

Submitted: \_\_\_\_\_  
(Section Head)  
Approved: \_\_\_\_\_  
(Plant Manager)

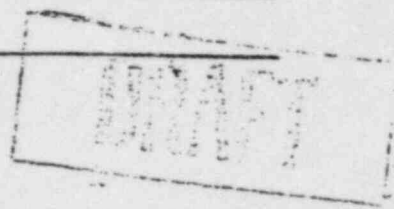
SP Number 29.024.01

Revision E

Date Eff. \_\_\_\_\_

TRANSIENT WITH FAILURE TO SCRAM

EMERGENCY PROCEDURE



1.0 SYMPTOMS

- 1.1 A valid scram signal or condition due to a reactor transient is alarmed or indicated and all control rods do not fully insert as indicated on the full core display, rod position printout on the computer, or four rod display.
- 1.2 Reactor pressure and/or neutron flux indication increases abruptly and may go off-scale on recorders and meters.
- 1.3 Safety relief valves may lift.

2.0 AUTOMATIC ACTIONS

- 2.1 1115 psig reactor vessel pressure and above actuates various safety relief valves. \_\_\_\_\_
- 2.2 1120 reactor vessel pressure TRIPS the reactor recirculation pumps. \_\_\_\_\_

3.0 IMMEDIATE OPERATOR ACTIONS

- 3.1 Manually scram reactor per SP 29.010.01 (Emergency Shutdown) \_\_\_\_\_
  - 3.1.1 Arm and depress manual scram pushbutton. \_\_\_\_\_
  - 3.1.2 Place the Mode switch in refuel. \_\_\_\_\_
  - 3.3.3 Verify all rods are inserted. \_\_\_\_\_
- 3.2 IF the reactor scrams AND all rods insert, AND power is decaying, THEN do not continue this procedure. \_\_\_\_\_
- 3.3 Trip the recirculation pumps. \_\_\_\_\_
- 3.4 Commence suppression pool cooling per SP 23.121.01 (Residual Heat Removal (RHR) System). \_\_\_\_\_
- 3.5 The following attempts to scram the reactor are to be performed concurrently if manpower is available.

- 3.5.1 Insert those rods not fully inserted with the reactor manual control system as the Rod Sequence Control System (RSCS) permits.
- 3.5.2 Bypass the scram discharge volume high level scram switches, reset the RPS trip and verify the vent and drain valves open.
- 3.5.2.1 Alternately RESET the Reactor Protective System and SCRAM the reactor until all rods are fully inserted.
- 3.5.3 Confirm all scram valves are open by observation of scram valve position lights. IF not, THEN perform the following:
- 3.5.3.1 DE-ENERGIZE RP's subchannel logic by opening the following breakers on 1C71\*PNL-001 in the relay room:
- a) CB2A
  - b) CB2B
  - c) CB7A
  - d) CB7B
- 3.5.3.2 Vent air from the scram air system by closing valve C11-02V-0704 and opening vent valve downstream of C11-01V-7104.
- 3.5.3.3 Restore the breakers and air valves to normal when all scram valves are open.
- 3.5.4 Bypass the scram discharge volume (SDV) high level scram switches, reset the RPS trip and verify the vent and drain valves open.
- 3.5.4.1 INDIVIDUALLY SCRAM Control Rods at Local Hydraulic Control Units (HCU's) by placing both NORM-TEST-S.R.I. switches to the TEST position.
- 3.6 IF reactor power is above 6% OR RPV level cannot be maintained OR suppression pool temperature reaches 110°F, THEN perform the following.
- 3.6.1 Start either A or B standby liquid control pump and inject the entire contents of the tank.

3.6.1.1 IF RWCU automatic isolation did not occur,  
THEN manually isolate RWCU.

3.6.1.2 Terminate all injection into the RPV with the exception of CRD and RCIC or HPCI to maintain RPV water level above the top of active fuel (TAF).

#### 4.0 SUBSEQUENT OPERATOR ACTION

4.1 Verify immediate operator actions.

4.2 IF reactor pressure is causing the safety relief valves (SRV's to cycle, THEN perform the following.

4.2.1 Manually open enough SRV's to reduce reactor pressure to between 800 and 960 psig.

4.2.2 For subsequent SRV operation, the valves should be cycled in order to minimize local heat loading of the suppression pool.

4.2.3 If the HPCI system is not in service, it may be placed in full flow test to minimize SRV cycling.

4.3 SAMPLE reactor coolant frequently to verify boron concentration above the level determined to maintain the plant shutdown.

4.4 After the reactor is shutdown, PROCEED to stabilize Plant Condition in Hot Shutdown by performing either steps 4.4.1, 4.4.2, or 4.4.3.

#### CAUTION

Do not shutdown SLC Injection once it has been started until the SLC Solution Tank is verified to be empty.

4.4.1 Maintain Reactor pressure between 800 and 960 psig by use of Main Turbine Bypass Valves.

#### CAUTION

Consult with the Nuclear Engineer to confirm that boron concentration in the reactor will be sufficient to maintain the reactor shutdown after accounting for a normal startup of the Steam Condensing Mode of RHR.

- 4.4.2 Maintain reactor pressure between 800 and 960 psig by use of the RHR steam condensing in accordance with SP 23.121.01 (Residual Heat Removal (RHR) System).
- 4.4.3 Maintain reactor pressure between 800 and 960 psig by opening safety relief valves and utilizing Suppression Pool Cooling to limit Suppression Pool temperature.
- 4.5 Place the reactor in COLD SHUTDOWN, by performing the following:
  - 4.5.1 Confirm by sample results and consultations with the Nuclear Engineer that sufficient negative reactivity has been inserted into the reactor to account for the positive reactivity effects of temperature decrease and dilution.
  - 4.5.2 Start the reactor recirc pumps at minimum speed.
  - 4.5.3 Shutdown and Cooldown in accordance with SP 22.005.01 (Shutdown to Cold Shutdown).
- 4.6 Override the RHR pump minimum flow valve to the closed position to prevent the loss of borated water when shutdown cooling is placed in service.
- 4.7 When reactor pressure has decreased to 135 psig, Startup RHR Shutdown Cooling in accordance with SP 23.121.01 (Residual Heat Removal (RHR) System).
- 4.8 If flooding the reactor vessel up to the steam dome is necessary, use the SLC system.
- 4.9 Maintain boron concentration in the vessel between 750 and 1000 PPM.

#### 5.0 FINAL PLANT CONDITIONS

- 5.1 The plant is in cold shutdown conditions.
- 5.2 Reactor level being maintained in the normal operating range (between 34" and 42")

Watch Engineer Review  
(Watch Engineer)

#### 6.0 DISCUSSION

An ATWS is extremely unlikely but will require prompt operator action to mitigate the consequences. Operator concerns are as follows:

- 6.1 Verify Recirc. pumps trip.
- 6.2 Shutdown the reactor.

- 6.3 Limit reactor pressure.
- 6.4 Maintain the core covered.
- 6.5 Limit Suppression Pool temperature. -
- 6.6 Place plant in Cold Shutdown.

The operator must attempt to scram the reactor with the most readily available means. If the reactor cannot be maintained subcritical with Control Rods and reactor level falls below +12.5" or Suppression Pool temperature can't be maintained below 110°F, SBLC must be initiated to minimize containment heat-up. Suppression Pool Cooling should be initiated as soon as possible to ensure suppression pool temperature limits are not exceeded.

A Cooldown must not be initiated until control rods are inserted or Boron concentration is satisfactory to prevent a restart of the reactor.

Once Boron injection is started, it must be run to completion.