2.11.24 Alternate Feedwater Injection System

Design Description

The alternate feedwater injection system (AFI) is a nonsafety-related system that provides makeup water to the reactor vessel in the event that all normal and emergency core cooling systems are unavailable. The system consists of a pump, piping, and valves and is protected from damage due to beyond design basis events. The system takes suction from a water source and injects into the non-safety-related portion of the CUW system, which in turn flows into the feedwater system. System capacity and flow rate are sized to provide sufficient makeup, which provides core cooling for a 24-hour period following scram from 100% power.

The AFI system is housed in a non-seismic AFI Pump House, which is located remotely from the Reactor Building, Control Building, and Turbine Building. The power supply and the water source for the AFI are also located remotely from those buildings. The system is manually operated and has no automatic controls. The AFI Pump House contains instrumentation to provide information to the operator on reactor vessel water level, reactor pressure, wetwell pressure, and suppression pool water level.

Inspections, Tests, Analyses and Acceptance Criteria

Table 2.11.24 provides a definition of the inspections, tests, and/or analyses, together with associated acceptance criteria, which will be undertaken for the AFI system.

Table 2.11.24 Alternate Feedwater Injection System

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
1. The basic configuration of the AFI system is as described in Section 2.11.24.	1. Inspections of the as-built AFI system are conducted.	1. The as-built AFI system configuration conforms with the description in Section 2.11.24.
2. The AFI pump is capable of injecting ≥800 gpm into the RPV at the lowest SRV safety lift pressure.	2. (a) Tests are conducted on the as-built AFI system. (b) Analyses are performed to convert the test results to the conditions of the Design Commitment.	2. The converted flow satisfies the following: the AFI pump is capable of injecting ≥800 gpm into the RPV at the lowest SRV safety lift pressure.

Table 2.11.24 Alternate Feedwater Injection System		
Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
3. The AFI system water supply has a minimum capacity of 300,000 gallons and is refillable.	3. Inspections of the as-built AFI system water supply are conducted.	3. The as-built AFI system water supply has a minimum capacity of 300,000 gallons and is refillable.
4. The AFI Pump House is located a minimum of 300 feet from the nearest outside wall of each of the Reactor Building, Control Building, and Turbine Building.	4. Inspections of the as-built AFI Pump House are conducted.	4. The as-built AFI Pump House is located a minimum of 300 feet from the nearest outside wall of each of the Reactor Building, Control Building, and Turbine Building.
5 The AFI water supply is located a minimum of 300 feet from the nearest outside wall of each of the Reactor Building, Control Building, and Turbine Building.	5. Inspections of the as-built AFI water supply are conducted.	5. The as-built AFI water supply is located a minimum of 300 feet from the nearest outside wall of each of the Reactor Building, Control Building, and Turbine Building.
6. The AFI power supply is located a minimum of 300 feet from the nearest outside wall of each of the Reactor Building, Control Building, and Turbine Building.	6. Inspections of the as-built AFI power supply are conducted.	6. The as-built AFI power supply is located a minimum of 300 feet from the nearest outside wall of each of the Reactor Building, Control Building, and Turbine Building.
7. Barriers exist, which qualify as intervening structures as defined by NEI 07-13, Rev. 7, between the AFI Pump House and each of the Reactor Building, Control Building, and Turbine Building.	7. Inspections of the as-built AFI Pump House are conducted.	7. Barriers exist, which qualify as intervening structures as defined by NEI 07-13, Rev. 7, between the as-built AFI Pump House and each of the Reactor Building, Control Building, and Turbine Building.

Table 2.11.24 Alternate Feedwater Injection System		
Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
8. Barriers exist, which qualify as intervening structures as defined by NEI 07-13, Rev. 7, between the AFI water supply and each of the Reactor Building, Control Building, and Turbine Building.	8. Inspections of the as-built AFI water supply are conducted.	8. Barriers exist, which qualify as intervening structures as defined by NEI 07-13, Rev. 7, between the as-built AFI water supply and each of the Reactor Building, Control Building, and Turbine Building.
9. Barriers exist, which qualify as intervening structures as defined by NEI 07-13, Rev. 7, between the AFI power supply and its auxiliaries and each of the Reactor Building, Control Building, and Turbine Building.	9. Inspections of the as-built AFI power supply/supplies are conducted.	9. Barriers exist, which qualify as intervening structures as defined by NEI 07-13, Rev. 7, between the as-built AFI power supply and its auxiliaries and each of the Reactor Building, Control Building, and Turbine Building.
10. Instrumentation exists to provide information to the operator in the AFI Pump House for reactor vessel water level, reactor pressure, suppression pool water level, and wetwell pressure.	10. Inspections of the as-built instrumentation are conducted.	10. Instrumentation exists to provide information to the operator in the AFI Pump House for reactor vessel water level, reactor pressure, suppression pool water level, and wetwell pressure.
11. MOVs in the AFI system injection line operate as designed on a manual initiation signal.	11. Tests are conducted on the as-built AFI system.	11. MOVs in the AFI system injection line operate as designed on a manual initiation signal.

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Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
12. An AFI instrumentation device which is physically attached to instrumentation piping satisfies the same requirements (safety class, quality group, and seismic category) as the instrumentation piping to which it is attached.	12. Inspections of the as-built instrumentation and related instrumentation piping are conducted.	12. An AFI instrumentation device which is physically attached to instrumentation piping for the as-built system satisfies the same requirements (safety class, quality group, and seismic category) as the instrumentation piping to which it is attached.