV-3								
		• FCV-3	0-47							
		• FCV-3	0-48.							

	Appendix D		Requ	uired Ope	erator Actio	ons		For	m ES	S-D-2
°	Op Test No.:	NRC 2010302	Scenario #	3	Event #	FR-Z.1	Page	74	of	88
	Event Descriptior	1: High (Containment Pr	essure Fur	oction Restor	ation (Orange Path)				

Time	Position	Applicant's Actions or Behavior
		FR-Z-1, High Containment Pressure
	RO/BOP	10. VERIFY MSIVs and MSIV bypass valves CLOSED.
	RO/BOP	11. DETERMINE if any S/G Intact:
		a. CHECK at least one S/G pressure:
		CONTROLLED or RISING
		AND
		Greater than 140 psig.
	CAUTION: Is	olating all S/Gs will result in a loss of secondary heat sink.
	RO/BOP	12. DETERMINE if any S/G Faulted:
		a. CHECK S/G pressures:
		Any S/G pressure DROPPING
		in an uncontrolled manner
		OR
		Any S/G pressure
		less than 140 psig.
	BOP	b. ISOLATE feed flow to affected S/G:
		• MFW
		• AFW
	BOP	13. MONITOR if hydrogen igniters and recombiners should be turned on:
		 a. DISPATCH personnel to open ice condenser AHU breakers USING EA-201-1, 480 V Board Room Breaker Alignments.
		b. CHECK hydrogen concentration measurement AVAILABLE:
		Hydrogen analyzers have been in ANALYZE
		for at least 5 minutes.
		c. CHECK containment hydrogen concentration less than 6%.
		 d. WHEN ice condenser AHU breakers have been opened, THEN ENERGIZE hydrogen igniters USING Appendix D, Placing Hydrogen Analyzers and Igniters In Service.

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Appendix D		Requ	ired Operator Actions	3	Fc	orm ES	S-D-2		
Op Test No.:	NRC 2010302	Scenario #	3 Event #	FR-Z.1	Page 75	of	88		
Event Description	Event Description: High Containment Pressure Function Restoration (Orange Path)								
Time	Position		Applicant's	s Actions or Behavi	or				
		FR-Z-1, H	igh Containment F	Pressure					
		e. CHEC	e. CHECK containment hydrogen concentration less than 0.5%.						
	RO		R if RHR spray shoul	d he placed in s	service:				
			K the following:						
			ntainment pressure						
			ater than 9.5 psig						
		AN	D						
		At least 1 hour has elapsed since beginning of accident							
AND									
		• RH	R suction ALIGNED						
		ANI	-						
			east one CCP AND o np RUNNING.	ne SI					
	RO	b. CHEC	K both RHR pumps	RUNNING.					
	RO	c. ESTA	BLISH Train B RHR	spray:					
		1) CI	HECK Train B RHR p	ump RUNNING	G.				
		2) EN	SURE RHR crosstie	FCV-74-35 CL	OSED.				
		3) CI	OSE RHR injection	FCV-63-94.					
		4) OI	PEN RHR spray FCV	-72-41.					
	RO	d. MONI	TOR containment pre	essure greater t	han 4 psig.				
	RO	15. MONITO	R if containment spra	y should be sto	pped:				
		a. CHEC	K any containment s	pray pump RUI	NNING.				
			K containment press						
			K containment spray		d to RWST.				
		1	T Containment Spray						
		e. STOP	containment spray p	umps and PLA	CE in A-AUTC).			

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Appendix D		Required Operator Actions	Form ES-D-2				
Op Test No.:	NRC 2010302	Scenario # <u>3</u> Event # FR-Z.1 Page	76 0	of <u>88</u>			
Event Descriptio	on: High	Containment Pressure Function Restoration (Orange Path)					
Time	Position	Applicant's Actions or Behavior					
	-	FR-Z-1, High Containment Pressure					
	RO	f. CLOSE containment spray discharge valves:					
		 FCV-72-39, Train A 		- ···.			
		FCV-72-2, Train B.					
	SRO 16. RETURN TO procedure and step in effect.						
		END					

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Appendix D		Req	uired Ope	erator Actio	ons		For	m ES	S-D-2
 Op Test No.:	NRC 2010302	Scenario #	3	Event #	ES-0.5	Page	77	of	88
Event Description: ES-0.5, Equipment Verifications									
	D 1/1								

Time	Position	Applicant's Actions or Behavior						
		ECA-0.0, Loss Of All AC Power						
CRITICAL	BOP	Start at least 1 EDG prior to placing equipment PTL in ECA.0-0						
TASK		1A-A EDG started, supplying 1A-A 6.9 kV Shutdown Board voltage.						
CRITICAL	RO	Start at least 1 CCP (high-head injection pump)						
TASK		1A-A CCP started delivering hi-head injection via the CCPIT to RCS.						
CRITICAL TASK	BOP	Start at least 1 'A' Train ERCW Pump in an operating safeguards train						
Evaluator No	manually s A, 2A-A, 1I pushbuttor should be t	SI actuation, both EDGs will fail to start. BOP Operator is expected to tart 1A-A EDG from either 1-M-1 using 1-HS-82-15, DG EMERG START 1A- B-B, 2B-B handswitch or back panel 0-M-26A using emergency start 0-HS-82-16A and start at least 1 'A' Train ERCW Pump (J-A ERCW Pump the U1 A Train pump started).						
	NOTE: Steps	s 1, 2, and 3 are immediate action steps.						
	SRO	 SUSPEND FRP implementation and MONITOR status trees for information only. 						
	RO	2. VERIFY reactor TRIPPED:						
		Reactor trip breakers OPEN						
		 Reactor trip bypass breakers OPEN or DISCONNECTED 						
		 Neutron flux DROPPING 						
	BOP	3. VERIFY turbine TRIPPED:						
	BOP	 ALL turbine stop valves CLOSED [SSPS status lights on M-6]. 						
	RO	4. ENSURE RCPs STOPPED.						
	NOTE: Step	5 should be handed off to a Unit Operator.						
		5. PERFORM the following notifications:						
	BOP	 a. NOTIFY four AUOs to report to MCR immediately to be available as necessary for DC load shed and local operation of TD AFW LCVs. 						
	BOP	 b. NOTIFY Site Security to station officers at key vital doors USING SSI- 1, Security Instructions for Members of the Security Force. 						
	RO	6. CHECK RCS ISOLATED:						
		a. Pressurizer PORVs CLOSED.						

	Appendix D	Form ES-D-2								
	Op Test No.:	NRC 2010302	Scenario #	3	Event #	ES-0.5	Page	78	of	88
1	Event Descriptio	on: ES-0	.5, Equipment V	erificatio	ons					

Time	Position	Applicant's Actions or Behavior							
		ECA-0.0, Loss Of All AC Power							
		b. Letdown isolation valves CLOSED							
		• FCV-62-69							
		• FCV-62-70							
		• FCV-62-72							
		• FCV-62-73							
		• • FCV-62-74							
		c. Excess letdown isolation valves CLOSED:							
		• FCV-62-54							
		• • FCV-62-55							
		d. Reactor vessel head vents CLOSED:							
		• FSV-68-394							
		• FSV-68-395							
		• FSV-68-396							
		• FSV-68-397							
	NOTE								
		loss of auxiliary control air, the TD AFW LCVs fail open.							
	2B'	iliary air compressors are powered from 480V C&A Vent Boards 2A1-A and 1-B.							
	BOP	7. MONITOR AFW flow:							
		a. CHECK TD AFW pump RUNNING.							
		b. CONTROL TD AFW pump USING EA-3-1, MCR Operation of TD AFW Pump.							
		c. MONITOR Aux Control Air AVAILABLE:							
		BOTH Unit 2 Shutdown Boards ENERGIZED							
		 Train A and B Aux Control Air pressure on 1-M-15 (prior to DC load-shedding). 							
		d. MAINTAIN AFW flow greater than 440 gpm UNTIL narrow range level greater than 10% [25% ADV] in at least one S/G.							
		e. CONTROL S/G narrow range levels between 10% [25% ADV] and 50%.							
		NOTE: • On • Aux 2B'							

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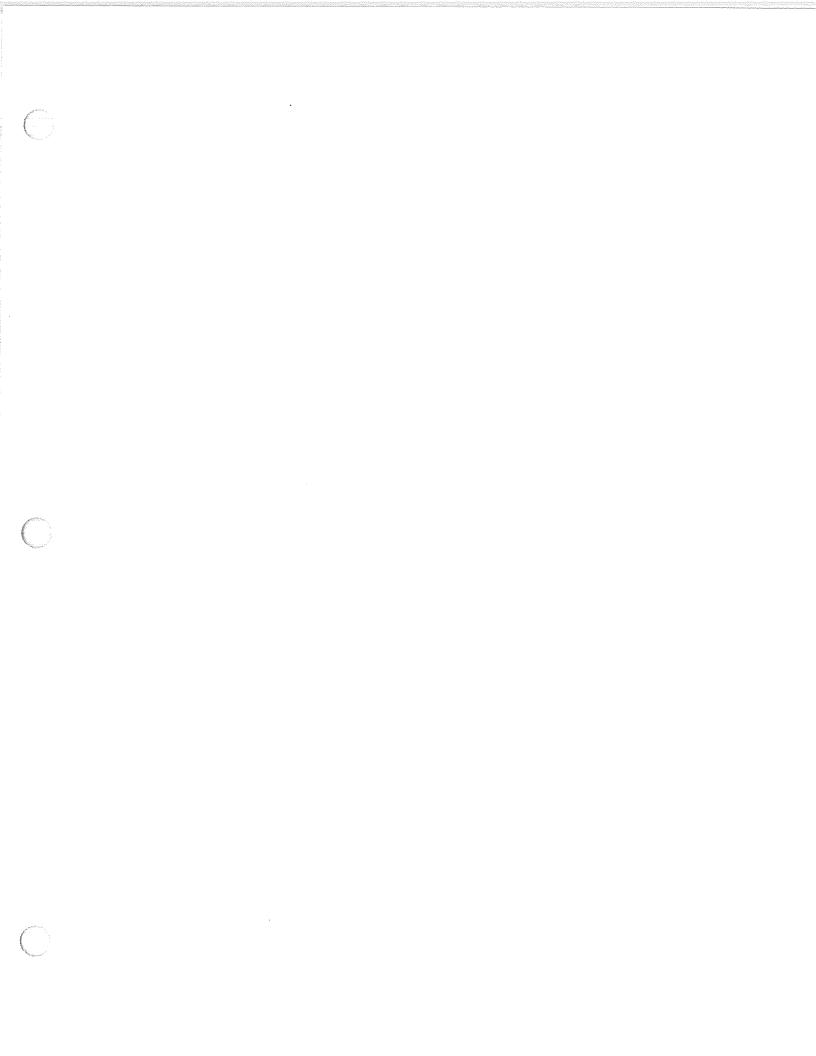
	Appendix D		Required Operator Actions					Form ES-D-2				
and the second s	Op Test No.:	NRC 2010302	Scenario #	3	Event #	ES-0.5	Page	79	of	88		
	Event Descriptio	n: ES-0 .	.5, Equipment V	erificatio	ns							

Time	Position	Applicant's Actions or Behavior
		ECA-0.0, Loss Of All AC Power
	CAUTION:	DO NOT attempt to start D/Gs if both trains of ERCW are unavailable due to catastrophic event.
CRITICAL TASK	BOP	Start at least 1 EDG prior to placing equipment PTL in ECA.0-0 1A-A EDG started, supplying 1A-A 6.9 kV Shutdown Board voltage.
CRITICAL TASK	Start at least 1 'A' Train ERCW Pump in an operating safeguards train	
·	BOP	8. ATTEMPT to restore power to any shutdown board on this unit:
		a. RESET D/G start lockout relays. [0-M-26]
CRITICAL TASK		b. EMERGENCY START diesel generators. [M-1 switch and M-26 pushbutton]
CRITICAL TASK		c. VERIFY at least one shutdown board ENERGIZED from D/G on this unit.
CRITICAL TASK		d. VERIFY ERCW supply to running diesel generators.
CRITICAL TASK		e. CHECK at least one shutdown board on this unit ENERGIZED.
	SRO	f. RESUME FRP implementation.
	SRO	g. RETURN TO procedure and step in effect.
		END

Appendix D Required Operator Actions										
Contraction of the second seco	Op Test No.: Event Descriptio	NRC 2010302	Scenario #	3 er	Event #	AOP-P.01	Page	80	of <u>88</u>	
	Time	Position			Applicant's	s Actions or Behavior	r			
			AOP-P.	01, Lo	ss of Off Site	Power	<u></u>			
	Evaluator No	actions im	portant to supportant are administrat	ort cur	rent operating	erforms through s strategies; furthe to Unit 2 MCR o	er activi	ities, while	Э	
			2.0 OPERA		CTIONS					
		CREW	1. DIAGNOSE the failure:							
			IF					GO TO SECTION	PAGE	
			Complete	loss of	off-site power			2.1	4	
\cap			A or B OR	start bu	isite Power: isses de-energize supply to individu	ed ual shutdown board		2.2	29	
					ard energized from					
			2.1 Comple	te Los	s of Offsite P	ower				
			NOTE: Steps	1 and 2	2 are immedia	te actions.				
	CRITICAL TASK					ing equipment l				
		BOP		esel G		•A 6.9 kV Shutd NNING and supp				
		BOP	RNO: EMERGENCY START available D/Gs. (From 1-M-1 Handswitch or 0-M Emergency Start PB)						D-M26-A	
		BOP	2. CHECK EF	RCW s	upply valves to	o D/Gs OPEN.				
	Evaluator No	ote: AOP-P.01 these proc procedure	as well as E-0, edures impleme s provide these	ECA-0 ent act instruc	0.0 and ES-0.5 ions to restore ctions giving th	5 verifies 6.9 kV s shutdown board ne operators mult V Shutdown Boa	d voltag tiple pro	e. Sever	al	

Appendix D		Req	uired Op	erator Actior	IS		Fo	rm ES	S-D-2		
Op Test No.:	NRC 2010302	Scenario # ss of Off Site Pov	<u>3</u>	Event #	AOP-P.01	Page	81	of	88		
Time	Position			Applicant	's Actions or Behavio)r					
			s of Off Site								
Critical Task:	Start 1A-	A EDG, to sup	ply 1A-	A 6.9 kV Shu	utdown Board v	oltage.					
	BOP	3. MONITOI (RNO Requir		6900V shute	down boards on	this unit E	ENERG	SIZED			
BOP RNO: IF NO 6900V shutdown board is ENERGIZED on this unit, THEN PERFOI the following:											
		a. IF unit Power	t is in M r has be	ode 1-4, THE en entered.	N ENSURE ECA	A-0.0, Los	ss of A	II AC			
		b. IF unit	t is in M	odes 5 or 6	this Step is N/A.						
Critical Task		c. IF any D/G is available1A-A EDG should be started									
	BOP	 d. WHEN off-site power is availablewill not be restored this scenario e. DO NOT CONTINUE Section 2.1 UNTIL at least one shutdown board is ENERGIZED. 									
	BOP	IF one 6900V shutdown board is ENERGIZED on this unit, THEN PERFORM the following:									
CRITICAL TASK	RO				injection pump) head injection v						
				lable CCP R							
	RO	b. IF NO	CCP is	available1	A-A CCP in serv	ice- step	N/A				
	BOP	c. IF any D/G available1A-A EDG in service- step N/A									
	BOP	allows			P for loss of shute	down boa	rd as t	ime			
			-	nit 1 Shutdown	-						
		 AOI 	₩.06 (U	nit 2 Shutdown	Boards)						

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Appendix D		Requi	ired Oper	ator Actic	ons		Fo	rm ES	-D-
Op Test No.: Event Descriptio	NRC 2010302 on: Lo	Scenario #	3 er	Event #	AOP-P.01	_ Page	82	of	8
Time	Position			Applicar	nt's Actions or Behavio	or			
	······	AOP-P.()1, Loss	of Off Sit	e Power				
	BOP	e. IF off-s	ite power	is availa	oleN/A for rema	ainder of s	cenari		
				io arana				<u> </u>	
		4. NOTIFY SI							
		a. EVALU	JATE EP	IP-1, Eme	ergency Plan Clas	sification	Matrix		
-10,		b. INITIAT	FE staffin	a of TSC	and OSC USING	Emerger	ICV Pa	aina	
		System	1					99	
		5. RECORD t	imo of la						
		5. RECORD t		ss of on-s	ite power				
		6. MONITOR	diesel ge	enerator lo	bading:				
······································									
		7. CHECK ch	arging sy	stem ope	eration:				
	CAUTION	to containme	ent will d	elay resto	compressors and ration of letdown. rise and PORV op	This may			air
	CAUTION	2 Opening <u>Train A</u> ERCW supply to Station Air Compressors with ERCW temp greater than 82.3°F makes <u>Train A</u> MCR Chiller and EBR Chiller inoperable due to inadequate ERCW flow. This would place both units in LCO 3.0.5.							
	NOTE	Starting control a	air compr	essors wi	II add about 0.1 M	IW to D/G	1A-A	and 11	B-B
		8. RESTORE	control a	ir:					
					es in CLOSE pos	ition.			

Appendix D		Required Operator Actions	Form ES-D-2								
Op Test No.: Event Descripti	NRC 2010302	Scenario # Event #AOP-P.01 Page	83 of 88								
Time	Position	Applicant's Actions or Behavior									
	1	AOP-P.01, Loss of Off Site Power									
		 b. ESTABLISH cooling water to station air compressors 1) VERIFY Train B ERCW available. 2) ENSURE FCV-67-208 Train B ERCW to air compressors OPEN. [0-M-27A] 	 VERIFY Train B ERCW available. ENSURE FCV-67-208 Train B ERCW to air compressors OPEN. 								
		 c. WHEN ERCW established to station air compressors, THEN DISPATCH an operator to start Station Air Compressors A and B USING EA-32-2, Establishing Control and Service Air. d. ENSURE auxiliary air compressors RUNNING. [M-15 or AB el 734] 									
		 (powered from Unit 2 Shutdown Bds) e. CHECK Phase B NOT actuated. 									
		 f. WHEN control air pressure restored, THEN RESTORE air to containment USING EA-32-1, Establishing Control Air to Containment. 									
9. DISPATCH operator to D/G Building to monitor diesel generators US 0-SO-82-1, 2, 3, 4 App. C.											
Evaluator No	actions in	DP-P.01 implementation, the crew performs through step 9, wh nportant to support current operating strategies; further activitie , are administrative or are delegated to Unit 2 MCR or other plane MCR.	es, while								

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	Appendix D		Form	1 ES-D-2								
	Op Test No.: Event Description	NRC 2010302	Scenario # ss of All AC Power		Event #	ECA-0.0	Page 84	of <u>88</u>				
	Time	Position			Applicant's A	ctions or Behavior		·····				
			AOP-P.	.01. Loss o	f Off Site P	ower						
	Evaluator Not	actions im	P-P.01 implem portant to supp are administra	nentation, th port current	e crew performer	orms through ste rategies; further Unit 2 MCR or c	activities, while	Э				
			2.0 OPERA	TOR ACTI	ONS		······································					
		CREW	2. DIAGNOSE the failure:									
			IF				GO TO SECTION	PAGE				
			Complete	e loss of off-si	e power	9699	2.1	4				
				oss of Offsite I B start busses	^p ower: de-energized		2.2	29				
			 loss o (shuto) 	of normal supp down board ei	ily to individual nergized from (shutdown board D/G)						
			2.1 Comple	2.1 Complete Loss of Offsite Power								
			NOTE: Steps	1 and 2 are	immediate	actions.						
	CRITICAL		Start at least	1 EDG prie	or to placin	g equipment PT	L in ECA.0-0.					
	TASK		1A-A EDG sta	arted, supp	olying 1A-A	6.9 kV Shutdow	vn Board volta	age.				
		BOP	10. CHECK Diesel Generators RUNNING and supplying shutdown boards.									
			(RNO Required)									
		BOP	RNO: EMERGENCY Emergency St		/ailable D/G	s. (From 1-M-1 F	landswitch or	0-M26-A				
		BOP	11. CHECK E	RCW suppl	y valves to l	D/Gs OPEN.						
	Evaluator Note	these proc procedure	1 as well as E-0, ECA-0.0 and ES-0.5 verifies 6.9 kV Shutdown Board voltage; peedures implement actions to restore shutdown board voltage. Several es provide these instructions giving the operators multiple prompts to continue o restore voltage to at least one 6.9 kV Shutdown Board.									

	Appendix D	Appendix D Required Operator Actions										
e^{-1}	Op Test No.:	NRC 2010302	Scenario #	1 Event #	ECA-0.0	Page <u>85</u> of <u>88</u>						
<u>C</u> 2	Event Description	n: Los	ss of All AC Power									
	Time	Position		Applicant's	Actions or Behavio	or						
			AOP-P.	01, Loss of Off Site	Power							
	Critical Task:	Start 1A-		bly 1A-A 6.9 kV Shut		oltage.						
		BOP		BOTH 6900V shutdo		this unit ENERGIZED.						
		BOP	RNO: IF NO 6900V sthe following:	shutdown board is EN	NERGIZED on t	his unit, THEN PERFORM						
			Power	 f. IF unit is in Mode 1-4, THEN ENSURE ECA-0.0, Loss of All AC Power has been entered. g. IF unit is in Modes 5 on 0, this Oten is N/A 								
	Oritical		g. IF unit is in Modes 5 or 6…this Step is N/A									
	Critical Task		h. IF any D/G is available1A-A EDG should be started									
		BOP				be restored this scenario						
				T CONTINUE Sectio RGIZED.	on 2.1 UNTIL at	least one shutdown board						
		BOP	IF one 6900V s the following:	shutdown board is El	NERGIZED on t	this unit, THEN PERFORM						
	CRITICAL TASK	RO		1 CCP (high-head in		ia the CCPIT to RCS.						
				RE available CCP RU								
		RO	g. IF NO (CCP is available1A	-A CCP in serv	ice- step N/A						
		BOP	h. IF any	D/G available1A-	-A EDG in serv	vice- step N/A						
\cap		BOP	allows:	DRM applicable AOP		down board as time						
				-P.05 (Unit 1 Shutdown B	-							
			• AOP	-P.06 (Unit 2 Shutdown B	oards)							

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	Appendix D	opendix D Required Op			Operator Actions Form			m ES	S-D-2	
C	Op Test No.:	NRC 2010302	Scenario #	1	Event#	ECA-0.0	_ Page	86	of	88
	Time	Position			Applicant's	s Actions or Behavio	r			
			AOP-P.	01, Los	ss of Off Site					
-		BOP	j. IF off-s	ite pow	ver is available	e…N/A for rema	inder of	scenari	0	
			13. NOTIFY S	M to pe	erform the follo	owing:				
-						gency Plan Class	sificatior	Matrix.		
-			d. INITIA	TE staf	fing of TSC a	nd OSC USING	Emerge	ncy Pag	jing	
_			System	1.	<u></u>					
_			14 050000	K	L					
\sim			14. RECORD 1	time of	loss of off-site	e power	<u></u>			
			15. MONITOR	diesel	generator loa	ding:				
-			16. CHECK ch	arging	system opera	ation:				
		CAUTION 1	to containm	ent will	l delay restora	mpressors and r tion of letdown. se and PORV ope	This ma			air
		CAUTION 2	greater than	182.3°F	makes Train	Station Air Con <u>A</u> MCR Chiller au his would place	nd EBR (Chiller i	nope	rable
		NOTE S	Starting control a	air com	pressors will a	add about 0.1 M	W to D/C	G 1A-A a	and 1	B-B.
			17. RESTORE	contro	l air:					
\frown			g. PLACE	MSIV	handswitches	s in CLOSE posi	tion.			

Appendix D		Require	ed Operator Actior	IS		Form ES-D-2		
Op Test No.: Event Descripti	NRC 2010302	Scenario # ss of All AC Power	1 Event #	ECA-0.0	Page	87	of	8
		and the second se						
Time	Position		Applicant	's Actions or Behavio	r			
		AOP-P.01	, Loss of Off Site	Power				
			.ISH cooling water FY Train B ERCW a		mpressor	s:		
		2) ENSU	JRE FCV-67-208 Tr N to air compressor	ain B				
		DISPAT	RCW established CH an operator to EA-32-2, Establish	start Station Air	Compres	sors A	N and E	3
		j. ENSURE (powered	auxiliary air com from Unit 2 Shut	pressors RUNNI down Bds)	NG. [M-1	5 or AE	3 el 73	34]
		k. CHECK	Phase B NOT act	uated.				
			ontrol air pressure lent USING EA-32 nent.				0	
			operator to D/G Bu 2, 3, 4 App. C.	uilding to monitor	diesel ge	enerato	ors US	SIN
Evaluator No	actions im	portant to support are administrative	tation, the crew pe current operating e or are delegated	strategies; furth	er activitie	es, whi	le	

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	Appendix D		Requ	uired Ope	erator Action	ons		For	m ES	S-D-2
<u></u>	Op Test No.:	NRC 2010302	Scenario #	11	Event #	Critical Task(s)	Page	88	of	88
	Event Description	on: Critica	al Task Listing						-	

Critical Tasks:	Critical Task Statement	Action Location	ESG pg #
1.	Start at least 1 EDG prior to placing equipment PTL in ECA.0-0	E-0 to E-1 transition	61
		ES-0.5 Step 1	78
		ECA-0.0 Step 8.a-c	79
		AOP-P.01 step 3.c	80
2.	Start at least 1 CCP (high-head injection pump)	E-0 to E-1 transition	61
		ES-0.5 Step 11.a	77
		AOP-P.01 step 3.c	81
3.	Start at least 1 'A' Train ERCW Pump in an operating safeguards train	E-0 to E-1 transition	61
		ECA-0.0 Step 8.d	79
		ES-0.5 Step 3	77

Appendix	D		Scenario Outline	Form ES-D-1	
Facility: Examiners	Sequoya :	h	Scenario No.: 4 Operators:	Op Test No.: 2010302	
Initial Conc			TD AFW Pp OOS for maintenan	ce	
Turnover: Target CTs	s: Isolate Stea Cooldown F Equalize pre	CS to less than essure between l	itions Iwater flow to ruptured S/G prior or equal to target temperature pr RCS and ruptured SG to stop pri	ior to RCS depressurization	
	(Time critica) Terminate F		ation prior to losing RCS Subcoo	ling	
Event #	Malf. No.	Event Type*	Event Description		
1.	CC14	C – BOP	Component Cooling Line Break (within make-up capacity)		
T+0	CC20	TS – SRO	Make-up valve 1-FCV-70-63 fails to open automatically		
2 . T+20	RX11B	I – RO TS – SRO	1-PT-1-73, Main Turbine Impu	se Pressure Transmitter fails low	
3. T+30	ZAITIC2448	C – BOP*	Gen H2 Temp Hx Cooling Wat	er Controller failure	
4 . T+35	TH05A	C – All TS – SRO	SGTL		
5. T+50	N/A	R – RO N – SRO/BOP	Rapid plant shutdown		
6. T+50	ZDIHS62138A	C – RO C – SRO	Rapid Boration Valve fails to o	pen; RWST use for rapid shutdown	
7 . T+50	TH05A	M – All	SGTL increases to SGTR requ	iring Rx Trip and Safety Injection	
8. T+50	MS04A	C – BOP	#1 SG MSIV Auto/Manual clos	e failure	
9 . T+60	RC06A RC06B	C – RO	Both Pzr Spray Valves fail full	open during RCS depressurization in E-3	
* (N)	ormal, (R)eacti	vity, (I)nstrume	nt, (C)omponent, (M)ajor		

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Scenario 4 Summary

The crew will assume the shift with the unit at 100% Power BOL and the TD AFW Pump OOS for maintenance with the directions to maintain 100% RTP per 0-GO-5 Section 5.2.

At the Lead Examiner direction, initiate the next event, a Component Cooling System leak occurs within the capacity of make-up however, the make-up flow control valve, 1-FCV-70-63 fails to open automatically requiring the operator action. Crew will respond by using ARPs 0-AR-M27B-B C-2, C-3 and, as necessary, AOP-M-03, Loss of Component Cooling Water, Section 2.4 to stabilize CCS inventory while continuing to identify the leak, which is outside containment. SRO will identify Tech Specs: 3.5.2, 3.6.2.1, 3.7.3.

When CCS Surge Tank conditions are stable and at the direction of the Lead Examiner, Turbine Impulse Transmitter PT-1-73 will fail low. This will result in inadvertent rod insertion. The crew will respond using alarm response procedure (ARPs) 1-AR-M5-A A-6 and abnormal procedure AOP-C.01, Rod Control Malfunctions Section 2.1, Uncontrolled Rod Bank Movement to place Rod Control in Manual. AOP-C.01 Section 2.1 transitions the crew to AOP-I.08 Section 2.1, Failure of 1-PI-1-73, to evaluate actual S/G levels vs. level program, Feedwater Control and direct transfer steam dump control system to steam pressure mode. SRO will refer to Tech Specs: 3.3.1.1 Functional Unit 22E, Action 8.b.

Following TS identification, at Lead Examiner direction, initiate the next event, Main Generator (MG) high hydrogen gas temperatures due to Hydrogen Cooling RCW TCV failing. The crew will respond to ICS and determine that the H2 cooling water valve, 1-TIC-24-48 is not functioning in AUTOMATIC; the operators will take manual control and attempt to restore H2 temperature. The H2 TIC will remain in MANUAL control for the remainder of the scenario.

Following the MG high hydrogen cooling failure, at the direction of the Lead Examiner, a Steam Generator Tube Leak (SGTL) approximately 15 gpm, occurs in #1 Steam Generator (SG). The crew will respond using ARPs 0-AR-M12-A B-5, C-1 and go to AOP-R.01, SG Tube Leak Section 2.1 initially. SRO will refer to Tech Specs: 3.4.6.2.c Action a.

Since this leak is within normal charging capacity, AOP-R.01 directs the crew to perform a rapid shutdown according to AOP-C.03, Rapid Shutdown or Load Reduction. During initiation of the rapid load reduction, 1-FCV-62-138, Emergency Boration Flow Control Valve fails to open (from the MCR and locally) resulting in the crew using either normal makeup boration or boration from the RWST. From Event 3, Rod Control remains in MANIUAL.

After the rapid shutdown is initiated, at the direction of the Lead Examiner, the SGTL will propagate to a significant rupture (~400 gpm). This leak size will require Reactor Trip/Safety Injection initiation.

After the crew initiates the Reactor Trip/SI, the ruptured S/G MSIV will not close. E-3, SGTR requires closing nonruptured MSIVs and other steam paths both from the MCR and locally to isolate the ruptured S/G. #1 S/G MSIV will close when EA-1-1, Closing MSIVs Locally, E-3 alternate path actions, is implemented.

As the crew progresses through E-3, they will cool down and depressurize the RCS to the identified target values. During depressurization, both Pressurizer Spray Valves will fail open requiring the crew to stop at least #1 and #2 RCPs to control the RCS depressurization.

EOP flow: E-0 - E-3

Scenario Termination: as directed by the Lead Examiner following completion of RCS depressurization and CCPIT isolation in E-3 Step 24.

PSA significant task: Manual MSIV Closure; SGTL Leak determination PSA significant DAS: SGTR PSA significant component failure: SG Tube failure; #1 MSIV closure; Pzr Spray Valve Control

NRC 1009 ESG-4 Booth Instruction File

8/16/2010

EVENT	IC/MF/RF/OR #	
		DESCRIPTION/EXPECTED ACTIONS/BOOTH FEEDBACK
Simulator IC MFs, RFs, ORs are active when the SCN file is loaded.	IC-16 Perform switch check. Allow the simulator to run for at least 3 minutes before loading SCEN file or starting the exercise. This will initialize ICS. Load SCENS: <u>1009 NRC ESG-4</u> Place simulator in RUN. Place OOS equipment in required position with tags. Clear alarms IMF FW07C f:1 IOR ZLOHS151A_GREEN f:0 IOR ZLOHS117A_GREEN f:0 IOR ZLOHS3136AA_GREEN1 f:0 IOR ZLOHS3136AA_GREEN2 f:0 IOR ZLOHS3136AA_RED1 f:0 IOR ZLOHS3136AA_GREEN1 f:0	FEEDBACK 100%, BOL ~150 MWD/MTU CB 'D' Rods @ 216 steps, all others @ 228 steps; [B] = 1120 ppm; Ba Blender setting: 27.5% Xe/Sm @ equilibrium Console Operator actions: Place simulator in run and perform the following: • Allow the simulator to run before loading SCEN file. • Place the MODE 1 sign on 1-M-4 • Place Train Week A sign TDAFW PUMP IS INOPERABLE. Close FCV-1-17 & 18 & place Hold Notice on HS-1-17&18 and FCV-1-51. Also place Hold Order on TDAFW Pump ERCW supply valves. Place Protected Equipment tags on both MD AFW Pumps, 1-M-4 and both EDGs, 0-M-26
Event 1.: insert using	IOR ZLOHS3179AA_GREEN2 f:0 IOR ZLOHS3179AA_RED1 f:0 IOR ZLOHS3179AA_RED2 f:0 IOR ZDIHS3179AA f:0 IMF CC20 f:1 k:1	1-FCV-70-63 fails to open automatically
<u>Key 1</u>	IMF CC14 f:32 k:1	Component Cooling Line Break- C-S Pp Disch Hdr (within make-up capacity)
		Support staff: If requested, report U2 make-up is in progress as expected.
	IRF CCR15 f:1 k:11	Demin Head Tank Make-up @ ~400 gpm
		<u>Support staff:</u> if dispatched to respond 1-AR-M15-B, E-3, wait 2 minutes insert k: 13 and report DI Head Tank make- up is in progress.

NRC 1009 ESG-4 Booth Instruction File

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EVENT	IC/MF/RF/OR #	8/16/2010
	IC/MIF/RF/OR #	DESCRIPTION/EXPECTED ACTIONS/BOOTH FEEDBACK
When Appx B performance requested,	IMF AN_OV_604 f:2 k:21	1-XA-55-M6-E A-4, "480V REAC MOV BD 1B1-B/1B2-B TRANSFER SWITCH IN AUX MODE": Any mode selector switch on Reactor MOV Bd 1B1-B or 1B2-B in 'Auxiliary' position.
		<u>Support staff:</u> When dispatched, wait 1 minute, insert k:23 and report as AUO, Appendix B valves transferred to 'AUXILIARY", standing by.
		<u>Support staff:</u> When directed by the MCR staff, insert k:33 to sequentially close specified valves; report as AUO valves are positioned to 'CLOSE'.
		<u>Support staff:</u> If requested, report as AB AUO water flow from CCS piping break subsiding.
When MCR staff directs.	IRF CCRV12 f:0 k:31	Closes the following Appendix B Valves:
airects,	IRF CCRV75 f:0 d:5 k:31 IRF CCR2V75 f:0 d:10 k:31	1-FCV-70-12, CCS HX 0B1 and 0B2 Outlet 1-FCV-70-75- U1 B-Trn to C-S Pump. 2-FCV-70-75- U2 B-Trn to C-S Pump.
INSTRUCTOR NOTE: c	lelete AN_OV_604 when directed	by the MCR staff to remove power from Appx. B Valves.
		<u>Support staff:</u> If dispatched, wait ~2 minutes, report as the AB AUO, water on the floor around the CC Hxs on AB EI. 714' and running down the stairs; location appears to be on the common inlet to the 0B1/0B2 CCS Hx.
		If requested to check the Flood Mode Pnl, report LS-40-54, 55 @714'3" increasing;
-		If requested to TB 685'local panel, report LS-59-180A/B Demin Water Storage Tank level low is the cause
Event 2.: insert using Key 2	IMF RX11B f:0 k:2	Impulse Pressure Transmitter 1-PT-1-73 Fails Low
		<u>Support staff report</u> : When IMs or MSS contacted to trip bistables, inform the crew that the IMs will report to the MCR in ~ 45 minutes.
Event 3.: insert using	IOR ZAITIC2448 f:1 k:3	Gen H2 Temp Hx Cooling Water Controller failure
<u>Key 3</u>		<u>Support staff:</u> if dispatched, TB AUO reports no apparent, visible cause for malf.
Event 4.: insert using Key 4	IMF TH05A f:0.3 k:4	#1 SGTL ~15 gpm & Rapid Plant Shutdown
		<u>Support staff report</u> : When Chem Lab contacted for RM- 90-119 limit, inform the crew of the limit on the Ops chemistry information report (turnover information). Report that other Chemistry actions will take ~45 minutes to complete.
		<u>Support staff report</u> : When RADCON/Chem Lab are requested to survey/sample S/Gs, wait ~10 min then report as RADCON that #1 S/G has slightly higher background than the others.
		<u>Support staff report</u> : Wait 45 minutes and report as Chem Lab that ruptured S/G is #1 S/G.
		e 2 of 3

NRC 1009 ESG-4 Booth Instruction File

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8/16/2010

EVENT	IC/MF/RF/OR #	DESCRIPTION/EXPECTED ACTIONS/BOOTH FEEDBACK
Event 5.	- none -	AOP-C.03 Rapid Plant Shutdown
		<u>Support staff report</u> : as necessary to support plant power reduction.
Event 6.	IOR ZDIHS62138A f:0 d:5	Emergency Boration Flow Control Valve (FCV-62-138) fails closed after starting open.
	[pre-insert]	<u>Support staff report</u> : If Dispatched to check locally wait~ 3 min and report valve closed but you cannot determine why it won't open. If requested to operate the valve locally, report that it will not open locally either.
Event 7. Modify Malfunction	MMF TH05A f:8.6 r:300	Lp 1 SGTL Increasing To SGTR (~400 Gpm) Over 5 Min. (Rx Trip/Safety Injection required)
		Support staff report: - none -
Event 8.	IMF MS04A f:1 [pre-insert]	#1 SG MSIV Auto/Manual close failure
<u>KEY-18</u>	IOR AN_OV_610 f:2 k:18 IOR AN_OV_617 f:2 d:5 k:18 IRF MSR04A f:1 d:10 k:18 AND	<u>Support staff report</u> : When directed to perform EA-1-1, wait 1 minute and report #1 SG MSIV transfer switch in the AUX position.
	DMF MS04A w/ k:18	THEN, Insert KEY 18
Event 9.: Insert during E-3 RCS Depress Key 9	IMF RC06A f:100 k:9 IMF RC06B f:100 k:9	BOTH Pzr Spray Valves PCV-68-340B & 68-340D Fail Open
· · · · · · · · · · · · · · · · · · ·		Support staff report: -none-
Termination Criteria:	completion of E-3 Step 24,	CCPIT Isolation

1009 ESG-4 Page 1 of 5

Unit 1 MCR CHECKLIST Page 1.	of 3 Today
Part 1 - Completed by Off-going Shift / Reviewed b	by On-coming Shift
Mode 1, 100% Power PSA Risk: YELLOW	NRC phone Authentication Code
Grid Risk: Green	
	Until 0800 XXXX
RCS Leakage ID .02 gpm, UNID .02 gpm	After 0800 YYYY
Common Tec	L Sh Spec Actions
None	
U-1 Tech S	Spec Actions
LCO/TRM Equipment INOP	Time INOP Owner
TS LCO 3.7.1.2.a TDAFW T&T valve repa	ir 2 hours ago MMG
TS 3.3.3.7.18b action 1 TDAFWP ERCW - AFW	Valve Position 2 hours ago MMG
Protected	l Equipment
 Equipment/spaces for TDAFW Pump per 0-GO-16 	Appx J
	Priorities
 100% RTP in accordance with 0-GO-5 Section 5.2 Daily and Shiftly SIs per work schedule 	, power Operation
Part 2 – Performed by on-coming shift	
Verify your current qualifications	Review Operating Log since last held shift or 3
	days, whichever is less
Standing Orders / Shift Orders X TACF	Immediate required reading
LCO Actions	
Part 3 – Performed by both off-going and on-comin	ig shift
Walk down of MCR Control Boards	

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1009 ESG-4 Page 2 of 5

SHIFT TURNOVER CHECKLIST

Page 2. of 3

Today

MAIN CONTROL ROOM (7690)
Train <u>A</u> Week
Protected Equipment:
MDAFW Pump A 1-HS-3-118A
■ MDAFW Pump B 1-HS-3-128A ■ D/G 1A-A 1-HS-57-46A
■ D/G 1B-B 1-HS-57-73A
OUTSIDE (7666) [593-5214]
All Equipment normal
Equipment/spaces for TDAFWP protected per 0-GO-16 Appx J
AUXILIARY BUILDING (7775)
TDAFW pump was tagged 2 hours ago for repair to the T&T valve. The packing was blowing
excessively. Expected Return to service is 8 hours. (WO 10-080025-000)
TURBINE BUILDING (7771) (593-8455)
All Equipment normal

1009 ESG-4 Page 3 of 5

SHIFT TURNOVER CHECKLIST

Page 3. of 3

Today

	Disabled Annunciators					
PANEL	WINDOW	ANNUNCIATOR	WO / PER Number			
<u> </u>						

Equipment Off-Normal (Pink Tags)

UNID And Noun Name	Panel	Problem Description	WO / PER Number

MCR WO LIST

ID And Noun Name	Panel	Problem Description	WO/PER Number
			······································

UNIT ONE REACTIVITY BRIEF Date: Today Time: Now

General Information

RCS Boron: 1120 ppm	Today	BA Cont	troller Setpoint: 27.5% *	RCS B-10 Depletion: 2 ppm
Operable BAT: A	BAT A Boron: 685	0 ppm	BAT C Boron: 6850ppm	RWST Boron: 2601 ppm
Nominal	Gallons per rod ste	p from 18	9: 17 gallons of acid, 75	gallons of water

* Verify boric acid flow controller is set at Adjusted BA Controller Setting iaw 0-SO-62-7 section 5.1

Estimated values for a 1° Change in Tave **

Gallons of acid: 22	
Lightone of and 99	

Gallons of water: 94

Rod Steps: 1

Estimated rods/boron for emergency step power reduction ** (Assuming Xenon equilibrium and no reactivity effects due to Xenon. 2/3 total reactivity from rods, 1/3 from boron)

Power reduction amount	Estimated Final Rod Position	Estimated boron addition
10%	181 Steps on bank D	93 gallons
30%	161 Steps on bank D	291 gallons
50%	n/a	n/a

** These values are approximations and not intended nor expected to be exact. The values may be superseded by Rx Engineering or SO-62-7 calculated values. These values are calculated assuming 100% steady state power operation only. Engineering data last updated <u>TODAY</u>. Data Valid up to three weeks from now.

Previous Shift Reactivity Manipulations

Number of dilutions: 1	Number of borations:	Rod steps in:
Gallons per dilution: 12	Gallons per boration:	Rod steps out:
Total amount diluted: 12	Total amount borated:	Net change: IN/Out

Current Shift Estimated Reactivity Manipulations

Remarks: Rx Power – 100% MWD/MTU – 1000 Xenon & Samarium at Equilibrium ***The boron letdown curve is flat for the next 25 EFPD.

Last Dilution Complete ~1 hour ago.

Next Unit 1 Flux Map is scheduled: three weeks from now

Unit Supervisor:

Name/Date

1009 ESG-4 Page 5 of 5

		Boron	Results				
Sample Point	Units	Boron	Date / Time	Goal	Limit		
U1 RCS	ppm	1120	Today / Now	Variable	Variable		
U2 RCS	ppm	816	Today / Now	Variable	Variable		
U1 RWST	ppm	2601	Today / Now	2550 - 2650	2500 - 2700		
U2 RWST	ppm	2569	Today / Now	2550 - 2650	2500 - 2700		
BAT A	ppm	6850	Today / Now	Variable	Variable		
BAT B	ppm	6850	Today / Now	Variable	Variable		
BAT C	ppm	6850	Today / Now	Variable	Variable		
U1 CLA #1	ppm	2556	Today / Now	2470-2630	2400-2700		
U1 CLA #2	ppm	2575	Today / Now	2470-2630	2400-2700		
U1 CLA #3	ppm	2591	Today / Now	2470-2630	2400-2700		
U1 CLA #4	ppm	2589	Today / Now	2470-2630	2400-2700		
U2 CLA #1	ppm	2531	Today / Now	2470-2630	2400-2700		
U2 CLA #2	ppm	2650	Today / Now	2470-2630	2400-2700		
U2 CLA #3	ppm	2522	Today / Now	2470-2630	2400-2700		
U2 CLA #4	ppm	2526	Today / Now	2470-2630	2400-2700		
Spent Fuel Pool	ppm	2547	Today / Now	<u>></u> 2050	<u>≥</u> 2000		
L	ithium Res	ults	- Torrene age	Goal	Midpoint		
U1 RCS	ppm	1.1	Today / Now	>1	>1		
U2 RCS	ppm	2.43	Today / Now	2.18-2.48	2.33		

Operations Chemistry Information

Indicator	Units	U1	Date / Time	U2	Date/Time
SI 50 S/G Leakage?	Yes/No	No	Today / Now	No	Today / Now
SI 137.5 CVE Leakrate	gpd	< 0.1	Today / Now	< 0.1	Today / Now
5 gpd leak equivalent	cpm	115	Today / Now	68	Today / Now
15 gpd (30 min increase)	cpm	265	Today / Now	83	Today / Now
30 gpd leak equivalent	cpm	490	Today / Now	206	Today / Now
75 gpd leak equivalent	cpm	1165	Today / Now	455	Today / Now
150 gpd leak equivalent	cpm	2290	Today / Now	870	Today / Now
CVE Air Inleakage	cfm	10	Today / Now	12.5	Today / Now
Bkgd on 99/119	cfm	40	Today / Now	40	Today / Now

Appendix D		Requ	ired Ope	rator Actions			Form	ES-D-2	
Op Test No.:	NRC 2010302	NRC 2010302 Scenario # _ 4 Event # 1 Page _ 1 _ of							
Event Description: Component Cooling Line Break (within make-up capacity) Make-up valve 1-FCV-70-63 fails to open automatically									
Time	Position Applicant's Actions or Behavior								
Simulator Operator: When directed, initiate Event 1 Indications/Alarms Annunciator: 0-M-27B • 0-XA-55-27B-B C-2, "UNIT 1 CCS SURGE TANK LEVEL ABNORMAL" D-2, "UNIT 1 CCS CURGE TK LVL LO AUTO MAKEUP INITIATED" • 0-XA-55-27B-D C-2, "UNIT 2 CCS SURGE TANK LEVEL ABNORMAL" D-2, "UNIT 2 CCS SURGE TK LVL LO AUTO MAKEUP INITIATED" • 0-XA-55-27B-D C-2, "UNIT 2 CCS SURGE TK LVL LO AUTO MAKEUP INITIATED" Indications • 1-LI-70-99A CCS SURGE TK A OUTLET LEVEL ("B" Header) indicates a lowering level • 1-LI-70-63A CCS SURGE TK A OUTLET LEVEL ("A" Header) indicates a lowering level • 2-LI-70-99A CCS SURGE TK A OUTLET LEVEL indicates a lowering level • 2-LI-70-63A CCS SURGE TK A OUTLET LEVEL indicates a lowering level • 2-LI-70-63A CCS SURGE TK A INLET LEVEL indicates a lowering level • 2-LI-70-63A CCS SURGE TK A INLET LEVEL indicates a lowering level • 2-LI-70-63A CCS SURGE TK A INLET LEVEL indicates a lowering level • 2-LI-70-63A CCS SURGE TK A INLET LEVEL indicates a lowering level Significant Resultant Alarms/Indications: Annunciator: • 1-XA-55-15 D-3, "TURB AUX OR REAC BLDG FLOODED" • E-3, "LS-59-180A/B DEM WTR AND CASK									
T + 0	BOP	Respond to 0	-M-27 ala	irms in accord	lance with A	larm Respo	nse Proc	edures	
Evaluator No	Evaluator Note: 0-M-27 Panel alarms from both units will actuate due to the common Component Cooling Water System operating alignment. If the BOP responds to U2 surge tank level and make-up alarms, expected make-up to the U2 surge tank is operating as expected. Prompts to be provided by the Simulator operator if contacted for U2 indications not available on Simulator Panel 0-M-27.							nk level bected.	
	BOPFrom 0-AR-M27B-B C-2, BOP will inform SRO: [3] IF surge tank level is low, THEN [a] DISPATCH operator to investigate problem.								
[b] IF sufficient level cannot be maintained, SRO GO TO AOP-M.03, Loss of Component Cooling Water.									

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Appendix D	Required Operator Actions						F	orm E	ES-D-2
Op Test No.:	NRC 2010302	Scenario #	4	Event #	1	Page	2	of	44
Event Descriptic	on: Com Make	ponent Cooling Li e-up valve 1-FCV	ine Breal -70-63 fa	k (within make-u ils to open auto	up capacity) matically				

Time	Position	Applicant's Actions or Behavior
	BOP	From 0-AR-M27B-B D-2, BOP will inform SRO: [1] CHECK surge tank level by observing [1-LI-70-63A].
	BOP	[2] VERIFY 1-LCV-70-63 OPEN.
Evaluator No	te: BOP ident light lit, RE 0-M-27B.	ifies U1 make-up valve 1-FCV-70-63 failed to open automatically (GREEN D light dark), notifies SRO and opens valve using handswitch 1-HS-70-63 at
Evaluator No	te: SRO/BOP determines	identifies CCS Surge Tank level stabilizing/level returning to normal; s make-up controlled to maintain level.
	Refer to A event guid	ppendix G for CCS Surge Tank Level Switch Setpoints following this e.
	CREW	[3] DISPATCH operator for local inspection to determine problem.
	SRO	[4] VERIFY proper valve alignment in accordance with 1-SO-70-1, Component Cooling Water System Train A, and 0-SO-70-1 Component Cooling Water System Train B.
	ВОР	[5] MONITOR level in both surge tanks to determine seal leakage return problems.
	RO/BOP	[6] MONITOR level increase in pocket sump for possible CCS leak inside containment.
	SRO/BOP	[7] IF sufficient level cannot be maintained, THEN GO TO AOP-M.03, Loss of Component Cooling Water for emergency makeup instructions. [C.1]
Evaluator No	applicable. to dispatch	may go to AOP-M.03, <i>Loss of Component Cooling Water;</i> Section 2.4 is Since the leak is within the capacity of make-up water flow, the crew needs AUOs to make up to the DI Water System to ensure make-up inventory is or the CCS System

Appendix D		Required Operator Actions					Form ES-D-2			
Op Test No.:	NRC 2010302	Scenario #	4	Event #	1	Page	3	of	44	

Event Description:

Component Cooling Line Break (within make-up capacity) Make-up valve 1-FCV-70-63 fails to open automatically

Time	Position	Applicant's Actions or Behavior					
	SRO	US may use or refer to AOP-M-03, <i>Loss of Component Cooling Water;</i> Section 2.4 Train B CCS Header Failure; Steps 1-4 are adequate to addres this event. Based on indications of 1-LI-70-99A, CCS Surge Tank A Outlet ("B" Header) is lowering.					
	CAUTION:	If any Containment Spray Pump is running with NO CCS cooling, spray pump may experience bearing failure after 10 minutes.					
	BOP	1. DISPATCH operators with radios to Auxiliary Building to LOCATE failure and PERFORM valve manipulations.					
	BOP	2. DISPATCH an operator with radio to perform Appendix B, Operation of App. R Valves Required by Section 2.4.					
	SRO/BOP	3. CHECK ERCW flows NORMAL for plant conditions: ERCW Flows are normal- crew moves on					
	NOTE: Ir fr	the event of a "B" train line break the surge tank baffle prevents the "A" train rom draining to less than 57% indicated level.					
	NOTE: A	ppendix G lists expected responses to various CCS surge tank levels.					
	SRO/BOP	 4. MONITOR Train B CCS surge tank level between 65% and 85%. 1(2)-LI-70-99A, Unit 1(2) B CCS Surge Tank Level. (RNO Required) 					
	SRO/BOP	RNO: IF CCS surge tank level is less than 64%, THEN ENSURE surge tank auto makeup starts.					
	BOP	 IF necessary to locally initiate surge tank makeup, THEN DISPATCH operator to perform the following: Manually make up from demin water, OR 					
		 ALIGN ERCW supply USING Appendix E, Aligning ERCW Emergency Makeup. [C.1] 					

Appendix D		Requ	ired Op	perator Actions	8		F	orm E	ES-D-2
Op Test No.:	NRC 2010302	Scenario #	4	Event #	1	Page	4	of	44
Event Description	n: Comp Make	oonent Cooling L -up valve 1-FCV	ine Breal -70-63 fa	k (within make-up ills to open autom	o capacity) natically				

Time	Position	Applicant's Actions or Behavior					
	NOTE: Pressure range provided is expected value based on one Train B CCS pump in service. Plant conditions may cause values to be outside the expected range.						
	BOP	 5. MONITOR the following: Train B CCS Surge Tank levels greater than 20%. 0B1/0B2 CCS HX inlet pressure NORMAL (between 90 and 118 psig). (RNO Required) 					
Evaluator N	ote: Train B Co the leak p	CS Pump cavitation is not expected if the crew initiates make-up and isolates er the following step RNO.					
		RNO: IF any Train B CCS pump is cavitating OR has lost suction, THEN STOP affected pump.					
		IF any of the following conditions exists:					
	BOP	 loss of surge tank level is imminent OR Train B header break is indicated which requires isolation OR Train B CCS flow has been lost, 					
	BOP	 THEN PERFORM the following: a. STOP and LOCK OUT Train B pumps: CCS Pump currently aligned to Train B (C-S, 1B-B, or 2B-B) 1B-B Containment Spray Pump 2B-B Containment Spray Pump 					
	BOP	 b. CLOSE Train B ESF Header Isol Valves: 0-FCV-70-12, 0B1/0B2 HX Outlet [Rx MOV Bd 1B2-B Compt. 12B] 1-FCV-70-75, RHR HX B Return Isol [Rx MOV Bd 1B2-B Compt. 14B] 2-FCV-70-75, RHR HX B Return Isol [Rx MOV Bd 2B2-B Compt. 14B] 					

Appendix D		Requ	ired Op	perator Action	าร		F	orm E	ES-D-2
Op Test No.:	NRC 2010302	Scenario #	4	Event #	1	Page	5	of	44
Event Descriptio	n: Com Make	ponent Cooling L e-up valve 1-FCV	ine Breal -70-63 fa	k (within make-ı iils to open auto	up capacity) matically				

Time	Position	Applicant's Actions or Behavior
·	SRO	c. IF in Mode 4, 5, or 6, THEN N/A
	NOTE 1:	When Train B CCS is out of service, the associated CCPs, SI Pumps, and RHR
		Pumps are INOPERABLE for ECCS purposes due to not being able to fulfill their design function for summer regional-field
	NOTE 2:	design function for sump recirculation. When CCS is out of service to mechanical seal HXs, the affected CCPs, SI
		Pumps, and RHR Pumps have been evaluated to be AVAILABLE. These pumps
		can run indefinitely without CCS cooling water to mechanical seal HXs. [C.4]
	SRO	6. EVALUATE Tech Specs and EPIP-1 USING Appendix H.
		• 3/4.5.2 ECCS – OPERATING
		3.5.2- 2 ECCS trains shall be OPERABLE. (TS NOTES 1&2 MODE 3 applicable…N/A)
		ACTION a.: w/ 1 or more trains inoperable and w/ at least 100% of the ECCS flow
		equivalent to a single OPERABLE ECCS train available, restore to OPERABLE
		status w/i 72 hrs or HT STBY w/i next 6 hrs & HT SHDN w/i following 6 hrs.
		 3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS 3.6.2.1-2 independent containment spray subsystems shall be OPERABLE with
		each subsystem comprised of:
		a. A Containment Spray train with:
		1. One OPERABLE Containment Spray pump.
		 One OPERABLE Containment Spray heat exchanger. An OPERABLE Containment Spray pump flow path capable of taking
		suction from the refueling water storage tank and transferring suction to
		the containment sump
		W/1 CSS subsystem inoperable, restore to OPERABLE w/i 72 hrs or HT STBY w/i
		next 6 hrs; restore inoperable subsystem to OPERABLE w/i next 48 hrs or CLD SHDN w/i next 30 hrs.
		3/4.7.3 COMPONENT COOLING WATER SYSTEM
		3.7.3- 2 independent component cooling water loops shall be OPERABLE.
		W/ 1 CCS water loop OPERABLE, restore 2 OPERABLE w/i 72 hrs or HT STBY w/i
		6 hrs & CLD SHDN w/i following 30 hrs.
	ВОР	7. ENSURE all breakers are reopened USING Appendix B, Operation of
		App. R Valves Required by Section 2.4.
		8. NOTIFY SM to evaluate OPDP-9. Emergent Issue Response.
	SRO	
	CREW	9. INITIATE Maintenance as required.
	SRO	10. GO TO appropriate plant procedure

Appendix D	Required Operator Actions							Form ES				
Op Test No.:	NRC 2010302	Scenario #	4	Event #	1	Page	6	of	44			
Event Descriptic	on: Com Make	ponent Cooling L -up valve 1-FCV	ine Breal -70-63 fa	k (within make-up ails to open autom	o capacity) natically			-				

Time	Position	Applicant's Actions or Behavior						
		END OF SECTION						
Evaluator Note: SRO/BOP required to		determines CCS Surge Tank manual make-up is adequate and will be maintain tank level (for the remainder of the scenario).						
Evaluator No	te: The follow	ng CREW Brief and Notification actions are not contained in the procedure.						
		CREW Brief would typically be conducted for this event as time allows prior to the next event.						
		Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.						
		Operations Management - Typically Shift Manager.						
		Maintenance Personnel – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).						
Lead Examin Specs identif	Lead Examiner may cue next event when CCS Surge Tank level controlled, leak isolated and Tech Specs identified.							

Appendix D		Required Operator Actions Form ES-D-2
Op Test No.:	NRC 2010302	Scenario # _ 4 _ Event # 2 Page 7 of 44
Event Descriptio	on: 1-PT-	-1-73, Main Turbine Impulse pressure transmitter fails low
Time	Position	Applicant's Actions or Behavior
Alarms/Indic Annunciat 1-M-5 • 1-XA-5 • 1-XA-5 Indication 1-M-4	ations tor: 55-5A C-6, "TS-68 55-5A B-7, "STEA	directed, initiate Event 2 -2P/Q REAC COOL LOOPS T REF T AUCT HIGH-LOW" M GEN LVL HIGH-LOW DEVIATION"
	8-2B, RCS/TURB	
	Crew	Respond to alarms in accordance with ARPs
	RO	Identifies automatic control rod motion with no runback in progress, positions Rod Control Handswitch 1-HS-85-5110 to MANUAL
	SRO	Direct entry to: AOP-C.01, Rod Control System Malfunctions, Sect 2.1, Uncontrolled Rod Bank Movement OR AOP-I.08, Turbine Impulse Pressure Instrument Malfunction
	NOTE	AOP-C.01, Rod Control System Malfunctions Sect 2.1, Uncontrolled Rod Bank Movement
		 an immediate action step. STOP uncontrolled rod motion:
	RO	 a. PLACE rod control in MAN. b. CHECK rod motion STOPPED.
	CAUTION:	Control Rods should NOT be manually withdrawn during a plant transient.
	RO/BOP	2. CHECK for plant transient:
	RO	a. CHECK reactor power and T-avg STABLE.

Ap	pend	lix	D

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Event Description: 1-PT-1-73, Main Turbine Impulse pressure transmitter fails low

Scenario #

Time	Position	Applicant's Actions or Behavior						
	Crew	3. CHECK for instrumentation malfunction:						
	RO	a. CHECK nuclear instrumentation OPERABLE.						
	RO	b. CHECK RCS RTDs OPERABLE						
	BOP	c. CHECK turbine impulse pressure channels OPERABLE. (RNO required)						
	SRO	RNO: c. GO TO AOP-I.08, Turbine Impulse						
		AOP-I.08, Turbine Impulse Pressure Instrument Malfunction Section 2.1 Unit 1: Failure of Turbine Impulse Pressure Instrument 1-P-1-73						
	RO/SRO 1. ENSURE control rods in MANUAL.							
	NOTE: Los bel	ess of Instrument Power to S/G level setpoint program input will drive setpoint ow 33%.						
	BOP	 EVALUATE placing main feedwater reg valves in MANUAL to maintain S/G levels on program 						
		Based on NOTE and secondary plant evaluation, FRVs remain in AUTO						
		3. ENSURE steam dumps in steam pressure mode:						
		a. PLACE steam dump FSV handswitches in OFF.						
		b. PLACE steam dump mode selector in STEAM PRESS mode.						
		c. ENSURE zero output (demand).						
		d. PLACE steam dump FSV handswitches in ON.						
		e. ENSURE steam dump controller setpoint at 1005 psig.						
	SRO	4. EVALUATE the following Tech Spec for applicability						
		 3.3.1.1, Reactor Trip System Instrumentation Functional Unit 22.E: Reactor Trip System Interlocks, Turbine Impulse Chamber Pressure, P-13 - ACTION 8.b: Reactor Trip- Turbine Trip; w/ less than Minimum Number of Channels OPERABLE, declare the interlock inoperable and verify that all affected channels of the functions listed below are OPERABLE or apply the appropriate ACTION statement(s) for those functions. 						

Appendix D	
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Event Description:

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Required Operator Actions

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1-PT-1-73, Main Turbine Impulse pressure transmitter fails low

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Scenario #

Time	Position	Applicant's Actions or Behavior
	RO	 DETERMINE Program T-avg for current reactor power USING TI-28 Figure 3 or ICS (NSSS / BOP, Program Reactor Average Temperature).
	RO	 RESTORE T-avg to within 1°F of program value USING one of the following:
		POSITION control rods OR
		ADJUST turbine load OR
		ADJUST RCS boron concentration.
	NOTE: If p	performing this AOP in conjunction with AOP-I.11 for Eagle LCP failure,
		O determines NOTE is N/A
	Crew	 NOTIFY I&C to perform Appendix A, Removing Unit 1 Turbine Impulse Pressure Loop 1-P-1-73 from Service.
	Crew	8. INITIATE Maintenance on 1-P-1-73.
	SRO	9. GO TO appropriate plant procedure.
		END OF SECTION
Evaluator Not	e: The following	g CREW Brief and Notification actions are not contained in the procedure.
		CREW Brief would typically be conducted for this event as time allows prior to the next event.
		Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.
		Operations Management - Typically Shift Manager.
		<u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Lead Examine	er may cue next	event when Tech Specs are identified.

Appendix D	Required Operator Actions Form ES-D-2								
Op Test No.:	NRC 2010302	Scenario #4 Event #3 Page10 of44							
Event Description	on: Ge	n H2 Temp Hx Cooling Water Controller failure							
Time	Position	Applicant's Actions or Behavior							
Alarms/India Multiple I	cations availat CS H2 Cooler O	n directed, initiate Event 3 ble: utlet Gas Temperature Alarms							
Indication 1-M-2	55-1A A-1, "GE B-4, "GE Is:	EN STATOR TEMPERATURE HIGH" EN STATOR COOL SYS FAILURE" GENERATOR H2 TEMP" trending to top of scale (indicator scale: 50-150°F)							
T = 30	BOP	Respond to ICS alarm, HYDROGEN COOLER OUTLET GAS TEMP (2 monitoring points) or MAIN GENERATOR window, TEMP's FOR HYDROGEN CLR							
	вор	Transfer 1-TIC-24-48, GENERATOR H2 COOLER REMP CONTROLLER, to MANUAL; manually control H2 cooling water flow to restore H2 temperature to normal (95-115°F)							
	CREW	Respond using ARPs 1-AR-M1-A, A-1, B-4, that direct entry into AOP-S.06, Turbine Trip, Section 2.0 for the failure. If the unit is not reduced to <15% power within 45 seconds, an automatic MT trip will occur.							
Evaluator No	ote: The follow	ring CREW Brief and Notification actions are not contained in the procedure. CREW Brief would typically be conducted for this event as time allows prior to the next event.							
		Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief. Operations Management - Typically Shift Manager. Maintenance Personnel – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager). e next event when MG H2 Temperature is returned to normal							

Appendix D Required Operator Actions Form ES-E							S-D-2		
Op Test No.:	NRC 2010302	Scenario #	4	Event#	4	Page	11	of	44
Event Description	on: Ste	am Generator Tube I	Applicant's Actions or Behavior initiate Event 4 MP LO RNG AIR EXH MON HIGH RAD" DN LIQ SAMP MON HI RAD (~10-12 min delay)" P EXH RADMON increasing count rate P RADMON increasing counts						
Time	Position				Actions or Beha	avior			
Indications// Annuncia 0-M-12 • 0-XA-5 • Indication 0-M-12 • 1-RR-5	Alarms tor: 55-12-AC-1, "CN B-5, "STI IS 90-119, CONDR ¹ 90-120, SG BLDM	DS VAC PMP LO M GEN BLDN LIQ VAC PUMP EXH F N LIQ SAMP RADI	RNG A SAMP RADMC	IR EXH MON MON HI RAE DN increasing) (~10-12 min d g count rate	elay)"			
1-M-5 Indication			showi	ng actual leve	el deviating (lov	w) from pro	ogram I	level	
T+35	Crew	Respond to ala							
	BOP	[1] CHECK 1- indication of				90-119 on	0-M-1	2 for	
	alar suc	m validity may b m, indicated resp h as blowdown m vdown transport	oonse o nonitor	of the rad mo	onitor, and, if p	ossible, ot	her ind	icatior	าร
	BOP	[2] IF alarm is Primary to S SRO/BOP dete	econd	ary Leakage	via Steam Ge	nerators.		68-13	7.5
Evaluator No	ote: SRO/crew package.	member may refe						rnovei	r
	BOP	[3] IF alarm is Leak.	valid,	THEN GO T	O AOP-R.01, \$	Steam Ger	nerator	Tube	
	BOP	[4] IF rad mon	iitor is	inoperable	STEP N/A				
	SRO	Direct entry to A high secondary		-					

Appendix D	Required Operator Actions					Form ES-D-2					
Op Test No.:	NRC 2010302	Scenario #	4	Event #	4	Page	12	of	44		
Event Descriptio	on: Stean	n Generator Tub	e Leak								

Time	Position	Applicant's Actions or Behavior						
		AOP-R.01, Steam Generator Tube Leak						
a.c		Section 2.1, S/G Tube Leak Requiring Rapid Shutdown						
		1. MONITOR if Pressurizer level can be maintained:						
		a. CONTROL charging flow USING FCV-62-93 and FCV-62-89 as						
		necessary to maintain Pzr level on program.						
		b. MONITOR pressurizer level STABLE or RISING.						
		(RNO may be implemented later)						
		RNO:						
		b. PERFORM the following:						
		1) ENSURE letdown isolated:						
		FCV-62-72 CLOSED						
		FCV-62-73 CLOSED						
		FCV-62-74 CLOSED						
		2) IF Pzr level continues to drop, THEN START additional CCP as						
		necessary.						
		IF Pzr level CANNOT be maintained greater than 5% OR loss of Pzr level imminent, THEN PERFORM the following:						
		1) TRIP the reactor.						
a		2) WHEN reactor is tripped, THEN INITIATE Safety Injection.						
		3) GO TO E-0, Reactor Trip or Safety Injection.						
	NOTE 1:	Appendix F or G can be used to estimate leak rate.						
aluator No		F and G are at the end of this event guide.						
	NOTE 2:	If letdown was isolated in Step 1, the leak rate may have exceeded the						
		capacity of one CCP in the normal charging alignment (EAL 1.2.2.P).						
		2. EVALUATE EPIP-1, Emergency Plan Classification Matrix.						
		NO Classification: RCS Identified leakage (Primary to Secondary leakage) is less than 25 gpm.						
	RO	3. MONITOR VCT level:						
		MAINTAIN VCT level greater than 13% USING auto or manual makeup						
		CHECK VCT makeup capability adequate to maintain level.						
		(RNO required when VCT make-up is required)						

Appendix D		Requ	ired Op	perator Actions			ES-D-2		
Op Test No.:	NRC 2010302	Scenario #	4	Event #	4	Page	13	of	44
Event Descriptio	on: Stear	n Generator Tub	e Leak						

Time	Position	Applicant's Actions or Behavior
	BO	RNO:
	RO	IF VCT level CANNOT be maintained, THEN PERFORM the following:
		a. ENSURE CCP suction aligned to RWST:
		1) OPEN LCV-62-135 and -136.
		2) CLOSE LCV-62-132 and 133.
		b. IF in Mode 1 or 2, THEN PERFORM the following:
		1) TRIP the reactor and GO TO E-0, Reactor Trip or Safety Injection
		 WHEN ES-0.1, Reactor Trip Response, is entered, THEN CONTINUE with Step 4 of this AOP
		4. MONITOR indications of leaking S/G:
		 a. NOTIFY Chem Lab to evaluate Primary to Secondary Leakage USING 1(2)-SI-CEM-068-137.5:
		 Method 1, Rapid Identification of Leaking Steam Generators
		 Method 3, Condenser Vacuum Exhaust (CVE) Sampling for Determination of Primary-to-Secondary (P/S) Leakage.
		b. NOTIFY RADCON to monitor Turbine Building and site environmen
		Steam lines
		S/G blowdown
		c. IDENTIFY leaking S/G(s) USING any of the following:
		 Unexpected rise in any S/G narrow range level OR
		 S/G sample results OR
		RADCON survey of main steamlines and S/G blowdown lines OR
		High radiation on any main steamline radiation monitor.
	1	- Ingritudiation of any main stoammo radiation monitor.

Appendix D		Required Operator Actions							ES-D-2
Op Test No.:	NRC 2010302	Scenario #	4	Event #	4	Page	14	of	44
Event Descriptio	n: Stear	n Generator Tub	e Leak						

Time	Position	Applicant's Actions or Behavior
		5. EVALUATE the following Tech Specs for applicability:
		3.4.6.2, Operational Leakage: Action c
		Reactor Coolant System leakage shall be limited to: c. 150 gallons per day of primary-to-secondary leakage through any one steam generator;
		ACTION: w/ primary-to-secondary leakage not w/i limits, HT STBY w/i 6 hrs & CD SHDN w/i following 30 hrs.
	NOTE:	Initiating shutdown required by Tech Specs requires 4 hour NRC notification per SPP-3.5, Regulatory Reporting Requirements.
Evaluator No.	ote: AOP-R.01	should be continued in parallel with AOP-C.03, Rapid Shutdown, and O. Refer to the next event guide for rapid shutdown
	SRO	6. INITIATE rapid shutdown by performing the following:
		a. ANNOUNCE S/G tube leak on PA system.
		 b. PERFORM rapid shutdown USING AOP-C.03 WHILE continuing in this section.
		c. ENSURE power reduced to less than 50% within one hour.
		d. ENSURE unit in Mode 3 within the following 2 hours.
	SRO	Implements unit shutdown to meet the 1-hour and 2 hour limits (SRO may handoff AOP-R.01 to BOP to perform single-performer while directing rapid shutdown)
	SRO	7. MINIMIZE Spread of contamination:
	BOP	 a. IF tube leak identified on S/G #1 AND S/G #4 is intact, THEN PERFORM the following:
	SRO	1) EVALUATE LCO 3.7.1.2.
		3.7.1.2, Auxiliary Feedwater (AFW) System
		ACTION: a. w/ 1 AFW train inoperable in MODE 1, 2, or 3, restore w/i 72 hrs or HT STBY w/i next 6 hrs & HT SHDN w/i following 12 hrs.
		-Surveillance Requirement: 4.7.1.2.1 At least once per 31 days, verify each AFW manual, power operated, and automatic valve in each water flow path, and in both steam supply flow paths to the steam turbine driven pump, that is not locked, sealed or otherwise secured in position, is in the correct position.
	D OD	
	BOP	2) CLOSE FCV-1-15 TDAFWP steam supply from S/G #1.
	BOP	3) ENSURE FCV-1-16 TDAFWP steam supply from S/G #4 OPEN.

Appendix D			Form ES-D-2						
Op Test No.:	NRC 2010302	Scenario #	4	Event #	4	Page	15	. of	44
Event Description	on: Stear	n Generator Tub	e Leak						

Time	Position	Applicant's Actions or Behavior							
	SRO	b. PERFORM EA-0-3, Minimizing Secondary Plant Contamination.							
	BOP	c. IF S/G blowdown is aligned to the river, THEN TERMINATE S/G Blowdown to river:							
		1) ENSURE S/G blowdown flow control FCV-15-43 CLOSED.							
		 DISPATCH operator to perform EA-15-1, Realigning S/G Blowdown to Cond DI. 							
		 WHEN EA-15-1 completed, THEN ADJUST FCV-15-43 to establish desired blowdown flow. 							
	BOP	d. NOTIFY Chem Lab to determine release rate for condenser vacuum exhaust USING 0-SI-CEM-030-415.0 and 0-SI-CEM-030-407.2.							
	ВОР	e. NOTIFY Chem Lab to evaluate rerouting steam generator sample drain lines to FDCT USING 0-TI-CEM-000-016.4.							
	BOP	 f. WHEN notified by Chemistry to bypass Condensate DI, THEN DISPATCH AUO to bypass polishers on affected unit: 							
		Unit 1 Only: PLACE 1-HS-14-3, Condensate Polisher Bypass Valve to OPEN. [Cond DI Bldg]							
		Unit 2 Only: Step N/A							
	SRO	g. EVALUATE Appendix C, Contingency Plan for Control and Processing of Large Volumes of Contaminated Water [C.5] .							
	RO	8. CHECK reactor trip breakers OPEN. (RNO required)							
	SRO	RNO: DO NOT CONTINUE this section UNTIL E-0 immediate actions are completed.							
	SRO	IF a reactor trip is directed, THEN GO TO E-0, <i>Reactor Trip or Safety Injection.</i>							

Appendix D		ns		F	orm E	S-D-2			
Op Test No.:	NRC 2010302	Scenario #	4	Event #	4	Page	16	of	44
Event Descriptio	on: Stea	m Generator Tube	e Leak						
Time	Position			A					

IIIIe	Position	Applicant's Actions or Behavior
	SRO	Direct Manual Rx Trip
	SRO	Enter and Direct E-0 Immediate Operator Actions (IOAs)
Lead Examir AOP-R.01 wi	ner may cue n Il not be com	ext event when AOP-C.03 Shutdown is in progress; the remainder of pleted due to the implementation of E-0, E-3.

Appendix D		Required Operator Actions	Fc	orm ES-D-2
Op Test No.:	NRC 2010302	Scenario # 4 Event # 4	Page 17	of44
Event Descriptio	on: Stea	m Generator Tube Leak		
			AOP-R.01	

APPENDIX F

Page 1 of 1

ESTIMATING RCS LEAK RATE USING CVCS FLOW BALANCE

NOTE 1 This method is recommended when leak requires rise in charging flow greater than ~10 gpm. Appendix G is more accurate for smaller leak rates.

NOTE 2 This appendix assumes RCS temperature and charging flow are approximately constant.

	INITIAL	FINAL	CHANGE
PZR Level			[1] (negative for level decrease)
Time			[2]
Charging Flow		[3]	
Letdown Flow		[4]	
Total RCP Seal Return Flow		[5]	

Pressurizer Level Conversion

I		zer level nge		conversion factor		Time Change		Pzr Level (positive		
		%	х	62 gal / %	÷		min	=		gpm
	step [1]] above	-		-	step [2] above	·		[6]	
				L	eak Rat	e Calculation				
Charging F	low	Letdown	Flow	Seal Retur Flow	n	Pzr Level Rate of Change		Instrument error correction factor		RCS Leak Rate
							+	3 gpm	=	gpm
step [3] abo	ove	step [4] a	lbove	step [5] abo	ve	step [6] above	_		-	
						<u></u>				

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Appendix D		Requ	uired Op	perator Actions			F	orm E	ES-D-2
Op Test No.: Event Descript	NRC 2010302	Scenario #	 e Leak	Event #	4	Page	18	of	44
	SQN	STEAL	M GENE	RATOR TUBE I	FAK	AOP	-R.01]	

Page	1	of	1
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APPENDIX G

ESTIMATING RCS LEAK RATE USING VCT AND PZR LEVEL

CAUTION This appendix CANNOT be used during VCT makeup, boration, or dilution.

NOTE This appendix assumes RCS temperature is approximately constant.

	VCT LEVEL (%)	PZR LEVEL (%)	TIME (min)
INITIAL			
FINAL			
CHANGE	[1]	[2]	[3]
	(positive for level decrease)	(positive for level decrease)	

VCT Level Conversion

VCT level change		conversion factor		Time Change	VCT Level Rate of Change (positive for level lowering)		
%	x	20 gal / %	_ ÷ _	min	=	gpm	
step [1] above				step [3] above		[4]	
		Pressu	<u>rizer L</u>	evel Conversion			
Pressurizer level change		conversion factor	Time Change		Pzr Level Rate of Change (positive for level lowering)		
%	X	62 gal / %	- ÷	min	=	gpm	
step [2] above				step [3] above		[5]	
		Lei	ak Rat	e Calculation			
VCT Level			r Level	• • • • • •	S Le	ak Rate	
Rate of Change		Rate o	of Chai	nge			
		+				gpm	
step [4] abov	step [5] abo	ve				

Appendix D		Req	uired Op	erator Action	S		Fo	Form ES-D-2		
Op Test No.:	NRC 2010302	Scenario #	4	Event #	5, 6	Page	19	of	44	
Event Descriptio	on: Rap	oid plant shutdowr	n, Rapid Be	oration Valve fai	ls to open; RWST (use for rapic	l shutdo	wn		
Time	Position	I		Applicant's	Actions or Behav	vior				
	perator: No ac	tion required	for Ever	nt 5; Verify E	vent 6 actuate	s as expe	ected			
	s/Indications Shutdown: N/A	L .								
1-M-6										
with h	62-138A, EMERG andswitch in the 2-137A, EMERG	e 'OPEN' positi	on.			s closed (GREEN	l light	lit)	
T+50					OP-C.03, Rapio	d Shutdow	n or l	oad		
	SRO	Reduction.						ouu		
	SRO	1. ENSURE USING A	crew ha	as been briefe E.	ed on reactivity	managem	ient ex	pecta	tions	
	Crew	Load (CheminicationRADC	Coordina istry	itor	f rapid shutdowr	n or load r	reductio	on:		
	BOP/RO	3. MONITO and Turbi			NOT required U	I SING Ap	pendix	A, Re	eactor	
	BOP/RO	4. CHECK	/ALVE F	POSITION LI	MIT light DARK	on EHC p	oanel. [M-2]		
					on volume and f adjusted as nec		n the f	ollowi	ng	
	RO/SRO		-		ERFORM the fo	ollowing:				
					ration volume:					
		• ~800 OR	gal to re	auce power f	rom 100% to 20)%				
		• 10 ga OR	l for eacl	n 1% power r	eduction					
			ie recom	mended by F	Reactor Enginee	ering				

Appendix D		Required Operator Actions						Form ES-				
Op Test No.:	NRC 2010302	Scenario #	4	Event #	5, 6	Page	20	of	44			
Event Descriptio	n: Rapio	d plant shutdown	, Rapid E	Boration Valve fai	ls to open; RWS1	use for rapic	l shutdo	own				

Time Position Applicant's Actions or Behavior b. DETERMINE recommended boration flowrate from table below or from SRO **Reactor Engineering:** (SRO discretion may be used to determine reduction rate) **TURBINE LOAD** BORATION **REDUCTION RATE FLOWRATE** (%/min) 1% ~15 gpm 2% ~30 gpm 3% ~45 apm

	4%		~70 gpm									
RO	c. ENSURE conc and flowrate.	currence ob	tained from US and STA	for boration volume								
RO	d. PLACE boric	acid transfe	er pump aligned to blend	er in FAST speed.								
RO		/-62-138 to	establish desired flow ra	te.								
	(RNO required)	RNO required)										
	RNO:											
	INITIATE normal b	boration US	SING Appendix D (follow	ving).								
		APPENDIX D										
		N	ORMAL BORATION									
RO	[1] PLACE [HS	-62-140A	Makeup Control to ST	OP position.								
RO			Makeup mode selecto									
	Acid controller se flow is ~45 gpm.	etting is tw	vice the desired flow ra	te. Maximum Boric								
RO	[3] ADJUST [For rate.	C-62-139]	BA flow controller set	point for desired flow								
RO	[4] ADJUST [Fe boric acid volu		BA integrator (batch o	counter) to desired								

Appendix D		erator Actior	าร		F	orm E	ES-D-2		
Op Test No.:	NRC 2010302	Scenario #	4	Event #	5, 6	Page	21	of	44

Event Description:

Rapid plant shutdown, Rapid Boration Valve fails to open; RWST use for rapid shutdown

Time	Position	Applicant's Actions or Behavior					
	RO	[5] PLACE [HS-62-140A] Makeup Control Switch mode selector switch to START.					
	RO	[6] IF desired boric acid flow rate NOT obtained, THEN ADJUST one or both of the following as necessary:					
		[FC-62-139] BA flow controller					
		recirculation valve for BAT aligned to blender.					
	RO	[7] ENSURE desired boric acid flow indicated on FI-62-139.					
		[8] WHEN required boric acid volume has been added, THEN PERFORM the following:					
	RO	[a] PLACE [HS-62-140A], Makeup Control to STOP position.					
	RO	[b] ENSURE [FC-62-142], Primary Water to Blender Flow Controller in AUTO with dial indicator set at 35%.					
	RO	[c] ADJUST [FC-62-139], Boric Acid Flow Controller to desired					
		blend solution USING TI-44 Boron Tables.					
	RO	[d] PLACE [HS-62-140B], Makeup Mode Selector Switch in AUTO position.					
	RO	[e] PLACE [HS-62-140A], Makeup Control to START.					
		AOP-C.03 Step 5.f continued					
	RO	f. CONTROL boration flow as required to inject desired boric acid volume					

Appendix D		Requ	Form ES-D-						
Op Test No.:	NRC 2010302	Scenario #	4	Event #	5, 6	Page	22	of	44

Event Description: Rapid plant shutdown, Rapid Boration Valve fails to open; RWST use for rapid shutdown

Time	Position	Applicant's Actions or Behavior							
	SRO	g. GO TO Step 7.							
	RO	 IF borating from RWST, THEN INITIATE boration to maintain control rods above low-low insertion limit; 							
		a. OPEN LCV-62-135 or -136.							
		b. CLOSE LCV-62-132 or -133.							
	SRO	7. INITIATE load reduction as follows:							
	RO	a. ADJUST load rate to desired value:							
		(SRO/RO chooses Normal Boration rates)							
		 between 1% and 4% per minute if borating via FCV-62-138 OR 							
		 between 1% and 3% per minute if borating via normal boration 							
•••••••••••••••••••••••••••••••••••••••	-	(App. D)							
		b. ADJUST setter for desired power level:							
		DESIRED RECOMMENDED RX POWER LEVEL SETTER VALUE							
		90% 76							
		80% 56							
		70% 46							
		60% 40							
		50% 35							
		40% 30							
		30% 25							
		20% or less 15							
	POD	a INITIATE turbing load reduction by depressing CO such butter							
	BOP	c. INITIATE turbine load reduction by depressing GO pushbutton.							

Appendix D		Required Operator Actions					Form ES-D-2			
]	
Op Test No.:	NRC 2010302	Scenario #	4	Event #	5, 6	Page	23	of	44	

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of

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Event Description: Rapid plant shutdown, Rapid Boration Valve fails to open; RWST use for rapid shutdown

Time	Position	Applicant's Actions or Behavior
		d. CONTROL turbine load reduction as necessary to reduce power to desired level.
	RO	8. MONITOR T-avg/T-ref mismatch:
	RO	a. CHECK T-ref indication AVAILABLE.
		(RNO required due to previous failure –PT-1-73, MANUAL Rod Control,
	RO/	 b. MONITOR automatic rod control maintaining T-avg/T-ref mismatch less than 3°F.
	SRO	(RNO required; however b. part 1 is not applicable since AUTO Rod Control is not available.)
		RNO:
		b. Part 1: IF auto rod control is functional… N/A
	RO	b. Part 2: IF any of the following conditions met:
		 auto rod control NOT functional OR
		 turbine load rate adjustment is NOT effective in reducing mismatch OR
		 situation does NOT allow slowing down load reduction,
	RO/ SRO	THEN RESTORE T-avg to within 3°F of T-ref USING manual rod control as necessary.
	RO/ SRO	b. Part 3: IF T-avg/T-ref mismatch CANNOT be maintained less than 5°F, THEN TRIP the reactor and GO TO E-0, Reactor Trip or Safety Injection
	BOP	9. MONITOR automatic control of MFW pump speed AVAILABLE.
	BOP	10. STOP secondary plant equipment USING Appendix B, Secondary Plant Equipment.
	<u> </u>	1

Appendix D			Form ES-D						
Op Test No.:	NRC 2010302	Scenario #	4	Event #	5, 6	Page	24	of	44
Event Description	on: Rapi	d plant shutdown	, Rapid E	Boration Valve fail	s to open; RWST	use for rapic	d shutdo	wn	

Time	Position	Applicant's Actions or Behavior
	raise	FM thermal power (U2118) is inoperable, rod insertion limit curve must be ed by 3 steps. Rod insertion limit alarms and ICS display are NOT matically adjusted when LEFM is inoperable.
	RO	11. MONITOR control rods above low-low insertion limit USING ICS or COLR.
		RNO (if required):
		ENSURE boration flow greater than applicable value:
		35 gpm from BAT
		OR
		90 gpm from RWST.
		REDUCE turbine load rate as necessary.
Evaluator N	Note: Additiona	I AOP-C.03 Steps not included as required power reduction should be
	complete	at or around this step.
When desir	red, the Lead Ex	aminer may cue the next event.

Appendix D	Required Operator Actions							Form ES-D-2		
Op Test No.:	NRC 2010302	Scenario #	4	Event #	7, 8, 9	Page	25	of	44	
Event Descriptio	#1 S	G MSIV Auto/Ma	inual clo	se failure;	d Safety Injection; S depressurization	in E-3				

Time	Position								
Simulator Op	Event	7- Increase SGTR to 8.6 severity (400 gpm) with 300 second ramp; 8- Verify expected actuation; DELETE as directed; 9- Insert Pressurizer Spray Valve failures- BOTH full open after they are							
	//	opened for E-3 RCS depressurization.							
Annunicators	/Indications A	vailable:							
Indications: 1-M-4									
	339A, 335A, 32	0A, RCS PZR LEVEL indicators decreasing							
1-M-5	2.340 PCS P7P	PRESS recorder trending down							
• 1-LR-68	-339 RCS PZR	LEVEL recorder trending down							
		, 322 RCS PZR PRESS indicators decreasing							
• 1-FI-68-		G HDR FLOW indicator increasing							
1-M-30									
• 1-RI-90-	421, WAIN STE	AM RAD MONITOR increasing counts							
		AOP-R.01 Step 1 RNO:							
		IF Pzr level CANNOT be maintained greater than 5% OR loss of Pzr level is imminent, THEN PERFORM the following:							
		1) TRIP the reactor.							
		2) WHEN reactor is tripped, THEN INITIATE Safety Injection.							
		3) GO TO E-0, Reactor Trip or Safety Injection.							
	SRO	Direct Manual Reactor Trip and Safety Injection based on pressurizer level loss imminent from AOP-R.01 Step 1 RNO.							
	RO	Manually Trip Reactor and initiate SI.							
	SRO	Enter and direct performance of E-0, Reactor Trip Or Safety Injection.							
Evaluator Not	surveys l discovery	g IOA performance, prior to Steps 1-4 immediate action verification, RO/BOP MCBs for any expected automatic system response that failed to occur. Upon y, they may take manual action(s) to align plant systems as expected for the progress. (Ref. EPM-4, Prudent Operator Actions)							

Appendix D	Required Operator Actions						Form ES-D-2		
Op Test No.:	NRC 2010302	Scenario #	4	Event #	7, 8, 9	Page	26	of	44
Event Descriptio	#1 S	G MSIV Auto/Ma	nual clos	se failure;	l Safety Injection; 6 depressurization i	in E-3			

Time	Position	Applicant's Actions or Behavior									
		E-0, Reactor Trip or Safety Injection									
Critical Task:	Equalize p	ressure between RCS and ruptured SG to stop primary to secondary leakage									
	(40 minute	(40 minutes)									
START TIME:	<u></u>										
END TIME:		(pg 36)									
	Note 1 Step	s 1 through 4 are immediate action steps									
		procedure has a foldout page									
		1. VERIFY reactor TRIPPED:									
		 Reactor trip breakers OPEN Reactor trip bypass breakers DISCONNECTED or OPEN 									
	RO	Neutron flux DROPPING									
		Rod bottom lights LIT									
		 Rod position indicators less than or equal to 12 steps. 									
		2. VERIFY turbine TRIPPED:									
	BOP	Turbine stop valves CLOSED.									
		3. VERIFY at least one train of shutdown boards ENERGIZED.									
	BOP	 Attempt to restore power to at least ONE train of shutdown boards Place DG 1A-A control switch in START 									
		 Verify Train A Shutdown Boards ENERGIZED 									
		4. DETERMINE if SI actuated:									
	RO	ECCS pumps RUNNING.									
	-	Any SI alarm LIT [M-4D] (SI will be actuated)									
Evaluator Not	e: ES-0.5 incl	uding appendices are contained in attachment at back of scenario guide									
	BOP	 PERFORM ES-0.5, Equipment Verifications WHILE continuing in this procedure. 									

Appendix D	Required Operator Actions							Form ES-D-2		
Op Test No.:	NRC 2010302	Scenario #	4	Event #	7, 8, 9	Page	27	of	44	
Event Descriptio	#1 S	G MSIV Auto/Ma	inual clos	se failure;	nd Safety Injection; CS depressurization	in E-3				

	Applicant's Actions or Behavior						
RO/BOP	6. DETERMINE if secondary heat sink available:						
	 a. CHECK total AFW flow greater than 440 gpm. b. CHECK narrow range level greater than 10% [25 ADV] in at least one S/G. 						
	 c. CONTROL feed flow to maintain narrow range level between 10% [25% ADV] and 50% in all S/Gs. 						
	(Heat Sink is available from AFW: if >440 gpm available.)						
RO	7. CHECK if main steam lines should be isolated:						
	a. CHECK if any of the following conditions have occurred:						
	 Any S/G pressure less than 600 psig OR 						
	 Any S/G pressure dropping UNCONTROLLED. OR 						
	Phase B actuation						
	b. ENSURE MSIVs and MSIV bypass valves CLOSED						
	c. ENSURE applicable Foldout Page actions COMPLETED						
RO	8. CHECK RCP trip criteria:						
	 a. CHECK the following: RCS pressure less than 1250 psig. 						
	AND						
	 At least one CCP OR SI pump RUNNING (RNO required) 						
	RNO:						
	a. GO TO Step 9.						
RO	 9. MONITOR RCS temperatures: IF any RCP running, THEN CHECK T-avg stable at or trending between 547°F and 552°F. 						
	RO						

Appendix D **Required Operator Actions** Form ES-D-2 Op Test No.: NRC 2010302 Scenario # 4 Event # 7, 8, 9 Page 28 44 of Event Description: SGTL increases to SGTR requiring Rx Trip and Safety Injection; #1 SG MSIV Auto/Manual close failure; Both Pzr Spray Valves fail full open during RCS depressurization in E-3

Time	Position	Applicant's Actions or Behavior
		OR • IF RCPs stopped… N/A (RNO required)
		RNO: RCPs are running
		IF temperature less than 547°F and dropping, THEN PERFORM the following:
		a. ENSURE steam dumps and atmospheric reliefs CLOSED.
		 b. IF cooldown continues, THEN CONTROL total feed flow: 1) ENSURE total AEW/ flow loss than or equal to 600 gram.
		 ENSURE total AFW flow less than or equal to 600 gpm. MAINTAIN total AFW flow greater than 440 gpm UNTIL narrow range level is greater than 10% [25% ADV] in at least one S/G.
		c. IF cooldown continues after AFW flow is controlled, THEN CLOSE
		MSIVs and MSIV bypass valves. d. IF temperature greater than 552°F… N/A
	RO	 10. CHECK pressurizer PORVs, safeties, and spray valves: a. Pressurizer PORVs CLOSED. b. Pressurizer safety valves CLOSED. c. Normal spray valves CLOSED.
		 d. Power to at least one block valve AVAILABLE. e. At least one block valve OPEN.
	CREW	 11. DETERMINE S/G secondary pressure boundaries are INTACT: CHECK all S/G pressures CONTROLLED or RISING.
		CHECK all S/G pressures greater than 140 psig.
	CREW	12. DETERMINE if S/G tubes are INTACT:
		All S/G narrow range levels CONTROLLED or DROPPING.
		 Secondary radiation NORMAL USING Appendix A, Secondary Rad Monitors. (App. A performed in ES-0.5). (RNO required)
		RNO: IF any S/G has level rising in an uncontrolled manner OR has high radiation, THEN PERFORM the following:

Appendix D	Required Operator Actions							Form ES-D-2		
Op Test No.:	NRC 2010302	Scenario #	4	Event #	7, 8, 9	Page	29	of	44	
Event Descriptio	#1 \$	SG MSIV Auto/Ma	anual clos	se failure;	id Safety Injection; S depressurization	in E-3				

Time	Position	Applicant's Actions or Behavior
Wher Board STAT		2.a, MONITOR status trees, the crew will implement status tree monitoring via SPDS. RED or ORANGE path status tree is observed, the SRO will designate one of the erators (typically the BOP) to verify status tree conditions using 1-FR-0, UNIT 1 TREES . Once verified, the SRO should direct the crew to transition to the te RED and/or ORANGE path procedure(s).
		a. MONITOR status trees.
		b. GO TO E-3, Steam Generator Tube Rupture.
		Crew transitions to E-3, Steam Generator Tube Rupture.
	SRO	Enter and direct performance of E-3 Steam Generator Tube rupture.

Appendix D	Required Operator Actions							Form ES-D-2		
Op Test No.:	NRC 2010302	Scenario #	4	Event #	7, 8, 9	Page	30	of	44	
Event Descriptio	#1 S	G MSIV Auto/Ma	anual clo	se failure;	d Safety Injection; S depressurization	in E-3				

Time	Position	Applicant's Actions or Behavior
		E-3, Steam Generator Tube Rupture
		1. MONITOR at least one RCP RUNNING.
		2. MONITOR RCP trip criteria:
		a. CHECK the following:
		 RCS pressure less than 1250 psig AND
		At least one CCP OR SI pump RUNNING. (<i>RNO required</i>)
		RNO: . GO TO Step 3
		3. MONITOR RCP trip criteria:
		a. IDENTIFY Ruptured S/G(s) as indicated by any of the following:
		 Unexpected rise in any S/G narrow range level.
		OR
		High radiation from any S/G sample.
		OR A DCON survey of main steem lines and S/C blowdown lines
		 RADCON survey of main steam lines and S/G blowdown lines. OR
		 High radiation on any main steamline radiation monitor.
	CAUTION:	Isolating both steam supplies to the TD AFW pump when it is the only source of feed flow will result in loss of secondary heat sink
Evaluator No	ote: Critical Ta Cooldown i	ask is to Isolate Steam flow and Feedwater flow to ruptured S/G prior to RCS initiation.
		4 & 5 inclusive completes operator-directed actions to isolate the Ruptured hus to complete this Critical Task .
Critical Task		4. ISOLATE flow from Ruptured S/G(s):
		a. ADJUST Ruptured S/G(s) atmospheric relief controller setpoint to 87% in AUTO. (1040 psig)

Appendix D

Required Operator Actions

Form ES-D-2

Op Test No.:	NRC 2010302	Scenario #	4	Event #	7, 8, 9	Page	31	of	44
Event Descriptio	#1 S	G MSIV Auto/Ma	inual clo	se failure;	d Safety Injection; S depressurization i	n E-3			

Time	Position	Applicant's Actions or Behavior
		E-3, Steam Generator Tube Rupture
		 b. CHECK Ruptured S/G(s) atmospheric relief hand switch in P-AUTO and valve(s) CLOSED.
Evaluator Not	e: Realigning	TDAFW to S/G #4 not required since TDAFW pump is Tagged out of service.
	BOP	 c. CLOSE TD AFW pump steam supply from Ruptured S/G FCV-1-15 (S/G #1) or FCV-1-16 (S/G #4).
	BOP	d. VERIFY Ruptured S/G(s) blowdown isolation valves CLOSED.
Evaluator Not	ruptured M close when The crew v	IV, the ruptured S/G MSIV, will not close requiring isolation of the non- ISIVs, other steam paths both from the MCR and locally. #1 S/G MSIV will n EA-1-1, Closing MSIVs Locally, E-3 alternate path actions, is implemented. will complete the cooldown on the intact SG atmospheric relief valves. IV should be closed prior to RCS Cooldown initiation in Step 8
	BOP	e. CLOSE Ruptured S/G(s) MSIV and MSIV bypass valve.
		(RNO required) RNO: . PERFORM the following:
	BOP	1) CLOSE Intact S/G MSIVs and MSIV bypass valves.
	BOP	 DISPATCH operator to perform EA-1-1, Closing MSIVs Locally, for any MSIV or MSIV bypass valve which fails to close.
	BOP	3) ISOLATE steam header:
		PLACE condenser steam dumps in OFF. [M-4]
		ENSURE steam dump valves CLOSED. [M-4]
		CLOSE FCV-47-180, HP Steam Seal Supply Isolation. [M-2]
		 ENSURE FCV-47-181 HP Steam Seal Supply Bypass CLOSED. [M-2]
		CLOSE MSR HP steam supply isolation valves. [M-2]
		 DISPATCH operator to locally isolate steam header USING EA-1-4, Local Isolation of Steam Header in Turb Bldg.

Appendix D

Required Operator Actions

Form ES-D-2

Op Test No.:	NRC 2010302	Scenario #	4	Event #	7, 8, 9	Page	32	of	44
Event Descriptio	#1 S	G MSIV Auto/Ma	anual clos	se failure;	l Safety Injection; 6 depressurization i	in E-3			

Time	Position	Applicant's Actions or Behavior
		E-3, Steam Generator Tube Rupture
	BOP	4) USE Intact S/G(s) atmospheric relief for steam dump.
Critical Task	BOP	5. MONITOR Ruptured S/G(s) level:
		a. CHECK narrow range level greater than 10% [25% ADV].
		 b. WHEN ruptured S/G level is greater than 10% [25% ADV], THEN PERFORM the following:
		1) STOP feed flow to ruptured S/G.
		2) ENSURE Turbine Driven AFW LCV for ruptured S/G in CLOSE PULL TO LOCK
	BOP	6. VERIFY Ruptured S/G ISOLATED from Intact S/G(s):
		a. CHECK narrow range level greater than 10% [25% ADV].
		 Ruptured S/G MSIVs and MSIV bypass valves CLOSED OR
		 MSIV(s) and MSIV bypass valve(s) CLOSED on Intact S/G(s) to be used for RCS cooldown.
	BOP	b. CHECK S/G #1 or S/G #4 ruptured.
	BOP	c. CHECK TDAFW pump steam supply from ruptured S/G ISOLATED:
		• FCV-1-15 (S/G #1) or FCV-1-16 (S/G #4) CLOSED
	BOP	 CHECK Ruptured S/G pressure greater than 550 psig (<u>Unit 1</u>) or 425 psig (<u>Unit 2</u>).
	1	Blocking low steamline pressure SI as soon as pressurizer pressure is less than 1960 psig will prevent an inadvertent MSIV closure and keep the condenser available for steam dump.
	N N	After the low steamline pressure SI signal is blocked, main steamline isolation will occur if the high steam pressure rate setpoint is exceeded.
		The 1250 psig RCP trip criterion is NOT applicable after RCS cooldown is initiated in the following step.
		8. INITIATE RCS cooldown:
	BOP/	a. DETERMINE target core exit T/C temperature based on Ruptured

Appendix D **Required Operator Actions** Form ES-D-2 Op Test No.: NRC 2010302 Scenario # 4 Event # 7, 8, 9 Page 33 of 44 Event Description: SGTL increases to SGTR requiring Rx Trip and Safety Injection; #1 SG MSIV Auto/Manual close failure; Both Pzr Spray Valves fail full open during RCS depressurization in E-3

Time	Position	Applicant's Actions or Behavior						
		E-3, Steam Generator Tube Ru	pture					
	SRO	S/G pressure:						
		Lowest Ruptured S/G pressure (psig)	Target Core Exit T/C Temp (°F)					
		1100 or greater	497					
		1050 - 1099	492					
		1000 - 1049	486					
		950 - 999	480					
		900 - 949	473					
		850 - 899	467					
		800 - 849	460					
		750 - 799	453					
		700 - 749	445					
		650 - 699	437					
		600 - 649	428					
		550 - 599	419					
		500 - 549	410					
		450 - 499	399					
		425 - 449	393					
	BOP/ RO	 b. WHEN RCS pressure less th following: 	an 1960 psig, THEN PERFORM the					
		1) BLOCK low steamline pre	essure SI.					
		 2) CHECK STEAMLINE PRESS ISOL/SI BLOCK RATE ISOL ENABLE permissive LIT. [M-4A, A4] 						
	BOP/ Crew	c. DUMP steam to condenser fro achievable rate: (RNO required MSIVs closed)	om Intact S/G(s) at maximum					
	BOP	 c IF steam dumps NOT available, THEN OPEN atmospheric relief values or Intact S/G(s) RAISE AFW flow to intact S/Gs as necessary to support cooldown. IF local control of atmospheric reliefs N/A IF NO Intact S/G available N/A 						
	SRO	d. WHEN core exit T/Cs less the Substep 8.a,	an target temperature determined in					

Form ES-D-2 Appendix D **Required Operator Actions** Op Test No .: NRC 2010302 Scenario # Event # 4 7, 8, 9 Page 34 of 44 Event Description: SGTL increases to SGTR requiring Rx Trip and Safety Injection; #1 SG MSIV Auto/Manual close failure; Both Pzr Spray Valves fail full open during RCS depressurization in E-3

Time	Position	Applicant's Actions or Behavior
		E-3, Steam Generator Tube Rupture
		THEN PERFORM the following:
	BOP	1) CLOSE steam dumps or S/G atmospheric reliefs to stop
		cooldown.
		2) REDUCE AFW flow as necessary to stop cooldown.
	BOP	MAINTAIN total feed flow
		greater than 440 gpm UNTIL level
		greater than 10% [25% ADV]
·····		in at least one Intact S/G.
		3) MAINTAIN core exit T/Cs less than target temperature USING
	BOP	steam dumps or atmospheric reliefs.
	BOP	9. MAINTAIN Intact S/G narrow range levels:
		a. Greater than 10% [25% ADV]
		b. Between 20% [25% ADV] and 50%.
	CAUTION:	Any time a pressurizer PORV opens, there is a possibility that it may
		stick open.
	RO	10. MONITOR pressurizer PORVs and block valves:
		a. Power to block valves AVAILABLE
		b. Pressurizer PORVs CLOSED
		c. At least one block valve OPEN.
······	RO	11. RESET SI signal.
	Crew	12. MONITOR AC busses energized from start busses.
	RO	13. ENSURE Phase A and Phase B RESET.

Appendix D	Required Operator Actions Form ES								S-D-2
Op Test No.:	NRC 2010302	Scenario #	4	Event #	7, 8, 9	Page	35	of	44
Event Descriptio		L increases to SG G MSIV Auto/Ma			d Safety Injection;	_		• •	
	Both	Pzr Spray Valves	s fail full (open during RC	S depressurization in	n E-3			

Time	Position	Applicant's Actions or Behavior
		E-3, Steam Generator Tube Rupture
	RO	14. CHECK control air established to containment: [Panel 6K and 6L]
		1-FCV-32-80 (2-FCV-32-81) Train A essential air OPEN
		1-FCV-32-102 (2-FCV-32-103) Train B essential air OPEN
		1-FCV-32-110 (2-FCV-32-111) non-essential air OPEN.
		15. DETERMINE if RHR pumps should be stopped:
		a. CHECK RHR pump suction aligned from RWST
		b. CHECK RCS pressure greater than 300 psig.
		c. STOP RHR pumps and PLACE in A-AUTO.
		d. MONITOR RCS pressure greater than 300 psig.
		(RNO for reference)
Evaluator No	ote: Critical	IF RCS pressure dropping uncontrolled, THEN START RHR pumps.
Evaluator No	ote: Critical depressu	Task is to Cooldown RCS to less than or equal to target temperature prior to RCS
Critical		Task is to Cooldown RCS to less than or equal to target temperature prior to RCS urization
Critical		Task is to Cooldown RCS to less than or equal to target temperature prior to RCS urization 16. CHECK if RCS cooldown should be stopped: a. CHECK core exit T/Cs less than target temperature determined
Evaluator No Critical Task		Task is to Cooldown RCS to less than or equal to target temperature prior to RCS urization 16. CHECK if RCS cooldown should be stopped: a. CHECK core exit T/Cs less than target temperature determined in Substep 8.a.
Critical		Task is to Cooldown RCS to less than or equal to target temperature prior to RCS urization 16. CHECK if RCS cooldown should be stopped: a. CHECK core exit T/Cs less than target temperature determined in Substep 8.a. b. CLOSE steam dumps or atmospheric reliefs to stop cooldown.
Critical		Task is to Cooldown RCS to less than or equal to target temperature prior to RCS urization 16. CHECK if RCS cooldown should be stopped: a. CHECK core exit T/Cs less than target temperature determined in Substep 8.a. b. CLOSE steam dumps or atmospheric reliefs to stop cooldown. c. REDUCE AFW flow as necessary to stop cooldown. MAINTAIN total feed flow greater than 440 gpm UNTIL level greater than 10% [25% ADV] in at least one Intact S/G. d. MAINTAIN core exit T/Cs less than target temperature USING steam
Critical		Task is to Cooldown RCS to less than or equal to target temperature prior to RCS urization 16. CHECK if RCS cooldown should be stopped: a. CHECK core exit T/Cs less than target temperature determined in Substep 8.a. b. CLOSE steam dumps or atmospheric reliefs to stop cooldown. c. REDUCE AFW flow as necessary to stop cooldown. MAINTAIN total feed flow greater than 440 gpm UNTIL level greater than 10% [25% ADV] in at least one Intact S/G.
Critical		Task is to Cooldown RCS to less than or equal to target temperature prior to RCS urization 16. CHECK if RCS cooldown should be stopped: a. CHECK core exit T/Cs less than target temperature determined in Substep 8.a. b. CLOSE steam dumps or atmospheric reliefs to stop cooldown. c. REDUCE AFW flow as necessary to stop cooldown. MAINTAIN total feed flow greater than 440 gpm UNTIL level greater than 10% [25% ADV] in at least one Intact S/G. d. MAINTAIN core exit T/Cs less than target temperature USING steam
Critical		Task is to Cooldown RCS to less than or equal to target temperature prior to RCS urization 16. CHECK if RCS cooldown should be stopped: a. CHECK core exit T/Cs less than target temperature determined in Substep 8.a. b. CLOSE steam dumps or atmospheric reliefs to stop cooldown. c. REDUCE AFW flow as necessary to stop cooldown. MAINTAIN total feed flow greater than 440 gpm UNTIL level greater than 10% [25% ADV] in at least one Intact S/G. d. MAINTAIN core exit T/Cs less than target temperature USING steam dumps or atmospheric reliefs.
Critical		Task is to Cooldown RCS to less than or equal to target temperature prior to RCS urization 16. CHECK if RCS cooldown should be stopped: a. CHECK core exit T/Cs less than target temperature determined in Substep 8.a. b. CLOSE steam dumps or atmospheric reliefs to stop cooldown. c. REDUCE AFW flow as necessary to stop cooldown. MAINTAIN total feed flow greater than 440 gpm UNTIL level greater than 10% [25% ADV] in at least one Intact S/G. d. MAINTAIN core exit T/Cs less than target temperature USING steam dumps or atmospheric reliefs. 17. CHECK Ruptured S/G(s) pressure STABLE or RISING.
Critical		Task is to Cooldown RCS to less than or equal to target temperature prior to RCS urization 16. CHECK if RCS cooldown should be stopped: a. CHECK core exit T/Cs less than target temperature determined in Substep 8.a. b. CLOSE steam dumps or atmospheric reliefs to stop cooldown. c. REDUCE AFW flow as necessary to stop cooldown. MAINTAIN total feed flow greater than 440 gpm UNTIL level greater than 10% [25% ADV] in at least one Intact S/G. d. MAINTAIN core exit T/Cs less than target temperature USING steam dumps or atmospheric reliefs. 17. CHECK Ruptured S/G(s) pressure STABLE or RISING. 18. CHECK RCS subcooling based on core exit T/Cs greater than 60°F.

Appendix D	Required Operator Actions								Form ES-D-2			
Op Test No.:	NRC 2010302	Scenario #	4	Event #	7, 8, 9	Page	36	of	44			
Event Descriptio	#1 S	G MSIV Auto/Ma	anual clo	se failure;	d Safety Injection; S depressurization	in E-3						

Time	Position	Applicant's Actions or Behavior
		E-3, Steam Generator Tube Rupture
<u></u>		c. CHECK depressurization rate ADEQUATE.
Evaluator Note: START TIME: _ END TIME:	Critical Ta	ask: Equalize pressure between RCS and ruptured SG to stop primary to secondary leakage (40 minutes)
Critical		d. CONTINUE depressurization UNTIL any of the following
Task		conditions SATISFIED:
		 Both of the following: 1) RCS pressure less than Ruptured S/G(s) pressure AND
		2) Pressurizer level greater than 10% [20% ADV]. OR
		 Pressurizer level greater than 65%. OR
		• RCS subcooling based on core exit T/Cs less than 40°F.
Evaluator Note:	BOTH P Crew im	2 spray valve full open (Key 6) . zr Spray Valves are failed open following operator-demanded positioning; plements RNO to stop RCPs as necessary; 2 RCPs, #s 1 & 2 should be to stop the pressure decay.
	aucyuau	e. CLOSE spray valve(s):
· · · · · · · · · · · · · · · · · · ·	RO	1) Normal spray valves
Evaluator Note:		(RNO required) Task: Terminate RCS depressurization prior to losing RCS Subcooling is shed by stopping RCPs as procedurally directed in the following step.
Critical Task	RO	RNO: 1) STOP RCPs #1 and 2.
		IF RCS pressure continues to drop, THEN STOP additional RCP as necessary.
	RO	2) Auxiliary spray valves.
Appendix D		NUREG 1021 Revision

Appendix D	Required Operator Actions							Form ES-D-2		
Op Test No.:	NRC 2010302	Scenario #	4	Event #	7, 8, 9	Page	37	of	44	
Event Descriptio		_ increases to SG G MSIV Auto/Ma	-	•	nd Safety Injection;					
					CS depressurization i	n E-3				

Time	Position	Applicant's Actions or Behavior
		E-3, Steam Generator Tube Rupture
	RO	f. GO TO Caution prior to Step 22
Evaluator N		wing PORV depressurization steps are included as the crew may decide, based
		procedural pace to this point, that Pzr Spray Flow depressurization rate is ate and, therefore use the Pzr PORVs to complete the RCS depressurization.
	CAUTION:	 Depressurizing the RCS using a pressurizer PORV may cause PRT rupture with resulting abnormal containment conditions.
		 Excessive cycling of a pressurizer PORV increases the potential for PORV failure.
		per head voiding may occur during RCS depressurization if no RCPs are ning. This may result in rapidly rising pressurizer level
de ad hade offen menning a series and an and		20. DEPRESSURIZE RCS USING one pressurizer PORV to minimize break flow and to refill pressurizer:
		a. CHECK at least one pressurizer PORV AVAILABLE
		 OPEN one pressurizer PORV UNTIL any of the following conditions SATISFIED:
		Both of the following:
		1) RCS pressure less than Ruptured S/G(s) pressure
		AND 2) Pressurizer level greater than 10% [20% ADV].
		OR
		Pressurizer level greater than 65%.
		OR
		 RCS subcooling based on core exit T/Cs less than 40□F.
		c. CLOSE pressurizer PORV.
		d. CLOSE spray valve(s):
	RO	 Normal spray valves (RNO required)
	RO	RNO: 1) STOP RCPs #1 and 2.
		IF RCS pressure continues to drop, THEN STOP additional RCP as necessary.
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Appendix D Form ES-D-2 **Required Operator Actions** Op Test No.: NRC 2010302 Scenario # 4 Event # 7, 8, 9 Page 38 of 44 Event Description: SGTL increases to SGTR requiring Rx Trip and Safety Injection; #1 SG MSIV Auto/Manual close failure; Both Pzr Spray Valves fail full open during RCS depressurization in E-3

Time	Position	Applicant's Actions or Behavior
		E-3, Steam Generator Tube Rupture
	RO	2) Auxiliary spray valves.
		21. CHECK RCS pressure RISING
	CAUTION:	Any delay in terminating SI after termination criteria are met may cause Ruptured S/G(s) overfill.
		22. CHECK if ECCS flow should be terminated:
		 RCS subcooling based on core exit T/Cs greater than 40°F.
		Secondary heat sink:
		 Narrow range level in at least one Intact S/G greater than 10% [25% ADV] OR
		Total feed flow to S/Gs greater than 440 gpm AVAILABLE
		RCS pressure STABLE or RISING.
		Pressurizer level greater than 10% [20% ADV].
		23. STOP the following ECCS pumps:
		a. STOP SI pumps and PLACE in A-AUTO.
		b. CHECK offsite power supplying shutdown boards
		c. STOP all BUT one CCP and PLACE in A-AUTO.
		24. ISOLATE CCPIT:
		a. CLOSE inlet isolation valves FCV-63-39 and FCV-63-40.
		b. CLOSE outlet isolation valves FCV-63-26 and FCV-63-25.
nario ma	av be terminate	ed at E-3 Step 24, RCS depressurization and CCPIT isolation

Appendix D	Required Operator Actions					F	Form ES-D-2		
Op Test No.:	NRC 2010302	Scenario #	4	Event #	ES-0.5	Page	39	of	44
Event Descripti	on: Equi	pment Verificatior	ı						
Time	Position			Applicant	's Actions or Beha	vior			
	an 11	ES-0.5, E	QUIPN		CATIONS				
Evaluator N	ote: BOP com (including	oletes ES-0.5 i any discrepa	includi ncies	ing Appendic	ces A & B and r taken) to SRO.	reports co	omple	tion	
	BOP	1. VERIFY [D/Gs R	UNNING.					
	BOP	2. VERIFY a	at least	four ERCW	pumps RUNNIN	G			
	BOP		1A-A 1B-B		NG Manually Start				
	BOP			ans RUNNIN	G				
	BOP	V EINITE			0.				
	BOP	5. VERIFY (genera	tor breakers (OPEN.				
	BOP		λFW pι FW pu ⁻W pur	mps	NG:				
	ontrol valves shou ablish flow due to		ositior			ı taken to	contro	I S/G	

 Appendix D
 Required Operator Actions
 Form ES-D-2

 Op Test No.:
 NRC 2010302
 Scenario # _____4
 Event # ____ES-0.5
 Page ____0 of ____4

Event Description:

Equipment Verification

Time	Position	Applicant's Actions or Behavior
	BOP	 7. CHECK AFW valve alignment: a. VERIFY MD AFW LCVs in AUTO. b. VERIFY TD AFW LCVs OPEN. c. VERIFY MD AFW pump recirculation valves FCV-3-400 and FCV-3-401 CLOSED.
	BOP	 8. VERIFY MFW Isolation: a. MFW pumps TRIPPED MFW regulating valves CLOSED MFW regulating bypass valve controller outputs ZERO MFW isolation valves CLOSED
	BOP	9. MONITOR ECCS operation:
		 a. VERIFY ECCS pumps RUNNING: CCPs: RHR pumps SI pumps
		b. VERIFY CCP flow through CCPIT.
		c. CHECK RCS pressure less than 1500 psig.
		d. VERIFY SI pump flow.
		e. CHECK RCS pressure less than 300 psig.
		f. VERIFY RHR pump flow.
	BOP	10. VERIFY ESF systems ALIGNED:
		 a. Phase A ACTUATED: PHASE A TRAIN A alarm LIT [M-6C, B5]. PHASE A TRAIN B alarm LIT [M-6C, B6].
		 b. Cntmt Vent Isolation ACTUATED: CNTMT VENT ISOLATION TRAIN A alarm LIT [M-6C, C5]. CNTMT VENT ISOLATION TRAIN B alarm LIT [M-6C, C6].

Appendix D	Required Operator Actions						F	orm E	S-D-2
Op Test No.:	NRC 2010302	Scenario #	4	Event #	ES-0.5	Page	41	of	44
Event Description	on: Equi	oment Verification	า						

Time	Position	Applicant's Actions or Behavior
		c. Status monitor panels:
		6C DARK
		6D DARK 6E LIT OUTSUDE autilized area
		 6E LIT OUTSIDE outlined area 6H DARK
		• 6J LIT.
		d. Train A status panel 6K:
		CNTMT VENT GREEN
		PHASE A GREEN
		e. Train B status panel 6L:
		CNTMT VENT GREEN PHASE A GREEN
	BOP	11. MONITOR for containment spray and Phase B actuation:
		a. CHECK for any of the following:
		Phase B ACTUATED
		OR
		Containment pressure greater than 2.8 psig.
		b. VERIFY containment spray INITIATED:
		1) Containment spray pumps RUNNING.
		 Containment spray header isolation valves FCV-72-39 and FCV- 72-2 OPEN.
		 Containment spray recirculation valves to RWST FCV-72-34 and FCV-72-13 CLOSED.
		4) Containment spray header flow greater than 4750 gpm per train.5) Panel 6E LIT.

Appendix D	Required Operator Actions						Form ES-D-		
Op Test No.:	NRC 2010302	Scenario #	4	Event #	ES-0.5	Page	42	of	44
Event Descriptio	on: Equip	oment Verificatio	n						

Time	Position	Applicant's Actions or Behavior
		c. VERIFY Phase B ACTUATED:
		PHASE B TRAIN A alarm LIT [M-6C, A5].
		PHASE B TRAIN B alarm LIT [M-6C, A6].
		d. ENSURE RCPs STOPPED.
		e. VERIFY Phase B valves CLOSED:
		Panel 6K PHASE B GREEN.
		Panel 6L PHASE B GREEN.
		f. CHECK cntmnt vacuum relief isolation valves CLOSED:
		[Pnl 6K MANUAL]
		• FCV-30-46
		 FCV-30-47 FCV-30-48.
		• 100-30-48.
		WHEN 10 minutes have elapsed, THEN ENSURE containment air return fans RUNNING.
		12. CHECK secondary and containment rad monitors USING the following:
	BOP	Appendix A, Secondary Rad Monitors (attached) Appendix B, Containment Red Maniterer (attached)
		Appendix B, Containment Rad Monitors. (attached)
W		13. CHECK pocket sump pumps STOPPED:
		[M-15, upper left corner]
	BOP	 HS-77-410, Rx Bldg Aux Floor and Equipment Drain Sump pump A
		HS-77-411, Rx Bldg Aux Floor and Equipment Drain Sump pump B
		14. DISPATCH personnel to perform EA-0-1, Equipment Checks Following
	BOP	ESF Actuation.

Appendix D	Required Operator Actions					Form ES-D-2			
Op Test No.:	NRC 2010302	Scenario #	4	Event #	ES-0.5	Page	43	of	44
Event Descriptio	n: Equip	ment Verificatio	n					. <u></u>	

Time	Position	Applicant's Actions or Behavior
ВОР	15. ENSURE plant announcement has been made regarding Reactor Trip and SI.	
Evaluator No		pletes ES-0.5 including Appendices A & B and reports completion
	(including	any discrepancies and actions taken, i.e.: manual Feedwater Isolation 5 Step 8) to SRO.
		END (ES-0.5, EQUIPMENT VERIFICATIONS)

Appendix D	Required Operator Actions						Form ES-D-2		
Op Test No.:	NRC 2010302	Scenario #	1	Event #	Critical Task(s)	Page	44	of	44
Event Descriptio	n: Critica	I Task Listing							

Critical Tasks:	Critical Task Statement	Action Location	ESG pg #
1.	Isolate Steam flow and Feedwater flow to ruptured S/G prior to RCS Cooldown initiation.	E-3 Steps 4, 5	30
2.	Cooldown RCS to less than or equal to target temperature prior to RCS depressurization	E-3 Step 16.d	35
3.	Equalize pressure between RCS and ruptured SG to stop primary to secondary leakage (40 minutes)	E-3 Step 19.d	36
4.	Terminate RCS depressurization prior to losing RCS Subcooling	E-3 Step 19.e RNO 1)	36



Sequoyah Nuclear Plant

Unit 1 & 2

E5G-4

General Operating Instructions

0-GO-5

NORMAL POWER OPERATION

Revision 0065

Quality Related

Level of Use: Continuous Use

Effective Date: 03-12-2010

Responsible Organization: OPS, Operations

Prepared By: W. T. Leary

Approved By: P. R. Simmons

Current Revision Description

Revised to address requirements overlooked in the initial issuance of the guidance for compliance with NERC Reliability Standards, VAR-002. These changes make no alteration to the operation of any equipment and are changes to required administrative notifications only. These changes are therefore minor editorial changes as defined in SPP-2.2.

PERFORMANCE OF THIS PROCEDURE IMPACTS REACTIVITY.

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ATTACHMENTS

Attachment 1: NORMAL POWER OPERATION

SQN	NORMAL POWER OPERATION	0-GO-5
Unit 1 & 2		Rev. 0065
		Page 3 of 100

1.0 INTRODUCTION

1.1 Purpose

This General Operating (GO) Instruction provides guidance for power ascension from approximately 30 to 100% power, at power conditions, power reduction from 100 to 30% power, Power Coastdown at End of Life operations, and Load Follow operations.

This instruction provides additional guidance for turbine control restoration following a turbine runback.

1.2 Scope

This GO contains the following sections:

5.1 Power Ascension From 30% Power to 100%

5.2 At Power Conditions

5.3 Power Reduction From 100% to 30%

5.4 Power Coastdown at End of Life

5.5 Load Follow Operations

2.0 REFERENCES

2.1 Performance References

- A. 1,2-SO-5-1, Feedwater Heaters and Moisture Separator Reheaters
- B. 1,2-SO-5-2, No. 3 Heater Drain Tank and Pumps
- C. 1,2-SO-5-3, No. 7 Heater Drain Tank and Pumps
- D. 1,2-SO-2/3-1, Condensate and Feedwater System
- E. 1,2-SO-2-9, Condenser Vacuum and Turbine Steam Seal Systems Operation
- F. 0-SO-12-1, Auxiliary Boiler System
- G. 0-SO-35-4, Monitoring Generator Parameters
- H. 0-SO-58-1. Main Generator Bus Duct Cooling System
- I. 0-SI-NUC-000-038.0, Shutdown Margin
- J. 1,2-SO-62-1, Chemical and Volume Control System
- K. 0-SO-62-7, Boron Concentration Control
- L. 1,2-SO-62-9, CVCS Purification System
- M. 0-SO-68-3, Pressurizer Spray and Heater Pressure Control System
- N. 0-SO-85-1, Control Rod Drive System
- O. 0-PI-OPS-000-666.0, River Temperature Limits Specified by NPDES permit
- P. 0-SI-OPS-092-078.0, Power Range Neutron Flux Channel Calibration By Heat Balance Comparison
- Q. 0-SI-CEM-000-050.0, 72-Hour Chemistry Requirements
- R. 0-SI-CEM-030-407.2, Radioactive Gaseous Waste Effluent Particulate and Iodine Dose Rates from Shield and Auxiliary Building Exhausts (Weekly/Special) and Condenser Vacuum Exhausts (Special)
- S. 0-SI-CEM-030-415.0, Gaseous Effluent Requirements (Gross Alpha, Noble Gas and Tritium
- T. 0-SI-OPS-000-001.0, Initial Startup System Parameter Log
- U. TI-40, Determination of Preconditioned Reactor Power

2.1 **Performance References (continued)**

V. 2-SO-98-1, Distributed Control System

2.2 Developmental References

- A. Memorandum from System Engineering concerning MSR operation RIMS S57 880322 999
- B. Memo from Reactor Engineering RIMS S57 941219 934
- C. S57-880322-999 and S57-880808-851
- D. <u>W</u> Letter GP89-076 (RIMS No. S53 890427 984)
- E. <u>W</u> Letter GP 89-155 (RIMS S57 891026 972)
- F. <u>W</u> Letter GP 86-02(B44 861112 002)
- G. SSP-2.3, Administration of Site Procedures
- H. TVA-NQA-PLN89-A
- I. GOI-10, Reactivity Control at End of Cycle Life (Trojan Nuclear Plant)
- J. FSAR, Section 13.5
- K. Memo from Reactor Engineering August 6, 1996 (G Bair)
- L. NERC Reliability Standard, VAR-002-1.1b

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Precautions

To ensure that NIS Reactor Power level indications remain within 2% of true power during power level changes, a check should be performed about every 20% power level change, when greater than 15% power, by comparing calorimetric power to each NIS Power Range drawer. The 20% power level check does not preclude the operating crews from making necessary changes in response to changing plant conditions.



TRM 3.3.3.15 requires LEFM core thermal power (U2118) to be used to perform 0-SI-OPS-092-078.0 above 15% reactor power. LEFM indication is available if the following conditions are met:

- LEFM status NORMAL on ICS Calorimetric Data screen.
- (LEFM core thermal power (ICS point U2118) shows good (green) data.
- CLEFM MFW header temp (ICS point T8502MA) greater than or equal to 250°F.

IF LEFM indication is NOT available above 15% reactor power, then TR 3.3.3.15 action must be entered.

The following should be used to determine the most accurate reactor power indication for comparison with NIS:



When reactor power is greater than 15%, use LEFM calorimetric power indication (U2118).

I

If LEFM is NOT available, then use average loop ∆T (UO485 or M-5 indicators) up to 40%. Above 40%, use computer point U1118.

The turbine should be operated in "IMP OUT" control during normal unit operation. "IMP IN" operation results in system swings and should only be used during the performance of valve tests. (W Ltr GP 89-155; RIMS S57 891026 972)



Pressurizer heaters and sprays may be operated as required to maintain pressurizer and RCS boron concentration within 50 ppm. If loop boron concentration is changed by 20 ppm or greater, use the pressurizer backup heaters to initiate automatic spray (if available). If Normal Spray is NOT available, then use Auxiliary Spray (1, 2-SO-62-1, Section 8.7) in conjunction with pressurizer backup heaters.

Condensate DI polishing operations during power ascension are controlled by staying within system parameters and by recommendations from the Chemistry Section.

The valve position limiter should be periodically positioned approximately 10% above the current governor control indications (keeps governor valves off of the limiter) as turbine load is changed. This prevents inadvertent load increases by limiting governor valve opening and allows a faster response of the runback feature which ensures main feedwater system will supply the required amount of flow.

Any off-frequency turbine operation is to be reported to Engineering for record keeping. The report will include duration and magnitude of off-frequency operation.

Operation at off-frequencies is to be avoided in order to prevent the probable occurrence of turbine blade resonance. Prolonged periods of operation at certain off-design frequencies could cause excessive vibratory stresses which could eventually generate fatigue cracking in the blades. Off-frequency operation is permitted to the degree and time limit specified on the chart "Off-Frequency Turbine Operation", Figure A.26 of TI-28.

The potential exists for condensation formation in steam extraction lines when feedwater heaters are isolated.

(V.

<u>Initial Startup After Refueling</u> - After refueling operations, the NIS indications may be inaccurate until calibration at higher power levels. The NIS calibration procedures will adjust the PRM trip setpoints to ensure that the excore detectors do not contribute to an overpower condition at the following RTP hold points. Reactor Engineering and/or Systems Engineering will determine procedure performance. [C.3]

At < 50% RTP a flux map and single point alignment, a hot channel factor determination, an axial imbalance comparison, and a PR NIS calibration will be performed. The PR high range trip setpoint will then be increased to its normal value of 109%.



At < 75% RTP, calorimetric calculations and RCS flow verification may be performed, EAGLE-21 updated prior to increasing power, a flux map, a hot channel factor determination, an axial imbalance comparison may be required if not performed at < 50%, a detector calibration (if \triangle AFD \ge 3%), and a PR NIS calibration may be performed.

If not performed at 75% hold point, an axial imbalance comparison and a detector calibration (if △ AFD ≥ 3%) should be performed at ~ 100% RTP. Engineering will determine if PR NIS calibration must be performed. Calorimetric calculations, RCS flow verification, a hot channel factor determination, and a reactivity balance will be performed and EAGLE-21 updated. Reactor Engineering will notify Operations that normal full power operations may proceed.



Preconditioned Power Levels and Maximum Allowable Rates of Power Increase are specified in TI-40, *Determination of Preconditioned Reactor Power*.



During initial startups, based on Westinghouse recommendations, a lower power ramp rate limit has been implemented for power levels above the intermediate power threshold. The Intermediate Power Threshold is unit/cycle dependent and is determined by the Vendor. Refer to TI-40.



ICS will automatically monitor pre-conditioned power level as follows:

Point U1127 is reactor power in percent of RTP based on either secondary calorimetric or RCS ∆T depending on power level.



Point UO103 is a 20 minute rolling average of reactor power rate-of-change fitted over a 20 minute period. UO103 is a leading indicator of %/hour power ramp rate and can be used in deciding to speed up or slow down the ramp rate.



Point UO104 is a 1 hour rolling average of reactor power rate-of-change fitted over a 1 hour period. UO104 is used in demonstrating compliance with fuel pre-conditioning power ramp rate limits.



Point K0058 is the currently qualified (or pre-conditioned) power level.

These points can all be monitored with the ICS group display "TI40". Appendix A may be used if the ICS is unavailable.

Declared fuel defects, as determined by the Fuel Reliability Assessment Team or the Shift Manager, have limited ramp rates during Reactor Power increases as specified in TI-40.

TI-40 power increase limits that are exceeded, in any one hour, are evaluated in accordance with SPP-3.1.

Power Coastdown At End Of Life:

Reactor power changes should be limited to less than or equal to 1% per hour to avoid causing xenon peaking which could force a plant shutdown.

¹ Do not perform unnecessary unit power maneuvers or testing (e.g., turbine valve testing). Such testing could result in an uncontrollable Xenon oscillation.



Nonessential work on systems which could cause a plant upset should be deferred.

Secondary Plant runbacks such as Main Feed Pump Turbine trip or #3 Heater Drain Tank runback will require a unit shutdown if Reactor power is not promptly returned to pre-transient level due to the resulting severe Xenon transient. If a system power alert is in effect, and electrical generation is critical, unit load should be reduced as necessary keeping T_{AVG} on program. Contact Reactor Engineering for an evaluation and guidance concerning unit shutdown or reduction of load.

Management should be consulted to evaluate the feasibility of a unit restart if a reactor trip occurs with RCS equilibrium boron concentration less than 50 ppm. If the reactor is to be restarted, the power level shall be limited to nominal pre-trip power level.

Axial Flux Difference Management:

When the reactor is operating at a steady power or during normal load changes, maintain ΔI within the operating limits of the Core Operating Limits Report (COLR). It is recommended that the core axial flux difference (AFD) be maintained within \pm 5% of the target band at all times, excluding the performance of 0-PI-NUC-092-036.0, "Incore - Excore Calibration," and End of life power coast downs. Operating time outside the band, which is given in TI-28 Attachments 1 and 2, should be minimized. Reactor Engineering should be contacted if time out of the \pm 5% target band exceeds approximately 30 minutes.

The position of control bank D should normally be ≥ 215 steps when power level is steady state at or above 85% RTP. At steady state power levels below 85%, control bank D should normally be ≥ 165 steps. If rod position is more than 5 steps below this guidance for long term, then impact may occur to safety analysis assumptions.

During heatup and cooldown transients, RCS density changes will cause changes in NIS indicated power. At constant reactor power, a 1°F change in T_{AVG} may cause as much as a 1% (or more) change in indicated NIS power.



The following limitations are applicable to Unit Two ONLY.

In winter months #7 HDTP capacity is not adequate to pump #6 Heater drains when all Condensate Demineralizer pumps are in service. Current practice is to run two Cond DI Pumps and / or throttle the condensate system to reduce backpressure. The preferred method is to throttle condensate pressure instead of running only two Condensate Demineralizer booster pumps at full power due to pump runout concerns.

Siemens-Westinghouse analysis has determined that the maximum unit power with one MFP operation is 65% under worst case conditions. The plant could operate higher if plant conditions permit.

MFP flow from the lead MFP should not exceed 53.7% of the total flow. Flow rates above this would result in HP steam flow to the lead MFPT. Computer points 1(2)UO504 and UO505 can be used to monitor.

Voltage Control

NOTE

Failure to comply with the NERC VAR-002 requirement could result in a Utility Violation and / or monetary penalties.



Operation of the Main Generator without Automatic Voltage Control could impact grid voltage requirements. Refer to GOI-6 for MVAR limits.



When the Main Generator is connected to the grid, the voltage regulator shall be operated in Automatic, unless coordinated with the Transmission Operator (SELD).



Main Generator operation outside of the Transmission Voltage Schedule requires coordination with the Transmission Operator, and notation in the operator's Log of time, reason, and that the Transmission Operator notification was made.



When directed to modify voltage, the Generator Operator shall comply (within plant procedural requirements) or provide an explanation of why the schedule cannot be met.



While the Main Generator is tied to the grid perform the following:

The Transmission Operator (SELD) shall be notified of any Voltage Regulator automatic trips to Manual or urgent Manual Transfers between AUTO and Manual as soon as practical but notification shall be within 30 minutes.

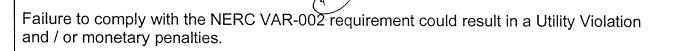
Ø

The Transmission Operator (SELD) shall be notified prior to a planned Voltage Regulator transfers between Manual and Auto.



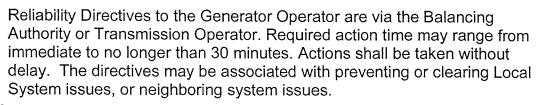
All position changes (to and from Auto or Manual) of the Voltage Regulator shall be entered into the Narrative Log along with the date, time of position change, reasons, anticipated duration and notifications made.

Reliability Directives and Protective Relay/Equipment Failures



NOTE

Plant Operations shall notify the Transmission Balancing Authority (BA) or Transmission Operator of protective relay or equipment failures that creates a creditable risk to Plant Generation. A creditable risk to generation represents a potential reduction in transmission system reliability.





Plant operations shall take timely actions as directed by the Balancing Authority or Transmission Operator to mitigate critical conditions to return the bulk electrical system to a reliable state. Plant operations shall comply with Balancing Authority or Transmission Operator directives unless such actions would violate safety, equipment, or regulatory or statutory requirements.



Plant Operations shall immediately inform the Balancing Authority or Transmission Operator of the inability to perform directives so that the TVA Reliability Entities may implement alternate remedial actions.

3.2 Limitations

(A.)

When the axial flux difference monitor alarm is inoperable, the AFD must be logged every hour by performing 0-SI-NUC-000-044.0.

(SR 4.2.1.1.a.2 & 4.2.1.1.b)

(B.)

When both the plant computer and NIS QPTR alarm systems are inoperable, the QPTR must be calculated every 12 hours by performing 0-SI-NUC-000-133.0. (SR 4.2.4.1.b)



Do not exceed a load change rate of plus or minus 5% per minute or a step change of 10%.

River water temperatures shall be maintained within the limitations of the NPDES permit as specified in 0-PI-OPS-000-666.0.



Westinghouse should be contacted if the turbine is operated outside of its operating limits as stated below.

To prevent high vibratory stresses and fatigue damage to the last stage turbine blading, do not operate the turbine outside of limits listed below: [W Ltr GP 86-02 (B44 861112 002)]



At loads less than or equal to <u>30% (350 M</u>W), the maximum permissible backpressure is 1.72 psi**a**. (3.5" Hg)



At loads greater than 30%, the maximum permissible backpressure is 2.7 psia (5.5" Hg) with a 5 minute limitation before tripping the turbine.

Do not allow the generator to become underexcited.

In the event of a change in the rated thermal power level exceeding 15% in one hour, notify Chemistry to initiate the conditional portions of 0-SI-CEM-000-050.0, 0-SI-CEM-030-407.2 and 0-SI-CEM-000-415.0 due to the thermal power change.

3.2 Limitations (continued)

The following Main Turbine vibration limitations and actions should be adhered to:

Vibration levels which exceed 7 mils (alarm setpoint) should be verified by Predictive Maintenance Group.

Vibration levels greater than 7 mils and less than 14 mils should be continuously monitored by Predictive Maintenance Group.

IF vibration level is greater than or equal to 14 mils, THEN TRIP the turbine.

Westinghouse recommends that if any throttle valve is held closed for more than 10 minutes, then it should be re-tested immediately upon reopening in accordance with 1,2-PI-OPS-047-002.0.

The generator may be operated without a bus duct cooler up to approximately 729 MW turbine load.

To ensure sufficient voltage for a safe shutdown after loss of both units, voltage and reactive power should be maintained within the limits of GOI-6.

With LEFM calorimetric power indication available, full power operation is defined as approximately 3455 MW_T not to exceed 3455.0 MW_T averaged over a 8-hour period. [C.1] If LEFM is available, power shall be monitored using plant computer point U2118 Instantaneous Value. **DO NOT** allow average thermal power to exceed 3455 MW thermal for two consecutive hours. Every effort should be made to maintain core thermal power 10 minute average less than 3455 MWt.

The following restrictions apply if LEFM calorimetric power indication (U2118) is unavailable:

F.) Applicable action of TRM 3.3.3.15 must be entered.

2.7 AFD limits in COLR and TI-28 must be made more restrictive by 1%.

Rod insertion limits in COLR must be raised by 3 steps.

If reactor power is greater than 40%, power should be monitored using U1118. If U1118 is also unavailable, use the highest reading NIS channel.

If reactor power is less than 40%, use the RCS average ΔT as the preferred method for determining power level.

3.2 Limitations (continued)

) IF equilibrium conditions are achieved, after exceeding by 10% or more of rated thermal power the thermal power at which the heat flux hot channel factor was last determined, THEN conditional performance of 0-SI-NUC-000-126.0, Hot Channel Factor Determination is required.

At low power levels, the LP Heaters may be unbalanced in extraction steam supply use and heat pickup across the condensate side of the heater string. This condition should correct itself as the unit approaches 45-50% Turbine Power. (Ref: PER 99-003789-000)

With one LP heater string out of service (isolated), power is limited to 86% (Unit 1) or 90% (Unit 2). This is based on LP turbine blading limitations. (Ref: DCN E21203A).

#3 heater drain tank should remain drained with LCV-6-105A and B failed open (per 1, 2-SO-5-2) until reactor power exceeds ~45-50%. This will prevent intermediate heater string isolations if a turbine trip occurs at lower power levels. If a level is established in the number 3 Heater Drain Tank prior to exceeding P-9 setpoint (50% power), a turbine trip will result in Intermediate Pressure Heater string isolation(s).

	SQN NORMAL P Unit 1 & 2		OWER OPERATION 0-GO-5 Rev. 0065 Page 15 of			
	STARTU		Unit(_ D	ate <u>foda</u>	
4.0	PREREQ	UISITES			/	
1)	Throughout t N/A'd if the c	this Instruction where condition does not ex	NOTES an IF/THEN stateme	nt exists, the step sl	nould be	
2)		s may be completed i				
	EN EN	ISURE Instruction to	be used is a copy of e	effective version.		
	TAN	_{vG} is being maintaine	d within 1.5°F of T_{REF}		B	
		level controls are be A if auto control NO	eing maintained in AU F available).	ТО	Ð	
	Co	re Operating Limits F	maintained within the Report (COLR) Je to dropped or misa	-	Ð	
	(15) Ste		stem is in the T _{AVG} mo		Y	
	(D) The (pu	e EHC system should ishbutton lit).	d be in OPER AUTO		Ð	
	(7) Ge cur	nerator pressurized v ve. (TI-28, Fig. A.I4	with hydrogen accord !)	ing to capability	9	
	(18) PR rea	Ms are being mainta adings.	ined within $\pm 2\%$ of co	re thermal power	-8-	

NOTE

During start up after a cold shutdown the Condensate DI normally will be aligned for full flow polishing until the MSRs are in service.



ENSURE Condensate DI polishing operation in accordance with RCL recommendations.

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U	SQN nit 1 & 2	NORMAL POWER OPERATIO	N 0-GO-5 Rev. 0065 Page 16 of	100
	START	UP No Unit	1	Date <u>+0 da</u>
4.0	PRERE	QUISITES (continued)		7
	[10] E	NSURE each performer documents the	ir name and initials	:
		Print Name	Initials	
			· · · · · · · · · · · · · · · · · · ·	
	· ·			

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SQN Unit 1 & 2	NORMAL POWE	R OPERATION	0-GO-5 Rev. 0065 Page 57 of 100
STARTUF	PNo(Unit _(Date <u>+0d 4</u>
5.2 At Power	Conditions		/
		CAUTIONS	
	peration is defined a averaged over a <u>n 8-</u> I		55 <u>MWT NOT to exce</u> ed
Power shall	NOT exceed one hou	ir average (U2125) o	of 3 <u>455.00 M</u> WT.
	NOT exceed an 8-ho 0700, 1500 and 2300		2126) of 3455.00 MWT
		NØTES	
	mply with the following on and/or monetary pe	NERC VAR-002 req	uirements could result in a
to Manual or	ission Operator shall b urgent Manual Transf _minutes [C.8]	e notified of any Volt ers between Auto an	age Regulator automatic trips d Manual as soon as practical
	ssion Operator shall b veen Auto and Manual		lanned Voltage Regulator
the Narrative	hanges (Auto or Manu e Log along with the da d notifications made.	al) of the Voltage Re ite, time of position c	egulator shall be entered into hange, reasons, anticipated
(5) Operation of voltage requ	main generator withou irements. Refer to GO	ut automatic voltage I 6 for MVAR limits.	control could impact gird
notification b	be made to the Transm	ission Operator (SEL	ule in GOI-6 requires that _D) within 30 minutes. Narrativ
Log entries made	shall be made that incl	ude time, date, reasc	on a duration, and notifications
Log entries made Main Genera Log entries	ator operation without	Automatic Voltage co eason & duration) an	ontrol requires that Narrative d that notification be made to



,

ENSURE Section 3.0, Precautions and Limitations, have been reviewed.

<u> 500</u>



TREND Computer point U2118 on a trend recorder in the unit horseshoe and monitor for increasing reactor power trends above 3455 MW_{T} .

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U	SQN nit 1 & 2	NORMAL POWE	ROPERATION	0-GO-5 Rev. 0065 Page 58 of 10	0
	STARTU	² No	Unit/		Date Toda
5.2	At Power	Conditions (continue	d)		/
	[3] IF	increasing power trend	is observed, THEN		
		SURE PROMPT action	is taken to decreas	e reactor power	
	as	necessary. [C.1]			1st
					CV
			NOTE		
to R	CS dilution, S	vities which may cause S/G flow changes, TDAI or temperature and/or F	WP testing, second	lary plant activit	are not limited ies which

[4] IF any preplanned activity will be performed which is expected to cause a transient increase in thermal power,
 THEN
 REDUCE turbine load and/or insert negative reactivity (using control rods or boration) prior to starting activity as necessary to ensure 10 minute average power (U2221RA or U1118RA)

will not exceed 3455 MWt.

1st

CV

SQN Unit 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 59 of 100	

STARTUP No.

Unit ____(

Date To day

5.2 At Power Conditions (continued)

CAUTION

If LEFM is lost with reactor power at 100%, core thermal power should NOT be raised to take advantage of U1118 reading lower.

NOTE

The following restrictions apply if LEFM calorimetric power (U2118) is unavailable:

- Applicable action of TRM 3.3.3.15 must be entered.
- AFD limits in COLR and TI-28 must be made more restrictive by 1%.
- Rod insertion limits in COLR must be raised by 3 steps.
 - [5] IF ICS point U2118 is unreliable or unavailable, THEN
 PERFORM the following:

[5.1] **MONITOR** thermal power by using one of the following:

	 ICS point U1118 (if available) 	
	 highest reading NIS power range chann 	el. [C.1]
[5.2]	RESTORE calorimetric power indication prior required performance of 0-SI-OPS-092-078.	
[5.3]	IF LEFM CANNOT be restored prior to	

[5.3] IF LEFM CANNOT be restored prior to 0-SI-OPS-092-078.0 being required, THEN

ENSURE power is less than or equal to 98.7% (3411 MW_T) prior to performing 0-SI-OPS-092-078.0:

- REDUCE turbine load as necessary.
 MAINTAIN T_{AVG} and AFD on program using boration and/or rod insertion as necessary.
- [5.4] **PERFORM** 0-SI-OPS-092-078.0 using U-1118 or alternate method.

SQN Unit 1 & 2		NORMAL POWE	R OPERATION	0-GO-5 Rev. 0065 Page 60 of 100	
	START	UP No/	Unit/	Date <u>7</u> 8	dy
5.2	At Power Conditions (continued)				/
	[5.5]	(3411 MWT) UNTIL	ess than or equal to 9 LEFM is restored 078.0 is re-performed	d using LEFM	
	[6] MAINTAIN rod control system in automatic to allow properties of the plant response to load reductions and runbacks.		allow proper s.		
		[7] DURING steady state operation \ge 85% RTP MAINTAIN contro bank D greater than 215 steps if possible and AFD within the nominal \pm 5% target band and also within the AFD limits specified in the COLR.		AFD within the AFD limits	
		DURING steady state ope bank D greater than 165 difference (AFD) within th within the AFD limits spee	steps if possible and e nominal \pm 5% targ	the axial flux	
		OPERATE the turbine in swings during operation i permitted during governo	n IMP IN. (Operation	erent system in IMP IN is	
			NOTE		

2

Valve position limiter should normally be maintained ~ 2% above governor valve position unless load swings occur.

[10] IF unsatisfactory load swings are observed, THEN

ADJUST governor valve position limiter as necessary to limit governor valve motion.

1st CV

1	SQN NORMAL POWER Unit 1 & 2		ROPERATION	0-GO-5 Rev. 0065 Page 61 of 100
5.2	STARTUP At Power	No Conditions (continue	Unit/	Date Tuby

CAUTION

Do NOT raise the limiter position unless the turbine control is positively controlling the turbine (limit light NOT LIT).

- [11] **IF** governor valve motion limiting is no longer needed, **THEN**
 - [11.1] ADJUST SETTER/REFERENCE controls to reduce turbine loading until the VALVE POS LIMIT light is NOT LIT.
 - [11.2] **INCREASE** VALVE POS LIMITER setpoint to ~ 2% above current load, ENSURING load does NOT change.
- [12] **IF** an axial xenon oscillation develops and requires suppression, **THEN**
 - [12.1] **MOVE** control bank inward when AFD is moving positive above target AFD, **OR**
 - [12.2] **MOVE** control bank outward when AFD is moving negative below target AFD, **AND**

HOLD AFD at target until oscillation is suppressed.

[12.3] IF this basic first overtone control is insufficient, THEN

CONTACT Reactor Engineering for assistance.

	SQN Unit 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 62 of 100
	STARTUP	No Unit	Date <u>78 d</u>
5.2	At Power	Conditions (continued)	
		NOTE	
			al in the negative allocation
1	-	the Main Generator will cause VARs to trend This will require lowering generator voltage	•
gen	nerator load will	I cause VARs to trend in the negative direct	ion and will require raising
		Refer to GOI-6 Section E for MVAR limits	for generator stability. Refe
1 10 L	necautions R.		
	precautions R, s		
		RFORM the following as required:	
			е,
		RFORM the following as required: IF Automatic Voltage Control is in service THEN ADJUST Main Generator VARs USING	
		RFORM the following as required: IF Automatic Voltage Control is in service THEN ADJUST Main Generator VARs USING [HS-57-22] Exciter Voltage Auto Adjuste	
		RFORM the following as required: IF Automatic Voltage Control is in service THEN ADJUST Main Generator VARs USING [<u>HS-57-22</u>] Exciter Voltage Auto Adjuste during power escalation.	r as necessary
		RFORM the following as required: IF Automatic Voltage Control is in service THEN ADJUST Main Generator VARs USING [HS-57-22] Exciter Voltage Auto Adjuste during power escalation. IF necessary to remove Automatic Voltage	r as necessary
		RFORM the following as required: IF Automatic Voltage Control is in service THEN ADJUST Main Generator VARs USING [HS-57-22] Exciter Voltage Auto Adjuste during power escalation. IF necessary to remove Automatic Voltage from service, THEN	er as necessary ge Control
		RFORM the following as required: IF Automatic Voltage Control is in service THEN ADJUST Main Generator VARs USING [HS-57-22] Exciter Voltage Auto Adjuste during power escalation. IF necessary to remove Automatic Voltage from service,	er as necessary ge Control
		RFORM the following as required: IF Automatic Voltage Control is in service THEN ADJUST Main Generator VARs USING [HS-57-22] Exciter Voltage Auto Adjuste during power escalation. IF necessary to remove Automatic Voltage from service, THEN PERFORM required steps in Appendix E IF Automatic Voltage Control is NOT in s	er as necessary ge Control
	[13] PEI [13.1]) [13.2]	RFORM the following as required: IF Automatic Voltage Control is in service THEN ADJUST Main Generator VARs USING [HS-57-22] Exciter Voltage Auto Adjuste during power escalation. IF necessary to remove Automatic Voltage from service, THEN PERFORM required steps in Appendix E	er as necessary ge Control

	SQN Unit 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 63 of 100	
	STARTUP	No Unit	Date	Today
5.2	At Power	Conditions (continued)		/
		NOTES		
1)	be used betw	sing a mixed bed demin is normally used v een 50-100 ppm if recommended by Cher vility NOT available.	when less than 50 ppm mistry or if required due	but ma to
2)	Every effort to should be ma 3455 MWt.	o maintain core thermal power 10 minute a de. Core thermal power one hour averag	average less than 3455 e SHALL not exceed	MWt
		RFORM the following as necessary to ma rmal power at desired value:	intain T-avg and	
	(14.1])	ADJUST RCS boron concentration in a 0-SO-62-7, Boron Concentration Contr		
		ADJUST control rod position in accord 0-SO-85-1, Control Rod Drive System OR	lance with	
	[14.3]	ADJUST turbine load slightly OR		
	[[14.4]]	DEBORATE RCS periodically using a in accordance with 1,2-SO-62-9 (if RC 100 ppm)	mixed bed demin S boron less than	
	OF	core thermal power 10 minute average ex R an increasing power trend which will exc served, THEN	ceed 3455 MWt is	
	EN	ISURE PROMPT action is taken to decrea necessary. [C.1]	ase reactor power	

C

SQN Unit 1 &		VER OPERATION	0-GO-5 Rev. 0065 Page 64 of 100
	RTUP No/ ower Conditions (contin	Unit/ ued)	Date <u>700</u>
		NOTE	
Appendix D	provides recommended p	ower values for mainta	iining condensate pressure i
secondarv pl	ant equipment must be re	moved from service for	n maintenance
secondary p	ant equipment must be re	emoved from service fo	or maintenance.
secondary pl	ant equipment must be re IF unit shutdown or load	moved from service fo	or maintenance.
secondary p	ant equipment must be re	emoved from service fo	or maintenance.
secondary p	ant equipment must be re	emoved from service for d reduction is required, his instruction.	or maintenance.
secondary p [16]	ant equipment must be re IF unit shutdown or load GO TO Section 5.3 of th	emoved from service for d reduction is required, his instruction. ed, THEN	THEN
secondary p [16]	ant equipment must be re IF unit shutdown or load GO TO Section 5.3 of th IF Load Follow is requir	emoved from service for d reduction is required, his instruction. ed, THEN , <i>Load Follow Operatic</i>	or maintenance. THEN

END OF TEXT

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Appendix I	D		Scenario Outline		Form ES-D-1	
Facility: Examiners:	Sequoya	h	Scenario No.: 6 Operators:	Op Test No.:	1020302	
Initial Conditions: 75% Power.						
Turnover:	00S		ore Flux Mapping per QPTR Tech S	Spec concerns; 1A-	A MDAFW Pump	
Target CTs:			dwater isolation prior to SG(s) inver	ntory loss (Time crit	ical action)	
	Manually S	stop RCPs prior	to FR-H.1 Step 9 completion			
Event No.	Malf. No.	Event Type*	Ever	It Description		
1 . T+0	SI02A	C – RO TS – SRO	Cold Leg Accumulator Nitrogen Leak			
2. T+10	RX11B	I – RO TS – SRO	First Stage Pressure Transmitter PT-1-73 Fails High.			
3 . T+20	MS12D	C – BOP	Lp #4 SG Atmos. Relief Valve Fa	ils Partially Open		
4 . T+30	FW18A	C – BOP	1A Main Feedwater Pump High V	ibration		
5 . T+40	N/A	R – RO N –sro/bop	Plant Power Reduction			
6. T+65	FW20 RP16K621A RP16K621B RP13A RP13B	M – All	Main Feedwater Header Break w	/ Feedwater Isolatic	on Failure	
7. Ț+65	FW07B FW22B	M – All	1B-B MDAFW Fail to Auto Start, a	air/vapor bound pur	np	
	FW07C FW22C		TDAFW Pump trip/Vapor bound			
* (N)o	rmal, (R)eactivi	ty, (I)nstrument	, (C)omponent, (M)ajor			

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Appendix D

Scenario 6 Summary

The crew will assume the shift at 75% Power with instructions to maintain 75% RTP per 0-GO-5 Section 5.1 Step 48 for Incore Flux Mapping for QPTR Tech Spec concerns.

After turnover, at Lead Examiner direction, insert a #1 Cold Leg Accumulator N2 leak. The crew will respond using alarm response procedures, (ARPs) 1-AR-M6-D A-1 which directs adjusting the pressure and/or level according to 1-SO-63-1, Cold Leg Injection Accumulators. SRO will identify Technical Specification 3.5.1.1.d Action a.

After Technical Specifications are addressed, at Lead Examiner direction, turbine first stage pressure transmitter, PT-1-73, Pimp Ch 1, will fail high. The crew will respond using ARP(s) 1-AR-M5-A C-6. The crew will respond to the automatic control rod motion by entering AOP-C.01, Rod Control System Malfunctions and perform the Immediate Operator Actions (IOAs) to stop the unexpected control rod motion. They then, transition to AOP-I.08, Turbine Impulse Pressure Instrument Malfunction to address the RCS temperature control, feedwater control and steam dump realignment (to steam pressure mode). SRO will identify to Technical Specification 3.3.1.1 Functional Unit 22E Action 8.b.

After Technical Specifications are addressed, at Lead Examiner direction, initiate the next malfunction, #4 SG Atmospheric Relief Valve fails open. The crew will respond using ARP(s) 1-AR-M5-A A-6, C-6 or 1-AR-M6-B D-7 and AOP-S.05, Steam Or Feedwater Leak which directs manual closure of the failed open relief valve and Tave-Tref deviation control.

At the Lead Examiner direction, 1A Main Feedwater Pump vibration will develop. The crew will respond using ARP(s) 1-AR-M3-B A-1, B-5 which will require a manual load reduction for MFP shutdown. If the crew decides to manually trip the MFP, the SRO should enter AOP-S.01, Main Feedwater Malfunctions Section 2.7, Main Feedwater Pump Trip Below 76% Turbine Load.

When the crew has stabilized the unit, at the Lead Examiner direction, a Main Feedwater Header Break (MFLB) outside containment occurs on the combined feed line downstream of the #1 HP Feedwater Heaters, upstream of the FWI Valves. The crew will respond using ARP(s) 1-AR-M5-A B-7 and AOP-S.05, Steam or Feedwater Leak. The leak will increase to the point that a reactor trip is required. The crew should evaluate and manually trip the reactor prior to any automatic reactor trip actuation.

When the reactor trips, will perform IOAs, enter E-0, Reactor Trip or Safety Injection and transition to ES-0.1, Reactor Trip Response. Once Status Tree monitoring is implemented, the crew will identify no auxiliary feedwater flow capability. Automatic Feedwater Isolation fails to occur requiring the crew to manually isolate the feed line break from the SGs.

1A-A MDAFW Pump is out of service and 1B-B MDAFW Pump and the TDAFW Pump both are air/vapor bound. Subsequently the TDAFW Pump trips on overspeed. The crew should manually stop 1B-B MDAFW Pump; venting is required to restore the pump. TDAFW Pump venting and T&T valve resetting are required to restore feedwater flow capability to SGs.

The scenario may be terminated, at the Lead Examiner direction when TDAFW Pump is restored and feeding the SG(s).

EOP flow: E-0 - ES-0.1 - FR-H.1 - ES-0.1

PSA significant transient: Loss of Feed & MFW Line Break PSA significant action: Recovery of AFW (TDAFW Pump)

NRC 1009 ESG-6 Booth Instruction File

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EVENT	IC/MF/RF/OR #	Description/Expected Actions/Booth Feedback
Simulator IC	IC-14 Perform switch check. PLACE the simulator in RUN before loading SCN file or starting the exercise. This will initialize ICS.	75%, BOL ~1000 MWD/MTU CB 'D' Rods @ 185 steps, all others @ 228 steps; [B] = 1189 ppm; Ba Blender setting: 29% Xe: -2529 pcm; Sm: -1019 pcm; <u>Console Operator actions: Place simulator in run and</u> <u>perform the following:</u>
	Load SCENS: <u>1009 NRC ESG-6</u> Place simulator in RUN. Place OOS equipment in required position with tags. Clear alarms	 Allow the simulator to run before loading SCEN file. Place the MODE 1 sign on 1-M-4 Place Train Week A sign
MFs, RFs, ORs are active when the SCN file is loaded.	IRF FWR34 f:1 IOR ZDIHS3116AA f:0 IMF RP16K621A f:1 IMF RP16K621B f:1 IMF RP13A f:1 IMF RP13B f:1	1A-A MDAWFP OOS FWI Automatic Actuation Failure
1.	IMF SI02A f:1 k:1	#1 CLA Lo-Pressure – Faulty Relief Valve; (Faulty relief valve corresponds to 10 psi/minute decrease at 500 psid CLA-containment pressure.) <u>Support staff report:</u> When requested, report as AUO N2 regulator aligned and set as expected.
	DMF SI02A	Prior to inserting Malfunction , ensure CLA pressure is being monitored; THEN: Delete malfunction when CLA pressure drops to < 624 psig.
2.	IMF RX11B f:1 k:2	 PT-1-73, Pimp Ch 1 fails low- no-load value; <u>Support staff report:</u> When MSS or IMs is contacted to trip bistables, inform the crew that the IMs will report to the MCR in ~45 minutes (WO package & briefing time). Ch 1, PT-1-73 indicated on 1-M-4; directly affects the load reference Tref MCR indications are also reflected in the system responds to the Tref program low failure; Steam Dump Cont Sys: will arm D solenoid, but dumps will not open since they are not armed; Rod Cont Sys: no-load value- 547°F value; Rods will insert SG Lvl Cont Sys: no-load value-~33% NR; Crew may <u>NOT</u> place FWC in MANUAL, but may monitor AUTO control establish/ control level at no-load value.

EVENT	IC/MF/RF/OR #	Description/Expected Actions/Booth Feedback
3.	IMF MS12D f:80 r240 k:3 {ZDIHS131}DMF MS12D	Lp #4 SG Atmos. Relief Valve Fails Open
		<u>Support staff report</u> : if dispatched, Security, AUO(s), report steam coming out of the top of West Valve Vault Room.
4.	IMF FW18A f:80 d:15 k:4 IOR ZAOPI4612 F:19.5 r:20 k:4	1A MFW Pump Hi Vibration w/ an oil leak at the pressure transmitter.
	IOR ZAOPI4617 F:165 r:15 k:4	<u>Support staff report</u> : When dispatched to investigate, wait ~3 minutes, report MFP vibration is 7.1 mils above baseline and slowly trending up; an oil line is leaking but is containable to this elevation/surrounding area.
		If dispatched, when requested, report as Engineering or Predictive Maintenance that local vibration is 7 mils above baseline
		 If Environmental Controls and/or Fire Protection personnel are dispatched, wait 5 minutes for each and report on station and implementing appropriate supporting actions.
	MMF FW18A f:100 d:15	<u>Support staff report</u> : When requested, report MFP vibration is NOW off scale high and noticeable floor vibration can be felt.
5.	N/A	Plant power reduction following MFP trip
		<u>Support staff report</u> : If requested, AUO(s) report Relay lights are dark- NOT armed.
6.	IMF FW20 f:50 k:6	Feedwater line break in turbine building; failure of common header, downstream of #1 FW Heater;
		<u>Support staff report</u> : If dispatched, AUO(s) report TB inaccessible, excessive steam and loud noise.
	IMF RP16K621A f:1 IMF RP16K621B f:1 IMF RP13A f:1 IMF RP13B f:1	FWI Function fails: FWI Valves, FRVs/Byps fail to close automatically.
Simulator Oper	ator: DO NOT vent and/or rese	et AFW Pump(s) without Lead Examiner direction
7.	IMF FW09B f:1 IMF FW22B f:1 e:1 IMF FW07B f:1 d:180 e:1	1B-B AFW Pump AUTO-Start defeated; 1B-B Air-bound AFW Pump; 1B-B AFW Pump trip;
		<u>Support staff</u> : when dispatched, wait 2 minutes, report as TB AUO, the pump is hot to the touch.
7.	To Vent MDAFWP: DMF FW07B DMF FW22B	1B-B AFW Pump is air/vapor bound when the pump is started and indicates only no load current, no discharge flow; if AFW is required, no water will be added to S/Gs #3 & #4 until the pump is vented.

NRC 1009 ESG-6 Booth Instruction File

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EVENT	IC/MF/RF/OR #	Description/Expected Actions/Booth Feedback
7.	IMF FW22C f:1 e:1 IMF FW07C f:1 d:240 e:1	TDAFWP becomes air-bound when required to supply AFW flow and will trip ~4 minutes later.
		Support staff report: SEE next line.
When directed by Lead Examiner, perform the following:	DMF FW22C DMF FW07C	TO VENT & RESET TDAFW Pump Mechanical Overspeed Trip & Airbound To Vent: Delete TD Airbound & OvSpd TripTHEN,
lononing.		<u>When directed by LEAD EXAMINER:</u> Report as AB AUO, notify the MCR that the TDAFW Pump has been vented and is ready to be reset, standing by [to receive direction to RESET]
AND Insert k:17	IRF FWR27 f:0 k:17	TDAFWPp Ovr Spd Reset
Termination Crite	eria: Lead Examiner directi initiation criteria.	on when TDAFW Pump is restored prior to RCS Feed and Bleed

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Unit 1 MCR CHECKLIST	Page 1. d			Today
Part 1 - Completed by Off-goin	g Shift / Reviewed b	y On-coming Shift		
Mode 1, 76% Power PSA Risk: YELLOW		NRC ph	one Authenticati	on <u>Code</u>
Grid Risk: Green				
			Until 0800 XXXX	-
RCS Leakage ID .02 gpm, UNID .02 g	jpm		After 0800 YYYY	
	Common Tec	h Spec Actions		
LCO/TRM	Equipment INOP		INOP	Owner
- none -	- none -			
	IL1 Tooh S	pec Actions		
LCO/TRM		pec Actions		
TS LCO 3.7.1.2.a	Equipment INOP 1A-AMDAFW Pump		Time INOP	Owner
TS 3.3.3.7.18.a action 1	1A-A MDAFWP ERCW	- AFW Valve Position	2 hours ago 2 hours ago	MMG MMG
		Equipment	2 110013 ago	
Equipment/spaces for TDAFW				
	Shift P	riorities		
Power was reduced to 76% R			for Incore Flux Ma	pping for OPTR
Tech Spec concerns.		,		oping for Qr TR
Maintain current plant condition	ns until evaluation is	complete.		
		•		
Part 2 – Performed by on-comir	ig shift			
Verify your current qualificatio	ns	🛛 🛛 Review Opera	ting Log since last	held shift or 3
			vs, whichever is le	
Standing Orders / Shift Orders	5 🛛 TACF		Immediate ree	quired reading
LCO Actions				
Part 3 – Performed by both off-	joing and on-comin	g shift	Street and Server	
Walk down of MCR Control Bo	bards			

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SHIFT TURNOVER CHECKLIST

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Page 2. of 3

Today

MAIN CONTROL ROOM (7690)
 Train <u>A</u> Week Protected Equipment: 1-HS-1-51A-S, TDAFW Pump
MDAFW Pump B 1-HS-3-128A
 D/G 1A-A 1-HS-57-46A D/G 1B-B 1-HS-57-73A
OUTSIDE (7666) [593-5214]
All Equipment normal
Equipment/spaces for 1A-A MDAFW Pump protected per 0-GO-16 Appx J
AUXILIARY BUILDING (7775)
 1A-A MDAFW Pump was tagged 2 hours ago to investigate/repair excessive coupling vibration. Expected Return to service is 8 hours. (WO 10-080026-000)
Equipment/spaces for 1A-A MDAFW Pump protected per 0-GO-16 Appx J
TURBINE BUILDING (7771) (593-8455) All Equipment normal for current conditions
 Equipment normal for current conditions Equipment/spaces for 1A-A MDAFW Pump protected per 0-GO-16 Appx J

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SHIFT TURNOVER CHECKLIST

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Page 3. of 3

Today

Disabled Annunciators				
PANEL	WINDOW	WINDOW ANNUNCIATOR		

Equipment Off-Normal (Pink Tags)

UNID And Noun Name	Panel	Problem Description	WO / PER Number

MCR WO LIST

ID And Noun Name	Panel	Problem Description	WO/PER Number
	· · · · · · · · · · · · · · · · · · ·		
· · · · · · · · · · · · · · · · · · ·			

UNIT ONE REACTIVITY BRIEF Date: Today Time: Now

General Information

200 0 4400		1		
RCS Boron: 1189 ppm	Today	BA Cor	ntroller Setpoint: 29% *	RCS B-10 Depletion: 2 ppm
Operable BAT: A	BAT A Boron: 685	5 0 ppm	BAT C Boron: 6850ppm	RWST Boron: 2601 ppm
Nominal	Gallons per rod ste	p from 18	9: 17 gallons of acid, 75	gallons of water

* Verify boric acid flow controller is set at Adjusted BA Controller Setting iaw 0-SO-62-7 section 5.1

Estimated values for a 1° Change in Tave **

Gallons of acid: 22	Collops of water 01	
	Gallons of water: 94	Rod Steps: 1

Estimated rods/boron for emergency step power reduction ** (Assuming Xenon equilibrium and no reactivity effects due to Xenon. 2/3 total reactivity from rods, 1/3 from boron)

Power reduction amount	Estimated Final Rod Position	Estimated boron addition
10%	181 Steps on bank D	93 gallons
30%	161 Steps on bank D	291 gallons
50%	n/a	n/a

** These values are approximations and not intended nor expected to be exact. The values may be superseded by Rx Engineering or SO-62-7 calculated values. These values are calculated assuming 100% steady state power operation only. Engineering data last updated <u>TODAY</u>. Data Valid up to three weeks from now.

Previous Shift Reactivity Manipulations

Number of dilutions: 1	Number of borations:	Rod steps in:	
Gallons per dilution: 12	Gallons per boration:	Rod steps out:	
Total amount diluted: 12	Total amount borated:	Net change:	IN/Out

Current Shift Estimated Reactivity Manipulations

Remarks: Rx Power ≈76% MWD/MTU – 1000 Xe: -2529 pcm; Sm: -1019 pcm; ***The boron letdown curve is flat for the next 25 EFPD.

Last Dilution Complete ~1 hour ago.

Next Unit 1 Flux Map is scheduled: three weeks from now

Unit Supervisor:

Name/Date

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		Boron	Results				
Sample Point	Units	Boron	Date / Time	Goal	Limit		
U1 RCS	ppm	1189	Today / Now	Variable	Variable		
U2 RCS	ppm	816	Today / Now	Variable	Variable		
U1 RWST	ppm	2601	Today / Now	2550 - 2650	2500 - 2700		
U2 RWST	ppm	2569	Today / Now	2550 - 2650	2500 - 2700		
BAT A	ppm	6850	Today / Now	Variable	Variable		
BAT B	ppm	6850	Today / Now	Variable	Variable		
BAT C	ppm	6850	Today / Now	Variable	Variable		
U1 CLA #1	ppm	2556	Today / Now	2470-2630	2400-2700		
U1 CLA #2	ppm	2575	Today / Now	2470-2630	2400-2700		
U1 CLA #3	ppm	2591	Today / Now	2470-2630	2400-2700		
U1 CLA #4	ppm	2589	Today / Now	2470-2630	2400-2700		
U2 CLA #1	ppm	2531	Today / Now	2470-2630	2400-2700		
U2 CLA #2	ppm	2650	Today / Now	2470-2630	2400-2700		
U2 CLA #3	ppm	2522	Today / Now	2470-2630	2400-2700		
U2 CLA #4	ppm	2526	Today / Now	2470-2630	2400-2700		
Spent Fuel Pool	ppm	2547	Today / Now	<u>></u> 2050	<u>≥</u> 2000		
	ithium Res	ults		Goal	Midpoint		
U1 RCS	ppm	1.1	Today / Now	>1	>1		
U2 RCS	ppm	2.43	Today / Now	2.18-2.48	2.33		

Operations Chemistry Information

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Primary to Se	econdary L	eakrate In	formation (Total C	PM RM-90-9	9/119)
Indicator	Units	U1	Date / Time	U2	Date/Time
SI 50 S/G Leakage?	Yes/No	No	Today / Now	No	Today / Now
SI 137.5 CVE Leakrate	gpd	< 0.1	Today / Now	< 0.1	Today / Now
5 gpd leak equivalent	cpm	115	Today / Now	68	Today / Now
15 gpd (30 min increase)	cpm	265	Today / Now	83	Today / Now
30 gpd leak equivalent	cpm	490	Today / Now	206	Today / Now
75 gpd leak equivalent	cpm	1165	Today / Now	455	Today / Now
150 gpd leak equivalent	cpm	2290	Today / Now	870	Today / Now
CVE Air Inleakage	cfm	10	Today / Now	12.5	Today / Now
Bkgd on 99/119	cfm	40	Today / Now	40	Today / Now
Steady state conditions	s are necessary	for an accurat	e determination of leak ra	ate using the CVE	Rad Monitor

Appendix D	1	Scenario Outline	Attachment 1					
Op Test No.:	NRC 2010302	Scenario # <u>6</u> Event # 1	Page <u>1</u> of <u>46</u>					
Event Descripti	on: Co	d Leg Accumulator Nitrogen Leak.						
Time	Position	Applicant's Actions or beha	vior					
		tion required for Event 1						
Alarms/Indi								
Annuncia 1-M-6	itor:							
	55-6D Window A	-1, "PIS-63-126 ACCUMULATOR TANK 1 PRESSURE H	il-LOW"					
Indication 1-M-6	าร							
	-63-128, 63-126,	NO. 1 CL ACCUM PRESSURE indicates a lowering pres						
T = 0	Crew	Respond to 1-M-6 alarms in accordance with Alarm (ARPs)	Response Procedures					
	RO	Refer to ARP 1-AR-M6-D A-1:						
		Probable Causes: 1. Low pressure						
		 a. Possible nitrogen vent valve or accumulator safety valve leaking. b. Loss of accumulator inventory resulting in decreasing level. 						
	NOTE: Th	e digital reading shall be used for the compliance inst	rument.					
		Corrective Actions						
		 [1] CHECK CLA digital pressure indication on [1-PIS 126] (M-6). 	S-63-128] and [1-PIS-63-					
		[2] IF CLA pressure is <624 psi g OR >668 psi g , TH Accumulator inoperable.	EN DECLARE the					
		[3] ADJUST accumulator level and/or pressure in ac 1, Cold Leg Injection Accumulators.	ccordance with 1-SO-63-					
		11 EVALUATE Toobaical Specifications 100.251	4 for one line life.					
		[4] EVALUATE Technical Specifications, LCO 3.5.1						
		 EVALUATE the following Tech Specs for applica 3.5.1.1.d Cold Leg Injection Accumulators: A nit between 624 and 668 psig <u>ACTION a</u>: w/ 1 CLA inoperable, except from boron limits, restore w/i 24 hrs or HT STBY w/i next 6 hrs 8 ≤1000 psig w/i following 6 hrs. 	rogen cover-pressure of					

Appendix D				Attachment 1					
Op Test No.:	NRC 2010302	Scenario #	6	Event #	1	Page	_2	of	46
Event Descriptio	on: Cold	Leg Accumulato	or Nitrogen	Leak.					

, Cold Leg Injection Accumulators og Nitrogen to the Cold Leg Accumulators dding Nitrogen to Cold Leg Accumulator 1 ross connect the Cold Leg Accumulators. d Leg Accumulator shall be pressurized between 624 psig psig to comply with TS 3.5.1.1. The Accumulator safety relief set to relieve pressure at 700 psig. E Power Checklist 1-63-1.01 complete.							
dding Nitrogen to Cold Leg Accumulator 1 ross connect the Cold Leg Accumulators. d Leg Accumulator shall be pressurized between 624 psig psig to comply with TS 3.5.1.1. The Accumulator safety relief set to relieve pressure at 700 psig.							
ross connect the Cold Leg Accumulators. d Leg Accumulator shall be pressurized between 624 psig psig to comply with TS 3.5.1.1. The Accumulator safety relief set to relieve pressure at 700 psig.							
d Leg Accumulator shall be pressurized between 624 psig psig to comply with TS 3.5.1.1. The Accumulator safety relief set to relieve pressure at 700 psig.							
osig to comply with TS 3.5.1.1. The Accumulator safety relied set to relieve pressure at 700 psig.							
E Power Checklist 1-63-1.01 complete.							
E Valve Checklist 1-63-1.02 complete.							
E Valve Checklist 1-63-1.06 complete.							
the following valves CLOSED:							
ENUMBER FUNCTION INITIALS							
V-63-107 No. 2 CL Accum N2 Supply Isol							
V-63-87 No. 3 CL Accum N2 Supply Isol							
V-63-63 No. 4 CL Accum N2 Supply Isol							
1-FCV-63-64] N2 Supply to CL Accum.							
ilator output pressure in the following two steps may be waived in save time when restoring pressure on an inoperable cold leg							
save and when restering pressure on an inoperable cold leg							
ulator outlet pressure is too low, Maintenance should be							
NOTE 2: If nitrogen regulator outlet pressure is too low, Maintenance should be contacted for assistance.							
1 nitrogen regulator 0-PCV-77-254 is OPERABLE, THEN VERIF							
1 nitrogen regulator 0-PCV-77-254 is OPERABLE, THEN VERIF e indicated on 0-PI-77-272 (downstream of 0-PCV-77-254) is							
1 nitrogen regulator 0-PCV-77-254 is OPERABLE, THEN VERIFY							
00							

Appendix D			Scenari	·····	Attachment 1				
Op Test No.:	NRC 2010302	Scenario #	6	Event #	1	Page	3	of	46
Event Descriptio	n: Cold	Leg Accumulato	or Nitroger	Leak.					

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Time	Positio	n Applicant's Actions or behavior
		 [7] IF Unit 1 nitrogen regulator 0-PCV-77-254 is INOPERABLE, THEN ALIGN Unit 2 nitrogen regulator 0-PCV-77-253 to supply U-1 cold leg accumulators as follows:
		[a] OPEN [0-77-865A]
		[b] VERIFY pressure indicated on 0-PI-77-269 (downstream of 0-PCV-77 253) is greater than or equal to 650 psig.
	NOTE:	If CLA pressure is less than 600 psig, then temperature monitoring is required
		to prevent brittle fracture of nitrogen piping downstream of 0-PCV-77-253 or - 254.
		[8] IF Accumulator 1 pressure is less than 600 psig, THEN PERFORM the following during pressurization:
		 [a] MONITOR piping temperature downstream of [1-63-705] using contact pyrometer.
		[b] IF piping temperature approaches 40°F, THEN THROTTLE [1-63-705 in close direction as necessary to maintain piping temperature greate than 40°F.
		[c] WHEN CLA #1 pressure is greater than 600 psig, THEN STOP temperature monitoring and OPEN [1-63-705] as desired.
		[9] OPEN [1-FCV-63-127] No. 1 CL Accum N2 Supply Isolation to admit nitrogen to accumulator.
	NOTE: T	ech Spec operability range for CLA pressure is 624-668 psig.
		[10] WHEN CLA #1 pressure increases to desired value, THEN
		a. CLOSE [1-FCV-63-127].
		b. CLOSE [1-FCV-63-64].
		c. IF [1-63-705] was THROTTLED, THEN ENSURE [1-63-705] is FULLY OPEN.
		 d. IF [0-77-865A] was OPENED, THEN ENSURE [0-77-865A] is CLOSED.
		END OF TEXT SECTION 8.3.1

Appendix D			Scenario	Outline			Atta	chme	ent 1
Op Test No.:	NRC 2010302	Scenario #	6	Event #	1	Page	4	of	46
Event Descriptio	n: Cold	Leg Accumulate	or Nitrogen	Leak.					

Time	Position	Applicant's Actions or behavior
		CREW Brief would typically be conducted for this event as time allows prior to the next event.
		Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.
		<u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Lead Exami identified.	ner may cue n	ext event when the CLA line up is returned to normal and Tech Specs are

Appendix D)	ŝ	Scenari	o Outline			Attac	hme	nt 1	
Op Test No.:	NRC 2010302	Scenario #	6	Event #	2	Page	5	of	46	
Event Descripti	ion: Firs	st Stage Pressure	Transmitte	er PT-1-73 Fails H	igh.					
Time	Position			Applicant's (Actions or Beha	vior				
Simulator C	perator: When	directed initi	oto Evo							
Alarms/Indi Annunci 1-M-5 • 1-XA-	cations	i8-2P/Q REAC C	OOL LO	OOPS T REF T A)W"				
1-M-5	matic Control Ro									
T = 10	68-2B, RCS/TUR Crew		-M-5 ala	arms in accorda	ance with Ala	rm Respor	ise Pro	cedu	res	
	RO	Identifies auto Rod Control H	omatic c Handswi	control rod motionitich 1-HS-85-5	on with no run 110 to MANU	with no runback in progress, positions to MANUAL				
	BOP/RO	Refer to ARP	1-AR-M	15-A C-6						
	SRO	Bank Moveme OR	od Cont ent	rol System Mal pulse Pressure				ed Ro	bd	
				C.01, Rod Cont t 2.1, Uncontro	-					
	NOTE: Step	1 is an immedi					iont			
RO 1. STOP uncontrolled rod motion: a. PLACE rod control in MAN. b. CHECK rod motion STOPPED.										
	CAUTION:	Control Rods	should	NOT be manua	illy withdrawn	during a	lant tr	ansia		
	RO/BOP	Г · · · · · · · · · · · · · · · · · · ·		t transient:						
	RO/BOP RO			or power and T	-avg STABLE	.				
	Crew	3. CHECK	for instru	umentation ma	lfunction:					
	RO	a. CHEC	K nucle	ar instrumental	tion OPERAB	LE.				

Appendix D		1	Scenario	Outline			Atta	chme	ent 1
Op Test No.:	NRC 2010302	Scenario #	6	Event #	2	Page	6	of	46
Event Description	n: First S	Stage Pressure	Transmitte	r PT-1-73 Fa	ils High.				

Time	Position	Applicant's Actions or Behavior
	RO	b. CHECK RCS RTDs OPERABLE
	BOP	c. CHECK turbine impulse pressure channels OPERABLE. (RNO required)
	SRO	RNO: c. GO TO AOP-I.08, Turbine Impulse
		AOP-I.08, Turbine Impulse Pressure Instrument Malfunction Section 2.1 Unit 1: Failure of Turbine Impulse Pressure Instrument 1-P-1-73
	RO/SRO	1. ENSURE control rods in MANUAL.
	BOP	 Dess of Instrument Power to S/G level setpoint program input will drive setpoint elow 33%. 2. EVALUATE placing main feedwater reg valves in MANUAL to maintain S/G levels on program
		Based on NOTE and secondary plant evaluation, FRVs remain in AUTO
		3. ENSURE steam dumps in steam pressure mode:
		a. PLACE steam dump FSV handswitches in OFF.
		b. PLACE steam dump mode selector in STEAM PRESS mode.
		c. ENSURE zero output (demand).
		 d. PLACE steam dump FSV handswitches in ON. e. ENSURE steam dump controller setpoint at 1005 psig.
	SRO	 4. EVALUATE the following Tech Spec for applicability 3.3.1.1, Reactor Trip System Instrumentation Functional Unit 22.E: Reactor Trip System Interlocks, Turbine Impulse Chamber Pressure, P-13 - ACTION 8.b: Reactor Trip- Turbine Trip; w/ less than Minimum Number of Channels OPERABLE, declare the interlock inoperable and verify that all affected channels of the functions listed below are OPERABLE or apply the appropriate ACTION statement(s) for those functions.
	RO	 DETERMINE Program T-avg for current reactor power USING TI-28 Figure 3 or ICS (NSSS / BOP, Program Reactor Average Temperature).

Appendix D		S	Scenari	o Outline			Attac	chme	ent 1
Op Test No.:	NRC 2010302	Scenario #	6	Event #	2	Page	7	of	46
Event Description	n: First S	Stage Pressure T	ransmitt	er PT-1-73 Fa	ils High.				

Time	Position	Applicant's Actions or Behavior
	RO	 RESTORE T-avg to within 1°F of program value USING one of the following:
		POSITION control rods OR
		ADJUST turbine load OR
		ADJUST RCS boron concentration.
	NOTE: If	performing this AOP in conjunction with AOP-I.11 for Eagle LCP failure, RO determines NOTE is N/A
	Crew	7. NOTIFY I&C to perform Appendix A, Removing Unit 1 Turbine Impulse Pressure Loop 1-P-1-73 from Service.
	Crew	8. INITIATE Maintenance on 1-P-1-73.
	SRO	9. GO TO appropriate plant procedure.
		END OF SECTION
Evaluator N	Note: The follow	ving CREW Brief and Notification actions are not contained in the procedure.
		CREW Brief would typically be conducted for this event as time allows prior to the next event.
		Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.
		Operations Management - Typically Shift Manager.
		<u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
.ead Exam	iner may cue ne	ext event when Tech Specs are identified.

Appendix D		Required Operator Actions Form ES-D-2							
Op Test No.:	NRC 2010302	RC 2010302 Scenario # _ 6 Event # 3 Page _ 8 of _ 46							
Event Descriptio	n: Lp	#4 SG Atmos. Relie	ef Valve F	ails Partially Ope	n				
	<u>.</u>								
Time	Position				Actions or Beha	vior			
Simulator Op Indications/A		directed, initia	ate Eve	nt 3					
Annunciat									
1-M-5		•							
• 1-XA-5 •	5-5A, A-6, "TS C-6, "TS	-68-2M/N RC LO -68-2P/Q REAC (OPS T A COOL L	AVG/AUCT T A OOPS T REF T	VG DEVN HIG AUCT HIGH-I	H-LOW" ₋OW"			
1-M-6									
• 1-XA-5	5-6B, D-7, "FS	-3-103B STM GE	IN LOOF	9 4 STEAM/FEE	DWATER FLO	OW MISMA	ТСН"		
Indication	s								
1-M-4 ● 1-FI-3-	103A 103B SG.	4 FW INLET FLC		CH 2 indicatio	a increasing fl		1 4 C	0-4	•
• 1-FI-1-	28A, 28B SG-4 S	STEAM FLOW C	H-1, CH-	-2 indicating incl	reasing flow (c	ow (compar ompared to	ed to S SGs 1	-3)	3)
1-M-5 ● 1-TR-6	8-28 RCS/TURF	BINE TEMP reco	rdar sha	we PCS tompo	ratura daviating	- from rofor			- 4 um
					alure deviaint	J IIOIII Ieleit	ence le	empera	ature
		ns/Indications: d motion in resp		Secondary-to-Pi	rimarv tempera	iture misma	tch		
T + 30	Crew	Respond to 1- Procedures (A	M-5 & 6					e	
	BOP/RO	Identifies ARP	9 1 - AR-N	M5-A A-6, C-6	acknowledge	s alarm ar	nd, no	tifies \$	SRO
	SRO	Acknowledges	and er	nters AOP-S.0	5, Steam Or Fe	eedwater Le	ak		
									_
			AC	P-S.05, Stear	n Or Feedwa	iter Leak			
	Crew	1. MONITOR	person	inel safety:					
				edwater lines r nel, THEN PE			solate	ed to	
		1) TRIP the reactor.							
			eak is c IVs.	on steam lines	OR source is	unknown,	THEN	I CLO	SE
				on feedwater lin I the following:		e is unkno	wn, Tl	HEN	
		a)		IFW pumps.					
		b)	CLOSE	E Feed Reg Va	alves.				
		4) GC	TO E-0), Reactor Trip	or Safety Inj	ection.			

Appendix D		Required Operator Actions Form ES-D-2
Op Test No.:	NRC 2010302	Scenario # _ 6 Event # 3 Page _ 9 of _ 46
Event Description	n: Lp	#4 SG Atmos. Relief Valve Fails Partially Open
Time	Position	Applicant's Actions or Behavior
	RO	2. MONITOR steam generator levels STABLE on program.
Evaluator No		tion to place 1-HS-1-31, SG-4 ATM RELIEF VALVE CONTROL to CLOSE and e the #4 SG Atmospheric Relief Valve
	BOP	3. CHECK the following:
		S/G atmospheric relief valves CLOSED (RNO required)
		steam dumps CLOSED.
		RNO:
	BOP	IF any S/G atmospheric relief valve or steam dump is leaking or failed open, THEN CLOSE valve(s) USING MCR switch.
		IF any valve CANNOT be closed N/A
		4. CHECK main turbine on line.
		5. MONITOR the following:
		reactor power STABLE
		 reactor power less than or equal to 100% (3455 MWt). (RNO if required)
		RNO: REDUCE turbine load as necessary to maintain reactor power less than or equal to 100% (3455 MWt).
	RO	6. MONITOR T-avg within 3°F of T-ref. (RNO if required)
	SRO/ BOP	RNO: REDUCE turbine load as necessary to maintain T-avg within 3°F of T-ref (or program value).
	SRO	IF T-avg CANNOT be maintained within 5°F of T-ref (or program value), THEN PERFORM the following:
	RO	a. TRIP the reactor
	BOP	b. WHEN reactor is tripped, THEN CLOSE MSIVs.

Appendix D		Required (Operator Actio	ons		For	m ES	6-D-2
Op Test No.:	NRC 2010302 Sc	enario #6	Event #	3	Page	10	of	46
Event Descriptio	n: Lp #4 SG /	Atmos. Relief Valv	ve Fails Partially	Open				

Time	Position	Applicant's Actions or Behavior
	Crew	c. GO TO E-0, Reactor Trip or Safety Injection.
Evaluator No	te: remaining crew actio	Steps 7-14 should be 'check/verify' actions based on expected previous ons.
	NOTE: Tec	h Spec LCO 3.6.1.4 is applicable if containment pressure exceeds 0.3 psig.
	RO	7. MONITOR containment pressure STABLE
	Crew	Steps 8-14
		15. EVALUATE actions required to restore plant to normal.
		16. Go to appropriate plant procedure.
		END OF SECTION
Evaluator No	te: The fol proced	lowing CREW Brief and Notification actions are not contained in the ure.
		CREW Brief would typically be conducted for this event as time allows prior to the next event.
		Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.
		Operations Management - Typically Shift Manager.
		Maintenance Personnel – Typically Maintenance Shift Supervisor (MSS).
		(Note: Maintenance notification may be delegated to the Shift Manager).
Lead Examin is stable.	er may cue ne	xt event when Atmospheric Relief Valve is closed and RCS temperature

Appendix D		Required Operator Actions Form ES-D-2
Op Test No.:	NRC 2010302	Scenario #6 Event #4 Page11 of46
Event Descripti	on: 1A	Main Feedwater Pump High Vibration - Manual Trip required
Time	Position	Applicant's Actions or Behavior
		n directed, initiate Event 4
Indications/		
Annuncia 1-M-5	ator:	
	55-3B, B-5, "Th	IRUST PRETRIP OR VIBRATION EXCESSIVE"
Actio	erminal: Secon n Field for base	dary Mimics→MAINFEED PUMPS→Click on MFP 'A' Icon (MFP "A" RUN OUT ine vibration data) ns/Indications:
		AIN FEEDWATER PUMP TURBINE 1A ABNORMAL"
T = 30	Crew	Respond to 1-M-3 alarms in accordance with Alarm Response Procedures (ARPs)
	BOP/RO	Identifies ARP 1-AR-M3B B-5, acknowledges alarm and, notifies SRO
	SRO	Acknowledges and implements ARP actions
· · · · · · · · · · · · · · · · · · ·		ARP 1-AR-M3B B-5 Probable Causes:
		Thrust Bearing Wear:
		1. Turbine or pump seal malfunction.
		2. Turbine mechanical failure.
		3. Thrust bearing mechanical failure.
		4. Loss of power to Bently Nevada Panel.
		Excessive Vibration:
		1. Rotor Imbalance
		2. Low Oil Temperature
		3. Bearing Failure 4. Loose Parts/Turbine Blading
		 Loose Parts/Turbine Blading Turbine vibration carry through.
		6. Excessive Moisture in Steam
		can be used to determine baseline vibration data. The baseline corresponds to Electrical Runout value given on ICS.
		I Bently-Nevada panel should be used to determine thrust bearing or vibration

Appendix D		Requ	ired Op	erator Action	าร		For	m ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	6	Event #	4	Page	12	of	46
Event Descriptio	n: 1A M	ain Feedwater P	ump Hiał	ו Vibration - Ma	nual Trip required				

Description:	A Main Feedwater	Pump High	Vibration -	Manual Tr	ip required
--------------	------------------	-----------	-------------	-----------	-------------

Time	Position	Applicant's Actions or Behavior
	wear	ly Nevada thrust bearing monitor will trip the MFPT on high thrust bearing setpoint of 10 mils above baseline (forward movement only) with 2/2 logic. t value is 7 mils above baseline.)
	NOTE 4: MFW	/ pump and turbine bearing vibration on Bently-Nevada panel should not ed 5 mils above baseline (Alert value is 3 mils above baseline.)
		ARP Corrective Actions:
Evaluator No	reports w	e crew has demonstrated the ability to determine MFP vibration severity, field vill present an oil leak plus the vibration situation requiring a manual 1A MFP entry into AOP-S.01.
	Applicab	le section of AOP-S.01, Loss of Normal Feedwater follows this event guide.
		[1] IF MFP trips, THEN GO TO AOP-S.01, Loss of Normal Feedwater
		[2] OBSERVE windows (A-1) or (B-1) to determine which MFPT is affected
		[3] CHECK ICS, Secondary Mimics, MFP Bearing Data to determine the affected MFWP.
		[4] IF Excessive Thrust Bearing wear is indicated, N/A
		[5] IF Excessive Turbine Vibration is indicated, THEN
		[a] DISPATCH operators to affected MFPT to perform the following:
		 CHECK local vibration indication on Bently-Nevada panel (Refer to GOI-6, Apparatus Operations).
		CHECK for abnormal noises or other indications of problem.
		[b] :MONITOR turbine vibration on ICS, Secondary Mimics, MFP Bearing Data.

Appendix D		Req	uired Op	erator Actio	ons		For	m E	S-D-2
Op Test No.:	NRC 2010302	Scenario #	6	Event #	4	Page	13	of	46

Event Description: 1A Main Feedwater Pump High Vibration - Manual Trip required

Time	Position	Applicant's Actions or Behavior
		[c] IF local vibration indication at or above Alert value, THEN CONTACT Predictive Maintenance and Engineering for assistance.
		 [d] IF vibration problem valid AND vibration exceeding 5 mils above baseline, THEN REMOVE MFWP from service using one of the following: 0-GO-5, Normal Power Operation OR AOP-C.03, Rapid Shutdown or Load Reduction.
		If the crew elects to trip 1A MFP, the SRO should enter AOP-S.01, Main Feedwater Malfunctions Section 2.7, Main Feedwater Pump Trip Below 76% Turbine Load.
		Following AOP-S.01 performance, the crew will conduct a brief.
Evaluator Not	e: The follow	wing CREW Brief and Notification actions are not contained in the procedure.
		CREW Brief would typically be conducted for this event as time allows prior to the next event.
		Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.
		Operations Management - Typically Shift Manager.
		Maintenance Personnel – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).

plant power reduction is required.

Appendix D		Req	Form ES-D-2						
Op Test No.:	NRC 2010302	Scenario #	6	Event #	4	Page	14	of	46
Event Description:	1A M	ain Feedwater F	^p ump High	Vibration - Manu	al Trip required				

Sect Crew	AOP-S.01, Main Feedwater Malfunctions on 2.7, Main Feedwater Pump Trip Below 76% Turbine Load SRO directs AOP-S.01 Section 2.7 implementation. [1] MONITOR at least one MFW pump RUNNING. [2] ENSURE running MFW pump loads as required.
	SRO directs AOP-S.01 Section 2.7 implementation. [1] MONITOR at least one MFW pump RUNNING.
	[1] MONITOR at least one MFW pump RUNNING.
	[2] ENSURE running MFW pump loads as required.
	[2] ENSURE running MFW pump loads as required.
	[3] CHECK feedwater flow greater than steam flow.
	(RNO required) RNO:
	IF steam flow reduction is needed, THEN PERFORM the following:
	a. REDUCE turbine load USING valve position limiter.
	 ENSURE control rods inserted as necessary to match T-avg and T- ref.
	[4] MONITOR steam generator levels returning to program level. (RNO required)
	RNO: PERFORM the following:
	a. IF any MFW Reg valve is in AUTO AND controller deviation is off-
	scale high with level above program, THEN PLACE affected MFW
	Reg valve controller(s) to MANUAL and back to AUTO to reset output
	b. IF manual control of MFWP speed or feed reg valve position is
	needed, THEN PERFORM the following as necessary:
	ADJUST running MFWP speed
	OR
	 ADJUST MFW Reg valve position.

Appendix D	dix D Required Operator Actions							m ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	6	Event #	4	Page	15	of	46
Event Descriptio	n: 1A M	ain Feedwater P	ump High	Vibration - M	lanual Trip required				

Time	Position	Applicant's Actions or Behavior
		AOP-S.01, Main Feedwater Malfunctions
	Section	2.7, Main Feedwater Pump Trip Below 76% Turbine Load
		c. IF reactor trip is imminent due to low S/G level, THEN TRIP the
		reactor and GO TO E-0, Reactor Trip or Safety Injection.
		d. WHEN S/G levels are stable and on program, THEN EVALUATE
		placing MFWP speed controls and MFW Reg valve controllers in
		AUTO.
		[5] CHECK reactor power less than 60%.
		(RNO required)
		RNO:
		ENSURE affected Main Feedwater Pump Turbine Condenser isolation valves CLOSED:
		a. MFWP A
		FCV-2-205, Condensate Inlet
		• FCv-2-205, Condensate Intel
		FCV-2-210, Condensate Outlet
		OR
		b. MFWP B
		FCV-2-211, Condensate Inlet
		FCV-2-216, Condensate Outlet
		[6] ENCLIDE upit is not uping to stable conditions
		[6] ENSURE unit is returning to stable conditions
		[7] DISPATCH personnel to investigate MFW pump trip.
		[8] CHECK C-7 LOSS OF LOAD permissive DARK. [M4A, window E-5]
		[9] CHECK valve position limit light DARK. [M-2]
		(RNO required)

Appendix D		Required Operator Actions For								
Op Test No.:	NRC 2010302	Scenario #	6	Event #	4	Page	16	of	46	
Event Descripti	on: 1A	Main Feedwate	r Pump Higl	NVibration - Ma	nual Trip required					
Time	Position			Applicant	's Actions or Behavi	or				
	Section 2			eedwater M Pump Trip B	alfunctions elow 76% Turbin	e Load				
		RNO:			cessary USING A		B.			
Evaluator N	ote: Appendi	x B, Turbine	Runback	Restoration	follows this event	guide.				
	NOTE: To en wher • F d • L	nsure unit is n determining Power should Irain tank pur	within cap I final pow be reduc nps in ser	pacity of one ver level: ed below 60 vice) or 55%	MFWP, the follow % (if all cond boos 6 (if two cond boos r output should be	ving shou ster pum ster pum	ps and ps in s	heate ervice	er e).	
		Γ	IATE load	d reduction a	s required USING	3 0-GO-5			<u></u>	
Evaluator No	desired p reactor o Boron Co changes	olant load rec ore distribution	luction (in on limits t Control is nanage th	this case 10 o determine used to dete	and turbine load 0-15%) is complet boration control/c ermine and contro pecifically GO-5 F	e, the cre hanges. ol boron d	ew wou 0-SO- concen	uld as -62-7, itratior	n	
					evels for extende o xenon changes		ls may	1		
					eater than 5%.					
		[12] INIT	IATE repa	airs on affect	ted equipment					
		[13] GO	TO appro	priate plant	procedure					
				EN	D OF SECTION					
Evaluator No	ote: SRO/CRE a brief at t	<i>N</i> should in his time.	sure read	tor power is	s stable per AOP	-S.01 an	id may	' conc	Juct	
Lead Examir	ner may cue ne	xt event who	en the CF	REW has sta	bilized plant pov	wer.				

Appendix	D	ctions Form							
Op Test No Event Desc		 Scenario # ain Feedwater P	<u>6</u> ump Higl	Event #	4 Ial Trip required	Page	17	of	46
	SQN	MAIN FEE	DWATE	R MALFUNCT	IONS	AOP-S.	01		

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APPENDIX B

TURBINE RUNBACK RESTORATION

NOTE	This appendix is used to remove turbine from valve position limiter prior to starting load reduction following a BOP runback.	
[1]	ENSURE governor valve tracking meter centered close to ZERO.	
[2]	DEPRESS [TURB MANUAL] mode selector pushbutton.	Ω
[3]	VERIFY [TURB MANUAL] lamp LIT.	
[4]	VERIFY reference and setter counters stabilize.	
[5]	ENSURE governor valve tracking meter centered close to ZERO.	
[6]	DEPRESS [OPER AUTO] mode selector pushbutton.	Π
[7]	VERIFY [OPER AUTO] lamp LIT.	
[8]	VERIFY reference and setter counters stabilize.	
	IF VALVE POS LIMIT light is LIT, THEN REDUCE turbine load reference using SETTER UNTIL VALVE POS LIMIT light is DARK.	

Appendix D			Form ES-I						
Op Test No.:	NRC 2010302	Scenario #	6	Event #	5	Page	18	of	46
Event Descriptio	on: Plant	Power Reductio	n						

Time	Position	Applicant's Actions or Behavior
Simulator C	perator: No ac	ctions for Event 5, Plant Power Reduction
	cations availab	
Evaluator N	reductio Step 15 Operato	current conditions and if the crew chooses to perform a 0-GO-5 power on, the first step actually performed is in Section 5.3 Step 14 through 5.3, below. or information on how to conduct the load reduction are contained in prior to Section 5.3 Steps 1 and 7; they follow:
T = 40		
	0-GO-5 Section	on 5.3 Step 1 NOTES:
		NOTES
	portion conditi	ection may be used to reduce power to ~30% during plant shutdown OR a n of this section may be performed to reduce power as required by plant ions. Steps which are not required for partial load reduction may be marked N/A M concurrence as specified by SPP-2.2.
	conder	idix D provides guidance on recommended power values to maintain nsate pressure if secondary plant equipment must be removed from service for enance.
	3) Steps	5.3[2] through 5.3[6] may be performed out of sequence.
	0-GO-5 Section	on 5.3 Step 7 NOTES:
		NOTES
		nce on restoration of EHC Controls after a BOP runback is contained in dix B, <i>Turbine Runback Restoration</i> . [c.4]
	2) For con or unus	re operating recommendations for situations such as end of core life coast down sual power maneuvers, contact Reactor Engineering for guidance. [c.5]
	3) It is rec	commended that AFD be controlled within the target band.
	(a) bon match	llowing general approach should be used during power reduction: ate RCS to reduce RCS T_{AVG} within limits of T_{REF} (b) reduce turbine load to T_{REF} with T_{AVG} iodically take rod control to MANUAL from AUTO and insert the bank to move
	AFD ne control	ear the target value, (d) return rod control to AUTO when not using the bank to AFD, and eat the above as necessary to accomplish the load change.

Appendix D	dix D Required Operator Actions							Form ES-D-2				
Op Test No.:	NRC 2010302	Scenario #	6	Event #	5	Page	19	of	46			
Event Descriptio	on: Plant	Power Reductio	n									

Time	Position	Applicant's Actions or Behavior
Evaluator N	lote: Accord	ing to AOP S.01 Section 2.7 Step 10 NOTE:
	NOTE: To	o ensure unit is within capacity of one MFWP, the following should be onsidered when determining final power level:
	•	Power should be reduced below 60% (if all cond booster pumps and heater drain tank pumps in service) or 55% (if two cond booster pumps in service).
	•	Less than or equal to 90% controller output should be maintained on running MFWP
	CREW	Load reduction as required USING 0-GO-5, NORMAL POWER OPERATION, Section 5.3 Power Reduction From 100% to 30%
		NOTE
	Turbine Im relays are	pulse pressure relay lights are located on L-262.Relay lights are dark when NOT armed. Relay No. 4 is a spare.
		[14] WHEN turbine load less than 71% (Unit 1) 72% (Unit 2), THEN PERFORM one of the following (N/A substep not performed):
		[14.1] VERIFY Turbine Runback circuits are NOT armed by performing the following:
		A. ENSURE [PIS-47-13RLY1], (Turbine runback from MFP loss) is NOT LIT.
		B. ENSURE [PIS-47-13RLY2], (Turbine runback from No. 3 HDT) is NOT LIT.
		C. ENSURE [PIS-47-13RLY3], (Closure of LCV-6-106B from Loss of any #3 HDTP) is NOT LIT.
		[14.2] VERIFY Turbine Runback circuits are NOT armed by performing the following:
		A. ENSURE [FU2-47-13A], (Turbine runback from MFP loss) REMOVED (Aux Inst Rm. R71).
		B. ENSURE [FU2-500-R071K3], (Turbine runback from No. 3 HDT) REMOVED (Aux Inst Rm R-75).
		C. ENSURE jumper between P18-1 and P18-2 in PnI 262, (Closure of LCV-6-106B from Loss of any #3 HDTP) REMOVED.

Appendix D		Required Operator Actions							S-D-2
Op Test No.:	NRC 2010302	Scenario #	6	Event #	5	Page	_20	of	46
Event Descriptio	on: Plant	Power Reductic	'n						

Time	Position	Applicant's Actions or Behavior								
		CAUTION								
	Valves LC load reduc	V-6-106A and 106B shall be verified to be controlling properly during unit tion.								
		NOTES								
	1) If hold may b	ing at a power level less than 60% the condensate demineralizer booster pumps e left running.								
	#3 hea	own of the condensate demineralizer booster pumps and ater drain pumps should be based upon header pressure and ability of the drain umps to pump forward.								
	3) This st	3) This step may be deferred if performing load reduction for AOP-S.01 or AOP-S.04.								
	4) Steps	5.3[15] through 5.3[20] may be performed out of sequence								
	[15] WHEN between 55 to 70% turbine load, THEN PERFORM the following:									
		[15.1] SIMULTANEOUSLY STOP both operating condensate demineralizer booster pumps in accordance with 1,2-SO-2/3-1 (N/A if NOT in service).								
		[15.2] VERIFY #3 HDT runback NOT armed by ensuring either (N/A method NOT used) Step 5.3[14.1]B completed OR								
		Step 5.3[14.2]B completed.								
		[15.3] STOP one of the three #3 heater drain tank pumps in accordance with 1,2-SO-5-2.								
Evaluator No	reductio would e	current conditions and if the crew chooses to perform a 0-GO-5 power on, the first step performed is Section 5.3 Step 14. The power reduction nd point be here, Step 15.3. Taking the HDT Pump out would be an SRO n based on secondary plant flows and pressures.								
Evaluator No	ote: The followi	ing CREW Brief and Notification actions are not contained in the procedure.								
		CREW Brief would typically be conducted for this event as time allows prior to the next event.								

Appendix D		Required Operator Actions							S-D-2
Op Test No.:	NRC 2010302	Scenario #	6	Event #	5	Page	21	of	46
Event Description	n: Plant	Power Reductio	n						

Time	Position	Applicant's Actions or Behavior					
		Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.					
		Operations Management - Typically Shift Manager.					
		<u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).					

Appendix D	ndix D Required Operator Actions							Form ES-D-2				
Op Test No.:	NRC 2010302	Scenario #	6	Event #	5	Page	22	of	46			
Event Descriptio	on: Plant	Power Reductio	n									

Time	Position	Applicant's Actions or Behavior
		0-SO-62-7, Boron Concentration Control
		Section 6.4, Borate
Evaluator No	2.7 (in thi controlling Concentra	duction to the desired plant load reduction as directed by AOP-S.01 Section s case 10-15%) is complete. GO-5 Precautions 3.1 'O' and 'P' direct g reactor core distribution limits and control rod height. 0-SO-62-7, Boron ation Control is used to determine and control boron concentration changes to manage these limits.
	Crew	SRO directs 0-SO-62-7 Section 6.4 implementation.
-	CAUTION:	Returning the Boric Acid Blender to service after unplugging, cleaning, or maintenance on Boric Acid System could introduce debris, sludge, air or solidified boron into CCP suction resulting in pump damage. Extreme care must be exercised to properly flush the Boric Acid piping following an outage. [C.2]
	ene and acc	large amount of boration is required (plant shutdown), Pzr heaters should be rrgized to cause spray operation for equalizing boron concentration in RCS pressurizer. If Normal Spray is NOT available, then this should be omplished by use of Auxiliary Spray (1, 2-SO-62-1) in conjunction with ssurizer backup heaters.
	RO	[1] ENSURE makeup system aligned for AUTO operation in accordance with Section 5.1.
	requ duri drop	os 2 and 3 are N/A for minor power changes OR if immediate boration is uired to maintain shutdown margin, to maintain rods above the insertion limit, ng an emergency shutdown (AOP-C.03), during recovery of a oped/misaligned rod (AOP-C.01), or at Chemistry recommendation in mode , 5 or 6.
	RO	[2] RECORD the quantity of boric acid required to achieve desired boron concentration using Appendix D gals
	RO	[3] PERFORM Appendix I Independent Verification of Calculation for Amount of Boric Acid or Primary Water. (N/A if App. D was performed by SRO to verify data from Rx Engineering)

Appendix D	endix D Required Operator Actions							rm ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	6	Event #	5	Page	23	of	46
Event Descriptio	n: Plant	Power Reductio	n						

Time	Position	Applicant's Actions or Behavior						
		0-SO-62-7, Boron Concentration Control						
		Section 6.4, Borate						
		[4] DETERMINE available boric acid volume in in-service BAT.						
	RO							
		gals						
	RO	[5] PLACE [HS-62-140A], Boric Acid to Blender Flow Control Switch to						
		the STOP position.						
	PO	PLACE [HS-62-140B], CVCS Makeup Selector Switch to the						
	RO	[6] BORATE position.						
		[7] AD ILIST [EC-62-120] Borio Acid Flow Controller to the desired flow						
	RO	[7] ADJUST [FC-62-139], Boric Acid Flow Controller to the desired flow rate.						
· · · · · · · · · · · · · · · · · · ·								
	RO	[8] SET IEO 62 1201 Potch Integrates to the desired supplify						
		[8] SET [FQ-62-139] , Batch Integrator to the desired quantity.						
	RO	[9] PLACE [HS-62-140A] , Boric Acid to Blender Flow Control Switch to the						
		START position.						
	RO	[10] ENSURE Boric Acid Pump aligned to blender in FAST speed by						
		right red light LIT on [HS-62-230A] OR [HS-62-232A].						
		scillations and/or erratic controller response may require manual operation of						
	Boric Acid Flor	w Controller [FC-62-139] until stable conditions exist.						
	RO	[11] VERIFY Boric Acid Flow established.						

Appendix D		Requ	ons	Form ES-D-2					
Op Test No.:	NRC 2010302	Scenario #	6	Event #	5	Page	24	of	46
Event Descriptio	n: Plant	Power Reductic	'n						

Time	Position	Applicant's Actions or Behavior
	100044	0-SO-62-7, Boron Concentration Control
		Section 6.4, Borate
		take approximately 15 minutes before any changes to reactivity are indicated rumentation or RCS temperature indication.
	RO	[12] IF reactor is critical, THEN MONITOR nuclear instrumentation and reactor coolant temperature to ensure proper response from boration.
		operability limits are prescribed by TRM 3.1.2.6 (Modes 1-3) or 3.1.2.5 des 4-6).
	RO	[13] MONITOR Boric Acid Storage Tank level.
	RO	[14] IF Volume Control Tank level increases to 63 percent, THEN ENSURE [LCV-62-118], Volume Control Tank Divert Valve OPENS to divert excess water to the Holdup Tank.
		ple may be obtained at normal RCS sample intervals provided the unit is at er and the unit response following the boration is as expected.
		[15] WHEN boration is complete, THEN
	RO	[a] PLACE [HS-62-140A] , Boric Acid to Blender Flow Control Switch to the STOP position.
		[b] CHECK no primary water flow on either [FI-62-142A] OR [FQ-62- 142].
		[c] ENSURE [FC-62-142], Primary Water to Blender Flow Controller is in AUTO position and the potentiometer (dial indicator) is set at 35%.
		[d] ADJUST [FC-62-139], Boric Acid Flow Controller to the desired blend solution in accordance with TI-44 Boron Tables.
		[e] ENSURE [FCV-62-128] is CLOSED.
		[f] PLACE [HS-62-140B] , CVCS Makeup Selector Switch to the AUTO position.
		[g] PLACE [HS-62-140A], Boric Acid to Blender Flow Control Switch to the START position.
		[h] IF RCS boron sample required, THEN NOTIFY Chem Lab to obtain RCS boron sample.

Appendix D	dix D Required Operator Actions					Foi	rm ES	S-D-2	
Op Test No.:	NRC 2010302	Scenario #	6	Event #	5	Page	25	of	46
Event Descriptio	n: Plant	Power Reductio	n						

Time	Position	Applicant's Actions or Behavior
		0-SO-62-7, Boron Concentration Control Section 6.4, Borate
	NOTE: Bora com	ation is done in batches until the total boron and/or power change is pleted.
	RO	[16] REPEAT this section as required to complete total boron change.
	RO	[17] WHEN total boration is complete,
		[i] THEN: REALIGN the blender controls for AUTO makeup to the CVCS in accordance with Section 5.1.
		[j] NOTIFY Chem Lab to obtain RCS boron sample.
	SRO	[18] IF in MODES 1, 2, or 3, THEN ENSURE requirements of TRM 3.1.2.6 are met.
		[19] If in MODES 4, 5 or 6 THEN ensure requirements of TRM 3.1.2.5 are met
		[20] GO TO appropriate plant procedure
		END OF SECTION

Appendix	(D	D Required Operator Actions							Form ES-D-2				
Op Test No Event Desc			enario # er Reductio	<u>6</u>	Event #	5	Page	_26	of	46			
	SQN 1,2	BOF		CENTR		ROL	0-SO-62-7 Rev 58			<u></u>			

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CALCULATION FOR AMOUNT OF BORIC ACID OR PRIMARY WATER (TI-44)

- NOTE 1 One calculation is required for each major change.
- NOTE 2 Boric acid amounts to achieve required RCS boron concentration may be significantly higher than calculated amounts if CVCS demin resins are removing boron. Amount of boron removal by mixed bed resins will depend on RCS boron, resin age, whether demin bed was previously borated, and letdown temperature. Chemistry should be consulted if required to evaluate resin bed removal.
- [1] IF REACTF not used, THEN

CALCULATE amount of primary water or boric acid required using TI-44.

RCS BORON	PPM CHANGE	AMOUNT PRIMARY WATER OR BORIC ACID
ppm Current		
ppm Target		
		TOTAL GAL(s)

NOTE REACTF data sheets are to be signed by the preparer and reviewer.

[2] IF REACTF used attach printout to procedure.

- NOTE IV is not required if appendix is performed by an SRO to verify data provided by Rx. Eng.
- [3] ENSURE independently verified by an SRO in accordance with Appendix I.

END OF TEXT

Appendix D		Requ	ired Op	erator Action	S		For	m ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	6	Event #	5	Page	27	of	46
Event Descriptior	ı: Plant	Power Reduction	n						
[

SQN	BORON CONCENTRATION CONTROL	0-SO-62-7
1,2		Rev. 58
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APPENDIX I

Page 1 of 1

INDEPENDENT VERIFICATION OF CALCULATION FOR AMOUNT OF BORIC ACID OR PRIMARY WATER (TI-44)

NOTE One calculation is required for each major change.

[1] IF REACTF not used, THEN

CALCULATE amount of primary water or boric acid required using TI-44.

RCS BORON	PPM CHANGE	AMOUNT PRIMARY WATER OR BORIC ACID
ppm Current		
ppm Target		
		TOTAL GAL(s)

NOTE REACTF data sheets are to be signed by the preparer and reviewer.

 \Box

[2] IF REACTF used attach printout to procedure.

Appendix D		Req	uired Oper	ator Actions	3		For	m ES·	-D-2
Op Test No.:		Scenario # ain Feedwater Hea DAFWP trip	<u> </u>	Event #	6, 7 tions:1B-B MD an	Page d TDAFWPs	28 vapor b	of	46 v/
Time	Position			Applicantia	Actions or Behav				
Simulator Ope		n directed init	ioto Evon		Actions of Benav	nor			
Indications ava Annunicato 1-M-3 • 1-XA-55- • 1-XA-55- • 1-M-5 • 1-XA-55- • 1-M-6 • 1-XA-55- • • Indicators: 1-M-4 • 1-FI-1-10 • 1-LI-3-11 Significant Annunciator • 1-XA-55- Deviations o • Increase • Deviation • Main fee	ailable: ors: 3A E-1, "P: 3C C-6, "L E-6, "L 5A A-7, "F: B-7, "L 6B D-1, "L D-4, "L D-7, "F: 03A, 103B, S 0, 107, 106, 3 Resultant A s: 2C, C-7, D-7, or unexpected in feedwate ns on feedwate	5-2-129 LOW NP 5-3-171D STM G 5-3-175D STM G 5-3-35A STEAM 5-3-42D STEAM 5-3-107D STM G 5-3-106B STEAM 5-3-106B STEAM 5-3-103B STM G 5-4 FW INLET FI 5G-4 FW INLET FI 5G-4NR LEVEL: Alarms/Indicati E-7: "LS-2-3A, 2 d conditions: r flow. ater regulating v o speed increasi	SH AT MF EN #4 LEV EN #4 LEV GEN FEED GEN LVL H EN LOOP 4 I GENERA EN LOOP 4 LOW CH-1 decreasing ons: 2-9A, 2-124	P'S" EL LOW" EL LOW" WATER FLO IIGH-LOW E LOW FW F TOR LOOP 4 STEAM/FE & 2: varying g level	EVIATION" LOW LOW WA LOW LOW WA EDWATER FLC	ATER LEVE OW MISMA	EL" TCH"	\L"	
T = 70	CREW	Refer to alarm	response	procedures	and carries ou	ut the follo	wing ac	tions	:
Evaluator Note	crew sho inaccessi	I safety is a cor uld take approp ble with excess r common pipe	riate actioi ive steam	n based on and loud no	AUO reports th bise report; the	at the TB leak locati	el 685'	is	
	SRO	Directs crew to	o enter AC	P-S.05, Ste	am Or Feedwa	ater Leak.			
			AOP	-S.05, Stea	m Or Feedwat	er Leak			
Evaluator Note	while dev 8 could b excessive challenge	following step i eloping a reactor e the decision p e delta between ed (i.e.: seconda ition to E-0.	or vs. turbi oint to init reactor ar	ne power tr ate a reacto nd secondar	end (RNO second for trip and trans try power develo	ond bullet) sition to E- ops or hoty	. If so, 0. If ar well lev	steps n el is	s 6 or

Appendix D		Requ	ired Op	erator Actio	ns		For	rm ES	5-D-2
Op Test No.:	NRC 2010302	Scenario #	6	Event #	6, 7	Page	29	of	46
Event Descriptio		Feedwater Head WP trip	ler Break	w/ AFW Malfu	inctions:1B-B MD and	TDAFWP	3 vapor l	bound	w/

) !4!	
Position	Applicant's Actions or Behavior
determi normal monitor within tl	his is a "MONITOR" step, the crew may continue in the procedure while ning Steam vs. feed line break. SG programmed level deviation following a load change is not unusual. The crew may continue in the procedure while ing SG levels in steps 1 & 2. Step 6 insures that RCS temperature is controlled nese normal ranges; if the crew cannot control these limits, they should decide ne reactor and transition to E-0.
Crew	1. MONITOR personnel safety:
	 IF steam or feedwater lines need to be immediately isolated to protect personnel, THEN PERFORM the following:
RO	1) TRIP the reactor.
BOP	 IF leak is on steam lines OR source is unknown, THEN CLOSE MSIVs.
BOP	3) IF leak is on feedwater lines OR source is unknown, THEN PERFORM the following:
BOP	a) TRIP MFW pumps.
BOP	b) CLOSE Feed Reg Valves.
SRO	4) GO TO E-0, Reactor Trip or Safety Injection.
BOP	2. MONITOR steam generator levels STABLE on program.
BOP	3. CHECK the following:
	 S/G atmospheric relief valves CLOSED
	steam dumps CLOSED.
BOP	4. CHECK main turbine on line.
reactor vs. and theref	is a "MONITOR" step, the crew may continue in the procedure while developing a turbine power trend (RNO second bullet). If so, steps 6 or 8 may be the decision point ore transition to reactor trip and E-0 implementation. If an excessive delta between d secondary power develops, the crew may decide to trip the reactor and transition to
	5. MONITOR the following:
	reactor power STABLE
RO	(RNO required)
	Since the determinormal monitor within the to trip the crew RO BOP BOP BOP BOP SRO BOP BOP BOP SRO BOP SRO

Appendix D		Requ	iired Op	erator Actions	j		For	rm ES	-D-2
Op Test No.:	NRC 2010302	Scenario #	6	Event #	6, 7	Page	30	of	46
Event Description		Feedwater Head WP trip	ler Break	w/ AFW Malfunc	tions:1B-B MD and	d TDAFWPs	s vapor l	oound \	w/

Time	Position	Applicant's Actions or Behavior					
		 reactor power less than or equal to 100% (3455 MWt). 					
		RNO:					
		REDUCE turbine load as necessaryN/A					
	SRO	IF any of the following conditions exist:					
		 greater than 35 MWe load drop is required to maintain reactor power less than or equal to 100% OR 					
		 steam leak results in reactor power rising by 3% or more OR 					
		reactor power CANNOT be controlled by turbine load reduction					
	SRO	THEN PERFORM the following:					
	RO	a. TRIP the reactor.					
	BOP	b. WHEN reactor is tripped, THEN CLOSE MSIVs.					
	SRO	c. GO TO E-0, Reactor Trip or Safety Injection.					
Evaluator Not	developir ave, and restoring transient normal ra	s is a "MONITOR" step, the crew may continue in the procedure while ng a T-ave vs. T-ref trend. The 3° delta between actual RCS temperature, T- programmed reference temperature, T-ref is the range the system is capable of following a normal load change. 5° delta is based on the maximum load for the RCS. Step 6 insures that RCS temperature is controlled within these anges; if the crew cannot control these limits, they should decide to trip the nd transition to E-0.					
	RO	 MONITOR T-avg within 3°F of T-ref. (RNO required) 					
	BOP	RNO required RNO: REDUCE turbine load as necessary to maintain T-avg within 3°F of T-ref (or program value).					
	SRO	IF T-avg CANNOT be maintained within 5°F of T-ref (or program value), THEN PERFORM the following:					
	RO	a. TRIP the reactor					
	BOP	b. WHEN reactor is tripped, THEN CLOSE MSIVs.					

Appendix D		Required Operator Actions					For	mΕ	S-D-2
Op Test No.:	NRC 2010302	Scenario #	6	Event #	6, 7	Page	31	of	46

Event Description:

Main Feedwater Header Break w/ AFW Malfunctions:1B-B MD and TDAFWPs vapor bound w/ TDAFWP trip

Time	Position	Applicant's Actions or Behavior
	SRO	c. GO TO E-0, Reactor Trip or Safety Injection.
	SRO	IF a reactor trip is directed,
		THEN GO TO E-0, Reactor Trip or Safety Injection.
	SRO	Direct Manual Rx Trip
	SRO	Enter E-0 and Direct Immediate Operator Actions (IOAs)
	NOTE: Te	ch Spec LCO 3.6.1.4 is applicable if containment pressure exceeds 0.3 psig.
	RO	7. MONITOR containment pressure STABLE
	BOP	8. MONITOR hotwell level STABLE:
		• VERIFY LCV-2-9 maintaining hotwell level in AUTO.
	BOP	RNO: INITIATE makeup to hotwell:
		RNO a & b N/A: hotwell make-up is not affected by scenario malfunction
		c. IF loss of hotwell level is imminent, THEN PERFORM the following:
		1) TRIP the reactor.
		2) WHEN reactor is tripped, THEN CLOSE MSIVs.
		3) GO TO E-0, Reactor Trip or Safety Injection.
		IF a reactor trip is directed,
	SRO	THEN GO TO E-0, Reactor Trip or Safety Injection.
	SRO	Direct Manual Rx Trip
	SRO	Enter and Direct E-0 Immediate Operator Actions (IOAs)

Appendix D		Required Operator Actions						Form ES-D-2			
Op Test No.:	NRC 2010302	Scenario #	6	Event #	6, 7	Page	32	of	46		
Event Descriptio		⁼ eedwater Heac WP trip	ler Break	w/ AFW Malfunc	tions:1B-B MD an	d TDAFWPs	vapor l	bound	w/		

Time	Position	on Applicant's Actions or Behavior								
		E-0, Reactor Trip or Safety Injection								
Evaluator No	surveys i discovery event in j	g IOA performance, prior to Steps 1-4 immediate action verification, RO/BOP MCBs for any expected automatic system response that failed to occur. Upon y, they may take manual action(s) to align plant systems as expected for the progress. (Ref. EPM-4, Prudent Operator Actions)								
	Feedwate MAIN FEE	g the reactor trip, RCS Tave will drop below 550°F, which makes up the er Isolation logic. Annunciator 1-XA-55-6B E-6, LOW TAVG REACTOR TRIP EDWATER VALVES ACTUATED (Tave <550°F and P-4, Reactor Trip Breaker nal) indicates FWI conditions are present.								
A	actuate S	w scripts operator actions with no SI and transition to ES-0.1. If the operators SI, that script follows this.								
Annunicators	1	s specified at Event 6 initiation								
		s 1 through 4 are immediate action steps								
	Note 2 This	procedure has a foldout page								
	RO	 VERIFY reactor TRIPPED: Reactor trip breakers OPEN Reactor trip bypass breakers DISCONNECTED or OPEN Neutron flux DROPPING Rod bottom lights LIT Rod position indicators less than or equal to 12 steps. 								
	BOP	2. VERIFY turbine TRIPPED:Turbine stop valves CLOSED.								
	BOP	 3. VERIFY at least one train of shutdown boards ENERGIZED. Attempt to restore power to at least ONE train of shutdown boards Place DG 1A-A control switch in START Verify Train A Shutdown Boards ENERGIZED 								
	RO	 4. DETERMINE if SI actuated: ECCS pumps RUNNING. Any SI alarm LIT [M-4D] (SI will be actuated) (RNO Required) 								
	RO/BOP	 RNO: DETERMINE if SI required: a. IF any of the following conditions exists: S/G pressure less than 600 psig, 								

Appendix D		Requ	Form ES-D-2						
Op Test No.: N	RC 2010302	Scenario #	6	Event #	6, 7	Page	33	of	46
Event Description:		Feedwater Head WP trip	ler Break	w/ AFW Maifund	ctions:1B-B MD ar	nd TDAFWPs	s vapor	bound	w/

Time	Position	Applicant's Actions or Behavior								
	· · · · · · · · · · · · · · · · · · ·	E-0, Reactor Trip or Safety Injection								
		OR								
		 RCS pressure less than 1870 psig, 								
		OR								
		 Containment pressure greater than 1.5 psig, 								
		THEN ACTUATE SI – SI NOT ACTUATED: E-0 Step 4 RNO b. below								
Evaluator No		w should evaluate/exercise FOLDOUT PAGE EVENT DIAGNOSTICS for SG								
		s during performance of the prudent operator actions (POAs)								
Evaluator No	100 from	w manually closes the Feedwater Isolation Valves, 1-FCV-3-33, 47, 87 and 1-M-4 handswitches and ENSURES /closes Feed Reg Valves/Bypass valves -3 controllers, this meets the Critical Task.								
Critical Task:	Manually	isolate/verify feedwater isolation prior to SG(s) inventory loss at this time.								
START TIME:										
		-								
END TIME:										
		FOLDOUT PAGE								
		RCP TRIP CRITERIA – N/A								
		EVENT DIAGNOSTICS								
		 IF any S/G pressure is dropping uncontrolled, THEN PERFORM the following: 								
	RO/BOP	a. CLOSE MSIVs and MSIV bypass valves								
		 b. IF any S/G pressure continues to drop uncontrolled, THEN PERFORM the following: 								
	RO	1) ENSURE SI actuated.								
		 IF at least one S/G is intact (S/G pressure controlled or rising), THENsubsequent Actions N/A 								
	SRO	E-0 Step 4 RNO b: b. IF SI is NOT required, THEN PERFORM the following:								
		1) MONITOR status trees.								
		2) GO TO ES-0.1, Reactor Trip Response.								
Evaluator No		ld recognize Loss of Heat Sink entry conditions, implement 1-FR-0 verification on to FR-H.1 at ES-0.1, Reactor Trip Response Step 1. Therefore, no ES-0.1 ario guide.								

Appendix D		Required Operator Actions							Form ES-D-2				
Op Test No.:	NRC 2010302	Scenario #	6	Event #	6, 7	Page	34	of	46				
Event Descriptior		Feedwater Head FWP trip	der Break	w/ AFW Malfun	ctions:1B-B MD and	d TDAFWPs	vapor	bound	w/				

Time	Position	sition Applicant's Actions or Behavior							
		E-0, Reactor Trip or Safety Injection							
Evaluator No	surveys l discovery event in	g IOA performance, prior to Steps 1-4 immediate action verification, RO/BOP MCBs for any expected automatic system response that failed to occur. Upon /, they may take manual action(s) to align plant systems as expected for the progress. (Ref. EPM-4, Prudent Operator Actions)							
	Feedwate MAIN FEE	g the reactor trip, RCS Tave will drop below 550°F, which makes up the er Isolation logic. Annunciator 1-XA-55-6B E-6, LOW TAVG REACTOR TRIP EDWATER VALVES ACTUATED (Tave <550°F and P-4, Reactor Trip Breaker nal) indicates FWI conditions are present.							
Annunicator	s/Indications as	s specified at Event 6 initiation							
	Note 1 Steps	s 1 through 4 are immediate action steps							
	Note 2 This	procedure has a foldout page							
	RO	 5. VERIFY reactor TRIPPED: Reactor trip breakers OPEN Reactor trip bypass breakers DISCONNECTED or OPEN Neutron flux DROPPING Rod bottom lights LIT Rod position indicators less than or equal to 12 steps. 							
	BOP	6. VERIFY turbine TRIPPED:Turbine stop valves CLOSED.							
	BOP	 7. VERIFY at least one train of shutdown boards ENERGIZED. Attempt to restore power to at least ONE train of shutdown boards Place DG 1A-A control switch in START Verify Train A Shutdown Boards ENERGIZED 							
	RO	 8. DETERMINE if SI actuated: ECCS pumps RUNNING. Any SI alarm LIT [M-4D] (SI will be actuated) (RNO Required) 							
	RO/BOP	 RNO: DETERMINE if SI required: b. IF any of the following conditions exists: S/G pressure less than 600 psig, OR 							

Appendix D		Required Operator Actions						Form ES-D-2				
Op Test No.:	NRC 2010302	Scenario #	6	Event #	6, 7	Page	35	of	46			
Event Descriptio		Feedwater Head WP trip	der Break	w/ AFW Malfunc	tions:1B-B MD an	id TDAFWPs	vapor	bound	w/			

Time	Position	Applicant's Actions or Behavior						
		E-0, Reactor Trip or Safety Injection						
		 RCS pressure less than 1870 psig, OR 						
		 Containment pressure greater than 1.5 psig, 						
		THEN ACTUATE SI.						
Evaluator No	te: SRO/crev depressu	w should exercise FOLDOUT PAGE <u>EVENT DIAGNOSTICS</u> for SG rization during performance of the prudent operator actions (POAs)						
Evaluator No Critical Task:	100 from from 1-M	w manually closes the Feedwater Isolation Valves,1-FCV-3-33, 47, 87 and 1-M-4 handswitches and ENSURES /closes Feed Reg Valves/Bypass valves -3 controllers, then this meets the Critical Task .						
Critical Task:	wanualiy	isolate/verify feedwater isolation prior to SG(s) inventory loss at this time. FOLDOUT PAGE						
		RCP TRIP CRITERIA – N/A						
		EVENT DIAGNOSTICS						
		 IF any S/G pressure is dropping uncontrolled, THEN PERFORM the following: 						
	RO/BOP	c. CLOSE MSIVs and MSIV bypass valves						
		 IF any S/G pressure continues to drop uncontrolled, THEN PERFORM the following: 						
	RO	3) ENSURE SI actuated.						
		 IF at least one S/G is intact (S/G pressure controlled or rising), THENsubsequent Actions N/A 						
Evaluator No	te: Actions for	ES-0.5 are contained in attachment at back of scenario guide						
	BOP	 PERFORM ES-0.5, Equipment Verifications WHILE continuing in this procedure. 						
	RO	 DETERMINE if secondary heat sink available: CHECK total AFW flow greater than 440 gpm. CHECK narrow range level greater than 10% [25 ADV] in at least one S/G. CONTROL feed flow to maintain narrow range level between 10% [25% ADV] and 50% in all S/Gs. (RNO required) 						

Appendix D	Required Operator Actions						Form ES-D-2				
Op Test No.:	NRC 2010302	Scenario #	6	Event #	6, 7	Page	36	of	46		
Event Descriptio		Feedwater Hea WP trip	ider Break	w/ AFW Malfund	ctions:1B-B MD and	I TDAFWPs	s vapor	bound	w/		

Time	Position	Applicant's Actions or Behavior
		E-0, Reactor Trip or Safety Injection
	RO	 RNO: a. IF S/G narrow range level is less than 10% [25% ADV] in all S/Gs, THEN START AFW pumps and ALIGN valves as necessary to raise AFW flow greater than 440 gpm.
	RO	 b. MAINTAIN total feed flow greater than 440 gpm UNTIL narrow range level greater than 10% [25% ADV] in at least one S/G. IF AFW flow greater than 440 gpm CANNOT be established, THEN PERFORM the following: MONITOR status trees. GO TO FR-H.1, Loss of Secondary Heat Sink.
	SRO BOP	Directs BOP to suspend ES-0.5 performance, verify Status Trees' conditions Identifies Heat Sink RED path using 1-FR-0, recommends transition to FR-H.1, Loss of Secondary Heat Sink.
	Crew	FR-H.1 transition

Appendix D		Requ	าร		For	rm ES	S-D-2		
[
Op Test No.: NR	C 2010302	Scenario #	6	Event #	6, 7	Page	37	of	46
Event Description:	Main TDAF	Feedwater Head WP trip	der Break	w/ AFW Malfur	nctions:1B-B MD and	TDAFWPs	vapor	bound	w/

Time	Position	Applicant's Actions or Behavior
		FR-H.1
		Loss of Secondary Heat Sink
	CAUTION:	Feeding an Intact or Ruptured S/G is preferred to feeding a Faulted S/G. Thermal stresses from feeding a Faulted S/G could rupture tubes, resulting in a Faulted-AND-Ruptured S/G.
	SRO	1. DETERMINE procedure applicability:
		a. CHECK the following:
		(RNO required)
		 Total feed flow less than 440 gpm due to operator action directed by another procedure. AND
		Total feed flow capability of greater than 440 gpm AVAILABLE.
		RNO:
		a. GO TO Step 2.
		2. MONITOR RWST level greater than 27%.
Evaluator No		nario intent is once the crew loops back to Step 3 an AFW pump will be following Feed & Bleed decision in step 5.
		3. CHECK if secondary heat sink required:
		a. RCS pressure greater than any non-Faulted S/G pressure.
		b. RCS temperature greater than 350°F.
		4. MONITOR at least one CCP available.
Evaluator No	te: At the Le	ad Examiner's direction, the TDAFWP will be restored to operation.
	NOTE: Press	surizer pressure greater than or equal to 2335 psig with rising RCS erature and a low loop delta-T indicates loss of heat removal capability.
		5. MONITOR RCS feed and bleed criteria:
		(RNO required 1 st time through this step)
		a. CHECK the following:
		 Any three S/G wide range levels less than 20% [41% ADV] OR
		 Pressurizer pressure greater than or equal to 2335 psig due to loss of secondary heat removal.
		b. STOP RCPs
		c. GO TO Caution prior to Step 17.

Appendix D		Required Operator Actions							Form ES-D-2				
Op Test No.:	NRC 2010302	Scenario #	6	Event #	6, 7	Page	38	of	46				
Event Descriptio	n: Main	Feedwater Head	der Break	w/ AFW Malfu	nctions:1B-B MD an	d TDAFWPs	vapor	bound	w/				

n: Main Feedwater Header Break w/ AFW Malfunctions:1B-B MD and TDAFWPs vapor bound w/ TDAFWP trip

Time	Position	Applicant's Actions or Behavior
		RNO:
		a. GO TO Step 6.
······································		
		6. MONITOR CST level greater than 5%.
		7. ATTEMPT to establish AFW flow to at least one S/G in the following order
		of priority Intact, Ruptured, Faulted:
		a. CHECK S/G blowdown isolation Valves CLOSED.
		b. CHECK control room indications for cause of AFW failure.
······		CST level
		AFW pump power supply
····		AFW valve alignment
		c. ESTABLISH MD AFW pump flow:
		1) ENSURE MD AFW pumps RUNNING.
		2) ENSURE AFW level control valves OPEN.
		 ENSURE MD AFW recirculation valves FCV-3-400 and FCV-3- 401 CLOSED.
		d. ESTABLISH TD AFW pump flow:
		1) ENSURE turbine steam supply valves OPEN:
		Either FCV-1-15 or FCV-1-16
		 FCV-1-17 and FCV-1-18
		Trip and throttle valve, FCV-1-51.
		2) ENSURE AFW level control valves OPEN:
		3) RAISE TD AFW pump speed as necessary.
		Continuous actions in Step 8 are NOT applicable after RCS feed and bleed is
	ii	nitiated in Step 17.
		8. MONITOR for AFW flow:
		a. CHECK total AFW flow to S/Gs greater than 440 gpm
		(RNO required)
		RNO:
		a. IF NO AFW flow can be verified, THEN:
		1) ENSURE personnel dispatched to locally restore AFW flow.

Appendix D		Required Operator Actions							S-D-2
Op Test No.:	NRC 2010302	Scenario #	6	Event #	6, 7	Page	39	of	46

Event Description: Main Feedwater Header Break w/ AFW Malfunctions:1B-B MD and TDAFWPs vapor bound w/ TDAFWP trip

Time	Position	Applicant's Actions or Behavior
		2) GO TO Step 9.
		IF AFW flow to at least one S/G verified,N/A
Evaluator Not	e: Crew tra	insitions to step 9 here.
Evaluator Not		Task: Manually Stop RCPs prior to FR-H.1 Step 9 completion
Critical	······	
Task		9. STOP all RCPs.
		10. MONITOR shutdown boards continuously energized.
Evaluator Not		d Condensate system are not available for SG feed due to the MFW leak and isolation.
		11. ATTEMPT to establish MFW flow to at least one S/GN/A
		a. MFW N/A
		b. CHECK condensate system IN SERVICE:
		(RNO required)
		RNO:
		b. START condensate system pumps
		IF condensate system CANNOT be placed in service, THEN GO TO Step 16
		16. CHECK RCS feed and bleed criteria:
		(RNO required)
		 Three S/G wide range levels less than 20% [41% ADV]. OR
		 Pressurizer pressure greater than or equal to 2335 psig due to loss of secondary heat removal.
		RNO:
		GO TO Step 3.
		3. CHECK if secondary heat sink required:
		a. RCS pressure greater than any non-Faulted S/G pressure.
		b. RCS temperature greater than 350°F.
Evaluator Note	the crowie	in a propodural "do" loop uptil at loopt 2 of 4 000 are loop there 000/ MUDE
		in a procedural "do" loop until at least 3 of 4 SGs are less than 20% WIDE me form of secondary make-up is restored.
	The scenar	io intent is once the crew loops back to Step 3 an AFW pump will be restored

Appendix D	Required Operator Actions						Form ES-D-2				
Op Test No.:	NRC 2010302	Scenario #	6	Event #	6, 7	Page	_40	of	46		
Event Descriptio		n Feedwater Head FWP trip	der Break	(w/ AFW Malfund	tions:1B-B MD a	nd TDAFWPs	s vapor l	bound	N/		
Time	Position	[Applicant's	Actions or Beh	avior					
	following F	eed & Bleed d	ecision								

Lead Examiner may terminate the scenario following crew evaluation of FR-H.1 Step 5, Feed & Bleed determination during the 2nd pass through the procedure.

Appendix D		Requ	Form ES-D-2						
Op Test No.:	NRC 2010302	Scenario #	6	Event #	ES-0.5	Page	41	of	46
Event Description	on: Equi	oment verification	าร						
	11								

Time	Position	Applicant's Actions or Behavior							
		ES-0.5, EQUIPMENT VERIFICATIONS							
Evaluator Note	 BOP complete (including) 	pletes ES-0.5 including Appendices A & B and reports completion any discrepancies/actions taken) to SRO.							
	BOP	1. VERIFY D/Gs RUNNING.							
	BOP	2. VERIFY D/G ERCW supply valves OPEN.							
	BOP	3. VERIFY at least four ERCW pumps RUNNING							
	BOP	4. VERIFY CCS pumps RUNNING							
		• Pump 1A-A (2A-A)							
		 Pump 1B-B (2B-B) Pump C-S. 							
	BOP	5. VERIFY EGTS fans RUNNING.							
	BOP	6. VERIFY generator breakers OPEN.							
	Crew	 NOTIFY at least two AUOs to report to MCR to be available for local actions. 							
		8. VERIFY AFW pumps RUNNING:							
	BOP								
		a. MD AFW pumps							
		b. TD AFW pump.							
	taken S/G.	level control valves should NOT be repositioned if manual action has been to control S/G levels, to establish flow due to failure, or to isolate a faulted							
		9. CHECK AFW valve alignment:							
		a. VERIFY MD AFW LCVs in AUTO.							
	BOP	b. VERIFY TD AFW LCVs OPEN.							
		 version version versin version version version version version version version ve							

Appendix D		Form ES-D-2							
Op Test No.:	NRC 2010302	Scenario #	6	Event #	ES-0.5	Page	42	of	46
Event Descriptio	n: Equip	ment verificatior	าร						

Time	Position	Applicant's Actions or Behavior
		ES-0.5, EQUIPMENT VERIFICATIONS
Evaluator Not	e: Critical Ta	sk: Manually isolate/verify feedwater isolation prior to SG(s) inventory loss
Critical Task	BOP	 10. VERIFY MFW Isolation: a. MFW pumps TRIPPED b. ENSURE the following: MFW regulating valves CLOSED MFW regulating bypass valve controller outputs ZERO MFW isolation valves CLOSED
	BOP	11. MONITOR ECCS operation:
		 a. VERIFY ECCS pumps RUNNING: CCPs: RHR pumps SI pumps
		 b. VERIFY CCP flow through CCPIT. c. CHECK RCS pressure less than 1500 psig. d. VERIFY SI pump flow. e. CHECK RCS pressure less than 300 psig.
		f. VERIFY RHR pump flow.
	BOP	 12. VERIFY ESF systems ALIGNED: a. Phase A ACTUATED: PHASE A TRAIN A alarm LIT [M-6C, B5]. PHASE A TRAIN B alarm LIT [M-6C, B6].
		 b. Cntmt Vent Isolation ACTUATED: CNTMT VENT ISOLATION TRAIN A alarm LIT [M-6C, C5]. CNTMT VENT ISOLATION TRAIN B alarm LIT [M-6C, C6].
		 c. Status monitor panels: 6C DARK 6D DARK 6E LIT OUTSIDE outlined area 6H DARK 6J LIT.

Appendix D		Requ	uired Ope	erator Action	ons		For	m E	S-D-2
Op Test No.:	NRC 2010302	Scenario #	6	Event #	ES-0.5	Page	43	of	46
Event Descriptio	on: Equip	ment verificatior	าร						

Time	Position	Applicant's Actions or Behavior
	1	ES-0.5, EQUIPMENT VERIFICATIONS
		d. Train A status panel 6K:
		CNTMT VENT GREEN
		PHASE A GREEN
		e. Train B status panel 6L:
		CNTMT VENT GREEN
		PHASE A GREEN
	BOP	13. MONITOR for containment spray and Phase B actuation:
		a. CHECK for any of the following:
		Phase B ACTUATED
		OR
		 Containment pressure greater than 2.8 psig
		b. VERIFY containment spray INITIATED:
		1) Containment spray pumps RUNNING.
		 Containment spray header isolation valves FCV-72-39 and FC\ 72-2 OPEN.
		 Containment spray recirculation valves to RWST FCV-72-34 ar FCV-72-13 CLOSED.
		 4) Containment spray header flow greater than 4750 gpm per trair 5) Panel 6E LIT.
		c. VERIFY Phase B ACTUATED:
		PHASE B TRAIN A alarm LIT [M-6C, A5].
		PHASE B TRAIN B alarm LIT [M-6C, A6].
		d. ENSURE RCPs STOPPED.
		e. VERIFY Phase B valves CLOSED:
		Panel 6K PHASE B GREEN.
		Panel 6L PHASE B GREEN.

Appendix D		Req	uired Ope	erator Actio	ons		Fo	rm ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	6	Event #	ES-0.5	Page	44	of	46
Event Descriptio	on: Equip	ment verificatio	ns						

Time	Position	Applicant's Actions or Behavior
		ES-0.5, EQUIPMENT VERIFICATIONS
		f. WHEN 10 minutes have elapsed, THEN ENSURE containment air return fans RUNNING.
		14. MONITOR if containment vacuum relief isolation valves should be closed:
		 a. CHECK containment pressure greater than 1.5 psig. b. CHECK cntmnt vacuum relief isolation valves CLOSED: [Pnl 6K MANUAL] FCV-30-46 FCV-30-47 FCV-30-48.
	BOP	 15. CHECK secondary and containment rad monitors USING the following Appendix A, Secondary Rad Monitors (attached) Appendix B, Containment Rad Monitors. (attached)
	BOP	 WHEN directed by E-0, THEN PERFORM Appendix D, Hydrogen Mitigation Actions.
		 17. CHECK pocket sump pumps STOPPED: [M-15, upper left corner] HS-77-410, Rx Bldg Aux Floor and Equipment Drain Sump pump A HS-77-411, Rx Bldg Aux Floor and Equipment Drain Sump pump B.
	BOP	18. DISPATCH personnel to perform EA-0-1, Equipment Checks Following ESF Actuation.
valuator No	BOP	 19. ENSURE plant announcement has been made regarding Reactor Trip and SI. pletes ES-0.5 including Appendices A & B and reports completion
		any discrepancies and actions taken per ES-0.5 Step 13) to SRO.
		END (ES-0.5, EQUIPMENT VERIFICATIONS)

Appendix D		Req	uired Ope	erator Actio	ns		For	m ES	S-D-2
Op Test No.: Event Description:	NRC 2010302 Equip	Scenario # ment verificatio	6	Event #	ES-0.5	Page	45	of	46

	(ES-0.5, EQUIPMENT VERIFICATIONS)
	APPENDIX A SECONDARY RAD MONITORS
BOP	1. CHECK following rad monitors including available trends prior to isolation:
	 Condenser exhaust recorder RR-90-119 S/G blowdown recorder RR-90-120 Main steam line rad monitors Post-Accident Main Steam Line rad recorder RR-90-268B points 3 (blue), 4 (violet), 5 (black), and 6 (brown). [M-31 (back of M-30)]
BOP	 IF secondary radiation is HIGH, THEN ENSURE Unit Supervisor notified.
 1	END OF TEXT

	APPENDIX B
	CONTAINMENT RAD MONITORS
BOP	 CHECK following rad monitors: Upper containment high range rad monitors RM-90-271 and RM-90-272 NORMAL [M-30] Lower containment high range rad monitors RM-90-273 and RM-90-274 NORMAL [M-30] Containment rad recorders RR-90-112 and RR-90-106 NORMAL [M-12] (prior to isolation).
BOP	 IF secondary radiation is HIGH, THEN ENSURE Unit Supervisor notified.
I	END OF TEXT

Appendix D		Req	uired Ope	erator Actio	ons		For	m ES	S-D-2
Op Test No.: Event Descriptio	NRC 2010302 n: Critica	Scenario # Il Task Listing		Event #	Critical Task(s)	Page	46	of	46

Critical Tasks:	Critical Task Statement	Action Location	ESG pg #
1.	Manually isolate/verify feedwater isolation prior to SG(s)	E-0 POAs	33 or 35
	inventory loss Time critical action per 0-TI-OPS-000-004.0 r1	ES-0.5 Step 10.b	42
2.	Manually Stop RCPs prior to FR-H.1 Step 9 completion	FR-H.1 Step 9	39



Sequoyah Nuclear Plant

Unit 1 & 2

General Operating Instructions

0-GO-5

NORMAL POWER OPERATION

Revision 0065

VFW offer to the

Quality Related

Level of Use: Continuous Use

Effective Date: 03-12-2010 Responsible Organization: OPS, Operations Prepared By: W. T. Leary

Approved By: P. R. Simmons

Current Revision Description

Revised to address requirements overlooked in the initial issuance of the guidance for compliance with NERC Reliability Standards, VAR-002. These changes make no alteration to the operation of any equipment and are changes to required administrative notifications only. These changes are therefore minor editorial changes as defined in SPP-2.2.

PERFORMANCE OF THIS PROCEDURE IMPACTS REACTIVITY.

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ATTACHMENTS

Attachment 1: NORMAL POWER OPERATION

2.0 REFERENCES

2.1 Performance References

- A. 1,2-SO-5-1, Feedwater Heaters and Moisture Separator Reheaters
- B. 1,2-SO-5-2, No. 3 Heater Drain Tank and Pumps
- C. 1,2-SO-5-3, No. 7 Heater Drain Tank and Pumps
- D. 1,2-SO-2/3-1, Condensate and Feedwater System
- E. 1,2-SO-2-9, Condenser Vacuum and Turbine Steam Seal Systems Operation
- F. 0-SO-12-1, Auxiliary Boiler System
- G. 0-SO-35-4, Monitoring Generator Parameters
- H. 0-SO-58-1. Main Generator Bus Duct Cooling System
- I. 0-SI-NUC-000-038.0, Shutdown Margin
- J. 1,2-SO-62-1, Chemical and Volume Control System
- K. 0-SO-62-7, Boron Concentration Control
- L. 1,2-SO-62-9, CVCS Purification System
- M. 0-SO-68-3, Pressurizer Spray and Heater Pressure Control System
- N. 0-SO-85-1, Control Rod Drive System
- O. 0-PI-OPS-000-666.0, River Temperature Limits Specified by NPDES permit
- P. 0-SI-OPS-092-078.0, Power Range Neutron Flux Channel Calibration By Heat Balance Comparison
- Q. 0-SI-CEM-000-050.0, 72-Hour Chemistry Requirements
- R. 0-SI-CEM-030-407.2, Radioactive Gaseous Waste Effluent Particulate and Iodine Dose Rates from Shield and Auxiliary Building Exhausts (Weekly/Special) and Condenser Vacuum Exhausts (Special)
- S. 0-SI-CEM-030-415.0, Gaseous Effluent Requirements (Gross Alpha, Noble Gas and Tritium
- T. 0-SI-OPS-000-001.0, Initial Startup System Parameter Log
- U. TI-40, Determination of Preconditioned Reactor Power

2.1 Performance References (continued)

V. 2-SO-98-1, Distributed Control System

2.2 Developmental References

- A. Memorandum from System Engineering concerning MSR operation RIMS S57 880322 999
- B. Memo from Reactor Engineering RIMS S57 941219 934
- C. S57-880322-999 and S57-880808-851
- D. <u>W</u> Letter GP89-076 (RIMS No. S53 890427 984)
- E. <u>W</u> Letter GP 89-155 (RIMS S57 891026 972)
- F. <u>W</u> Letter GP 86-02(B44 861112 002)
- G. SSP-2.3, Administration of Site Procedures
- H. TVA-NQA-PLN89-A
- I. GOI-10, Reactivity Control at End of Cycle Life (Trojan Nuclear Plant)
- J. FSAR, Section 13.5
- K. Memo from Reactor Engineering August 6, 1996 (G Bair)
- L. NERC Reliability Standard, VAR-002-1.1b

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Precautions

To ensure that NIS Reactor Power level indications remain within 2% of true power during power level changes, a check should be performed about every 20% power level change, when greater than 15% power, by comparing calorimetric power to each NIS Power Range drawer. The 20% power level check does not preclude the operating crews from making necessary changes in response to changing plant conditions.



TRM 3.3.3.15 requires LEFM core thermal power (U2118) to be used to perform 0-SI-OPS-092-078.0 above 15% reactor power. LEFM indication is available if the following conditions are met:

- LEFM status NORMAL on ICS Calorimetric Data screen.
- LEFM core thermal power (ICS point U2118) shows good (green) data.
- LEFM MFW header temp (ICS point T8502MA) greater than or equal to 250°F.

If LEFM indication is NOT available above 15% reactor power, then TR 3.3.3.15 action must be entered.

C.) The following should be used to determine the most accurate reactor power indication for comparison with NIS:

- When reactor power is greater than 15%, use LEFM calorimetric power indication (U2118).
- If LEFM is NOT available, then use average loop ∆T (UO485 or M-5 indicators) up to 40%. Above 40%, use computer point U1118.

The turbine should be operated in "IMP OUT" control during normal unit operation. "IMP IN" operation results in system swings and should only be used during the performance of valve tests. (W Ltr GP 89-155; RIMS S57 891026 972)

E)

Pressurizer heaters and sprays may be operated as required to maintain pressurizer and RCS boron concentration within 50 ppm. If loop boron concentration is changed by 20 ppm or greater, use the pressurizer backup heaters to initiate automatic spray (if available). If Normal Spray is NOT available, then use Auxiliary Spray (1, 2-SO-62-1, Section 8.7) in conjunction with pressurizer backup heaters.

If not performed at 75% hold point, an axial imbalance comparison and a detector calibration (if △ AFD ≥ 3%) should be performed at ~ 100% RTP. Engineering will determine if PR NIS calibration must be performed. Calorimetric calculations, RCS flow verification, a hot channel factor determination, and a reactivity balance will be performed and EAGLE-21 updated. Reactor Engineering will notify Operations that normal full power operations may proceed.



Preconditioned Power Levels and Maximum Allowable Rates of Power Increase are specified in TI-40, *Determination of Preconditioned Reactor Power*.



During initial startups, based on Westinghouse recommendations, a lower power ramp rate limit has been implemented for power levels above the intermediate power threshold. The Intermediate Power Threshold is unit/cycle dependent and is determined by the Vendor. Refer to TI-40.



ICS will automatically monitor pre-conditioned power level as follows:

Point U1127 is reactor power in percent of RTP based on either secondary calorimetric or RCS Δ T depending on power level.

Point UO103 is a 20 minute rolling average of reactor power rate-of-change fitted over a 20 minute period. UO103 is a leading indicator of %/hour power ramp rate and can be used in deciding to speed up or slow down the ramp rate.



(ġ.)

Point UO104 is a 1 hour rolling average of reactor power rate-of-change fitted over a 1 hour period. *UO104 is used in demonstrating compliance with fuel pre-conditioning power ramp rate limits.*



Point K0058 is the currently qualified (or pre-conditioned) power level.



These points can all be monitored with the ICS group display "TI40". Appendix A may be used if the ICS is unavailable.

Declared fuel defects, as determined by the Fuel Reliability Assessment Team A or the Shift Manager, have limited ramp rates during Reactor Power increases as specified in TI-40.



TI-40 power increase limits that are exceeded, in any one hour, are evaluated in accordance with SPP-3.1.

- N. Power Coastdown At End Of Life:
 - 1. Reactor power changes should be limited to less than or equal to 1% per hour to avoid causing xenon peaking which could force a plant shutdown.
 - Do not perform unnecessary unit power maneuvers or testing (e.g., turbine valve testing). Such testing could result in an uncontrollable Xenon oscillation.
 - 3. Nonessential work on systems which could cause a plant upset should be deferred.
 - 4. Secondary Plant runbacks such as Main Feed Pump Turbine trip or #3 Heater Drain Tank runback will require a unit shutdown if Reactor power is not promptly returned to pre-transient level due to the resulting severe Xenon transient. If a system power alert is in effect, and electrical generation is critical, unit load should be reduced as necessary keeping T_{AVG} on program. Contact Reactor Engineering for an evaluation and guidance concerning unit shutdown or reduction of load.
 - 5. Management should be consulted to evaluate the feasibility of a unit restart if a reactor trip occurs with RCS equilibrium boron concentration less than 50 ppm. If the reactor is to be restarted, the power level shall be limited to nominal pre-trip power level.

Axial Flux Difference Management:

When the reactor is operating at a steady power or during normal load changes, maintain ΔI within the operating limits of the Core Operating Limits Report (COLR). It is recommended that the core axial flux difference (AFD) be maintained within \pm 5% of the target band at all times, excluding the performance of 0-PI-NUC-092-036.0, "Incore - Excore Calibration," and End of life power coast downs. Operating time outside the band, which is given in TI-28 Attachments 1 and 2, should be minimized. Reactor Engineering should be contacted if time out of the \pm 5% target band exceeds approximately 30 minutes.

The position of control bank D should normally be ≥ 215 steps when power level is steady state at or above 85% RTP. At steady state power levels below 85%, control bank D should normally be ≥ 165 steps. If rod position is more than 5 steps below this guidance for long term, then impact may occur to safety analysis assumptions.



During heatup and cooldown transients, RCS density changes will cause changes in NIS indicated power. At constant reactor power, a 1°F change in T_{AVG} may cause as much as a 1% (or more) change in indicated NIS power.

R. The following limitations are applicable to Unit Two ONLY.

1. In winter months #7 HDTP capacity is not adequate to pump #6 Heater drains when all Condensate Demineralizer pumps are in service. Current practice is to run two Cond DI Pumps and / or throttle the condensate system to reduce backpressure. The preferred method is to throttle condensate pressure instead of running only two Condensate Demineralizer booster pumps at full power due to pump runout concerns.

- 2. Siemens-Westinghouse analysis has determined that the maximum unit power with one MFP operation is 65% under worst case conditions. The plant could operate higher if plant conditions permit.
- 3. MFP flow from the lead MFP should not exceed 53.7% of the total flow. Flow rates above this would result in HP steam flow to the lead MFPT. Computer points 1(2)UO504 and UO505 can be used to monitor.

Voltage Control

NOTE

Failure to comply with the NERC VAR-002 requirement could result in a Utility Violation and / or monetary penalties.



Operation of the Main Generator without Automatic Voltage Control could impact grid voltage requirements. Refer to GOI-6 for MVAR limits.



When the Main Generator is connected to the grid, the voltage regulator shall be operated in Automatic, unless coordinated with the Transmission Operator (SELD).



Main Generator operation outside of the Transmission Voltage Schedule requires coordination with the Transmission Operator, and notation in the operator's Log of time, reason, and that the Transmission Operator notification was made.



When directed to modify voltage, the Generator Operator shall comply (within plant procedural requirements) or provide an explanation of why the schedule cannot be met.



While the Main Generator is tied to the grid perform the following:

(a) The Transmission Operator (SELD) shall be notified of any Voltage Regulator automatic trips to Manual or urgent Manual Transfers between AUTO and Manual as soon as practical but notification shall be within 30 minutes.



The Transmission Operator (SELD) shall be notified prior to a planned Voltage Regulator transfers between Manual and Auto.

All position changes (to and from Auto or Manual) of the Voltage Regulator shall be entered into the Narrative Log along with the date, time of position change, reasons, anticipated duration and notifications made.

Reliability Directives and Protective Relay/Equipment Failures

Failure to comply with the NERC VAR-002 requirement could result in a Utility Violation and / or monetary penalties.

NØTĖ

Plant Operations shall notify the Transmission Balancing Authority (BA) or Transmission Operator of protective relay or equipment failures that creates a creditable risk to Plant Generation. A creditable risk to generation represents a potential reduction in transmission system reliability.

Reliability Directives to the Generator Operator are via the Balancing Authority or Transmission Operator. Required action time may range from immediate to no longer than 30 minutes. Actions shall be taken without delay. The directives may be associated with preventing or clearing Local System issues, or neighboring system issues.



Plant operations shall take timely actions as directed by the Balancing Authority or Transmission Operator to mitigate critical conditions to return the bulk electrical system to a reliable state. Plant operations shall comply with Balancing Authority or Transmission Operator directives unless such actions would violate safety, equipment, or regulatory or statutory requirements.



Plant Operations shall immediately inform the Balancing Authority or Transmission Operator of the inability to perform directives so that the TVA Reliability Entities may implement alternate remedial actions.

3.2 Limitations



When the axial flux difference monitor alarm is inoperable, the AFD must be logged every hour by performing 0-SI-NUC-000-044.0.

(SR 4.2.1.1.a.2 & 4.2.1.1.b)



When both the plant computer and NIS QPTR alarm systems are inoperable, the QPTR must be calculated every 12 hours by performing 0-SI-NUC-000-133.0. (SR 4.2.4.1.b)



Do not exceed a load change rate of plus or minus 5% per minute or a step change of 10%.



River water temperatures shall be maintained within the limitations of the NPDES permit as specified in 0-PI-OPS-000-666.0.

NOTE

Westinghouse should be contacted if the turbine is operated outside of its operating limits as stated below.

) To prevent high vibratory stresses and fatigue damage to the last stage turbine blading, do not operate the turbine outside of limits listed below: [W Ltr GP 86-02 (B44 861112 002)]



At loads less than or equal to 30% (350 MW), the maximum permissible backpressure is 1.72 psia. (3.5" Hg)



At loads greater than 30%, the maximum permissible backpressure is 2.7 psia (5.5" Hg) with a 5 minute limitation before tripping the turbine.



Do not allow the generator to become underexcited.

In the event of a change in the rated thermal power level exceeding 15% in one hour, notify Chemistry to initiate the conditional portions of 0-SI-CEM-000-050.0, 0-SI-CEM-030-407.2 and 0-SI-CEM-000-415.0 due to the thermal power change.

3.2 Limitations (continued)

The following Main Turbine vibration limitations and actions should be adhered to:

Ø

Vibration levels which exceed 7 mils (alarm setpoint) should be verified by Predictive Maintenance Group.

2.) v

Vibration levels greater than 7 mils and less than 14 mils should be continuously monitored by Predictive Maintenance Group.



IF vibration level is greater than or equal to 14 mils, THEN TRIP the turbine.

Westinghouse recommends that if any throttle valve is held closed for more than 10 minutes, then it should be re-tested immediately upon reopening in accordance with 1,2-PI-OPS-047-002.0.

The generator may be operated without a bus duct cooler up to approximately 729 MW turbine load.

To ensure sufficient voltage for a safe shutdown after loss of both units, voltage and reactive power should be maintained within the limits of GOI-6.

With LEFM calorimetric power indication available, full power operation is defined as approximately 3455 MW_T not to exceed 3455.0 MW_T averaged over a 8-hour period. [C.1] If LEFM is available, power shall be monitored using plant computer point U2118 Instantaneous Value. **DO NOT** allow average thermal power to exceed 3455 MW thermal for two consecutive hours. Every effort should be made to maintain core thermal power 10 minute average less than 3455 MWt.

The following restrictions apply if LEFM calorimetric power indication (U2118) is unavailable:

Applicable action of TRM 3.3.3.15 must be entered.

AFD limits in COLR and TI-28 must be made more restrictive by 1%.

Rod insertion limits in COLR must be raised by 3 steps.



If reactor power is greater than 40%, power should be monitored using U1118. If U1118 is also unavailable, use the highest reading NIS channel.



If reactor power is less than 40%, use the RCS average ΔT as the preferred method for determining power level.

3.2 Limitations (continued)

⁾ IF equilibrium conditions are achieved, after exceeding by 10% or more of rated thermal power the thermal power at which the heat flux hot channel factor was last determined, THEN conditional performance of 0-SI-NUC-000-126.0, Hot Channel Factor Determination is required.



At low power levels, the LP Heaters may be unbalanced in extraction steam supply use and heat pickup across the condensate side of the heater string. This condition should correct itself as the unit approaches 45-50% Turbine Power. (Ref: PER 99-003789-000)



With one LP heater string out of service (isolated), power is limited to 86% (Unit 1) or 90% (Unit 2). This is based on LP turbine blading limitations. (Ref: DCN E21203A).

#3 heater drain tank should remain drained with LCV-6-105A and B failed open (per 1, 2-SO-5-2) until reactor power exceeds ~45-50%. This will prevent intermediate heater string isolations if a turbine trip occurs at lower power levels. If a level is established in the number 3 Heater Drain Tank prior to exceeding P-9 setpoint (50% power), a turbine trip will result in Intermediate Pressure Heater string isolation(s).

SQN Unit 1 & :			0-GO-5 Rev. 0065 Page 15 of 100			
	RTUP No <u>//A</u> REQUISITES	Unit/	Date Jader			
Peterough	pout this Instruction whore	NOTES	wists the stop should be			
	the condition does not ex	e an IF/THEN statement e xist.				
Prerequ	isites may be completed	in any order.				
H	ENSURE Instruction to	be used is a copy of effe	ctive version.			
Ø	T _{AVG} is being maintaine	ed within 1.5°F of T _{REF} .	<u>~</u>			
E	SG level controls are b (N/A if auto control NO	eing maintained in AUTO T available).	杠			
Ð	Core Operating Limits I	maintained within the ope Report (COLR) ue to dropped or misalign				
E	Steam dump control sy (N/A if Tavg Mode NO T	rstem is in the T _{AVG} mode F available).	Ð			
(10)	The EHC system should be in OPER AUTO (pushbutton lit).					
Ø	Generator pressurized with hydrogen according to capability curve. (TI-28, Fig. A.I4)					
181	PRMs are being mainta	Ms are being maintained within $\pm 2\%$ of core thermal power dings.				

NOTE

During start up after a cold shutdown the Condensate DI normally will be aligned for full flow polishing until the MSRs are in service.



ENSURE Condensate DI polishing operation in accordance with RCL recommendations.

0-GO-5 Rev. 0065 Page 16 of 100

STARTUP No.____

Unit _/

Date To day

4.0 PREREQUISITES (continued)

[10] **ENSURE** each performer documents their name and initials:

Print Name	Initials
SI Restrictor Openafor	5AC
REMOTER Operator 1	PO1
Rencher Chinator 2	Aliz
Renotor FRIGINER	RE
Cham Generis	05.

* Multiple pages & steps N/Ad as they were previously performed. this procedure is being used to raise power of unit 1 from as 75% to 100% ponce 500

5.0 INSTRUCTIONS

CAUTION

Steps of this procedure must be performed sequentially, unless specifically stated otherwise.

NOTES

- 1) Radiation Protection should be notified during normal plant operations if power level increases or decreases are either stopped or started.
- 2) Guidance on restoration of EHC Controls after a BOP runback is contained in Appendix B, *Turbine Runback Restoration*. [C.4]

SQN Unit 1 & 2				0-GO-5 Rev. 0065 Page 18 of 100		
	STARTU	P No <u>n∥A</u>	Unit	Date		
5.1	Power As	scension From 30% t	to 100%			
			NOTES			
1)	Failure to cor Violation and	mply with the NERC V /or monetary penaltie	AR-002 requiremen	ts could result in a Utility		
2)	automatic trip	ission Operator (SELI os to Manual or urgen tical, but within 30 min	f Manual Transfers b	f any Voltage Regulator between Auto and Manual as		
3)	The Transmi Regulator tra	ssion Operator (SELC Insfer between Auto a) shall be notified pr nd Manual.	ior to a planned Voltage		
4)	All position changes (Auto or Manual) of the Voltage Regulator shall be entered into the Narrative Log along with the date, time of position change, reasons, anticipated duration, and notifications made.					
5)	Operation of voltage requi	main generator witho rements. Refer to GO	ut automatic voltage I 6 for MVAR limits.	control could impact gird		
6)	Main Generator operation outside of the Voltage Schedule in GOI-6 requires that notification be made to the Transmission Operator (SELD) within 30 minutes. Narrative Log entries shall be made that include time, date, reason & duration, and notifications made.					
7)						
8)	Confirmation reactor powe		on SHALL be obtair	ned prior to exceeding 30%		

P

VERIFY from Chemistry Section that SG and feedwater secondary chemistry is within acceptable limits.

reviewed and Section 4.0, Prerequisites complete.

HEM SUN

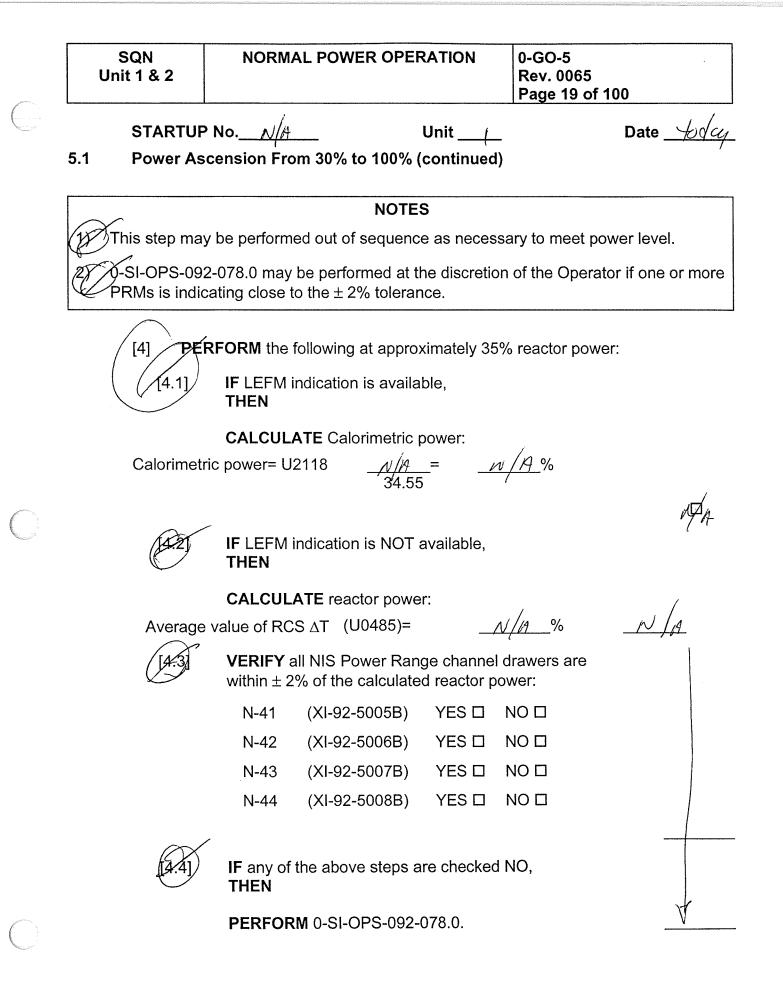
Chemistry personnel contacted



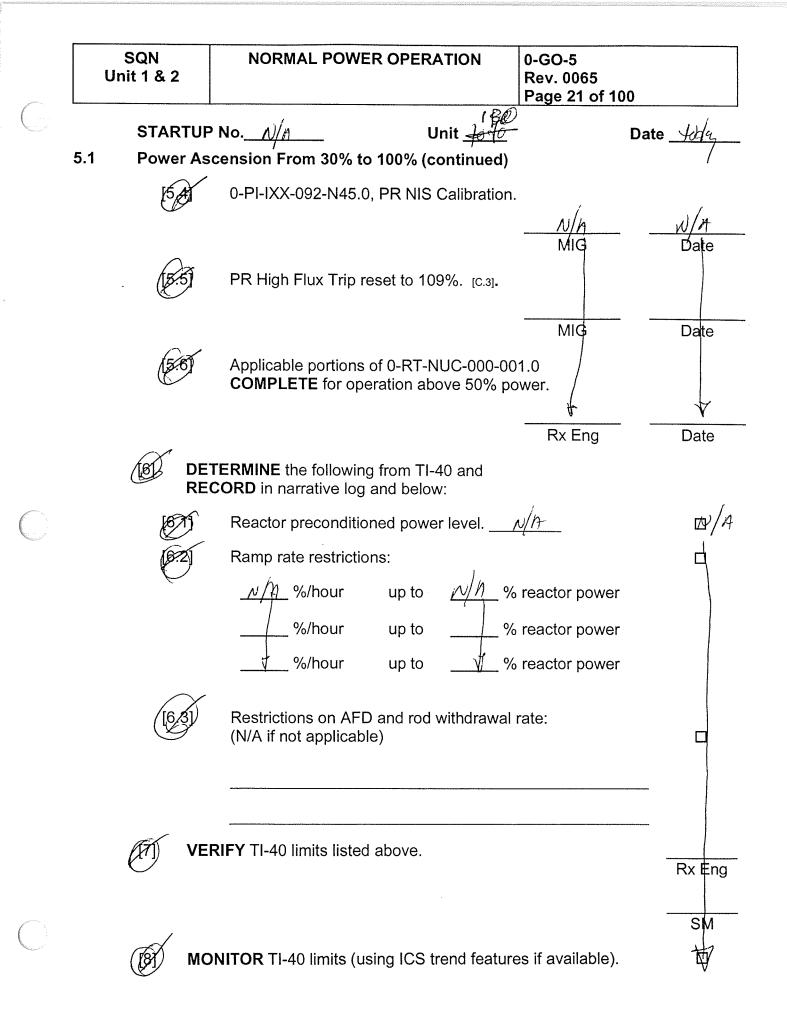
IF this is a startup following refueling, THEN

ENSURE applicable portions of 0-RT-NUC-000-001.0 are COMPLETE for operation above 35% power.

Rx Engr.



	SQN Unit 1 & 2	NORMAL POV	VER OPERATION	0-GO-5 Rev. 0065 Page 20 of 100)
	STARTU	P No/A	Unit	<u>t</u>	Date <u>pd</u>
5.1	Power As	scension From 30%	to 100% (continu	ied)	
	(4.5)	continuously durii AND	deviation from con ng performance of DPS-092-078.0 if t		
			NOTES		
200	With reactor may be perfc	engineering concurre ormed in parallel with	ence, power increa this step.	ise per steps 5.1[6] th	rough 5.1[
Ø	for power inc	rease, then N/A Step	o 5.1[5]. (Startup F	ndary side chemistry i Reactivity Calibrations formed at ≈ 30% Pov	and Tests
	IST IF s	startup is following re emistry hold is preclu	efueling activities a iding power ascens	nd secondary sion, THEN	
	exc	SURE the following ceeding 50% rated the york order)			
	an				
	[5 .1]	0-SI-NUC-000-12	6.0, Hot Channel I	Factor Determination.	•
	[5.1]	0-SI-NUC-000-12	6.0, Hot Channel	Factor Determination.	N/.
		0-SI-NUC-000-12	8.0, Hot Channel 1	Factor Determination. <u>µ</u> A Rx Eng	// Dat
	[15.2]		9.0, Hot Channel 1	<u> </u>	N/.
	[5.1]	0-SI-NUC-092-07		<u> </u>	N/.
	(15.1) (15.2) (15.2)	0-SI-NUC-092-07 Comparison.	9.0, Incore-Excore	Rx Eng Axial Imbalance	/_ Dat



SQN Unit 1 & 2	NORMAL POWER	OPERATION	0-GO-5 Rev. 0065 Page 22 of 100						
STARTUP No. <u>MA</u> Unit <u>I</u> Date <u>Joku</u> .1 Power Ascension From 30% to 100% (continued)									
		NOTE							
(toward incoming)	e Main Generator will ca . This will require raising enerator stability. Refer	g generator voltage	e. Refer to GOI-6 S						
[9] PEI	RFORM the following as IF Automatic Voltage		ce,						
C	THEN ADJUST Main Gener [HS-57-22] Exciter Vo during power escalati	oltage Auto Adjuste		NIA					
[19.2]	IF necessary to remo from service, THEN PERFORM required s								
(9 .3]	IF Automatic Voltage THEN ADJUST Main Gener [HS-57-23] Exciter Vo during power escalati	Control is NOT in rator VARs USING oltage Base Adjust	service,	×					

Valve position limit and governor control meter are displayed on EHC Display panel 1,2-XX-047-2000 (M-2).

Actions effecting reactivity are directed in the following step. 0-SO-62-7 requirements shall be adhered to for reactivity changes (i.e. reactivity balance, amounts of boric acid or water). All appropriate verifications and peer checks shall be utilized during performance.

(TO)

INITIATE power increase to between 45 and 49% and

MAINTAIN valve position limit approximately 10% above current governor control indication as turbine load is changed.

Unit 1 & 2	NORMAL POWER OPER	ATION	0-GO-5 Rev. 0065 Page 24 of 100	
	P No <i>ی الط</i> ل cension From 30% to 100% (c	Jnit <u>1</u> continued)	D	Date <u>fode</u>
The turbine load in acceptable band.	ncrease should be stopped until	the MFW F	Reg valves are ope	erating in the
[12,5]	ENSURE MFW Reg valves a auto (within ± 5% from zero o	•		NHA
[12.6]	IF MFW Reg. valves are NO [°] band, THEN	T maintainir	ng within the 5%	
	NOTIFY Instrument Maintena	ance.		ф
The potential exit reedwater heater	sts for condensation formations are isolated.	on in steam	extraction lines	when
		on in steam	extraction lines	when
Teedwater heater		/		
Teedwater heater	enance support may be required ENSURE Feedwater Heater and #7 Heater Drain Tank le to maintain levels within norr	f if controlle s 5 and 6, N vel controlle mal ranges.	r adjustments are /ISR Drain Tank, ers are adjusted	
Teedwater heater	enance support may be required ENSURE Feedwater Heater and #7 Heater Drain Tank le	f if controlle s 5 and 6, N vel controlle mal ranges.	r adjustments are /ISR Drain Tank, ers are adjusted	
Teedwater heater Instrument Mainte [12:7]	enance support may be required ENSURE Feedwater Heater and #7 Heater Drain Tank le to maintain levels within norr HEN reactor power is approxima RIFY annunciator XA-55-4A, wi	f if controlle s 5 and 6, N vel controlle mal ranges. ately 35%, T	r adjustments are /ISR Drain Tank, ers are adjusted	
Teedwater heater Instrument Mainte [12:7]	enance support may be required ENSURE Feedwater Heater and #7 Heater Drain Tank le to maintain levels within norr HEN reactor power is approxima	f if controlle s 5 and 6, N vel controlle mal ranges. ately 35%, T	r adjustments are /ISR Drain Tank, ers are adjusted	

 \bigcirc

 \bigcirc

SQN Unit 1 & 2 0-GO-5 Rev. 0065 Page 25 of 100

STARTUP No. N/A

Unit __/__

Date tork

NAA

5.1 Power Ascension From 30% to 100% (continued)

MSR	HANDSWITCH	WARMING VALVE	INITIALS
A1	HS-1-142	FCV-1-142	$\frac{N/M}{1st} = \frac{N/M}{CV}$
B1	HS-1-144	FCV-1-144	1st CV
C1	HS-1-146	FCV-1-146	1st CV
A2	HS-1-136	FCV-1-136	1st CV
B2	HS-1-138	FCV-1-138	1st CV
C2	HS-1-140	FCV-1-140	$\frac{1}{1 \text{ st}} \frac{1}{CV}$

NOTE

#3 heater drain tank should remain drained with LCV-6-105A and B full open until reactor power exceeds ~45-50%.



ENSURE #7 heater drain tank is on recirc in accordance with 1,2-SO-5-3.

ENSURE the remaining available pumps are aligned and ready for service in accordance with 1,2-SO-2/3-1:

Condensate booster pumps.



Hotwell pump.

-04a	SQN Unit 1 & 2	NORMAL POWER	OPERATION	0-GO-5 Rev. 0065 Page 26 of 100
-	STARTU	JP No/A	Unit/	Date forday
5.1	Power A	Ascension From 30% to 1	00% (continued)	· /
Č.		ی) ng additional condensate p the MFW Reg. valves resp		
Æ	· /	ng step may be performed usly performed in 0-GO-4.	out of sequence a	nd may be marked N/A if it
	1	/HEN the condensate boos 40 amps, THEN TART the following pumps		
	[17.1	Third HW pump (if ava	ailable).	NA
	172	Second CBP.		<i>L</i>
·····			NOTES	
Ę		ng additional condensate p valves respond correctly a		nps in service, ensure that the n the acceptable band.
				rd of #7 Heater Drain System , if system conditions warrant.
<u></u>	Steps 5.1[1	8] through 5.1[23] may be	performed out of s	sequence.
		VHEN confirmation obtaine nat #7 heater drain tank ch		
		START pumping forward us ising 1,2-SO-5-3.	sing the #7 heater	drain tank pumps
	//5 -)	IAINTAIN Condensate Bo preater than or equal to 75	•	n pressure
		IAINTAIN Main Feedwate han 330 psig (PI-2-129).	r Pump suction pre	essure greater

U	SQN nit 1 & 2	NOF	RMAL POWE		0-GO-5 Rev. 0065 Page 28 c	
	STARTU	P No//	<u> </u> A	Unit	<u>1</u>	Date to de
5.1	Power As	scension	From 30% to	o 100% (contin	ued)	/
	[21.2]	CLOS	E the followin	g steam inlet le	akoff isolation va	lves:
	Ŷ	MSR	VALVE	POSITION	INITIALS	
			1-679	CLOSED	N/D	
		A-1	1-714	CLOSED	1	
			1-680	CLOSED		
		B-1	1-715	CLOSED		
		0.1	1-681	CLOSED		
		C-1	1-716	CLOSED		
		A-2	1-682	CLOSED		
		A-2	1-717	CLOSED		
			1-683	CLOSED		
		B-2	1-718	CLOSED		
			1-684	CLOSED		
		C-2	1-719	CLOSED	V]

NOTE

(____

Due to interlocks on MSR valves, bypass valves must be opened prior to main isol valves. For example: Open FCV-1-241 and when full open, then open FCV-1-141.

(21.3) **ENSURE** MSR HP steam supplies ALIGNED as follows:

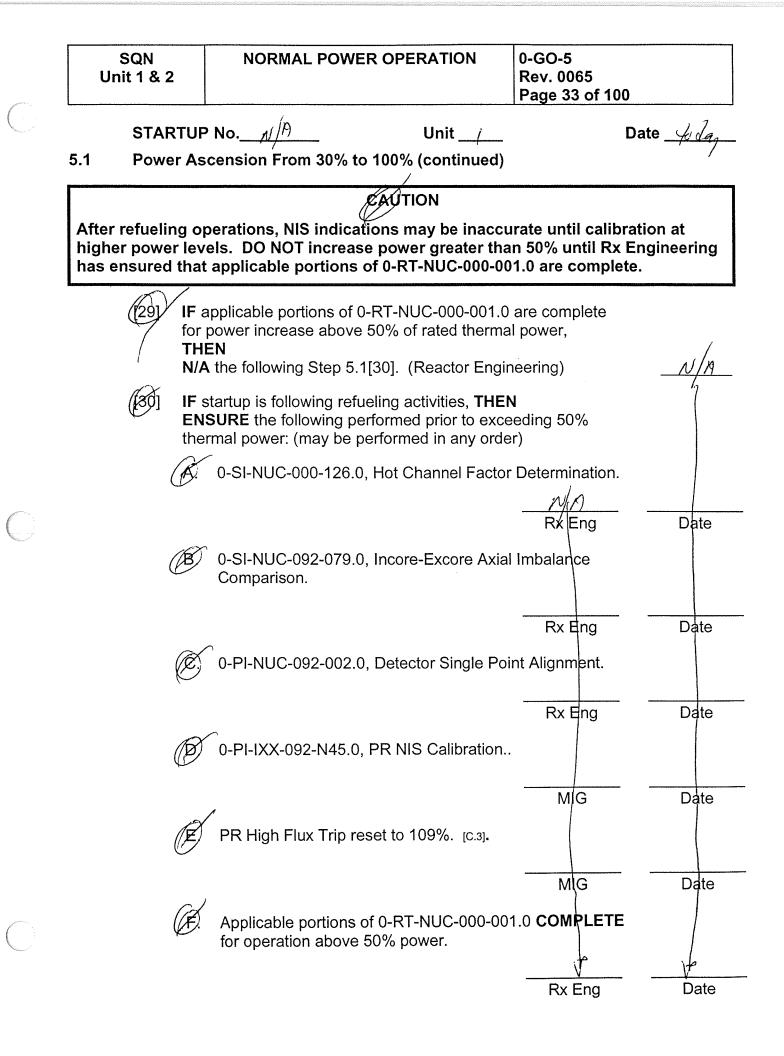
MSR	EQUIPMENT	HANDSWITCH	POSITION	√
A1	MSR BYPASS ISOL	HS-1-241A	OPEN	NEA
AT	MSR MAIN ISOL	HS-1-141A	OPEN	ф
B1	MSR BYPASS ISOL	HS-1-243A	OPEN	
	MSR MAIN ISOL	HS-1-143A	OPEN	巾
01	MSR BYPASS ISOL	HS-1-245A	OPEN	山
C1	MSR MAIN ISOL	HS-1-145A	OPEN	<u></u> ф
40	MSR BYPASS ISOL	HS-1-235A	OPEN	ļф
A2	MSR MAIN ISOL	HS-1-135A	OPEN	<u> </u>
DO	MSR BYPASS ISOL	HS-1-237A	OPEN	
B2	MSR MAIN ISOL	HS-1-137A	OPEN	
00	MSR BYPASS ISOL	HS-1-239A	OPEN	
C2	MSR MAIN ISOL	HS-1-139A	OPEN	世

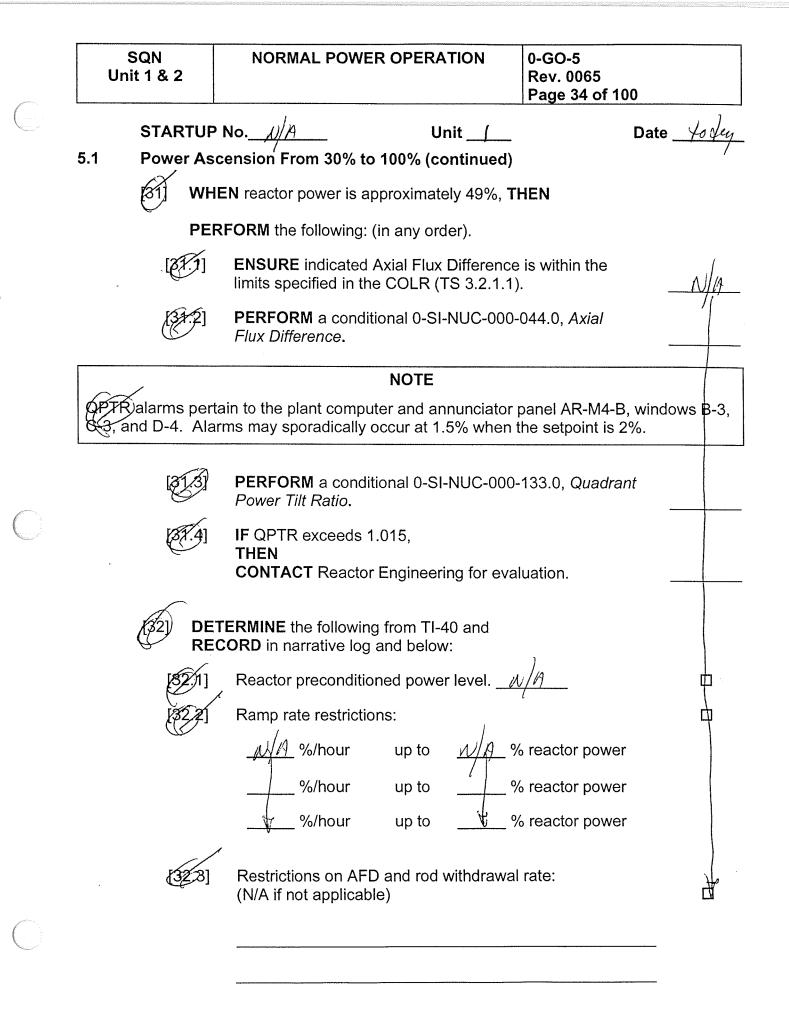
	SQN Unit 1 & 2	NORMAL POWER	ROPERATION	0-GO-5 Rev. 0065 Page 29 of 10	0			
	START	UP No/19	Unit/		Date to day			
5.1								
	~	· · · · · · · · · · · · · · · · · · ·	NOTES					
E	Control va	lves ramp open for 120 mi	nutes for turbine co	ld start.				
Ŧ	MSR Cont Hot Start b	rol valves ramp open from putton was previously depre	the 400°F position essed during perfor	to full open in or mance of 0-GO-	ne hour when 4 or 0-GO-11			
	(21	DEPRESS the RAME separator reheater co the reheater.			NZA			
	21.	5] IF MSR controls will THEN PERFORM the follow		MP mode,				
		OT DEPRESS MAN on MSR control	IUAL pushbutton panel.					
	ADJUST manual potentiometer to gradually open MSR TCVs over approx. 120 minutes WHILE continuing in this procedure.							
	[27.6] OPEN all MSR OPERATING vents (6-3 thru 6-93) on panel XS-6-3.							
	[21.7] CLOSE all MSR STARTUP vents (6-1 thru 6-91) on panel XS-6-1.							
	27	8] PERFORM App. C to	o locally isolate MS	R startup vents.				
	A.	9) ENSURE MSR HP s	team warming valv	es are CLOSED	:			
	MSR	EQUIPMENT	HANDSWITCH	POSITION	\checkmark			
	A1	MSR WARMING LINE	HS-1-142	CLOSED	MAA			
	B1	MSR WARMING LINE	HS-1-144	CLOSED				
	C1	MSR WARMING LINE	HS-1-146	CLOSED				
	A2	MSR WARMING LINE	HS-1-136	CLOSED	中			
	B2	MSR WARMING LINE	HS-1-138	CLOSED				
	C2	MSR WARMING LINE	HS-1-140	CLOSED	E			

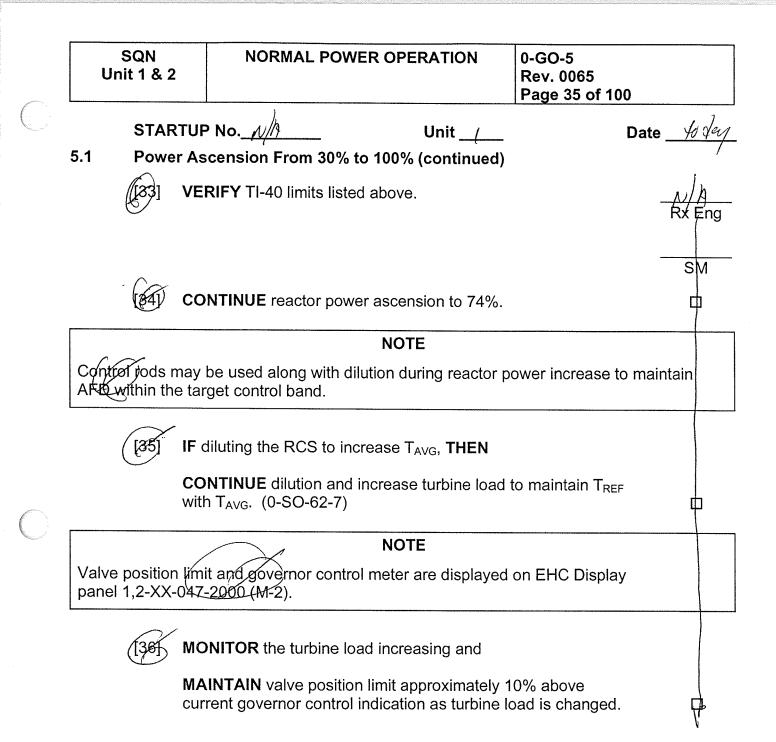
U	SQN nit 1 & 2	NORMAL PO	WER OPERATION	Rev. 00	65 0 of 100
	STARTU	JP No <i>i\/A</i>	Unit	1	Date _
5.1	Power A	scension From 309	% to 100% (contin	ued)	
	121.1	0] IF this power as 1 through March	cension is during th a 31, THEN	e months of C	october
			OPS-000-006.0 and sition of MSR doghe		
	21.1] IF t his power as through Septem	cension is during th ber 30, THEN	ne months of A	pril 1
		OPEN MSR dog	ghouses' vent damp	ers.	
			NOTE		<u></u>
L		r shell side pressure			
		#7 heater drain tan verpressure conditio		indicating an	
	ە P		n, THEN 3, Section 8.0, Infre		on to
	o P p	verpressure condition	n, THEN 3, Section 8.0, Infre pressurization.		on to
	o P p	verpressure condition ERFORM 1,2-SO-5- revent #7 HDT overp /HEN approximately	n, THEN 3, Section 8.0, Infre pressurization.	equent Operati	on to
	o P p	verpressure condition ERFORM 1,2-SO-5- revent #7 HDT overp /HEN approximately VERIFY annunc C-20 /	n, THEN 3, Section 8.0, Infre pressurization. 40% turbine load: ciator XA-55-4A, wi AMSAC MED	equent Operati	on to
	o P p	Verpressure condition ERFORM 1,2-SO-5- revent #7 HDT overp /HEN approximately VERIFY annunc C-20 / AR CLOSE the dra	n, THEN 3, Section 8.0, Infre pressurization. 40% turbine load: ciator XA-55-4A, wi AMSAC MED	equent Operati ndow E-7: s LIT .	
	o P p	Verpressure condition ERFORM 1,2-SO-5- revent #7 HDT overp /HEN approximately VERIFY annunc C-20 / AR CLOSE the dra	n, THEN 3, Section 8.0, Infre pressurization. 40% turbine load: ciator XA-55-4A, wi AMSAC MED ins on the operating	equent Operati ndow E-7: s LIT .	
	0 P p (23) V [23.1 [23.1]	Verpressure condition ERFORM 1,2-SO-5- revent #7 HDT overp /HEN approximately VERIFY annunc C-20 / AR CLOSE the dra pump turbine (N	n, THEN 3, Section 8.0, Infre pressurization. 40% turbine load: ciator XA-55-4A, wi AMSAC MED ins on the operating V/A other pump).	equent Operati ndow E-7: s LIT . g main feedwa	ter

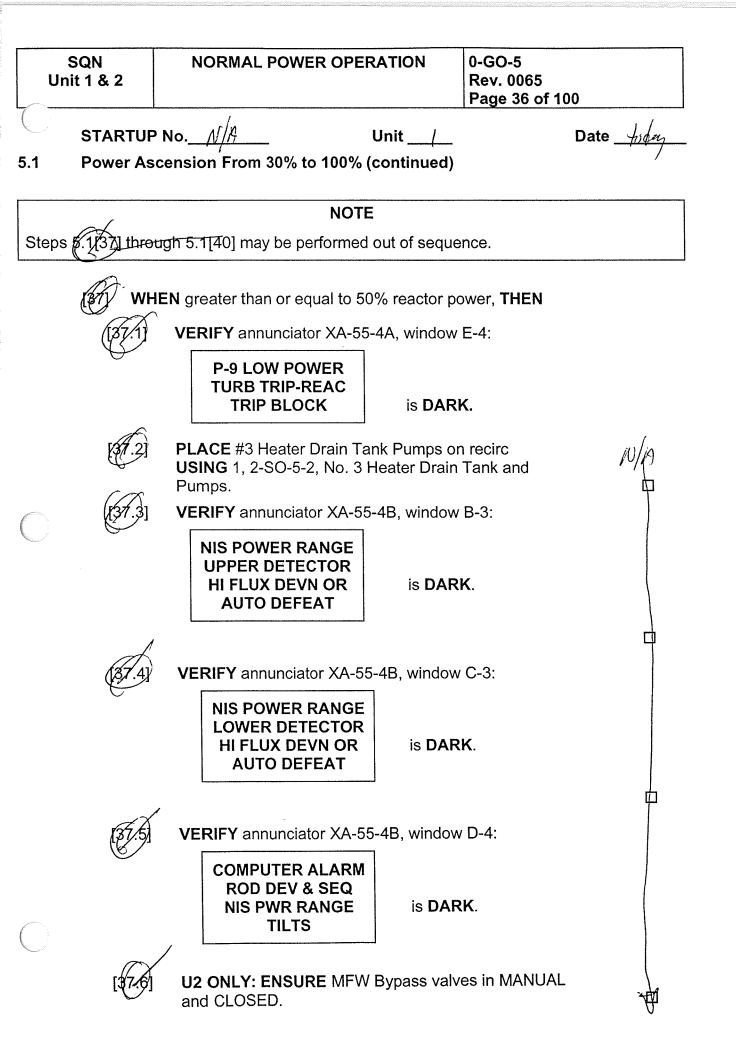
ι	SQN Jnit 1 & 2	NORMAL POV	VER OPERATION	0-GO-5 Rev. 0065 Page 31 of 100	
	STARTUP	No/A	Unit	Da	nte <u>to da</u>
5.1	Power As	cension ['] From 30%	to 100% (continued)		
			NOTES		
B	feed pump in or 65% (Unit 2	service may be defe 2). Logic prevents of	erations Superintende erred until power is app opening the standby M exceeding 9 million lbs	proximately 55% (U FPT condenser isol	nit 1) ation valve
Ł	allows one ch	3.3.2) functional un annel to be inopera the second MFPT.	t 6.f (AFW start function ble in Mode 1 for up to	on for the trip of both 4 hours when start	n MFPT) ing up or
	(24) WH	EN approximately 4	0 to 45% turbine load,	THEN	
	PLA	CE second MFPT	in service by performir	ng the following:	
	[24,1]		Superintendent has a uring the power ascent		
		MFPT	hich MFPT is in service	e.	NA
		(B) MONITOR le increased.	pading of the MFP in s	ervice as load is	
	[2 4 .2)	WHEN second N	IFPT is to be placed in	service, THEN	
		PLACE second I 1,2-SO-2/3-1.	MFPT in service in acc	ordance with	
		na ana ana ana ana ana ana ana ana ana	NOTE		
THE	step and indi	vidual substeps may	y be performed out of s	sequence.	
	(25) PEI	RFORM the followir	ng as system paramete	ers permit:	
	[25.1]	VERIFY three (3 (if available).) Hotwell pumps runnir	ng	
	[25.2]	VERIFY two (2)	Condensate booster p	umps running.	
	[25:3]		ump(s) in service (only erations Superintender		

	QN :1 & 2	NORMA	AL POWER OPERA	F	-GO-5 Rev. 0065 Page 32 of 100)
	STAR	TUP No <u>///</u> /////////////////////////////////	U	nit	I	Date <u>49</u> 9
5.1	Powe	r Ascension Fro	m 30% to 100% (co	ontinued)		
	25	A] VERIFY o	ne (1) #7 Heater Dra	ain Tank pun	np in service.	μ¢
	B		one gland steam ex AUTO position:	hauster runn	ing and one	V
-		EXHAUSTER	HANDSWITCH	(√)	(√)	/
		Α	HS-47-209A	AUTO 🗆	START #	A
		В	HS-47-209B	AUTO 🗆	START D	A
	12	THEN	eal water is being s			
			E normal gland seal unit) in accordance v er System.			Æ
Steps 5	5.1[26]	through 5.1[31] r	nay be performed o	ut of sequence	ce.	
	[20]	IF the second # THEN	7 heater drain tank p	oump has no	t been started,	
		START the second with 1,2-SO-5-3	ond #7 heater drain	tank pump ir	accordance	
			NOTE			
Hydrog	<u>en</u> pre	ssure should be	maintained greater	than or equal	to 66 psig.	
	6-					
	BI		ator hydrogen press in accordance with ability Curve.			
	(28)		ater temperature wil as specified in 0-PI-			1
						N N









SQN Unit 1 & 2	NORMAL POWER OPERATIO	N 0-GO-5 Rev. 0065 Page 39 of 100
	P No <u>N/A</u> Unit scension From 30% to 100% (contin	· · · · · ·
load. This load	CAUTION drains must be pumping forward p imit assumes that both MFW pump g, turbine load must be further limi e.	os are in service. If only one
	RFORM the following <u>PRIOR TO</u> inc ove 60%.	reasing turbine load
(43.1]	ENSURE #3 Heater Drain Tank p USING 1, 2-SO-5-2.	umping forward $\frac{N/\gamma}{\gamma}$
1432	ENSURE #7 Heater Drain Tank p USING 1, 2-SO-5-3.	umping forward
	I SURE at least one bus duct cooler is SO-58-1 <u>PRIOR TO</u> increasing load a	
	NOTES	
1) TI-40 ramp r	ate restrictions are recorded in Step 5	5.1[32].
The following is NOT appli	g step may be marked N/A if intermed cable.	liate power threshold
(451) WI	HEN Reactor Power approaches the	
51151	reshold for the respective unit, THEN	
Th EN	ISURE Reactor Power ramp rate targ	

C

SQN Unit 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 40 of 100
STARTUF 5.1 Power As	PNo/A Unit/ cension From 30% to 100% (continu	
	CAUTIONS	ene deutsche eine sonderen mehren werden eine Bereichen der Gesternen werden die Gesternen werden für 4444 vilges mehrenen.
Valves 106A HDT pump s	and 106B shall be verified to be ope	erating properly after each #3
		054 or B open and only two #2
	ately 79% turbine load with LCV-6-10 are in service, the available NPSH fo	
	NOTES	
	g HDT pumps in service, ensure main f nd correctly and then stabilize in an acc	
pressure is h is increased	will come open at about 70% turbine lo igh. Minimize duration at this load to re to 100% condensate pressure will grad to pump forward and the condenser by	educe wear on the valve. As load lually decrease allowing the #3
in .] through 5.1[49] may be performed in a	
[46] WI	IEN approximately 70% turbine load, T	THEN
[467]]	PLACE the third #3 heater drain pu accordance with 1,2-SO-5-2. [C.2]	
[46.2]	ENSURE valves LCV-6-106A and L controlling #3 heater drain tank leve	

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1	SQN nit 1 & 2	NORMAL POWE	ER OPERATION	0-GO-5 Rev. 0065 Page 41 of 100	
	STARTUP	• No//A	Unit	_ Date _ Jody	
5.1	Power As	cension From 30% to	o 100% (continued)	
	~		CAUTION		
cond and Cond the p	ensate pres 3 and #7 HE e ns ate Dem umps must	OT pump and bypass ineralizer pumps at be started:	sure, condensate valve operation. his discretion, but	alizer pumps using booster pump inlet pressure, The US/SRO may start or sto if any of the following occur s than 125 psig, as indicated	
	on [PI-2-77].	Deceter i unip cues			
	/lain Feedwa PI-2-129].	ater Pump suction p	ressure less than	420 psig, as indicated on	
35/1	njection Wa	iter Pump discharge XA-55-3B window E	-	han 265 psig, as indicated by	
			NØTES		
Should #7 heater drain tank pump(s) amps swing or if system pressure needs to be increased by approximately 40 psig, then Cond DI Booster pumps can be started; however, two of the three pumps must be started at the same time.					
i i	ncreased by	approximately 40 psi	s) amps swing or if g, then Cond DI Bo	oster pumps can be started;	
	ncreased by nowever, two When placing	approximately 40 psi o of the three pumps n	s) amps swing or if g, then Cond DI Bo nust be started at th n service, ensure N	oster pumps can be started;	
	Ncreased by Nowever, two When placing correctly and (47) EV	approximately 40 psi o of the three pumps n g condensate pumps i	(s) amps swing or if g, then Cond DI Bo nust be started at th n service, ensure N cceptable band. condensate demin th 1,2-SO-2/3-1 (Ti	eralizer booster his step can be	
	Ncreased by Nowever, two When placing correctly and (47) EV	approximately 40 psign of the three pumps in g condensate pumps in then stabilize in an a ALUATE starting two mps in accordance with	(s) amps swing or if g, then Cond DI Bo nust be started at th n service, ensure N cceptable band. condensate demin th 1,2-SO-2/3-1 (Ti	eralizer booster his step can be	
If sta	ncreased by nowever, two When placing correctly and (4/1) EV put N/4 rting up follo	approximately 40 psi o of the three pumps n g condensate pumps i then stabilize in an a ALUATE starting two mps in accordance wi A'd or signed-off at tim wing refueling operation ow reactor power, the	s) amps swing or if g, then Cond DI Bo nust be started at th n service, ensure N cceptable band. condensate demin th 1,2-SO-2/3-1 (The when pumps are NOTE ons and reactivity c	eralizer booster his step can be	
i P 20 If sta comp	ncreased by nowever, two When placing correctly and (4/1) EV put N/4 rting up follor bleted at \approx 30 n at \approx 75% R	approximately 40 psi o of the three pumps n g condensate pumps i then stabilize in an a ALUATE starting two mps in accordance wi A'd or signed-off at tim wing refueling operation ow reactor power, the	(s) amps swing or if g, then Cond DI Bo nust be started at the n service, ensure N cceptable band. condensate demin th 1,2-SO-2/3-1 (The when pumps are NOTE ons and reactivity c n reactivity calculat	oster pumps can be started; he same time. IFW Reg. valves respond eralizer booster his step can be started). alculations and tests were ions and tests must be perform 001.0 are complete	

0-GO-5 SQN NORMAL POWER OPERATION Unit 1 & 2 Rev. 0065 Page 42 of 100 Date Today STARTUP No. Unit _____ Power Ascension From 30% to 100% (continued) 5.1 AUTION After refueling, NIS indications may be inaccurate until calibration at higher power levels. DO NOT increase power above 75% until applicable portions of SEE PHOTOS 100 M Phillen SAQue lan 0-RT-NUC-000-001.0 are complete. des FOR HER IF startup is following refueling, THEN **PERFORM** the following prior to operation above 75% power: (may be performed in any order) [49.1⁻ **ENSURE** the following have been performed (may be N/A'd by Reactor Eng. and Instrument Maint. if NOT required): 0-SI-NUC-000-126.0, Hot Channel Factor Determination. Rx Eng Date 0-SI-NUC-092-079.0, Incore-Excore Axial Imbalance Comparison. today Rx Eng 0-PI-NUC-092-036.0, Incore/Excore Detector Calibration (N/A if NOT required or if $\triangle AFD < 3\%$). N/A For Joc Rx Eng Date 0-PI-NUC-092-002.0, Detector Single Point Alignment. NA B fodu RX Eng Date 0-PI-IXX-092-N45.0, PR NIS Calibration. le tota

SQN Unit 1 & 2		NORMAL POWER OPERATION		0-GO- Rev. (Page		
	STARTUP	No	Unit		Date	
5.1	Power As	cension From 30	0% to 100% (continued	d)		
	[49.2]	•	ms Eng to perform 0-Pl op ∆T Zeros. [C.7]	-SXX-000	-022.2 to	
	[49.3]		icable portions of 0-RT-		-001.0	
		are complete in	or operation above 75%	KIP.	Rx	En
			NOTES			
1)		2-078.0 may be p cating close to the	erformed at the discreti ± 2% tolerance.	on of the	Operator if one or	r mo
2)	Steps 5.1[50]	and 5.1[51] may	be performed out of se	quence.		
	[50] PEI	RFORM the follow	ving at approximately 7	5% reacto	or power:	
	[50] PEI [50.1]	IF LEFM indica	ving at approximately 7 ation is available, THEN Calorimetric power:		or power:	
	[50.1]	IF LEFM indica	ation is available, THEN Calorimetric power:		or power:	
	[50.1]	IF LEFM indica CALCULATE fic power= U2118	ation is available, THEN Calorimetric power:	l %		
	[50.1] Calorimetr	IF LEFM indica CALCULATE fic power= U2118 IF LEFM indica	ation is available, THEN Calorimetric power: = 34.55	l %		
	[50.1] Calorimetr [50.2]	IF LEFM indica CALCULATE fic power= U2118 IF LEFM indica	ation is available, THEN Calorimetric power: = 34.55 ation is NOT available, reactor power:	l %		
	[50.1] Calorimetr [50.2]	IF LEFM indica CALCULATE Tic power= U2118 IF LEFM indica CALCULATE Tic power= U1118 VERIFY that a	ation is available, THEN Calorimetric power: = 34.55 ation is NOT available, reactor power:	I % % channel d	□ □ rawers	
	[50.1] Calorimetr [50.2] Calorimetr	IF LEFM indica CALCULATE Tic power= U2118 IF LEFM indica CALCULATE Tic power= U1118 VERIFY that a	ation is available, THEN Calorimetric power: = = ation is NOT available, reactor power: == = === === === === === === === === === ==== ==== ==== ==== ==== ======= ==========	I % % channel d	□ □ rawers	
	[50.1] Calorimetr [50.2] Calorimetr	IF LEFM indica CALCULATE fic power= U2118 IF LEFM indica CALCULATE fic power= U1118 VERIFY that a are within ± 29	ation is available, THEN Calorimetric power: = = = ation is NOT available, reactor power: =	I THEN % channel dr	□ rawers ower.	

N-44 (XI-92-5008B) YES □ NO □

U	SQN Init 1 & 2	NORMAL POWER OPERATION	N 0-GO-5 Rev. 0065 Page 44 of 100)
	STARTUP	No Unit		Date
.1	Power Asc	cension From 30% to 100% (contin	ued)	
	[50.4]	IF any of the above steps are chec	ked NO , THEN	
		PERFORM 0-SI-OPS-092-078.0.		
		CAUTIONS		u z zaciyał w Kanada za nasta kateria da stateria da stateria da stateria da stateria da stateria da stateria d
,		and/or 105B may be throttling oper ng higher than #3 HDT pump disch		system

 Turbine runback will occur if #3 HDT pump flow to the condensate system drops below 5500 gpm (for greater than 10 seconds), condensate bypass valve LCV-6-105A or 105B opens, and turbine load is above 81% (Unit 1) or 82% (Unit 2).

[51] **PRIOR** to increasing turbine load above 77%:

ENSURE the following:

[51.1] LCV-6-106A and -106B are controlling properly.

[51.2] LCV-6-105A and -105B are **CLOSED**.

NOTES

- 1) Ramp load rate increases shall be within the limits of TI-40
- 2) Intermediate Power Threshold ramp rate target value of 2% / hr may apply.
 - [52] **RECORD** power ascension ramp rate from TI-40.

NOTES

- 1) Operation above 75% Load with only two Hotwell Pumps in service requires further evaluation.
- 2) Steps 5.1[53] through 5.1[56] may be performed out of sequence.

[53] **CONTINUE** the power ascension to 90% reactor power.

SQN	NORMAL POWER OPERATION	0-GO-5
Unit 1 & 2		Rev. 0065
		Page 45 of 100

STARTUP No.

Unit _____

Date _____

5.1 Power Ascension From 30% to 100% (continued)

NOTE

Control rods may be used along with dilution during reactor power increase to maintain AFD within the target control band.

[54] IF diluting the RCS to increase T_{AVG}, THEN

CONTINUE dilution and increase turbine load to maintain T_{REF} with T_{AVG} . (0-SO-62-7)

NOTE

Guidance on restoration of EHC Controls after a BOP runback via the valve position limiter is contained in Appendix B, *Turbine Runback Restoration*. [C.4]

[55] MONITOR the turbine load increasing and

MAINTAIN valve position limit approximately 10% above the current governor control indication as turbine load is changed.

NOTE

When the turbine impulse pressure relay number is illuminated on Panel L-262, the relay is closed and Runback circuit is armed.

[56] WHEN greater than 77% Turbine Load, THEN

VERIFY [**PIS-47-13RLY1**] light [**1**], 'Turbine Runback From Loss of 1 MFP' is illuminated on Panel L-262.

[57] WHEN greater than 82% Turbine Load, THEN

VERIFY the following relay lights are illuminated on Panel L-262:

- [57.1] [PIS-47-13RLY2], Turbine Runback From #3HDT.[2]
- [57.2] [PIS-47-13RLY 3], NPSH Protection VLV-6-106B closes on #3 HDT pump trip. [3]

SQN	NORMAL POWER OPERATION	0-GO-5
Unit 1 & 2		Rev. 0065
		Page 46 of 100

STARTUP No.

Unit _____

Date _____

5.1 Power Ascension From 30% to 100% (continued)

NOTES

- 1) Reactor power can be increased greater than 90% as long as adequate MFP suction is maintained.
- 2) Steps 5.1[58] through 5.1[62] may be performed out of sequence.
 - [58] WHEN approximately 85 to 90% reactor power

OR when determined by Unit SRO (if power raised above 90%), **THEN**

ENSURE third condensate booster pump in service in accordance with 1,2-SO-2/3-1. [C.2]

NOTE

A nominal CBP suction pressure of approximately 180 psig, as indicated on [PI-2-77], will alleviate bypassing to the condenser at full power.

- [59] **IF** condensate pressure is high resulting in #3 or #7 heater drain tank bypassing to the condenser, **OR** the normal level control valves are near full open, **THEN**
 - [59.1] **THROTTLE [14-550]** to attain desired condensate pressure.
 - [59.2] IF unable to throttle [14-550], THEN

REFER to 1,2-SO-5-2, Section 8.0 to adjust condensate pressure.

OR

EVALUATE removal of the condensate demineralizer booster pumps (N/A if NOT in service).

SQN Unit 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 47 of 100
STARTUP	No Unit	Date
1 Power Asc	cension From 30% to 100% (continued)
	NOTE	
Two Cond DI Boos	ster pumps must be started at the same t	ime.
	LUATE starting available condensate de ster pump(s) to raise system pressure ~	
Pump Sta	arted YES D NO D	
[61] WH THE	EN reactor power is approximately 90%, EN	
PEF	RFORM the following:	
[61.1]	ADJUST Power Range instrumentatio with 0-SI-OPS-092-078.0.	n in accordance
[61.2]	INITIATE performance of 1-PI-OPS-00 or 2-PI-OPS-000-022.1, Appendix B.	00-020.1
	CAUTION	
The potential exi feedwater heater	sts for condensation formation in stea s are isolated.	am extraction lines when
[61.3]	ENSURE the following level controller levels within normal ranges:	rs are maintaining
	A. Secondary plant heaters.	
	B. MSR drain tanks.	

CAUTION

DO NOT exceed an average of 3455.0 MWT during an 8-hour period. [C.1]

[62] **MONITOR** NIS, ∆T and calorimetrics on plant computer (pt. U2118) while increasing reactor power.

SQN Unit 1 & 2				0-GO-5 Rev. 0065 Page 48 of 100	
	STARTU	P No	Unit	Da	ite
5.1	Power A	scension From 30%	% to 100% (continue	d)	
			NOTES		
1)		renturi unfouling may ot affected by ventu		tion. LEFM calorimet	ric power
2)		Ū.	•	o LEFM unavailable, t exceeding 97% react	
3)	Steps 5.1[63	3] through 5.1[67] ma	ay be performed out c	of sequence.	
		Unit is returning to f less than 50%	ull power after a turbi	ne load reduction	
		ND U1118 is being u HEN	used to monitor power		
	P	ERFORM the followi	ng prior to exceeding	97% power:	
	[63.1]	· ·	ns Engineering to (X-000-022.2, Calorin ecessary.	netric Calculation,	
	[63.2]		licable sections of 0-F vater Flow Constant.		

NOTES

BOP Eng

1) Ramp load rate increases shall be within the limits of TI-40

required)

- 2) Intermediate Power Threshold ramp rate target value of 2% / hr may apply.
 - [64] **RECORD** power ascension ramp rate from TI-40.
 - [65] **CONTINUE** power ascension to 100% RTP.

SQN	NORMAL POWER OPERATION	0-GO-5
Unit 1 & 2		Rev. 0065
		Page 49 of 100

STARTUP No._____

Unit _____

Date _____

5.1 Power Ascension From 30% to 100% (continued)

NOTE

Control rods may be used along with dilution during reactor power increase to maintain AFD within the target control band.

[66] IF diluting the RCS to increase T_{AVG}, THEN

CONTINUE dilution and increase turbine load to maintain T_{REF} with T_{AVG} . (0-SO-62-7)

NOTE

Valve position limit and governor control meter are displayed on EHC Display panel 1,2-XX-047-2000 (M-2).

[67] MONITOR the turbine load increasing AND

MAINTAIN valve position limit approximately 10% above the current governor control indication as turbine load is changed.

NOTE

Steps 5.1[68] through 5.1[71] may be performed out of sequence.

[68] WHEN reactor power approaches 100%, THEN

ADJUST governor valve position limiter ~ 2% above governor valve position.

NOTE

Engineering recommends placing the 3rd Condensate Demineralizer Booster Pump in service when at full power. Operation of only 2 Condensate Demineralizer Booster Pumps is allowed but reduces the operating margin in the event of a condensate transient based on the lower suction pressure to the MFPs.

 [69] IF it is desired to place the 3rd condensate demineralizer booster pump in service, THEN
 START 3rd condensate demineralizer booster pump in accordance with 1,2-SO-2/3-1.

SQN	NORMAL POWER OPERATION	0-GO-5
Unit 1 & 2		Rev. 0065
		Page 50 of 100

STARTUP No.

Unit _____

Date ____

5.1 Power Ascension From 30% to 100% (continued)

CAUTION

Governor valve position limit meter may NOT match the governor valve position meter; therefore, monitor the megawatt meter and valve position limit light continuously during the following step.

NOTES

- 1) Operation with the VALVE POS LIMIT light LIT is acceptable if unsatisfactory load swings are experienced.
- 2) Actions effecting reactivity are directed in the following step. All appropriate verifications and peer checks shall be utilized during performance.
 - [70] **IF** unsatisfactory load swings are experienced as the unit approaches full power, **THEN**
 - [70.1] WITH turbine load set for maximum of 100% power, SLOWLY and CAUTIOUSLY PULSE the governor VALVE POSITION LIMIT in LOWER direction while monitoring megawatts for a decrease and VALVE POS LIMIT light to ILLUMINATE.
 - [70.2] WHEN the limiter just reaches the governor valve position, THEN

STOP limiter adjustment.

SQN	NORMAL POWER OPERATION	0-GO-5
Unit 1 & 2		Rev. 0065
		Page 51 of 100

STARTUP No.

Unit _____

5.1 Power Ascension From 30% to 100% (continued)

CAUTION

Do not raise the limiter position unless the turbine control is positively controlling the turbine (limit light NOT LIT).

NOTE

Actions effecting reactivity are directed in the following step. All appropriate verifications and peer checks shall be utilized during performance.

- [71] **PERFORM** the following if the limiter prevents reactor operation at approximately 100%:
 - [71.1] **ADJUST** SETTER/REFERENCE controls to reduce turbine loading until the VALVE POS LIMIT light is NOT LIT.
 - [71.2] **INCREASE** VALVE POSITION LIMIT to allow a load increase using the SETTER/REFERENCE controls, NOT to exceed 3455.00 MWT.

SQN Unit 1 & 2				0-GO-5 Rev. 0065 Page 52 of 100	
	STARTU	^D No	Unit	Date	
5.1	Power As)			
			NOTES		
1)	Full power operation is defined as 100% power operation at approximately 3455 MW _T instantaneous value, U2118 not to exceed 3455.00 MW _T average thermal power in an 8-hour period. [c.1]				
2)	Do not intentionally operate the reactor at greater than 100% power (e.g., if reactor power is less than 100% for any time period then operation at slightly greater than 100% to "make up" for "lost" power is not permissible). [c.1]				
3)	Computer point U2118 should be trended on a trend recorder in the unit horseshoe and monitored for increasing reactor power trends above 3455 MW _T . Prompt action shall be taken to decrease reactor power whenever an increasing power trend is observed. [C.1]				
4)	Do not exceed an 8-hour average value (U2126) of 3455.00 MW _T . Do not allow U2125 (one hour avg) to exceed 3455.00 MW _T (100%) for more than one hour. [C.1]				
	Dortiona of a			vith step5.1[72] if required.	

[72] WHEN the unit stabilizes at 100% reactor power, THEN

PERFORM the following: (may be performed in any order)

[72.1]	ADJUST Governor Valve position, rod height, and/or RCS boron concentration as necessary to establish core thermal power at desired value and Auctioneered Hi T-avg approximately equal to T-ref.			
[72.2]	NOTIFY load coordinator that the power increase is complete.			
[72.3]	2.3] NOTIFY Radiation Protection that power has stabilized at 100%.			
	(step continued on next page)			

U	SQN NORMAL Unit 1 & 2		OPERATION	0-GO-5 Rev. 0065 Page 53 of 100	
	ate				
5.1	Power Asc	cension From 30% to 1	100% (continued)	
			NOTE		
		spillover bypass FCV-4	7-191 should be r	minimized to reduce	the effect of
unit t	rip on seal ste	am pressure.			
	[72.4]	IF Seal Steam spillov SERVICE, THEN	er bypass [FCV-4	[7-191] is IN	
		THROTTLE Seal Ste [FCV-47-191] as requ pressure.			
	[72.5]	IF river temperature i	s less than 45°F,	THEN	
	[72.5]	IF river temperature is CONSULT Engineeri should be removed fr	ing to determine if		

CAUTION

A bias adjustment in the upward direction (> 50%, Unit 1)(> +0, Unit 2) should NOT be used unless evaluated by Systems Engineering since this could impact a MFPT's maximum speed and the ability to fully load in the event the other MFPT trips.

[72.7]	IF feed pump vibration is above desired levels, THEN CONSULT with vibration engineer and system engineer to determine which feed pump to bias to reduce vibration.	
[72.8]	IF MFPT master controller output is NOT indicating 45% to 55% THEN CONSULT with MFPT controls system engineer to evaluate if adjustment is required per 1,2-SO-2/3-1.	

SQN NORMA Unit 1 & 2		NORMAL	POWER OPERATION	0-GO-5 Rev. 0065 Page 54 of 100	
	STARTUP	No	Unit	Date _	
5.1	Power Asc	ension From	30% to 100% (continued)		
	. [72.9	adjustment:	E if CBP seal backpressure Y Systems Engineering (BO		
	[,	if adjust	tments are required on back -VLV-54-689.	•	
	[72.9	of 2-VL THEN ADJUS	em Engineer determines ad .V-54-689 is needed, ST [<u>2-VLV-54-689]</u> as requir I backpressure.	-	

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U	SQN nit 1 & 2	NORMAL PO	WER OPERATION	0-GO-5 Rev. 0065 Page 55 of 100	
	STARTUP	No	Unit	_ [Date
5.1	Power As	cension From 309	% to 100% (continued	d)	
	[73] IF s	tartup is following	refueling activities, TH	EN	
			are performed at app : (may be performed ir	-	
	[73.1]	0-PI-SXX-000-0	22.2, Calorimetric Cal	culation.	Systems Eng
	[73.2]	0-PI-SXX-000-0	22.1, Delta T and Tav	g Update. [C.7]	Systems Eng
	[73.3]	0-SI-NUC-000-1	26.0, Hot Channel Fa	ctor Determination.	
				Rx Eng	Date
	[73.4]	0-SI-NUC-000-1	20.0, Reactivity Balar	nce.	
				Rx Eng	Date
	[73.5]	0-SI-NUC-092-0 Comparison.)79.0, Incore-Excore A	Axial Imbalance	
				Rx Eng	Date
	[73.6]	0-Pl-NUC-092-0 Calibration.)36.0, Incore-Excore D	Detector	
				Rx Eng	Date
	[73.7]	(May be N/A'd i	45.0, PR NIS Calibrati f Engineering determir 75% RTP is adequate	nes calibration	
		periorition at v		•7	Inst Maint
	[73.8]		ons of 0-RT-NUC-000 I power operations.	-001.0 are	
		,			Rx Engr

SQN NORMAL F Unit 1 & 2		NORMAL POV	WER OPERATION	0-GO-5 Rev. 0065 Page 56 of 100
ST	ARTUP	No	Unit	Date
1 Po	wer Asc	ension From 30%	to 100% (continue	ed)
			NOTE	
his step r	may be p	performed out of sec	quence if required.	
[74				
-	reco NO	rders were re-scale	and Steam Generate ed to 80% - 90% in (le LR-3-43A and LR e Level Recorders, to)-GO-2, THEN -3-98A, Steam
[7:	recc NO Gen	rders were re-scale	ed to 80% - 90% in (le LR-3-43A and LR e Level Recorders, to)-GO-2, THEN -3-98A, Steam
[7	recc NO Gen 5] IF u	rders were re-scale FIFY MIG to re-scale erator Wide Range	ed to 80% - 90% in (le LR-3-43A and LR e Level Recorders, to)-GO-2, THEN -3-98A, Steam
[74 [74]	recc NO Gen 5] IF u GO	FIFY MIG to re-scale rIFY MIG to re-scale erator Wide Range nit shutdown to mir TO Section 5.3.	ed to 80% - 90% in (le LR-3-43A and LR e Level Recorders, to	D-GO-2, THEN -3-98A, Steam 5 0% - 100%.

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END OF TEXT

Appendix	D		Scenario Outline			Form ES-D-1	
Facility: Examiners	Sequoyah s:		Scenario No.: 7 Op Test No.: Operators:		Op Test No.:	2010302	
Initial Cond			Start 2 nd Main Feedwater Pu Ixiliary Feedwater Pump OOS			lation	
Turnover:	Continue	e plant startup. Cu	urrently at 0-GO-5 Section 5.	1, Step	23		
Target CTs		FW flow to the Fa	using control rods or boration oulted SG (#3 SG) by stopping				
Event No.	Malf. No.	Event Type*		Event	t Description		
1. T+0	N/A	R – RO N – SRO/BOP	~42% Start 2 nd MFP, Continue Power Escalation				
2 . T+20	CN02B	C – BOP	1B Condensate Booster Pump trip				
3. T+30	RX06A	I – RO TS – SRO	Pzr Level Controlling Chan	nel LT	68-339 fails low		
3.a T+30	N/A	N – BOP	Restore Letdown following	Pzr Le	vel Ch failure.		
4. T+40	RX15D	TS – SRO	#4 SG Narrow Range Leve	l Trans	mitter LT 3-106 fails	s low.	
5. T+45	RX24	I – BOP	Feedwater Header PT-3-1 I	Fails Lo	W		
6. T+55	MS06C	C – RO N – Crew	Small Steam Leak Outside	Contai	nment Upstream O	f Loop #3 MSIV	
7. T+65	RP01C [pre-insert]	C – RO	ATWS- Both RTBs fail to au	utomati	cally or manually of	pen from MCR	
8. T+65	RD09	C – RO	Control Rods fail to move in	Auton	natic- delayed		
9. T+65	MS06C	M – All	Steam Leak increases to M	SLB re	quiring Reactor Trip	o/Safety Injection	
10. T+65	FW04C	C – BOP	Loop #3 MDAFW LCV Fails	Full O	pen		
* (N)	ormal, (R)ea	activity, (I)nstrum	ient, (C)omponent, (M)ajo	or			

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Scenario 7 Summary

The crew will assume the shift with the unit in MODE 1, ~42% RTP with direction to continue plant startup from 0-GO-5 Section 5.1 Step 23 and place the 2nd Main Feedwater Pump in service according to 1-SO-2/3-1 Section 5.16.4 Step 8; then continue plant startup.

When the 2nd Main Feedwater Pump is in service and after the RO raises power, at Lead Examiner direction, 1B Condensate Booster Pump trip will occur. The crew will respond using alarm response procedures, (ARPs) 1-AR-M1-B E-3 and enter AOP-S.04, Condensate or Heater Drains Malfunction Section 2.5. The SRO should direct the application of 0-GO-5, Normal Power Operations Section 5.1 Step 17 to start the available CBP, assuring secondary condensate flow/MFP suction pressure adequacy.

At Lead Examiner direction, the controlling pressurizer level channel LT 68-339 will fail low resulting in letdown isolation and Pzr heaters de-energized. The crew will respond using ARPs 1-AR-M5-A C-3, E-3 and AOP-I.04, Pressurizer Instrument and Control Malfunctions Section 2.4. SRO will refer to Technical Specifications 3.3.1.1 Table 3.3-1 functional unit 11 Action 6; TS 3.3.3.7 Table 3.3-10 Functional Units 7 Action 2.

Following restoration of letdown, at Lead Examiner direction, a Steam Generator #4 narrow range level transmitter LT-3-106 will fail low. No plant transient will result due to the median selector circuit. The crew will respond using ARPs 1-AR-M3-C D-2 and 1-AR-M5-A B-7 and AOP-I.06 Section 2.2. SRO will refer to Technical Specifications 3.3.1.1 Table 3.3-1 Functional Unit 14.A & B, Action 9; 3.3.2.1 Table 3.3-3 Functional Unit(s) 5a- Action 17; 6.c.i.a & 6.c.ii.a & b- Action 36, 8.c- Action 22c.

At Lead Examiner direction, Feedwater header pressure transmitter PT-3-1 will fail low resulting in MFP speed increase to attempt to restore steam header to feedwater differential pressure to program. The crew will respond using ARPs 1-AR-M3-C C-1 and 1-AR-M5-A B-7, AOP-S.01 Section 2.3 is implemented, which directs manual MFP speed control. MFP speed control will remain in manual for the remainder of the scenario.

When plant is stable, at Lead Examiner direction, a small unisolable steam leak will occur on Steam Generator Loop 3 outside containment upstream of the Main Steam Isolation Valve. After identifying increasing reactor power with decreasing main generator megawatts, the crew will enter AOP-S.05, Steam or Feedwater Leak to stabilize the plant and monitor key parameters for Reactor Trip. The crew may attempt to manually trip the reactor based on Reactor/ Turbine power mismatch; if so, initiate the Main Steam Line Break (MSLB) once the reactor trip breakers are open.

When the small steam leak has been addressed, at Lead Examiner direction, the steam leak will be increased to a significant MSLB requiring Reactor Trip and Safety injection. When manual reactor trip is actuated, both reactor trip breakers will fail to open automatically and manually from the MCR resulting in an ATWS and entry into contingency procedure FR-S.1.

During response to the ATWS, control rods will initially insert in automatic but stop after ~10 seconds requiring manual rod insertion. When the Reactor is shutdown and Safety Injection occurred if required, the auxiliary feedwater supply valve to the faulted S/G will fail full open requiring that the associated AFW pump be stopped to stop feed flow to the faulted S/G. Local isolation of the failed AFW valve may also initiated.

E- Procedure Path: E-0 – FR-S.1 – E-0 – E-2

The scenario may be terminated when crew meets transition criteria to E-2.

NRC 1009 ESG-7 Booth Instruction File

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8/16/2010

EVENT		
	IC/MF/RF/OR #	DESCRIPTION/EXPECTED ACTIONS/BOOTH FEEDBACK
Simulator IC	IC-118 Perform switch check. Allow the simulator to run for at least 3 minutes before loading SCEN file or starting the exercise. This will initialize ICS.	 42%, BOL ~150 MWD/MTU CB 'D' Rods @ 180 steps, all others @ 228 steps; [B] = 1350 ppm; Ba Blender setting: 28% Xe/Sm @ equilibrium <u>Console Operator actions: Place simulator in run and perform the following:</u> Set Ranges on Tave/Tref Recorder on 1-M-6 to ± 3 degrees
	Load SCENS: <u>1009 NRC ESG-7</u> Place simulator in RUN. Place OOS equipment in required position with tags. Clear alarms	 For current conditions (System Menu/Strip Chart Assign Tab through to fix) Place the MODE 1 sign on 1-M-4 Place Train Week A sign Place 1C Pzr Htrs I/S
MFs, RFs,	IMF FW07C f:1	TDAFW Pump Is Inoperable.
ORs are active when the SCN file is loaded.	IOR ZLOHS151A_GREEN f:0 IOR ZLOHS117A_GREEN f:0 IOR ZLOHS118A_GREEN f:0	<u>Close</u> FCV-1-17 & 18 & <u>place Hold Notice</u> on HS-1-17&18 and FCV-1-51.
	IOR ZLOHS3136AA_GREEN1 f:0 IOR ZLOHS3136AA_GREEN2 f:0	Also <u>place Hold order</u> on TDAFW Pump ERCW supply valves. Place Protected Equipment Tags on 1-M-4, MD AFW Pumps
	IOR ZLOHS3136AA_RED1 f:0 IOR ZLOHS3136AA_RED2 f:0 IOR ZLOHS3136AA_RED2 f:0 IOR ZLOHS3179AA_GREEN1 f:0 IOR ZLOHS3179AA_GREEN2 f:0 IOR ZLOHS3179AA_RED1 f:0 IOR ZLOHS3179AA_RED2 f:0 IOR ZDIHS3179AA_f:0	and 0-M-26, both EDGs
1.	- none -	~42% Power, Start 2 nd Main Feedwater Pump, Continue Plant Startup.
	IRF FWR10A f:3360 r:30 k:1 IRF FWR10B f:3700 r:30 k:11	<u>Support staff report:</u> Simulates I&C local speed changer adjustments as requested by MCR crew (vary 'f' value to obtain requested rpm on 1-M-3).
2.	IMF CN02B f:1 k:2	1B Condensate Booster Pump trip
		<u>Support staff report:</u> When AUO dispatched, wait ~3 minutes and report timed overcurrent relay target is actuated.
3.	IMF RX06A f:1 k:3	Controlling Pzr LvI Transmitter fails Io (LT 68-339)
		<u>Support staff report:</u> When MSS contacted, report that I&C will report to the MCR in ~ 25 minutes.

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EVENT	IC/MF/RF/OR #	DESCRIPTION/EXPECTED ACTIONS/BOOTH FEEDBACK
4.	IMF RX15D f:0 k:4	#4 SG LvI Transmitter fails Lo (LT 3-106)
		<u>Support staff report:</u> When MSS contacted, report that I&C will report to the MCR in ~ 45 minutes.
5.	IMF RX24 f:1 r:30 k:5	FW Header Pressure Transmitter fails Io (PT-3-1)
		Support staff report: When AUO dispatched, wait ~3 minutes an report no apparent local problems.
6.	IMF MS06C f:29 r:15 k:6	MS Leak Outside Containment - LP #3 upstream of MSIV
		<u>Support staff report:</u> When AUO dispatched, wait ~2 minutes, report steam coming from the East Valve Vault Room; No personnel safety issues observable.
structor Not	e: If Crew elects to manually trip are open.	for the small steam leak, MMF to the values below once the RTBs
7.	IMF RP01C f:1	ATWS- both Rx Trip Breakers Auto/Manual fail
	[Pre-insert]	Support staff report: below
8.	IMF RD09 f:1 d:10 e:7	Rods move in AUTO for 10 seconds following MT Manual Tr then Auto movement stops.
		Support staff report: none
	IRF RPR05A f:1 d:180 k:18	Opens Rx Trip Bkrs in sequence
	IRF RPR05B f:1 d:185 k:18	<u>Support staff report:</u> When AUO dispatched, wait 3 min 5 sec, report both Rx Trip Bkrs opened locally.
9.	MMF MS06C f:75 r:300	Increase MS Leak Outside Containment - LP #3 upstream of MSIV requiring Rx Trip & SI
		<u>Support staff report:</u> If previously dispatched, when contacted report leak much worse;
		If dispatched to look for steam/feedwater leaks, wait ~3 minutes, report steam coming from the East Valve Vault Room
10.	IMF FW04C f:1 e:1	#3 MDAFW Main LCV-3-148 fails open
		<u>Support staff report:</u> When AUO dispatched, wait ~3 minutes, report the valve is full open; no apparent cause.
	IRF FWR05 f:0 k:20	MDAFW #3 LCV Isolation Valve 1-VLV-3-826 (Isolates Main and Bypass valves)
		<u>Support staff report:</u> When AUO dispatched, wait ~ 5 minutes, report 3-826 is closed

Page 1

DELTA	REACTOR	POWER	ASSUMED	INSERTED	EXPECTED	DELTA RHC	BORON	DELTA		IIRECOMMEN	IODINE
TIME	POWER	DEFECT	ROD HT	WORTH	XENON	BORON	CONC	PPM	DILUTION	BORATION	CONC
(hrs)	(%)	(pcm)	(steps)	(pcm)	(pcm)	(pcm)	(ppm)	(ppm)	(gal)	(gal)	(% eq)
0	42.0	740.7	180.0	-315.7	-2020.0		1350.0				42.0
1	50.0	865.5	190.0	-230.5	-1995.3	14.9	1347.6	-2.4	113	0	42.4
2	54.5	934.4	193.0	-203.5	-1960.4	7.0	1346.5	-1.1	53	0	43.4
3	59.0	1003.6	196.0	-177.3	-1925.0	7.6	1345.3	-1.2	58	0	44.7
4	63.5	1072.5	199.0	-152.2	-1891.8	10.5	1343.6	-1.7	80	0	46.3
5	68.0	1141.8	202.0	-128.1	-1862.4	15.8	1341.1	-2.5	121	0	48.2
6	72.5	1211.5	205.0	-105.0	-1838.4	22.6	1337.5	-3.6	173	0	50.4
7	75.0	1251.0	208.0	-84.1	-1822.9	3.1	1337.0	-0.5	24	0	52.7
8	75.0	1251.1	211.0	-64.7	-1820.5	-21.7	1340.5	3.4	0	40	54.9
9	75.0	1250.0	214.0	-47.2	-1830.6	-8.5	1341.8	1.4	0	16	56.9
10	75.0	1249.6	216.0	-36.1	-1849.8	7.6	1340.6	-1.2	58	0	58.7
11	75.0	1250.0	216.0	-36.0	-1875.1	25.7	1336.5	-4.1	197	0	60.3
12	75.0	1251.3	216.0	-36.0	-1904.5	30.7	1331.7	-4.9	236	0	61.7
13	75.0	1252.9	216.0	-36.0	-1936.3	33.3	1326.4	-5.3	257	0	63.0
14	75.0	1254.6	216.0	-35.9	-1969.2	34.6	1320.9	-5.5	268	0	64.2
15	75.0	1256.3	216.0	-35.9	-2002.3	34.8	1315.4	-5.5	271	0	65.3
16	75.0	1258.1	216.0	-35.8	-2035.0	34.4	1309.9	-5.5	268	0	66.2
17	75.0	1259.8	216.0	-35.8	-2066.7	33.4	1304.6	-5.3	262	0	67.1
18	75.0	1261.5	216.0	-35.8	-2097.1	32.1	1299.5	-5.1	252	0	67.9
19	75.0	1263.2	216.0	-35.7	-2126.0	30.5	1294.7	-4.8	241	0	68.6
20	75.0	1264.8	216.0	-35.7	-2153.2	28.8	1290.1	-4.6	228	0	69.2
150		J	Hold Tavg	= Tref +/- 1	.5F			Total	3160	56	
6820	BAT ppm		5							v boration/dilution	
	1								-	y be accumulate	
										gle additions	
	for Maneu	ver		ant restart fo	bilowing for	ced outage-	50% hold	15% hold	I		
Date	Nome		Today							· · · · · · · · · · · · · · · · · · ·	
RxEng			J. Sidekick								
Comme	ents		none								

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Unit 1 MCR CHECKLIST Page 1. c		Today		
Part 1 - Completed by Off-going Shift / Reviewed by	/ On-coming Shift			
Mode 1, 42% Power PSA Risk: YELLOW	NRC phone Authentication Cod	le		
Grid Risk: Green				
RCS Leakage ID .02 gpm, UNID .02 gpm	Until 0800 XXXX After 0800 YYYY			
	Spec Actions			
None				
	Dec Actions			
LCO/TRM Equipment INOP TS LCO 3.7.1.2.a TDAFW T&T valve repair	Time INOP Own			
TS LCO 3.7.1.2.a TDAFW T&T valve repair TS 3.3.3.7.18b action 1 TDAFWP ERCW - AFW	2 hours ago MM /alve Position 2 hours ago MM			
	/alve Position 2 hours ago MM	G		
	Equipment			
 Equipment/spaces for TDAFW Pump per 0-GO-16 / 	Appx J			
Shift P	iorities			
Place the 2nd Main Feedwater Pump in service accordin	g to 1-SO-2/3-1 Section 5.16.4, Startup of Second	d MFPT.		
Section 5.16.4 is in progress and complete through step	7. AUO, MIG, and PDM, support are present at t	he 1-B		
 MFPT as needed. Plant Startup held at ~42% awaiting availability of MFP B 	for post 72 bro. Currently in 0 CO 5 Section 5.4	01		
Continue plant startup per Rx Engineering Spreadsheet.	Spreadsheet has been verified by the SRO/STA	, Step 23.		
Appendix D and E have been completed. Pre-conditione	d Power level is 100%.	1-00-02-7		
Part 2 – Performed by on-coming shift				
Verify your current qualifications	Review Operating Log since last held sl	nift or 3		
	days, whichever is less			
Standing Orders / Shift Orders X TACF	Immediate required r	reading		
LCO Actions				
Part 3 – Performed by both off-going and on-coming) shift			
Walk down of MCR Control Boards				

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SHIFT TURNOVER CHECKLIST

Page 2. of 3

Today

MAIN CONTROL ROOM (7690)	
 Train <u>B</u> Week Protected Equipment: MDAFW Pump A 1-HS-3-118A MDAFW Pump B 1-HS-3-128A D/G 1A-A 1-HS-57-46A D/G 1B-B 1-HS-57-73A 	
OUTSIDE (7666) [593-5214]	
 All Equipment normal for current conditions Equipment/spaces for TDAFWP protected per 0-GO-16 Appx J 	
AUXILIARY BUILDING (7775)	
• IDAFW pump was tagged 2 hours ago for repair to the T&T valve. The packing was blowing excessively. Expected Return to service is 8 hours. (WO 10-080025-000)	
TURBINE BUILDING (7771) (593-8455)	
All Equipment normal for current conditions	

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SHIFT TURNOVER CHECKLIST

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Page 3. of 3

Today

	Disabled Annunciators						
PANEL	WINDOW ANNUNCIATOR	ANNUNCIATOR WO / PER				ANNUNCIATOR WO / PER Nu	WO / PER Number

Equipment Off-Normal (Pink Tags)

UNID And Noun Name	Panel	Problem Description	WO / PER Number

MCR WO LIST

ID And Noun Name	Panel	Problem Description	WO/PER Number

UNIT ONE REACTIVITY BRIEF Date: Today Time: Now

General Information

RCS Boron: 1350 ppm	Today	BA Cor	ntroller Setpoint: 28% *	RCS B-10 Depletion: 2 ppm
Operable BAT: A	BAT A Boron: 685	0 ppm	BAT C Boron: 6850ppm	• • •
Nominal	Gallons per rod ste	p from 18	9: 17 gallons of acid, 75	

* Verify boric acid flow controller is set at Adjusted BA Controller Setting iaw 0-SO-62-7 section 5.1

Estimated values for a 1° Change in Tave **

Gallons of acid: 22

Gallons of water: 94

Rod Steps: 1

Estimated rods/boron for emergency step power reduction ** (Assuming Xenon equilibrium and no reactivity effects due to Xenon. 2/3 total reactivity from rods, 1/3 from boron)

Power reduction amount	Estimated Final Rod Position	Estimated boron addition		
10%	181 Steps on bank D	93 gallons		
30%	161 Steps on bank D	291 gallons		
50%	n/a	n/a		

** These values are approximations and not intended nor expected to be exact. The values may be superseded by Rx Engineering or SO-62-7 calculated values. These values are calculated assuming 100% steady state power operation only. Engineering data last updated <u>TODAY</u>. Data Valid through three weeks from now.

Previous Shift Reactivity Manipulations

Number of dilutions: 1	Number of borations:	Rod steps in:
Gallons per dilution: 12	Gallons per boration:	Rod steps out:
Total amount diluted: 12	Total amount borated:	Net change: IN/Out

Current Shift Estimated Reactivity Manipulations

Remarks: Rx Power – 42% MWD/MTU – 150 Xenon & Samarium at Equilibrium *** **As Required by Reactor Engineering startup spreadsheet.** ***The boron letdown curve is flat for the next 25 EFPD.

Last Dilution Complete ~1 hour ago.

Next Unit 1 Flux Map is scheduled: N/A

Unit Supervisor:

Name/Date

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Operations Chemistry Information								
	Boron Results							
Sample Point	Units	Boron	Date / Time	Goal	Limit			
U1 RCS	ppm	1350	Today / Now	Variable	Variable			
U2 RCS	ppm	816	Today / Now	Variable	Variable			
U1 RWST	ppm	2601	Today / Now	2550 - 2650	2500 - 2700			
U2 RWST	ppm	2569	Today / Now	2550 - 2650	2500 - 2700			
BAT A	ppm	6850	Today / Now	Variable	Variable			
BAT B	ppm	6850	Today / Now	Variable	Variable			
BAT C	ppm	6850	Today / Now	Variable	Variable			
U1 CLA #1	ppm	2556	Today / Now	2470-2630	2400-2700			
U1 CLA #2	ppm	2575	Today / Now	2470-2630	2400-2700			
U1 CLA #3	ppm	2591	Today / Now	2470-2630	2400-2700			
U1 CLA #4	ppm	2589	Today / Now	2470-2630	2400-2700			
U2 CLA #1	ppm	2531	Today / Now	2470-2630	2400-2700			
U2 CLA #2	ppm	2650	Today / Now	2470-2630	2400-2700			
U2 CLA #3	ppm	2522	Today / Now	2470-2630	2400-2700			
U2 CLA #4	ppm	2526	Today / Now	2470-2630	2400-2700			
Spent Fuel Pool	ppm	2547	Today / Now	<u>></u> 2050	<u>></u> 2000			
	ithium Res	ults	Transfer hear	Goal	Midpoint			
U1 RCS	ppm	1.1	Today / Now	>1	>1			
U2 RCS	ppm	2.43	Today / Now	2.18-2.48	2.33			

Primary to Secondary Leakrate Information (Total CPM RM-90-99/119)							
Indicator	Units	U1	Date / Time	U2	Date/Time		
SI 50 S/G Leakage?	Yes/No	No	Today / Now	No	Today / Now		
SI 137.5 CVE Leakrate	gpd	< 0.1	Today / Now	< 0.1	Today / Now		
5 gpd leak equivalent	cpm	115	Today / Now	68	Today / Now		
15 gpd (30 min increase)	cpm	265	Today / Now	83	Today / Now		
30 gpd leak equivalent	cpm	490	Today / Now	206	Today / Now		
75 gpd leak equivalent	cpm	1165	Today / Now	455	Today / Now		
150 gpd leak equivalent	cpm	2290	Today / Now	870	Today / Now		
CVE Air Inleakage	cfm	10	Today / Now	12.5	Today / Now		
Bkgd on 99/119	cfm	40	Today / Now	40	Today / Now		
Steady state conditions	s are necessary	for an accurat	e determination of leak r	ate using the CVE	Rad Monitor		

Operations Chemistry Information

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Appendix D		Ş	Scenario	Outline		Attachment 1
Op Test No.:	NRC 2010302	Scenario #		Event #1	Page	1of44
Event Descriptio	n: ~42	2% Start 2 nd MFP, (Continue Po	ower Escalation		
Time	Position			Applicant's Actions	or behavior	
	perator: No ac					
Indications a	vailable: None	e, Crew will pe	rform sta	rtup IAW 0-GO-5 Se	ection 5.1, Step	23.
T = 0	Following completion of crew turnover, at the SRO's direction, the BOP will place the 1B MFP in service Section 5.1 Power Ascension From 30% to 100% Step 23 in preparation for continuing plant power escalation.					
	SRO	Direct load in Power Opera	crease fro <i>tion</i> , begi	om ~42% power in ac inning in Section 5.1,	cordance with (at Step 23.	0-GO-5, Normal
	 NOTE: 1) With verbal approval from the Operations Superintendent, placing the second main feed pump in service may be deferred until power is approximately 55% (Unit 1) or 65% (Unit 2). Logic prevents opening the standby MFPT condense isolation values if the pump is NOT reset prior to exceeding 9 million lbs/hr floon the running pump. 2) LCO 3.3.2.1 (3.3.2) functional unit 6.f (AFW start function for the trip of bot MFPT) allows one channel to be inoperable in Mode 1 for up to 4 hours when the trip of t					
		tarting up or shutting down the second MFPT.				
	SRO	[23] WHEN approximately 40% turbine load:				
	BOP/ SRO	[23.1] VERIFY annunciator XA-55-4A, window E-7 is LIT: C-20 AMSAC ARMED				
	BOP		3.2] CLOSE the drains on the operating main feedwater p (N/A other pump).			oump turbine
			MFPT	DESCRIPTION	HANDSWIT	CH
			A	DRAIN VALVES	HS-46-14	
			В	DRAIN VALVES	HS-46-41	
	SRO	[24] WHEN MFPT i	PLACE second			
	SRO	[24.1] IF the Operations Superintendent has approved N/A				
	SRO/ BOP	[24.2] WHEN second MFPT is to be placed in service, THEN PLACE second MFPT in service in accordance with 1,2-SO-2/3-1.				

Appendix D		·		Scei	nario Outlin	9			At	tachme	nt 1
Op Test No.:	NRC 2010	302	Scenario)# _7	Event #		1	Pag	e _2	of	44
Event Descriptio	n:	~42	% Start 2 nd M	MFP, Cont	inue Power Esc	alation					
Time	Posit	ion			Applica	nt's Act	ions o	r behavior		······································	······································
Valuator No	ote: The fo		ng steps a	re from	1-SO-2/3-1 S	ection 5	.16.4 b	eginning at	step 8	. The	
recearing sie		SO WE			ormed and si the following:	napped i	nto the	Scenario Ir	nitial Co	ondition	s
					1-HCV-3-70]		W Pun	no 1A Bypas	s N	/Α	
			[b] EN	NUSRE [_OSED.	1-HCV-3-84], Main	FW Pu	imp 1B Bypa	ass Wa	arm-up \	Valv
				[c] IF starting 1A MFP N/A							
			[d] IF	[d] IF starting 1B MFP, THEN THROTTLE [1-FCV-3-84] MFP Recirc valve between 30%-50% OPEN USING [1-FIC-3-84].							С
			Va	ive betw	een 30%-50	% OPEN	USIN	G [1-FIC-3-	84].		
	NOTE:	pum	p is RESE	T but N	on loss of b DT pumping 4 hours whe	forward.	LCO 3	.3.2.1 allow	s the A	FW sta	=W rt to
			operable for up to 4 hours when starting up the second MFW pump. [9] RESET the Standby MFPT.								
			[10] ENS	SURE the	e following:						
			MFPT DESCRIPTION VALVE				POSIT	101			
			1A	Condenser Inlet Isol valve 1-FCV		1-FCV-2-	205A	OPE	EN		
				Co	ndenser Out	let Isol v	/alve	1-FCV-2-2	21 0 A	OPE	ĪN
			1B	Co	ondenser Inl	et Isol va	alve	1-FCV-2-3	211A	OPE	IN
				Co	ndenser Out	let Isol v	valve	1-FCV-2-	216A	OPE	N
	NOTE:	Eithe	er stop values for the a	ve hands	witch will op	en both	high pr	essure and	low pr	essure s	stop
		Varve	[11] OPE	N the St	op Valves fo andswitch to	r the MF	PT to t	e started by	y placii	ng eithe	r the
				MFPT	DESCRIP		T	DSWITCH		LVE TION	
				1A	H/P Stop	Valve	1-H	S-46-15A	OF	'EN	
					L/P Stop	Valve	1-H	5-46-16A	OF	EN	
				1B	H/P Stop		1-H	S-46-43A		'EN	
					L/P Stop	Valve	1-H	5-46-44A	OP	'EN	
			i		<u>+</u>		4				
	BOP				MFP turning	•					
			(as indic	ated on	1-M-3, Turn	ing Gea	r MFP1	۲ B handsw	/itch.1	-HS-46-	38A

App	end	ix	D
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Scenario Outline

____1

Attachment 1

Page <u>3</u> of <u>44</u>

Op Test No.: NRC 2010302

Scenario # 7 Event #

Event Description:

~42% Start 2nd MFP, Continue Power Escalation

Time	Position	Applicant's Actions or behavior					
	CAUTION:	Observe MFP speed, flow, discharge pressure during the MPFT startup to prevent an inadvertent FW swing if the MFPT minimum speed setpoint is excessively high.					
	setti on h pres	feedwater pump speed controller will take control at the minimum speed ng and run the governor valve positioner out to its upper limit. Minimum speed igh pressure steam is 3100 to 3,300 rp m and 3650 to 3850 rp m on low sure steam. This value may vary based on previous hand speed changer stment.					
	CREW	[13] NOTIFY I&C to adjust the MFPT hand changer for the proper rpm as the second MFPT is accelerated.					
	pane (dan bear NOTE 2:1A M ICS o point 331E temp 20" H	ation and thrust bearing wear should be monitored on local Bently Nevada el and ICS (Secondary Mimics, MFP Bearing Data). Max allowable vibration ger limit) is 5 mils above baseline; alert value is 3 mils above baseline. Thrust ing wear trip setpoint is 10 mils above baseline (7 mils alert above baseline). IFWP condenser vacuum may be monitored using 1-PI-2-331A (TB el. 685), computer point 1U2082, or by monitoring condenser drain temperature (ICS 1T2360A). 1B MFWP condenser vacuum may be monitored using, 1-PI-2- 8 (TB el. 685), ICS computer point 1U2084, or by monitoring condenser drain berature (ICS point 1T2361A). Drain temp ≤160°F indicates vacuum of at least lg. MFWP trip setpoint of 12.2 psia corresponds to ~5 "Hg vacuum or drain of ~200°F.					
	NOTE 3:Max	allowable bearing temperature is 225°F.					
	BOP	[14] MONITOR the following parameters during MFWP startup:					
		 Vibration and thrust bearing wear (at local panel). MFWP Condenser vacuum/drain temperature. Oil system and bearing temperatures. 					
	BOP	 [15] OPEN Governor Valve by PERFORMING one of the following: [a] IF MCR operation of Governor Valve Positioner is available, THEN PLACE the applicable Governor Valve Positioner to the RAISE position to open the steam chest valves and accelerate the MFPT: 1B GV Positioner→1-HS-46-40A →OPEN 					
	вор	[b] IF MCR operation of Governor Valve Positioner is unavailable, THEN:					

Appendix D	Appendix D Scenario Outline							Attachment 1				
Op Test No.:	NRC 2010302	Scenario #	7 Event #	1	Page	4	of	44				
Event Descriptior	ר: ~42	% Start 2 nd MFP, Conf	tinue Power Escalati	ion								
Time	Position		Applicant's	s Actions or be	ehavior							
		 ESTABLISH direct communications between the personnel operating the U1 MFP speed control locally and the U1 Main Control Room. 										
		 DIRECT I&C to slowly adjust U1 MFP Speed Control using loc manual control of the MFP Governor Valve Positioner to thrott steam chest valves and control MFPT speed. 						local rottle				
	CAUTION:	DO NOT increas	DO NOT increase second MFPT speed faster than the master speed control can maintain program d/p.									
	NOTE: As t	e second MEPT i	s loaded the fire	t MEDT should	back down		. d					

		<u> </u>
NOTE:	As th	e second MFPT is loaded, the first MFPT should back down in load.
		[16] SLOWLY LOAD the second MFPT to raise MFPT speed until demand on MFPT speed controller matches the demand output of the first MFPT.
		[17] ENSURE MFP Injection Water Intermediate Leakoff Pressure for BOTH MFPs is approximately 200-250 psig.
		[a] [1-PI-54-2], 1A MFP
		AND
		[b] [1-PI-54-6], 1B MFP
		[18] ENSURE MFP Injection Water Differential Pressure for pump started is equal to or greater than 25 psid.
		[a] [1-PDI-54-1], 1A MFP
		OR
		[b] [1-PDI-54-5], 1B MFP
		[19] WHEN the output meter for the SIC for the second MFPT matches the output meter on the Master Controller, THEN PLACE the second MFPT SIC in AUTO.
	NOTE:	NOTE: As the

Appendix D			Scena	ario Outline		Attachmen	t 1
Op Test No.:	NRC 2010302	Scenario #	7	Event #	1 Pa	ge <u>5</u> of	44
Event Descriptio	n: ~42º	% Start 2 nd MF	P, Contin	ue Power Escalation			
Time	Position			Applicant's Act	ions or behavior		
		[20] CLOS	SE the se	econd MFPT drain v	alves (N/A valves	not closed):	
			MFPT	DESCRIPTION	HANDSWITCH	POSITION	
			1A	Drain Valves	1-HS-46-14	CLOSED	
			1B	Drain Valves	1-HS-46-41	CLOSED	
		to the pote MFP dama	ntial for age.	controllers should isolating all three in	termediate heater	strings and resu	ulting
	CAUTION 2:	Operation on MFP DI	lowly due to affe	∍ct			
	BOP	[21] ENSU and in	RE [1-F MANU/	CV-3-70] or [1-FCV AL.	/-3-84] MFP Recir	c valve is CLOS	ED
	CAUTION:	Failure to r the second the first MF	I MFWP	the minimum speed being unable to sup s.	l on the second M oply adequate fee	FWP could resul d flow in the eve	lt in nt
	NOTE: The comp	following ste pleted prior	ep may l to excee	be performed in para eding 55% power.	allel with power in	crease but shoul	d be
		are in	AUTO, '	P speed controllers [THEN PERFORM the second MFWP:			
		[a] VE	RIFY bo	oth MFWP speed co	ontroller bias settir	ngs at 50%.	
				C to slowly adjust t WP so that the MF			
	CAUTION 1:	unless eval	luated b	in the upward direct y Systems Enginee nd the ability to fully	ring since this cou	ld impact a MFP	'T's
	CAUTION 2	50% will reacted the Master	sult in a MFPT (PT Controller from M n instantaneous spe Controller from Manu antaneous speed cl	eed change of the ual to Auto with bi	MFPT. Transfer as not set to 50%	ring
			step may	/ be performed at ar			

Op Test No.: NRC 2010302 Scenario # 7 Event #				
	1 Page	6	of	44
Event Description: ~42% Start 2 nd MFP, Continue Power Escalation				

Time	Position	Position Applicant's Actions or behavior					
	CO	ith both MFPTs in AUTO it may become necessary to adjust the MFPT speed ntrol bias on one of the operating MFPTs to prevent MFPTs from fighting ch other (oscillating).					
		[23] IF an adjustment of the flow balance between the MFPTs is desired, THEN					
		SLOWLY ADJUST one MFPT speed control bias in downward direction (0% to 50%) until desired flow balance is achieved.					
		End of Section 5.16.4					

Appendix D			Scenario	Outline			Atta	chme	nt 1
Op Test No.:	NRC 2010302	Scenario #	7	Event #	1	Page	7	of	44
Event Descriptio	n: ~42%	% Start 2 nd MFP,	Continue F	Power Escalati	on				

Position	Applicant's Actions or behavior								
	0-SO-62-7 Boron Concentration Control, Section 6.2 Dilute								
subsequer	nt power e	scalation, large	n the RE-provided Rea volume dilutions will b	ctivity Spreads be divided even	heet; during ly over each				
An extra ba pressurize	ank of pres r spray op	ssurizer heater eration for equa	s (Back-up Group 1C) alizing boron concentra	will be energize ation in RCS ar	ed to cause id pressurizer.				
RO	[1] ENS posit	URE unit is <u>NC</u> ive reactivity ac	<u>)T</u> in a Tech Spec or T dditions. [C.1]	RM action that	prohibits				
NOTE	17 1	<u> </u>							
RU	[2] ENS expe	cted amounts of	capacity available in the of CVCS letdown: (N/A	ne HUT selecte (if <u>not</u> used)	d to receive				
		HUT	LEVEL	INITIALS					
		А	%						
		В	%						
RO	[3] ENS with	URE makeup s Section 5.1.	ystem is aligned for A	UTO operation	in accordance				
RO									
ini	tial calcula	tion. The follow	ving signoff indicates t	hat any differer	ices in the two				
RO	- Amoi	unt of Boric Aci	d or Primary Water. (N						
RO				to Blender Flov	V Control Switch				
	0-SO-6 te: Dilutions w subsequer hour as de An extra ba pressurize RO NOTE HI RO RO RO	0-SO-62-7 Borom te: Dilutions will be performant of pressure of the subsequent power each our as determined to subsequent power each out as determined	0-SO-62-7 Boron Concentration te: Dilutions will be performed based or subsequent power escalation, large hour as determined by the crew. An extra bank of pressurizer heater pressurizer spray operation for equal RO [1] ENSURE unit is NC positive reactivity ad positive reactive positive reactive positive reactive positive reactive positive reactive positive reactive	0-SO-62-7 Boron Concentration Control, Section 6 te: Dilutions will be performed based on the RE-provided Real subsequent power escalation, large volume dilutions will be hour as determined by the crew. An extra bank of pressurizer heaters (Back-up Group 1C) pressurizer spray operation for equalizing boron concentration Concentration Structure spray operation for equalizing boron concentration (I) ENSURE unit is NOT in a Tech Spec or T positive reactivity additions. [C.1] NOTE HUT level increase of 1% is equal to 1380 gallon: (I) expected amounts of CVCS letdown: (N/A RO [2] ENSURE sufficient capacity available in the expected amounts of CVCS letdown: (N/A B % RO [3] ENSURE makeup system is aligned for A with Section 5.1. RO [4] RECORD the quantity of dilution water record boron concentration using Appendix D. (Ngals) NOTE Due to eyeball interpolation the verified calculation initial calculation. The following signoff indicates to results have been discussed and are close enoug RO [5] PERFORM Appendix I Independent Verifin Amount of Boric Acid or Primary Water. (N_SRO to verify data from Rx Engineering)	O-SO-62-7 Boron Concentration Control, Section 6.2 Dilute Interpretable of the provided Reactivity Spreads Subsequent power escalation, large volume dilutions will be divided even hour as determined by the crew. An extra bank of pressurizer heaters (Back-up Group 1C) will be energize pressurizer spray operation for equalizing boron concentration in RCS ar RO [1] ENSURE unit is NOT in a Tech Spec or TRM action that positive reactivity additions. [C.1] NOTE HUT level increase of 1% is equal to 1380 gallons (TI-28 fig. C.2 RO [2] ENSURE sufficient capacity available in the HUT selecte expected amounts of CVCS letdown: (N/A if not used) HUT LEVEL INITIALS A				

Appendix D			Scenari	o Outline			Atta	chme	ent 1
Op Test No.:	NRC 2010302	Scenario #	7	Event #	1	Page	8	of	44
Event Descriptio	ın: ~42'	% Start 2 nd MFP,	, Continue	Power Escala	ation			-	

Time	Position	Applicant's Actions or behavior
		Applicant's Actions or behavior
		-62-7 Boron Concentration Control, Section 6.2 Dilute
	RO	[7] PLACE [HS-62-140B], CVCS Makeup Selector Switch to the DILUTE position.
	RO	[8] ENSURE [<u>HS-62-140D</u>], Boric Acid Valve to the Blender is CLOSED (Green light is LIT).
	RO	[9] SET [FQ-62-142], Batch Integrator for the desired quantity
<u> </u>	NOTE F	Primary Water Flow Controller [FC-62-142] receives its reference signal (70
		appm) from setpoint potentiometer (dial indicator) located on panel M-6. A setpoint of 35% corresponds to a 70 gpm primary water flow rate
	RO	[10] ADJUST [FC-62-142], Primary Makeup Water Flow Controller for the desired flow rate
	RO	[11] PLACE [HS-62-140A], Boric Acid Supply to Blender Flow Control Switch to the START position.
	C	low oscillations and/or erratic controller response may require manual peration of Primary Water Flow Controller [FC-62-142] until stable conditions exist.
	RO	[12] VERIFY the following;
		[a] Inlet to top of VCT [FCV-62-128] is OPEN.
		[b] Primary Water flow by [FI-62-142A] OR [FQ-62-142].
	B n	Iternate dilution in small amounts is acceptable on a regular basis, provided no ignificant changes in seal water temperature or seal leakoff are indicated. atches of 5 to 10 gallons may be added through FCV-62-144 on a frequency ot to exceed once per 30 minutes. ICS points for No. 1 seal leakoffs and seal
	W	rater temperatures on the RCPs should be monitored during and after dilution.
	RO	[13] IF primary water addition to the bottom of the VCT [FCV-62-144] is desired, THEN
	RO	[a] CLOSE [FCV-62-128] with [HS-62-128].
	RO	[b] OPEN [FCV-62-144] with [HS-62-144].

Appendix D			Scena	rio Outline				Attac	hmen	it 1
Op Test No.:	NRC 20103	302 Scena	io # 7	Event #	1		Page	9	of	44
Event Description			MFP, Continu	-			l ugo	<u> </u>	<u> </u>	
Time	Positi	on		Applican	t's Actions	or beha	vior			
	0-	SO-62-7 Boi	on Concent	ration Cont	trol, Sectio	n 6.2 Dil	ute		<u> </u>	
	RO	[c]	VERIFY Prir	mary Water	flow by [FI-	<u>62-142A</u>]	OR [FO	Q-62-14	42].	
	NOTE	It may take indicated of	approximat n nuclear ins	ely 15 minu strumentatic	tes before a	any chanç emperatu	ges to re re indic	activity ation.	/ are	
		[14] to	MONITOR r ensure the pr	nuclear instr roper respor	rumentation	and read ution.	tor cool	ant ten	ıperat	ure
		[15]	IF [<u>LI-62-12</u>	91 . Volume	Control Tar	nk Level	increase	es to 63		
		TH	EN ENSURE ENS to diver	E [<u>LCV-62-1</u>	18], Volum	e Control	Tank D	ivert Va		<u> </u>
		[46]								
		[16] [a]	WHEN diluti PLACE [HS the STOP pe	6-62-140A],		o Blende	r Flow C	Control	Switcl	h to
		[b]	IF [FCV-62- 144] with [H	144] was pr	eviously Of	PENED, 1	THEN C	LOSE	[FCV-	<u>-62-</u>
		[c]	VERIFY no 142].	primary wat	er flow on e	either [FI-	62-142/] OR [FQ-62	2-
.ead Examin	er may dir	ect initiatior	of the next	event at hi	is discretio	n. Steps	on the	next t		ades
	are ass	ociated with dilutions ar	performanc	ce of repetit	tive dilutio	ns or ma	y not be	e perfo	rmed	. J
		[17] req paç	IF power inc uired, THEN e)							ext
		[19]	REALIGN th	ne blender c	ontrols for	AUTO ma	keup to	the C	/CS ir	 1
			ordance with	n Section 5.1	1.					
		[20]	ENSURE dil							
	NOTE		y be obtaine the unit resp) unit i	s at
		[21]	IF RCS boro ain RCS boro	on sample is	X				b to	
				En	d of Sectio	on 6.2				

Appendix D		Scenario Outline		Attachm	ient 1
Op Test No.:	NRC 2010302	Scenario # 7	Page	<u>10</u> of	44
Event Description	ר: ~42'	% Start 2 nd MFP, Continue Power Escalation			
Time	Position	Applicant's Actions or be	avior		
		2-7 Boron Concentration Control, Section 6.2 D			
		STEP		2 nd	3 rd
[4] RECORD th concentration	e quantity of dilu	tion water required to achieve desired boron x D.			
		Calculation for amount of BA or PW.	Quantity	Quantity	Quantity
[6] PLACE [HS STOP posit	<u>-62-140A]</u> , Boric ion.	Acid Supply to Blender Flow Control Switch to the		SRO	SRO
[7] PLACE [HS	-62-140B], CVCS	S Makeup Selector Switch to the DILUTE position.			
		c Acid Valve to Blender is CLOSED (Green light LIT).		<u> </u>	
		grator for the desired quantity.			
			1 st CV		$\frac{1}{1^{st}CV}$
[10] ADJUST [] rate.	//	/ 1 st CV	$\frac{1}{1^{st}CV}$		
[11] PLACE [H	[11] PLACE [HS-62-140A], BA Supply to Blender Flow Control Switch to START.				
					$\frac{1}{1^{st}CV}$
[12] VERIFY th					
[a] Inlet to	top of VCT [FCV	-62-128] is OPEN.			
		FI-62-142A] or [FQ-62-142].			
bottom of f	tion to top of VC he VCT IFCV-62	[FCV-62-128] is not warranted, but PW addition to the -144] is desired, THEN			
[a] CLOSE	[FCV-62-128] w	th [HS-62-128]			
[b] OPEN	[FCV-62-144] wit	h [<u>HS-62-144]</u> .			
[c] VERIF	/ Primary Water	flow by [FI-62-142A] or [FQ-62-142] .			
[14] MONITOR	nuclear instrume	ntation and reactor coolant temperature to ensure the			L
	oonse from dilutio				
		creases to 63 percent, THEN ENSURE /alve, OPENS to divert excess water to the HUTs.			
[16] WHEN dilu	tion is complete,	THEN			
		Boric Acid to Blender Flow Control Switch to STOP		1 st CV	
	V-62-144] was pr S-62-144] .	eviously OPENED, THEN CLOSE [FCV-62-144]			
		er flow on either [FI-62-142A] or [FQ-62-142] .			
	RE [FCV-62-128]				
PERFOR	7] will be repea VI the following:				
[a] PLACE	E [<u>HS-62-140B</u>],	CVCS Makeup Selector Switch to the AUTO position	/		
		BA to Blender Flow Control Switch to START position.	1 CV	Γ	7
		ged in Unit Narrative Log.		F	ĺ
	00	U			-

Appendix D		Scenario Outline	Attachment 1
Op Test No.:	NRC 2010302	Scenario #7Event #2	Page11of44
Event Description	on: 1B	Condensate Booster Pump trip	
Time	Position	Applicant's Actions or Beh	avior
Simulator O	perator: When	directed, initiate Event 2	
Indications// Annuncia 1-M-1 • 1-XA-4 1-M-3	Alarms tor: 55-1B E-3, "MO1	OR TRIPOUT PNL 1-M-1 THRU 1-M-6" DENSATE BOOSTER PUMP 1A FAIL TO START"	
Indication 1-M-3	IS:		
		S decrease to '0' FP INLET PRESS indicates a lowering pressure	
Annunciat 1-M-3			
• 1-74-0	DD-3A E-1, "P3-2	-129 LOW NPSH AT MFP'S"	
T + 20	BOP	Identifies alarm 1-XA-55-3A B-4, "Condensate Boo Start", acknowledges alarm and, notifies SRO	oster Pump 1B Fail To
		Refers to and implements Condensate Booster Pu procedure (ARP), Probable Causes:	mp alarm response
	BOP	[1] Dispatches an AUO locally; [2] VERIFY NPSH > 20 psig.	
		[3] IF Condensate Boost Pump Tripped, THEN Condensate or Heater Drains Malfunction.	GO TO AOP-S.04,
	SRO	Directs entry into and implementation of AOP-S.04 Drains Malfunction Section 2.5, Condensate Boost	•
		AOP-S.04, Condensate or Heater Drai	
Evaluator No	te: Secondar	Section 2.5, Condensate Booster pressures and flows will fluctuate but stabilize; impl	
	below is no	pt necessary; required pressures and flows and will l conditions to reach step 5 RNO to start the standby	be adequate to maintain
	SRO/ BOP	1. VERIFY two condensate booster pumps RUNN (RNO- reference)	
		RNO:	
		IF NO condensate booster pumpis running N/A	

Appendix D			Scenario	Outline			Atta	chme	ent 1
Op Test No.:	NRC 2010302	Scenario #	7	Event #	2	Page	12	of	44
Event Description	n: 1B Co	ndensate Boos	ter Pump t	rip					

Time	Position	Applicant's Actions or Behavior
		IF one condensate booster pump is running AND secondary pump cavitation indicated, THEN PERFORM the following:
		a. TRIP reactor.
		b. TRIP MFW pumps.
		c. GO TO E-0, Reactor Trip or Safety Injection.
		2. MONITOR Steam generator levels returning to program. [M-4].
		3. MONITOR reactor power:
		a. CHECK ICS thermal power indication AVAILABLE.
		 REDUCE turbine load as necessary to maintain 10 minute average power less than applicable limit (3455 or 3411 MWt).
		4. DISPATCH operator to investigate cause of Condensate Booster Pump trip.
Evaluator No	,	ew should elect to start 1C CBP according to 0-GO-5 Section 5.1, Power on From 30% to 100% Step 25 adhering to step 17 of the same section:
	[17] WH STA	EN the condensate booster pump reaches approximately 140 amps, THEN RT the following pumps in accordance with 1,2-SO-2/3-1:
		2] Second CBP
	CAUTION:	Reducing turbine load too rapidly could result in further drop in condensate pressure due to reduction in heater drain flow. Recommended load rate is 1% per minute if turbine load reduction is needed.
	NOTE: Seve	ere MFW pump cavitation is likely if inlet pressure is less than 250 psig.
		5. MONITOR Feedwater pump inlet pressure greater than 320 psig. [M-3, PI-2-129]
		(RNO required)
	050	RNO:
	SRO	EVALUATE starting additional available condensate system pumps (Hotwell, Cond. Booster, Cond. DI Booster)
		REDUCE turbine load until N/A
	BOP	SRO directs the BOP to start 1C CBP
	L	1

Appendix D			Scenari	o Outline			Atta	chme	ent 1
Op Test No.:	NRC 2010302	Scenario #	7	Event #	2	Page	13	of	44
Event Descriptio	n: 1B C	ondensate Boos	ster Pump	trip					

Time	Position	Applicant's Actions or Behavior
		 MONITOR Condensate Booster pump suction pressure greater than 100 psig. [M-3, PI-2-77]
		 NOTIFY Maintenance to investigate and repair pump malfunction as necessary.
		 8. CHECK reactor power greater than 85% (RNO required) RNO:
		GO TO Step 10.
		10. GO TO appropriate plant procedure.
Evaluator No	te: The fo	llowing CREW Brief and Notification actions are not contained in the dure.
		CREW Brief would typically be conducted for this event as time allows prior to the next event.
		Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.
		<u>Operations Management</u> - Typically Shift Manager. <u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
Lead Examin	er may cue ne	ext event when 1C CBP is in service.

Appendix D			Scenari	o Outline			Atta	chme	nt 1
Op Test No.:	NRC 2010302	Scenario #	7	Event #	3	Page	14	of	44
Event Description	on: Pz	zr Level Controlling	Channel I	LT 68-339 fails low	I				
					<u></u>				
Time	Position			Applicant's A	ctions or Be	havior			
		n directed, initi	ate Eve					<u></u>	
Indications// Annuncia 1-M-5 • 1-XA-4 •	ator: 55-5A C-3, "Pl	RESSURIZER LE ZR LVL LOW HE	VEL HIG	GH-LOW" DFF & LETDOW	N SECURED"				
Indicatio 1-M-4 • 1-Ll-68		LEVEL indicate	s '0' leve	91					
1-M-6 ● 1-FI-62 0-M-27	2-82, LETDOWN	ms/Indications	.OW ind						
	27B-B A-5, "LE	TDOWN HX OU					·····		
T + 30	RO	Identifies alar acknowledge	m 1-XA s alarm	-55-5A C-3, "Pl and, notifies Sl	RESSURIZEI RO	R LEVEL H	HGH-L	.OW",	
	SRO	Direct entry to Pressurizer L	o AOP-I. evel Ins	.04, Pressurize trument Malfun	r Instrument I ction	Malfunction	n, Sec	tion 2.	4
	NOTE: Ap	pendix M show	s layout	of PZR level c	ontrol for ope	erator refer	ence		
	RO		I-68-339	indicates NOF					
		339E i b. ENSU	RE LEV in LT-68 RE LEV -320 or 1	ing: /EL CONTROL -335 & 320. /EL REC CHAN LT-68-335.					
	RO	4. CHECK le		N SERVICE.					
		RNO:		SING EA-62-5,	, Establishing	Normal C	hargin	g and	

Appendix D		Scenario Outline	Attachment 1
Op Test No.:	NRC 2010302	Scenario # _ 7 Event # 3	Page15of44
Event Descriptio	n: Pzr	Level Controlling Channel LT 68-339 fails low	
Time	Position	Applicant's Actions or Be	havior
Evaluator No		owing steps are from EA-62-5 performed by the RO ay continue in AOP-I.04 with Tech Spec Evaluation	to reestablish Letdown.
		4.0 OPERATOR ACTIONS	
		4.1 Section Applicability2. IF normal letdown flow is to be established, TH	EN GO TO Section 4.3.
		4.3 Establishing Normal Letdown Flow	
	NOTE EA-6 be e	2-3, Establishing Excess Letdown, may be utilized stablished.	if Normal Letdown canno
	SRO	1. IF charging flow NOT established, THEN PERI	ORM Section 4.2.
	RO	2. VERIFY pressurizer level greater than 17%.	
	RO	3. ENSURE letdown orifice isolation valves CLOS	ED:
		LETDOWN ORIFICE ISOLATION VALVES	CLOSED √
		FCV-62-72	
		FCV-62-73	
		FCV-62-74	
	RO/BOP	4. OPEN letdown isolation valves:	
		LETDOWN ISOLATION VALVES	OPEN √
		FCV-62-69	
		FCV-62-70	
		FCV-62-77	
			<u> </u>
	le	lacing cooling water on the Letdown Heat Exchang tdown flow should prevent TIS-62-79B/A from actu CV-70-192.	er prior to restoring ating and fully opening
	RO/BOP	5. PLACE [HIC-62-78] in MANUAL, AND OPEN	[TCV-70-192] to ~50%
	RO/BOP	6. PLACE letdown pressure controller [PCV-62-8 ADJUST output between 40% and 50%, (50%)	
	RO?BOP	 ADJUST charging flow as necessary to prever line. 	It flashing in the letdown

Appendix D		Scenario Outline	Attachment 1
Op Test No.:	NRC 2010302		Page <u>16</u> of <u>44</u>
	···· F2	r Level Controlling Channel LT 68-339 fails low	
Time	Position	Applicant's Actions or Be	havior
	RO/BOP	8. OPEN letdown orifice isolation valves as need	
		LETDOWN ORIFICE ISOLATION VALVES	OPEN √
		FCV-62-72	
		FCV-62-73	
		FCV-62-74	
	NOTE:	Normal letdown pressure is 325 psig at normal ope	
	RO/BOP	 ADJUST letdown pressure controller [PCV-62 desired pressure. 	2-81] output to obtain
		10 AD ILIST letdown prossure controller IBCV	60.041
	RO/BOP	 ADJUST letdown pressure controller [PCV- existing pressure. 	b2-6 IJ selpoint to match
	RO/BOP	11. PLACE letdown pressure controller [PCV-62	2-81] in AUTO.
	NOTE: N	lormal letdown temperature is ∼100°F.	
	RO/BOP	12. ADJUST [HIC-62-78A] to obtain desired let	down temperature, as
		indicated on [TI-62-78] .	
	RÓ/BOP	13. PLACE [HIC-62-78A] in AUTO.	
		etdown temperature may swing due to repeated ac hich causes letdown temperature control valve TC	
	RO/BOP	 IF necessary to stabilize letdown temperatur following: 	e, THEN PERFORM the
	RO/BOP	 a. PLACE [HIC-62-78A] in MANUAL and AD OPEN direction. 	JUST controller output in
	RO/BOP	 b. WHEN letdown heat exchanger outlet tem approximately 100°F, THEN PLACE [HIC- 	
	RO/BOP	15. ENSURE high temperature divert valve [HS-	62-79A] in DEMIN position.

Appendix D			Scenari	o Outline			Attac	chme	nt 1
Op Test No.:	NRC 2010302	Scenario #	7	Event #	3	Page	17	of	44
Event Descriptio	on: Pz	r Level Controlling	Channel L	_T 68-339 fails	low				
Time	Position			Applicant's	Actions or B	ehavior			
	RO	16. ADJUS injection f	T chargi		wn as necessa		ain RC	P sea	l
		17. IF CCP	suction i	s aligned to	the RWST N	I/A			
		18. GO TO							
	RO	Returns to A	OP-1.04						
Evaluator No	ote: Continu complet	⊥ µing with AOP- ed.	I.04 with	Tech Spec	Evaluation. EA	A-62-5, Lete	down re	estora	ition
		5. EVALUA	TE the fo	ollowing Tec	h Specs for ap	olicability:			
		Table 3.3-1 fu total, SU and/ a. INOPERAB b. Minimum C to 4 hrs for • 3.3.3.7 Ac Table 3.3-10 F	nctional u or PWR C LE Ch pla hs OPER surveillar cident Mo functional ore INOPE	Ps may proc aced in trippe ABLE met; ho nce testing of pnitoring Instr I Units 7 Actio ERABLE Ch to	6: w/ number of eed provided the d condition w/i 6 owever, INOPER other channels	e following a hrs. ABLE Ch m per Spec 4.3 ne less than	re satisf nay be b 3.1.1.1. minimu	fied: oypasso m chai	ed up nnels
		6. ENSURE	pressur	izer heaters	restored to ser	vice.			
	CAUTION:	differences be	etween P	zr and RCS	jes in RCS bord boron) may im	on concent pact core r	ration (eactivit	due to	<u>с</u>
		7. MONITO							
				r in Mode 1					.,,
		b. MONI	IUK COR	e thermal po	wer for unexpe	ected chang	jes.		
	NOTE: If p	erforming AOF	in conju	unction with	AOP-I.11 for a	n Eagle LC	P failur	e N	 I/A
	Crew	8. NOTIFY USING a L-68-3	MIG to re ppropriat 339 (L-4		pressurizer lev ix l				
Lead Examin addressed.	er may cue th	e next event w	vhen Let	down is res	stored and Teo	chnical Sp	ecifica	tions	are

Appendix D		Scenario Outline	Attachment 1
Op Test No.:	NRC 2010302	Scenario #7Event #4	Page18of44
Event Description	n: #4 \$	Steam Generator narrow range level transmitter fails low.	
Time	Position	Applicant's Actions or Beh	navior
		directed, initiate Event 4	
1-M-6	or: 5-3C, D-2 "EAM	/TTD SG LOOP 4 LO LO LEVEL"	
Indications 1-M-4	S:	-106B STEAM GENERATOR LOOP 4 LOW LOW WAT	ER LEVEL"
		evel indicates downscale ansient occurs due to median selection circuit	
T + 40	BOP	Identifies alarm 1-XA-55-6B D-4, "LS-3-106B STE LOW LOW WATER LEVEL", acknowledges alarm	AM GENERATOR LOOP 4 and, notifies SRO
	SRO	Direct entry to AOP-I.06, Steam Generator Instrum 2.2, Unit 1 S/G level instrument malfunction	nent Malfunction, Section
		AOP-I.06, Steam Generator Instrume	
	SRO	Section 2.2, Unit 1 S/G Level Instrume	
		 EVALUATE the following Tech Specs for appli 3.3.1.1, Reactor Trip System Instrumentation Table 3.3-1 Functional Unit 14.A & B, <u>Action 9</u>: w/ num less than total, SU and/or PWR OPs may proceed prov satisfied: a. INOPERABLE Ch placed in tripped condition w/i 6 h 	ber of OPERABLE Chs 1 ided the following are
		 b. affected protection set, Trip Time Delay for 1 affecte the TTD for multiple affected SGs (TM) w/i 4 hrs. c. Minimum Chs OPERABLE met; however, INOPERA 	d SG (TS) adjusted to match BLE Ch may be bypassed
		 up to 4 hrs for surveillance testing of other channels 3.3.2.1, Engineered Safety Feature Actuation Syste Table 3.3-3 Functional Unit(s) 5a- <u>Action 17</u>: w/ OPERA SU and/or PWR OPs may proceed provided the follo satisfied: 	Market Market
		 a. INOPERABLE Ch placed in tripped condition w. b. Minimum Chs OPERABLE is met; however, INC bypassed up to 4 hrs for surveillance testing of other Table 3.3-3 Functional Unit(s) 6.c.i.a & b, 6.c.ii.a & b-<u>A</u> Chs one less than Total Chs, SU and/or PWR OPs r following conditions are satisfied: 	DPERABLE Ch may be r Chs per Spec 4.3.2.1.1. <u>ction 36</u> : w/ # of OPERABLE
		 a. INOPERABLE Ch placed in tripped condition w. b. affected protection set, TTD for 1 affected SG (for multiple affected SGs (TM) w/i 4 hrs. c. Minimum Chs OPERABLE met; however, INOP bypassed up to 4 hrs for surveillance testing other C Table 3.3-3 Functional Unit(s) 8.c- <u>Action 22c</u>: w/ less f 	TS) adjusted to match TTD PERABLE Ch may be hs per Spec 4.3.2.1.1.

Appendix D	Scenario Outline						Attac	:hme	nt 1
Op Test No.:	NRC 2010302	Scenario #	7	Event #	4	Page	19	of	44
Event Description	n: #4 Ste	am Generator	narrow rar	nge level tran	smitter fails low.				

. .

 OPERABLE, declare interlock INOPERABLE, verify all affected Chs of function below are OPERABLE or apply appropriate ACTION statement(s): c. Turbine Trip - SG Level Hi-Hi; Feedwater Isolation - SG Level Hi-Hi 3.3.3.5 Remote Shutdown Instrumentation – N/A 3.3.3.7 Accident Monitoring Instrumentation Table 3.3-10 Functional Unit 10 <u>Action 1.a</u>: w/ one less than minimum Chs require 	Time	Position	Applicant's Actions or Behavior
NOTE: If performing AOP in conjunction with AOP-I.11 for an Eagle LCP failure N/A Crew 2. NOTIFY IM to remove failed S/G level instrument from service USING appropriate Appendix:			 OPERABLE, declare interlock INOPERABLE, verify all affected Chs of functions below are OPERABLE or apply appropriate ACTION statement(s): c. Turbine Trip - SG Level Hi-Hi; Feedwater Isolation - SG Level Hi-Hi 3.3.3.5 Remote Shutdown Instrumentation – N/A 3.3.3.7 Accident Monitoring Instrumentation
Crew 2. NOTIFY IM to remove failed S/G level instrument from service USING appropriate Appendix:			restore INOPERABLE Ch to OPERABLE w/i 30 days or HT STBY w/i next 6 hrs
Crew appropriate Appendix:	NOTE: If per	rforming AOP	in conjunction with AOP-I.11 for an Eagle LCP failure… N/A
Loop 4: L-3-106 – Ch II - Appendix V		_	2. NOTIFY IM to remove failed S/G level instrument from service USING
			Loop 4: L-3-106 – Ch II - Appendix V
When Technical Specifications are addressed, the Lead Examiner may cue the next event			

Appendix D)	Scenario Outline Attachment 1
Op Test No.:	NRC 2010302	Scenario #7Event #5 Page 20 of 44
Event Descripti	on: Fe	edwater Header PT-3-1 Fails I ow
Time	Position	Applicant's Actions or Behavior
Simulator O	perator: Whe	n directed, initiate Event 5
Indications/ Annuncia 1-M-3 • 1-XA- Indicatior	ator: -55-3C, C-1 "PS-	3-4 NO 1 FW HTR PRESSURE HI"
1-M-3 • 1-LR- • 1-PC- 1-M-4 • 1-FI-3 flow-	2-12, HOTWELL 46-20, 20A, 20B -35A, 35B, 48A, above steam flo	LEVEL C CONDENSER decreasing trend , MFPT 1A&1B Speed CONTROL speed demand increases 48B, 90A, 90B, 103A, 103B, SG-1 thru 4 SG FW INLET FLOW Chs 1&2 increasin w ms/Indications:
Indicatior 1-M-4 • SI-412 Evaluator No	2, ROD Speed (& ote: For this enter A	a indicating lights) indicate outward rod motion (potential) event, crew may respond per the Annunciator Response Procedure directly OP-S.01 Section 2.1. Section 2.1 Step 1 is an IMMEDIATE ACTION step; the ay perform the action(s) associated with Step 1 from memory without direction
T + 45	BOP	Identifies alarm 1-XA-55-3C, C-1 "PS-3-4 NO 1 FW HTR PRESSURE HI", acknowledges alarm and, notifies SRO
	BOP	Takes manual control of MFP (Master) Speed control and reduce Feedwate pressure and flow.
	Crew	Refer to annunciator Response procedure.
	BOP	 [1] DISPATCH operator to #1 feedwater heaters to verify the following valves open: a. 1-PSV-3-4 b. 1-PSV-3-14 c. 1-PSV-3-24
	BOP	[2] REDUCE feedwater pressure to ≤1100 psig.

Appendix D)	Scenario Outline Attachment 1
Op Test No.:	NRC 2010302	Scenario # 7 Event # 5 Page 21 of 44
		Scenario # _ 7 Event # 5 Page _ 21 of _ 44
Event Descript	ion: Fe	edwater Header PT-3-1 Fails Low
Time	Position	Applicant's Actions or Behavior
	BOP	[3] WHEN pressure reduces to ~1100 psig, THEN VERIFY the above mentioned PSV's closed.
	BOP	[4] IF alarm still illuminated or by SRO decision, THEN GO TO AOP-S.01, Loss of Normal Feedwater.
	SRO	Direct entry to AOP-S.01, MAIN FEEDWATER Malfunction, Section 2.0, Operator Actions.
		AOP-S.01, MAIN FEEDWATER Malfunction Section 2.3, Failure of Automatic MFW Pump Control
	BOP/	1. Unit 1 Only:
	SRO	DIAGNOSE the failure and identify and Failure of MFW Pump Control
	SRO	Direct entry to AOP-S.01, MAIN FEEDWATER Malfunction, Section 2.3, Failure of Automatic MFW Pump Control
		tep 1 is an IMMEDIATE ACTION.
·	BOP	1. RESTORE feedwater pressure:
		a. PLACE affected MFP speed controller(s) in MANUAL:
		MFPT 1A & 1B Speed Control OR
		MFPT 1A Speed Controller
		OR
		MFPT 1B Speed Controller
		b. ADJUST speed on affected MFP(s) to restore feedwater pressure to
		normal (~1040 psig at full power).
	BOP	2. DETERMINE if MFP trip is needed:
		a. CHECK BOTH MFW pumps IN SERVICE.
		 b. IF MFW pump trip is needed due to loss of speed control, THEN PERFORM the following: TRIP affected MFP.
		2) GO TO applicable section:

Appendix D			Scenario	Outline			Atta	chme	ent 1
Op Test No.:	NRC 2010302	Scenario #	7	Event #	5	Page	22	of	44
Event Descriptio	n: Feed	lwater Header F	PT-3-1 Fails	Low					

Time	Position	Applicant's Actions or Behavior						
	CAUTION:	Feed flow transients may impact core thermal power.						
		3. MAINTAIN steam generator level(s) on program.						
	NOTE: Appe	endix C may be used to determine program feedwater D/P for current power.						
		4. CHECK Feed Flow Channels NORMAL. [M-4]						
	CAUTION: F	Reactor operation at low power levels for extended periods may challenge eactivity control due to xenon changes.						
	BOP							
	CREW	6. INITIATE repairs on failed equipment.						
		7. GO TO appropriate plant procedure.						
Load Exami	inor mov que th	END OF SECTION						
	mer may cue th	e next event when plant is stable with MFP speed control in manual.						

Appendix D			Attac	Attachment 1						
Op Test No.:	NRC 2010302	Scenario #	7	Event #	6	Page 23	of	44		
Event Description	on: Sm	all Steam Leak Ou	utside Co	ntainment Upstrea	m Of Loop #3 M	SIV				
Time	Position			Applicant's A	ctions or Be	havior				
Simulator O	perator: When	directed, init	iate Eve	and the second se						
1-M-3 • 1-LR-2 1-M-4 • 1-XI-9 increa Significant F Indication	ns: 57-107, GENER <i>I</i> 2-12, HOTWELL 2-5005C, 5006C, asing Resultant Alarn	LEVEL C CONE 5007C, 5008C,	DENSER RX POV	decreasing tree		Power Range indic	ators			
	2, ROD Speed (&									
T + 55	BOP	and notifies S	Power i	ndicators increa	asing, Genera	ator Megawatts de	ecrea	sing		
	CREW	Monitors containment pressure, temperature and rad monitors for primary/ secondary contamination								
	CREW					ased on NIS powe I level decreasing				
	SRO	Direct entry to	o AOP-S	S.05, Steam or	Feedwater Lo	eak				
			A	OP-S.05, Stea				<u></u>		
		1. MONITOR	nerson		Operator Act	lions				
		a. IF stea	m or fee			mediately isolated	to pr	oteo		
		1) TRIP the reactor.								
		MS	SIVs.			unknown, THEN		э́Е		
				n feedwater lin I the following:	es OR source	e is unknown, TH	EN			
		a) [•]	TRIP M	FW pumps.						
		b) (CLOSE	Feed Reg Valv	/es.					
		4) GC	TO E-0), Reactor Trip	or Safety Inje	ection.				

Appendix D			Scenari	o Outline			Atta	chme	ent 1
Op Test No.:	NRC 2010302	Scenario #	7	Event #	6	Page	24	of	44
Event Description	on: Sma	II Steam Leak O	utside Cor	ntainment Ups	stream Of Loop #3 MSI	v			

Time	Position	Applicant's Actions or Behavior					
Evaluator Note		expected to move through AOP-S.05; probably about Step 8 to 10, they will					
	identify t	that they cannot maintain at-power plant operations, transition back to Step 2					
r	RNO an	d initiate a reactor trip.					
	BOP	 MONITOR steam generator levels STABLE on program. (RNO required) 					
		RNO: IF reactor trip is imminent due to low S/G level, THEN PERFORM the following:					
		a. TRIP the reactor.					
		b. GO TO E-0, Reactor Trip or Safety Injection.					
v							
	BOP	3. CHECK the following:					
		S/G atmospheric relief valves CLOSED					
		Steam dumps CLOSED.					
	BOP	4. CHECK main turbine on line.					
	RO	5. MONITOR the following:					
		 reactor power less than 100% 					
		reactor power less than or equal to 100% (3455 MWt).					
	RO	6. MONITOR T-avg/T-ref deviation less than 5°F.					
	NOTE: Teo	ch Spec LCO 3.6.1.4 is applicable if containment pressure exceeds 0.3 psig.					
	RO	7. MONITOR containment pressure STABLE.					
		twell level will fluctuate and secondary make-up flow will increase, perhaps be					
		keep up with Hotwell level loss due to the break size. The crew may					
		Step 8 RNO even though secondary make-up control is functioning correctly.					
	BOP	8. MONITOR hotwell level STABLE:					
		VERIFY LCV-2-9 maintaining hotwell level in AUTO.					
	BOP	RNO: INITIATE makeup to hotwell:					
		a. PLACE LIC-2-9, Auto Makeup, in MANUAL. [M-2]					

		Scenario Outline Attachment 1
Dp Test No.:	NRC 2010302	Scenario #7 Event #6 Page25 of44
Event Descriptio	n: Sn	nall Steam Leak Outside Containment Upstream Of Loop #3 MSIV
Time		
Time	Position	Applicant's Actions or Behavior
		 OPEN LCV-2-9 USING LIC-2-9, Auto Makeup, as necessary to maintain hotwell level.
		c. IF loss of hotwell level is imminent, THEN PERFORM the following:
		1) TRIP the reactor.
		2) WHEN reactor is tripped, THEN CLOSE MSIVs.
		3) GO TO E-0, Reactor Trip or Safety Injection.
	BOP	9. VERIFY generator megawatts STABLE or DROPPING.
·		
	BOP	10. CHECK the following containment parameters NORMAL:
		Containment temperature
		Containment humidity
		11. VERIFY NO abnormal leakage from S/G safety valves:
	BOP	 NOTIFY Security to visually scan east and west valve vault room areas on affected unit OR
	BOP	DISPATCH operator to verify NO abnormal leakage from east and west valve vault rooms [inspect from outside rooms]
	SRO	12. EVALUATE EPIP-1, Emergency Plan Initiating Conditions Matrix. (Notify Shift Manager to Evaluate REP)
	BOP	
	NOTE: Te	ech Spec LCO 3.7.1.3 requires at least 240,000 gal for CST volume.
	BOP	13. MONITOR CST levels greater than 70%.
		14. VERIFY leak IDENTIFIED and ISOLATED.
	CREW	(RNO required)
	SRO	RNO: EVALUATE dispatching operators with radios to identify leak.
	1	IF leak CANNOT be isolated, THEN EVALUATE rapid shutdown USING

Appendix D	pendix D Scenario Outline							Attachment 1		
Op Test No.:	NRC 2010302	Scenario #	7	Event #	6	Page	26	of	44	
Event Descriptio	on: Sma	ll Steam Leak Oເ	utside Cor	ntainment Upstrea	m Of Loop #3 M	ISIV				
Time	Position			Applicant's A	ctions or Be	havior				

		Application of Deflavior							
	15. EVALUATE actions required to restore plant to normal.								
	16. GO TO appropriate plant procedure.								
Lead Examiner may initiate next event to increase leak to a large break at or before this point when crew has determined there is a secondary leak outside containment.									

Appendix D		Scenario Outline	Attachment 1
	·		
Op Test No.: -	NRC 2010302	Scenario #7	of44
Event Description		am Leak to Break O/S Containment Upstream Lp #3 MSIV w/ ATWS, Rod sec delay) & #3 SG MDAFWP LvI Control VIv fails open.	s fail to move in auto
Time	Position		
		Applicant's Actions or Behavior directed, MODIFY Event 6- increase steam leak to break	_ •
Indications/A Annunicat 1-M-6 • 1-AR-N • 1-AR-N • 1-AR-N • 1-AR-N Indications 1-M-1 • 1-XR-5 1-M-3 • 1-LR-2 1-M-4 • 1-XI-92 increas	larms ors: 16B A-7, "FS-3- 16B B-7, "FS-3- 16B C-7, "FS-3- 16B D-7, "FS-3- 3: 7-107, GENERA -12, HOTWELL -5005C, 5006C, sing (exceeding esultant Alarm	35B STM GEN LOOP 1 STEAMFEEDWATER FLOW MISMATCH 48B STM GEN LOOP 2 STEAMFEEDWATER FLOW MISMATCH 90B STM GEN LOOP 3 STEAMFEEDWATER FLOW MISMATCH 103B STM GEN LOOP 4 STEAMFEEDWATER FLOW MISMATCH ATOR MEGAWATTS decreasing LEVEL C CONDENSER decreasing (w/ maximum make-up flow 5007C, 5008C, RX POWER Chs I-IV, N-41 – 44, NIS Power Rang >3% w/ secondary power- Turbine Impulse Pressure- Tref) ms/Indications:	" " H
• SI-412, T + 65	ROD Speed (&	 indicating lights) indicate unexpected outward rod motion Direct manual Rx Trip and MSIV closure; enter E-0, Rx Trip Injection based on AOP-S.05 criteria: MONITOR step 5, Rx Power not stable OR MONITOR step 8, Hotwell Level loss imminent) 	Or Safety
	RO	E-0, reactor Trip or safety Injection Perform E-0 Immediate Operator actions (IOAs) 1. VERIFY reactor TRIPPED: (RNO required) RNO: E-0 Step 1 RNO: 1. TPIP reactor	
		 1- TRIP reactor. 2- IF reactor CANNOT be tripped, THEN PERFORM the fol a. MONITOR status trees. b. GO TO FR-S.1, Nuclear Power Generation/ATWS. 	lowing:

Appendix D		ę	Scenari	o Outline			Atta	chme	nt 1
Op Test No.:	NRC 2010302	Scenario #	7	Event #	7, 8, 9, 10	Page	28	of	44
Event Descriptior		n Leak to Break ec delay) & #3 So	O/S Cont G MDAF	tainment Upstr WP LvI Contro	eam Lp #3 MSIV w/ A1 I VIv fails open.	WS, Rod	s fail to	move i	n auto

Time	Position	Applicant's Actions or Behavior
		FR-S.1, Nuclear Power Generation/ATWS.
	RO	Identify ATWS after attempting manual Rx Trip initiation with both M-4 and M-6 Rx Trip Switches (1-RT-1 & 1-RT-2).
	BOP	Initiate a manual Main Turbine trip
	SRO	Direct entry to ER S 1. Nuclear Dewar Concertion (ATIMO
		Direct entry to FR-S.1, Nuclear Power Generation/ATWS
		CPs should NOT be tripped with reactor power greater than 5%.
Evaluator N	ote: Crew ma	ay close MSIV's and attempt to isolate AFW to faulted S/.G <u>WHEN REACTOR</u> <u>PED</u> during performance of FR-S.1. When attempting to isolate AFW, level valve will not close and crew may elect to stop 1B AFW Pump at that time.
	RO	 VERIFY reactor TRIPPED: Reactor trip breakers OPEN Reactor trip bypass breakers OPEN or DISCONNECTED Neutron flux DROPPING Rod bottom lights LIT Rod position indicators less than or equal to 12 steps. (RNO required)
Critical Task		
CRITICAL	C: Insert negati	ive reactivity using control rods or boration prior to completion of FR-S.1
TASK	RO	RNO: TRIP reactor.
		 IF reactor trip breakers will NOT open, THEN MAINTAIN <u>auto or manual</u> rod insertion at max achievable rate UNTIL rods are at bottom.
	BOP	 2. VERIFY turbine TRIPPED: ALL turbine stop valves CLOSED
		•
-		3. CHECK AFW System operation:

Appendix D	endix D Scenario Outline						Attachment 1			
Op Test No.:	NRC 2010302	Scenario #	7	Event #	7, 8, 9, 10	Page	29	of	44	
Event Description		1 Leak to Break c delay) & #3 S	O/S Conta G MDAFW	inment Upsti /P LvI Contro	ream Lp #3 MSIV w/ AT ol VIv fails open.	WS, Rod	s fail to	move i	in auto	

Time	Position	Applicant's Actions or Behavior
		FR-S.1, Nuclear Power Generation/ATWS.
		a. MD AFW pumps RUNNING
	BOP	b. TD AFW pump RUNNING as necessary.
		(Not Running Tagged OOS in initial conditions)
		c. MD AFW LCVs in AUTO.
		d. TD AFW LCVs OPEN.
Critical Task		
CRITICAL	linsen neg	ative reactivity using control rods or boration prior to completion of FR-S.1
TASK	RO/BOP	4. EMERGENCY BORATE RCS by performing the following:
	RO/BOP	a. ENSURE at least one CCP RUNNING.
	RO/BOP	b. INITIATE Emergency Boration USING EA-68-4.
	RO/BOP	c. VERIFY charging flow path established:
		• FCV-62-90 OPEN
		• FCV-62-91 OPEN
		FCV-62-86 or FCV-62-85 OPEN
	RO/BOP	d. CHECK pressurizer pressure less than 2335 psig.
	RO/BOP	5. VERIFY Containment Purge isolated:
		a. VERIFY containment purge and vent dampers (System 30) CLOSED.
		[Panel 6K and 6L]
	RO/BOP	6. MONITOR SI NOT actuated:
		a. S.I. ACTUATED permissive DARK [M-4A, D4].
Evaluator No		e manually actuated SI previously. Auto SI will likely occur when MSIV's are fter Rx Trip in FR-S.1 and as the faulted S/G continues to depressurize.
Evaluator No	ote: Crew wil	l likely have dispatched personnel prior to reaching this step.
		will be dispatched- one to open the RTBs/RTByps in the AB; the second to MG supply breakers at the 480VAC Unit Boards in the TB.
		7. Check reactor and turbine trip status
	RO	a. reactor tripped
	BOP	b. turbine TRIPPED:
		ALL turbine stop valves CLOSED.

Appendix D	endix D Scenario Outline						Atta	Attachment 1		
Op Test No.:	NRC 2010302	Scenario #	7	Event #	7, 8, 9, 10	Page	30	of	44	
Event Description		n Leak to Break ec delay) & #3 S	O/S Conta G MDAFV	ainment Upstr VP LvI Contro	ream Lp #3 MSIV w/ AT I VIv fails open.	WS, Rod	s fail to	move i	n auto	

Time	Position	Applicant's Actions or Behavior
		FR-S.1, Nuclear Power Generation/ATWS.
	RO	8. MONITOR reactor subcritical:
		a. Power range channels less than 5%.
		b. Intermediate range SUR NEGATIVE.
		c. GO TO Step 19.
	SRO	19. ENSURE status tree monitoring initiated.
	BOP	20. MAINTAIN S/G narrow range levels:
		a. Power range channels less than 5%.
		b. Between 10% [25% ADV] and 50%.
		21 MONITOD hereiter terrisetter (
	RO	21. MONITOR boration termination criteria:
	RU	a. NOTIFY Chem Lab to sample RCS boron concentration.
		b. CHECK for all of the following:
		all control rods FULLY INSERTED
		RCS temperature greater than 540°F
		no RCS dilution has occurred.
	SRO	22. RETURN TO procedure and step in effect.
	-	SRO directs crew to return to E-0 Step 1

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Op Test No.:	NRC 2010302	Scenario #	7	Event #	7, 8, 9, 10	Page	31	of	44	
Event Description		m Leak to Break ec delay) & #3 S	O/S Con G MDAF	tainment Upstr WP LvI Control	eam Lp #3 MSIV w/ A ⁻ VIv fails open.	TWS, Rod	s fail to	move i	n auto	

Time	Position	Applicant's Actions or Behavior
		E-0, reactor Trip or safety Injection
Evaluator Not	e: Critical Ta	ask: Isolate AFW flow to the Faulted SG (#3 SG) by stopping AFW flow within 10 minutes of E-0 entry from FR-S.1
END TIME:		
		Perform E-0 Steps 1-4 high level only; FR-S-1 directed E-0 Steps 1-4 and ES-0.5 performance
	RO	1. VERIFY reactor TRIPPED:
	BOP	2. VERIFY turbine TRIPPED:
	BOP	3. VERIFY at least one 6.9KV shutdown board ENERGIZED on this unit.
	RO	4. DETERMINE if SI actuated: (RNO for reference)
		RNO: DETERMINE if SI required:
		a. IF any of the following conditions exists:
		 S/G pressure less than 600 psig, OR RCS pressure less than 1870 psig, OR Containment pressure greater than 1.5 psig, THEN ACTUATE SI.
		b. IF SI is NOT required N/A
		 PERFORM ES-0.5, Equipment Verifications WHILE continuing in this procedure.

Appendix D	pendix D Scenario Outline						Atta	Attachment 1		
Op Test No.:	NRC 2010302	Scenario #	7	Event #	7, 8, 9, 10	Page	32	of	44	
Event Descriptior		ו Leak to Break וכ delay) & #3 S	O/S Conta G MDAFW	ainment Upstre VP LvI Control	eam Lp #3 MSIV w/ AT VIv fails open.	WS, Rod	s fail to	move ir	∩ auto	

Time	Position	Applicant's Actions or Behavior
		E-0, reactor Trip or safety Injection
		FOLDOUT PAGE
		<u>RCP TRIP CRITERIA</u> – N/A
		EVENT DIAGNOSTICS
		• IF any S/G pressure is dropping uncontrolled, THEN PERFORM the following:
	RO/BOP	a. CLOSE MSIVs and MSIV bypass valves
		 IF any S/G pressure continues to drop uncontrolled, THEN PERFORM the following:
	RO	1) ENSURE SI actuated.
		 IF at least one S/G is intact (S/G pressure controlled or rising), THEN ISOLATE AFW to faulted S/G(s):
		 CLOSE AFW level control valves for faulted S/G(s) IF any AFW valve for faulted S/G CANNOT be CLOSED, THEN PERFORM Appendix E, Isolating AFW to Faulted S/G.
		ENSURE at least one of the following conditions met:
		 total AFW flow greater than 440 gpm OR
		 Narrow Range level greater than 10% [25% ADV] in at least one intact S/G.
Evaluator N	ote: Critical Ta	ask: Isolate AFW flow to the Faulted SG (#3 SG) by stopping AFW flow within 10
		minutes of E-0 entry from FR-S.1 (Failed AFW LCV isolation)
		APPENDIX E ISOLATING AFW TO FAULTED S/G
		 IF motor-driven AFW LCV for faulted S/G CANNOT be closed, THEN PERFORM the following:
Critical Task		 a. IF at least one other AFW pump is available, THEN PLACE affected MD AFW pump in PULL TO LOCK.
		b. ENSURE at least one of the following:
		 total AFW flow greater than 440 gpm OR
		 Narrow Range level greater than 10% [25% ADV] in at least one intact S/G.
		 DISPATCH personnel to locally isolate MD AFW to faulted S/G USING EA-3-11, Local Isolation of MD and TD AFW.
		 d. WHEN MD AFW flowpath to faulted S/G is locally isolated, THEN ENSURE affected MD AFW pump RUNNING.
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Appendix D			Scenario	Outline			Atta	chme	ent 1
Op Test No.:	NRC 2010302	Scenario #	7	Event #	7, 8, 9, 10	Page	33	of	44
Event Descriptior		Leak to Break c delay) & #3 \$	< O/S Conta SG MDAFW	ainment Upst /P Lvl Contro	ream Lp #3 MSIV w/ AT ol VIv fails open.	WS, Rod	s fail to	move i	in auto

Time	Position	Applicant's Actions or Behavior
		E-0, reactor Trip or safety Injection
	NOTE:	TDAFW pump steam supply will automatically swap from S/G #1 to S/G #4 after
		50 second time delay when FCV-1-17 or -18 is closed.
		2. IF turbine-driven AFW LCV for faulted S/G CANNOT be closed, THEN
	_	PERFORM the following:
		 a. IF at least one MD AFW pump is available to supply an intact S/G, THEN CLOSE FCV-1-17 or FCV-1-18 to stop TD AFW flow.
		b. ENSURE at least one of the following:
		Y
		 total AFW flow greater than 440 gpm OR
		 Narrow Range level greater than 10% [25% ADV] in at least one intact S/G.
		 DISPATCH personnel to locally isolate TD AFW to faulted S/G USING EA-3-11, Local Isolation of MD and TD AFW.
		 d. WHEN TD AFW flowpath to faulted S/G is locally isolated, THEN PERFORM the following:
		1) IF S/G #1 or 4 is faulted, THEN ENSURE steam supply from
		faulted S/G isolated by closing FCV-1-15 (S/G #1) or FCV-1-16
		(S/G #4).
		2) ENSURE FCV-1-17 and FCV-1-18 OPEN.
		3) ENSURE TD AFW pump RUNNING.
		END OF TEXT
		Return to E-0, reactor Trip or safety Injection, Step 6
		6. DETERMINE if secondary heat sink available:
		a. CHECK total AFW flow greater than 440 gpm.
		 CHECK narrow range level greater than 10% [25% ADV] in at least one S/G.
	RO	7. CHECK if main steam lines should be isolated:
		a. CHECK if any of the following conditions have occurred:
		 Any S/G pressure less than 600 psig OR
		Any S/G pressure dropping UNCONTROLLED. OR

Appendix D			Scenario	o Outline			Atta	chme	nt 1
Op Test No.:	NRC 2010302	Scenario #	7	Event #	7, 8, 9, 10	Page	34	of	44
Event Description		n Leak to Break ec delay) & #3 \$	O/S Conta G MDAFV	ainment Upst VP LvI Contro	ream Lp #3 MSIV w/ AT ol VIv fails open.	WS, Rod	s fail to	move i	n auto

Time	Position	Applicant's Actions or Behavior
		E-0, reactor Trip or safety Injection
		 ENSURE MSIVs and MSIV bypass valves CLOSED
		c. ENSURE applicable Foldout Page actions COMPLETED
	RO	 8. CHECK RCP trip criteria: a. CHECK the following: RCS pressure less than 1250 psig. AND
		At least one CCP OR SI pump RUNNING b. STOP RCPs
	RO	 9. MONITOR RCS temperatures: IF any RCP running, THEN CHECK T-avg stable at or trending between 547°F and °F. OR
		 IF RCPs stopped, THEN CHECK T-cold stable or trending to between 547°F and 552°F.
	RO	 10. CHECK pressurizer PORVs, safeties, and spray valves: a. Pressurizer PORVs CLOSED. b. Pressurizer safety valves CLOSED. c. Normal spray valves CLOSED. d. Power to at least one block valve AVAILABLE. e. At least one block valve OPEN.
	CREW	 11. DETERMINE S/G secondary pressure boundaries are INTACT: CHECK all S/G pressures CONTROLLED or RISING. CHECK all S/G pressures greater than 140 psig. (RNO Required)

Appendix D		Scenario Outline							nt 1
Op Test No.:	NRC 2010302	Scenario #	7	Event #	7, 8, 9, 10	Page	35	of	44
Event Descriptio		m Leak to Break ec delay) & #3 S	O/S Con G MDAF	tainment Upstre WP LvI Control '	am Lp #3 MSIV w/ A VIv fails open.	ATWS, Rods	s fail to	move i	n auto

Time	Position	Applicant's Actions or Behavior
		E-0, reactor Trip or safety Injection
	SRO	RNO: PERFORM the following:
	SRO	a. MONITOR status trees – Status tree monitoring previously initiated.
		b. GO TO E-2, Faulted Steam Generator Isolation.
		Crew transitions to E-2, Faulted Steam Generator Isolation.

Appendix D	dix D Scenario Outline						Attachment 1		
Op Test No.:	NRC 2010302	Scenario #	7	Event #	7, 8, 9, 10	Page	36	of	44
Event Descriptio		m Leak to Break ec delay) & #3 S			eam Lp #3 MSIV w/ A VIv fails open.	ATWS, Rod	s fail to	move i	n auto

Time	Position	Applicant's Actions or Behavior					
		E-2, Faulted Steam Generator Isolation					
Evaluator No	ote: Critical Ta	isk: Isolate AFW flow to the Faulted SG (#3 SG) by stopping AFW flow within 10 minutes of E-0 entry from FR-S.1					
START TIME	ART TIME: (From E-0 Entry)						
END TIME:							
	CAUTION: U	nisolating a faulted S/G or secondary break should NOT be considered NLESS needed for RCS cooldown.					
	BOP	1. CHECK MSIVs and MSIV bypass valves CLOSED.					
	BOP	2. CHECK ANY S/G secondary pressure boundary INTACT:					
		Any S/G pressure CONTROLLED or RISING					
	BOP	3. IDENTIFY Faulted S/G(s):					
		a. CHECK S/G pressures:					
		Any S/G pressure DROPPING in an uncontrolled manner.					
		OR					
		Any S/G pressure less than 140 psig.					
	CAUTIONS:	 Secondary heat sink requires at least one S/G available. 					
		 If the TD AFW pump is the only source of feed flow, isolating both steam supplies will result in loss of secondary heat sink. 					
		4. ISOLATE Faulted S/G(s):					
	BOP	a. ENSURE MFW isolated to faulted S/G(s) by any of the following:					
		feedwater isolation valve CLOSED [M-4]					
		OR					
		 feedwater regulating valve and bypass valve CLOSED [M-3]. 					
	BOP	b. ENSURE AFW isolated to faulted S/G(s):					
		CLOSE MD AFW LCV					
		CLOSE TD AFW LCV and PLACE in PULL TO LOCK.					
		l					

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Appendix D			Scenario	o Outline			Atta	chme	nt 1
Op Test No.:	NRC 2010302	Scenario #	7	Event #	7, 8, 9, 10	Page	37	of	44
Event Description		n Leak to Break ec delay) & #3 S	O/S Conta G MDAFV	ainment Upstr VP LvI Control	eam Lp #3 MSIV w/ A I VIv fails open.	TWS, Rod	s fail to	move i	n auto

Time	Position	Applicant's Actions or Behavior
		E-2, Faulted Steam Generator Isolation
	POD	c. CHECK S/G #1 or #4 faulted.
	BOP	(RNO required)
		RNO:
		c. GO TO Substep 4.e.
	BOP	d. VERIFY S/G blowdown valves CLOSED.
	BOP	e. VERIFY atmospheric relief CLOSED.
	BOP	5. CHECK CST level greater than 5%.
	BOP	6. VERIFY secondary radiation NORMAL:
		CHECK appardance radiation NODMAL LIGING Apparatic A
		 CHECK secondary radiation NORMAL USING Appendix A, Secondary Rad Monitors.
		(App. A also contained in ES-0.5)
		b. NOTIFY Chem Lab to take S/G activity samples.
	BOP	c. WHEN Chem Lab is ready to sample S/Gs, THEN PERFORM the
	DUF	following:
		1) ENSURE FCV-15-43 Blowdown Flow Control valve CLOSED.
		2) ENSURE Phase A signal RESET.
		3) OPEN blowdown isolation valves.
		d. NOTIFY RADCON to survey main steam lines and S/G blowdown.
		• • •
		d. NOTIFY RADCON to survey main steam lines and S/G blowdown. e. WHEN S/G samples completed, THEN CLOSE blowdown isolation valves.

Appendix D		Scenario Outline						Attachment 1			
Op Test No.:	NRC 2010302	Scenario #	7	Event #	7, 8, 9, 10	Page	38	of	44		
Event Description	n: Stea	m Leak to Break	O/S Con	tainment Upstre	am Lp #3 MSIV w/ A	TWS, Rod	s fail to	move i	n auto		

Steam Leak to Break O/S Containment Upstream Lp #3 MSIV w/ ATWS, Rods fail to move in auto (10 sec delay) & #3 SG MDAFWP LvI Control VIv fails open.

Time	Position	Applicant's Actions or Behavior
		E-2, Faulted Steam Generator Isolation
	RO/ SRO	7. CHECK SI termination criteria:
		a. RCS subcooling based on core exit T/Cs greater than 40°F.
	BOP	b. Secondary heat sink:
		 Narrow range level in at least one Intact S/G greater than 10% [25% ADV]
		OR
		 Total feed flow to Intact S/Gs greater than 440 gpm.
	RO	c. RCS pressure stable or rising.
	RO	d. Pressurizer level greater than 10% [20% ADV].
	SRO	e. GO TO ES-1.1, SI Termination.
	SRO	8. GO TO E-1, Loss of Reactor or Secondary Coolant.
		END
Lead Examin	er may termin	ate the scenario at E-2 Step 7.e, SI Termination criteria determination.

Appendix D		Required Operator Actions Form ES-D-2
Op Test No.: Event Descriptio	NRC 2010302	_ Scenario # Event #ES-0.5 Page39 of44
Time	Position	Applicant's Actions or Behavior
		ES-0.5, EQUIPMENT VERIFICATIONS
Evaluator No		pletes ES-0.5 including Appendices A & B and reports completion any discrepancies and actions taken) to SRO.
i	BOP	1. VERIFY D/Gs RUNNING.
	BOP	2. VERIFY D/G ERCW supply valves OPEN.
	BOP	3. VERIFY at least four ERCW pumps RUNNING
	ВОР	4. VERIFY CCS pumps RUNNING
		 Pump 1A-A (2A-A) Pump 1B-B (2B-B) Pump C-S.
	BOP	5. VERIFY EGTS fans RUNNING.
	BOP	6. VERIFY generator breakers OPEN.
	Crew	 NOTIFY at least two AUOs to report to MCR to be available for local actions.
	BOP	 8. VERIFY AFW pumps RUNNING: a. MD AFW pumps b. TD AFW pump.
		level control valves should NOT be repositioned if manual action has been to control S/G levels, to establish flow due to failure, or to isolate a faulted
	BOP	 9. CHECK AFW valve alignment: a. VERIFY MD AFW LCVs in AUTO. b. VERIFY TD AFW LCVs OPEN. c. VERIFY MD AFW pump recirculation valves FCV-3-400 and FCV-3-401 CLOSED.

Appendix D		Requ	uired Ope	erator Action	ns		For	rm ES	3-D-2
Op Test No.:	NRC 2010302	Scenario #	7	Event #	ES-0.5	Page	40	of	44
Event Descriptio	n: Equip	ment verificatio	ns						

Time	Position	Applicant's Actions or Behavior
		ES-0.5, EQUIPMENT VERIFICATIONS
		10. VERIFY MFW Isolation:
		a. MFW pumps TRIPPED
	BOP	b. ENSURE the following:
		 MFW regulating valves CLOSED
		 MFW regulating bypass valve controller outputs ZERO
		MFW isolation valves CLOSED
	BOP	11. MONITOR ECCS operation:
		a. VERIFY ECCS pumps RUNNING:
		CCPs:
		RHR pumps
		SI pumps
		b. VERIFY CCP flow through CCPIT.
		c. CHECK RCS pressure less than 1500 psig.
		d. VERIFY SI pump flow.
		e. CHECK RCS pressure less than 300 psig.
	-	f. VERIFY RHR pump flow.
	BOP	12. VERIFY ESF systems ALIGNED:
		a. Phase A ACTUATED:
		PHASE A TRAIN A alarm LIT [M-6C, B5].
		PHASE A TRAIN B alarm LIT [M-6C, B6].
	:	b. Cntmt Vent Isolation ACTUATED:
		CNTMT VENT ISOLATION TRAIN A alarm LIT [M-6C, C5].
		CNTMT VENT ISOLATION TRAIN B alarm LIT [M-6C, C6].
		c. Status monitor panels:
		6C DARK
		6D DARK
		6E LIT OUTSIDE outlined area
		6H DARK
		• 6J LIT.

Appendix D		Requ	uired Ope	erator Acti	ons		Fo	rm ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	7	Event #	ES-0.5	Page	41	of	44
Event Descriptio	n: Equip	ment verificatio	ns						

Time	Position	Applicant's Actions or Behavior
		ES-0.5, EQUIPMENT VERIFICATIONS
		d. Train A status panel 6K:
		CNTMT VENT GREEN
		PHASE A GREEN
······································		e. Train B status panel 6L:
		CNTMT VENT GREEN
		PHASE A GREEN
	BOP	13. MONITOR for containment spray and Phase B actuation:
		a. CHECK for any of the following:
		Phase B ACTUATED
		OR
		Containment pressure greater than 2.8 psig
		b. VERIFY containment spray INITIATED:
		1) Containment spray pumps RUNNING.
		 Containment spray header isolation valves FCV-72-39 and FCV- 72-2 OPEN.
		 Containment spray recirculation valves to RWST FCV-72-34 and FCV-72-13 CLOSED.
		4) Containment spray header flow greater than 4750 gpm per train.5) Panel 6E LIT.
		c. VERIFY Phase B ACTUATED:
		PHASE B TRAIN A alarm LIT [M-6C, A5].
		 PHASE B TRAIN B alarm LIT [M-6C, A6].
	 	d. ENSURE RCPs STOPPED.
		e. VERIFY Phase B valves CLOSED:
		Panel 6K PHASE B GREEN.
		Panel 6L PHASE B GREEN.

Appendix D		Required Operator Actions					Form ES-D-2					
Op Test No.:	NRC 2010302	Scenario #		Event #	ES-0.5	Page	42	of	44			
Event Descriptio	on: Equip	ment verificatior	าร									

Time	Position	Applicant's Actions or Behavior
		ES-0.5, EQUIPMENT VERIFICATIONS
		 WHEN 10 minutes have elapsed, THEN ENSURE containment air return fans RUNNING.
		14. MONITOR if containment vacuum relief isolation valves should be closed:
		a. CHECK containment pressure greater than 1.5 psig.
		 b. CHECK cntmnt vacuum relief isolation valves CLOSED: [Pnl 6K MANUAL] FCV-30-46 FCV-30-47 FCV-30-48.
	BOP	 15. CHECK secondary and containment rad monitors USING the following: Appendix A, Secondary Rad Monitors (attached) Appendix B, Containment Rad Monitors. (attached)
	BOP	 WHEN directed by E-0, THEN PERFORM Appendix D, Hydrogen Mitigation Actions.
		17. CHECK pocket sump pumps STOPPED: [M-15, upper left corner]
		 HS-77-410, Rx Bldg Aux Floor and Equipment Drain Sump pump A HS-77-411, Rx Bldg Aux Floor and Equipment Drain Sump pump B.
	BOP	18. DISPATCH personnel to perform EA-0-1, Equipment Checks Following ESF Actuation.
	BOP	19. ENSURE plant announcement has been made regarding Reactor Trip and SI.
Evaluator No		and SI. pletes ES-0.5 including Appendices A & B and reports completion g any discrepancies and actions taken) to SRO.
		END (ES-0.5, EQUIPMENT VERIFICATIONS)

Appendix D	·	Requ	uired Ope	erator Actio	ons	· · · · · · · · · · · · · · · · · · ·	For	m ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	7	Event#	ES-0.5	Page	_43	of	44
Event Description	on: Equip	ment verificatio	ns						

	(ES-0.5, EQUIPMENT VERIFICATIONS)							
	APPENDIX A							
	SECONDARY RAD MONITORS							
BOP	 CHECK following rad monitors including available trends prior to isolation: 							
	 Condenser exhaust recorder RR-90-119 S/G blowdown recorder RR-90-120 							
	Main steam line rad monitors							
	 Post-Accident Main Steam Line rad recorder RR-90-268B points 3 (blue), 4 (violet), 5 (black), and 6 (brown). 							
	[M-31 (back of M-30)]							
BOP	2. IF secondary radiation is HIGH,							
	THEN							
	ENSURE Unit Supervisor notified.							
	END OF TEXT							

APPENDIX B							
 	CONTAINMENT RAD MONITORS						
BOP	1. CHECK following rad monitors:						
	 Upper containment high range rad monitors RM-90-271 and RM-90- 272 NORMAL [M-30] 						
	 Lower containment high range rad monitors RM-90-273 and RM-90- 274 NORMAL [M-30] 						
	 Containment rad recorders RR-90-112 and RR-90-106 NORMAL [M- 12] (prior to isolation). 						
BOP	2. IF secondary radiation is HIGH,						
	THEN						
	ENSURE Unit Supervisor notified.						
 L							
	END OF TEXT						

Appendix D		Requ	uired Ope	erator Actio	ons		For	m ES	S-D-2
Op Test No.:	NRC 2010302	Scenario #	7	Event #	Critical Task(s)	Page	44	of	44
Event Descriptio	on: Critica	al Task Listing							

Critical Tasks:	Critical Task Statement	Action Location	ESG pg #
1.	Insert Negative reactivity using control rods or boration prior to completion of FR-S.1	FR-S-1 Step 1 RNO; Step 4	28 29
2.	Isolate AFW flow to the Faulted SG (#3 SG) by stopping AFW flow within 10 minutes of E-0 entry from FR-S.1	E-0 POAs (incl FOP items)	32 or 35
	Time critical action per 0-TI-OPS-000-004.0 r1	ES-0.5 Step 10.b	42



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Sequoyah Nuclear Plant

Unit 1 & 2

General Operating Instructions

0-GO-5

NORMAL POWER OPERATION

Revision 0065

Quality Related

poly dato

Level of Use: Continuous Use

Effective Date: 03-12-2010 Responsible Organization: OPS, Operations Prepared By: W. T. Leary . Approved By: P. R. Simmons

Current Revision Description

Revised to address requirements overlooked in the initial issuance of the guidance for compliance with NERC Reliability Standards, VAR-002. These changes make no alteration to the operation of any equipment and are changes to required administrative notifications only. These changes are therefore minor editorial changes as defined in SPP-2.2.

PERFORMANCE OF THIS PROCEDURE IMPACTS REACTIVITY.

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ATTACHMENTS

Attachment 1: NORMAL POWER OPERATION

1.0 INTRODUCTION

1.1 Purpose

This General Operating (GO) Instruction provides guidance for power ascension from approximately 30 to 100% power, at power conditions, power reduction from 100 to 30% power, Power Coastdown at End of Life operations, and Load Follow operations.

This instruction provides additional guidance for turbine control restoration following a turbine runback.

1.2 Scope

This GO contains the following sections:

- 5.1 Power Ascension From 30% Power to 100%
- 5.2 At Power Conditions
- 5.3 Power Reduction From 100% to 30%
- 5.4 Power Coastdown at End of Life
- 5.5 Load Follow Operations

2.0 REFERENCES

2.1 Performance References

- A. 1,2-SO-5-1, Feedwater Heaters and Moisture Separator Reheaters
- B. 1,2-SO-5-2, No. 3 Heater Drain Tank and Pumps
- C. 1,2-SO-5-3, No. 7 Heater Drain Tank and Pumps
- D. 1,2-SO-2/3-1, Condensate and Feedwater System
- E. 1,2-SO-2-9, Condenser Vacuum and Turbine Steam Seal Systems Operation
- F. 0-SO-12-1, Auxiliary Boiler System
- G. 0-SO-35-4, Monitoring Generator Parameters
- H. 0-SO-58-1. Main Generator Bus Duct Cooling System
- I. 0-SI-NUC-000-038.0, Shutdown Margin
- J. 1,2-SO-62-1, Chemical and Volume Control System
- K. 0-SO-62-7, Boron Concentration Control
- L. 1,2-SO-62-9, CVCS Purification System
- M. 0-SO-68-3, Pressurizer Spray and Heater Pressure Control System
- N. 0-SO-85-1, Control Rod Drive System
- O. 0-PI-OPS-000-666.0, River Temperature Limits Specified by NPDES permit
- P. 0-SI-OPS-092-078.0, Power Range Neutron Flux Channel Calibration By Heat Balance Comparison
- Q. 0-SI-CEM-000-050.0, 72-Hour Chemistry Requirements
- R. 0-SI-CEM-030-407.2, Radioactive Gaseous Waste Effluent Particulate and Iodine Dose Rates from Shield and Auxiliary Building Exhausts (Weekly/Special) and Condenser Vacuum Exhausts (Special)
- S. 0-SI-CEM-030-415.0, Gaseous Effluent Requirements (Gross Alpha, Noble Gas and Tritium
- T. 0-SI-OPS-000-001.0, Initial Startup System Parameter Log
- U. TI-40, Determination of Preconditioned Reactor Power

2.1 **Performance References (continued)**

V. 2-SO-98-1, Distributed Control System

2.2 Developmental References

- A. Memorandum from System Engineering concerning MSR operation RIMS S57 880322 999
- B. Memo from Reactor Engineering RIMS S57 941219 934
- C. S57-880322-999 and S57-880808-851
- D. <u>W</u> Letter GP89-076 (RIMS No. S53 890427 984)
- E. <u>W</u> Letter GP 89-155 (RIMS S57 891026 972)
- F. <u>W</u> Letter GP 86-02(B44 861112 002)
- G. SSP-2.3, Administration of Site Procedures
- H. TVA-NQA-PLN89-A
- I. GOI-10, Reactivity Control at End of Cycle Life (Trojan Nuclear Plant)
- J. FSAR, Section 13.5
- K. Memo from Reactor Engineering August 6, 1996 (G Bair)
- L. NERC Reliability Standard, VAR-002-1.1b

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Precautions

To ensure that NIS Reactor Power level indications remain within 2% of true power during power level changes, a check should be performed about every 20% power level change, when greater than 15% power, by comparing calorimetric power to each NIS Power Range drawer. The 20% power level check does not preclude the operating crews from making necessary changes in response to changing plant conditions.



TRM 3.3.3.15 requires LEFM core thermal power (U2118) to be used to perform 0-SI-OPS-092-078.0 above 15% reactor power. LEFM indication is available if the following conditions are met:

- LEFM status NORMAL on ICS Calorimetric Data screen.
- LEFM core thermal power (ICS point U2118) shows good (green) data.
- LEFM MFW header temp (ICS point T8502MA) greater than or equal to 250°F.

If LEFM indication is NOT available above 15% reactor power, then TR 3.3.3.15 action must be entered.

C.) The following should be used to determine the most accurate reactor power indication for comparison with NIS:

- When reactor power is greater than 15%, use LEFM calorimetric power indication (U2118).
- If LEFM is NOT available, then use average loop ∆T (UO485 or M-5 indicators) up to 40%. Above 40%, use computer point U1118.

The turbine should be operated in "IMP OUT" control during normal unit operation. "IMP IN" operation results in system swings and should only be used during the performance of valve tests. (W Ltr GP 89-155; RIMS S57 891026 972)

Pressurizer heaters and sprays may be operated as required to maintain pressurizer and RCS boron concentration within 50 ppm. If loop boron concentration is changed by 20 ppm or greater, use the pressurizer backup heaters to initiate automatic spray (if available). If Normal Spray is NOT available, then use Auxiliary Spray (1, 2-SO-62-1, Section 8.7) in conjunction with pressurizer backup heaters.

Condensate DI polishing operations during power ascension are controlled by staying within system parameters and by recommendations from the Chemistry Section.

) The valve position limiter should be periodically positioned approximately 10% above the current governor control indications (keeps governor valves off of the limiter) as turbine load is changed. This prevents inadvertent load increases by limiting governor valve opening and allows a faster response of the runback feature which ensures main feedwater system will supply the required amount of flow.

Any off-frequency turbine operation is to be reported to Engineering for record keeping. The report will include duration and magnitude of off-frequency operation.

Operation at off-frequencies is to be avoided in order to prevent the probable occurrence of turbine blade resonance. Prolonged periods of operation at certain off-design frequencies could cause excessive vibratory stresses which could eventually generate fatigue cracking in the blades. Off-frequency operation is permitted to the degree and time limit specified on the chart "Off-Frequency Turbine Operation", Figure A.26 of TI-28.

The potential exists for condensation formation in steam extraction lines when feedwater heaters are isolated.

Initial Startup After Refueling - After refueling operations, the NIS indications may be inaccurate until calibration at higher power levels. The NIS calibration procedures will adjust the PRM trip setpoints to ensure that the excore detectors do not contribute to an overpower condition at the following RTP hold points. Reactor Engineering and/or Systems Engineering will determine procedure performance. [C.3]

At < 50% RTP a flux map and single point alignment, a hot channel factor determination, an axial imbalance comparison, and a PR NIS calibration will be performed. The PR high range trip setpoint will then be increased to its normal value of 109%.

2. At < 75% RTP, calorimetric calculations and RCS flow verification may be performed, EAGLE-21 updated prior to increasing power, a flux map, a hot channel factor determination, an axial imbalance comparison may be required if not performed at < 50%, a detector calibration (if \triangle AFD \ge 3%), and a PR NIS calibration may be performed.

3.

If not performed at 75% hold point, an axial imbalance comparison and a detector calibration (if Δ AFD \geq 3%) should be performed at ~ 100% RTP. Engineering will determine if PR NIS calibration must be performed. Calorimetric calculations, RCS flow verification, a hot channel factor determination, and a reactivity balance will be performed and EAGLE-21 updated. Reactor Engineering will notify Operations that normal full power operations may proceed.



Preconditioned Power Levels and Maximum Allowable Rates of Power Increase are specified in TI-40, *Determination of Preconditioned Reactor Power*.



During initial startups, based on Westinghouse recommendations, a lower power ramp rate limit has been implemented for power levels above the intermediate power threshold. The Intermediate Power Threshold is unit/cycle dependent and is determined by the Vendor. Refer to TI-40.



ICS will automatically monitor pre-conditioned power level as follows:



Point U1127 is reactor power in percent of RTP based on either secondary calorimetric or RCS Δ T depending on power level.



Point UO103 is a 20 minute rolling average of reactor power rate-of-change fitted over a 20 minute period. UO103 is a leading indicator of %/hour power ramp rate and can be used in deciding to speed up or slow down the ramp rate.



Point UO104 is a 1 hour rolling average of reactor power rate-of-change fitted over a 1 hour period. *UO104 is used in demonstrating compliance with fuel pre-conditioning power ramp rate limits*.



Point K0058 is the currently qualified (or pre-conditioned) power level.



These points can all be monitored with the ICS group display "TI40". Appendix A may be used if the ICS is unavailable.

Declared fuel defects, as determined by the Fuel Reliability Assessment Team A or the Shift Manager, have limited ramp rates during Reactor Power increases as specified in TI-40.



TI-40 power increase limits that are exceeded, in any one hour, are evaluated in accordance with SPP-3.1.

- N. Power Coastdown At End Of Life:
- Reactor power changes should be limited to less than or equal to 1% per hour to avoid causing xenon peaking which could force a plant shutdown.
 - 2. Do not perform unnecessary unit power maneuvers or testing (e.g., turbine valve testing). Such testing could result in an uncontrollable Xenon oscillation.
 - 3. Nonessential work on systems which could cause a plant upset should be deferred.
 - 4. Secondary Plant runbacks such as Main Feed Pump Turbine trip or #3 Heater Drain Tank runback will require a unit shutdown if Reactor power is not promptly returned to pre-transient level due to the resulting severe Xenon transient. If a system power alert is in effect, and electrical generation is critical, unit load should be reduced as necessary keeping T_{AVG} on program. Contact Reactor Engineering for an evaluation and guidance concerning unit shutdown or reduction of load.
 - 5. Management should be consulted to evaluate the feasibility of a unit restart if a reactor trip occurs with RCS equilibrium boron concentration less than 50 ppm. If the reactor is to be restarted, the power level shall be limited to nominal pre-trip power level.

Axial Flux Difference Management:

When the reactor is operating at a steady power or during normal load changes, maintain ΔI within the operating limits of the Core Operating Limits Report (COLR). It is recommended that the core axial flux difference (AFD) be maintained within \pm 5% of the target band at all times, excluding the performance of 0-PI-NUC-092-036.0, "Incore - Excore Calibration," and End of life power coast downs. Operating time outside the band, which is given in TI-28 Attachments 1 and 2, should be minimized. Reactor Engineering should be contacted if time out of the \pm 5% target band exceeds approximately 30 minutes.

The position of control bank D should normally be \geq 215 steps when power level is steady state at or above 85% RTP. At steady state power levels below 85%, control bank D should normally be \geq 165 steps. If rod position is more than 5 steps below this guidance for long term, then impact may occur to safety analysis assumptions.

Ð

During heatup and cooldown transients, RCS density changes will cause changes in NIS indicated power. At constant reactor power, a 1°F change in T_{AVG} may cause as much as a 1% (or more) change in indicated NIS power.

R. The following limitations are applicable to Unit Two ONLY.

#1. In winter months #7 HDTP capacity is not adequate to pump #6 Heater drains when all Condensate Demineralizer pumps are in service. Current practice is to run two Cond DI Pumps and / or throttle the condensate system to reduce backpressure. The preferred method is to throttle condensate pressure instead of running only two Condensate Demineralizer booster pumps at full power due to pump runout concerns.

- 2. Siemens-Westinghouse analysis has determined that the maximum unit power with one MFP operation is 65% under worst case conditions. The plant could operate higher if plant conditions permit.
- 3. MFP flow from the lead MFP should not exceed 53.7% of the total flow. Flow rates above this would result in HP steam flow to the lead MFPT. Computer points 1(2)UO504 and UO505 can be used to monitor.

) Voltage Control

NOTE

Failure to comply with the NERC VAR-002 requirement could result in a Utility Violation and / or monetary penalties.



Operation of the Main Generator without Automatic Voltage Control could impact grid voltage requirements. Refer to GOI-6 for MVAR limits.



When the Main Generator is connected to the grid, the voltage regulator shall be operated in Automatic, unless coordinated with the Transmission Operator (SELD).



Main Generator operation outside of the Transmission Voltage Schedule requires coordination with the Transmission Operator, and notation in the operator's Log of time, reason, and that the Transmission Operator notification was made.



When directed to modify voltage, the Generator Operator shall comply (within plant procedural requirements) or provide an explanation of why the schedule cannot be met.



While the Main Generator is tied to the grid perform the following:



The Transmission Operator (SELD) shall be notified of any Voltage Regulator automatic trips to Manual or urgent Manual Transfers between AUTO and Manual as soon as practical but notification shall be within 30 minutes.



The Transmission Operator (SELD) shall be notified prior to a planned Voltage Regulator transfers between Manual and Auto.



All position changes (to and from Auto or Manual) of the Voltage Regulator shall be entered into the Narrative Log along with the date, time of position change, reasons, anticipated duration and notifications made.

Reliability Directives and Protective Relay/Equipment Failures

Failure to comply with the NERC VAR-002 requirement could result in a Utility Violation and / or monetary penalties.

Plant Operations shall notify the Transmission Balancing Authority (BA) or Transmission Operator of protective relay or equipment failures that creates a creditable risk to Plant Generation. A creditable risk to generation represents a potential reduction in transmission system reliability.

Reliability Directives to the Generator Operator are via the Balancing Authority or Transmission Operator. Required action time may range from immediate to no longer than 30 minutes. Actions shall be taken without delay. The directives may be associated with preventing or clearing Local System issues, or neighboring system issues.



Plant operations shall take timely actions as directed by the Balancing Authority or Transmission Operator to mitigate critical conditions to return the bulk electrical system to a reliable state. Plant operations shall comply with Balancing Authority or Transmission Operator directives unless such actions would violate safety, equipment, or regulatory or statutory requirements.



Plant Operations shall immediately inform the Balancing Authority or Transmission Operator of the inability to perform directives so that the TVA Reliability Entities may implement alternate remedial actions.

3.2 Limitations

When the axial flux difference monitor alarm is inoperable, the AFD must be logged every hour by performing 0-SI-NUC-000-044.0.

(SR 4.2.1.1.a.2 & 4.2.1.1.b)

When both the plant computer and NIS QPTR alarm systems are inoperable, the QPTR must be calculated every 12 hours by performing 0-SI-NUC-000-133.0. (SR 4.2.4.1.b)



Do not exceed a load change rate of plus or minus 5% per minute or a step change of 10%.



River water temperatures shall be maintained within the limitations of the NPDES permit as specified in 0-PI-OPS-000-666.0.

NOTE

Westinghouse should be contacted if the turbine is operated outside of its operating limits as stated below.

 To prevent high vibratory stresses and fatigue damage to the last stage turbine blading, do not operate the turbine outside of limits listed below: [W Ltr GP 86-02 (B44 861112 002)]



At loads less than or equal to 30% (350 MW), the maximum permissible backpressure is 1.72 psia. (3.5" Hg)

At loads greater than 30%, the maximum permissible backpressure is 2.7 psia (5.5" Hg) with a 5 minute limitation before tripping the turbine.

Do not allow the generator to become underexcited.

In the event of a change in the rated thermal power level exceeding 15% in one hour, notify Chemistry to initiate the conditional portions of 0-SI-CEM-000-050.0, 0-SI-CEM-030-407.2 and 0-SI-CEM-000-415.0 due to the thermal power change.

3.2 Limitations (continued)

The following Main Turbine vibration limitations and actions should be adhered to:

Vibration levels which exceed 7 mils (alarm setpoint) should be verified by Predictive Maintenance Group.

2. V

Vibration levels greater than 7 mils and less than 14 mils should be continuously monitored by Predictive Maintenance Group.



IF vibration level is greater than or equal to 14 mils, THEN TRIP the turbine.

Westinghouse recommends that if any throttle valve is held closed for more than 10 minutes, then it should be re-tested immediately upon reopening in accordance with 1,2-PI-OPS-047-002.0.

The generator may be operated without a bus duct cooler up to approximately 729 MW turbine load.

To ensure sufficient voltage for a safe shutdown after loss of both units, voltage and reactive power should be maintained within the limits of GOI-6.

With LEFM calorimetric power indication available, full power operation is defined as approximately 3455 MW_T not to exceed 3455.0 MW_T averaged over a 8-hour period. [C.1] If LEFM is available, power shall be monitored using plant computer point U2118 Instantaneous Value. **DO NOT** allow average thermal power to exceed 3455 MW thermal for two consecutive hours. Every effort should be made to maintain core thermal power 10 minute average less than 3455 MWt.

The following restrictions apply if LEFM calorimetric power indication (U2118) is unavailable:

Applicable action of TRM 3.3.3.15 must be entered.

AFD limits in COLR and TI-28 must be made more restrictive by 1%.



Rod insertion limits in COLR must be raised by 3 steps.



If reactor power is greater than 40%, power should be monitored using U1118. If U1118 is also unavailable, use the highest reading NIS channel.



If reactor power is less than 40%, use the RCS average ΔT as the preferred method for determining power level.

3.2 Limitations (continued)

IF equilibrium conditions are achieved, after exceeding by 10% or more of rated thermal power the thermal power at which the heat flux hot channel factor was last determined, THEN conditional performance of 0-SI-NUC-000-126.0, Hot Channel Factor Determination is required.

At low power levels, the LP Heaters may be unbalanced in extraction steam supply use and heat pickup across the condensate side of the heater string. This condition should correct itself as the unit approaches 45-50% Turbine Power. (Ref: PER 99-003789-000)

With one LP heater string out of service (isolated), power is limited to 86% (Unit 1) or 90% (Unit 2). This is based on LP turbine blading limitations. (Ref: DCN E21203A).

#3 heater drain tank should remain drained with LCV-6-105A and B failed open (per 1, 2-SO-5-2) until reactor power exceeds ~45-50%. This will prevent intermediate heater string isolations if a turbine trip occurs at lower power levels. If a level is established in the number 3 Heater Drain Tank prior to exceeding P-9 setpoint (50% power), a turbine trip will result in Intermediate Pressure Heater string isolation(s).

SQN Unit 1 & 2		NORMAL P	POWER OPE	RATION	0-GO-5 Rev. 0065 Page 15 of 10	0
START 4.0 PRERE		t		Unit		Date <u>Toda</u>
/			NOTE	:S		
N/A'd if the	e con	Instruction wh dition does not ay be complete	t exist.		exists, the step	should be
						തി
(HT) I	ENSU	IRE Instruction	n to be used i	s a copy of ef	fective version.	PO 1 Tocky
(+2) -	T _{avg} i	s being mainta	ined within 1	.5°F of T _{REF} .		F
		vel controls are f auto control l			0	Ð
	Core	ol rods are bei Operating Limi f shutting dow	its Report (C	OLR)	perating band of gned rod).	
		n dump contro if Tavg Mode N			e	B
		HC system sh button lit).	ould be in O	PER AUTO		D
		rator pressuriz . (TI-28, Fig.		ogen accordin	g to capability	Ð
	PRM: readii	0	intained with	in ±2% of core	e thermal power	
			(NOT	Ê		

During start up after a cold shutdown the Condensate DI normally will be aligned for full flow polishing until the MSRs are in service.



ENSURE Condensate DI polishing operation in accordance with RCL recommendations.

MENI Segur

U	SQN Init 1 & 2	NORMAL POWER OPERAT	ION 0-GO-5 Rev. 006 Page 16	
		i i i i i i i i i i i i i i i i i i i	t	Date 10
4.0	PRER	EQUISITES (continued)		
	[10]	ENSURE each performer documents	their name and initia	als:
		Print Name	Initials	
		REACTOR Openander 1	POI	
	-	Restator (percator 2	POR	
		Sr Reactor Operator	SAC	
		Shift Manuier	<u> </u>	
		REPATION ENGINEER	<u> </u>	
		Monisty Superviser	ab	

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5.0 INSTRUCTIONS

CAUTION

Steps of this procedure must be performed sequentially, unless specifically stated otherwise.

NOTES

Radiation Protection should be notified during normal plant operations if power level increases or decreases are either stopped or started.

Guidance on restoration of EHC Controls after a BOP runback is contained in Appendix B, *Turbine Runback Restoration*. [C.4]

SQN Unit 1 & 2		ROPERATION	0-GO-5 Rev. 0065 Page 18 of 100
STARTUP	No	Unit _/	Date
.1 Power As	cension From 30% to	100%	
_		NOTES	
Failure to com Violation and/	oply with the NERC VA or monetary penalties.	R-002 requiremer	nts could result in a Utility
automatic trip	ssion Operator (SELD) s to Manual or urgent N ical, but within 30 minu	Manual Transfers	of any Voltage Regulator between Auto and Manual as
The Transmis Regulator trar	sion Operator (SELD) nsfer between Auto and	shall be notified pi d Manual.	rior to a planned Voltage
the Narrative	anges (Auto or Manua Log along with the date notifications made.	I) of the Voltage R e, time of position	Regulator shall be entered into change, reasons, anticipated
Operation of r voltage requir	nain generator without ements. Refer to GOI 6	automatic voltage 6 for MVAR limits.	e control could impact gird
notification be	made to the Transmis entries shall be made	sion Operator (SE	dule in GOI-6 requires that ELD) within 30 minutes. date, reason & duration, and
Log entries be	or operation without Au e made (time, date, rea uty Specialist (ODS) wi	ison & duration) ai	control requires that Narrative nd that notification be made to
Confirmation i reactor power	from Chemistry Sectior	n SHALL be obtai	ned prior to exceeding 30 %

ENSURE Section 3.0 Precautions and Limitations has been reviewed and Section 4.0, Prerequisites complete.

3NO

VERIFY from Chemistry Section that SG and feedwater secondary chemistry is within acceptable limits.

tt Seiper

Chemistry personnel contacted



E

IF this is a startup following refueling, THEN

ENSURE applicable portions of 0-RT-NUC-000-001.0 are COMPLETE for operation above 35% power.

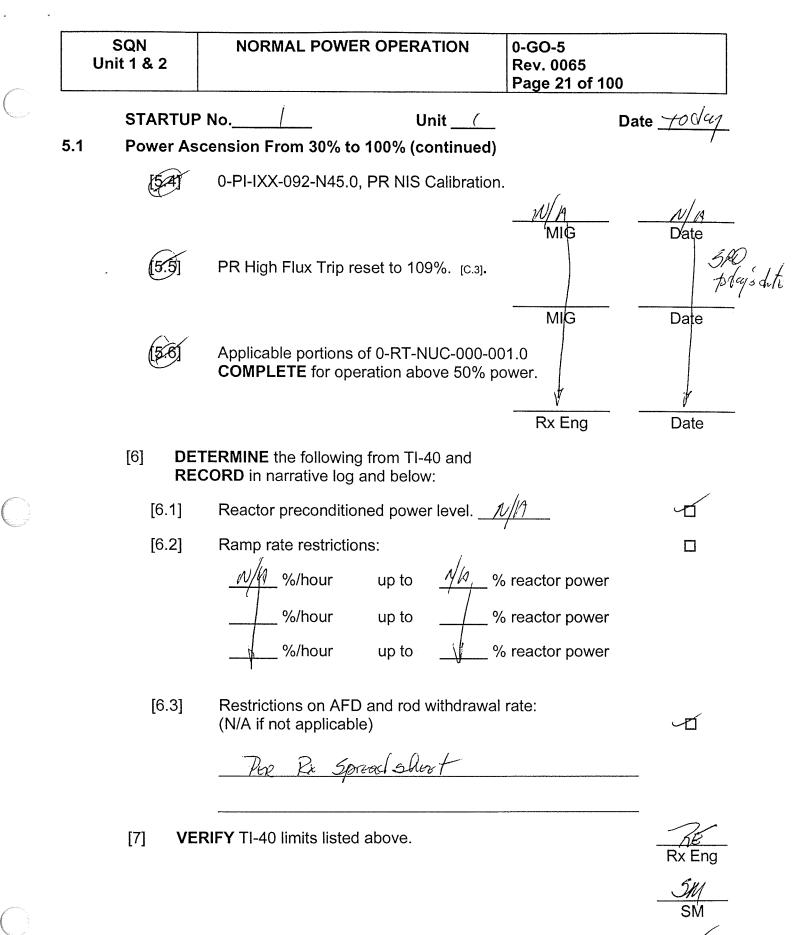
Rx Engr.

U	SQN nit 1 & 2	NOR		ERATION	0-GO-5 Rev. 0065 Page 19 o	
	STARTUP	• No(Unit/		Date/
5.1	Power As	cension F	rom 30% to 100%	o (continued	d)	
			NOT	ES		
Đ-	This step may	/ be perforr	ned out of sequer	ice as neces	ssary to meet p	ower level.
)-SI-OPS-092 PRMs is indic	2-078.0 ma ating close	y be performed at to the $\pm 2\%$ tolera	the discretion	on of the Oper	ator if one or mo
	[4] PEF	✓ RFORM the	e following at appr	oximately 3	5% reactor pov	ver:
	[4.1]	IF LEFM Then	indication is avail	able,		
			_ATE Calorimetric		1	
	Calorimetri	ic power= l	J2118 <u>////</u> 34.5		<u>ic/14_%</u>	
						1 the
	[4:2]	IF LEFM Then	indication is NOT	available,		·
		CALCUI	ATE reactor pow	er:	,	,
	Average	value of R0	CS ∆T (U0485)=		<u>~/14 %</u>	N/17
	(4.3)		all NIS Power Rai 2% of the calculat			
		N-41	(XI-92-5005B)	YES 🗆	NO 🗆	
		N-42	(XI-92-5006B)	YES 🗆	NO 🗆	
		N-4 3	(XI-92-5007B)	YES 🗆	NO 🗆	
		N-44	(XI-92-5008B)	YES 🗆		
		IF any of THEN	the above steps a	are checked	I NO,	
						1

	SQN Jnit 1 & 2	NORMAL PO	WER OPERATION	0-GO-5 Rev. 0065 Page 20 of 10	0
	STARTU	P No /	Unit		Date <u>+0 19</u>
5.1	Power As	scension From 30%	ն to 100% (continue	ed)	- /
	[4.6]	continuously duri AND	s deviation from core	nis procedure	
)			OPS-092-078.0 if th	e deviation is >2%.	PÔ
15%	× With reactor.		NOTES		
Ó	may be perfo	engineering concurre ormed in parallel with	ence, power increas i this step.	e per steps 5.1[6] t	hrough 5.1[10]
-	tor power incl	ollowing refueling op rease, then N/A Ster med at ≈ 45% React	p 5.1 5]. (Startup Re	eactivity Calibration	s and Tests
	5 IF s	startup is following re	efueling activities and	d secondary	
		emistry hold is preclu	iding power ascension	on, THEN	
	EN: exc	SURE the following seeding 50% rated the order)	have been performe	on, THEN d prior to	
	EN: exc	SURE the following eeding 50% rated th order)	have been performe	on, THEN d prior to be performed in actor Determination <i>N / f</i> 2	iv/14-
	EN: exc	SURE the following seeding 50% rated th order) 0-SI-NUC-000-12	have been performe nermal power: (May l	on, THEN d prior to be performed in actor Determination 	///- Date

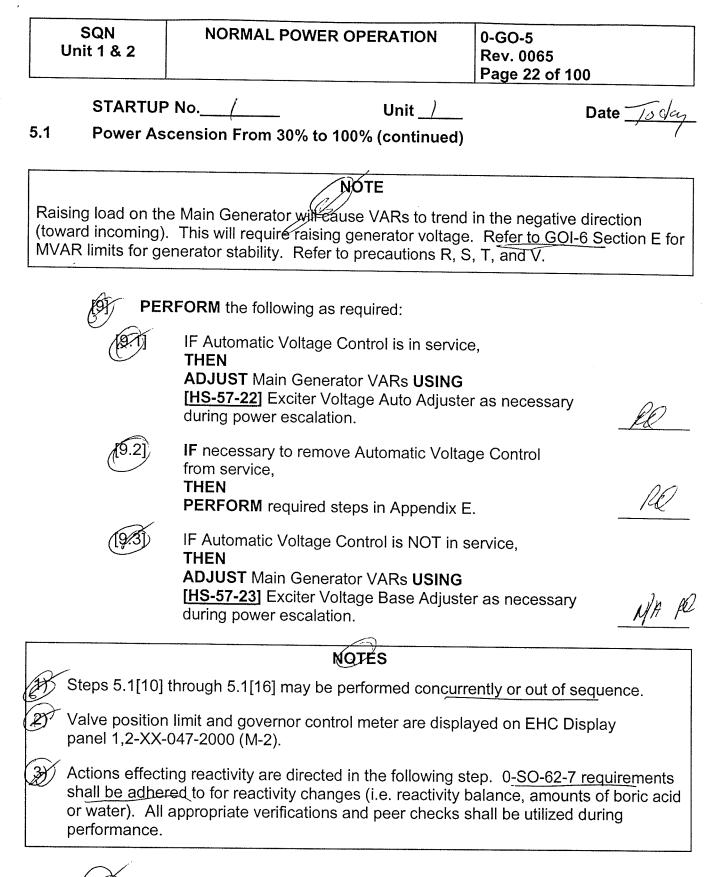
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[8] **MONITOR** TI-40 limits (using ICS trend features if available).

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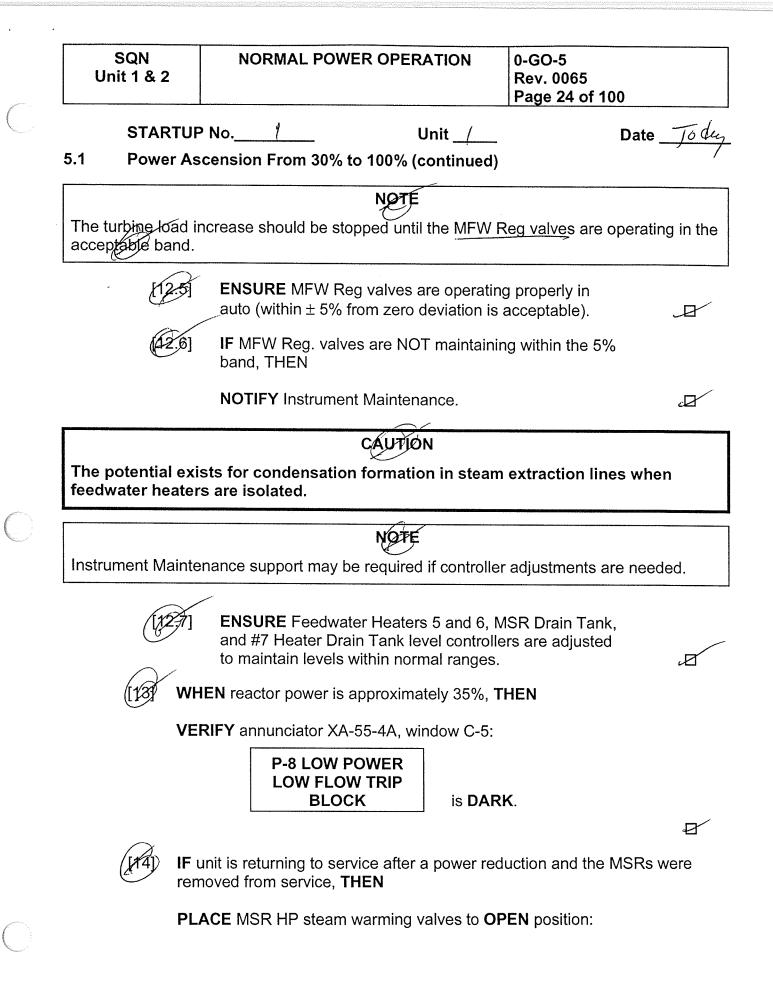


INITIATE power increase to between 45 and 49% and

MAINTAIN valve position limit approximately 10% above current governor control indication as turbine load is changed.



U	SQN Init 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 23 of 100
	STARTUF	• No/ Unit/	Date
5.1	Power As	cension From 30% to 100% (continued)	
		NOTE	
		be used <u>along with dilution during</u> reactor get control band.	power increase to maintain
	IT IF a	liluting the RCS to increase T _{AVG} , THEN	
		NTINUE dilution and increase turbine load T _{AVG} .(0-SO-62-7)	to maintain T _{REF} 4
	E PE	RFORM the following during power increa	se:
.		NOTE	·····
T _{AVG} 0.31	will be progra 2°F per % po	ammed from 547°F at no load to 578.2°F a	at 100% load at a rate of
	(12.1)	MONITOR TAVG following TREF on pro	gram. 4
	[12.2]	MONITOR pressurizer level on program (25 to 60% as a function of T_{AVG}).	n
		NOTE	
	FM is availab OT available,	le, computer point U2118 should be used use U1118 when greater than or equal to	as true reactor power. If Li 40% and the average value
is N0	ΔT when les	s inan 40%.	
is N0		MONITOR all RPIs, group step counter limits and inoperable rods or rod misali and NIS for correct power distribution a power tilts.	gnment, Loop ∆T,
is N0		MONITOR all RPIs, group step counter limits and inoperable rods or rod misali and NIS for correct power distribution a	gnment, Loop ∆T,
is N(RCS Gen appr	AT when les [1223] erator MVAR	MONITOR all RPIs, group step counter limits and inoperable rods or rod misali and NIS for correct power distribution a power tilts. NOTE s may be reduced if the Generator Stator of larm value of 50%. Refer to <u>GOI-6 Secti</u> o	gnment, Loop ∆T, Ind quadrant J Ground Fault Relay indicatio



S	QI	N		
Unit	1	&	2	

0-GO-5 Rev. 0065 Page 25 of 100

STARTUP No.

Unit

Date 10 der

-17

P

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5.1 Power Ascension From 30% to 100% (continued)

MSR	HANDSWITCH	WARMING VALVE	INITIALS
A1	HS-1-142	FCV-1-142	<u> </u>
· B1	HS-1-144	FCV-1-144	<u></u>
C1	HS-1-146	FCV-1-146	<u></u>
A2	H8-1-136	FCV-1-136	<u></u>
B2	(HS-1-138	FCV-1-138	<u></u>
C2	HS-1-140	FCV-1-140	<u></u>

NO⁻

#3 heater drain tank should remain drained with LCV-6-105A and B full open until reactor power exceeds ~45-50%

> ENSURE #7 heater drain tank is on recirc in accordance with 1,2-SO-5-3.

ENSURE the remaining available pumps are aligned and ready for service in accordance with 1,2-SO-2/3-1:



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Condensate booster pumps.



Hotwell pump.

SQN Unit 1 & 2	NORMAL POWE	ROPERATION	0-GO-5 Rev. 0065 Page 26 of 100	
	P No	Unit		te <u>76 (</u>
5.1 Power As	scension From 30% to	100% (continued)	1	
		NOTES		·
ensure that the acceptable b	g additional condensate he MFW Reg. valves re and.	e pumps in service, e espond correctly and	or HDT pumps in se I then stabilize in the	rvice, e
The following was previous	g step may be performe sly performed in 0-GO-4	d out of sequence a	and may be marked	N/A if it
[17]) WH	JEN the condensate bo	oster pump reaches	s approximately	
J40) amps, THEN ART the f ollowing pump			
[17.]]	Third HW pump (if a		,	Pa
[17.2]	Second CBP.			R
		NØTES		
When placing MFW Reg. va	g additional condensate alves respond correctly	pumps or HDT pur and then stabilize i	mps in service, ensu n the acceptable bai	re that t nd.
With approva may be defer	Il from Ops Superintenc red until turbine load is	lent, pumping forwa approximately 60%	ard of #7 Heater Dra	in Syste Is warra
(3) Steps 5.1[18]] through 5.1[23] may b	e performed out of s	sequence.	
(18) WH that	IEN confirmation obtain t #7 heater drain tank c	ed from Chemistry hemistry is in limits,	Section THEN	
			drain tank numna	
ST/ usir	ART pumping forward ung 1,2-SO-5-3.	using the #7 heater	urain tank pumps	lle
usir (19) MA	ART pumping forward ung 1,2-SO-5-3. INTAIN Condensate Bo ater than or equal to 75	boster Pump suction		

C

SQN Unit 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 27 of 100
STARTU	P No Unit	Date $T_0 \phi$
5.1 Power As	scension From 30% to 100% (continued	-
	CAUTIONS	nan anna an an Anna an
MSR heatup (automatic r contract 85F	b limits are restricted to 100°F per hour mode) or 50°F in a 30-minute period (ma P62-836839)	or 25°F in a 15-minute period anual mode). (SECO limits,
On the LP tu rate of chan	urbine inlet, do NOT exceed an instanta ge of 125°F/Hr for turbine expansion co	neous change of 50°F or a onsiderations.
rate of chanFor a cold s	ge of 125°F/Hr for turbine expansion co tart, the HP bundle warming valves sho	onsiderations.
rate of chanFor a cold s	ge of 125°F/Hr for turbine expansion co	onsiderations.
For a cold s 15 minutes	ge of 125°F/Hr for turbine expansion co tart, the HP bundle warming valves sho before bringing the MSR in service.	onsiderations. ould be opened at least
For a cold s 15 minutes I Placing MSR	ge of 125°F/Hr for turbine expansion co tart, the HP bundle warming valves sho	onsiderations. ould be opened at least
rate of chan For a cold s 15 minutes I Placing MSR Step 5.1[21]	ge of 125°F/Hr for turbine expansion co tart, the HP bundle warming valves sho before bringing the MSR in service. NOTES Is in service before 35% turbine load can o	onsiderations. ould be opened at least
rate of chan For a cold s 15 minutes I Placing MSR Step 5.1[21]	ge of 125°F/Hr for turbine expansion co tart, the HP bundle warming valves sho before bringing the MSR in service. NOTES As in service before 35% turbine load can o may be N/A'd if MSRs are in service.	onsiderations. ould be opened at least

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C

SQN Unit 1 & 2		NORMAL POWER OPERATION		Rev. 0065		
	STARTUP	No		Unit _	(Date <u>-/o</u>
5.1	Power Ase	cension	From 30% t	o 100% (contin	ued)	
	[21.2]	CLOS	E the followir	ng steam inlet le	akoff isolation valv	es:
		MSR	VALVE	POSITION	INITIALS	
			(1-679	CLOSED	ROI	
		A-1	(17)14	CLOSED		
		B-1	(7)680	CLOSED		
		B-1	(1-1715	CLOSED		
		C-1	13681	CLOSED		
		0-1	<i>(X)</i> 716	CLOSED		
		A-2	(1-682	CLOSED		
			1717	CLOSED		
		B-2	6/683	CLOSED		
			(12718	CLOSED		
		C-2	1-684	CLOSED		
			(1719	CLOSED		

NOTE

Due to interlocks on MSR valves, bypass valves must be opened prior to main isol valves. For example: Open FCV-1-241 and when full open, then open FCV-1-141.

ENSURE MSR HP steam supplies ALIGNED as follows:

MSR	EQUIPMENT	HANDSWITCH	POSITION	\checkmark
RX	MSR BYPASS ISOL	HS-1-241A	OPEN	
Ø	MSR MAIN ISOL	HS-1-141A	OPEN	Ð
BA	MSR BYPASS ISOL	HS-1-243A	OPEN	Ø
E'	MSR MAIN ISOL	HS-1-143A	OPEN	Ø
R	MSR BYPASS ISOL	HS-1-245A	OPEN	کل
<u>e</u>	MSR MAIN ISOL	HS-1-145A	OPEN	Æ
(NG)	MSR BYPASS ISOL	HS-1-235A	OPEN	Ð
(Fe	MSR MAIN ISOL	HS-1-135A	OPEN	Æ
62	MSR BYPASS ISOL	HS-1-237A	OPEN	Ð
64	MSR MAIN ISOL	HS-1-137A	OPEN	Ð
(fa)	MSR BYPASS ISOL	HS-1-239A	OPEN	đ
(Mar	MSR MAIN ISOL	HS-1-139A	OPEN	

SQN Unit 1 & 2		NORMAL POWER OPERATION		0-GO-5 Rev. 0065 Page 29 of 100		
:	STARTU	IP No Unit			Date <u>7</u> 6	
5.1	Power A	scension From 30% to	100% (continued)		l	
			NOTES			
Cor	ntrol valve	es ramp open for 120 mi	nutes for turbine co	ld start.		
		l valves ramp open from tton was previously depre				
	[27.4]	DEPRESS the RAMI separator reheater content the reheater.			E	
	[21.5] *	IF MSR controls will THEN PERFORM the follow		MP mode,		
	L	A. DEPRESS MAN on MSR control	IUAL pushbutton panel.		<u>N</u> A	
		B. ADJUST manual MSR TCVs over continuing in this	al potentiometer to g r approx. 120 minut s procedure.	gradually open es WHILE	NI	
	[27.6]	OPEN all MSR OPEI (6-3 thru 6-93) on pa			_14	
		CLOSE all MSR STA (6-1 thru 6-91) on pa			R	
	[2]8]	PERFORM App. C to	o locally isolate MS	R startup vents.	Red	
	27.9]	ENSURE MSR HP s	team warming valv	es are CLOSED:		
	NSR	EQUIPMENT	HANDSWITCH	POSITION	\checkmark	
	(R)	MSR WARMING LINE	HS-1-142	CLOSED	Ŕ	
	BO	MSR WARMING LINE	HS-1-144	CLOSED	Æ	
		MSR WARMING LINE	HS-1-146	CLOSED	Ø	
	62	MSR WARMING LINE	HS-1-136	CLOSED	Ø	
		MSR WARMING LINE	HS-1-138	CLOSED	B	
	rø1	MSR WARMING LINE	HS-1-140	CLOSED		

SQN Unit 1 & 2		ORMAL POWER C	PERATION	0-GO-5 Rev. 0065 Page 30 of 100	
STAF	RTUP No		Unit/	Γ	Date <u>73 de</u>
5.1 Powe	er Ascensio	on From 30% to 10	0% (continued)		/
[2(nis power ascension rough March 31, TH		onths of October	
		FER to 0-PI-OPS-00 ineer for position of		•	NA
[2		nis power ascensior ugh September 30,		onths of April 1	
	OPI	EN MSR doghouses	' vent dampers.		
	OPI	EN MSR doghouses	s' vent dampers.		
Benchboard i determine he	instruments	PI-5-87A for #7 hea	ØTE	A for #6 heater ma	A
	instruments ater shell si IF #7 hea	PI-5-87A for #7 hea	ater and PI-5-84		
	instruments ater shell si IF #7 hea overpress PERFORI	PI-5-87A for #7 hea ide pressure. ter drain tank (HDT)	opressure is indic non 8.0, Infrequer	cating an	AU
determine he	instruments ater shell si IF #7 heat overpress PERFORI prevent #	PI-5-87A for #7 hea ide pressure. ter drain tank (HDT) ure condition, THEN M 1,2-SO-5-3, Secti	opressure is indic non 8.0, Infrequer zation.	cating an	AU
determine he	instruments ater shell si IF #7 heat overpress PERFORI prevent # WHEN ap	PI-5-87A for #7 hea ide pressure. ter drain tank (HDT) ure condition, THEN M 1,2-SO-5-3, Secti 7 HDT overpressuri	ater and PI-5-84 pressure is indic on 8.0, Infrequer zation. rbine load:	cating an nt Operation to	A

[23.2] **CLOSE** the drains on the operating main feedwater pump turbine (N/A other pump).

MFPT	DESCRIPTION	HANDSWITCH	POSITION	INITIALS
A	DRAIN VALVES	HS-46-14	CLOSED	
В	DRAIN VALVES	HS-46-41	CLOSED	

SQN Unit 1 & 2		NORMAL POWER OPERATION		0-GO-5 Rev. 0065 Page 31 of 100				
	STARTUP	No	Unit	Dat	e			
5.1	Power As	cension From 30 [°]	% to 100% (continue)	d)				
			NOTES					
1)	feed pump in or 65% (Unit 2	With verbal approval from the Operations Superintendent, placing the second main feed pump in service may be deferred until power is approximately 55% (Unit 1) or 65% (Unit 2). Logic prevents opening the standby MFPT condenser isolation valves if the pump is NOT reset prior to exceeding 9 million lbs/hr flow on the running pump.						
2)	allows one ch		rable in Mode 1 for up	tion for the trip of both to 4 hours when startir				
	[24] WH	EN approximately	40 to 45% turbine loa	d, THEN				
	PLA	ACE second MFP	T in service by perform	ing the following:				
	[24.1]	-	ns Superintendent has during the power asce	• •				
		A. RECORD	which MFPT is in serv	ice.				
		B. MONITOR increased.	loading of the MFP in	service as load is				
	[24.2]	WHEN second	MFPT is to be placed	in service, THEN				
		PLACE second 1,2-SO-2/3-1.	I MFPT in service in ac	ccordance with				
			NOTE					

 \bigcirc

[25.1]	VERIFY three (3) Hotwell pumps running (if available).	
[25.2]	VERIFY two (2) Condensate booster pumps running.	
[25.3]	VERIFY MFW pump(s) in service (only 1 required if approved by Operations Superintendent).	

SQN NORMA Unit 1 & 2		AL POWER OPERA	F	-GO-5 Rev. 0065 Page 32 of 100)	
STARTUP No			U	nit		Date
5.1	Power As	scension Fro	m 30% to 100% (co	ontinued)		
	[25.4]	VERIFY o	ne (1) #7 Heater Dr	ain Tank pur	np in service.	
[25.5]			one gland steam ex AUTO position:	hauster runn	ing and one	
	. E	XHAUSTER	HANDSWITCH	(√)	(√)	
		А	HS-47-209A	AUTO 🗆	START 🗆	
		В	HS-47-209B		START 🗆	1

[25.6] **IF** gland seal water is being supplied from opposite unit, **THEN**

RESTORE normal gland seal water alignment (supplied from this unit) in accordance with 1,2-SO-37-1, Gland Seal Water System.

NOTE

Steps 5.1[26] through 5.1[31] may be performed out of sequence.

[26] **IF** the second #7 heater drain tank pump has not been started, **THEN**

START the second #7 heater drain tank pump in accordance with 1,2-SO-5-3.

NOTE

Hydrogen pressure should be maintained greater than or equal to 66 psig.

- [27] **ENSURE** generator hydrogen pressure is sufficient for anticipated load in accordance with TI-28, Figure A.14, Generator Capability Curve.
- [28] **VERIFY** river water temperature within the limitations of the NPDES permit as specified in 0-PI-OPS-000-666.0.

L	SQN Unit 1 & 2		NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 33 of 100	
	STAR	TUP	No Unit	_ D	ate
5.1	Power	[,] As	cension From 30% to 100% (continued	d)	
[CAUTION		
high	ner power	lev	perations, NIS indications may be inac els. DO NOT increase power greater t applicable portions of 0-RT-NUC-000-	han 50% until Rx E	ngineerin
		for THI		mal power,	
			the following Step 5.1[30]. (Reactor En	0 0,	
		EN	startup is following refueling activities, TH SURE the following performed prior to ex rmal power: (may be performed in any or	ceeding 50%	
		A.	0-SI-NUC-000-126.0, Hot Channel Fac	tor Determination.	
				Rx Eng	Date
		B.	0-SI-NUC-092-079.0, Incore-Excore Ax Comparison.	kial Imbalance	
				Rx Eng	Date
		C.	0-PI-NUC-092-002.0, Detector Single F	Point Alignment.	
				Rx Eng	Date
		D.	0-PI-IXX-092-N45.0, PR NIS Calibratio	n	
				MIG	Date
		E.	PR High Flux Trip reset to 109%. [C.3].		
				MIG	Date
		F.	Applicable portions of 0-RT-NUC-000-(for operation above 50% power.	001.0 COMPLETE	
				Rx Eng	Dat

C

 \bigcirc

U	SQN nit 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 34 of 100
	STARTUP	9 No Unit	Date
5.1	Power As	cension From 30% to 100% (continued)	
	[31] WH	EN reactor power is approximately 49%, TI	HEN
	PE	RFORM the following: (in any order).	
	[31.1]	ENSURE indicated Axial Flux Difference limits specified in the COLR (TS 3.2.1.1).	
	[31.2]	PERFORM a conditional 0-SI-NUC-000-0 Flux Difference.	044.0, <i>Axial</i>
		NOTE	
QP1 C-3,	and D-4. Ala	ain to the plant computer and annunciator p rms may sporadically occur at 1.5% when t	he setpoint is 2%.
	[31.3]	PERFORM a conditional 0-SI-NUC-000- <i>Power Tilt Ratio</i> .	133.0, Quadrant
	[31.4]	IF QPTR exceeds 1.015, THEN CONTACT Reactor Engineering for evalu	uation.
		TERMINE the following from TI-40 and CORD in narrative log and below:	
	RE	CORD in narrative log and below:	
	RE ([32.1]	CORD in narrative log and below: Reactor preconditioned power level Ramp rate restrictions:	
	RE ([32.1]	CORD in narrative log and below: Reactor preconditioned power level Ramp rate restrictions:	reactor power
	RE ([32.1]	CORD in narrative log and below: Reactor preconditioned power level Ramp rate restrictions: %/hour up to %	reactor power
	RE ([32.1]	CORD in narrative log and below: Reactor preconditioned power level Ramp rate restrictions: %/hour up to %	□ reactor power reactor power reactor power

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U	SQN nit 1 & 2	NORMA	L POWER OPERAT	F	9-GO-5 Rev. 0065 Page 38 of 1	00
	STARTUP	No	Uni	t		Date
5.1	Power Ase	cension Fro	n 30% to 100% (cor	ntinued)		
	[41.2]	IF LEFM in	dication is NOT avail	lable, THEN	N	
		CALCULA	TE reactor power:			
	Calorimetri	c power= U1	118=		_%	
			34.11			
	[41.3]	VERIFY that drawers are power.	at all operable NIS Pe e within \pm 2% of the c	ower Range calculated c	e channel alorimetric	
		N-41	(XI-92-5005B)	YES 🗆	NO 🗆	
		N-42	(XI-92-5006B)	YES 🗆	NO 🗆	
		N-43	(XI-92-5007B)	YES 🗆	NO 🗆	
		N-44	(XI-92-5008B)	YES 🗆	NO 🗆	
	[41.4]	IF any of th	e above steps are ch		THEN	
	- 4	DEDEODU			1 1 8 km 7 V	

PERFORM 0-SI-OPS-092-078.0.

NOTES

- 1) More restrictive turbine load limit for Unit 1 is based on ensuring adequate MFP suction pressure to allow pumping against higher S/G pressures following S/G replacement. (Ref: DCN E21203A).
- Siemens Westinghouse analysis has determined that the maximum Unit Two unit power with 1 MFP operation is 65% under worst case conditions. Operation at higher power levels are dependent on current conditions. This would require System Engineering evaluation.(Ref: DCN D21732A).
 - [42] **ENSURE** second MFPT is in service <u>PRIOR TO</u> increasing turbine load above 55% (Unit 1) or 65% (Unit 2).

SQN	NORMAL POWER OPERATION	0-GO-5
Unit 1 & 2		Rev. 0065
		Page 39 of 100

STARTUP No.___

Unit _____

Date

5.1 Power Ascension From 30% to 100% (continued)

CAUTION

#3 and #7 heater drains must be pumping forward prior to exceeding 60% turbine load. This load limit assumes that both MFW pumps are in service. If only one MFWP is running, turbine load must be further limited to maintain adequate MFWP suction pressure.

- [43] **PERFORM** the following <u>PRIOR TO</u> increasing turbine load above 60%.
 - [43.1] **ENSURE** #3 Heater Drain Tank pumping forward **USING** 1, 2-SO-5-2.
 - [43.2] **ENSURE** #7 Heater Drain Tank pumping forward **USING** 1, 2-SO-5-3.
- [44] **ENSURE** at least one bus duct cooler is in service **USING** 0-SO-58-1 <u>PRIOR TO</u> increasing load above 729 MWe.

NOTES

- 1) TI-40 ramp rate restrictions are recorded in Step 5.1[32].
- 2) The following step may be marked N/A if intermediate power threshold is NOT applicable.
 - [45] **WHEN** Reactor Power approaches the Intermediate Power Threshold for the respective unit, **THEN**

ENSURE Reactor Power ramp rate target is **ESTABLISHED** at 2% / hr.

Intermediate Power Threshold value

SQN Unit 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 40 of 100
STARTUP	No Unit	Date

5.1 Power Ascension From 30% to 100% (continued)

CAUTIONS

- 1) Valves 106A and 106B shall be verified to be operating properly after each #3 HDT pump start.
- 2) At approximately 79% turbine load with LCV-6-105A or B open and only two #3 HDT pumps are in service, the available NPSH for the MFP will be insufficient.

NOTES

- 1) When placing HDT pumps in service, ensure main feedwater pumps and main reg valves respond correctly and then stabilize in an acceptable band.
- 2) LCV-6-105A will come open at about 70% turbine load if condensate discharge pressure is high. Minimize duration at this load to reduce wear on the valve. As load is increased to 100% condensate pressure will gradually decrease allowing the #3 HDT pumps to pump forward and the condenser bypass valve(s) to close.
- 3) Steps 5.1[46] through 5.1[49] may be performed in any order.
 - [46] WHEN approximately 70% turbine load, THEN
 - [46.1] **PLACE** the third #3 heater drain pump in service in accordance with 1,2-SO-5-2. [C.2]
 - [46.2] **ENSURE** valves LCV-6-106A and LCV-6-106B are controlling #3 heater drain tank level properly.

STARTUP No._____

Unit _____

Date _____

5.1 Power Ascension From 30% to 100% (continued)

CAUTION

Evaluate starting and stopping of Condensate Demineralizer pumps using condensate pressure, MFP inlet pressure, condensate booster pump inlet pressure, and #3 and #7 HDT pump and bypass valve operation. The US/SRO may start or stop Condensate Demineralizer pumps at his discretion, but if any of the following occurs the pumps must be started:

- 1) Condensate Booster Pump suction pressure is less than 125 psig, as indicated on [PI-2-77].
- 2) Main Feedwater Pump suction pressure less than 420 psig, as indicated on [PI-2-129].
- 3) Injection Water Pump discharge pressure is less than 265 psig, as indicated by an alarm on XA-55-3B window E-1.

NOTES

- Should #7 heater drain tank pump(s) amps swing or if system pressure needs to be increased by approximately 40 psig, then Cond DI Booster pumps can be started; however, two of the three pumps must be started at the same time.
- 2) When placing condensate pumps in service, ensure MFW Reg. valves respond correctly and then stabilize in an acceptable band.
 - [47] **EVALUATE** starting two condensate demineralizer booster pumps in accordance with 1,2-SO-2/3-1 (This step can be N/A'd or signed-off at time when pumps are started).

NOTE

If starting up following refueling operations and reactivity calculations and tests were completed at \approx 30% reactor power, then reactivity calculations and tests must be performed again at \approx 75% RTP.

[48] **IF** all applicable portions of 0-RT-NUC-000-001.0 are complete for power increase above 75% of rated thermal power, **THEN**

N/A the following Step 5.1[49]. (Reactor Engineering)

U	SQN nit 1 & 2		NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 42 of 100	
	STARTU	P No	Unit	_ C)ate
5.1	Power As	scensi	ion From 30% to 100% (continued)	
			CAUTION		
level	s. DO NOT	increa	dications may be inaccurate until ase power above 75% until applica re complete.	calibration at high able portions of	er power
	[49] IF	startup	o is following refueling, THEN		
			the following prior to operation at performed in any order)	bove 75% power:	
	[49.1]	N/A	SURE the following have been performance of the following have been performent and Instrument quired):	ormed (may be Maint. if NOT	
		A.	0-SI-NUC-000-126.0, Hot Channe Determination.	l Factor	
				Rx Eng	Date
		В.	0-SI-NUC-092-079.0, Incore-Exco Imbalance Comparison.	re Axial	
				Rx Eng	Date
		C.	0-PI-NUC-092-036.0, Incore/Exco Calibration (N/A if NOT required o		
				Rx Eng	Date
		D.	0-PI-NUC-092-002.0, Detector Sir Alignment.	ngle Point	
				Rx Eng	Date

Rx Eng

Date

	SQN Unit 1 & 2	NORMAL P	OWER OPERATION		0-5 0065 9 43 of 100
	STARTUP	No	Unit		Date
5.1	Power Ase	cension From 30	% to 100% (continue	d)	
	[49.2]	NOTIFY System check RCS Loc	ms Eng to perform 0-P op ∆T Zeros. [C.7]	1-SXX-00	0-022.2 to
	[49.3]	ENSURE appli	cable portions of 0-RT	-NUC-000)-001.0
		are complete to	or operation above 75%	% RTP.	Rx
			NOTES		
1)	0-SI-OPS-092 PRMs is indica	e-078.0 may be pe ating close to the	erformed at the discret $\pm 2\%$ tolerance.	ion of the	Operator if one or
2)	Steps 5.1[50]	and 5.1[51] may I	be performed out of se	quence.	
	Calorimetri	CALCULATE (c power= U2118	Calorimetric power: = 34.55	%	
	[50.2]	IF LEFM indica	tion is NOT available,	THEN	
		CALCULATE r	eactor power:		
	Calorimetri	c power= U1118	=	%	
	[50.3]		NIS Power Range A of the calculated calo		
		N-41	(XI-92-5005B)	YES 🗆	NO 🗆
		N-41 N-42	(XI-92-5005B) (XI-92-5006B)	YES □ YES □	NO 🗆 NO 🗆
			· · · · · ·		

	SQN Unit 1 & 2	NORMAL POWER OPERATIO	N 0-GO-5 Rev. 0065 Page 44 of 100
	STARTUP	No Unit	Date
5.1	Power As	cension From 30% to 100% (contin	ued)
	[50.4]	IF any of the above steps are chec	ked NO, THEN
		PERFORM 0-SI-OPS-092-078.0.	
		CAUTIONS	
1)	LCV-6-105A pressure bei	and/or 105B may be throttling oper ng higher than #3 HDT pump disch	n due to condensate system arge pressure.
2)	Turbine runk	pack will occur if #3 HDT pump flow apm (for greater than 10 seconds),	to the condensate system drops

ENSURE the following:

[51.1] LCV-6-106A and -106B are controlling properly.

[51.2] LCV-6-105A and -105B are CLOSED.

NOTES

- 1) Ramp load rate increases shall be within the limits of TI-40
- 2) Intermediate Power Threshold ramp rate target value of 2% / hr may apply.

[52] **RECORD** power ascension ramp rate from TI-40.

NOTES

- 1) Operation above 75% Load with only two Hotwell Pumps in service requires further evaluation.
- 2) Steps 5.1[53] through 5.1[56] may be performed out of sequence.
 - [53] **CONTINUE** the power ascension to 90% reactor power.

Unit 1 & 2		POWER OPERATION	0-GO-5 Rev. 0065 Page 45 of 100
STARTUP No Unit Date Power Ascension From 30% to 100% (continued)		Date	
1 Powe	er Ascension From	30% to 100% (continued)
		NOTE	
	may be used along v ne target control band		power increase to maintain
	ne target control band		power increase to maintain
FD within th	IF diluting the RCS	d. to increase T _{AVG} , THEN n and increase turbine load	

Guidance on restoration of EHC Controls after a BOP runback via the valve position limiter is contained in Appendix B, *Turbine Runback Restoration*. [C.4]

[55] MONITOR the turbine load increasing and

MAINTAIN valve position limit approximately 10% above the current governor control indication as turbine load is changed.

NOTE

When the turbine impulse pressure relay number is illuminated on Panel L-262, the relay is closed and Runback circuit is armed.

[56] WHEN greater than 77% Turbine Load, THEN

VERIFY [**PIS-47-13RLY1**] light [**1**], 'Turbine Runback From Loss of 1 MFP' is illuminated on Panel L-262.

[57] WHEN greater than 82% Turbine Load, THEN

VERIFY the following relay lights are illuminated on Panel L-262:

- [57.1] [PIS-47-13RLY2], Turbine Runback From #3HDT.[2]
- [57.2] [PIS-47-13RLY 3], NPSH Protection VLV-6-106B closes on #3 HDT pump trip. [3]

SQN Unit 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065]
		Page 46 of 100	

STARTUP No._____ Unit

Date _____

5.1 Power Ascension From 30% to 100% (continued)

NOTES

- 1) Reactor power can be increased greater than 90% as long as adequate MFP suction is maintained.
- 2) Steps 5.1[58] through 5.1[62] may be performed out of sequence.
 - [58] **WHEN** approximately 85 to 90% reactor power

OR when determined by Unit SRO (if power raised above 90%), **THEN**

ENSURE third condensate booster pump in service in accordance with 1,2-SO-2/3-1. [C.2]

NOTE

A nominal CBP suction pressure of approximately 180 psig, as indicated on [PI-2-77], will alleviate bypassing to the condenser at full power.

- [59] **IF** condensate pressure is high resulting in #3 or #7 heater drain tank bypassing to the condenser, **OR** the normal level control valves are near full open, **THEN**
 - [59.1] **THROTTLE** [14-550] to attain desired condensate pressure.
 - [59.2] IF unable to throttle [14-550], THEN

REFER to 1,2-SO-5-2, Section 8.0 to adjust condensate pressure.

OR

EVALUATE removal of the condensate demineralizer booster pumps (N/A if NOT in service).

SQN Unit 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 47 of 100	
STARTU	P No Unit	Da	ate
1 Power As	cension From 30% to 100% (continued	1)	
	NOTE		
wo Cond DI Boo	ster pumps must be started at the same t	ime.	
	ALUATE starting available condensate do oster pump(s) to raise system pressure ~		
Pump S	tarted YES 🗆 NO 🗆		······
	HEN reactor power is approximately 90%, EN		
PE	RFORM the following:		
[61.1]	ADJUST Power Range instrumentatic with 0-SI-OPS-092-078.0.	on in accordance	
[61.2]	INITIATE performance of 1-PI-OPS-00 or 2-PI-OPS-000-022.1, Appendix B.	00-020.1	
	CAUTION		
	ists for condensation formation in stea	am extraction lines	when
feedwater heate	rs are isolated.		

- [61.3] **ENSURE** the following level controllers are maintaining levels within normal ranges:
 - A. Secondary plant heaters.
 - B. MSR drain tanks.

CAUTION

DO NOT exceed an average of 3455.0 MWT during an 8-hour period. [C.1]

[62] **MONITOR** NIS, ΔT and calorimetrics on plant computer (pt. U2118) while increasing reactor power.

	SQN Unit 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 48 of 100
	STARTI	JP No Unit	Date
5.1	Power A	Ascension From 30% to 100% (continu	ied)
	······································	NOTES	
1)	Feedwater (U2118) is	venturi unfouling may impact U1118 indi not affected by venturi unfouling.	cation. LEFM calorimetric power
2)	lf U1118 is Calorimetrie	being used to monitor reactor power due c Calculation should be performed prior t	e to LEFM unavailable, then to exceeding 97% reactor power.
3)	Steps 5.1[6	3] through 5.1[67] may be performed ou	t of sequence.
	tc A	Unit is returning to full power after a tur less than 50% ND U1118 is being used to monitor pow HEN	
	Р	ERFORM the following prior to exceeding	g 97% power:
	[63.1] NOTIFY Systems Engineering to perform 0-PI-SXX-000-022.2, Calor Section 8.1, if necessary.	imetric Calculation, □
	[63.2	PERFORM applicable sections of 0 to adjust Feedwater Flow Constant. required)	

BOP Eng

NOTES

- 1) Ramp load rate increases shall be within the limits of TI-40
- 2) Intermediate Power Threshold ramp rate target value of 2% / hr may apply.
 - [64] **RECORD** power ascension ramp rate from TI-40.
 - [65] **CONTINUE** power ascension to 100% RTP.

SQN	NORMAL POWER OPERATION	0-GO-5]
Unit 1 & 2		Rev. 0065	
		Page 49 of 100	

STARTUP No.

Unit _____

Date _____

5.1 Power Ascension From 30% to 100% (continued)

NOTE

Control rods may be used along with dilution during reactor power increase to maintain AFD within the target control band.

[66] **IF** diluting the RCS to increase T_{AVG}, **THEN**

CONTINUE dilution and increase turbine load to maintain T_{REF} with T_{AVG} . (0-SO-62-7)

NOTE

Valve position limit and governor control meter are displayed on EHC Display panel 1,2-XX-047-2000 (M-2).

[67] MONITOR the turbine load increasing AND

MAINTAIN valve position limit approximately 10% above the current governor control indication as turbine load is changed.

NOTE

Steps 5.1[68] through 5.1[71] may be performed out of sequence.

[68] WHEN reactor power approaches 100%, THEN

ADJUST governor valve position limiter ~ 2% above governor valve position.

NOTE

Engineering recommends placing the 3rd Condensate Demineralizer Booster Pump in service when at full power. Operation of only 2 Condensate Demineralizer Booster Pumps is allowed but reduces the operating margin in the event of a condensate transient based on the lower suction pressure to the MFPs.

[69] IF it is desired to place the 3rd condensate demineralizer booster pump in service, THEN START 3rd condensate demineralizer booster pump in accordance with 1,2-SO-2/3-1.

SQN	NORMAL POWER OPERATION	0-GO-5
Unit 1 & 2		Rev. 0065
		Page 50 of 100

STARTUP No.___

Unit _____

Date

5.1 Power Ascension From 30% to 100% (continued)

CAUTION

Governor valve position limit meter may NOT match the governor valve position meter; therefore, monitor the megawatt meter and valve position limit light continuously during the following step.

NOTES

- 1) Operation with the VALVE POS LIMIT light LIT is acceptable if unsatisfactory load swings are experienced.
- 2) Actions effecting reactivity are directed in the following step. All appropriate verifications and peer checks shall be utilized during performance.
 - [70] **IF** unsatisfactory load swings are experienced as the unit approaches full power, **THEN**
 - [70.1] WITH turbine load set for maximum of 100% power, SLOWLY and CAUTIOUSLY PULSE the governor VALVE POSITION LIMIT in LOWER direction while monitoring megawatts for a decrease and VALVE POS LIMIT light to ILLUMINATE.
 - [70.2] WHEN the limiter just reaches the governor valve position, THEN

STOP limiter adjustment.

SQN	NORMAL POWER OPERATION	0-GO-5
Unit 1 & 2		Rev. 0065
		Page 51 of 100

STARTUP No.

.

Unit _____

Date ____

5.1 Power Ascension From 30% to 100% (continued)

CAUTION

Do not raise the limiter position unless the turbine control is positively controlling the turbine (limit light NOT LIT).

NOTE

Actions effecting reactivity are directed in the following step. All appropriate verifications and peer checks shall be utilized during performance.

- [71] **PERFORM** the following if the limiter prevents reactor operation at approximately 100%:
 - [71.1] **ADJUST** SETTER/REFERENCE controls to reduce turbine loading until the VALVE POS LIMIT light is NOT LIT.
 - [71.2] **INCREASE** VALVE POSITION LIMIT to allow a load increase using the SETTER/REFERENCE controls, NOT to exceed 3455.00 MWT.

	SQN Unit 1 & 2	NORMAL POWER OF	PERATION	0-GO-5 Rev. 0065 Page 52 of 100
	STARTU	P No	Unit	Date
5.1	Power As	scension From 30% to 100	% (continued))
		NO	TES	
1)	Full power op instantaneou 8-hour perioc	s value, U2118 not to excee	power operation d 3455.00 MW	on at approximately 3455 MW $_{\rm T}$ / $_{\rm T}$ average thermal power in an
2)	(e.g., if reacto	ionally operate the reactor a or power is less than 100% f 100% to "make up" for "lost"	or any time pe	riod then operation at slightly
3)	and monitore	d for increasing reactor pow n to decrease reactor power	er trends abov	corder in the unit horseshoe /e 3455 MW _T . Prompt action increasing power trend is
4)	Do not excee (one hour ave	ed an 8-hour average value (g) to exceed 3455.00 MW⊤ ((U2126) of 345 100%) for mor	5.00 MW _T . Do not allow U2125 e than one hour. _[C.1]
				ith step5.1[72] if required.

v

PERFORM the following: (may be performed in any order)

[72.1]	ADJUST Governor Valve position, rod height, and/or RCS boron concentration as necessary to establish core thermal power at desired value and Auctioneered Hi T-avg approximately equal to T-ref.	
[72.2]	NOTIFY load coordinator that the power increase is complete.	
[72.3]	NOTIFY Radiation Protection that power has stabilized at 100%.	
	(step continued on next page)	

	QN 1 & 2	NORMAL POWER OPERATION	0-GO-5 Rev. 0065 Page 53 of 100
	STARTUP	No Unit	Date
.1	Power Asc	cension From 30% to 100% (continued	
		NOTE	
Use of s unit trip	seal steam on seal ste	spillover bypass FCV-47-191 should be r am pressure.	ninimized to reduce the effect of
			
	[72.4]	IF Seal Steam spillover bypass [FCV-4 SERVICE, THEN	7-191] is IN
		THROTTLE Seal Steam spillover bypa [FCV-47-191] as required to control sec pressure.	
	[72.5]	IF river temperature is less than 45°F, ⁻	THEN
		CONSULT Engineering to determine if	third CCW pump
		should be removed from service.	

CAUTION

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A bias adjustment in the upward direction (> 50% , Unit 1)(> +0, Unit 2) should NOT be used unless evaluated by Systems Engineering since this could impact a MFPT's maximum speed and the ability to fully load in the event the other MFPT trips.

[72.7]	IF feed pump vibration is above desired levels, THEN CONSULT with vibration engineer and system engineer to determine which feed pump to bias to reduce vibration.	
[72.8]	IF MFPT master controller output is NOT indicating 45% to 55% THEN CONSULT with MFPT controls system engineer to evaluate if adjustment is required per 1,2-SO-2/3-1.	

	SQN it 1 & 2	NORMAL POV	VER OPERATION	0-GO-5 Rev. 0065 Page 55 of 10	00
	STARTUP	No	Unit		Date
5.1	Power As	cension From 30%	to 100% (continued)		
	[73] IF s	tartup is following re	fueling activities, THE	N	
	EN: Rate	SURE the following a ed Thermal Power: (are performed at appro may be performed in a	oximately 100% any order)	
	[73.1]	0-PI-SXX-000-022	2.2, Calorimetric Calcu	llation.	
	-				Systems Eng
	[73.2]	0-PI-SXX-000-022	2.1, Delta T and Tavg	Update. [C.7]	Systems Eng
	[73.3]	0-SI-NUC-000-12	-		
				Rx Eng	Date
	[73.4]	0-SI-NUC-000-120	0.0, Reactivity Balance	9.	
				Rx Eng	Date
	[73.5]	0-SI-NUC-092-079 Comparison.	9.0, Incore-Excore Axi	_	Dale
				Rx Eng	Date
	[73.6]	0-PI-NUC-092-036 Calibration.	6.0, Incore-Excore Det	tector	
				Rx Eng	Date
	 [73.7] 0-PI-IXX-092-N45.0, PR NIS Calibration (May be N/A'd if Engineering determines calibration performed at < 75% RTP is adequate.) 				
		,			Inst Maint
	[73.8]		s of 0-RT-NUC-000-00	01.0 are	
		complete for full p	ower operations.		Rx Engr

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<u></u>	SQN Unit 1 & 2	NORMAL PO	OWER OPERATION	0-GO-5 Rev. 0065 Page 56 of 100				
and a start of the	STAF	RTUP No	Unit	Date				
	5.1 Power Ascension From 30% to 100% (continued)							
			NOTE					
	This step may be performed out of sequence if required.							
	[74]	NOTIFY MIG to re-sc	and Steam Generator aled to 80% - 90% in 0-0 ale LR-3-43A and LR-3-	98A, Steam				
	Generator Wide Range Level Recorders, to 0% - 100%. [75] IF unit shutdown to minimum load, THEN							
		GO TO Section 5.3.						
	[76] IF unit is to be maintained at normal power, THEN							
		GO TO Section 5.2.	END OF TEXT					

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STARTUP No._____

Unit _____

5.2 At Power Conditions

CAUTIONS

- 1) Full power operation is defined as approximately 3455 MWT NOT to exceed 3455.0 MWT averaged over an 8-hour period. [C.1]
- 2) Power shall NOT exceed one hour average (U2125) of 3455.00 MWT.
- 3) Power shall NOT exceed an 8-hour average value (U2126) of 3455.00 MWT (readings at 0700, 1500 and 2300 hours).

NOTES

- 1) Failure to comply with the following NERC VAR-002 requirements could result in a Utility Violation and/or monetary penalties.
- 2) The Transmission Operator shall be notified of any Voltage Regulator automatic trips to Manual or urgent Manual Transfers between Auto and Manual as soon as practical, but within 30 minutes [C.8]
- 3) The Transmission Operator shall be notified prior to a planned Voltage Regulator transfer between Auto and Manual.
- 4) All position changes (Auto or Manual) of the Voltage Regulator shall be entered into the Narrative Log along with the date, time of position change, reasons, anticipated duration, and notifications made.
- 5) Operation of main generator without automatic voltage control could impact gird voltage requirements. Refer to GOI 6 for MVAR limits.
- 6) Main Generator operation outside of the Voltage Schedule in GOI-6 requires that notification be made to the Transmission Operator (SELD) within 30 minutes. Narrative Log entries shall be made that include time, date, reason & duration, and notifications made
- 7) Main Generator operation without Automatic Voltage control requires that Narrative Log entries be made (time, date, reason & duration) and that notification be made to Operations Duty Specialist (ODS) within 30 minutes.
- 8) Steps in this section may be performed out of sequence.
 - [1] **ENSURE** Section 3.0, Precautions and Limitations, have been reviewed.
 - [2] **TREND** Computer point U2118 on a trend recorder in the unit horseshoe and monitor for increasing reactor power trends above 3455 MW_T.