

LIMITING CONDITIONS FOR OPERATIONSURVEILLANCE REQUIREMENTS

3.12 (cont'd)

B. Reactor Equipment Cooling (REC) System

1. Both Reactor Equipment Cooling subsystems and their associated pumps shall be operable whenever irradiated fuel is in the vessel or the spent fuel pool, except as specified in 3.12.B.2 and 3.12.B.3 below.

2. From and after the date that any active component that affects operability of one REC subsystem becomes inoperable, continued reactor operation is permissible during the succeeding thirty days provided that during such thirty days all active components that affect operability of the operable REC subsystem, the active components that affect operability of the engineered safeguards compartment cooling systems, and the diesel generator associated with the operable subsystem are operable.

The allowable repair time does not apply when the reactor is in the shutdown mode and reactor pressure is less than 75 psig.

3. Both REC subsystems, with one pump per subsystem, shall be operable as stated in 3.12.B.1 and 3.12.B.2 above during reactor head-off operations requiring LPCI or Core Spray system availability or Service Water cooling shall be available.

4. If the requirements of 3.12.B.1 through 3.12.B.3 cannot be met, the reactor shall be shutdown in an orderly manner and in the Cold Shutdown condition within 24 hours or operations requiring LPCI or Core Spray system availability shall be halted.

4.12 (cont'd)

B. Reactor Equipment Cooling (REC) System

1. REC System Testing <u>Item</u>	<u>Frequency</u>
a. Pump Operability	Once/Mo. h
b. Motor operated Valve Operability	Once/Month
c. Pump flow rate Each pump shall deliver 1175 gpm at 65 psid.	Once/3 months and after pump maintenance
d. System head tank level shall be monitored.	Daily

2. When it is determined that any active component that affects operability of an REC subsystem is inoperable, all active components that affect operability of the operable REC subsystem shall be verified operable immediately and weekly thereafter.

LIMITING CONDITIONS FOR OPERATION

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3.5.A (cont'd.)

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 that affect operability of the operable Core Spray subsystem and all active components that affect operability of both LPCI subsystems and the diesel generators are operable.
3. Both LPCI subsystems shall be operable:
 - (1) prior to reactor startup from a Cold Condition, except as specified in 3.22.B.1, or
 - (2) when there is irradiated fuel in the vessel and when the reactor vessel pressure is greater than atmospheric pressure, except as specified in 3.5.A.4 and 3.5.A.5 below.
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 remaining active components that affect operability of the LPCI subsystem containing the inoperable pump, and all active components that affect operability of the operable LPCI subsystem, both Core Spray subsystems, and both diesel generators are operable.

4.5.A (cont'd.)

2. When it is determined that one Core Spray subsystem is inoperable, the operable Core Spray subsystem and both LPCI subsystems shall be verified to be operable immediately. The operable Core Spray subsystem shall be verified to be operable daily thereafter.
3. LPCI subsystem testing shall be as follows:

<u>Item</u>	<u>Frequency</u>
a. Simulated Automatic Actuation Test	Once/Operating Cycle
b. Pump Operability	Once/month
c. Motor Operated Valve Operability	Once/month
d. Pump Flow Rate	Once/3 months

During single pump LPCI, each RHR pump shall deliver at least 7700 GPM but no more than 8400 GPM against a system head equivalent to a reactor vessel pressure of 20 psid above drywell pressure with water level below the jet pumps. At the same conditions, two pump LPCI flow shall be at least 15,000 GPM.

 - e. Recirculation pump discharge valves shall be tested each refueling outage to verify full open to full closed in $t \leq 26$ seconds.
 - f. An air test shall be performed on the drywell and torus headers and nozzles once/5 years.
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 remaining active components that affect operability of the LPCI subsystem containing the inoperable pump, all active components that affect operability of the operable LPCI subsystem, and both Core Spray subsystems shall be verified to be operable immediately and the operable LPCI pumps daily thereafter.

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.A (Cont'd.)

5. From and after the date that one LPCI subsystem is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding 7 days, unless it is sooner made operable, provided that during such 7 days all active components that affect operability of the operable LPCI subsystem, both Core Spray subsystems, the RHR Service Water subsystem associated with the operable LPCI subsystem, and both diesel generators shall be operable.
6. All recirculation pump discharge valves shall be operable prior to reactor startup (or closed if permitted elsewhere in these specifications).
7. The reactor shall not be started up with the RHR system supplying cooling to the fuel pool.
8. If the requirements of 3.5.A 1,2,3,4,5,6 or 7 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.

B. Residual Heat Removal (RHR) Service Water System

1. Except as specified in 3.5.B.2, 3.5.B.3, and 3.5.F.3 below, both RHR Service Water subsystems 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.

4.5.A. (Cont'd.)

5. When it is determined that a LPCI subsystem is inoperable, the operable LPCI subsystem, both Core Spray subsystems, and the RHR Service Water Subsystem associated with the operable LPCI subsystem shall be verified to be operable immediately and daily thereafter.
6. All recirculation pump discharge valves shall be tested for operability during any period of Reactor cold shutdown exceeding 48 hours, if operability tests have not been performed during the preceding 31 days.

B. Residual Heat Removal (RHR) Service Water System

1. RHR Service Water System testing shall be as follows:

<u>Item</u>	<u>Frequency</u>
a. Pump & Valve Operability	Once/3 months
b. Pump Capacity Test. After pump Each RHR service water booster pump shall deliver 4000 gpm.	maintenance and every 3 months

LIMITING CONDITIONS FOR OPERATION

3.5.B (Cont'd.)

- 2. From and after the date that any RHR Service Water booster pump is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding thirty days, unless such pump is sooner made operable, provided that during such thirty days the remaining active components that affect operability of the RHR Service Water subsystem containing the inoperable pump, and all active components that affect operability of the operable RHR Service Water subsystem are operable.
- 3. From and after the date that one RHR Service Water 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, provided that all active components that affect operability of the operable RHR Service Water subsystem, its associated LPCI subsystem, and its associated diesel generator are operable.
- 4. If the requirements of 3.5.B.1, 3.5.B.2 or 3.5.B.3 cannot be met, an orderly shutdown shall be initiated and the reactor shall be in a cold shutdown condition within 24 hours.

C. HPCI System

- 1. The HPCI System shall be operable whenever there is irradiated fuel in the reactor vessel, reactor pressure is greater than 113 psig, and prior to reactor startup from a Cold Condition, except as specified in 3.5.C.2 and 3.5.C.3 below.

SURVEILLANCE REQUIREMENTS

4.5.B (Cont'd.)

- 2. When it is determined that any RHR Service Water booster pump is inoperable, the remaining active components that affect operability of the RHR Service Water subsystem containing the inoperable pump, and all active components that affect operability of the operable RHR Service Water subsystem shall be verified to be operable immediately and weekly thereafter.
- 3. When one RHR Service Water subsystem becomes inoperable, the operable RHR Service Water subsystem and its associated LPCI subsystem shall be verified to be operable immediately and daily thereafter.

C. HPCI System

- 1. HPCI System testing shall be performed as follows:

<u>Item</u>	<u>Frequency</u>
a. Simulated Automatic Actuation Test	Once/operating Cycle
b. Pump Operability	Once/month
c. Motor Operated Valve Operability	Once/month

3.5 BASES

A. Core Spray and LPCI Subsystems

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

The limiting conditions of operation in Specifications 3.5.A.1 through 3.5.A.8 specify the combinations of operable subsystems to assure the availability of the minimum required cooling systems. During reactor shutdown when the residual heat removal system is realigned from LPCI to the shutdown cooling mode, the LPCI subsystems are considered operable.

The Core Spray System is a low pressure coolant system which is comprised of two, distinct subsystems and designed to provide emergency cooling to the core by spraying in the event of a loss-of-coolant accident. This system functions in combination with the LPCI System to prevent excessive fuel clad temperature.

The LPCI System is an operating mode of the RHR System and is comprised of two, distinct LPCI subsystems. 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 and Core Spray systems 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 this reference, the repair period is found to be slightly greater than 1/2 the test interval. This assumes that the

(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).

3.5.A BASES (cont'd.)

Core Spray subsystems and LPCI subsystems constitute a 1 out of 4 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 is 1 month.

Should one Core Spray subsystem become inoperable, the remaining Core Spray subsystem and the LPCI subsystems are available should the need for core cooling arise. To assure that the remaining Core Spray and LPCI subsystems are available, they are verified to be operable immediately.

Should the loss of one LPCI pump occur, a nearly full complement of core cooling equipment is available. Three LPCI pumps in conjunction with the Core Spray subsystems will perform the core cooling function. Because of the availability of the majority of the core cooling equipment, which will be verified to be operable, a thirty day repair period is justified. If one LPCI subsystem is not available, at least 1 LPCI pump must be available to fulfill the containment cooling function. The 7 day repair period is set on this basis.

B. RHR Service Water System

The RHR Service Water System consists of two, distinct subsystems designed to provide heat removal for the containment cooling function. Each RHR Service Water subsystem contains two RHR Service Water booster pumps serving one side of one of two RHR Heat Exchangers, while two RHR (LPCI) pumps serve the other side. The RHR Service Water System operates in conjunction with the RHR System to provide the containment cooling function.

The design of the RHR Service Water System is predicated upon the use of one RHR Service Water booster pump and one RHR heat exchanger for heat removal after a design basis accident. Thus, there are ample spares for margin above design conditions. Loss of margin should be avoided and the equipment maintained in a state of operation. So a 30 day out-of-service time is chosen for this equipment. If one loop is out-of-service, reactor operation is permissible for seven days. The requirements for availability of the RHR System for support of the containment cooling function are reflected in the associated action statements for the LPCI System.

With components or subsystems out-of-service, overall core and containment cooling reliability is maintained by verifying the operability of the remaining cooling equipment. For routine out-of-service periods caused by preventive maintenance, etc., the operability of other systems and components will be verified as given in the Technical Specifications. However, if a failure, design deficiency, etc., caused the out-of-service period, then a demonstration of operability may be needed 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.

The pump capacity test is a comparison of measured pump performance parameters