C. Containment Purge Supply and Exhaust Valves

The containment purge supply and exhaust valves shall be closed and may not be opened unless the reactor is in the cold shutdown or refueling shutdown condition.

Basis:

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

The shutdown conditions of the reactor are selected based on the type of activities that are being carried out. When the reactor head is not to be removed, the specified cold shutdown margin of 1% $\Delta K/K$ precludes criticality under any occurance. During refueling the reactor is subcritical by 10% $\Delta K/K$. This precludes criticality under any circumstances even though fuel is being moved or control rods withdrawn. Positive reactivity addition by rod motion from an initial 10% $\Delta K/K$ subcritical reactor condition precludes criticality because the reactor would be substantially subcritical even if all control rods were completely withdrawn. Positive reactivity changes by boron dilution may be required or small fluctuations may occur during preparation for, recovery from, or during refueling but maintaining the boron concentration greater than 1800 ppm precludes criticality under any circumstances. Should continuous dilution occur, the time intervals for this incident are discussed in Section 14.1.5 of the PFDSAR.

Regarding internal pressure limitations, the containment design pressure of 60 psig would not be exceeded if the internal pressure before a major loss-of-coolant accident were as much as 6 psig.[1] The containment is designed to withstand an internal vacuum of 2.0 psig.[2]

The containment purge supply and exhaust valves are required to be closed during plant operations since these valves have not been demonstrated capable of closing from the full open position during a design basis loss-of-coolant accident. Maintaining these valves closed during plant operation ensures that excessive quantities of radioactive materials will not be released via the containment purge system in the event of a design basis loss of coolant accident.

References

(1) FSAR - Section 14.3.4

(2) FSAR - Section 5.5.2

E. In addition to the preceding requirements, temperature readings will be obtained at the locations where inward deformations were measured. Temperature measurements will also be obtained on the outside of the containment building wall.

X. LEAKAGE TEST OF CONTAINMENT PURGE SUPPLY AND EXHAUST VALVES

The containment purge supply and exhaust valves shall be demonstrated to be leak tight at intervals not to exceed 6 months. Valve operability shall be determined by verifying that when the measured leakage rate is added to the leakage rates last determined pursuant to Specifications 15.4.4.II and 15.4.4.III for other penetrations and isolation valves, the combined leakage rate, is less than or equal to 0.60 La. The leakage rate for the containment purge supply and exhaust valves shall be compared to the previously measured leakage rate to detect excessive valve degradation.

Basis

The containment is designed for an accident pressure of 60 psig.[1] While the reactor is operating, the internal environment of the containment will be air at approximately atmospheric pressure and a temperature of about 105°F. With these initial conditions, the temperature of the steam-air mixture at the peak accident pressure of 60 psig is 286°F.

Prior to initial operation, the containment will be strength tested at 60 psig and then will be leak-tested. The design objective of this pre-operational leakage rate test has been established as 0.4% by weight per 24 hours at 60 psig. This leakage rate is consistent with the construction of the containment,[2] which is equipped with independent leak-testable penentrations and contains channels over all containment liner welds, which were independently leak-tested during construction.

limits during the intervals between integrated leakage rate tests. The allowable value of 0.50 L_p has been reduced 10% to allow for possible deterioration in the intervals between tests.

The limiting leakage rates from the Residual Heat Removal System are judgment values based primarily on assuring that the components could operate without mechanical failure for a period on the order of 200 days after a Design Basis Accident. The test pressure (350 psig) achieved either by normal system operation or by hydrostatically testing, gives an adequate margin over the highest pressure within the system after a design basis accident. Similarly, the pressure test for the return lines from the containment to the Residual Heat Removal System (60 psig) is equivalent to the design pressure of the containment. A Residual Heat Removal System leakage of 2 gal/hr will limit off-site exposures due to leakage to insignificant levels relative to those calculated for leakage directly from the containment in the Design Basis Accident. The dose calculated as a result of this leakage is 7.7 mr for a 2 hour exposure at the site boundary.(5)

Periodic visual inspection is the method to be used to determine loss of load-carrying capability because of wire breakage. The pre-stress lift-off test provides a direct measure of the load-carrying capability of the tendon. A deterioration of the corrosion preventive properties of the sheathing filler will be indicated by a change in the physical appearance of the filler. If the surveillance program indicated, by extensive wire breakage or tendon stress relation, that the pre-stressing tendons are not behaving as expected, the situation will be evaluated immediately. The specified acceptance criteria are such as to alert attention to the situation well before the tendon load-carrying capability would deteriorate to a point that failure during a design basis accident might be possible. Thus, the cause of the incipient deterioration could be evaluated and corrective action studied without need to shut down the reactor.

The purpose of the leakage tests of the isolation valves in the containment purge supply and exhaust lines is to identify excessive degradation of the resilient seats for these valves. With the exception of the test frequency and acceptance criteria, leakage tests of the containment purge supply and exhaust valves shall be conducted in accordance with 15.4.4.III.

References

(1) FSAR Section 5.1.2.3

(2) FSAR Section 5.1.?

(30 FSAR Section 14.3.5

(4) FSAR Section 14.3.4

(5) FSAR Section 6.2.3