

**Clinton Power Station
Licensed Operator Training
Simulator Exercise Guide**

EXAM

ILT 08-01 Exam Scenario 1

REVISION 00

DEVELOPER: _____ Tom Pickley _____

REVIEWED BY: _____ Simulator Instructor _____

APPROVED BY: _____ / _____
Operations Date

Overview

Makeup/Reject: All CP's except H and J are in service. RO train #1 & 2 are in-service in auto to WD
ECCS: RHR A, B, C, LPCS and HPCS are Operable. RCIC is Operable
SDC: N/A
Electrical: 6.9 KV 1A & 1B and 4.16 1A & 1B on UAT, 4160 Volt Busses 1A1, 1B1 & 1C1 are being supplied by RAT
Ventilation:
Radwaste: 1WF Evap is in operating. A and B RT F/D are in service.

Plant Status

On Line Risk Green

Reactor

Operational Condition: Mode 1
Total Core Flow: 70.7 mlb/hr
FCV Position: A: 52.8% B: 53.1%
Reactor Power 65% (<=100%) 2282 MWt (<=3473) 737 Mwe
Xenon: Stable
RPV Level 33 in Narrow Range
RPV Pressure 963 psi (< 1045)
In service SDC loop None MODE 1

Containment

Suppression Pool Temperature: 75.5 F (<=93.1 F)
Suppression Pool Level 19.2 ft (19 ft 0 to 19 ft 5 in)
Drywell Pressure 0.8 psi (0 to 1 psig)
Drywell to Containment dp: 0.8 psi >=-.02 psid to <=1.0 psid
Drywell Avg Air Temperature: 104 F (<=146.53 F)
Secondary Containment: 0.74 in WG (>= 0.25 in WG vacuum)

BOP

Condenser Vacuum: 28 in Hg
Off – Gas Flow: 38.5 scfm
Condensate Temperature: 94 F
Generator Reactive Load: 228 MVARs

Plant Chemistry

CPI (goal < 1.1): **1.00**
Reactor Sulfates (goal < 2) 1.31 ppb
Reactor Chlorides: 0.51 ppb
FW Iron (goal < 2.1) 0.85 ppb

Protected Equip: None

Comments: See Turnover Sheet

From “Excellence in Human Performance”

Leaders reinforce desired jobsite behaviors (Handbook page 17)

Participate in training program activities.

Leaders monitor and provide feedback to improve training program quality as well as to coach and reinforce individuals who meet or exceed behavior expectations and Standards of performance. During training activities, leaders guide workers on how actions or inactions influence reactor safety and on the potential consequences of mistakes. They give particular attention to recognizing error-likely situations and flawed defenses during tasks important to nuclear safety

ATTACHMENT 1
Reactivity Maneuver Approval Cover Page
Page 1 of 4

Station: Clinton Valid Date(s): xx/xx/xxxx Reactivity Maneuver Plan #: C11-Simu.1

Multiple Activations Allowed? No (If yes, CRS may make additional copies)

Prepared by: Joe Top / xx/xx/xx Reviewed by: Roger Bottom / xx/xx/xx
 Reactor Engineer / Date Qualified Nuclear Engineer / Date

Approved by: Michelle Strange / xx/xx/xx Authorized by: _____ / xx/xx/xx
 RE Manager / Date Senior Reactor Operator / Date

NF Review by Michael Charm / xx/xx/xx
 NF Reciewer / Date

ReMA Activated: _____ / xx/xx/xx ReMA Terminated: _____ / xx/xx/xx
 Unit Supervisor / Date Unit Supervisor / Date

Title of Evolution: Power Reduction to Removal of A TDRFP
Purpose/Overview of Evolution: This ReMA is provided for a non emergent load reduction to support removal of the A TDRFP. This ReMA is NOT intended to take the place of emergency load reductions per the guidance of CPS 3005.01, Unit Power Changes. Emergency load reductions shall be implemented per the guidance of CPS 3005.01, Unit Power Changes.
Reactivity Maneuver Steps
Extended General Issues: Select desired amount of power reduction
1. Reduce reactor power to 60% with flow
2. Maintain reactor power using rods and flow
3.
4.
General Issues: <ul style="list-style-type: none"> ▪ The critical parameters are provided as a guide to focus the monitoring of the evolution. Changes to these parameters may be necessary to accommodate the actual startup load profile and predictor uncertainties. Changes to the critical parameters are to be done in accordance with the ReMA Training and Reference Material guidelines per OP-AB-300-1003. ▪ Main Steam Line Radiation Monitors may initially show elevated response from crud burst in core (due to rod movements) and from “hydrogen pockets” being swept into the core (due to flow perturbations in the condensate / feedwater piping). Response should diminish as the feedwater system comes to equilibrium.

**ATTACHMENT 2
Reactivity Maneuver Guidance Sheet**

STEP 1 of 2

Reactivity Maneuver Plan # C11-Simu.1

Description of Step :

Reduce reactor power to ~ 60% with flow.

Rod notching may also be used if necessary to control FCL. The Reactor Engineer will provide guidance on the control rods to be moved to achieve the FCL necessary to support operating at 60%.

It is acceptable to stop at intermediate power levels as necessary to support plant conditions.

Note: Additional monitoring is required per CPS 3005.01, in addition to what is specified below.

QNE presence required in the Control Room? Yes No X *

*RE Coverage shall be provided consistent with the guidelines of OP-AB-300-1003 and NF-AB-701.

Initial Conditions (may be ranges) to be verified at the START of the Step

Parameter	Value or Range	Init.	Parameter	Value or Range	Init.
Core Power (MWth or %)	N/A	N/A	MFLCPR	< 0.900	
Core Flow (Mlb/hr or %)	N/A	N/A	MFLPD	< 0.900	
FCL (%)	≤ 90.0 %		MAPRAT	N/A	N/A

Critical Parameters to be Verified During the Step

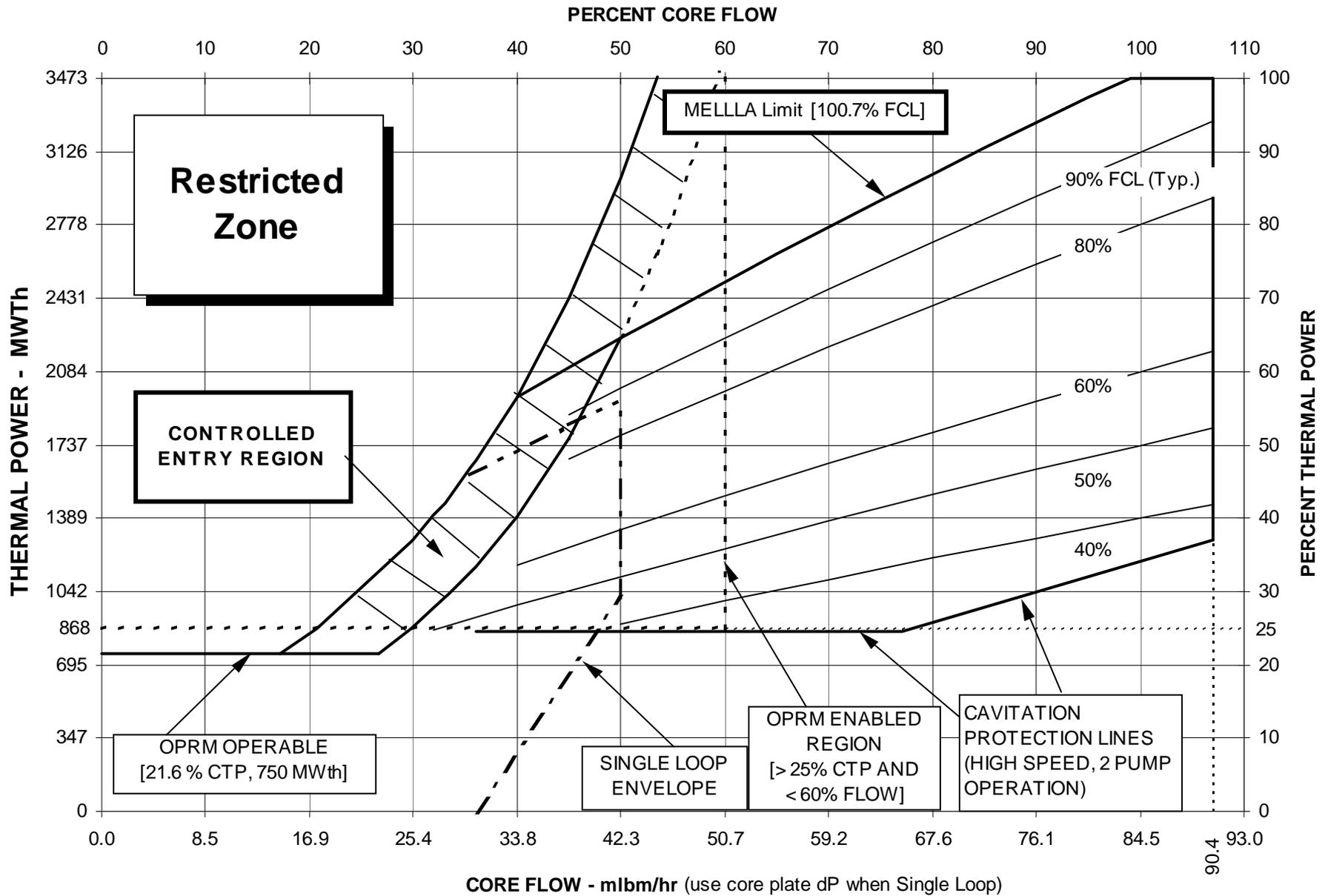
Description; including frequency, method of monitoring, and contingency actions (if needed)

	High	Low
FCL	90.0 %	N/A
Monitor Frequency: Demand 3D Case or verify with power and flow from P680 display after completion of power reduction.		
Contingency: Insert control rods in reverse order sequence to reduce FCL.		

Step Complete: _____ / _____
Reactor Operator / Date

Verified by: _____ / _____
Unit Supervisor / Date

FIGURE 1: CPS STABILITY CONTROL & POWER/FLOW OPERATING MAP



Facility: <u>Clinton Power Station</u>		Scenario No.: <u>One</u>		Operating Test No.: <u>08-01</u>	
Examiners: _____			Operators: _____		
_____			_____		
_____			_____		
Initial Conditions:					
65% power, Drywell pressure is high. Thunderstorm storms are expected in the area within the next hour.					
Turnover:					
1. Run 'B' mixer to reduce DW pressure – First Priority					
2. Power needs lowered to 60% power to remove the 'A' RFPT from service for a scheduled outage due to problems.					
Event No.	Malf. No.	Event Type*	Event Description		
1	HVAC_SP ARE_L3 1	N-BOP TS-CRS	Reduce DW pressure, 'B' mixer trips, entry into ITS.		
2	NA	R-ATC	Power reduction to support removal of 'A' TDRFP		
3	Override	C-ATC	'A' TDRFP trouble alarm		
4	Override	C-ATC	'B' RWCU pump seal plate temperature high		
5	YP_XMFT B_4912 1	TS-CRS	'A' APRM fails downscale.		
6	YFFWPPS S_13 1	C-BOP	'B' MC pump coupling fails		
7	YPXMALS E_1	C-BOP	Fuel failure		
8	YP_XMFT B_4068, 69, 70, 71	M-ALL	Debris in the Condenser causes all CD pumps to trip		
9	RR03	M-ALL	A small RR leak occurs in the Drywell		
10	YFRIPPSS	M-ALL	The RCIC shaft breaks		
11	YP_XMFT B_4103	M-ALL	HPCS Injects and then trips		

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

Scenario No.: OneOperating Test No.: 08-01**Narrative Summary**

Event #	Description
1.	Drywell pressure is high requiring the BOP to run 'B' mixing compressor to reduce Drywell pressure. Operational Requirement Manual action 3.5.2 for the test Prep switch entered. The mixing compressor trips and the CRS enters ITS 3.6.3.3.
2.	Power is reduced with recirculation flow to allow removal of the RFPT.
3.	'A' TDRFP experiences a trouble alarm on a thrust bearing wear condition requiring tripping of the 'A' TDRFP. This will require verification that the running 'B' TDRFP is adequately maintaining level. A RR FCV runback will require entry to CPS 4008.01, Abnormal Coolant Flow and CPS 4100.02 Core Stability Control to verify no core instabilities along with entry into CPS 4002.01, Abnormal RPV Level/Loss of Feedwater At Power
4.	RWCU pump B develops a seal leak requiring its removal from service.
5.	'A' APRM fails down scale entry into ITS 3.3.1.1 and OPRM ITS 3.3.1.3.
6.	'B' MC pump coupling fails results in the loss of makeup condensate. This requires the startup of the standby pump.
7.	Fuel clad failure will require entry to the CPS 4010.01. Subsequent activities will require the BOP to shut valves RE021&22, RF021&22, along with other activities.
8, 9, 10 & 11.	Debris breaks loose in the condenser causing a loss of suction and trip of all CD pumps. A small RR loop leak occurs and the RCIC shaft breaks and HPCS injects and then trips. A Blowdown is performed at TAF and level is recovered with Low Pressure ECCS.

EOPS

1,3,6

Critical tasks:

- Emergency Depressurize when less than TAF.
- Recover level to above TAF.

Operator Actions

Event No.(s): 1		Page 1 of 1
Description: Reduce Drywell pressure		
Initiation: Following shift turnover		
Cues: Directed by SRO		
Time	Position	Applicant's Actions or Behavior
	BOP	<p>Per CPS 3316.01, Containment Combustible Gas Control, step 8.3: Places MOV Test Prep Switch for CGCS Div 2 to Test and notes time.</p> <ol style="list-style-type: none"> 1. Start CGCS Hydrogen Cmpr 1B, 1HG02CB. <ul style="list-style-type: none"> • Record start time IAW CPS 9094.01D001 2. Verify 1HG009B, CGCS Cmpr 1B Suct Vlv opens. <p>At DW pressure of .6 psig the B Mixer will trip off.</p> <p><u>SECURING DRYWELL VENTING</u></p> <ol style="list-style-type: none"> 1. Stop CGCS Hydrogen Cmpr 1B, 1HG02CB. <ul style="list-style-type: none"> • Record stop time IAW CPS 9094.01D001 2. Verify 1HG009A(B), CGCS Cmpr1B Suct Vlv shuts. (If the control switch is not taken to stop the suction valve will remain open) <ul style="list-style-type: none"> • Places MOV Test Prep Switch for CGCS Div 2 into NORMAL and notes time.
	RO	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Applies ORM ACTION 3.5.2 for MOV Test Prep Switch for CGCS Div 2 • Enters ITS 3.6.3.3 A.1 for B Mixer.
Terminus: D/W Venting is completed and ITS call completed		

NOTES:

Operator Actions

Event No.(s): 2		Page 1 of 1
Description: Power reduction to support removal of the A RFPT turbine		
Initiation: Following D/W Venting and ITS call.		
Cues: Directed by SRO		
Time	Position	Applicant's Actions or Behavior
	RO	Per CPS 3005.01, Unit Power Changes, step 8.2.8. <ul style="list-style-type: none"> • Reduce power with Flow to ~60%.
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Enforces OPS expectations and standards.
Terminus: Clearly observable plant response from change in power level.		

NOTES:

Operator Actions

Event No.(s): 3		Page 1 of 1
Description: 'A' TDRFP trouble alarm		
Initiation: Following the power reduction, on the signal of lead examiner		
Cues: Annunciator 5002-1B alarms , report from field operator		
Time	Position	Applicant's Actions or Behavior
	RO	Per CPS 5002-1B, RFP 1A trouble: <ul style="list-style-type: none"> • Trips the 'A' TDRFP due to high thrust bearing wear • Observes Low Level Alarm and RR FCV runback Per CPS 4008.01, Abnormal Coolant Flow and CPS 4100.02 Core Stability Control, monitor for: <ul style="list-style-type: none"> • Entry to the restricted zone • Core Instabilities power operating Map CPS 4002.01, Abnormal RPV Level/Loss of Feedwater At Power <ul style="list-style-type: none"> • As necessary, Start/stop Condensate, Condensate Booster or Reactor Feedwater pumps in support of level control. • Maintain adequate NPSH to the Feed Pumps (> 320 psig)
	BOP	<ul style="list-style-type: none"> • Dispatches a field operator • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Enters CPS 4008.01, Abnormal Coolant Flow and CPS 4100.02 Core Stability Control, Directs actions listed above. • Enters CPS 4002.01, Abnormal RPV Level/Loss of Feedwater At Power, Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Enforces OPS expectations and standards. ○ Contacts Shift Manager and recommends notifications.
Terminus: 'A' TDRFP tripped and RPV level stabilized		

NOTES:

<p>TO EVALUATORS: If computer points FW-BC902 and or FW-BC903 are called up on DCS, inform the operators they both indicate High. (This is a limitation of the simulator.)</p>

Operator Actions

Event No.(s): 4		Page 1 of 1
Description: RWCU Pump seal plate temperature high		
Initiation: Upon resolution of the FW transient on the signal of the lead evaluator		
Cues: Annunciator CPS 5000-2E alarms		
Time	Position	Applicant's Actions or Behavior
	RO	Per CPS 3303.01, RWCU step 8.1.4 and 8.1.3: <ul style="list-style-type: none"> • Direct field Operator to remove all Filter demins from service • Open the F/D bypass valve • Shutdown RWCU pump 'B' • Place one F/D in service
	BOP	<ul style="list-style-type: none"> • Dispatches a field operator to support RWCU operation • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Enters CPS 3303.01 Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Enforces OPS expectations and standards. ○ Contacts Shift Manager and recommends notifications.
Terminus: RWCU pump has been shutdown IAW CPS 3303.01		

NOTES:

Operator Actions

Event No.(s): 5		Page 1 of 1
Description: Failure of 'A' APRM		
Initiation: RWCU pump has been shutdown IAW CPS 3303.01, on the signal of lead examiner		
Cues: Annunciator 5060-8E		
Time	Position	Applicant's Actions or Behavior
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	RO	<ul style="list-style-type: none"> • Acknowledges and announces 'A' APRM annunciator and reading • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any additional unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Declares 'A' APRM Inop per ITS 3.3.1.1 A.1 and 'A' OPRM Inop per ITS 3.3.1.3.A.1 or A.2 or A.3. • Complies with action statement(s) for T.S. Section <ul style="list-style-type: none"> ○ May direct going to Sensor Bypass for Div 1. • Enforces OPS expectations and standards • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. <ul style="list-style-type: none"> ○ Contacts Shift Manager and recommends notifications.
Terminus: SRO has addressed ITS requirements.		

NOTES:

Operator Actions

Event No.(s): 6		Page 1 of 1
Description: MC pump “B” coupling fails		
Initiation: SRO has addressed I.T.S. requirements, on the signal of lead examiner		
Cues: Annunciator CPS 5014-2C alarming		
Time	Position	Applicant’s Actions or Behavior
	BOP	Per CPS 3208.01 MC/CY, STEP 8.1.1.1 (or 8.2.2): <ul style="list-style-type: none"> • Direct shutting the discharge valve and reopen upon pump start (if section 8.1.1.1 is used). • Start up the standby pump • Shutdown the failed pump
	RO	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Enforces OPS expectations and standards. ○ Contacts Shift Manager.
Terminus: Standby Pump started and shutdown of the failed pump		

NOTES:

Operator Actions

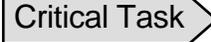
Event No.(s): 7		Page 1 of 1
Description: Fuel failure		
Initiation: After crew has started an other MC pump, on the signal of lead examiner		
Cues: OG pretreat alarming, MSL rad monitors trending up		
Time	Position	Applicant's Actions or Behavior
	BOP	Per CPS 4010.01, Reactor Coolant Hi Activity, Sub. Action: <ul style="list-style-type: none"> • Sound the CNMT evacuation alarm. • Shut: <ul style="list-style-type: none"> • 1RE021, EQ Drain Sump Disch CNMT Inbd Vlv. • 1RE022, EQ Drain Sump Disch CNMT Outbd Vlv. • 1RF021, Flr Drain Sump Disch CNMT Inbd Vlv. • 1RF022, Flr Drain Sump Disch CNMT Outbd Vlv. CPS 3408.01 VR/VQ, Step 8.1.1.2: <ul style="list-style-type: none"> ○ Shift CNMT Building HVAC System to Continuous CNMT Purge Filtered mode
	RO	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Enters CPS 4010.01, Reactor Coolant Hi Activity, and directs actions listed above. • Directs Chemistry to sample the Reactor Coolant • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Enforces OPS expectations and standards. ○ Contacts Shift Manager and recommends notifications.
Terminus: Valves shut, SRO has entered CPS 4010.01 and directed actions accordingly.		

NOTES:

Operator Actions

Event No.(s): 8, 9,10,11		Page 1 of 2
Description: Debris breaks loose in the condenser causing a loss of suction and trip of all CD pumps and small RR leak.		
Initiation: After Fuel Failure has been addressed, on the signal of lead examiner		
Cues: All Condensate and Feedwater pumps trip		
Time	Position	Applicant's Actions or Behavior
Critical Task	RO	Inserts a manual scram CPS 4100.01, Reactor Scram: <ul style="list-style-type: none"> • Place mode switch in Shutdown • Check and report power 1% and trending down • Check rods, reports shutdown criteria is met • Report level and pressure are following expected trends • Verify turbine and generator are tripped • Stabilize pressure <1065 psig Performs EOP/ON actions as directed by SRO <ul style="list-style-type: none"> • Coordinates with BOP operator to monitor and control RPV press
	BOP	<ul style="list-style-type: none"> • Makes plant announcement for reactor scram and evacuate the containment • Coordinates with RO to monitor and control RPV press • Evacuate the Containment Performs EOP/ON actions as directed by SRO <ul style="list-style-type: none"> • Reports HPCS Injection and trip • Reports RCIC will not inject • Maximize CRD • Inject with SLC • Initiates ADS • verifies 7 ADS valves are open • Maximizes injection and restores level above TAF

NOTES:

Event No.(s):		8, 9,10	Unisolable main steam line	Page 2 of 2
Time	Position	Applicant's Actions or Behavior		
	SRO	Directs entry into EOP-1, EOP-6 for high drywell pressure and EOP-3 (Blowdown) actions as entry conditions are met. <ul style="list-style-type: none"> • Directs Stabilize pressure below 1065 psig • Hold level above TAF • Maximize CRD • Inject with SLC When RPV water level is less than TAF, directs entry into EOP-3 and EOP actions: <ul style="list-style-type: none"> • Initiation of ADS • verify 7 ADS valves are open 		
Critical Task 				
Terminus:				
<ul style="list-style-type: none"> • Reactor scrammed • ADS has been initiated • Level restored above TAF • Upon approval of lead examiner 				

NOTES:

Simulator Operator Instructions**Initial Setup**

1. Verify daily lamp test completed
2. Reset to IC-41 (Verify/Adjust Power to 65% with rods and/or flow to match turnover).
 - Make sure DW pressure is up to ~1.0 psig built into the initial conditions or the Lesson plan
 - Ensure B MC pump is running
 - B RT pump is running.
 - A TDRFP is running.
3. Load the lesson plan for this scenario.
4. Place simulator in RUN
5. Verify Rod Drive pressure at 250 #.
6. Turn on and advance recorders
7. Verify the AR/PR server is running and stabilize AR/PR
8. Identify T/S issues associated with OOS and turnover
9. Ensure PR001 is on service and PR002 is in Standby. (Main Stack monitors).
10. Ensure PR012 is operating / in-service. (If asked at any time during the evaluation why PR012 is running, inform crew it is to support Chemistry. This is a limitation discovered during ITR/Validation of scenario, PR012 won't auto start and can't be started from the instructor station so it is started at the beginning of the scenario so it will be running if it is needed or referenced.)
11. Verify simulator conditions match the turnover
12. Provide a copy of CPS 3005.01, signing for step 8.2.9.
13. Fill out plant status and have Turnover Sheet ready for the crew.
14. Provide pull sheets, REMA, Re instructions and Cram Instructions.

Event Triggers and Role Play

If asked at any time during the evaluation why PR012 is running, inform crew it is to support Chemistry. (This is a limitation discovered during ITR/Validation of scenario, PR012 won't auto start and can't be started from the instructor station so it is started at the beginning of the scenario so it will be running if it is needed or referenced.)

Event

1. Lower DW pressure.
 - a. **No trigger.** Activates when D/W pressure is less than .6 psig.
 - b. Role play – To support this evolution. If sent to B Mixer it appears fine. If sent to B Mixer breaker it is tripped and has a bad smell. NO FIRE.
 - c. Role play – If asked then Cumulative data will be taken care of by the WCS.
2. Power reduction to support removal of a RFPT turbine
 - a. **No triggers**
3. 'A' TDRFP trouble alarm
 - a. **Remote trigger 1**
 - b. Role Play- field Operator that 43 psig on Thrust Bearing Wear Pressure at 1PL76JA and starting to hear unusual sounds from 'A' TDRFP.
 - c. **TO EVALUATORS / Booth Operators:** If computer points FW-BC902 and or FW-BC903 are called up on PPC, inform the operators they both indicate High. (This is a limitation of the simulator.)
 - d. Role Play for Chemistry, RP and RE.
4. 'B' RT pump seal plate temperature high
 - a. **Remote trigger 2** on request from lead evaluator
 - b. Role play field operator that 'B' RT pump seal temperature is 285 degrees and rising slowly. The CCW is lined up to this pump and the other 'A' RT pump is at 175 degrees and stable. No steam in the room.
 - c. **Remote trigger 7** to remove RT F/D 'A', **Remote trigger 8** to remove RT F/D 'B'.
 - d. **Remote trigger 9** to place on service RT F/D 'A', **Remote trigger 10** to place on service RT F/D 'B'
5. 'A' APRM fails down scale
 - a. **Remote trigger 3** on request from lead evaluator
 - b. Role play as C/I if requested, investigating. Will come up with troubleshooting plan.
6. 'B' MC pump coupling fails.
 - a. **Remote trigger 4** on request from lead evaluator
 - b. Role Play – 'B' MC coupling is failed and support the startup of the 'A' MC pump.
7. Fuel failure
 - a. **Remote trigger 5** on request from lead evaluator
 - b. Role Play – If requested Primary to secondary Cntd d/p is .0125 psid.
 - c. Role Play – As Chemistry and RP is called.
 - d. If back panels are checked, inform operators all MSL Rads are tracking together.

8. Loss of all Condensate Pumps
 - a. **Remote trigger 6** on request from lead evaluator.
 - b. After 2 minutes from scram announcement go to MCR as IMD.

Procedures Used During Simulator Scenario # 1

(List of Annunciators on back of page)

1. EOP-1
2. EOP-3
3. EOP-9
4. 3316.01 CCGS
5. ITS/ORM/ODCM
6. 3005.01 Unit Power Changes
7. 4008.01 O/N
8. 4100.02 O/N
9. 4002.01 O/N
10. 3303.01 RT
11. 3208.01 MC/CY
12. 4010.01 O/N
13. 3408.01 VR/VQ
14. 4100.01 O/N
15. 4001.02 O/N
16. 4979.01 O/N
17. 4411.03
18. 4411.09

19. Annunciators:

- 5002-1B, 1C, 2Q, 4G
- 5000-2E, 2C
- 5060-8E
- 5014-2C
- 5041-7H,1C
- 5041-1c, 7H
- 5031-1G
- 5003-1D/E
- 5006-3D
- 5015-1A-M, 4C-M
- 5016-1G
- 5000-2C/E/F
- 5043-2A, 1G
- 5042-5H
- 5043-1G
- 5067-3E/F, 2L
- 5013-3A, 4E
- 5064-3C/D, 4C/D
- 5130-1G, 2G
- 5004-1L
- 5006-3D, 2H
- 5062-8E
- All alarms after the Scram

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EXAM

ILT 08-1 Exam Scenario 2

REVISION 00

DEVELOPER: _____ Tom Pickley _____

REVIEWED BY: _____ Simulator Instructor _____

APPROVED BY: _____ / _____
Operations Date

Overview

Makeup/Reject: CP's B,C,D,E and F are in service. RO train #1 & 2 are in-service in auto to WD

ECCS: RHR A, B, C, LPCS and HPCS are Operable. RCIC is Operable

SDC: N/A

Electrical: 6.9 KV 1A & 1B and 4.16 1A & 1B on UAT, 4160 Volt Busses 1A1, 1B1 & 1C1 are being supplied by RAT

Ventilation:

Radwaste: 1WF Evap is in Hot Standby. A and B RT F/D are in service.

Plant Status

On Line Risk Green

Reactor

Operational Condition: Mode 1
 Total Core Flow: _32.4_ mlb/hr
 FCV Position: A: _90_% B: _90_%
 Reactor Power: _27_% (<=100%) _919_ MWt (<=3473) _244_ Mwe
 Xenon: Stable
 RPV Level: _29_ in Narrow Range
 RPV Pressure: _929_ psi (< 1045)
 In service SDC loop: None MODE 1

Containment

Suppression Pool Temperature: _75.5_ F (<=93.1 F)
 Suppression Pool Level: _19.2_ ft (19 ft 0 to 19 ft 5 in)
 Drywell Pressure: _0.5_ psi (0 to 1 psig)
 Drywell to Containment dp: _0.5_ psi >=-.02 psid to <=1.0 psid
 Drywell Avg Air Temperature: _103_ F (<=146.53 F)
 Secondary Containment: _0.74_ in WG (>= 0.25 in WG vacuum)

BOP

Condenser Vacuum: _28.7_ in Hg
 Off – Gas Flow: _34.4_ scfm
 Condensate Temperature: _84_ F
 Generator Reactive Load: _85.4_ MVARs

Plant Chemistry

CPI (goal < 1.1): **1.00**
 Reactor Sulfates (goal < 2): 1.31 ppb
 Reactor Chlorides: 0.51 ppb
 FW Iron (goal < 2.1): 0.85 ppb

Protected Equip: None

Comments: See Turnover Sheet

From “Excellence in Human Performance”

Leaders reinforce desired jobsite behaviors (Handbook page 17)

Participate in training program activities.

Leaders monitor and provide feedback to improve training program quality as well as to coach and reinforce individuals who meet or exceed behavior expectations and Standards of performance. During training activities, leaders guide workers on how actions or inactions influence reactor safety and on the potential consequences of mistakes. They give particular attention to recognizing error-likely situations and flawed defenses during tasks important to nuclear safety

ATTACHMENT 1
Reactivity Maneuver Approval Cover Page
Page 1 of 4

Station: **Clinton** Valid Date(s): xx/xx/xxxx Reactivity Maneuver Plan #: C11-Simu.3

Multiple Activations Allowed? No (If yes, CRS may make additional copies)

Prepared by: Roger Bottom / xx/xx/xx Reviewed by: Joe ONE / xx/xx/xx
 Reactor Engineer / Date Qualified Nuclear Engineer / Date

Approved by: Michelle ONE Boss / xx/xx/xx Authorized by: _____ / xx/xx/xx
 RE Manager / Date Senior Reactor Operator / Date

NF Review Carlos Quark / xx/xx/xx
 NF Reviewer / Date

ReMA Activated: _____ / xx/xx/xx ReMA Terminated: _____ / xx/xx/xx
 Unit Supervisor / Date Unit Supervisor / Date

Title of Evolution: RR Pump Upshift
Purpose/Overview of Evolution: This ReMA provides the steps for raising reactor power to support upshift of the RR Pumps.
Reactivity Maneuver Steps
Extended General Issues: Select desired amount of power increase
1. Withdraw control rods to achieve conditions to support RR Upshift
2. Shift RR Pumps to fast speed and increase flow to 65% (~54.9 Mlbm/hr)
3.
4.
General Issues:
<ul style="list-style-type: none"> ▪ The critical parameters are provided as a guide to focus the monitoring of the evolution. Changes to these parameters may be necessary to accommodate the actual startup load profile and predictor uncertainties. Changes to the critical parameters are to be done in accordance with the ReMA Training and Reference Material guidelines per OP-AB-300-1003. ▪ The plan is to pull control rods in order to achieve sufficient conditions to perform and RR pump upshift. Flow will then be increased to ~65%.

**ATTACHMENT 2
Reactivity Maneuver Guidance Sheet**

STEP 1 of 2

Reactivity Maneuver Plan # C11-Simu.3

Description of Step : Increase reactor power with control rods to ~30% (~1050 MWt) to support RR pump shift to fast speed. Perform control rod pulls in accordance with approved sequence. Ensure Feedwater heating is in service and that feedwater temperature is within 50°F of nominal prior to exceeding 21.6% (750 MWt). Reference Appendix A of CPS 3102.01.					
QNE presence required in the Control Room? Yes <u> X </u> No <u> _ </u> * *RE Coverage shall be provided consistent with the guidelines of OP-AB-300-1003 and NF-AB-701.					
Initial Conditions (may be ranges) to be verified at the START of the Step					
Parameter	Value or Range	Init.	Parameter	Value or Range	Init.
Core Power (MWth or %)	N/A	N/A	MFLCPR	N/A	N/A
Core Flow (Mlb/hr or %)	N/A	N/A	MFLPD	N/A	N/A
FCL (%)	N/A	N/A	MAPRAT	N/A	N/A
Critical Parameters to be Verified During the Step					
Description; including frequency, method of monitoring, and contingency actions (if needed)					
			High	Low	
FCL Monitor Frequency: Demand 3D Case or verify with power and flow from P680 display. FCL should be monitored constantly after crossing 21.6% power and just prior to pump upshift. Contingency: Insert control rods in reverse order sequence to reduce FCL.			57.3 %	N/A	
Step Complete: _____ / _____ Reactor Operator / Date		Verified by: _____ / _____ Unit Supervisor / Date			

ATTACHMENT 2
Reactivity Maneuver Guidance Sheet

STEP 2 of 2

Reactivity Maneuver Plan # C11-Simu.3

Description of Step :
Shift RR Pumps to fast speed and increase core flow to ~65% (~54.9 Mlbm/hr). Increasing flow may be performed in increments to support throttling FCVs and as necessary to place other plant systems in service.

Reactor power will be 40-45% (1389 – 1563 MWt) at the completion of this step.

Note: It is possible that performing a pump upshift will cause the plant to enter into the CONTROLLED ENTRY REGION of the power / flow operating map. Per EC 358831, entry into this region in support of RR pump shifting activities has been evaluated and is acceptable.

QNE presence required in the Control Room? Yes X* No *
*RE Coverage shall be provided consistent with the guidelines of OP-AB-300-1003 and NF-AB-701.

Initial Conditions (may be ranges) to be verified at the START of the Step

Parameter	Value or Range	Init.	Parameter	Value or Range	Init.
Core Power (MWth or %)	N/A	N/A	MFLCPR	< 0.900	
Core Flow (Mlb/hr or %)	N/A	N/A	MFLPD	< 0.900	
FCL (%)	< 57.3%		MAPRAT	N/A	N/A

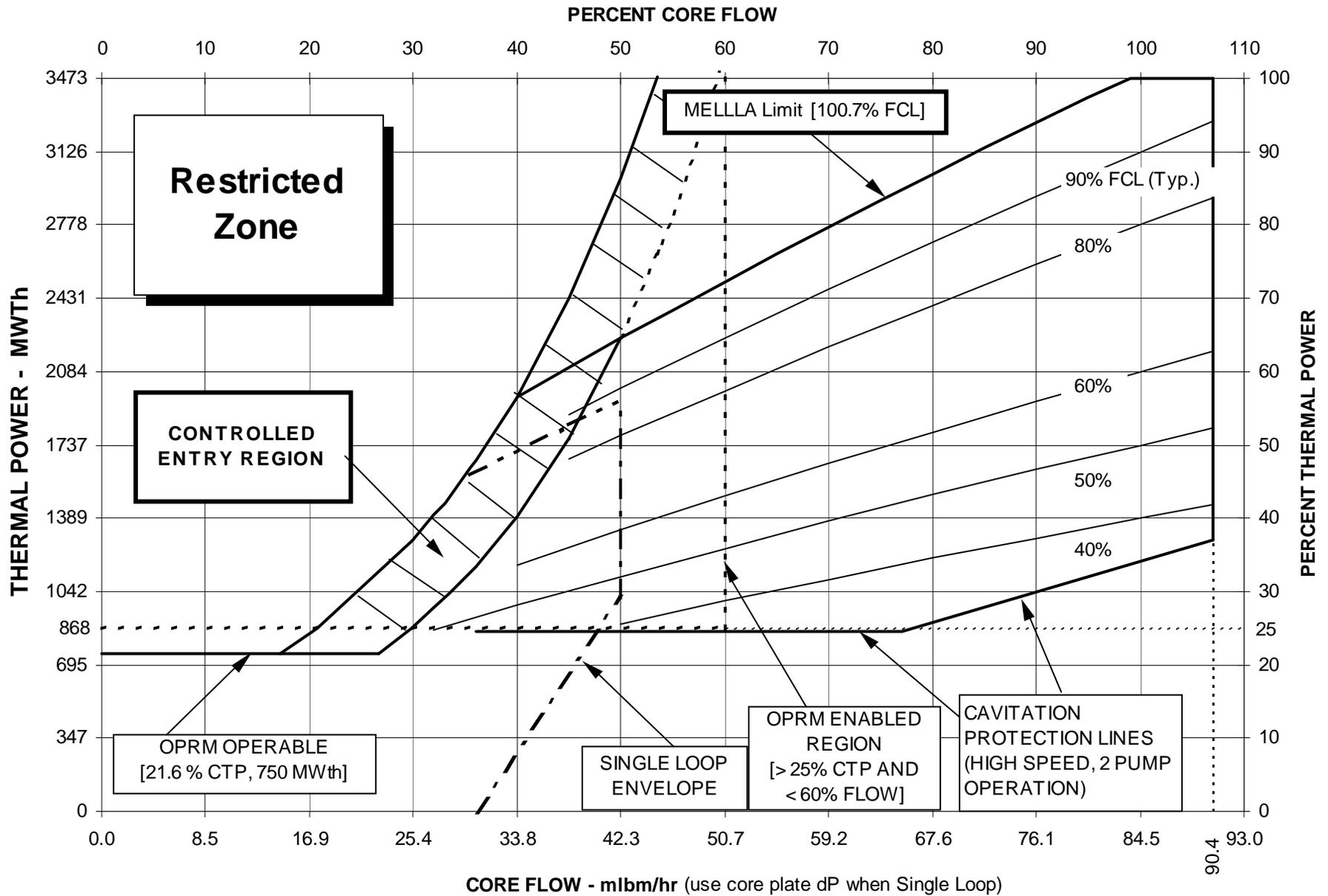
Critical Parameters to be Verified During the Step

Description; including frequency, method of monitoring, and contingency actions (if needed)	High	Low

Step Complete: _____ / _____
Reactor Operator / Date

Verified by: _____ / _____
Unit Supervisor / Date

FIGURE 1: CPS STABILITY CONTROL & POWER/FLOW OPERATING MAP



Facility: <u>Clinton Power Station</u>	Scenario No.: <u>Two</u>	Operating Test No.: <u>08-01</u>	
Examiners: _____ _____	Operators: _____ _____		
Initial Conditions:			
27% power RR Pumps on LFMG, Pulling rods to 30% power for Recirculation pump upshift. Thunderstorms are expected in the area within the next hour.			
Turnover:			
1. Shift Main EHC pump to support maintenance – First Priority.			
2. Pull rods to raise power to 30% and await instructions to shift Reactor Recirc pumps to Fast Speed.			
	Malf. No.	Event Type*	Event Description
1	NA	N-BOP	Main EHC pump swap.
2	NA	R-ATC	Pull rods to raise power.
3	4025I_Acti on3ROD16 49I_ACTIO N3 1	C-ATC TS-CRS	Rod drifts outward.
4	HP01HP_1 E22C003_ MTFSHEA R 1	C-BOP TS-CRS	HPCS WLP Shaft shears.
5	YAFWPPL B_5 30.000	C-ATC	“A” CB pump clogged oil filter/bearing oil deficiency.
6	YP_XMFT B_3918 1	C-BOP	Trip of ‘B’ CCW pump.
7	YAMSAVF P_15 0.0	I-BOP	SSE level control failure.
8	YP_XMFT B_5082 1	M-ALL	RPV Instrument line failure in the secondary containment.
9	YP_XMFT B_4963 1	M-ALL	Auto and Manual scram failure.
10	YP_XMFT B_5107_1	M-ALL	One SLC Pump fails to start

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

Scenario No.: Two
Narrative Summary

Operating Test No.: 08-01

Event #	Description
1.	Swap the running Main EHC pumps, the 'A' Main EHC pump will be started and the 'B' Main EHC pump shutdown.
2.	Allow rod withdrawal to raise power.
3.	During rod withdrawal a rod continues to move outward, Off-Normal CPS 4007.02 requires operator action to stop its outward movement. Once the rod is scrammed the rod will no longer withdraw. LCO 3.1.3 action C.1&2 is entered.
4.	HPCS WLP shaft shear. Stop the WLP, pull C/P fuses and CRS enters ITS 3.5.1 B.1 and B.2.
5.	"A" CB pump will experience a Clogged oil filter with a bearing oil deficiency requiring the startup of the standby pump and shutdown of the "A" pump.
6.	Trip of 'B' CCW pump. Start up 'A' CCW pump.
7.	SSE level control fails causing level to go low requiring the manual level control to restore level on the SSE.
8.	The RPV instrument line will break resulting in a partial lost of RPV instrumentation, a steam leak in the secondary containment and EOP-8 entry. Two areas in secondary containment will exceed Maximum Safe temperature requiring blowdown.
9.	When scrammed, rods will not move resulting in reactor remaining at power and entry to EOP-1A. This will require insertion of rods and the initiation of SLC to shutdown the reactor.
10.	When SLC is started the B SLC pump fails to start.

EOPS
8,1A,3

Critical tasks:

- Insert control rods and/or start SLC to shutdown the reactor
- Terminate and Prevent Injection prior to emergency depressurization
- Initiate emergency depressurization once two Max Safe temperatures are exceeded.
- Commence RPV feed to Restore level to the prescribed band when RPV pressure is below figure J.

Shift Turnover Information

⇒ **Day of week and shift**

- ◆ Today Day Shift

⇒ **Weather conditions**

- ◆ Thunderstorms are expected in the area within the next hour.

⇒ **(Plant power level)**

- | | |
|--------------------------|---|
| ◆ 27% Power | ◆ A-2, step 27 is complete, 16-33 at 26 |
| ◆ 944 MWt | ◆ |
| ◆ 252 MWe | ◆ |
| ◆ 32.4 Mlbm/hr CORE FLOW | ◆ |

⇒ **Thermal Limit Problems/Power Evolutions**

- | | |
|--|---|
| ◆ Raise power by pulling rods to 30% then await instructions to shift RR pumps to fast speed. | ◆ |
| ◆ RE is present and available. Rx startup in progress. Gang is permissible, but continuous drive is NOT authorized | ◆ |
| ◆ | ◆ |

⇒ **Existing LCOs, date of next surveillance**

- | | |
|---|---|
| ◆ | ◆ |
| ◆ | ◆ |

⇒ **Surveillances or major maintenance**

- | | |
|---|---|
| ◆ FWLC selected to channel B for calibration of channel A later this shift. | ◆ |
| ◆ | ◆ |
| ◆ | ◆ |

⇒ **Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment**

- | | |
|---|---|
| ◆ | ◆ |
| ◆ | ◆ |

⇒ **Comments, evolutions, problems, etc.**

- | | |
|--|---|
| ◆ Online Safety is Green | ◆ In 3004.01 complete thru step 8.3.10 |
| ◆ Shift Main EHC pump to support maintenance – First Priority. | ◆ Carrying electrical load in accordance with the Power Team. |

Operator Actions

Event No.(s): 2		Page 1 of 1
Description: Pull rods to raise power		
Initiation: Following Main EHC pump shift.		
Cues: Directed by SRO		
Time	Position	Applicant's Actions or Behavior
	RO	Per Turbine Startup and Generator Synchronization, CPS3004.01, step 8.3.11 and NF-CL-721 series: <ul style="list-style-type: none"> • Withdraw rods to raise power to 30% Rods are withdrawn by depressing the withdraw pushbutton or the continuous and withdraw pushbuttons together.
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures.
Terminus: Clearly observable plant response from change in power level.		

NOTES:

Operator Actions

Event No.(s): 3		Page 1 of 1
Description: Rod 16-49 drifts outward		
Initiation: Once the reactivity manipulation is complete, on the signal of lead examiner		
Cues: Rod Drift, 5006-4G alarms		
Time	Position	Applicant's Actions or Behavior
	RO	Per Inadvertent Rod Movement, CPS 4007.02: Immediate actions <ul style="list-style-type: none"> • Select and fully insert the moving rod with the In Timer Skip button Subsequent actions; <ul style="list-style-type: none"> • Once fully inserted release the In Timer Skip button • Observe rod withdrawal • Reinsert rod with the In Timer Skip button Per CPS 5006-3D, OPRM Enabled: <ul style="list-style-type: none"> ▪ Monitor for core instabilities
	BOP	<ul style="list-style-type: none"> • Dispatch a field operator to the HCU for the rod • Directs field operator to Individually scram rod • Evaluates thermal limits • Evaluate MSL rad monitor values • Evaluates OG Rad levels
	SRO	<ul style="list-style-type: none"> • Enters and direct actions per Inadvertent Rod Movement, CPS 4007.02 • Control Rod Operability, Tech. Spec. LCO 3.1.3 action C.1&2 • Contacts Shift Manager and recommends notifications.
Terminus: Once rod is fully inserted, individually scrambled and Tech Specs referenced.		

NOTES:

Operator Actions

Event No.(s): 4		Page 1 of 1
Description: HPCS WLP Shaft shears		
Initiation: Following completion of rod failure, on the signal of lead examiner		
Cues: HPCS System, 5062-7D alarms		
Time	Position	Applicant's Actions or Behavior
	BOP	Per ARP Procedure CPS 5062-7D: <ul style="list-style-type: none"> • Dispatches NLO to investigate. ○ If ATM is checked for pressure it reads 0 psig When directed: <ul style="list-style-type: none"> • Shutdown the HPCS WLP Pump. Per HPCS CPS 3309.01 precaution 4.3: <ul style="list-style-type: none"> • Dispatches NLO to remove HPCS control power fuses. 5062-7B will alarm.
	RO	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands. • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Evaluates and enters Technical Specification LCO 3.5.1 B.1 and B.2. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Contacts Shift Manager and recommends notifications.
Terminus: HPCS control power fuses removed and Technical Specifications evaluated.		

NOTES:

If the crew does not pull the control power fuses the coupling on the HPCS pump will be broken to prevent HPCS from injecting.

Operator Actions

Event No.(s): 5		Page 1 of 1
Description: CB pump "A" clogged oil filter/bearing oil deficiency		
Initiation: After crew has addressed HPCS problem and on the signal of lead examiner.		
Cues: Annunciator CPS 5001-1H alarming,		
Time	Position	Applicant's Actions or Behavior
	RO	CPS 5001-1H, Clogged Oil Filter CB 1A: <ul style="list-style-type: none"> ▪ Directs field operator to turn Cuno filter CPS 3104.01, CD/CB step 8.2.2: <ul style="list-style-type: none"> • Startup standby CB pump • Shutdown 'A' CB pump
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Enforces OPS expectations and standards • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures.
Terminus: Standby CB pump started and shutdown the 'A' CB pump.		

NOTES:

Operator Actions

Event No.(s): 6		Page 1 of 1
Description: Trip of 'B' CCW pump		
Initiation: After shifting of CB pumps, on the signal of lead examiner		
Cues: Annunciator CPS 5040-1B alarming,		
Time	Position	Applicant's Actions or Behavior
	RO	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions. • Responds to annunciator 5003-3D and 3E, RR Low Cooling Water Flow.
	BOP	<ul style="list-style-type: none"> • Respond to annunciator 5040-1B, Informs CRS B CCW pump tripped. • Starts standby pump per ARP (O/A 2.a). • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Directs starting of 'A' CCW pump. • Directs RO to monitor RR and RT Temps. • Enforces OPS expectations and standards • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures.
Terminus: Standby CCW pump started.		

NOTES:

Operator Actions

Event No.(s): 7		Page 1 of 1
Description: SSE level control failure		
Initiation: After crew has addressed CCW pump trip and on the signal of lead examiner		
Cues: Annunciator CPS 5019-3A alarming		
Time	Position	Applicant's Actions or Behavior
	BOP	Per CPS 5019-3A, Hi/Lo SSE Shell, OA 2: <ul style="list-style-type: none"> • Determines level to be low. • Direct field operator to investigate. • Throttle open 1GS-S10, SSE Feed Water Bypass Vlv to restore level to the $-2 \frac{1}{2} \rightarrow + 2 \frac{1}{2}$. Note: When the operator feeds with the Bypass valve the additional cold water will initially cause SSE pressure to drop further before it recovers.
	RO	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Terminus: SSE level restored and alarm clear		

NOTES:

May take up to (2) minutes for alarm to come in. (This is normal.)

Operator Actions

Event No.(s):		8,9,10	Page 1 of 5
Description: RPV Instrument line failure in the secondary containment, Failure to scram			
Initiation: on the signal of lead examiner			
Cues: Multiple secondary containment area temperature and area radiation alarms, Rods fail to insert upon Scramming			
Time	Position	Applicant's Actions or Behavior	
	RO	Reports EOP-8 entry on Hi temperature Performs EOP actions as directed by SRO <ul style="list-style-type: none"> • Initiate a manual reactor scram before first max safe temperature is exceeded Per CPS 4100.01, Reactor Scram: <ul style="list-style-type: none"> • Place mode switch in Shutdown • Check and report power unchanged • Operate FW to control level 3 to 8 • Check rods, reports shutdown criteria is not met • Report level and pressure are following expected trends • Stabilize pressure <1065 psig • Coordinates with BOP operator to monitor and control RPV level and press 	
	BOP	<ul style="list-style-type: none"> • Reports secondary containment high temperature and rad alarms to SRO • Makes plant announcement for reactor scram • Should make plant announcement to evacuate Fuel/Aux buildings. Performs EOP actions as directed by SRO <ul style="list-style-type: none"> • Verifies operation of area coolers • Verifies operation of VF, Fuel Bldg Vent. • Evacuates affected areas of Secondary Containment • Monitors area temperatures, levels and radiation levels • Reports a secondary containment Max Safe temperature being approached to SRO • Reports two secondary containment Max Safe temperatures are being exceeded to SRO • Coordinates with RO to monitor and control RPV level and press 	

Critical Task

NOTES:

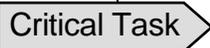
Event No.(s):		8,9,10	Page 2 of 5
Time	Position	Applicant's Actions or Behavior	
	SRO	<p>Directs entry into EOP-8 and EOP actions as entry conditions are met:</p> <ol style="list-style-type: none"> 1. Operate VF 2. Operate area coolers 3. Hold floor drain sump levels below max. normal 4. Isolate all discharges into the affected area except systems needed for: <ul style="list-style-type: none"> • EOP Actions • Fire Fighting 5. Per EOP-8/CPS 4001.01, Reactor Coolant Leakage: <ul style="list-style-type: none"> • Directs BOP to isolate the source of leakage 6. Direct a scram prior to exceeding Maximum safe temperature 7. Enters EOP-1 <p>Directs additional actions:</p> <ol style="list-style-type: none"> 1. Notification of Radiation Protection (RP) Department 2. Evacuate affected areas of Secondary Containment <p>Directs and verifies performance of appropriate actions per EOP-1:</p> <ol style="list-style-type: none"> 1. Mode Switch to SHUTDOWN <ul style="list-style-type: none"> • Per EOP-1 enters EOP-1A <p>Enters EOP-3 and direct Blowdown once exceeding Maximum safe temperature in two areas</p>	

Critical Task

NOTES:

Event No.(s):		8,9,10	Page 3 of 5
Time	Position	Applicant's Actions or Behavior	
	RO	Performs EOP actions as directed by SRO: <ul style="list-style-type: none"> • Arms and depresses MANUAL SCRAM push-buttons. • Initiates ARI. • CPS No. 4411.08, Alternate Control Rod Insertion <ul style="list-style-type: none"> • Inserts control rods until RPC lockup • Directs defeating RPC for further rod insertion • Verifies RR downshifts at Level 3, and trips at Level 2. • Terminates and prevents injection CB/FW systems CPS 4411.02 • When RPV level reaches -60", control RPV water level between TAF and -60" using only the listed Preferred ATWS Systems 	
		Critical Task	
		Critical Task	
	BOP	Performs EOP-1A actions as directed by SRO: <ul style="list-style-type: none"> • Inhibits ADS. • Verifies needed auto actions. <ul style="list-style-type: none"> • Isolations • DG Start • Dispatches area operator to monitor DGs • Starts and verifies injection of SLC trains 'A' and 'B'. <ul style="list-style-type: none"> • Reports SLC B failure to start. • Terminates and prevents injection systems CPS 4411.02 <ol style="list-style-type: none"> 1. HPCS 2. RCIC 3. LPCS – LPCS-5 valve may cycle open due to Instrument failure. 'B' RO may have to give LPCS-5 valve a close signal to complete the T/P. 4. LPCI Stabilizes RPV pressure below 1065 psig	
		Critical Task	
		Critical Task	

NOTES:

Event No.(s):		8,9,10	Page 4 of 5
Time	Position	Applicant's Actions or Behavior	
	SRO	Directs entry into EOP-1A and EOP actions as entry conditions are met: 1. Inhibit ADS 2. Arm and depress MANUAL SCRAM push-buttons 3. Initiate ARI 5. Determines Power to be greater than 5% and Directs injection of SLC 6. Insert control rods manually per CPS No. 4411.08, Alternate Control Rod Insertion 7. Verifies needed auto actions. <ul style="list-style-type: none"> • Isolations • DG Start 8. Terminate and prevent injection of Detail F1 CPS 4411.02 9. When RPV level reaches -60", control RPV water level between TAF and -60" using only the listed Preferred ATWS Systems 10. Enters EOP-6 for High Drywell Temperature 11. Directs crew to stabilize RPV pressure below 1065 psig Monitor status and hold condition of identified parameters below (within) specified values. <ul style="list-style-type: none"> • On transient, positions himself as command authority on the unit. • Acknowledges immediate operator actions and directs subsequent actions. • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications. 	
			
			
			

NOTES:

Event No.(s):		8,9,10	Page 5 of 5
Time	Position	Applicant's Actions or Behavior	
Critical Task	RO	Performs EOP-3 actions as directed by SRO • Termination and prevention of injection of all F1 systems 1. CB/FW At less than 138 psig:	
Critical Task		• Re-feed to level band OF -60 to TAF	
Critical Task	BOP	Performs EOP-3 actions as directed by SRO • termination and prevention of injection of all F1 systems 1. LPCS 2. LPCI	
Critical Task		• initiation of ADS and verify 7 ADS valves open	
4 Critical Tasks	SRO	Enters EOP-3 and direct Blowdown once exceeding Maximum safe temperature in two areas • Directs termination and prevention of injection of all F1 systems • Directs initiation of ADS and verify 7 ADS valves open • Directs Re-feed at 138 psig • Directs level band at -60 to -TAF	
Terminus: • EOP-8 actions initiated • SLC started • Rod Insert commenced • RPV level lowered • ADS initiated • Level restored and stabilized • Upon approval of lead examiner			

NOTES:

Simulator Operator Instructions

Initial Setup

1. Verify daily lamp test completed
2. Reset to IC-42 (Verify/Adjust Power to 27% with rods and to match turnover If needed).
3. Load the lesson plan for this scenario.
4. Place simulator in RUN.
5. Select the FWLC level instrument B.
6. Turn on and advance recorders.
7. Verify Load set is at 600 MWe.
8. Verify the AR/PR server is running and stabilize AR/PR.
9. Verify Rod Drive pressure at 250#.
10. Identify T/S issues associated with OOS and turnover.
11. Verify simulator conditions match the turnover.
12. Rema and Rod Pull sheets marked up thru step 27 with 16-33 at 26
13. Provide marked up CPS 3004.01 complete to step 8.3.10.
14. Fill out plant status sheet and have Turnover sheet ready for crew.

Event Triggers and Role PlayEvent #

1. Main EHC pump swap
 - a. **No trigger** - to start
 - b. Role play - Field operator to swap the running Main EHC pumps. Local EHC pressure reading of 1625 psig for pump and 1625 psig header. All other EHC parameters are normal
 - c. **Remote trigger 10** – When requested to test auto start feature
 - d. The Pump will shutoff when stopped with the control room switch.

2. Pull rods to raise power
 - a. **No triggers**
 - b. RE –Xenon is at equilibrium. Gang is permissible, but continuous drive is NOT authorized

3. Rod drifts outward.
 - a. **Remote trigger 1** – on request from lead evaluator.
 - b. No problem lights at the RGDC or RACCs
 - c. Role Play – Field operator reports no indications of problem at the HCU.
 - d. RE – 3D ran thermal limits have not been approached or exceeded. If scram times are asked for? Then no rods are slow.
 - e. **Remote trigger 8** – When directed to scram the rod and report it completed. When asked accumulator N2 pressure is 1200 psig after rod is scrambled

4. HPCS WLP shaft shears
 - a. **Remote trigger 2** - on request from lead evaluator
 - b. Role play – Field Operator if asked HPCS WLP the motor is turning but the pump is not.
 - c. If ATM is checked it is reading 0 psig.
 - d. **Remote trigger 7** – When directed remove HPCS motor breaker Trip and C/P fuses and report it completed.
 - e. If called - Respond as maintenance to investigate.
 - f. If requested by CRS, RCIC is operable by administrative means.

NOTE: If the control power fuses are not pulled then insert the HPCS Shaft Break from the Lesson Plan.

5. CB pump “A” clogged oil filter/bearing oil deficiency
 - a. **Remote trigger 3** - on request from lead evaluator
 - b. Role play – Field Operator to turn the Cuno filter for the CB A pump and report it done, leave this alarm in. Support startup of the standby CB pump. (Lube oil is >8 psi and >75°F)

More Event Triggers and Role Play on the next page

6. 'B' CCW pump Trip
 - a. **Remote trigger 4** on request from lead evaluator
 - b. When sent to A CCW pump it is okay. When sent to the breaker it is warm to the touch and has an overcurrent trip in. No fire.
 - c. Role play as maintenance personnel in the field if requested.

7. SSE level control failure
 - a. **Remote trigger 5** - on request from lead evaluator
 - b. Role play as field operator no indications locally that would explain failure.
 - c. Controller is set at 0 inches, but level control valve is shut.
 - d. May take up to (2) minutes for alarm to come in. (This is normal.)

8. RPV Instrument line failure in the secondary containment
 - a. **Remote trigger 6** on request from lead evaluator
 - b. When the XL3 printout is requested provide attachment 1
 - c. Role play as personnel in the field
 - (1) When an operator is dispatched to the 781 East Gas Control Boundary report that the area appears to have a steam leak. You are unable to enter.

9. Auto and Manual scram failure
 - a. **Triggers** – already active
 - b. Perform Pending actions when requested
 - c. Show up in the MCR 2 minutes after the scram announcement as IMD. (10 min if no announcement)

10. RT-1 and RT-4 fail to shut on SLC initiation
 - a. **Triggers** – already active

*TEAR THIS PIECE OFF AND GIVE TO OPERATOR
CHECKING FP ALARM*

Attachment 1

61-17 AB-781 East Col 121-124 AC ALARM

61-18 AB-781 East Col 121-124 AC ALARM

61-19 AB-781 East Col 121-124 AC ALARM

61-20 AB-781 East Col 121-124 AC ALARM

Procedures Used During Simulator Scenario # 3

(List of Annunciators on back of page)

1. EOP-1
2. EOP-1A
3. EOP-8
4. EOP-3
5. EOP-6
6. 3105.02 EHC
7. ITS/ORM/ODCM
8. 3004.01 TG S/U and Sync
9. 4007.02 O/N
10. 3309.01 HPCS
11. 3104.01 CD/CB
12. 4100.01 O/N
13. 4001.01 O/N
14. 4411.08 ARI
15. 4411.02 T/P
16. SLC hard card
17. T/P hard card (2)
18. 3203.01 CCW
19. 3107.01 GS
20. 3304.02 RCIS
21. 4411.104410.00 C012
22. 4411.09
23. 4410.00 C003
24. 4410.00 C004
25. 4411.03
26. 4411.04
27. 4411.11
28. 4411.02
29. 3101.01
30. HU-AA-1211
31. OP-AB-300-1001

32. Annunciators:

- 5006-4G, 5D, 3H, 1H, 3D
- 5062-7D, 8E, 7B
- 5019-3A
- 5001-1H
- 5040-1B, 8D
- 5003-3D, 3E, 2F, 2J, 2M, 4B, 4H
- 5017-3A
- 5130-1G ,2G
- 5003-3D, 3K
- 5002-2P, 1Q
- 5004-3A, 3F
- 5009-5B
- 5063-7H
- 5065-6F
- 5140 AR/PR
- All alarms after the Scram

**Clinton Power Station
Licensed Operator Training
Simulator Exercise Guide**

EXAM

ILT 08-1 Exam Scenario 2

REVISION 00

DEVELOPER: _____ Tom Pickley _____

REVIEWED BY: _____ Simulator Instructor _____

APPROVED BY: _____ / _____
Operations Date

Overview

Makeup/Reject: CP's B,C,D,E and F are in service. RO train #1 & 2 are in-service in auto to WD

ECCS: RHR A, B, C, LPCS and HPCS are Operable. RCIC is Operable

SDC: N/A

Electrical: 6.9 KV 1A & 1B and 4.16 1A & 1B on UAT, 4160 Volt Busses 1A1, 1B1 & 1C1 are being supplied by RAT

Ventilation:

Radwaste: 1WF Evap is in Hot Standby. A and B RT F/D are in service.

Plant Status

On Line Risk Green

Reactor

Operational Condition: Mode 1
 Total Core Flow: _32.4_ mlb/hr
 FCV Position: A: _90_% B: _90_%
 Reactor Power: _27_% (<=100%) _919_ MWt (<=3473) _244_ Mwe
 Xenon: Stable
 RPV Level: _29_ in Narrow Range
 RPV Pressure: _929_ psi (< 1045)
 In service SDC loop: None MODE 1

Containment

Suppression Pool Temperature: _75.5_ F (<=93.1 F)
 Suppression Pool Level: _19.2_ ft (19 ft 0 to 19 ft 5 in)
 Drywell Pressure: _0.5_ psi (0 to 1 psig)
 Drywell to Containment dp: _0.5_ psi >=-.02 psid to <=1.0 psid
 Drywell Avg Air Temperature: _103_ F (<=146.53 F)
 Secondary Containment: _0.74_ in WG (>= 0.25 in WG vacuum)

BOP

Condenser Vacuum: _28.7_ in Hg
 Off – Gas Flow: _34.4_ scfm
 Condensate Temperature: _84_ F
 Generator Reactive Load: _85.4_ MVARs

Plant Chemistry

CPI (goal < 1.1): **1.00**
 Reactor Sulfates (goal < 2): 1.31 ppb
 Reactor Chlorides: 0.51 ppb
 FW Iron (goal < 2.1): 0.85 ppb

Protected Equip: None

Comments: See Turnover Sheet

From “Excellence in Human Performance”

Leaders reinforce desired jobsite behaviors (Handbook page 17)

Participate in training program activities.

Leaders monitor and provide feedback to improve training program quality as well as to coach and reinforce individuals who meet or exceed behavior expectations and Standards of performance. During training activities, leaders guide workers on how actions or inactions influence reactor safety and on the potential consequences of mistakes. They give particular attention to recognizing error-likely situations and flawed defenses during tasks important to nuclear safety

ATTACHMENT 1
Reactivity Maneuver Approval Cover Page
Page 1 of 4

Station: **Clinton** Valid Date(s): xx/xx/xxxx Reactivity Maneuver Plan #: C11-Simu.3

Multiple Activations Allowed? No (If yes, CRS may make additional copies)

Prepared by: Roger Bottom / xx/xx/xx Reviewed by: Joe ONE / xx/xx/xx
 Reactor Engineer / Date Qualified Nuclear Engineer / Date

Approved by: Michelle ONE Boss / xx/xx/xx Authorized by: _____ / xx/xx/xx
 RE Manager / Date Senior Reactor Operator / Date

NF Review Carlos Quark / xx/xx/xx
 NF Reviewer / Date

ReMA Activated: _____ / xx/xx/xx ReMA Terminated: _____ / xx/xx/xx
 Unit Supervisor / Date Unit Supervisor / Date

Title of Evolution: RR Pump Upshift
Purpose/Overview of Evolution: This ReMA provides the steps for raising reactor power to support upshift of the RR Pumps.
Reactivity Maneuver Steps
Extended General Issues: Select desired amount of power increase
1. Withdraw control rods to achieve conditions to support RR Upshift
2. Shift RR Pumps to fast speed and increase flow to 65% (~54.9 Mlbm/hr)
3.
4.
General Issues:
<ul style="list-style-type: none"> ▪ The critical parameters are provided as a guide to focus the monitoring of the evolution. Changes to these parameters may be necessary to accommodate the actual startup load profile and predictor uncertainties. Changes to the critical parameters are to be done in accordance with the ReMA Training and Reference Material guidelines per OP-AB-300-1003. ▪ The plan is to pull control rods in order to achieve sufficient conditions to perform and RR pump upshift. Flow will then be increased to ~65%.

**ATTACHMENT 2
Reactivity Maneuver Guidance Sheet**

STEP 1 of 2

Reactivity Maneuver Plan # C11-Simu.3

Description of Step : Increase reactor power with control rods to ~30% (~1050 MWt) to support RR pump shift to fast speed. Perform control rod pulls in accordance with approved sequence. Ensure Feedwater heating is in service and that feedwater temperature is within 50°F of nominal prior to exceeding 21.6% (750 MWt). Reference Appendix A of CPS 3102.01.					
QNE presence required in the Control Room? Yes <u> X </u> No <u> </u> * *RE Coverage shall be provided consistent with the guidelines of OP-AB-300-1003 and NF-AB-701.					
Initial Conditions (may be ranges) to be verified at the START of the Step					
Parameter	Value or Range	Init.	Parameter	Value or Range	Init.
Core Power (MWth or %)	N/A	N/A	MFLCPR	N/A	N/A
Core Flow (Mlb/hr or %)	N/A	N/A	MFLPD	N/A	N/A
FCL (%)	N/A	N/A	MAPRAT	N/A	N/A
Critical Parameters to be Verified During the Step					
Description; including frequency, method of monitoring, and contingency actions (if needed)					
			High	Low	
FCL Monitor Frequency: Demand 3D Case or verify with power and flow from P680 display. FCL should be monitored constantly after crossing 21.6% power and just prior to pump upshift. Contingency: Insert control rods in reverse order sequence to reduce FCL.			57.3 %	N/A	
Step Complete: _____ / _____ Reactor Operator / Date		Verified by: _____ / _____ Unit Supervisor / Date			

**ATTACHMENT 2
Reactivity Maneuver Guidance Sheet**

STEP 2 of 2

Reactivity Maneuver Plan # C11-Simu.3

Description of Step :

Shift RR Pumps to fast speed and increase core flow to ~65% (~54.9 Mlbm/hr). Increasing flow may be performed in increments to support throttling FCVs and as necessary to place other plant systems in service.

Reactor power will be 40-45% (1389 – 1563 MWt) at the completion of this step.

Note: It is possible that performing a pump upshift will cause the plant to enter into the CONTROLLED ENTRY REGION of the power / flow operating map. Per EC 358831, entry into this region in support of RR pump shifting activities has been evaluated and is acceptable.

QNE presence required in the Control Room? Yes X No *

*RE Coverage shall be provided consistent with the guidelines of OP-AB-300-1003 and NF-AB-701.

Initial Conditions (may be ranges) to be verified at the START of the Step

Parameter	Value or Range	Init.	Parameter	Value or Range	Init.
Core Power (MWth or %)	N/A	N/A	MFLCPR	< 0.900	
Core Flow (Mlb/hr or %)	N/A	N/A	MFLPD	< 0.900	
FCL (%)	< 57.3%		MAPRAT	N/A	N/A

Critical Parameters to be Verified During the Step

Description; including frequency, method of monitoring, and contingency actions (if needed)

High

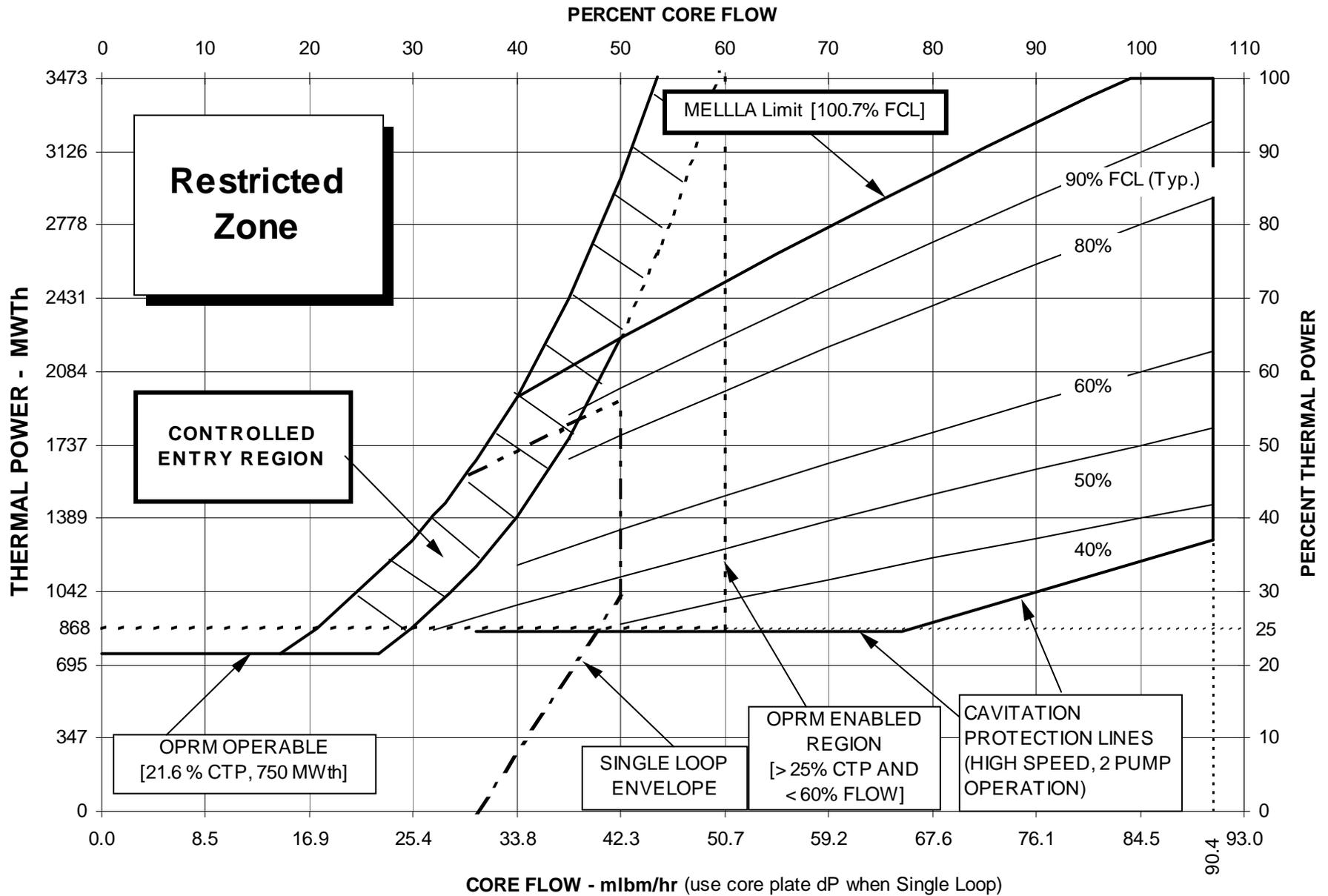
Low

	High	Low

Step Complete: _____ / _____
Reactor Operator / Date

Verified by: _____ / _____
Unit Supervisor / Date

FIGURE 1: CPS STABILITY CONTROL & POWER/FLOW OPERATING MAP



Facility: <u>Clinton Power Station</u>		Scenario No.: <u>Two</u>		Operating Test No.: <u>08-01</u>	
Examiners: _____			Operators: _____		
_____			_____		
_____			_____		
Initial Conditions:					
27% power RR Pumps on LFMG, Pulling rods to 30% power for Recirculation pump upshift. Thunderstorms are expected in the area within the next hour.					
Turnover:					
1. Shift Main EHC pump to support maintenance – First Priority.					
2. Pull rods to raise power to 30% and await instructions to shift Reactor Recirc pumps to Fast Speed.					
	Malf. No.	Event Type*	Event Description		
1	NA	N-BOP	Main EHC pump swap.		
2	NA	R-ATC	Pull rods to raise power.		
3	4025L_Acti on3ROD16 49I_ACTIO N3 1	C-ATC TS-CRS	Rod drifts outward.		
4	HP01HP_1 E22C003_ MTFSHEA R 1	C-BOP TS-CRS	HPCS WLP Shaft shears.		
5	YAFWPPL B_5 30.000	C-ATC	"A" CB pump clogged oil filter/bearing oil deficiency.		
6	YP_XMFT B_3918 1	C-BOP	Trip of 'B' CCW pump. delete		
7	YAMSAVF P_15 0.0	I-BOP	SSE level control failure.		
8	YP_XMFT B_5082 1	M-ALL	RPV Instrument line failure in the secondary containment.		
9	YP_XMFT B_4963 1	M-ALL	Auto and Manual scram failure.		
10	YP_XMFT B_5107_1	M-ALL	One SLC Pump fails to start		

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

Scenario No.: Two
Narrative Summary

Operating Test No.: 08-01

Event #	Description
1.	Swap the running Main EHC pumps, the 'A' Main EHC pump will be started and the 'B' Main EHC pump shutdown.
2.	Allow rod withdrawal to raise power.
3.	During rod withdrawal a rod continues to move outward, Off-Normal CPS 4007.02 requires operator action to stop its outward movement. Once the rod is scrammed the rod will no longer withdraw. LCO 3.1.3 action C.1&2 is entered.
4.	HPCS WLP shaft shear. Stop the WLP, pull C/P fuses and CRS enters ITS 3.5.1 B.1 and B.2.
5.	"A" CB pump will experience a Clogged oil filter with a bearing oil deficiency requiring the startup of the standby pump and shutdown of the "A" pump.
6.	Trip of 'B' CCW pump. Start up 'A' CCW pump.
7.	SSE level control fails causing level to go low requiring the manual level control to restore level on the SSE.
8.	The RPV instrument line will break resulting in a partial lost of RPV instrumentation, a steam leak in the secondary containment and EOP-8 entry. Two areas in secondary containment will exceed Maximum Safe temperature requiring blowdown.
9.	When scrammed, rods will not move resulting in reactor remaining at power and entry to EOP-1A. This will require insertion of rods and the initiation of SLC to shutdown the reactor.
10.	When SLC is started the B SLC pump fails to start.

EOPS
8,1A,3

Critical tasks:

- Insert control rods and/or start SLC to shutdown the reactor
- Terminate and Prevent Injection prior to emergency depressurization
- Initiate emergency depressurization once two Max Safe temperatures are exceeded.
- Commence RPV feed to Restore level to the prescribed band when RPV pressure is below figure J.

Shift Turnover Information

⇒ **Day of week and shift**

- ◆ Today Day Shift

⇒ **Weather conditions**

- ◆ Thunderstorms are expected in the area within the next hour.

⇒ **(Plant power level)**

- | | |
|--------------------------|---|
| ◆ 27% Power | ◆ A-2, step 27 is complete, 16-33 at 26 |
| ◆ 944 MWt | ◆ |
| ◆ 252 MWe | ◆ |
| ◆ 32.4 Mlbm/hr CORE FLOW | ◆ |

⇒ **Thermal Limit Problems/Power Evolutions**

- | | |
|--|---|
| ◆ Raise power by pulling rods to 30% then await instructions to shift RR pumps to fast speed. | ◆ |
| ◆ RE is present and available. Rx startup in progress. Gang is permissible, but continuous drive is NOT authorized | ◆ |
| ◆ | ◆ |

⇒ **Existing LCOs, date of next surveillance**

- | | |
|---|---|
| ◆ | ◆ |
| ◆ | ◆ |

⇒ **Surveillances or major maintenance**

- | | |
|---|---|
| ◆ FWLC selected to channel B for calibration of channel A later this shift. | ◆ |
| ◆ | ◆ |
| ◆ | ◆ |

⇒ **Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment**

- | | |
|---|---|
| ◆ | ◆ |
| ◆ | ◆ |

⇒ **Comments, evolutions, problems, etc.**

- | | |
|--|---|
| ◆ Online Safety is Green | ◆ In 3004.01 complete thru step 8.3.10 |
| ◆ Shift Main EHC pump to support maintenance – First Priority. | ◆ Carrying electrical load in accordance with the Power Team. |

Operator Actions

Event No.(s): 2		Page 1 of 1
Description: Pull rods to raise power		
Initiation: Following Main EHC pump shift.		
Cues: Directed by SRO		
Time	Position	Applicant's Actions or Behavior
	RO	Per Turbine Startup and Generator Synchronization, CPS3004.01, step 8.3.11 and NF-CL-721 series: <ul style="list-style-type: none"> • Withdraw rods to raise power to 30% Rods are withdrawn by depressing the withdraw pushbutton or the continuous and withdraw pushbuttons together.
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures.
Terminus: Clearly observable plant response from change in power level.		

NOTES:

Operator Actions

Event No.(s): 3		Page 1 of 1
Description: Rod 16-49 drifts outward		
Initiation: Once the reactivity manipulation is complete, on the signal of lead examiner		
Cues: Rod Drift, 5006-4G alarms		
Time	Position	Applicant's Actions or Behavior
	RO	Per Inadvertent Rod Movement, CPS 4007.02: Immediate actions <ul style="list-style-type: none"> • Select and fully insert the moving rod with the In Timer Skip button Subsequent actions; <ul style="list-style-type: none"> • Once fully inserted release the In Timer Skip button • Observe rod withdrawal • Reinsert rod with the In Timer Skip button Per CPS 5006-3D, OPRM Enabled: <ul style="list-style-type: none"> ▪ Monitor for core instabilities
	BOP	<ul style="list-style-type: none"> • Dispatch a field operator to the HCU for the rod • Directs field operator to Individually scram rod • Evaluates thermal limits • Evaluate MSL rad monitor values • Evaluates OG Rad levels
	SRO	<ul style="list-style-type: none"> • Enters and direct actions per Inadvertent Rod Movement, CPS 4007.02 • Control Rod Operability, Tech. Spec. LCO 3.1.3 action C.1&2 • Contacts Shift Manager and recommends notifications.
Terminus: Once rod is fully inserted, individually scrambled and Tech Specs referenced.		

NOTES:

Operator Actions

Event No.(s): 4		Page 1 of 1
Description: HPCS WLP Shaft shears		
Initiation: Following completion of rod failure, on the signal of lead examiner		
Cues: HPCS System, 5062-7D alarms		
Time	Position	Applicant's Actions or Behavior
	BOP	Per ARP Procedure CPS 5062-7D: <ul style="list-style-type: none"> • Dispatches NLO to investigate. ○ If ATM is checked for pressure it reads 0 psig When directed: <ul style="list-style-type: none"> • Shutdown the HPCS WLP Pump. Per HPCS CPS 3309.01 precaution 4.3: <ul style="list-style-type: none"> • Dispatches NLO to remove HPCS control power fuses. 5062-7B will alarm.
	RO	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands. • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Evaluates and enters Technical Specification LCO 3.5.1 B.1 and B.2. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Contacts Shift Manager and recommends notifications.
Terminus: HPCS control power fuses removed and Technical Specifications evaluated.		

NOTES:

If the crew does not pull the control power fuses the coupling on the HPCS pump will be broken to prevent HPCS from injecting.

Operator Actions

Event No.(s): 5		Page 1 of 1
Description: CB pump "A" clogged oil filter/bearing oil deficiency		
Initiation: After crew has addressed HPCS problem and on the signal of lead examiner.		
Cues: Annunciator CPS 5001-1H alarming,		
Time	Position	Applicant's Actions or Behavior
	RO	CPS 5001-1H, Clogged Oil Filter CB 1A: <ul style="list-style-type: none"> ▪ Directs field operator to turn Cuno filter CPS 3104.01, CD/CB step 8.2.2: <ul style="list-style-type: none"> • Startup standby CB pump • Shutdown 'A' CB pump
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Enforces OPS expectations and standards • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures.
Terminus: Standby CB pump started and shutdown the 'A' CB pump.		

NOTES:

Operator Actions

Event No.(s): 6		Page 1 of 1
Description: Trip of 'B' CCW pump		
Initiation: After shifting of CB pumps, on the signal of lead examiner		
Cues: Annunciator CPS 5040-1B alarming,		
Time	Position	Applicant's Actions or Behavior
	RO	<ul style="list-style-type: none"> ● Monitors reactor to ensure operations remain within established bands ● Monitors control room panels and notifies the SRO of any unusual or unexpected conditions. ● Responds to annunciator 5003-3D and 3E, RR Low Cooling Water Flow.
	BOP	<ul style="list-style-type: none"> ● Respond to annunciator 5040-1B, Informs CRS B-CCW pump tripped. ● Starts standby pump per ARP (O/A 2.a). ● Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> ● Directs actions listed above. ● Directs starting of 'A' CCW pump. ● Directs RO to monitor RR and RT Temps. ● Enforces OPS expectations and standards ● Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures.
Terminus: Standby CCW pump started.		

NOTES:

Operator Actions

Event No.(s): 7		Page 1 of 1
Description: SSE level control failure		
Initiation: After crew has addressed CCW pump trip and on the signal of lead examiner		
Cues: Annunciator CPS 5019-3A alarming		
Time	Position	Applicant's Actions or Behavior
	BOP	Per CPS 5019-3A, Hi/Lo SSE Shell, OA 2: <ul style="list-style-type: none"> • Determines level to be low. • Direct field operator to investigate. • Throttle open 1GS-S10, SSE Feed Water Bypass Vlv to restore level to the $-2 \frac{1}{2} \rightarrow + 2 \frac{1}{2}$. Note: When the operator feeds with the Bypass valve the additional cold water will initially cause SSE pressure to drop further before it recovers.
	RO	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Terminus: SSE level restored and alarm clear		

NOTES:

May take up to (2) minutes for alarm to come in. (This is normal.)

Operator Actions

Event No.(s):		8,9,10	Page 1 of 5
Description: RPV Instrument line failure in the secondary containment, Failure to scram			
Initiation: on the signal of lead examiner			
Cues: Multiple secondary containment area temperature and area radiation alarms, Rods fail to insert upon Scramming			
Time	Position	Applicant's Actions or Behavior	
	RO	Reports EOP-8 entry on Hi temperature Performs EOP actions as directed by SRO <ul style="list-style-type: none"> • Initiate a manual reactor scram before first max safe temperature is exceeded Per CPS 4100.01, Reactor Scram: <ul style="list-style-type: none"> • Place mode switch in Shutdown • Check and report power unchanged • Operate FW to control level 3 to 8 • Check rods, reports shutdown criteria is not met • Report level and pressure are following expected trends • Stabilize pressure <1065 psig • Coordinates with BOP operator to monitor and control RPV level and press 	
	BOP	<ul style="list-style-type: none"> • Reports secondary containment high temperature and rad alarms to SRO • Makes plant announcement for reactor scram • Should make plant announcement to evacuate Fuel/Aux buildings. Performs EOP actions as directed by SRO <ul style="list-style-type: none"> • Verifies operation of area coolers • Verifies operation of VF, Fuel Bldg Vent. • Evacuates affected areas of Secondary Containment • Monitors area temperatures, levels and radiation levels • Reports a secondary containment Max Safe temperature being approached to SRO • Reports two secondary containment Max Safe temperatures are being exceeded to SRO • Coordinates with RO to monitor and control RPV level and press 	

Critical Task

NOTES:

Event No.(s):		8,9,10	Page 2 of 5
Time	Position	Applicant's Actions or Behavior	
	SRO	<p>Directs entry into EOP-8 and EOP actions as entry conditions are met:</p> <ol style="list-style-type: none"> 1. Operate VF 2. Operate area coolers 3. Hold floor drain sump levels below max. normal 4. Isolate all discharges into the affected area except systems needed for: <ul style="list-style-type: none"> • EOP Actions • Fire Fighting 5. Per EOP-8/CPS 4001.01, Reactor Coolant Leakage: <ul style="list-style-type: none"> • Directs BOP to isolate the source of leakage 6. Direct a scram prior to exceeding Maximum safe temperature 7. Enters EOP-1 <p>Directs additional actions:</p> <ol style="list-style-type: none"> 1. Notification of Radiation Protection (RP) Department 2. Evacuate affected areas of Secondary Containment <p>Directs and verifies performance of appropriate actions per EOP-1:</p> <ol style="list-style-type: none"> 1. Mode Switch to SHUTDOWN <ul style="list-style-type: none"> • Per EOP-1 enters EOP-1A <p>Enters EOP-3 and direct Blowdown once exceeding Maximum safe temperature in two areas</p>	

Critical Task

NOTES:

Event No.(s):		8,9,10	Page 3 of 5
Time	Position	Applicant's Actions or Behavior	
	RO	Performs EOP actions as directed by SRO: <ul style="list-style-type: none"> • Arms and depresses MANUAL SCRAM push-buttons. • Initiates ARI. • CPS No. 4411.08, Alternate Control Rod Insertion <ul style="list-style-type: none"> • Inserts control rods until RPC lockup • Directs defeating RPC for further rod insertion • Verifies RR downshifts at Level 3, and trips at Level 2. • Terminates and prevents injection CB/FW systems CPS 4411.02 • When RPV level reaches -60", control RPV water level between TAF and -60" using only the listed Preferred ATWS Systems 	
		Critical Task	
		Critical Task	
	BOP	Performs EOP-1A actions as directed by SRO: <ul style="list-style-type: none"> • Inhibits ADS. • Verifies needed auto actions. <ul style="list-style-type: none"> • Isolations • DG Start • Dispatches area operator to monitor DGs • Starts and verifies injection of SLC trains 'A' and 'B'. <ul style="list-style-type: none"> • Reports SLC B failure to start. • Terminates and prevents injection systems CPS 4411.02 <ol style="list-style-type: none"> 1. HPCS 2. RCIC 3. LPCS – LPCS-5 valve may cycle open due to Instrument failure. 'B' RO may have to give LPCS-5 valve a close signal to complete the T/P. 4. LPCI Stabilizes RPV pressure below 1065 psig	
		Critical Task	

NOTES:

Event No.(s):		8,9,10	Page 4 of 5
Time	Position	Applicant's Actions or Behavior	
	SRO	Directs entry into EOP-1A and EOP actions as entry conditions are met: 1. Inhibit ADS 2. Arm and depress MANUAL SCRAM push-buttons 3. Initiate ARI 5. Determines Power to be greater than 5% and Directs injection of SLC 6. Insert control rods manually per CPS No. 4411.08, Alternate Control Rod Insertion 7. Verifies needed auto actions. <ul style="list-style-type: none"> • Isolations • DG Start 8. Terminate and prevent injection of Detail F1 CPS 4411.02 9. When RPV level reaches -60", control RPV water level between TAF and -60" using only the listed Preferred ATWS Systems 10. Enters EOP-6 for High Drywell Temperature 11. Directs crew to stabilize RPV pressure below 1065 psig Monitor status and hold condition of identified parameters below (within) specified values. <ul style="list-style-type: none"> • On transient, positions himself as command authority on the unit. • Acknowledges immediate operator actions and directs subsequent actions. • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications. 	
	Critical Task		
	Critical Task		
	Critical Task		

NOTES:

Event No.(s):		8,9,10	Page 5 of 5
Time	Position	Applicant's Actions or Behavior	
Critical Task	RO	Performs EOP-3 actions as directed by SRO • Termination and prevention of injection of all F1 systems 1. CB/FW At less than 138 psig:	
Critical Task	BOP	• Re-feed to level band OF -60 to TAF	
Critical Task		Performs EOP-3 actions as directed by SRO • termination and prevention of injection of all F1 systems 1. LPCS 2. LPCI	
Critical Task	SRO	• initiation of ADS and verify 7 ADS valves open	
4 Critical Tasks		Enters EOP-3 and direct Blowdown once exceeding Maximum safe temperature in two areas • Directs termination and prevention of injection of all F1 systems • Directs initiation of ADS and verify 7 ADS valves open • Directs Re-feed at 138 psig • Directs level band at -60 to -TAF	
Terminus: • EOP-8 actions initiated • SLC started • Rod Insert commenced • RPV level lowered • ADS initiated • Level restored and stabilized • Upon approval of lead examiner			

NOTES:

Simulator Operator Instructions

Initial Setup

1. Verify daily lamp test completed
2. Reset to IC-42 (Verify/Adjust Power to 27% with rods and to match turnover If needed).
3. Load the lesson plan for this scenario.
4. Place simulator in RUN.
5. Select the FWLC level instrument B.
6. Turn on and advance recorders.
7. Verify Load set is at 600 MWe.
8. Verify the AR/PR server is running and stabilize AR/PR.
9. Verify Rod Drive pressure at 250#.
10. Identify T/S issues associated with OOS and turnover.
11. Verify simulator conditions match the turnover.
12. Rema and Rod Pull sheets marked up thru step 27 with 16-33 at 26
13. Provide marked up CPS 3004.01 complete to step 8.3.10.
14. Fill out plant status sheet and have Turnover sheet ready for crew.

Event Triggers and Role PlayEvent #

1. Main EHC pump swap
 - a. **No trigger** - to start
 - b. Role play - Field operator to swap the running Main EHC pumps. Local EHC pressure reading of 1625 psig for pump and 1625 psig header. All other EHC parameters are normal
 - c. **Remote trigger 10** – When requested to test auto start feature
 - d. The Pump will shutoff when stopped with the control room switch.

2. Pull rods to raise power
 - a. **No triggers**
 - b. RE –Xenon is at equilibrium. Gang is permissible, but continuous drive is NOT authorized

3. Rod drifts outward.
 - a. **Remote trigger 1** – on request from lead evaluator.
 - b. No problem lights at the RGDC or RACCs
 - c. Role Play – Field operator reports no indications of problem at the HCU.
 - d. RE – 3D ran thermal limits have not been approached or exceeded. If scram times are asked for? Then no rods are slow.
 - e. **Remote trigger 8** – When directed to scram the rod and report it completed. When asked accumulator N2 pressure is 1200 psig after rod is scrambled

4. HPCS WLP shaft shears
 - a. **Remote trigger 2** - on request from lead evaluator
 - b. Role play – Field Operator if asked HPCS WLP the motor is turning but the pump is not.
 - c. If ATM is checked it is reading 0 psig.
 - d. **Remote trigger 7** – When directed remove HPCS motor breaker Trip and C/P fuses and report it completed.
 - e. If called - Respond as maintenance to investigate.
 - f. If requested by CRS, RCIC is operable by administrative means.

NOTE: If the control power fuses are not pulled then insert the HPCS Shaft Break from the Lesson Plan.

5. CB pump “A” clogged oil filter/bearing oil deficiency
 - a. **Remote trigger 3** - on request from lead evaluator
 - b. Role play – Field Operator to turn the Cuno filter for the CB A pump and report it done, leave this alarm in. Support startup of the standby CB pump. (Lube oil is >8 psi and >75°F)

More Event Triggers and Role Play on the next page

6. 'B' CCW pump Trip
 - a. **Remote trigger 4** on request from lead evaluator
 - b. When sent to A CCW pump it is okay. When sent to the breaker it is warm to the touch and has an overcurrent trip in. No fire.
 - c. Role play as maintenance personnel in the field if requested.

7. SSE level control failure
 - a. **Remote trigger 5** - on request from lead evaluator
 - b. Role play as field operator no indications locally that would explain failure.
 - c. Controller is set at 0 inches, but level control valve is shut.
 - d. May take up to (2) minutes for alarm to come in. (This is normal.)

8. RPV Instrument line failure in the secondary containment
 - a. **Remote trigger 6** on request from lead evaluator
 - b. When the XL3 printout is requested provide attachment 1
 - c. Role play as personnel in the field
 - (1) When an operator is dispatched to the 781 East Gas Control Boundary report that the area appears to have a steam leak. You are unable to enter.

9. Auto and Manual scram failure
 - a. **Triggers** – already active
 - b. Perform Pending actions when requested
 - c. Show up in the MCR 2 minutes after the scram announcement as IMD. (10 min if no announcement)

10. RT-1 and RT-4 fail to shut on SLC initiation
 - a. **Triggers** – already active

*TEAR THIS PIECE OFF AND GIVE TO OPERATOR
CHECKING FP ALARM*

Attachment 1

61-17 AB-781 East Col 121-124 AC ALARM

61-18 AB-781 East Col 121-124 AC ALARM

61-19 AB-781 East Col 121-124 AC ALARM

61-20 AB-781 East Col 121-124 AC ALARM

Procedures Used During Simulator Scenario # 3

(List of Annunciators on back of page)

1. EOP-1
2. EOP-1A
3. EOP-8
4. EOP-3
5. EOP-6
6. 3105.02 EHC
7. ITS/ORM/ODCM
8. 3004.01 TG S/U and Sync
9. 4007.02 O/N
10. 3309.01 HPCS
11. 3104.01 CD/CB
12. 4100.01 O/N
13. 4001.01 O/N
14. 4411.08 ARI
15. 4411.02 T/P
16. SLC hard card
17. T/P hard card (2)
18. 3203.01 CCW
19. 3107.01 GS
20. 3304.02 RCIS
21. 4411.104410.00 C012
22. 4411.09
23. 4410.00 C003
24. 4410.00 C004
25. 4411.03
26. 4411.04
27. 4411.11
28. 4411.02
29. 3101.01
30. HU-AA-1211
31. OP-AB-300-1001

32. Annunciators:

- 5006-4G, 5D, 3H, 1H, 3D
- 5062-7D, 8E, 7B
- 5019-3A
- 5001-1H
- 5040-1B, 8D
- 5003-3D, 3E, 2F, 2J, 2M, 4B, 4H
- 5017-3A
- 5130-1G ,2G
- 5003-3D, 3K
- 5002-2P, 1Q
- 5004-3A, 3F
- 5009-5B
- 5063-7H
- 5065-6F
- 5140 AR/PR
- All alarms after the Scram

**Clinton Power Station
Licensed Operator Training
Simulator Exercise Guide**

EXAM

ILT 08-1 Exam Scenario 3

REVISION 00

DEVELOPER: _____ Tom Pickley _____

REVIEWED BY: _____ Simulator Instructor _____

APPROVED BY: _____ / _____
Operations Date

Overview

Makeup/Reject: A,B,C CP's are in service. RO train #1 & 2 are in-service in auto to WD
ECCS: RHR A, B, C, LPCS and HPCS are Operable. RCIC is Operable
SDC: N/A
Electrical: 6.9 KV 1A & 1B and 4.16 1A & 1B on RAT, 4160 Volt Busses 1A1, 1B1 & 1C1 are being supplied by RAT
Ventilation:
Radwaste: FP/FP 1B in service. 1WF Evap is in Hot Standby. A RT F/D is in service.

Plant Status

On Line Risk Green

Reactor

Operational Condition: Mode 2
Total Core Flow: 26.9 mlb/hr
FCV Position: A: 90 % B: 90 %
Reactor Power 0 % (<=100%) 0 MWt (<=3473) 0 Mwe
Xenon: Stable
RPV Level 26.7 in Narrow Range
RPV Pressure 600 psi (< 1045)
In service SDC loop None MODE 2

Containment

Suppression Pool Temperature: 75.5 F (<=93.1 F)
Suppression Pool Level 19.1 ft (19 ft 0 to 19 ft 5 in)
Drywell Pressure 0.4 psi (0 to 1 psig)
Drywell to Containment dp: 0.4 psi >=-.02 psid to <=1.0 psid
Drywell Avg Air Temperature: 100 F (<=146.53 F)
Secondary Containment: 0.74 in WG (>= 0.25 in WG vacuum)

BOP

Condenser Vacuum: 27 in Hg
Off – Gas Flow: 12.8 scfm
Condensate Temperature: 78 F
Generator Reactive Load: 0 MVARs

Plant Chemistry

CPI (goal < 1.1): **1.00**
Reactor Sulfates (goal < 2) 1.31 ppb
Reactor Chlorides: 0.51 ppb
FW Iron (goal < 2.1) 0.85 ppb

Protected Equip: None

Comments: See Turnover Sheet

From “Excellence in Human Performance”

Leaders reinforce desired jobsite behaviors (Handbook page 17)

Participate in training program activities.

Leaders monitor and provide feedback to improve training program quality as well as to coach and reinforce individuals who meet or exceed behavior expectations and Standards of performance. During training activities, leaders guide workers on how actions or inactions influence reactor safety and on the potential consequences of mistakes. They give particular attention to recognizing error-likely situations and flawed defenses during tasks important to nuclear safety

Attachment 1
Reactivity Maneuver Approval Cover Page

Station: Clinton Valid Date(s): 2/2-2/15/08 Reactivity Maneuver Plan #: C12-0001

Are Multiple Activations Allowed: No (If yes, US may make additional copies)

Prepared by: _____ / _____
 Reactor Engineer / Date

Reviewed by: _____ / _____
 Qualified Nuclear Engineer / Date

Approved by: _____ / _____
 RE Manager / Date

Authorized by: _____ / _____
 Senior Reactor Operator / Date

NF Review (circle one) yes/declined by _____ / _____
 NF Individual Contacted/Date

ReMA Activated: _____ / _____
 Unit Supervisor / Date

ReMA Terminated: _____ / _____
 Unit Supervisor / Date

Title of Evolution: BOC 12 Plant Startup
Purpose/Overview of Evolution: This ReMA provides the steps for starting up the reactor from C1R11 refueling outage. The ReMA covers power ascension from All Rods In (ARI) to ~96.9% CTP (~3365 MWth).
Maneuver Steps
1. Withdraw rods from ARI to ~29% CTP.
2. Shift RR pumps to fast speed & increase core flow to ~65% (~54.9 Mlbm/hr)
3. Increase reactor power to ~96.9% CTP (~3365 MWth).
4. Maintain power at ~96.9% CTP (~3365 MWth) with rods & flow
General Issues:
<ul style="list-style-type: none"> ▪ The plan is to pull control rods until the target rod pattern is achieved. However, since this will be a xenon free startup, all rods cannot be fully withdrawn to their target positions during the power ascension. Also fuel conditioning limits will require a slow flow ramp (0.35 kw/ft/hr; ~30 MWe/hr) to reach rated power. A second downpower will be required (separate ReMA) to achieve the target rod pattern. ▪ The critical parameters are provided as a guide to focus the monitoring of the evolution. Changes to these parameters may be necessary to accommodate the actual startup load profile and predictor uncertainties. Changes to the critical parameters are to be done in accordance with the ReMA procedure OP-AB-300-1003. ▪ Main Steam Line Radiation Monitors may initially show elevated response from crud burst in the core (due to rod movements) and from "hydrogen pockets" being swept into the core (due to flow perturbations in the condensate/feedwater piping). Response should diminish as the feedwater system comes to equilibrium. ▪ Turbine Control Valve (TCV) oscillations have been experienced at ~87% (~3021 MWth). It may be necessary to flow quickly through this region to avoid excessive valve oscillations.

Attachment 2
Reactivity Maneuver Guidance Sheet

Step 1 of 4

Reactivity Maneuver Plan # C12-0001

Description of Step: Withdraw rods from ARI to ~29% CTP.					
					Initial Complete
a) Withdraw control rods in accordance with Startup Sequence A2-01 to ~29% (~1007 MWth) to support RR pump shift to fast speed.					
b) Verify scram time testing is complete before shifting RR pumps to fast speed. A separate control rod sequence package will be provided for this testing.					
<p>Note: Prior to exceeding 21.6% power verify feedwater heating is in service and that feedwater temperature is within 50°F of nominal prior to exceeding 21.6% (750 MWth). Reference App. A of CPS 3102.01. The Reactor Engineer will provide guidance on adjustments to the rod pattern or flow to accommodate predictor uncertainties or schedule changes.</p>					
QNE presence required in the Control Room? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Onsite Only? Yes <input type="checkbox"/> No <input type="checkbox"/>					
Initial Conditions (may be ranges) to be verified at the START of the Step					
Parameter	Value or Range	Init.	Parameter	Value or Range	Init.
Generator Output	N/A	N/A	MFLCPR	N/A	N/A
Core Power (MWt or %)	N/A	N/A	MFLPD	N/A	N/A
Core Flow (Mlb/hr or %)	N/A	N/A	MAPRAT	N/A	N/A
FCL (%)	N/A	N/A			
Critical Parameters to be Verified During the Step					
Description including frequency, method of monitoring, and contingency actions (if needed)			High	Low	
<u>FCL</u> Monitor frequency : Demand 3D case after crossing 21.6% (750 MWth) & just prior to RR pump shift to fast speed. Power and flow indications on the P680 displays may also be used. (Contingency: Insert control rods to reduce FCL.)			57.3%	N/A	

ReMA Step Complete: _____ / _____ Verified by: _____ / _____
 Reactor Operator/Date Unit Supervisor/Date

Attachment 2
Reactivity Maneuver Guidance Sheet

Step 2 of 4

Reactivity Maneuver Plan # C12-0001

Description of Step: Shift RR pumps to fast speed & increase core flow to ~65% (~54.9 Mlbm/hr)						Initial Complete
a) Shift RR pumps to fast speed. During upshifts of RR pumps there is a potential for entry in to the Controlled Entry Region. This has been evaluated and is acceptable.						
b) Increase core flow to ~65% (~54.9 Mlbm/hr). Increasing flow may be performed in increments to support minimizing throttling of FCVs and as necessary to support plant systems. At the completion of this step reactor power will be ~40-45% (~1389-1563 MWth).						
Reactor Engineer to provide guidance on adjustments to rod pattern or flow to accommodate predictor uncertainties and schedule changes.						
QNE presence required in the Control Room? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Onsite Only? Yes <input type="checkbox"/> No <input type="checkbox"/>						
Initial Conditions (may be ranges) to be verified at the START of the Step						
Parameter	Value or Range	Init.	Parameter	Value or Range	Init.	
Generator Output	N/A	N/A	MFLCPR	< 0.900		
Core Power (MWt or %)	N/A	N/A	MFLPD	< 0.750		
Core Flow (Mlb/hr or %)	N/A	N/A	MAPRAT	N/A	N/A	
FCL (%)	< 57.3%					
Critical Parameters to be Verified During the Step						
Description including frequency, method of monitoring, and contingency actions (if needed)			High		Low	
NONE						

ReMA Step Complete: _____ / _____ Verified by: _____ / _____
 Reactor Operator/Date Unit Supervisor/Date

Attachment 2
Reactivity Maneuver Guidance Sheet

Step 3 of 4

Reactivity Maneuver Plan # C12-0001

Description of Step:

Increase power to ~96.9% CTP (~3365 MWth) with flow and rods. Power may be increased in increments as necessary to support plant evolutions. Flow adjustments may be used to maintain power approximately constant for any hold points.

Note:

At ~80% power, bundle nodal powers of exposed fuel are expected to reach the threshold of ~8.5kw/ft. In accordance with NF-AB-440, a fuel conditional ramp rate of 0.35kw/ft/hr will be required. RE will provide guidance on fuel conditioning ramp.

The intent is to withdraw as many rods as possible. However, xenon conditions and fuel conditioning requirements will not permit withdrawal of the control rods to desired target positions. Reactor Engineer will provide guidance on control rod movements and flow increases.

Reactor Engineer to provide guidance on adjustments to rod pattern or flow to accommodate predictor uncertainties and schedule changes.

QNE presence required in the Control Room? Yes X* No Onsite Only? Yes No

*RE coverage will be provided consistent with OP-AB-300-1003 & NF-AB-701.

Initial Conditions (may be ranges) to be verified at the START of the Step

Parameter	Value or Range	Init.	Parameter	Value or Range	Init.
Generator Output	N/A	N/A	MFLCPR	< 0.900	
Core Power (MWt or %)	N/A	N/A	MFLPD	< 0.900	
Core Flow (Mlb/hr or %)	~65% (~54.9 Mlbm/hr)		MAPRAT	N/A	N/A
FCL (%)	N/A	N/A			

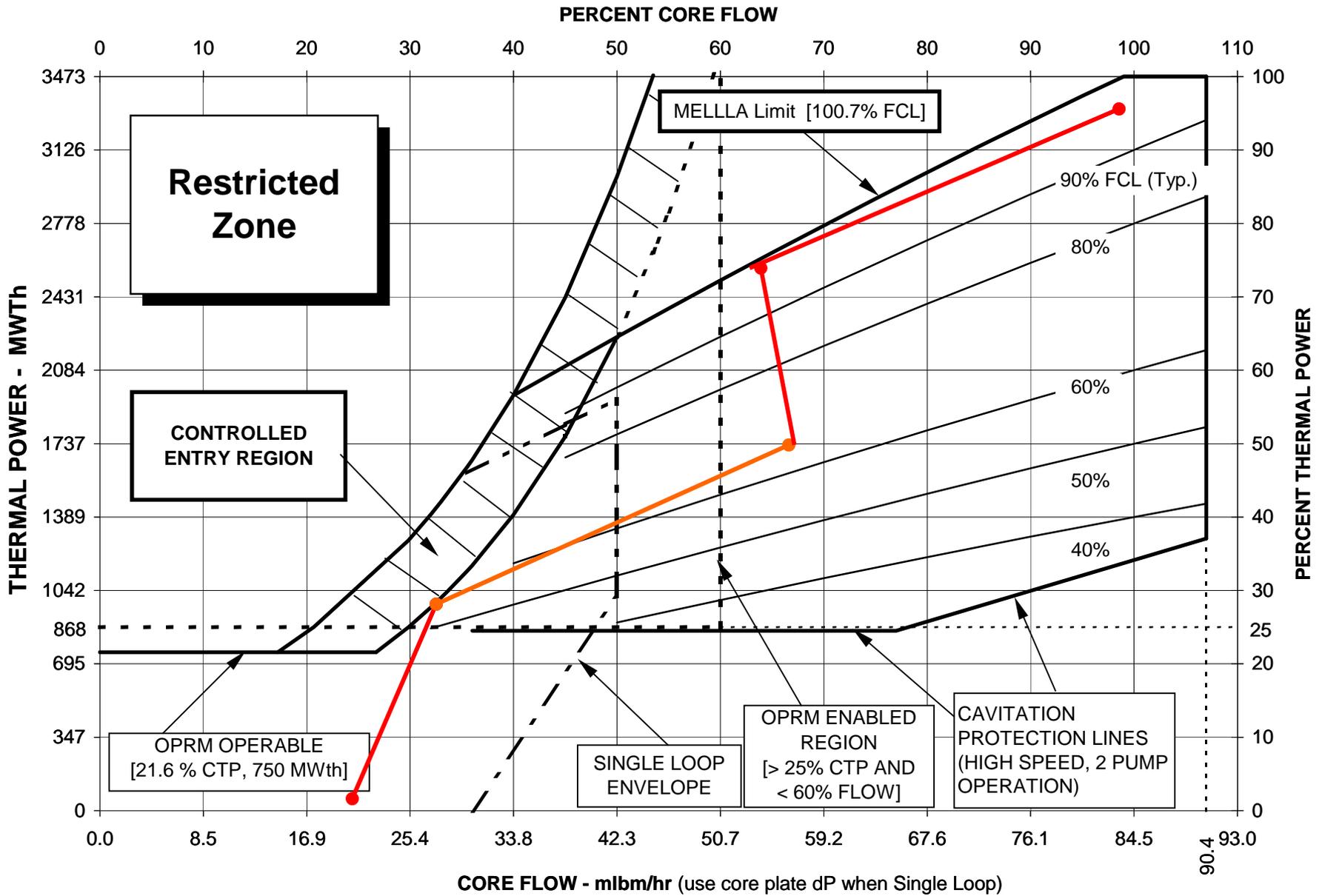
Critical Parameters to be Verified During the Step

Description including frequency, method of monitoring, and contingency actions (if needed)	High	Low
<u>FCL</u> Monitor Frequency: Demand 3D Case or verify with power and flow from P680 display after each 50 MWe increase in electrical output. Contingency: Insert control rods as recommended by the Reactor Engineer.	98.7%	N/A
<u>MFLCPR</u> Monitor Frequency: 3D case at each 50 MWe increase in electrical output when MFLCPR > 0.900. Contingency: Refer to CPS 2202.03 for correction of power distribution problems.	0.980	N/A

<p><u>MFLPD</u> Monitor Frequency: 3D case at each 50 MWe reduction in electrical output when MFLPD > 0.900. Contingency: Refer to CPS 2202.03 for correction of power distribution problems.</p>	<p>0.980</p>	<p>N/A</p>
<p><u>Fuel Conditioning Limits</u> Monitor Frequency: 1. Approach to threshold (when PCRAT > 0.900) - use 3D cases (PCIOMR edits) at ~5% increase in power; 2. Fuel conditioning ramp rate (when P-Max (PC,KWTH) > 0.0) – Use 3D cases (PCIOMR edits) at ~30 minute intervals. (Contingency: Refer to NF-AB-440 for actions to take if fuel conditioning limits are exceeded.)</p>	<p>Approach to threshold: P-Max (PC,KWTH) = 0.45 Fuel Conditioning Ramp Rate: 0.45 kw/ft/hr (nominal ramp rate is 0.35 kw/ft/hr)</p>	

ReMA Step Complete: _____ / _____ Verified by: _____ / _____
Reactor Operator/Date Unit Supervisor/Date

FIGURE 1: CPS STABILITY CONTROL & POWER/FLOW OPERATING MAP



ATTACHMENT 1
Reactivity Maneuver Approval Cover Page
Page 1 of 2

Station: **Clinton** Valid Date(s): XX/XX/XXXX Reactivity Maneuver Plan #: C11-Simu.4

Multiple Activations Allowed? No (If yes, CRS may make additional copies)

Prepared by: Roger ONE / XX/XX/XX Reviewed by: Joe ONE / XX/XX/XX
 Reactor Engineer / Date Qualified Nuclear Engineer / Date

Approved by: Michelle ONE Boss / XX/XX/XX Authorized by: _____ / XX/XX/XX
 RE Manager / Date Senior Reactor Operator / Date

NF Review Carlos Quark / XX/XX/XX
 NF Reviewer / Date

ReMA Activated: _____ / XX/XX/XX ReMA Terminated: _____ / XX/XX/XX
 Unit Supervisor / Date Unit Supervisor / Date

Title of Evolution: Withdraw Rods from ARI to RR Pump Upshift
Purpose/Overview of Evolution: This ReMA provides the steps for starting up the plant from the ARI condition to the performance of RR pump upshift.
Reactivity Maneuver Steps
Extended General Issues: Select desired amount of power reduction
1. Withdraw control rods from ARI to RR pump shift to fast speed
General Issues: <ul style="list-style-type: none"> ▪ The critical parameters are provided as a guide to focus the monitoring of the evolution. Changes to these parameters may be necessary to accommodate the actual startup load profile and predictor uncertainties. Changes to the critical parameters are to be done in accordance with the ReMA Training and Reference Material guidelines per OP-AB-300-1003.

ATTACHMENT 2
Reactivity Maneuver Guidance Sheet

Description of Step :

From the ARI condition, increase power with control rods to ~29% (1007 MWt) to support RR pump shift to fast speed.

Ensure Feedwater heating is in service and that feedwater temperature is within 50°F of nominal prior to exceeding 21.6% (750 MWt). Reference Appendix A of CPS 3102.01.

QNE presence required in the Control Room? Yes * No *

*RE Coverage shall be provided consistent with the guidelines of OP-AB-300-1003 and NF-AB-701.

Initial Conditions (may be ranges) to be verified at the START of the Step

Parameter	Value or Range	Init.	Parameter	Value or Range	Init.
Core Power (MWth or %)	N/A	N/A	MFLCPR	N/A	N/A
Core Flow (Mlb/hr or %)	N/A	N/A	MFLPD	N/A	N/A
FCL (%)	N/A	N/A	MAPRAT	N/A	N/A

Critical Parameters to be Verified During the Step

Description; including frequency, method of monitoring, and contingency actions (if needed)

	High	Low
FCL Monitor Frequency: Demand 3D Case or verify with power and flow from P680 display. FCL should be monitored constantly after crossing 21.6% power and just prior to pump upshift. Contingency: Insert control rods in reverse order sequence to reduce FCL.	57.3 %	N/A

Step Complete: _____ / _____
 Reactor Operator / Date

Verified by: _____ / _____
 Unit Supervisor / Date

REACTOR OPERATOR INSTRUCTIONS FOR CRITICALITY

SCOPE OF REVISION:

- This form was updated as a result of the procedure revision.

ROUTINE USE

ORIGINATOR: *Christian Small*

CLASS CODE: *SNNNI*

SQR: *Mark Vandermyde*

APPROVAL DATE: *04/25/05*

CURRENT CHANGES TO GENERAL REVISION

<i>Change #</i>	<i>Date</i>	<i>List of Affected Pages</i>
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____

REACTOR OPERATOR INSTRUCTIONS FOR CRITICALITY

Steps 8.3, 8.4, 8.7.4

Core Conditions Expected:

Estimated Date/Time of criticality _____ / _____

Xenon Increasing Decreasing NoneModerator Temperature: 468 °FCycle Exposure: 9000 MWD/TSequence: A2 - SimulatorComments: Minimum Xenon conditions, High Moderator
Temperature; Middle of Cycle StartupEstimated Critical PositionCriticality is estimated to occur between steps 17 and 35BOC Criticality Instructions

For BOC, if criticality is reached prior to step _____, insert rods in reverse order up to and including step _____ and investigate with the Reactor Engineer and Nuclear Fuels.

For BOC, if criticality is not reached at the completion of step _____, insert rods in reverse order, up to and including step _____ and investigate with the Reactor Engineer and Nuclear Fuels.

Non-BOC Criticality InstructionsFor non-BOC, if criticality is reached either prior to step 17 or after step 35, continue with the reactor startup and initiate a CR to document and trend the ECP being outside the expected range of criticality.Instructions

- * Expect the reactor to become critical at any time.
- * Move control rods with careful attention.
- * Monitor nuclear instruments during and following rod movements.
- * If a nontransient period of less than 30 sec occurs, insert rods and investigate.
- * Perform 1/M plots at steps

<u>17</u>	<u>19</u>	<u>22</u>	<u>23</u>
<u>25</u>	<u>26</u>	<u>27</u>	<u>28</u>
<u>29</u>	<u>31</u>	<u>33</u>	<u>35</u>

ADDITIONAL INSTRUCTIONSThis is a middle of cycle, xenon-free startup at relatively high moderator temperature. Watch for potential high notch worths in interior regions of the core.Michelle ONE Boss
Reactor Engineer_____
Date Time

Facility: <u>Clinton Power Station</u>		Scenario No.: <u>Three</u>		Operating Test No.: <u>08-01</u>	
Examiners: _____			Operators: _____		
_____			_____		
_____			_____		
Initial Conditions:					
Subcritical ~600 psig, Steam seals and Auxiliary Steam is provided by the electrode boiler, hot restart.					
Thunderstorm storms are expected in the area within the next hour.					
Turnover:					
1. Test the Generator Emergency Seal Oil Pump per 3109.01 section 8.1.2.3 – First Priority.					
2. Pull Rods to criticality.					
Event No.	Malf. No.	Event Type*	Event Description		
1	NA	N-BOP	Test the Generator Emergency Seal Oil Pump		
2	Rod 0825I_ACTIONA -Rod uncoupled	C-ATC TS-CRS	Continue with startup, discovers Uncoupled rod		
3	NA	R-ATC	Pull rods for criticality		
4	SRM_BI_ACTIO N2 and 1	I-ATC	B SRM fails		
5	CDSR_VAC_P MP_A	I-BOP	Vacuum Pump Trip		
6	SRM_CI_ACTIO N2 and 1	TS-CRS	A SRM fails		
7	Override	C-BOP	RCIC drain trap level high		
8	YARITPLA_1 Override	M-ALL	RCIC unisolable steam leak		
9	YP_XMFTB_500 2	M-ALL	Reactor scrams on initiation of RPT/ARI		
10	CAM1PR006AT V_VALUE1 CAM1PR006CT V_VALUE1 CAM1PR006DT V_VALUE1 CAM1PR006BT V_VALUE1 VGCEFUSE_V 677503CC VGBZFUSE_V 421691CC	M-ALL	Radiation monitor fails to initiate an isolation		

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

Scenario No.: Three
Narrative Summary

Operating Test No.: 08-01

Event #	Description
1.	Test the Generator Emergency Seal Oil Pump per 3109.01 section 8.1.2.3.
2.	Rod 08-25 is uncoupled and goes to overtravel. This will require action to recouple and entry into Technical Specification 3.1.3.
3.	Withdrawal rods for criticality.
4.	'B' SRM fails causing a rod block requiring bypassing to proceed with startup. Requiring a review of Technical Specification 3.3.1.4 action A.1 and ORM 2.2.2 Action 3.2.2.a
5.	The A Mechanical Vacuum Pump trips requiring starting the B Pump.
6.	'A' SRM fails causing a rod block and requiring entry into Technical Specification 3.3.1.4 action A.1 and ORM 2.2.2 Action 3.2.2.a
7.	The RCIC drain trap level high will require manually opening the drain trap bypass valve to drain the steam pot.
8.	The RCIC steam supply line develops a leak causing the RCIC room temperature to rise resulting in an EOP-8 entry. A scram is required prior exceeding the Maximum safe temperature.
9.	The mode switch and manual scram pushbutton will not cause a scram requiring entry into EOP-1A. Manual initiation of ARI/RPT will insert the rods for a scram. EOP-1A will be exited and EOP-1 will be entered.
10.	The VF exhaust radiation monitor trends up to the trip isolation but fails to actuate VF isolation and start of VG requiring BOP to manually perform.

EOP
8,1A,1

Critical tasks:

- Manual insertion of ARI prior to exceeding Maximum safe temperature
- Manually shutdown and isolate VF and startup VG

Shift Turnover Information**⇒ Day of week and shift**

- ◆ Today Day Shift

⇒ Weather conditions

- ◆ Thunderstorms are expected in the area within the next hour.

⇒ (Plant power level)

- | | |
|--|--------------------------------------|
| ◆ Subcritical, with equilibrium Xenon, 3 days after shutdown | ◆ CPS 3001.01 complete to step 8.2.5 |
| ◆ na- MWt | ◆ CPS 3002.01 at step 8.5.2 |
| ◆ na- MWe | ◆ |
| ◆ 27.0 Mlbm/hr CORE FLOW | ◆ |

⇒ Thermal Limit Problems/Power Evolutions

- | | |
|--|---|
| ◆ Pull to critical, heatup and pressurization, step 25 on the pull sheet, 08-25 @ 12 | ◆ |
| ◆ | ◆ |
| ◆ | ◆ |

⇒ Existing LCOs, date of next surveillance

- | | |
|--------|---|
| ◆ None | ◆ |
| ◆ | ◆ |

⇒ Surveillances or major maintenance

- | | |
|---|---|
| ◆ | ◆ |
| ◆ | ◆ |
| ◆ | ◆ |

⇒ Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment

- | | |
|---|---|
| ◆ Test the Generator Emergency Seal Oil Pump per 3109.01 section 8.1.2.3 for PMT. | ◆ |
| ◆ | ◆ |

⇒ Comments, evolutions, problems, etc.

- | | |
|---|--|
| ◆ Online Safety is Green | ◆ Test the Generator Emergency Seal Oil Pump per 3109.01 section 8.1.2.3 for PMT – First Priority. |
| ◆ Steam seals and Auxiliary Steam is provided by the electrode boiler | ◆ Continue with Reactor startup. |

Operator Actions

Event No.(s): 2		Page 1 of 1
Description: Uncoupled rod		
Initiation: Following Emergency Seal Oil Pump test		
Cues: Annunciator CPS 5006-5G alarms		
Time	Position	Applicant's Actions or Behavior
	RO	<p>CPS 5006-5G, Rod Overtravel:</p> <ul style="list-style-type: none"> • Determine the rod that alarmed 08-25. • Tell SRO to review TS LCO 3.1.3 <p>As directed by SRO Per CPS 3304.02, RCIS step 8.2.6:</p> <ol style="list-style-type: none"> 1) Verify that the INDIVID DRIVE light is energized on the OCM. If not, select individual drive by depressing DRIVE MODE push-button. 2) Insert the drive 1 or 2 notches in an attempt to recouple the rod. 3) Determine if the rod has recoupled by performing a coupling check 4) If the rod has recoupled, return to normal operation.
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Declares the rod inoperable, enters LCO 3.1.3 Action C.1 and C.2 • When the rod is recoupled declare the rod Operable and exit the LCOs • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Terminus: Rod has been recoupled and SRO applied LCO actions		

NOTES:

Event No.(s): 3		Page 1 of 1
Description: Pull rods for criticality		
Initiation: When directed by SRO after Rod has been recoupled		
Cues: Directed by SRO		
Time	Position	Applicant's Actions or Behavior
	RO	<p>Per CPS 3001.01, Approach To Critical, Step 8.2.6 and CPS 2202.01F001, Control Rod Sequence:</p> <ul style="list-style-type: none"> • Withdraw rods for criticality • Prior to exceeding 1×10^6 cps, withdraw SRM's Per CPS 3306.01, SRM/IRM step 8.1.2: <ul style="list-style-type: none"> • Depress the POWER ON button • Select the SRMs • Depress the drive out button until withdrawn • Depress the drive out button • Announce reactor is critical
	BOP	<ul style="list-style-type: none"> • Announce reactor criticality • Log in the date/time criticality was achieved, and criticality data: <ul style="list-style-type: none"> • Rod Sequence • Group/Array • Rod • Rod Position • SRM reading and Period • RR loop temperature • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above • Stays in a position of oversight • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Enforces OPS expectations and standards.
Terminus: Clearly observable plant response from change in power level or Reactor is critical.		

NOTES:

Operator Actions

Event No.(s): 4		Page 1 of 1
Description: 'B' SRM fails		
Initiation: After the rod is recoupled or on the signal of lead examiner		
Cues: Annunciators CPS 5006-2H & 5005-1K, 2K, & 3K alarm		
Time	Position	Applicant's Actions or Behavior
	RO	Per CPS 5006-2H, SRM Inop: <ul style="list-style-type: none"> • Bypass the failed SRM Per CPS 3306.01, SRM/IRM step 8.2.2: <ul style="list-style-type: none"> • Place the SRM Bypass joy stick to B SRM • Observe the rod block clears
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Reviews TS 3.3.1.2 Action A.1 and ORM 2.2.2 Action 3.2.2.a. • Directs Bypassing SRM B and continue with the startup • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Terminus: B SRM has been bypassed IAW CPS 3306.01.		

NOTES:

If the B RO appears about to perform the operation to bypass the 'B' SRM, the Lead Evaluator should signal for event # 5 to be started to draw the B RO away from P-680.

Operator Actions

Event No.(s): 5		Page 1 of 1
Description: Vacuum Pump trips		
Initiation: After crew has addressed SRM problem, on the signal of lead examiner		
Cues: Annunciator CPS 5019-1A alarming		
Time	Position	Applicant's Actions or Behavior
	BOP	Per CPS 3112.01, Condenser Vacuum <ul style="list-style-type: none"> • Dispatches field operator to perform local actions to start B Vacuum Pump • After at least 5 minutes of seal water pump operation, start the B Vacuum Pump
	RO	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Enters CPS 4004.02 Loss of Vacuum • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Terminus: B Vacuum Pump is in operation		

NOTES:

Operator Actions

Event No.(s): 6		Page 1 of 1
Description: 'A' SRM fails		
Initiation: After B Vacuum Pump is running, on the signal of lead examiner		
Cues: Annunciators CPS 5006-2H & 5005-1K, 2K, & 3K alarm		
Time	Position	Applicant's Actions or Behavior
	RO	Per CPS 5006-2H, SRM Inop: <ul style="list-style-type: none"> • Reports annunciator to CRS • Monitors reactor to ensure operations remain within established bands
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Reviews and enters TS 3.3.1.2 Action A.1 and ORM 2.2.2 Action 3.2.2.a. • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Terminus: ITS actions reviewed and entered		

NOTES:

<u>TO LEAD EVALUATOR:</u> Ensure this event is started before IRM's are on Range 2 to ensure a Tech Spec call can be made.

Operator Actions

Event No.(s): 7		Page 1 of 1
Description: RCIC drain trap level high		
Initiation: After ITS actions reviewed and entered, on the signal of lead examiner		
Cues: Annunciator 5063-2C alarming		
Time	Position	Applicant's Actions or Behavior
	BOP	Per CPS 5063-2C, RCIC Steam Drain Trap Level High: <ul style="list-style-type: none"> • Recognizes failure of 1E51-F054, RCIC Turbine Inlet Steam Line Water Drain Pot Trap Bypass to open and opens the valve manually. • Verifies 1E51-F025 and 1E51-F026, Upstream and Downstream RCIC Turbine Inlet Steam Line Water Drain Pot Normal Drains are open • Reports failure
	RO	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Enforces OPS expectations and standards • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures.
Terminus: Drain Pot level alarm clear, SRO has directed actions accordingly.		

NOTES:

Operator Actions

Event No.(s): 8,9		Page 1 of 2
Description: RCIC unisolable steam leak, Reactor scrams on initiation of RPT/ARI		
Initiation: After RCIC drain trap level high problem has been addressed, on the signal of lead examiner		
Cues: Multiple secondary containment area temperature and area radiation alarms, rods fail to insert upon manual/automatic SCRAM		
Time	Position	Applicant's Actions or Behavior
	RO	<p>Reports EOP-8 entry on Hi temperature Performs EOP actions as directed by SRO</p> <ul style="list-style-type: none"> • Initiate a manual reactor scram before first max safe temperature is exceeded Per CPS 4100.01, Reactor Scram: <ul style="list-style-type: none"> • Place mode switch in Shutdown, check and report power unchanged <ul style="list-style-type: none"> • Arms and depresses MANUAL SCRAM push-buttons • Initiates ARI • Reports control rods inserted, shutdown criteria met • Operate FW to control level 3 to 8 • Check rods, reports shutdown criteria is met • Report level and pressure are following expected trends • Stabilize pressure <1065 psig • Coordinates with BOP operator to monitor and control RPV level and press.
	BOP	<ul style="list-style-type: none"> • Reports secondary containment high temperature and rad alarms to SRO • Makes plant announcement for reactor scram • Should make plant announcement to evacuate Fuel/Aux buildings. • Attempts to close RCIC steam isolation valves from the control room <p>Performs EOP actions as directed by SRO</p> <ul style="list-style-type: none"> • Verifies operation of area coolers • Verifies operation of VF • Evacuates affected areas of Secondary Containment • Monitors area temperatures, levels and radiation levels • Reports secondary containment Max Safe temperature being exceeded to SRO • Coordinates with RO to monitor and control RPV level and press

Critical Task →

NOTES:

Event No.(s):		8,9	Page 2 of 2
Time	Position	Applicant's Actions or Behavior	
	SRO	Directs entry into EOP-8 and EOP actions as entry conditions are met: <ol style="list-style-type: none"> 1. Operate VF 2. Operate area coolers 3. Hold floor drain sump levels below max. normal 4. Isolate all discharges into the affected area except systems needed for: <ul style="list-style-type: none"> • EOP Actions • Fire Fighting 5. Per EOP-8/CPS 4001.02: <ul style="list-style-type: none"> • Directs BOP to isolate RCIC steam lines 	
		<div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">Critical Task</div> <ol style="list-style-type: none"> 6. Direct a scram prior to exceeding Maximum safe temperature 7. Directs entry into EOP-1A and EOP actions as entry conditions are met.: <ul style="list-style-type: none"> • Inhibit ADS • Arm and Depress MANUAL SCRAM pushbuttons • Initiate ARI 8. Directs additional actions: <ul style="list-style-type: none"> • Notification of Radiation Protection (RP) Department • Evacuate affected areas of Secondary Containment 9. Enters and Directs and verifies performance of appropriate actions per EOP-1: <ol style="list-style-type: none"> a. Mode Switch to SHUTDOWN b. Shutdown criteria verified c. Control RPV Water Level between Level 3 and Level 8 d. Stabilize RPV pressure below 1065 psig e. Verify needed automatic actions: <ul style="list-style-type: none"> • Isolations • ECCS Start • DG Start 	
Terminus: RCIC isolation is attempted and Reactor is scrammed			

NOTES:

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Operator Actions

Event No.(s): 10		Page 1 of 1
Description: Radiation monitor fails to initiate an isolation		
Initiation: Following the steam leak into the secondary containment		
Cues: Annunciator 5050-7F, 5052-7F and AR/PR 1RIX-PR006A-D monitors alarms		
Time	Position	Applicant's Actions or Behavior
	BOP	Performs EOP actions as directed by SRO, CPS 5050-7F, 5052-7F, Hi Rad Initiation VG: <ul style="list-style-type: none"> • Verify alarming condition of 1RIX-PR006A-D • Report EOP-8 entry condition • Shutdown and isolate VF CPS 3404.01, Fuel Building Ventilation, step 8.3 • Startup VG CPS 3319.01, Standby Gas, step 8.2.1
Critical Task		
Critical Task		
	RO	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs entry into EOP-8 and EOP actions as entry conditions are met. • When fuel build exhaust is above 10 mrem/hr shutdown and isolate VF CPS 3404.01, Fuel Building Ventilation • Startup VG CPS 3319.01, Standby Gas General: <ul style="list-style-type: none"> • On transient, positions himself as command authority on the unit. • Acknowledges immediate operator actions and directs subsequent actions. • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Critical Task		
Critical Task		
Terminus: <ul style="list-style-type: none"> • RPV level stable and under control in required band • Reactor is Scrammed • Effort has been made to isolate RCIC steam lines • Failed automatic isolation and actuation (VF/VG) manually performed • Upon approval of lead examiner 		

NOTES:

Simulator Operator Instructions

Initial Setup

1. Verify daily lamp test completed
2. Reset to an IC with Pressure at 600 psig and rods and/or flow to match turnover
3. Load the lesson plan for this scenario
4. Place simulator in RUN
5. Select the B FWLC level instrument
6. Turn on and advance recorders
7. Reset SRM A drawer
8. Provide pull sheets: on step 25 rod 08-25 is at 12
9. Provide and ECP and RE instructions
10. Verify the AR/PR server is running and stabilize AR/PR
11. Verify TT alarm is reset
12. Verify Rod Drive pressure at 250#
13. Hang OOS tags per turnover on #2 SAC
14. Identify T/S issues associated with OOS and turnover
15. Verify simulator conditions match the turnover
16. Provide marked up CPS 3001.01 complete to step 8.2.5
17. Provide a marked up CPS 3002.01 complete to step 8.6
18. Provide a marked up CPS 9000.06D001 with stable heatup values
19. Fill out plant status and have Turnover Sheet ready for the crew
20. Provide pull sheets, REMA, Re instructions and Cram Instructions

Event Triggers and Role Play**Event #**

1. Test the Generator Emergency Seal Oil Pump
 - a. **No trigger.**
2. Uncoupled rod
 - a. **Remote trigger 1** to remove the uncoupled malfunction once the rod is inserted to recouple
 - b. Role Play – Shift Manager – I will have WCS initiate AR/CR and take care of notifications. Proceed with pull to critical.
3. Withdraw Rods To criticality
 - a. **No triggers**
4. ‘B’ SRM fails
 - a. **Remote trigger 2** on request from lead evaluator
 - b. If SRM ‘B’ drawer is checked report the reading at the drawer for period and scale are going up and down, trip and INOP lights are ON
 - c. Maintenance will need a work package to determine the extent of the problem with the SRM.
5. Vacuum Pump trip
 - a. **Remote trigger 3** on request from lead evaluator
 - b. Role Play- Field operator
6. ‘A’ SRM fails
 - a. **Remote trigger 4** on request from lead evaluator
 - b. If SRM ‘A’ drawer is checked report the reading at the drawer for period and scale are going up and down, trip and INOP lights are ON
 - c. Maintenance will need a work package to determine the extent of the problem with the SRM.
7. RCIC drain trap level high
 - a. **Remote trigger 5** on request from lead evaluator
 - b. Role play - Field operator that the trap is lined up
8. RCIC unisolable steam leak
 - a. **Remote trigger 6** on request from lead evaluator
 - b. If RCIC ATM’s are checked they read 10 times higher than on the last 9000.01 reading.
 - c. Role play as personnel in the field
 - (1) Heavy steam in RCIC room
 - d. If valve breakers are checked, no problems are found.
9. Reactor scrams on initiation of RPT/ARI
 - a. **No triggers**
 - b. After 2 minutes from scram announcement go to MCR as IMD.
10. Radiation monitor fails to initiate an isolation and start up VG.
 - a. **No triggers**
 - b. **Remote trigger 7** after 3 minutes, when requested to S/D VF locally. Then report VF S/D locally.

**Clinton Power Station
Licensed Operator Training
Simulator Exercise Guide**

EXAM

ILT 08-1 Exam Scenario 3

REVISION 00

DEVELOPER: _____ Tom Pickley _____

REVIEWED BY: _____ Simulator Instructor _____

APPROVED BY: _____ / _____
Operations Date

Overview

Makeup/Reject: A,B,C CP's are in service. RO train #1 & 2 are in-service in auto to WD
ECCS: RHR A, B, C, LPCS and HPCS are Operable. RCIC is Operable
SDC: N/A
Electrical: 6.9 KV 1A & 1B and 4.16 1A & 1B on RAT, 4160 Volt Busses 1A1, 1B1 & 1C1 are being supplied by RAT
Ventilation:
Radwaste: FP/FP 1B in service. 1WF Evap is in Hot Standby. A RT F/D is in service.

Plant Status

On Line Risk Green

Reactor

Operational Condition: Mode 2
Total Core Flow: 26.9 mlb/hr
FCV Position: A: 90 % B: 90 %
Reactor Power 0 % (<=100%) 0 MWt (<=3473) 0 Mwe
Xenon: Stable
RPV Level 26.7 in Narrow Range
RPV Pressure 600 psi (< 1045)
In service SDC loop None MODE 2

Containment

Suppression Pool Temperature: 75.5 F (<=93.1 F)
Suppression Pool Level 19.1 ft (19 ft 0 to 19 ft 5 in)
Drywell Pressure 0.4 psi (0 to 1 psig)
Drywell to Containment dp: 0.4 psi >=-.02 psid to <=1.0 psid
Drywell Avg Air Temperature: 100 F (<=146.53 F)
Secondary Containment: 0.74 in WG (>= 0.25 in WG vacuum)

BOP

Condenser Vacuum: 27 in Hg
Off – Gas Flow: 12.8 scfm
Condensate Temperature: 78 F
Generator Reactive Load: 0 MVARs

Plant Chemistry

CPI (goal < 1.1): **1.00**
Reactor Sulfates (goal < 2) 1.31 ppb
Reactor Chlorides: 0.51 ppb
FW Iron (goal < 2.1) 0.85 ppb

Protected Equip: None

Comments: See Turnover Sheet

From “Excellence in Human Performance”

Leaders reinforce desired jobsite behaviors (Handbook page 17)

Participate in training program activities.

Leaders monitor and provide feedback to improve training program quality as well as to coach and reinforce individuals who meet or exceed behavior expectations and Standards of performance. During training activities, leaders guide workers on how actions or inactions influence reactor safety and on the potential consequences of mistakes. They give particular attention to recognizing error-likely situations and flawed defenses during tasks important to nuclear safety

ATTACHMENT 1
Reactivity Maneuver Approval Cover Page
Page 1 of 2

Station: **Clinton** Valid Date(s): XX/XX/XXXX Reactivity Maneuver Plan #: C11-Simu.4

Multiple Activations Allowed? No (If yes, CRS may make additional copies)

Prepared by: Roger ONE / XX/XX/XX Reviewed by: Joe ONE / XX/XX/XX
 Reactor Engineer / Date Qualified Nuclear Engineer / Date

Approved by: Michelle ONE Boss / XX/XX/XX Authorized by: _____ / XX/XX/XX
 RE Manager / Date Senior Reactor Operator / Date

NF Review Carlos Quark / XX/XX/XX
 NF Reviewer / Date

ReMA Activated: _____ / XX/XX/XX ReMA Terminated: _____ / XX/XX/XX
 Unit Supervisor / Date Unit Supervisor / Date

Title of Evolution: Withdraw Rods from ARI to RR Pump Upshift
Purpose/Overview of Evolution: This ReMA provides the steps for starting up the plant from the ARI condition to the performance of RR pump upshift.
Reactivity Maneuver Steps
Extended General Issues: Select desired amount of power reduction
1. Withdraw control rods from ARI to RR pump shift to fast speed
General Issues: <ul style="list-style-type: none"> ▪ The critical parameters are provided as a guide to focus the monitoring of the evolution. Changes to these parameters may be necessary to accommodate the actual startup load profile and predictor uncertainties. Changes to the critical parameters are to be done in accordance with the ReMA Training and Reference Material guidelines per OP-AB-300-1003.

ATTACHMENT 2
Reactivity Maneuver Guidance Sheet

Description of Step :

From the ARI condition, increase power with control rods to ~29% (1007 MWt) to support RR pump shift to fast speed.

Ensure Feedwater heating is in service and that feedwater temperature is within 50°F of nominal prior to exceeding 21.6% (750 MWt). Reference Appendix A of CPS 3102.01.

QNE presence required in the Control Room? Yes * No *

*RE Coverage shall be provided consistent with the guidelines of OP-AB-300-1003 and NF-AB-701.

Initial Conditions (may be ranges) to be verified at the START of the Step

Parameter	Value or Range	Init.	Parameter	Value or Range	Init.
Core Power (MWth or %)	N/A	N/A	MFLCPR	N/A	N/A
Core Flow (Mlb/hr or %)	N/A	N/A	MFLPD	N/A	N/A
FCL (%)	N/A	N/A	MAPRAT	N/A	N/A

Critical Parameters to be Verified During the Step

Description; including frequency, method of monitoring, and contingency actions (if needed)

	High	Low
<p>FCL</p> <p>Monitor Frequency: Demand 3D Case or verify with power and flow from P680 display. FCL should be monitored constantly after crossing 21.6% power and just prior to pump upshift.</p> <p>Contingency: Insert control rods in reverse order sequence to reduce FCL.</p>	57.3 %	N/A

Step Complete: _____ / _____
 Reactor Operator / Date

Verified by: _____ / _____
 Unit Supervisor / Date

REACTOR OPERATOR INSTRUCTIONS FOR CRITICALITY

SCOPE OF REVISION:

- This form was updated as a result of the procedure revision.

ROUTINE USE

ORIGINATOR: *Christian Small*

CLASS CODE: *SNNNI*

SQR: *Mark Vandermyde*

APPROVAL DATE: *04/25/05*

CURRENT CHANGES TO GENERAL REVISION

<i>Change #</i>	<i>Date</i>	<i>List of Affected Pages</i>
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____

REACTOR OPERATOR INSTRUCTIONS FOR CRITICALITY

Steps 8.3, 8.4, 8.7.4

Core Conditions Expected:

Estimated Date/Time of criticality _____ / _____

Xenon Increasing Decreasing NoneModerator Temperature: 468 °FCycle Exposure: 9000 MWD/TSequence: A2 - SimulatorComments: Minimum Xenon conditions, High Moderator
Temperature; Middle of Cycle StartupEstimated Critical PositionCriticality is estimated to occur between steps 17 and 35BOC Criticality Instructions

For BOC, if criticality is reached prior to step _____, insert rods in reverse order up to and including step _____ and investigate with the Reactor Engineer and Nuclear Fuels.

For BOC, if criticality is not reached at the completion of step _____, insert rods in reverse order, up to and including step _____ and investigate with the Reactor Engineer and Nuclear Fuels.

Non-BOC Criticality Instructions

For non-BOC, if criticality is reached either prior to step 17 or after step 35, continue with the reactor startup and initiate a CR to document and trend the ECP being outside the expected range of criticality.

Instructions

- * Expect the reactor to become critical at any time.
- * Move control rods with careful attention.
- * Monitor nuclear instruments during and following rod movements.
- * If a nontransient period of less than 30 sec occurs, insert rods and investigate.
- * Perform 1/M plots at steps 17 19 22 23
25 26 27 28
29 31 33 35

ADDITIONAL INSTRUCTIONS

This is a middle of cycle, xenon-free startup at relatively high
moderator temperature. Watch for potential high notch worths in
interior regions of the core.

Michelle ONE Boss
Reactor Engineer

Date Time

Facility: <u>Clinton Power Station</u>		Scenario No.: <u>Three</u>		Operating Test No.: <u>08-01</u>	
Examiners: _____			Operators: _____		
_____			_____		
_____			_____		
Initial Conditions:					
Subcritical ~600 psig, Steam seals and Auxiliary Steam is provided by the electrode boiler, hot restart.					
Thunderstorm storms are expected in the area within the next hour.					
Turnover:					
1. Test the Generator Emergency Seal Oil Pump per 3109.01 section 8.1.2.3 – First Priority.					
2. Pull Rods to criticality.					
Event No.	Malf. No.	Event Type*	Event Description		
1	NA	N-BOP	Test the Generator Emergency Seal Oil Pump		
2	Rod 0825I_ACTIONA -Rod uncoupled	C-ATC TS-CRS	Continue with startup, discovers Uncoupled rod		
3	NA	R-ATC	Pull rods for criticality		
4	SRM_BI_ACTIO N2 and 1	I-ATC	B SRM fails		
5	CDSR_VAC_P MP_A	I-BOP	Vacuum Pump Trip		
6	SRM_CI_ACTIO N2 and 1	TS-CRS	A SRM fails- delete		
7	Override	C-BOP	RCIC drain trap level high		
8	YARITPLA_1 Override	M-ALL	RCIC unisolable steam leak		
9	YP_XMFTB_500 2	M-ALL	Reactor scrams on initiation of RPT/ARI		
10	CAM1PR006AT V_VALUE1 CAM1PR006CT V_VALUE1 CAM1PR006DT V_VALUE1 CAM1PR006BT V_VALUE1 VGCEFUSE_V 677503CC VGBZFUSE_V 421691CC	M-ALL	Radiation monitor fails to initiate an isolation		

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

Scenario No.: Three
Narrative Summary

Operating Test No.: 08-01

Event #	Description
1.	Test the Generator Emergency Seal Oil Pump per 3109.01 section 8.1.2.3.
2.	Rod 08-25 is uncoupled and goes to overtravel. This will require action to recouple and entry into Technical Specification 3.1.3.
3.	Withdrawal rods for criticality.
4.	'B' SRM fails causing a rod block requiring bypassing to proceed with startup. Requiring a review of Technical Specification 3.3.1.4 action A.1 and ORM 2.2.2 Action 3.2.2.a
5.	The A Mechanical Vacuum Pump trips requiring starting the B Pump.
6.	'A' SRM fails causing a rod block and requiring entry into Technical Specification 3.3.1.4 action A.1 and ORM 2.2.2 Action 3.2.2.a
7.	The RCIC drain trap level high will require manually opening the drain trap bypass valve to drain the steam pot.
8.	The RCIC steam supply line develops a leak causing the RCIC room temperature to rise resulting in an EOP-8 entry. A scram is required prior exceeding the Maximum safe temperature.
9.	The mode switch and manual scram pushbutton will not cause a scram requiring entry into EOP-1A. Manual initiation of ARI/RPT will insert the rods for a scram. EOP-1A will be exited and EOP-1 will be entered.
10.	The VF exhaust radiation monitor trends up to the trip isolation but fails to actuate VF isolation and start of VG requiring BOP to manually perform.

EOP
8,1A,1

Critical tasks:

- Manual insertion of ARI prior to exceeding Maximum safe temperature
- Manually shutdown and isolate VF and startup VG

Shift Turnover Information**⇒ Day of week and shift**

- ◆ Today Day Shift

⇒ Weather conditions

- ◆ Thunderstorms are expected in the area within the next hour.

⇒ (Plant power level)

- | | |
|--|---|
| <ul style="list-style-type: none"> ◆ Subcritical, with equilibrium Xenon, 3 days after shutdown ◆ na- MWt ◆ na- MWe ◆ 27.0 Mlbm/hr CORE FLOW | <ul style="list-style-type: none"> ◆ CPS 3001.01 complete to step 8.2.5 ◆ CPS 3002.01 at step 8.5.2 ◆ ◆ |
|--|---|

⇒ Thermal Limit Problems/Power Evolutions

- | | |
|--|---|
| <ul style="list-style-type: none"> ◆ Pull to critical, heatup and pressurization, step 25 on the pull sheet, 08-25 @ 12 ◆ ◆ | <ul style="list-style-type: none"> ◆ ◆ ◆ |
|--|---|

⇒ Existing LCOs, date of next surveillance

- | | |
|---|--|
| <ul style="list-style-type: none"> ◆ None ◆ | <ul style="list-style-type: none"> ◆ ◆ |
|---|--|

⇒ Surveillances or major maintenance

- | | |
|---|---|
| <ul style="list-style-type: none"> ◆ ◆ ◆ | <ul style="list-style-type: none"> ◆ ◆ ◆ |
|---|---|

⇒ Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment

- | | |
|--|--|
| <ul style="list-style-type: none"> ◆ Test the Generator Emergency Seal Oil Pump per 3109.01 section 8.1.2.3 for PMT. ◆ | <ul style="list-style-type: none"> ◆ ◆ |
|--|--|

⇒ Comments, evolutions, problems, etc.

- | | |
|---|--|
| <ul style="list-style-type: none"> ◆ Online Safety is Green ◆ Steam seals and Auxiliary Steam is provided by the electrode boiler | <ul style="list-style-type: none"> ◆ Test the Generator Emergency Seal Oil Pump per 3109.01 section 8.1.2.3 for PMT – First Priority. ◆ Continue with Reactor startup. |
|---|--|

Operator Actions

Event No.(s): 2		Page 1 of 1
Description: Uncoupled rod		
Initiation: Following Emergency Seal Oil Pump test		
Cues: Annunciator CPS 5006-5G alarms		
Time	Position	Applicant's Actions or Behavior
	RO	<p>CPS 5006-5G, Rod Overtravel:</p> <ul style="list-style-type: none"> • Determine the rod that alarmed 08-25. • Tell SRO to review TS LCO 3.1.3 <p>As directed by SRO Per CPS 3304.02, RCIS step 8.2.6:</p> <ol style="list-style-type: none"> 1) Verify that the INDIVID DRIVE light is energized on the OCM. If not, select individual drive by depressing DRIVE MODE push-button. 2) Insert the drive 1 or 2 notches in an attempt to recouple the rod. 3) Determine if the rod has recoupled by performing a coupling check 4) If the rod has recoupled, return to normal operation.
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Declares the rod inoperable, enters LCO 3.1.3 Action C.1 and C.2 • When the rod is recoupled declare the rod Operable and exit the LCOs • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Terminus: Rod has been recoupled and SRO applied LCO actions		

NOTES:

Event No.(s): 3		Page 1 of 1
Description: Pull rods for criticality		
Initiation: When directed by SRO after Rod has been recoupled		
Cues: Directed by SRO		
Time	Position	Applicant's Actions or Behavior
	RO	<p>Per CPS 3001.01, Approach To Critical, Step 8.2.6 and CPS 2202.01F001, Control Rod Sequence:</p> <ul style="list-style-type: none"> • Withdraw rods for criticality • Prior to exceeding 1×10^6 cps, withdraw SRM's Per CPS 3306.01, SRM/IRM step 8.1.2: <ul style="list-style-type: none"> • Depress the POWER ON button • Select the SRMs • Depress the drive out button until withdrawn • Depress the drive out button • Announce reactor is critical
	BOP	<ul style="list-style-type: none"> • Announce reactor criticality • Log in the date/time criticality was achieved, and criticality data: <ul style="list-style-type: none"> • Rod Sequence • Group/Array • Rod • Rod Position • SRM reading and Period • RR loop temperature • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above • Stays in a position of oversight • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Enforces OPS expectations and standards.
Terminus: Clearly observable plant response from change in power level or Reactor is critical.		

NOTES:

Operator Actions

Event No.(s): 4		Page 1 of 1
Description: 'B' SRM fails		
Initiation: After the rod is recoupled or on the signal of lead examiner		
Cues: Annunciators CPS 5006-2H & 5005-1K, 2K, & 3K alarm		
Time	Position	Applicant's Actions or Behavior
	RO	Per CPS 5006-2H, SRM Inop: <ul style="list-style-type: none"> • Bypass the failed SRM Per CPS 3306.01, SRM/IRM step 8.2.2: <ul style="list-style-type: none"> • Place the SRM Bypass joy stick to B SRM • Observe the rod block clears
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Reviews TS 3.3.1.2 Action A.1 and ORM 2.2.2 Action 3.2.2.a. • Directs Bypassing SRM B and continue with the startup • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Terminus: B SRM has been bypassed IAW CPS 3306.01.		

NOTES:

If the B RO appears about to perform the operation to bypass the 'B' SRM, the Lead Evaluator should signal for event # 5 to be started to draw the B RO away from P-680.

Operator Actions

Event No.(s): 5		Page 1 of 1
Description: Vacuum Pump trips		
Initiation: After crew has addressed SRM problem, on the signal of lead examiner		
Cues: Annunciator CPS 5019-1A alarming		
Time	Position	Applicant's Actions or Behavior
	BOP	Per CPS 3112.01, Condenser Vacuum <ul style="list-style-type: none"> • Dispatches field operator to perform local actions to start B Vacuum Pump • After at least 5 minutes of seal water pump operation, start the B Vacuum Pump
	RO	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Enters CPS 4004.02 Loss of Vacuum • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Terminus: B Vacuum Pump is in operation		

NOTES:

Operator Actions

Event No.(s): 6		Page 1 of 1
Description: 'A' SRM fails		
Initiation: After B Vacuum Pump is running, on the signal of lead examiner		
Cues: Annunciators CPS 5006 2H & 5005 1K, 2K, & 3K alarm		
Time	Position	Applicant's Actions or Behavior
	RO	<ul style="list-style-type: none"> Per CPS 5006 2H, SRM Inop: <ul style="list-style-type: none"> • Reports annunciator to CRS • Monitors reactor to ensure operations remain within established bands
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Reviews and enters TS 3.3.1.2 Action A.1 and ORM 2.2.2 Action 3.2.2.a. • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Terminus: ITS actions reviewed and entered		

NOTES:

<u>TO LEAD EVALUATOR:</u> Ensure this event is started before IRM's are on Range 2 to ensure a Tech Spec call can be made.

Operator Actions

Event No.(s): 7		Page 1 of 1
Description: RCIC drain trap level high		
Initiation: After ITS actions reviewed and entered, on the signal of lead examiner		
Cues: Annunciator 5063-2C alarming		
Time	Position	Applicant's Actions or Behavior
	BOP	Per CPS 5063-2C, RCIC Steam Drain Trap Level High: <ul style="list-style-type: none"> • Recognizes failure of 1E51-F054, RCIC Turbine Inlet Steam Line Water Drain Pot Trap Bypass to open and opens the valve manually. • Verifies 1E51-F025 and 1E51-F026, Upstream and Downstream RCIC Turbine Inlet Steam Line Water Drain Pot Normal Drains are open • Reports failure
	RO	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Enforces OPS expectations and standards • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures.
Terminus: Drain Pot level alarm clear, SRO has directed actions accordingly.		

NOTES:

Operator Actions

Event No.(s): 8,9		Page 1 of 2
Description: RCIC unisolable steam leak, Reactor scrams on initiation of RPT/ARI		
Initiation: After RCIC drain trap level high problem has been addressed, on the signal of lead examiner		
Cues: Multiple secondary containment area temperature and area radiation alarms, rods fail to insert upon manual/automatic SCRAM		
Time	Position	Applicant's Actions or Behavior
	RO	<p>Reports EOP-8 entry on Hi temperature Performs EOP actions as directed by SRO</p> <ul style="list-style-type: none"> • Initiate a manual reactor scram before first max safe temperature is exceeded Per CPS 4100.01, Reactor Scram: <ul style="list-style-type: none"> • Place mode switch in Shutdown, check and report power unchanged <ul style="list-style-type: none"> • Arms and depresses MANUAL SCRAM push-buttons • Initiates ARI • Reports control rods inserted, shutdown criteria met • Operate FW to control level 3 to 8 • Check rods, reports shutdown criteria is met • Report level and pressure are following expected trends • Stabilize pressure <1065 psig • Coordinates with BOP operator to monitor and control RPV level and press.
	BOP	<ul style="list-style-type: none"> • Reports secondary containment high temperature and rad alarms to SRO • Makes plant announcement for reactor scram • Should make plant announcement to evacuate Fuel/Aux buildings. • Attempts to close RCIC steam isolation valves from the control room <p>Performs EOP actions as directed by SRO</p> <ul style="list-style-type: none"> • Verifies operation of area coolers • Verifies operation of VF • Evacuates affected areas of Secondary Containment • Monitors area temperatures, levels and radiation levels • Reports secondary containment Max Safe temperature being exceeded to SRO • Coordinates with RO to monitor and control RPV level and press

Critical Task →

NOTES:

Event No.(s):		8,9	Page	2	of	2
Time	Position	Applicant's Actions or Behavior				
	SRO	Directs entry into EOP-8 and EOP actions as entry conditions are met: <ol style="list-style-type: none"> 1. Operate VF 2. Operate area coolers 3. Hold floor drain sump levels below max. normal 4. Isolate all discharges into the affected area except systems needed for: <ul style="list-style-type: none"> • EOP Actions • Fire Fighting 5. Per EOP-8/CPS 4001.02: <ul style="list-style-type: none"> • Directs BOP to isolate RCIC steam lines 6. Direct a scram prior to exceeding Maximum safe temperature 7. Directs entry into EOP-1A and EOP actions as entry conditions are met.: <ul style="list-style-type: none"> • Inhibit ADS • Arm and Depress MANUAL SCRAM pushbuttons • Initiate ARI 8. Directs additional actions: <ul style="list-style-type: none"> • Notification of Radiation Protection (RP) Department • Evacuate affected areas of Secondary Containment 9. Enters and Directs and verifies performance of appropriate actions per EOP-1: <ol style="list-style-type: none"> a. Mode Switch to SHUTDOWN b. Shutdown criteria verified c. Control RPV Water Level between Level 3 and Level 8 d. Stabilize RPV pressure below 1065 psig e. Verify needed automatic actions: <ul style="list-style-type: none"> • Isolations • ECCS Start • DG Start 				
	Critical Task					
Terminus: RCIC isolation is attempted and Reactor is scrammed						

NOTES:

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Operator Actions

Event No.(s): 10		Page 1 of 1
Description: Radiation monitor fails to initiate an isolation		
Initiation: Following the steam leak into the secondary containment		
Cues: Annunciator 5050-7F, 5052-7F and AR/PR 1RIX-PR006A-D monitors alarms		
Time	Position	Applicant's Actions or Behavior
	BOP	Performs EOP actions as directed by SRO, CPS 5050-7F, 5052-7F, Hi Rad Initiation VG: <ul style="list-style-type: none"> • Verify alarming condition of 1RIX-PR006A-D • Report EOP-8 entry condition • Shutdown and isolate VF CPS 3404.01, Fuel Building Ventilation, step 8.3 • Startup VG CPS 3319.01, Standby Gas, step 8.2.1
Critical Task		
Critical Task		
	RO	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs entry into EOP-8 and EOP actions as entry conditions are met. • When fuel build exhaust is above 10 mrem/hr shutdown and isolate VF CPS 3404.01, Fuel Building Ventilation • Startup VG CPS 3319.01, Standby Gas General: <ul style="list-style-type: none"> • On transient, positions himself as command authority on the unit. • Acknowledges immediate operator actions and directs subsequent actions. • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Critical Task		
Critical Task		
Terminus: <ul style="list-style-type: none"> • RPV level stable and under control in required band • Reactor is Scrammed • Effort has been made to isolate RCIC steam lines • Failed automatic isolation and actuation (VF/VG) manually performed • Upon approval of lead examiner 		

NOTES:

Simulator Operator Instructions

Initial Setup

1. Verify daily lamp test completed
2. Reset to an IC with Pressure at 600 psig and rods and/or flow to match turnover
3. Load the lesson plan for this scenario
4. Place simulator in RUN
5. Select the B FWLC level instrument
6. Turn on and advance recorders
7. Reset SRM A drawer
8. Provide pull sheets: on step 25 rod 08-25 is at 12
9. Provide and ECP and RE instructions
10. Verify the AR/PR server is running and stabilize AR/PR
11. Verify TT alarm is reset
12. Verify Rod Drive pressure at 250#
13. Hang OOS tags per turnover on #2 SAC
14. Identify T/S issues associated with OOS and turnover
15. Verify simulator conditions match the turnover
16. Provide marked up CPS 3001.01 complete to step 8.2.5
17. Provide a marked up CPS 3002.01 complete to step 8.6
18. Provide a marked up CPS 9000.06D001 with stable heatup values
19. Fill out plant status and have Turnover Sheet ready for the crew
20. Provide pull sheets, REMA, Re instructions and Cram Instructions

Event Triggers and Role Play**Event #**

1. Test the Generator Emergency Seal Oil Pump
 - a. **No trigger.**
2. Uncoupled rod
 - a. **Remote trigger 1** to remove the uncoupled malfunction once the rod is inserted to recouple
 - b. Role Play – Shift Manager – I will have WCS initiate AR/CR and take care of notifications. Proceed with pull to critical.
3. Withdraw Rods To criticality
 - a. **No triggers**
4. ‘B’ SRM fails
 - a. **Remote trigger 2** on request from lead evaluator
 - b. If SRM ‘B’ drawer is checked report the reading at the drawer for period and scale are going up and down, trip and INOP lights are ON
 - c. Maintenance will need a work package to determine the extent of the problem with the SRM.
5. Vacuum Pump trip
 - a. **Remote trigger 3** on request from lead evaluator
 - b. Role Play- Field operator
6. ‘A’ SRM fails
 - a. **Remote trigger 4** on request from lead evaluator
 - b. If SRM ‘A’ drawer is checked report the reading at the drawer for period and scale are going up and down, trip and INOP lights are ON
 - c. Maintenance will need a work package to determine the extent of the problem with the SRM.
7. RCIC drain trap level high
 - a. **Remote trigger 5** on request from lead evaluator
 - b. Role play - Field operator that the trap is lined up
8. RCIC unisolable steam leak
 - a. **Remote trigger 6** on request from lead evaluator
 - b. If RCIC ATM’s are checked they read 10 times higher than on the last 9000.01 reading.
 - c. Role play as personnel in the field
 - (1) Heavy steam in RCIC room
 - d. If valve breakers are checked, no problems are found.
9. Reactor scrams on initiation of RPT/ARI
 - a. **No triggers**
 - b. After 2 minutes from scram announcement go to MCR as IMD.
10. Radiation monitor fails to initiate an isolation and start up VG.
 - a. **No triggers**
 - b. **Remote trigger 7** after 3 minutes, when requested to S/D VF locally. Then report VF S/D locally.

**Clinton Power Station
Licensed Operator Training
Simulator Exercise Guide**

EXAM

ILT 08-1 Exam Scenario 3

REVISION 00

DEVELOPER: _____ Tom Pickley _____

REVIEWED BY: _____ Simulator Instructor _____

APPROVED BY: _____ / _____
Operations Date

Overview

Makeup/Reject: A,B,C CP's are in service. RO train #1 & 2 are in-service in auto to WD
ECCS: RHR A, B, C, LPCS and HPCS are Operable. RCIC is Operable
SDC: N/A
Electrical: 6.9 KV 1A & 1B and 4.16 1A & 1B on RAT, 4160 Volt Busses 1A1, 1B1 & 1C1 are being supplied by RAT
Ventilation:
Radwaste: FP/FP 1B in service. 1WF Evap is in Hot Standby. A RT F/D is in service.

Plant Status

On Line Risk Green

Reactor

Operational Condition: Mode 2
Total Core Flow: 26.9 mlb/hr
FCV Position: A: 90 % B: 90 %
Reactor Power 0 % (<=100%) 0 MWt (<=3473) 0 Mwe
Xenon: Stable
RPV Level 26.7 in Narrow Range
RPV Pressure 600 psi (< 1045)
In service SDC loop None MODE 2

Containment

Suppression Pool Temperature: 75.5 F (<=93.1 F)
Suppression Pool Level 19.1 ft (19 ft 0 to 19 ft 5 in)
Drywell Pressure 0.4 psi (0 to 1 psig)
Drywell to Containment dp: 0.4 psi >=-.02 psid to <=1.0 psid
Drywell Avg Air Temperature: 100 F (<=146.53 F)
Secondary Containment: 0.74 in WG (>= 0.25 in WG vacuum)

BOP

Condenser Vacuum: 27 in Hg
Off – Gas Flow: 12.8 scfm
Condensate Temperature: 78 F
Generator Reactive Load: 0 MVARs

Plant Chemistry

CPI (goal < 1.1): **1.00**
Reactor Sulfates (goal < 2) 1.31 ppb
Reactor Chlorides: 0.51 ppb
FW Iron (goal < 2.1) 0.85 ppb

Protected Equip: None

Comments: See Turnover Sheet

From “Excellence in Human Performance”

Leaders reinforce desired jobsite behaviors (Handbook page 17)

Participate in training program activities.

Leaders monitor and provide feedback to improve training program quality as well as to coach and reinforce individuals who meet or exceed behavior expectations and Standards of performance. During training activities, leaders guide workers on how actions or inactions influence reactor safety and on the potential consequences of mistakes. They give particular attention to recognizing error-likely situations and flawed defenses during tasks important to nuclear safety

ATTACHMENT 1
Reactivity Maneuver Approval Cover Page
Page 1 of 2

Station: **Clinton** Valid Date(s): XX/XX/XXXX Reactivity Maneuver Plan #: C11-Simu.4

Multiple Activations Allowed? No (If yes, CRS may make additional copies)

Prepared by: Roger ONE / XX/XX/XX Reviewed by: Joe ONE / XX/XX/XX
 Reactor Engineer / Date Qualified Nuclear Engineer / Date

Approved by: Michelle ONE Boss / XX/XX/XX Authorized by: _____ / XX/XX/XX
 RE Manager / Date Senior Reactor Operator / Date

NF Review Carlos Quark / XX/XX/XX
 NF Reviewer / Date

ReMA Activated: _____ / XX/XX/XX ReMA Terminated: _____ / XX/XX/XX
 Unit Supervisor / Date Unit Supervisor / Date

Title of Evolution: Withdraw Rods from ARI to RR Pump Upshift
Purpose/Overview of Evolution: This ReMA provides the steps for starting up the plant from the ARI condition to the performance of RR pump upshift.
Reactivity Maneuver Steps
Extended General Issues: Select desired amount of power reduction
1. Withdraw control rods from ARI to RR pump shift to fast speed
General Issues: <ul style="list-style-type: none"> ▪ The critical parameters are provided as a guide to focus the monitoring of the evolution. Changes to these parameters may be necessary to accommodate the actual startup load profile and predictor uncertainties. Changes to the critical parameters are to be done in accordance with the ReMA Training and Reference Material guidelines per OP-AB-300-1003.

ATTACHMENT 2
Reactivity Maneuver Guidance Sheet

Description of Step :

From the ARI condition, increase power with control rods to ~29% (1007 MWt) to support RR pump shift to fast speed.

Ensure Feedwater heating is in service and that feedwater temperature is within 50°F of nominal prior to exceeding 21.6% (750 MWt). Reference Appendix A of CPS 3102.01.

QNE presence required in the Control Room? Yes * No *

*RE Coverage shall be provided consistent with the guidelines of OP-AB-300-1003 and NF-AB-701.

Initial Conditions (may be ranges) to be verified at the START of the Step

Parameter	Value or Range	Init.	Parameter	Value or Range	Init.
Core Power (MWth or %)	N/A	N/A	MFLCPR	N/A	N/A
Core Flow (Mlb/hr or %)	N/A	N/A	MFLPD	N/A	N/A
FCL (%)	N/A	N/A	MAPRAT	N/A	N/A

Critical Parameters to be Verified During the Step

Description; including frequency, method of monitoring, and contingency actions (if needed)

	High	Low
FCL Monitor Frequency: Demand 3D Case or verify with power and flow from P680 display. FCL should be monitored constantly after crossing 21.6% power and just prior to pump upshift. Contingency: Insert control rods in reverse order sequence to reduce FCL.	57.3 %	N/A

Step Complete: _____ / _____
 Reactor Operator / Date

Verified by: _____ / _____
 Unit Supervisor / Date

REACTOR OPERATOR INSTRUCTIONS FOR CRITICALITY

SCOPE OF REVISION:

- This form was updated as a result of the procedure revision.

ROUTINE USE

ORIGINATOR: *Christian Small*

CLASS CODE: *SNNNI*

SQR: *Mark Vandermyde*

APPROVAL DATE: *04/25/05*

CURRENT CHANGES TO GENERAL REVISION

	<i>Change #</i>	<i>Date</i>	<i>List of Affected Pages</i>
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____

REACTOR OPERATOR INSTRUCTIONS FOR CRITICALITY

Steps 8.3, 8.4, 8.7.4

Core Conditions Expected:

Estimated Date/Time of criticality _____ / _____

- Xenon Increasing
 Decreasing
 None

Moderator Temperature: 468 °F

Cycle Exposure: 9000 MWD/T

Sequence: A2 - Simulator

Comments: Minimum Xenon conditions, High Moderator
 Temperature; Middle of Cycle Startup

Estimated Critical Position

Criticality is estimated to occur between steps 17 and 35

BOC Criticality Instructions

For BOC, if criticality is reached prior to step _____, insert rods in reverse order up to and including step _____ and investigate with the Reactor Engineer and Nuclear Fuels.

For BOC, if criticality is not reached at the completion of step _____, insert rods in reverse order, up to and including step _____ and investigate with the Reactor Engineer and Nuclear Fuels.

Non-BOC Criticality Instructions

For non-BOC, if criticality is reached either prior to step 17 or after step 35, continue with the reactor startup and initiate a CR to document and trend the ECP being outside the expected range of criticality.

Instructions

- * Expect the reactor to become critical at any time.
- * Move control rods with careful attention.
- * Monitor nuclear instruments during and following rod movements.
- * If a nontransient period of less than 30 sec occurs, insert rods and investigate.
- * Perform 1/M plots at steps 17 19 22 23
 25 26 27 28
 29 31 33 35

ADDITIONAL INSTRUCTIONS

This is a middle of cycle, xenon-free startup at relatively high moderator temperature. Watch for potential high notch worths in interior regions of the core.

Michelle ONE Boss

 Reactor Engineer

_____/_____
 Date Time

Facility: <u>Clinton Power Station</u>		Scenario No.: <u>Three</u>		Operating Test No.: <u>08-01</u>	
Examiners: _____			Operators: _____		
_____			_____		
_____			_____		
Initial Conditions:					
Subcritical ~600 psig, Steam seals and Auxiliary Steam is provided by the electrode boiler, hot restart.					
Thunderstorm storms are expected in the area within the next hour.					
Turnover:					
1. Test the Generator Emergency Seal Oil Pump per 3109.01 section 8.1.2.3 – First Priority.					
2. Pull Rods to criticality.					
Event No.	Malf. No.	Event Type*	Event Description		
1	NA	N-BOP	Test the Generator Emergency Seal Oil Pump – delete		
2	Rod 0825I_ACTIONA -Rod uncoupled	C-ATC TS-CRS	Continue with startup, discovers Uncoupled rod		
3-4	NA	R-ATC	Pull rods for criticality		
4-3	SRM_BI_ACTIO N2 and 1	I-ATC	B SRM fails		
5	CDSR_VAC_P MP_A	I-BOP	Vacuum Pump Trip – delete		
6	SRM_CI_ACTIO N2 and 1	TS-CRS	A SRM fails		
7	Override	C-BOP	RCIC drain trap level high – delete		
8	YARITPLA_1 Override	M-ALL	RCIC unisolable steam leak		
9	YP_XMFTB_500 2	M-ALL	Reactor scrams on initiation of RPT/ARI		
10	CAM1PR006AT V_VALUE1 CAM1PR006CT V_VALUE1 CAM1PR006DT V_VALUE1 CAM1PR006BT V_VALUE1 VGCEFUSE_V 677503CC VGBZFUSE_V 421691CC	M-ALL	Radiation monitor fails to initiate an isolation		

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

Scenario No.: Three
Narrative Summary

Operating Test No.: 08-01

Event #	Description
1.	Test the Generator Emergency Seal Oil Pump per 3109.01 section 8.1.2.3.
2.	Rod 08-25 is uncoupled and goes to overtravel. This will require action to recouple and entry into Technical Specification 3.1.3.
3.	Withdrawal rods for criticality.
4.	'B' SRM fails causing a rod block requiring bypassing to proceed with startup. Requiring a review of Technical Specification 3.3.1.4 action A.1 and ORM 2.2.2 Action 3.2.2.a
5.	The A Mechanical Vacuum Pump trips requiring starting the B Pump.
6.	'A' SRM fails causing a rod block and requiring entry into Technical Specification 3.3.1.4 action A.1 and ORM 2.2.2 Action 3.2.2.a
7.	The RCIC drain trap level high will require manually opening the drain trap bypass valve to drain the steam pot.
8.	The RCIC steam supply line develops a leak causing the RCIC room temperature to rise resulting in an EOP-8 entry. A scram is required prior exceeding the Maximum safe temperature.
9.	The mode switch and manual scram pushbutton will not cause a scram requiring entry into EOP-1A. Manual initiation of ARI/RPT will insert the rods for a scram. EOP-1A will be exited and EOP-1 will be entered.
10.	The VF exhaust radiation monitor trends up to the trip isolation but fails to actuate VF isolation and start of VG requiring BOP to manually perform.

EOP
8,1A,1

Critical tasks:

- Manual insertion of ARI prior to exceeding Maximum safe temperature
- Manually shutdown and isolate VF and startup VG

Shift Turnover Information

⇒ **Day of week and shift**

- ◆ Today Day Shift

⇒ **Weather conditions**

- ◆ Thunderstorms are expected in the area within the next hour.

⇒ **(Plant power level)**

- | | |
|--|--------------------------------------|
| ◆ Subcritical, with equilibrium Xenon, 3 days after shutdown | ◆ CPS 3001.01 complete to step 8.2.5 |
| ◆ na- MWt | ◆ CPS 3002.01 at step 8.5.2 |
| ◆ na- MWe | ◆ |
| ◆ 27.0 Mlbm/hr CORE FLOW | ◆ |

⇒ **Thermal Limit Problems/Power Evolutions**

- | | |
|--|---|
| ◆ Pull to critical, heatup and pressurization, step 25 on the pull sheet, 08-25 @ 12 | ◆ |
| ◆ | ◆ |
| ◆ | ◆ |

⇒ **Existing LCOs, date of next surveillance**

- | | |
|--------|---|
| ◆ None | ◆ |
| ◆ | ◆ |

⇒ **Surveillances or major maintenance**

- | | |
|---|---|
| ◆ | ◆ |
| ◆ | ◆ |
| ◆ | ◆ |

⇒ **Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment**

- | | |
|---|---|
| ◆ Test the Generator Emergency Seal Oil Pump per 3109.01 section 8.1.2.3 for PMT. | ◆ |
| ◆ | ◆ |

⇒ **Comments, evolutions, problems, etc.**

- | | |
|---|--|
| ◆ Online Safety is Green | ◆ Test the Generator Emergency Seal Oil Pump per 3109.01 section 8.1.2.3 for PMT – First Priority. |
| ◆ Steam seals and Auxiliary Steam is provided by the electrode boiler | ◆ Continue with Reactor startup. |

Operator Actions

Event No.(s): 2		Page 1 of 1
Description: Uncoupled rod		
Initiation: Following Emergency Seal Oil Pump test		
Cues: Annunciator CPS 5006-5G alarms		
Time	Position	Applicant's Actions or Behavior
	RO	<p>CPS 5006-5G, Rod Overtravel:</p> <ul style="list-style-type: none"> • Determine the rod that alarmed 08-25. • Tell SRO to review TS LCO 3.1.3 <p>As directed by SRO Per CPS 3304.02, RCIS step 8.2.6:</p> <ol style="list-style-type: none"> 1) Verify that the INDIVID DRIVE light is energized on the OCM. If not, select individual drive by depressing DRIVE MODE push-button. 2) Insert the drive 1 or 2 notches in an attempt to recouple the rod. 3) Determine if the rod has recoupled by performing a coupling check 4) If the rod has recoupled, return to normal operation.
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Declares the rod inoperable, enters LCO 3.1.3 Action C.1 and C.2 • When the rod is recoupled declare the rod Operable and exit the LCOs • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Terminus: Rod has been recoupled and SRO applied LCO actions		

NOTES:

Event No.(s): 3-4		Page 1 of 1
Description: Pull rods for criticality		
Initiation: When directed by SRO after Rod has been recoupled		
Cues: Directed by SRO		
Time	Position	Applicant's Actions or Behavior
	RO	<p>Per CPS 3001.01, Approach To Critical, Step 8.2.6 and CPS 2202.01F001, Control Rod Sequence:</p> <ul style="list-style-type: none"> • Withdraw rods for criticality • Prior to exceeding 1×10^6 cps, withdraw SRM's Per CPS 3306.01, SRM/IRM step 8.1.2: <ul style="list-style-type: none"> • Depress the POWER ON button • Select the SRMs • Depress the drive out button until withdrawn • Depress the drive out button • Announce reactor is critical
	BOP	<ul style="list-style-type: none"> • Announce reactor criticality • Log in the date/time criticality was achieved, and criticality data: <ul style="list-style-type: none"> • Rod Sequence • Group/Array • Rod • Rod Position • SRM reading and Period • RR loop temperature • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above • Stays in a position of oversight • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Enforces OPS expectations and standards.
Terminus: Clearly observable plant response from change in power level or Reactor is critical.		

NOTES:

Operator Actions

Event No.(s): 4-3		Page 1 of 1
Description: 'B' SRM fails		
Initiation: After the rod is recoupled or on the signal of lead examiner		
Cues: Annunciators CPS 5006-2H & 5005-1K, 2K, & 3K alarm		
Time	Position	Applicant's Actions or Behavior
	RO	Per CPS 5006-2H, SRM Inop: <ul style="list-style-type: none"> • Bypass the failed SRM Per CPS 3306.01, SRM/IRM step 8.2.2: <ul style="list-style-type: none"> • Place the SRM Bypass joy stick to B SRM • Observe the rod block clears
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Reviews TS 3.3.1.2 Action A.1 and ORM 2.2.2 Action 3.2.2.a. • Directs Bypassing SRM B and continue with the startup • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Terminus: B SRM has been bypassed IAW CPS 3306.01.		

NOTES:

If the B RO appears about to perform the operation to bypass the 'B' SRM, the Lead Evaluator should signal for event # 5 to be started to draw the B RO away from P-680.

Operator Actions

Event No.(s): 5		Page 1 of 1
Description: Vacuum Pump trips		
Initiation: After crew has addressed SRM problem, on the signal of lead examiner		
Cues: Annunciator CPS 5019 1A alarming		
Time	Position	Applicant's Actions or Behavior
	BOP	Per CPS 3112.01, Condenser Vacuum <ul style="list-style-type: none"> ● Dispatches field operator to perform local actions to start B Vacuum Pump ● After at least 5 minutes of seal water pump operation, start the B Vacuum Pump
	RO	<ul style="list-style-type: none"> ● Monitors reactor to ensure operations remain within established bands ● Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> ● Enters CPS 4004.02 Loss of Vacuum ● Directs actions listed above. ● Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. ● Enforces OPS expectations and standards. ● Contacts Shift Manager and recommends notifications.
Terminus: B Vacuum Pump is in operation		

NOTES:

Operator Actions

Event No.(s): 6		Page 1 of 1
Description: 'A' SRM fails		
Initiation: After B Vacuum Pump is running, on the signal of lead examiner		
Cues: Annunciators CPS 5006-2H & 5005-1K, 2K, & 3K alarm		
Time	Position	Applicant's Actions or Behavior
	RO	Per CPS 5006-2H, SRM Inop: <ul style="list-style-type: none"> • Reports annunciator to CRS • Monitors reactor to ensure operations remain within established bands
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Reviews and enters TS 3.3.1.2 Action A.1 and ORM 2.2.2 Action 3.2.2.a. • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Terminus: ITS actions reviewed and entered		

NOTES:

<u>TO LEAD EVALUATOR:</u> Ensure this event is started before IRM's are on Range 2 to ensure a Tech Spec call can be made.

Operator Actions

Event No.(s): 7		Page 1 of 1
Description: RCIC drain trap level high		
Initiation: After ITS actions reviewed and entered, on the signal of lead examiner		
Cues: Annunciator 5063 2C alarming		
Time	Position	Applicant's Actions or Behavior
	BOP	<p>Per CPS 5063 2C, RCIC Steam Drain Trap Level High:</p> <ul style="list-style-type: none"> ● Recognizes failure of 1E51 F054, RCIC Turbine Inlet Steam Line Water Drain Pot Trap Bypass to open and opens the valve manually. ● Verifies 1E51 F025 and 1E51 F026, Upstream and Downstream RCIC Turbine Inlet Steam Line Water Drain Pot Normal Drains are open ● Reports failure
	RO	<ul style="list-style-type: none"> ● Monitors reactor to ensure operations remain within established bands ● Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> ● Directs actions listed above. ● Enforces OPS expectations and standards ● Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures.
Terminus: Drain Pot level alarm clear, SRO has directed actions accordingly.		

NOTES:

Operator Actions

Event No.(s): 8,9		Page 1 of 2
Description: RCIC unisolable steam leak, Reactor scrams on initiation of RPT/ARI		
Initiation: After RCIC drain trap level high problem has been addressed, on the signal of lead examiner		
Cues: Multiple secondary containment area temperature and area radiation alarms, rods fail to insert upon manual/automatic SCRAM		
Time	Position	Applicant's Actions or Behavior
	RO	<p>Reports EOP-8 entry on Hi temperature Performs EOP actions as directed by SRO</p> <ul style="list-style-type: none"> • Initiate a manual reactor scram before first max safe temperature is exceeded Per CPS 4100.01, Reactor Scram: <ul style="list-style-type: none"> • Place mode switch in Shutdown, check and report power unchanged <ul style="list-style-type: none"> • Arms and depresses MANUAL SCRAM push-buttons • Initiates ARI • Reports control rods inserted, shutdown criteria met • Operate FW to control level 3 to 8 • Check rods, reports shutdown criteria is met • Report level and pressure are following expected trends • Stabilize pressure <1065 psig • Coordinates with BOP operator to monitor and control RPV level and press.
	BOP	<ul style="list-style-type: none"> • Reports secondary containment high temperature and rad alarms to SRO • Makes plant announcement for reactor scram • Should make plant announcement to evacuate Fuel/Aux buildings. • Attempts to close RCIC steam isolation valves from the control room <p>Performs EOP actions as directed by SRO</p> <ul style="list-style-type: none"> • Verifies operation of area coolers • Verifies operation of VF • Evacuates affected areas of Secondary Containment • Monitors area temperatures, levels and radiation levels • Reports secondary containment Max Safe temperature being exceeded to SRO • Coordinates with RO to monitor and control RPV level and press

Critical Task →

NOTES:

Event No.(s):		8,9	Page 2 of 2
Time	Position	Applicant's Actions or Behavior	
	SRO	Directs entry into EOP-8 and EOP actions as entry conditions are met: <ol style="list-style-type: none"> 1. Operate VF 2. Operate area coolers 3. Hold floor drain sump levels below max. normal 4. Isolate all discharges into the affected area except systems needed for: <ul style="list-style-type: none"> • EOP Actions • Fire Fighting 5. Per EOP-8/CPS 4001.02: <ul style="list-style-type: none"> • Directs BOP to isolate RCIC steam lines 	
		<div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">Critical Task</div> <ol style="list-style-type: none"> 6. Direct a scram prior to exceeding Maximum safe temperature 7. Directs entry into EOP-1A and EOP actions as entry conditions are met.: <ul style="list-style-type: none"> • Inhibit ADS • Arm and Depress MANUAL SCRAM pushbuttons • Initiate ARI 8. Directs additional actions: <ul style="list-style-type: none"> • Notification of Radiation Protection (RP) Department • Evacuate affected areas of Secondary Containment 9. Enters and Directs and verifies performance of appropriate actions per EOP-1: <ol style="list-style-type: none"> a. Mode Switch to SHUTDOWN b. Shutdown criteria verified c. Control RPV Water Level between Level 3 and Level 8 d. Stabilize RPV pressure below 1065 psig e. Verify needed automatic actions: <ul style="list-style-type: none"> • Isolations • ECCS Start • DG Start 	
Terminus: RCIC isolation is attempted and Reactor is scrammed			

NOTES:

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Operator Actions

Event No.(s): 10		Page 1 of 1
Description: Radiation monitor fails to initiate an isolation		
Initiation: Following the steam leak into the secondary containment		
Cues: Annunciator 5050-7F, 5052-7F and AR/PR 1RIX-PR006A-D monitors alarms		
Time	Position	Applicant's Actions or Behavior
	BOP	Performs EOP actions as directed by SRO, CPS 5050-7F, 5052-7F, Hi Rad Initiation VG: <ul style="list-style-type: none"> • Verify alarming condition of 1RIX-PR006A-D • Report EOP-8 entry condition • Shutdown and isolate VF CPS 3404.01, Fuel Building Ventilation, step 8.3 • Startup VG CPS 3319.01, Standby Gas, step 8.2.1
	RO	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs entry into EOP-8 and EOP actions as entry conditions are met. • When fuel build exhaust is above 10 mrem/hr shutdown and isolate VF CPS 3404.01, Fuel Building Ventilation • Startup VG CPS 3319.01, Standby Gas General: <ul style="list-style-type: none"> • On transient, positions himself as command authority on the unit. • Acknowledges immediate operator actions and directs subsequent actions. • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
		Terminus: <ul style="list-style-type: none"> • RPV level stable and under control in required band • Reactor is Scrammed • Effort has been made to isolate RCIC steam lines • Failed automatic isolation and actuation (VF/VG) manually performed • Upon approval of lead examiner

NOTES:

Simulator Operator Instructions

Initial Setup

1. Verify daily lamp test completed
2. Reset to an IC with Pressure at 600 psig and rods and/or flow to match turnover
3. Load the lesson plan for this scenario
4. Place simulator in RUN
5. Select the B FWLC level instrument
6. Turn on and advance recorders
7. Reset SRM A drawer
8. Provide pull sheets: on step 25 rod 08-25 is at 12
9. Provide and ECP and RE instructions
10. Verify the AR/PR server is running and stabilize AR/PR
11. Verify TT alarm is reset
12. Verify Rod Drive pressure at 250#
13. Hang OOS tags per turnover on #2 SAC
14. Identify T/S issues associated with OOS and turnover
15. Verify simulator conditions match the turnover
16. Provide marked up CPS 3001.01 complete to step 8.2.5
17. Provide a marked up CPS 3002.01 complete to step 8.6
18. Provide a marked up CPS 9000.06D001 with stable heatup values
19. Fill out plant status and have Turnover Sheet ready for the crew
20. Provide pull sheets, REMA, Re instructions and Cram Instructions

Event Triggers and Role Play**Event #**

1. Test the Generator Emergency Seal Oil Pump
 - a. **No trigger.**
2. Uncoupled rod
 - a. **Remote trigger 1** to remove the uncoupled malfunction once the rod is inserted to recouple
 - b. Role Play – Shift Manager – I will have WCS initiate AR/CR and take care of notifications. Proceed with pull to critical.
3. Withdraw Rods To criticality
 - a. **No triggers**
4. ‘B’ SRM fails
 - a. **Remote trigger 2** on request from lead evaluator
 - b. If SRM ‘B’ drawer is checked report the reading at the drawer for period and scale are going up and down, trip and INOP lights are ON
 - c. Maintenance will need a work package to determine the extent of the problem with the SRM.
5. Vacuum Pump trip
 - a. **Remote trigger 3** on request from lead evaluator
 - b. Role Play- Field operator
6. ‘A’ SRM fails
 - a. **Remote trigger 4** on request from lead evaluator
 - b. If SRM ‘A’ drawer is checked report the reading at the drawer for period and scale are going up and down, trip and INOP lights are ON
 - c. Maintenance will need a work package to determine the extent of the problem with the SRM.
7. RCIC drain trap level high
 - a. **Remote trigger 5** on request from lead evaluator
 - b. Role play - Field operator that the trap is lined up
8. RCIC unisolable steam leak
 - a. **Remote trigger 6** on request from lead evaluator
 - b. If RCIC ATM’s are checked they read 10 times higher than on the last 9000.01 reading.
 - c. Role play as personnel in the field
 - (1) Heavy steam in RCIC room
 - d. If valve breakers are checked, no problems are found.
9. Reactor scrams on initiation of RPT/ARI
 - a. **No triggers**
 - b. After 2 minutes from scram announcement go to MCR as IMD.
10. Radiation monitor fails to initiate an isolation and start up VG.
 - a. **No triggers**
 - b. **Remote trigger 7** after 3 minutes, when requested to S/D VF locally. Then report VF S/D locally.

**Clinton Power Station
Licensed Operator Training
Simulator Exercise Guide**

EXAM

ILT 08-1 Exam Scenario 3

REVISION 00

DEVELOPER: _____ Tom Pickley _____

REVIEWED BY: _____ Simulator Instructor _____

APPROVED BY: _____ / _____
Operations Date

Overview

Makeup/Reject: A,B,C CP's are in service. RO train #1 & 2 are in-service in auto to WD
ECCS: RHR A, B, C, LPCS and HPCS are Operable. RCIC is Operable
SDC: N/A
Electrical: 6.9 KV 1A & 1B and 4.16 1A & 1B on RAT, 4160 Volt Busses 1A1, 1B1 & 1C1 are being supplied by RAT
Ventilation:
Radwaste: FP/FP 1B in service. 1WF Evap is in Hot Standby. A RT F/D is in service.

Plant Status

On Line Risk Green

Reactor

Operational Condition: Mode 2
Total Core Flow: 26.9 mlb/hr
FCV Position: A: 90 % B: 90 %
Reactor Power 0 % (<=100%) 0 MWt (<=3473) 0 Mwe
Xenon: Stable
RPV Level 26.7 in Narrow Range
RPV Pressure 600 psi (< 1045)
In service SDC loop None MODE 2

Containment

Suppression Pool Temperature: 75.5 F (<=93.1 F)
Suppression Pool Level 19.1 ft (19 ft 0 to 19 ft 5 in)
Drywell Pressure 0.4 psi (0 to 1 psig)
Drywell to Containment dp: 0.4 psi >=-.02 psid to <=1.0 psid
Drywell Avg Air Temperature: 100 F (<=146.53 F)
Secondary Containment: 0.74 in WG (>= 0.25 in WG vacuum)

BOP

Condenser Vacuum: 27 in Hg
Off – Gas Flow: 12.8 scfm
Condensate Temperature: 78 F
Generator Reactive Load: 0 MVARs

Plant Chemistry

CPI (goal < 1.1): **1.00**
Reactor Sulfates (goal < 2) 1.31 ppb
Reactor Chlorides: 0.51 ppb
FW Iron (goal < 2.1) 0.85 ppb

Protected Equip: None

Comments: See Turnover Sheet

From “Excellence in Human Performance”

Leaders reinforce desired jobsite behaviors (Handbook page 17)

Participate in training program activities.

Leaders monitor and provide feedback to improve training program quality as well as to coach and reinforce individuals who meet or exceed behavior expectations and Standards of performance. During training activities, leaders guide workers on how actions or inactions influence reactor safety and on the potential consequences of mistakes. They give particular attention to recognizing error-likely situations and flawed defenses during tasks important to nuclear safety

ATTACHMENT 1
Reactivity Maneuver Approval Cover Page
Page 1 of 2

Station: **Clinton** Valid Date(s): XX/XX/XXXX Reactivity Maneuver Plan #: C11-Simu.4

Multiple Activations Allowed? No (If yes, CRS may make additional copies)

Prepared by: Roger ONE / XX/XX/XX Reviewed by: Joe ONE / XX/XX/XX
 Reactor Engineer / Date Qualified Nuclear Engineer / Date

Approved by: Michelle ONE Boss / XX/XX/XX Authorized by: _____ / XX/XX/XX
 RE Manager / Date Senior Reactor Operator / Date

NF Review Carlos Quark / XX/XX/XX
 NF Reviewer / Date

ReMA Activated: _____ / XX/XX/XX ReMA Terminated: _____ / XX/XX/XX
 Unit Supervisor / Date Unit Supervisor / Date

Title of Evolution: Withdraw Rods from ARI to RR Pump Upshift
Purpose/Overview of Evolution: This ReMA provides the steps for starting up the plant from the ARI condition to the performance of RR pump upshift.
Reactivity Maneuver Steps
Extended General Issues: Select desired amount of power reduction
1. Withdraw control rods from ARI to RR pump shift to fast speed
General Issues: <ul style="list-style-type: none"> ▪ The critical parameters are provided as a guide to focus the monitoring of the evolution. Changes to these parameters may be necessary to accommodate the actual startup load profile and predictor uncertainties. Changes to the critical parameters are to be done in accordance with the ReMA Training and Reference Material guidelines per OP-AB-300-1003.

ATTACHMENT 2
Reactivity Maneuver Guidance Sheet

Description of Step :

From the ARI condition, increase power with control rods to ~29% (1007 MWt) to support RR pump shift to fast speed.

Ensure Feedwater heating is in service and that feedwater temperature is within 50°F of nominal prior to exceeding 21.6% (750 MWt). Reference Appendix A of CPS 3102.01.

QNE presence required in the Control Room? Yes * No *

*RE Coverage shall be provided consistent with the guidelines of OP-AB-300-1003 and NF-AB-701.

Initial Conditions (may be ranges) to be verified at the START of the Step

Parameter	Value or Range	Init.	Parameter	Value or Range	Init.
Core Power (MWth or %)	N/A	N/A	MFLCPR	N/A	N/A
Core Flow (Mlb/hr or %)	N/A	N/A	MFLPD	N/A	N/A
FCL (%)	N/A	N/A	MAPRAT	N/A	N/A

Critical Parameters to be Verified During the Step

Description; including frequency, method of monitoring, and contingency actions (if needed)

	High	Low
<p>FCL</p> <p>Monitor Frequency: Demand 3D Case or verify with power and flow from P680 display. FCL should be monitored constantly after crossing 21.6% power and just prior to pump upshift.</p> <p>Contingency: Insert control rods in reverse order sequence to reduce FCL.</p>	57.3 %	N/A

Step Complete: _____ / _____
 Reactor Operator / Date

Verified by: _____ / _____
 Unit Supervisor / Date

REACTOR OPERATOR INSTRUCTIONS FOR CRITICALITY

SCOPE OF REVISION:

- This form was updated as a result of the procedure revision.

ROUTINE USE

ORIGINATOR: *Christian Small*

CLASS CODE: *SNNNI*

SQR: *Mark Vandermyde*

APPROVAL DATE: *04/25/05*

CURRENT CHANGES TO GENERAL REVISION

	<i>Change #</i>	<i>Date</i>	<i>List of Affected Pages</i>
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____

REACTOR OPERATOR INSTRUCTIONS FOR CRITICALITY

Steps 8.3, 8.4, 8.7.4

Core Conditions Expected:

Estimated Date/Time of criticality _____ / _____

Xenon Increasing Decreasing NoneModerator Temperature: 468 °FCycle Exposure: 9000 MWD/TSequence: A2 - SimulatorComments: Minimum Xenon conditions, High Moderator
Temperature; Middle of Cycle StartupEstimated Critical PositionCriticality is estimated to occur between steps 17 and 35BOC Criticality Instructions

For BOC, if criticality is reached prior to step _____, insert rods in reverse order up to and including step _____ and investigate with the Reactor Engineer and Nuclear Fuels.

For BOC, if criticality is not reached at the completion of step _____, insert rods in reverse order, up to and including step _____ and investigate with the Reactor Engineer and Nuclear Fuels.

Non-BOC Criticality InstructionsFor non-BOC, if criticality is reached either prior to step 17 or after step 35, continue with the reactor startup and initiate a CR to document and trend the ECP being outside the expected range of criticality.Instructions

- * Expect the reactor to become critical at any time.
- * Move control rods with careful attention.
- * Monitor nuclear instruments during and following rod movements.
- * If a nontransient period of less than 30 sec occurs, insert rods and investigate.
- * Perform 1/M plots at steps

<u>17</u>	<u>19</u>	<u>22</u>	<u>23</u>
<u>25</u>	<u>26</u>	<u>27</u>	<u>28</u>
<u>29</u>	<u>31</u>	<u>33</u>	<u>35</u>

ADDITIONAL INSTRUCTIONSThis is a middle of cycle, xenon-free startup at relatively high moderator temperature. Watch for potential high notch worths in interior regions of the core.Michelle ONE Boss
Reactor Engineer_____
Date Time

Facility: <u>Clinton Power Station</u>		Scenario No.: <u>Three</u>		Operating Test No.: <u>08-01</u>	
Examiners: _____			Operators: _____		
_____			_____		
_____			_____		
Initial Conditions:					
Subcritical ~600 psig, Steam seals and Auxiliary Steam is provided by the electrode boiler, hot restart.					
Thunderstorm storms are expected in the area within the next hour.					
Turnover:					
1. Test the Generator Emergency Seal Oil Pump per 3109.01 section 8.1.2.3 – First Priority.					
2. Pull Rods to criticality.					
Event No.	Malf. No.	Event Type*	Event Description		
1	NA	N-BOP	Test the Generator Emergency Seal Oil Pump delete		
2	Rod 0825I_ACTIONA -Rod uncoupled	C-ATC TS-CRS	Continue with startup, discovers Uncoupled rod		
3 4	NA	R-ATC	Pull rods for criticality		
4 3	SRM_BI_ACTIO N2 and 1	I-ATC	B SRM fails		
5	CDSR_VAC_P MP_A	I-BOP	Vacuum Pump Trip		
6	SRM_CI_ACTIO N2 and 1	TS-CRS	A SRM fails		
7	Override	C-BOP	RCIC drain trap level high		
8	YARITPLA_1 Override	M-ALL	RCIC unisolable steam leak		
9	YP_XMFTB_500 2	M-ALL	Reactor scrams on initiation of RPT/ARI		
10	CAM1PR006AT V_VALUE1 CAM1PR006CT V_VALUE1 CAM1PR006DT V_VALUE1 CAM1PR006BT V_VALUE1 VGCEFUSE_V 677503CC VGBZFUSE_V 421691CC	M-ALL	Radiation monitor fails to initiate an isolation		

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

Scenario No.: Three
Narrative Summary

Operating Test No.: 08-01

Event #	Description
1.	Test the Generator Emergency Seal Oil Pump per 3109.01 section 8.1.2.3.
2.	Rod 08-25 is uncoupled and goes to overtravel. This will require action to recouple and entry into Technical Specification 3.1.3.
3.	Withdrawal rods for criticality.
4.	'B' SRM fails causing a rod block requiring bypassing to proceed with startup. Requiring a review of Technical Specification 3.3.1.4 action A.1 and ORM 2.2.2 Action 3.2.2.a
5.	The A Mechanical Vacuum Pump trips requiring starting the B Pump.
6.	'A' SRM fails causing a rod block and requiring entry into Technical Specification 3.3.1.4 action A.1 and ORM 2.2.2 Action 3.2.2.a
7.	The RCIC drain trap level high will require manually opening the drain trap bypass valve to drain the steam pot.
8.	The RCIC steam supply line develops a leak causing the RCIC room temperature to rise resulting in an EOP-8 entry. A scram is required prior exceeding the Maximum safe temperature.
9.	The mode switch and manual scram pushbutton will not cause a scram requiring entry into EOP-1A. Manual initiation of ARI/RPT will insert the rods for a scram. EOP-1A will be exited and EOP-1 will be entered.
10.	The VF exhaust radiation monitor trends up to the trip isolation but fails to actuate VF isolation and start of VG requiring BOP to manually perform.

EOP
8,1A,1

Critical tasks:

- Manual insertion of ARI prior to exceeding Maximum safe temperature
- Manually shutdown and isolate VF and startup VG

Shift Turnover Information

⇒ **Day of week and shift**

- ◆ Today Day Shift

⇒ **Weather conditions**

- ◆ Thunderstorms are expected in the area within the next hour.

⇒ **(Plant power level)**

- | | |
|--|--------------------------------------|
| ◆ Subcritical, with equilibrium Xenon, 3 days after shutdown | ◆ CPS 3001.01 complete to step 8.2.5 |
| ◆ na- MWt | ◆ CPS 3002.01 at step 8.5.2 |
| ◆ na- MWe | ◆ |
| ◆ 27.0 Mlbm/hr CORE FLOW | ◆ |

⇒ **Thermal Limit Problems/Power Evolutions**

- | | |
|--|---|
| ◆ Pull to critical, heatup and pressurization, step 25 on the pull sheet, 08-25 @ 12 | ◆ |
| ◆ | ◆ |
| ◆ | ◆ |

⇒ **Existing LCOs, date of next surveillance**

- | | |
|--------|---|
| ◆ None | ◆ |
| ◆ | ◆ |

⇒ **Surveillances or major maintenance**

- | | |
|---|---|
| ◆ | ◆ |
| ◆ | ◆ |
| ◆ | ◆ |

⇒ **Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment**

- | | |
|---|---|
| ◆ Test the Generator Emergency Seal Oil Pump per 3109.01 section 8.1.2.3 for PMT. | ◆ |
| ◆ | ◆ |

⇒ **Comments, evolutions, problems, etc.**

- | | |
|---|--|
| ◆ Online Safety is Green | ◆ Test the Generator Emergency Seal Oil Pump per 3109.01 section 8.1.2.3 for PMT – First Priority. |
| ◆ Steam seals and Auxiliary Steam is provided by the electrode boiler | ◆ Continue with Reactor startup. |

Operator Actions

Event No.(s): 2		Page 1 of 1
Description: Uncoupled rod		
Initiation: Following Emergency Seal Oil Pump test		
Cues: Annunciator CPS 5006-5G alarms		
Time	Position	Applicant's Actions or Behavior
	RO	<p>CPS 5006-5G, Rod Overtravel:</p> <ul style="list-style-type: none"> • Determine the rod that alarmed 08-25. • Tell SRO to review TS LCO 3.1.3 <p>As directed by SRO Per CPS 3304.02, RCIS step 8.2.6:</p> <ol style="list-style-type: none"> 1) Verify that the INDIVID DRIVE light is energized on the OCM. If not, select individual drive by depressing DRIVE MODE push-button. 2) Insert the drive 1 or 2 notches in an attempt to recouple the rod. 3) Determine if the rod has recoupled by performing a coupling check 4) If the rod has recoupled, return to normal operation.
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Declares the rod inoperable, enters LCO 3.1.3 Action C.1 and C.2 • When the rod is recoupled declare the rod Operable and exit the LCOs • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Terminus: Rod has been recoupled and SRO applied LCO actions		

NOTES:

Event No.(s): 3-4		Page 1 of 1
Description: Pull rods for criticality		
Initiation: When directed by SRO after Rod has been recoupled		
Cues: Directed by SRO		
Time	Position	Applicant's Actions or Behavior
	RO	<p>Per CPS 3001.01, Approach To Critical, Step 8.2.6 and CPS 2202.01F001, Control Rod Sequence:</p> <ul style="list-style-type: none"> • Withdraw rods for criticality • Prior to exceeding 1×10^6 cps, withdraw SRM's Per CPS 3306.01, SRM/IRM step 8.1.2: <ul style="list-style-type: none"> • Depress the POWER ON button • Select the SRMs • Depress the drive out button until withdrawn • Depress the drive out button • Announce reactor is critical
	BOP	<ul style="list-style-type: none"> • Announce reactor criticality • Log in the date/time criticality was achieved, and criticality data: <ul style="list-style-type: none"> • Rod Sequence • Group/Array • Rod • Rod Position • SRM reading and Period • RR loop temperature • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above • Stays in a position of oversight • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Enforces OPS expectations and standards.
Terminus: Clearly observable plant response from change in power level or Reactor is critical.		

NOTES:

Operator Actions

Event No.(s): 4-3		Page 1 of 1
Description: 'B' SRM fails		
Initiation: After the rod is recoupled or on the signal of lead examiner		
Cues: Annunciators CPS 5006-2H & 5005-1K, 2K, & 3K alarm		
Time	Position	Applicant's Actions or Behavior
	RO	Per CPS 5006-2H, SRM Inop: <ul style="list-style-type: none"> • Bypass the failed SRM Per CPS 3306.01, SRM/IRM step 8.2.2: <ul style="list-style-type: none"> • Place the SRM Bypass joy stick to B SRM • Observe the rod block clears
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Reviews TS 3.3.1.2 Action A.1 and ORM 2.2.2 Action 3.2.2.a. • Directs Bypassing SRM B and continue with the startup • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Terminus: B SRM has been bypassed IAW CPS 3306.01.		

NOTES:

If the B RO appears about to perform the operation to bypass the 'B' SRM, the Lead Evaluator should signal for event # 5 to be started to draw the B RO away from P-680.

Operator Actions

Event No.(s): 5		Page 1 of 1
Description: Vacuum Pump trips		
Initiation: After crew has addressed SRM problem, on the signal of lead examiner		
Cues: Annunciator CPS 5019-1A alarming		
Time	Position	Applicant's Actions or Behavior
	BOP	Per CPS 3112.01, Condenser Vacuum <ul style="list-style-type: none"> • Dispatches field operator to perform local actions to start B Vacuum Pump • After at least 5 minutes of seal water pump operation, start the B Vacuum Pump
	RO	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Enters CPS 4004.02 Loss of Vacuum • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Terminus: B Vacuum Pump is in operation		

NOTES:

Operator Actions

Event No.(s): 6		Page 1 of 1
Description: 'A' SRM fails		
Initiation: After B Vacuum Pump is running, on the signal of lead examiner		
Cues: Annunciators CPS 5006-2H & 5005-1K, 2K, & 3K alarm		
Time	Position	Applicant's Actions or Behavior
	RO	Per CPS 5006-2H, SRM Inop: <ul style="list-style-type: none"> • Reports annunciator to CRS • Monitors reactor to ensure operations remain within established bands
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Reviews and enters TS 3.3.1.2 Action A.1 and ORM 2.2.2 Action 3.2.2.a. • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Terminus: ITS actions reviewed and entered		

NOTES:

<u>TO LEAD EVALUATOR:</u> Ensure this event is started before IRM's are on Range 2 to ensure a Tech Spec call can be made.

Operator Actions

Event No.(s): 7		Page 1 of 1
Description: RCIC drain trap level high		
Initiation: After ITS actions reviewed and entered, on the signal of lead examiner		
Cues: Annunciator 5063-2C alarming		
Time	Position	Applicant's Actions or Behavior
	BOP	Per CPS 5063-2C, RCIC Steam Drain Trap Level High: <ul style="list-style-type: none"> • Recognizes failure of 1E51-F054, RCIC Turbine Inlet Steam Line Water Drain Pot Trap Bypass to open and opens the valve manually. • Verifies 1E51-F025 and 1E51-F026, Upstream and Downstream RCIC Turbine Inlet Steam Line Water Drain Pot Normal Drains are open • Reports failure
	RO	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Enforces OPS expectations and standards • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures.
Terminus: Drain Pot level alarm clear, SRO has directed actions accordingly.		

NOTES:

Operator Actions

Event No.(s): 8,9		Page 1 of 2
Description: RCIC unisolable steam leak, Reactor scrams on initiation of RPT/ARI		
Initiation: After RCIC drain trap level high problem has been addressed, on the signal of lead examiner		
Cues: Multiple secondary containment area temperature and area radiation alarms, rods fail to insert upon manual/automatic SCRAM		
Time	Position	Applicant's Actions or Behavior
	RO	<p>Reports EOP-8 entry on Hi temperature Performs EOP actions as directed by SRO</p> <ul style="list-style-type: none"> • Initiate a manual reactor scram before first max safe temperature is exceeded Per CPS 4100.01, Reactor Scram: <ul style="list-style-type: none"> • Place mode switch in Shutdown, check and report power unchanged <ul style="list-style-type: none"> • Arms and depresses MANUAL SCRAM push-buttons • Initiates ARI • Reports control rods inserted, shutdown criteria met • Operate FW to control level 3 to 8 • Check rods, reports shutdown criteria is met • Report level and pressure are following expected trends • Stabilize pressure <1065 psig • Coordinates with BOP operator to monitor and control RPV level and press.
	BOP	<ul style="list-style-type: none"> • Reports secondary containment high temperature and rad alarms to SRO • Makes plant announcement for reactor scram • Should make plant announcement to evacuate Fuel/Aux buildings. • Attempts to close RCIC steam isolation valves from the control room <p>Performs EOP actions as directed by SRO</p> <ul style="list-style-type: none"> • Verifies operation of area coolers • Verifies operation of VF • Evacuates affected areas of Secondary Containment • Monitors area temperatures, levels and radiation levels • Reports secondary containment Max Safe temperature being exceeded to SRO • Coordinates with RO to monitor and control RPV level and press

Critical Task →

NOTES:

Event No.(s):	8,9	Page	2	of	2
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Time	Position	Applicant's Actions or Behavior
	SRO	<p>Directs entry into EOP-8 and EOP actions as entry conditions are met:</p> <ol style="list-style-type: none"> 1. Operate VF 2. Operate area coolers 3. Hold floor drain sump levels below max. normal 4. Isolate all discharges into the affected area except systems needed for: <ul style="list-style-type: none"> • EOP Actions • Fire Fighting 5. Per EOP-8/CPS 4001.02: <ul style="list-style-type: none"> • Directs BOP to isolate RCIC steam lines 6. Direct a scram prior to exceeding Maximum safe temperature 7. Directs entry into EOP-1A and EOP actions as entry conditions are met.: <ul style="list-style-type: none"> • Inhibit ADS • Arm and Depress MANUAL SCRAM pushbuttons • Initiate ARI 8. Directs additional actions: <ul style="list-style-type: none"> • Notification of Radiation Protection (RP) Department • Evacuate affected areas of Secondary Containment 9. Enters and Directs and verifies performance of appropriate actions per EOP-1: <ol style="list-style-type: none"> a. Mode Switch to SHUTDOWN b. Shutdown criteria verified c. Control RPV Water Level between Level 3 and Level 8 d. Stabilize RPV pressure below 1065 psig e. Verify needed automatic actions: <ul style="list-style-type: none"> • Isolations • ECCS Start • DG Start

Critical Task

Terminus: RCIC isolation is attempted and Reactor is scrammed

NOTES:

Operator Actions

Event No.(s): 10		Page 1 of 1
Description: Radiation monitor fails to initiate an isolation		
Initiation: Following the steam leak into the secondary containment		
Cues: Annunciator 5050-7F, 5052-7F and AR/PR 1RIX-PR006A-D monitors alarms		
Time	Position	Applicant's Actions or Behavior
	BOP	Performs EOP actions as directed by SRO, CPS 5050-7F, 5052-7F, Hi Rad Initiation VG: <ul style="list-style-type: none"> • Verify alarming condition of 1RIX-PR006A-D • Report EOP-8 entry condition • Shutdown and isolate VF CPS 3404.01, Fuel Building Ventilation, step 8.3 • Startup VG CPS 3319.01, Standby Gas, step 8.2.1
Critical Task		
Critical Task		
	RO	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs entry into EOP-8 and EOP actions as entry conditions are met. • When fuel build exhaust is above 10 mrem/hr shutdown and isolate VF CPS 3404.01, Fuel Building Ventilation • Startup VG CPS 3319.01, Standby Gas General: <ul style="list-style-type: none"> • On transient, positions himself as command authority on the unit. • Acknowledges immediate operator actions and directs subsequent actions. • Enforces OPS expectations and standards. • Contacts Shift Manager and recommends notifications.
Critical Task		
Critical Task		
Terminus:		
<ul style="list-style-type: none"> • RPV level stable and under control in required band • Reactor is Scrammed • Effort has been made to isolate RCIC steam lines • Failed automatic isolation and actuation (VF/VG) manually performed • Upon approval of lead examiner 		

NOTES:

Simulator Operator Instructions

Initial Setup

1. Verify daily lamp test completed
2. Reset to an IC with Pressure at 600 psig and rods and/or flow to match turnover
3. Load the lesson plan for this scenario
4. Place simulator in RUN
5. Select the B FWLC level instrument
6. Turn on and advance recorders
7. Reset SRM A drawer
8. Provide pull sheets: on step 25 rod 08-25 is at 12
9. Provide and ECP and RE instructions
10. Verify the AR/PR server is running and stabilize AR/PR
11. Verify TT alarm is reset
12. Verify Rod Drive pressure at 250#
13. Hang OOS tags per turnover on #2 SAC
14. Identify T/S issues associated with OOS and turnover
15. Verify simulator conditions match the turnover
16. Provide marked up CPS 3001.01 complete to step 8.2.5
17. Provide a marked up CPS 3002.01 complete to step 8.6
18. Provide a marked up CPS 9000.06D001 with stable heatup values
19. Fill out plant status and have Turnover Sheet ready for the crew
20. Provide pull sheets, REMA, Re instructions and Cram Instructions

Event Triggers and Role Play**Event #**

1. Test the Generator Emergency Seal Oil Pump
 - a. **No trigger.**
2. Uncoupled rod
 - a. **Remote trigger 1** to remove the uncoupled malfunction once the rod is inserted to recouple
 - b. Role Play – Shift Manager – I will have WCS initiate AR/CR and take care of notifications. Proceed with pull to critical.
3. Withdraw Rods To criticality
 - a. **No triggers**
4. ‘B’ SRM fails
 - a. **Remote trigger 2** on request from lead evaluator
 - b. If SRM ‘B’ drawer is checked report the reading at the drawer for period and scale are going up and down, trip and INOP lights are ON
 - c. Maintenance will need a work package to determine the extent of the problem with the SRM.
5. Vacuum Pump trip
 - a. **Remote trigger 3** on request from lead evaluator
 - b. Role Play- Field operator
6. ‘A’ SRM fails
 - a. **Remote trigger 4** on request from lead evaluator
 - b. If SRM ‘A’ drawer is checked report the reading at the drawer for period and scale are going up and down, trip and INOP lights are ON
 - c. Maintenance will need a work package to determine the extent of the problem with the SRM.
7. RCIC drain trap level high
 - a. **Remote trigger 5** on request from lead evaluator
 - b. Role play - Field operator that the trap is lined up
8. RCIC unisolable steam leak
 - a. **Remote trigger 6** on request from lead evaluator
 - b. If RCIC ATM’s are checked they read 10 times higher than on the last 9000.01 reading.
 - c. Role play as personnel in the field
 - (1) Heavy steam in RCIC room
 - d. If valve breakers are checked, no problems are found.
9. Reactor scrams on initiation of RPT/ARI
 - a. **No triggers**
 - b. After 2 minutes from scram announcement go to MCR as IMD.
10. Radiation monitor fails to initiate an isolation and start up VG.
 - a. **No triggers**
 - b. **Remote trigger 7** after 3 minutes, when requested to S/D VF locally. Then report VF S/D locally.

**Clinton Power Station
Licensed Operator Training
Simulator Exercise Guide**

EXAM

ILT 08-1 Exam Scenario 4

REVISION 00

DEVELOPER: _____ Tom Pickley _____

REVIEWED BY: _____ Simulator Instructor _____

APPROVED BY: _____ / _____
Operations Date

Overview

Makeup/Reject: All CP's except J are in service. RO train #1 & 2 are in-service in auto to WD
ECCS: RHR A, B, C, LPCS and HPCS are Operable. RCIC is Operable
SDC: N/A
Electrical: 6.9 KV 1A & 1B and 4.16 1A & 1B on UAT, 4160 Volt Busses 1A1, 1B1 & 1C1 are being supplied by RAT
Ventilation:
Radwaste: FP/FP 1B in service. 1WF Evap is in Hot Standby. A and B RT F/D are in service.

Plant Status

On Line Risk Yellow

Reactor

Operational Condition: Mode 1
Total Core Flow: 84.2 mlb/hr
FCV Position: A: 86.6% B: 87.3%
Reactor Power 95.8% (<=100%) 3321 MWt (<=3473) 1089 Mwe
Xenon: Stable
RPV Level 35 in Narrow Range
RPV Pressure 1020 psi (< 1045)
In service SDC loop None MODE 1

Containment

Suppression Pool Temperature: 75.5 F (<=93.1 F)
Suppression Pool Level 19.2 ft (19 ft 0 to 19 ft 5 in)
Drywell Pressure 0.6 psi (0 to 1 psig)
Drywell to Containment dp: 0.6 psi >=-.02 psid to <=1.0 psid
Drywell Avg Air Temperature: 104 F (<=146.53 F)
Secondary Containment: 0.74 in WG (>= 0.25 in WG vacuum)

BOP

Condenser Vacuum: 26.4 in Hg
Off – Gas Flow: 66.6 scfm
Condensate Temperature: 109 F
Generator Reactive Load: 256 MVARs

Plant Chemistry

CPI (goal < 1.1): **1.00**
Reactor Sulfates (goal < 2) 1.31 ppb
Reactor Chlorides: 0.51 ppb
FW Iron (goal < 2.1) 0.85 ppb

Protected Equip: HPCS and Div 1 & 2 Backup ADS Air Supply
Comments: MDRFP is CO

From “Excellence in Human Performance”

Leaders reinforce desired jobsite behaviors (Handbook page 17)

Participate in training program activities.

Leaders monitor and provide feedback to improve training program quality as well as to coach and reinforce individuals who meet or exceed behavior expectations and Standards of performance. During training activities, leaders guide workers on how actions or inactions influence reactor safety and on the potential consequences of mistakes. They give particular attention to recognizing error-likely situations and flawed defenses during tasks important to nuclear safety

Turnover

This page contains the Turnover information not found in the Overview page.

1. Power, xenon and time in life
Power was reduced to 80% for surveillance testing.
2. Status of Tagged Out Equipment
MDRFP is OOS for coupling replacement
3. Shift conditions
Day Shift Today
4. Weather Conditions
Sunny and clear.
5. Thermal Limit Problems or concerns
6. LCO's in effect
7. Surveillances in progress
Perform 9064.01 Drywell Post-LOCA Vacuum Breaker Verification Test.
- 8.
9. Evolutions planned for the shift
10. Risk Levels
Yellow
11. Other

Facility: <u>Clinton Power Station</u>	Scenario No.: <u>Four</u>	Operating Test No.: <u>08-01</u>	
Examiners: _____ _____	Operators: _____ _____		
Initial Conditions: 96% power, steady state. MDRFP is CO for coupling replacement.			
Turnover:			
<ul style="list-style-type: none"> • VC running for 9070.01, Control Room Hvac Air Filter Package Operability Test Run. • A Reduction in power will be requested by dispatch. • Perform 9012.01, Scram Discharge Volume Vent and Drain Valve Operability Test 			
Event No.	Malf. No.	Event Type*	Event Description
1	IO	C-ATC TS-CRS	Perform SDV Vent and Drain Valve test one valve fails
2	None	R-ATC	Reduce power with flow
3	IO	C-ATC	A RR FCV Drifts shut
4	VC01VC_VC0 6YA_MTVFA ILSP	C-BOP TS-CRS	VC Makeup Train A Outlet DMPR fails shut during surveillance run.
5	None	N-BOP	Shift to the B VC train.
6	F041LTVFAI LSP	C-BOP	SRV 41L Fails open, closes on first attempt to close
7	YPXMAISE_ 527	M-ALL	Small break LOCA requiring an Emergency Depressurization.
8	YP_XMFTB_ 4106	M-ALL	LPCS Pump fails to start on High Drywell Pressure

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

Scenario No.: Four**Operating Test No.: 08-01****Narrative Summary****Event #****Description**

1. The ATC will perform the SDV vent and drain valve test and one of the valves will indicate intermediate requiring TS entry
2. After shift turnover the Control Room staff will receive a phone call to reduce power for grid stability concerns.
3. The A Flow control valve will continue to drift shut slowly requiring the ATC to manually lock out the RR FCV. This may require the ATC to match flows after the transient.
- 4, 5. The ongoing VC train surveillance will have a damper failure causing TS entry and start of the opposite VC train
6. SRV 41L will inadvertently open this valve is NON-ADS and NON-LLS requiring the BOP to take it to off and will not be available for the B/D.
7. Small break LOCA will get the crew into EOP-1 and EOP-6 the Reactor will require a blow down on Figure N PSP.
8. Manually start LPCS

EOP

1,3,6

Critical tasks:

- Starting Containment Sprays
- Blow Down when Figure N is exceeded.

Shift Turnover Information**⇒ Day of week and shift**

- ◆ Today Day Shift

⇒ Weather conditions

- ◆ Thunderstorms are expected in the area within the next hour.

⇒ (Plant power level)

- | | |
|--------------------------|--------------------------------|
| ◆ 96% Power/100% FCL | ◆ CPS 3005.01 thru step 8.1.19 |
| ◆ 3328 MWt | ◆ A-2, step 36 is complete |
| ◆ 1092 MWe | ◆ |
| ◆ 84.5 Mlbm/hr CORE FLOW | ◆ |

⇒ Thermal Limit Problems/Power Evolutions

- | | |
|---|---|
| ◆ | ◆ |
| ◆ | ◆ |
| ◆ | ◆ |

⇒ Existing LCOs, date of next surveillance

- | | |
|--------|---|
| ◆ None | ◆ |
| ◆ | ◆ |

⇒ Surveillances or major maintenance

- | | |
|--|---|
| ◆ VC running for 9070.01, Control Room HVAC Air Filter Package Operability Test Run 4 hrs 27 min into the 10 hour run. | ◆ |
| ◆ 9012.01, Scram Discharge Volume Vent and Drain Valve Operability Test for position indication only. Stroke times are not needed. | ◆ |
| ◆ | ◆ |

⇒ Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment

- | | |
|---|---|
| ◆ MDRFP is CO for coupling replacement. | ◆ |
| ◆ | ◆ |

⇒ Comments, evolutions, problems, etc.

- | | |
|--|---|
| ◆ Online Safety is Yellow | ◆ |
| ◆ 9012.01, Scram Discharge Volume Vent and Drain Valve Operability Test for position indication only. Stroke times are not needed. | |

Operator Actions

Event No.(s): 1		Page 1 of 1
Description: Perform SDV Vent and Drain Valve test one valve fails		
Initiation: Following turnover		
Cues: Shift Turnover		
Time	Position	Applicant's Actions or Behavior
	ATC	<ul style="list-style-type: none"> • Performs 9012.01, Scram Discharge Volume Vent and Drain Valve Operability Test • Simultaneously, depress and <u>hold</u> both: Scram Disch Vol Vent V, <u>and</u> Scram Disch Vol DR V Test SW push-buttons, When the valves indicate closed, Release the Scram Disch Vol Vent V <u>and</u> Scram Disch Vol DR V Test Sw push-buttons • Report C11-F011 did not fully open
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions • Directs the determination of C11-F011 position locally • Reports C11-F011 is in an intermediate position
	SRO	<ul style="list-style-type: none"> • Directs the above actions • Declares C11-F011 Inop • Enters Tech Spec LCO 3.1.8 A.1 Isolate the Line in 7 days.
Terminus: Tech Specs have been entered.		

Operator Actions

Event No.(s): 2		Page 1 of 1
Description: Reduce power with flow		
Initiation: MISO calls requesting a power reduction to 90% within 30 minutes for Grid Stability.		
Cues: Directed by SRO		
<u>General Note</u>		
Time	Position	Applicant's Actions or Behavior
	ATC	Per CPS 3005.01, Unit Power Changes, step 8.2.8. <ul style="list-style-type: none"> • Reduce power with Flow to ~90%.
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Enforces OPS expectations and standards.
Terminus: Power change complete.		

Note:

- Denotes an action that should be performed.
- Denotes an action that may be performed.

Operator Actions

Event No.(s): 3		Page 1 of 1
Description: A RR FCV Drifts shut		
Initiation: Following the power change, and upon direction of Lead Examiner.		
Cues:		
Time	Position	Applicant's Actions or Behavior
	ATC	<ul style="list-style-type: none"> • Communicates that the A RR FCV is closing. • Locksout the A RR FCV by shutting down the HPU <ul style="list-style-type: none"> ○ Verifies the FCV motion stops. ○ ATC may need to match recirc loop flows depending on the time the RRFCV gets locked out.
	BOP	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Verifies that the RR loop flows are within Tech Spec limits: <ul style="list-style-type: none"> -if less than 70% rated core flow then loop mismatch is limited to 10% of rated core flow (8.45mlbm/hr) - if greater than or equal to 70% rated core flow then loop mismatch is limited to 5% of rated core flow (4.225 mlbm/hr)
Terminus: The A RR FCV is locked out.		

Operator Actions

Event No.(s):	4		Page	1	of	1
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Description: **VC Makeup Train A Outlet DMPR fails shut during surveillance run.**

Initiation: Following the Tech Spec call and upon direction from the Lead Examiner.

Cues: Annunciator 5050-5D, Low Flow Downstream 0VC09SA

Time	Position	Applicant's Actions or Behavior
	BOP	<ul style="list-style-type: none"> • Communicates Annunciator 5050-5D • References ARP Per CPS 5050-5D Low Flow Downstream 0VC09SA. <ul style="list-style-type: none"> • Stop 0VC05CA CONT RM HVAC MU Air Fan
	ATC	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	SRO	<ul style="list-style-type: none"> • Directs the above actions • Enforces OPS expectations and standards • Enters Tech Spec LCO 3.7.3 A.1 Restore VC subsystem in 7 days.

Terminus: 0VC05CA is off

Operator Actions

Event No.(s): 5		Page 1 of 1
Description: Shift to the B VC train.		
Initiation: N/A		
Cues: Annunciator 5050-5D, Low Flow Downstream 0VC09SA		
Time	Position	Applicant's Actions or Behavior
	ATC	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	BOP	Per 3402.01P001, CV Train Shifting <ul style="list-style-type: none"> • Direct Equipment Operator to perform local operations • Shut Locker Room EXH Fan ISOL DMPR 0VC69Y • Shut Locker Room EXH Fan ISOL DMPR 0VC70Y • Stop Cont Rm Trn A Supply Fan 0VC03CA • Verify Dampers reposition • Start Cont Rm Trn B Supply Fan 0VC03CB • Verify Dampers reposition • Open Locker Room EXH Fan ISOL DMPR 0VC69Y • Open Locker Room EXH Fan ISOL DMPR 0VC70Y • Direct Chiller Startup
	SRO	<ul style="list-style-type: none"> • Directs the above actions • Enforces OPS expectations and standards • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures.
Terminus: VC Train B is running		

Operator Actions

Event No.(s): 6		Page 1 of 1
Description SRV 41L Fails open, closes on first attempt to close		
Initiation: After VC train B is running and upon direction from the Lead Examiner.		
Cues: Annunciator 5067-8L, SRV Monitoring System Trouble		
Time	Position	Applicant's Actions or Behavior
	ATC	<ul style="list-style-type: none"> • Assists in determination of which SRV is open • Monitors reactor to ensure operations remain within established bands • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	BOP	<ul style="list-style-type: none"> • Sounds the Containment Evacuation alarm • Place the switch for SRV 41L to OPEN and then back to OFF • Determine the SRV 41L is shut
	SRO	<ul style="list-style-type: none"> • Enters 4009.01, Inadvertant Opening SRV • Directs the above actions • Enforces OPS expectations and standards • Determines SRV 41L is not required by Tech Specs.
Terminus: SRO has determined SRV 41L is not required by Tech Specs.		

Operator Actions

Event No.(s): 7 & 8		Page 1 of 2
Description: Small break LOCA requiring an Emergency Depressurization and LPCS Pump fails to start on High Drywell Pressure		
Initiation: After SRV 41L is shut and upon direction of Lead Examiner		
Cues: Rising Drywell Pressure		
Time	Position	Applicant's Actions or Behavior
	ATC	<ul style="list-style-type: none"> • Places the Mode Switch in S/D • Carries out Scram Choreography by reporting <ul style="list-style-type: none"> – Mode Switch in Shutdown, Power is... – Rod status is... – Reactor Power is... and trend – Reactor pressure is... and trend – Reactor level is... and trend – Any EOPs with entry conditions (EOP-1, 6) <p>Per CPS 4100.01, Reactor Scram</p> <ul style="list-style-type: none"> • Turn Mode Switch to SHUTDOWN <ul style="list-style-type: none"> – Verify reactor power is lowering – Verify SHUTDOWN CRITERIA met • IF RPV level is rising with 2 feed pumps operating • THEN Secure 1 Feed Pump and control RPV water level Level 3 to Level 8. • Verify Turbine and Generator trip when required • Performs EOP actions as directed by SRO.
	BOP	<p>Carries out Scram Choreography by:</p> <ul style="list-style-type: none"> • Making an Announcement <ul style="list-style-type: none"> – Reactor Scram – MDRFP may start – Evacuate the RCIC room – Evacuate the Containment • Determine Rod status and report to CRS <p>Per EOP-6 Primary Containment Control</p> <ul style="list-style-type: none"> • Starts Drywell Mixers, as directed. • Starts Containment Spray, as directed. ○ Monitors the start of the ECCS Systems on High Drywell Pressure. • Determines LPCS did not start and manually starts LPCS • Operates ECCS Systems as needed, to control RPV Water Level, Level 3 to Level 8 • Initiates ADS
	 Critical Task	
	 Critical Task	

Event No.(s): 8 & 9

Page 2 of 2

Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> Carries out Scram Choreography by performing an Update: <ul style="list-style-type: none"> Entering EOP-1 and 6 Entering Scram Off-Normal Transient Annunciator Response is authorized Enters EOP-1, RPV Control, and directs the following: <ul style="list-style-type: none"> Determines Mode Switch is in SHUTDOWN. Determines Shutdown Criteria is met. Directs control of RPV Pressure 800 to 1065 psig with Bypass Valves or SRVs. Directs maintaining RPV Level, Level 3 to Level 8 by using Preferred Injection Systems. Enters EOP-6, Primary Containment Control, and directs the following: <ul style="list-style-type: none"> Starting Mixers IAW Fig. O, directs the start of Containment Sprays. Enters EOP-3, Emergency RPV Depressurization, when Figure N is exceeded. <ul style="list-style-type: none"> Directs initiation of ADS Directs opening other SRVs until 7 are open May direct the isolation of RT and/or RR. <ul style="list-style-type: none"> Enforces OPS expectations and standards Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures.
	Critical Task	
	Critical Task	
Terminus: 7 SRVs are open, level band of 3 to 8 is established and upon direction of Lead Examiner.		

Critical Tasks

- Initiate Containment Sprays.
- Initiate ADS.

Simulator Operator Instructions

Initial Setup

1. Verify daily lamp test completed
2. Reset to IC for this scenario (Verify/Adjust Power to 96% with flow).
3. Load lesson plan for this scenario
4. Place simulator in RUN
5. Verify the AR/PR server is running and stabilize AR/PR
6. Verify VC A is running for 9070.01
7. Verify RCIC Flow Controller is set at 620 psig.
8. Ensure the correct number of CPs are in service.
9. Make sure CRD drive water D/P is in the expected range
10. Verify correct Control Rod Move Sheets in P680 Book and the correct Cram array are used
11. Turn on and advance recorders
12. Hang OOS tags per turnover
13. Identify T/S issues associated with OOS and turnover
14. Verify simulator conditions match the turnover
15. Provide copies of the following:
 - 9070.01, Control Room Hvac Air Filter Package Operability Test Run.
 - 9012.01, Scram Discharge Volume Vent and Drain Valve Operability Test

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Event Triggers and Role PlayEvent #

1. Perform SDV Vent and Drain Valve test one valve fails
 - a. On a Trigger
 - b. Roll play:
 - (1) **Equipment Operator:** Report all SDV are closed.
 - (2) **Equipment Operator:** Report C11-F011 is intermediate at end of test.
2. Reduce power
 - a. No Trigger
 - b. Role play: As the MISO call requesting a power reduction to 90% within 30 minutes for Grid Stability.
3. RR FCV Fails shut
 - a. **Remote 1**
 - b. Role play: None
4. VC Makeup Train A Outlet DMPR fails shut during surveillance run
 - a. **Remote 2**
 - b. Role play: The 'A' 0VC05CA Fan is making noise and vibrating.
5. Shift to the B VC train
 - a. **Pending Page**
 - b. Role play: **Equipment Operator**
Perform Local operations
Report the backdraft dampers are shut when asked by the CR.
Start VC Chiller
6. SRV 41L Fails open, closes on first attempt to close intermittent.
 - a. **Remote 3**
 - b. Role Play: None
7. Small break LOCA requiring an Emergency Depressurization.
 - a. **Remote 4**
 - b. Role play: None.
8. LPCS Pump fails to start on High Drywell Pressure
 - a. **None**
 - b. Role play: None