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3.6.4 Containment Purge Supply and Exhaust Isolation Valves

The Containment Purge Supply and Exhaust Isolation Valves (V12-6, V12-7, V12-8, and V12-9) shall be capable of shutting in 2 seconds. If any valve is not capable of shutting in that time, the valve will be declared inoperable and the action statements of 3.6.3 shall be followed.

Basis

The Reactor Coolant System conditions of cold shutdown assure that no steam will be found and hence there would be no pressure buildup in the containment if the Reactor Coolant System ruptures.

The shutdown margins are selected based on the type of activities that are being carried out. The 10% $\Delta k/k$ shutdown margin during refueling precludes criticality, even though fuel is being moved. When the reactor head is not to be removed, the specified cold shutdown margin of 1% $\Delta k/k$ precludes criticality.

Regarding internal pressure limitations, the containment design pressure of 42 psig would not be exceeded if the internal pressure before a major loss-of-coolant accident were as much as 2 psig.⁽¹⁾ The containment is designed to withstand an internal vacuum of 2.0 psig.⁽²⁾

The Containment Purge Supply and Exhaust Isolation Valves may be opened during plant operation when needed for safety related considerations (equipment or personnel) to support plant operations and maintenance activities within the containment vessel. Examples of this need may include the reducing of airborne activity to increase stay-time or eliminate the need for respiratory protective equipment, or reduce ambient temperature during hot months to increase effectiveness of workers and to minimize occupational effects of necessary, non-routine activities in the containment. Although the valves are fully qualified to close under design basis accident conditions, it is intended that the time the valves remain open will be limited.

The Containment Purge Valves must be operable and must close within the specified time limit to limit post LOCA thyroid dose and to limit the increase in peak clad temperature due to reduction in containment internal pressure.

References

- (1) FSAR Section 6.2.1
- (2) FSAR Section 3.8.1.3

- c. Notification of the pending test, either of a sample tendon or the containment structural test, along with detailed acceptance criteria shall be forwarded to the Nuclear Regulatory Commission two months prior to the actual test. Within six months of conducting the test, a report and evaluation shall be submitted to the NRC.

4.4.5 Containment Purge Supply and Exhaust Isolation Valves

The Containment Purge Supply and Exhaust Isolation Valves (V12-10, V12-11, V12-12, and V12-13) shall be tested at each refueling to determine their capability to shut within the time limit specified in Specification 3.6.4.

Basis

The containment is designed for an accident pressure of 42 psig.⁽¹⁾ While the reactor is operating, the internal environment of the containment will be air at approximately atmospheric pressure and a maximum temperature of 120°F. With these initial conditions, the temperature of the steam-air mixture at the peak accident pressure of 42 psig is 263°F.

Prior to initial operation, the containment was strength tested at 48.3 psig and then was leak-tested. The acceptance criterion for this preoperational leakage rate test was established at 0.08 weight percent of the contained air per 24 hours at 42 psig. This acceptable leakage rate was equivalent to a 0.1 weight percent of the contained steam-air atmosphere per 24 hours at 42 psig and 263°F. The acceptance criteria for Integrated Leakage Rate Tests (ILRTs) is now established as 0.1 weight percent of the contained air per 24 hours at 42 psig. This value is reduced to 0.075 weight percent of the contained air per 24 hours per Section 4.4.1.1.f.(3) to provide added conservatism to the test results. The leakage rate at 42 psig must not exceed this reduced value. These leakage rates are consistent with the construction of the containment,⁽²⁾ which is equipped with a penetration pressurization system

which pressurizes penetrations, double gasketed seals, and some isolation valve spaces. The channels over all of the containment liner welds were independently leak-tested during construction.

The safety analysis has been performed on the basis of a leakage rate of 0.10% per 24 hours at 42 psig and 263°F. With this leakage rate and with minimum containment engineered safety features operating, the public exposure would not exceed 10 CFR 100 guideline values in the event of the design basis accident.⁽³⁾