

LOW REACTOR WATER LEVEL

A. SYMPTOMS

1. Alarms.

- a. RX VESSEL LOW LEVEL 902-5 (903-5).
 - b. REACTOR FEED PUMP SUCTION LOW PRESSURE 902-6 (903-6).
 - c. RFP AUTO TRIP 902-6 (903-6).
 - d. RFP DISCHARGE LOW PRESSURE 902-6 (903-6).
 - e. FEEDWATER CONTROL VALVE AIR FAILURE 902-5 (903-5).
 - f. FEEDWATER ELECT CONTROL SIGNAL FAILURE 902-5 (903-5).
 - g. GROUP 2 ISOL CH TRIP 902-5 (903-5).
 - h. GROUP 3 ISOL CH TRIP 902-5 (903-5).
2. Feedwater flow less than steam flow with reactor vessel level below normal and decreasing.
 3. Feedwater Regulator Valve failed closed.
 4. Inadvertent closure of Isolation Valves in Feedwater System.

B. AUTOMATIC ACTIONS

1. Reactor scram at +8" indicated.
2. Reactor Feed Pumps in RUNOUT.
3. Group 2 and 3 Isolations @ +8" indicated.
4. ECCS initiation @ -59 inches.

C. IMMEDIATE OPERATOR ACTIONSNOTE

LOCAL MANUAL control of Feedwater Regulating Valves may be attempted at any time. The pace of the transient will be the determining factor.

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1. IF Feedwater Regulating Valve has

a. Failed in AUTO -

- (1) Take MANUAL control and establish normal water level using more than one level indication.
- (2) IF valve does not respond in MANUAL and level is continuing to decrease, PLACE the other Feedwater Regulating Valve in service and isolate the failed Feedwater Regulating Valve.
- (3) IF neither Feedwater Regulating Valve responds in AUTO, take LOCAL MANUAL control of the valve in service.

CAUTION

IF reactor scrams or feedwater controls must be abandoned, ensure the Level Setpoint is returned to normal.

NOTE

In lieu of the following step, it is possible to adjust recirculation flow until water level settles out at a constant level within the operating range. However, consideration must be given to operating power level, fuel limits, etc., before performing such a maneuver.

b. Locked Out -

- (1) Reduce Level Setpoint to match level.
- (2) Attempt to RESET.
- (3) IF valve resets, restore Level Setpoint and level to normal.
- (4) IF valve will NOT RESET, restore Level Setpoint to normal, PLACE the other Feedwater Regulating Valve in service and isolate the failed Feedwater Regulating Valve.
- (5) IF neither Feedwater Regulating Valve responds, take LOCAL MANUAL control of the valve in service.

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- c. CLOSED -
 - (1) PLACE the other Feedwater Regulating Valve in service.
 - (2) Take MANUAL control of the operable Feedwater Regulating Valve and attempt to restore level.
 - (3) Isolate the failed Feedwater Regulating Valve.
- 2. IF Reactor Feed Pumps have tripped
 - a. Due to low suction pressure -
 - (1) VERIFY Standby Condensate Pump has AUTO started.
 - (2) VERIFY Standby Reactor Feed Pump has AUTO started.
 - (3) Correct cause of low suction pressure.
 - b. Due to other than low suction pressure -
 - (1) VERIFY that Standby Reactor Feed Pump has AUTO started.
 - (2) PLACE the control switch for the tripped pump in Pull-To-Lock.
 - (3) Determine the cause of the trip.
- 3. Secure blowdown through the Reactor Water Cleanup System.
- 4. IF reactor water level reaches +8", VERIFY reactor scram. Follow the Scram procedure (DGP 2-3).
- 5. IF reactor water level decreases to -59", VERIFY HPCI System initiates.
- 6. IF high pressure systems fail to initiate or cannot maintain level,
 - a. START a Core Spray or LPCI Pump and

NOTE

If no ECCS is available a Condensate Pump may be used, provided the pump is capable of adding water to the vessel.

- b. Manually initiate Auto Blowdown 120 seconds after level reaches -59".

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CAUTION

IF Yarway reference leg flashing occurs during depressurization, Yarway indication may be above -59" such that LPCI and Core Spray Injection Valves do not open automatically.

7. VERIFY that LPCI or Core Spray injection occurs when reactor pressure decreases to 350 psig as indicated by more than one indication.

D. SUBSEQUENT OPERATOR ACTIONS

1. Station an additional Operator to monitor and control reactor vessel level. Multiple level indications should be utilized. This Operator shall be assigned no other function.
2. Refer to Procedure To Assure Adequate Core Cooling (DGA-19), if any of the following conditions occur:
 - a. Reactor water level indications are continuing to decrease with ECCS operating.
 - b. Reactor water level is sustained at a level below the top of the active fuel as indicated by available level indications.
 - c. Reactor water level indication is unavailable.
 - d. Less than design flow is indicated on Feedwater or ECC System when design flow is required.
3. IF desired and IF level approaches the High Level Trip setpoints for feedwater and/or HPCI, take MANUAL control of these systems to maintain level and to prevent trips of feedwater and HPCI Systems.
4. IF level has been successfully controlled such that a scram did not occur, continue normal operation and attempt to determine what initiated the transient.
5. IF a reactor scram occurred, VERIFY Group II and III Isolations have occurred.
6. IF -59" level was reached, VERIFY Group I Isolation occurred.
7. IF the Main Condenser is available and plant shutdown is necessary, follow the procedure for Normal Shutdown from Power (DGP 2-1).
8. IF the Main Condenser is not available and shutdown is necessary, cooldown using the Isolation Condenser.

9. IF Relief Valves have been actuated, continually MONITOR and RECORD torus water temperature every 5 minutes. RECORD data on Figure 1 and file it in the operating surveillance file.
10. IF the torus temperature reaches 120°F during isolation conditions, depressurize the reactor to below 150 psig at normal cooldown rates.

CAUTION

VERIFY 2/3 core coverage before initiating containment cooling.

11. Commence torus cooling as necessary to maintain torus water temperature less than 170°F.
12. Notify the Shift Supervisor of systems started manually.

CAUTION

Determine the radiological condition of the drywell and reactor coolant before resetting an isolation.

13. PLACE all air operated valves associated with an isolation in the CLOSED position prior to resetting an isolation. Failure to do this may cause the valve to open automatically when the isolation is reset.
14. IF the Relief Valves are actuated and torus temperature reaches 160°F or greater while the reactor pressure is above 150 psig, an external visual exam of the torus must be conducted before resuming power operation.

E. DISCUSSION

This procedure assumes the failure of a Feedwater Regulating Valve, a Reactor Feed Pump or the Feedwater Control System. The failures are covered under the IMMEDIATE actions in order of more probable to least probable (i.e., feedwater valve problems versus LPCI initiation). Time for action is presumed to exist between the first indication or alarm and any Low Level Trips.

The IMMEDIATE actions are to restore level. If at any time during the transient, +2 psig drywell pressure is reached, the Loss of Coolant (Break Inside Drywell) (DGA-1) should be followed. Once a reactor scram occurs on Low level, the procedural steps in this procedure are consistent with the actions for Loss of Coolant (Break Outside Drywell) (DGA-3).

The loss of all feedwater will result in a low water level scram in about 7 seconds when operating at full power. On a reactor scram, an automatic setdown of reactor water level setpoint to one-half of its original value (approximately 15 inches) takes place. An alarm, F.W. LEVEL SETPOINT AUTO-RUNBACK will actuate on Panel 902(3)-5.

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FIGURE 1

Torus Temperature and Time Temperature was taken

Time	Temperature	Time	Temp.	Time	Temp.	Time	Temp.

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