ENCLOSURE 4

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2
NRC DOCKET NOS. 50-325 & 50-324
OPERATING LICENSE NOS. DPR-71 & DPR-62
REQUEST FOR LICENSE AMENDMENT
HIGH PRESSURE COOLANT INJECTION SYSTEM

TECHNICAL SPECIFICATION PAGES - UNIT 1

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3/4.5 EMERGENCY CORE COOLING SYSTEMS

3/4.5.1 HIGH PRESSURE COOLANT INJECTION SYSTEM

LIMITING CONDITION FOR OPERATION

3.5.1 The High Pressure Coolant Injection (HPCI) system shall be OPERABLE with:

a. One OPERABLE high pressure coolant injection pump, and

b. An OPERABLE flow path capable of taking suction from the suppression pool and transferring the water to the pressure vessel.

APPLICABILITY: CONDITIONS 1, 2, and 3 with reactor vessel steam dome pressure greater than 150 psig.

ACTION:

a. With the HPCI system inoperable, POWER OPERATION may continue provided the ADS, CSS, and LPCI systems are OPERABLE; restore the inoperable HPCI system to OPERABLE status within 14 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. With the surveillance requirements of Specification 4.5.1 not performed at the required frequencies due to low reactor steam pressure, the provisions of Specification 4.0.4 are not applicable provided the appropriate surveillance is performed within 48 hours after reactor steam pressure is adequate to perform the tests.

SURVEILLANCE REQUIREMENTS

4.5.1 The HPCI shall be demonstrated OPERABLE:

a. At least once per 31 days by:

1. Verifying that the system piping from the pump discharge valve to the system isolation valve is filled with water.

3/4.5.1 HIGH PRESSURE COOLANT INJECTION SYSTEM

BACKGROUND:

The High Pressure Coolant Injection (HPCI) system consists of a steam driven turbine-pump unit, piping and valves to provide steam to the turbine, and piping and valves to transfer water from the suction source to the core via the feedwater system line where the coolant is distributed within the reactor vessel through the feedwater sparger. Suction piping for the system is provided from the condensate storage tank (CST) and the suppression pool. Pump suction for the HPCI system is normally aligned to the CST source to minimize injection of suppression pool water into the reactor vessel. However, if the CST water supply is low or if the suppression pool level is high, an automatic transfer to the suppression pool water source assures a water supply for continuous operation of the HPCI system. The steam supply to the HPCI system turbine is piped from the main steam line upstream of the associated inboard main steam line isolation valve.

The HPCI system is designed to provide core cooling at reactor pressures between 1120 psig and 150 psig. Upon receipt of an initiation signal, the HPCI system turbine stop valves and turbine control valves open simultaneously and the turbine accelerates to a specified speed. As the HPCI system flow increases, the turbine governor valve is automatically adjusted to maintain design flow. Exhaust steam from the HPCI system turbine is discharged to the suppression pool. A full flow test line is provided to route water from and to the CST to allow testing of the HPCI system during normal operation without injecting water into the reactor vessel.

The High Pressure Coolant Injection (HPCI) system is provided to assure that the reactor core is adequately cooled to limit fuel cladding 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 HPCI system permits the reactor to be shut down while maintaining sufficient reactor vessel water level inventory until the vessel is depressurized. The HPCI system continues to operate until reactor pressure is below the pressure at which Low Pressure Coolant Injection (LPCI) system operation or Core Spray system operation maintains core cooling.

APPLICABILITY:

The HPCI system is required to be OPERABLE during OPERATIONAL CONDITIONS 1, 2, and 3 when there is considerable energy in the reactor core and core cooling would be required to prevent fuel damage in the event of a break in the primary system piping. In OPERATIONAL CONDITIONS 1, 2, and 3 when reactor steam dome pressure is less than or equal to 150 psig, the HPCI system is not required to be OPERABLE because the low pressure ECCS systems can provide sufficient flow below this pressure.

3/4.5.1 HIGH PRESSURE COOLANT INJECTION SYSTEM (Continued)

ACTIONS:

With the HPCI system inoperable, adequate core cooling is assured by the demonstrated operability of the redundant and diversified Automatic Depressurization system and the low pressure cooling systems. In addition, the Reactor Core Isolation Cooling (RCIC) system, a system for which no credit is taken in the safety analysis, will automatically provide makeup at reactor pressures on a reactor low water level condition. The out-of-service period of 14 days is based on the demonstrated operability of redundant and diversified low pressure core cooling systems.

SURVEILLANCE REQUIREMENTS:

The surveillance requirements provide adequate assurance that the HPCI system will be OPERABLE when required. Although all active components are testable and full flow can be demonstrated by recirculation during reactor operation, a complete functional test requires reactor shutdown. The pump discharge piping is maintained full to prevent water hammer damage and to provide cooling at the earliest moment.

REFERENCES:

1. Brunswick Steam Electric Plant Updated FSAR, Section 6.3.2.2.1.

2. Brunswick Steam Electric Plant Updated FSAR, Section 15.1.3.

3. Brunswick Steam Electric Plant Updated FSAR, Section 15.2.5.

4. Brunswick Steam Electric Plant Updated FSAR, Section 15.2.6.

5. Brunswick Steam Electric Plant Updated FSAR, Section 15.5.2.

3/4.5.2 AUTOMATIC DEPRESSURIZATION SYSTEM (ADS)

Upon failure of the HPCIS to function properly after a small break loss-of-coolant accident, the ADS automatically causes the safety-relief valves to open, depressurizing the reactor so that flow from the low pressure cooling system can enter the core in time to limit fuel cladding temperature to less than 2200°F. ADS is conservatively required to be OPERABLE whenever reactor vessel pressure exceeds 113 psig even though low pressure cooling systems provide adequate core cooling up to 150 psig.

ENCLOSURE 5

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2
NRC DOCKET NOS. 50-325 & 50-324
OPERATING LICENSE NOS. DPR-71 & DPR-62
REQUEST FOR LICENSE AMENDMENT
HIGH PRESSURE COOLANT INJECTION SYSTEM

TECHNICAL SPECIFICATION PAGES - UNIT 2

3/4.5 EMERGENCY CORE COOLING SYSTEMS

3/4.5.1 HIGH PRESSURE COOLANT INJECTION SYSTEM

LIMITING CONDITION FOR OPERATION

3.5.1 The High Pressure Coolant Injection (HPCI) system shall be OPERABLE with:

a. One OPERABLE high pressure coolant injection pump, and

b. An OPERABLE flow path capable of taking suction from the suppression pool and transferring the water to the pressure vessel.

APPLICABILITY: CONDITIONS 1, 2, and 3 with reactor vessel steam dome pressure greater than 150 psig.

ACTION:

a. With the HPCI system inoperable, POWER OPERATION may continue provided the ADS, CSS, and LPCI systems are OPERABLE; restore the inoperable HPCI system to OPERABLE status within 14 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. With the surveillance requirements of Specification 4.5.1 not performed at the required frequencies due to low reactor steam pressure, the provisions of Specification 4.0.4 are not applicable provided the appropriate surveillance is performed within 48 hours after reactor steam pressure is adequate to perform the tests.

SURVEILLANCE REQUIREMENTS

4.5.1 The HPCI shall be demonstrated OPERABLE:

a. At least once per 31 days by:

1. Verifying that the system piping from the pump discharge valve to the system isolation valve is filled with water.

3/4.5 EMERGENCY CORE COOLING SYSTEM

BASES

3/4.5.1 HIGH PRESSURE COOLANT INJECTION SYSTEM

BACKGROUND:

The High Pressure Coolant Injection (HPCI) system consists of a steam driven turbine-pump unit, piping and valves to provide steam to the turbine, and piping and valves to transfer water from the suction source to the core via the feedwater system line where the coolant is distributed within the reactor vessel through the feedwater sparger. Suction piping for the system is provided from the condensate storage tank (CST) and the suppression pool. Pump suction for the HPCI system is normally aligned to the CST source to minimize injection of suppression pool water into the reactor vessel. However, if the CST water supply is low or if the suppression pool level is high, an automatic transfer to the suppression pool water source assures a water supply for continuous operation of the HPCI system. The steam supply to the HPCI system turbine is piped from the main steam line upstream of the associated inboard main steam line isolation valve.

The HPCI system is designed to provide core cooling at reactor pressures between 1120 psig and 150 psig. Upon receipt of an initiation signal, the HPCI system turbine stop valves and turbine control valves open simultaneously and the turbine accelerates to a specified speed. As the HPCI system flow increases, the turbine governor valve is automatically adjusted to maintain design flow. Exhaust steam from the HPCI system turbine is discharged to the suppression pool. A full flow test line is provided to route water from and to the CST to allow testing of the HPCI system during normal operation without injecting water into the reactor vessel.

The High Pressure Coolant Injection (HPCI) system is provided to assure that the reactor core is adequately cooled to limit fuel cladding 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 HPCI system permits the reactor to be shut down while maintaining sufficient reactor vessel water level inventory until the vessel is depressurized. The HPCI system continues to operate until reactor pressure is below the pressure at which Low Pressure Coolant Injection (LPCI) system operation or Core Spray system operation maintains core cooling.

APPLICABILITY:

The HPCI system is required to be OPERABLE during OPERATIONAL CONDITIONS 1, 2, and 3 when there is considerable energy in the reactor core and core cooling would be required to prevent fuel damage in the event of a break in the primary system piping. In OPERATIONAL CONDITIONS 1, 2, and 3 when reactor steam dome pressure is less than or equal to 150 psig, the HPCI system is not required to be OPERABLE because the low pressure ECCS systems can provide sufficient flow below this pressure.

3/4.5.1 HIGH PRESSURE COOLANT INJECTION SYSTEM (Continued)

ACTIONS:

With the HPCI system inoperable, adequate core cooling is assured by the demonstrated operability of the redundant and diversified Automatic Depressurization system and the low pressure cooling systems. In addition, the Reactor Core Isolation Cooling (RCIC) system, a system for which no credit is taken in the safety analysis, will automatically provide makeup at reactor pressures on a reactor low water level condition. The out-of-service period of 14 days is based on the demonstrated operability of redundant and diversified low pressure core cooling systems.

SURVEILLANCE REQUIREMENTS:

The surveillance requirements provide adequate assurance that the HPCI system will be OPERABLE when required. Although all active components are testable and full flow can be demonstrated by recirculation during reactor operation, a complete functional test requires reactor shutdown. The pump discharge piping is maintained full to prevent water hammer damage and to provide cooling at the earliest moment.

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5. Brunswick Steam Electric Plant Updated FSAR, Section 15.5.2.

3/4.5.2 AUTOMATIC DEPRESSURIZATION SYSTEM (ADS)

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