

PNPS
TABLE 3.2.C.1

INSTRUMENTATION THAT INITIATES ROD BLOCKS

<u>Trip Function</u>	<u>Operable Channels per Trip Function</u>		<u>Required Operational Conditions</u>	<u>Notes</u>
	<u>Minimum</u>	<u>Available</u>		
Rod Block Monitor(Power Dependent)	2	2	Run, with limiting control rod pattern, and reactor power > LPSP	(2)(5)
Rod Block Monitor Inoperative	2	2	Run, with limiting control rod pattern, and reactor power > LPSP	(2)(5)
Rod Block Monitor Downscale	2	2	Run, with limiting control rod pattern, and reactor power > LPSP	(2)(5)
Reactor Mode Switch in Shutdown	2	2	Shutdown	(7)

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NOTES FOR TABLE 3.2.C-1

1. Deleted
2. a. With one RBM Channel inoperable:
 - (1) restore the inoperable RBM channel to operable status within 24 hours; otherwise place one rod block monitor channel in the tripped condition within the next hour, and;
 - (2) prior to control rod withdrawal, perform an instrument function test of the operable RBM channel.
- b. With both RBM channels inoperable, place at least one inoperable rod block monitor channel in the tripped condition within one hour.
3. Deleted
4. Deleted
5. RBM operability is required in the run mode in the presence of a limiting rod pattern with reactor power greater than the RBM low power setpoint (LPSP). A limiting rod pattern exists when:
$$\text{MCPR} < 1.41 \text{ for reactor power } \geq 90\%$$
$$\text{MCPR} < 1.72 \text{ for reactor power} < 90\%$$

The allowable value for the LPSP is $\leq 29\%$ of rated core thermal power.
6. Deleted
7. With one or more Reactor Mode Switch - Shutdown Position channels inoperable, suspend control rod withdrawal and initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies immediately.

PNPS
TABLE 3.2.C-2
CONTROL ROD BLOCK INSTRUMENTATION SETPOINTS

<u>Trip Function</u>	<u>Trip Setpoint</u>
Rod Block Monitor (Power Dependent)	(1) (3)
Rod Block Monitor Inoperative	Not Applicable
Rod Block Monitor Downscale	(1) (3)
Mode Switch in Shutdown	Not Applicable
(1) The trip level setting shall be as specified in the CORE OPERATING LIMITS REPORT.	
(2) Deleted	
(3) The RBM bypass time delay (t_{d2}) shall be < 2.0 seconds.	

**PNPS
TABLE 4.2.C**

MINIMUM TEST AND CALIBRATION FREQUENCY FOR CONTROL ROD BLOCKS ACTUATION

<u>Instrument Channel</u>	<u>Instrument Functional Test</u>	<u>Calibration</u>	<u>Instrument Check</u>
RBM - Upscale	Once/3 Months	Once/6 Months	Once/Day
RBM - Downscale	Once/3 Months	Once/6 Months	Once/Day
RBM - Inoperative	Once/3 Months	Not Applicable	Once/Day
Mode Switch in Shutdown	Once/Operating Cycle	Not Applicable	Not Applicable
<u>Logic System Functional Test (4) (6)</u>			
System Logic Check	Once/Operating Cycle		

NOTES FOR TABLES 4.2.A THROUGH 4.2.G

1. Initially once per month until exposure hours (M as defined on Figure 4.1.1) is 2.0×10^5 ; thereafter, according to Figure 4.1.1 with an interval not less than one month nor more than three months.
2. Functional tests, calibrations and instrument checks are not required when these instruments are not required to be operable or are tripped. Functional tests shall be performed before each startup with a required frequency not to exceed once per week. Calibrations of IRMs and SRMs shall be performed during each startup or during controlled shutdowns with a required frequency not to exceed once per week. Instrument checks shall be performed at least once per day during those periods when the instruments are required to be operable.
3. Deleted.
4. Simulated automatic actuation shall be performed once each operating cycle. Where possible, all logic system functional tests will be performed using the test jacks.
5. Reactor low water level and high drywell pressure are not included on Table 4.2.A since they are tested on Tables 4.1.1 and 4.1.2.
6. The logic system functional tests shall include a calibration of time delay relays and timers necessary for proper functioning of the trip systems.
7. Calibration of analog trip units will be performed concurrent with functional testing. The functional test will consist of injecting a simulated electrical signal into the measurement channel. Calibration of associated analog transmitters will be performed each refueling outage.

BASES:

3.2 PROTECTIVE INSTRUMENTATION (Cont)

The HPCI high flow and temperature instrumentation are provided to detect a break in the HPCI steam piping. Tripping of this instrumentation results in actuation of HPCI isolation valves. Tripping logic for the high flow is a 1 out of 2 logic, and all sensors are required to be operable.

Temperature is monitored at three (3) locations with four (4) temperature sensors at each location. Two (2) sensors at each location are powered by "A" direct current control bus and two (2) by "B" direct current control bus. Each pair of sensors, e.g., "A" or "B", at each location is physically separated and the tripping of either "A" or "B" bus sensor will actuate HPCI isolation valves.

The trip settings of $\leq 300\%$ of design flow for high flow and 200° F or 170° F, depending on sensor location, for high temperature are such that core uncover is prevented and fission product release is within limits.

The RCIC high flow and temperature instrumentation are arranged the same as that for the HPCI. The trip setting of $\leq 300\%$ for high flow and 200° F, 170° F, and 150° F, depending on sensor location, for temperature are based on the same criteria as the HPCI.

The Reactor Water Cleanup System high flow and temperature instrumentation are arranged similar as that for the HPCI. The trip settings are such that core uncover is prevented and fission product release is within limits.

The instrumentation which initiates CSCS action is arranged in a dual bus system. As for other vital instrumentation arranged in this fashion, the Specification preserves the effectiveness of the system even during periods when maintenance or testing is being performed. An exception to this is when logic functional testing is being performed.

The control rod block functions are provided to prevent excessive control rod withdrawal. The trip logic for this function is 1 out of n: e.g., any trip on one of two RBM's will result in a rod block.

The minimum instrument channel requirements assure sufficient instrumentation to assure the single failure criteria is met. The minimum instrument channel requirements for the RBM may be reduced by one for not longer than 24 hours without significantly increasing the risk of an inadvertent control rod withdrawal.

BASES:

3.2 PROTECTIVE INSTRUMENTATION (Cont)

The RBM rod block function provides local protection of the core, for a single rod withdrawal error from a limiting control rod pattern.

The RBM bypass time delay (t_{d2}) is the delay between the time the signal is normalized to the reference signal and the time the signal is passed to the trip logic. Control rod withdrawal is unrestricted during this interval. The RBM bypass time delay is low enough to assure that control rod movement is minimized during the time RBM trips are bypassed.

The refueling interlocks also operate one logic channel, and are required for safety only when the mode switch is in the refueling position.

For effective emergency core cooling for small pipe breaks, the HPCI system must function since reactor pressure does not decrease rapidly enough to allow either core spray or LPCI to operate in time. The automatic pressure relief function is provided as a backup to the HPCI in the event the HPCI does not operate. The arrangement of the tripping contacts is such as to provide this function when necessary and minimize spurious operation. The trip settings given in the specification are adequate to assure the above criteria are met. The specification preserves the effectiveness of the system during periods of maintenance, testing or calibration, and also minimizes the risk of inadvertent operation; i.e., only one instrument channel out of service.

Four radiation monitors are provided which initiate the Reactor Building Isolation and Control System and operation of the standby gas treatment system. The instrument channels monitor the radiation from the refueling area ventilation exhaust ducts.

Four instrument channels are arranged in a 1 out of 2 twice trip logic.

BASES:

4.2 PROTECTIVE INSTRUMENTATION (Cont)

A logic system functional test interval of 24 months was selected to minimize the frequency of safety system inoperability due to testing and to minimize the potential for inadvertent safety system trips and their attendant transients.