4.4 EMERGENCY COOLING

Applicability: Applies to surveillance requirements for the emergency cooling systems.

Objective: To verify the operability of the emergency cooling systems.

Specification: Surveillance of the emergency cooling systems shall be performed as follows:

Item	Frequency
A. Core Spray System	
1. Pump Operability	Once/3 months. Also after major maintenance and prior to startup following a refueling outage.
2. Motor operated valve operability	Once/3 months
3. Automatic actuation test	Every three months
4. Pump compartment water-tight doors closed	Once/week and after each entry
5. Core spray header ΔP instrumentation	
Check	Once/day
Calibrate	Once/3 months
Test	Once/3 months
B. Automatic Depressurization	
1. Valve operability	Once every **24 months***
2. Automatic actuation test	Every refueling outage
C. Containment Cooling System	
1. Pump Operability	Once/3 months. Also after major maintenance and prior to startup following a refueling outage.

*Valve operability shall be demonstrated at system operating pressure prior to exceeding 5 percent power, **following a refueling outage**.

Item	Frequency
C. Containment Cooling System	
2. Motor-operated valve operability	Every 3 months
3. Pump compartment water-tight doors closed	Once/week and after each entry
D. Emergency Service Water System	
1. Pump Operability	Once/3 months. Also after major maintenance and prior to startup following a refueling outage.
E. Control Rod Drive Hydraulic System	
1. Pump Operability	Once/month. Also after major maintenance and prior to startup following a refueling outage.
F. Fire Protection System	
1. Pump Operability	Once/month. Also after major maintenance and prior to startup following a refueling outage.
2. Isolation valve operability	Once/3 months. Also after major maintenance and prior to startup following a refueling outage.

Bases:

It is during major maintenance or repair that a system's design intent may be violated accidentally. Therefore, a functional test is required after every major maintenance operation. During an extended outage, such as a refueling outage, major repair and maintenance may be performed on many systems. To be sure that these repairs on other systems do not encroach unintentionally on critical standby cooling systems, they should be given a functional test prior to startup.

Motor operated pumps, valves and other active devices that are normally on standby should be exercised periodically to make sure that they are free to operate. Motors on pumps should operate long enough to approach equilibrium temperature to ensure there is no overheat problem. Whenever practical, valves should be stroked full length to ensure that nothing impedes their motion. Testing of components per OC Inservice Testing Program in accordance with ASME Section XI once every 3 months provides assurances of the availability of the system. The Control Rod Hydraulic pumps and Fire Protection System pumps are not part of the Inservice Test Program per ASME Section XI and will continue to be tested for operability once per month. Engineering judgment based on experience and availability analyses of the type presented in Appendix L of the FDSAR indicates that testing these components more often than once a month over a long period of time does not significantly improve the system reliability. Also, at this frequency of testing wearout should not be a problem through the life of the plant.

During tests of the electromatic relief valves, steam from the reactor vessel will be discharged directly to the absorption chamber pool. Scheduling the tests in conjunction with the refueling outage permits the tests to be run at low power, prior to 5 percent power, enhancing the safety of the plant by assuring EMRV operability before higher power levels are reached.

The control rod drive hydraulic system is normally in operation, thereby providing continuous indication of system operability. A check of flow rate and operability can be made during normal operation.

the valve or its associated actuator by cycling the valve through at least one complete cycle of full travel and verifying the isolation time limit is met. Following maintenance, repair or replacement work on the control or power circuit for the valves, the affected component shall be tested to assure it will perform its intended function in the circuit.

3. Quarterly, during periods of sustained POWER OPERATION, each main steam isolation valve shall be closed (one at a time) and its closure time verified to be within the limits of Specification 4.5.F.1 above. Such testing shall be conducted with reactor power not greater than 50% of rated power.

4. Reactor Building to Suppression Chamber Vacuum Breakers

   a. The reactor building to suppression chamber vacuum breakers and associated instrumentation, including setpoint, shall be checked for proper operation every three months.

   b. During each REFUELING OUTAGE, each vacuum breaker shall be tested to determine that the force required to open the vacuum breaker from closed to fully open does not exceed the force specified in Specification 3.5.A.4.a. The air-operated vacuum breaker instrumentation shall be calibrated during each REFUELING OUTAGE.

5. Pressure Suppression Chamber - Drywell Vacuum Breakers

   a. Periodic OPERABILITY Tests

      Once every 3 months and following any release of energy which would tend to increase pressure to the suppression chamber, each OPERABLE suppression chamber - drywell vacuum breaker shall be exercised. Operation of position switches, indicators and alarms shall be verified every 3 months by operation of each OPERABLE vacuum breaker.

   b. REFUELING OUTAGE Tests

      (1) All suppression chamber - drywell vacuum breakers shall be tested to determine the force required to open each valve from fully closed to fully open.

      (2) The suppression chamber - drywell vacuum breaker position indication and alarm systems shall be calibrated and functionally tested.

Surveillance of the suppression chamber-reactor building vacuum breakers consists of OPERABILITY checks and leakage tests (conducted as part of the containment leak-tightness tests). These vacuum breakers are normally in the closed position and open only during tests or an accident condition. As a result, a testing frequency of three months for OPERABILITY is considered justified for this equipment. Inspections and calibrations are performed during the REFUELING OUTAGEs, this frequency being based on equipment quality, experience, and engineering judgement.

The 14 suppression chamber-drywell vacuum relief valves are designed to open to the full open position (the position that curtain area is equivalent to valve bore) with a force equivalent to a 0.5 psi differential acting on the suppression chamber face of the valve disk. This opening specification assures that the design limit of 2.0 psid between the drywell and external environment is not exceeded. Once each REFUELING OUTAGE, each valve is tested to assure that it will open fully in response to a force less than that specified. Also, it is inspected to assure that it closes freely and operates properly.

The containment design has been examined to establish the allowable bypass area between the drywell and suppression chamber as 10.5 in^2 (expressed as vacuum breaker open area). This is equivalent to one vacuum breaker disk off its seat 0.371 inch; this length corresponds to an angular displacement of 1.25°. A conservative allowance of 0.10 inch has been selected as the maximum permissible valve opening. Valve closure within this limit may be determined by light indication from two independent position detection and indication systems. Either system provides a control room alarm for a non-seated valve.

At the end of each refueling cycle, a leak rate test shall be performed to verify that significant leakage flow paths do not exist between the drywell and suppression chamber. The drywell pressure will be increased by at least 1 psi with respect to the suppression chamber pressure. The pressure transient (if any) will be monitored with a sensitive pressure gauge. If the drywell pressure cannot be increased by 1 psi over the suppression chamber pressure it would be because a significant leakage path exists; in this event, the leakage source will be identified and eliminated before POWER OPERATION is resumed. If the drywell pressure can be increased by 1 psi over the suppression chamber, the rate of change of the suppression chamber pressure must not exceed a rate equivalent to the rate of air flow from the drywell to the suppression chamber through a 2-inch orifice. In the event the rate of change of pressure exceeds this value, then the source of leakage will be identified and eliminated before POWER OPERATION is resumed.

The drywell suppression chamber vacuum breakers are exercised every 3 months and immediately following termination of discharge of steam into the suppression chamber. This monitoring