

May 29, 1984

Docket 50-298

DISTRIBUTION	EJordan
Docket File	JNGrace
NRC PDR	PLeech
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ORB#2 Reading	SNorris
DEisenhut	ACRS (10)
OELD	Gray File

Mr. J. M. Pilant, Director
Licensing & Quality Assurance
Nebraska Public Power District
P.O. Box 499
Columbus, Nebraska 68601

Dear Mr. Pilant:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION - MPA F-55 (TMI II.K.3.28)
"QUALIFICATION OF ADS ACCUMULATORS" PER 10 CFR 50.54(f)

Re: Cooper Nuclear Station

During the course of our review, your facility was identified as a plant that did not either have sufficient accumulator capacity to ensure that the ADS valves can operate to provide emergency cooling system operation for 100 days following an accident or one for which adequate justification was provided as to why the accumulator design is acceptable if the 100 day function is not met (see position - II.K.3.28 - NUREG-0737 dated November 1980). Since you have not provided an adequate response addressing the above stated item, we request, pursuant to 10 CFR 50.54(f), that you provide the information listed in the enclosure. A response to this request is required within 45 days of the receipt of this letter.

The information requested in this letter affects fewer than 10 respondents; therefore, OMB clearance is not required under P.L. 96-511.

Sincerely,

Original signed by
Darrell G. Eisenhut

Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation

Enclosure:
Request for Additional
Information

cc w/enclosures
See next page

EQB:Chief
DENoonan*
05/9/84

* See previous concurrence page

DL:ORB#2	DL:ORB#2	DL:ORB#2	DL:ORB#2	AD-OR:DL	OELD	D:DL
SNorris;jk*	RHermann*	BSiegel*	Vassallo*	GLainas*		DEisenhut
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Mr. J. M. Pilant
Nebraska Public Power District
Cooper Nuclear Station

cc:

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COOPER NUCLEAR POWER STATION - DOCKET NO. 50-298MULTI-PLANT ACTION F-55 OR TMI II.K.3.28
VERIFY QUALIFICATION OF ACCUMULATOR ON ADS VALVES

- 1) Your letter of August 26, 1983 indicated that the accumulator system was capable of actuating the ADS valves for a period of 1 hour following an accident. Based on the requirements of NUREG-0737 Item II.K.3.28, it is 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 functions during and following exposure to hostile environments, taking no credit for non-safety-related equipment or instrumentation. 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 this cannot be demonstrated, it must be shown that the accumulator design is still acceptable. If reliance on back-up systems to recharge the accumulators is necessary for long term operation (for instance, feed and bleed if RHR not available) clarify if the back-up system is environmentally and seismically qualified or that compensatory measures are provided for long term operation (ie: procedures for manual action, additional air or nitrogen on hand, hardware for connections readily available or installed, bases that sufficient time exists for the required manual actions). Since this system is a part of the emergency core cooling system, it must function for the long-term period of 100 days following an accident or justification be provided for the time specified for long term operation.

You are requested to address in detail (a) how you meet the above requirement for 100 days following an accident or (b) the justification as to why a shorter time period is sufficient capability for your plant 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.

- 2) You are 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. In order to demonstrate the capability of the accumulator to provide sufficient pressure for valve actuations for this time period, a detailed analysis is required. You are requested to provide such an analysis which includes the accumulator volume, the actual leakage rate allowable, the pressure available at the end of this period, and the pressure required for valve operation. If at the end of the required time period (and number of required actuations), the pressure in the accumulators exceeds the pressure required, this can be considered an additional margin.

- 3) You are requested to submit a detailed summary of the periodic leak test that is used to demonstrate the capability of the accumulator system.
- 4) You are requested to provide verification of the seismic qualification for Class I seismic ADS components within the drywell that you stated you were obtaining from your AE in your August 26, 1983. Further, for the Class II seismic backup system, justify its adequacy or provide a discussion of compensating measures as described in question 1.

The staff's preliminary assessment supporting the questions above is attached.

PRELIMINARY ASSESSMENT
COOPER NUCLEAR STATION
DOCKET NO. 50-298

MULTI-PLANT ACTION F-55
VERIFY QUALIFICATION OF ACCUMULATOR ON ADS VALVES

1.0 Background

Safety analysis reports claim that air or nitrogen accumulators for the automatic depressurization system (ADS) valves are provided with sufficient capacity to cycle the valves open 5 times at design pressures. GE has also stated that the emergency core cooling (ECC) systems are designed to withstand a hostile environment and still perform their function for 100 days following an accident. Licensees and applicants must demonstrate that the ADS valves, accumulators, and associated equipment and instrumentation meet the requirements specified in the plant's FSAR and are capable of performing their functions during and following exposure to hostile environments, taking no credit for non-safety-related equipment or instrumentation. Additionally, air (or nitrogen) leakage through valves must be accounted for in order to assure that enough inventory of compressed air is available to cycle the ADS valves. If this cannot be demonstrated, it must be shown that the accumulator design is still acceptable.

The commitment to satisfy the requirement of II.K.3.28 for Cooper Nuclear Station, is discussed in the licensee's initial submittals dated January 16, 1980 and December 28, 1981 and their response to the request for additional information dated August 26, 1983.

2.0 Discussion

As described in the FSAR, there are four main steam lines with three safety valves and eight relief valves. The relief valves provide overpressure protection and can function as safety valves, or be opened manually (from the control room). Six of the relief valves are part of the ADS system and function automatically so that the low pressure core injection (LPCI) and core spray systems can be used to protect the core in cases of small line breaks. For this mode of operation, each of the ADS valves is provided with a power-actuated device capable of opening the valve at any steam pressure above 100 psig and capable of holding the valve open until the steam pressure drops to 50 psig. The power-actuated device is a pneumatic operated piston within the main valve which opens the second stage valve and causes the main valve to lift off its seat. Each of the relief valves in the ADS is equipped with an accumulator and check valve which will maintain sufficient air or nitrogen for a minimum of 5 valve operations (cycles). The ADS valves, accumulators, and check valves are all located within the drywell.

The licensee's letter of January 16, 1980 states that the check valves are a soft seat (BUNA-N) design manufactured by Dragon Valves Inc.

The licensee's letter of December 28, 1981 indicates that the normal gas supply for the pneumatically actuated ADS valves is nitrogen from the containment

inerting system. The backup supply is the instrument air system which consists of three air compressors acting in parallel. The licensee's letter of December 28, 1981 states that the instrument air floats* on the system and will provide a pneumatic supply if the nitrogen system fails. The plant air compressors are supplied by on-site power (main generator or diesels).

3.0 Demonstration of Qualification

3.1 Although the FSAR indicates that the accumulators are sized to contain sufficient air for a minimum of five valve actuations, (page IV-4-5), it does not specify the drywell pressure during these actuations, nor does it specify the time period allowed for these actuations. The licensee's letter of August 26, 1983 states that the ADS accumulators will provide the "required" actuation, with leakage taken into account, at 70% of drywell pressure. This letter does not specify the time period allowed for these actuations, however, from the test summarized in Section 3.3 below, it is assumed that one hour is the maximum time period allowed for these actuations. A longer time period cannot be justified on the basis of the leak test described.

3.2 The licensee has not presented any data on leakage rates. The letter of August 26, 1983 indicates that the licensee has performed calculations which show that the accumulators are sized to perform the required relief valve actuations at both normal containment pressure and at 70% of drywell pressure. These calculations are based in part on G.E. proprietary information and were not submitted for review.

3.3 The basis for the allowable leakage criteria is given in the licensee's letter of August 26, 1983 as leakage "such that the system will maintain at least the minimum required pressure for one hour and still provide more than adequate relief valve actuation time with the leakage of the relief valve actuator taken into account." The accumulators are leak tested (once per operating cycle) at normal containment pressure for one hour to assure that minimum required accumulator pressure can be maintained. Since the accumulator systems will be verified as class one seismic and environmentally qualified, no additional leakage due to seismic events or harsh environments is considered.

3.4 Long-term (100 day) capability of the ADS was addressed by the licensee in his letter of December 28, 1981 wherein he describes two independent pneumatic supplies, a normal and a backup system. The first, which is also used to maintain the containment atmosphere, is the 8,000 gallon liquid nitrogen storage tank. The backup supply is the instrument air system. There are pressure switches for each accumulator system which cause an alarm to annun-

*The term "floats" as used here is interpreted to mean that instrument air is always available behind a check valve, and does not require startup of compressors or changing valve position to be effective. The check valve direction is from the instrument air system to the ADS.

ciate in the control room when a low pressure condition exists and compressors for the instrument air system are supplied with on-site power (diesels or main generator).

The accumulators, piping, and check valves associated with the ADS (i.e., all components of ADS within the drywell) are installed to seismic Class I criteria. The licensee's letter of August 26, 1983 indicates that this statement is being verified by the A&E, and further states that the two independent pneumatic supplies (i.e., components outside of containment), are seismic Class II.

3.5 The environmental qualification of ADS components was addressed in the licensee's letter of August 26, 1983. This letter states that the Nebraska Public Power District (the licensee) is verifying that the electrical components meet the qualification requirements of 10 CFR 50.49 in conjunction with final environmental qualification of the plant electrical equipment as described in a letter from J. M. Pilant to D. B. Vassalo dated May 20, 1983.

4.0 Evaluation

4.1 The number of valve actuations which the accumulators are capable of providing after failure of the primary pneumatic source is not clearly defined in the licensee's submittals. While the FSAR cites the number five, the latest submittals refer to the accumulator capability as the "required number." The staff finds this statement to be incomplete and therefore unacceptable. The licensee should state unambiguously the number of times the valves are able to operate after an accident which involves loss of pneumatic supply, and the period of time during which this capability is required.

4.2 It is recognized that proprietary information may be involved in the determination of leakage rates. The leakage rates per se should not be proprietary. The staff requires the leakage rates and associated information including accumulator volume, gas volume used per valve operation, accumulator pressure and drywell pressure, in order to determine if the required capability will be achieved. The licensee should follow the procedures established by the NRC for submitting proprietary information for review. The staff finds the information submitted referenced in Section 3.2 above to be incomplete.

4.3 The basis given for the allowable leakage, as given in Section 3.3 above, can be considered acceptable only if the time period for which the capability is required, as requested in Section 4.1 above, is one hour or less. The staff will make a finding on this issue based upon the information received in response to Section 4.1 above.

Although it would be more conservative to assume an increased leakage rate after a seismic event or an accident; the licensee has examined the effects of these events on the leakage rate and concluded that there will be no increase

in the leakage rate. The effect of the possible additional leakage would be to reduce the time indicated in 3.3 above.

The licensee has stated that he will make periodic leak tests of the accumulator systems for the ADS at each refueling outage. He has not provided details of these tests and has described them only as sufficient to demonstrate that the minimum pressure for the "required" actuations will be retained in the accumulators for one hour. The staff believes the leak test procedure should be documented with exact times and pressures given in order to determine acceptability. The period should be defined in a less ambiguous manner. The staff recommends that when Technical Specifications are issued with regard to this action that the surveillance requirements be defined clearly in order to assure that an acceptable leakage test is always current. This would be accomplished by specifying a leakage test will be performed at least once every 24 months.

4.4 The seismic qualification of ADS components and piping within the drywell is presently being verified by the A&E. The staff requires this verification in order to determine whether the short-term requirements are met. Since both the primary pneumatic supply system (LN₂), and the backup system (instrument air), have not been verified as having capacity to resist the SSE, long-term (100 days) capability has not been demonstrated.

4.5 The licensee states that the ADS electrical equipment is within the scope of 10 CFR 50.49 and will be addressed by Multi-Plant Action B-60, Environmental Qualification of Electrical Equipment for Nuclear Power Plants. The staff finds the licensee is aware of and has considered the requirements of environmental qualification of equipment important to safety.

5.0 Conclusion

Based on the evaluation given above in Sections 4.1, 4.2, 4.3, and 4.4, the staff concludes that the licensee has failed to demonstrate the required qualification for the ADS accumulator at Cooper Nuclear Station.