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Docket Nos.: 50-352
50-353

June 21, 1984

Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Limerick Generating Station, Units 1 & 2
Information for Equipment Qualification Branch (EQB)
on ADS Accumulators

Reference: 1) Letter from E. J. Bradley (PECo) to A. Schwencer dated 1/30/84 Transmitting Revised Response to NRC RAI 271.2
2) Telecon between J. Arhar (PECo) and G. Bagchi (NRC/EQB) on 6/6/84

File: GOVT 1-1 (NRC)

Dear Mr. Schwencer:

The attached FSAR page changes modify the response to NRC RAI 271.2 as discussed in the reference 2) telecon.

The information contained on these draft FSAR changes will be incorporated into the FSAR, exactly as it appears on the attachments, in the revision scheduled for July, 1984.

Sincerely,

Eugene J. Bradley

JHA/cmv/F6

Attachment

Copy to: See Attached Service List

B001
1/1

cc: Judge Lawrence Brenner (w/o enclosure)
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QUESTION 271.2

In accordance with Section 3.10.2 of the Limerick SER, the NRC staff has begun its review of information provided in the FSAR responding to the requirements of NUREG 0737, Item II.K.3.28 "Qualification of ADS Accumulators". We find that additional information is needed to complete our review. Please provide the following information.

1. Define the basis for the allowable leakage criteria for the ADS accumulator system (e.g., boundary conditions, environmental, and seismic parameters, operator interface, margin, etc.).

2. What margin is in the allowable leakage criteria to account for possible increase in leakage resulting from the effects of a harsh environment and/or a seismic event?

3. Provide a statement that test and/or analysis performed verified that a harsh environment and/or seismic event would not increase the leakage rate.

4. Define the periodic leak testing of the ADS accumulator system, including the time interval between these leak tests, and a concise description of the test procedure employed.

5. Provide a confirmatory statement that the backup system will meet the overall requirements of the ADS system.

6. Provide a concise description of the alarms and instrumentation associated with the ADS accumulator system and backup system.

7. Provide a concise description of the tests performed on the backup system and their frequency.

8. Provide a concise description of the surveillance to be performed, including the frequency, of alarms associated with the ADS accumulator system (and backup system, if applicable).

9. Provide a statement that test and/or analysis will be performed to verify that leakage will not prevent the ADS from performing as required.

10. Provide proposed technical specifications for Limerick to specify the following.

    - ADS leak test frequency
    - Allowable leakage rate

- Actions to be taken, in a specified time frame, should the allowable leakage rate be exceeded.

11. Provide a statement that confirms that the complete ADS accumulator system and associated equipment and control circuitry are a part of the Limerick Environmental Qualification Program and will be qualified to accommodate the affects of and are compatible with the environmental condition associated with normal operation, maintenance, testing, and postulated accidents as stated in General Design Criteria 2 and 4 of Appendix A of 10 CFR 50.

12. Provide a P&ID of the ADS Accumulator System including the gas bottle supply.

RESPONSE

1. The basis for the allowable leakage criteria applies only to the short-term ADS SRV operations because provision is made for an infinite long-term supply through the use of external connections. An allowable leakage criteria of 173 scc/min was established to ensure that there would be sufficient pneumatic pressure to depressurize the reactor pressure vessel from the HPCI/RCIC operating pressure to the RHR shutdown cooling operating pressure range using two ADS SRV actuations over a period of 6 hours. Calculations indicate that this leakage criteria will ensure ADS operability for periods in excess of 6 hours for a range of containment conditions that might accompany the need for ADS operation. This duration is sufficient to ensure that the ADS valves can perform their functions.

2. An 81 ~~X 40~~ scc/min margin is provided in the allowable leakage rate criteria described above to account for any possible increase in leakage due to a harsh environment and/or seismic event. This margin is obtained by oversizing the accumulators by ~~55%~~ 79%.

   The pneumatic components that make up the ADS accumulator system were designed for low leakage in a harsh environment and seismic event. A safety grade pneumatic supply of nitrogen cylinders is available to provide a backup supply if the ADS accumulator system leakage rate should exceed its allowable limit.

3. As described below, testing and/or analysis has been performed to verify that a harsh environment and/or seismic event would not increase the leakage rate of the ADS pneumatic supply system.

The pneumatic system solenoid valves have been qualified under the qualification program for electrical equipment to remain functional under conditions simulating the environment following a postulated design basis LOCA. The pneumatic system spring-loaded, soft-seated valves have been qualified to remain leaktight after a seismic event. A materials and design review was performed to ensure that the check valves would not experience a significant increase in leakage due to post-LOCA environmental conditions. The functional capability of the check valves will be further reviewed as part of the mechanical equipment qualification program. In any event, the backup safety grade pneumatic supply will provide the motive force for ADS valve operability.

4. A surveillance test will be conducted every refueling cycle under the local leak rate test (LLRT) program. Although the accumulator system is not considered to be a part of the primary containment boundary, this test under the LLRT program ensures completion of the surveillance test. Two tests will be performed at 90 psig. For the first test, the isolation boundaries will be the normal supply check valve, the seismic supply check valve, and the de-energized actuation solenoid. Vents are provided on the upstream side of the isolation check valves to meet the single isolation valve criteria. For the second test, the solenoid will be energized so that the SRV actuator and the solenoid valve vent port become part of the boundaries. In both tests, the leakage criteria will be 78 scc/min. The acceptance criteria of 78 scc/min. is 85% of the expected leakage, which is obtained by subtracting the ~~46~~ 81 scc/min. margin in Item 2 above from the ~~123~~ 173 scc/min. allowable leakage in Item 1 above.

5. The backup system is safety-related, seismic Category I, and designed to meet the overall requirements for long-term operation of the ADS system.

6. The condition of low instrument gas system receiver tank pressure is alarmed in the control room. The alarm is unspecific with respect to individual ADS accumulators. When low pressure is sensed in the instrument gas receiver tank, the station instrument air system can be manually placed into service as a backup. Low pressure in the normal instrument gas supply header automatically connects the backup safety-grade instrument gas system to the seismic Category I ADS valve supply header. The alarms and instrumentation associated with the backup, safety-grade pneumatic supply are described below:

   a. Pressure instrumentation is installed in each of the two supply piping branches outside containment to provide pressure indication in the control room. High or low

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supply pressure in the backup safety-grade gas supply header is alarmed in the control room.

b. Instrumentation is provided to close the ADS valve gas supply containment isolation valves when system pressure falls to below primary containment pressure.

c. Indication of valve position for containment isolation valves and solenoid valves on the backup ADS gas supply header is provided in the control room.

d. Local pressure indication is provided on each backup ADS gas supply header.

7. Testing of the backup system is performed by use of a surveillance test as part of the primary containment leak rate testing program. Leakage from the remainder of the system will be monitored daily by operations personnel using a different surveillance test for the seismic bottle supply pressure.

8. The alarms and isolation initiation instrumentation associated with the backup nitrogen system will be calibrated once per operating cycle.

9. Each ADS accumulator system will be leak rate tested as described in the response to Item 4 above. Leakage within the limits discussed in the response to Item 1 above will not prevent the ADS pneumatic supplies from fulfilling their safety function based on analysis.

10. As stated on page 4 of Enclosure 1 of letter dated March 21, 1983, D.G. Eisenhut, NRC, to T.J. Dente, Chairman, BWR Owners Group, the Technical Specification requirements regarding the ADS will be determined after NRC staff review is completed. The BWR Standard Technical Specifications (NUREG-0123) currently do not address these points, although the surveillance test requirements contained in the response to Items 4 and 7 ensure that ADS leakage will be formally monitored.

11. The complete ADS accumulator system and associated equipment and control circuitry are included in the Limerick Environmental Qualification Program for electrical and mechanical equipment and will be qualified to accommodate the effects of, and be compatible with, the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents as stated in General Design Criteria 2 and 4 of Appendix A of 10 CFR 50.

12. Figures 5.1-3 and 9.3-2 contain P&IDs of the nuclear boiler and primary containment instrument gas systems.