

FLORIDA POWER AND LIGHT COMPANY
TURKEY POINT UNITS 3 AND 4
OFF-NORMAL OPERATING PROCEDURE 0208.1
AUGUST 3, 1983

1.0 Title:

SHUTDOWN RESULTING FROM REACTOR TRIP OR TURBINE TRIP

2.0 Approval and List of Effective Pages:

2.1 Approval:

Change Dated 8/3/83 Reviewed by Plant Nuclear Safety Committee: 83-75
and Approved by Plant Manager - Nuclear: 8/3/83

2.2 List of Effective Pages:

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3.0 Purpose and Discussion:

3.1 Purpose:

This procedure provides instructions to be followed when a shutdown occurs due to a reactor or turbine trip. It also provides guidance for conduct of initial investigation and post trip review as appropriate for the nature of the trip involved.

3.2 Discussion:

3.2.1 Turbine thrust bearing pressure trip and all generator trips of electrical origin cause an immediate opening of the generator OCB's. For all other trips, the OCB's remain closed for 30 seconds to provide an energy drain for the turbine and increase the coastdown time of the reactor coolant pumps.

3.2.2 Any of the following will cause a reactor trip:

1. Source range high level
2. Intermediate range high level
3. Power range high level - low setpoint
4. Power range high level - high setpoint

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5. Pressurizer high pressure
6. Pressurizer high level
7. Pressurizer low pressure
8. Low coolant flow
9. RCP breakers open
10. 4KV bus low voltage
11. 4KV bus underfrequency
12. Overpower delta T setpoint
13. Overtemperature delta T setpoint
14. Safety injection
15. Turbine trip
16. Low-low steam generator level
17. Steam flow greater than feed flow coincident with low steam generator level
18. Manual trip

3.2.3 Any of the following will cause a turbine trip:

1. Condenser low vacuum
2. Low bearing oil pressure
3. Thrust bearing pressure
4. Turbine overspeed
5. Reactor trip
6. Steam generator high-high level
7. Generator lockout
8. Generator - Transformer Lockout
9. Manual trip
10. Safety Injection



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3.2.4 Initial investigation and post trip review guidelines are provided to assure that an adequate investigation and restart determination appropriate to the nature of the trip are conducted and documented. For example, a simple trip with no equipment malfunction consequences that resulted from a clearly known cause would require proportionately less effort to make a safe to restart determination than would a trip of indeterminate cause or with significant equipment damage. Lack of available recorded data may necessitate more emphasis on interviews, statements, analog or logsheet information, etc.

4.0 Symptoms:

4.1 Symptoms are annunciator alarms associated with any of the causes listed in 3.2.2 and 3.2.3.

5.0 Instructions:

5.1 Immediate Automatic Action:

5.1.1 The turbine will trip with either a turbine or reactor trip signal.

5.1.2 The reactor will trip with any reactor trip signal or any turbine trip signal with reactor power above P-7.

5.1.3 Steam dumps to condenser or atmosphere may activate.

5.1.4 Main Generator Lockout (Mid and East OCB's open, auxiliary breakers open, startup breakers close, field breaker open).

5.2 Immediate Operator Actions:

5.2.1 If a reactor trip is called for, verify that reactor trip breakers have opened and that all shutdown and control rods are fully inserted.

1. If the above automatic actions did not occur, then manually trip the reactor using any of the following methods, which are listed in descending order of preference:

(1) Reactor trip push button, console or VP-8.

(2) Locally in MCC-8 room, open reactor breakers and/or M6 set breakers.

(3) Locally in 480V load centers, open breakers to MG sets.

(4) Emergency borate and attempt to drive in rods manually.

5.2.2 Verify turbine has tripped and if not, push manual trip and verify turbine stop and control valve closure.

CAUTION: Failure of the turbine to trip following a reactor trip can result in a severe RCS cooldown accident.

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- 5.2.3 Verify main generator lockout. Mid and East OCB's, exciter field breaker and auxiliary transformer breakers should be open. Startup transformer breakers should be closed.
- 5.2.4 Verify feedwater isolation. Close Feedwater Isolation MOV's.
- 5.2.5 Verify the operation of the steam dumps to condenser. They should maintain Tavg at 547° F, however, if condenser vacuum has been lost utilize the atmospheric steam dumps to maintain 547° F.

CAUTION: If the steam dumps to condenser were being used for a unit startup, place the mode selector switch to auto and reset the Hagan setpoint controller to prevent an uncontrolled cooldown.

- 5.2.6 Close reheat steam supply MOV's.
- 5.2.7 If all RCP's trip, verify and maintain natural circulation per Operating Procedure 1008.7, Natural Circulation.
- 5.2.8 Maintain pressurizer pressure and level at no load valves by energizing backup heaters and cycling charging pumps as required. Isolate letdown if necessary to maintain pressurizer level.

5.3 Subsequent Operator Actions:

- 5.3.1 When unit is stable, the Plant Supervisor - Nuclear/STA initiate post trip review in accordance with Appendix A.
- 5.3.2 Verify feed train and with the feedwater by-pass valves, manually control steam generator levels. Care should be taken in restoring levels to avoid dropping Tavg below 547°F and to avoid thermal shocking the steam generators.
- 5.3.3 If low-low steam generator level or loss of feed train occurs, verify the auxiliary feedwater MOV's are open. Regulate auxiliary feed flow to maintain steam generator levels near no load values.
- 5.3.4 If unable to maintain adequate steam generator levels, close the blowdown MOV's.
- 5.3.5 If unable to maintain adequate steam generator levels, steam dump must be minimized and reactor coolant pumps should be stopped as required to reduce heat input to the steam generators.

NOTE: Partial loss of RCPs (i.e., 1 or 2 pumps fail) can effect pressurizer spray capability. It is desirable to maintain RCPs in operation as long as operating conditions permit to provide a more orderly recovery from a trip. However, loss of the "B" 4 KV bus and its associated "B" and "C" RCPs results in loss of normal spray capability for the pressurizer. In this event, prudent use of pressurizer heaters and the auxiliary spray valve must be exercised to effectively control the pressurizer pressure. Loss of the "A" RCP will not effect pressurizer spray control and effective spray should be available with either the "B" or "C" RCP operating.

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- 5.3.6 If all of the reactor coolant pumps are stopped, assure that natural circulation is established in accordance with Operating Procedure 1008.7, Natural Circulation.
- 5.3.7 Verify as turbine slows down, the bearing oil pumps start as follows:
1. Auxiliary oil pump at 9 psig, bearing oil pressure, or
 2. Turning gear oil pump at 7 psig, bearing oil pressure, or
 3. Emergency DC oil pump at 3.5 psig, bearing oil pressure.
- 5.3.8 Verify the bearing oil lift pump starts when turbine reaches 600 RPM and discharge pressure is approximately 600 psig.
- 5.3.9 Verify that at 0 RPM and 600 lbs. bearing oil lift pressure, the turning gear engages or engage it manually.
- 5.3.10 Place Control Switch for turbine drains to open as soon as possible after trip.
- 5.3.11 Verify gland seal regulator is in service as long as condenser vacuum is maintained.
- 5.3.12 Maintain bearing oil temperature between 80° - 100°F.
- 5.3.13 If the reactor is to be maintained at hot shutdown conditions, commence boration to the xenon free condition as shown in Section III, Figure.3, of the Plant Curve Book.
- 5.3.14 If it is not desired to maintain the plant in the hot shutdown condition, bring the unit to cold shutdown per Operating Procedure 0205.2, Reactor Shutdown, Hot Shutdown to Cold Shutdown Condition.
- 5.3.15 Notify the Lab that RCS sampling is required as per Tech Spec 3.1.4.

6.0 References:

- 6.1 Westinghouse Turbine Operation and Control Instruction Book, Volume I, FPL File 5610-M-3-206, Westinghouse Instruction Book No. 1250-C683.
- 6.2 Westinghouse Turbine Generator Instruction Book, FPL File 5610-M-3-205.
- 6.3 Operating Procedure 0205.2, Reactor Shutdown, Hot Shutdown to Cold Shutdown Conditions.
- 6.4 Operating Procedure 1008.7 - Natural Circulation.



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0 Records Required:

- 7.1 Entry into plant logs of details related to trip.
- 7.2 Entry into Startup/Shutdown/Trip Log Book
- 7.3 Appendix B of Administrative Procedure 0103.12, Notification of Significant Events to NRC, shall be completed for each reactor or turbine trip.
- 7.4 Completed copies of Appendix A of this procedure, including all attachments, constitute quality control records and, therefore, shall be retained in accordance with Administrative Procedure 0190.14, Document Control and Quality Assurance Records.



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APPENDIX A
(Sheet 1 of 3)

POST TRIP REVIEW
(Cover Sheet for Trip Review and Appraisal Package)

1. Unit: _____
Date: _____ Time of Trip: _____

2. Cause of Reactor Trip:

A) Logic that directly resulted in reactor trip:

B) Root cause of trip:

3. Trip Sequence Time Intervals - from DDPS SOE

*NOTE: If DDPS is Out of Service (OOS) indicate status of components marked with asterick.

*Logic Matrix Actuated:	_____	Time 0	
RT Relays Dropout	_____)	} 0.1 second maximum } from RT relay dropout } to breaker open.
*Reactor Trip Breakers	A _____)	
(OPEN)	B _____)	
*RPI Rod Bottom	_____		
*Turbine Stop	Right _____		
Valves - (CLOSED)	Left _____		
*Generator Breakers	A _____		
(OPEN)	B _____		

Attach SOE and any pertinent PTR file parameter printouts.

4. Limiting Conditions for Operation: (List any deviations) _____

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APPENDIX A
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POST TRIP REVIEW

5. Transient Response of Systems and Equipment: (Indicate any observed problems or effects) _____

6. If appropriate, have system or equipment walkdown inspections or damage assessment conducted and documented. Attach results. _____

7. Verify unit is stable or controlled to desired conditions, consider:

CHECK (X)	
<input type="checkbox"/>	Nuclear Instrumentation
<input type="checkbox"/>	RCS Fluid Inventory
<input type="checkbox"/>	RCS Pressure
<input type="checkbox"/>	RCS Temperature
<input type="checkbox"/>	RCS Flow
<input type="checkbox"/>	Containment Sump
<input type="checkbox"/>	PRMS
<input type="checkbox"/>	ARMS
<input type="checkbox"/>	S/G Level
<input type="checkbox"/>	S/G Pressure
<input type="checkbox"/>	Turbine Gen. (Vibr., hyd. status, etc)
<input type="checkbox"/>	Secondary Systems

REMARKS: _____

If Safety Injection was actuated verify Emergency Operating Procedure 20000 is implemented.

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POST TRIP REVIEW

- 8. Discuss trip cause, any safety considerations, and immediate corrective actions.
 - A) If cause of reactor trip is known (see Item 2), acceptably corrected and any safety considerations are resolved, and the PS-N, STA, and Operations Supervisor concur; authorize unit startup in accordance with OP 0202.2.
 - B) If cause of reactor trip is not known (see Item 2) or any safety considerations are not resolved, the Operations Superintendent - Nuclear or Plant Manager - Nuclear or Site Manager shall also be consulted and concur prior to authorizing unit startup. Additional investigation and/or support may be necessary and shall be provided at this time if required. This may include prior PNSC review if appropriate and deemed necessary.

REMARKS: ~ Reactor startup authorized pending resolution of the following items (List if applicable):

9. Make appropriate notifications:

- Operating Procedure 0103.12 Notification of Significant Events to NRC
- Emergency Procedure 20103 Classification of Emergencies

Completed Date: _____

Time: _____

Signed: _____
Plant Supervisor - Nuclear

Signed: _____
Shift Technical Advisor

REMARKS:

Transmit package with attachments to the Operations Supervisor for further review and routing.

