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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

Glenn O. Bright
Dr. James H. Carpenter
James L. Kelley, Chairman

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

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 and Conclusions on
Contention 57-c-3 (Nighttime Alerting and Notification)

Under extension of time approved by the Board and all Parties,
(See Tr. 10225, 10,210), Wells Eddleman, Intervenor, files these proposed
Findings of Fact, Conclusions of Law and Proposed Order on Contention
57-C-3 (Nighttime Alerting and Notification).

FINDINGS OF FACT

1. Contention 57-C-3 as originally admitted reads:

The plan does not have provisions for notification at night, e.g. in the hours between 1 a.m. and 6 a.m. when most people living near the plant would normally be asleep. Nor does the plan assure that they would be timely awakened to take sheltering action, as e.g. on a summer night when many might have windows open or air conditioners on. The plan should provide automatic phone-dialing equipment to transmit an emergency message to all households in the EPZ for Harris, asking people to alert their phoneless neighbors.

2. In denying Applicants' motion for summary disposition (which was supported by various affidavits including one by Dr. M. Reada Bassiouni, acoustic consultant to CP&L), the Board

directed the Applicants and Staff to address these questions:

(A) "whether the sirens can wake up virtually all the people sleeping in the EPZ between 1 and 6 a.m., particularly those with windows closed and air conditioners running," and

(B) "whether the presently-planned means of back-up mobile notification could and should be augmented to meet the 'about' 15-minute standard in Appendix E, if necessary."

3. FEMA testimony did not address the second question (B) above. Applicants did not directly address augmentation of the system, but in effect their testimony is that it cannot be effectively augmented. (Keast et al., at 27, following Tr. 9365; it may take all of 15 minutes for (emergency) vehicles to travel to the rural areas to be alerted. This is one of the obvious practical constraints on the ability to restructure mobile alerting routes to target rural areas for coverage within 15 minutes. Joyner, Tr. 9583; accord, Applicants' Finding 39 and Fn.23, pp 32 and 33 of Applicants' proposed findings).

4. In any event, mobile alerting is not relied upon at the Shearon Harris Nuclear Power Plant as part of the primary notification system. (FEMA witness Carter, Tr. 9701; accord, Applicants Fn.24, p.32 of their proposed findings.) The siren system at Harris is the primary notification system.

5. The NRC requires that the notification system provide both an alert signal and an instructional message to the population within the 10-mile EPZ within 15 minutes. CLI-80-40, 12 NRC 636 at 638. Both FEMA and NRC "insist" on this design requirement. Ibid.

The NRC goes on to cite its rulemaking justification of the 15-minute notice requirement:

In determining what that (public notification) requirement should be, a line must be drawn somewhere, and the Commission

believes that providing as much time as practicable for the taking of protective action is in the interest of the public health and safety. The Commission recognizes that this requirement may present a significant financial impact and that the technical basis for this requirement is not without dispute. ... However, the essential rationale behind emergency planning is to provide additional assurance for the public protection even during ... an unexpected event. The 15-minute notification capability requirement is wholly consistent with that rationale.

45 FR 55407, quoted at 12 NRC 639.

The Commission concluded, "This rationale is unaltered by petitioners' filings with the Commission", and let the regulations stand.

Notification must cover essentially 100% of the EPZ within 15 minutes. NUREG-0654 at 3-3, re^{areas up to} 5 miles from the plant. For the full EPZ, capability for providing an alert signal to the population on and area wide basis throughout the EPZ within 15 minutes is required. NUREG-0654 at 3-3, emphasis added (Cf. Applicants' Finding 6 at p.7 for quotations/cites).

6. Contrary to Applicants' proposed Finding 8, it is clear that FEMA-43 was not designed with any reference to "what's required to alert the people in the EPZ" or after any assessment of "the validity of the requirements" or even considering "the question of nighttime / early morning alerting of people." FEMA witness Carter, principal author of FEMA-43 (cf. Applicants' proposed Finding 14, p.12) Tr. 9916-9917 upon Board examination.

It is clear, however, that the requirements of 10 CFR 50.47(a)(1) to assure that effective protective action can and will be taken, the requirements of 10 CFR 50 Appendix E, IV. D. 3 and the above-cited requirement of NUREG-0654 apply at all times of the day or night. They make no exceptions for nighttime conditions and they require effectiveness.

7. Motions by the Attorney General of North Carolina and by Intervenor Eddleman to subpoena CP&L consultant Dr. M. Reada Bassiouni were summarily denied by the Board, and the Board's rationale for that

denial is not available to the parties at the time of filing these findings. However, the Board did admit, as if sworn, a statement by Dr. Bassiouni in which he strongly criticizes FEMA's testimony and concluded "the (FEMA) guidelines address outdoor notification. A 10 dB differential between the siren sound level and ambient background level outdoors does not necessarily guarantee a 10 dB differential indoors. In order for a siren system design to incorporate indoor alerting, different requirements must be met.

"The relevant siren level is that which has already been attenuated through the walls of the house. Since the guidelines do not require indoor siren sound levels or ambients to be calculated, they do not address the effectiveness of indoor notification." (Tr. 9879, Eddleman Exhibit 73 at 7, correcting transcription errors).

8. Applicants' attempts to stress the credentials of the witnesses (proposed findings 14, 18, 21, 15-17, 19, 20) add force to the weakness of their case. Those witnesses testified for Applicants that only 69% of persons asleep in the EPZ would be awakened by the sirens, and for FEMA that only 64.5% would be. (On this last, cf. Applicants' proposed finding 49. The FEMA witnesses conceded that a single phone call to each household in the EPZ would alert over 90% of the population who have telephones (Tr. 9763), and that simultaneous-calling phone systems that can ring 1000 numbers (or more) at once are referenced in FEMA-43 section E.16 (Tr. 9760-61)

However, even incorporating "informal alerting", FEMA concluded that 87.8% of the persons in the EPZ could be alerted within 15 minutes (Applicants' Finding 51, p.42) and Applicants' comparable number is 88% (Applicants' Finding 46 at p.38)

All these witnesses assume that 100% of the sirens work when activated (See, e.g., Tr. 9700). However, this is not conservative and Applicants' counsel Ridgway indicated to the hearing that a siren

had probably failed during the emergency planning exercise for Shearon Harris in May 1985, but the company had no way to verify that it did or did not work.

9. There are numerous lesser problems with the data of FEMA and the Applicants, e.g. lack of field verification at Harris of the Applicants' (HMM) SIREP and FEMA's OSPM models (See, e.g. Tr. 9729, 9479-80). (Dr. Bassiouni made such measurements, Tr. 9875-76; Eddleman Exhibit 73 at 4, but his data is not in evidence.); Applicants have erroneously claimed a part of region 'O' on Applicants' Exhibit 47 is unpopulated;etc. Dr. Bassiouni translated as study from German (Eddleman Exh 74) contrary to their footnote 19 on page 28, prop findings)

10. However, these are less significant weaknesses than those given in Finding 8 and those given here: FEMA witness Carter did not maintain that 10dB above ambient indoors would wake people up (Tr. 9701-9702). FEMA witness Kryter calculated that with a 32dB fan noise, 10 dB above ambient would only awaken 27 to 29% of the people asleep in the EPZ (Tr. 9705, see also 9702-5). Outdoor sound levels of 90 to 99 dB are required for a 50% probability of waking people up. Tr. 9927. This is not very inconsistent with Dr. Bassiouni's German study where 3 45-second repetitions of a 60-dB sound in a bedroom awakened 60% of German air-raid protection students of all adult ages. (Eddleman Exh 74 at 7-8 for repetition; Bassiouni at Tr. 9877, Eddleman Exh 73 at 5.) The German study of sirens includes

attenuation of 10-15 dB. However, if we use Dr. Kryter's 27.5dB for closed storm windows (Tr. 9908, e.g.), the German study requires 87.5 dB outside (constant level), corresponding to a peak of about 92-95 dB for 60% awakening, in reasonable agreement with the testimony of the witnesses who appeared at the hearing.

Even for a 3-person household, 50% probability of awakening any individual gives only 87.5% for a household exposed to 85-100 dB outside, based on these data.

Applicants' Exhibit 46 (EPZ Nighttime Sound Level Map) makes it glaringly clear that most of the EPZ, whether within 5 miles of the Harris plant, or within 10 miles but beyond 5 miles, is exposed to sound levels outdoors of less than the 85-100 dB required to give 50% probability of awakening a person sleeping indoors in a house without background noise but which has closed storm windows.

This lack of alerting, shown most strikingly near siren 70 but evident at many other sites, is simply unacceptable.

11. Applicants' case is further weakened by the very document (Applicants' Exhibit 54, "Prompt Notification of 100% of People in the EPZ" by Dr. Bassiouni, from Power Engineering September 1983 pp 47-49. There Dr. Bassiouni states, "It is difficult to guarantee 100% notification by purely physical means under any circumstances ... even when specially designed alert systems are installed within the 10-mile EPZ, it is essential to take into consideration some complex physical and sociological factors and capitalize on them.

"Neither the NRC's NUREG-0654 guidelines nor the Federal Emergency Management Agency's evaluation guide provide for consideration of these factors." (emphasis added).

The Board notes that informal alerting as mentioned in the hearing is not controllable like a siren or telephone system, and is not part of the primary alerting system or notification system under NRC or FEMA regulations or guidance.

Dr. Bassiouni continues (Applicants' Exh. 54) "Existing federal guidelines assume that people will be alerted only by sirens or some other alerting device. If, however, any of the people in the EPZ are indoors at the time of the alert, it may be difficult for them to hear the siren signal because of substantial sound attenuation through building structures, and competition from sounds inside the structures."

Finally, it is worth noting that Dr. Bassiouni in this article advocates reliance on informal alerting and other mechanisms not included in NRC and FEMA notification system requirements as a means of saving money for utilities (compare the first and last paragraphs of the article). The NRC under the Atomic Energy Act is concerned with requiring what is necessary for the public health and safety, not with reducing or weighing the costs of necessary equipment and systems.

12. Informal alerting has weaknesses in practice, too. In the Mount St. Helens volcano disaster cited by Applicants' witness Milet, only 68% of the population was notified; in the flood he cites, only a little over half of those formally notified engaged in informal notification. Nevertheless, he assumes that 80% of persons formally notified will engage in informal notification. (Cf. Applicants' proposed Finding 46.) The evidence does not support such high percentages. And, as noted above, informal alerting is outside the scope of notification means required by the NRC and FEMA rules.

CONCLUSIONS and ORDER

1. FEMA's findings on emergency planning issues are a rebuttable presumption (10 CFR 50.47). In this case, both FEMA's evidence and that of the Applicants and Dr. Bassiouni rebuts the idea that the Harris siren system is adequate for night-time alerting of people asleep indoors.

2. Therefore the Harris siren system must be upgraded, either by more sirens, or by means such as the telephone system mentioned in the contention, to provide a design capable of notifying 100% of persons within 5 miles of the plant, within 15 minutes, and to notify essentially all of the persons within the 5-to-10 mile ring containing the rest of the EPZ in time for them to receive a guidance message from the Emergency Broadcast System within about 15 minutes of activation of the notification system. It is clear that back-up alerting alone cannot do this.

It is so ordered.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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Shearon Harris Nuclear Power Plant, Unit 1

Docket 50-400
O.L.

CERTIFICATE OF SERVICE

I hereby certify that copies of Wells Eddleman's Proposed Findings and Conclusions on Contention 57-C-3 (Nighttime Alerting) and of Wells Eddleman's objections to Power Engineering article, _____

HAVE been served this 16 day of December 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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