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

DOCUMENT TITLE START-UP TRANSFORMER OFF-NORMAL OPERATION

DOCUMENT FILE NUMBER 2-0910030

DOCUMENT REVISION NUMBER 0

DOCUMENT DISTRIBUTED ON 5-10-83
DATE

DOCUMENT SENT TO:

2

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

PROCESSED BY: Haller DATE

2

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT NO. 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0910030
REVISION 0

1.0 Title:

Start-Up Transformer Off-Normal Operation

2.0 Review and Approval:

Reviewed by Facility Review Group 4-18 & 5/5 1983

Approved by J. H. Barrow Plant Manager 5-9 1983

Revision __ Reviewed by F R G _____ 19__

Approved by _____ Plant Manager _____ 19__

3.0 Purpose and Discussion:

3.1 This procedure provides instructions to follow in case of a malfunction or loss of start-up transformers 2A and/or 2B in order to minimize possible damage and outage time.

3.2 Since failure of the start-up transformer may cause a loss of power not only in the plant but the 240 KV switchyard as well, it is important that prompt action be taken to determine the cause of any malfunction and/or alarm and its solution.

3.3 In order to minimize the possibility of damage and/or injury, no mechanical or electrical interlock should ever be intentionally overridden nor should any feeder breaker that has tripped due to an automatic protective feacture be reclosed until the cause has been determined and corrected or isolated.

4.0 Symptoms:

Indications of a malfunction and/or loss of a start-up transformer can be any one or more of the following:

4.1 Start-Up transformer 2A differential current trip, window B-1.

4.2 Start-Up transformer 2A fault pressure trip, window B-11.

4.3 Start-Up transformer 2A alarm panel, window B-21.

4.4 Start-Up transformer 2A 4 KV ground, window B-31.

4.5 4 KV switchgear (SWGR) 2A2 feeders overload trip, window B-41.

4.6 Start-Up transformer 2A 240 KV ground trip, window B-2.

ST. LUCIE UNIT NO. 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0910030, REVISION 0
START-UP TRANSFORMER OFF-NORMAL OPERATION

2

4.0 Symptoms: (continued)

4.7 Start-Up transformer 2A lockout relay failure, window B-12.

4.8 Start-Up transformer 2A 6.9 KV ground, window B-32.

4.9 6.9 KV SWGR 2A1 feeders overload trip, window B-42.

4.10 6.9 KV SWGR 2A1 differential current trip, window B-3.

4.11 4 KV SWGR 2A2 differential current trip, window B-13.

4.12 6.9 KV SWGR 2A1/ 4 KV SWGR 2A2 undervoltage, window B-23.

4.13 6.9 KV SWGR 2A1/2A2/2A3/2AB differential lockout relays failure, window B-4.

4.14 Start-Up transformer 2B differential current trip, window A-1.

4.15 Start-Up transformer 2B fault pressure trip, window A-11.

4.16 Start-Up transformer 2B alarm panel, window A-21.

4.17 Start-Up transformer 2B 4 KV ground, window A-31.

4.18 4 KV SWGR 2B2 feeders overload trip, window A-41.

4.19 Start-Up transformer 2B 240 KV ground trip, window A-2.

4.20 Start-Up transformer 2B lockout relay failure, window A-12.

4.21 Start-Up transformer 2B 6.9 KV ground, window A-32.

4.22 6.9 KV SWGR 2B1 feeders overload trip, window A-42.

4.23 6.9 KV SWGR 2B1 differential current trip, window A-3.

4.24 4 KV SWGR 2B2 differential current trip, window A-13.

4.25 6.9 KV SWGR 2B1/4 KV SWGR 2B2 undervoltage, window A-23.

4.26 6.9 KV/4 KV SWGR 2B1/2B2/2B3 differential lockout relays failure, window A-4.

4.27 Fire Pump 1A/1B running, window F-8.

4.28 Transformer Deluge operating, window F-16.

4.29 Automatic starting of one or both diesel generators.

4.30 Various Control Room electrical metering and switch indicating lights.

ST. LUCIE UNIT NO. 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0910030, REVISION 0
START-UP TRANSFORMER OFF-NORMAL OPERATION

2

5.0 Instructions:

5.1 Start-Up transformer lockout

5.1.1 Indications - the following are some of the indications that will accompany a transformer lockout:

A. Loss of power to the associated 6.9 KV and 4 KV SWGR.

B. Various alarms from section 4.0.

C. Loss of power to switchyard east or west bus.

5.1.2 Causes - any one of the following can cause a lockout of the Start-Up transformer:

A. Transformer 2A (2B) differential current

B. Transformer 2A (2B) fault pressure

C. Transformer 2A (2B) 240 KV ground

5.1.3 Automatic Actions:

A. Start-Up transformer 2A:

1. Transformer cooling equipment cut off

2. 4 KV breaker 2-20605 (1W88) to SWGR 2A4 and 6.9 KV breaker 2-30102 to SWGR 2A1 trip

B. Start-Up transformer 2B:

1. Transformer cooling equipment cut off

2. 4 KV breaker 2-20705 (1W82) to SWGR 2B4 and 6.9 KV breaker 2-30202 open.

C. Start-Up transformer 2A and/or 2B:

1. Diesel generator(s) 2A and/or 2B start, come up to speed and voltage.

2. Bus stripping has cleared 4 KV SWGR 2A3 and/or 2B3 and/or 2AB.

3. Diesel Generator(s) 2A and/or 2B close in on their respective buses and are sequentially loaded.

5.1.4 Operator Actions:

A. If any automatic action has not occurred, the operator should manually execute the required steps.

B. Determine the cause of the lockout from step 5.1.2 and take necessary steps to correct.

NOTE: If fault pressure has malfunction, the circuit may be de-energized by placing the fault pressure toggle switch to OFF with the permission of the Nuclear Plant Supervisor.

C. Notify the load dispatcher of the lockout and plant conditions.

ST. LUCIE UNIT NO. 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0910030, REVISION 0
START-UP TRANSFORMER OFF-NORMAL OPERATION

5.0 Instructions: (continued)

5.2 Loss of Start-Up Transformer Feeder Breaker

5.2.1 Indications - the following are some of the indications that will accompany a loss of a Start-Up transformer breaker:

A. Loss of power to the associated 6.9 KV or 4 KV SWGR.

B. Various alarms from section 4.0

C. Possible loss of power to the switchyard east or west bus

5.2.2 Causes - any one of the following could cause an automatic protective trip of a Start-Up transformer breaker:

A. Current overload

B. Associated bus lockout due to current differential

C. Associated transformer lockout (section 5.1)

D. Switchyard backup lockout

5.2.3 Automatic Action:

A. 6.9 KV and 4.16 KV feeder breakers will trip.

B. None of the other trips of a 6.9 KV breaker initiate automatic features, although by loss of the operating equipment on the bus, protective features concerned with those systems will actuate.

C. 4 KV SWGR 2A2 or 2B2

1. Any other trip of a 4 KV Start-Up transformer breaker will only affect its associated bus resulting in actuation of protection features of the systems supplied.

2. A loss of a 4 KV bus (section 5.2.3.A only) will start one or both diesel generators and initiate load shedding of the appropriate bus(es), close in the diesel(s) to their bus(es) and selectively load the diesel(s).

5.2.4 Operator Actions:

A. If any automatic action has not occurred, the operator should manually execute the required steps.

B. Determine the cause of the trip from section 5.2.2 and take necessary steps to correct.

C. Notify the load dispatcher of the plant conditions.

5.3 Bus Differential Lockout of 6.9 KV 2A1 (2B1) or 4 KV SWGR 2A2 (2B2)

5.3.1 Indications - the following are some of the indications that will accompany a lockout of the 6.9 KV or 4 KV SWGR:

A. Loss of power to the associated bus.

B. Various alarms from section 4.0.

2

ST. LUCIE UNIT NO. 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0910030, REVISION 0
START-UP TRANSFORMER OFF-NORMAL OPERATION

5.0 Instructions: (continued)

5.3 (continued)

5.3.2 Causes - a lockout of the 6.9 KV 2A1 (2B1) or 4 KV 2A2 (2B2) SWGR is caused by a fault on the bus.

5.3.3 Automatic Actions:

A. The differential also causes the Start-Up and auxiliary transformer breakers to open on the associated bus. In addition, breakers to the 480 VAC Load Center 2A1 (2B1) and 4 KV SWGR 2A3 (2B3) are opened.

5.3.4 Operator Actions:

A. If any automatic action has not occurred, the operator should manually execute the required steps.

B. Determine the cause of the lockout from section 5.3.2 and take necessary actions to correct.

C. Notify the load dispatcher of the plant conditions.

D. Check the status of other systems supplied by these switchgear and insure any required operations are performed.

5.4 Transformer Fire:

5.4.1 Indications - the following are some of the indications that could accompany a transformer fire:

A. Possible loss of power to associated buses.

B. Various alarms from section 4.0.

5.4.2 Causes for a transformer fire are numerous; a few are:

A. Shorts

B. Grounds

C. Oil leak

D. Cooling equipment failure

5.4.3 Automatic Actions:

A. If a loss of power and/or lockout have occurred, see the appropriate section.

5.4.4 Operator Actions:

A. Sound fire alarm.

B. Notify plant personnel over the page system of the nature and location of the fire.

C. Insure fire pumps are running.

D. Insure transformer deluge system is operating.

ST. LUCIE UNIT NO. 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0910030, REVISION 0
START-UP TRANSFORMER OFF-NORMAL OPERATION

2

5.0 Instructions: (continued)

5.4 (continued)

5.4.4 (continued)

E. Start diesel generator on affected side(s).

F. Trip Start-Up transformer breakers to 6.9 KV and 4 KV switchgear on affected side.

G. Open switchyard OCB's to bus supplying affected transformer.

H. Open affected transformer "J" switch.

I. Ensure diesel generator(s) is/are loaded carrying vital buses.

J. Notify local fire department.

K. Notify load dispatcher of plant conditions.

L. Determine if fire is internal or external to the transformer or both, if possible.

M. Open power to transformer cooling equipment.

5.5 Lockout Relay Failure:

5.5.1 Indications - audible alarm in Control Room.

5.5.2 Causes - may be one of the following:

A. Blown fuse

B. Open relay

5.5.3 Automatic Actions:

NONE

5.5.4 Operator Actions:

A. Replace fuses as necessary.

B. Notify maintenance supervisor if relays are inoperative.

5.6 6.9 KV or 4 KV Ground

5.6.1 Indications - Audible alarm in Control Room.

5.6.2 Causes - one or more of the following:

A. Grounded 4 KV winding on the Start-Up transformer.

B. Grounded 6.9 KV winding on the Start-Up transformer.

5.6.3 Automatic Actions:

NONE

ST. LUCIE UNIT NO. 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0910030, REVISION 0
START-UP TRANSFORMER OFF-NORMAL OPERATION

2

5.0 Instructions: (continued)

5.6 (continued)

5.6.4 Operator Actions:

A. Start diesel generator(s) on affected side.

B. If time allows, synchronize the diesel generator with the vital bus and supply the vital bus with the diesel generator.

C. Isolate the affected transformer.

D. Determine the cause of the ground.

E. Notify the load dispatcher of plant conditions.

5.7 Transformer Alarm Panel Malfunction

5.7.1 Indications - audible alarm in Control Room.

5.7.2 Causes - listed in section 5.7.4

5.7.3 Automatic Actions:

A. Fault pressure operates the transformer lockout (section 5.1). All other features do not cause initiation of automatic protective features.

5.7.4 Operator Actions:

A. Investigation of the alarm to determine the cause and correction as necessary of the following conditions:

1. Loss of 125 V DC transformer alarm power - check the DC supply breaker and bus voltage.

2. Pressure relief device - isolate the transformer as per section 5.6.4.

3. Low oil flow - check oil flow gauge and pump operation.

4. Atmoseal tank low oil level - inspect liquid level gauge mounted on transformer. If level is low, reduce load on transformer and inspect for leaks. If any oil leaks are found, isolate the transformer per section 5.6.4.

5. Top oil temperature ($90^{o}C$) or thermal relay (hot spot) ($120^{o}C$) - Shift fans and pump to manual. If alarm persists, isolate the transformer per section 5.6.4.

6. Gas Detector - isolate the transformer as per section 5.6.4.

ST. LUCIE UNIT NO. 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0910030, REVISION 0
START-UP TRANSFORMER OFF-NORMAL OPERATION

2

5.0 Instructions

5.7 (continued)

5.7.4 (continued)

A. (continued)

7. Loss of cooling power

(a) Check circuit breakers to pump and fans ON

(b) Check circuit breaker to fans ON

(c) Insure 480 V AC normal and/or alternate power is available and supplying the cooling equipment.

(d) If fans and pump cannot be re-started, reduce transformer load. If high temperature alarm is reached, isolate the transformer per section 5.6.4.

8. Loss of Control power

(a) Check fans and pump

(b) Check control circuit breaker ON.

(c) Check control fuse, replace if necessary.

(d) If fans and pump cannot be re-started, reduce transformer load. If high temperature alarm is reached, isolate transformer per section 5.6.4.

9. Loss of Source #1 or Source #2 and/or transfer to standby power - check controls, fans, and pump operating. Then check 480 V MCC breakers:

S/U Transformer 2A - Preferred Supply MCC 2A1 BKR 2-40857

Standby Supply MCC 2B1 BKR 2-41654

S/U Transformer 2B - Preferred Supply MCC 2B1 BKR 2-41651

Standby Supply MCC 2A1 BKR 2-40858

NOTE: 2A is alternate (source #2) for transformer 2B and 2B is alternate for transformer 2A.

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

DOCUMENT TITLE BLACKOUT OPERATION

DOCUMENT FILE NUMBER 2-0030140

DOCUMENT REVISION NUMBER 3

DOCUMENT DISTRIBUTED ON 5-9-83
DATE

DOCUMENT SENT TO:

2

COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED	COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED
	MASTER			UNCONTROLLED COPIES	
1	D. A. Sager				
2					
3				NRC - Region II	
4				Attn: EPPS Branch Chief	
5	N. G. Roos			H. Paduano - GO	
6	TSC			A. W. Bailey	
7				G. Anglehart - CI	
8					
9					
10	Control Room II			G. Regal	
11				A. Udelow -Backfit	
12				Training - Larry Baker	
13					
14					
15	Training			J. Spodick	
				T. Vogan - GO	
				G. J. Boissy	
				R. R. Jennings	
				H. M. Mercer	
				Resident NRC	
				NRC - II: HQ	
				Attn: Chief, Nuclear Response Branch	
				C. Burns - CI	

PROCESSED BY: [signature] DATE 5-9-83

EMERGENCY PROCEDURE
2-0030140 REV. 3
BO

2

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT 2
EMERGENCY PROCEDURE NUMBER 2-0030140
REVISION 3

BLACKOUT OPERATION
(BO)

TOTAL NUMBER OF PAGES: 14

2

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT 2
EMERGENCY PROCEDURE NUMBER 2-0030140
REVISION 3

1.0 SCOPE:

This procedure provides the action to be taken in the event of a complete loss of off-site electrical power concurrent with a Turbine trip.

2.0 SYMPTOMS:

2.1 Alarms associated with the loss of operating plant components.

2.2 Loss of normal Control Room lighting and DC lighting energized.

2.3 Reactor and Turbine trip.

2.4 Emergency Diesel Generators start.

2.5 Reactor Coolant Pump trip and Main Feedwater Pump trip.

3.0 AUTOMATIC ACTIONS:

NOTE: Any Automatic Actions that should occur and do not, must be manually initiated.

	AUTOMATIC ACTION		INITIATING EVENT
3.1	Reactor Trip	3.1	RCS Low Flow $\leq$95%
3.2	Turbine Trip	3.2	Reactor trip bus low voltage
3.3	Generator lock-out	3.3	Turbine trip/Bkrs closed
3.4	Generator breakers open	3.4	Turbine Trip
3.5	Incoming feeder breakers open to 4160V and 6900V buses	3.5	Start up transformer breakers fail to close
3.6	Tie breakers between normal 4160V buses (2A2 and 2B2) and the emergency 4160V buses (2A3 and 2B3) open	3.6	Undervoltage on 2A2 and 2B2 4160V buses
3.7	Ties between essential and non-essential sections of emergency 480V MCCs open	3.7	Undervoltage on Emergency 480V MCCs

ST. LUCIE UNIT 2
EMERGENCY PROCEDURE NUMBER 2-0030140, REVISION 3
BLACKOUT OPERATION

3.0 IMMEDIATE AUTOMATIC ACTION: (Cont.)

AUTOMATIC ACTION	INITIATING EVENT
3.8 Breakers open for the following non-safety related loads which are normally fed from emergency buses	3.8 Diesel load shedding sequence

NOTE: These loads can be manually reconnected to the emergency buses as needed.

CEDM MG Sets 2A and 2B

Reactor cavity sump pump 2A and 2B

Containment building elevator

Electrical equipment room hoist

120/208 Power Panel 121 transformer

Lighting panel transformers 110, 112, 114, 117, 125, 126

Incoming feeder from 2A2 and 2B2 4160V buses

RCP oil lift pumps (B pumps only - A pumps running)

Pressurizer relief isol valves (1476 and 1477)

480V Lighting panel 2A, 2B and 2C (required at night for security)

Waste management heat tracing transformers 2A and 2B

Air conditioner HVA-4, ACC-4

Power panel 120

Lighting panels 113, 116, 109, 115, 130

Refueling equipment

Refueling water to charging pumps (V-2504)

Boric Acid batching tank heaters

Fire siren

NOTE: Thumb rule: Starting KVA = 6 x HP rating.

*** CAUTION ***

These loads could create overload conditions if proper care is not taken to ensure there is adequate margin on the D/G for them. It should be determined there is sufficient starting KVA available prior to energizing these loads, then only energize one at a time and re-evaluate the D/G load.

ST. LUCIE JNIT 2
EMERGENCY PROCEDURE NUMBER 2-0030140, REVISION 3
BLACKOUT OPERATION

2

3.0 IMMEDIATE AUTOMATIC ACTION: (Cont.)

	AUTOMATIC ACTION	INITIATING EVENT
3.9	All loads on emergency buses are tripped except the following: Boric Acid Makeup Pumps Charging Pumps Emergency lighting Class I power panels RCP oil lift pumps (A pumps only - B pumps off) Diesel fuel oil transfer pump	3.9 Diesel load shedding sequence
3.10	2A and 2B Diesel Generators start and energize 4160V emergency buses 2A3, 2B3, and 2AB and loads listed in Step 3.9	3.10 Undervoltage on 2A3 and 2B3 4160V buses
3.11	Subsequent loads are started at three second intervals (See Table 1, Emergency Diesel Generator Loading Sequence).	3.11 Diesel Generator Loading sequence
3.12	Auxiliary Feedwater auto start initiates	3.12 2A or 2B Steam Generator level decreases to 20.6%

ST. LUCIE UNIT 2
EMERGENCY PROCEDURE NUMBER 2-0030140, REVISION 3
BLACKOUT OPERATION

2

4.0 IMMEDIATE OPERATOR ACTION:

	ACTION		LOCATIONS
4.1	Trip Turbine and reactor manually	4.1	RTGB-201 and 204
4.2	Check all CEAs are fully inserted and reactor trip breakers are open	4.2	RTGB-204 and top of RPS Panels
4.3	Check turbine valves are closed	4.3	RTGB-201
4.4	Check generator Exciter Supply Breaker and Generator Breakers 8W49 and 8W52 are open	4.4	RTGB-201
4.5	Place reheater control system system in MANUAL, close TCVs	4.5	RTGB-201
4.6	Check that Diesel Generators have started and are feeding only emergency buses	4.6	RTGB-201
4.7	Open Startup Transformer breakers	4.7	RTGB-201
4.8	Reduce T_{avg} to reference setpoint by manual operation of the steam dump valves to atmosphere	4.8	RTGB-203
4.9	Isolate Steam Generator blowdown	4.9	RTGB-206
4.10	Verify 2C steam-driven AFW pump has started and has established flow to the Steam Generators. If AFW pumps have started due to the auto start feature, the motor driven pumps may be secured, if desired	4.10	RTGB-202

2

ST. LUCIE UNIT 2
EMERGENCY PROCEDURE NUMBER 2-0030140, REVISION 3
BLACKOUT OPERATION

5.0 SUBSEQUENT ACTIONS:

5.1 Implement the Emergency Plan as necessary in accordance with EPIP 3100021E, "Duties of the Emergency Coordinator".

5.2 Verify adequate natural circulation flow by ensuring that hot and cold leg temperatures, Pressurizer pressure and level stabilize within approximately 15 minutes. The core ΔT should be <49°F (ΔT for full power).

1. If the above conditions are not established:

   A. Check RCS temperature and pressure to ensure that the RCS is subcooled.

   B. Ensure AFW flow to the Steam Generators has been initiated and the steam dumps to atmosphere are in operation.

   C. Refer to EOP 2-0120043, "Inadequate Core Cooling".

2. Return at least one RCP in each loop to operation as soon as off-site power is available and the requirements for pump restart are satisfied in accordance with EOP 2-0120040, Paragraph 5.8.

5.3 Start equipment in Table 1 if required.

5.4 If one Diesel fails to start, attempt a manual start.

1. If manual start attempt is unsuccessful, an operator should be sent to the diesel local control station to inspect status of local alarm panel.

2. If no alarms are present on the local alarm panel, an inspection of the overspeed trip lever should be made to ensure it has not tripped.

3. If the overspeed trip levers are latched, the Normal/Isolate switches on the local control panel should be placed in the ISOLATE position and a local start attempt should be made.

4. Refer to OP 2-2200020 and OP 2-2200050.

5.5 Locally open Condenser Vacuum breakers (MV-10-1A and MV-10-1B). Locally close MSR main steam block valves (MV-08-4, MV-08-6, MV-08-8, and MV-08-10).

5.6 Check MSR warm-up valves (MV-08-5, MV-08-7, MV-08-9, and MV-08-11) to be closed or close manually.

ST. LUCIE UNIT 2
EMERGENCY PROCEDURE NUMBER 2-0030140, REVISION 3
BLACKOUT OPERATION

2

5.0 SUBSEQUENT ACTIONS: (Cont.)

5.7 Send an operator to align and start emergency cooling water to the Instrument Air Compressor, then reset Control Room handswitch and manually start the Instrument Air Compressor (Plant Auxiliaries Control Panel).

CAUTION: Do not overload the Diesel Generators when starting additional equipment (3685KW maximum continuous rating).

5.8 When Diesel Generator power is available, energize equipment as may be required for plant safety and to achieve an orderly shutdown within the Diesel Generator load limitations as follows:

1. Verify one set of reactor cavity and reactor support cooling fans operating. If not, start one set.

2. Lock out automatic starting equipment that is not in service.

3. Manually open all breakers on any non-vital bus or Motor Control Center that is to be re-energized.

4. Reset lockout relays for each required bus to allow closing of feeder breakers.

5.9 Remove the following components from service:

Steam jet air ejectors
Priming ejector
Auxiliary priming ejector
Auxiliary steam to RAB
Gland seal system

5.10 Start 2A and 2B CEDM cooling fans.

5.11 Start 2A and 2B reactor support cooling fans.

CAUTION: Consider equipment starting requirements. Alternate operation of equipment may be required to avoid overloading the Diesel Generators (3685KW maximum continuous rating).

ST. LUCIE UNIT 2
EMERGENCY PROCEDURE NUMBER 2-0030140, REVISION 3
BLACKOUT OPERATION

5.0 SUBSEQUENT ACTIONS: (Cont.)

5.12 Manually close breakers for Pressurizer heater buses on 4160V buses 2A3 and 2B3. Place the Override Key Switch to the PRESSURE OVERRIDE position and reset the Backup heater breakers. This should be accomplished within two hours following the loss of off-site power.

CAUTION: Consider equipment starting requirements. Alternate operation of equipment may be required to avoid overloading the Diesel Generators (3685KW maximum continuous rating).

NOTE: The above actions will only energize B-1 and B-4 banks of Backup heaters.

5.13 Check that the Bearing Oil Lift Pump starts automatically when Turbine speed decreases to approximately 600 rpm.

5.14 Start oil reservoir vapor extractor and generator oil vapor extractor.

5.15 Check that the turning gear engages and starts automatically when turbine speed decreases to zero rpm, or manually engage it.

5.16 Reduce the flow of cooling water to maintain the temperature of the oil leaving the turbine lube oil and the air side and hydrogen side oil coolers between 95 - 100oF.

5.17 Isolate cooling water supply to the Generator hydrogen coolers.

5.18 If additional Condensate Storage Tank water is required, have Unit 1 personnel place the Water Treatment Plant in service.

5.19 Place the Spent Fuel Pool Cooling Pump in operation as necessary.

NOTE: With spent fuel element assemblies from 3-1/3 cores present, the Spent Fuel Pool can safely withstand at least five hours without cooling before reaching the boiling point.

5.20 Periodically check fuel oil levels in the Diesel Generator day tanks to confirm proper operation of the fuel oil transfer system and to ensure uninterrupted Diesel Generator operation.

5.21 Sample and analyze the reactor coolant to determine if fuel element clad failure has occurred.

5.22 Determine expected duration of power outage. If unable to do so or if outage is to be prolonged, borate RCS to Cold Shutdown concentration.

ST. LUCIE UNIT 2
EMERGENCY PROCEDURE NUMBER 2-0030140, REVISION 3
BLACKOUT OPERATION

5.0 SUBSEQUENT ACTIONS: (Cont.)

5.23 If the outage will exceed four hours and the RWT is available, proceed to Cold Shutdown conditions utilizing natural circulation, atmospheric steam dump and feedwater addition. Refer to EOP 2-0120040, "Natural Circulation/Cooldown". Place Shutdown Cooling in service when appropriate temperatures and pressures are reached.

NOTE: Do not begin plant cooldown until Cold Shutdown boron concentration is verified.

5.24 If Pressurizer cooldown cannot be accomplished in a timely manner from the addition of cooler liquid (auxiliary spray) from the Charging Pump via the Pressurizer spray line, proceed with the alternate positive means of depressurization as follows:

1. Place the switches for the Power Operated Relief Valves (V-1474 and V-1475) in the OVERRIDE position.

2. Initiate a high Pressurizer pressure trip signal on two RPS channel trip units.

3. Place the switch for either Power Operated Relief Valve (V-1474 or V-1475) in the OFF position and vent the Pressurizer to the Quench Tank. Return the switch to OVERRIDE to close valve.

4. Control the rate of cooldown and depressurization by selective operation of the Power Operated Relief Valves in this mode until cooldown via the auxiliary spray valves can be initiated.

5.25 When normal AC power is available:

1. Restore bus sections to their normal supplies.

2. Place the Diesel Generator system in standby lineup as per OP 2-2200020.

3. Restore all plant systems to normal.

6.0 DISCUSSION:

6.1 A loss of power to the 4160V buses results in a loss of power to all 480V Load Centers and Motor Control Centers and to all instrumentation not fed directly or indirectly from the station battery. A reactor trip will occur from a low reactor coolant flow rate signal due to the loss of power to the 6900V buses supplying the Reactor Coolant Pumps and will be accompanied by a Turbine Trip and Generator lockout.

6.2 Steam dump to atmosphere must be used to remove reactor decay heat. Initially, Steam Generator safety valves may acuatate to augment the steam flow and to help control Steam Generator pressure immediately after the trip.

ST. LUCIE UNIT 2
EMERGENCY PROCEDURE NUMBER 2-0030140, REVISION 3
BLACKOUT OPERATION

2

6.0 DISCUSSION: (Cont.)

6.3 On-site power will be supplied by the Emergency Diesel Generators.

6.4 A rapid reduction in Steam Generator water levels will occur due to the reduction of the Steam Generator void fraction on the secondary side and also because steam flow will continue after normal feedwater flow stops. Auxiliary feedwater flow will automatically initiate after the first Steam Generator level reaches 20.6% (2/4 logic).

6.5 Core decay heat removal is accomplished by natural circulation in the reactor coolant loops.

6.6 Core damage is not expected as a result of a loss of power condition since the Steam Generators are maintained as a heat sink and RCS pressure and inventory control are available.

6.7 If operating under blackout conditions and an Engineered Safety Features Actuation signal occurs, any non-emergency loads that are running will be automatically tripped and the required emergency loads will be automatically started.

2

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030140, REVISION 3
BLACKOUT OPERATION

TABLE 1

DIESEL GENERATOR LOADING SEQUENCE

ITEM	Automatic Starting Equipment (4)	Per Diesel Generator Quantity	Nominal Load or Nameplate HP	Starting KVA	Timing Sequence	RUNNING LOAD (KW) Shutdown With Loss of OFF-Site Power (LOOP)	RUNNING LOAD (KW) LOCA (Recirculation) With Loss of OFF-Site Power (LOOP)	RUNNING LOAD (KW) Main Steam Line Break With Loss of Offsite Power (LOOP)
1	High Pressure Safety Inj. Pump	1	400	2422.0	0 Sec.	-	324	324
2	Motor Operated Valves	Lot	-	-	0 Sec.	6.7	27.2	33.1
3	Emergency Lighting	Lot	-	-	0 Sec.	125	125	125
4	Power Panels	Lot	-	-	0 Sec.	195	195	195
5	Diesel Oil Transfer Pumps	1	3	21.5	0 Sec.	3	3	3
6	RCP Oil Lift Pumps	4	10	66.85	0 Sec.	40	20	20
7	Uninterruptible Power Supply	1	-	-	0 Sec.	55	55	55
8	HVAC Dampers	Lot	-	-	0 Sec.	4	4	4
9	HVAC Valves	Lot	-	-	0 Sec.	1.5	1.5	1.5
10	Low Pressure Safety Inj. Pump	1	400	2183.3	3 Sec.	274	321	274
11	Containment Fan Coolers	2	125/83	828.4	3 Sec.	134	96	96
12	Elec. Equip. Room Supply	1	100	584.12	3 Sec.	95	95	95
13	Component Cooling Water	1	450	2491.2	6 Sec.	351	351	351
14	Shield Building Exhaust	1	60	340.6	6 Sec.	-	40.2	40.2
15	Shield Building Heaters	Lot	-	-	6 Sec.	-	31.5	31.5
16	Intake Cooling Water Pump	1	600	3709.0	9 Sec.	453	453	453

2

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030140, REVISION 3
BLACKOUT OPERATION

TABLE 1

DIESEL GENERATOR LOADING SEQUENCE

ITEM	Automatic Starting Equipment (4)	Per Diesel Generator Quantity	Nominal Load or Nameplate HP	Starting KVA	Timing Sequence	RUNNING LOAD (KW) Shutdown With Loss of OFF-Site Power (LOOP)	LOCA (Recirculation) With Loss of OFF-Site Power (LOOP)	Main Steam Line Break With Loss of Offsite Power (LOOP)
17	Containment Spray Pump	1	500	2892.6	12 Sec.	-	405	405
18	Hydrazine Pump	1	3	21.5	12 Sec.	-	1	1
19	Reactor Supports Cooling	1	40	234.76	18 Sec.	22	-	-
20	Reactor Cavity Supply Fan	1	20	124.15	18 Sec.	15	-	-
21	Intake Building Cooling Fan	1	7.5	44.0	21 Sec.	7.5	7.13	7.5
22	Battery Room Roof Ventilator 2-RV-1	1	0.75	8.5	21 Sec.	.75	.75	.75
23	Elec. Equip. Room Exhaust, 2-RV-3	1	5	34.22	21 Sec.	5	5	5
24	ECCS Area Exhaust Fan	1	60	358	24 Sec.	45	45	45
25	Control Room Emer. Filter Fan	1	10	62.0	24 Sec.	-	10	10
26	Control Room Air Conditioning	2	55	-	24 Sec.	68	68	68
27	Boric Acid Heat Trace	Lot	Lot	-	27 Sec.	30	30	30
28	Battery Charger	1	60KW	-	27 Sec.	60	60	60
29	Auxiliary Feedwater Pump	1	350	1951.4	30 Sec.	255	255	255

2

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030140, REVISION 3
BLACKOUT OPERATION

TABLE 1

DIESEL GENERATOR LOADING SEQUENCE

ITEM	Automatic Starting Equipment	Per Diesel Generator Quantity	Nominal Load or Nameplate HP	Starting KVA	Timing Sequence	RUNNING LOAD (KW) Shutdown With Loss of OFF-Site Power (LOOP)	LOCA (Recirculation) With Loss of OFF-Site Power (LOOP)	Main Steam Line Break With Loss of Offsite Power (LOOP)
30	RAB Supply Fan	1	150	900.1	33 Sec.	111	111	111
31	Elec. Equip. Room Exhaust, 2-HVE-11	1	50	244.7	38 Sec.	38	38	38
32	Charging Pumps	2	125	1656.8	5 Min.	60	60	60
33	Boric Acid Makeup Pump (2)	2	25	124.1	5 Min.	24	24	24
34	Instrument Air Compressor	1	60	340.6	Manual load	60	60	60
35	Fuel Pool Cooling Pump	1	40	234.6	Manual load	26	-	26
36	Hydrogen Recombiner	1	75KW	-	Manual load	-	75	75
37	Pressurizer Heaters	1	200KW	-	Manual load	200 (after 2 hours LOOP)	-	-

Notes:
(1) Actuated on RAS
(2) Both Boric Acid Makeup Pumps are loaded onto Diesel Generator A

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NO. 2-0030140, REVISION 3
BLACKOUT OPERATION

2

7.0 REFERENCES:

7.1 St. Lucie Unit 2 FSAR, Sections 8 and 15

7.2 Off-Normal OP 2-0030130, "Shutdown Resulting From Reactor/Turbine Trip"

7.3 OP 2-0210020, "Charging and Letdown"

7.4 OP 2-0330020, "Turbine Cooling Water Operation"

7.5 Off-Normal OP 2-0250031, "Boron Concentration Control, Off-Normal"

7.6 Off-Normal OP 2-1010040, "Loss of Instrument Air"

7.7 OP 2-1540020, " Water Plant Startup and Shutdown"

7.8 OP 2-2200020, "Emergency Diesels - Standby Lineup"

7.9 OP 2-0700022, "Auxiliary Feedwater System Operation"

8.0 RECORDS/NOTIFICATIONS:

8.1 Normal log entries

8.2 AP 0010134, "Component Cycles and Transients"

9.0 APPROVAL:

Reviewed by Facility Review Group October 26 1982
Approved by J. H. Barrow (for) Plant Manager October 26 1982

Revision 3 Reviewed by FRG 5/5 1983
Approved by J H Barrow Plant Manager 5/6 1983

"LAST PAGE"

EP 2-0030140
Rev. 3
Total No. of Pages 14

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

DOCUMENT TITLE Control Room Inaccessibility

DOCUMENT FILE NUMBER 2-0030141

DOCUMENT REVISION NUMBER 3

DOCUMENT DISTRIBUTED ON 5-4-83
DATE

DOCUMENT SENT TO:

2

COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED	COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED
	MASTER			UNCONTROLLED COPIES	
1	D. A. Sager				
2					
3				NRC - Region II	
4				Attn: EPPS Branch Chief	
5	N. G. Roos			H. Paduano - GO	
6	TSC			A. W. Bailey	
7	HOT SHUTDOWN PANEL			G. Anglehart - CE	
8	LOW LEVEL R.A.B -5' Aux F.W. Pumps				
9	~~Turbine Building Control Room~~				
10	Control Room II				
11 —	TURBINE SWITCHGEAR RM			G. Regal	
12				A. Ugelow - Backfit	
13				Training - Larry Baker	
14					
15	Training			J. Spodick	
				T. Vogan - GO	
				G. J. Boissy	
				R. R. Jennings	
				H. M. Mercer	
				Resident NRC	
				NRC - IE: EO	
				Attn: Chief, Nuclear Response Branch	
				C. Burns - CE	

PROCESSED BY: J Calley DATE

2

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141
REVISION 3

CONTROL ROOM INACCESSIBILITY
(CRI)

TOTAL NO. OF PAGES 42

2

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141
REVISION 3

1.0 TITLE:

CONTROL ROOM INACCESSIBILITY

2.0 SYMPTOMS:

Conditions exist such that the Control Room becomes uninhabitable and must be evacuated.

3.0 IMMEDIATE AUTOMATIC ACTION:

None

4.0 IMMEDIATE OPERATOR ACTION:

	ACTION		NOTES	
4.1	Manually trip the reactor and Turbine prior to leaving the Control Room, if possible.	4.1	Push buttons on RTGB-201 and 204.	/R3
4.2	Announce evacuation of the Control Room over the P.A. system.			
4.3	Implement the Emergency Plan, as necessary, in accordance with EPIP 3100021E, "Duties of the Emergency Coordinator".			
4.4	Obtain the Remote Shutdown Room Keybox Master Key from the Control Room Key Locker.	4.4	Key Number 130	/R3
4.5	Evacuate all personnel from the Control Room.			

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

5.0 SUBSEQUENT ACTIONS:

5.1 Man and take control of stations as follows: CHECK

1. Reactor Control Operator "A" - Remote Shutdown Panel.

   A. Establish communications on the Sound Power Phone System. ____

   B. Monitor available plant parameters on the Remote Shutdown Panel. ____

   C. Start motor or steam-driven Auxiliary Feedwater Pumps and feed the Steam Generators as required. ____

   D. Control Pressurizer pressure and level by manual control of Pressurizer heaters, auxiliary spray valves, and letdown valves. ____

   NOTE: Only the "P" Letdown level and pressure valves are controllable from the Remote Shutdown Panel.

2. Nuclear Plant Supervisor - Electrical Equipment Room, Reactor Auxiliary Building - 43' Elev.

   A. Open or check open Reactor Trip Breakers TCB-1 through 8. ____

   B. Place isolation switches in the ISOLATE position on the following switchgear in the order listed: (See Appendix A).

   480V Load Center 2A3 ____

   480V Load Center 2B3 ____

   480V Load Center 2A2 ____

   4160V SWGR 2A3 ____

   480V MCC 2A5 ____

   480V MCC 2A6 ____

   480V Load Center 2B2 ____

   4160V SWGR 2B3 ____

   480V MCC 2B6 ____

   480V MCC 2B5 ____

   480V MCC 2AB ____

   Isolation Panel 2AB ____

   Isolation Panel 2A ____

   Isolation Panel 2B ____

   Communications Isolation Panel ____

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

5.0 SUBSEQUENT ACTIONS: (continued)

5.1 (continued)

2. (continued) CHECK

C. Assist Reactor Control Operator "A" in monitoring unit parameters from the Remote Shutdown Panel. _____

D. Open or check open:

480V Load Center 2A3 P-1 HTR Feed 2-40305 _____

480V Load Center 2B3 P-2 HTR Feed 2-40602 _____

3. Reactor Control Operator "B" - Turbine Operating Level.

A. Locally trip or verify tripped Unit No. 2 Turbine. _____

B. Verify Turbine Stop Valves and Control Valves are shut; if not, initiate Turbine trip from Turbine front standard. _____

C. At the AFW Pump area, place the isolate switches for MV-08-19B, MV-08-18B, MV-08-18A, and MV-08-19A in ISOLATE. _____

D. Proceed to Turbine Building Switchgear Room and establish communications on the Sound Powered Phone circuit. _____

E. Place isolation switches in the ISOLATE position for bus feeder breakers as follows (See Appendix A):

4160V SWGR 2A2 _____

4160V SWGR 2B2 _____

6900V SWGR 2A1 _____

6900V SWGR 2B1 _____

F. Stop 2A and 2B Main Feedwater Pumps, 2A and 2B Heater Drain Pumps, and one Condensate Pump by opening their respective breakers. _____

CAUTION: Ensure that one Condensate Pump remains in service.

4. Nuclear Operator - Reactor Auxiliary Building.

A. Place isolate switches in ISOLATE/LOCAL position on the following switchgear (see Appendix A):

4160V SWGR 2AB _____

480V Load Center 2AB _____

B. Proceed to the Diesel Generator Building and place isolation switches on 2A and 2B Diesel Control Panels in ISOLATE position (See Appendix A). _____

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

5.0 INSTRUCTIONS: (continued)

5.1 (continued)

4. (continued)

CHECK

C. Open or check open isolation valves for Letdown pressure and level control valves (V-2110P and V-2201P). Isolate V-2110Q and V-2201Q. _____

D. Proceed to the Charging Pump area and establish communications on the Sound Powered Phone circuit. _____

5.2 Maintain Pressurizer level at approximately 33% indicated level. _____

5.3 Maintain Pressurizer pressure at approximately 2100 psia. _____

5.4 Maintain Reactor Coolant System temperature at or below 532°F (2A cold leg temperature) by use of atmospheric steam dump and/or selective shutdown of Reactor Coolant Pumps. _____

NOTE: Stop Reactor Coolant Pumps as required by opening the Reactor Coolant Pump breakers in the Turbine Building Switchgear Room. _____

5.5 Maintain Steam Generator levels at approximately 65% indicated level by operation of the Auxiliary Feedwater Pumps and discharge valves to the Steam Generators. _____

5.6 Isolate Steam Generator blowdown by manually closing isolation valves at the Closed Blowdown Heat Exchangers. _____

5.7 When Turbine speed decreases to "0" RPM, verify that the Turning Gear Oil Pump and the turning gear are in operation _____

5.8 Periodically check the habitability of the Control Room and when conditions permit, reoccupy the Control Room. Return isolation switches to NORMAL for switches and controls that are operational and maintain the Unit at Hot Standby until a complete evaluation has been made. _____

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

CHECK 2

5.0 INSTRUCTIONS: (continued)

5.9 If Control Room accessibility is not possible, place the unit in a Cold Shutdown condition as follows:

1. Commence boration to Cold Shutdown conditions by manual valve lineup. Borate to 1900 ppm as shown below. Carry out boron sampling as required during cooldown. _____ /R3

NOTE: This concentration will ensure >5% Shutdown Margin at 201°F at any time in core life, assuming the most reactive CEA stuck full out. Use both the local boron flow meters vs. time and BAM Tank level change to determine how many gallons of boron have been added. Do not interpolate values shown, always round critical boron concentration DOWN to next lower value on table.

NOTE: If plant curves are available, they may be used to determine shutdown boron concentration requirements instead of this Table.

Boron Concentration Prior to Control Room Inaccessibility	Number of Gallons of Boron needed to reach 1900 ppm	BAM Tank level change (1 BAM Tank)
50 PPM	7223 Gal	75%
100 PPM	7039 Gal	73%
200 PPM	6668 Gal	70%
300 PPM	6295 Gal	66%
400 PPM	5919 Gal	62%
500 PPM	5442 Gal	57%
600 PPM	5162 Gal	54%
700 PPM	4779 Gal	50%
800 PPM	4395 Gal	46%
900 PPM	4008 Gal	42%
1000 PPM	3618 Gal	38%
1100 PPM	3226 Gal	34%
1200 PPM	2832 Gal	30%
1300 PPM	2435 Gal	25%
1400 PPM	2036 Gal	21%
1500 PPM	1634 Gal	17%

2. Ensure Steam Generator level is being maintained at approximately 65% by the Auxiliary Feedwater Pumps. _____

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

5.0 INSTRUCTIONS: (continued)

5.9 (continued) CHECK

3. Stop at least one Reactor Coolant Pump prior to reaching 500°F by tripping its breaker at the 2A1 or 2B1 switchgear. Additional RCPs may be stopped as desired to control cooldown rate. After pump coastdown, stop the lift pumps by opening the associated breakers in the electrical switchgear room. Re-close lift pump breakers after one minute elapses. ____

4. Place all Pressurizer heater switches at the Remote Shutdown Panel to OFF. Heaters may be energized to control RCS pressure as needed. ____

5. The highest RCS cold leg temperature (highest one with RCP running) shall be plotted every 30 minutes. The copy of the graph (Figure 1) shall be kept with this procedure. The RCS temperature and pressure shall be determined to be within the limits of Figure 3.4-3 at least once per 30 minutes during cooldown. ____

   NOTE: Cooldown of the RCS shall be limited to $\leq$ 75°F in any one hour period with RCS temperature >97°F. /R3

6. The Pressurizer water phase temperature shall be plotted every 30 minutes using the Saturated Temperature vs. Pressure curve of this procedure (Figure 2). If possible, maximize letdown and minimize charging when using auxiliary spray to minimize thermal stress on spray nozzle. ____

   NOTE: Cooldown of the Pressurizer shall be limited to $\leq$ 190°F in any one hour period.

7. When the quanity of boron calculated in Step 5.9.1 has been added, cooldown may proceed. Verify by chemistry sample (if possible) that desired boron concentration has been obtained. Commence taking data on cooldown curve. Have the "B" Reactor Control Operator break Condenser vacuum by manually opening vacuum breaker MOVs. ____

   CAUTION: MSIS will occur at about 475°F, and sealing steam will be lost. Condenser vacuum must be broken prior to 475°F to prevent seal damage.

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

5.0 INSTRUCTIONS: (continued)

5.9 (continued)

CHECK

8. Have I & C personnel install temporary VCT level monitoring equipment. While locally monitoring and controlling VCT level, slowly open the atmospheric steam dumps and establish the desired cooldown rate. ____

NOTE: A makeup blend ratio to the VCT of about 9:1 is sufficient to maintain 1900 PPM boron in the RCS.

NOTE: A temperature differential of approximately 100°F between the RCS and Pressurizer should be maintained during cooldown. Cooldown of the Pressurizer must be accomplished by use of auxiliary spray and heater control.

9. When the SIAS amber permissive lights come on (1836 psia), block SIAS by turning the key operated switch on the Remote Shutdown Panel for both A and B channels. ____ /R3

10. At 1750 psia, isolate and bypass the following transmitters:

A. Charging header flow: close valve marked "HIGH SIDE", open valve marked "BYPASS", and close valve marked "LOW SIDE". ____

B. Charging header pressure: close its isolation valve. ____ /R3

11. Commence venting all four SITs from remote valve stations in the Electrical Penetration Room. (Valves 3733, 3734, 3735, 3736, 3737, 3738, 3739 and 3740). ____

NOTE: Do not vent more than one SIT to <235 psig. /R3

12. Maintain at least two Reactor Coolant Pumps operating. If possible, two RCPS in the same loop should be left running. ____

13. Periodically adjust the steam dump controllers and auxiliary spray control to maintain the desired cooldown and de-pressurization rate. Verify that the Steam Generators are being maintained at approximately 65% level. ____

14. With RCS pressure < 1700 psia, but prior to commencing SDC operations, rack out 2A and 2B Containment Spray Pump breakers (2-20203 and 2-20407). ____

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

5.0 INSTRUCTIONS: (continued)

5.9 (continued)

CHECK

15. When RCS temperature is < 500°F and RCS pressure is < 1500 psia, perform the following:

    A. Close 2-V-07145 and 2-V-07130 (Containment spray pump disch valves) ____

    B. Close the following containment spray header manual isolation valves.

    2-V-07161 (A hdr FCV upstream isol) ____

    2-V-07164 (B hdr FCV upstream isol) ____

    2-V-07162 (A hdr FCV downstream isol) ____

    2-V-07165 (B hdr FCV downstream isol) ____

16. When RCS pressure is < 275 psia, rack in the breakers for and then close the SIT discharge valves by placing the local control switch in the CLOSE position.

    MV-3614: Bkr 2-41219 ____

    MV-3624: Bkr 2-41311 ____

    MV-3634: Bkr 2-42117 ____

    MV-3644: Bkr 2-42048 ____

17. Rack out the SIT discharge valve breakers. ____

CAUTION: Prior to lowering RCS pressure below (LATER) psia, two RCPs in the same loop must be operating.

18. Lower RCS temperature to 325°F and RCS pressure to 275 psia. ____

19. Rack out one HPSI Pump prior to 280°F. Ensure the other HPSI pump remains operable. ____

    CAUTION: With SDC in service, an increase in RCS pressure > 350 psia will result in rapid RCS inventory loss due to lifting of relief valves in Hot Leg suction lines (Total capacity 4,600 gpm).

    NOTE: Minimum pressure for RCP operation is (LATER), so it is necessary to proceed quickly to Shutdown Cooling.

20. Stop the operating RCPs prior to lowering pressure to (LATER) by tripping the breakers on 2A1 and 2B1 switchgear. After pump coastdown, stop the oil lift pumps by opening the breaker for each pump for 1 minute, then re-closing the breaker. ____

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

5.0 INSTRUCTIONS: (continued)

5.9 (continued)

CHECK

21. Reduce RCS pressure to < 275 psia, then open the following valves from their local controllers:

    A. Hot Leg Suction Valves: V-3651, V-3652, V-3665, V-3480, V-3481, V-3664. ____

    NOTE: V-3664 and V-3665 local controllers are in Pipe Penetration Room, all others are in the Cable Spreading Room.

    NOTE: V-3545 (Hot Leg Suction Cross-Tie) is normally closed. It may be used to provide flow during off-normal conditions and must be open if both trains of SDC are in service. /R3

    B. Open CCW from SDC Heat Exchangers: HCV-14-3A and HCV-14-3B by isolating instrument air to the HVC's and bleeding off air pressure. ____

    C. SDC Heat Exchanger Discharge Valves: MV-3456 and MV-3457. ____

    D. LPSI Header Isolation Valves: MV-3615, MV-3625, MV-3635 and MV-3645. ____

22. Close the following valves:

    A. RWT recirculation stop valves: V-3459, V-3463, and V-3597. ____

    B. Miniflow header stop valves: V-3659, V-3660, V-3495 and V-3496. ____

    C. V-3432 and V-3444 LPSI suction from RWT. ____ /R3

23. Have the Nuclear Operator establish communications on the Sound Power Phone System in the 2A LPSI Pump Room. ____

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

5.0 INSTRUCTIONS: (continued)

5.9 (continued)

CHECK

24. Establish SDC as follows:

    A. Insert keys for MV-3306 and MV-3657 (controllers located in A LPSI Room) and place switches to MODULATE position. ____

    B. Using key switches at local controllers, open MV-3517 and MV-3658. ____

    C. Give MV-3306 a 3 second open signal, then allow switch to return to NORMAL. ____

    D. Start the 2A LPSI Pump, then open MV-3306 to obtain 3000 gpm flow as indicated on FI-3306 at the Remote Shutdown Panel. ____

    E. While observing SDC outlet temperature and flow on the Remote Shutdown Panel, alternately open MV-3657 and close MV-3306 to achieve desired cooldown rate and maintain 3000 gpm. ____

25. At 200°F RCS temperature, remove the trip and close fuses on the remaining HPSI Pump. Open the breaker for one Charging Pump so that no more than two Charging Pumps are operable. ____

26. Stabilize RCS temperature at approximately 100°F and RCS pressure at approximately 250 psia. Control pressure by use of Pressurizer heaters and auxiliary spray. Do not take the Pressurizer solid until Control Room access has been re-established. ____

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

6.0 PURPOSE & DISCUSSION:

6.1 This procedure provides instructions for placing the plant in a safe condition when operations cannot safely be conducted from the Control Room.

6.2 The reactor and turbine are manually tripped prior to leaving the Control Room, if possible, or locally from the Reactor Trip Switchgear and the Turbine front standard.

6.3 A heat sink is provided by automatic steam dump to the Condenser and/or to atmosphere.

6.4 Level is maintained in the Steam Generators by manual control of auxiliary feedwater valves with flow furnished by the Auxiliary Feedwater Pumps.

6.5 Pressurizer level and pressure are maintained by manual control of Pressurizer heaters, auxiliary spray valves, and letdown valves, and are monitored at the Remote Shutdown Panel.

6.6 Isolation switches located in the Reactor Auxiliary Building Electrical Equipment Room, Turbine Building Switchgear Room, Diesel Generator Rooms, and Reactor Auxiliary Building are manually selected to the ISOLATE position to prevent inadvertant operation of vital equipment due to possible electrical malfunction in the unattended Control Room.

6.7 A copy of this procedure will be posted at each manned operating station required for plant shutdown from outside the Control Room.

6.8 A listing of isolation switches will be posted on each of the following panels, MCCs, and distribution buses.

1. Load Centers 2A, 2B, 2AB
2. Isolation Switch Panels 2A, 2B, 2AB
3. MCC 2A5, 2A6, 2B5, 2B6
4. 4160V Buses 2A3, 2B3, 2AB
5. 4160V Buses 2A2, 2B2
6. 6900V Buses 2A1, 2B1
7. Diesel Generator 2A and 2B Control Panels
8. Auxiliary Feedwater Pump Area

6.9 The Nuclear Plant Supervisor will utilize additional personnel as available to assist in required subsequent actions.

2

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

7.0 REFERENCES:

7.1 Emergency Operating Procedure #1-0030141.

7.2 St. Lucie Unit 2 Technical Specifications.

8.0 RECORDS:

8.1 A completed, initialled copy of this procedure shall be retained in the plant file.

9.0 APPROVAL:

Reviewed by Facility Review Group: October 26, 1982

Approved by J. H. Barrow (for) Plant Manager October 26, 1982

Revision 3 Reviewed by F R G May 2 1983

Approved by C M Wethy Plant Manager 5-2- 1983

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"

ISOLATION SWITCHES

480V Load Center 2A3 - Pressurizer Heater Bus, Auxiliary Building Electrical Equipment Room

1. Pressurizer Backup Heater Bank B-1
2. Pressurizer Backup Heater Bank B-2
3. Pressurizer Backup Heater Bank B-3

/R3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A" (continued)

ISOLATION SWITCHES

480V Load Center 2B3 - Pressurizer Heater Bus, Auxiliary Building Electrical Equipment Room

1. Pressurizer Backup Heater Bank B-4
2. Pressurizer Backup Heater Bank B-5
3. Pressurizer Backup Heater Bank B-6

/R3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A" (continued)

ISOLATION SWITCHES

480V Load Center 2A2 - Auxiliary Building Electrical Equipment Room

1. Station Service Transf 2A2 Main Breaker
2. Bus Tie to 480V L.C. 2AB
3. Containment Fan Cooler 2-HVS-1A
4. Charging Pump 2A

/R3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

APPENDIX "A" (continued)

ISOLATION SWITCHES

480 V Load Center 2A5 - Auxiliary Building Electrical Equipment Room

1. Containment Fan Cooler 2-HVS-1B

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A" (continued)

ISOLATION SWITCHES

4160V SWGR 2A3 - Auxiliary Building Electrical Equipment Room

1. HP Safety Injection Pump No. 2A
2. LP Safety Injection Pump No. 2A
3. Containment Spray Pump No. 2A
4. Pressurizer Heater Transf No. 2A3
5. CEDM Cooling Fan 2HVE-21A
6. Component Cooling Water Pump No. 2A
7. Intake Cooling Water Pump No. 2A
8. Feeder to 4.16KV Bus No. 2AB
9. Feeder from 4.16KV Bus No. 2A2
10. Feed to 480V SS Transformer 2A2/2A5
11. Emergency Diesel Generator No. 2A
12. Auxiliary Feedwater Pump No. 2A

/R3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A" (continued)

ISOLATION SWITCHES

480V MCC 2A5 - Auxiliary Building Electrical Equipment Room

* 1. Makeup Bypass to Charging Pumps V-2514 (Emergency Borate)

2. Aux. F.W. Pump 2A Discharge Valve to S/G 2A (MV-09-9 and I-SE-09-2)

3. S/G #2B to AFWP-2C Turbin MV-08-12

4. Comp Cool Wtr to Cont Cool Unit 2A Valve MV-14-9

5. Comp Cool Wtr from Cont Cool Unit 2A MV-14-10

* 6. Comp Cool Wtr Cont Cool Unit 2B MV-14-11

* 7. Comp Cool Wtr from Cont Cool Unit 2B Valve MV-14-12

*NOTE: Switch 1, 6 and 7 must be in ISOLATE to have remote control of 2A charging pump.

/R3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A" (continued)

ISOLATION SWITCHES

480V MCC 2A6 - Auxiliary Building Electrical Equipment Room

1. Boric Acid Makeup Pump 2A
2. Boric Acid Makeup Pump 2B
3. Control Room Air Cond Unit 2HVA/ACC 3A
4. Shield Bldg. Vent Exhaust Fan 2HVE-6A
5. Control Room Emerg. Filtration Fan 2HVE-13A
6. Containment Spray Isolation Valve MV-07-161
7. 2A LPSI Pump Suction Valve V-3444

/R3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A" (continued)

ISOLATION SWITCHES

480V Load Center 2B2 - Auxiliary Building Electrical Equipment Room

1. Station Service Transf. 2B-2 Main Breaker
2. Bus Tie to 480V L.C. 2AB
3. Containment Fan Cooler 2HVS-1C
4. Charging Pump 2B

/R3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

APPENDIX "A" (continued)

ISOLATION SWITCHES

480V Load Center 2B5 - Auxiliary Building Electrical Equipment Room

1. Containment Fan Cooler 2-HVS-1D.

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A" (continued)

ISOLATION SWITCHES

4160V SWGR 2B3 - Auxiliary Building Electrical Equipment Room

1. Emergency Diesel Generator No. 2B
2. Feed to 480V SS Transformer 2B2/2B5
3. Pressurizer Heater Transf No. 2B3
4. Component Cooling Water Pump No. 2B
5. HP Safety Injection Pump No. 2B
6. LP Safety Injection Pump No. 2B
7. Containment Spray Pump No. 2B
8. CEDM Cooling Fan 2HVE-21B
9. Feeder to 4160V Bus No. 2AB
10. Intake Cooling Water Pump No. 2B
11. Incoming Feeder from 4.16KV Bus 2B2
12. Auxiliary Feedwater Pump No. 2B

/R3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A" (continued)

ISOLATION SWITCHES

480V MCC 2B6 - Auxiliary Building Electrical Equipment Room

1. 2HVE-13B - Control Room Booster Fan
2. Control Rm Air Cond 2HVA-3B
3. Containment Spray Isolation Valve (MV-07-164)
4. Shield Bld Vent Exh Fan 2HVE-6B
5. 2B LPSI Pump Suction Valve (V-3432)

/R3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A" (continued)

ISOLATION SWITCHES

480V MCC 2B5 - Auxiliary Building Electrical Equipment Room

1. CCW to Containment Fan Cooler 2HVS-1C (MV-14-13)
2. CCW from Containment Fan Cooler 2HVS-1D (MV-14-14)
* 3. Boric Acid Gravity Feed Valve (V-2508)
4. Boric Acid Gravity Feed Valve (V-2509)
* 5. CCW to Containment Fan Cooler 2HVS-1D (MV-14-15)
6. CCW from Containment Fan Cooler 2HVS-1D (MV-14-16)
7. 2B AFW Pump Discharge to 2B Steam Generator (MV-09-10 and I-SE-09-3) (Back of MCC 2B5)
8. 2A Steam Generator to 2C AFW Pump Turbine (MV-08-13) (Back of MCC 2B5)

*NOTE: Switch 3 and 5 must be in ISOLATE to have remote control of 2B charging pump.

/R3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A" (continued)

ISOLATION SWITCHES

480V MCC 2AB - Auxiliary Building Electrical Equipment Room

1. Component Cooling Water Suction Valve Hdr. A (MV-14-3)
2. Component Cooling Water Suction Valve Hdr. B (MV-14-4)
3. Component Cooling Water Discharge Valve Hdr. A (MV-14-1)
* 4. Component Cooling Water Discharge Valve Hdr. B (MV-14-2)
* 5. Control Room Air Cond Unit 2-HVA/ACC 3C

*NOTE: Switch 4 and 5 must be in ISOLATE to have remote control of 2C charging pump.

/R3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

APPENDIX "A" (continued)

ISOLATION SWITCHES

Transfer Panel 2AB - Auxiliary Building Electrical Equipment Room
(2AB Battery Room)

1. 2C Aux Feed Pump Stop Valve MV-08-3 /R3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

APPENDIX "A" (continued)

ISOLATION SWITCHES

Transfer Panel 2A - Auxiliary Building Electrical Equipment Room

1. 2A Steam Gen Atms Steam Dump PIC-08-1A1
2. 2A Steam Gen Atms Steam Dump PIC-08-1A1
3. SS-1-157 - Letdown Cont Isol Valve (V-2516)
4. SS-1-189 - Aux Spray Valve (I-SE-02-3)
5. SS-194 - Charging Line Isol Valve (V-2523)
6. 2A Diesel Gen Watt/Volt Meter
7. SS-1-176 - Charging to Loop 2A2 (I-SE-02-02)
8. 2C AFW Pmp Discg to 2B Steam Gen (MV-09-12 and I-SE-09-5)
9. 2B Steam Generator Atms Steam Dump PIC-08-3A1

/R3

2

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

APPENDIX "A" (continued)

ISOLATION SWITCHES

Transfer Panel 2B - Auxiliary Building Electrical Equipment Room

1. 2A Steam Gen Atms Steam Dump PIC-08-1B1
2. 2A Steam Gen Atms Steam Dump PIC-08-1B1
3. SS-2-157 - Letdown Stop Valve (V-2515)
4. SS-2-189 - Aux Spray Valve (I-SE-02-04)
5. SS-1-194 - Letdown Cont Isol Valve (V-2522)
6. 2B Diesel Gen Watt/Volt meter
7. SS-2-176 - Charging to Loop 2B1 (I-SE-02-01)
8. 2C AFW Pump Disch to 2A Steam Gen (MV-09-11 and I-SE-09-4)
9. 2A Steam Gen Atms Steam Dump PIC-08-3B1

/R3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A" (continued)

ISOLATION SWITCHES

Communications Isolation Panel - Auxiliary Building Communications Room

1. Fire Alarm/Siren Evacuation - Control Console, Isolation Switch

/R3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

APPENDIX "A" (continued)

ISOLATION SWITCHES

4160V SWGR 2A2 - Turbine Building Switchgear Room

1. Feeder to 480V SWGR No. 2A1
2. Feeder to 4.16KV Bus No. 2A3
3. Incoming Feeder from 4.16KV SWGR 2A4

/R3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

APPENDIX "A" (continued)

ISOLATION SWITCHES

4160V SWGR 2B2 - Turbine Building Switchgear Room

1. Feeder to 480V SWGR No. 2B1
2. Feeder to 4.16KV Bus No. 2B3
3. Incoming Feeder from 4.16KV SWGR 2B4

/R3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A" (continued)

ISOLATION SWITCHES

6900V SWGR 2A1 - Turbine Building Switchgear Room

1. Incoming Feeder from S/U Transf No. 2A

/R3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A" (continued)

ISOLATION SWITCHES

6900V SWGR 2B1 - Turbine Building Switchgear Room

1. Incoming Feeder from S/U Transf No. 2B

/R3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

APPENDIX "A" (continued)

ISOLATION SWITCHES

AFW PUMP AREA

1. MV-08-19B (Atmospheric Dump Valve)
2. MV-08-18B (Atmospheric Dump Valve)
3. MV-08-18A (Atmospheric Dump Valve)
4. MV-08-19A (Atmospheric Dump Valve)

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A" (continued)

ISOLATION SWITCHES

4160V SWGR 2AB - Auxiliary Building Ground Floor

1. Component Cooling Water Pump No. 2C
2. Intake Cooling Water Pump No. 2C
3. Incoming Feeder from 4.16KV Bus 2A3
4. Incoming Feeder from 4.16KV Bus 2B3

/R3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A" (continued)

ISOLATION SWITCHES

480V Load Center 2AB - Auxiliary Building Ground Floor

1. Bus Tie to 480V L.C. 2A2 (Left End of Panel) /R3
2. 2C Charging Pump
3. Bus Tie to 480V L.C. 2B2

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A" (continued)

ISOLATION SWITCHES

2A Diesel Generator Control Panel

1. Voltage Control
2. Frequency Control
3. Start Circuit

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

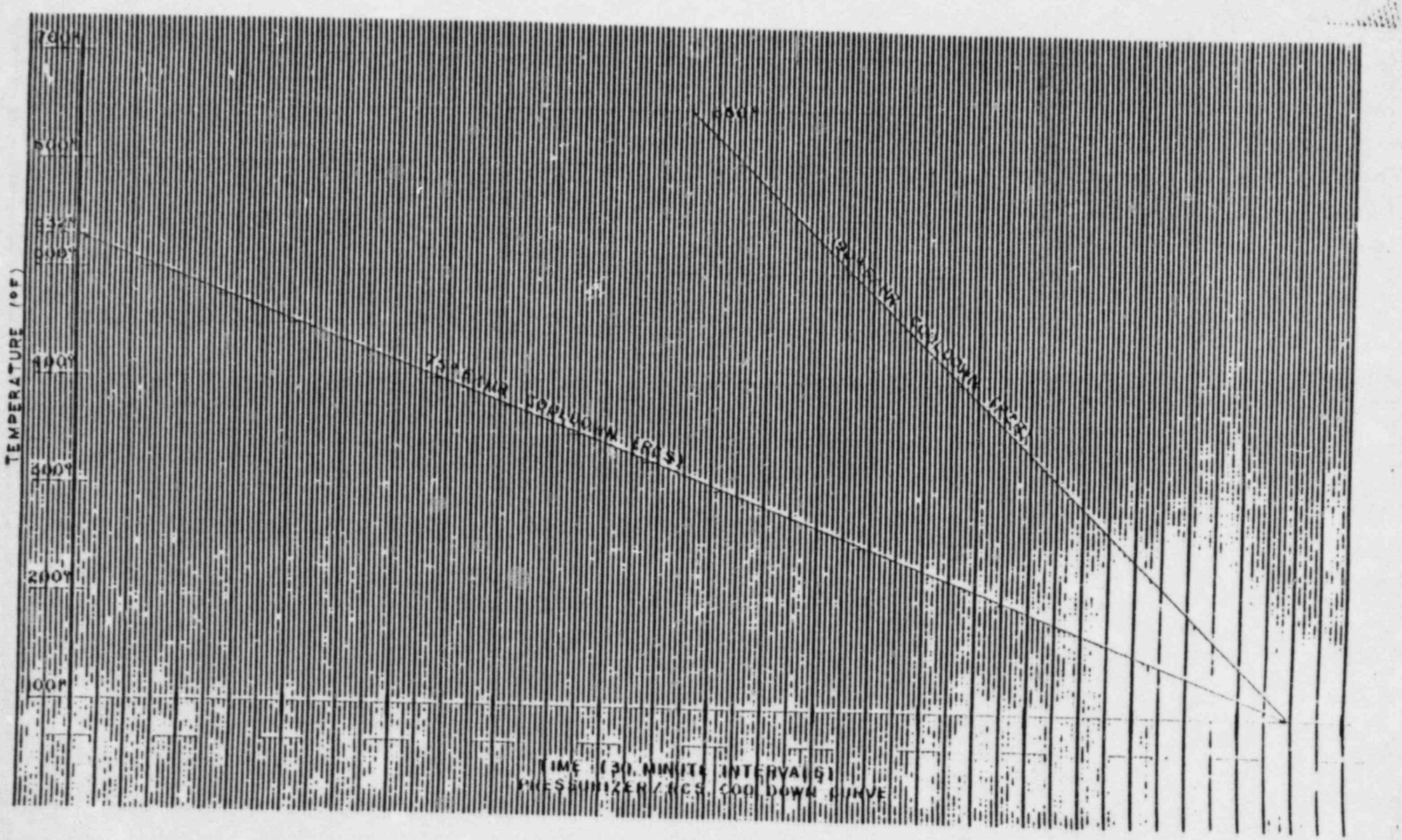
APPENDIX "A" (continued)

ISOLATION SWITCHES

2B Diesel Generator Control Panel

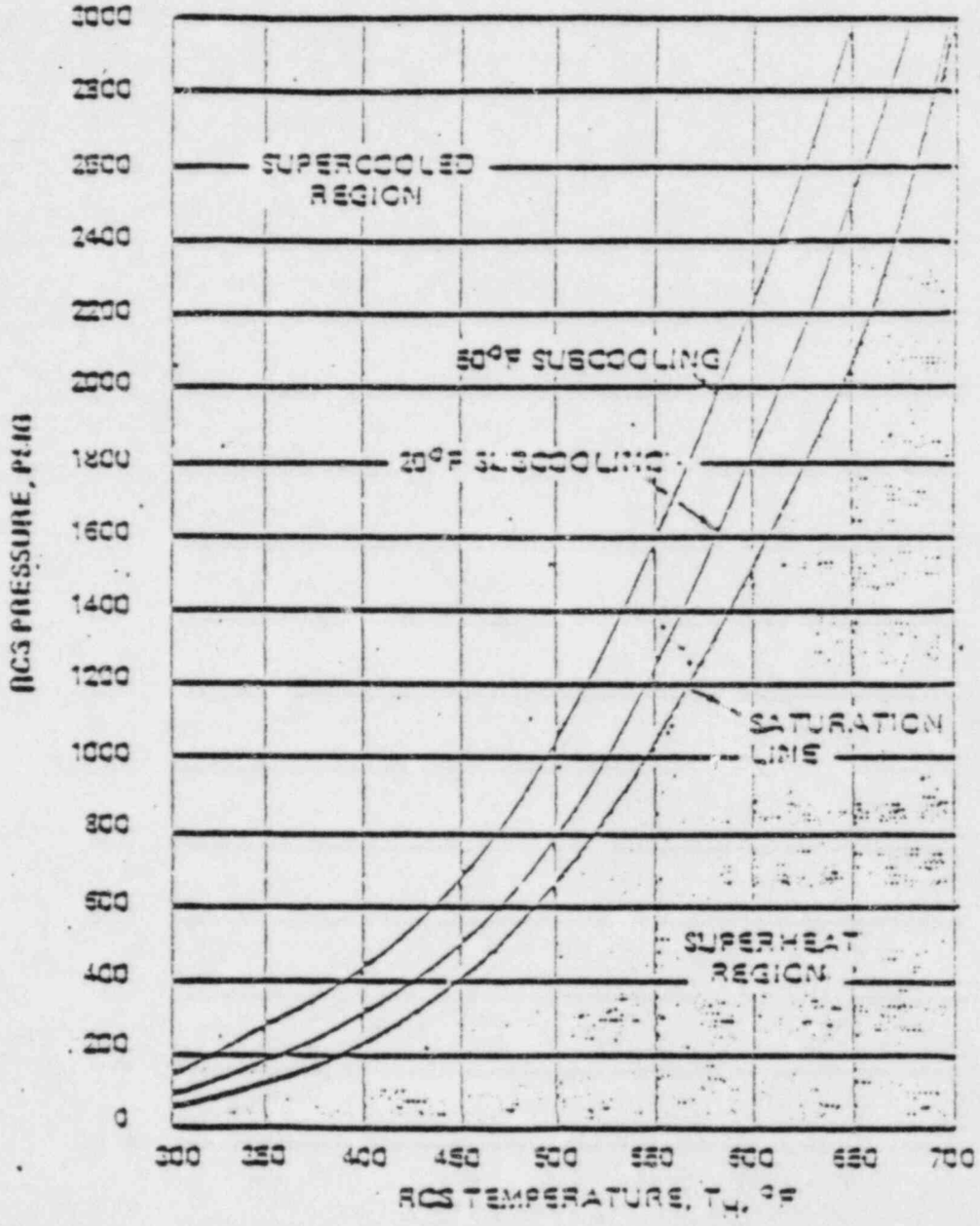
1. Voltage Control
2. Frequency Control
3. Start Circuit

ST. LUCIE UNIT NO. 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY



ST. LUCIE UNIT NO. 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2



ST. LUCIE UNIT NO. 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

2

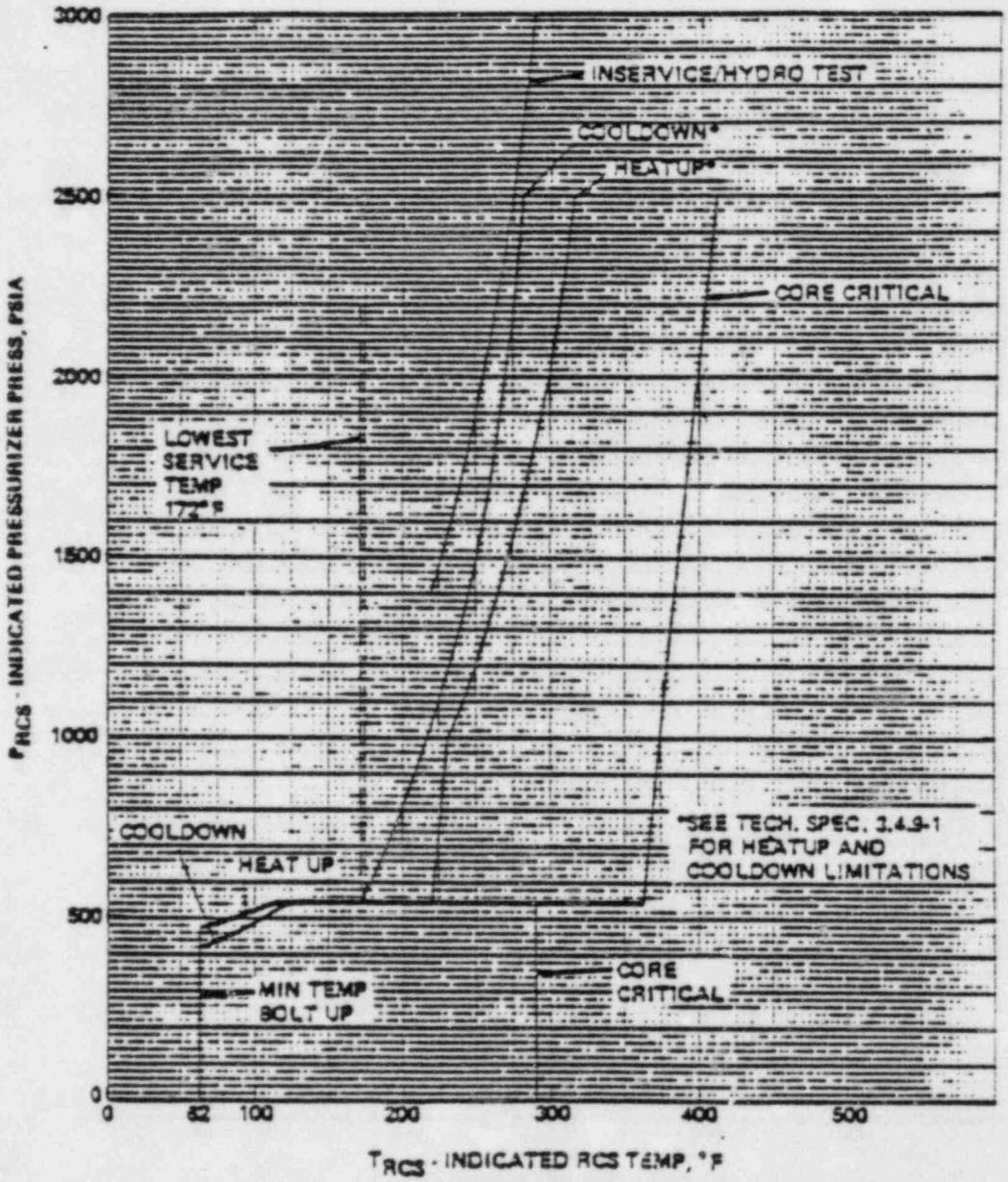


FIGURE 3.4-3

REACTOR COOLANT SYSTEM
PRESSURE TEMPERATURE LIMITATIONS
2 TO 10 YEARS OF OPERATION

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

DOCUMENT TITLE Control Room Inaccessibility

DOCUMENT FILE NUMBER 2-0030141

DOCUMENT REVISION NUMBER 4

DOCUMENT DISTRIBUTED ON 5-9-83
DATE

DOCUMENT SENT TO:

2

COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED	COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED
	MASTER			UNCONTROLLED COPIES	
1	D. A. Sager				
2					
3				NRC - Region II	
4				Attn: EPPS Branch Chief	
5	N. G. Roos			H. Paduano - GO	
6	TSC			A. W. Bailey	
7	HOT SHUTDOWN PANEL			G. Anglenart - CE	
8	LOW LEVEL R.A.B. -5' Aux F.W. Pumps				
9	~~Turbine Switchgear Room~~				
10	Control Room II				
11	Turbine Switchgear Rm			G. Regal	
12				A. Ugelow - Backfit	
13				Training - Larry Baker	
14					
15	Training				
				J. Spodick	
				T. Vogan - GO	
				G. J. Boissy	
				R. R. Jennings	
				E. M. Mercer	
				Resident NRC	
				NRC - IE: HQ	
				Attn: Chief, Nuclear Response Branch	
				C. Burns - CE	

PROCESSED BY: [signature] DATE

EMERGENCY PROCEDURE
2-0030141 REV. 4
CRI

2

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141
REVISION 4

CONTROL ROOM INACCESSIBILITY
(CRI)

TOTAL NO. OF PAGES 42

2

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141
REVISION 4

1.0 TITLE:

CONTROL ROOM INACCESSIBILITY

2.0 SYMPTOMS:

Conditions exist such that the Control Room becomes uninhabitable and must be evacuated.

3.0 IMMEDIATE AUTOMATIC ACTION:

None

4.0 IMMEDIATE OPERATOR ACTION:

	ACTION	NOTES
4.1	Manually trip the reactor and Turbine prior to leaving the Control Room, if possible.	4.1 Push buttons on RTGB-201 and 204.
4.2	Announce evacuation of the Control Room over the P.A. system.	
4.3	Implement the Emergency Plan, as necessary, in accordance with EPIP 3100021E, "Duties of the Emergency Coordinator".	
4.4	Obtain the Remote Shutdown Room Keybox Master Key from the Control Room Key Locker.	4.4 Key Number 2
4.5	Evacuate all personnel from the Control Room.	

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

5.0 SUBSEQUENT ACTIONS:

5.1 Man and take control of stations as follows: CHECK

1. Reactor Control Operator "A" - Remote Shutdown Panel

   A. Establish communications on the Sound Power Phone System. ___

   B. Monitor available plant parameters on the Remote Shutdown Panel. ___

   C. Start motor or steam-driven Auxiliary Feedwater Pumps and feed the Steam Generators as required. ___

   D. Control Pressurizer pressure and level by manual control of Pressurizer heaters, auxiliary spray valves, and letdown valves. ___

NOTE: Only the "P" Letdown level and pressure valves are controllable from the Remote Shutdown Panel.

2. Nuclear Plant Supervisor - Electrical Equipment Room, Reactor Auxiliary Building - 43' Elev.

   A. Open or check open Reactor Trip Breakers TCB-1 through 8. ___

   B. Place isolation switches in the ISOLATE position on the following switchgear in the order listed: (See Appendix A)

   480V Load Center 2A3 ___
   480V Load Center 2B3 ___
   480V Load Center 2A2 ___
   4160V Swgr. 2A3 ___
   480V MCC 2A5 ___
   480V MCC 2A6 ___
   480V Load Center 2B2 ___
   4160V Swgr. 2B3 ___
   480V MCC 2B6 ___
   480V MCC 2B5 ___
   480V MCC 2AB ___
   Isolation Panel 2AB ___
   Isolation Panel 2A ___
   Isolation Panel 2B ___
   Communications Isolation Panel ___

5.0 SUBSEQUENT ACTIONS: (continued)

5.1 (continued)

2. (continued)

CHECK

C. Assist Reactor Control Operator "A" in monitoring unit parameters from the Remote Shutdown Panel. ____

D. Open or check open:

480V Load Center 2A3 P-1 HTR Feed 2-40305 ____

480V Load Center 2B3 P-2 HTR Feed 2-40602 ____

3. Reactor Control Operator "B" - Turbine Operating Level

A. Locally trip or verify tripped Unit 2 Turbine. ____

B. Verify Turbine Stop Valves and Control Valves are shut. If not, initiate Turbine trip from Turbine front standard. ____

C. At the AFW Pump area, place the isolate switches for MV-08-19B, MV-08-18B, MV-08-18A, and MV-08-19A in ISOLATE. ____

D. Proceed to Turbine Building Switchgear Room and establish communications on the Sound Powered Phone circuit. ____

E. Place isolation switches in the ISOLATE position for bus feeder breakers as follows (See Appendix A):

4160V Swgr. 2A2 ____

4160V Swgr. 2B2 ____

6900V Swgr. 2A1 ____

6900V Swgr. 2B1 ____

F. Stop 2A and 2B Main Feedwater Pumps, 2A and 2B Heater Drain Pumps, and one Condensate Pump by opening their respective breakers. ____

CAUTION: Ensure that one Condensate Pump remains in service.

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

5.0 SUBSEQUENT ACTIONS: (continued)

5.1 (continued) CHECK

4. Nuclear Operator - Reactor Auxiliary Building

A. Place isolate switches in ISOLATE/LOCAL position on the following switchgear (see Appendix A):

4160V Swgr. 2AB ___

480V Load Center 2AB ___

B. Proceed to the Diesel Generator Building and place isolation switches on 2A and 2B Diesel Control Panels in ISOLATE position (see Appendix A). ___

C. Open or check open isolation valves for Letdown pressure and level control valves (V-2110P and V-2201P). Isolate V-2110Q and V-2201Q. ___

D. Proceed to the Charging Pump area and establish communications on the Sound Powered Phone circuit. ___

5.2 Maintain Pressurizer level at approximately 33% indicated level. ___

5.3 Maintain Pressurizer pressure at approximately 2100 psia. ___

5.4 Maintain Reactor Coolant System temperature at or below 532°F (2A cold leg temperature) by use of atmospheric steam dump and/or selective shutdown of Reactor Coolant Pumps. ___

NOTE: Stop Reactor Coolant Pumps as required by opening the Reactor Coolant Pump breakers in the Turbine Building Switchgear Room. ___

5.5 Maintain Steam Generator levels at approximately 65% indicated level by operation of the Auxiliary Feedwater Pumps and discharge valves to the Steam Generators. ___

5.6 Isolate Steam Generator blowdown by manually closing isolation valves at the Closed Blowdown Heat Exchangers. ___

5.7 When Turbine speed decreases to "0" RPM, verify that the Turning Gear Oil Pump and the turning gear are in operation. ___

5.8 Periodically check the habitability of the Control Room and when conditions permit, reoccupy the Control Room. Return isolation switches to NORMAL for switches and controls that are operational and maintain the Unit at Hot Standby until a complete evaluation has been made. ___

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

CHECK 2

5.0 SUBSEQUENT ACTIONS: (continued)

5.9 If Control Room accessibility is not possible, place the unit in a Cold Shutdown condition as follows:

1. Commence boration to Cold Shutdown conditions by manual valve lineup. Borate to 1900 ppm as shown below. Carry out boron sampling as required during cooldown. ____

NOTE: This concentration will ensure >5% Shutdown Margin at 201°F at any time in core life, assuming the most reactive CEA stuck full cut. Use both the local boron flow meters vs. time and BAM Tank level change to determine how many gallons of boron have been added. Do not interpolate values shown, always round critical boron concentration DOWN to next lower value on table.

NOTE: If plant curves are available, they may be used to determine shutdown boron concentration requirements instead of this Table.

Boron Concentration Prior to Control Room Inaccessibility	Number of Gallons of Boron needed to reach 1900 ppm	BAM Tank level change (1 BAM Tank)
50 PPM	7223 Gallons	75%
100 PPM	7039 Gallons	73%
200 PPM	6668 Gallons	70%
300 PPM	6295 Gallons	66%
400 PPM	5919 Gallons	62%
500 PPM	5442 Gallons	57%
600 PPM	5162 Gallons	54%
700 PPM	4779 Gallons	50%
800 PPM	4395 Gallons	46%
900 PPM	4008 Gallons	42%
1000 PPM	3618 Gallons	38%
1100 PPM	3226 Gallons	34%
1200 PPM	2832 Gallons	30%
1300 PPM	2435 Gallons	25%
1400 PPM	2036 Gallons	21%
1500 PPM	1634 Gallons	17%

2. Ensure Steam Generator level is being maintained at approximately 65% by the Auxiliary Feedwater Pumps. ____

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

5.0 SUBSEQUENT ACTIONS: (continued)

5.9 (continued)

CHECK

3. Stop at least one Reactor Coolant Pump prior to reaching 500°F by tripping its breaker at the 2A1 or 2B1 switchgear. Additional RCPs may be stopped as desired to control cooldown rate. After pump coastdown, stop the lift pumps by opening the associated breakers in the electrical switchgear room. Re-close lift pump breakers after one minute elapses. ____

4. Place all Pressurizer heater switches at the Remote Shutdown Panel to OFF. Heaters may be energized to control RCS pressure as needed. ____

5. The highest RCS cold leg temperature (highest one with RCP running) shall be plotted every 30 minutes. The copy of the graph (Figure 1) shall be kept with this procedure. The RCS temperature and pressure shall be determined to be within the limits of Figure 3.4-3 at least once per 30 minutes during cooldown. ____

NOTE: Cooldown of the RCS shall be limited to $\leq$75°F in any one hour period with RCS temperature >97°F.

6. The Pressurizer water phase temperature shall be plotted every 30 minutes using the Saturated Temperature vs. Pressure curve of this procedure (Figure 2). If possible, maximize letdown and minimize charging when using auxiliary spray to minimize thermal stress on spray nozzle. ____

NOTE: Cooldown of the Pressurizer shall be limited to $\leq$190°F in any one hour period.

7. When the quantity of boron calculated in Step 5.9.1 has been added, cooldown may proceed. Verify by chemistry sample (if possible) that desired boron concentration has been obtained. Commence taking data on cooldown curve. Have the "B" Reactor Control Operator break Condenser vacuum by manually opening vacuum breaker MOVs. ____

CAUTION: MSIS will occur at about 475°F, and sealing steam will be lost. Condenser vacuum must be broken prior to 475°F to prevent seal damage.

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

5.0 SUBSEQUENT ACTIONS: (continued)

5.9 (continued) CHECK

8. Have I & C personnel install temporary VCT level monitoring equipment. While locally monitoring and controlling VCT level, slowly open the atmospheric steam dumps and establish the desired cooldown rate. ___

NOTE: A makeup blend ratio to the VCT of about 9:1 is sufficient to maintain 1900 PPM boron in the RCS.

NOTE: A temperature differential of approximately 100°F between the RCS and Pressurizer should be maintained during cooldown. Cooldown of the Pressurizer must be accomplished by use of auxiliary spray and heater control.

9. When the SIAS amber permissive lights come on (1836 psia), block SIAS by turning the key operated switch on the Remote Shutdown Panel for both A and B channels. ___

10. At 1750 psia, isolate and bypass the following transmitters:

A. Charging header flow: close valve marked "HIGH SIDE", open valve marked "BYPASS", and close valve marked "LOW SIDE". ___

B. Charging header pressure: close its isolation valve. ___

11. Commence venting all four SITs from remote valve stations in the Electrical Penetration Room. (Valves 3733, 3734, 3735, 3736, 3737, 3738, 3739 and 3740). ___

NOTE: Do not vent more than one SIT to <235 psig.

12. Maintain at least two Reactor Coolant Pumps operating. If possible, two RCPs in the same loop should be left running. ___

13. Periodically adjust the steam dump controllers and auxiliary spray control to maintain the desired cooldown and de-pressurization rate. Verify that the Steam Generators are being maintained at approximately 65% level. ___

14. With RCS pressure <1700 psia, but prior to commencing SDC operations, rack out 2A and 2B Containment Spray Pump breakers (2-20203 and 2-20407). ___

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

5.0 SUBSEQUENT ACTIONS: (continued)

5.9 (continued)

CHECK

15. When RCS temperature is <500°F and RCS pressure is <1500 psia, perform the following:

    A. Close 2-V-07145 and 2-V-07130 (Containment spray pump disch valves). ___

    B. Close the following containment spray header manual isolation valves:

    2-V-07161 (A hdr FCV upstream isol) ___

    2-V-07164 (B hdr FCV upstream isol) ___

    2-V-07162 (A hdr FCV downstream isol) ___

    2-V-07165 (B hdr FCV downstream isol) ___

16. When RCS pressure is <275 psia, rack in the breakers and then close the SIT discharge valves by placing the local control switch in the CLOSE position.

    MV-3614: Bkr. 2-41219 ___

    MV-3624: Bkr. 2-41311 ___

    MV-3634: Bkr. 2-42117 ___

    MV-3644: Bkr. 2-42048 ___

17. Rack out the SIT discharge valve breakers. ___

    CAUTION: Prior to lowering RCS pressure below (later) psia, two RCPs in the same loop must be operating.

18. Lower RCS temperature to 325°F and RCS pressure to 275 psia. ___

19. Rack out one HPSI Pump prior to 280°F. Ensure the other HPSI pump remains operable. ___

    CAUTION: With SDC in service, an increase in RCS pressure >350 psia will result in rapid RCS inventory loss due to lifting of relief valves in Hot Leg suction lines (Total capacity 4,600 gpm).

    NOTE: Minimum pressure for RCP operation is (later), so it is necessary to proceed quickly to Shutdown Cooling.

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

5.0 SUBSEQUENT ACTIONS: (continued)

5.9 (continued)

CHECK

20. Stop the operating RCPs prior to lowering pressure to (later) by tripping the breakers on 2A1 and 2B1 switchgear. After pump coastdown, stop the oil lift pumps by opening the breaker for each pump for one minute, then re-closing the breaker. ___

21. Reduce RCS pressure to <275 psia, then open the following valves from their local controllers:

    A. Hot Leg Suction Valves: V-3651, V-3652, V-3665, V-3480, V-3481, V-3664. ___

       NOTE: V-3664 and V-3665 local controllers are in Pipe Penetration Room; all others are in the Cable Spreading Room.

       NOTE: V-3545 (Hot Leg Suction Cross-Tie) is normally closed. It may be used to provide flow during off-normal conditions and must be open if both trains of SDC are in service.

    B. Open CCW from SDC Heat Exchangers: HCV-14-3A and HCV-14-3B by isolating instrument air to the HCVs and bleeding off air pressure. ___

    C. SDC Heat Exchanger Discharge Valves: MV-3456 and MV-3457. ___

    D. LPSI Header Isolation Valves: MV-3615, MV-3625, MV-3635 and MV-3645. ___

22. Close the following valves:

    A. RWT recirculation stop valves: V-3459, V-3463, and V-3597. ___

    B. Miniflow header stop valves: V-3659, V-3660, V-3495 and V-3496. ___

    C. V-3432 and V-3444 LPSI suction from RWT. ___

23. Have the Nuclear Operator establish communications on the Sound Power Phone System in the 2A LPSI Pump Room. ___

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

5.0 SUBSEQUENT ACTIONS: (continued)

5.9 (continued)

CHECK

24. Establish SDC as follows:

    A. Insert keys for MV-3306 and MV-3657 (controllers located in A LPSI Room) and place switches to MODULATE position. ____

    B. Using Key switches at local controllers, open MV-3517 and MV-3658. ____

    C. Give MV-3306 a three second open signal, then allow switch to return to NORMAL. ____

    D. Start the 2A LPSI Pump, then open MV-3306 to obtain 3000 gpm flow as indicated on FI-3306 at the Remote Shutdown Panel. ____

    E. While observing SDC outlet temperature and flow on the Remote Shutdown Panel, alternately open MV-3657 and close MV-3306 to achieve desired cooldown rate and maintain 3000 gpm. ____

25. At 200°F RCS temperature, remove the trip and close fuses on the remaining HPSI Pump. Open the breaker for one Charging Pump so that no more than two Charging Pumps are operable. ____

26. Stabilize RCS temperature at approximately 100°F and RCS pressure at approximately 250 psia. Control pressure by use of Pressurizer heaters and auxiliary spray. Do not take the Pressurizer solid until Control Room access has been re-established. ____

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

6.0 PURPOSE AND DISCUSSION:

6.1 This procedure provides instructions for placing the plant in a safe condition when operations cannot safely be conducted from the Control Room.

6.2 The reactor and turbine are manually tripped prior to leaving the Control Room, if possible, or locally from the Reactor Trip Switchgear and the Turbine front standard.

6.3 A heat sink is provided by automatic steam dump to the Condenser and/or to atmosphere.

6.4 Level is maintained in the Steam Generators by manual control of auxiliary feedwater valves with flow furnished by the Auxiliary Feedwater Pumps.

6.5 Pressurizer level and pressure are maintained by manual control of Pressurizer heaters, auxiliary spray valves, and letdown valves, and are monitored at the Remote Shutdown Panel.

6.6 Isolation switches located in the Reactor Auxiliary Building Electrical Equipment Room, Turbine Building Switchgear Room, Diesel Generator Rooms, and Reactor Auxiliary Building are manually selected to the ISOLATE position to prevent inadvertant operation of vital equipment due to possible electrical malfunction in the unattended Control Room.

6.7 A copy of this procedure will be posted at each manned operating station required for plant shutdown from outside the Control Room.

6.8 A listing of isolation switches will be posted on each of the following panels, MCCs, and distribution buses.

1. Load Centers 2A, 2B, 2AB
2. Transfer Panels 2A, 2B, 2AB
3. MCC 2A5, 2A6, 2B5, 2B6
4. 4160V Buses 2A3, 2B3, 2AB
5. 4160V Buses 2A2, 2B2
6. 6900V Buses 2A1, 2B1
7. Diesel Generator 2A and 2B Control Panels

6.9 The Nuclear Plant Supervisor will utilize additional personnel as available to assist in required subsequent actions.

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

7.0 REFERENCES:

7.1 Emergency Operating Procedure 1-0030141

7.2 St. Lucie Unit 2 Technical Specifications

8.0 RECORDS:

8.1 A completed, initialed copy of this procedure shall be retained in the plant file.

9.0 APPROVAL:

Reviewed by Facility Review Group October 26 1982

Approved by J. H. Barrow (for) Plant Manager October 26 1982

Revision 4 Reviewed by FRG 5/6 1983

Approved by J H Barrow for Plant Manager 5/6 1983

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"

ISOLATION SWITCHES

480V Load Center 2A3 - Pressurizer Heater Bus, Auxiliary Building Electrical Equipment Room

1. Pressurizer Backup Heater Bank B-1
2. Pressurizer Backup Heater Bank B-2
3. Pressurizer Backup Heater Bank B-3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0230141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

480V Load Center 2B3 - Pressurizer Heater Bus, Auxiliary Building Electrical Equipment Room

1. Pressurizer Backup Heater Bank B-4
2. Pressurizer Backup Heater Bank B-5
3. Pressurizer Backup Heater Bank B-6

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

480V Load Center 2A2 - Auxiliary Building Electrical Equipment Room

1. Station Service Transf 2A2 Main Breaker
2. Bus Tie to 480V L.C. 2AB
3. Containment Fan Cooler 2-HVS-1A
4. Charging Pump 2A

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

480V Load Center 2A5 - Auxiliary Building Electrical Equipment Room

1. Containment Fan Cooler 2-HVS-1B

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

4160V SWGR 2A3 - Auxiliary Building Electrical Equipment Room

1. HP Safety Injection Pump No. 2A
2. LP Safety Injection Pump No. 2A
3. Containment Spray Pump No. 2A
4. Pressurizer Heater Transf No. 2A3
5. CEDM Cooling Fan 2HVE-21A
6. Component Cooling Water Pump No. 2A
7. Intake Cooling Water Pump No. 2A
8. Feeder to 4.16KV Bus No. 2AB
9. Feeder from 4.16KV Bus No. 2A2
10. Feed to 480V SS Transformer 2A2/2A5
11. Emergency Diesel Generator No. 2A
12. Auxiliary Feedwater Pump No. 2A

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

480V MCC 2A5 - Auxiliary Building Electrical Equipment Room

* 1. Makeup Bypass to Charging Pumps V-2514 (Emergency Borate)

2. Aux. F.W. Pump 2A Discharge Valve to S/G 2A (MV-09-9 and I-SE-09-2)

3. S/G #2B to AFWP-2C Turbin MV-08-12

4. Comp Cool Wtr to Cont Cool Unit 2A Valve MV-14-9

5. Comp Cool Wtr from Cont Cool Unit 2A MV-14-10

* 6. Comp Cool Wtr Cont Cool Unit 2B MV-14-11

* 7. Comp Cool Wtr from Cont Cool Unit 2B Valve MV-14-12

*NOTE: Switch 1, 6, and 7 must be in ISOLATE to have remote control of 2A charging pump.

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

480V MCC 2A6 - Auxiliary Building Electrical Equipment Room

1. Boric Acid Makeup Pump 2A
2. Boric Acid Makeup Pump 2B
3. Control Room Air Cond Unit 2HVA/ACC 3A
4. Shield Bldg. Vent Exhaust Fan 2HVE-6A
5. Control Room Emerg. Filtration Fan 2HVE-13A
6. Containment Spray Isolation Valve MV-07-161
7. 2A LPSI Pump Suction Valve V-3444

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

480V Load Center 2B2 - Auxiliary Building Electrical Equipment Room

1. Station Service Transf. 2B-2 Main Breaker
2. Bus Tie to 480V L.C. 2AB
3. Containment Fan Cooler 2HVS-1C
4. Charging Pump 2B

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

480V Load Center ?B5 - Auxiliary Building Electrical Equipment Room

1. Containment Fan Cooler 2-HVS-1D

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

4160V SWGR 2B3 - Auxiliary Building Electrical Equipment Room

1. Emergency Diesel Generator No. 2B
2. Feed to 480V SS Transformer 2B2/2B5
3. Pressurizer Heater Transf No. 2B3
4. Component Cooling Water Pump No. 2B
5. HP Safety Injection Pump No. 2B
6. LP Safety Injection Pump No. 2B
7. Containment Spray Pump No. 2B
8. CEDM Cooling Fan 2HVE-21B
9. Feeder to 4160V Bus No. 2AB
10. Intake Cooling Water Pump No. 2B
11. Incoming Feeder from 4.16KV Bus 2B2
12. Auxiliary Feedwater Pump No. 2B

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

480V MCC 2B6 - Auxiliary Building Electrical Equipment Room

1. 2HVE-13B - Control Room Booster Fan
2. Control Room Air Cond 2HVA-3B
3. Containment Spray Isolation Valve (MV-07-164)
4. Shield Bld Vent Exh Fan 2HVE-6B
5. 2B LPSI Pump Suction Valve (V-3432)

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

480V MCC 2B5 - Auxiliary Building Electrical Equipment Room

1. CCW to Containment Fan Cooler 2HVS-1C (MV-14-13)
2. CCW from Containment Fan Cooler 2HVS-1D (MV-14-14)
* 3. Boric Acid Gravity Feed Valve (V-2508)
4. Boric Acid Gravity Feed Valve (V-2509)
* 5. CCW to Containment Fan Cooler 2HVS-1D (MV-14-15)
6. CCW from Containment Fan Cooler 2HVS-1D (MV-14-16)
7. 2B AFW Pump Discharge to 2B Steam Generator (MV-09-10 and I-SE-09-3) (Back of MCC 2B5)
8. 2A Steam Generator to 2C AFW Pump Turbine (MV-08-13) (Back of MCC 2B5)

*NOTE: Switch 3 and 5 must be in ISOLATE to have remote control of 2B charging pump.

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

480V MCC 2AB - Auxiliary Building Electrical Equipment Room

1. Component Cooling Water Suction Valve Hdr. A (MV-14-3)
2. Component Cooling Water Suction Valve Hdr. B (MV-14-4)
3. Component Cooling Water Discharge Valve Hdr. A (MV-14-1)
* 4. Component Cooling Water Discharge Valve Hdr. B (MV-14-2)
* 5. Control Room Air Cond Unit 2-HVA/ACC 3C

*NOTE: Switch 4 and 5 must be in ISOLATE to have remote control of 2C charging pump.

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

Transfer Panel 2AB - Auxiliary Building Electrical Equipment Room
(2AB Battery Room)

1. 2C Aux Feed Pump Stop Valve MV-08-3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

Transfer Panel 2A - Auxiliary Building Electrical Equipment Room

1. 2A Steam Gen Atms Steam Dump PIC-08-1A1
2. 2A Steam Gen Atms Steam Dump PIC-08-1A1
3. SS-1-157 - Letdown Cont Isol Valve (V-2516)
4. SS-1-189 - Aux Spray Valve (I-SE-02-3)
5. SS-194 - Charging Line Isol Valve (V-2523)
6. 2A Diesel Gen Watt/Volt Meter
7. SS-1-176 - Charging to Loop 2A2 (I-SE-02-02)
8. 2C AFW Pmp Discg to 2B Steam Gen (MV-09-12 and I-SE-09-5)
9. 2B Steam Generator Atms Steam Dump PIC-08-3A1

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

Transfer Panel 2B - Auxiliary Building Electrical Equipment Room

1. 2B Steam Gen Atms Steam Dump PIC-08-1B1 /R4
2. 2B Steam Gen Atms Steam Dump PIC-08-1B1 /R4
3. SS-2-157 - Letdown Stop Valve (V-2515)
4. SS-2-189 - Aux Spray Valve (I-SE-02-04)
5. SS-1-194 - Letdown Cont Isol Valve (V-2522)
6. 2B Diesel Gen Watt/Volt meter
7. SS-2-176 - Charging to Loop 2B1 (I-SE-02-01)
8. 2C AFW Pump Disch to 2A Steam Gen (MV-09-11 and I-SE-09-4)
9. 2A Steam Gen Atms Steam Dump PIC-08-3B1

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

Communications Isolation Panel - Auxiliary Building Communications Room

1. Fire Alarm/Site Evacuation - (Control Console, Isolation Switch)

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

4160 SWGR 2A2 - Turbine Building Switchgear Room

1. Feeder to 480V SWGR No. 2A1
2. Feeder to 4.16KV Bus No. 2A3
3. Incoming Feeder from 4.16KV SWGR 2A4

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

4160V SWGR 2B2 - Turbine Building Switchgear Room

1. Feeder to 480V SWGR No. 2B1
2. Feeder to 4.16KV Bus No. 2B3
3. Incoming Feeder from 4.16KV SWGR 2B4

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

6900V SWGR 2A1 - Turbine Building Switchgear Room

1. Incoming Feeder from S/U Transf No. 2A

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

6900V SWGR 2B1 - Turbine Building Switchgear Room

1. Incoming Feeder from S/U Transf No. 2B

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

APPENDIX "A"
(continued)

ISOLATION SWITCHES

AFW PUMP AREA

1. MV-08-19B (Atmospheric Dump Valve)
2. MV-08-18B (Atmospheric Dump Valve)
3. MV-08-18A (Atmospheric Dump Valve)
4. MV-08-19A (Atmospheric Dump Valve)

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

4160V SWGR 2AB - Auxiliary Building Ground Floor

1. Component Cooling Water Pump No. 2C
2. Intake Cooling Water Pump No. 2C
3. Incoming Feeder from 4.16KV Bus 2A3
4. Incoming Feeder from 4.16KV Bus 2B3

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

480V Load Center 2AB - Auxiliary Building Ground Floor

1. Bus Tie to 480V L.C. 2A2 (Left End of Panel)
2. 2C Charging Pump
3. Bus Tie to 480V L.C. 2B2

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

2A Diesel Generator Control Panel

1. Voltage Control
2. Frequency Control
3. Start Circuit

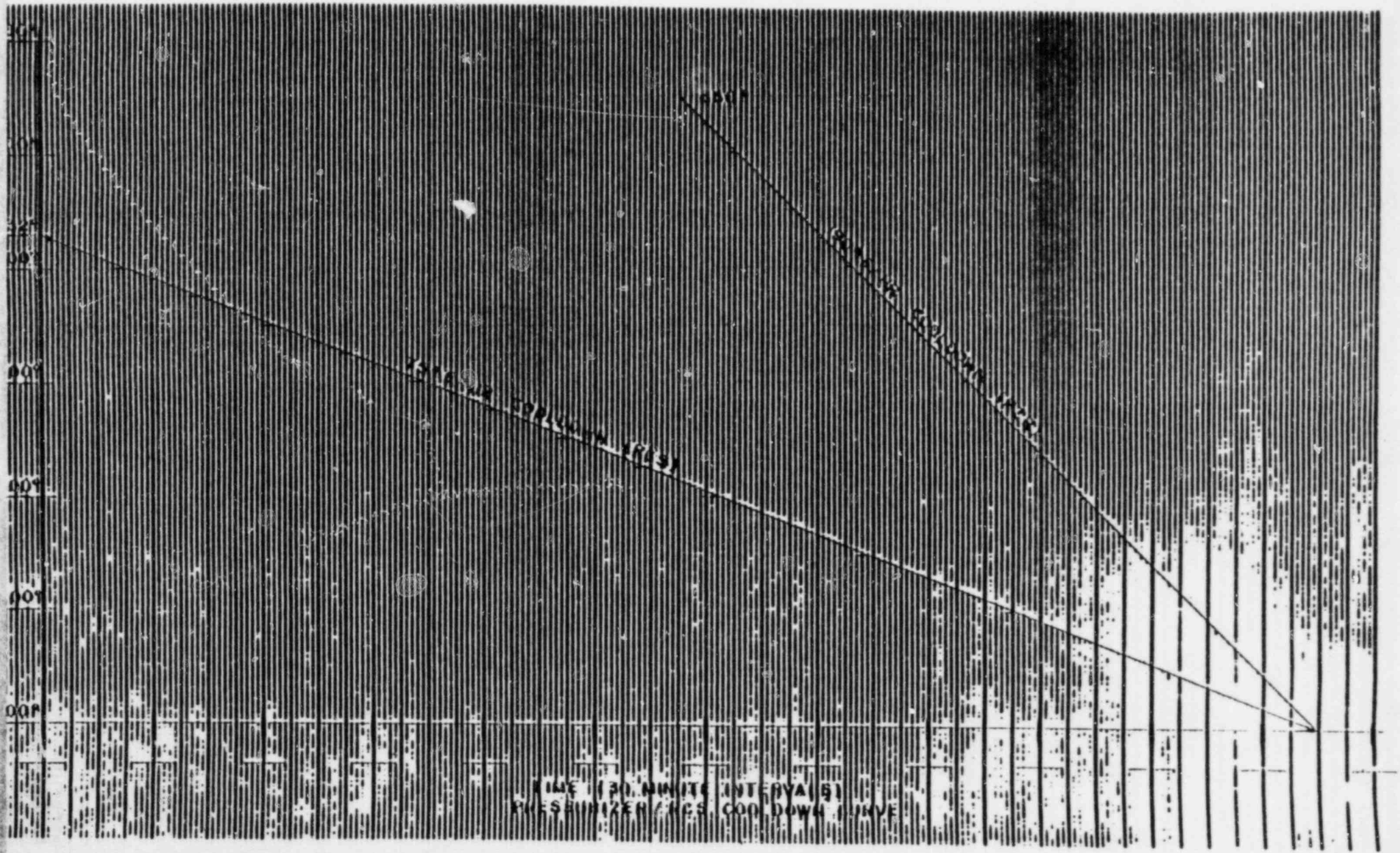
2

APPENDIX "A"
(continued)

ISOLATION SWITCHES

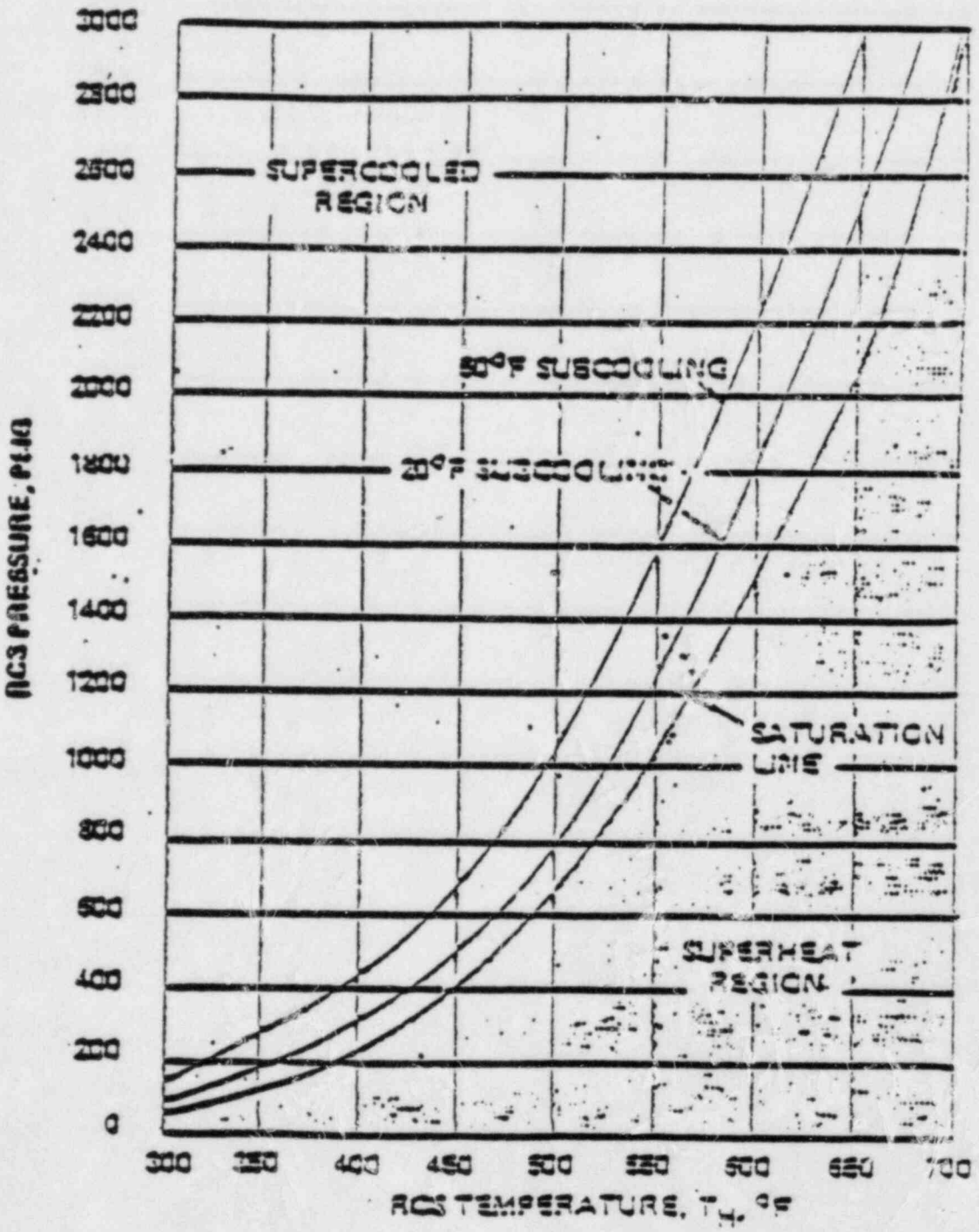
2B Diesel Generator Control Panel

1. Voltage Control
2. Frequency Control
3. Start Circuit


TIME (30 MINUTE INTERVALS)
PRESSURIZER / HCS COOLDOWN CURVE

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NO. 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

2



ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NO. 2-0030141, REVISION 4
CONTROL ROOM INACCESSIBILITY

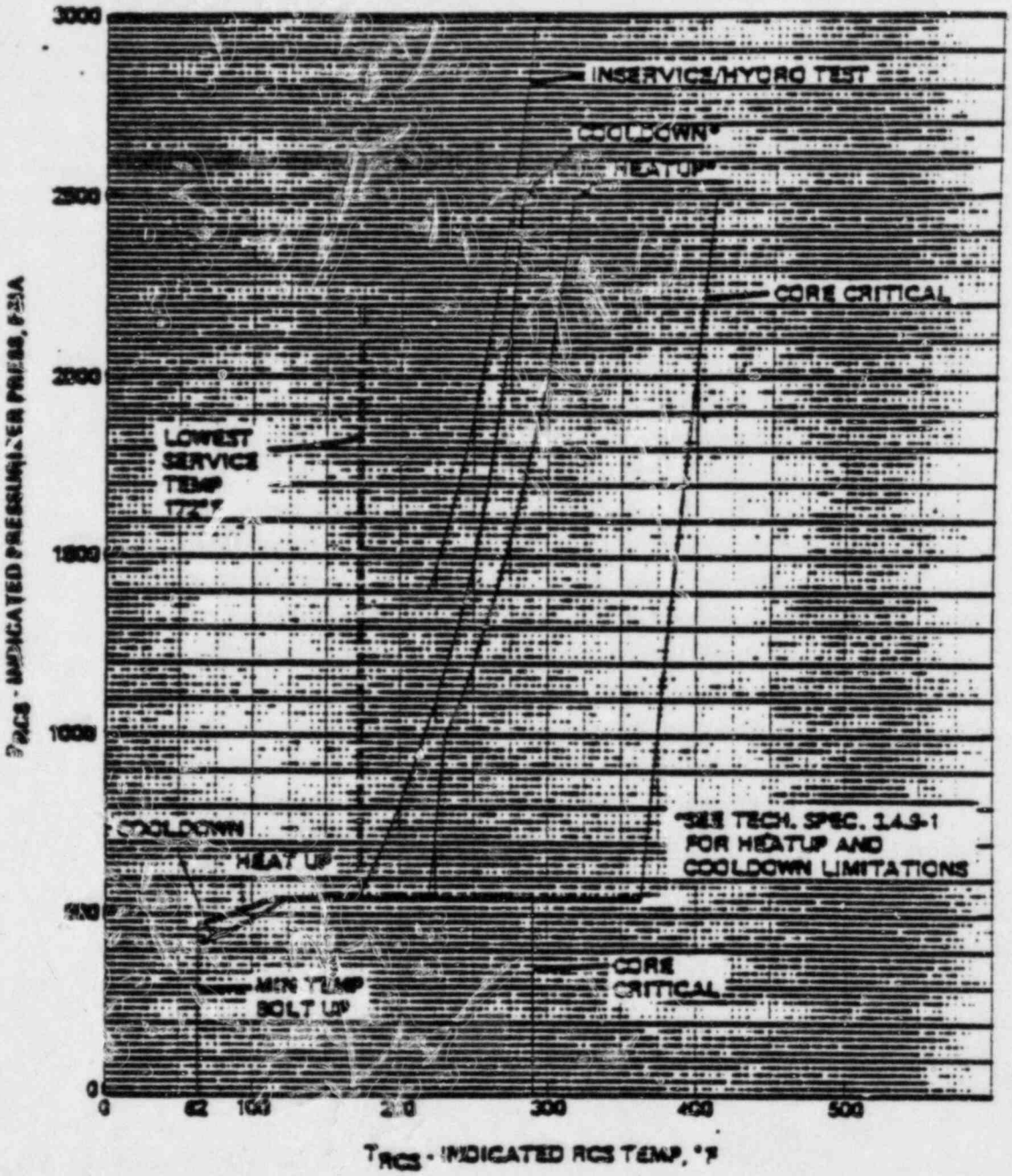


FIGURE 3.4-3

REACTOR COOLANT SYSTEM
PRESSURE TEMPERATURE LIMITATIONS
0 TO 10 YEARS OF OPERATION

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

DOCUMENT TITLE CEA OFF-NORMAL OPERATION AND REALIGNMENT

DOCUMENT FILE NUMBER 2-0110030

DOCUMENT REVISION NUMBER 2

DOCUMENT DISTRIBUTED ON 5-9-83
DATE

DOCUMENT SENT TO:

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

PROCESSED BY: Haller DATE _____

2

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0110030
REVISION 2

1.0 TITLE:

CEA OFF-NORMAL OPERATION AND REALIGNMENT

2.0 APPROVAL:

Reviewed by Facility Review Group March 10 1983

Approved by C. M. Wethy Plant Manager March 10 1983

Revision 2 Reviewed by FRG 5/5 1983

Approved by J H Barrow Plant Manager 5/6 1983

3.0 PURPOSE AND DISCUSSION:

3.1 Purpose:

This procedure provides instructions for operator action during abnormal operation and realignment of Control Element Assemblies (CEA).

3.2 Discussion:

1. The action statements applicable to a stuck or untrippable CEA, to two or more inoperable CEAs and to a large misalignment ($\geq$15 inches) of two or more CEAs, require a prompt shutdown of the reactor since either of these conditions may be indicative of a possible loss of mechanical functional capability of the CEAs and in the event of a stuck or untrippable CEA, the loss of Shutdown Margin.

2. For small misalignments (<15 inches) of the CEAs, there is 1) a small effect on the time dependent long term power distributions relative to those used in generating LCOs and LSSS setpoints, 2) small effect on the available Shutdown Margin, and 3) a small effect on the ejected CEA worth used in the safety analysis. Therefore, the action statement associated with small misalignments of CEAs permits a 1 hour time interval during which attempts may be made to restore the CEA to within its alignment requirements. The one hour time limit is sufficient to (1) identify causes of a misaligned CEA, (2) take appropriate corrective action to realign the CEAs and (3) minimize the effects of xenon redistribution.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0110030, REVISION 2
CEA OFF-NORMAL OPERATION AND REALIGNMENT

2

3.0 PURPOSE AND DISCUSSION: (Cont.)

3.1 (Cont.)

3. Overpower margin is provided to protect the core in the event of a large misalignment ($\geq$15 inches) of a CEA. However, this misalignment would cause distortion of the core power distribution. This distribution may, in turn, have a significant effect on 1) the available Shutdown Margin, 2) the time dependent long term power distributions relative to those used in generating LCOs and LSSS setpoints, and 3) the ejected CEA worth used in the safety analysis. Therefore, the action statement associated with the large misalignment of a CEA requires a prompt realignment of the misaligned CEA.

4. The action statements applicable to misaligned or inoperable CEAs include requirements to align the operable CEAs in a given group with the inoperable CEA. Conformance with these alignment requirements bring the core, within a short period of time, to a configuration consistent with that assumed in generating LCO and LSSS setpoints. However, extended operation with CEAs significantly inserted in the core may lead to perturbations in 1) local burnup, 2) peaking factors, and 3) available Shutdown Margin which are more adverse than the conditions assumed to exist in the safety analyses and LCO and LSSS setpoint determination. Therefore, time limits have been imposed on operation with inoperable CEAs to preclude such adverse conditions from developing.

4.0 SYMPTOMS:

4.1 Upon observation from ADS, digital position indicators, or data processor, one or more CEAs are misaligned, dropped, or slipped.

4.2 CEA position deviation alarm.

4.3 CEA motion inhibit alarm.

4.4 Dropped CEA alarm.

4.5 AWP alarm.

4.6 PDIL and PPDIL alarms.

4.7 Group out of sequence alarm.

4.8 Short term, steady state insertion alarm.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0110030, REVISION 2
CEA OFF-NORMAL OPERATION AND REALIGNMENT

2

5.0 INSTRUCTIONS:

5.1 CEA inoperable or misalignment of greater than 7.0 inches but less than 15.0 inches.

5.1.1 Immediate Automatic Action:

1. CEA motion inhibit.

5.1.2 Immediate Operator Action:

1. Place CEDs control panel in OFF.

2. Determine if any mismatch exists between reactor power and turbine power. If a mismatch exists, adjust turbine power to equal reactor power.

5.1.3 Subsequent Operator Action:

1. Determine from symptoms and CEA position indications the cause of the inoperability or if the CEA is operable but misaligned, in accordance with Appendix "B".

2. Ensure automatic functions have initiated.

3. Determine Shutdown Margin within one hour after detection of an inoperable CEA to be greater than the Shutdown Margin specified in Technical Specification 3.1.1.1 and once per 12 hours thereafter.

4. If excessive friction or mechanical interference prevents movement of the CEA or the CEA is untrippable, be in Hot Standby in six hours. See OP #2-0030125, "Turbine Shutdown Full Load to Zero Load".

5. If one or more CEAs are inoperable due to other reasons than stated in Step 5.1.3.4, declare inoperable within one hour and realign remainder of operable CEAs in group within 7.0 inches of inoperable CEAs, without violating CEA sequence and insertion limits, within one hour (or be in Hot Standby within 6 hours). Operation in Modes 1 and 2 may continue provided the thermal power level is restricted pursuant to Technical Specification 3.1.3.6 during subsequent operation and the Shutdown Margin requirement of Technical Specification 3.1.1.1 is determined at least once per 12 hours.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0110030, REVISION 2
CEA OFF-NORMAL OPERATION AND REALIGNMENT

2

5.0 INSTRUCTIONS: (Cont.)

5.1 (Cont.)

5.1.3 (Cont.)

6. If CEAs are functioning properly, realign CEA(s) within one hour, in accordance with Appendix "A".

CAUTION: If CEA(s) become misaligned by 15 inches or more, but does not drop while performing the above instruction, proceed to Section 5.2. If CEA(s) drop while performing the above instruction, proceed to Section 5.3.

5.2 One CEA misaligned by 15 inches or more but not a dropped CEA.

5.2.1 Immediate Automatic Action:

1. CEA motion inhibit.

5.2.2 Immediate Operator Action:

1. Place CEDS control panel in OFF.

2. Determine if any mismatch exists between reactor power and turbine power. If a mismatch exists, adjust turbine power to equal reactor power.

5.2.3 Subsequent Operator Actions:

1. Determine from symptoms and CEA position indications the cause of the inoperability or if the CEA is operable but misaligned, in accordance with Appendix "B".

2. Ensure automatic functions have initiated.

3. Refer to Plant Curve Book and obtain F_R^T value.

4. Within 15 minutes (25 minutes if F_R^T <1.5), restore the CEA (per Appendix A) to within 7.0 inches of all other CEAs in its group or reduce power to <70% of RATED THERMAL POWER within one hour of misalignment.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0110030, REVISION 2
CEA OFF-NORMAL OPERATION AND REALIGNMENT

2

5.0 INSTRUCTIONS: (Cont.)

5.2 (Cont.)

5.2.3 (Cont.)

5. Within one hour:

a) Restore to operable status within its specified alignment requirements (within 7.0 inches of other CEA's in its group) per Appendix A.

OR

b) Declare CEA inoperable and assure Shutdown Margin requirement of T.S. 3.1.1.1 is satisfied. Operation in Modes 1 and 2 may continue pursuant to the requirements of T.S. 3.1.3.6 provided within one hour:

* CAUTION: Prior to realigning the CEA, reduce power to <70% of the THERMAL POWER level prior to misalignment IF THE PRE-MISALIGNMENT ASI WAS MORE NEGATIVE THAN -0.15. /R2

1. Align the remainder of the CEA's in the group to within 7.0 inches of the inoperable CEA while maintaining the allowable CEA sequence and insertion limits shown in T.S. Figure 3.1-2.

2. The Shutdown Margin requirement of Specification 3.1.1.1 is determined at least once per 12 hours.

OR

c) Be in Hot Standby within 6 hours.

6. Determine Shutdown Margin within one hour after detection of an inoperable CEA to be greater than the Shutdown Margin specified in Technical Specification 3.1.1.1.

7. If excessive friction or mechanical interference prevents movement of the CEA, or the CEA is untrippable, be in Hot Standby in six hours. See OP #2-0030125, "Turbine Shutdown Full Load to Zero Load".

8. With more than one CEA inoperable or misaligned from any other CEA in its group by 15 inches (indicated position) or more, be in Hot Standby within 6 hours.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0110030, REVISION 2
CEA OFF-NORMAL OPERATION AND REALIGNMENT

2

5.0 INSTRUCTIONS: (Cont.)

5.3 Dropped CEA

5.3.1 Immediate Automatic Action:

1. CEA motion inhibit.

5.3.2 Immediate Operator Action:

1. Immediately reduce turbine load to match the reactor power and to return the plant conditions to within LCO's.

5.3.3 Subsequent Operator Action:

1. Determine from symptoms and CEA position indications the cause of the inoperability or if the CEA is operable but misaligned, in accordance with Appendix "B". During the determination of the cause of the dropped CEA the reactor power shall not be increased above the value present at the time the dropped CEA occurred.

2. Ensure automatic functions have initiated.

3. Refer to Plant Curve Book and obtain F_R^T value.

4. Within 15 minutes (25 minutes if F_R^T <1.5), restore the CEA (per Appendix A) to within 7.0 inches of all other CEA's in its group or reduce power to <70% of RATED THERMAL POWER within on hour of misalignment.

5. Within one hour:

a) Restore to operable status within its specified alignment requirements (within 7.0 inches of other CEA's in its group) per Appendix A.

OR

b) Declare CEA inoperable and assure Shutdown Margin requirements of T.S. 3.1.1.1 are satisfied. Operation in Modes 1 and 2 may continue pursuant to the requirements of T.S. 3.1.3.6.

* CAUTION: Prior to realigning the CEA, reduce power to <70% of the THERMAL POWER level prior to misalignment IF THE PRE-MISALIGNMENT ASI WAS MORE NEGATIVE THAN -0.15. /R2

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0110030, REVISION 2
CEA OFF-NORMAL OPERATION AND REALIGNMENT

2

5.0 INSTRUCTIONS: (Cont.)

5.3 (Cont.)

5.3.3 (Cont.)

5. (Cont.)

b) (Cont.)

1. Within one hour align the remainder of the CEA's in the group to within 7.0 inches of the inoperable CEA while maintaining the allowable CEA sequence and insertion limits shown in T.S. Figure 3.1-2.

2. The Shutdown Margin requirement of Specification 3.1.1.1 is determined at least once per 12 hours.

OR

c) Be in Hot Standby within 6 hours.

6. Determine Shutdown Margin within one hour after detection of an inoperable CEA to be greater than Shutdown Margin specified in Technical Specification 3.1.1.1.

7. If excessive friction or mechanical interference prevents movement of the CEA, or the CEA is untrippable, be in Hot Standby in six hours. See OP #2-0030125, "Turbine Shutdown Full Load to Zero Load".

8. With more than one CEAs inoperable or misaligned from any other CEA in its group by 15 inches (indicated position) or more, be in Hot Standby within 6 hours.

9. Upon ascertaining and correcting the cause for the dropped CEA, recovery of the CEA may be made.

CAUTION: The CEA should be recovered by a slow, smooth withdrawal using small increments of movement. Preferably, the movement increments should be three steps or less. The period of time for recovering the CEA should be approximately 10 minutes. Appropriate changes in RCS boron concentration should be made during the withdrawal of the CEA.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0110030, REVISION 2
CEA OFF-NORMAL OPERATION AND REALIGNMENT

5.0 INSTRUCTIONS: (Cont.)

5.3 (Cont.)

5.3.3 (Cont.)

9. (Cont.)

NOTE: Following the return of the CEA to its group, operation should be maintained at the existing power level for at least one hour in order to allow assessment of resultant power distributions and/or azimuthal tilts.# Upon ascertaining that a normal power distribution is present and that the plant conditions are normal, power may then be raised to the desired operating power.

Notify Reactor Engineering Supervisor.

NOTE: It may be necessary to operate at this reduced power level for as long as 24 to 36 hours in order to reduce the azimuthal oscillation and the resulting values of F_R^T, T_q, F_{XY}^T, and ASI resulting from a dropped CEA.

6.0 REFERENCES:

6.1 St. Lucie Unit 2 Technical Specifications

6.2 CEDMCS Tech Manual

7.0 RECORDS REQUIRED:

7.1 Normal log entries

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0110030, REVISION 2
CEA OFF-NORMAL OPERATION AND REALIGNMENT

2

APPENDIX A - CEA REALIGNMENT

1.0 Limits and Precautions:

1.1 Regulating CEAs should be withdrawn in sequence and overlap between groups shall not exceed 40 percent.

1.2 Do not exceed a sustained SUR of 1.4 DPM (alarm 1.3 DPM).

1.3 Criticality shall be anticipated any time CEAs are being withdrawn.

1.4 If deviation between CEAs in any group approaches 3 inches, stop group withdrawal and realign CEAs.

1.5 Individual CEA positions within the group shall be determined at least once per 12 hours except when the CEA position deviation circuit is out of service, then verify CEA positions at least once every four hours.

1.6 CEAs shall be limited in physical insertion as shown by Technical Specification Figure 3.1-2 (insertion limit curves).

2.0 Instructions:

2.1 Alignment of a CEA which is below its group, prior to criticality:

1. Utilizing MANUAL SEQUENTIAL control, insert the misaligned group a minimum of 4 inches.

2. Utilizing MANAUAL INDIVIDUAL control, withdraw the low CEA to the group position.

3. Monitor the position of all CEAs in the group for proper alignment.

2.2 Alignment of a CEA which is above its group, prior to criticality:

1. Utilize MANUAL INDIVIDUAL control, and insert the high CEA to the group position.

2. Monitor the position of all CEAs in the group for proper alignment.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0110030, REVISION 2
CEA OFF-NORMAL OPERATION AND REALIGNMENT

APPENDIX A - CEA REALIGNMENT (Cont.)

2.0 (Cont.)

2.3 Alignment of an above or below CEA with the reactor critical:

1. Utilize MANUAL INDIVIDUAL control to return the misaligned CEA to the group position.

2. If necessary, alternate between MANUAL INDIVIDUAL control of the misaligned CEA and MANUAL SEQUENTIAL control of its associated group to maintain the desired reactor power level.

3. Monitor the position of all CEAs in the group for proper alignment.

4. Utilize MANUAL GROUP control as required to readjust the group positions for proper automatic sequencing.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0110030, REVISION 2
CEA OFF-NORMAL OPERATION AND REALIGNMENT

2

APPENDIX B - DROPPED CEA INVESTIGATION

1.0 Determine that the dropped CEA is functional, select Manual Individual (MI) on the Mode Select switch, select the affected CEA on the Individual CEA Selection switches, and select the group of the affected CEA on the Group Select switch. Momentarily press the Bypass Enable push button and press and hold the CMI Bypass push button. Withdraw the affected CEA until the Core Mimic DRC light and the Lower Electric Limit light both deenergize. Insert and withdraw the affected CEA and check for smooth operation and normal indications. Reactor power shall not be increased above the value present at the time the dropped CEA occurred. If the affected CEA is determined to be functional realign the CEA per the dropped CEA procedure.

2.0 Guidelines for Investigating Dropped CEAs:

Dropped CEAs have occurred from:

A. Tripped CEA Disconnect

B. Loss of CEA Subgroup logic function

Symptoms

A. 1. CEA Disconnect in OFF, red light off, green light on.

2. CEA Disable lights red for affected CEA.

B. Timer Failure lights red for affected CEA.

Trouble Shooting

A. Call I & C specialist in.

B. Connect visicorder to coil monitor of affected CEA.

C. Close/check closed CEA disconnect of affected CEA and record trace of UG.

D. Check trace for proper SCR firing and proper coil current.

* E. If D is not satisfactory, troubleshoot UG circuits.

* F. If D is satisfactory, attempt to withdraw the CEA while recording Coil Monitor trace. Check traces for SCR firing, coil current, and timing. Troubleshoot as required.

* Place Subgroup of affected CEA on maintenance bus prior to troubleshooting that affects any of the other Subgroup CEAs.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0110030, REVISION 2
CEA OFF-NORMAL OPERATION AND REALIGNMENT

2

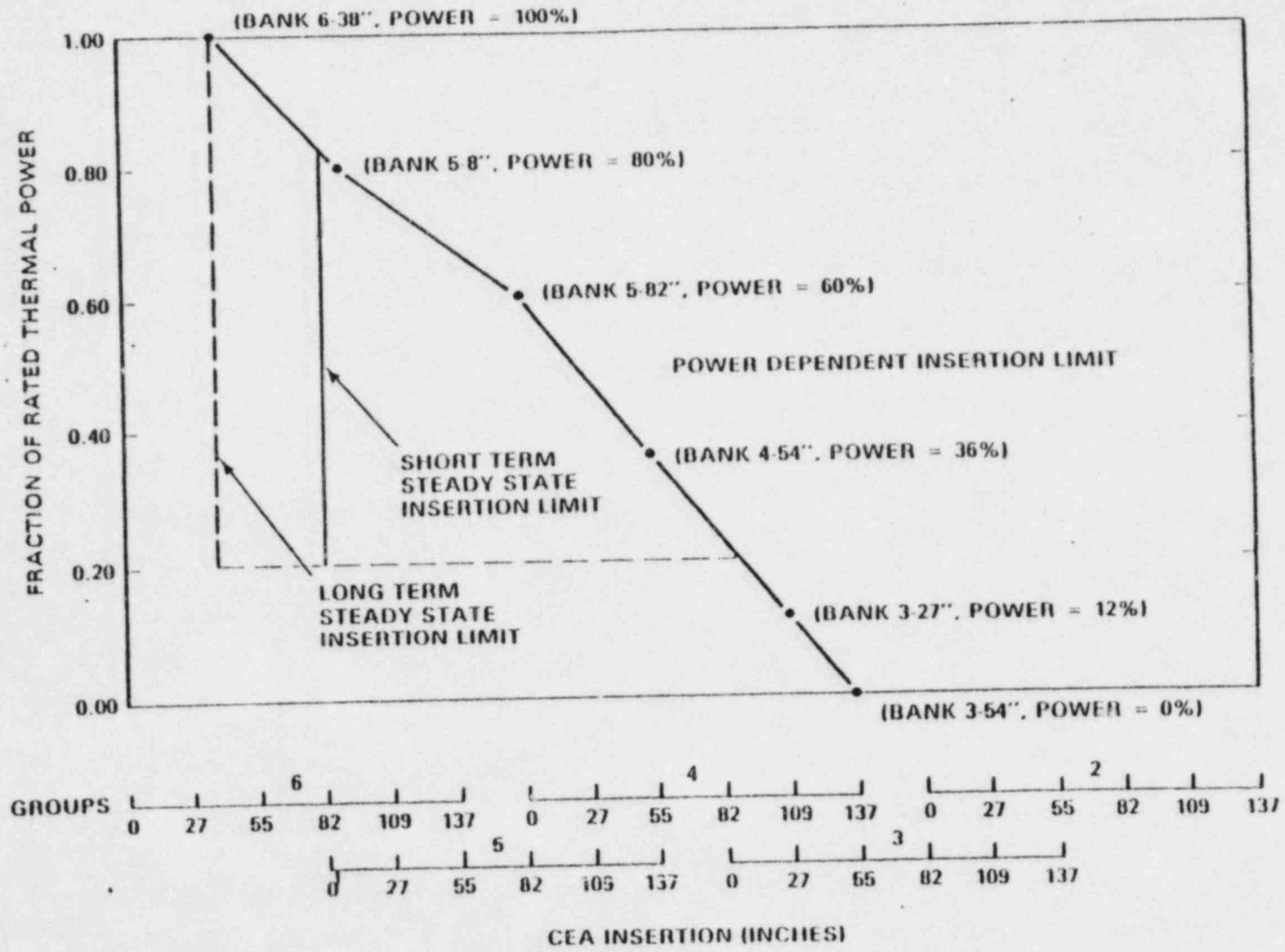


Figure 3.1-2
CEA insertion limits vs THERMAL POWER with four reactor coolant pumps operating

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

DOCUMENT TITLE PRESSURIZER PRESSURE & LEVEL

DOCUMENT FILE NUMBER 2-0120035

DOCUMENT REVISION NUMBER 2

DOCUMENT DISTRIBUTED ON 5-9-83
DATE

2

DOCUMENT SENT TO:

COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED	COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED
	MASTER			UNCONTROLLED COPIES	
1	D. A. Sager				
2					
3				NRC - Region II	
4				Attn: EPPS Branch Chief	
5	N. G. Roos			H. Paduano - GO	
6	TSC			A. W. Bailey	
7				G. Anglehart - CE	
8					
9					
10	Control Room II			G. Regal	
11				Ugelow, Al —Backfit	
12				Training - Larry Baker	
13					
14					
15	Training			J. Spodick	
				T. Vogan - GO	
				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: J Fallon DATE

2

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0120035
REVISION 2

1.0 TITLE:

PRESSURIZER PRESSURE AND LEVEL-OFF-NORMAL OPERATION

2.0 REVIEW AND APPROVAL:

Reviewed by Facility Review Group March 1 1983

Approved by J. H. Barrow (for) Plant Manager March 1 1983

Revision 2 Reviewed by FRG May 6 1983

Approved by C M Wethy Plant Manager May 7 1983

3.0 PURPOSE:

This procedure provides instructions for operator action in the event of malfunction of Pressurizer pressure and level control systems, or pressure transient caused by inadvertant operation of the auxiliary spray valves.

4.0 SYMPTOMS:

4.1 Pressurizer High-Low Pressure alarm, Channel X or Y.

4.2 Pressurizer High-Low Level alarm, Channels X or Y.

4.3 Pressurizer Low-Low Level alarm, Channels X or Y.

4.4 Pressurizer Proportional Heaters Low Level trip.

4.5 Pressurizer Back-up Heaters Low Level Trip Control Switch isolated.

4.6 Safety or Relief Valve(s) open alarm.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0120035, REVISION 2
PRESSURIZER PRESSURE AND LEVEL-OFF-NORMAL OPERATION

2

5.0 INSTRUCTIONS:

5.1 Immediate Automatic Actions:

5.1.1 Abnormal Pressurizer Pressure Condition

1. Pressurizer safety valves open at 2500 psia.
2. High pressure reactor trip and power operated reliefs open at 2375 psia.
3. High pressure alarm actuates at 2340 psia and a back-up signal will de-energize all heaters. /R2
4. Proportional heaters cycle from minimum output at 25 psi above setpoint to maximum output at 25 psi below setpoint.
5. Spray valves cycle from full closed at 25 psi above setpoint to full open 75 psi above setpoint. /R2
6. Back-up heaters energize at <2200 psia and de-energize at >2200 psia.
7. Low pressure alarm actuates at 2100 psia.
8. TM/LP reactor trip initiates at 1887 psia minimum pressure.
9. SIAS initiates at 1708 psia.

5.1.2 Abnormal Pressurizer Level Condition

1. All Pressurizer heaters de-energize at 27% indicated level, and respective Pressurizer Heater Transformer Feeder Breaker opens. /R2
2. Low level alarm actuates and signal to start the back-up Charging Pump is received at 5% below RRS setpoint. /R2

   NOTE: Only one back-up Charging Pump is in the level control system.

3. The back-up Charging Pump receives a signal to start at 3% below RRS setpoint, decreasing. /R2
4. The back-up Charging Pump receives a signal to stop at 1% below RRS setpoint, increasing, and minimum letdown (29 gpm). /R2

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0120035, REVISION 2
PRESSURIZER PRESSURE AND LEVEL-OFF-NORMAL OPERATION

2

5.0 INSTRUCTIONS: (Cont.)

5.1 (Cont.)

5.1.1 (Cont.)

5. All back-up heaters energize and a back-up stop signal to the back-up Charging Pump is received at 4.0% above RRS setpoint. /R2

6. Maximum letdown is 128 gpm at 9% above RRS setpoint. /R2

7. High level alarm actuates at 10% above RRS setpoint.

5.2 Immediate Operator Actions:

5.2.1 Abnormal Pressurizer Pressure

1. Ensure Pressurizer spray, and Proportional and Back-up heaters are operating properly in automatic. If not, shift spray valve controller to MANUAL and energize or de-energize heaters, whichever is applicable.

2. Ensure power operated relief valves are closed. If open, isolate by closing V-1476 and/or V-1477 (power operated relief isolation valves). Refer to OP 2-0120036, "Pressurizer Relief/Safety Valve-Off-Normal Operation".

3. Ensure SE-02-03 and SE-02-04 (Auxiliary spray valves) are closed. If open, attempt to close using key switch. If still open, stop all Charging Pumps and isolate letdown. Refer to OP 2-0210030, "Charging and Letdown Off-Normal Operation".

4. Ensure pressure anomaly is not caused by a large rate of change of T_{ave}. /R2

CAUTION: During blackout conditions with the Diesel Generators supplying power, the control bistables for the back-up heaters are not energized and must be bypassed.

Therefore, in a blackout, the control switches on RTGB-203 must be reset and the Key Switch selected to PRESSURE OVERRIDE to regain heater control. Note, however, this will only energize B1 and B4 banks of back-up heaters.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0120035, REVISION 2
PRESSURIZER PRESSURE AND LEVEL-OFF-NORMAL OPERATION

2

5.0 INSTRUCTIONS: (Cont.)

5.2 (Cont.)

5.2.2 Abnormal Pressurizer Level

1. Ensure selected RRS channel is operating properly. If not, shift to operable channel.

2. Ensure the back-up Charging Pump starts and letdown flow is decreasing, or the back-up Charging Pump stops and letdown flow is increasing, whichever is applicable.

3. Ensure level anomaly is not caused by a large rate of change in T_{ave}.

5.3 Subsequent Actions

5.3.1 Check that Pressurizer Safety Valves are not leaking or have actuated by observing downstream header temperature indication and Quench Tank indications.

5.3.2 Ensure AOV-2515, AOV-2516, and AOV-2522 (Letdown Isol) are open.

5.3.3 Ensure SE-02-01 and SE-02-02 (Charging Isol) are open.

5.3.4 Ensure LCV-2110P and LCV-2110Q (Pressurizer Level Control) are operating properly.

5.3.5 Ensure PCV-2201P and PCV-2201Q (Letdown Pressure Control) are operating properly.

5.3.6 Manually start the third Charging Pump, if conditions require.

5.3.7 Ensure Letdown Valve Limiter Bypass switch is in the NORMAL position. /R2

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0120035, REVISION 2
PRESSURIZER PRESSURE AND LEVEL-OFF-NORMAL OPERATION

2

5.0 INSTRUCTIONS: (Cont.)

5.3 (Cont.)

5.3.8 Compare letdown flow, charging flow, charging pump header pressure, and VCT level for indications of leaks or lifting relief valves in the CVCS system. Refer to OP 2-0120035, "Charging and Letdown-Off-Normal Operation".

5.3.9 Ensure that Power Operated Relief Valve (V-1474 and 1475) hand switches are in the proper mode for existing plant conditions.

NOTE: (1) Switch in NORMAL RANGE:

RCS Temperature >320°F
RCS Pressure >490 psia

(2) Switch in LTOP:

RCS Temperature <280°F /R2
RCS Pressure <460 psia.

5.3.10 If Pressurizer level decrease cannot be immediately explained, refer to OP 2-0120035, "Excessive Reactor Coolant System Leakage".

5.3.11 With <27% level on Channel X, the 'A' Pressurizer Heater Transformer feeder breaker trips and the 'B' side 480V breakers trip. With <27% level on Channel Y, the 'B' Pressurizer Tranformer feeder breaker trips and the 'A' side 480V breakers trip. The key operated override switch placed in the LEVEL OVERRIDE position will reset the 480V breakers.

NOTE: (1) With Channel 'X' selected, and if Channel 'X' fails low, all heaters trip. The operator must then select Channel Y and LEVEL OVERRIDE to get power to the 'B' side heaters (i.e., P2, B4, B5, and B6). /R2

(2) With Channel 'X' selected, and if Channel 'Y' fails low, all heaters trip. The operator must then select LEVEL OVERRIDE to get power to the 'A' side heaters (i.e., P1, B1, B2, B3).

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0120035, REVISION 2
PRESSURIZER PRESSURE AND LEVEL-OFF-NORMAL OPERATION

2

6.0 REFERENCES:

6.1 St. Lucie Unit 2 FSAR

6.2 C-E Setpoint Guidelines

6.3 F.P.L. Training Lesson Outline #91

7.0 RECORDS REQUIRED:

7.1 Normal log entries

7.2 Applicable chart recorders

7.3 If pressure transient was caused by inadvertant auxiliary spray valve actuation, document transient per AP 2-0010134, "Component Cyclic and Transient Limits Records".

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

DOCUMENT TITLE Natural Circulation Cooldown

DOCUMENT FILE NUMBER 2-0120040

DOCUMENT REVISION NUMBER 2

DOCUMENT DISTRIBUTED ON 5-3-83
DATE

DOCUMENT SENT TO:

2

COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED	COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED
	MASTER			UNCONTROLLED COPIES	
1	D. A. Sager				
2					
3				NRC - Region II	
4				Attn: EPPS Branch Chief	
5	N. G. Roos			H. Paduano - GO	
6	TSC			A. W. Bailey	
7				G. Anglehart - CI	
8					
9					
10	Control Room II			G. Regal	
11				A. Ugelow - Backfit	
12				Training - Larry Baller	
13					
14					
15	Training			J. Spodick	
				T. Vogan - GO	
				G. J. Bolssy	
				R. R. Jennings	
				E. M. Mercer	
				Resident NRC	
				NRC - IE: HQ	
				Attn: Chief, Nuclear Response Branch	
				C. Burns - CI	

PROCESSED BY: Hall DATE

2

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0120040
REVISION 2

NATURAL CIRCULATION/COOLDOWN
(NC/C)

TOTAL NO. OF PAGES 27

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE 2-0120040
REVISION 2

2

1.0 SCOPE:

This procedure provides instructions to the operator for two conditions:

A. Total loss of Reactor Coolant Pump (RCP) flow to the reactor core.

B. Plant Cooldown using natural circulation flow.

2.0 SYMPTOMS:

2.1	Loss of off-site power.	2.1	Indications Start-up Transformer breakers open
2.2	Loss of or low voltage on 6.9 KV buses.	2.2	Indications 6.9 KV switchgear 2A1, 2B1 differential current trip. 6.9 KV switchgear 2A1, 2B1 UNDERVOLTAGE alarm.
2.3	RCP Overload	2.3	Indications Alarm
2.4	REACTOR COOLANT LOW FLOW channel pre-trip.	2.4	Indications Alarm
2.5	REACTOR COOLANT LOW FLOW CHANNEL trip	2.5	Indications TCBs open. CEAs inserted.

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

2

2.0 SYMPTOMS: (Cont.)		
	2.6 Loss of Component Cooling Water (CCW) flow to RCPs for > 10 minutes, requiring manual trip of all four pumps.	2.6 Indications Reactor Trip from loss of CCW flow FIA-1158, FIA-1168 FIA-1178, FIA-1188
	2.7 Valid SIAS-CIAS caused by low RCS pressure requiring all RCPs to be tripped after all Control Element Assemblies have been inserted for 5 seconds.	2.7 Indications SIAS-CIAS actuation Low RCS pressure CEAs inserted
3.0 AUTOMATIC ACTION:		INITIATING EVENT
	3.1 Reactor coolant low flow reactor trip.	3.1 95% of full RCS flow
4.0 IMMEDIATE OPERATOR ACTION:		LOCATION
	4.1 Carry out immediate operator actions for reactor trip in accordance with Off-Normal OP 2-0030130, "Reactor Trip/ Turbine Trip".	4.1 RTGB-201, RTGB-202, RTGB-204

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

2

5.0 SUBSEQUENT ACTIONS: CHECK

5.1 Implement the Emergency Plan as necessary in accordance with EPIP 3100021E, "Duties of the Emergency Coordinator". ____

5.2 Establish and maintain hot leg temperature (T_h) at least 20°F below the saturation temperature corresponding to RCS pressure (refer to Figure 1) by doing the following: ____

1. Operate Pressurizer heaters or auxiliary spray to increase or maintain Pressurizer pressure and to provide subcooling margin. ____

Note: If natural circulation was caused by a loss of Off-Site Power, the Backup heaters must be reset and the Backup Interlock B/P key switch must be placed in the PRESSURE position. This will allow operation of B-1 and B-4 banks of the Backup heaters.

/R2

2. Increase turbine bypass or atmospheric steam dump flow to reduce or maintain RCS temperature and prevent lifting secondary safeties. ____

5.3 Verify that the Pressurizer level control system is functioning to maintain Pressurizer level. If necessary, manually operate charging and letdown to restore and maintain normal Pressurizer level. If operable Charging Pumps cannot restore RCS inventory and Pressurizer level, observe RCS and Containment parameters for indications of a LOCA. ____

5.4 Restore and maintain Steam Generator levels at approximately 65%. When feeding the Steam Generators, use caution to avoid excessively cooling the RCS. ____

CAUTION: Do <u>not</u> exceed a cooldown rate of 75°F/hr.

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

2

5.0 SUBSEQUENT ACTIONS: (Cont.)

CHECK

5.5 Verify by the following indications that natural circulation flow has been established within approximately 15 minutes after RCPs were tripped:

1. Loop ΔT ($T_h - T_c$) less than normal full power ΔT ($<46^{\circ}F$). _____

2. Cold leg temperatures (Tc) constant or decreasing. _____

3. Hot leg temperatures (Th) stable (i.e., not steadily increasing). _____

4. No abnormal differences between Th RTD's and core thermocouples. _____

5.6 Confirm boron concentration in the RCS by sampling from as many different points as possible. _____

5.7 Maintain the plant in a stabilized condition based upon auxiliary plant system availability (e.g., condensate inventory). _____

5.8 If one or more RCPs are restored to an operable condition within 10 minutes, start an RCP in each loop if the following criteria are satisfied:

1. At least one Steam Generator is removing heat from the RCS. _____

2. Pressurizer level and pressure are responding normally to the Pressurizer Level and Pressure Control Systems. _____

3. The RCS is at least $20^{\circ}F$ subcooled (refer to Figure 1). _____

4. The yellow PERMISSIVE light on the associated pump control switch is lit. _____

5. No indication of voids in RCS are present. _____

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

2

5.0 SUBSEQUENT ACTIONS: (Cont.)

CHECK

5.9 If all four RCPs can be returned to operable status within 10 minutes, power operation may be resumed under the direction of the Nuclear Plant Supervisor. If RCS cooldown is required under these conditions, the cooldown should be accomplished using forced circulation. ____

5.10 If required to conduct a plant cooldown to shutdown cooling (SDC) conditions using natural circulation, proceed as follows:

1. Establish as stable plant conditions as circumstances permit. ____

2. Commence boration to maintain required Shutdown Margin (SDM) during cooldown. ____

3. Commence an RCS cooldown by utilizing one of the following methods: ____

   A. If the Condenser is available, use the Steam Dump Bypass System and Main or Auxiliary Feedwater.

   B. If the Condenser is not available, use the atmospheric dump valves and Main or Auxiliary Feedwater.

4. Continuously verify natural circulation flow throughout the cooldown process. ____

5. Observe all available indications to determine conditions within the RCS. ____

   A. Use the QSPDS Saturation Margin Display (SMD) Th, Tc, and RCS pressure to verify that the RCS is subcooled. /R2

   B. Figure 1 or the nomograph on RTGB-203 should be used for comparison with the QSPDS SMD. Subcooled margin can also be determined by subtracing Th from pressurizer temperature (TI-1101). /R2

   C. Incore thermocouples, indicated on the QSPDS or recorded on the DDPS, can also be used for indication of Th. ____

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

2

5.0 SUBSEQUENT ACTIONS: (Cont.)

CHECK

5.10 (Cont.)

6. Establish and maintain an RCS cooldown rate of 50°F/hr (See Figure 2). The highest RCS cold leg temperature shall be plotted every 30 minutes on a copy of Figure 4. The RCS temperature and pressure shall be determined to be within the limits of Technical Specification Figure 3.4-3 at least once per 30 minutes during cooldown. _____

7. The Pressurizer water phase shall be recorded on Table 1 and plotted every 30 minutes on Figure 4. This temperature shall also be compared with the lowest spray water temperature to ensure that differential temperature does not exceed 350°F. _____

8. Maintain RCS pressure above and to the right of curve values shown on Figure 3. _____

9. During the cooldown, maintain a minimum of 20°F subcooling by the following methods (listed in order of preference): _____

   A. Manual control of Pressurizer heaters and auxiliary spray.

      NOTE: Use only one Charging Pump.

   B. Operating Charging or HPSI Pumps.

10. During the cooldown, maintain Pressurizer level by the following methods (listed in order of preference): _____

    a. Control charging and letdown.

    b. Operating HPSI Pumps.

11. Monitor the available condensate inventory and replenish the CST as required. _____

CAUTION: CONDENSATE STORAGE TANK VOLUME SHALL BE MAINTAINED PER TECHNICAL SPECIFICATION 3.7.1.3.

12. During RCS cooldown and depressurization, perform the evolutions specified in Appendix C. _____

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

5.0 SUBSEQUENT ACTIONS: (Cont.)

CHECK

5.10 (Cont.)

13. During RCS depressurization monitor for void formation in the reactor vessel upper head region. Indications of possible void formation include: _____

    A. RCS temperature = Tsat for the corresponding RCS pressure.

    B. A Pressurizer level increase significantly greater than expected while operating auxiliary spray.

    C. A Pressurizer level decrease while operating charging.

    D. If the Pressurizer Level Control System is in automatic, an unanticipated letdown flow greater than charging flow.

14. If voiding in the RCS is indicated, perform the following:

    A. Isolate letdown by closing V-2515, V-2516 and V-2522 (Letdown Containment Isol). _____ /R2

    B. Stop the RCS depressurization. _____

    C. Stop the RCS cooldown. _____

    D. If possible, review and select one RCP in each loop for restarting. _____

    E. Repressurize the RCS to eliminate the void by operating Pressurizer heaters or HPSI and Charging Pumps. _____

NOTE: If the HPSI or Charging pumps are utilized to charge the RCS solid, the pumps should be stopped after solid RCS conditions are indicated.

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

2

5.0 SUBSEQUENT ACTIONS: (Cont.)

CHECK

5.10 (Cont.)

14. (Cont.)

F. If required to continue the cooldown with the known presence of a steam void in the reactor vessel head, proceed using the Fill and Drain Method (Appendix D). _____

G. When conditions permit, re-initiate letdown and resume depressurization to SDC initiation pressure. _____

15. If off-site power has been lost and it becomes necessary to augment the cooldown rate, refer to Appendix E. _____

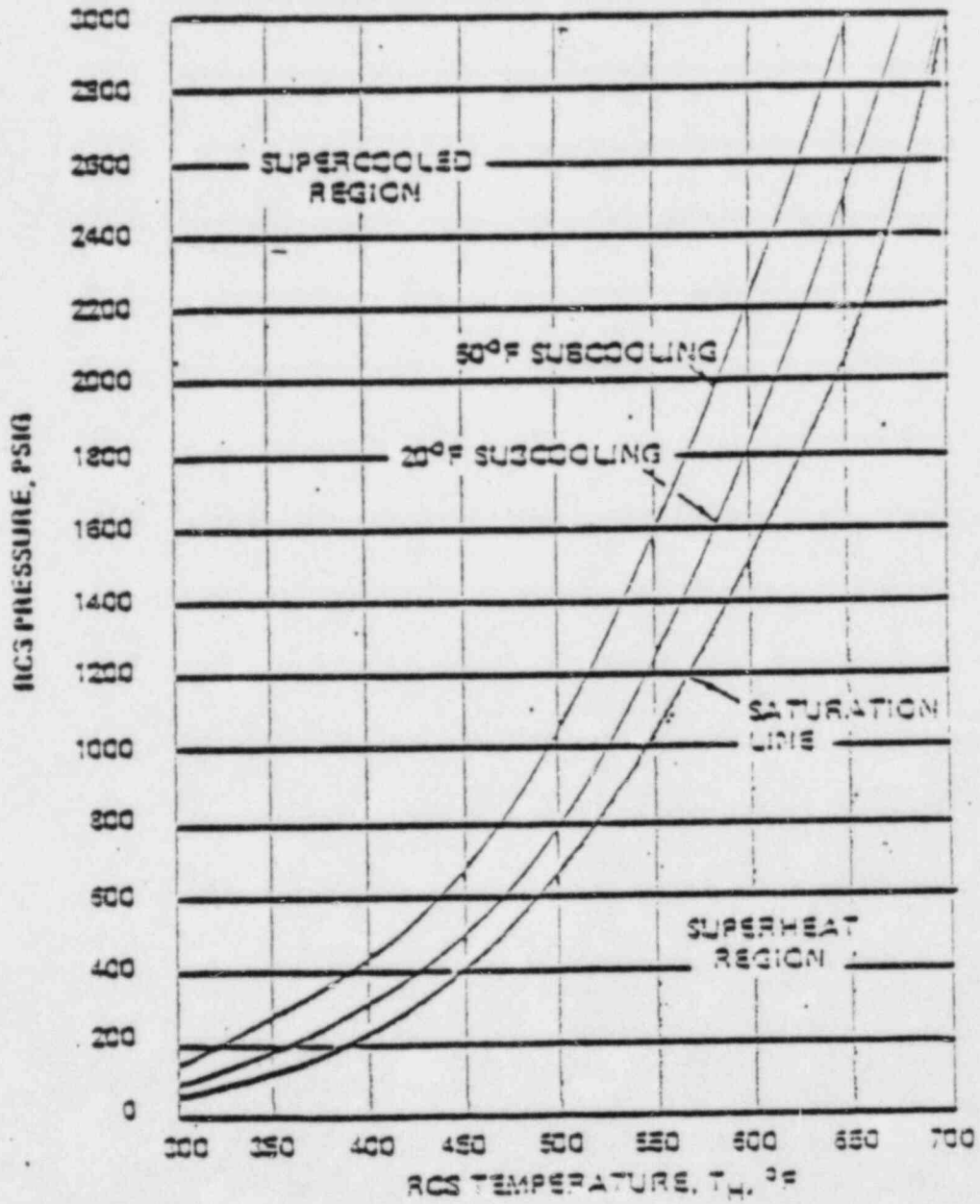
16. When RCS temperature reaches 325°F, maintain the RCS at this temperature for an additional 20.4 hours (See Figure 2). _____

17. Upon completion of the required "soak" period, initiate SDC in accordance with Appendix F. _____

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

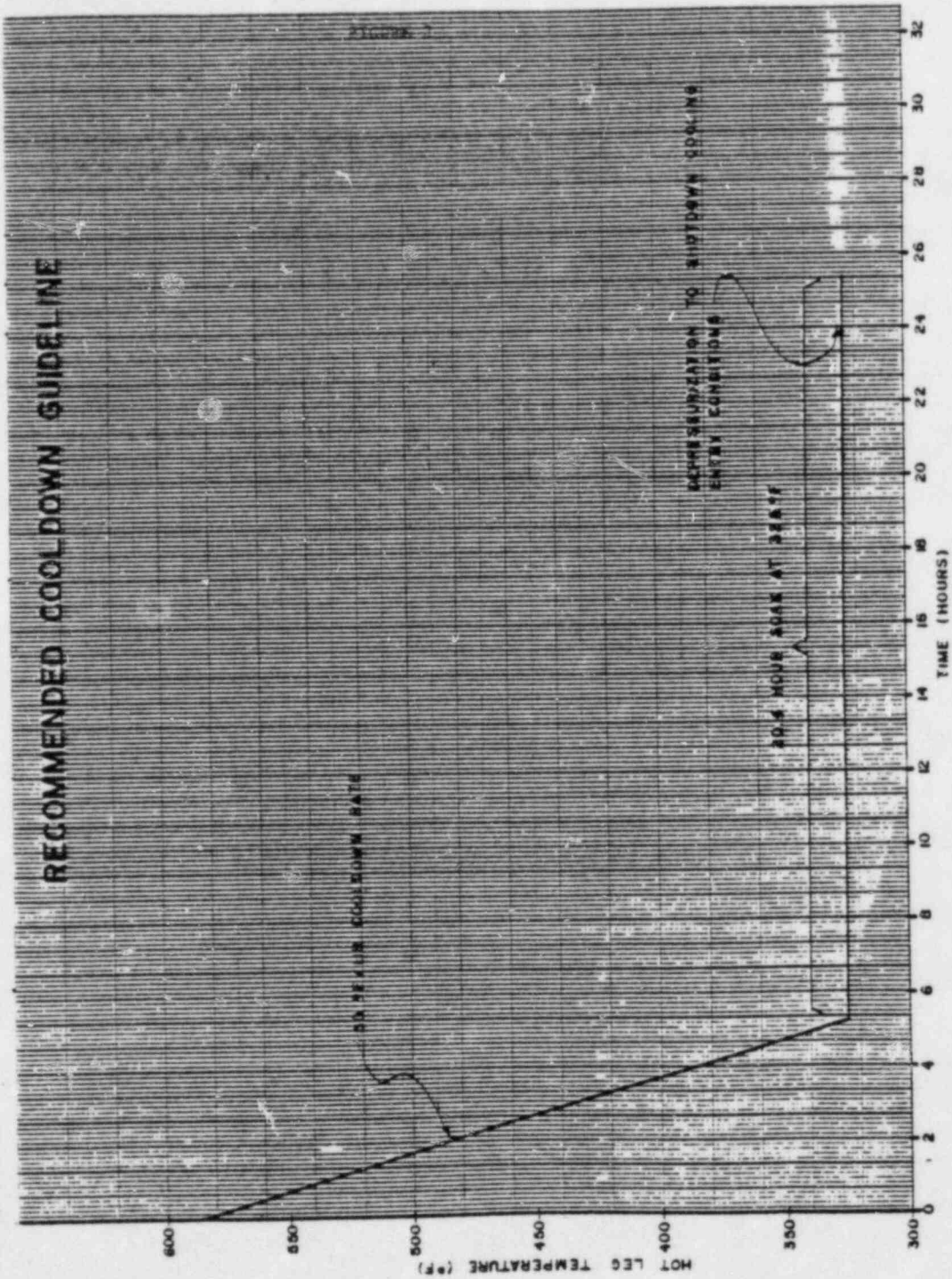
2

Figure 1
SATURATION



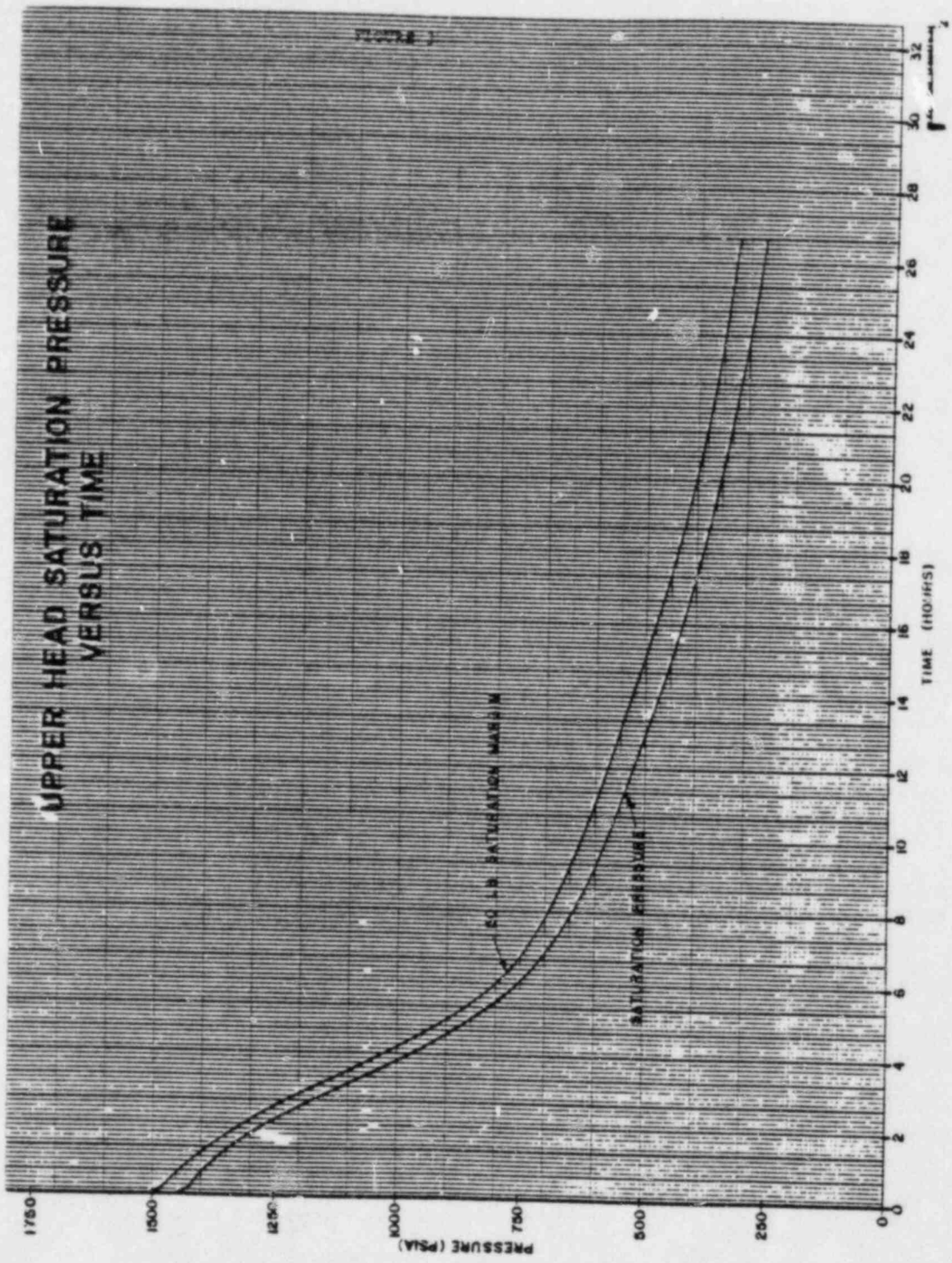
ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

FIGURE 2



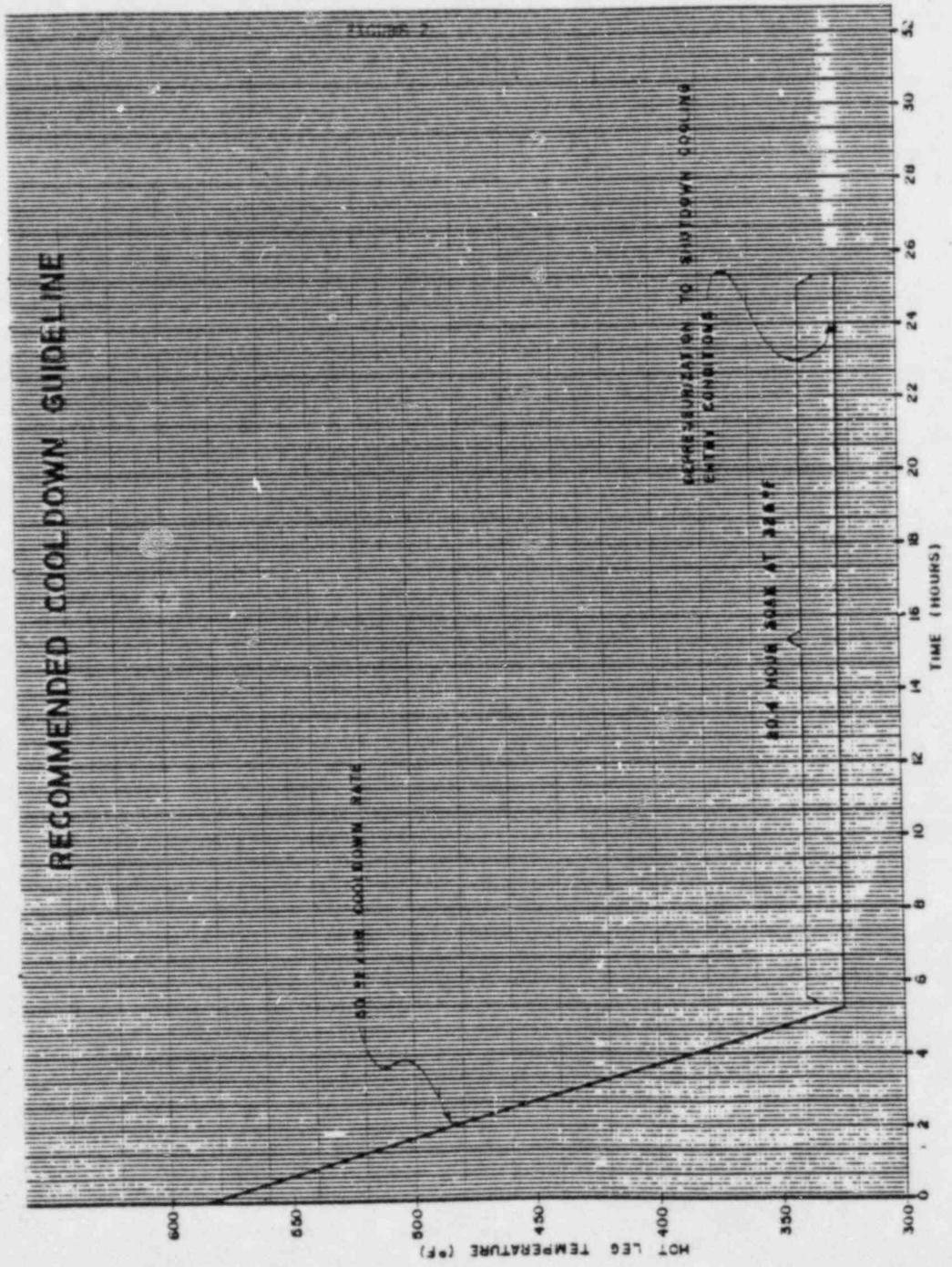
ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

FIGURE 3



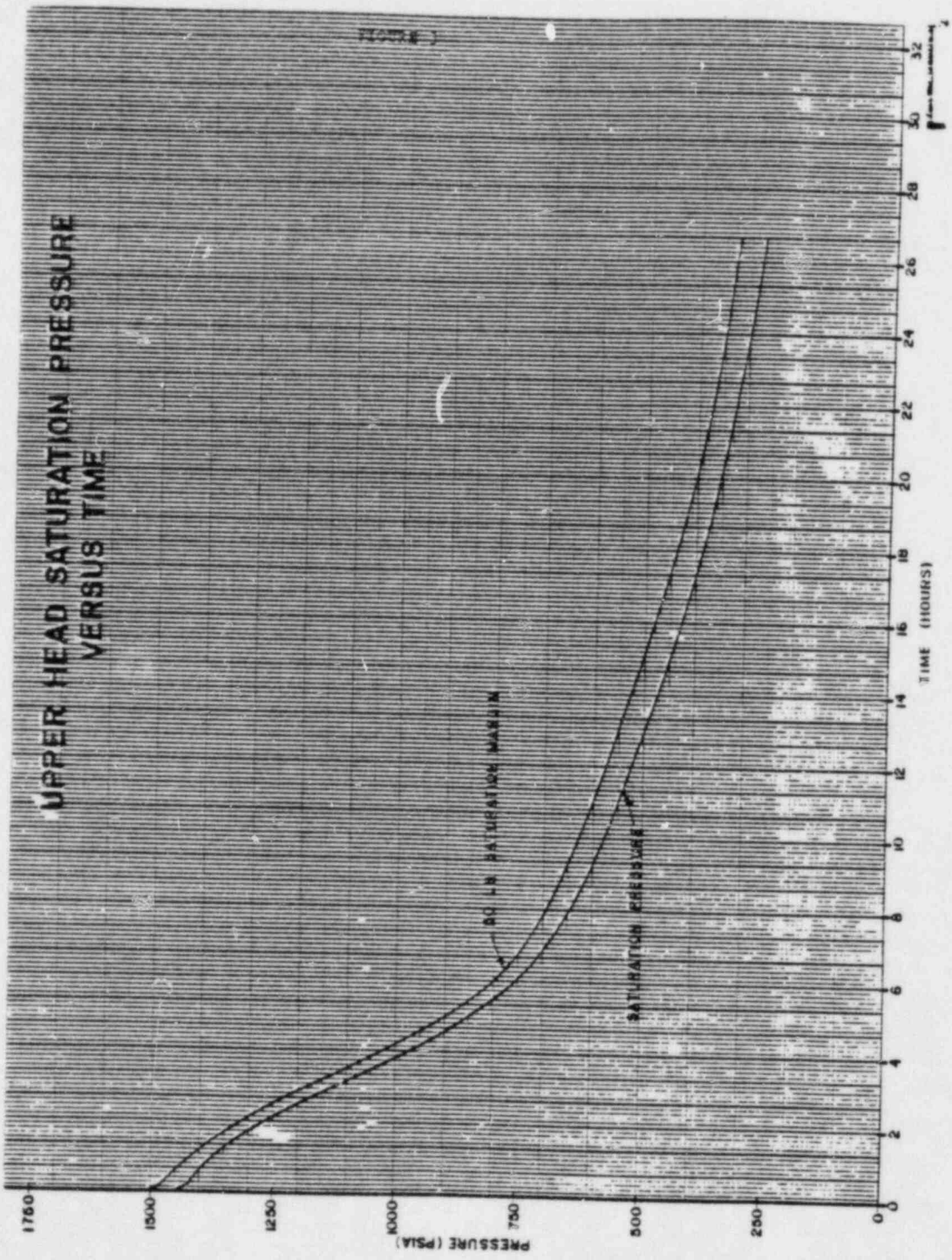
ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

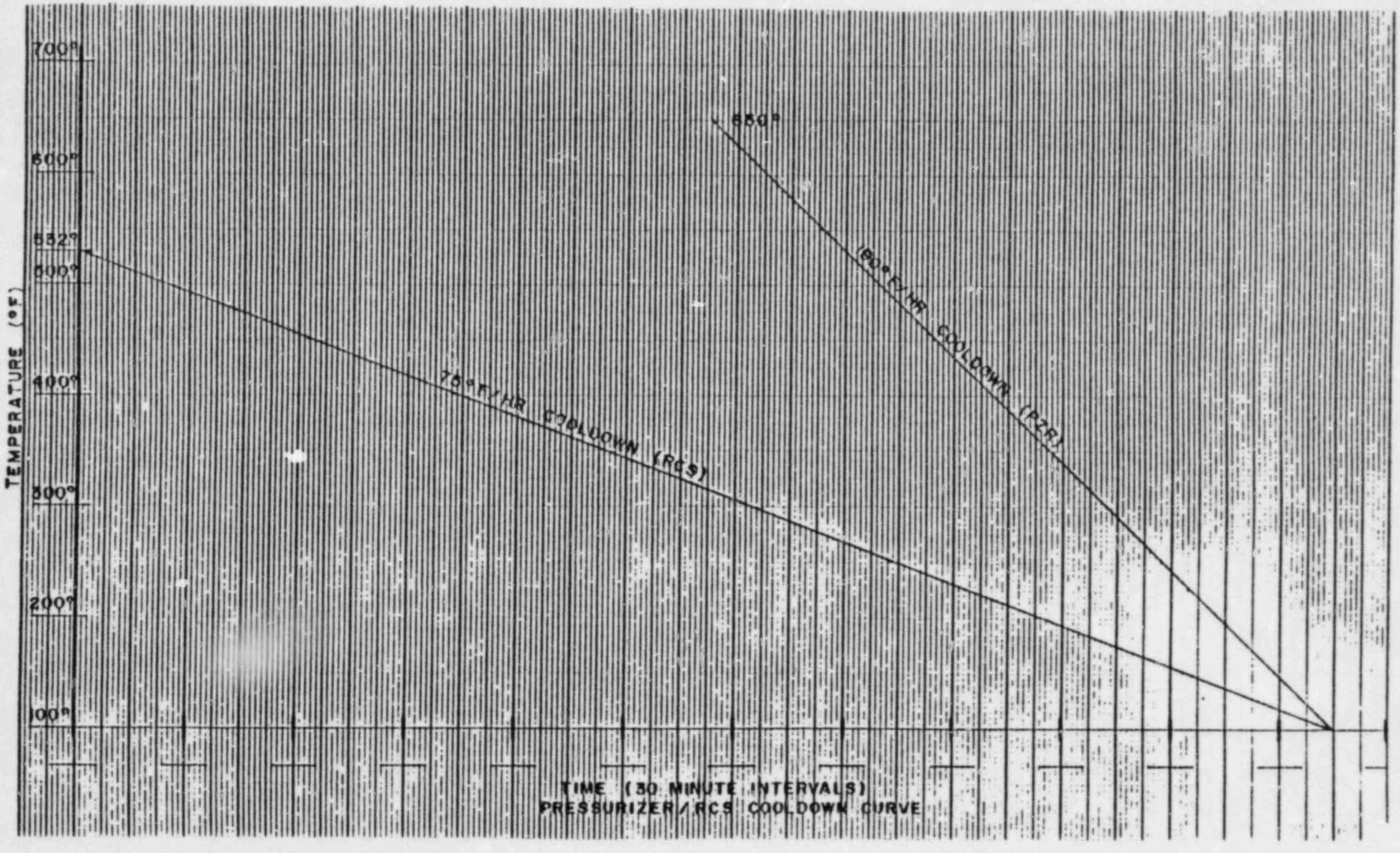
FIGURE 2



ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

FIGURE 3





PRESSURIZER/RCS COOLDOWN CURVE

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0030141, REVISION 3
CONTROL ROOM INACCESSIBILITY

5.0 INSTRUCTIONS: (continued)

5.1 (continued)

4. (continued)

CHECK

C. Open or check open isolation valves for Letdown pressure and level control valves (V-2110P and V-2201P). Isolate V-2110Q and V-2201Q. _____

D. Proceed to the Charging Pump area and establish communications on the Sound Powered Phone circuit. _____

5.2 Maintain Pressurizer level at approximately 33% indicated level. _____

5.3 Maintain Pressurizer pressure at approximately 2100 psia. _____

5.4 Maintain Reactor Coolant System temperature at or below 532°F (2A cold leg temperature) by use of atmospheric steam dump and/or selective shutdown of Reactor Coolant Pumps. _____

NOTE: Stop Reactor Coolant Pumps as required by opening the Reactor Coolant Pump breakers in the Turbine Building Switchgear Room. _____

5.5 Maintain Steam Generator levels at approximately 65% indicated level by operation of the Auxiliary Feedwater Pumps and discharge valves to the Steam Generators. _____

5.6 Isolate Steam Generator blowdown by manually closing isolation valves at the Closed Blowdown Heat Exchangers. _____

5.7 When Turbine speed decreases to "0" RPM, verify that the Turning Gear Oil Pump and the turning gear are in operation _____

5.8 Periodically check the habitability of the Control Room and when conditions permit, reoccupy the Control Room. Return isolation switches to NORMAL for switches and controls that are operational and maintain the Unit at Hot Standby until a complete evaluation has been made. _____

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

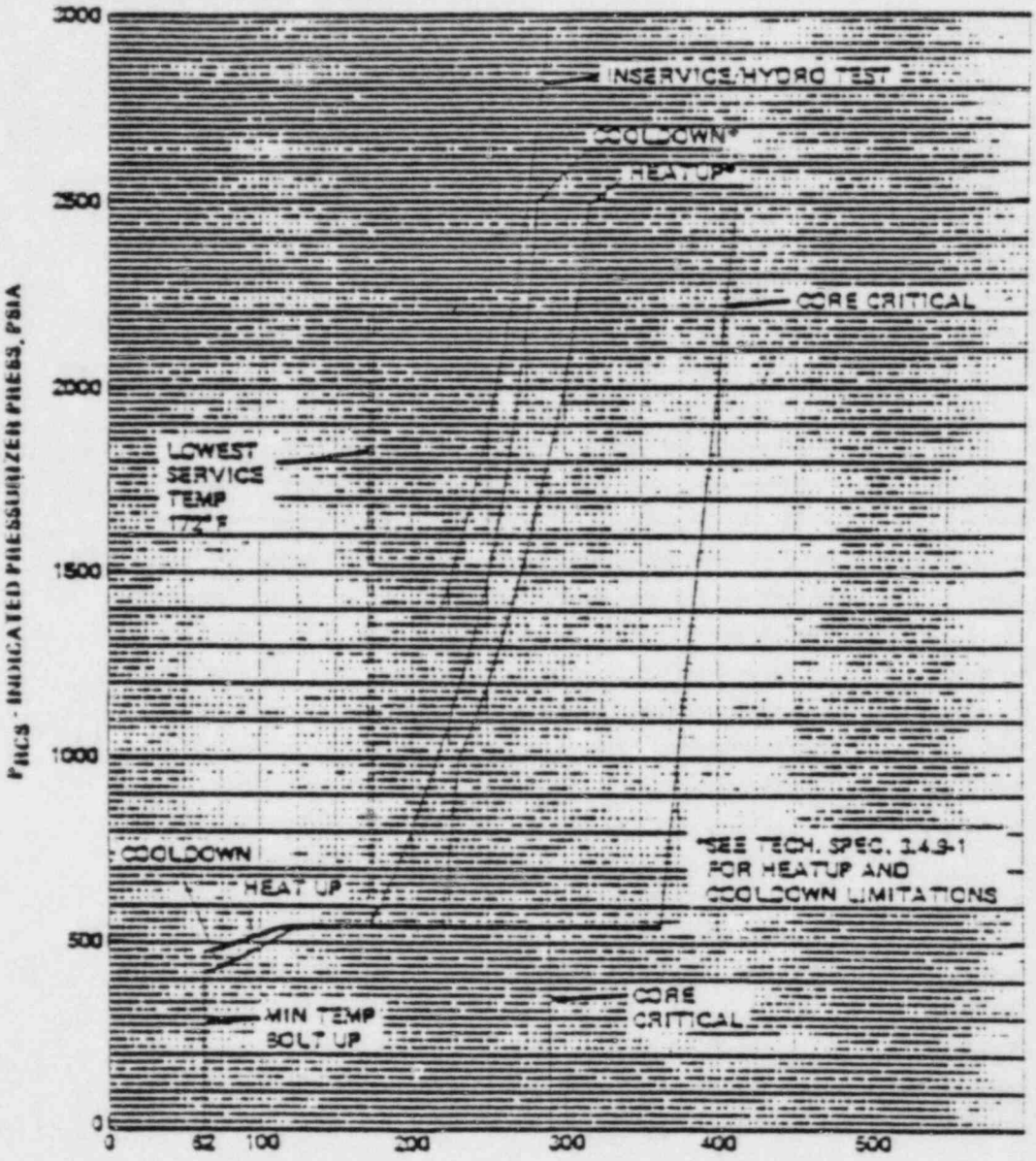


FIGURE 3.4-3

REACTOR COOLANT SYSTEM
PRESSURE TEMPERATURE LIMITATIONS
2 TO 10 YEARS OF OPERATION

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

2

TABLE 1

DATE _____

TIME every 30 minutes	COLUMN 1 PRESSURIZER TEMP TI-1101	COLUMN 2 AUX SPRAY LINE TEMP TI-2229	COLUMN 3 PRESSURIZER PRESS PI 1107-1/1108-1	* DIFFERENCE COLUMN 1 MINUS COLUMN 2

*LIMITED TO $\leq 350^{\circ}$ AND $\geq 50^{\circ}$

RCS TEMP AND PRESSURE
SHALL BE WITHIN LIMITS
OF FIGURE 3.4-3 FOR EACH
30 MINUTE PERIOD.

_____ Operator _____ Shift

_____ Operator _____ Shift

_____ Operator _____ Shift

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

2

APPENDIX A

PRECAUTIONS

1. Natural circulation flow cannot be verified until the RCP's have stopped coasting down after being tripped.

2. Due to increased loop transit times, verification of plant responses to a plant change cannot be accomplished until approximately 10 to 15 minutes following the action.

3. After a cold shutdown boron concentration is attained in the RCS, makeup water added to the RCS during the cooldown should be at least the same boron concentration as in the RCS to prevent any dilution of RCS boron concentration.

4. Once Pressurizer cooldown has begun, Pressurizer level indication decalibration will occur (indication on the normal Pressurizer level indication will begin to deviate from the true Pressurizer level). The temperature compensation correction curve posted on the RTGB should be used to determine true Pressurizer water level. Cold calibrated Pressurizer level indication is also available for lower Pressurizer temperatures.

5. Minimize the use of Pressurizer auxiliary spray whenever the temperature differential between the spray water and the Pressurizer is >200°F. Any auxiliary spray cycle with a temperature differential > 200°F shall be recorded in accordance with AP 0010134.

6. If Pressurizer spray is not available, boron concentration in the Pressurizer may be lower than the RCS loop boron concentration. RCS boron concentration should be increased to avoid being diluted below minimum requirements by a possible Pressurizer outsurge.

7. If either the HPSI or LPSI Pumps are utilized to collapse any steam voids in the RCS by charging the system solid, the pump(s) should be stopped after solid conditions are indicated. This will minimize the potential for any inadvertant flowpath from the RCS back to the Refueling Water Tank.

8. If the RCS is solid, closely monitor any makeup or draining and any system heatup or cooldown to avoid any unfavorable rapid pressure excursions.

9. During all phases of the cooldown, monitor RCS temperature to avoid exceeding a cooldown rate > 100°F/hr.

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

2

APPENDIX A (Cont.)

PRECAUTIONS

10. If cooling down by natural circulation with an isolated steam Generator, an inverted Δ T (i.e., Tc > Th) may be observed in the idle loop. This is due to a small amount of reverse heat transfer in the isolated Steam Generator and will have no effect on natural circulation flow in the intact Steam Generator.

11. All available indications should be used to aid in diagnosing the event since it may cause irregularities in a particular instrument reading. Critical parameters must be verified when one or more confirmatory indications are available.

12. When establishing auxiliary feedwater flow to the Steam Generators, use Steam Generator levels as well as header flowrates to ensure each Steam Generator is receiving auxiliary feedwater.

13. Condensate inventory should be monitored periodically to ensure that an adequate supply is available. Makeup to the Condensate Storage Tank should be started as soon as practical. If CST level decreases to minimum required by Technical Specifications, the plant should be immediately cooled down utilizing the Fill and Drain Method (Appendix D).

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

2

APPENDIX B

DISCUSSION

Reactor Coolant Pump forced circulation and heat transfer to the Steam Generators is the preferred mode of operation for decay heat removal whenever plant temperatures and pressures are above the Shutdown Cooling System (SDC) entry conditions. The natural circulation capability at the St. Lucie Plant provides an emergency means for core cooling using the steam generators, if the RCPs are unavailable.

Natural circulation is governed by decay heat, component elevations, primary to secondary heat transfer, loop flow resistance, and voiding. Component elevations at St. Lucie Plant are such that satisfactory natural circulation decay heat removal is obtained by density differences between the bottom of the core and the top of the Steam Generator tube sheet. An additional contribution to natural circulation flowrate is the density difference obtained as the coolant passes through the Steam Generator U-tubes, but this is not required for satisfactory natural circulation. Natural circulation is assured even if the U-tubes are partially uncovered on the Steam Generator secondary side. Because of the temperature distribution in the Steam Generator U-tubes, there is no degradation in primary to secondary heat transfer as long as the secondary level covers at least 1/3 of the tube height. By ensuring that the loop Δ T is less than the full power Δ T, the power-to-flow ratio is assured to be less than 1.0 during natural circulation.

Satisfactory natural circulation heat removal can be obtained with either one or two Steam Generators. Unequal auxiliary feedwater to the Steam Generators will not lead to unsatisfactory natural circulation as long as all the decay heat is being removed through the Steam Generators.

Assurance that the RCS is being maintained in a subcooled condition can be obtained as follows. With the QSPDS Saturation Margin Display (SMD) operating normally, the graph on RTGB-203 is used in conjunction with the SMD to eliminate dependence on a single instrument. With the SMD inoperable, reference to the nomograph utilizing Control Room indication such as hot leg temperature, Pressurizer pressure, and incore thermocouples will determine the margin to saturation. Subcooling margin can also be determined by subtracting hot leg temperature from Pressurizer temperature (TI-1101). /R2

During normal plant operation under conditions of forced circulation flow, there is only a small flow of coolant in the reactor vessel head area. During periods of natural circulation, there is little, if any, effective flow. If the RCS is cooled down using natural circulation, it is possible to generate a steam void in the reactor vessel head when saturation conditions develop. These conditions can be produced by the temperature sustained by the retained metal heat and decreased RCS pressure during cooldown.

2

APPENDIX B (Cont.)

DISCUSSION

Analyses have demonstrated that the upper reactor head region fluid can be cooled to SDC entry conditions without void formation using a hot leg temperature cooldown rate of 50°F/hr in approximately 14.2 hours. In order to provide additional conservatism, this procedure directs that a cooldown rate of about 50°F/hr to 325°F be utilized, followed by a soak at 325°F for 20.4 hours for a total cooldown time of approximately 25.7 hours from cooldown initiation. (See Figure 2). The condensate supply required for this cooldown is 270,500 gallons. Makeup water can be supplied from the Water Treatment Plant and the two 500,000 gallon City Water Storage Tanks, or Treated Water Storage Tank. Pumping capability from all sources can be supplied from the Diesel Generators.

An alternative to the above cooldown procedure is the fill and drain method (See Appendix D). This method may be employed should an extremely low probability event occur which could cause a loss of condensate makeup capacity or require a rapid RCS de-pressurization rate. It provides for cooling of the upper reactor vessel head region by using auxiliary spray to the Pressurizer to lower RCS pressure and create a void in the upper head. Voiding in the upper head flushes hot upper head fluid into the cooler RCS where it mixes with RCS water. The water flushed out of the upper head will cause a surge of water from the RCS into the Pressurizer. The process is halted by stopping the spray. The insurge compresses the pressurizer steam space, raising the pressure, thus stopping the insurge and halting flashing in the upper head. Charging to the RCS will then force fluid into the upper head. Mixing of colder loop water with the hot upper head cools the upper head and causes an outsurge from the Pressurizer. The process is continued until the upper head is solid. The cycle is then repeated until RCS temperature and pressure have been reduced to SDC entry conditions.

The above procedure has been analyzed and performed successfully twice at St. Lucie and is considered a safe, alternative method of natural circulation cooldown.

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

2

APPENDIX C

RCS COOLDOWN/DE-PRESSURIZATION CHECKOFF LIST

INITIAL

1. At RCS pressure of 1750 psig, isolate and bypass the following transmitters:

_____ A. FT-2212 (Charging Hdr Flow Transmitter)

NOTE: Close the valve on the transmitter marked HIGH SIDE, open the valve marked BYPASS, and close the valve marked LOW SIDE.

_____ B. PT-2212 (Charging Hdr Pressure Transmitter)

NOTE: Close its isolation valve.

_____ 2. At RCS pressure of 1836 psia, the "SIAS Channel Activation Block Permiss" annunciator will come on. Block Channels A and B of SIAS by turning the key-interlocked switches in the BLOCK direction. /R2

NOTE: If the channels have been blocked, the two annunciators "SIAS Channel A Blocked" and "SIAS Channel B Blocked" will come on. /R2

3. At RCS pressure <1750 psia and prior to initiating SDC operations,
isolate the Hydrazine Injection System by:

_____ A. Racking out 2A Hydrazine pump (Bkr 2-41259).

_____ B. Racking out 2B Hydrazine Pump (Bkr 2-42053).

_____ C. Racking out 2A Containment Spray Pump (Bkr 2-20203).

_____ D. Racking out 2B Containment Spray Pump (Bkr 2-20407).

_____ 4. At Steam Generator pressure of 685 psig, the "MSIS Channel A Actuation Block Permissive" and "MSIS Channel B Actuation Block Permissive" annunciators will come on. Block the MSIS channels by turning the key-interlocked switches in the BLOCK direction. /R2

NOTE: If the channels have been blocked, the two annunciators "MSIS Channel A Actuation Blocked" and "MSIS Channel B Actuation Blocked" will come on. /R2

_____ 5. Prior to reaching RCS pressure of 1100 psia, unisolate and place in operation the standby Pressurizer level control and letdown pressure control valves.

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

APPENDIX C (Cont.)

RCS COOLDOWN/DE-PRESSURIZATION CHECKOFF LIST

INITIAL

6. When RCS pressure is 650 psia, de-pressurize the Safety Injection Tanks to 260 psia by opening the SIT vent valves.

_____ 2A1 SIT at 260 psia

_____ 2A2 SIT at 260 psia

_____ 2B2 SIT at 260 psia

_____ 2B1 SIT at 260 psia

7. When RCS temperature is < 500°F and RCS pressure is < 1500 psia, perform the following:

A. Close the Containment Spray (CS) pump discharge valves:

_____ V-07145
_____ V-07130

B. Close and tag the manual valves in the CS header:

_____ V-07162 (A Hdr)
_____ V-07165 (B Hdr)

C. Close Containment Spray motor operated valves:

_____ MV-07-3 (A Hdr)
_____ MV-07-4 (B Hdr)

NOTE: Manual valves at present. /R2

8. When RCS cold leg temperature reaches 280°F, annunciators "PORV 1474 LTOP CONDTN SELECT LTOP" and "PORV 1475 LTOP CONDTN SELECT LTOP" will come on. /R2

_____ A. Close MOV-1476 and MOV-1477 (Relief Block Valve). /R2

_____ B. Select LTOP on control switches for PORV-1474 and PORV-1475, and ensure that neither PORV opens. /R2

_____ C. Open MOV-1476 and MOV-1477.

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

2

APPENDIX C (Cont.)

RCS COOLDOWN/DE-PRESSURIZATION CHECKOFF LIST

INITIAL

9. When RCS pressure is $\leq$ 275 psia rack in the breakers for and then close the SIT discharge valves by placing the switch in the CLOSE position.

_____ MV-3614 (Bkr 2-41219)

_____ MV-3624 (Bkr 2-41311)

_____ MV-3634 (Bkr 2-42117)

_____ MV-3644 (Bkr 2-42048) /R2

_____ 10. Rack out the breakers for the SIT discharge valves.

11. When RCS temperature reaches 325°F and RCS pressure reaches 275 psia, perform the following:

_____ A. Remove the trip and close fuses on one HPSI pump, and tag with caution tags.

NOTE: Ensure the remaining HPSI pump is operable.

_____ B. Remove the trip and close fuses on the 2A and 2B CS Pumps, and tag with caution tags.

12. When RCS temperature reaches 200°F, perform the following:

_____ A. Remove the trip and close fuses on the remaining HPSI pump and tag with caution tags.

_____ B. Tag out one Charging Pump such that no more than two Charging Pumps are available for dilution below 200°F.

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

APPENDIX D

RCS FILL AND DRAIN METHOD OF COOLING

REACTOR VESSEL HEAD REGION

NOTE: This method of RCS cooldown should only be employed in the event that rapid de-pressurization of the RCS is required, or Condensate Storage Tank level decreases below minimum required by Tech Specs.

CAUTION: DURING THIS EVOLUTION, PRESSURIZER LEVEL IS NOT A VALID INDICATOR OF RCS INVENTORY DURING TRANSIENT CONDITIONS. CARE SHOULD BE EXERCISED TO OBSERVE OTHER PARAMETERS WHICH WOULD INDICATE ANY LOSS OF RCS INVENTORY.

1. Take manual control of the charging and letdown system.

2. Lower RCS pressure by using auxiliary sprays into the Pressurizer.

3. As voiding occurs in the upper reactor vessel head, a surge of water from the RCS will cause Pressurizer level to increase rapidly. Terminate auxiliary spray prior to Pressurizer level increasing to 70% indicated level.

4. Cool the upper reactor vessel head region by charging with a Charging Pump to the RCS loop(s). Continue charging until either of the following conditions occur:

   4.1 Pressurizer level decreases to 30% indicated level

   OR

   4.2 The upper reactor head is charged solid.

   NOTE: A solid upper head condition will be evident by an increasing Pressurizer level as charging to the loops is continued.

5. Repeat steps 1 through 4 above until SDC entry conditions are established.

   NOTE: If the above were to prove unsuccessful, Pressurizer heaters may be used (if sufficient volume is available) to heat up the pressurizer and remove a vessel head void. This strategy should be used only as a last resort and will take an hour or more to be successful. /R2

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

2

APPENDIX E

AUGMENTED COOLDOWN WITH THE STEAM DUMP

BYPASS SYSTEM (SBCS)

If the desired RCS cooldown rate cannot be attained, the SBCS can be used either by itself or in conjunction with the atmospheric dump valves. Since Condenser vacuum may not be available, the following actions should be taken to place the SBCS in service:

1. Call available maintenance personnel onsite to remove the target flange on a SBVS valve (preferably V-8803).

   NOTE: If no maintenance personnel are on site, call the Duty Call Supervisor.

2. Isolate all other SBCS valves from the Condenser (except the selected valve).

3. Jumper low vacuum interlock in SBCS (performed by I & C.).

4. Reset the Condenser vacuum interlock by depressing the reset button (on the outside of the RRS #2 cabinet) and observe that the Condenser vacuum interlock yellow light goes out.

   NOTE: This will bypass the vacuum permissive and allow operation of V-8803 to atmosphere after removal of the target flange.

5. Place all SBCS controllers in MANUAL.

6. When the target flange for V-8803 has been removed and the vacuum interlock jumpered, manually adjust the controller for V-8803 to control RCS cooldown rate.

   CAUTION: DO NOT EXCEED A COOLDOWN RATE $\geq$ 75°/HR.

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

APPENDIX F

INITIATION OF SHUTDOWN COOLING

NOTE: Perform bracketed steps for train "B"

_____ 1. Open HCV-3657 [3512] (SDC disch to LPSI hdr).

_____ 2. Open MV-3517 [3658] (LPSI pump supply to SDC HX).

_____ 3. Check to be open FCV-3306 [3301] (SDC HX bypass).

_____ 4. Open MV-3536 [3539] (SDC recirc warmup).

_____ 5. Open MV-3456 [3457] (LPSI pump return from SDC HX).

_____ 6. Check to be open V-3767 [3205] (LPSI pump mini-flow).

_____ 7. Check to be open V-3495 and 3659 [3496 and 3660] (Mini-flow hdr stop).

_____ 8. Start 2A [2B] LPSI pump.

_____ 9. Check to be closed V-3661 (Check valve leakage drain).

_____ 10. Open HCV-3615 and 3625 [3635 and 3645] (LPSI isol).

_____ 11. Open HCV-3618 and 3628 [3638 and 3648] (Check valve leakage control).

_____ 12. Open V-3459, V-3463, and I-SE-03-2A and 2B (RWT recirc stop).

_____ 13. Check the boron concentration in the system after circulating for ten minutes. Continue circulation until the boron concentration is $\geq$ to the concentration in the RCS.

_____ 14. Close HCV-3618, HCV-3628, [HCV-3638 and HCV-3648] (Check valve leakage control).

_____ 15. Close V-3459, V-3463 and I-SE-03-2A and 2B (RWT recirc stop).

_____ 16. Close HCV-3615 and 3625 [3635 and 3645] (LPSI isol).

_____ 17. Close HCV-3657 [3512] (SDC disch to LPSI hdr).

_____ 18. Continue to run LPSI pump to heat the SDC system as much as pratical.

_____ 19. Verify flow on FI-3306 [3301].

_____ 20. Close V-3767 [3205]. Ensure pump minimum flow requirements are met.

_____ 21. Stop the LPSI pump.

_____ 22. Close V-3444 [3432] (LPSI pump suction from RWT).

_____ 23. Close MV-3536 [3539] (SDC recirc warmup).

_____ 24. Check RCS pressure < 275 psia, then open V-3480, 3481 and 3664 [V-3651, 3652 and 3665] (SDC return valves).

_____ 25. Open HCV-14-3A [3B] (CCW to SDC HX).

_____ 26. Start 2A [2B] LPSI pump.

2

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

APPENDIX F (Cont.)

INITIATION OF SHUTDOWN COOLING

_____ 27. Slowly inch open HCV-3625 [3635] to bring SDC system up to temperature.

_____ 28. Adjust FIC-3306 [3301] to maximum flow in AUTO mode.

_____ 29. When temperature has stabilized, open fully HCV-3615 and 3625 [3635 and 3645] and adjust FIC-3306 [3301] to control at 3000 gpm in AUTO.

_____ 30. Adjust HCV-3657 [3512] to maintain desired cooldown rate.

ST. LUCIE UNIT 2
EMERGENCY OPERATING PROCEDURE NUMBER 2-0120040, REVISION 2
NATURAL CIRCULATION/COOLDOWN

2

6.0 DISCUSSION:

See Appendix B

7.0 REFERENCES:

7.1 CE Emergency Operating Procedure Guidelines, CEN-152

7.2 Emergency Operating Procedure 1-0120040, "Natural Circulation/Cooldown"

8.0 RECORDS REQUIRED:

8.1 Normal log entries

9.0 APPROVAL:

Reviewed by Facility Review Group October 26 1982

Approved by J. H. Barrow (for) Plant Manager October 26 1982

Revision 2 Reviewed by FRG April 22 1983

Approved by J H Barrow for Plant Manager April 22 1983

"LAST PAGE"

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

DOCUMENT TITLE Operational Requirements for Emergency Cooling Water Canal

DOCUMENT FILE NUMBER 2-0360030

DOCUMENT REVISION NUMBER 1

DOCUMENT DISTRIBUTED ON 5-5-83
DATE

DOCUMENT SENT TO:

2

COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED	COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED
	MASTER			UNCONTROLLED COPIES	
1	D. A. Sager				
2					
3				NRC - Region II	
4				Attn: EPPS Branch Chief	
5	N. G. Roos			H. Paduano - GO	
6	TSC			A. W. Bailey	
7				G. Anglehart - CE	
8					
9					
10	Control Room II			G. Regal	
11				Ugelow, Al —Backfit	
12				Training - Larry Baker	
13					
14					
15	Training			J. Spodick	
				T. Vogan - GO	
				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: Baller DATE

2

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0360030
REVISION 1

1.0 TITLE:

Operational Requirements for the Emergency Cooling Water Canal

2.0 REVIEW AND APPROVAL:

Reviewed by Facility Review Group March 25 1983
Approved by J. H. Barrow (for) Plant Manager April 4 1983

Revision 1 Reviewed by FRG May 2 1983
Approved by J H Barrow For Plant Manager May 5 1983

3.0 PURPOSE:

The Emergency Cooling Water System consists of a canal connecting Big Mud Creek to the intake in front of the circulating water intake structure. This secondary source will be used only in the event that the primary source from the Atlantic Ocean becomes inoperable. For normal operation the barrier wall across the Ultimate Heat Sink (UHS) separates the intake canal from Big Mud Creek.

An operable UHS ensures that sufficient cooling capacity is available to either (1) provide normal cooldown of the facility, or (2) to mitigate the effects of accident conditions within acceptable limits.

4.0 SYMPTOMS:

4.1 Intake structure low water level (Annunciators LA-1 and LB-1)

4.2 Intake local level indication less than -9 ft.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0360030, REVISION 1
OPERATIONAL REQUIREMENTS FOR EMERGENCY COOLING WATER CANAL

2

5.0 INSTRUCTIONS:

5.1 The Nuclear Plant Supervisor shall determine the need to operate the Emergency UHS valves.

5.2 Insure Unit 1 Control Room is aware of low water level condition.

5.3 The Nuclear Plant Supervisor shall notify the Duty Call Supervisor.

5.4 The turbine generator and associated equipment will be shut down per OP 2-0030125.

5.5 The Circulating Water System shall be shut down per OP 2-0620020.

5.6 Implement the Emergency Plan as necessary in accordance with EPIP 3100021E, "Duties of the Emergency Coordinator."

5.7 The reactor shall be shut down and placed in mode 3.

NOTE: The reactor shall be in mode 3 within one hour of reaching an intake water level of less than -10.5 ft.

5.8 Within 12 hours after placing the reactor in mode 3, the UHS barrier valves I-SE-37-1 and I-SE-37-2 shall be opened providing cooling water from Big Mud Creek. Verify by alarm (E-44) and valve position indicator lights.

NOTE: In the event barrier valves fail to open on signal, first instruct Unit 1 Control Room to attempt to open them. If valves still fail to open, they can be opened by placing an air assist on the top of the piston per steps 5.8.1.1 through 5.8.1.5. The required tubing, connectors and regulator will be available at the valve or from the I & C Department.

5.8.1 Operation Procedure

5.8.1.1 Insure valve has an open signal before attaching hose so upper piston void can intake air preventing a vacuum from forming.

5.8.1.2 Attach hose to upper piston connection and air supply.

5.8.1.3 Unlock and open supply air valve (V-37221 or V-37220, BA 3 Key).

5.8.1.4 Regulate 1-2 psig intervals until valve opens (normally <5 psig opens valve).

5.8.1.5 Close supply air valve, vent upper piston and remove hose.

5.9 Continue reactor cooldown per OP 2-0030127.

/R1

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0360030, REVISION 1
OPERATIONAL REQUIREMENTS FOR EMERGENCY COOLING WATER CANAL

2 /R1

6.0 REFERENCES:

6.1 St. Lucie Unit 2 FSAR, Section 9

6.2 Unit 2 Technical Specification Section 3.7.5.1

6.3 Circulating Water System Normal Operation, OP 2-0620020

6.4 Turbine Shutdown, OP 2-0030125

6.5 Reactor Cooldown from Mode 3, OP 2-0030127

7.0 RECORDS REQUIRED:

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 1

DOCUMENT DISTRIBUTED ON 5-2-83
DATE

DOCUMENT SENT TO:

2

COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED	COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED
	MASTER			UNCONTROLLED COPIES	
1	D. A. Sager				
2					
3				NRC - Region II	
4				Attn: EPPS Branch Chief	
5	N. G. Roos			H. Paduano - GO	
6	TSC			A. W. Bailey	
7				G. Anglehart - CE	
8					
9					
10	Control Room II			G. Regal	
11				Ugelow, Al - Backfit	
12				Training - ECT	
13					
14					
15	Training			J. Spodick	
				T. Vogan - GO	
				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: J Fuller DATE

2

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE 2-0410030
REVISION 1

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 1 Reviewed by FRG 4-28 1983

Approved by J H Barrow for Plant Manager 4-28 1983

3.0 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 $\leq$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. /R1

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

   A. 20° subcooling exists in the Reactor Coolant System and pressurizer pressure and level control are established, and

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

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NUMBER 2-0410030, REVISION 1
HPSI - OFF NORMAL OPERATION

2

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 2
OFF-NORMAL OPERATING PROCEDURE NUMBER 2-0410030, REVISION 1
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 unblocking signal or with manual pushbuttons.
2. Verify actuation.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NUMBER 2-0410030, REVISION 1
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

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

DOCUMENT TITLE ICW System -OFF-NORMAL Operation

DOCUMENT FILE NUMBER 2-0640030

DOCUMENT REVISION NUMBER 1

DOCUMENT DISTRIBUTED ON 5-2-83
DATE

DOCUMENT SENT TO:

2

COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED	COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED
	MASTER			UNCONTROLLED COPIES	
1	D. A. Sager				
2					
3				NRC - Region II	
4				Attn: EPPS Branch Chief	
5	N. G. Roos			H. Paduano - GO	
6	TSC			A. W. Bailey	
7				G. Anglehart - CE	
8					
9					
10	Control Room II			G. Regal	
11				Ugelow, Al —Backfit	
12				Training - Larry Baker	
13					
14					
15	Training			J. Spodick	
				T. Vogan - GO	
				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: _____ DATE _____

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0640030
REVISION 1

2

1.0 TITLE:

ICW SYSTEM - OFF NORMAL OPERATION

2.0 REVIEW AND APPROVAL:

Reviewed by Facility Review Group January 25 1983

Approved by C. M. Wethy Plant Manager January 25 1983

Revision 1 Reviewed by FRG 4-28 1983

Approved by J H Barrow Plant Manager 4-28 1983

3.0 PURPOSE AND DISCUSSION:

3.1 This procedure provides instructions to be followed when a malfunction or failure in the Intake Cooling Water (ICW) System occurs.

3.2 While one ICW Pump and header are sufficient to meet minimum requirements, redundancy has been lost when one header and/or ICW Heat Exchanger is out of service. Maximum effort should be made to restore out of service equipment to normal.

3.3 An inoperable Intake Cooling Water loop shall be made operable within 72 hours or be in at least Hot Standby within the next 6 hours and in Cold Shutdown within the following 30 hours.

4.0 SYMPTOMS:

4.1 Intake Cooling Water headers low pressure (E-30)

4.2 Intake Cooling Water pumps motor overload alarms (E-6) (E-7) (E-8)

4.3 Intake Cooling Water Pumps motor overload trip alarm (E-6) (E-7) (E-8)

4.4 High temperature alarms on CCW and TCW Heat Exchanger outlets (S-13) (E-37)

4.5 High differential pressure on TCW basket strainers, SS-21-4A and SS-21-4B (E-32)

4.6 High differential pressure on CCW basket strainers, I-SS-21-1A and I-SS-21-1B (E-31)

4.7 Visible evidence of line rupture

4.8 Low Flow Alarm on CCW Heat Exchangers outlet (saltwater) (S-3) (S-5)

/R1

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0640030, REVISION 1
ICW SYSTEM - OFF NORMAL OPERATION

2

5.0 INSTRUCTIONS:

5.1 Immediate Automatic Action:

None

5.2 Immediate Operator Action:

None

5.3 Subsequent Operator Action:

1. If ICW Pumps discharge low pressure alarm is associated with high flow through a CCW Heat Exchanger, TCW Heat Exchanger, or OBCS Heat Exchanger, instruct the operator to take manual control of the affected flow control valve and reduce flow to normal operating flows.

2. Upon loss of an ICW Pump, line up the standby pump to the affected header and start the standby pump.

3. Blocked CCW Heat Exchanger basket strainer (SS-21-1A or SS-21-1B).

   a. Open affected strainer bypass valve (V21187 or V21234).

   b. Back wash or clean the affected strainer.

      NOTE: While backwashing, observe FIS-21-9A or FIS-21-9B to ensure adequate ICW flow on header.

   c. Return system to normal lineup.

4. Blocked TCW heat exchanger basket strainer (SS-21-4A or SS-21-4B).

   a. Open V-21215 (TCW Hx inlet tie).

   b. Backwash or clean the affected strainer.

   c. Return system to normal lineup.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0640030, REVISION 1
ICW SYSTEM - OFF NORMAL OPERATION

2

5.0 INSTRUCTIONS: (Cont.)

5.3 (Cont.)

5. Rupture of ICW line.

a. Determine if affected portion of line can be isolated. Isolate affected portion if possible and align standby pump to unaffected header. Proceed to tie headers together where applicable to keep both heat exchangers in service.

b. An inoperable Intake Cooling Water loop shall be made operable within 72 hours or be in a least Hot Standby within the next 6 hours and in Cold Shutdown within the following 30 hours.

6.0 REFERENCES:

6.1 Ebasco P & ID 2998-G-082

6.2 St. Lucie Unit 2 Technical Specification 3.7.4

7.0 RECORDS REQUIRED:

7.1 Normal log entries

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

DOCUMENT TITLE DC Ground Isolation

DOCUMENT FILE NUMBER 2-0960030

DOCUMENT REVISION NUMBER 1

DOCUMENT DISTRIBUTED ON 5-4-83
DATE

DOCUMENT SENT TO:

2

COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED	COPY NO.	DOCUMENT HOLDER	TRANSMITTAL RETURNED
	MASTER			UNCONTROLLED COPIES	
1	D. A. Sager				
2					
3				NRC - Region II	
4				Attn: EPPS Branch Chief	
5	N. G. Roos			H. Paduano - GO	
6	TSC			A. W. Bailey	
7				G. Anglehart - CE	
8					
9					
10	Control Room II			G. Regal	
11				Ugelow, Al —Backfit	
12				Training - Larry Baker	
13					
14					
15	Training			J. Spodick	
				T. Vogan - GO	
				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: [signature] DATE

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030
REVISION 1

2

1.0 TITLE:

DC GROUND ISOLATION

2.0 REVIEW AND APPROVAL:

Reviewed by Facility Review Group March 9 1983

Approved by J. H. Barrow (for) Plant Manager April 1 1983

Revision 1 Reviewed by FRG April 22 1983

Approved by J H Barrow /2 Plant Manager [illegible] 19 83

3.0 PURPOSE:

3.1 Provide instructions for isolating a DC system ground without affecting plant operation.

3.2 Discussion:

This procedure shall be used as a guideline for DC ground location and isolation. The Nuclear Plant Supervisor and the Nuclear Watch Engineer shall use any section, in any order, as they deem necessary to maintain the plant stability and to insure that no limiting condition for operation from the Standard Technical Specification is violated.

4.0 PRECAUTIONS AND LIMITS:

Maintain two way radio communication between control center and operating point. Verify control center operator is observing ground light on RTGB-201 when isolating circuits to minimize time each circuit is switched off.

5.0 RELATED SYSTEM STATUS:

None

6.0 REFERENCES:

6.1 Ebasco Power Distribution Motor Data 2998-B-335 series drawings

6.2 Ebasco Control Wiring Diagrams 2998-B-327 series drawings

7.0 RECORDS REQUIRED:

Plant Work Order for the grounded circuits

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS:

8.1 If the ground appears on a bus which is tied to the 2A, 2B, or 2C DC bus, then proceed to Step 8.1.1. If the ground is on a separate isolated bus, then proceed to Step 8.1.5.

___ 8.1.1 Energize the standby battery charger and verify that all the 125V DC buses are being supplied from their respective chargers.

8.1.2 Open or verify open the following breakers in 125V DC bus 2AB power panels:

___ 8.1.2.1 Brk. 2-60310, 125V DC bus 2C

___ 8.1.2.2 Brk. 2-60335, 125V DC bus 2A

___ 8.1.2.3 Brk. 2-60333, 125V DC bus 2B

___ 8.1.3 The 2AB 125V DC bus is now isolated from the 2A and 2B 125V DC buses, and the 2C 125V DC bus is isolated from the 2AB 125V DC bus. Determine which DC bus is grounded.

___ 8.1.4 Return the 125V DC system to its original lineup.

___ 8.1.5 Proceed to the appropriate section as follows:

125V DC bus 2A ground:	Section 8.2
125V DC bus 2B ground:	Section 8.3
125V DC bus 2AB ground:	Section 8.4
125V DC bus 2C ground:	Section 8.5

8.2 Isolate a ground on 125V DC bus 2A as follows:

8.2.1 Breaker 2-60101 (PSL 1/PSL 2 Inst. Air Tie Valves PCV-18.5 and PCV-18.6)

8.2.2 Breaker 2-60102 RTGB-201 and RTGB-203

1.	RTGB-201	CWD 800
	F1 and F2	CWD 720
	F3 and F4	CWD 883
	F33 and F34	CWD 711
2.	RTGB-203	CWD 396
	F31 and F32	CWD 130
	F35 and F36	CWD 121
	F39 and F40	CWD 98
	F43 and F44	CWD 138
	F33 and F34	CWD 103
	F45 and F46	CWD 97

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.2 (Cont.)

8.2.3 Breaker 2-60103 (480V Swgr. 2A-1): Momentarily open and reclose breaker. If ground does not clear, proceed to Section 8.2.4. If the ground did clear, proceed to 480V LC Swgr. 2A1 and perform the following:

8.2.3.1 At the rear of each compartment listed below, momentarily remove and replace the close and trip circuit fuses for the listed breakers:

	COMPT.	BREAKER	EQUIPMENT
_____	2B	2-40103	Main Feed - Station Service Transformer
_____	3C	2-40107	Station Air Compressor
_____	5B	2-40111	Hypochlorite MCC 2A10
_____	5C	2-40112	Main Transformer 2A Cooling Source #1
_____	6A	2-40114	Main Transformer 2B Cooling Source #2
_____	6B	2-40115	Turbine Area MCC 2A1
_____	6C	2-40116	Intake Area MCC 2A3
_____	7B	2-40119	Turbine Area MCC 2C
_____	7C	2-40120	Turbine Bldg. Crane #2
_____	7D	2-40121	Rad Waste MCC 2A2

8.2.4 Breaker 2-60104 (6900V Swgr. 2A1)

1. COMPT	BREAKER	EQUIPMENT
01	2-30101 (2W87)	Incoming fdr aux trans 2A
02	2-30102 (2W89)	Incoming fdr S/U trans standby 2A
03	2-30103	Feedwater pump 2A
04	2-30140	RCP 2A1
05	2-30105	RCP 2B2

/R1

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.2 (Cont.)

___ 8.2.5 Breaker 2-60105 (480V Swgr. 2A-2): Momentarily open and reclose breaker. If the ground did not clear, proceed to Section 8.2.6. If the ground did clear, proceed to 480V Swgr. 2A-2 and perform the following:

___ 8.2.5.1 At the rear of each compartment listed below, momentarily remove and replace the close and trip circuit fuses for the listed breakers:

	COMPT.	BREAKER	EQUIPMENT
_____	4B	2-40211	2HVE-10A
_____	4C	2-40212	CEA MG Set 2A
_____	5A	2-40214	Spare /R1

8.2.6 Breaker 2-60106 (4160V Swgr. 2A-2): Momentarily open and reclose breaker. NOTE: Annunciator window B4 and B12 will alarm. If the ground did not clear, proceed to Section 8.2.7. If the ground did clear, proceed to 4160V Swgr. 2A-2 and perform the following:

8.2.6.1 Open cubicle 1 and momentarily remove and replace the close and trip circuit fuses for breaker (1W86) 2-20101. If the ground did not clear, momentarily remove and replace the 4160V 2A-2 undervoltage fuses. Close cubicle 1. /R1

8.2.6.2 Open cubicle 2 and momentarily remove and replace the close and trip circuit fuses for breaker 2-20102. If the ground did not clear, momentarily remove and replace the startup standby transformer 2A lockout relay fuses. NOTE: Annunciator window B12 will annunciate. Close cubicle 2.

8.2.6.3 Open cubicle 10 and momentarily remove and replace the close and trip circuit fuses for breaker 2-20110. If the ground did not clear, momentarily remove and replace the 4160V Swgr. 2A-2 differential relay fuses. NOTE: Annunciator window B4 will alarm.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.2 (Cont.)

8.2.6 (Cont.)

8.2.6.4 Open the cubicles listed below and momentarily remove and replace the close and trip circuit fuses for the listed breakers:

	CUBICLE	BREAKER	EQUIPMENT
_____	03	2-20103	CWP 2A1
_____	04	2-20104	CWP 2B1
_____	05	2-20105	SGBD MCC 1B-9 Transformer
_____	06	2-20106	TCWP 2A
_____	07	2-20107	Condensate Pump 2A
_____	08	2-20108	Htr. Drain Pump 2A
_____	09	2-20109	Feed to 4160V Swgr. 2A3

___ 8.2.7 Breaker 2-60107 (125V DC PP218): Momentarily open and reclose breaker. See Appendix E for load list.

___ 8.2.8 Breaker 2-60108 (Test Station for 6.9KV Swgr. 2A1 and 2B1): Momentarily open and reclose breaker.

___ 8.2.9 Breaker 2-60109 (Comp. Cooling Water Surge Tank): Momentarily open and reclose breaker. NOTE: LCV-14-1 (CCW surge tank inlet) fails closed.

___ 8.2.10 Breaker 2-60110 (Unit Aux XFMER 2A Control Cabinet): Momentarily open and reclose breaker. NOTE: Annunciator window C-48 will alarm.

___ 8.2.11 Breaker 2-60111 (DC LP 227): Momentarily open and reclose breaker. See Appendix E for load list.

___ 8.2.12 Breaker 2-60112 (S/U Standby XFMER 2A Control Cabinet): Momentarily open and reclose breaker. NOTE: Annunciator B-21 will alarm.

___ 8.2.13 Breaker 2-60113 (480V Pzr. Htr. Bus 2A3 Sudden Pressure Relay Ckt.): Momentarily open and reclose breaker.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.2 (Cont.)

___ 8.2.14 Breaker 2-60114 (Main XFMER 2A Control Cabinet): Momentarily open and reclose breaker. NOTE: Annunciator window C-36 will alarm.

___ 8.2.15 Breaker 2-60115 (RTGB-205 and 203): Momentarily open and reclose breaker. See Appendix E for load list, FF1 to FF20 (RTGB-205), FF1 to FF12 (RTGB-203).

___ 8.2.16 Breaker 2-60116 (4160 Swgr. 2A-3): Momentarily open and reclose breaker. NOTE: Annunciator windows B4, 15, 18, 19, 54, 56, 57 and 59; E-46; G-44, R-28 and 30, S-47, 57 and X-8 will alarm. If the ground did not clear, proceed to Section 8.2.17. If the ground did clear, proceed to 4160V Swgr. 2A-3 and perform the following:

8.2.16.1 Open cubicle 6 and momentarily remove and replace the close and trip circuit fuses for breaker 2-20206, CCWP 2A. NOTE: Annunciator window S-51 will alarm. If the ground did not clear, momentarily remove and replace the 4160V Swgr. 2A-3 differential relay fuses. NOTE: Annunciator window B-4 will alarm.

8.2.16.2 Open cubicle 11 and momentarily remove and replace the close and trip circuit fuses for breaker 2-20211, Diesel Generator 2A. NOTE: Annunciator window B-56 will alarm. If the ground does not clear, momentarily remove and replace the 4160V Swgr. 2A-3 load shedding relay fuses. NOTE: Annunciator window B-15 will alarm.

8.2.16.3 Open the cubicles listed below and momentarily remove and replace the close and trip circuit fuses for the listed breakers. NOTE: Listed annunciator windows will alarm.

ANN. WINDOW	COMPT.	BREAKER	EQUIPMENT
R-30	1	2-20201	HPSI Pump 2A
R-28	2	2-20202	LPSI Pump 2A
S-47	3	2-20203	Cont. Spray 2A
B-59	4	2-20204	Feed to Prz. Htr. 2A3
X-8	5	2-20205	CEDM Cooling Fan 2HVE-21A
E-46	7	2-20207	ICWP 2A
B-54	8	2-20208	Feed to 4160V 2AB
B-19	9	2-20209	Supply from 4160V 2A2
B-47	10	2-20210	Feed to 480V LC 2A2/2A5
G-44	12	2-20212	AFWP 2A

/R1

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.2 (Cont.)

___ 8.2.17 Breaker 2-60117 (DG 2A Cont. Pnl.): Momentarily open and reclose breaker. NOTE: This breaker is the feed to the annunciator circuit on 2A DG.

___ 8.2.18 Breaker 2-60118 (Cont. Transfer Panel 2A): Momentarily open and reclose breaker.

___ 8.2.19 Breaker 2-60119 (RTGB-206): Momentarily open and reclose breaker. NOTE: See Appendix E for load list.

___ 8.2.20 Breaker 2-60120 (Static Inv. Cab. 2A): Remove Static Inverter 2A from service by performing Section 8.3 of Operating Procedure 2-0970020.

___ 8.2.21 Breaker 2-60121 (IRS 2A Valve SE-07-3A): Momentarily open and reclose breaker. NOTE: Valve SE-07-3A will open.

___ 8.2.22 Breaker 2-60122 (DG 2A Control Panel): Momentarily open and reclose breaker.
NOTE: Annunciator window B-36 and B-26 on RTGB-201 and B-3 on DG 2A local annunciator will alarm. If the ground did not clear, proceed to step 8.2.23. /R1

___ 8.2.23 Breaker 2-60123 (480V Swgr. 2A-2): Momentarily open and reclose breaker. NOTE: B-29 will alarm. If the ground does not clear, proceed to 8.2.4. If the ground did clear, proceed to 480V Swgr. 2A-2 and perform the following:

___ 8.2.23.1 Open compartment 6A (instrumentation) and momentarily remove and replace the 2A-2 Swgr. UV relay fuses. NOTE: Annunciator window B-29 will alarm. Close compartment 6A.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.2 (Cont.)

8.2.23 (Cont.)

8.2.23.2 At the rear of each compartment listed below, momentarily remove and replace the close and trip circuit fuses for the listed breakers:

COMPT.	BREAKER	EQUIPMENT
1A	2-40201	Spare
1B	2-40202	MCC 2A-7
1C	2-40203	MCC 2A-5
1D	2-40204	Spare
5B	2-40215	MCC 2A9-1A
5C	2-40216	Spare
5D	2-40217	Charging Pump 2A
6B	2-40219	Main Feed
6C	2-40220	480V LC 2AB

___ 8.2.24 Breaker 2-60124 (Relief Valve V-1475): Momentarily open and close breaker.

___ 8.2.25 Breaker 2-60125 (Battery Charger 2A): Momentarily open and close breaker.

8.2.26

___ 8.2.27 Breaker 2-60127 (HVCB): Momentarily open and reclose breaker. See Appendix E for load list, FF25 to FF36.

8.2.28 Breaker 2-60128 (Spare)

___ 8.2.29 Breaker 2-60129 (Static Inverter Cabinet 2C): Remove static inverter 2C from service by performing Section 8.3 of Operating Procedure 2-0970020.

___ 8.2.30 Breaker 2-60130 (Control Transfer Panel 2A): Momentarily open and reclose breaker.

___ 8.2.31 Breaker 2-60131 (Plt. Aux. Cont. Ann. - LA): Momentarily open and reclose breaker.

/R1

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.2 (Cont.)

___ 8.2.32 Breaker 2-60132 (DC PP-238): Momentarily open and reclose breaker. See Appendix E for load list.

___ 8.2.33 Breaker 2-60133 (Bus MA): This breaker trips reactor trip breakers TCB-1 and TCB-5. Verify that reactor trip breakers TCB-1 through 8 are closed.

___ 8.2.33.1 Inform the Control Room that TCB-1 and TCB-5 will be tripped. Momentarily open and reclose breaker 2-60133. NOTE: Annunciator windows K-9 and K-10 will alarm. If the ground did not clear, proceed to Section 8.2.34. If the ground did momentarily clear, proceed to reactor trip switchgear and perform the following:

___ 8.2.33.1.1 Momentarily remove and replace the close and trip fuses for TCB-1.

___ 8.2.33.1.2 Momentarily remove and replace the close and trip fuses for TCB-5.

___ 8.2.33.2 Verify that reactor trip breakers TCB-1 through 8 are closed before proceeding with remainder of procedure.

___ 8.2.34 Breaker 2-60134 (Bus MC): This breaker trips reactor trip breakers TCB-3 and TCB-7. Verify that reactor trip breakers TCB-1 through TCB-8 are closed.

___ 8.2.34.1 Inform the Control Room that TCB-3 and TCB-7 will be tripped. Momentarily open and reclose breaker 2-60134. NOTE: Annunciator windows K-4 and K-5 will alarm. If the ground did not clear, proceed to Section 8.2.35. If the ground did momentarily clear, proceed to reactor trip switchgear and perform the following:

8.2.34.1.1 Momentarily remove and replace the close and trip fuses for TCB-3.

8.2.34.1.2 Momentarily remove and replace the close and trip fuses for TCB-7.

8.2.34.2 Verify that reactor trip breakers TCB-1 through 8 are closed before proceeding with remainder of procedure.

/R1

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.2 (Cont.)

8.2.35 Breaker 2-60135 (ISO CAB "SA"): Verify SS in isolation panel SA are in "normal" position. Momentarily open and close breaker.

8.2.36 Breaker 2-60136 (Charging Line 2A2 Valve I-SE-02-02)

8.2.37 Breaker 2-60137 (DG 2A Cont. Pnl. Exc.)

8.2.38 Breaker 2-60138 (Iso. Pnl. 2A-Charging Line Iso. Valve V-2523)

8.2.39 Breaker 2-60139 480V LC 2A5.

8.2.40 Breaker 2-60140 125V DC PP-254.

8.2.41 Breaker 2-60141 Spare.

8.2.42 Breaker 2-60142 Spare.

8.2.43 Momentarily remove and replace the DC bus 2A under-voltage relay fuses in DC bus 2A.

8.2.44 Momentarily remove and replace the DC bus 2A ground relay fuses in DC bus 2A.

/R1

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.3 Isolate a ground on 125V DC bus 2B as follows:

___ 8.3.1 Breaker 2-60201 (Hydrogen Panel): Momentarily open and reclose breaker. NOTE: The annunciator horn at the H_2 control panel must be reset locally.

___ 8.3.2 Breaker 2-60202 (LP-228): Momentarily open and reclose breaker. See Appendix F for load list.

___ 8.3.3 Breaker 2-60203 (Turbine Oil H_2 Seal Oil and Htr. Drain Fire Protection): Momentarily open and reclose breaker.

___ 8.3.4 Breaker 2-60204 (S/U Standby XFMER 2B Cont. Cab.): Momentarily open and reclose breaker.

___ 8.3.5 Breaker 2-60205 (480V Pzr. Htr. Bus 2B3 Sudden Press. Relay Ckt.): Momentarily open and reclose breaker.

___ 8.3.6 Breaker 2-60206 (Main XFMER 2B Cont. Cab.): Momentarily open and reclose breaker.

___ 8.3.7 Breaker 2-60207 (480V Swgr. 2B2 Cont. Cab.): Momentarily open and reclose breaker. If the ground did not clear, proceed to Section 8.3.8. If the ground did clear, proceed to 480V Swgr. 2A-2 and perform the following:

8.3.7.1 At the rear of each compartment listed below, momentarily remove and replace the close and trip fuses for the listed breakers:

	COMPT.	BREAKER	EQUIPMENT
_____	3A	40505	Spare
_____	4B	40510	2HVE-10B
_____	4C	40511	CEA MG Set 2B

/R1

___ 8.3.8 Breaker 2-60208 (Aux. XFMER 2B Control Cab.): Momentarily open and reclose breaker.

___ 8.3.9 Breaker 2-60209 (Excitation Swgr.): Do Not Operate this breaker. Proceed to 8.3.10. If ground cannot be cleared after completion of 8.3, notify Electrical Department that the ground is apparently in the excitation switchgear. NOTE: Operation of breaker will trip generator on loss of DC.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.3 (Cont.)

8.3.10 Breaker 2-60210 RTGB-201 CWD 800 /KI

____ 8.3.11 Breaker 2-60211 (480V Swgr. 2B-1): Momentarily open and reclose breaker. If ground does not clear, proceed to Section 8.3.12. If ground did clear, proceed to 480V LC Swgr. 2B-1 and perform the following:

8.3.11.1 At the rear of each compartment listed below, momentarily remove and replace the close and trip fuses for the listed breakers:

	COMPT.	BREAKER	EQUIPMENT
____	1B	2-40402	Main XFMER 2A Cooling Source #2
____	1D	2-40404	MCC #2B-2
____	2B	2-40406	MCC #2B-10
____	2C	2-40407	Main XFMER 2B Cooling Source #1
____	3A	2-40409	MCC #2C
____	3B	2-40410	MCC #2B-1
____	3C	2-40411	MCC #2B-3
____	6B	2-40419	Main Feed
____	6C	2-40420	2B1-2A1 Tie

8.3.12 Breaker 2-60212 (6900V Swgr. 2B-1): Momentarily open and reclose breaker. If ground did not clear, proceed to Section 8.3.13. If ground did clear, proceed to 6900V Swgr. 2B1 and perform the following:

8.3.12.1 Open the cubicles listed below and momentarily remove and replace the close and trip circuit fuses for the listed breakers:

CUBICLE	BREAKER	EQUIPMENT
01	2-30205	Reactor Coolant Pump 2B1
02	2-30204	Reactor Coolant Pump 2A2
03	2-30203	Feedwater Pump 2B

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.3 (Cont.)

___ 8.3.13 Breaker 2-60213 (PP-219): Momentarily open and reclose breaker. See Appendix G for load list.

___ 8.3.14 Breaker 2-60214 (4160V Swgr. 2B-2): Momentarily open and reclose breaker. NOTE: Annunciator windows A4 and A15 will alarm. If the ground does not clear, proceed to Section 8.3.15. If the ground did clear, proceed to 4.16KV Swgr. 2B-2 and perform the following:

___ 8.3.14.1 Open cubicle 10 and momentarily remove and replace the close and trip fuses for breaker 2-20301. If the ground did not clear, momentarily remove and replace 4.16KV Swgr. 2B2 undervoltage fuses. Close cubicle 10.

___ 8.3.14.2 Open cubicle 9 and momentarily remove and replace the close and trip fuse for breaker 2-20302. If the ground did not clear, momentarily remove and replace the startup standby transformer 2B lockout relay fuses. NOTE: Annunciator window A15 will alarm. Close cubicle 9.

___ 8.3.14.3 Open cubicle 1 and momentarily remove and replace the close and trip fuses for breaker 2-20310. If the ground did not clear, momentarily remove and replace the 4.16KV Swgr. 2B2 differential relay fuses. NOTE: Annunciator window A4 will alarm.

___ 8.3.14.4 Open the cubicles listed below and momentarily remove and replace the close and trip circuit fuses for the listed breakers:

	CUBICLE	BREAKER	EQUIPMENT
_____	02	2-20309	Feed to 4160V Bus 2B3
_____	03	2-20308	Htr. Dr. Pump 2B
_____	04	2-20307	Condensate Pump 2B
_____	05	2-20306	TCWP 2B
_____	07	2-20304	CWP 2B2
_____	08	2-20303	CWP 2A2

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.3 (Cont.)

___ 8.3.15 Breaker 2-60215 (480V Swgr. 2B-2): Momentarily open and reclose breaker. If the ground did not clear, proceed to Section 8.3.16. If the ground did momentarily clear, proceed to 480V Swgr. 2B2 and perform the following:

___ 8.3.15.1 Open compartment 2A (instrumentation) and momentarily remove and replace the 2B2 swgr. undervoltage relay fuses. Close compartment 2A.

___ 8.3.15.2 At the rear of each compartment listed below, momentarily remove and replace the close and trip fuses for the listed breakers:

	COMPT.	BREAKER	EQUIPMENT	
_____	2C	2-40504	2B2-2AB Tie	
_____	3B	2-40506	MCC 2B-9 2HVS-1C	
_____	3C	2-40507	Spare	/R1
_____	3D	2-40508	Charging Pump 2B	
_____	6A	2-40514	Reactor Crane #2	
_____	7A	2-40518	Spare	/R1
_____	7B	2-40519	MCC 2B-7	
_____	7C	2-40520	MCC 2B-5	
_____	7D	2-40521	Spare	/R1

___ 8.3.16 Breaker 2-60216 (Aux. Spray Valve ISE-02-4): Momentarily open and reclose breaker. NOTE: Valve fails closed, loses indication.

___ 8.3.17 Breaker 2-60217 (IRS Valve 2B SE-07-3B - 100W): Momentarily open and reclose breaker.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.3 (Cont.)

___ 8.3.18 Breaker 2-60218 (4.16KV Swgr. 2B-3): Momentarily open and reclose breaker. NOTE: Annunciator windows A4, A15, A52, A54, A56, A57, A59, E47, G45, R52, R56, R59 and S52 will alarm. If the ground did not clear, proceed to Section 8.3.19. If the ground did clear, proceed to 4.16KV Swgr. 2B-3 and perform the following:

8.3.18.1 Open cubicle 4 and momentarily remove and replace the close and trip fuses for breaker 2-20404. NOTE: Annunciator window S52 will alarm. If the ground did not clear, momentarily remove and replace the 4.16KV Swgr. 2B-3 differential relay fuses. NOTE: Annunciator window A4 will alarm.

___ 8.3.18.2 Open cubicle 1 and momentarily remove and replace the close and trip fuses for breaker 2-20401. NOTE: Annunciator window A56 will alarm. If the ground did not clear, momentarily remove and repalce the 4.16KV Swgr. 2B-3 load shedding relay fuses. NOTE: Annunciator window A15 will alarm.

___ 8.3.18.3 Open the cubicles listed below and momentarily remove and replace the close and trip fuses for the listed breakers. NOTE: Listed annunciator windows will alarm.

	CUBICLE	BREAKER	ANN. WINDOW	EQUIPMENT
___	2	2-20402	A-57	Feed to 2B2 480V LC
___	3	2-20403	A-59	Feed to 2B3 480V Press. Htrs.
___	5	2-20405	R-56	HPSI Pump 2B
___	6	2-20406	R-59	LPSI Pump 2B
___	7	2-20407	R-52	Cont. Spray Pump 2B
___	8	2-20408		CEDM Cooling Fan 2HVE-21B
___	9	2-20409	A-54	Feed to 2AB 4160V
___	10	2-20410	E-47	ICWP 2B
___	11	2-20411	A-52	Supply from 2B2 4160V
___	12	2-20412	G-45	Aux. Feed Water Pump 2B

8.3.19 Breaker 2-60219 (DG 2B Control Panel)

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.3 (Cont.)

___ 8.3.20 Breaker 2-60220 (Static Inverter Cab. 2B): Remove inverter 2B from service by performing Section 8.3.1 through 8.3.8 of Operating Procedure 2-0970020.

___ 8.3.21 Breaker 2-60221 (DG 2B Cont. Panel). Momentarily open and reclose breaker.
NOTE: Annunciator window A-36 and A-26 on RTGB-201 and 8-3 on DG 2B local annunciator will alarm. If the ground did not clear, proceed to step 8.3.22. /R1

___ 8.3.22 Breaker 2-60222 (Static Inverter Cab. 2D): Remove inverter 2D from service by performing Section 8.3.1 through 8.3.8 of Operating Procedure 2-0970020.

___ 8.3.23 Breaker 2-60223 (Plant Aux. Cont. BD Ann.-LB): Momentarily open and reclose breaker.

___ 8.3.24 Breaker 2-60224 (Cont. Transfer Panel 2B): Momentarily open and reclose breaker.

___ 8.3.25 Breaker 2-60225 (2B Battery Charger): Momentarily open and reclose breaker.

___ 8.3.26 Breaker 2-60226 (Space)

___ 8.3.27 Breaker 2-60227 (RTGB-203, 205): Momentarily open and reclose breaker. See Appendix H for load list.

___ 8.3.28 Breaker 2-60228 (DC PP-239): Momentarily open and close breaker. See Appendix I for load list.

___ 8.3.29 Breaker 2-60229 480V LC 2B5. /R1

___ 8.3.30 Breaker 2-60230 (DG Control Panel): Momentarily open and reclose breaker.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.3 (Cont.)

___ 8.3.31 Breaker 2-60231 (RTCB-206): Momentarily open and reclose breaker. See Appendix J for load list.

___ 8.3.32 Breaker 2-60232 (Letdown Control Isol. Valve V-2522): Momentarily open and reclose breaker. Valve will fail closed, lose indication.

___ 8.3.33 Breaker 2-60233 (Bus MB): This breaker trips reactor trip breakers TCB-2, TCB-6 and TCB-9. Verify that reactor trip breakers TCB-1 through 8 are closed.

___ 8.3.33.1 Inform the Control Room that TCB-2, TCB-6 and TCB-9 will be tripped. Momentarily open and reclose breaker 2-60233. NOTE: Annunciator windows K-1 and K-2 will alarm. If the ground did not clear, proceed to Section 8.3.34. If the ground did momentarily clear, proceed to reactor trip switchgear and perform the following:

___ 8.3.33.1.1 Momentarily remove and replace the close and trip fuses for TCB-2.

___ 8.3.33.1.2 Momentarily remove and replace the close and trip fuses for TCB-6.

___ 8.3.33.1.3 Momentarily remove and replace the close and trip fuses for TCB-9.

___ 8.3.33.2 Verify that reactor trip breakers TCB-1 through 8 are closed before proceeding with remainder of procedure.

___ 8.3.34 Breaker 2-60234 (Bus MD): This breaker trips reactor trip breakers TCB-4 and TCB-8. Verify that reactor trip breakers TCB-1 through TCB-8 are closed.

___ 8.3.34.1 Inform the Control Room that TCB-4 and TCB-8 will be tripped. Momentarily open and reclose breaker 2-60234. NOTE: Annunciator windows K-12 and K-13 will alarm. If the ground did not clear, proceed to Section 8.3.35. If the ground did momentarily clear, proceed to reactor trip switchgear and perform the following:

___ 8.3.34.1.1 Momentarily remove and replace the close and trip fuses for TCB-4.

___ 8.3.34.1.2 Momentarily remove and replace the close and trip fuses for TCB-8.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.3 (Cont.)

8.3.34 (Cont.)

___ 8.3.34.2 Verify that reactor trip breakers TCB-1 through 8 are closed before proceeding with remainder of procedure.

___ 8.3.35 Breaker 2-60235 (Charging Line 2B1 Valve I-SE-02-01): Momentarily open and reclose breaker. (*missing CWD)

___ 8.3.36 Breaker 2-60236 (Relief Valve V-1474): Momentarily open and reclose breaker. Valve fail closed, lose indication, window H-12 will alarm.

___ 8.3.37 Breaker 2-60237 (Iso. Cab. "SB"): Momentarily open and reclose breaker.

___ 8.3.38 Breaker 2-60238 (HVCB): Momentarily open and reclose breaker. See Appendix K for load list.

___ 8.3.39 Breaker 2-60239 Spare.

___ 8.3.40 Breaker 2-60240 125V DC PP-255.

___ 8.3.41 Breaker 2-60241 Spare.

___ 8.3.42 Breaker 2-60242 Spare.

___ 8.3.43 Momentarily remove and replace the DC bus 2B undervoltage relay fuses in DC bus 2B.

___ 8.3.44 Momentarily remove and replace the DC bus 2B ground relay fuses in DC bus 2B.

___ 8.3.45 If the ground has not cleared at this point, notify Electrical Maintenance Department that the ground is apparently in the generator excitation swgr. Do Not Operate breaker 2-60209. Main Generator will trip on loss of DC.

/R1

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.4 Isolate a ground on the 2AB 125V DC Bus as follows:

___ 8.4.1 Breaker 2-60301 Spare.

___ 8.4.2 Breaker 2-60302 (HVCB): Momentarily open and reclose breaker. See Appendix M for load list.

___ 8.4.3 Breaker 2-60303 (RTGB-205): Momentarily open and reclose breaker. See Appendix N for load list.

___ 8.4.4 Breaker 2-60304 (RTGB-205): Momentarily open and reclose breaker. See Appendix O for load list.

___ 8.4.5 Breaker 2-60305 (Spare)

___ 8.4.6 Breaker 2-60306 (Spare)

___ 8.4.7 Breaker 2-60307 (Spare)

___ 8.4.8 Breaker 2-60308 (Spare)

___ 8.4.9 Breaker 2-60309 (SUPS Cabinet): Remove the vital AC inverter from service by performing steps 8.4.1 through 8.4.12 of Operating Procedure 2-0970021.

___ 8.4.10 Breaker 2-60310 (125V DC tie to 2C bus) should be open.

___ 8.4.11 Breaker 2-60311 Spare.

___ 8.4.12 Breaker 2-60312 (Iso. Term Cab. 3): Momentarily open and reclose breaker.

___ 8.4.13 Breaker 2-60313 (Spare)

___ 8.4.14 Breaker 2-60314 (Spare)

___ 8.4.15 Breaker 2-60315 (Spare)

___ 8.4.16 Breaker 2-60316 (Spare)

___ 8.4.17 Breaker 2-60317 (Spare)

___ 8.4.18 Breaker 2-60318 (Spare)

___ 8.4.19 Breaker 2-60319 Spare.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.4 (Cont.)

___ 8.4.20 Breaker 2-60320 (Aux. FWP Steam Valve MV-08-3): Verify 2C AFWP is not running. Momentarily open and reclose breaker.

___ 8.4.21 Breaker 2-60321 (4160V Swgr. 2AB): Momentarily open and close breaker. NOTE: Annunciator windows A5, A54, B54, E91, S53 and R57 will alarm. If ground did not clear, proceed to Section 8.4.22. If ground did clear, proceed to 4160V Swgr. 2AB and perform the following:

8.4.21.1 Open cubicle 1 and momentarily remove and replace the close and trip fuses for breaker 2-20501 (spare cubicle). /R1

Open the cubicles listed below and momentarily remove and replace the close and trip circuit fuses for the listed breakers.

CUBICLE	BREAKER	EQUIPMENT
02	2-20502	CCWP 2C
03	2-20503	ICWP 2C
04	2-20504	Feed from 4.16KV Bus 2B3
05	2-20505	Feed from 4.16KV Bus 2A3

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.4 (Cont.)

___ 8.4.22 Breaker 2-60322 (480V Swgr. 2AB): Momentarily open and reclose breaker. If the ground did not clear, proceed to Section 8.4.23. If the ground did clear, proceed to 480V Swgr. 2AB and perform the following:

8.4.22.1 Open compartment 2A (instrumentation) and momentarily remove and replace the 480V swgr. 2AB undervoltage relay fuses. Close compartment 2A.

8.4.22.2 At the rear of each compartment listed below, momentarily remove and replace the close and trip fuses for the listed breakers:

COMPT.	BREAKER	EQUIPMENT
1B	2-40702	Bus Tie to 480V Swgr. 2A-2
1C	2-40703	MCC 2AB
2B	2-40706	Bus Tie to 480V Swgr. 2B-2
2C	2-40707	Charging Pump 2C

___ 8.4.23 Breaker 2-60323 (Isol. Cab. "SAB"): Momentarily open and reclose breaker.

___ 8.4.24 Breaker 2-60324 (PP-240): Momentarily open and reclose breaker. See Appendix R for load list.

___ 8.4.25 Breaker 2-60325 (Spare)

___ 8.4.26 Breaker 2-60326 (Battery Charger 2AB): Momentarily open and reclose breaker.

___ 8.4.27 Breaker 2-60327 Spare.

___ 8.4.28 Breaker 2-60328 Spare.

___ 8.4.29 Breaker 2-60329 Spare.

___ 8.4.30 Breaker 2-60330 Spare.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.4 (Cont.)

___ 8.4.31 Momentarily remove and replace the DC Bus 2AB undervoltage relay fuses in DC Bus 2AB.

___ 8.4.32 Momentarily remove and replace the DC Bus 2AB ground relay fuses in DC Bus 2AB.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

2

8.0 INSTRUCTIONS: (Cont.)

8.5 Isolate a ground on 125V DC Bus 2C as follows:

___ 8.5.1 Breaker 2-60601 (Spare)

___ 8.5.2 Breaker 2-60602 (125V DC PP-133 SGBTF): Momentarily open and reclose breaker. (Ensure Unit 1 feed is closed.)

___ 8.5.3 Breaker 2-60603 (4160V Tie Swgr. 2A4): Momentarily open and close breaker.

___ 8.5.4 Breaker 2-60604 (4160V Tie Swgr. 2B4): Momentarily open and reclose breaker.

___ 8.5.5 Breaker 2-60605 (Battery Charger 2C): Momentarily open and reclose breaker.

___ 8.5.6 Breaker 2-60606 (Security Fire Detection Rad. Vital AC Cabinet): Place the SUPS on its alternate source prior to opening 2-60606. Return SUPS to normal operation if ground did not clear. /R1

___ 8.5.7 Breaker 2-60607 (Air Side Seal Oil Backup Pump): Verify pump is not running. Momentarily open and reclose breaker.

___ 8.5.8 Breaker 2-60609 (Emergency Oil Pump): Verify pump is not running. Momentarily open and reclose breaker. /R1
NOTE: Annunciator window C-56 will alarm.

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX E

PP 218 CKT. 7 RTGB- TB CWD REV. 0

8.2.7
Bkr. 6010

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
Ckt. 1		1004		Isol. Term. Cab. 1	Loss of many Class Ann.
Ckt. 3		1701		480V LC 2A5	
Ckt. 4		929		Bkr. Test Sta. 2A2-2B2 4160V Swgr.	Out of service
Ckt. 5		740		L.P. Htr. 2-3A and 2-4A Reverse Current Valves	Reverse current valves will attempt to close against flow, flow holds open
Ckt. 6		1696		PACB-2	
Ckt. 7		740		H.P. Htr. 2-5A Reverse Current Valves	Reverse current valves will attempt to close against flow, flow holds open
Ckt. 8		1696		PACB-2	
Ckt. 9		638	Aux. FW P2C	I-SE-08-1 Local Control Station	
Ckt. 13		1213		Sequence of Events Recorder-Annunciator	Window F-37 will alarm
Ckt. 14		1638		RA-ST-1	
Ckt. 15				Feeder to Rm. 26-5	
Ckt. 17				Feeder to Rm. 26-6	

/R1

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX E

DC LP 227 CKT. 11 RTGB- TB CWD REV. 0

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
Ckt. 11				Control Room Emerg. Lighting	No effect

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX E

PP DC 2A CKT. 15 RTGB- 205 TB T8 CWD 645 REV. 0

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
F1 F2	F1P F2N	157		Letdown Containment Isolation Valve	Fail closed, lose indication
F3 F4	F3P F4N	159	V-2505	RCP Controlled Bleedoff Isolation	Fail closed, lose indication
F5 F6	F5P F6N	159	V-2650	Boric Acid Tank 2A Recirc.	Fail closed, lose indication
F7 F8	F7P F8N	159	V-2651	Boric Acid Tank 2B Recirc.	Fail closed, lose indication
F9 F10	F9P F10N	163	FCV-2210Y	Boric Acid Flow	Fail closed, lose indication
F11 F12	F11P F12N	194	V-2523	Charging Line Isol Valve	Fail open, lose indication
F13 F14	F13P F14N	176	I-SE-02-02	Charging Line 2A Valve I-SE-02-02	Fail open, lose indication, manually reset HS-I-SE-02-02 RTGB-205
F15 F16	F15P F16N	563	V-6341	RDT Cont. Isol. Valve	Fail closed, lose indication, manually reset HS-6341 RTGB-205
F17 F18	F17P F18N	564	V-6750	Waste Gas Cont. Isol. Valve	Fail closed, lose indication, manually reset HS-6750 RTGB-205
F19 F20	F19P F20N	576	LCV-07-11A	Reactor Sump Isol. Valve	Fail closed, lose indication, must open/reset CS-1/576 when fuse restored to re-open
F21	F21P	1528	I-SE-05-1E	SI Tanks Sample Valve	Fail closed, lose indication

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX E

PP DC 2A CKT. 19 RTGB- 206 TB T2 CWD 646 REV. 0

2

8.2.19
Bkr. 2-6011?

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
F1 F2	F1P F2N	202	HCV-14-8A	Comp. Cool. Wtr. Normal Supply Hdr. Isol. Valve	Fail closed, lose indication
F3 F4	F3P F4N	202	HCV-14-8B	Comp. Cool. Wtr. Normal Supply Hdr. Isol. Valve	Fail closed, lose indication
F5 F6	F5P F6N	211	HSE-14-3A	Comp. Cool. Wtr. from HCV-14-3A	Fail open, lose indication, reset to close
F7 F8	F7P F8N	212	HCV-14-1	Comp. Cool. Wtr. to Reactor Cool. Pumps	Fail closed, lose indication, reset to open
F9 F10	F9P F10N	212	HCV-14-2	Comp. Cool. Wtr. from Reactor Cool. Pumps	Fail closed, lose indication, reset to open
F11 F12	F11P	242	I-SE-03-1B	SI Tank 2A2 Fill and Drain	Fail closed, lose indication
F13 F14	F13P F14N	242	I-SE-03-1A	SI Tank 2A2 Fill and Drain	Fail closed, lose indication
F15 F16	F15P F16N	256	V-3612	SI Tank 2A2, N_2 to SI Tank	Fail closed, lose indication
F17 F18	F17P F18N	256	V-3622	SI Tank 2A1, N_2 to SI Tank	Fail closed, lose indication
F19 F20	F19P F20N	280	HCV-3618	Check Valve Leakage Drain to RWT	Fail closed, lose indication
F21 F22	F21P F22N	281	HCV-3628	Check Valve Leakage Drain to RWT	Fail closed, lose indication

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX E

PP DC 2A CKT. 19 RTGB- 206 TB T2 CWD 646 REV. 0

2

8.2.19
Bkr. 60119

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
F23 F24	F23P F24N	289	FCV-07-1A	Containment Spray Valve	Fail open, lose indication
F25 F26	F25P F26N	312	HCV-08-1A	Main Steam Isol. Valve	Lose indication, valve will stay open if air supply is uninterrupted
F27 F28	F27P F28N	317	HCV-18-1	Instrument Air Isolation Valve	Fail closed, lose indication
F29 F30	F29P FF30N	319	FCV-23-3	Steam Gen. 2A Blowdown Isol. Valves	Fail closed, lose indication
F31 F32	F31P F32N	319	FCV-23-5	Steam Gen. 2A Blowdown Isol. Valves	Fail closed, lose indication
F33 F34	F33P F34N	320 320	FCV-26-2	Containment Radiation Sample Isol. Valves	Fail closed, lose indication
F35 F36	F35P F36N	461	FCV-23-7 FCV-23-9	Steam Gen. 2A and 2B Blowdown Sample Isol. Valves (A)	Fail closed, lose indication
F37 F38	F37P F38N	536	HCV-25-1 thru 25-7	Drain Valves to Reactor Auxiliary Bldg. Sumps	Fail closed, lose indication
F39 F40	F39P F40N	578	V-5200	Primary Coolant Sample Valve	Fail closed, lose indication
F41 F42	F41P F42N	579	V-5201	Press Surge Line Sample Valve	Fail closed, lose indication

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX E

PP DC 2A CKT. 19 RTGB- 206 TB T2 CWD 646 REV. 0

8.2.19
Bkr. 60119

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
F43 F44	F43P F44N	580	V-5202	Press. Stm. Space Sample Valve	Fail closed, lose indication, reset to open
F45 F46	F45P F46N	1520	V-3495	Minimum Flow Isol. Valve	Fail closed, lose indication, valve re-opens when fuse restored
F47 F48	F47P F48N	1519	To RWT Val. I-SE-03-2A	SI Tank Test Line	Fail closed, lose indication, reset HS-1519-1 to re-open
F49 F50	F49P F50N	1519	V-3572	Hot Leg HPSI Line Check Valve Leakage Drain Loop 2A	Fail closed, lose indication, reset HS-3572 to re-open
F51 F52	F51P F52N	243	V-3613	SI Tank 2A2 Vent	Fail closed, lose indication
F53 F54	F53P F54N	243	V-3623	SI Tank 2A1 Vent	Fail closed, lose indication
F55 F56	F55P F56N	1528	I-SE-05-1E	SI Tanks Sample Valves	Fail closed, lose indication, reset HS-03-1 to re-open
F57 F58	F57P F58N	247	V-3737	SI Tank 2B1	
F59 F60	F59P F60N	247	V-3739	SI Tank 2B2	
F61 F62	F61P F62N	655	HCV-09-1A	Main Feedwater Isolation Valve	Window P-6 will alarm
F63 F64	F63P F64N	671	HCV-09-2A	Main Feedwater Isolation	Window P-26 will alarm

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX E

PP DC 2A CKT. 27 RTGB- HVCB TB W1-LTA CWD 1239 REV. 0

8.2.27
Bkr. 601[illegible]7

2

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
F25 F26	F25P F26N	511	FCV-25-1 FCV-25-3 FCV-25-5	Reactor Containment Purge Isol. Valves	Fail closed, lose indication
F27 F28	F27P F28N	317	HCV-18-1	Instrument Air Isolation Valve	
F29 F30	F29P F30N	1160	FCV-25-20	Continuous Containment/ Hydrogen Purge Isol. Valve	Fail closed, lose indication
F31P4 F32N4		1239	FCV-25-7	Containment Vacuum Relief Valve	Fail closed, lose indication
F33 F34	F33P F34N	1164	FCV-25-26	Continuous Containment/ Hydrogen Purge Isol. Valve	Fail closed, lose indication
F35 F36	F35P F36N	455		Fuel Pool Rad. Monitoring	Fuel Handling Building Ventilation is shifted to Shield Building Ventilation Fans/Shield Building Ventilation is isolated

/R1

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX E

PP DC PP-238 CKT. 32 RTGB- TB CWD REV. 0

8.2.32
Bkr. 6013

2

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
Ckt. 1	2-60651			Spare	
Ckt. 2	2-60652	640		Reflash Module RA-T-4	Window F-42 will alarm
Ckt. 3	2-60653	640		Reflash Module RA-T-5	Window G-4 will alarm
Ckt. 4	2-60654	640		Reflash Module RA-T-6	Window G-24 will alarm
Ckt. 5	2-60655			Spare	
Ckt. 6	2-60656	1564		Reflash Module RA-RAB-17	Windows R26, P23, P15, F37, E30 will alarm
Ckt. 7	2-60657	Spare		Spare	
Ckt. 8	2-60658	986		Reflash Module RA-T-7	Window B-7 will alarm
Ckt. 9	2-60659	1551		Reflash Module RA-RAB-2	Window B-29 will alarm
Ckt. 10	2-60660	Spare		Spare	
Ckt. 11	2-60661	Spare		Spare	
Ckt. 12	2-60662	131		Reflash Module RA-RAB-3	Window B-9 will alarm
Ckt. 13	2-60663	Spare		Spare	
Ckt. 14	2-60664	584		Reflash Module RA-RAB-6	Window N-6 will alarm
Ckt. 15	2-60665	1007		Reflash Module RA-T-9	Window E-32 will alarm
Ckt. 16	2-60666	Spare		Spare	
Ckt. 17	2-60667	990		RA-RAB-19	
Ckt. 18	2-60668	188		Reflash Module RA-RAB-8	Window N-23 will alarm
Ckt. 19	2-60669	1634		I-SE-09-5 Relay (B2C 73)	

/R1

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX E

PP DC PP-238 CKT. 32 RTGB- TB CWD REV. 0

8.2.32
Bkr. 60132

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
Ckt. 20	2-60670	1001		Reflash Module RA-RAB-11	Window B-20 will alarm
Ckt. 21	2-60671	1701		RA-RAB-25	
22	2-60672	Spare		Spare	
23	2-60673				
Ckt. 24	2-60674	596		Reflash Module RA-RAB-28	

/R1

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX F

PP DC LP-228 CKT. 02 RTGB- TB CWD REV. 0

8.3.2
Bkr. 2-60202

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
Ckt. 1		N/A		Control Room Emergency DC Lighting	No effect without loss of A/C lighting

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX G

PP DC PP-219 CKT. 13 RTGB- TB CWD REV. 0

8.3.13
Bkr. 60213

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
PP-238	Ckt. 23	444		Rad. Monitoring Panel No. 1	Closes sample isolation valve I-SE-26-1 to component cooling water radiation monitoring skid #1 (RS-26-1)
Ckt. 1	2-60551	1694		PACB-2	
Ckt. 2	2-60552	931		Breaker Test Station for 2A3 and 2B3 4160V Switchgear	Test Station out of service
Ckt. 3	2-60553	1579		RTGB-201, 203, 205 and HCVB Annunciators	Backup Power Supply
Ckt. 4	2-60554	933		Breaker Test Station for 2AB 4160V Switchgear	Test Station out of service
Ckt. 5	2-60555	740	LP Htr 2-3B and 2-4B	Reverse Current Valves	Will close reverse current valve SC-10-3B and 4B
Ckt. 6	2-60556	1004		Isolation Term Cabinet 2	Loss of many annunciators
Ckt. 7	2-60557	587		Waste Management Local Annunciator ("Y")	Backup Power Supply
Ckt. 8	2-60558	1704		480V LC 2B5	
Ckt. 9	2-60559	638		Aux FW P2C I-SE-08-2 Local Control Station	
Ckt. 10	2-60560	740	HP Htr 2-5B	Reverse Current Valve	Will close reverse current valve SC-10-5B
Ckt. 11	2-60561	638		Aux FW P2C RA-ST-3	
Ckt. 14	2-60564	1639		RA-ST-2	

/R1

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX H

PP DC 2B CKT. 27 RTGB- 205 TB T6 CWD 657 REV. 0

8.3.27
Bkr. 6022

2

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
F1 F2	F1P F2N	157	V-2515	Letdown Stop Valve	Fails closed, lose indication
F3 F4	F3P F4N	159	V-2524	RCP Controlled Bleedoff Isol. Valve	
F5 F6	F5P F6N	176	I-SE-02-01	Charging Line 2B1 Valve	Fails open, lose indication, reset to close
F7 F8	F7P F8N	194	V-2522	Letdown Containment Isol.	Fails closed, lose indication
F9 F10	F9P F10N	163	V-2512	Makeup Stop Valve	Fails closed, lose indication
F11 F12	F11P F12N	194	V-2523	Charging Line Isol Valve	
F13 F14	F13P F14N	564	V-6718	Waste Gas Containment Isol. Valve	Fails closed, lose indication, manually reset HS-6718 to open
F15 F16	F15P F16N	563	V-6341	RDT Cont Isol. Valve	
F17 F18	F17P F18N	576	V-5750	Waste Gas Cont. Isol Valve	
F19 F20	F19P F20N	190	LCV-07-11A	Reactor Sump Isolation Valves	

/R1

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX H

PP DC 2B CKT. 27 RTGB- 205 TB T6 CWD 657 REV. 0

8.3.27
Bkr. 60227

2

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX I

PP DC 239 CKT. 28 RTGB- TB CWD REV. 0

8.3.28
Bkr. 2-60228

FUSE NO.	BREAKER	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
Ckt. 1	2-60701	882		Reflash Module RA-RAB-18	Window C-31 will alarm
Ckt. 2	2-60702			Spare	
Ckt. 3	2-60703			Spare	
Ckt. 4	2-60704			Spare	
Ckt. 5	2-60705	1553		Reflash Module RA-RAB-1	Windows A-4, A-9 will alarm
Ckt. 6	2-60706	259		Reflash Module RA-T-2	Window C-57 will alarm
Ckt. 7	2-60707	1007		Reflash Module RA-CC-1	Window E-32 will alarm
Ckt. 8	2-60708			Spare	
Ckt. 9	2-60709			Spare	
Ckt. 10	2-60710	1008		Reflash Module RA-RAB-4	Window B-33 will alarm
Ckt. 11	2-60711	1558		Reflash Module RA-RAB-7	
Ckt. 12	2-60712	875		Reflash Module RA-T-1	
Ckt. 13	2-60713			Spare	
Ckt. 14	2-60714			Spare	
Ckt. 15	2-60715			Spare	
Ckt. 16	2-60716			Spare	
Ckt. 17	2-60717	992		RA-RAB-20	
Ckt. 18	2-60718	188		Reflash Module RA-RAB-9	
Ckt. 19	2-60719	1803		Reflash Module RA-RAB-29	

/R1

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX J

PP DC 2B CKT. 31 RTGB- 206 TB T28 CWD 646 REV. 0

8.3.3.1
Bkr. 2-60231

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
F1 F2	F1P F2N	202	HCV-14-8B	Component Cool Wtr. Normal Supply Hdr. Isol. Valve	Fail closed, lose indication
F3 F4	F3P F4N	202	HCV-14-10	Component Cool. Wtr. Normal Return Hdr. Isol. Valve	Fail closed, lose indication
F5 F6	F5P F6N	211	HSE-14-3B HCV-14-3B	Component Cool. Wtr. from Shutdown Ht Exch 2B	Fail open, lose indication
F7 F8	F7P F8N	212	HCV-14-7	Component Cool. Wtr. to Reactor Cool. Pumps	Fail closed, lose indication
F9 F10	F9P F10N	212	HCV-14-6	Component Cool. Wtr. from Reactor Cool. Pumps	Fail closed, lose indication
F11 F12	F11P F12N	176	V-3661	Recirc. Draw Line Drain to Reactor Drain Tank	Fail closed, lose indication
F13 F14	F13P F14N	242	I-SE-03-1C	Safety Injection Tank Fill and Drain Valve	Fail closed, lose indication
F15 F16	F15P F16N	242	I-SE-03-1D	Safety Injection Tank Fill and Drain Valve	Fail closed, lose indication
F17 F18	F17P F18N	256	V-3632	SI Tank 2B1	Fail closed, lose indication
F19 F20	F19P F20N	256	V-3642	SI Tank 2B2	Fail closed, lose indication

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX J

PP DC 2B CKT. 31 RTGB- 206 TB T28 CWD 646 REV. 0

8.3.3.1
Bkr. 2-6021

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
F21 F22	F21P F22N	282	HCV-3638	Check Valve Leakage Drain to RWT	Fail closed, lose indication
F23 F24	F23P F24N	283	HCV-3648	Check Valve Leakage Drain to RWT	Fail closed, lose indication
F25 F26	F25P F26N	289	FCV-07-1B	Containment Spray Valve	Fail open, lose indication
F27 F28	F27P F28N	316	HCV-08-1B	Main Steam Isol. Valve, Opening, Closing and Solenoid Test	Solenoid test valves fail open, stroke test valve fail open, lose indication, P49 will alarm
F29 F30	F29P F30N	319	FCV-23-4	Steam Gen. 2A Blowdown Isol. Valve	Fail closed, lose indication
F31 F32	F31P F32N	319	FCV-23-6	Steam Gen. 2B Blowdown Isol. Valve	Fail closed, lose indication
F33 F34	F33P F34N	320	FCV-26-1 FCV-26-3 FCV-26-5	Containment, Suction Return Rad. Sample Isol. Valve	Fail closed, lose indication
F35 F36	F35P F36N	578	V-5203	Primary Coolant Sample Valve	Fail closed, lose indication, local and remote
F37 F38	F37P F38N	579	V-5204	Press. Surge Line Sample Valve	Fail closed, lose indication, local and remote
F39 F40	F39P F40N	580	V-5205	Press. Steam Space Sample Valve	Fail closed, lose indication, local and remote

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX J

PP DC 2B CKT. 31 RTGB- 206 TB T28 CWD 646 REV. 0

8.3.3.1
Bkr. 2-60231

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
F41 F42	F41P F42	586	HCV-25-1A thru 25-7A	Drain valves to Reactor to Auxiliary Bldg. Sumps	All valves this circuit fail closed, lose indication
F43 F44	F43P F44N	1520	V-3496	Minimum Flow Isol. Valve	Fail closed, lose indication, Annunciator P-2 will alarm
F45 F46	F45P F46N	1519	V-3571	Hot Leg HPSI Line Check Valve Leakage Drain Loop 2B	Fail closed, lose indication
F47 F48	F47P F48N	275	V-3738	SI Tank 2B1 Vent Valve	Fail closed, lose indication
F49 F50	F49P F50N	275	V-3740	SI Tank 2B2 Vent Valve	Fail closed, lose indication
F51 F52	F51P F52N	849	HCV-15-1	Primary Water Isol. Valve	Fail closed, lose indication
F53 F54	F53P F54N	1527	I-SE-05-1A	SI Tank 2A1 Sample Valve	Fail closed, lose indication
F55 F56	F55P F56N	1527	I-SE-05-1B I-SE-05-1A	SI Tank 2A2 and 2A1 Sample Valve	Fail closed, lose indication at local station
F57 F58	F57P F58N	1527	I-SE-05-1B	SI Tank 2A2 Sample Valve	Fail closed, lose indication at local station
F59 F60	F59P F60N	1527	I-SE-05-1C	SI Tank 2B1 Sample Valve	Fail closed, lose indication at local station

/R1

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX J

PP DC 2B CKT. 31 RTGB- 206 TB T28 CWD 646 REV. 0

2

8.3.3.1
Bkr. 2-6023

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
F61 F62	F61P F62N	1527	I-SE-05-1D	SI Tank 2B2 Sample Valve	Fail closed, lose indication at local station
F63 F64	F63P F64N	1519	I-SE-03-2B	SI Tank Test Line to RWT/VCT	Fail closed, lose indication
F65 F66	F65P F66N	656	HCV-09-1B	Main Feedwater Isolation Valve	Window P-16 will alarm
F67 F68	F67P F68N	672	HCV-09-2B	Main Feedwater Isolation Valve	Window P-36 will alarm

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX K

PP DC 2B CKT. 38 RTGB- HVCB TB W8-RTE CWD 1239 REV. 0

8.3.38
Bkr. 2-60238

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
F25	F25P	153	V-2581	Letdown to RAD Monitor	
F26	F26N				
F27	F27P			Spare	
F28	F28N				
F29	F29P			Spare	
F30	F30N				
F31	F31P			Spare	
F32	F32N				

/R1

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX L

PP DC 2AB CKT. 1 RTGB- 201 TB ____ CWD 800 REV. 5

2

8.4.1
2-60301

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
F51		887		KWH Meter Output	Contact MPS, lose indication
F52		887		KWH Meter Output	Contact MPS, lose indication
F53		871		Gross MW Recorder	Contact MPS, lose indication
F54		871		Digital MW Recorder	Contact MPS, lose indication
F55		744		PT-12-30	None
F56		744		PT-16-2	None
All other ckts are spares					

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX M

PP DC 2AB CKT. G2 RTGB- 201 TB W13 RTF CWD 1241 REV. 0

2

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZ
		CWD	TAG	TITLE	
F11	F11P	543	V-6342	RDT Cont. Isol Valve	
F12	F12N				
F13	F13P	512	V-6565	Waste Gas Stop Valve	
F14	F14N				
F15	F15P			Spare	
F16	F16N				
F17	F17P	566	V-6728	Resin Disch Stop Valve	
F18	F18N				

/R1

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX N

PP DC 2AB CKT. 03 RTGB- 205 TB T2 CWD 645 REV. 0

2

8.4.3
Bkr. 2-0303

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
F1 F2	F1P F2N	151		Letdown Press. and Intermediate Letdown Temp. Channels	Loss of indication PCV-2201P, Q On RTGB-205
F3 F4	F3P F4N	158	LCV-2110P LCV-2110Q	Letdown Throttle Valves	Lose indication only, valves still function
F5 F6	F5P F6N	160	V-2513	Volume Control Tank Vent	Fail closed, lose indication
F7 F8	F7P F8N	163		Not on indicated CWD*	
F9 F10	F9P F10N			Spare	
F11 F12	F11P F12N	563	V-6300	RDT Vent Stop Valve	Fail open, lose indication
F13 F14	F13P F14N	564	V-6565	Waste Gas Stop Valve	Fail closed, lose indication
F15 F16	F15P F16N	565	V-6739	Spent Resin Tank to Drumming Station	Fail closed, lose indication
F17 F18	F17P F18N	566	V-6728	Resin Disch Stop Valve	Fail closed, lose indication
F19 F20	F19P F20N	543		Reactor Drain Pump 2B	Loss of pump alternator
F21-F32	Spares			Spares	

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX O

PP DC 2AB CKT. 04 RTGB- 205 TB T10 CWD 645 REV. 0

8.4.4
Bkr. 2-6030[illegible]

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
F1 F2	F1P F2N	151	PCV-2201P PCV-2201Q	Letdown Pressure Control	Loss of indication only
F3 F4	F3P F4N	160	V-2500	Volume Control Tank Inlet	If de-energized opens to VCT
F5 F6	F5P F6N	160	V-2513	Volume Control Tank Vent	Fail closed, lose indication
F7 F8	F7P F8N	160	V-2507	RCP Controlled Bleedoff	
F9 F10	F9P F10N	163	V-2512	Makeup Stop	Fail closed, lose indication
F11 F12	F11P F12N	563	V-6300	RDT Vent Stop Valve	Fail open, lose indication
F13 F14	F13P F14N	564	V-6565	Waste Gas Stop Valve	Fail closed, lose indication
F15 F16	F15P F16N	562	LCV-6604	Flash Tank Level Valve	
F17 F18	F17P F18N	562	V-6307	Flash Tank Diverter Valve	
F19 F20	F19P F20N	562	V-6308	Flash Tank N_2 Stop Valve	
All other fuses this T.B. shown as spares F21 thru F32					

/R1

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX P

PP DC 2AB CKT. 11 RTGB- 201 TB ____ CWD 800 REV. 5

8.4.11
2-60311

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
F1 and F2		720		DEH Governor Fluid Pump 2A MP1	None
F3 and F4		883		Generator Protective Relaying	
All other circuits are spares					

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX Q

PP DC 2AB CKT. 19 RTGB- 202 TB ____ CWD 638 REV. 6

8.4.19
2-60319

2

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
Ckt. 1		638		Solenoid Valves I-SE-08-1 and I-SE-08-2	Energ. to close

ST. LUCIE UNIT 2
OFF-NORMAL OPERATING PROCEDURE NO. 2-0960030, REVISION 1
DC GROUND ISOLATION

APPENDIX R

PP 240 CKT. 24 RTGB- TB PD & MD 64J REV. 0

2

8.4.24
Bkr. 2-60324

FUSE NO.	LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
Ckt. 4		999		Reflash Module RA-T-8	Window D28 will alarm
Ckt. 12		742		Reflash Module RA-T-3	Window E26 will alarm
Ckt. 20		1003		Reflash Module RA-RAB-12	Window A50 will alarm
NOTE: All other circuits this panel shown as spares					

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

DOCUMENT TITLE Accidents Involving New & Spent Fuel

DOCUMENT FILE NUMBER 2-1600030

DOCUMENT REVISION NUMBER 1

DOCUMENT DISTRIBUTED ON 5-4-83
DATE

DOCUMENT SENT TO:

2

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

PROCESSED BY: [signature] DATE

2

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT 2
OFF NORMAL OPERATING PROCEDURE NO. 2-1600030
REVISION 1

1.0 TITLE:

ACCIDENTS INVOLVING NEW OR SPENT FUEL

2.0 REVIEW AND APPROVAL:

Reviewed by Facility Review Group March 11 1982

Approved by J. H. Barrow (for) Plant Manager March 11 1982

Revision 1 Reviewed by FRG May 2 1983

Approved by [signature] Plant Manager 5-2-1983

3.0 PURPOSE AND DISCUSSION:

3.1 This procedure provides instructions to be followed in the event a new or spent fuel element is dropped or involved in a collision during fuel handling operations.

3.2 Discussion:

1. The dropping or collision of a new fuel element may result in an alpha radiation hazard if the fuel element cladding is breached and the uranium oxide fuel pellets are exposed to the surrounding atmosphere.

2. Breaching of the fuel element cladding should be assumed to have accompanied an accident involving fuel until subsequent radiation monitoring and sampling indicates that no radioactive release has occurred.

3. The damaging of a spent fuel element can result in a serious radiation hazard if the integrity of the fuel rod cladding is breached. The radiation hazard is caused by the release of the fission product gases I^{131}, Xe^{133}, and Kr^{85}, normally held in the fuel rod voids between the fuel pellets and the cladding, to the Containment or Spent Fuel Pool atmosphere.

4. Once the initial release of fission product gases through the breached cladding has occurred, further significant release of fission product gases from the fuel pellets themselves is not expected due to the low temperature of the fuel during fuel handling operations.

ST. LUCIE UNIT 2
OFF NORMAL OPERATING PROCEDURE NO. 2-1600030, REVISION 1
ACCIDENTS INVOLVING NEW OR SPENT FUEL

2

4.0 SYMPTOMS:

4.1 Damage to a spent fuel element, the cladding of which has been breached, may be accompanied by:

4.1.1 Area Process or Containment air high radiation alarms.

4.1.2 Gas bubbles originating from the damaged element.

4.2 The alpha radiation hazard associated with a damaged new fuel element will not cause actuation of the Area or Process Radiation Monitor high radiation alarms.

ST. LUCIE UNIT 2
OFF NORMAL OPERATING PROCEDURE NO. 2-1600030, REVISION 1
ACCIDENTS INVOLVING NEW OR SPENT FUEL

2

5.0 INSTRUCTIONS:

5.1 Immediate Automatic Actions:

5.1.1 For damage to new fuel - none.

5.1.2 If damage to spent fuel occurred inside Containment, then a Containment Isolation Actuation Signal (CIAS) may occur.

5.1.3 Containment evacuation alarm may actuate.

5.1.4 If damage to spent fuel occurred in the Fuel Handling Building (FHB), then a high radiation signal may alarm in the Control Room which will isolate the FHB and activate the Shield Building Ventilation System (SBVS). /R1

5.2 Immediate Operator Action:

5.2.1 Inform Control Room personnel of the accident.

5.2.2 If the accident occurred inside the Containment:

1. Sound the Containment Evacuation Alarm.

2. Stop 2-HVE-8A and 2-HVE-8B (Containment Purge Fans) if running. /R1

3. Verify I-FCV-25-1 through I-FCV-25-6 (Containment Purge valves) have closed. /R1

4. Evacuate the Containment and check for personnel contamination.

5. Notify Health Physics Department to perform a complete radiological evaluation.

6. Monitor applicable Process and Area Radiation Monitor channels for an increase in radiation levels inside Containment.

5.2.3 If the accident occurred in the Fuel Pool Area:

1. Evacuate the Fuel Pool Area and remain on the landing outside the north door until monitored for contamination.

2. Notify Control Room personnel.

3. Monitor applicable Area Radiation and Process Monitor channels for an increase in radiation levels inside the Fuel Pool Area.

5.2.4 Notify the Duty Call Supervisor and the Health Physics Supervisor.

ST. LUCIE UNIT 2
OFF NORMAL OPERATING PROCEDURE NO. 2-1600030, REVISION 1
ACCIDENTS INVOLVING NEW OR SPENT FUEL

2

5.0 INSTRUCTIONS: (Cont.)

5.3 Subsequent Action:

5.3.1 Accident occurring in the Containment:

1. Health Physics personnel shall evaluate airborne particulate and gaseous samples from the Containment atmosphere and survey the surrounding area.

2. If radiation levels or sampling results indicate that the damaged fuel element cladding has been breached resulting in release of significant radioactivity:

   a. Upon recommendation of the Chemistry Department, verify the Continuous Containment Purge System and its associated filter train is in service and adjust flowrate to the value prescribed by Chemistry Department personnel.

   b. When airborne radioactivity levels have been reduced to a level that would allow a normal containment purge, obtain a new gas release permit and start 2-HVE-8A or 2-HVE-8B to purge Containment. /R1

   c. Continue purging the Containment until the Health Physics Department determines that a safe re-entry can be made.

3. If there are no indications that the fuel element cladding has been breached, re-establish the Containment in accordance with OP 2-0530021, "Controlled Gaseous Batch Release to Atmosphere". /R1

4. Upon verification by Health Physics personnel that radiation levels in the Containment are safe, refueling personnel shall enter the Containment and visually inspect the spent fuel element for damage.

5. After visual inspection and upon approval by the Reactor Engineer, the element shall be transferred to the Spent Fuel Pool and stored away from the remaining fuel elements.

ST. LUCIE UNIT 2
OFF NORMAL OPERATING PROCEDURE NO. 2-1600030, REVISION 1
ACCIDENTS INVOLVING NEW OR SPENT FUEL

2

5.0 INSTRUCTIONS: (Cont.)

5.3 (Cont.)

5.3.2 Accident occurring in the Spent Fuel Pool:

1. Health Physics Department shall evaluate airborne particulate and gaseous samples from the Spent Fuel Pool atmosphere.

2. If radiation levels or sampling results indicate that the damaged spent fuel element cladding has been breached:

   a. Operate the Shield Building Ventilation System to provide filtered/monitored ventilation of the Fuel Pool Area.

   b. Continue ventilation and sampling the Spent Fuel Pool atmosphere until Health Physics personnel determine that safe entry can be made.

3. Upon verification by the Health Physics Department that radiation levels in the Spent Fuel Pool Area are normal, refueling personnel shall enter the area and visually inspect the spent fuel element for damage.

4. After visual inspection and upon approval by the Reactor Engineer, the element shall be moved and stored away from the remaining fuel elements in the Spent Fuel Pool.

6.0 REFERENCES:

6.1 St. Lucie Unit 2 FSAR, Section 6.2.3.2.2, "Shield Building Ventilation System"; Section 9.1.4, "Fuel Handling System"; Section 9.4.2, "Heating, A/C, and Ventilation Control"; and Sections 12.1 and 12.2, "Radiation Monitoring System" /R1

6.2 St. Lucie Unit 2 Technical Specifications, Section 3/4.9, Refueling Operations /R1

6.3 10 CFR20, Appendix B, "Concentrations in Air and Water Above Natural Background"

6.4 St. Lucie Plant Radiation Protection Manual

7.0 RECORDS, REPORTS, AND NOTIFICATIONS:

7.1 Normal log entries