

## REACTIVITY CONTROL SYSTEMS

### BASES

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The ACTION statements which permit limited variation from the basic requirements are accompanied by additional restrictions which ensure that the original criteria are met. Mis-alignment of a rod requires measurement of peaking factors or a restriction in THERMAL POWER; either of these restrictions provide assurance of fuel rod integrity during continued operation. The reactivity worth of a mis-aligned rod is limited for the remainder of the fuel cycle to prevent exceeding the assumption used in the accident analysis.

The maximum rod drop time restriction is consistent with the assumed rod drop time used in the accident analyses. Measurement with  $T_{avg} > 541^{\circ}F$  and with all reactor coolant pumps operating ensures that the measured drop times will be representative of insertion times experienced during a reactor trip at operating conditions.

Control rod positions and OPERABILITY of the rod position indicators are required to be verified on a nominal basis of once per 12 hours with more frequent verifications required if an automatic monitoring channel is inoperable. These verification frequencies are adequate for assuring that the applicable LCO's are satisfied.

The terms "Shutdown Rod Position Indicator", "Analog Rod Position Indicator", "Control Rod Position Indicator", and "Rod Position Indicator" are all used in this bases section or in the Technical Specifications, and all refer to indication driven by the output of the Analog Rod Position Indication (ARPI) system.

One method for determining rod position are the indicators on the control console. An alternate method of determining rod position is the plant computer. Either the control console indicator or plant computer is sufficient to comply with this specification. The plant computer receives the same input from ARPI as the control console indicators and provides resolution equivalent to or better than the control console indicators. The plant computer also provides a digital readout of rod position which eliminates interpolation and parallax errors inherent to analog scales.

Rod demand position is indicated on the control console and the plant computer. The rod demand position is a digital signal, namely a pulse, and is generated each time the Rod Control System demands a rod position step change, one pulse for each rod step. The pulses are "counted" and displayed by the control console group demand step counters. There are two group demand step counters for each bank of rods with exception of shutdown banks C and D. The plant computer also "counts" and displays the demand pulses. Only the group 1 demand position of each rod bank is displayed on the plant computer as only the group 1 pulses are routed to the plant computer. The group 1 demand position on the plant computer is, by default, called "Cont Bank A Steps" or "S/D Bank A Steps" etc. with no reference to group 1 or group 2.

As the plant computer receives the same demand pulses from the Rod Control System as the control console group demand step counters and provides equivalent resolution, the plant computer "bank step" display provides an alternate method of determining group 1 rod demand position. Either the control console group 1 demand step counter or the plant computer "bank step" display is sufficient to comply with this specification for group 1 rod demand position. Only the control console group 2 demand counter can be used to comply with the specification for group 2 rod demand.

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