LIMITING CONDITIONS FOR OPERATION

3.1 REACTOR PROTECTION SYSTEM

Applicability:

Applies to the instrumentation and associated devices which initiate a reactor scram.

Objective

To assure the operability of the reactor protection system.

Specification:

When there is fuel in the vessel, the setpoint, minimum number of trip systems, and minimum number of instrument channels that must be operable for each position of the reactor mode switch shall be as given in Table 3.1.1. The designed system response times from the opening of the sensor contact up to and including the opening of the trip actuator contacts shall not exceed 100 milli-seconds.

SURVEILLANCE REQUIREMENTS

4.1 REACTOR PROTECTION SYSTEM

Applicability:

Applies to the surveillance of the instrumentation and associated devices which initiate reactor scram.

Objective

To specify the type and frequency of surveillance to be applied to the protection instrumentation.

Specification:

A. Instrumentation systems shall be functionally tested and calibrated as indicated in Tables 4.1.1 and 4.1.2 respectively.

B. Daily during reactor power operation, the peak heat flux and peaking factor shall be checked and the SCRAM and APRM Rod Block settings given by equations in Specification 2.1.A.1 and 2.1.B shall be calculated if the peaking factor exceeds 2.62 for 7x7 fuel, 2.44 for 8x8 fuel, or 2.51 for 8x8R fuel.

LIMITING CONDITIONS FOR OPERATION

3.1 REACTOR PROTECTION SYSTEM

Applicability:

Applies to the instrumentation and associated devices which initiate a reactor scram.

Objective

To assure the operability of the reactor protection system.

Specification:

When there is fuel in the vessel, the setpoint, minimum number of trip systems, and minimum number of instrument channels that must be operable for each position of the reactor mode switch shall be as given in Table 3.1.1. The designed system response times from the opening of the sensor contact up to and including the opening of the trip actuator contacts shall not exceed 100 milli-seconds.

SURVEILLANCE REQUIREMENTS

4.1 REACTOR PROTECTION SYSTEM

Applicability:

Applies to the surveillance of the instrumentation and associated devices which initiate reactor scram.

Objective

To specify the type and frequency of surveillance to be applied to the protection instrumentation.

Specification:

A. Instrumentation systems shall be functionally tested and calibrated as indicated in Tables 4.1.1 and 4.1.2 respectively.

B. Daily during reactor power operation, the maximum fraction of limiting density factor shall be checked and the SCRAM and APRM Rod Block settings given by equations in Specification 2.1.A.1 and 2.1.B shall be calculated if the maximum fraction of limiting power density exceeds the fraction of rated power.

1762 286

3.1 BASES

The reactor protection system automatically initiates a reactor scram to:

1. Preserve the integrity of the fuel cladding.

2. Preserve the integrity of the reactor coolant system.

3. Minimize the energy which must be absorbed following a loss of coolant accident, and present inadvertant criticality.

When there is no fuel in the reactor, the scram serves no function; therefore, the reactor protection system is not required to be operable.

This specification provides the limiting conditions for operation necessary to preserve the ability of the system to perform its intended function even during periods when instrument channels may be out of service because of maintenance. When necessary, one channel may be made inoperable for brief intervals to conduct required functional tests and calibrations.

The reactor protection system is of the dual channel type (Reference subsection 7.2 FSAR). The system is made up of two independent trip systems, each having two subchannels of tripping devices. Each subchannel has an input from at least one instrument channel which monitors a critical parameter.

The outputs of the subchannels are combined in a 1 out of 2 logic; i.e. an input signal on either one or both of the subchannels will cause a trip system trip. The outputs of the trip systems are arranged so that a trip on both systems is required to produce a reactor scram.

This system meets the intent of IEEE - 279 for Nuclear Power Plant Protection Systems. The system has a reliability greater than that of a 2 out of 3 system and somewhat less than that of a 1 out of 2 system.

With the exception of the Average Power Range Monitor (APRM) channels, the Intermediate Range Monitor (IRM) channels, the Main Steam Isolation Valve closure and the Turbine stop Valve closure, each subchannel has one instrument channel. When the minimum condition for operation on the number of operable instrument channels per untripped protection trip system is met or if it cannot be met and the affected protection trip system is placed in a tripped condition, the effectiveness of the protection system is preserved.

The APRM instrument channels are provided for each protection trip system. APRM's A and E operate contacts in one subchannel and APRM's C and E operate contacts in the other subchannel. APRM's B, D and F are arranged similarly in

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.5.F Minimum Low Pressure Cooling and Diesel Generator Availability	4.5.F Minimum Low Pressure Cooling and Diesel Generator Availability
1. During any period when one diesel generator is inoperable, continued reactor operation is permissible only during the succeeding seven days unless such diesel generator is sooner made operable, provided that all of the low pressure core and containment cooling subsystems and the remaining diesel generators shall be operable. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be placed in the Cold Shutdown Condition within 24 hours.	1. When it is determined that one diesel generator is inoperable, all low pressure core cooling and containment cooling subsystems shall be demonstrated to be operable immediately and daily thereafter. In addition, the operable diesel generators shall be demonstrated to be operable immediately and daily thereafter.
2. Any combination of inoperable components in the core and containment cooling systems shall not defeat the capability of the remaining operable components to fulfill the cooling functions.	
3. When irradiated fuel is in the reactor vessel and the reactor is in the Cold Shutdown Condition, both core spray systems, the LPCI and containment cooling subsystems may be inoperable, provided no work is being done which has the potential for draining the reactor vessel.	
4. During a refueling outage, fuel and LPRM removal and replacement may be performed provided at least one of the following conditions below is satisfied:	

1762 288

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.5.F.3 (Cont'd)	4.5.F.2 (Cont'd)

a. Both core spray systems and the LPCI system shall be operable except that one core spray system or the LPCI system may be inoperable for a period of thirty days, or

b. The reactor vessel head is removed, the cavity is flooded, the spent fuel pool gates are removed, and the water level is maintained at least 21 feet over the top of irradiated fuel assemblies seated in the spent fuel storage pool racks and no work is being performed which has the potential for draining the reactor vessel.

1762 289

3.5.E BASES (Cont'd.)

With one ADS valve known to be incapable of automatic operation, four valves remain operable to perform their ADS function. However, since the ECCS Loss-of-Coolant Accident analysis for small line breaks assumed that all five ADS valves were operable, reactor operation with one ADS valve inoperable is only allowed to continue for seven (7) days provided that the HPCI system is demonstrated to be operable and that the actuation logic for the (remaining) four ADS valves is demonstrated to be operable. The ADS test circuit permits continued surveillance on the operable relief valves to assure that they will be available if required.

F. Minimum Low Pressure Cooling and Diesel Generator Availability

The purpose of Specification F is to assure that adequate core cooling capability is available at all times. It is during refueling outages that major maintenance is performed and during such time that all low pressure core cooling systems may be out of service. This specification provides that should this occur, no work will be performed on the primary system which could lead to draining the vessel. This work would include work on certain control rod drive components and recirculation system. Additionally, the specification provides minimum core flooding requirements during refueling operations. Specification 3.9 must also be consulted to determine other requirements for the diesel generators.

G. Maintenance of Filled Discharge Pipe

If the discharge piping of the core spray, LPCI subsystem, HPCI, and RCIC are not filled, a water hammer can develop in this piping when the pump and/or pumps are started. If a water hammer were to occur at the time at which the system were required, the system would still perform its design function. However, to minimize damage to the discharge piping and to ensure added margin in the operation of these systems, this Technical Specification requires the discharge lines to be filled whenever the system is in an operable condition.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.7 CONTAINMENT SYSTEMS	4.7 CONTAINMENT SYSTEMS
Applicability:	Applicability:
Applies to the operating status of the primary and secondary containment systems.	Applies to the primary and secondary containment integrity.
Objective:	Objective:
To assure the integrity of the primary and secondary containment system.	To verify the integrity of the primary and secondary containment.
Specification:	Specification:
A. Primary Containment	
1. Whenever the nuclear system is pressurized above atmospheric pressure or work is being done which has the potential to drain the vessel, the pressure suppression pool water volume and temperature shall be maintained within the following limits except as specified by 3.7.A.2, or when inoperability of the core spray systems, the LPCI and containment cooling subsystems is permissible as provided for in 3.5.F.3 and 3.5.F.4.b.	1. The suppression chamber water level and temperature shall be checked once per day.
a. Minimum water volume- 122,900 ft^3	2. a. Whenever there is indication of relief valve operation (except when the reactor is being shutdown and torus cooling is being established) or testing which adds heat to the suppression pool, the pool temperature shall be continually monitored and also observed and logged every 5 minutes until the heat addition is terminated.
b. Maximum water volume- 127,300 ft^3	3. Whenever there is indication of relief valve operation with the temperature of the suppression pool reaching 160°F or more and the primary coolant system pressure greater than 200 psig, an external visual examination of the suppression chamber shall be conducted before resuming power operation.
	4. A visual inspection of the suppression chamber interior, including water line regions shall be made at each major refueling outage.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.10.A.5.b (Cont'd)	4.10.A

directional control valves for remaining control rods shall be disarmed electrically and sufficient margin to criticality shall be demonstrated.

c. If maintenance is to be performed on two control rod drives, they must be separated by more than two control cells in any direction.

d. An appropriate number of SRM's are available as defined in specification 3.10.B.

6. Any number of control rods may be withdrawn or removed from the reactor core provided the following conditions are satisfied:

a. The reactor mode switch is locked in the "refuel" position. The refueling interlock which prevents more than one control rod from being withdrawn may be bypassed on a withdrawn control rod after the fuel assemblies in the cell containing (controlled by) that control rod have been removed from the reactor core. All other refueling interlocks shall be operable.

B. Core Monitoring

1. Except as specified in 3.10.B.2, 3.10.B.3 and 3.10.B.4, during core alterations two SRM's shall be operable, one in the core quadrant where fuel or controls rods are being moved and one in the adjacent quadrant. For an SRM to be considered operable, the following conditions shall be satisfied:

B. Core Monitoring

1. Prior to making any alterations to the core, the SRM's shall be functionally tested and checked for neutron response. Thereafter, while required to be operable, the SRM's will be checked daily for response.

1762 292

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.10.B (Cont'd)	4.10.B (Cont'd)
a. The SRM shall be inserted to the normal operating level. (Use of special movable, dunking type detectors during fuel loading and major core alterations in place of normal detectors is permissible as long as the detector is connected to the normal SRM circuit.)	2. Prior to unloading or reloading of fuel as provided for in sections 3.10.B.2 & 3.10.B.3, the SRM's shall be functionally tested. Prior to unloading of fuel, the SRM's should also be checked for neutron response.
b. The SRM shall have a minimum of 3 cps with all rods fully inserted in the core.	
2. Prior to unloading of fuel, the SRM's shall be proven operable as stated above; however, during unloading of fuel, the SRM count rate may drop below 3 cps, provided all control rods are full inserted and rendered electrically inoperable with the exception of the following provision. Individual control rods outside the periphery of the then existing fuel matrix may be electrically armed and moved after all fuel in the cell containing that control rod have been removed from the reactor core.	
3. Prior to reloading of fuel, two, three, or four fuel assemblies may be returned to their previous core positions adjacent to each of the 4 SRM's to obtain the required 3 cps. Until these assemblies are loaded, the SRM 3 cps count rate is not required.	
4. The SRM 3 cps count rate is not required with all fuel removed from the core.	
C. Spent Fuel Pool Water Level	C. Spent Fuel Pool Water Level
Whenever irradiated fuel is stored in the spent fuel pool, the pool	Whenever irradiated fuel is stored in the spent fuel pool, the water

1762 293

water level shall be maintained at or above 8 1/2' above the top of the fuel.

level shall be recorded daily.

D. Heavy Loads Over Spent Fuel

Loads in excess of 1000 lbs (excluding the rigging and transport vehicle) shall be prohibited from travel over fuel assemblies in the spent fuel storage pool.

3.10 BASES (Cont'd)

The requirements for SRM Operability during these core alterations assure sufficient core monitoring.

B. Core Monitoring

The SRM's are provided to monitor the core during periods of station shutdown and to guide the operator during refueling operations and station startup. Requiring two operable SRM's in or adjacent to any core quadrant where fuel or control rods are being moved assures adequate monitoring of that quadrant during such alterations. The requirement of 3 counts per second provides assurance that neutron flux is being monitored and insures that startup is conducted only if the source range flux level is above the minimum assumed in the control rod drop accident.

During unloading of fuel, it is permissible to allow the SRM count rate to decrease below 3 cps. Since all fuel moves during core unloading will reduce reactivity, the lower number of counts will not present a hazard. Requiring the SRM's to be functionally tested prior to fuel removal assures that the SRM's will be operable at the start of fuel removal. The daily response check of the SRM's ensures their continued operability until the count rate deminishes due to fuel removal. Control rods in cells from which all fuel has been removed and which are outside the periphery of the then existing fuel matrix may be armed electrically and moved for maintenance purposes during fuel removal, provided all rods that control fuel are fully inserted and electrically disarmed.

During core loading, the loading of adjacent assemblies around the four SRM's before attaining the 3 cps is permissible because these assemblies were in a subcritical configuration when they were removed and therefore will remain subcritical when the same assemblies are placed back into their previous positions. Since specification 3.10.A.2 requires that all control rods be fully inserted prior to loading fuel, inadvertent critical whenity is precluded during core loading.

C. Spent Fuel Pool Water Level

To assure that there is adequate water to shield and cool the irradiated fuel assemblies stored in the pool, a minimum pool water level is established. The minimum water level of 8 1/2' above the top of the fuel is established because it provides adequate shielding and is well above the level to assure adequate cooling.

1762 295

4.10 BASES

A. Refueling Interlocks

Complete functional testing of all refueling interlocks before any refueling outage will provide positive indication that the interlocks operate in the situations for which they were designed. By loading each hoist with a weight equal to the fuel assembly, positioning the refueling platform and withdrawing control rods, the interlocks can be subjected to valid operational tests. Where redundancy is provided in the logic circuitry, tests can be performed to assure that each redundant logic element can independently perform its functions.

B. Core Monitoring

Requiring the SRM's to be functionally tested prior to any core alteration assures that the SRM's will be operable at the start of that alteration. The daily response check of the SRM's ensures their continued operability.