LIMITING CONDITIONS FOR OPERATION

3.5.C HPCI Subsystem (cont'd.)

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.

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

SURVEILLANCE REQUIREMENTS

4.5.C HPCI Subsystem (cont'd.)

Item	Frequency
(b) Pump Operability	Once/month
(c) Motor Operated Valve Operability	Once/month
(d) Flow Rate at approximately 1030 psig Reactor Steam Pressure	Once/3 months
(e) Verify, with reactor pressure ≤175 psig, the HPCI pump can develop a flow rate ≥5000 gpm against a system head correspoding to reactor pressure.*	Once/operating cycle

The HPCI pump shall deliver at least 5000 gpm for a system head corresponding to a reactor pressure of approximately 1030 to 150 psig.

2. DELETED

* Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test.

LIMITING CONDITIONS FOR OPERATION

3.5.C HPCI Subsystem (cont'd.)

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.

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

SURVEILLANCE REQUIREMENTS

4.5.C HPCI Subsystem (cont'd.)

Item	Frequency
(b) Pump Operability	Once/month
(c) Motor Operated Valve Operability	Once/month
(d) Flow Rate at approximately 1000 psig Reactor Steam Pressure	Once/3 months
(e) Verify, with reactor pressure ≤175 psig, the HPCI pump can develop a flow rate ≥5000 gpm against a system head correspod-ing to reactor pressure.*	Once/operating cycle

The HPCI pump shall deliver at least 5000 gpm for a system head corresponding to a reactor pressure of 1000 to 150 psig.

2. DELETED

* Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test.

4.5 BASES

Core and Containment Cooling Systems Surveillance Frequencies

The performance of individual emergency core cooling systems (HPCI, LPCI, Core Spray and ADS) and the integrated performance of the emergency core cooling systems are described in analyses referenced in Section 6.5 of the Updated Final Safety Analysis Report. Periodic surveillance of pumps and valves is performed in accordance with ASME Code, Section XI, to the extent described in the Inservice Testing Plan, to verify that the systems will provide the flow rates required by the respective analyses. HPCI and RCIC flow tests are performed at two pressures so that the systems' capability to provide rated flow over their operating range is verified. Reactor steam pressure must be ≤1030 and ≥920 psig to perform the high pressure test and greater than or equal to the Electro-Hydraulic Control (EHC) System minimum pressure set with the EHC System controlling pressure (EHC System begins controlling pressure at a nominal 150 psig) and ≤175 psig to perform TS 4.5.C.1.e. To avoid damaging Core Spray system valves during Core Spray pump flow testing, throttling is not normally performed to obtain a system head corresponding to a reactor pressure of ≥105 psig. Pump curves are used to determine equivalent values for flow rate and test pressure for the Core Spray pumps in order to meet the Surveillance Requirements. HPSW flow tests verify that rated flow can be delivered to the RHR heat exchangers.

The testing interval for the core and containment cooling systems is based on industry practice, sound engineering 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 frequent tests of the pumps and injection valves is deemed to be adequate testing of these systems.

The flow path piping of the emergency core cooling systems (ECCS) has the potential to develop voids and pockets of entrained air. Maintaining the pump discharge lines of the HPCI system, Core Spray system, and LPCI subsystems full of water ensures that the ECCS will perform properly, injecting its full capacity into the reactor pressure vessel upon demand. This will also prevent a water hammer following an ECCS initiation signal. One acceptable method of ensuring that the lines are full is to vent at the high points. An acceptable method of ensuring the LPCI and Core Spray system discharge lines are full is to verify the absence of the associated "keep fill" system accumulator alarms.

While the reactor is in the Cold Condition one low pressure ECCS subsystem can maintain adequate reactor vessel water level. To provide redundancy, a minimum of two low pressure ECCS subsystems are required to be OPERABLE with the reactor in the Cold Condition.

4.5 BASES

Core and Containment Cooling Systems Surveillance Frequencies

The performance of individual emergency core cooling systems (HPCI, LPCI, Core Spray and ADS) and the integrated performance of the emergency core cooling systems are described in analyses referenced in Section 6.5 of the Updated Final Safety Analysis Report. Periodic surveillance of pumps and valves is performed in accordance with ASME Code, Section XI, to the extent described in the Inservice Testing Plan, to verify that the systems will provide the flow rates required by the respective analyses. HPCI and RCIC flow tests are performed at two pressures so that the systems' capability to provide rated flow over their operating range is verified. Reactor steam pressure must be ≤1030 and ≥920 psig to perform the high pressure test and greater than or equal to the Electro-Hydraulic Control (EHC) System minimum pressure set with the EHC System controlling pressure (EHC System begins controlling pressure at a nominal 150 psig) and ≤175 psig to perform TS 4.5.C.1.e. To avoid damaging Core Spray system valves during Core Spray pump flow testing, throttling is not normally performed to obtain a system head corresponding to a reactor pressure of ≥105 psig. Pump curves are used to determine equivalent values for flow rate and test pressure for the Core Spray pumps in order to meet the Surveillance Requirements. HPSW flow tests verify that rated flow can be delivered to the RHR heat exchangers.

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While the reactor is in the Cold Condition one low pressure ECCS subsystem can maintain adequate reactor vessel water level. To provide redundancy, a minimum of two low pressure ECCS subsystems are required to be OPERABLE with the reactor in the Cold Condition.