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Docket Nos. 50-324
and 50-325

May 7, 1969

Supplemental Report to ACRS

BRUNSWICK STEAM ELECTRIC PLANT
UNITS 1 & 2

U. S. Atomic Energy Commission
Division of Reactor Licensing

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1.0 INTRODUCTION

The staff report to the Committee on the Brunswick Steam Electric Plant Units 1 & 2, dated April 21, 1969, stated several positions that did not agree with the applicant's PSAR. These positions were discussed in either the Bell Station report, dated March 24, 1969, or the Brunswick report. A summary of these positions, as they related to Brunswick, was presented in Section 8.0 of the Brunswick report.

Since the April 11, 1969 Committee meeting, we have discussed these positions with the Carolina Power and Light Company (CP&L). (The Committee will recall that CP&L representatives were present during a part of its meeting with the Georgia Power Company on the Hatch plant.) As a result of this meeting, CP&L filed Amendment No. 7 (Fifth Supplement) on May 5, 1969, presenting what they consider to be clarifying information or modification of previous information in the application relating to the subject positions.

This supplementary report to the ACRS presents the status of each of the stated staff positions and how Amendment No. 7 has affected these positions.

2.0 STATUS OF COMMON ISSUES ON BWR's

2.1 Design basis for engineered safety features

We require that the applicant demonstrate that the engineered safety features are designed to accommodate those conditions used by the staff to approvde site acceptability. (10 CFR 100).

Amendment No. 7 expresses some philosophy about design margins for the engineered safety features but does not identify the radiation source

conditions. Therefore, this item has not changed from our original report and remains unresolved.

2.2 NDT requirements for primary system

The information provided in Amendment No. 7 (page II-4.3-1) resolves our previous problem and we now find this issue to be resolved.

2.3 Reactor coolant piping code

As previously stated to the Committee, the staff position is that the USAS B31.7 piping code should be used in the design of the primary system piping. We further stated that a rule was in preparation that would require the use of this code at some date which may cover this plant.

Amendment No. 7 presents certain steps beyond the currently used B31.1 code that will be taken by the applicant. These steps incorporate some of the provisions of B31.7 but not all.

In view of our intention to publish a rule concerning the use of the B31.7 code, we conclude that the extent to which use of the code will be required for Brunswick can be resolved after issuance of the construction permit.

2.4 Main steam line seismic design criteria

Our current position is stated as follows:

> "The main steam lines beyond the second isolation valve and up to the turbine nozzle, including all valves and branch lines out to and including the first valve in each branch line, should be designed to withstand the operational basis earthquake. Branch lines greater than 2-1/2 inch diameter should be considered."

The information submitted in Amendment No. 7 characterizes the main steam line as a Class II system with static analysis for the seismic loads. Therefore, this issue remains unresolved.

2.5 Automatic vessel depressurization system

Amendment No. 7 again states the applicant's position that the AC interlock on the auto-relief system will be provided if required by the AEC. Further, the system will meet IEEE-279 criteria for the electrical and electronic design with the exception that the mechanical aspects of the blowdown system are not covered by IEEE-279.

We conclude that this meets our requirement and therefore resolves the issue. We will require that the interlock be provided.

2.6 ECCS leakage isolation capability

This item has not changed since our last meeting with the Committee. Information submitted in Amendment No. 7 only documents the applicant's previously stated position. As we indicated on the Hatch review our position is: "Systems which are required to recirculate water after the loss-of-coolant accident should be designed to have remotely operated valves located inside and outside containment or be otherwise so protected that gross leakage or single failure of pipes or valves will not result in loss of recirculation or containment isolation capability. The designs should also provide for suitable leak detection and surveillance capability."

2.7 Design of the RBM system

Information provided in Amendment No. 7 only documents the applicant's position that the RBM system need not be safety grade and meet IEEE-279 criteria.

It is clearly stated that the system to be provided for Brunswick is the same as other systems already approved for construction for other BWR's.

We should point out that part of our problem resolving this item is the misunderstanding that appears to exist between the staff and other GE applicants. One case, Vermont Yankee, stated in Amendment No. 4 to their application that:

> "The (RBM) system will be designed with two channels of instrumentation so that except for bypassing for brief periods of testing and maintenance (these are the only contemplated purpose for employing bypassing) no single component failure will impair its design function."

We indicated to CP&L that we were willing to evaluate specific areas of the design where meeting IEEE-279 might prove to be a hardship. Several meetings were held with the applicant and the designer at which we requested that these areas be identified. The designer declined to pursue this approach because of his contention that the consequence of a rod withdrawal error and an RBM failure is not a safety problem. Amendment 7 indicated generally only the principal areas of nonconformance. We understand that the areas identified do not include all such areas. Since the designer and the applicant have been unwilling to discuss specific areas where their design fails to meet IEEE-279, this issue remains unresolved.

2.8 Flow-biased flux scram

Amendment No. 7 (page II-7.9-1) restates the applicant's position that a flow-biased flux scram will be added and its electrical and electronic design will meet the IEEE-279 criteria if required by the AEC. An exception

is taken to meeting IEEE-279 in the hydraulic and mechanical areas.

We conclude that the applicant has provided the necessary design requirements for the scram system except for the hydraulic and mechanical areas. It is our position that some means of deriving redundant flow measurements from each recirculation loop should be provided to meet the requirements of IEEE-279. We will require the flow-biased scram with the understanding that if operating experience at other BWR plants does show it is not needed for safety, we will consider removing the scram requirement at that time.

2.9 Inservice inspection

Our original report on Brunswick stated that the proposed approach to develop an inservice inspection program was inadequate.

The applicant has presented in Amendment No. 7 (page II-1.5-1) a commitment to develop an inservice inspection program that will "...accomplish as near as practicable the intent of the N-45 Committee recommendations." This program is expected to be completed within the next six to nine months.

We conclude that this acceptable and will require the applicant to submit the program, developed from the study, for our review.

2.10 Deformation and stress limits

The applicant presented in Amendment No. 7 (page II-4.7-1) revised seismic design criteria which state the limits to which the plant will be designed. These limits are in terms of limiting yield stress or maximum deformation.

Two items that were of concern to the staff dealing with the use of experimental results and plastic instability analysis for setting limits have been resolved with the applicant. The methods will not be used by the applicant in the design of the Brunswick Plant without further discussion and acceptance by the staff.

Based on Amendment No. 7, we conclude that the stress and deformation limits proposed are acceptable.

3.0 STATUS OF APPLICANT-RELATED ISSUES

3.1 Diagonal reinforcement in primary containment

Our position is that diagonal reinforcement is required in the primary containment to resist seismic shear stresses.

The applicant does not propose to use diagonal reinforcement. Moreover, Amendment No. 7 does not address this issue. Therefore, the issue remains unresolved.

3.2 Seismic design of fire systems

Our position is that those portions of the fire protection system whose failure could damage Class I structures and components must be designed to Class I seismic standards.

In Amendment No. 7, (page II-1.7-1), the applicant states that the fire protection system will be placed and anchored so as to preclude mechanical damage to Class I systems and structures. Moreover, the fire protection system will be designed as a dry-type system with manually operated isolation valves located at the point of introduction to Class I structures.

We find this to be an acceptable approach toward meeting our requirements. We conclude that the issue is resolved.

3.3 Additional flooding protection

In Amendment No. 7, (page II-2.8-1), the applicant provides clarifying information on flooding effects of the maximum probable hurricane (MPH). The analyses were performed using the ESSA approach defined in HUR-7-97.

In the area of the reactor buildings, the still water flood level is 22.0 feet MSL with a maximum stable wave height of 1.6 feet and a maximum wave run-up along vertical structures is 2.0 feet. The maximum water height, therefore, is 25.6 feet MSL in the area of the reactor buildings.

In the area of the intake structure, the maximum stable wave height is 3.0 feet and the maximum wave run-up is 3.3 feet. Therefore, the maximum water height in the area of the intake structure is 6.3 feet above the still water flood level, or 28.3 feet MSL.

The applicant proposed to provide flooding protection up to 22.0 feet MSL. We expect that additional flooding protection will be required. We defer specification of the required flooding protection pending receipt of the CERC recommendations, which we expect shortly.

3.4 Tornado design margin

The tornado loading conditions for Class I structures is based on a maximum tangential velocity of 300 miles per hour, a translation velocity of 60 miles per hour, and an atmospheric pressure drop of 3 psig in 3 seconds.

We have asked the applicant to assess the tornado safety margin that exists in the design of Class I structures (Questions 5.1.6 and 5.2.2).

In Amendment No. 7 (page II-5.2.2) the applicant states that the factored load "U" will contain a 15% margin for tornado loads "...when considering shear and diagonal tension in shear walls (i.e., exterior walls of the reactor building."

We find this modification to be an acceptable method for identifying safety margins with respect to tornado levels.

3.5 Fish and Wildlife recommendations

The applicant has not clarified his position with respect to the Fish and Wildlife recommendations.

4.0 AMENDMENT NO. 7 INFORMATION ON OTHER AREAS

4.1 Load shedding circuitry

Late in our review of the Brunswick Plant, we identified an area of the load shedding circuitry that made the onsite power system vulnerable to a single failure. The applicant has corrected this problem and we conclude that the original concern is now resolved.

4.2 Cadweld testing program

The applicant has documented a revised cadweld testing program. The schedule for testing and inspection is now 4 out of the first 100 splices for each bar size, 3 out of the next 100 splices, and 2 out of the next and subsequent units of 100 splices.

We find this program to be an acceptable substitute for that described in our original report to the Committee.

4.3 Quality assurance program details

The applicant's quality assurance program prior to Amendment No. 7, was deficient in that the extent to which the program details would be documented, was not clarified. This clarification is reflected in Amendment No. 7 (page I-1.4-1). This deficiency is, therefore, resolved.

4.4 Performance features of the fuel failure detection system

The applicant's description of the performance features of the fuel failure detection system, prior to Amendment No. 7, was incomplete. This deficiency has been corrected in Amendment No. 7. We will continue to review this aspect of the design in terms of the capability for prompt detection of gross fuel failures.

5.0 CONCLUSION

As can be seen from this supplementary report the following problems have not been resolved with the applicant: (2.1), (2.4), (2.6), (2.7), (2.8), (3.1), (3.3), and (3.5). We have presented to the applicant our position on each of these problems several times.