Nebraska Public Power District

GENERAL OFFICE
P.O. BOX 499, COLUMBUS, NEBRASKA 68601-0499
TELEPHONE (402) 564-8561

NLS8400213

July 26, 1984

Mr. Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Reference: 1) Letter from D. G. Eisenhut to J. M. Pilant dated May 29, 1984, "Request for Additional Information (TMI II.K.3.28) 'Qualification of ADS Accumulators' per 10CFR50.54(f)"

2) Letter from J. M. Pilant to D. B. Vassallo dated August 26, 1983, "II.K.3.28 'Qualification of ADS Accumulators' Response to NRC Request"

Attachment: 1) Qualification of ADS Accumulators - Response to Request

Dear Mr. Eisenhut:

Subject: Response to "Request for Additional Information 'Qualification of ADS Accumulators' per 10CFR50.54(f)"

The purpose of this letter is to respond to your letter of May 29, 1984, (Reference 1) requesting additional information on the qualification of ADS Accumulators. Shown as Attachment 1 is the District's response to this request.

Should you have any questions concerning this response, please do not hesitate to contact my office.

Sincerely,

Jay M. Pilant
Technical Staff Manager
Nuclear Power Group

JMP/gmc:emz26/7
Attachment

A046
1/1

Attachment: 1) Qualification of ADS Accumulators - Response to Request

1. Item 1 of Reference (1) stated that it was necessary to demonstrate that the ADS valves, accumulators, and associated equipment and instrumentation meet the requirements specified in the plant FSAR and are capable of performing their function during and following exposure to hostile environments. Additionally, air (or nitrogen) leakage through the valves must be accounted for to assure that enough inventory or compressed gas is available to cycle the ADS valves. If not, it must be shown that the accumulator design is still acceptable. If a backup system is required to recharge the accumulator for long-term operation, clarify if the backup system is environmentally and seismically qualified or that compensatory measures are provided for long-term operation. Because of the ECCS function of this system it must function for 100 days following an accident or justification be provided for the time specified for long-term operation.

   The District was requested to address in detail (a) how it met the above requirement for 100 days following an accident, or (b) the justification as to why a shorter time period is sufficient capability for CNS and why seismic qualification of the components should not be a requirement, or (c) provide a commitment and schedule for upgrading to the 100-day long-term capability requirement that uses seismically qualified components.

   Response:

   As stated previously in Reference (2), the District is not able to meet the new 100-day requirement (Part a of Item 1 above) following an accident without relying upon a nonseismic Class 1 makeup system. The USAR additionally does not provide a detailed basis for justifying a shorter period of time for CNS (Part b of Item 1 above). USAR Section 5.2.1.1.5 demonstrates conformance to 10CFR50.46 "Long-Term Cooling Criteria" without the need for ADS valve actuation out to a specified 100 days. If the NRC changes the CNS design basis to 100 days, the District would be required to "provide a commitment and schedule for upgrading to the 100-day long-term capability requirement that uses seismically qualified components" (Part c of Item 1 above). The District has identified those components and parts that will have to be replaced or qualified in order to meet the intent of the seismic and environmental qualifications addressed in this item. Because of the numerous commitments made for upcoming outages, it is foreseen that the upgrade would take place during the second refueling outage commencing after NRC changing of the CNS design basis.

2. The District was requested to clearly define the time period for which the accumulators can be relied on as the sole source of pneumatic supply for the ADS valves following an accident and the number of actuations which can be provided during this time period. A detailed analysis is required including accumulator volume, actual leakage rate allowable, the pressure available at the end of this period, and the pressure required for valve operation.

Response:

Preoperational testing results of the three-stage Target Rock safety relief valves showed that the valves were capable of at least five actuations at normal drywell pressure while relying on only the accumulators for pneumatic supply. In 1980 these valves were replaced with two-stage Target Rock safety valves. Even though the present valves are not the same as those used for preoperational testing, the results are more conservative because the present valves require less differential pressure to operate and have less piston displacement. Calculations done by the District show that one actuation of ADS valves is possible 3.6 hours after a LOCA has occurred. This calculation shows that an accumulator's volume is 1.05 SCF, and that by surveillance procedure the maximum allowable accumulator leakage is .25 SCFH (.35 SCFH total system leakage when the valve is open). The accumulator pressure at the end of this 3.6 hour period would be 53.4 psig, while 51 psig is required to keep the valve open, thus allowing reactor pressure to decrease from approximately 1,000 psig to 50 psig. This calculation is conservative in view of the fact that the maximum drywell pressure assumed is 26 psig, and were this pressure lower, then the pressure required to keep the valve open would be lower.

3. The District was requested to submit a detailed summary of the periodic leak test that is used to demonstrate the capability of the accumulator system.

Response:

Attachment A is a detailed summary of CNS Surveillance Procedure 6.2.2.2.6 (ADS Accumulator Functional Test) which is designed to determine the accumulator leak rates once per operating cycle.

4. The District was requested to provide verification of the seismic qualification for Class I seismic ADS components within the drywell that was obtained from the Architect Engineer (Reference 2).

It was further requested that the District provide a discussion of the adequacy of the Class II seismic system or provide a discussion of compensating measures as described in Question 1.

Response:

The Architect Engineer has verified that the accumulators, components, and tubing are Seismic I. Documentation is not available for seismic qualification of the check valves and pressure switches. To meet the Seismic I requirements, it is foreseen that these components will be replaced with qualified components during the second refueling outage commencing after NRC acceptance of this response (i.e., SER received) if documentation cannot be obtained beforehand.

Detailed Summary of CNS ADS Accumulator Functional Test

Discussion

With the reactor and the drywell at atmospheric pressure, ADS Accumulators 71A, 71B, 71C, 71E, 71G, and 71H are designed to actuate the main steam relief valves at least five times. This corresponds to two actuations with the drywell at 70% of its design pressure. ADS Accumulators 71D and 71F are larger and designed to actuate the main steam relief valves at least 14 times as part of the ADS Low-Low Set logic. Check valves in the accumulator system prevent back leakage if the supply air is lost.

The accumulator test is performed by isolating and bleeding the air supply to the accumulators, then attaching a pressure test gauge to the system. Accumulator pressure is adjusted to the normal minimum supply pressure (95 psig). After one hour the gauge pressure is observed and recorded. A minimum of 68.6 psig is required to assure five actuations under the test conditions for ADS Accumulators 71A, 71B, 71C, 71E, 71G, and 71H. A minimum of 70 psig is required to assure 14 actuations under the test conditions for ADS Accumulators 71D and 71F.

The test shall be performed with the reactor in a cold shutdown condition and with the drywell vented.

Functional test frequency is once per operating cycle.

Procedure

ADS Accumulator Functional Test

1. Close stop valves to the ADS pneumatic operators.

2. Crack open the cap on the tee fitting downstream to depressurize the line between the stop valve and the ADS check valves.

3. When the line is depressurized, remove the cap and observe in Control Room that accumulator low pressure lights are off and common alarm is off.

   Note: All accumulator check valves should seat. If the check valves do not seat, the air will be bled and the accumulator low pressure light and alarm will be received in the Control Room.

4. Accumulator Test (Typical)

   a. Bleed the air from accumulator by removing the cap on the test tee in the low accumulator pressure pressure switch line.

      Note: The low accumulator pressure light and common alarm (if not already in) will be received in the Control Room.

   b. When the accumulator is depressurized, attach the test gauge and instrument air supply to the test tee.

c. Repressurize the accumulator to 95 psig; check the test connection for leaks and tighten as necessary.

d. After the accumulator has been repressurized for one hour, observe and record the test gauge pressure. The minimum acceptable pressure is 68.6 psig for small accumulators and 70 psig for large accumulators

e. Depressurize the accumulator, remove the test gauge and air supply, and replace the cap on the test tee connection.

5. Replace and tighten the tee caps.

6. Open stop valves to the ADS pneumatic operators.

7. When the system is repressurized, check the throat fitting and tee caps for leaks and repair as necessary.

8. Observe in Control Room that the accumulator low pressure lights are off and common alarm is off.