

DOCUMENT REVISION DISTRIBUTION SHEET -

UNIT II

OFF NORMAL & EMERGENCY OPER. PROCEDURE

DOCUMENT TITLE BRON CONCENTRATION CONTROL OFF NOR.DOCUMENT FILE NUMBER 2-0250031DOCUMENT REVISION NUMBER 1DOCUMENT DISTRIBUTED ON 11-3-83

DATE

DOCUMENT SENT TO:

2

COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED	COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED
	MASTER			UNCONTROLLED COPIES	
1	D. A. Sager			NRC - Region II	
2				Attn: EPPS Branch Chief	
3				H. Paduano - GO	
4				A. W. Bailey	
5	N. G. Roos			C. Ugelow - CF	
6	TSC			No II	
7				T. J. Depionty	
8				G. Regal	
9				Ugelow, Al - Backfile	
10	Control Room II			Training - Larry Baker ECI	
11				TRNG	
12				J. Spodick	
13				T. Vogan - GO	
14				G. J. Boissy	
15	Training			R. R. Jennings	
				By M. Messer	
				R. J. Frechette	
				Resident NRC	
				NRC - IE: HQ	
				Attn: Chief, Nuclear Response	
				Branch	
				C. Burns - CE	

8311150146 831107
 CF ADOCK 05000389
 CF

PROCESSED BY: Halle

DATE _____

8401260145 840118
 PDR ADOCK 05000389
 F PDR

2

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT NO. 2
OFF-NORMAL PROCEDURE NUMBER 2-0250031
REVISION 1

FOR INFORMATION ONLY
This document is not controlled. Before use,
verify information with a controlled document.

1.0 TITLE:

BORON CONCENTRATION CONTROL OFF-NORMAL

2.0 APPROVAL:

Reviewed by Facility Review Group February 9, 1982

Approved by C. M. Wethy Plant Manager February 15, 1982

Revision 1 Reviewed by F R G 8-24 1983

Approved J. H. B. Plant Manager 11-3 1983

3.0 PURPOSE AND DISCUSSION:

This procedure provides instructions to control Reactor Coolant System (RCS) boron concentration and maintain Volume Control Tank (VCT) level when there is a malfunction of the Boron Concentration Control System.

A sudden drop in the VCT level could be caused by a leak in the Charging and Letdown portion of the Chemical and Volume Control System (CVCS), or large change in RCS volume due to RCS leakage or rapid RCS temperature change.

/R1

4.0 SYMPTOMS:

Any one of the following symptoms may indicate a failure in the Boron Concentration Control System:

4.1 VCT Low Level alarm (setpoint 35%). (M3)

4.2 VCT Low-Low Level alarm (setpoint 5%) (M11)

4.3 Boric Acid High-Low Flow alarm 'flow deviates from setpoint ± 10 gpm). (N40)4.4 Demineralized Makeup Water High-Low Flow alarm (flow deviates from setpoint ± 10 gpm). (M26)

4.5 Unexplained increase in count rate or nuclear power when reactor is shutdown.

4.6 Unexplained reactor coolant temperature change.

/R1

4.7 Control Element Assembly (CEA) insertion while the CEDS is in the AUTOMATIC mode while raising VCT level by blending.

/R1

ST. LUCIE UNIT NO. 2
OFF-NORMAL PROCEDURE NUMBER 2-0250031, REVISION 1
BORON CONCENTRATION CONTROL OFF-NORMAL

2

5.0 INSTRUCTIONS:

5.1 IMMEDIATE AUTOMATIC ACTION:

1. At a VCT level of 5% (decreasing), MV-2504 (RWT to Charging Pumps) opens and MV-2501 (VCT outlet) closes.
2. Charging pumps trip on low suction pressure of 10 PSIA.

/R1

5.2 IMMEDIATE OPERATOR ACTIONS:

FOR ABNORMALLY LOW VCT LEVEL (<42%)

1. Check shut V-2500 (Direct Valve).
2. Initiate or verify adequate make-up flow to the VCT.
3. Analyze all available indications to determine the exact status of both the plant and the CVCS system, then take appropriate subsequent operator action.

ST. LUCIE UNIT NO. 2
OFF-NORMAL PROCEDURE NUMBER 2-0250031, REVISION 1
BORON CONCENTRATION CONTROL OFF-NORMAL

2

5.0 INSTRUCTIONS: (continued)

5.3 SUBSEQUENT OPERATOR ACTIONS:

1. For an uncontrolled, rapidly decreasing VCT level where CVCS or Boron Control System leakage is indicated:
 - A. Isolate letdown by closing LCV-2110 Q and P (Letdown Level Control Valves) and 2V-2515, 2V-2516, and 2V-2522, (Letdown Isolation Valves).
 - B. Isolate charging by taking charging pumps to the "STOP" position.
 - C. Isolate the VCT by closing MV-2501 (VCT Outlet).
 - D. Maintain the plant in a steady state condition while locating and isolating the leak.
 - E. Locally inspect the CVCS and Boron Control Systems to determine source of leakage, and isolate if possible.
 - F. Attempt to refill the VCT using a blended make-up flow.

NOTE

If the VCT has been emptied, ensure the charging pumps are vented before use due to possible gas binding from gas build-up in the pumps old lines. After refilling, ensure VCT level instrumentation reference legs are refilled

- G. If charging is necessary to perform boration functions, or to restore and/or maintain pressurizer level:
 1. If reactor is shut down: Ensure MV-2504 (RWT to charging suction) is open, and cycle ON/OFF charging pumps as needed.
 2. If reactor is critical: Close and rack out MV-2504, and carefully provide desired blended ratio make-up to the charging pump suction through MV-2525 at a flow rate equal to charging flow.
2. If the VCT level falls below 42%, verification of the AUTOMATIC mode can be done as follows:
 - A. Verify that FCV-2210Y (Boric Acid Flow Control Valve) and FCV-2210X (Reactor Make-up Water Flow Control Valve) are in the AUTO position. Turn each to the OPEN-RESET position, then back to AUTO.
 - B. Verify the 2A or 2B BAM pump is in the AUTO position.
 - C. Verify that the Boric Acid Flow Controller (FRC-2210Y, and Water Flow Controller (FRC-2210X), are in the AUTO mode, with flow setpoints set above zero at the proper blend ratio setpoints.

ST. LUCIE UNIT NO. 2
OFF-NORMAL PROCEDURE NUMBER 2-0250031, REVISION 1 .
BORON CONCENTRATION CONTROL OFF-NORMAL

2

5.0 INSTRUCTIONS: (continued)

5.3 SUBSEQUENT OPERATOR ACTION: (continued)

2. (continued)

- D. Verify the Make-up Water select switch is in the AUTO position.
- E. Place the control switch for AOV-2512 (Blend to VCT) to RESET and then back to AUTO.
- F. Verify Boric Acid and Water flow on recorders FR-2210Y and FR2210X.
- G. If proper flow rates cannot be gained or maintained, utilize manual control per Section 5.3 3.

3. If the VCT is not being made up to automatically, or if manual make-up is desired, a blended make-up of the VCT can be completed as follows:

- A. Determine the reactor coolant boron concentration from the most recent boron analysis, or calculated concentration compared with Boronometer (if analysis following a concentration adjustment is unavailable).
- B. Obtain Boric Acid Blend ratio using present RCS Boron Concentration and the blend ratio curve contained in the plant curves, or figure ratio using the below listed formula.

$$\frac{(\text{BAMT Concentration PPM}) - (\text{RCS Concentration PPM})}{(\text{RCS Concentration PPM})} = \text{BLEND RATIO}$$

This will yield the number of gallons of primary water to mix per gallon of boric acid from the BAM tank.

- C. If time permits, figure amount of blended make-up volume to be added to the VCT by the below formula:

$$[(\text{Desired VCT Level } \%) - (\text{Present VCT Level } \%)] \times 33.8 \text{ GAL}/\% = \text{TOTAL MAKEUP VOLUME}$$

- D. Add the Boric Acid and water to the VCT simultaneously using flow rates determined by blend ratio, or add the calculated quantities using batching method with manual flow control and use of acid and water flow totalizers.
- E. Place the make-up mode select switch to MANUAL position.
- F. Ensure both the Boric Acid and Reactor Make-up Water Flow Controllers are in MANUAL, with zero output.
- G. Place the Boric Acid Flow Control Valve (FCV-2210Y), and the Reactor Make-up Water Flow Control Valve (FCV-2210X) control switches to the "AUTO" position.
- H. Start a Boric Acid Make-up Pump.
- I. Open 2V-2512 (VCT Blend Valve).

ST. LUCIE UNIT NO. 2
OFF-NORMAL PROCEDURE NUMBER 2-0250031, REVISION 1
BORON CONCENTRATION CONTROL OFF-NORMAL

2

5.0 INSTRUCTIONS: (continued)

5.3 SUBSEQUENT OPERATOR ACTIONS: (continued)

3. (continued)

- J. Open Boric Acid and Water Flow Control Valves by varying controller outputs to achieve desired flow rates as determined in Step 2.
 - K. Blend up the VCT to normal level.
 - L. When the calculated quantities of acid and water have been added, or normal level has been achieved, Stop the blend to the VCT.
 - M. Ensure Boric Acid pumps are stopped, and control switches returned to "AUTO", ensure the 2V-2512 is closed.
4. For failure of the entire Boron Concentration Control System, maintain VCT level and proceed as follows:
- A. Station an operator in the VCT valve gallery at the blending tee, and an operator at the boric acid station.
 - B. Establish and maintain constant communications with the operator at the boric acid station.
 - C. Start 2A or 2B BAM pump.
 - D. Have operator at blending tee open 2V-2512 (VCT Blend Valve).
 - E. Instruct operator at boric acid station to position 2V 2180 (Manual Dilute Valve), in 2A charging pump room (RMW to charging pump suction), and the manual borate valve 2V 2647 (FCV-2210Y bypass valve) at the BAM station, to establish water and acid flow rates in accordance with proper blend ratio using latest RCS boron analysis compared to boronometer.
 - F. If flow indications malfunction, instruct the operator to open 2V 2180 and 2V 2647 one quarter handwheel turn, and stand by. Observe Tave, CEA position, and the Boronometer while instructing the operator to position V-2180 and V-2647 as required to maintain stable conditions.
 - G. Verify CEA position, Tave and the Boronometer frequently.

ST. LUCIE UNIT NO. 2
OFF-NORMAL PROCEDURE NUMBER 2-0250031, REVISION 1
BORON CONCENTRATION CONTROL OFF-NORMAL

2

6.0 REFERENCES:

- 6.1 CE P&ID, E-19367-210-120, Chemical and Volume Control System.
- 6.2 CE P&ID E-19367-210-121, Chemical and Volume Control System.
- 6.3 EF 2-0120042, "Loss of Reactor Coolant".

/R1

/R1

7.0 RECORDS, REPORTS & NOTIFICATION:

- 7.1 Normal log entries.

DOCUMENT REVISION DISTRIBUTION SHEET - UNIT II
OFF NORMAL & EMERGENCY OPER. PROCEDURE

DOCUMENT TITLE HPSI - OFF NORMAL OPS

DOCUMENT FILE NUMBER 2-0410030

DOCUMENT REVISION NUMBER 2

DOCUMENT DISTRIBUTED ON 11-2-83

DOCUMENT SENT TO: _____ DATE _____

2

COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED	COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED
	MASTER			UNCONTROLLED COPIES	
1	D. A. Sager			NRC - Region II	
2				Attn: EPPS Branch Chief	
3				H. Paduano - GO	
4				A. W. Bailey	
5	N. G. Roos			C. Anglin	
6	TSC			ELEC	
7				NOT	
8				T.J. DEPIONTY	
9				G. Regal	
10	CONTROL ROOM II			Ugelow, Al - Backfile	
11				Training - ECT	
12				TR.VG	
13				J. Spodick	
14				T. Vogan - GO	
15	Training			G. J. Boissy	
				R. R. Jennings	
				H. M. Mercer	
				R. J. Frechette	
				Resident NRC	
				NRC - IE: HQ	
				Attn: Chief, Nuclear Response	
				Branch	
				C. Burns - CE	

PROCESSED BY: Hallen DATE _____

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE 2-0410030
REVISION 2

2

1.0 TITLE:

HPSI - OFF NORMAL OPERATION

2.0 REVIEW AND APPROVAL:

Reviewed by Facility Review Group _____ December 28 1982

Approved by J. H. Barrow (for) _____ Plant Manager December 28 1982

Revision 2 Reviewed by FRG _____ 8-5 1983

Approved by J.H. Barrow _____ Plant Manager 11-1 19833.0 PURPOSE AND DISCUSSION:

3.1 Purpose:

This procedure provides instructions for various off normal situations that could occur when High Pressure Safety Injection (HPSI) is required.

3.2 Discussion:

1. No single active component failure will prevent the system from performing its design function. However, manual action may be required to maintain maximum system effectiveness.
2. The minimum components required to function are one HPSI pump, one LPSI pump, and three Safety Injection Tanks.
3. All motor and air operated valves required to operate during safety injection have been designed to fail in such a position as to ensure failsafe operation.
4. HPSI pumps for each flow path are located in separate water tight rooms to ensure that a suction or discharge line break will not disable both flow paths.
5. There exists a possibility that during operation with RCS pressure <1836 psia a loss of coolant accident could occur with safety injection blocked. Should conditions indicate an LOCA, safety injection will have to be manually initiated.

FOR INFORMATION ONLY

This document is not controlled. Before use, verify information with a controlled document.

ST. LUCIE UNIT NO. 2
OFF-NORMAL OPERATING PROCEDURE NUMBER 2-0410030, REVISION 2
HPSI - OFF NORMAL OPERATION

2

3.0 PURPOSE AND DISCUSSION: (continued)

3.2 Discussion: (continued)

6. If the HPSI system has been automatically actuated because of a low pressure condition, it must remain in operation until:

- A. RCS is maintained 20°F subcooled.
- B. Pressurizer pressure and level is controllable with indicated level >30% and stable.
- C. No indications of RCS voids.
- D. S/G level (small break) is controllable with indicated wide range level >40% and stable.
- E. Shutdown cooling equipment is available and entry conditions can be established as required by RCS cooldown procedures.
- F. Permission is obtained from the Assistant Nuclear Plant Supervisor/Emergency Coordinator.

OR

7. The operator has determined that no LOCA conditions exist.

/R2

4.0 SYMPTOMS:

- 4.1 Safeguards room sump high level annunciation
- 4.2 Area radiation monitor alarm
- 4.3 Visual indication of safety injection system leakage
- 4.4 Visual indication of pump or valve malfunction at the RTGB
- 4.5 No indication of safety injection loop flow
- 4.6 Indication of excessive safety injection loop flow

ST. LUCIE UNIT NO. 2
OFF-NORMAL OPERATING PROCEDURE NUMBER 2-0410030, REVISION 2
HPSI - OFF NORMAL OPERATION

2

5.0 INSTRUCTIONS:

5.1 Immediate Automatic Action:

None

5.2 Immediate Operator Action:

- 5.2.1 Observe plant parameters; determine nature of the problem, take appropriate subsequent action.

5.3 Subsequent Operator Action:

5.3.1 Failure of motor or air operated valves to operate on SIAS:

1. Manually operate valves.

5.3.2 Rupture of pump suction line upstream of pump suction isolation valve:

1. Close affected header MV suction valve (RWT or containment sump).
2. Stop affected HPSI and LPSI Pumps.

5.3.3 Rupture of pump discharge line between pump discharge isolation valve and SI header valves:

1. Close affected header isolation valve.
2. Stop pump.
3. Close pump suction or discharge isolation valve.

5.3.4 Rupture of pump discharge line between header isolation valve and loop isolation valves:

1. Close header isolation valve.
2. Close affected loop isolation valve(s).
3. Stop affected pump.

5.3.5 Rupture of SI line between loop isolation valve and RCS:

1. Close affected loop isolation valve.

5.3.6 No indication of flow to loop(s):

1. Verify isolation valves in correct position.

5.3.7 Indication of LOCA with safety injection signal blocked

1. Manually initiate safety injection either by unblock signal or with manual pushbuttons.
2. Verify actuation.

ST. LUCIE UNIT NO. 2
OFF-NORMAL OPERATING PROCEDURE NUMBER 2-0410030, REVISION 2
HPSI - OFF NORMAL OPERATION

2

6.0 REFERENCES:

6.1 CE P&ID E13172-310-130, Safety Injection System, Sheet 1

6.2 CE P&ID E13172-310-131, Safety Injection System, Sheet 2

7.0 RECORDS REQUIRED:

7.1 Normal log entries