TABLE 3.1.1
REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT REQUIREMENTS

Trip Function	Limiting Trip Settings	Modes in which function must be Operable or Operating** Refuel(3)	Startup	Run	Total No. of Instrument Channels per Trip System	Min. No. of Operable or Operating Instrument Channels Per Trip System(1)	Required Condition
1. Mode Switch in Shutdown		X	X	X	1	1	A
2. Manual Scram		X	X	X	1	1	A
3. Neutron Flux IRM (See Note 2)	≤ 120/125 of full scale	X	X	X(c)	4	3	A
a. High-High							
b. Inoperative							
4. Flow Referenced Neutron Flux APRM (See Note 5)	See Specifications 2.3A.1			X	3	2	A or B
a. High-High							
b. Inoperative							
c. Downscale	≥ 3/125 of full scale						
5. High Reactor Pressure	≤ 1075 psig	X	X(f)	X(f)	2	2	A
6. High Drywell Pressure	≤ 2 psig	X(4)	X(e,f)	X(e,f)	2	2	A
7. Reactor Low Water Level	≥ 7 in.(6)	X	X(f)	X(f)	2	2	A
8. Scram Discharge Volume High Level							
a. East	≤ 56 gal.(8)	X(a)	X(f)	X(f)	2	2	A
b. West	≤ 56 gal.(8)	X(a)	X(f)	X(f)	2	2	A
9. Turbine Condenser Low Vacuum	≥ 23 in. Hg	X(b)	X(b,f)	X(f)	2	2	A or C

Table 3.1.1 - Continued

6. Seven inches on the water level instrumentation is 10'6" above the top of the active fuel at rated power.

7. Trips upon loss of oil pressure to the acceleration relay.

8. Limited trip setting refers to the volume of water in the discharge volume receiver tank and does not include the volume in the lines to the level switches.

* Required Conditions when minimum conditions for operation are not satisfied.

A. All operable control rods fully inserted.

B. Power on IRM range or below and reactor in Startup, Refuel, or Shutdown mode.

C. Reactor in Startup or Refuel mode and pressure below 600 psig.

D. Reactor power less than 45% (751.5 MWt.).

** Allowable Bypass Conditions

It is permissible to bypass:

a. The scram discharge volume High Water Level scram function in the refuel mode to allow reactor protection system reset. A rod block shall be applied while the bypass is in effect.

b. The Low Condenser vacuum and MSIV closure scram functions in the Refuel and Startup modes if reactor pressure is below 600 psig.

c. The scram function of an IRM instrument channel when the reactor is in the Run mode and the associated APRM is operable and indicating at least 3/125 full scale.

d. The turbine stop valve closure and fast control valve closure scram functions when the reactor thermal power is $\leq$45%(751.5 MWt).

Bases Continued:

3.1 Three APRM instrument channels are provided for each protection trip system. APRM's #1 and #3 operate contacts in one subchannel, and APRM's #2 and #3 operate contacts in the other subchannel. APRM's #4,#5, and #6 are arranged similarly in the other protection trip system. Each protection trip system has one more APRM than is necessary to meet the minimum number required. This allows the bypassing of one APRM per protection trip system for maintenance, testing, or calibration. Additional IRM channels have also been provided to allow for bypassing of one such channel in each trip system.

The bases for the scram settings for the IRM, APRM, high reactor pressure, reactor low water level, turbine control valve fast closure, and turbine stop valve closure are discussed in Specifications 2.3 and 2.4.

Instrumentation (pressure switches) in the drywell are provided to detect a loss of coolant accident and initiate the emergency core cooling equipment. This instrumentation is a backup to the water level instrumentation which is discussed in Specification 3.2.

The control rod drive scram system is designed so that all of the water which is discharged from the reactor by the scram can be accommodated in the discharge piping. Part of this piping consists of two instrument volumes which accommodate in excess of 56 gallons of water each and is the low point in the piping. During normal operation the discharge volumes are empty; however, should they fill with water, the water discharge to the piping from the reactor could not be accommodated which would result in slow scram times or partial or no control rod insertion. To preclude this occurrence, level switches have been provided in the instrument volumes which alarm and scram the reactor when the volume of water in either of the discharge volume receiver tanks reaches 56 gallons. At this point there is sufficient volume in the piping to accommodate the scram without impairment of the scram times or amount of insertion of the control rods. This function shuts the reactor down while sufficient volume remains to accommodate the discharged water and precludes the situation in which a scram would be required but not be able to perform its function adequately.

Loss of condenser vacuum occurs when the condenser can no longer handle the heat input. Loss of

Table 3.2.3 - Continued
Instrumentation That Initiates Rod Block

Function	Trip Settings	Reactor Modes in Which Function Must Be Operable or Operating and Allowable Bypass Conditions** Refuel	Startup	Run	Total No. of Instrument Channels per Trip system	Min. No. of Operable or Operating Instrument Channels Per Trip System (Notes 1,6)	Required Conditions*
4. RBM							
a. Upscale (flow referenced)	≤65 W+ 43 (Note 2)			X(c)	1	1 (Note 5)	D or E
b. Downscale	≥3/125 full			X(c)	1	1 (Note 5)	D or E
5. Scram Discharge Volume							
Water Level - High ≤40 gal							
a. East			X	X	1	1	B and D, or A
b. West			X	X	1	1	B and D, or A

Notes:

(1) There shall be two operable or operating trip systems for each function. If the minimum number of operable or operating instrument channels cannot be met for one of the two trip systems, this condition may exist up to seven days provided that during this time the operable system is functionally tested immediately and daily thereafter. This note is not applicable to the Scram Discharge Volume Rod Block since it exists in only one trip system.

(2) "W" is the reactor recirculation driving flow in percent.

(3) Only one of the four SRM channels may be bypassed.

(4) There must be at least one operable or operating IRM channel monitoring each core quadrant.

(5) One of the two RBM's may be bypassed for maintenance and/or testing for periods not in excess of 24 hours in any 30 day period. An RBM channel will be considered inoperable if there are less than half the total number of normal inputs from any LPRM level.

Any four rod group may contain a control rod which is valved out of service provided the above requirements and Specification 3.3.A are met.

3. If the cycle average scram insertion time (τ_{AVG}), based on the de-energization of the scram pilot valve solenoids at time zero, of all operable control rods in the reactor power operation condition at the 20% inserted position is larger than the adjusted analysis mean scram time (τ_B), a more restrictive MCPR limit (see section 3.11.C.1) shall be used.

D. Control Rod Accumulators

In the "Startup" or "Run" Mode, a rod accumulator may be inoperable provided that no other control rod in the nine-rod square array around this rod has a:

1. Inoperable accumulator.

2. Directional control valve electrically disarmed while in a non-fully inserted position.

If a control rod with an inoperable accumulator is inserted "full-in" and its directional control valves are electrically disarmed, it shall not be considered to have an inoperable accumulator.

In the "Refuel" Mode, the accumulator associated with any withdrawn control rod must be Operable unless all the fuel has been removed from the cell containing that control rod.

D. Control Rod Accumulators

Once a week, check the status in the control room of the required Operable accumulator pressure and level alarms.