

Submitted: _____

SP Number 29.023.02

Approved: _____

Revision C

Plant Manager

Effective Date _____

COOLDOWN

EMERGENCY PROCEDURE

DRAFT

1.0 PURPOSE

The purpose of this procedure is to depressurize and cooldown the RPV to cold shutdown conditions while maintaining RPV water level within a satisfactory range.

2.0 ENTRY CONDITIONS

This procedure is entered from SP 23.023.01 (Level Control) after the RPV water level has been stabilized.

3.0 OPERATOR ACTIONS

CAUTION

If a high drywell pressure ECCS initiation signal occurs or exists while depressurizing, prevent injection from those CS and LPCI pumps not required to assure adequate core cooling prior to reaching their maximum injection pressures. When the high drywell pressure ECCS initiation signal clears, restore CS and LPCI to AUTOMATIC/STANDBY mode.

CAUTION

Do not secure or place an ECCS in MANUAL mode unless, by at least two independent indications, (1) misoperation in AUTOMATIC mode is confirmed, or (2) adequate core cooling is assured. If an ECCS is placed in MANUAL mode, it will not initiate automatically. Make frequent checks of the initiating or controlling parameter. When manual operation is no longer required, restore the system to Automatic/Standby Mode if possible.

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- 3.1 Maintain RPV water level between +6" on Fuel Zone Indicator and +58.75" with one or more of the following systems: _____

3.1.1 Condensate/Feedwater 1115 to 0 psig _____

3.1.2 CRD 1115 to 0 psig _____

CAUTION

Do not throttle HPCI or RCIC systems below the minimum speed of 2150 RPM.

3.1.3 RCIC 1115 to 50 psig _____

3.1.4 HPCI 1115 to 100 psig _____

3.1.5 C.S. 333 to 0 psig _____

3.1.6 LPCI 238 to 0 psig _____

CAUTION

If signals of high suppression pool water level (26'11") or low condensate storage tank water level (3'4") occur, confirm automatic transfer of/or manually transfer HPCI and RCIC suction from the condensate tank to the suppression pool.

- 3.1.7 If any of the following limits are exceeded, proceed to SP 29.023.03 (Containment Control) and perform it concurrently with this procedure.

a. Drywell pressure above +1.69 psig _____

b. Drywell temperature above 135°F _____

c. Suppression Pool temperature above 90°F _____

d. Suppression Pool level above 26'8" _____

e. Suppression Pool level below 26'0" _____

- 3.2 If RPV water level cannot be determined or maintained above TAF, enter SP 29.023.04 (Level Restoration). _____

1. TAF = +6" as read on fuel zone instrumentation:

- 3.3 If SRV's are cycling, manually open one SRV and reduce RPV pressure to between 700 psig and 960 psig to minimize SRV cycling (alternate SRV's to equalize suppression pool heating if this step must be repeated using Figure 1 as a guide.) _____
- 3.4 Depressurize the RPV and maintain cooldown rate below 100°F/hr per SP 22.005.01, Shutdown to Cold Shutdown concurrently with this procedure. _____
- 3.4.1 Pressure reduction may be augmented with one or more of the following systems. _____

CAUTION

Cooldown rates greater than 100°F/hr may be required to conserve RPV water inventory, protect primary containment integrity, or limit radioactive release to the environment.

CAUTION

Do not depressurize the RPV below 100 psig unless motor driven pump sufficient to maintain RPV water level are running and available for injection.

- 3.4.2 Use one or more of the following systems:

(A) Main Condenser available

- (1) Main Turbine Bypass Valves (preferred method) per SP 22.005.01, Shutdown to Cold Shutdown _____
- (2) RCIC per SP 23.119.01, Reactor Core Isolation Cooling (RCIC) System _____
- (3) HPCI per SP 23.202.01, High Pressure Coolant Injection _____
- (4) RHR (Steam Condensing Mode) per SP 23.121.01, Residual Heat Removal (RHR) System _____
- (5) Other Steam Driven Equipment _____
 - (1) Steam Jet Air Ejectors per SP 23.701.01, Condenser Off-Gas Removal _____

- (2) RFPTS per SP 23.109.01, Feedwater System _____
- (3) Steam Seal Evaporator per SP 23.124.01, Steam Sealing _____
- (4) Main Condenser Deaerating Steam per SP 22.103.01, Condensate _____
- (5) RWCU (Recirculation Mode) per SP 23.709.01, Reactor Water Cleanup System _____
- (6) Main Steam Line Drains per SP 23.116.01, Main and Auxiliary Steam _____
- (7) RWCU (Blowdown Mode) per SP 23.701.01, Reactor Water Cleanup System _____

(B) Main Condenser not available

- (1) RCIC per SP 23.119.01, Reactor Core Isolation Cooling (RCIC) System _____
- (2) HPCI per SP 23.202.01, High Pressure Coolant Injection _____
- (3) RHR (Steam Condensing Mode) per SP 23.121.01, Residual Heat Removal (RHR) System _____
- (4) RWCU (Recirculation Mode) per SP 23.709.01, Reactor Water Cleanup System _____
- (5) SRV's
 - (1) Open relief valves using Figure 1 as a guide to equalize suppression pool heating _____
 - (2) Fewer blowdowns with increased pressure reductions are desirable to minimize SRV cycle stresses. _____
 - (3) If the continuous SRV pneumatic supply is or becomes unavailable, depressurize with sustained SRV opening. _____
- (6) RWCU (Blowdown Mode) per SP 23.709.01, Reactor Water Cleanup. _____

- 3.5 When the RHR shutdown cooling interlocks clear, initiate the shutdown cooling mode of RHR per SP 23.121.01, Residual Heat Removal (RHR) System. _____
- 3.6 If the RHR shutdown cooling mode cannot be established and further cooldown is required, continue to cooldown with the systems listed in substep 3.4.2(A) or 3.4.2(B) as applicable. _____
- 3.7 If RPV cooldown is required but cannot be accomplished, perform the following. _____
- 3.8 Initiate Suppression Pool Cooling per SP 23.121.01, Residual Heat Removal (RHR) System. _____
- 3.9 Close the following valves:
- (A) RPV Head Vents
- 1B21 MOV-084 _____ 1B21 MOV-085 _____
- (B) All MSIV's
- 1B21 AOV-081A _____ 1B21 AOV-082A _____
- 1B21 AOV-081B _____ 1B21 AOV-082B _____
- 1B21 AOV-081C _____ 1B21 AOV-082C _____
- 1B21 AOV-081D _____ 1B21 AOV-082D _____
- (C) MSL Drain Lines
- 1B21 MOV-038 _____ 1B21 MOV-033 _____
- 1B21 AOV-088 _____ 1B21 AOV-089 _____
- (D) RHR Steam Condensing Valve
- 1E11 MOV-049 _____
- 3.10 Position SRV's so that only one SRV is open. _____
- 3.11 Maintain RPV water level less than 58.75" until RPV pressure is less than (later) psig by use of HPCI and RCIC. _____

3.12 When PRV water level exceeds 58.75".

(A) CLOSE the following HPCI isolation valves:

1E41 MOV-041 _____ 1E41 MOV-042 _____

1E41 MOV-047 _____ 1E41 MOV-048 _____

(B) CLOSE the following RCIC isolation valves:

1E51 MOV-041 _____ 1E51 MOV-042 _____

1E51 MOV-047 _____ 1E51 MOV-048 _____

3.13 Start one CS or LPCI pump with suction from the suppression pool.

3.14 Slowly raise RPV water level while maintaining less than 100°F/hr cooldown rate, to establish a flow path through the open SRV back to the suppression pool.

3.15 Slowly increase CS or LPCI flow to establish a 100°F/hr cooldown rate.

3.16 IF necessary, increase CS or LPCI flow to the maximum single pump flow for the pressure at which RPV pressure stabilizes.

3.17 IF RPV pressure does not stabilize ABOVE (later) psig, start another pump.

3.18 IF RPV pressure does not stabilize BELOW (later) psig, open additional SRV's located symmetrically about the suppression pool.

CAUTION

CONTROL SUPPRESSION POOL TEMPERATURE TO MAINTAIN RPV WATER TEMPERATURE ABOVE 70°F PER SP 23.121.01, RESIDUAL HEAT REMOVAL (RHR) SYSTEM.

3.19 When RPV cooldown is under control and plant conditions are stable, proceed to cold shutdown in accordance with SP 22.005.01, Shutdown to Cold Shutdown.

4.0 REFERENCES

- 4.1 SP 29.023.01 - Level Control
- 4.2 SP 29.023.04 - Level Restoration
- 4.3 SP 22.005.01 - Shutdown to Cold Shutdown
- 4.4 SP 23.119.01 - Reactor Core Isolation Cooling (RCIC) System
- 4.5 SP 23.202.01 - High Pressure Coolant Injection
- 4.6 SP 23.121.01 - Residual Heat Removal (RHR) System
- 4.7 SP 23.701.01 - Condenser Off Gas Removal
- 4.8 SP 23.124.01 - Steam Sealing
- 4.9 SP 23.103.01 - Condensate
- 4.10 SP 23.109.01 - Feedwater System
- 4.11 SP 23.709.01 - Reactor Water Cleanup System
- 4.12 SP 23.203.01 - Core Spray System
- 4.13 SP 23.204.01 - Low Pressure Coolant Injection

+RV-093H		+RV-093L	
+RV-093F	1C61TE022A	1Z93TE132A-1	+RV-0936
	1Z93TE135B	1Z93TE110W-2	
	1Z93TE113Z	1Z93TE110Y-3	
	1Z93TE113X	1Z93TE110X-4	
	1Z93TE113Y	1Z93TE110Z-5	
	1Z93TE113W	1Z93TE132B-6	
	1Z93TE135A		
+RV-093J	1Z93TE134B	1C61TE022B-1	+RV-093A
	1Z93TE112Z	1Z93TE133A-2	
	1Z93TE112X	1Z93TE111W-3	
	1Z93TE112Y	1Z93TE111Y-4	
	1Z93TE112W	1Z93TE111X-5	
	1Z93TE134A	1Z93TE111Z-6	
		1Z93TE133B-7	
+RV-093G		+RV-093D	
+RV-093K		+RV-093E	

FIGURE 1