ATTACHMENT B

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT

3.5 CORE AND CONTAINMENT COOLING SYSTEMS

Applicability

Applies to the operational status of the core and suppression pool cooling systems.

Objective

To assure the operability of the core and suppression pool cooling systems under all conditions for which this cooling capability is an essential response to station abnormalities.

Specification

A. Core Spray and LPCI Systems

1. Both core spray systems shall be operable whenever irradiated fuel is in the vessel and prior to reactor startup from a Cold Condition, except as specified in 3.5.A.2 below.

4.5 CORE AND CONTAINMENT COOLING SYSTEMS

Applicability

Applies to the Surveillance Requirements of the core and suppression pool cooling systems which are required when the corresponding Limiting Condition for operation is in effect.

Objective

To verify the operability of the core and suppression pool cooling systems under all conditions for which this cooling capability is an essential response to station abnormalities.

Specification

A. Core Spray and LPCI Systems

1. Core Spray System Testing.

	Item	Frequency
a.	Simulated Automatic Actuation test.	Once/Operating Cycle
b.	Pump Operability	Once/month
c.	Motor Operated Valve Operability	Once/month
d.	Pump flow rate Each pump shall deliver at least 3600 gpm against a system head corresponding to a reactor vessel pressure of 104 psig.	Once/3 months
e.	Core Spray Header Δp Instrumentation	

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
3.5.A Core Spray and LPCI Systems (cont'd)	4.5.A Core Spray and LPCI Systems (cont'd)
	Check Once/day Calibrate Once/3 months Test Step Once/3 months
2. From and after the date that one of the core spray systems is made or found to be inoperable for any reason, continued reactor operation is permissible during the succeeding seven days, provided that during such seven days all active components of the other core spray system and active components of the LPCI system and the diesel generators are operable.	2. This section intentionally left blank
3. The LPCI system shall be operable whenever irradiated fuel is in the reactor vessel, and prior to reactor startup from a Cold Condition, except as specified in 3.5.A.4 and 3.5.F.5.	3. LPCI system Testing shall be as follows: a. Simulated Automatic Actuation Test — Once/Operating Cycle b. Pump Operability — Once/month c. Motor Operated valve operability — Once/Month d. Pump Flow — Once/3 months Each LPCI pump shall pump 4800 gpm at a head across the pump of at least 380 ft.
4. From and after the date that the LPCI system is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding seven days unless it is sooner made operable, provided that during such seven days the containment cooling system (including 2 LPCI pumps) and active components of both core spray systems, and the diesel generators required for operation of such components if no external source of power were available shall be operable.	
5. If the requirements of 3.5.A cannot be met, an orderly shutdown of the reactor shall be initiated and the reactor shall be in the Cold Shutdown Condition within 24 hours.	

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LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT

3.5.B Containment Cooling System

1. Except as specified in 3.5.B.2 and 3.5.F.3 below, both containment cooling system loops shall be operable whenever irradiated fuel is in the reactor vessel and reactor coolant temperature is greater than 212°F, and prior to reactor startup from a Cold Condition.

2. From and after the date that one containment cooling system loop is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding 72 hours unless such system loop is sooner made operable, provided that the other containment cooling system loop, including its associated diesel generator, is operable.

3. If the requirements of 3.5.B cannot be met, an orderly shutdown shall be initiated and the reactor shall be in a Cold Shutdown Condition within 24 hours.

4.5.B Containment Cooling System

1. Containment Cooling system Testing shall be as follows:

	Item	Frequency
a.	Pump & Valve Operability	Once/3 months
b.	Pump Capacity Test Each RBCCW pump shall deliver 1700 gpm at 70 ft. TDH. Each SSWS pump shall deliver 2700 gpm at 55 ft. TDH.	After pump maintenance and every 3 months
c.	Air test on drywell and torus headers and nozzles	Once/5 years

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
C. HPCI System	C. HPCI System
1. The HPCI system shall be operable whenever there is irradiated fuel in the reactor vessel, reactor pressure is greater than 150 psig, and reactor coolant temperature is greater than 365°F; except as specified in 3.5.C.2 below.	1. HPCI system testing shall be performed as follows: a. Simulated Automatic Actuation Test — Once/operating cycle b. Pump Operability — Once/month c. Motor Operated Valve Operability — Once/month d. Flow Rate at 1000 psig — Once/3 months e. Flow Rate at 150 psig — Once/operating cycle The HPCI pump shall deliver at least 4250 gpm for a system head corresponding to a reactor pressure of 1000 to 150 psig.
2. From and after the date that the HPCI system is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding seven days unless such system is sooner made operable, providing that during such seven days all active components of the ADS system, the RCIC system, the LPCI system and both core spray systems are operable.	
3. If the requirements of 3.5.C cannot be met, an orderly shutdown shall be initiated and the reactor pressure shall be reduced to or below 150 psig within 24 hours.	

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT

3.5.D Reactor Core Isolation Cooling (RCIC) System

1. The RCIC system shall be operable whenever there is irradiated fuel in the reactor vessel, reactor pressure is greater than 150 psig, and reactor coolant temperature is greater than 365°F; except as specified in 3.5.D.2 below.

2. From and after the date that the RCICS is made or found to be inoperable for any reason, continued reactor power operation is permissible only during the succeeding seven days provided that during such seven days the HPCIS is operable.

3. If the requirements of 3.5.D cannot be met, an orderly shutdown shall be initiated and the reactor pressure shall be reduced to or below 150 psig within 24 hours.

4.5.D Reactor Core Isolation Cooling (RCIC) System

1. RCIC system testing shall be performed as follows:

a.	Simulated Automatic Actuation Test	Once/operating cycle
b.	Pump Operability	Once/month
c.	Motor Operated Valve Operability	Once/month
d.	Flow Rate at 1000 psig	Once/3 months
e.	Flow Rate at 150 psig	Once/operating cycle

The RCIC pump shall deliver at least 400 gpm for a system head corresponding to a reactor pressure of 1000 to 150 psig.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
3.5.E Automatic Depressurization System (ADS)	4.5.E Automatic Depressurization System (ADS)
1. The Automatic Depressurization System shall be operable whenever there is irradiated fuel in the reactor vessel and the reactor pressure is greater than 104 psig and prior to a startup from a Cold Condition, except as specified in 3.5.E.2 below.	1. During each operating cycle the following tests shall be performed on the ADS: a. A simulated automatic actuation test shall be performed prior to startup after each refueling outage. The ADS manual inhibit switch will be included in this test. b. With the reactor at pressure, each relief valve shall be manually opened until a corresponding change in reactor pressure or main turbine bypass valve positions indicate that steam is flowing from the valve.
2. From and after the date that one valve in the Automatic Depressurization System is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding seven days unless such valve is sooner made operable, provided that during such seven days the HPCI system is operable.	
3. If the requirements of 3.5.E cannot be met, an orderly shutdown shall be initiated and the reactor pressure shall be reduced to at least 104 psig within 24 hours.	

3.5.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 72 hours unless such diesel generator is sooner made operable, provided that all of the low pressure core and containment cooling systems and the remaining diesel generator 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.

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 systems may be inoperable, provided no work is being done which has the potential for draining the reactor vessel.

4. During a refueling outage, for a period of 30 days, refueling operation may continue provided that one core spray system or the LPCI system is operable or Specification 3.5.F.5 is met.

5. When irradiated fuel is in the reactor vessel and the reactor is in the Refueling Condition with the torus drained, a single control rod drive mechanism may be removed, if both of the following conditions are satisfied:

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
3.5.F Minimum Low Pressure Cooling and Diesel Generator Availability	
a) No work on the reactor vessel, in addition to CRD removal, will be performed which has the potential for exceededing the maximum leak rate from a single control blade seal if it became unseated.	
b) i) the core spray systems are operable and aligned with a suction path from the condensate storage tanks. ii) the condensate storage tanks shall contain at least 200,000 gallons of usable water and the refueling cavity and dryer/ separator pool shall be flooded to a least elevation 114'-0"	
3.5.G	
(Intentionally left blank)	
3.5.H Maintenance of Filled Discharge Pipe	4.5.H Maintenance of Filled Discharge Pipe
Whenever core spray systems, LPCI system, HPCI or RCIC are required to be operable, the discharge piping from the pump discharge of these systems to the last block valve shall be filled.	The following surveillance requirements shall be adhered to to assure that the discharge piping of the core spray systems, LPCI system, HPCI and RCIC are filled:
	1. Every month prior to the testing of the LPCI system and core spray systems, the discharge piping of these systems shall be vented from the high point and water flow observed.
	2. Following any period where the LPCI system or core spray systems have not been required to be operable, the discharge piping of the inoperable system shall be vented from the high point prior to the return of the system to service.

4.5.H Maintenance of Filled Discharge Pipe (Cont'd)

3. Whenever the HPCI or RCIC system is lined up to take suction from the torus, the discharge piping of the HPCI and RCIC shall be vented from the high point of the system and water flow observed on a monthly basis.

4. The pressure switches which monitor the discharge lines to ensure that they are full shall be functionally tested every month and calibrated every three months.

BASES:

3.5.A Core Spray and LPCI System

This specification assures that adequate emergency cooling capability is available whenever irradiated fuel is in the reactor vessel.

Based on the loss of coolant analysis performed by General Electric in accordance with Section 50.46 and Appendix K of 10CFR50, the Pilgrim I Emergency Core Cooling Systems are adequate to provide sufficient cooling to the core to dissipate the energy associated with the loss of coolant accident, to limit calculated fuel clad temperature to less than 2200°F, to limit calculated local metal water reaction to less than or equal to 17%, and to limit calculated core wide metal water reaction to less than or equal to 1%.

Core spray distribution has been shown, in full-scale tests of systems similar in design to that of Pilgrim, to exceed the minimum requirements by at least 25%. In addition, cooling effectiveness has been demonstrated at less than half the rated flow in simulated fuel assemblies with heater rods to duplicate the decay heat characteristics of irradiated fuel. The accident analysis takes credit for core spray flow into the core at vessel pressure below 205 psig. However, the analysis is conservative in that no credit is taken for spray cooling heat transfer in the hottest fuel bundle until the pressure at rated flow for the core spray (104 psig vessel pressure) is reached.

The LPCI system is designed to provide emergency cooling to the core by flooding in the event of a loss-of-coolant accident. This system functions in combination with the core spray system to prevent excessive fuel clad temperature. The LPCI system and the core spray system provide adequate cooling for break areas of approximately 0.2 square feet up to and including the double-ended recirculation line break without assistance from the high pressure emergency core cooling systems.

The combination of the core spray systems and the LPCI system assures that adequate core cooling is achieved assuming any coincident single failure of an active safety-related component. Core Standby Cooling System (CSCS) performance evaluations consider only the most severe single failure for each break size range. These single failures include the LPCI injection valve, one diesel generator, the HPCI system or one ADS valve. With these single failures, the combinations of analyzed low pressure CSCS capacity include two core spray pumps, one core spray pump and two LPCI pumps, or two core spray and four LPCI pumps. Each core spray system consists of one pump and associated piping and valves with all active components required to be operable. The LPCI system consists of four LPCI pumps and associated piping and valves with all active components required to be operable.

BASES:

3.5.A Core Spray and LPCI Systems (Cont'd)

Should one core spray system become inoperable, the remaining core spray and the LPCI system are available should the need for core cooling arise. Based on judgments of the reliability of the remaining systems; i.e., the core spray and LPCI, a seven-day repair period was obtained.

If the LPCI system is not available, at least 2 LPCI pumps must be available to fulfill the containment cooling function. Based on judgments of the reliability of the remaining core spray systems, a 7-day repair period was set.

The LPCI system is not considered inoperable when the RHR System is operating in the shutdown cooling mode.

BASES:

3.5.B Containment Cooling System

The containment cooling system for Pilgrim I consists of two independent loops each of which to be an operable loop requires one LPCI pump, two RBCCW pumps, and two SSW pumps to be operable. There are installed spares for margin above the design conditions. Each system has the capability to perform its function; i.e., removing 64 x 10^6 Btu/hr (Ref. Amendment 18), even with some system degradation. If one loop is out-of-service, reactor operation is permitted for 72 hours.

With components or systems out-of-service, overall core and containment cooling reliability is maintained by the operability of the remaining cooling equipment.

Since some of the SSW and RBCCW pumps are required for normal operation, capacity testing of individual pumps by direct flow measurement is impractical. The pump capacity test is a comparison of measured pump performance parameters to shop performance tests combined with a comparison to the performance of the previously tested pump. These pumps are rotated during operation and performance testing will be integrated with this or performed during refueling when pumps can be flow tested individually. Tests during normal operation will be performed by measuring the shutoff head. Then the pump under test will be placed in service and one of the previously operating pumps secured. Total flow indication for the system will be compared for the two cases. Where this is not feasible due to changing system conditions, the pump discharge pressure will be measured and its power requirement will be used to establish flow at that pressure.

BASES:

3.5.C HPCI

The limiting conditions for operating the HPCI System are derived from the Station Nuclear Safety Operational Analysis (Appendix G) and a detailed functional analysis of the HPCI System (Section 6).

The HPCIS is provided to assure that the reactor core is adequately cooled to limit fuel clad temperature in the event of a small break in the nuclear system and loss-of-coolant which does not result in rapid depressurization of the reactor vessel. The HPCIS permits the reactor to be shut down while maintaining sufficient reactor vessel water level inventory until the vessel is depressurized. The HPCIS continues to operate until reactor vessel pressure is below the pressure at which LPCI operation or Core Spray System operation maintains core cooling.

The capacity of the system is selected to provide this required core cooling. The HPCI pump is designed to pump 4250 gpm at reactor pressures between 1100 and 150 psig. Two sources of water are available. Initially, demineralized water from the condensate storage tank is used instead of injecting water from the suppression pool into the reactor.

When the HPCI System begins operation, the reactor depressurizes more rapidly than would occur if HPCI was not initiated due to the condensation of steam by the cold fluid pumped into the reactor vessel by the HPCI System. As the reactor vessel pressure continues to decrease, the HPCI flow momentarily reached equilibrium with the flow through the break. Continued depressurization causes the break flow to decrease below the HPCI flow and the liquid inventory begins to rise. This type of response is typical of the small breaks. The core never uncovers and is continuously cooled throughout the transient so that no core damage of any kind occurs for breaks that lie within the capacity range of the HPCI.

The analysis in the FSAR, Appendix G, shows that the ADS provides a single failure proof path for depressurization for postulated transients and accidents. The RCIC is required as an alternate source of makeup to the HPCI only in the case of loss of all offsite A-C power. Considering the HPCI and the ADS plus RCIC as redundant paths, and considering judgments of the reliability of the ADS and RCIC systems, a 7-day allowable repair time is specified.

The requirement that HPCI be operable when reactor coolant temperature is greater that 365°F is included in Specification 3.5.C.1 to clarify that HPCI need not be operable during certain testing (e.g., reactor vessel hydro testing at high reactor pressure and low reactor coolant temperature). 365°F is approximately equal to the saturation steam temperature at 150 psig.

BASES:

3.5.D RCIC System

The RCIC is designed to provide makeup to the nuclear system as part of the planned operation for periods when the normal heat sink is unavailable. The nuclear safety analysis, FSAR Appendix G, shows that RCIC also serves as redundant makeup system on total loss of all offsite power in the event that HPCI is unavailable. In all other postulated accidents and transients, the ADS provides redundancy for the HPCI. Based on this and judgments on the reliability of the HPCI system, an allowable repair time of seven days is specified.

The requirement that RCIC be operable when reactor coolant temperature is greater than 365°F is included in Specification 3.5.D.1 to clarify that RCIC need not be operable during certain testing (e.g., reactor vessel hydro testing at high reactor pressure and low reactor coolant temperature). 365°F is approximately equal to the saturation steam temperature at 150 psig.

BASES:

3.5.E Automatic Depressurization System (ADS)

The limiting conditions for operating the ADS are derived from the Station Nuclear Operational Analysis (Appendix G) and a detailed functional analysis of the ADS (Section 6).

This specification ensures the operability of the ADS under all conditions for which the automatic or manual depressurization of the nuclear system is an essential response to station abnormalities.

The nuclear system pressure relief system provides automatic nuclear system depressurization for small breaks in the nuclear system so that the low pressure coolant injection (LPCI) and the core spray systems can operate to protect the fuel barrier.

Because the Automatic Depressurization System does not provide makeup to the reactor primary vessel, no credit is taken for the steam cooling of the core caused by the system actuation to provide further conservatism to the CSCS. Performance analysis of the Automatic Depressurization System is considered only with respect to its depressurizing effect in conjunction with LPCI or Core Spray. There are four valves provided and each has a capacity of 800,000 lb/hr at a reactor pressure of 1125 psig.

The allowable out of service time for one ADS valve is determined as seven days because of the redundancy and because of HPCIS operability; therefore, redundant protection for the core with a small break in the nuclear system is still available.

The ADS test circuit permits continued surveillance on the operable relief valves to assure that they will be available if required.

BASES:

3.5.H Maintenance of Filled Discharge Pipe

If the discharge piping of the core spray, LPCI system, HPCI, and RCIC are not filled, a water hammer can develop in this piping when the pump and/or pumps are started. An analysis has been done which shows that 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.

BASES:

4.5 Core and Containment Cooling Systems Surveillance Frequencies

The testing interval for the core and containment cooling systems is based on industry practice, quantitative reliability analysis, judgment and practicality. The core cooling systems have not been designed to be fully testable during operation. For example, in the case of the HPCI, automatic initiation during power operation would result in pumping cold water into the reactor vessel which is not desirable. Complete ADS testing during power operation causes an undesirable loss-of-coolant inventory. To increase the availability of the core and containment cooling systems, the components which make up the system; i.e., instrumentation, pumps, valves, etc., are tested frequently. The pumps and motor operated injection valves are also tested each month to assure their operability. A simulated automatic actuation test once each cycle combined with monthly tests of the pumps and injection valves is deemed to be adequate testing of these systems.

The surveillance requirements provide adequate assurance that the core and containment cooling systems will be operable when required.

4.9

The diesel fuel oil quality must be checked to ensure proper operation of the diesel generators. Water content should be minimized because water in the fuel could contribute to excessive damage to the diesel engine.

The Electrical Protection Assemblies (EPAs) on the RPS inservice power supplies (either two motor generator sets or one motor generator and the alternate supply), consist of protective relays that trip their incorporated circuit breakers on overvoltage, undervoltage or underfrequency conditions. There are 2 EPAs in series per power source. It is necessary to periodically test the relays to ensure the sensor is operating correctly and to ensure the trip unit is operable. Based on experience at conventional and nuclear power plants, a six month frequency for the channel functional test is established. This frequency is consistent with the Standard Technical Specifications.

The EPAs of the power sources to the RPS shall be determined to be operable by performance of a channel calibration of the relays once per operating cycle. During calibration, a transfer to the alternate power source is required; however, prior to switching to alternate feed, de-energization of the applicable MG set power source must be accomplished. This results in a half-scram on the channel being calibrated until the alternate power source is connected and the half scram is cleared. Based on operating experience, drift of the EPA protective relays is not significant. Therefore, to avoid possible spurious scrams, a calibration frequency of once per cycle is established.

ATTACHMENT C

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENT
3.5 CORE AND CONTAINMENT COOLING SYSTEMS	4.5 CORE AND CONTAINMENT COOLING SYSTEMS
Applicability	**Applicability**
Applies to the operational status of the core and suppression pool cooling subsystems.	Applies to the Surveillance Requirements of the core and suppression pool cooling subsystems which are required when the corresponding Limiting Condition for operation is in effect.
Objective	**Objective**
To assure the operability of the core and suppression pool cooling subsystems under all conditions for which this cooling capability is an essential response to station abnormalities.	To verify the operability of the core and suppression pool cooling subsystems under all conditions for which this cooling capability is an essential response to station abnormalities.
Specification	**Specification**
A. Core Spray and LPCI Subsystems	A. Core Spray and LPCI Subsystems
1. Both core spray subsystems shall be operable whenever irradiated fuel is in the vessel and prior to reactor startup from a Cold Condition, except as specified in 3.5.A.2 below.	1. Core Spray Subsystem Testing.

Item	Frequency
a. Simulated Automatic Actuation test.	Once/Operating Cycle
b. Pump Operability	Once/month
c. Motor Operated Valve Operability	Once/month
d. Pump flow rate Each pump shall deliver at least 3600 gpm against a system head corresponding to a reactor vessel pressure of 104 psig.	Once/3 MONTHS
e. Core Spray Header Δp Instrumentation	

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
3.5.A Core Spray and LPCI Subsystems (cont'd)	4.5.A Core Spray and LPCI Subsystems (cont'd)

Check	Once/day
Calibrate	Once/3 months
Test	Once/3 months

2. From and after the date that one of the core spray subsystems is made or found to be inoperable for any reason, continued reactor operation is permissible during the succeeding seven days, provided that during such seven days all active components of the other core spray subsystem and active components of the LPCI subsystem and the diesel generators are operable.

2. ~~When it is determined that one core spray subsystem is inoperable, the operable core spray subsystem, the LPCI subsystem and the diesel generators shall be demonstrated to be operable immediately. The operable core spray subsystem shall be demonstrated to be operable daily thereafter.~~

3. The LPCI subsystem shall be operable whenever irradiated fuel is in the reactor vessel, and prior to reactor startup from a Cold Condition, except as specified in 3.5.A.4, 3.5.A.5 and 3.5.F.5.

3. LPCI Subsystem Testing shall be as follows:

a. Simulated Automatic Actuation Test	Once/Operating Cycle
b. Pump Operability	Once/month
c. Motor Operated valve operability	Once/Month
d. Pump Flow	Once/3 months

Each LPCI pump shall pump 4800 gpm at a head across the pump of at least 380 ft.

Sections 4 and 5, formerly 5 and 6, moved from page 105 to here.

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LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENT
3.5.A Core Spray and LPCI Subsystems (Cont'd)	4.5.A Core Spray and LPCI Subsystems (Cont'd)
~~4. From and after the date that one of the RHR (LPCI) pumps is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding thirty days provided that during such thirty days the containment cooling subsystem, the remaining active components of the LPCI Subsystem, and all active components of both core spray subsystems and the diesel generators are operable.~~	~~4. When it is determined that one of the RHR (LPCI) pumps is inoperable at a time when it is required to be operable, the containment cooling subsystem, the remaining active components of the LPCI Subsystem, both core spray systems and the diesel generators shall be demonstrated to be operable immediately and the operable LPCI pumps daily thereafter.~~
5. From and after the date that the LPCI subsystem is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding seven days unless it is sooner made operable, provided that during such seven days the containment cooling subsystem (including 2 LPCI pumps) and active components of both core spray subsystems, and the diesel generators required for operation of such components if no external source of power were available shall be operable.	~~5. When it is determined that the LPCI subsystem is inoperable, both core spray subsystems, the containment cooling subsystem and the diesel generators required for operation of such components if no external source of power were available shall be demonstrated to be operable immediately and daily thereafter.~~
6. If the requirements of 3.5.A cannot be met, an orderly shutdown of the reactor shall be initiated and the reactor shall be in the Cold Shutdown Condition within 24 hours.	

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LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT

3.5.B Containment Cooling Subsystem — System

1. Except as specified in 3.5.B.2, 3.5.B.3, and 3.5.F.3 below, both containment cooling subsystem — system loops shall be operable whenever irradiated fuel is in the reactor vessel and reactor coolant temperature is greater than 212°F, and prior to reactor startup from a Cold Condition.

Sections 2 and 3 moved here from page 107

~~* Conditional relief granted from this LCO for the period October 31, 1980 through November 7, 1980.~~

4.5.B Containment Cooling Subsystem — System

1. Containment Cooling Subsystem — System Testing shall be as follows:

	Item	Frequency
a.	Pump & Valve Operability	Once/3 months
b.	Pump Capacity Test Each RBCCW pump shall deliver 1700 gpm at 70 ft. TDH. Each SSWS pump shall deliver 2700 gpm at 55 ft. TDH.	After pump maintenance and every 3 months
c.	Air test on drywell and torus headers and nozzles	Once/5 years

N

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
~~3.5.B Containment Cooling Subsystem (Cont'd)~~	~~4.5.B Containment Cooling Subsystem (Cont'd)~~
2. From and after the date that one containment cooling subsystem loop is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding seven days, unless such subsystem loop is sooner made operable, provided that the other containment cooling subsystem loop, including its associated diesel generator, is operable.	2. ~~When one containment cooling subsystem loop becomes inoperable, the operable subsystem loop and its associated diesel generator shall be demonstrated to be operable immediately and the operable containment cooling subsystem loop daily thereafter.~~
3. If the requirements of 3.5.B cannot be met, an orderly shutdown shall be initiated and the reactor shall be in a Cold Shutdown Condition within 24 hours.	
C. HPCI Subsystem	C. HPCI Subsystem
1. The HPCI Subsystem shall be operable whenever there is irradiated fuel in the reactor vessel, reactor pressure is greater than 150 psig, and reactor coolant temperature is greater than 365°F; except as specified in 3.5.C.2 and 3.5.C.3 below.	1. HPCI Subsystem testing shall be performed as follows:

a. Simulated Automatic Actuation Test	Once/operating cycle
b. Pump Operability	Once/month
c. Motor Operated Valve Operability	Once/month
d. Flow Rate at 1000 psig	Once/3 months
e. Flow Rate at 150 psig	Once/operating cycle

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Sections 2 and 3 moved here from page 108

last sentence of 4.5.C.1 moved here from page 108

~~Conditional relief granted from this LCO for the period October 31, 1980 through November 7, 1980.~~

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
~~3.5.C HPCI Subsystem (Cont'd)~~	~~4.5.C HPCI Subsystem (Cont'd)~~
	The HPCI pump shall deliver at least 4250 gpm for a system head corresponding to a reactor pressure of 1000 to 150 psig. MOVED TO 107
2. From and after the date that the HPCI Subsystem is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding seven days unless such Subsystem is sooner made operable, providing that during such seven days all active components of the ADS Subsystem, the RCIC system, the LPCI subsystem and both core spray subsystems are operable. MOVED TO 107	2. ~~When it is determined that the HPCI Subsystem is inoperable the RCIC, the LPCI subsystem, both core spray subsystems, and the ADS subsystem actuation logic shall be demonstrated to be operable immediately. The RCIC system and ADS subsystem logic shall be demonstrated to be operable daily thereafter.~~
3. If the requirements of 3.5.C cannot be met, an orderly shutdown shall be initiated and the reactor pressure shall be reduced to or below 150 psig within 24 hours. MOVED TO 107	
3.5.D Reactor Core Isolation Cooling (RCIC) Subsystem	4.5.D Reactor Core Isolation Cooling (RCIC) Subsystem
1. The RCIC Subsystem shall be operable whenever there is irradiated fuel in the reactor vessel, reactor pressure is greater than 150 psig, and reactor coolant temperature is greater than 365°F; except as specified in 3.5.D.2 below.	1. RCIC Subsystem testing shall be performed as follows:

a.	Simulated Automatic Actuation Test	Once/operating cycle
b.	Pump Operability	Once/month
c.	Motor Operated Valve Operability	Once/month

Sections 2 and 3 moved here from page 109

The last sentence of 4.5.D.1 moved here from page 109

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
~~3.5.D Reactor Core Isolation Cooling (RCIC) Subsystem (Cont'd)~~	~~4.5.D Reactor Core Isolation Cooling (RCIC) Subsystem (Cont'd)~~
2. From and after the date that the RCICS is made or found to be inoperable for any reason, continued reactor power operation is permissible only during the succeeding seven days provided that during such seven days the HPCIS is operable. MOVED TO 108	d. Flow Rate at 1000 psig — Once/3 months e. Flow Rate at 150 psig — Once/operating cycle MOVED TO 108 The RCIC pump shall deliver at least 400 gpm for a system head corresponding to a reactor pressure of 1000 to 150 psig.
3. If the requirements of 3.5.D cannot be met, an orderly shutdown shall be initiated and the reactor pressure shall be reduced to or below 150 psig within 24 hours. MOVED TO 108	2. ~~When it is determined that the RCIC subsystem is inoperable, the HPCIS shall be demonstrated to be operable immediately and weekly thereafter.~~
3.5.E Automatic Depressurization System (ADS)	4.5.E Automatic Depressurization System (ADS)
1. The Automatic Depressurization ~~Subsystem~~ System shall be operable ~~whenever~~ there is irradiated fuel in the reactor vessel and the reactor pressure is greater than 104 psig and prior to a startup from a Cold Condition, except as specified in 3.5.E.2 below.	1. During each operating cycle the following tests shall be performed on the ADS: a. A simulated automatic actuation test shall be performed prior to startup after each refueling outage. The ADS manual inhibit switch will be included in this test. b. With the reactor at pressure, each relief valve shall be manually opened until a corresponding change in reactor pressure or main turbine bypass valve positions indicate that steam is flowing from the valve.

sections 2 and 3 moved here from page 110

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
~~3.5.E Automatic Depressurization System (ADS) (Cont'd)~~	~~4.5.E Automatic Depressurization System (ADS) (Cont'd)~~
2. From and after the date that one valve in the automatic depressurization system is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding seven days unless such valve is sooner made operable, provided that during such seven days the HPCI system is operable. MOVED TO 109	~~2. When it is determined that one valve of the ADS is inoperable, the ADS subsystem actuation logic for the other ADS valves and the HPCI subsystem shall be demonstrated to be operable immediately and at least weekly thereafter until the valve is repaired.~~
3. If the requirements of 3.5.E cannot be met, an orderly shutdown shall be initiated and the reactor pressure shall be reduced to at least 104 psig within 24 hours. MOVED TO 109	
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~~ 72 hours 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 generator 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.	~~2. 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 generator shall be demonstrated to be operable immediately and daily thereafter until the inoperable diesel is repaired.~~
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.	

sections 3, 4 and 5 moved here from page 111

3.5.F Minimum Low Pressure Cooling and Diesel Generator Availability (Cont'd)

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.

Sections 3, 4, and 5 moved to page 110

4. During a refueling outage, for a period of 30 days, refueling operation may continue provided that one core spray system or the LPCI system is operable or Specification 3.5.F.5 is met.

5. When irradiated fuel is in the reactor vessel and the reactor is in the Refueling Condition with the torus drained, a single control rod drive mechanism may be removed, if both of the following conditions are satisfied:

a) No work on the reactor vessel, in addition to CRD removal, will be performed which has the potential for exceeding the maximum leak rate from a single control blade seal if it became unseated.

b) i) the core spray systems are operable and aligned with a suction path from the condensate storage tanks. ii) the condensate storage tanks shall contain at least 200,000 gallons of usable water and the refueling cavity and dryer/separator pool shall be flooded to at least elevation 114'-0".

3.5.G

(Intentionally left blank)

Section 3.5.H moved here from page 112

Section 4.5.H, 4.5.H.1, and 4.5.H.2 moved here from page 112

LIMITING CONDITION FOR OPERATION

3.5.H Maintenance of Filled Discharge Pipe

MOVED TO 111

Whenever core spray subsystems, LPCI subsystem, HPCI, or RCIC are required to be operable, the discharge piping from the pump discharge of these systems to the last block valve shall be filled.

SURVEILLANCE REQUIREMENT

4.5.H Maintenance of Filled Discharge Pipe (Cont'd)

MOVED TO 111

The following surveillance requirements shall be adhered to to assure that the discharge piping of the core spray subsystems, LPCI subsystem, HPCI and RCIC are filled:

1. Every month prior to the testing of the LPCI subsystem and core spray subsystem, the discharge piping of these systems shall be vented from the high point and water flow observed.

MOVED TO 111

2. Following any period where the LPCI subsystem or core spray subsystems have not been required to be operable, the discharge piping of the inoperable system shall be vented from the high point prior to the return of the system to service.

MOVED TO 111

3. Whenever the HPCI or RCIC system is lined up to take suction from the torus, the discharge piping of the HPCI and RCIC shall be vented from the high point of the system and water flow observed on a monthly basis.

4. The pressure switches which monitor the discharge lines to ensure that they are full shall be functionally tested every month and calibrated every three months.

Amendment No. 39

BASES:

3.5.A Core Spray and LPCI Subsystem → System

This specification assures that adequate emergency cooling capability is available whenever irradiated fuel is in the reactor vessel.

Based on the loss of coolant analysis performed by General Electric in accordance with Section 50.46 and Appendix K of 10CFR50, the Pilgrim I Emergency Core Cooling Systems are adequate to provide sufficient cooling to the core to dissipate the energy associated with the loss of coolant accident, to limit calculated fuel clad temperature to less than 2200°F, to limit calculated local metal water reaction to less than or equal to 17%, and to limit calculated core wide metal water reaction to less than or equal to 1%.

~~The limiting conditions of operation in Specifications 3.5.A.1 through 3.5.A.6 specify the combinations of operable subsystems to assure the availability of the minimum cooling systems noted above. No single failure of CSCS equipment occurring during a loss-of-coolant accident under these limiting conditions of operation will result in inadequate cooling of the reactor core.~~

Core spray distribution has been shown, in full-scale tests of systems similar in design to that of Pilgrim, to exceed the minimum requirements by at least 25%. In addition, cooling effectiveness has been demonstrated at less than half the rated flow in simulated fuel assemblies with heater rods to duplicate the decay heat characteristics of irradiated fuel. The accident analysis takes credit for core spray flow into the core at vessel pressure below 205 psig. However, the analysis is conservative in that no credit is taken for spray cooling heat transfer in the hottest fuel bundle until the pressure at rated flow for the core spray (104 psig vessel pressure) is reached.

The LPCI ~~subsystem~~ system is designed to provide emergency cooling to the core by flooding in the event of a loss-of-coolant accident. This system functions in combination with the core spray system to prevent excessive fuel clad temperature. The LPCI ~~subsystem~~ system and the core spray ~~subsystem~~ system provide adequate cooling for break areas of approximately 0.2 square feet up to and including the double-ended recirculation line break without assistance from the high pressure emergency core cooling subsystems.

~~The allowable repair times are established so that the average risk rate for repair would be no greater than the basic risk rate. The method and concept are described in reference (1). Using the results developed in~~

The combination of the core spray systems and the LPCI system assures that adequate core cooling is achieved assuming any coincident single failure of an active safety-related component. Core Standby Cooling System (CSCS) performance evaluations consider only the most severe single failure for each break size range. These single failures include the LPCI injection valve, one diesel generator, the HPCI system or one ADS valve. With these single failures, the combinations of analyzed low pressure CSCS capacity include two core spray pumps, one core spray pump and two LPCI pumps, or two core spray and four LPCI pumps. Each core spray system consists of one pump and associated piping and valves with all components required to be operable. The LPCI system consists of four LPCI pumps and associated piping and valves with all components required to be operable.

new paragraph

BASES:

3.5.A Core Spray and LPCI Subsystems (Cont'd)

~~this reference, the repair period is found to be less than 1/2 the test interval. This assumes that the core spray subsystems and LPCI constitute a 1 out of 2 system; however, the combined effect of the two systems to limit excessive clad temperatures must also be considered. The test interval specified in Specification 4.5 was 3 months. Therefore, an allowable repair period which maintains the basic risk considering single failures should be less than 30 days and this specification is within this period. For multiple failures, a shorter interval is specified and to improve the assurance that the remaining systems will function, a daily test is called for. Although it is recognized that the information given in reference (a) provides a quantitative method to estimate allowable repair times, the lack of operating data to support the analytical approach prevents complete acceptance of this method at this time. Therefore, the times stated in the specific items were established with due regard to judgment.~~

Should one core spray subsystem become inoperable, the remaining core spray and the LPCI system are available should the need for core cooling arise. ~~To assure that the redundant core spray and LPCI subsystems and the diesel generators are available, they are demonstrated to be operable immediately. This demonstration includes a manual initiation of the pumps and associated valves and diesel generators.~~ Based on judgments of the reliability of the remaining systems, i.e., the core spray and LPCI, a seven-day repair period was obtained.

~~Should the loss of one LPCI pump occur, a nearly full complement of core and containment cooling equipment is available. The 4 LPCI pumps in conjunction with the core spray subsystem will perform the core cooling function. Because of the availability of the majority of the core cooling equipment, which will be demonstrated to be operable, a 30-day repair period is justified.~~ If the LPCI subsystem is not available, at least 2 LPCI pumps must be available to fulfill the containment cooling function. The 7-day repair period is set ~~on this basis~~.

The LPCI ~~subsystem~~ is not considered inoperable when the RHR System is operating in the shutdown cooling mode.

~~(1) Jacobs, I.M., "Guidelines for Determining Safe Test Intervals and Repair Times for Engineered Safeguards", General Electric Co. A.P.E.D., April, 1969 (APED 5736)~~

Based on judgements of the reliability of the remaining core spray subsystems, a

BASES:

3.5.B Containment Cooling ~~Subsystem~~ System

38 The containment cooling subsystem for Pilgrim I consists of two independent loops each of which to be an operable loop requires one LCPI pump, two RBCCW pumps, and two SSW pumps to be operable. There are installed spares for margin above the design conditions. Each system has the capability to perform its function; i.e., removing 64 x 10^6 Btu/hr (Ref. Amendment 18), even with some system degradation. If one loop is out-of-service, reactor operation is permitted for seven days ~~with daily testing of the operable loop and the appropriate diesel generator~~ 72 hours

With components or ~~subsystems~~ systems out-of-service, overall core and containment cooling reliability is maintained by ~~demonstrating~~ the operability of the remaining cooling equipment. ~~The degree of operability to be demonstrated depends on the nature of the reason for the out-of-service equipment. For routine out-of-service periods caused by preventative maintenance, etc., the pump and valve operability checks will be performed to demonstrate operability of the remaining components. However, if a failure, design deficiency, etc., caused the out-of-service period, then the demonstration of operability should be thorough enough to assure that a similar problem does not exist on the remaining components. For example, if an out-of-service period were caused by failure of a pump to deliver rated capacity, the other pumps of this type might be subjected to a capacity test. In any event, surveillance procedures, as required by Section 4 of these specifications, detail the required extent of testing.~~

Since some of the 5 SSW and RBCCW pumps are required for normal operation, capacity testing of individual pumps by direct flow measurement is impractical. The pump capacity test is a comparison of measured pump performance parameters to shop performance tests combined with a comparison to the performance of the previously tested pump. These pumps are rotated during operation and performance testing will be integrated with this or performed during refueling when pumps can be flow tested individually. Tests during normal operation will be performed by measuring the shutoff head. Then the pump under test will be placed in service and one of the previously operating pumps secured. Total flow indication for the system will be compared for the two cases. Where this is not feasible due to changing system conditions, the pump discharge pressure will be measured and its power requirement will be used to establish flow at that pressure.

BASES:

3.5.C HPCI

The limiting conditions for operating the HPCI System are derived from the Station Nuclear Safety Operational Analysis (Appendix G) and a detailed functional analysis of the HPCI System (Section 6).

The HPCIS is provided to assure that the reactor core is adequately cooled to limit fuel clad temperature in the event of a small break in the nuclear system and loss-of-coolant which does not result in rapid depressurization of the reactor vessel. The HPCIS permits the reactor to be shut down while maintaining sufficient reactor vessel water level inventory until the vessel is depressurized. The HPCIS continues to operate until reactor vessel pressure is below the pressure at which LPCI operation or Core Spray System operation maintains core cooling.

The capacity of the system is selected to provide this required core cooling. The HPCI pump is designed to pump 4250 gpm at reactor pressures between 1100 and 150 psig. Two sources of water are available. Initially, demineralized water from the condensate storage tank is used instead of injecting water from the suppression pool into the reactor.

When the HPCI System begins operation, the reactor depressurizes more rapidly than would occur if HPCI was not initiated due to the condensation of steam by the cold fluid pumped into the reactor vessel by the HPCI System. As the reactor vessel pressure continues to decrease, the HPCI flow momentarily reaches equilibrium with the flow through the break. Continued depressurization causes the break flow to decrease below the HPCI flow and the liquid inventory begins to rise. This type of response is typical of the small breaks. The core never uncovers and is continuously cooled throughout the transient so that no core damage of any kind occurs for breaks that lie within the capacity range of the HPCI.

The analysis in the FSAR, Appendix G, shows that the ADS provides a single failure proof path for depressurization for postulated transients and accidents. The RCIC is required as an alternate source of makeup to the HPCI only in the case of loss of all offsite A-C power. Considering the HPCI and the ADS plus RCIC as redundant paths, ~~reference (1) methods would give an estimated allowable repair time of 10 days based on the one month testing frequency. Considering this and the~~ and considering judgments of the reliability of the ADS and RCIC systems, a 7-day ~~period~~ allowable repair time is specified.

The requirement that HPCI be operable when reactor coolant temperature is greater than 365°F is included in Specification 3.5.C.1 to clarify that HPCI need not be operable during certain testing (e.g., reactor vessel hydro testing at high reactor pressure and low reactor coolant temperature). 365°F is approximately equal to the saturation steam temperature at 150 psig.

BASES:

3.5.D RCIC System

The RCIC is designed to provide makeup to the nuclear system as part of the planned operation for periods when the normal heat sink is unavailable. The nuclear safety analysis, FSAR Appendix G, shows that RCIC also serves as redundant makeup system on total loss of all offsite power in the event that HPCI is unavailable. In all other postulated accidents and transients, the ADS provides redundancy for the HPCI. Based on this and judgments on the reliability of the HPCI system, an allowable repair time of seven days is specified. ~~Immediate and weekly demonstrations of the HPCI operability during RCIC outage is considered adequate based on judgment and practicality. More frequent testing would cause undesirable steam flow interruption and thermal cycling transients.~~

The requirement that RCIC be operable when reactor coolant temperature is greater than 365°F is included in Specification 3.5.D.1 to clarify that RCIC need not be operable during certain testing (e.g., reactor vessel hydro testing at high reactor pressure and low reactor coolant temperature). 365°F is approximately equal to the saturation steam temperature at 150 psig.

BASES:

3.5.E Automatic Depressurization System (ADS)

The limiting conditions for operating the ADS are derived from the Station Nuclear Operational Analysis (Appendix G) and a detailed functional analysis of the ADS (Section 6).

This specification ensures the operability of the ADS under all conditions for which the automatic or manual depressurization of the nuclear system is an essential response to station abnormalities.

The nuclear system pressure relief system provides automatic nuclear system depressurization for small breaks in the nuclear system so that the low pressure coolant injection (LPCI) and the core spray (CS) systems can operate to protect the fuel barrier.

Because the Automatic Depressurization System does not provide makeup to the reactor primary vessel, no credit is taken for the steam cooling of the core caused by the system actuation to provide further conservatism to the CSCS. Performance analysis of the Automatic Depressurization System is considered only with respect to its depressurizing effect in conjunction with LPCI or Core Spray. There are four valves provided and each has a capacity of 800,000 lb/hr at a reactor pressure of 1125 psig.

The allowable out of service time for one ADS valve is determined as seven days because of the redundancy and because of HPCIS operability; ~~and because the HPCIS is demonstrated to be operable during this period.~~ Therefore, redundant protection for the core with a small break in the nuclear system is still available.

The ADS test circuit permits continued surveillance on the operable relief valves to assure that they will be available if required.

BASES:

3.5.N Maintenance of Filled Discharge Pipe

If the discharge piping of the core spray, LPCI, injection, HPCI, and RCIC are not filled, a water hammer can develop in this piping when the pump and/or pumps are started. An analysis has been done which shows that 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.

BASES:

4.5 Core and Containment Cooling Systems Surveillance Frequencies

The testing interval for the core and containment cooling systems is based on industry practice, quantitative reliability analysis, judgment and practicality. The core cooling systems have not been designed to be fully testable during operation. For example, in the case of the HPCI, automatic initiation during power operation would result in pumping cold water into the reactor vessel which is not desirable. Complete ADS testing during power operation causes an undesirable loss-of-coolant inventory. To increase the availability of the core and containment cooling systems, the components which make up the system; i.e., instrumentation, pumps, valves, etc., are tested frequently. The pumps and motor operated injection valves are also tested each month to assure their operability. A simulated automatic actuation test once each cycle combined with monthly tests of the pumps and injection valves is deemed to be adequate testing of these systems.

~~When components and subsystems are out-of-service, overall core and containment cooling reliability is maintained by demonstrating the operability of the remaining equipment. The degree of operability to be demonstrated depends on the nature of the reason for the out-of-service equipment. For routine out-of-service periods caused by preventative maintenance, etc., the pump and valve operability checks will be performed to demonstrate operability of the remaining components. However, if a failure, design deficiency, caused the outage, then the demonstration of operability should be thorough enough to assure that a generic problem does not exist. For example, if an out-of-service period were caused by failure of a pump to deliver rated capacity due to a design deficiency, the other pumps of this type might be subjected to a flow rate test in addition to the operability checks.~~

~~Redundant operable components are subjected to increased testing during equipment out-of-service times. This adds further conservatism and increases assurance that adequate cooling is available should the need arise.~~

THE SURVEILLANCE REQUIREMENTS PROVIDE ADEQUATE ASSURANCE THAT THE CORE AND CONTAINMENT COOLING SYSTEMS WILL BE OPERABLE WHEN REQUIRED.

The diesel fuel oil quality must be checked to ensure proper operation of the diesel generators. Water content should be minimized because water in the fuel could contribute to excessive damage to the diesel engine.

~~When it is determined that some auxiliary electrical equipment is out of service, the increased surveillance required in Section 4.5.F is deemed adequate to provide assurance that the remaining equipment will be operable.~~

The Electrical Protection Assemblies (EPAs) on the RPS inservice power supplies (either two motor generator sets or one motor generator and the alternate supply), consist of protective relays that trip their incorporated circuit breakers on overvoltage, undervoltage or underfrequency conditions. There are 2 EPAs in series per power source. It is necessary to periodically test the relays to ensure the sensor is operating correctly and to ensure the trip unit is operable. Based on experience at conventional and nuclear power plants, a six month frequency for the channel functional test is established. This frequency is consistent with the Standard Technical Specifications.

The EPAs of the power sources to the RPS shall be determined to be operable by performance of a channel calibration of the relays once per operating cycle. During calibration, a transfer to the alternate power source is required; however, prior to switching to alternate feed, de-energization of the applicable MG set power source must be accomplished. This results in a half-scram on the channel being calibrated until the alternate power source is connected and the half scram is cleared. Based on operating experience, drift of the EPA protective relays is not significant. Therefore, to avoid possible spurious scrams, a calibration frequency of once per cycle is established.