detection tests. Sufficient data and analysis shall be included to show that a stabilized leak rate was attained and to identify all significant required correction factors such as those associated with humidity and barometric pressure, and all significant errors such as those associated with instrumentation sensitivities and data scatter. This report shall be titled "Reactor Containment Building Integrated Leak Rate Test" and shall be submitted to the NRC within 3 months of the test.

4.4.1.2 Local Leakage Rate Tests

4.4.1.2.1 Scope of Testing

Local Leakage Rate tests of penetrations and valves identified in the FSAR shall be performed in accordance with 10CFR 50 Appendix J except as provided in 4.4.1.2.5.f.

4.4.1.2.2 Conduct of Tests

a. Local leak rate tests shall be performed pneumatically at a pressure of not less than P_a, with the following exception: The access hatch door seal test shall normally be performed at 10 psig and the test every six months specified in 4.4.1.2.5.b shall be performed at a pressure not less than P_a.

b. Acceptable methods of testing are halogen gas detection, pressure decay, pneumatic flow measurement, or equivalent.

c. The pressure for a valve test shall be applied in the same direction as that when the valve would be required to perform its safety function unless it can be determined that the direction will provide equivalent or more conservative results.

d. Valves to be tested shall be closed by normal operation and without any preliminary exercising or adjustments.

4.4.1.2.3 Acceptance Criteria

The combined leakage from all penetrations and valves subject to Local Leak Rate tests shall not exceed .6 L_a (the maximum allowable leakage rate at P_a).

4.4.1.2.4 Corrective Action and Retest

a. If at any time it is determined that the criterion of 4.4.1.2.3 above is exceeded, repairs shall be initiated immediately.

b. If conformance to the criterion of 4.4.1.2.3 is not demonstrated within 48 hours following detection of excessive local leakage, the reactor shall be shutdown and depressurized until repairs are effected and the local leakage meets the acceptance criterion as demonstrated by retest.

4.4.1.2.5 Test Frequency

Local leak detection tests shall be performed at a frequency as required by 10CFR 50 Appendix J, except that:

a. The equipment hatch and fuel transfer tube seals shall be tested every other refueling period but in no case at intervals greater than 3 years. If they are opened they will be tested after being closed.

b. The entire personnel and emergency airlocks shall be tested once every six months. When the airlocks are opened during the interim between six month tests, the airlock door resilient seals shall be tested within 72 hours of the first of each of a series of openings. This requirement exists whenever containment integrity is required.

c. The reactor building purge isolation valves shall be leak tested per 10CFR 50, Appendix J, Item III.D.3.

d. An interspace pressurization test (See T.S. 4.4.1.7.1) shall be performed for reactor building purge isolation valves every 3 months. This requirement is not in effect during cold shutdown.

e. Deleted.

f. Where an exemption from the frequency specified by 10CFR 50 Appendix J has been granted by the NRC, the frequency specified by the exemption shall apply.

4.4.1.3 Isolation Valve Functional Tests

Every three months, remotely operated reactor building isolation valves shall be stroked to the position required to fulfill their safety function unless such operation is not practical during plant operation. The valves not stroked every three months shall be stroked during each refueling period.

4.4.1.4 Annual Inspection

A visual examination of the accessible interior and exterior surfaces of the containment structure and its components shall be performed annually and prior to any integrated leak test to uncover any evidence of deterioration which may affect either the containment's structural integrity or leak-tightness. The discovery of any significant deterioration shall be accompanied by corrective actions in accord with acceptable procedures, nondestructive tests, and inspections, and local testing where practical, prior to the conduct of any integrated leak test. Such repairs shall be reported as part of the test results.

4.4.1.5 Reactor Building Modifications

Any major modification or replacement of components affecting the reactor building integrity shall be followed by either an integrated leak rate test or a local leak test, as appropriate, and shall meet the acceptance criteria of 4.4.1.1.6 and 4.4.1.2.3, respectively.

4.4.1.6 Operability of Access Hatch Interlocks

1. At least once per six months the operability of the personnel and emergency hatch door interlocks and the associated control room annunciator circuits shall be determined. If the interlock permits both doors to be open at the same time or does not provide accurate status indication in the control room the interlock shall be declared inoperable.

2. During periods when containment integrity is required and an interlock is inoperable, each entry and exit via that airlock shall be locally supervised by a member of the unit operating maintenance or technical staffs, to assure that only one door is open at any time and that both doors are properly closed following use. A record of supervision and verification of closure shall be maintained during periods of interlock inoperability in an appropriate station log.

3. If an interlock is inoperable for more than 14 days following determination of inoperability, use of the airlock, except for emergency purposes, shall be suspended until the interlock is returned to operable status.

4.4.1.7 Operability of Purge Valves

1. A periodic pressurization of the purge valve interspaces to 50.6 psig per Specification 4.4.1.2.5.d shall be performed to help assure timely detection and resolution of valve and/or actuator degradation. The acceptance criteria is that total local leakage when updated for the new purge valve leakage shall be less than $0.6L_a$. See Specification 3.6.8 for further action.

2. The rubber seats on purge valves shall be visually examined each refueling interval to detect degradation (e.g. cracking, brittleness, etc.) and to assure timely cleaning, lubrication, and seat replacement. As a minimum, seats shall be replaced at the first refueling following 5 years of seat service.

Bases (1)

The reactor building is designed for an internal pressure of 55 psig and a steam-air mixture temperature of 281°F. Prior to initial operation, the containment was strength tested at 115 percent of design pressure and leak rate tested at the design pressure. The containment was also leak tested prior to initial operation at approximately 50 percent of the design pressure. These tests established the acceptance criteria of 4.4.1.1.3.

The performance of periodic integrated and local leakage rate tests during the plant life provides a current assessment of potential leakage from the containment in case of an accident that would pressurize the interior of the containment. In order to provide a realistic appraisal of the integrity of the containment under accident conditions "as found" local leakage results must be documented for correction of the integrated leakage rate test results. Containment isolation valves are to be closed in the normal manner prior to local or integrated leakage rate tests. Containment Isolation Valves are addressed in the FSAR.

The minimum test pressure of 30 psig for the periodic integrated leakage rate test is sufficiently high to provide an accurate measurement of the leakage rate and it exceeds the pre-operational leakage rate test at the reduced pressure of 27.5 psig. The specification provides a relationship for relating the measured leakage of air at the reduced pressure to the potential leakage of 55 psig. The minimum of 24 hours was specified for the integrated leakage rate test to help stabilize conditions and thus improve accuracy and to better evaluate data scatter. The frequency of the periodic integrated leakage rate test is keyed to the refueling schedule for the reactor, because these tests can best be performed during refueling shutdowns.

The specified frequency of periodic integrated leakage rate tests is based on three major considerations. First is the low probability of leaks in the liner, because of conformance of the complete containment to a 0.10 percent leakage rate at 55 psig during pre-operational testing and the absence of any significant stresses in the liner during reactor operation. Second is the more frequent testing, at design pressure, of those portions of the containment envelope that are most likely to develop leaks during reactor operation and the low value of leakage that is specified as acceptable from penetrations and isolation valves, 0.6 L_a.

More frequent testing of various penetrations is specified as these locations are more susceptible to leakage than the reactor building liner due to the mechanical closure involved. The basis for specifying a total leakage rate of 0.6 L_a from those penetrations and isolation valves is that more than one-half of the allowable integrated leakage rate will be from these sources.

Valve operability tests are specified to assure proper closure or opening of the reactor building isolation valves to provide for isolation or functioning of Engineered Safety Features systems. Valves will be stroked to the position required to fulfill their safety function unless it is establish that such testing is not practical during operation. Valves that cannot be full-stroke tested will be part-stroke tested during operation and full-stroke tested during each normal refueling shutdown.

Periodic surveillance of the airlock interlock systems is specified to assure continued operability and preclude instances where one or both doors are inadvertently left open. When an airlock is inoperable and containment integrity is required, local supervision of airlock operation is specified.

Purge valve interspace pressurization test operability requirements and inspections provide a high degree of assurance of purge valve performance as containment isolation barriers. Third is the tendon stress surveillance program which provides assurance that an important part of the structural integrity of the containment is maintained.

Reference

(1) FSAR, Chapter 5.

5.7.4.1 Integrated Leakage Rate Tests

These tests are conducted periodically in the same manner as the initial leakage rate test. Precautions are employed to protect reactor equipment and instrumentation from being damaged.

5.7.4.2 Local Leak Detection Tests - Penetrations

Components which penetrate and seal the containment boundary with seals, gaskets, or sealant compounds which are resilient, or piping penetrations fitted with an expansion bellows as the only barrier to leakage from containment are leak tested at periodic intervals to ensure their continuing integrity. **The local leak rate shall be measured for components listed in Table 5.7-2 using a Type "B" test as defined in 10CFR50, Appendix J.**

All electrical penetrations have at least one epoxy insulator, structurally bonded between wire and steel, and full penetration, steel-to-steel welds as the barrier between the containment atmosphere and the environment.

Of the penetrations in the category requiring periodic leak detection testing, most are continuously pressurized with air, at a pressure in excess of 55 psig, by the penetration pressurization system. Therefore, during reactor operation, continuous indication of leakage through the resilient seals of these items is provided by the leak detection rotameters of the penetration pressurization system.

5.7.4.3 Local Leak Detection Tests And Operability Tests

Isolation Valves

Periodic tests are conducted to determine the operability and leak-tightness of valves serving an isolation function. **The local leak rate shall be measured for isolation valves listed in Table 5.7-3 using a Type "C" test as defined in 10CFR50, Appendix J.** The safeguards actuation system test circuitry provides the means for testing isolation valve operability.

Table 5.7-2
(Sheet 1 of 1)

COMPONENTS REQUIRED TO BE TESTED USING A TYPE "B" TEST

1. Personnel air lock door gaskets and other seals

2. Emergency air lock door gaskets and other seals.

3. Resilient seals on the equipment hatch and fuel transfer tube blind flanges.

4. Blind flanges on penetration No. 414 (L. R. Pressure Sensing).

5. Blind flanges on both ends of pipe through the following penetrations:

PENETRATION NUMBER	DESCRIPTION
104	OTSG drains
105	OTSG cleaning
106	OTSG cleaning
210	OTSG annulus drains
211	OTSG annulus drains
241	Incore Instrument Transfer Tube Access
415	Leak Rate Test Bleed Line
416	Leak Rate Test Bleed Line
417	Leak Rate Test Supply Line

TABLE 5.7-3
(Sheet 1 of 1)

CONTAINMENT ISOLATION VALVES REQUIRED TO BE TESTED
USING A TYPE "C" TEST

	VALVES	DESCRIPTION
1.	AH-V1A/1B/1C/1D	Reactor Building Purge Supply/Exhaust
2.	CA-V1,2,3,13	Primary Sampling
	CA-V189,192	Reclaimed Water
	CA-V4A,4B,5A,5B	Secondary Sampling
3.	CF-V2A,2B,12A,12B	Core Flood
	CF-V19B,20A,20B	Core Flood
4.	CM-V1,2,3,4	Containment Monitoring
5.	DH-V64,69	Decay Heat
6.	HP-V1,6	Hydrogen Purge
7.	HR-V2A,2B,4A,4B	Hydrogen Recombiner
	HR-V22A,22B,23A,23B	Hydrogen Recombiner
8.	IA-V8,20	Instrument Air
9.	IC-V2,3,4,6,16,18	Intermediate Cooling
10.	LR-V4,5,6	Leak Rate Test
11.	MU-V2A,2B,3,18,20	Makeup and Purification
	MU-V25,26,116	Makeup and Purification
12.	NI-V27	Nitrogen
13.	NS-V4,11,15,35	Nuclear Services Closed Cooling
14.	PP-V210,211,212,213	Penetration Pressurization
15.	RB-V2A,7	Reactor Building Industrial Cooling
16.	SA-V2,3	Service Air
17.	SF-V23	Spent Fuel Cooling
18.	WDG-V3,4	Waste Gas Header
19.	WDL-V303,304	Waste Disposal Liquid
20.	WDL-V534,535	Reactor Building Sump Gravity Drains