4.5.2 Local Leak Detection Tests

a. Test

(1) Local leak rate tests, other than Personnel Airlock doors between the seals tests, shall be performed at ≥ 55 psig.

(2) Local leak rate tests for checking airlock door seals within 72 hours of each door opening shall be performed as follows:

(a) A between the seals test shall be performed on the Personnel Airlock at ≥ 10 psig.

(b) A full pressure test shall be performed on the Emergency Escape Airlock at ≥ 55 psig. A seal contact check shall be performed on the Emergency Escape Airlock following each full pressure test. Emergency Escape Airlock door opening, solely for the purpose of strongback removal and performance of the seal contact check, does not necessitate additional pressure testing.

(3) Acceptable methods of testing are halogen gas detection, soap bubble, pressure decay, or equivalent.

(4) The local leak rate shall be measured for each of the following components:

(a) Containment penetrations that employ resilient seal gaskets, sealant compounds, or bellows.

(b) Airlock and equipment door seals.

(c) Fuel transfer tube.

(d) Isolation valves on the testable fluid systems' lines penetrating the containment.

(e) Other containment components which require leak repair in order to meet the acceptance criterion for any integrated leak rate test.

b. Acceptance Criteria

(1) The total leakage from all penetrations and isolation valves shall not exceed 0.60 L_a.

(2) The leakage for a Personnel Airlock door seal test shall not exceed 0.023 L_a.

(3) An acceptable Emergency Escape Airlock door seal contact check consists of a verification of continuous contact between the seals and the sealing surfaces.

c. Corrective Action

(1) If at any time it is determined that 0.60 L_a is exceeded, repairs shall be initiated immediately.

If repairs are not completed and conformance to the acceptance criterion of 4.5.2.b(1) is not demonstrated with 48 hours, the Plant shall be placed in at least hot shutdown within the next 6 hours and in at least cold shutdown within the following 30 hours.

(2) If at any time it is determined that total containment leakage exceeds L_a, within one hour action shall be initiated to bring the Plant to hot shutdown within the next six (6) hours and cold shutdown within the following thirty (30) hours.

(3) If the Personnel Airlock door seal leakage is greater than 0.023 L_a, or if the Emergency Escape Lock door seal contact check fails to meet its acceptance criterion, repairs shall be initiated immediately to restore the door seal to the acceptance criteria of specification 4.5.2.b(2) or 4.5.2.b(3). In the event repairs cannot be completed within 7 days, the Plant shall be brought to a hot shutdown condition within the next six (6) hours and cold shutdown within the following thirty (30) hours.

If air lock door seal leakage results in one (1) door causing total containment leakage to exceed 0.60 L_a, the door shall be declared inoperable and the remaining operable door shall be immediately locked closed and tested within four (4) hours. As long as the remaining door is found to be operable, the provisions of 4.5.2.c(2) do not apply. Repairs shall be initiated immediately to establish conformance with specification 4.5.2.b(1). In the event conformance to this specification cannot be established within 48 hours the Plant shall be brought to a hot shutdown within the next 6 hours and cold shutdown within the following 30 hours.

d. Test Frequency

(1) Individual penetrations and containment isolation valves shall be leak rate tested at a frequency of at least every six months prior to the first postoperational integrated leak rate test and at a frequency of at least every refueling thereafter, not exceeding a two-year interval, except as specified in (a) and (b) below:

(a) The containment equipment hatch and the fuel transfer tube shall be tested at each refueling shutdown or after each time used, if that be sooner.

an important part, of the structural integrity of the containment is maintained.

The basis for specification of a total leakage rate of 0.60 L_a from penetrations and isolation valves is specified to provide assurance that the integrated leak rate would remain within the specified limits during the intervals between integrated leak rate tests. This value allows for possible deterioration in the intervals between tests.

The basis for specification of a Personnel Airlock door seal leakage rate of 0.023 L_a is to provide assurance that the failure of a single airlock door will not result in the total containment leakage exceeding 0.6 L_a. Due to its design, a seal contact check is used on the Emergency Escape Airlock. The seal contact check is intended to provide assurance that the Emergency Escape Airlock doors will not leak excessively. The seven (7) day LCO specified for exceeding the airlock door leakage limit is acceptable since it requires that the total containment leakage limit is not exceeded.

The limiting leakage rates from the shutdown cooling 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 DBA. The test pressure (270 psig) achieved either by normal system operation or by hydrostatically testing gives an adequate margin over the highest pressure within the system after a DBA. Similarly, the hydrostatic test pressure for the return lines from the containment to the shutdown cooling system (100 psig) gives an adequate margin over the highest pressure within the lines after a DBA. [5]

A shutdown cooling system leakage of 1/5 gpm will limit off-site exposures due to leakage to insignificant levels relative to those calculated for leakage directly from the containment in the DBA. The engineered safeguards room ventilation system is equipped with isolation valves which close upon a high radiation signal from a local radiation detector. These monitors shall be set at 2.2×10^5 cpm, which is well below the expected level, following a loss-of-coolant accident (LOCA), even without clad failure. The 1/5 gpm leak rate is sufficiently high to permit prompt detection and to allow for reasonable leakage through the pump seals and valve packings, and yet small enough to be readily handled by the sumps and radioactive waste system. Leakage to the engineered safeguards room sumps will be returned to the containment clean water receiver following a LOCA, via the equipment drain tank and pumps. Additional makeup water to the containment sump inventory can be readily accommodated via the charging pumps from either the SIRW tank or the concentrated boric acid storage tanks.

ATTACHMENT 4

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

TECHNICAL SPECIFICATIONS CHANGE REQUEST

LOCAL LEAK RATE TESTING OF THE EMERGENCY ESCAPE AIRLOCK

Current Pages Marked to Show Changes

3 Pages

4.5.2 Local Leak Detection Tests

a. Test

(1) Local leak rate tests, other than Personnel Airlock doors between the seals tests, shall be performed at ~~a pressure of not less than ≥~~ 55 psig.

(2) Local leak rate tests for checking airlock door seals within 72 hours of each door opening shall be performed ~~at a pressure of not less than 10 psig.~~ as follows:

(a) A between the seals test shall be performed on the Personnel Airlock at ≥ 10 psig.

(b) A full pressure test shall be performed on the Emergency Escape Airlock at ≥ 55 psig. A seal contact check shall be performed on the Emergency Escape Airlock following each full pressure test. Emergency Escape Airlock door opening, solely for the purpose of strongback removal and performance of the seal contact check, does not necessitate additional pressure testing.

(3) Acceptable methods of testing are halogen gas detection, soap bubble, pressure decay, or equivalent.

(4) The local leak rate shall be measured for each of the following components:

(a) Containment penetrations that employ resilient seal gaskets, sealant compounds, or bellows.

(b) Airlock and equipment door seals.

(c) Fuel transfer tube.

(d) Isolation valves on the testable fluid systems' lines penetrating the containment.

(e) Other containment components which require leak repair in order to meet the acceptance criterion for any integrated leak rate test.

b. Acceptance Criteria

(1) The total leakage from all penetrations and isolation valves shall not exceed 0.60 L_a.

(2) The leakage for ~~an~~ a Personnel airlock door seal test shall not exceed 0.023 L_a.

(3) An acceptable Emergency Escape Airlock door seal contact check consists of a verification of continuous contact between the seals and the sealing surfaces.

c. Corrective Action

(1) If at any time it is determined that 0.60 L_a is exceeded, repairs shall be initiated immediately.

If repairs are not completed and conformance to the acceptance criterion of 4.5.2.b(1) is not demonstrated with 48 hours, the Plant shall be placed in at least hot shutdown within the next 6 hours and in at least cold shutdown within the following 30 hours.

(2) If at any time it is determined that total containment leakage exceeds L_a, within one hour action shall be initiated to bring the Plant to hot shutdown within the next six (6) hours and cold shutdown within the following thirty (30) hours.

(3) If the Personnel airlock door seal leakage is greater than 0.023 L_a, or if the Emergency Escape Lock door seal contact check fails to meet its acceptance criterion, repairs shall be initiated immediately to restore the door ~~to less than~~ seal to the acceptance criteria of specification 4.5.2.b(2) or 4.5.2.b(3). In the event repairs cannot be completed within 7 days, the Plant shall be brought to a hot shutdown condition within the next six (6) hours and cold shutdown within the following thirty (30) hours.

If air lock door seal leakage results in one (1) door causing total containment leakage to exceed 0.60 L_a, the door shall be declared inoperable and the remaining operable door shall be immediately locked closed and tested within four (4) hours. As long as the remaining door is found to be operable, the provisions of 4.5.2.c(2) do not apply. Repairs shall be initiated immediately to establish conformance with specification 4.5.2.b(1). In the event conformance to this specification cannot be established within 48 hours the Plant shall be brought to a hot shutdown within the next 6 hours and cold shutdown within the following 30 hours.

d. Test Frequency

(1) Individual penetrations and containment isolation valves shall be leak rate tested at a frequency of at least every six months prior to the first postoperational integrated leak rate test and at a frequency of at least every refueling thereafter, not exceeding a two-year interval, except as specified in (a) and (b) below:

(a) The containment equipment hatch and the fuel transfer tube shall be tested at each refueling shutdown or after each time used, if that be sooner.

an important part, of the structural integrity of the containment is maintained.

The basis for specification of a total leakage rate of 0.60 L_a from penetrations and isolation valves is specified to provide assurance that the integrated leak rate would remain within the specified limits during the intervals between integrated leak rate tests. This value allows for possible deterioration in the intervals between tests.

The basis for specification of ~~an~~ a Personnel airlock door seal leakage rate of 0.023 L_a is to provide assurance that the failure of a single airlock door will not result in the total containment leakage exceeding 0.6 L_a. Due to its design, a seal contact check is used on the Emergency Escape Airlock. The seal contact check is intended to provide assurance that the Emergency Escape Airlock doors will not leak excessively. The seven (7) day LCO specified for exceeding the airlock door leakage limit is acceptable since it requires that the total containment leakage limit is not exceeded.

The limiting leakage rates from the shutdown cooling 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 DBA. The test pressure (270 psig) achieved either by normal system operation or by hydrostatically testing gives an adequate margin over the highest pressure within the system after a DBA. Similarly, the hydrostatic test pressure for the return lines from the containment to the shutdown cooling system (100 psig) gives an adequate margin over the highest pressure within the lines after a DBA. [5]

A shutdown cooling system leakage of 1/5 gpm will limit off-site exposures due to leakage to insignificant levels relative to those calculated for leakage directly from the containment in the DBA. The engineered safeguards room ventilation system is equipped with isolation valves which close upon a high radiation signal from a local radiation detector. These monitors shall be set at 2.2×10^5 cpm, which is well below the expected level, following a loss-of-coolant accident (LOCA), even without clad failure. The 1/5 gpm leak rate is sufficiently high to permit prompt detection and to allow for reasonable leakage through the pump seals and valve packings, and yet small enough to be readily handled by the sumps and radioactive waste system. Leakage to the engineered safeguards room sumps will be returned to the containment clean water receiver following a LOCA, via the equipment drain tank and pumps. Additional makeup water to the containment sump inventory can be readily accommodated via the charging pumps from either the SIRW tank or the concentrated boric acid storage tanks.

ATTACHMENT 5

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

ADDITIONAL TESTING AND EVALUATION OF ALTERNATIVES FOR EMERGENCY ESCAPE AIRLOCK

2 Pages

DISCUSSION OF ADDITIONAL TESTING AND EVALUATION OF EMERGENCY ESCAPE AIRLOCK

The design of the Emergency Escape Airlock relies on the increase in containment pressure during a postulated event to provide sufficient closing force to produce an effective seal. During airlock pressure testing, a strongback is necessary to simulate this pressure and to protect the inner door locking pins from the forces generated by the internal test pressure in the barrel. This strongback is removed after the test and the seal contact is checked to determine if the seals have taken an unacceptable set. The doors must be reopened to accomplish this test restoration.

Following discussion with the NRC, a Technical Specifications Change Request dated March 25, 1991 (and supplemented on May 1, 1991) was withdrawn on July 29, 1991. This action was based on identifying additional testing and evaluation that was needed to support that request. The additional testing was needed to determine if other alternative test methods at lower pressures could be substituted for the current test that requires a strongback and a seal contact check. The intent was to eliminate the need to open the Emergency Escape Airlock doors after the test. The evaluation was intended to determine if alterations could reasonably be made to the airlock that would result in full compliance with 10 CFR Part 50, Appendix J, III.D.2.(b)(ii) and III.D.2.(b)(iii) and the Technical Specifications.

DISCUSSION OF ADDITIONAL TESTING

Special Test T-317, "Escape Air Lock Between-the-Seals Test", was completed on March 20, 1992. This test attempted to measure seal leak rates at low initial pressures and without the door strongbacks installed. Trial tests were performed at pressures lower than the Palisades Technical Specification test pressure requirements of 10 psig. The test results indicate that meaningful between-the-seals testing is not possible with the present design of the escape air lock. With the annulus between the door seals pressurized to as low as 2 psig without the door strongback installed, the test pressure still dropped off immediately. This indicates that the leak rates for between-the-seals testing on the Emergency Escape Airlock can not be properly evaluated against meaningful acceptance criteria if the door strongbacks are not installed.

EVALUATION OF AIRLOCK MODIFICATION ALTERNATIVES

In the July, 29,1991 letter on this issue, we informed the NRC that we would also investigate modifications to the existing Emergency Escape Airlock doors to facilitate other methods of complying with the Appendix J requirements. Since that time we have evaluated possible modifications to the escape lock to facilitate between-the-seals testing. The modifications that were considered were:

1. Modify the seal design or change the seal material.
   A proposal was received from the airlock vendor to perform testing of different seal shapes and materials. This was later rescinded. They believe, and we concur, that the seal material and shape currently in use are reliable and adequate to maintain containment integrity. Simply changing the seal

material or shape would be unlikely to allow meaningful between-the-seals test with strongbacks removed.

2. Perform door modifications by removing the doors and altering the sealing surfaces.
   Minor modifications were considered for the door mechanisms, and a reconfigured sealing surface would be used. This modification has never been performed by the airlock vendor and would be experimental. There is no guarantee that these efforts would be successful in allowing Palisades to perform between-the-seals testing. The cost of this modification is estimated to be roughly equal to performing an airlock retrofit, as described following.

3. Perform an airlock retrofit which would include removing and replacing the doors, the ends of the bulkhead, and the door mechanisms.
   The doors would be replaced with doors of a design whose seals can be tested per Appendix J without additional restraint or subsequent seal restoration. The mechanisms would be updated for smoother operation but their function would not be altered.

The only viable alternative found was the replacement of the air lock doors which has been estimated to cost a minimum of $ 700,000. The cost of performing the modification is not warranted because no increase in plant or public safety would be realized. The other modifications to the present doors or seals that were considered did not ensure adequate performance improvement to permit between-the-seals testing without strongbacks.