

## 3.2.B Control Rods

2. The control rod drive housing support system shall be in place during reactor power operation and when the reactor coolant system is pressurized above atmospheric pressure with fuel in the reactor vessel, unless all control rods are fully inserted and Specification 3.3.A.1 is met.

- 3.a The rod worth minimizer (RWM) shall be operable during power operation and startup, when thermal power is less than or equal to 20% of rated thermal power. Entry into startup mode and withdrawal of selected control rods is permitted for the purpose of determining the operability of the RWM prior to withdrawal of control rods for the purpose of bringing the reactor to criticality.

Action: With the RWM inoperable, verify control rod movement and compliance with the prescribed control rod pattern by a second licensed operator or other technically qualified member of the operational staff who is present at the reactor control console. Otherwise, control rod movement may be only by actuating the manual scram or placing the reactor mode switch in the shutdown position.

- 3.b Control rod patterns and the sequence of withdrawal or insertion shall be established such that:

1. when the reactor is critical and below 20% design power the maximum worth of any insequence control rod which is not electrically disarmed is less than 0.010 delta k.

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- b. When the rod is fully withdrawn the first time subsequent to each refueling outage or after maintenance, observe that the drive does not go to the overtravel position.

2. The control rod drive housing support system shall be inspected after reassembly and the results of the inspection recorded.

3. Prior to control rod withdrawal for startup or insertion to reduce power below 20% the operability of the Rod Worth Minimizer (RWM) shall be verified by:

- a. verifying the correctness of the control rod withdrawal sequence input to the RWM computer.
- b. performing the RWM computer diagnostic test.
- c. verifying the annunciation of the selection errors of at least one out-of-sequence control rod in each distinct RWM group.
- d. verifying the rod block function of an out-of-sequence control rod which is withdrawn no more than three notches.

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3.b.2 and when the reactor is above 20% design power the maximum worth of any control rod, including allowance for a single operator error, is less than 0.020 delta k.

4. Control rods shall not be withdrawn for startup or refueling unless at least two source range channels have an observed count rate equal to or greater than three counts per second.
5. During operation with limiting control rod patterns, as determined by the Reactor Engineer, either:
  - a. Both RBM channels shall be operable: or
  - b. Control rod withdrawal shall be blocked: or
  - c. The operating power level shall be limited so that the MCPR will remain above the Safety Limit MPCR assuming a single error that results in complete withdrawal of any single operable control rod.

C. Scram Insertion Times

1. The average scram insertion time, based on the deenergization of the scram pilot valve solenoids as time zero, of all operable control rods in the reactor power operation condition shall be no greater than:

<u>% Inserted From Fully Withdrawn</u>	<u>Average Scram Insertion Times (set)</u>
10	.55
30	1.275
50	2.00
90	3.50

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4. Prior to control rod withdrawal for startup or during refueling, verify that at least two source range channels have an observed count rate of at least three counts per second.
5. When a limiting control rod pattern exists, an instrument functional test of the RBM shall be performed prior to withdrawal of the designated rod(s) and daily thereafter.

C. Scram Insertion Times

1. Following each refueling outage, each operable control rod shall be subjected to scram time tests from the fully withdrawn position. If testing is not accomplished with the nuclear system pressure above 950 psig, the measured scram insertion time shall be extrapolated to reactor pressures above 950 psig using previously determined correlations. Testing of all operable control rods shall be completed prior to exceeding 40% rated thermal power.

BASES:

When THERMAL POWER is greater than 20% of RATED THERMAL POWER, there is no possible rod worth which, if dropped at the design rate of the velocity limiter, could result in a peak enthalpy of 280 cal/gm. Thus requiring the RWM to be OPERABLE when THERMAL POWER is less than or equal to 20% of RATED THERMAL POWER provides adequate control.

We are therefore requiring as a limiting condition of operation (LCO) that the Rod Worth Minimizer (RWM) be operable when the reactor is critical and below 20% of design power in accordance with Specification 3.3.B.3a so that the maximum in-sequence control rod worth will be limited to 0.010 delta k as given in Specification 3.3.B.3b(1) even assuming a single failure of the RWM or an operator error. The RWM assists and supplements the operator with an effective backup control rod monitoring routine that enforces adherence to pre-established startup, shutdown, and low power level control rod procedures. The RWM computer prevents the operator from establishing control rod patterns that are not consistent with prestored RWM sequences by initiating appropriate rod select block, rod withdrawal block, and rod insert block - interlock signals to the reactor manual control systems rod block circuitry. Reference: FSAR Section 7.16.4.3. The RWM sequences stored in the computer memory are based on control rod withdrawal procedures designed to limit the individual control rod worths to levels given in Specification 3.3.B.3.b.

Two exceptions to the requirement for RWM operability are permitted: (1) The first exception permits the withdrawal of selected control rods to allow the determination of RWM operability prior to bringing the reactor to criticality. (2) The second exception permits control rod movement with the RWM inoperable if the movement is verified to be in compliance with the prescribed control rod patterns by a second licensed operator, or other qualified member of the plant operational staff, who is present at the reactor control console.