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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

August 12, 1985

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD
Glenn O. Bright
Dr. James H. Carpenter
James L. Kelley, Chairman

In the Matter of

CAROLINA POWER AND LIGHT CO. et al.
(Shearon Harris Nuclear Power Plant, Unit 1)

Docket 50-400 OL

ASLBP No. 82-468-01 OL

Wells Eddleman's Proposed Findings/Conclusions on Contention 5&7-C-10 and Emergency Planning

Introduction.

At the outset, I want to re-emphasize my view of the scope of this matter as including the ability and willingness of the emergency management personnel to use the Protection Factor information to protect the health and safety of the public under 10 CFR 50.47(a)(1). See, e.g., Tr. 7924-26 (including reference to 10 CFR 50.47(a)(1); Tr. 7928-9 (Usefulness depends on attitude, as well as on the info); and Tr. 7935-36, etc. I do not propose to repeat the arguments here, since they're in the record.

I rely on the Board's earlier ruling that such rulings, and rulings on summary disposition and other motions, do not become ripe for appeal until a partial initial decision on a subject area (in this instance, emergency planning) has issued. Therefore I have not specifically responded to Applicants' proposed including of summary disposition orders in their proposed findings, since no additional decision on those matters is proposed by them.

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But I take strong exception to the apparent proposal to approve the Harris plant's licensing, as far as this Board has jurisdiction (see Applicants' "Conclusions", paragraphs 69-71, 8/1/85 Applicants' proposed findings at 38-39, and "Order", paragraph 72, following). There is not a partial initial decision yet on safety matters, nor is it evident all safety matters will be put into the coming partial initial decision; also the safety matter of drug abuse affecting construction quality (CCNC Contention WB-3) is still at issue; further, the emergency planning issue of whether sirens will awaken sleeping persons indoors with windows shut and/or air conditioners or other noisy appliances on, is still to be litigated. Applicants have the burden of proof and should not get a license until they have fully carried this burden. (I shall make points below that they have not carried their burden with respect to contention 57-C-10.)

PROPOSED FINDINGS

1. NUREG-0654 criterion II.J.10.m requires emergency response plans to include "expected local protection afforded in residential units or other shelter for direct and inhalation exposure...".

2. Applicants' witness Martin testified that the shelter survey of nonresidential structures was initiated by CP&L. Tr. 8016. FEMA's witnesses testified they didn't have any information on the EPZ structures other than that presented (in the hearing) by CP&L. Tr. 8135. Witness Martin directed CP&L's surveys of Harris EPZ structures

3. Witness Martin testified that "expected protection" as used in NUREG-0654 criterion II.J.10.m means, founded on specific measurements or calculated measurements. Tr. 8060.

4. Witness Martin made no measurements of air infiltration rates of any structures within the EPZ. Tr. 8027. He also did not look for cracks in the wall or roofs, or around windows and doors, in his surveys. Tr. 8051.

5. Changes in the amount of air moving into a structure affect the inhalation exposure dose as well as the direct exposure dose to persons inside that structure. (Martin, Tr. 8026)

6. The range of air infiltration rates for typical commercial structures range over a factor of 3 (0.5 to 1.5 air changes per hour) Martin, Tr. 8030-33, see at 8034. However, a range of 0.5 to 1 was used in Martin's studies (Tr. 8041-42).

7. Witness Martin agreed that wind speed increases the differential pressure between the inside and outside of buildings, increasing the potential for air infiltration by the presence of the pressure differential. (Tr. 8049). He also agreed this is true for all kinds of structures. (Tr. 8049).

8. Witness Myers testified that only Martin's attachment 8 (summary data on protection factors in structures (see below)) and page 4 of Martin's attachment 5, would be incorporated into the NC Emergency Response plan for the Shearon Harris plant. Tr. 8058; see also 8059 and 8113, 8114-8115.

9. Martin testified that a typical air change rate, though not his 0.5-1 air change per hour rate, is based on a 1 mile per hour wind. Tr. 8109. Martin further stated he had "no idea" what the average wind speed was around the Shearon Harris site. Tr. 8115.

10. The inhalation dose estimates depend on air change rates which were not measured, and are not specific to typical wind speeds around the Harris site (evidently -- see Finding 9 above). Findings 3,4,5,7,9 above.

11. The inhalation dose information to be incorporated into the plan (Martin's attachment 5, page 4 only) does not include air infiltration rate data. Tr. 8071. No data on measured, or calculated measurements of, infiltration rates and their effect on either inhalation or direct dose or protection factors is going into the North Carolina plan for Harris emergency response.

12. The summaries of protection factors to be incorporated into the NC Emergency Response Plan for the Shearon Harris plant (see Finding 8, above), collapse data to the point that the ranges given are not typical of the actual structures within the EPZ. This is evident from a comparison of the base data (Martin's Attachments 6 and 7) with the summaries on Attachment 8. See also the admissions to this effect by Applicants' witnesses (Tr. 8111-8113; Tr. 8052-53 and 8104-8105). The school range is not typical of either school, unless so wide a range is assumed, as to be useless for assessing expected protection, i.e. 4 to 25 as representative of one building with 4 (no range) and another with a range of 10-25; likewise for inhalation, 1.2(no range) [illegible] for one school and 1.6 to 5.7 for another, so that the range is not typical of the 2 buildings, but of neither: a range of 1.2 to 5.7 is not representative of a building that has only 1.2. See Tr. 8112-8113, also 8111. Applicants' witness appeared evasive on this point, but it is obvious from [illegible] Martin Attachments 6, 7 and 8). The ranges for buildings are likewise biased by the inclusion of the high end ranges of untypical structures (see Martin Attachment 6, e.g. Allied Corp.) in ranges on Attachment 8.

13. Purely from a protection factor viewpoint, there is reason to move people to structures of higher protection factor if doing so will not expose them to additional radiation dose. Martin, Tr. 8004-5, 8008-9. However, this will not likely be done. Myers, Heard testimony.

14. Witness Myers' description of the factors that affect inhalation dose (Tr. 7937-8) is in fact a description of the factors that affect the protection factor for direct exposure from nuclides deposited outside a structure. Myers' involvement in the protection factor issue in development of emergency response plans was to bring

together people who had knowledge of those matters (see Tr. 7912-13).

15. None of Mr. Myers' staff were witnesses. However, witness Myers testified he would have to rely on his staff concerning the effect of wind speed on air infiltration into buildings (Tr. 8066-67). As noted in Finding 5 above (see Tr. 8026 & Tr. 8048-9), air infiltration can increase both the inhalation dose and the direct exposure dose to persons inside the structures. Yet, the air exchange rates assumed by Mr. Martin will not appear in the plan (Tr. 8071, Martin and Myers agree).

16. The inhalation dose is critical in ordering sheltering (Tr. 8147, FEMA witness Heard) and in-place sheltering assumes (in nuclear plant emergency response plans in the Southeastern region) no movement to higher protection factor structures (Tr. 8151, Heard) and (in all plans witness Heard is aware of) in-place sheltering for "one to two hours at the most" (Heard, Tr. 8151). Thus, in estimating the health effects of in-place sheltering as conceived in the Harris emergency response plans, specific information on infiltration rates assumed is needed. This is particularly so, since witness Heard referred to a "mean of 1.5" inhalation dose protection factor when the actual inhalation dose Protection Factors for most structures within the EPZ are generally less, see, e.g. Applicants' Exhibit 29 at p.51, and Martin Attachments 6 and 7. The dependence of dose on the infiltration rate means that infiltration rate information must be included in the plan, for various wind speeds and different types of structures typical of those within the EPZ, both residential and other structures.

17. Witness Myers also would rely on his staff concerning whether protection factors of structures within the EPZ fall outside the ranges given in the plan (Tr. 8109). Thus, there is no evidence that the PFs of structures in the EPZ do all fall in these ranges,

and the proposed data for inclusion in the plan, even if completely presented by typical sorts of structures as Finding 17 above would logically require, are not shown to be complete. Myers had "no idea" of the percentage of structures in the EPZ that were analyzed for PFs. Tr. 7941D-4

18. Witness Martin testified (prefiled, pp 8-11, see Applicants' proposed finding #50, p.30 of 8/1/85 proposed findings) that there was no direct determination of Protection Factors for churches and small commercial structures. Martin also testified, as noted above, that specific measured or calculated measured protection factors are required to meet the requirements of NUREG-0654 II.J.10.m. See Finding 3 above, Tr. 8060. Thus, the protection factors assumed for churches and small commercial structures do not meet the requirements of the NUREG-0654 specifications, i.e. criterion II.J.10.m.

19. The protection factor in Martin Attachment 8 (the data that is to be included in the Harris NC Emergency Response Plan) shows a low range of airborne direct exposure Protection Factors of about 1.2, or less than that provided for airborne nuclides direct exposure in a single-story brick house with no basement. (Martin, Tr. 8065). The protection factor of 5 (Martin attachment 8) for deposited nuclides is less than that for a single story brick house with no basement. (ibid.) Inspection of Martin's attachments 8,6,7 and 5 show that the PF's of nonresidential EPZ structures mostly fall in the ranges as previously

20. FEMA witnesses Heard and Hawkins had testified (prefiled, p.3) that the use of typical residential (home) protection factors for single-story brick or frame houses without basements "is conservative" but they admitted on cross-examination (Tr. 8144) that it is not conservative if the other structures provide less protection than a brick house with no basement. As noted above, Finding 19, this is true for most EPZ non-residential structures, as inspection of Martin Attachments 8, 6, 7 and 5 will show. The low range of PFs for most such structures are approximately 1.2 for airborne exposure and in the range of 5 for deposited nuclide exposure.

Witness Heard's attempt to explain this inconsistency (Tr. 8149-50) only reinforces the conclusion that the use of residential structure PFs in the Harris emergency response plan would not be conservative. The "more substantial structures" (that would have higher PFs, per witness Heard) are not typical of other (nonresidential) structures within the Harris EPZ.

21. FEMA staff also testified that Protection Factors of residential "and other" structures were in the plan (Applicants' Exhibit 29), but could point to no such other structures (Tr. 8139-41) and admitted their statement that it includes "other" structures was incorrect, Tr. 8140. The erroneous statement appears to be taken from a too-literal reading of the plan narrative (Tr. 8140-41), but the plan contains no PFs of other (non-residential) structures, Tr. 8141.

22. The inconsistencies cited in Findings 20 (vs. 19, and in 20 itself) and 21 above indicate that FEMA's review of the Harris Emergency Response Plan with respect to the protection factor issue was extremely cursory and inaccurate. FEMA witnesses testified that they had no information "except what Applicants have produced here" (in the hearings), Tr. 8135.

23. FEMA's findings would not be reliable, due to the cursory and inaccurate review noted in Findings 20-22 above. In addition, FEMA's finding that adequate protective action "could" be taken, (see Tr. 8144) is not that required by 10 CFR 50.47(a)(2)(1).

24. Board examination and other questions revealed that evacuation is the preferred action in a nuclear accident, see Tr. 8158, and sheltering would only be ordered for a puff release lasting one to two hours maximum (Tr. 8151). These facts should be made known and included in the emergency response plan. They also show that the use to be made of information in the plan is an issue the Board and witnesses did not stay away from, despite the Board's limiting the contention and cross-examination to "exclude" those questions.

CONCLUSIONS

A. 10 CFR 50.47(a)(1) requires a finding that there is reasonable assurance that adequate protective actions "can and will be taken" in the event of a radiological emergency. However, FEMA's finding in this case was only that such measures "could" be taken. Thus it would be up to Applicants, assuming FEMA's finding were unrebutted, to carry the burden of proof that such adequate protective actions can and will be taken.

B. FEMA witnesses gave very brief testimony which nevertheless contained some inaccuracies their witnesses admitted, e.g. that the use of protection factors based on houses as a proxy for the protection factors in other structures was conservative (they conceded on cross examination that it was not conservative) and that protection factors were given in the April 1, 1985 emergency plan revision for "other" structures (they conceded no other structures' Protection Factors are actually in that revision of the plan). FEMA's findings are evidently based on such a cursory and inaccurate review as to not be reliable.

C. Applicants presented no evidence that effective protective action will be taken. Mr. Myers' testimony (prefiled, p.5) simply states that the information "will be available to officials who will decide what protective action (that is, evacuating or sheltering the population) to take in the event of an accident at the Harris plant." As noted above, Mr. Myers evidently did not know what an inhalation protection factor was (at least, what factors affect it), and would have to rely on his staff (see, e.g. Tr 7913; Tr. 8066-67) concerning the meaning and use of protection factor information applicable to accident conditions. None of these staff were presented as witnesses. Applicants' witness Martin also testified that measured or calculated [illegible] were required to meet NUREG-0654 II.J.10.m criteria, but he did not measure any air infiltration rates or calculate them? Tr 8060, 8027

Applicants themselves objected to questions about the use of the protection factor information, although some of this information was elicited in later Board examination after the objections were sustained. (See, e.g., Tr. 8145-8149, Board examination, and following redirect and recross). See also Finding 24, above.

It is also evident that the information to be incorporated into the plan is so summarized that it is not typical of any structure in the EPZ.

For all these reasons (lack of witnesses who demonstrate that adequate protective action can and will be taken, lack of knowledge by witnesses presented, lack of useful information to be placed into the plan for typical structures as required by NUREG-0654 cirterion II.J.10.m, and lack of proof as to the use of the information, which is distinct fgrom attitudes of the users -- see, e.g., Tr. 7928, Judge Kelley's question during argument)) the Applicants have not carried their burden of proof with respect to this contention.

D. FEMA witnesses stated they had no information on sheltering other than what Applicants had produced in the hearing (Tr. 8135). Therefore the above findings would necessarily apply, and Conclusion C. above would necessarily apply, to FEMA's findings also. This reaffirms and adds basis to our conclusion B. above, and we specifically conclude that FEMA's findings are inadequate and inadequately supported to meet the requirements of 10 CFR 50.47(a)(1) with respect to Contention 57-C-10.

ORDER

It is, therefore, ordered that no license to operate the Shearon Harris Nuclear Power Plant be issued until the requirements of 10 CFR 50.47(a)(1) are met, in particular with reference to protection factor information included in the emergency response plan.

(END)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the matter of CAROLINA POWER & LIGHT CO. Et al.) Docket 50-400
Shearon Harris Nuclear Power Plant, Unit 1) O.L.

CERTIFICATEOF SERVICE

I hereby certify that copies of Wells Eddleman's Proposed Findings/ Conclusions on Contention 5&7-C-10 & Emergency Planning

HAVE been served this 12 day of August 1985, by deposit in the US Mail, first-class postage prepaid, upon all parties whose names are listed below, except those whose names are marked with an asterisk, for whom service was accomplished by _____

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