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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
CAROLINA POWER & LIGHT COMPANY	)	
and NORTH CAROLINA EASTERN	)	Docket No. 50-400 OL
MUNICIPAL POWER AGENCY	)	
	)	
(Shearon Harris Nuclear Power	)	
Plant)	)	

APPLICANTS' REPLY TO NCAG AND EDDLEMAN PROPOSED  
FINDINGS OF FACT AND CONCLUSIONS OF LAW  
ON REOPENED HEARINGS ON EDDLEMAN 57-C-3  
(NIGHT-TIME NOTIFICATION)

I. INTRODUCTION

1. Applicants herein submit their reply to "Attorney General's Proposed Findings of Fact and Conclusions of Law on Eddleman Contention 57-C-3 (Night-Time Notification)," dated March 19, 1986 (cited hereafter as "NCAG-II PF [paragraph number(s)]") and "Wells Eddleman's Proposed Findings of Fact and Conclusions of Law on Contention 57-C-3 (Alert/Notification) (Reopened)," dated March 19, 1986 (cited hereafter as "Eddleman-II PF\_\_\_\_\_").

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2. Applicants have not attempted to respond to each proposed finding with which Applicants disagree. Nor is the Board required to address expressly each and every individual finding proposed by every party. See Union Electric Co. (Callaway Plant, Unit 1), ALAB-740, 18 N.R.C. 343, 367 (1983), citing Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-422, 6 N.R.C. 33, 41 (1977), aff'd, CLI-78-1, 7 N.R.C. 1 (1978), aff'd sub nom. New England Coalition on Nuclear Pollution v. NRC, 582 F.2d 87 (1st Cir. 1978). As to matters not raised in this reply, Applicants generally rely upon but do not repeat "Applicants' Proposed Findings of Fact and Conclusions of Law on Reopened Hearings on Eddleman 57-C-3 (Night-Time Notification)," dated March 18, 1986 (cited hereafter as "App.-II PF\_\_\_"), as well as "Applicants' Proposed Findings of Fact and Conclusions of Law on Eddleman 57-C-3 (Night-Time Notification)," dated December 9, 1985 (cited hereafter as "App. PF \_\_\_"), and "Applicants' Reply To Other Parties' Proposed Findings of Fact and Conclusions of Law on Eddleman 57-C-3 (Night-Time Notification)," dated January 6, 1986 (cited hereafter as "App. Reply PF \_\_\_").

## II. FINDINGS OF FACT

3. In assessing the proposed findings filed by the North Carolina Attorney General ("NCAG"), we note that half of that document is a mere reproduction of the proposed findings filed

by that office following the initial hearings on Eddleman 57-C-3, which Applicants and the NRC Staff/FEMA have already addressed.<sup>1/</sup> Compare NCAG-II PF 1-13, 22 with "Attorney General's Proposed Findings of Fact and Conclusions of Law on Eddleman Contention 57-C-3 (Night-Time Notification)," dated December 16, 1985, at ¶¶ 1-14. Further, the NCAG has simply recited his earlier paragraph 9, with no apparent recognition that the arousal figures cited there were corrected (see App. Reply PF 14) and, indeed, were the subject of Item 4 of the Board's January 16, 1986 "Memorandum and Order (Limited Reopening of the Record on Eddleman Contention 57-C-3)" (cited hereafter as "January 16 Order"). January 16 Order at 9. See also "Additional Testimony of David N. Keast on Eddleman 57-C-3 (Night-Time Notification)," ff. Tr. 10,471 (hereafter "Keast"), at 19. Similarly, the NCAG's reiteration of his paragraphs 10 and 11 -- quoting arousal percentages apparently based on Lukas and Horonjeff (App. PF 25 n. 11, 29), without any acknowledgement of the Krallmann data -- is of no assistance to the Board.<sup>2/</sup>

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<sup>1/</sup> See App. Reply PF; "NRC Staff/FEMA Proposed Findings of Fact and Conclusions of Law on Eddleman Contention 57-C-3 (Nighttime Notification)," dated December 23, 1985.

<sup>2/</sup> Both Dr. Kryter and Mr. Keast advocate the use of the Krallmann "deep sleep" data to predict awakening by the Harris alert/notification system. The Krallmann data indicate alerting percentages which are significantly greater than those indicated by either Lukas or Horonjeff. See App.-II PF 20-21, 24-25.

4. The newly-drafted portion of the NCAG's proposed findings is also of little assistance to the Board. First, the NCAG's new proposed finding on informal notification is untimely in the extreme. NCAG-II PF 14. The January 16 Order was unequivocal: the record was not reopened on the efficacy of informal notification.<sup>3/</sup> January 16 Order at 1. Moreover, the NCAG representatives did not even attend the November hearings (except for the conference call with Dr. Bassiouni, see App. PF 12), much less cross-examine the experts there in an attempt to support the skepticism about informal notification which the NCAG now expresses. Under these circumstances, where the NCAG's office has failed to participate in the development of the evidentiary record, the NCAG cannot now be heard to complain that the record is lacking in some particular. The uncontroverted testimony of two of the nation's leading disaster sociologists clearly establishes the existence and efficacy of informal notification processes in actual emergencies. See generally App. PF 17, 19, 41-51, 54. Moreover, despite the Commission's requirement that proposed findings contain "exact citations to the transcript of record and exhibits in support of each proposed finding" (10 C.F.R. § 2.754(c)), none of the

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<sup>3/</sup> Neither was the hearing reopened to address Dr. Bassiouni's concerns (NCAG-II PF 15), although, at the Board's direction, the Krallmann study cited by Dr. Bassiouni was a principal focus of the reopened hearings.

NCAG's proposed findings on the reopened hearings include even a single reference to the record. The NCAG's wholesale failure to comply with the Commission's rules of practice here unfairly increases the burden on the Board and the other parties. Finally, the NCAG's proposed findings on the reopened hearings are largely conclusory, with little or no underlying analysis. For all these reasons, the NCAG proposed findings are entitled to little weight.

5. Neither the North Carolina Attorney General nor Mr. Eddleman seriously challenge the use of the Krallmann "deep sleep" data to predict awakening by the Harris alert/ notification system.<sup>4/</sup> Indeed, the NCAG is silent on the subject, and Mr. Eddleman casts his limited comments on the use of the Krallmann data as an attack on Mr. Keast's "credibility."<sup>5/</sup>

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<sup>4/</sup> Although Mr. Eddleman makes no serious attempt to dispute the Krallmann data, throughout his proposed findings he cites ranges of arousal percentages and ranges of numbers of houses alerted (with Krallmann-derived estimates at only one end of the range). See, e.g., Eddleman-II PF 1-3, 8. As noted above (see n.2), the use of the Krallmann data is advocated by both of the experts who testified on the matter. Accordingly, it is the Krallmann figures, and not ranges, which are relevant here. See App.-II PF 24-25. Moreover, Mr. Eddleman completely fails to acknowledge the contributions of informal notification and mobile alerting. The evidence of record establishes that greater than 97% of all households throughout the EPZ would be alerted by fixed sirens and by informal notification within 15 minutes -- even excluding the tone alert radios being distributed within five miles of the plant. The mobile alerting system, which also was not considered in the 97% figure, can be expected to alert some additional incremental proportion of the population in the same time period. App.-II PF 26.

<sup>5/</sup> Mr. Eddleman also accuses Mr. Keast of refusing to acknowledge his prior testimony on cross-examination.

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See Eddleman-II PF 9. Mr. Eddleman argues that Mr. Keast's highest alerting percentages (based on the Krallmann data) are not credible, citing Dr. Kryter for the proposition that the

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Eddleman-II PF 9. But a review of the pages cited by Mr. Eddleman indicates that the cross-examiner misquoted Mr. Keast's prior testimony. Compare Tr. 10,507 at lines 12-17 (Keast) with Tr. 10,579 at lines 12-17 (Gamin). Thus, as an attentive witness concerned with the accuracy of the record, Mr. Keast quite properly declined to accept the erroneous quotation of his prior testimony.

Mr. Eddleman's claim that Mr. Keast "changed his percentage awake to 10 from 3" is similarly lacking in basis. Eddleman-II PF 9. All of Mr. Keast's calculations involving people already awake at night have been based on Arbitron studies indicating that approximately 10 percent of the population is awake at any point during the night (and thus would be alerted). Tr. 10,748 (Keast). Therefore, any awakening mechanism can (at most) awaken the remaining 90% of the population. Assuming, for example, that the mechanism has a 92% probability of awakening, then those awakened would be  $0.92 \times 0.9$ , or a fraction of 0.83 of the people. The total alerted would thus be the sum of the 10% previously awake plus the 83% awakened, or 93%. In this example, the effect of having 10% of the people already awake increases the total alerted by 1% -- from 92% to 93%.

As another example, if the awakening mechanism has an awakening probability of 70%, then  $0.7 \times 0.9$ , or a fraction of 0.63 of the population, would be awakened. Adding the 10% already awake yields a total of 73% alerted. In this example, the effect of having 10% of the people already awake increases the alerted population by 3%. Mr. Keast's testimony on this subject is thus consistent throughout the proceeding.

In short, Mr. Eddleman's attempts to impugn Mr. Keast's credibility fall far short of the mark. Indeed, to the contrary, the Board has commended Mr. Keast on several occasions for his remarkable patience and his accuracy as a witness. See, e.g., Tr. 9646 (Carpenter); Tr. 9672 (Kelley). See generally App. PF 21.

Krallmann study used an outdoor recording of a siren. But Mr. Eddleman's references to the record do not support that proposition. Both Mr. Keast and Dr. Kryter indicated that the Krallmann report provides no certain answer as to where the siren recording was made. Tr. 10,538-48 (Kryter, Keast). While Dr. Kryter initially opined that the recording was likely made outdoors (Tr. 10,539), he reconsidered that opinion upon reflection, concluding that the recording was probably made indoors. Tr. 10,546 (Kryter). And, contrary to Mr. Eddleman's representation, Dr. Kryter did not later reverse that determination, though he corrected a mathematical error in his oral testimony on the higher frequency components of siren signals and the attenuation from outdoors to indoors. See Tr. 10,634-35 (Kryter). Certainly Dr. Kryter did not recant his strong endorsement of the use of the Krallmann data. See generally App.-II PF 24.

6. In any event, whether the siren in the Krallmann study was recorded indoors or outdoors, the difference is de minimus. Both Dr. Kryter and Mr. Keast agree that the fundamental tone of the siren sound at approximately 500 Hz is most significant for determining arousability, regardless of whether the FS-1000 or the Krallmann siren spectrum is used. Tr. 10,547, 10,548 (Keast); Tr. 10,544, 10,547 (Kryter). Even if Krallmann had used an outdoor recording of siren sounds, it would at most have contributed an additional 1 to 2 dB to the

arousability attributable to the fundamental tone. See, e.g., Tr. 10,547 (Kryter). Hence, Mr. Eddleman's protracted cross-examination of Dr. Kryter on the amplitudes of higher frequency components or harmonics relative to the fundamental tone does not undermine Mr. Keast's calculations. Tr. 10,547 (Keast).

7. Nor do either the NCAG or Mr. Eddleman mount a serious attack on the tone alert program being implemented within the first five miles of the EPZ. The NCAG does urge the implementation of "a vigorous continuing program of public education \* \* \* on the use and importance of the tone alert radios." NCAG-II PF 21. But the NCAG fails to acknowledge that Applicants have already committed to a comprehensive public education campaign which includes virtually all of the elements which the NCAG outlines and, in fact, exceeds the NCAG's proposal in a number of respects. Compare NCAG-II PF 21 with App.-II PF 32-33.

8. While the Harris school brochure is being revised to include information about the tone alert radio program (App.-II PF 33), the NCAG would go further, proposing the institution of a nuclear emergency education program -- of unspecified content -- in the schools. NCAG-II PF 21. The short answer to this proposal is that the NCAG has pointed to no evidentiary basis which would support the imposition of such a requirement; and, to the extent that the proposed school program is intended to cover topics beyond the purpose and operation of tone alert



radios, it (in effect) raises a new proposed contention which is late in the extreme and is not supported by a showing of good cause. Finally, there is no regulatory basis to require such programs for school children. See Kansas Gas & Electric Co. (Wolf Creek Generating Station, Unit 1), LBP-84-26, 20 N.R.C. 53, 69-70, 98 (1984), aff'd, ALAB-798, 21 N.R.C. 357 (1985). The NCAG's proposal therefore must be rejected.

9. The NCAG also proposes "[a]t least annual general testing and more frequent surveying of the radios with corrective action and early retesting being conducted if the percentage of radio inoperability falls below 87%." NCAG-II PF 21. Again, the NCAG has failed to even acknowledge the extensive testing and survey program to which Applicants already have committed. The radios have numerous self-test features, and will be tested by the NWS on a weekly basis. App.-II PF 32 n.14. In addition, random sample surveys of the residences within the first five miles of the EPZ will be conducted three times during the first year of the tone alert program, and at least annually thereafter, to evaluate the level of operability of the radios, including public acceptance of the tone alert program. The data obtained through the surveys will be evaluated to identify means of enhancing the overall operability level, with more frequent surveys as necessary if indicated by the data. Applicants have expressed a strong commitment to evaluate survey results indicating that any tone alert radios

are not being used, to determine how the tone alert program might be enhanced.<sup>6/</sup> "Testimony of H. Ralph Goodwin, Alvin H. Joyner, David N. Keast, and Dewey B. Overman, II on Eddleman Contention 57-C-3 (Nighttime Notification)," ff. Tr. 10,723 (hereafter "Goodwin et al."), at 20; Tr. 10,877-78, 10,881, 10,883, 10,888-89 (Goodwin). To the extent the NCAG seeks to require an even more rigorous testing and survey program, he has failed to provide any evidentiary basis to support the imposition of such requirements. Nor has he identified a regulatory basis for those requirements.

10. Mr. Eddleman alleges other minor purported "weaknesses" in the use of tone alert radios. Eddleman-II PF 7. But, contrary to Mr. Eddleman's assertions, the testing program for the tone alert radios includes weekly testing of the tone-alerting feature. See App.-II PF 32 n.14. Mr. Eddleman also notes that, in tone alert radio tests for the Hatch nuclear

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<sup>6/</sup> Applicants have committed to maintain an absolute minimum of 66% operability for the radio program, while the NCAG would require 87% operability. Even with only 66% of the radios operable, 96.5% of the households in the first five miles of the EPZ would be alerted by either radios or sirens (based on the Krallman data). A 21% increase in the operability factor (to 87%) only increases the percentage of the population alerted by mechanical means by 1.8% -- to 98.3%. The NCAG has failed to provide any evidentiary or regulatory basis to justify his proposed more stringent requirement and, as indicated, the associated incremental protection of public health and safety is minimal. NCAG-II PF 21; Tr. 10,878-79, 10,881 (Goodwin); Goodwin et al. at 14; Tr. 10,725 (Keast). The NCAG's proposed requirement therefore must be rejected.

plant, "the largest percentage not alerted was found in the third annual test." Eddleman-II PF 7. However, contrary to the implication of Mr. Eddleman's observation, the tests do not indicate a trend of greater failure over time. See "Results of The 1982-1984 Public Alert Exercises," ff. Tr. 10,758; Tr. 10,769 (Keast). Moreover, in the third Hatch tone alert test 13% of the survey population was not alerted; and, even assuming that 13.6% of the households within the first five miles of the Harris EPZ do not have operable tone alert radios in use, it is nevertheless concluded (based on the Krallmann data) that 98.3% of all households within that area would be alerted via the fixed sirens and/or the tone alert radios. See App.-II PF 34.

11. Mr. Eddleman next argues that the "signal band switch" on the radios should be more deeply recessed so that it cannot "be tripped by an object below it." Eddleman-II PF 7. But there are small rubber feet on the corners of the radio, which further elevate the radio and protect the switch. Moreover, the rubber feet make it likely that someone would pick up the radio in order to move it, rather than attempting to slide it or drag it across a surface; this minimizes any possibility that the radio would inadvertently be pulled over an object of a size and shape to trip the switch. Tr. 10,788-89 (Overman). In any event, the weekly NWS tests would make a household aware of a tone alert which was inoperable due to an incorrect switch

position. See App.-II PF 32 n.14. Mr. Eddleman's concerns are thus quite speculative and insignificant. Mr. Eddleman further asserts that Applicants have not "assessed the sleeping locations of adults in EPZ households to see if they match its assumptions" that there will be two adults in 50% of the master bedrooms in the EPZ. Eddleman-II PF 7. But there was no need for Applicants to conduct such a survey; their 50% assumption is a conservative use of EPZ-specific U.S. Census data indicating that 68% of the households in the EPZ include married couples. Goodwin et al. at 11-12.

12. Finally, Mr. Eddleman criticizes Applicants because the tone alert radios "have not yet been put in place or tested." Eddleman-II PF 1. But this does not constitute an infirmity in the tone alert program. Recognizing the Commission's express approval of predictive findings on emergency planning issues, the Appeal Board has held that installation and testing of the alert and notification system "is precisely the type of matter for which the Commission believes predictive findings can suffice at this stage." Louisiana Power & Light Co. (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 N.R.C 1076, 1104-05 (1983). Accord, 50 Fed. Reg. 19323 (1985) (reiterating "the general predictive nature of the Commission's findings on emergency planning and preparedness issues"); Philadelphia Electric Co. (Limerick Generating Station, Units 1 and 2), ALAB-819, 22 N.R.C. 681, 710 (1985); Pacific Gas &

Electric Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-791, 20 N.R.C. 819, 834-35 (1984).

13. The bulk of the proposed findings filed by Mr. Eddleman and by the NCAG are devoted to argument that the tone alert radio program should be extended to the full EPZ. See NCAG-II PF 16-20; Eddleman-II PF 2, 4-6, 8.7/ But neither Mr. Eddleman nor the NCAG provide any reasoned analysis to dispute the Board's tentative holding that, by endorsing the three-part design objective in NUREG-0654/FEMA-REP-1 (Rev. 1), the Commission recognized a distinction between system performance within five miles of the plant and system performance outside the five-mile radius.8/ Similarly, by expressly acknowledging that

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7/ While there has been no attempt to verify the accuracy of all calculations performed by Mr. Eddleman and the NCAG, some of the mathematics are clearly in error. For example, Mr. Eddleman first indicates that approximately 61 houses within the first five miles of the EPZ would not be alerted by fixed sirens alone. See Eddleman-II PF 3, 8. Mr. Eddleman next asserts that the inclusion of tone alert radios adds about 50 households to the total alerted within that area. Eddleman-II PF 8. Then, inexplicably, Mr. Eddleman subtracts 50 from 61, and asserts that it is the difference (11) -- not the figure 50 -- which reflects the contribution of tone alert radios to overall alerting within the first five miles of the EPZ. Eddleman-II PF 8. The derivation of the figure in NCAG-II PF 19 is also in error. See Keast at Attachment B (6,338 houses from five miles to the boundary of the EPZ) and App.-II PF 24 (89.5% of households in that area alerted by sirens alone).

8/ Throughout his proposed findings, Mr. Eddleman repeatedly refers to "the criterion" of alerting "essentially 100% of the people within the EPZ within 15 minutes." See, e.g., Eddleman-II PF 5, 8, Conclusion of Law. However, the NUREG-0654 design objective (endorsed by the Commission) limits this "essentially 100%/15-minute criterion to only the first five miles of the EPZ. And the regulations specify no precise percentages at all. See generally App. PF 5-8.

FEMA and the NRC Staff in NUREG-0654 (Rev. 1) had abandoned a 90% alerting requirement for the 5 to 10-mile area, the Commission indicated the acceptability of a rate of alerting of less than 90% within that area. See January 16 Order at 2-3; citing Final Rule on Emergency Planning, CLI-80-40, 12 N.R.C. 636 (1980). Nor have intervenors even attempted to explain away Duke Power Co. v. NRC, No. 80-2253 (D.C. Cir. Sept. 29, 1981) (per curiam), which appears to remove any doubt about the legal effect of the Commission's language in CLI-80-40. See generally App. PF 5-8; App.-II PF 4-5.

14. Mr. Eddleman argues that Applicants are required to assess the cost-effectiveness of the tone alert program, particularly the asserted need to expand it to cover the entire EPZ. Eddleman-II PF 4-5. He simply misconstrues the applicable law. Cost-effectiveness is the "raison d'etre" for the flexibility in the design criterion for the second five miles of the EPZ; cost-effectiveness is not the regulatory standard by which alert and notification systems are to be judged. See CLI-80-40, 12 N.R.C. at 638. The sole issue before the Board is whether the alert and notification system proposed by Applicants meets the Commission's regulations. As the Appeal Board has observed, where the Commission's requirements are met, "the fact that they may also be satisfied, perhaps in a more satisfactory manner, by some other alternative is legally irrelevant." Consolidated Edison Co. of New York (Indian Point

Station, Unit No. 2), ALAB-188, 7 A.E.C. 323, 339 (1974).  
Accord, Wisconsin Electric Power Co. (Point Beach Nuclear Plant, Unit 2), ALAB-78, 5 A.E.C. 319, 330 (1972); Consumers Power Co. (Midland Plant, Units 1 and 2), ALAB-35, 4 A.E.C. 711, 712 (1971); Wisconsin Electric Power Co. (Point Beach Nuclear Plant, Unit No. 2), ALAB-31, 4 A.E.C. 689, 693 (1971).

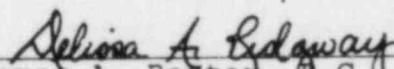
15. The Board here echoes the observation of the Catawba licensing board:

We are a body of limited authority with a responsibility to determine if the emergency response planning is in conformity with regulatory standards. Although we recognize intervenors' "desire that the level of emergency preparedness \* \* \* be enhanced to the maximum extent possible," our function is not to require that measures be taken which exceed the Commission's requirements.

Duke Power Co. (Catawba Nuclear Station, Units 1 and 2), LBP-84-37, 20 N.R.C. 933, 940 (1984), aff'd, ALAB-813, 22 N.R.C. 59 (1985). The public alert and notification system proposed by Applicants for the Harris EPZ meets the Commission's regulations, both within five miles of the plant and

in the area from the five-mile radius to the boundary of the EPZ. See App.-II PF 24-26, 34, 36-37. That concludes the Board's inquiry.

Respectfully submitted,

  
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Thomas A. Baxter, P.C.  
Delissa A. Ridgway  
SHAW, PITTMAN, POTTS & TROWBRIDGE  
1800 M Street, N.W.  
Washington, D.C. 20036  
(202) 822-1000

Richard E. Jones  
Dale E. Hollar  
CAROLINA POWER & LIGHT COMPANY  
P.O. Box 1551  
Raleigh, North Carolina 27602  
(919) 836-8161

Counsel for Applicants

Dated: March 25, 1986



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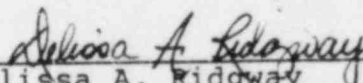
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Plant) )

CERTIFICATE OF SERVICE

I hereby certify that copies of "Applicants' Reply to NCAG and Eddleman Proposed Findings of Fact and Conclusions of Law on Reopened Hearings on Eddleman 57-C-3 (Night-Time Notification)" were served this 25th day of March, 1986, by deposit in the U.S. mail, first class, postage prepaid, to the parties on the attached Service List.

  
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Delissa A. Ridgway

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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SERVICE LIST

James L. Kelley, Esquire  
Atomic Safety and Licensing Board  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Mr. Glenn O. Bright  
Atomic Safety and Licensing Board  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dr. James H. Carpenter  
Atomic Safety and Licensing Board  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Charles A. Barth, Esquire  
Janice E. Moore, Esquire  
Elaine Chan, Esquire  
Office of Executive Legal Director  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Docketing and Service Section  
Office of the Secretary  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Mr. Daniel F. Read, President  
CHANGE  
Post Office Box 2151  
Raleigh, North Carolina 27602

John D. Runkle, Esquire  
Conservation Council of  
North Carolina  
307 Granville Road  
Chapel Hill, North Carolina 27514

M. Travis Payne, Esquire  
Edelstein and Payne  
Post Office Box 12607  
Raleigh, North Carolina 27605

Dr. Richard D. Wilson  
729 Hunter Street  
Apex, North Carolina 27502

Mr. Wells Eddleman  
812 Yancey Street  
Durham, North Carolina 27701

Richard E. Jones, Esquire  
Vice President and Senior Counsel  
Carolina Power & Light Company  
Post Office Box 1551  
Raleigh, North Carolina 27602

Dr. Linda W. Little  
Governor's Waste Management Board  
513 Albemarle Building  
325 North Salisbury Street  
Raleigh, North Carolina 27611

Bradley W. Jones, Esquire  
U.S. Nuclear Regulatory Commission  
Region II  
101 Marietta Street  
Atlanta, Georgia 30303

Mr. Robert P. Gruber  
Executive Director  
Public Staff - NCUC  
Post Office Box 991  
Raleigh, North Carolina 27602

Joseph Flynn, Esquire  
Associate General Counsel  
FEMA  
500 C Street, S.W., Suite 480  
Washington, D.C. 20740

Steven Rochlis, Esq.  
Regional Counsel  
FEMA  
1371 Peachtree Street, N.E.  
Atlanta, Georgia 30309

Jo Anne Sanford, Esquire  
Special Deputy Attorney General  
P. O. Box 629  
Raleigh, North Carolina 27602

Fred R. Gamin  
Assistant Attorney General  
State of North Carolina  
1203 Archdale Building  
512 North Salisbury Street  
Raleigh, North Carolina 27611