FLORIDA POWER AND LIGHT COMPANY
TURKEY POINT UNITS 3 AND 4
EMERGENCY OPERATING PROCEDURE 20002 (E-2)
MARCH 5, 1981

1.0 Title:

LOSS OF SECONDARY COOLANT

2.0 Approval and List of Effective Pages:

2.1 Approval:

Change dated 3/5/81 Reviewed by PNSC March 5, 1981

Approved by J.K. Hays Plant Mgr-N March 15, 1981

2.2 List of Effective Pages:

Page	Date	Page	Date	Page	Date	Page	Date
1	3/5/81	3	3/5/81	5	3/5/81	7	3/5/81
2	3/5/81	4	3/5/81	6	3/5/81	8	3/5/81

3.0 Purpose:

The objectives of these instructions are as follows:

3.1 To establish stabilized reactor coolant system and steam generator conditions prior to plant cooldown.

3.2 To minimize the energy release due to the break by isolation of the break where possible.

3.3 To prevent the pressurizer safety valves from lifting by dumping steam from all steam generators to the main condenser when possible or to the atmosphere from the unaffected steam generators.

3.4 To isolate the auxiliary feedwater flow to the affected steam generator, to maximize auxiliary feedwater flow to the intact steam generators, and minimize the energy release.

3.5 To borate the reactor coolant to establish and maintain reactor shutdown margin.

4.0 Symptoms:

Refer to section on Symptoms, Emergency Operating Procedure 20000 (E-0), Immediate Actions and Diagnostics.

5.0 Immediate Actions:

5.1 On Affected Unit:

Refer to section on Immediate Actions of Emergency Operating Procedure 20000 (E-0), Immediate Actions and Diagnostics, if not already performed.

Manual Actions:

If safety injection actuation occurred as a result of high steam line flow with low Tavg or low steam generator pressure, steam line isolation should have occurred.

In that case verify the actuation of steamline isolation. If not actuated, manually initiate steamline isolation.

5.2 On Non-affected Unit:

It is considered to be advantageous to maintain the non-affected unit in operation during the initial phases of this type accident, as long as the requirements of Technical Specifications, Section 3.4 (RWST level $\geq$ 320,000 gallons), are not violated.

5.2.1 Maintain the non-affected unit as near as possible to steady state conditions during initial phase of accident.

5.2.2 Close steam generator blowdowns on non-affected unit to conserve condensate storage tank water.

5.2.3 After verifying that the high head SIS pumps on the non-affected unit are operating, close SIS sectionalizing valves MOV-*-878A and MOV-*-878B. When the SIS signal has been reset stop the high head SIS pumps on the non-affected unit and return their switches to auto.

CAUTION: It is imperative that a minimum of two safety injection pumps remain operating to supply injection to the affected unit. If one or two safety injection pumps are out of service on the affected unit, continue operating the pumps from the non-affected unit. Do not close SIS sectionalizing valves MOV-*-878A and MOV-*-878B.

If RWST level on the non-affected unit drops below 320,000 gallons begin an orderly shutdown of that unit at a rate prescribed in Administrative Procedure 0103.8, Shutdown Rate Guidelines.

5.3 Subsequent Actions:

CAUTION: The diesels should not be operated at idle or minimum load for longer than 15 minutes. If the diesels are shut down, they should be prepared for restart.

NOTE: The process variables referred to in this Instruction are typically monitored by more than one instrumentation channel. The redundant channels should be checked for consistency while performing the steps of this Instruction.

NOTE: The pressurizer water level indication should always be used in conjunction with other specified reactor coolant system indications to evaluate system conditions and to initiate manual operator actions.

5.3.1 If reactor coolant pressure is above the low head safety injection pump shut-off head (approx. 185 psig), manually reset safety injection so that safeguards equipment can be controlled by manual action. Ensure that containment isolation is maintained. Stop the low head safety injection pumps and place in the standby mode.

CAUTION: Whenever the wide range reactor coolant pressure decreases below the low head safety injection shutoff head, the low head safety injection pumps should be manually restarted to deliver fluid to the reactor coolant system.

CAUTION: Automatic reinitiation of safety injection may not occur so the operator must carefully monitor plant parameters during subsequent evolutions to determine if the need for manual safety injection exists.

CAUTION: Subsequent to this Step should loss of offsite power occur, manual action (e.g., manual safety injection initiation) will be required to load the safeguards equipment onto the diesel powered emergency busses.

5.3.2 Stop all reactor coolant pumps after high head safety injection pump operation has been verified and when the wide range reactor coolant pressure is at |1400| psig as seen on PI-*-403, VPA or PI-*-405 VPB.

CAUTION: If component cooling water to the reactor coolant pumps is isolated on a containment pressure signal, all reactor coolant pumps should be stopped |DELETED| because of loss of motor bearing cooling and thermal barrier cooling. Increased component cooling water requirements, resulting from safety injection may cause closure of FCV-*-626. Verify that FCV-*-626 is open.

NOTE: The conditions given above for stopping reactor coolant pumps should be continuously monitored throughout this instruction.

NOTE: If reactor coolant pump termination is necessary, verify the steam dump to condenser auto manual controller potentiometer setpoint is correct and place the steam dump selector switch to manual prior to tripping the reactor coolant pumps.

CAUTION: If component cooling water to the reactor coolant pumps is lost while there is no seal water injection, close *-293D and *-239B, charging flow to seal water injection filters. This will preclude thermal shocking the RCP's on restart of the charging pumps. If component cooling water to the reactor coolant pumps is subsequently regained, *-293D and *-293B may be reopened.

5.3.3 Determine which steam generator is affected by observing the individual steamline pressures (PAMS). A low steamline pressure compared to the others denotes the faulted loop; terminate auxiliary feedwater to that steam generator.

|NOTE: If all steam generators are depressurized or depressurizing, the auxiliary feedwater flow must not be terminated to any steam generator until the faulted loop is identified|.

NOTE: If no loop has a low steamline pressure compared to the others and all steamlines have been isolated, determine if a break has occurred in the steamline, or in any piping system that connects with the secondary pressure boundary. If no indication of a break in the pressure boundary is found, go to Section 5.2 of Emergency Operating Procedure 20000 (E-0) and re-evaluate the accident with particular emphasis on the Loss of Reactor Coolant. If a leak from the secondary systems is found, continue to follow these instructions.

5.3.4 |If the water level in the non-faulted steam generators is in the narrow range span, regulate the auxiliary feedwater flow to those steam generators to maintain an indicated narrow range steam generator water level|. If water level increases in an unexplained manner in one steam generator, go to Emergency Operating Procedure 20003 (E-3), Steam Generator Tube Rupture.

NOTE: Monitor the Condensate Storage Tank level and before reaching a low level, notify the A.E.O. to put the water treatment plant in service (if available).

5.3.5 If containment spray has been actuated, and if the emergency containment coolers are operating, reset containment spray. Spray pumps should be shut off and placed in the standby mode with operable flow paths.

5.3.6 NOTE: The conditions given below for termination of safety injection should be continuously monitored throughout this instruction.

|A. If,|1. One wide range reactor coolant temperature |T_H as confirmed by core exit thermocouples|, if available, is less than 350° F, AND

2. Wide range reactor coolant pressure is greater than 700 psig and is stable or increasing AND

3. Pressurizer water level is greater than 20% of span and rising (heaters covered) AND

4. The reactor coolant indicated subcooling is greater than |60°| F (Subcooled Margin Monitor), AND

5. |Auxiliary feedwater flow is isolated to all depressurized steam generators and at least 570 gpm is injected into the non-faulted steam generators or indicated narrow range water level in at least one non-faulted steam generator is greater than 15 percent of span|.

Stop all safety injection pumps and place in the standby mode and maintain operable flow paths.

CAUTION: If wide range reactor coolant pressure decreases more than 200 psi or pressurizer water level decreases by 10% of span following termination of safety injection |or the reactor coolant subcooling drops below 60° F|, MANUALLY REINITIATE safety injection pump operation to maintain reactor coolant pressure and pressurizer water level. Go to Section 5.2 of Emergency Operating Procedure 20000 (E-0) to reevaluate the event, unless this reevaluation has already been performed.

NOTE: If all wide range reactor coolant temperature indicators go above 350°F when attempting to satisfy the conditions of |5.3.6.A|, initiate safety injection pump operation and continue operation until conditions of |5.3.6.B and 5.3.6.C| are satisfied.

THEN Go to Step 5.3.6.7

|B.|IF (1) All wide range reactor coolant temperature TH (PAMS) are greater than 350° F, AND

(2) Reactor coolant pressure is above the shutoff head of the safety injection pumps, AND

(3) Safety injection flow to the Reactor Coolant System is zero,

THEN attempt to reestablish the reactor coolant pressure to greater than 2000 psig and pressurizer water level to greater than 50% of span by

(1) Resetting safety injection, and

(2) Establishing full charging flow.

NOTE: Ensure that water addition during this process does not result in dilution of the reactor coolant system water.

|C. WHEN| (1) All wide range reactor coolant temperature T_H are greater than 350° F, AND

(2) Wide range reactor coolant pressure is greater than 2000 psig and is stable or increasing AND

(3) |Auxiliary feedwater flow is isolated to all depressurized steam generators and at least 570 gpm is injected into the non-faulted steam generators or indicated narrow range water level in at least one non-faulted steam generator is greater than 15% of span, AND|

(4) Pressurizer water level is greater than 50 percent of span, AND

(5) The reactor coolant indicated subcooling is greater than 50 . (Subcooled Margin Monitors)

|NOTE: If all steam generators are depressurized or depressuring, the safety injection flow must not be terminated until the faulted steam generator is identified|.

THEN go to Step |5.3.6.D|

|D.|Stop all safety injection pumps and place in the standby mode and maintain operable safety injection flowpaths.

CAUTION: If wide range reactor coolant pressure |decreases by 200 psi or pressurizer water level drops by 10% of span following termination of safety injection or the reactor coolant subcooling drops below 50° F, MANUALLY REINITIATE safety injection pump operation to maintain reactor coolant pressure and pressurizer level|. Go to Section 5.2 of Emergency Operating Procedure 20000 (E-0) to reevaluate the event, unless this reevaluation has already been performed.

|E.|Reset containment isolation (Phase A). Re-establish normal makeup to maintain pressurizer level in the normal operating range and to maintain system pressure at a nominal value of 2000 psig. Ensure that water addition during this process does not result in dilution of the reactor coolant system boron concentration.

F. Re-establish operation of the pressurizer heaters after verification of sufficient pressurizer level to assure coverage of the pressurizer heaters, e.g. through comparisons of pressurizer surge line, water space, and vapor space temperatures. When system pressure can be controlled by pressurizer heaters, and containment temperatures are low enough to assure proper operation of control systems, restore normal pressurizer level control.

5.3.7 Monitor either the average temperature indication of core exit thermocouples (if available) or all wide range reactor coolant temperature T_H to verify that RCS temperature is at least 50°F less than saturation temperature at RCS indicated pressure.

If 50°F indicated subcooling is not present, then attempt to establish 50°F indicated subcooling by steam dump from the steam generators to the condenser or the atmosphere.

CAUTION: If steam dump is necessary, maintain a reactor coolant cooldown rate of no more than 50°F/HR, consistent with plant make-up capability.

Steam dump should be initiated in the following manner to stabilize reactor coolant system temperature:

1. Establish a flow path in at least one steamline in an intact loop (if possible) IF the main condenser is available and IF an uncontrolled steam release is not reinitiated upon opening the MSIV. Transfer the steam dump system to steam header pressure control. Set the steam header pressure control setpoint to the pressure in the intact steam generator(s) at the time safety injection is terminated.

OR

2. Dump steam to the atmosphere from the intact loops using the steam generator atmospheric dump valves. Set each steam generator atmospheric dump valve pressure control setpoint to the pressure in the intact steam generator(s) at the time safety injection is terminated.

   If 50°F indicated subcooling cannot be established or maintained, then manually reinitiate safety injection. Go to Section 5.2 of Emergency Operating Procedure 20000 (E-0) to re-evaluate the event, unless the re-evaluation has already been performed.

5.3.8 When the reactor coolant temperature and pressure are stable, borate the reactor coolant system to cold shutdown conditions, as necessary.

5.3.9 Refer to Operating Procedure 20000 (E-0), Steps 5.2.7.13 - 5.2.7.15 to evaluate plant status affected by safeguards actuation.

5.3.10 After offsite power is available, establish the auxiliary systems necessary for a controlled cooldown to cold shutdown. If offsite power is available and all reactor coolant pumps are stopped, restart at least one reactor coolant pump in an intact loop (with the pressurizer spray line if possible) for cooldown purposes in accordance with procedures. Maintain subcooled conditions in the reactor coolant system consistent with the normal cooldown curve. If these subcooled conditions cannot be maintained, restart safety injection pumps.

NOTE: If there is significant radioactivity in one or more steam generator's secondary side due to tube leaks and steam is being dumped to the atmosphere, immediately isolate the steam generator associated with the break. If all steam generators with significant radioactivity cannot be isolated, begin cooldown and depressurization of the reactor coolant system to limit the release of radioactivity to the environs.

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5.3.11 After establishing operation of auxiliary systems, initiate a controlled cooldown and depressurization to cold shutdown conditions using Operating Procedure 0205.2, Reactor Shutdown, Hot Shutdown to Cold Shutdown Conditions.

NOTE: Safety Injection should be reinitiated if an uncontrolled reactor coolant system depressurization or an uncontrolled drop in pressurizer water level occurs during the cooldown process.

NOTE: During the cooldown, the reactor coolant system pressure will decrease below |1400| psig. Tripping the operating reactor coolant pump(s) due to the pressure criterion of Step 5.3.2 is not required. Other criteria of Step 5.3.2 are still applicable at this time.

6.0 References:

6.1 FSAR 14.2.5, Break of a Steam Pipe

6.2 Westinghouse Emergency Operating Procedure (E-2), Loss of Secondary Coolant

6.3 Emergency Operating Procedure 20000 (E-0), Immediate Actions and Diagnostics

6.4 Emergency Operating Procedure 20003 (E-3), Steam Generator Tube Rupture

6.5 Operating Procedure 0205.2, Reactor Shutdown, Hot Shutdown to Cold Shutdown Conditions

7.0 Records, Reports and Notifications

7.1 Sequential log entries in the Nuclear Plant Supervisor's Log Book of the significant events pertaining to the Loss of Secondary Coolant.

ATTACHMENT

Operator Training and Management Involvement

The issue of Pressurized Thermal Shock has received considerable management attention within FPL since being identified. We actively participate with the Westinghouse Owners Group and EPRI groups addressing this subject. Our training emphasizes the potential effects that rapid overcooling may have on vessel integrity during scheduled training sessions.

We have reviewed and evaluated the Turkey Point Licensed Operator Training Program and Requalification Program. We conclude Pressurized Thermal Shock is addressed and adequately covered in the existing Turkey Point Training Programs. Overcooling transients that could result in rapid cooldown (thermal shock) of the reactor pressure vessel inner wall are presented and discussed in the Turkey Point Training Program and Requalification Program. Operating pressure - temperature limit curves have been developed for system hydrostatic tests and any condition of normal operation including anticipated operational occurrences. These pressure - temperature limit curves are presented and discussed as part of the Licensed Operator Training Program and Requalification Program.

Emergency Operating Procedures have been developed to provide instruction to the operator for overcooling transient that could result in rapid cooldown of the reactor coolant system. These Emergency Operating Procedures provide instructions to (1) minimize the reactor coolant system cooldown rate and (2) prevent repressurization following an overcooling transient.

During simulator training sessions licensing operators receive training and experience in handling overcooling transients that could result in rapid cooldown of the reactor coolant system.