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RECORD #323

TITLE: RESPONSE TO REQUEST FOR TECHNICAL ASSISTANCE REGARDING THE AUXILIARY
BUILDING VENTILATION SYSTEM AT ZION NUCLEAR POWER STATION

323

June 23, 1993

MEMORANDUM FOR: Edward G. Greenman, Director
 Division of Reactor Projects
 Region III

FROM: John A. Zwolinski, Assistant Director
 for Region III Reactors
 Division of Reactor Projects III/IV/V
 Office of Nuclear Reactor Regulation

SUBJECT: RESPONSE TO REQUEST FOR TECHNICAL ASSISTANCE (TASK INTERFACE AGREEMENT) REGARDING THE AUXILIARY BUILDING VENTILATION SYSTEM AT THE ZION NUCLEAR POWER STATION (AITS #93-0274, TAC NOS. M86295 AND M86296)

In a memorandum dated April 23, 1993, Region III requested technical assistance (Task Interface Agreement - TIA) from NRR in the resolution of issues regarding the auxiliary building ventilation system at the Zion Nuclear Power Station. In a subsequent supplement dated May 11, 1993, to the original request, additional questions were posed.

Enclosed are the NRR responses to the questions asked by Region III.

Original Signed by John A. Zwolinski

John A. Zwolinski, Assistant Director
 for Region III Reactors
 Division of Reactor Projects III/IV/V
 Office of Nuclear Reactor Regulation

Enclosure:
 As stated

cc: W. Hehl, RI
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 A. Beach, RIV
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DATE	6/15/93	6/22/93	06/04/93	06/04/93	06/07/93
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DATE	06/04/93	06/04/93	6/23/93		

QUESTIONS FROM ORIGINAL TIA DATED APRIL 23, 19931. REGION III QUESTION

The licensee has taken the position that the UFSAR contains two different types of information: descriptive and design. They indicated that the paragraphs labeled "system description" are just general design and operating features intended to provide an understanding of the overall plant operation. The licensee further stated that only the paragraphs labeled "design basis" can be considered as design basis. The issue we would like resolved during your review involves whether the whole UFSAR is considered the design basis of the plant, or only sections specifically labeled. This issue is of concern at Zion, as well as generic to other plants.

NRR RESPONSE (PROJECT DIRECTORATE III-2 - PDIII-2)

Per the definition of Design Bases in 10 CFR 50.2, the Design Bases means that information which identifies the specific functions to be performed by a structure, system or component of a facility, and the specific values or ranges of values chosen for controlling parameters as reference bounds for design. These values may be: (1) restraints derived from generally accepted "state of the art" practices for achieving functional goals, or (2) requirements derived from analysis (based on calculation and/or experiments) of the effects of a postulated accident for which a structure, system or component must meet its functional goals.

Regardless of what a paragraph in an UFSAR or FSAR is called, if a specification was assumed in an accident analysis, then it is part of the design basis.

2. REGION III QUESTION

Other questions related to the UFSAR which also came from the enforcement conference were:

- a) Is the concept that we only care about maintaining negative pressure within contaminated cubicles in the auxiliary building the design basis, or is maintaining a negative pressure within the whole auxiliary building the design basis?

NRR RESPONSE (PLANT SYSTEMS BRANCH - SPLB, AND RADIATION PROTECTION BRANCH - PRPB)

The design basis, as well as the licensing basis, for the auxiliary building ventilation system which serves all areas of the auxiliary building, including the spent fuel pool building, is to maintain the auxiliary building at a negative pressure of about 0.25 inches of water relative to ambient under normal and abnormal operation and to maintain the cubicles at a negative pressure of about 0.25 inches of water relative to the auxiliary building, hence, at a negative pressure of about 0.50 inches of water relative to the outside. (Refer to the

Design Criteria for the HVAC for the Zion Station prepared by Sargent and Lundy.)

It should be noted that the objective is to maintain the auxiliary building at a negative pressure with respect to all adjacent areas so that contamination is not transported to areas which are at a lower pressure than the auxiliary building. It is possible but undesirable for the auxiliary building to be negative with respect to atmospheric pressure, and still positive with respect to adjacent area(s) such as a ventilation system vacuum duct that runs through the building. In Zion's case, however, the Sargent and Lundy design documents indicate that the design negative pressure is with respect to the outdoors.

3. REGION III QUESTION

- b) Does the auxiliary building wall/door have any function with regard to keeping contaminated airborne material inside?

NRR RESPONSE (PLANT SYSTEMS BRANCH - SPLB AND RADIATION PROTECTION BRANCH - PRPB)

The design functions that the auxiliary building outer walls and doors serve in situations not involving an accident are structural and missile protection and control of the spread of contamination by allowing the required vacuum to be maintained. The pressure in potentially contaminated areas such as the pump cubicles and pipe chases should be controlled at approximately 0.25" negative pressure with respect to the adjacent clean areas in the auxiliary building. Maintaining this negative pressure in the potentially contaminated areas serves to confine radioactive materials to the auxiliary building under non-accident conditions. The integrity of the walls, doors, floor and ceiling maintains control over the spread of contamination by controlling pressure because without this integrity, it would not be possible to maintain the negative pressure.

4. REGION III QUESTIONS

- 3) The licensee used PRA to justify operability of a system. Can licensees justify operability with PRA?
- 4) Can the licensee use PRA to delay a test or an operability determination?

NRR RESPONSE (PROBABILISTIC SAFETY ASSESSMENT BRANCH - SPSB)

The supplement to the original TIA stated that an NRR response to these two questions was no longer required because Region III had independently concluded that these practices are not acceptable. As noted in NRC Inspection Manual Chapter 9900, "The use of PRA or probabilities of the occurrence of accidents or external events is not acceptable for making operability decisions." NRR therefore concurs with the Region III conclusions.

QUESTIONS FROM MAY 11, 1993 SUPPLEMENT TO TIA

5. REGION III QUESTION

One of the key points associated with this issue was whether or not the auxiliary building outer walls (and by extension, the missile door) serve a design function beyond structural and missile protection in situations not involving an accident. Specifically, is there some design function for the auxiliary building outer walls relating to the "confinement" of radioactive materials that may be present in the auxiliary building during non-accident conditions (i.e. maintaining a nominal 0.25" H₂O negative pressure with respect to the outside as described in the UFSAR?)

NRR RESPONSE (PLANT SYSTEMS BRANCH - SPLB AND RADIATION PROTECTION BRANCH - PRPB)

The design functions that the auxiliary building outer walls and doors serve in situations not involving an accident are structural and missile protection and control of the spread of contamination by allowing the required vacuum to be maintained. The pressure in potentially contaminated areas such as the pump cubicles and pipe chases should be controlled at approximately 0.25" negative pressure with respect to the adjacent clean areas in the auxiliary building. Maintaining this negative pressure in the potentially contaminated areas serves to confine radioactive materials to the auxiliary building under non-accident conditions.

From a health physics standpoint, the ventilation system is designed to draw from areas of low contamination to areas of high contamination.

Without the integrity of the building provided by the walls, doors, ceiling and floor, the ventilation system cannot perform this function. It should be noted that the 1/4" negative pressure is not absolute. The UFSAR refers to it as "nominal" and "approximately" 1/4" negative pressure. A lesser value, down to about 1/8" negative pressure would probably suffice, but clearly, 0.0" or 0.1" does not meet the requirement for a "nominal" 1/4".

6. REGION III QUESTION

The need for the auxiliary building to be maintained at a negative pressure is most critical when large quantities of radioactive materials have been released to the auxiliary building general area. The most significant scenario for this would be the "Event-V" or "interfacing system LOCA" where radioactive water is released directly to the "confinement." Is the "interfacing system LOCA" considered a postulated accident and is the occurrence of such an event considered part of the design basis?

NRR RESPONSE (CONTAINMENT SYSTEMS AND SEVERE ACCIDENT BRANCH - SCSB AND RADIATION PROTECTION BRANCH - PRPB)

The answer to both questions is No.

However, there is one scenario requiring a negative pressure to be maintained by the auxiliary building ventilation system that is evaluated in Chapter 15 of the UFSAR and which is a design basis accident, though not a limiting one. Specifically, the spent fuel pool is contained within the auxiliary building, which is analyzed in Section 15.7.4.1 of the UFSAR for a postulated accident involving dropping of a spent fuel assembly onto the spent fuel pool floor. In Section 15.7.4.1.5 of the UFSAR, the conservative dose estimates for this event are an off site dose at the site boundary of about 0.54 rem for a two hour integrated whole body exposure and an off site two hour thyroid dose at the site boundary of about 1.8 rem. Both these values are well within the guideline values in 10 CFR Part 100.

However, these dose calculations are based on the gaseous release of about 33,600 curies of Xe^{133} and about 4 curies of I^{131} through the ventilation system. In particular, credit is taken in the dose calculation for the removal of 90% of the airborne elemental iodine by the charcoal filters prior to being released through the vent stacks.

In the event of a failure to maintain the auxiliary building at a negative pressure with respect to ambient, these calculated dose estimates are no longer valid and the actual off site doses at the site boundary could be considerably higher. For the specific instance in which the 12 foot by 12 foot equipment access door was left open, there would be an unreviewed safety question when this door was open and spent fuel handling operations were in progress.

There is no doubt that the design basis, as well as the licensing basis, for the auxiliary building ventilation system which serves all areas of the auxiliary building, including the spent fuel pool area, is to maintain the auxiliary building at a negative pressure of about 0.25 inches of water relative to ambient under normal and abnormal operation. (Refer to the Design Criteria for the HVAC for the Zion Station prepared by Sargent and Lundy.)

While the Standard Review Plan (SRP) was issued after the operating licenses for the Zion Station, they continue to serve as a history and codification of the NRC staff's acceptance criteria during the time that Zion was being reviewed at the operating license stage. In Section II.3.b of the SRP, 6.2.3, "Secondary Containment Functional Design," the acceptance criteria for the negative pressure differential pressure in areas where charcoal filtration is relied upon to remove gaseous elemental radioactive iodine, is 0.25 inches of water under all wind conditions up to the wind speed at which diffusion becomes great enough to ensure site boundary exposures less than those calculated for the design basis accident even if exfiltration occurs. This requirement was reflected in Section 9.10.1 of the FSAR at the time of the Zion Station's operating license issuances and represents the licensing basis for the operating licenses.

7. REGION III QUESTION

Guidance was requested on the role that PRA may or may not have in the preparation of 10 CFR 50.59 safety evaluations by licensees.

NRR RESPONSE (PROBABILISTIC SAFETY ASSESSMENT BRANCH - SPSB)

There is no formal staff guidance on this issue. However, an interpretation of 10 CFR 50.59 can be made that is consistent with staff practice on the uses of PRA, as well as with existing industry guidance on the subject.

Specifically, part (a)(2) of 10 CFR 50.59 identifies the use of probability in reference to the determination of an unreviewed safety question:

"A proposed change, test, or experiment shall be deemed to involve an unreviewed safety question (i) if the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report may be increased. . ."

Prior to the advent of PRA, the increase in probability of occurrence for a 10 CFR 50.59 evaluation was evaluated primarily on design basis considerations and engineering judgment. However, with the current availability of PRA methods, reliability data, and plant specific PRAs, it is reasonable to expect that these can be used to estimate changes in probability associated with proposed plant modifications. However, in keeping with the current NRC practice, if the results of licensee 10 CFR 50.59 evaluations are to be acceptable to the staff, they should not be based solely on bottom line PRA numbers. Other considerations, such as engineering judgment and operating experience should also be factored in when appropriate.

In summary, NRR has no particular objection to the use of PRA in 10 CFR 50.59 evaluations but recommends that it play a supportive role, in conjunction with other inputs, such as engineering judgment and operating experience.