

July 9, 1984

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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BEFORE THE ATOMIC SAFETY AND LICENSING BOARD 84 JUL 12 10:57

In the Matter of)	
)	
CAROLINA POWER & LIGHT COMPANY)	Docket Nos. 50-400 OL
and NORTH CAROLINA EASTERN)	50-401 OL
MUNICIPAL POWER AGENCY)	
)	
(Shearon Harris Nuclear Power)	
Plant, Units 1 and 2))	

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APPLICANTS' COMMENTS ON WELLS EDDLEMAN'S
RESPONSE TO BOARD ORDER REQUIRING
ADDITIONAL SPECIFICATION OF CONTENTION 215

Introduction

In its Further Rulings on Admissibility of Offsite Emergency Planning Contentions Submitted by Intervenor Eddleman, at 24 (June 14, 1984), the Board addressed Eddleman proposed Contention 215, which alleges that there are numerous conservatisms in the Evacuation Time Estimates which may make the estimates unrealistically high and thus provide an unsound basis for protective action decision-making.

The Board admitted Contention 215, but found that in its present form the contention requires further specification, "both to make litigation more valuable and to give the other parties fair notice of the subject of litigation." Id. Mr. Eddleman was directed to serve on the Board and parties, by

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June 29, 1984, a list of specific conservatisms in the Estimates he wants to litigate. Other parties were afforded the opportunity to file comments on such conservatisms by July 10, 1984.

On June 29, 1984, Mr. Eddleman filed his ". . . Response to Board Order Requiring Additional Specification of Contention #215." Applicants herein submit their comments on the four "conservatisms" identified by Mr. Eddleman.

The contention and the Board's ruling both cite the Licensing Board decision in Commonwealth Edison Company (Byron Nuclear Power Station, Units 1 and 2), LBP-84-2, 19 N.R.C. ____ (January 13, 1984), for the proposition that evacuation time estimates should aim for realism, and not employ conservatisms in a way which adversely impacts protective action decision-making. The thrust of Eddleman 215 is to challenge such conservatisms. The deficiency in Mr. Eddleman's further specification of Contention 215, however, is that while he identifies assumptions, Mr. Eddleman fails either to explain why the assumption is conservative, or to assert that its impact on the estimates is significant (in terms of its influence on protective action choices).

The evacuation time estimate (ETE) report compiled by HMM Associates for the Shearon Harris EPZ is a state-of-the-art analysis of representative evacuation scenarios. The analysis has been prepared using a computer simulation model and the guidance provided by NUREG-0654, Appendix 4. In undertaking

the computer simulations it is necessary to provide detailed input data. The input data consists of existing statistical information, such as census data and roadway characteristics, and assumptions about activity that will take place during each scenario modeled. The assumptions incorporated into this analysis are consistent with those used by HMM Associates in its compilation of ETE reports for other nuclear power plant sites.

In choosing the assumptions to be input to the evacuation scenarios HMM Associates attempted to be as accurate as possible. However, where the simplifying assumptions in combination have some potential for error, the analysts have attempted to balance the overpredictive versus underpredictive assumptions to compile scenarios that are realistic or may be slightly conservative (i.e., they include potential errors that may overestimate, slightly, the time required to evacuate rather than underestimate the time required.)

Comments on Specific Assumptions

Eddleman Item 1: The assumption of evacuation from home. For certain times of day, this assumption is unrealistic for many persons who will not be at home, but be at work, school, shopping, doctor's office, etc. This could also result in double counting of evacuees for persons who both live and work within the EPZ (6/14/84 Order at 31).

Eddleman Item 4: The assumption in all of the evacuation scenarios that at least one person is at home at all residences. (See Estimates at 1-3, 1-4.) The number of persons at school, the lakes, etc. varies according to more realistic criteria and these should too.

In order to compile evacuation time estimates the analyst must consider several aspects of an evacuation scenario. The three major elements that must be considered are: (1) the time required to notify the population of the need to evacuate, (2) the time required for each segment of the population to prepare to evacuate, and (3) the actual travel time required to depart the area being evacuated. Federal guidance provides for considering these elements separately for permanent residents, transient populations, and special facility population. NUREG-0654, Appendix 4, Figure 4.

In compiling the Shearon Harris ETE, it was assumed that the resident population will evacuate from their places of residence. In other words, regardless of the location of the residents of each home in the EPZ when notification is initiated, it is assumed that one vehicle will depart from the residence after notification and preparation for evacuation. Preparation to evacuate (Step 2 identified above), involves the formation of family units and packing of clothing, personal goods and valuables. This step may also require intermediate travel from the place at which notification is received to the residence for formation of family units and other preparation. This phenomenon is accounted for in the allotted preparation times, which range from 30 to 150 minutes from the governmental decision to evacuate. ETE at 6-1.

This assumption does involve some double counting of people, since some workers and recreational patrons are permanent

residents. It must be emphasized, however, that evacuation time estimates deal primarily with vehicle movements. This intentional double counting of some members of the population simulates implicitly, by adding vehicles to the evacuation routes, the traffic friction on the network due to travel to residences prior to actual evacuation. Consequently, the assumption may not mirror population numbers precisely, but it more accurately reflects vehicle activity on the evacuation network.

Eddleman Item 2: The assumption of one vehicle per household (Evac. Time Estimates, e.g. at 3-2/3-3). Households with 2 vehicles may evacuate in both vehicles rather than linking up.

The assumption of more than one vehicle per household would be a conservative assumption that would tend to overestimate the numbers of vehicles evacuating and, therefore, the resultant evacuation time. Suggesting this more "conservative" approach appears to be in conflict with the thesis of Eddleman 215 (i.e., to avoid unrealistically high evacuation time estimates created by stacking conservative assumptions). There are several reasons why an assumption of more than one vehicle per household would be unreasonably conservative:

- A. Work and recreational trips are already accounted for in other assumptions as noted in the previous response.

- B. In observations of evacuations from actual disasters auto occupancy has been in the range of 3-4 persons per vehicle. The ETE assumption is that there will be 2.7 permanent residents per vehicle, which is below the observed range. This assumption is conservative enough. Assuming more than one vehicle per household (in addition to the double counting inherent in transient and special facility populations) would be unrealistically conservative.
- C. NUREG-0654 (App. 4 at 4-3) suggests a reasonable range of two to three permanent residents per vehicle. The assumed value of 2.7 fits within this range.

Eddleman Item 3: The apparent assumption that those households without vehicles will automatically evacuate with neighbors (or can) at the rate of one vehicle per household.

The methodology used in the Shearon Harris ETE assumes that vehicle occupancy rates for the non-auto owning population are similar to those for the auto-owning population: one vehicle per household. This is a slightly conservative, but entirely reasonable assumption. Such an assumption provides for one vehicle trip to the residence to pick up anyone there. It does not matter, for evacuation time estimate purposes, whether that vehicle is operated by a friend, neighbor or emergency worker. Based on estimates of the non-auto owning population,

at most this assumption could theoretically put 410 extra vehicles on the network (versus a total of 7347 required to accommodate all permanent residents). ETE at 3-2. In practice, however, providing for these extra trips is a reasonable means for accounting for vehicles within the network following internal routes to collect non-auto-owning passengers. Eliminating these vehicles altogether would tend to underestimate the time required to evacuate. This would also be inconsistent with the thesis of Eddleman 215. As a practical matter, the number of vehicles assumed to accommodate the non-auto-owning population is not significant. A reduction of a total of 410 vehicles would not reduce evacuation time estimates appreciably -- i.e., a reduction of 10 minutes might be achieved by changing this assumption to include no vehicles to handle the non-auto-owning population.

Conclusion

The four assumptions identified by Mr. Eddleman illustrate the point made in the Introduction, supra, that the analysts who prepared the ETE used off-setting assumptions in an effort to achieve realism. Two of the assumptions identified by Mr. Eddleman (Numbers 2 and 3), if altered to meet the apparent criticism, would result in underprediction of evacuation times -- the very opposite effect from the concern voiced in Eddleman 215 and in Byron, supra. In short, they do not support the basis for the contention but, rather, cut against it. The

other assumption (Numbers 1 and 4 appear to address the same issue) involves a conservatism, but Mr. Eddleman does not describe how the assumption invalidates, if it does, the utility of the ETE for protective action decision-making. Consequently, Applicants submit that the defects found by the Board in Contention 215 have not been cured and it should be dismissed for lack of specificity.

Respectfully submitted,

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Dated: July 9, 1984

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CERTIFICATE OF SERVICE

I hereby certify that copies of "Applicants' Comments on Wells Eddleman's Response to Board Order Requiring Additional Specification of Contention 215" were served this 9th day of July, 1984, by deposit in the U.S. mail, first class, postage prepaid, to the parties on the attached Service List.

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