

TABLE 4.1.2

SCRAM INSTRUMENT CALIBRATIONMINIMUM CALIBRATION FREQUENCIES FOR REACTOR PROTECTION INSTRUMENT CHANNELS

<u>Instrument Channel</u>	<u>Group</u> <sup>(1)</sup>	<u>Calibration Standard</u> <sup>(4)</sup>	<u>Minimum Frequency</u> <sup>(2)</sup>
High Flux APRM			
Output Signal	B	Heat Balance	Once Every 7 Days
Output Signal (Reduced) (7)	B	Heat Balance	Once Every 7 Days
Flow Bias	B	Standard Pressure and Voltage Source	Refueling Outage
LPRM (LPRM ND-2-1-104(80))	B(5)	Using TIP System	Every 2,000 MWD/T average core exposure (8)
High Reactor Pressure	B	Standard Pressure Source	Once/Operating Cycle
Turbine Control Valve Fast Closure	A	Standard Pressure Source	Every 3 Months
High Drywell Pressure	B	Standard Pressure Source	Once/Operating Cycle
High Water Level in Scram Discharge Volume	B	Water Level	Once/Operating Cycle
Low Reactor Water Level	B	Standard Pressure Source	Once/Operating Cycle
Turbine Stop Valve Closure	A	(6)	Refueling Outage
High Main Steam Line Radiation	B	Appropriate Radiation Source <sup>(3)</sup>	Refueling Outage
First Stage Turbine Pressure Permissive (PS-5-14(A-D))	A	Pressure Source	Every 6 Months and After Refueling
Main Steam Line Isolation Valve Closure	A	(6)	Refueling Outage

TABLE 4.1.2 NOTES

1. A description of the three groups is included in the bases of this Specification.
2. Calibration tests are not required when the systems are not required to be operable or are tripped. If tests are missed, they shall be performed prior to returning the systems to an operable status.
3. A current source provides an instrument channel alignment every 3 months.
4. Response time is not part of the routine instrument check and calibration, but will be checked every operating cycle.
5. Does not provide scram function.
6. Physical inspection and actuation.
7. The IRM and SRM channels shall be determined to overlap during each startup after entering the STARTUP/HOT STANDBY MODE and the IRM and APRM channels shall be determined to overlap during each controlled shutdown, if not performed within the previous 7 days.
8. The specified frequency is met if the calibration is performed within 1.25 times the interval specified, as measured from the previous performance.

BASES: 3.1 (Cont'd)

The requirement to have all scram functions, except those listed in Table 3.1.1, operable in the "Refuel" mode is to assure that shifting to this mode during reactor operation does not diminish the need for the reactor protection system.

The ability to bypass one instrument channel when necessary to complete surveillance testing will preclude continued operation with scram functions which may be either unable to meet the single failure criteria or completely inoperable. It also eliminates the need for an unnecessary shutdown if the remaining channels and subsystems are found to be operable. The conditions under which the bypass is permitted require an immediate determination that the particular function is operable. However, during the time a bypass is applied, the function will not meet the single failure criteria; therefore, it is prudent to limit the time the bypass is in effect by requiring that surveillance testing proceed on a continuous basis and that the bypass be removed as soon as testing is completed.

Sluggish indicator response during the perturbation test will be indicative of a plugged instrument line or closed instrument valves. This test assures the operability of the reactor pressure sensors as well as the reactor level sensors since both parameters are monitored through the same instrument lines.

The independence of the safety system circuitry is determined by operation of the scram test switch. Operation of this switch during the refueling outage and following maintenance on these circuits will assure their continued independence.

BASES:4.1 REACTOR PROTECTION SYSTEM

- A. The scram sensor channels listed in Tables 4.1.1 and 4.1.2 are divided into three groups: A, B and C. Sensors that make up Group A are the on-off type and will be tested and calibrated at the indicated intervals.

Group B devices utilize an analog sensor followed by an amplifier and bistable trip circuit. This type of equipment incorporates control room mounted indicators and annunciator alarms. A failure in the sensor or amplifier may be detected by an alarm or by an operator who observes that one indicator does not track the others in similar channels. The bistable trip circuit failures are detected by the periodic testing.

Group C devices are active only during a given portion of the operating cycle. For example, the IRM is active during start-up and inactive during full-power operation. Testing of these instruments is only meaningful within a reasonable period prior to their use.

The basis for a three-month functional test interval for group (A) and (B) sensors is provided in NEDC-30851P-A, "Technical Specification Improvement Analysis for BWR Reactor Protection Systems," March 1988.

SRM/IRM/APRM overlap Surveillances are established to ensure that no gaps in neutron flux indication exist from subcritical to power operation for monitoring core reactivity status.

The overlap between SRMs and IRMs is required to be demonstrated to ensure that reactor power will not be increased into a neutron flux region without adequate indication. This is required prior to withdrawing SRMs from the fully inserted position since indication is being transitioned from the SRMs to the IRMs.

The overlap between IRMs and APRMs is of concern when reducing power into the IRM range. On power increases, the system design will prevent further increases (by initiating a rod block) if adequate overlap is not maintained. Overlap between IRMs and APRMs exists when sufficient IRMs and APRMs concurrently have onscale readings such that the transition between the RUN and STARTUP/HOT STANDBY Modes can be made without either APRM downscale rod block, or IRM upscale rod block. Overlap between SRMs and IRMs similarly exists when, prior to withdrawing the SRMs from the fully inserted position, IRMs are above mid-scale on range 1 before SRMs have reached the upscale rod block.

As noted, IRM/APRM overlap is only required to be met during entry into STARTUP/HOT STANDBY Mode from the Run Mode. That is, after the overlap requirement has been met and indication has transitioned to the IRMs, maintaining overlap is not required (APRMs may be reading downscale once in the STARTUP/HOT STANDBY Mode).

If overlap for a group of channels is not demonstrated (e.g., IRM/APRM overlap), the reason for the failure of the Surveillance should be determined and the appropriate channel(s) declared inoperable. Only those appropriate channels that are required in the current condition should be declared inoperable.

VYNPS

BASES: 4.1 (Cont'd)

LPRM gain settings are determined from the local flux profiles measured by the Traversing Incore Probe (TIP) System. This establishes the relative local flux profile for appropriate representative input to the APRM System. The 2,000 megawatt-days per short ton (MWD/T) frequency is based on operating experience with LPRM sensitivity changes, and that the resulting nodal power uncertainty, combined with other identified uncertainties, remains less than the total uncertainty (i.e., 8.7%) allowed by the GETAB safety limit analysis.

- B. The ratio of MFLPD to FRP shall be checked once per day when operating at  $\geq 25\%$  Rated Thermal Power to determine if the APRM gains require adjustment. Because few control rod movements or power changes occur, checking these parameters daily is adequate. The 12 hour allowance after thermal power  $\geq 25\%$  Rated Thermal Power is achieved is acceptable given the large inherent margin to operating limits at low power levels.