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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY & LICENSING BOARD

In The Matter Of	)	
	)	
DUKE POWER COMPANY, et al.	)	Docket Nos.
	)	50-413, 50-414
Catawba Nuclear Station,	)	
Units 1 & 2	)	(Emergency Planning)

PALMETTO ALLIANCE & CAROLINA ENVIRONMENTAL STUDY GROUP PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW IN THE FORM OF A PARTIAL INITIAL DECISION

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CAROLINA ENVIRONMENTAL STUDY GROUP

July 27, 1984

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INTRODUCTION

1. This Partial Initial Decision addresses the contested emergency planning issues with respect to the application for operating licenses for Units 1 and 2 of the Catawba Nuclear Station (Catawba) filed by Duke Power Company (Duke or the Company), North Carolina Municipal Power Agency One (NCMPA-1), North Carolina Electric Membership Corporation (NCEMC), and Saluda River Electric Cooperative (SREC) (collectively: The Applicants) and opposed by Palmetto Alliance and the Carolina enviornmental Study Group (Intervenors).

2. A separate Atomic Safety and Licensing Board entered a Partial Initial Decision on safety and environmental contentions June 22, 1984. That same Licensing Board ruled on the admission of the emergency planning contentions which we decide here on the record of a pre-hearing conference conducted August 8, 1983, appearing at Tr. pp. 1084-1102 and in Orders issued August 17, September 29 and December 30, 1983. Where the original Licensing Board's rulings on the admission of contentions bear on our consideration of the evidence at hearing, the specifics of that Board's rulings are referred to in the body of this decision. Suffice it to say, here, that we are mindful of those rulings and treat them as the law of the case in establishing the issues for litigation and decision by us in this proceeding.

3. By motion of the Applicants, supported by the NRC Staff and opposed by Intervenors, the initial Licensing Board which had admitted the emergency planning contentions and decided the safety and environmental issues entered its Memorandum and Order of February 21, 1984, (Concerning Motion to Bifurcate This Proceeding) establishing a separate Licensing Board to conduct hearings on emergency planning matters in order that Applicants then May 1, 1984 fuel load schedule not be adversely impacted by delays in the decisional process. That Board's decision was founded upon its assurance that the rights of the Intervenors to fair and adequate time to prepare and participate would be protected and that any subsequently appointed Board would duly consider the existing record as it might bear on emergency planning matters. On February 27, 1984, the Chief Administrative Judge established this Atomic Safety and Licensing Board to preside over all emergency planning issues in the Catawba proceeding.

4. By Memorandum and Order of February 28, 1984 we directed the parties to confer and propose specific dates for the submission of pre-filed testimony and commencement of hearings. Subsequently, the Applicants and the Intervenors, conferred in an unsuccessful effort to narrow and resolve the ten admitted emergency planning issues and to resolve matters of scheduling in the proceeding. These issues included potential conflicts between proceedings still pending before the original Licensing Board on outstanding safety issues, particularly those

contentions with respect to the integrity of emergency diesel generators, and the litigation of emergency planning matters before this Board.

5. By Order of April 2, 1984 we established the dates for pre-filing of testimony and commencement of hearings in this proceeding subject to the condition that Applicants and Staff agree to a suspension of discovery obligations on the pending diesel generator matters, which agreement was forthcoming.

6. Evidentiary hearings were conducted commencing May 1, 1984 in Rock Hill, South Carolina at which all parties actively participated through the presentation of their own witnesses, the introduction of documentary evidence, and the cross examination of witnesses presented by the other parties. Hearings were conducted May 1, 2, 3, 4, 7, 8, 9, 10 and 11 in Rock Hill, including a limited appearance session on May 9, 1984. Three days of hearings were held May 23, 24 and 25 in Charlotte, North Carolina on Emergency Planning Contention 11 with respect to the issue of the need to include portions of the City of Charlotte in the plume exposure pathway emergency planning zone for the facility. Finally, four additional hearing days were conducted June 5, 6, 7 and 8, again in Rock Hill, South Carolina. All told, some 16 hearing days were logged reflecting a record of over 4,000 pages and the receipt of some more than 70 hearing exhibits.

7. We note at the outset the general positions advanced by the parties: Intervenors Palmetto Alliance and Carolina

Enviromental Study Group each emphasized their desire that the level of emergency preparedness for those residing near the Catawba Nuclear Station be enhanced to the maximum extent possible. Both Palmetto and CESG candidly expressed their reservations regarding the safety of the Catawba facility as reflected in the safety and environmental contentions which they have actively advanced before the other Licensing Board in this licensing proceeding. Neither Intervenor recedes from their position that the Catawba facility should not be licensed to operate because of safety and environmental flaws. However, both groups express their acknowledgement of the inevitability of the plant's licensing and operation with some measure of cynicism with respect to this Commission and its Licensing Board's pro-nuclear track record. The Intervenors stress, however, that their goal with respect to these emergency planning issues is to enhance the state of emergency preparedness through the process of critiquing deficiencies in the existing plans and implementing capabilities and through the relief and remedial measures which they seek from this Licensing Board. They observe that it is their acknowledged expectation that the Catawba plant will be licensed and will operate in the face of their safety concerns that enhances their conviction that the perceived flaws in emergency planning should be remedied in order to assure that effective protective action will be accomplished in the event of an actual radiological accident at the facility. Palmetto and CESG characterize the emergency planning process as a cooperative

venture involving Duke Power Company, federal, state, and local authorities, members of the affected public, and interested citizen groups such as the Intervenors themselves. This is a sometimes adversarial process which, appropriately enough, requires a critical examination of the adequacy of existing plans, ultimately producing a superior state of emergency preparedness.

8. Applicants, together with the NRC staff, representatives of the Federal Emergency Management Agency (FEMA), the North Carolina and South Carolina State authorities, and the County authorities from Mecklenburg, Gaston and York Counties within the ten mile EPZ predictably defend the adequacy of the existing plans and state of preparedness while acknowledging the fundamental points made by Palmetto and CESG: that the overall state of emergency preparedness is enhanced through the process at hand. Pointedly, Applicants and their allied federal, state and local associates acknowledged the critical contribution which Intervenors have made in the process already. They point to a number of changes in the emergency plans and supporting materials such as Applicants' public information brochure which have already integrated changes in response to the critiques made in the Intervenors' emergency planning contentions. The record also reflects further acknowledgement by Applicants' witnesses and emergency planning officials of the validity of critical suggestions raised during these proceedings.

9. We agree with the fundamental observation made by all the parties that emergency planning is of necessity a cooperative process involving all of the participants with particular, though sometimes divergent, interests in the subject matter. It is this Board's conviction that all the participants, and more importantly the public as a whole, gain from the process of critical analysis of the adequacy of emergency plans and the incorporation of such critical contributions in the planning product. It is with these principles in mind that we pass to our decision on the ten emergency planning contentions admitted for litigation in this proceeding with the general observation that as to each contention the result to which we strive is the enhancement of emergency planning for the facility.

INTERVENORS'S EMERGENCY PLANNING CONTENTIONS 1 and 7
PUBLIC EDUCATION AND INFORMATION

1. In Contentions 1 and 7, the Intervenors allege that the public information programs conducted by Applicants and state and local officials, which relies principally on Duke Power Company's emergency plan brochure, is inadequate to inform the public of how they are to be notified and what their initial actions are to be in order to assure effective emergency response in the event of an accident at the facility. The ability to assure effective in-place sheltering as a protective action is Palmetto and CESG's challenge to the effectiveness of Duke's emergency plan brochure, both as to content and design, and support their criticisms with the expert testimony of witnesses Andrews and Pittard, a doctoral candidate in community psychology and an audio visual specialist, respectively. Through the introduction of a number of Duke documents and publications and through cross examination of Applicants' witnesses, Intervenors further argue that Duke has obscured the required emergency information in its reassuring public relations and "public acceptance" programs designed to "humanize the plant".

2. North and South Carolina state officials concede the lapses in implementation of their own state plans' public information program requirements and concede reliance on Duke's own efforts, principally their emergency brochure. Duke Power insists that its emergency brochure, upon which it relies in establishing compliance with the Commission's requirements,

contains the necessary information as well as additional background and informative material. Duke disclaims the relevance of its other public relations efforts while denying that such efforts either dilute, obscure or mislead the public regarding the seriousness of the hazard from an accident at the facility or the appropriate emergency response. Duke points to specific revisions in its emergency brochure including language changes, additions, and a reduced reading level as responsive to the Intervenors' criticisms, and commit to future changes to respond further.

3. We find for intervenors on this contention and agree that the public information presently provided by applicants and state and local authorities has not been demonstrated to be adequate to assure appropriate responses in the event of a radiological emergency at the facility. We agree with a variety of specific criticisms leveled at the design and content of Applicants' emergency brochure; find troubling the contradictory messages communicated on balance by Duke's "public acceptance efforts" targeted at the Catawba EPZ population; and conclude that the state and local authorities have failed to demonstrate effective implementation of the commitments made in their own emergency plans for the facility as well as failing in their overriding obligations to share in the coordinated responsibilities for effective public information. We are disturbed and disappointed in their abdication of responsibility

and unwarranted reliance upon Applicants to perform their public duties.

4. Contention 7, which all parties treated at hearing as a corollary claim related to Contention 1, asserts that the efforts of Applicants and state and local authorities, including the brochure, failed to adequately address the subject of in-place sheltering such that inadequate protective action would result if sheltering were the advised response. We agree. Not only is this result required where the general public information efforts are proven inadequate, but we find specific deficiencies in the failure to provide clear, concise and adequate instructions on the subject needed in order for the public to effectively protect themselves.

5. Contention 1 was admitted by the initial Licensing Board at the conclusion of the August 8, 1983, pre-hearing conference conducted to consider Intervenors' proposed emergency planning contentions. The entire contention as drafted was admitted. Tr. 1085-1086. Its admission was not opposed by Applicants, but was opposed on various grounds by the NRC staff. The contention reads:

> Public information provided by Applicants and state and local officials is not adequate to insure appropriate responses to notification procedures.
>
> The principal source of information is Applicant's brochure, which is inadequate, intentionally deceptive regarding potential health effects of radiation, and misleading, in that:
>
> A significant body of scientific evidence that indicates health effects at very low levels of radiation is not cited. Therefore, people with compelling reasons to stay (such as farmers tending to

livestock) may not take the threat seriously, especially after being repeatedly told in the past that radiation is not particularly harmful, and that a serious accident is extremely unlikely. It does not indicate that there is danger in accumulated radiation dosage. It does not give adequate information on protection from beta and gamma rays. It does not specify how young "very young" is. There is no chart to indicate overexposure during non-routine releases or accident to put into perspective the possible dose received before or during an evacuation. It does not specify ingestion dangers from contaminated food and water. It does not specify the importance of getting to reception areas for registration for purposes of notification for evacuees' re-entry to their homes, nor of emergency notification for evacuees, accounting for fiscal aspects of evacuation and for the basis of establishing legal claims which might result from the evacuation, as specified in "Catawba Site Specific NUREG Criteria" p.B2, #3. In fact, citizens are told they may go directly to "stay with friends or relatives living at least 15 miles from the plant" (p. 10 #5). Neither does it state that the reception areas exist to provide decontamination of people and vehicles. It states that in an emergency at Catawba, citizens "would be given plenty of time to take necessary action." This cannot be guaranteed in the event of a sudden pressure vessel rupture, where sheltering would be indicated. This eventuality is not mentioned. It assumes all recipients can read, and at a certain level of comprehension. As a primary source of information, it is imperative that all have access to and understanding of the emergency procedures to be taken. There is no information concerning the existence of a "plume exposure pathway," which would influence a citizen's choice of escape routes. Although this information may be available via other media during a crisis, it is important for citizens to be aware of this phenomenon beforehand. Although the North Carolina state plan calls for emergency information to be distributed as detailed in Part 1, Section IV, 2, 3, and 4, no such material other than Applicants' brochure has been made available. When and if such material is formulated, it should include information on points of concern as listed in this contention. The emergency brochure falsely reassures residents that they "would be given plenty of time to take necessary action" in the event of an emergency. In the event of a vessel rupture, such as one resulting from a PTS incident, a catastrophic failure of the containment is a proximate result. In that event, significant releases would reach residents well before they were able to remove

themselves from harm even under Duke's overly optimistic evacuation time estimates.

6. The obligations of Applicants and state and local officials with respect to public information and education are established by the following regulatory requirements:

10 CFR Section 50.47(b)(7) provides:

> Information is made available to the public on a periodic basis on how they will be notified and what their initial actions should be in an emergency (e.g., listening to a local broadcast station and remaining indoors), the principal points of contact with the news media for dissemination of information during an emergency (including the physical location or locations) are established in advance and procedures for coordinated dissemination of information to the public are established.

10CFR Part 50, App. E, Section IV.D.2 provides:

> Provisions shall be described for yearly dissemination to the public within the plume explosure pathway EPZ of basic emergency planning information, such as the methods and times required for public notification and the protective actions planned if an accident occurs, general information as to the nature and effects of radiation, and a listing of local broadcast stations that will be used for dissemination of information during an emergency. Signs or other measures shall also be used to disseminate to any transient population within the plume exposure pathway EPZ appropriate information that would helpful if an accident occurs.

7. We also found helpful the available decisional precedent on the issue of the adequacy of public information programs with particular reference to the adequacy of the content and distribution of emergency planning brochures. In two previous partial initial decisions Licensing Boards have required remedial changes to Applicant's public information brochures in light of the legal and analytical principles which we find instructive for

our consideration of the issues before us in this proceeding: Consumers Power Company (Big Rock Point Plant) LBP-82-60, 16 NRC 540 (1982); Louisiana Power & Light Company (Waterford Steam Electric Station, Unit 3), LBP-83-27, 17 NRC 949 (1983).

8. We agree with the Licensing Board in Big Rock Point that the purpose of the emergency planning brochure is

> To give residents and transients the information they need to respond to audible alarm systems and to be sufficiently knowledgeable to understand the importance of responding.
>
> The purpose of the pamphlet is to communicate necessary information. To do that, it must be clear, concise, and well-organized. It also must be properly distributed, so that the people who need the information will be likely to receive it.

16 NRC at 544.

9. We also agree with the Licensing Board in Waterford that

> The most important informational function of the brochure is to prepare people to turn on their radio and television stations upon the activation of the siren in order to find out what actions they might be asked to take at that time.

17 NRC 949 (1983).

10. Guidance as to how these regulatory obligations can be satisfied is provided by an NRC regulatory document, entitled NUREG 0654/FEMA-REP-1, Rev. 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants" (November 1980). This document is hereafter referred to as NUREG-0654. The criteria contained in NUREG-0654 are not requirements. Rather,

they are intended as guidance for use in drafting and reviewing emergency plans.

11. In the original January 1980 promulgation of NUREG-0654 (Rev. 0), language is included which does not appear in the current Rev. 1 which provides us with helpful suggestions for understanding the purpose of the public education and information requirements as well as directing us to important sources of empirical evidence to test whether such obligations have been effectively met. In the Rev. 0 version of NUREG-0654 Criteria IIG2, an acceptance standard is suggested:

> The public information program describing this system is acceptable if the permanent and transient adult population within about ten miles of the site is provided an adequate opportunity to become aware of this information annually. The program should include provision for written material that is likely to be available in a residence during an emergency.

12. Further, in Appendix 3 to NUREG-0654 (Rev.0), "Means For Providing a Prompt Notification to the Population," the effectiveness of the Applicant's notification system is to be evaluated:

> Every year, the operator shall take a statistical sample of the residents of all areas within about ten miles to assess the public's awareness of the Prompt Notification System and the availability of information on what to do in an emergency. The plan must include a provision for corrective measures to provide reasonable assurance that coverage approaching the design objectives is maintained.

13. Although this specific language is not contained in the current revision of NUREG-0654, it continues to provide useful guidance as to how we should weigh the evidence in this proceeding since the regulatory obligations themselves remain

unchanged. We agree with a similar observation made by the Seabrook Licensing Board in interpreting the meaning of the Commission's Emergency Planning requirements:

> Although this particular passage is not found in NUREG-0654, Rev. 1, the Board can find no indication that the NRC purposely intended to change the requirement.

Public Service Company of New Hampshire, et. al. (Seabrook Station, Units 1 and 2), LBP-83-32A, 17 NRC 1170, at 1178 (1983).

14. We find helpful the admonition in Rev. 0 of NUREG-0654 that the permanent and transient EPZ populace is to be "provided an adequate opportunity to become aware of this information annually." Id. Such a requirement of "adequacy" underlies the Commission's Emergency Planning requirements since the test of Emergency Planning requirements overall must be whether they will work in practice. Such a standard of effectiveness is explicit in the general Emergency Planning Rule, 10 CFR Section 50.47 (a)(1):

> .... no operating license for a nuclear power reactor will be issued unless a finding is made by NRC that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency.

15. Finally, the desirability for and probative value of empirical evidence reflecting the effectiveness of the public information and education program is acknowledged in the most current FEMA guidance on this subject, "Standard Guide for the Evaluation of Alert and Notification Systems for Nuclear Power Plant," FEMA-43/September 1983, which requires the conduct of a statistically sound telephone opinion survey of plume EPZ

residences in order to make a "final determination of the effectiveness of an alert and notification system." Such a survey must be designed to determine:

- The validity of the address and telephone;
- If the respondent was aware of any emergency alerting signal;
- How the respondent was made aware of any emergency alerting signal;
- The location (at home, away from home) of the respondent at the time of the test; and
- If the residence had received an emergency instructional package regarding what to do in an actual emergency.

At the request of Palmetto, we took official notice of FEMA-43. Tr. 1598.

16. As our starting point for evaluating the evidence on Emergency Planning Contentions 1 and 7 regarding the adequacy of the public education and information programs for Catawba, we look to the provisions of the applicable state and local plans for the facility to determine the planning commitments which are acknowledged by the participants -- Duke Power Company and the state and local authorities. The North Carolina Plan admitted as Appl. Ex. EP-1, Tr. 128, establishes the requirements for a "Public Education and Information" program: "Instructions and Directions" to be provided after an actual emergency has been declared, and "educational" information to be provided on a "continuous basis" in advance of an accident to educate the public so that they will be prepared for an accident, will know how they are to be notified, and what their initial actions are to be if an accident occurs. These provisions of the North

Carolina plan appear at Part 1 at pp. 53-56. The provisions material to this contention state:

> Two types of public information concerning nuclear power plants are required within the EPZ. The first type, which is "educational" in nature, acquaints the public with the effects on the human body in the environment of an accident release of nuclear radiational in the atmosphere and contains precautions to minimize these effects. In addition, the methods used to alert and notify the public of an emergency are included. The means by which this type of information is made available to the public on a continuous basis may include, but are not necessarily limited to: (a) Catawba Nuclear Station Emergency Brochure (figure 15), (b) information printed in local telephone directories, (c) magazines, periodicals, newsletters and bulletins published by departments and agencies of State and local governments, (d) industrial and business publications, (e) local newspapers, (f) direct mail, (g) displays and/or literature in those facilities listed in the Catawba Nuclear Station Emergency Plan, (h) local radio and television service spots, and (i) programs presented to civic organizations. (Emphasis supplied)
>
> State and local governments and Duke Power Company share a joint responsibility for disseminating this type of information. Duke Power Company will serve as the managing agency for the production and distribution of the brochure.

17. We conclude that the North Carolina authorities have been inexcusably ineffectual in the implementation of the commitments in their own plan. Not only has North Carolina, along with the other participants including local government and the Applicants Duke Power Company, failed to accomplish the objective which they have established with what little they have done; but they have almost wholly failed to employ the means which their own plan specifies are to be employed to accomplish the public education and information objectives.

18. Intervenors stated their claim directly in Emergency Planning Contention I of July 1983: "Although the North Carolina State Plan calls for emergency information to be distributed as detailed in Part I, Section IV, 2, 3 and 4, no such material other than Applicant's brochure has been made available."

19. In his pre-filed testimony, Appl. Ex. EP-7, the Director of the North Carolina Division of Emergency Management, J. T. Pugh, candidly concedes the accuracy of this criticism, "insofar as it goes." He explains that North Carolina has chosen to rely on Duke's Catawba brochure "rather than to distribute one of its own." Appl. Ex. EP-6,7. We find such candor to be warranted by the weight of all the evidence though Witness Pugh undermined his original forthrightness by his efforts at "clarification" made upon taking the stand.

> The Intervenors' question misquotes the plan of North Carolina. The North Carolina Plan does not call for emergency information to be distributed in the detail stated in their question. It does list the options for the plan that may be implemented, and it needs to be clarified...The plan does not call for the distribution of public information in any set way. It lists four or five options in NUREG-0654. Those options are what were listed in the plan.

Pugh Tr. 147-148, 5/1/84.

20. We find this effort at "clarification" troubling in and of itself since it bespeaks an effort to contort the plain English language meaning of the plan's own terms leaving us with measurably less confidence that we can rely on the express provisions of that written commitment. Mr. Pugh characterizes the means listed in the plan as mere "options", Tr. 147, and

offers the construction that "the plan does not call for distribution of public information in any set way." Tr. 148. He construes language of the plan, "may include, but are not necessarily limited to" to mean "may not include, and may be limited to less than." We are of the opinion that a fair reading of the terms of this portion of the North Carolina State Plan is that the means by which the specified public information is to be made available will include most if not exactly all of items (a) through (i) and perhaps others not listed. The clear implication is that the list should not be understood as all inclusive. Other means may very well be employed as the plan is implemented. The fact of the matter, however, is most fairly reflected in Mr. Pugh's original pre-filed testimony, prior to "clarification."

> However, one of the options of the North Carolina Emergency Plan is that the state may opt to rely on Duke's Emergency Plan EP brochure rather than to distribute one of its own. The State of North Carolina has elected to adopt that option.

21. In substance, the State of North Carolina has no discernible public education and information program of its own, but places almost total reliance, as was alleged originally by Palmetto and CESG, upon the brochure authored and disseminated by Applicants Duke Power Company as virtually the sole vehicle for "acquaint(ing) the public with the effects on the human body and the environment of an accident release of nuclear radiation in the atmosphere and (communicating) precautions to minimize these effects."

22. "Presently, we have opted to rely on the Catawba Nuclear Station Emergency brochure." Pugh, Tr. 292, 5/2/84. No brochures or other public information materials are provided by North Carolina which address the "hazard" for which emergency planning is required, i.e. the effects of an accidental release of nuclear radiation on the human body and environment. Pugh, Tr. 305, 5/2/84.

23. It is only by straining at gnats that we can find any measurable public information activities conducted by other than Applicants Duke Power Company through their Catawba brochure. Generally, it appears that Mr. Pugh's staff members respond to questions from the news media and members of the public regarding the plan, although no scripts or other written materials reflect such presentations. Pugh Tr. 295, 5/3/84. The North Carolina authorities also have published a general duty "all-hazards" brochure entitled "Disasters and What To Do To Protect Yourself" in the form of tabbed cards on subjects of nuclear power plant emergency, thunderstorm, winter storm, tornado, hurricane, earthquake, flash flood, and fire, bound together in a small handy brochure format. Appl. Ex. EP-12.

24. While the All-Hazards brochure is helpful and presents its disaster information in a commendably concise and clear format, it is not offered by the authorities or Applicants as a Catawba specific information vehicle, which Mr. Pugh's pre-filed testimony concedes, Appl. Ex. EP-7, Pugh pp.6-7, North Carolina relies on Applicant's Catawba Emergency Plan brochure. No

evidence is offered to suggest that North Carolina's "All-Hazards" brochure has even been made available to the public in the Catawba EPZ. Pugh Tr. 292-293, 295-296, 530-531, 5/1/84, 5/2/84.

25. Thus, looking at the listing of means to be employed under the North Carolina Public Education and Information Plan, Appl. Ex. EP-1, Part 1, pages 53-55, there appears to be no use of Items (b) "Information printed in local telephone directories;" (c) "Magazines, periodicals, newsletters and bulletins published by departments and agencies of State and local governments," except for the limited reference and use of the "All-Hazards" brochure;" (d) "Industrial and business publications;" (e) "Local newspapers," except for information supplied in response to questions by journalists; (f) "Direct mail;" (g) "Displays, and/or literature in those facilities listed in the Catawba Nuclear Station Emergency Plan;" (h) "Local radio and television service spots;" (i) "Programs presented to civic organizations," except the unspecified meetings and talks attended by North Carolina authorities upon invitation. In short, while the North Carolina plan acknowledges that "State and local governments and Duke Power Company share a joint responsibility for disseminating this type of information," Id. at p. 55, North Carolina state authorities have almost entirely reneged on their part of this responsibility and have, instead, deferred to the Applicants, Duke Power Company, et al., to determine the content and extent of the public information and

education program for the populace effected by their own Catawba facility. For all practical purposes, the North Carolina authorities place full reliance on Duke's Catawba brochure to accomplish this purpose. Pugh Tr. 295, 5/2/84.

26. Mr. Pugh attempts to comfort us that such deficiencies, past and present, may be remedied in the future once his office succeeds in its hiring of a full time public information officer. Appl. Ex. EP-7, Pugh. 6; Tr. 532, 5/3/84. We see no reason why such a belated and indefinite assurance should be relied upon as curing the longstanding and clear past deficiencies. The North Carolina authorities have been aware of the criticism reflected in Palmetto and CESG's contention as to their undue reliance on Duke's brochure, since July of 1983, and yet they show no evidence of any remedial measures until they take the stand in this proceeding. Further, in a slightly different context, Mr. Pugh asserts that his entire fifty person staff is capable of public education and information activities on this subject. Pugh Tr. 293, 5/2/84. If this be so, we see no reason why the addition of a single new staff member should be expected to greatly enhance the level of effectiveness of the North Carolina program.

27. The situation appears to be much the same in South Carolina. We find that the written plan makes appropriate and explicit commitments to a public information and education program to accomplish the purpose of ensuring effective protective response and set forth the means to do so. However,

much as in the case of North Carolina, the plan's commitments are worth little more than the paper upon which they are written. There is virtually no evidence of real effort at implementation. The South Carolina authorities, like their colleagues in North Carolina, ultimately trust and rely on the Applicants, Duke Power Company, and their Catawba brochure to provide the required public education and information.

28. The South Carolina plan, "South Carolina Operational Radiological Emergency Response Plan" or SCORERP, admitted in evidence as Appl. Ex. EP-2, in Annex C, p. ___, on Public Information, commits the authorities to the following mission:

> To provide the general public and transient population with appropriate educational information relating to potential hazards resulting from a nuclear facility incident, State, local, and facility radiological emergency response programs and appropriate actions for public self-protection in the event of an incident.

29. We find this statement of purpose laudable and fully consistent with regulatory requirements. However, when employed as a standard by which they South Carolina plan's implementation is judged, this mission statement proves to be an indictment of those charged with implementing the plan's terms.

30. Under "execution" at p. C-9, the plan assigns responsibility to the Public Education Section to "coordinate the conduct of program activities within the state." Among the "program elements" to which the planners have committed are included:

> (a) identification of possible types of incidents to include potential health and environmental effects, ...
> (c) appropriate actions for public self-protection.

Id.

31. The plan, further, provides for the means by which such public information will be communicated:

> (E)ducational information will be disseminated through available public and private resources to include: (a) publications, (b) printed and electronic media, (c) State displays and distributions of prepared literature at public locations, (d) State, local and facility participation in civic, public and school programs or meetings.
>
> Dissemination of information to the transient population will be accomplished by providing access to educational materials at appropriate locations to include facility visitor centers, motels/hotel lobbies, airports, train stations, parks, campgrounds, recreation areas, etc.

Id. at C-10.

32. Again, these provisions sound good. They appear to reflect good planning to implement the stated mission for the State of South Carolina's Public Education and Information Program and appear appropriate to meet regulatory requirements in this area. However, they are merely words on paper which fail, wholly, to reflect actual practice which is deficient and inadequate to accomplish the requirements of their own plan let alone Commission regulations.

33. Applicants offer the testimony of Messrs. P. R. Lunsford and W. M. McSwain from the Emergency Preparedness Division of the South Carolina Adjutant General's Office in support of their case on Contentions 1 and 7. Mr. Lunsford concedes that the South Carolina authorities "rely heavily on the utility" to adequately inform the public at Catawba. Lunsford

Tr. 240, 5/1/84. He provides the following summary of the South Carolina Program:

> I consider it extremely important that the public be educated, that there be a continuing effort for that. Insofar as our own efforts, I cannot speak for the entire State government. I can speak for the Emergency Preparedness Division what we have done.
>
> In addition to what has already been mentioned, that has been done by Duke Power, we've participated .. insofar as I know, a representative from our office has been at every meeting that we have been invited to .. that is public meeting .. to have a representative. In addition, the York County director, or some representative, I believe, has attended also.
>
> I myself have made a number of those appearances. I think that's something that is good to be done. Unfortunately, we don't have enough people to do it with the frequency that I deem it should be done. We manufacture a brochure in cooperation with Clemson University. Of course, I was not the individual that was working on that, but it was a colleague of mine, and we distributed it in accordance with a distribution out of our state's statistics on the number of farmers per county. This was mainly for the ingestion pathway. The responsibility for public information in the state of South Carolina rests in the Division of Public Safety Programs, the Governor's Office, so I cannot speak for that agency, although I am aware of some of the things that have been done, particularly efforts in publicity in the media, particularly in radio and television.
>
> On a sustaining level, as I mentioned, there hasn't been enough, in my view, and I say that in my testimony and it takes a continuing effort of all of us.

Lunsford Tr. 223-224, 5/1/84.

34. Mr. Lunsford emphasized his belief in the importance of public education in this pre-filed testimony, Appl. Ex. EP-7, Lunsford, p. 16:

> I would hope there would also be more continuing education of the public, for in my view that is one of the most important things that must be done.

35. By way of rebuttal to the direct cases of Applicants and the NRC Staff, Intervenors Palmetto Alliance and CESG were permitted to present the testimony of Judith D. Turnipseed, Public Information Officer for the Division of Public Safety in the South Carolina Governor's Office. Ms. Turnipseed testified that she acts as the designated representative of the Governor's Press Secretary who is assigned primary responsibility for public information activities under the Catawba plan. Turnipseed Tr. 4506, 6/8/84. She agreed that the South Carolina authorities rely primarily on Duke's Catawba Emergency Plan brochure, Id. Tr. 4509; and she is aware that other offices in state government have made available a publication entitled, "Agriculture and Nuclear Power in South Carolina," Appl. Ex. EP-10, which has been distributed through the County Extension Service to farmers. Its primary emphasis is on interdicting exposure to farm animals and agricultural products. She was unaware of the extensiveness of its distribution. Id. Tr. 4511-12. In addition, Ms. Turnipseed was aware of the existence of a FEMA publication - "In Time of Emergency: a Citizen's Handbook on Nuclear Attack and Natural Disasters," Appl. Ex. EP-11, which she understood had been distributed on occasion by the Emergency Preparedness Division. This brochure contains no information regarding emergency response for accidents at fixed nuclear facilities like Catawba. Id. Tr. 4513.

36. With reference to the listing of means for dissemination of public information as contained in the South

Carolina Plan at p. C-10, Ms. Turnipseed was unaware of any other items under (a) "publications," made available under the South Carolina Plan. Item (b) "printed and electronic media," reflects responses to questions from members of the news media as well as press releases regarding the annual exercise at the facility. Id. Tr. 4515. Item (c) "State displays and distribution prepared literature at public locations" is reflected by a now discontinued audio visual presentation but no other such activities known to Ms. Turnipseed. Id. Tr. 4516. With respect to Item (d) "Programs or Meetings" Mrs. Turnipseed was aware of the participation by others such as Mr. Lunsford and local officials in meetings sponsored by Duke Power Company, although she herself had never attended such events. Id. Tr. 4517-18.

37. With regard to the dissemination of information to transient populations in the EPZ, Ms. Turnipseed was unaware of any educational material to be distributed through "facility visitor centers, motel/hotel lobbies, airports, train stations, parks, campgrounds, recreation areas," except for the general purpose sticker composed by Duke Power Company, Appl. Ex. EP-9, which makes no reference whatsoever to the potential hazard resulting from a nuclear facility incident. Id. Tr. 4519.

38. With regard to communicating the message set forth in the South Carolina Plan's statement of mission, i.e. "potential hazards resulting from a nuclear facility incident," Mrs. Turnipseed agreed that the Duke sticker fails to indicate the nature of the hazard at all. Id. It does not even employ the

word "nuclear" in its obscure reference to the reader's presence in "an area covered by an emergency warning system."

39. Ms. Turnipseed acknowledges that, as the plan provides in its statement of mission, [The public] should understand that [it is] in danger, yes." Id., Tr. 4520, (6/8/84). She acknowledges, however, that the relied-upon Catawba emergency brochure of Duke Power Company fails to even denote the "health effects" from a severe accident as adverse or otherwise communicate the life-threatening or injury-producing nature of the hazard posed by the nuclear accident being planned for. Id. Tr. 4523. Lest we rely upon Ms. Turnipseed herself to communicate the needed information regarding the nature of the hazard of nuclear accidents, which information is notably absent from the written materials disseminated to the public, her lack of even the most general knowledge on the subject of potential accidental levels of dosage and consequent health effects clearly establishes her lack of qualification to serve as the source of such needed information. Id. Tr. 4541-4543.

40. It is fundamental that Applicants and their allied State and local authorities must demonstrate that they can and will implement the planning commitments which they have made in order that effective protective action can and will be taken in the event of an accident at the Catawba facility. It is axiomatic that State officials must demonstrate their capability to implement their own planning commitments. It is abundantly clear on this record that such is not the case and that serious

deficiencies exist in the capabilities and track record of the North Carolina and South Carolina state officials' implementation of their own public information and education planning commitments. Such deficiencies are, themselves, a basis for our ultimate findings in favor of Intervenors and against Applicants and Staff on Contentions 1 and 7. Analytically, however, such findings of deficiencies reinforce the emphasis which is called for in our review of the adequacy of Applicants' public information and education efforts. The State officials' deference to Duke in this regard confirms Intervenors' basic allegation that Duke has largely monopolized the field in providing public information on the subject of emergency response at the Catawba facility.

41. Before we reach our review of Duke Power Company's efforts in the public information field, we need to touch briefly upon the efforts by local county officials in the public information area. While we conclude that the emergency management officials for each of the counties involved in response within the plume EPZ have, creditably, served as resources in their communities for information regarding the plan for the Catawba facility, it is clear that they, too, defer primarily to the efforts and materials of Duke Power to get the message across. Their efforts, while commendable, do not begin to fill the void in the implementation of the North and South Carolina State plans nor do they make a dent on the overwhelming impact of Duke's own efforts in the field.

42. The plans themselves charge local officials with very limited tasks in this area. Except for public information activities keyed to the annual emergency planning exercises, virtually all reference in the county plans relate to post-accident public information activities only. For example, the Gaston and Mecklenberg County portions of the North Carolina Plan, Parts 2 and 3, respectively, which are almost verbatim copies of each other, speak generally of the Public Information Officer's responsibility for "preparation and release of emergency public information and instructions concerning a nuclear radiation incident or accident at the Catawba station," which appears to relate principally to post-accident emergency response. Item D-3 of each county plan speaks of an annual information presentation for the media to be conducted jointly with Duke Power Company and state authorities. Appl. Ex. EP-1, Part 2, pp. 25-28; Part 3, pp. 27-30. The York County, South Carolina plan provides similarly, but in even more general terms. Notably, at page D-14 of the York County Emergency Operations Plan, the reliance upon Duke's Catawba Emergency brochure in the event of an actual accident is explicit:

> Public information support teams will refer to the brochure printed by Catawba Nuclear Station. <u>This brochure will be in the home of all residents</u> in the ten mile EPZ as well as posted in the County Emergency Preparedness Office and other open locations for dissemination to transient populations. (Emphasis supplied)

Appl. Ex. EP-2, York County EOP, p. D-14.

43. We conclude that the local county officials responsible for implementing the Catawba Emergency Plan, like their State counterparts, add little to effectively inform and educate the public as to how they will be notified and what their initial actions should be in the event of an accident at the Catawba facility. All parties, then, point to the efforts of the Applicants, Duke Power Company, et al., for their primary reliance in effective performance of the public education and information requirements of the plans and Commission regulations. We now turn to a review of the efforts by Applicants in this field.

Findings on Emergency Planning Contentions 1 and 7.

44. For its part, Applicants seek to make their case through relliance on the content of their "Catawba Nuclear Station Emergency Plan" brochure (1984 edition) which has been received in evidence as Applicants' Exhibit EP-5. The thrust of their case is that the Commission's regulatory requirements, particularly those contained in the evaluation criteria of NUREG 0654, prescribe only very general content requirements applicable to the annual publication of the licensee, here Duke's Catawba brochure, and that such limited content requirements are fully satisfied by reference to language which is contained in the 1984 brochure. Further, Applicants urge us to limit the scope of our

consideration on Contentions 1 and 7 to the brochure alone, and not to any other aspects of Duke's information programs. McGarry Tr. 473, 5/2/84. We decline to do so.

45. Palmetto and CESG assert, and we agree, that their contentions call into question the effectiveness of the required public information and education programs in their totality, but that the Duke brochure - even if judged in isolation - fails to demonstrate effective compliance with the Commission's public information and education requirements. In much the same way that they allege that the required information contained in the brochure is embedded and, therefore, obscured by secondary information assuring the reader of the plant's safety and Duke's goodwill, Intervenors urge that the overall impact of Duke's public information program for the facility is to "falsely reassure" the public regarding the hazard involved in a potential nuclear accident and, therefore, lull the public into a false sense of security and reduce the likelihood of effective response in the event of an actual accident. Guild, Tr. 473-474, 5/2/84.

46. The NRC staff joins Applicants in their position that the scope of the contentions are limited to the brochure. McGurren Tr. 478 5/2/84. The FEMA witnesses Heard and Hawkins limit their analysis on these contentions to a review of the content of the state and local plans and Duke's brochure. NRC Staff Exhibit EP-2 pp. 4-7. Such a limited review of the plan and brochure alone, which we have of necessity performed ourselves, gives us little basis for confidence in the value of

the FEMA endorsement of the adequacy of the public information program for the facility. Accordingly, we attach little weight to their cursory analysis or approval of the present program.

47. Intervenors Palmetto Alliance and Carolina Environmental Study Group offer an extensive case in support of their positions on Contentions 1 and 7 through the presentation of expert direct evidence through witnesses Andrews, Pittard and Rutledge, through cross examination of the witnesses presented by Applicants and FEMA, including the introduction of extensive documentary evidence obtained in the course of discovery from Duke's files, and finally, by way of rebuttal through witnesses Turnipseed, Chernoff and Best. We agree with the substantive criticisms which Intervenors advance through their direct witnesses and share many of the concerns raised by Intervenors in the examination of witnesses on cross examination and rebuttal. We are directing Applicants to cure those deficiencies in the public information and education program for which they are responsible and are requiring a further demonstration by Applicants of sufficient remedial action on the part of others to establish that the program as a whole will hereafter meet the Commission's regulatory requirements.

48. Palmetto and CESG have made a persuasive case that the primary theme of Duke Power Company's public relations programs targeted at the EPZ public is that the plant will operate safely and that Duke can be trusted as a good neighbor to assure the safety of those living near Catawba; but that the required

information on emergency preparedness has not been effectively communicated. In support of their position Intervenors offer an internal Duke memorandum authored by Mary Cartwright, Duke's General Manager for Community Relations, entitled "Catawba Information Programs," and admitted as Intervenors' Exhibit EP-7. This document makes amply clear that Intervenors' thesis is correct. The subject of emergency planning is referred to in the memo in the context of what is described as Duke's "public acceptance efforts" targeted at the communities in the emergency planning zone for Catawba. It appears that emergency planning is merely one of the "focus issues" which are identified as "those that have been admitted in some form as contentions," presumably in the operating license proceedings which are also said, in the memo, to include a quality assurance contention focusing on welding inspection and alleged lack of hands-on experience by Catawba plant operators. A number of specific information vehicles are described in detail in the memo. For example,

> We have been preparing features for placement in the smaller papers that serve the communities around the plant. All features are designed to humanize the plant.

Id. The memo further describes a series of media briefings on issues which are anticipated to be in the news during the coming year. Examples described include steam generator problems which were anticipated and a briefing on quality assurance including welding inspection and the engineering work involved in pipe supports.

49. Duke has been extensively involved in what they describe as "community activities" near the Catawba facility. They have employed a "Catawba Information Coordinator," identified as Pat Osborne, Int. Ex. EP-12, who has given tours and spoken in the community concerning the plant for at least two years. The company memo mentions a special emphasis by the communications coordinator on placing thermo-luminescent dosimeters in homes and businesses around the plant "so that we could begin educating the public on background radiation." It mentioned mailings to civic clubs who have churches in local communities inviting recipients to tour the plant:

> (T)heir tour featured the plant, refreshments and an introduction to our weatherization program in which Duke provides materials for churches to weatherize low-income homes. We have purposely tied the two programs together in this community.

Id.

50. Special tours have been conducted for barbers and beauticians within ten miles of the plant who are recognized by Duke as "discussion leaders" who will be encouraged to keep literature in their shops on a regular basis. Seminars are planned on radiation for physicians and dentists around the plant. "Dear Neighbor" letters were mailed to each residence in the EPZ just prior to siren installation to alert residents to their purpose and to invite them to community meetings to discuss the plant. Int. Ex. EP-12. The memo, further, observes that Duke's public relations staff is particularly concerned about "young mothers who do not work outside the home," for whom an

emphasis was placed upon physicians and dentists as sources of information as well as the planned use of cards to be entitled "Now That We're Neighbors" to be placed in grocery stores and shops around the plant. Welcome Wagons will help distribute literature and Catawba frisbees for the kids to "our new neighbors." For school children informational tours are planned as well as contests, games and energy songs.

51. As Ms. Cartwright's memo reflects, Duke has employed a regular newsletter called "The New Generation" which has been mailed on a quarterly basis to all of the households in the EPZ. As she explains,

> (A)rticles in the newsletter are again geared to the subject areas of the contentions. We have dealt with welding, with operator training, radiation monitoring and emergency planning. We will continue to dwell on subjects likely to draw media attention over the coming months.

Appl. Ex. EP-7. Duke's Mr. Carter reflects that some 8 or 9 editions of "The New Generation" have been distributed to EPZ households as contrasted with the distribution of a single mailed edition of the emergency planning brochure 1984 edition. Carter, Tr. 476-477 5/2/84. A specimen of "The New Generation," the December 1983 edition, Int. Ex. EP-8, reflects the limited manner in which the subject of emergency planning is treated in this public information material. Among articles entitled "Catawba's Neighbors Attend Open House," "Resident NRC Inspectors Follow All Aspects of Plant" and "Catawba Security Officers Are a Highly Trained Team" there appears the "humanized" treatment of the subject of emergency planning under the heading, "On the Job,

Mike Bolch." Mr. Bolch, who appeared as a witness in the proceeding, is described as the Emergency Preparedness Coordinator for the Catawba Nuclear Station.

> The possibilities of us ever having a serious problem are very, very low - but they're not zero ... that ... is why we have an extensive emergency plan for this plant.

Mr. Bolch acknowledges, and with regard to Duke's public information efforts, we agree

> We can always find better ways to do things - we can always improve.

Id. This publication, while informative and artfully done, contributes nothing to the accomplishment of the required public information and education objectives established in Commission regulations. It is, as acknowledged in Ms. Cartwright's memo, clearly part of Duke's "public acceptance efforts" regarding the plant and designed to respond to concerns by the public including explicitly the contentions of Palmetto and CESG.

52. Intervenors offer a further example of public information materials disseminated by Duke in the form of a pamphlet entitled, "Catawba .. How Much Radiation Do You Receive?" Int. Ex. EP-11. This pamphlet, which is apparently distributed upon request at the plant to members of the public, depicts a fold-out table under the same heading as the brochure's title with the following explanation:

> We live in a radioactive world. Radiation is all around us and is part of our natural environment. By filling out this form you will get an idea of the amount you are exposed to every year. The average American is exposed to a total of 180 units.

The reverse side has a narrative discussion of the subject by a physician identified as the Corporate Medical Director for Southern California Edison Company which concludes:

> From my perspective, the benefits of radiation and radioactive materials clearly outweigh the risks.

Id. Neither this pamphlet -- which is specifically on the subject of radiation -- or in "The New Generation" or Duke's "Dear Neighbor" letter regarding radiation dosages or health effects in any accidental or non-routine release, mentions circumstances such as those for which emergency response by the public would be required.

53. We review these matters in some detail because they put in perspective the content and format of the Catawba Nuclear Station emergency plan brochure, Appl. Ex. EP-5, the "Catawba Nuclear Station Student Emergency Plan," Appl. Ex. EP-6, and the decal for transients in the EPZ, Appl. Ex. EP-9, which are the public information materials specifically relied upon by Duke Power Company to establish compliance with the Commission's emergency planning public information and education requirements.

54. It is clear that Duke has had more than ample opportunity to get the required emergency planning messages across to the EPZ population. In its own voluntary public relations programs targeted at the Catawba EPZ population, it has virtually carpeted each household with volumes of written material regarding the facility. It certainly cannot be said that Applicants' failure to effectively communicate the needed emergency response information is to be excused for lack of

opportunity due to limitations on space in their published literature, personnel in their corporate communications and public relations departments, or opportunity generally. Failure to communicate the necessary information is not a product of circumstances, but is a product of Duke's choice and design.

55. Further, our review of the documentary evidence offered by Intervenors on Duke's "Catawba Information Programs" makes clear that the 1984 Catawba emergency planning brochure is a product in its format and content of the deliberate and well-considered strategy of Duke's overall Catawba information and public relations programs. While we express no view as to the desirability or propriety of Duke's "public acceptance efforts," as reflected in these materials, and cannot perform the role of "censor" over Duke's communications activities, we can and do conclude that these materials and this program fail to effectively accomplish the public information and education requirements of Commission regulations. They are, instead, clearly public relations efforts designed primarily to comfort and assure the public as to the safety of the Catawba Nuclear Station and the good intentions of its operator, Duke Power Company. As such, we at the Commission may find them laudable; but they cannot stand for Applicants' compliance with emergency planning requirements; and since they form a part of the public's information and educational understanding they must be judged along with the proffered emergency planning materials in weighing the effectiveness of Duke's total public information program.

56. Duke Power Company, itself, is apparently very mindful of the effects of its public information efforts on the Catawba EPZ population. They have employed scientific opinion research data in order to test the effectiveness of these "public acceptance" programs and presumably to, fine-tune these programs on the basis of such data, as needed. Ms. Cartwright's internal memorandum concludes:

> (T)he measurement for this program has been opinion research in the emergency planning zone. Our first survey was in 1981. We had another one in the spring of 1983 and we will be going back into the field the last two weeks of September. We are not not only comparing the Catawba community historically, but are also comparing it with the ten mile area surrounding our Oconee Station which has been operating ten years and our McGuire Station which has operating for two years. This information has not only confirmed the success of our Catawba information programs but has allowed us to tailor these programs to the informational needs of our community.

Int. Ex. EP-7. It is therefore clear that Applicants have had in their possession extensive empirical evidence, upon which they themselves rely, to establish the effectiveness of their public information programs in the Catawba Emergency Planning Zone, both over time and by comparison to the programs and results in the EPZs surrounding Duke's operating Oconee and McGuire nuclear stations where people have been the recipients of Duke's informational programs for some time. This empirical evidence as to the effectiveness of Duke's public information programs at Catawba, although clearly available, has not been offered by Applicants in support of its position that, contrary to the allegations of Intervenors' Contentions 1 and 7, Duke's

information programs have been adequate to establish that Commission requirements have been met and that effective protective action can and will be taken in the event of a radiological emergency at Catawba. The only proper inference we can draw from Applicants' failure to, themselves, offer this empirical evidence is that such evidence would prove adverse to Applicants' defense on these contentions and would instead support Intervenors' claims.

57. We are persuaded, further, that we should infer that Duke's opinion survey evidence reflects unfavorably on its defense to Contentions 1 and 7 by the testimony of Marvin Chernoff, subpoenaed by Intervenors on rebuttal, whose firm was responsible for Duke's surveys. While we declined to admit the survey results themselves when offered by Intervenors, Tr. 484-92, or presented through Mr. Chernoff as part of their rebuttal case, Tr. 4268, we did permit Mr. Chernoff to be questioned as to the success of the Catawba information program as he measured it through his opinion research. He agreed with Ms. Cartwright's conclusion that the "public acceptance" program for Catawba had been successful and confirmed that survey results show that Catawba EPZ residents are less concerned about radiation effects and the possibility of a radiological accident than the general population as a whole. Chernoff, Tr. 4304-4305, 6/7/84. Chernoff interprets this as an indication that Catawba EPZ residents feel "comfortable with the information in support of Duke Power." Chernoff, Tr. 4305, 6/7/84. We note in passing

without relying thereupon, that some survey results, as provided by Applicants in discovery for surveys conducted in September 1983 and February 1984 of the Catawba EPZ populations, were identified by Intervenors as offers of proof and marked for identification as Intervenors' Exhibits EP-10 and 9, respectively. Among the questions asked was Q21

> (D)uring the past year have you received any brochures or pamphlets which tell you about the steps to take in the event of an emergency at the plant?

Int. Ex. EP-9, for identification only as an offer of proof. This February 1984 survey conducted one month after Applicants' claim to have mailed the 1984 brochure to each household in the EPZ reflected that some 26% of the total respondents answered "No" when asked if they had received an emergency planning brochure within the last year.

58. As previously observed, Applicants and the NRC staff urge that our inquiry be limited to examining Duke's 1984 Catawba brochure, within which, we are told, we will find the information required to be disseminated by Commission regulations and the evaluation criteria of NUREG 0654. As previously noted, we decline to adopt such a narrow view of either the scope of Intervenors' Contentions 1 and 7 or the meaning of the Commission's regulatory requirements with respect to public education and information.

59. It is clear that the general obligation imposed by the regulations and explicated in the evaluation criteria is to provide both the permanent and transient adult population within

the plume EPZ an "adequate opportunity to become aware" of "how they will be notified and what their actions should be in an emergency." NUREG 0654 II G. The evaluation criteria specify the content of the program which "shall include, but not necessarily be limited to: information on radiation, on contact for additional information, on protective measures, and special needs of the handicapped. It is clear that this listing is not intended to be exclusive or all-inclusive. We emphasize, again, that the plain meaning of the regulations and evaluation criteria is that the information itself be adequate to educate the public for effective protective response.

60. Applicants and the NRC Staff, further, would have us look solely at the Catawba brochure as satisfying Commission requirements. Again, we reject such a narrow limit on our inquiry, which is unsupported by the terms of Intervenors' contentions that reach the totality of the public information and education programs of Applicants and state and local officials; and is unsupported by the Commission regulations and evaluation criteria. NUREG 0654 sets forth a listing of "means for accomplishing this dissemination" which, again, are clearly exemplary and are explicitly identified as a non-exclusive list. Among the items listed is the annually distributed publication - here the Catawba brochure - but also information in the telephone book, in utility bills and postings in public areas. Thus, reliance by Applicants and the Staff upon the Catawba brochure as reflecting full compliance with the regulatory requirements is

obviously misplaced. Again, the evaluation criteria itself provides the standard by which the effectiveness of the means for dissemination as well as the information itself disseminated may be tested: "The public information program shall provide the permanent and transient adult population within the plume exposure EPZ an "adequate opportunity to become aware of the information annually." (emphasis added). The evaluation criteria sets forth the additional standard that "the programs should include provision for written material that is likely to be available in a residence during an emergency." Id. It is clear, then, that Applicants and NRC staff must demonstrate that adequate information is not only prepared but is effectively disseminated and retained for use during an emergency.

61. The only public information materials beyond the 1984 Catawba brochure to which Applicants point as fulfilling their regulatory responsibilities towards transient populations within the plume EPZ are the small decal, Appl. Ex. EP-9, rather mysteriously referring to the reader's presence in "an area covered by an emergency warning system;" and the signs posted near Lake Wylie. Again, the NUREG 0654 evaluation criteria explicitly make clear that such narrow reliance is misplaced. In addition to the other means for dissemination of information to both permanent and transient adult populations, the evaluation criteria provide a suggested listing of means to reach transients given their obvious special requirements and the obvious ineffectiveness of a mailed distribution such as is appropriate

for the permanent resident population. The evaluation criteria suggests,

> "signs or other measures (e.g. decals, posted notices or other means, placed in hotels, motels, gasoline stations and phone booths) shall also be used to disseminate to any transient population within the plume exposure pathway EPZ appropriate information that would be helpful if an emergency or accident occurs. Such notices should refer the transient to the telephone directory or other source of local emergency information and guide the visitor to appropriate radio and television frequencies."
> Id.

With respect to means we are pointed to none other than the decal and signs at Lake Wylie. No evidence was offered suggesting the use of signs in any other location, of any posted notices, of any information at all to be placed in hotels, motels, gasoline stations, or phone booths. We note specifically that no indication whatsoever was given that any information regarding emergency planning for Catawba was to be provided to the largest and most problematic concentrations of transient populations, the 26,000 person peak attendance at the Carowinds theme amusement park or the 10,000 peak attendance at the Heritage USA PTL religious retreat both located within the plume EPZ for Catawba.

62. Neither the decal nor the Lake Wylie signs comply with the explicit terms of the state plans or the evaluation criteria of NUREG 0654 with respect to informational content, let alone effective dissemination. As previously discussed, both state plans require that public information include content regarding the hazard for which emergency response may be required. The South Carolina plan in the SCORERP mission statement requires

information "relating to potential hazards resulting from a nuclear facility incident," Appl. Ex. EP-2, p. C-9. The North Carolina plan specifies that such public information should acquaint the public with "the effects on the human body and the environment of an accidental release of nuclear radiation in the atmosphere." Appl. Ex. EP-1, Part 1, p.53. Applicants' decals and signs make no reference whatsoever to the nature of the hazard, let alone even the existence of the Catawba Nuclear Station in the reader's proximity. Neither they nor any other facet of the public information program for the transient EPZ population meets the plans requirements in this regard. The FEMA testimony, NRC Staff Ex. EP-2, provides only a generalized endorsement that the emergency planning standard for public information has been satisfied. The FEMA testimony reflects no analysis whatsoever of the adequacy of the information dissemination to transients and their finding, therefore, is accorded very little weight.

63. We turn now to an analysis of the "Catawba Nuclear Station Emergency Plan" brochure (1984 edition), Appl. Ex. EP-5, upon which Applicants and the NRC Staff place primary reliance for proof that the public information and education program at Catawba satisfies regulatory requirements. At the outset we should note that the 1984 brochure was preceded by a "preliminary version" of the brochure, Appl. Ex. EP-7, Carter p. 3, distributed to the parties, the NRC, state and local officials and approximately 3,000 members of the public who attended

emergency planning meetings in 1983. This 1983 version of the brochure was admitted in evidence as Appl. Ex. EP-8. While this 1983 brochure was ultimately replaced with the 1984 edition which was to be mailed to all EPZ households in January 1984, nothing on the face of the 1983 edition identifies it as a "preliminary version" or a draft in any way, nor are we informed of any basis for the recipients understanding that this 1983 edition was being circulated for comment, criticism and ultimate revision. Be that as it may, it is the 1983 version of the Catawba brochure, Appl. Ex. EP-8, which was the target of Intervenors' specific criticisms contained in Contentions 1 and 7.

64. While Palmetto and CESG maintain their fundamental criticims of Duke's Catawba brochure, that it is inadequate to inform the public as required by Commission regulations in that it falsely reassures the reader regarding the hazard of exposure to accidental releases of radiation from the facility and is ineffective in communicating instructions on emergency response, Applicants appear to acknowledge the validity of a number of the specific criticisms leveled by Intervenors at the 1983 brochure in the revisions which are reflected in the 1984 edition. Further, Applicants have committed to make additional revisions in the upcoming September 1984 publication at the behest of state and local officials, also responsive to Intervenor criticisms.

65. For example, Applicants respond to Intervenors' contention that the original brochure failed to specify how young "very young" is in warning of their particular vulnerability of

young children to harm from exposure to radiation. The brochure text was revised to specify "children up to six years old" in response to this criticism. Appl. Ex. EP-7, Carter, p. 9; Appl. Ex. EP-5, p. 4; Carter, Tr. 173, 5/1/84. In their contention Intervenors assert that the brochure "does not specify ingestion dangers from contaminated food and water." Applicants respond by revision of the brochure at p. 9 to state that "water, milk and food supplies will be monitored for potential contamination. The emergency broadcast stations will notify the public of any actions to be taken in regard to food and water." Appl. Ex. EP-7, Carter, p. 10; Glover, Tr. 174-175, 5/1/84.

66. Intervenors allege that the brochure does not specify the

> Importance of getting to reception areas for registration for purposes of notification for evacuees' re-entry to their homes, nor of emergency notification for evacuees accounting for fiscal aspects of evacuation and for the basis of establishing legal claims which might result from the evacuation ... in fact, citizens are told they may go directly to stay with friends or relatives living at least 15 miles from the plant.

The 1984 revision of the brochure added language at page 10 under the heading, "If You Are Ordered To Evacuate" explicitly noting that "... after you register at the shelter, you may choose to stay with friends or relatives ..."

66. Further language was added to provide, "registering at the shelter to enable officials to contact you to tell you when you can go back home. You can also get information there while away from home." An entirely new section is added to the 1984

edition of the brochure under the heading "Services Provided at the Shelter" to emphasize the need to go first to the shelters if ordered to evacuate. This new section added information about the services to be provided by the Red Cross, Salvation Army and insurance companies and was added at Intervenor's behest. Appl. Ex. EP-5, p. 10; Appl. Ex. EP-7, Carter, p. 11. In response to Intervenor's contention that the brochure failed to state that decontamination of people and vehicles would be performed at the shelters, Applicants added language in this new section to provide, "Shelters would have facilities for decontamination of evacuees and their vehicles and personal items." Id.

67. Intervenors asserted that the brochure had falsely reassured the public by stating that in an emergency people "would be given plenty of time to take necessary action," Appl. Ex. EP-8, p. 10. In response, this sentence was deleted from the 1984 edition. Appl. Ex. EP-7, Carter, p. 13; Tr. 1517-1519.

68. Palmetto and CESG criticized the original brochure asserting that it "assumes all recipients can read, and at a certain level of comprehension," adding that "as a primary source of information, it is imperative that all have access to and understanding of the emergency procedures to be taken." Duke submitted a draft of the brochure to Susanna V. Duckworth, a reading specialist at Winthrop College, for assessment of the reading level. She determined the initial draft to be approximately at a college level. She advised Duke that parts of the copy were verbose and too complex. In response to this

criticism, the text of the brochure was revised in an effort to lower the reading level. Dr. Duckworth testified that based on application of the Fry Readability Formula, which utilizes a simple quantitative measure of readability based on sentence length and number of syllables, she determined that the "narrative" portions of the 1984 brochure, such as the information on page two under the heading "How it Works" regarding plant operations and page four under the heading "Radiation, a Fact of Life" were written on an eleventh grade level. "Instructional" portions such as the listing of actions to take under the heading "You Might Be Told to Stay Indoors" on page nine, under "If You Are Ordered to Evacuate," on page 10, and under "Things You May Want to Take in an Evacuation," on page 11, are written on a seventh grade reading level and are appropriate for the average reader. Appl. Ex. EP-7, Duckworth, pp. 14-15; Tr. 446, 450, 5/2/84.

69. In their testimony in the proceeding, officials of North Carolina and South Carolina also suggested the need for a number of revisions in the brochure. Mr. Pugh of North Carolina suggested that the brochure should give more emphasis to the necessity of going directly to the shelters in an evacuation and that the availability of monitoring and decontamination at the shelters should be stressed on page 10 under the heading "If You Are Ordered to Evacuate" under item five. Appl. Ex. EP-7, Pugh, pp. 7-8; Pugh Tr. 392-393, 5/2/84. Mr. Pugh's suggestion at this

time is somewhat ironic since in June of 1983 he had urged that a contrary provision be included:

> Our other concern is on page 10 in the paragraph beginning "North Carolina residents go first to the shelter for your area ..." Our plan does not call for evacuees who will not be seeking public shelter to report to a shelter first before continuing to their destination. We would be suggested that the statement be changed to say that "... you may go to the shelter shown on the map for your area or you may choose to stay with friends or relatives living at least fifteen miles from the plant."

Pugh letter of June 28, 1983 to Glover of Duke Power Company, Intervenor's Exhibit EP-2; Pugh, Tr. 393, 5/2/84. Duke has agreed to make these changes. Glover, Tr. 392-393, 5/2/84. South Carolina officials Lunsford and McSwain suggested certain revisions Duke has agreed to make to its next brochure. Appl. Ex. EP-7, Lunsford and McSwain, pp. 13-14; Glover Tr. 384, 5/2/84. These revisions include modifying the map of shelters to indicate county boundaries and the communities in each zone, Appl. Ex. EP-7, Lunsford and McSwain, p. 13; Glover, Tr. 520-522, 5/3/84; and insertion of a tear-out card by which information on blind, hearing-impaired, transportation-dependent and others with special needs could notify emergency management officials, Appl. Ex. EP-7, Lunsford and McSwain, pp. 13-14, Glover, Tr. 382-387, 5/2/84. In the hearing, Applicants also agreed to make a number of further revisions in the next edition of the brochure, such as to correctly depict the Charlotte city limits as contiguous with the boundaries of EPZ Zones A-2 and A-3, Glover, Tr. 335 5/2/84, and to delete all of the shelters shown for York County in the table on page 13 and map on page 14, since the shelters have been

found inadequate during review by the Red Cross. Appl. Ex. EP-7, Lunsford, p. 13.

70. While we find all of these changes appropriate improvements on exisiting Duke public information brochure, they are far short of sufficient to remedy the more fundamental problem with the brochure as an effective public information and education tool or to cure the more general inadequacies in the public information program as required by the Commission for the Catawba facility.

71. Palmetto Alliance and Carolina Fnvironmental Study Group presented testimony of three witnesses supporting their criticism of the public information and education program for Catawba focused particularly on a critique of the ineffectiveness of the Catawba nuclear station emergency plan brochure (1984 edition), Appl. Ex. EP-5. They presented authoritative, thoughtful and balanced criticisms of the brochure's design and content founded carefully on expert treatment of the subject of individual psychological response to crisis events such as would likely occur if any emergency were declared at the Catawba station, as well as a persuasive and thoughtful treatment of the design considerations which should be employed in the preparation of written emergency planning informational materials such as Duke's brochure. Each witness offers helpful and well considered recommendations for remedial measures to enhance the effectiveness of the public information and education program and any written materials to be employed therein for use at Catawba.

72. Intervenors presented the testimony of Arlene Andrews to establish how people are likely to respond in the event of an emergency at the Catawba station and how effective emergency preparedness can enhance effective emergency response. Ms. Andrews critiques the 1984 edition Catawba brochure:

> As presently designed (it) does not provide the clarity and direction needed by individuals in a state of anxiety and potential psychological crisis.

Int. Ex. EP-38, Andrews, p. 4. Ms. Andrews is a doctoral candidate in Clinical-Community Psychology at the University of South Carolina. She holds a Master of Social Work with an emphasis in community intervention and she has academic training in crisis intervention including particularly the impact of disasters on communities and in the field of environmental psychology which represents the study of the effects of the physical and social enviornments on individual behavior. Ms. Andrews is a part-time faculty member in the College of Social Work at the University of South Carolina and has been employed as the administrator of crisis intervention agencies.

73. Ms. Andrews explains that an emergency at the Catawba facility is potentially an event which may precipitate psychological crises for members of the public. In such a state, people may respond with maladaptive behavior including disorganized functioning, confusion and disorientation; or, alternatively, the perception of threat which may lead to heightened arousal and to protective, life saving responses. The actual individual response is likely to depend upon how prepared

he or she is to deal with such an event. Ms. Andrews offers the following view as the purpose for emergency planning from the perspective of individual psychological response:

> A major goal of emergency planning is to prevent psychological crises by promoting positive emotional coping skills, clarity of thought, and prompt appropriate action among individuals so that masses of people will act in a cooperative and coordinated manner. An effective emergency plan will reduce confusion and promote a sense of competence and personal control by individuals in response to their perceived threat.

Id., at p.3. An effective plan should present "simple, clear information about specific behaviors the individual should perform and accurate, easily accessible information about helping resources during the state of emergency." Id. pp. 3-4. Such information should be "immediately comprehensible, decisive and directive." Id.

74. In Ms. Andrews' opinion, the 1984 Catawba brochure fails to adequately promote effective emergency response by individuals. The brochure presents too broad a range of information leaving the reader unclear what action he or she is to take in an emergency. "Information regarding what to do and who will help ... is "embedded in lengthy text about the power plant and radiation." Id. at p. 5. She offers the following recommendations:

> 1. The "what to do" information could appear at the beginning of the text. Informational materials such as the sections entitled "How it Works," "Radiation ... A Fact of Life," "About Radiation," and "Nuclear Terms" should be either placed in an appendix at the end or deleted if not relevant in an emergency.
> 2. The "what to do" information should be clear and repetitive.

3. The "helping resources" information should be clear and repetitive.

75. We found Ms. Andrews to be a thoughtful and forthright witness. Her qualifications to offer insight into individual psychological responses to an emergency at the facility are unquestioned and her critique of the brochure's inadequacies is well founded on her expertise and experience with individual response to crises. We consider her recommendations informed and persuasive.

76. Intervenors next presented the expert testimony of Ms. Ruth Pittard, the Director of Audio Visual Services at Davidson College. Ms. Pittard has worked for over ten years in the design, production and presentation of audio visual materials for instructional use at the college as well as materials for use by community and service organizations. She had familiarized herself with the NUREG-0654 public information planning objectives and evaluation criteria and evaluated Duke's Catawba brochure (1984 edition) for its effectiveness in accomplishing the primary objective of effectively informing the public regarding how they will be notified and what their actions should be in an emergency. Int. Ex. EP-38, Pittard, at p. 3. She concludes that the brochure does not effectively accomplish this objective and recommends that we require the brochure's modification or replacement to effectively communicate this message. We note with appreciation Ms. Pittard's offer to assist in redesigning such materials. Id., at p. 8.

77. Ms. Pittard explains that the "required message" as specified in NUREG-0654 is obscured rather than enhanced by the "design theme" actually communicated by the "physical placement or layout of the information presented to the reader as well as the language mode used to communicate the message." Id. at pp. 4, 6. The brochure's design theme communicates, inappropriately, the point that Duke Power Company is concerned about safety at the Catawba plant. Id. at p. 7.

78. Ms. Pittard stresses that through the use of factors such as location of the message within the text, consistency and repetitiveness of the message, use of pictoral means and illustrations to reinforce the message, boldness of print, use of "alarm" colors like red and orange as compared to "cool and calm" colors such as green and blue, setting off the message from the body of the text, language mode such as active versus passive language, and actual volume of the material to be read will influence how effectively the required message is read, interpreted and retained.

79. In the context of providing emergency planning information, Ms. Pittard stresses that such information should be communicated in a simple, coherent and consistent message written in a bold and decisive manner. The information should be written in an active voice. It should employ bold colors and be supported with pictograms or illustrations to reinforce the printed message. All secondary information should either be relegated to the end of the materials or omitted all together if

the text will not otherwise be short and to the point. Ms. Pittard finds the 1984 Catawba brochure to be weighty and not short and to the point. She finds the required message is located in the body of the text towards the end of the brochure and not in a manner to focus the reader's attention on the important information. Duke's use of such language as the very first section heading, "We Want You To Be Prepared," communicates the secondary message that Duke is concerned about safety at the nuclear facility rather than the required message regarding appropriate response actions by the reader.

80. In response to questions on cross-examination, Ms. Pittard acknowledged that the required message as specified in NUREG-0654 is contained in the brochure. She stresses, however, the important point that because of the conflicting design theme of the brochure, this required message is obscured and not effectively communicated. Pittard, Tr. 1731, 5/10/84.

81. We found Ms. Pittard's testimony very informative, helpful and persuasive. We note in passing that her observation concerning the use of such "alarm" colors as red and orange appears very well taken. While the colors on the inside of the brochure pages are limited to soothing blue and greens such as appear on page 5 in the chart entitled "Sources of Radiation" and in the protective action zones and shelter location maps on pages 12 and 14. In fact, the only place where the "alarm" color red appears at all is on the photograph of the annunciators on the control room panels at Catawba depicted on the cover of the

brochure. It appears that the efficacy of the use of such "alarm" coloring has not escaped Duke in enhancing the visibility of displays for its own Catawba station operators. We think a similar principal, as espoused by Ms. Pittard, dictates the use of such a color scheme to reinforce the critical messages which Duke should communicate to the public in its emergency planning materials. We find Ms. Pittard's analysis and observations very helpful in our own review of the Catawba brochure.

82. Finally, Intervenors presented the testimony of Philip Rutledge, a member of Carolina Environmental Study Group who performed a telephone survey to assess the level of public knowledge of emergency response information to persons living in the EPZ for Duke's McGuire nuclear station. While we excluded Mr. Rutledge's survey evidence as not bearing sufficiently on the state of emergency preparedness for the Catawba EPZ population, we did find that Mr. Rutledge's background knowledge and experience warranted consideration of his recommendations for improvement in the effectiveness of the Catawba public education program.

83. Mr. Rutledge has academic training in psychology and sociology, is a Master's degree candidate at the University of North Carolina at Greensboro, and has extensive experience in research and the conduct and analysis of public opinion surveys. His conduct of the survey of Duke's McGuire EPC population and experience in active participation in the emergency planning phase of this proceeding as well as in assisting the Charlotte

Mecklenberg Emergency Planning Review Committee provides us ample basis for thorough consideration of his suggested improvements in the Catawba public information program. We will pass to Mr. Rutledge's recommendations the conclusion of our consideration of the evidence on Contentions 1 and 7.

84. We agree with Intervenors' witnesses that the Catawba Nuclear Station Emergency Plan brochure (1984 edition), is ineffective and inadequate to accomplish the public information and education planning objective of informing the EPZ public how they will be notified in the event of an accident at Catawba and what their initial actions should be. While the brochure is attractive and professionally produced, we find it's 14 pages ponderous, verbose, overly technical and wholly ineffectual in communicating the simple and concise messages which are called for by the Commission's public information requirements.

85. To begin with, even the most diligent and literate reader, not likely to be represented by large numbers of the general public to whom the brochure is addressed, would be left, after the most exhaustive perusal of the brochure, to wonder just exactly what the hazard was for which the emergency plan is required. It requires the legal scholarship of Applicant's able counsel to find, buried in the text at page four of the brochure under the bold heading "Radiation ... A Fact of Life," any information whatsoever on the subject of what the fuss is all about. There, following a paragraph ending with the sentence, "You can see an operating nuclear power plant adds very little to

how much radiation we get" is the only indication of the nature of the hazard for which the public's preparedness is required:

> If there were a major emergency at Catawba, people in areas near the plant could be exposed to high levels of radiation. Exposure to high levels of radiation causes health effects. For your protection, follow the instructions on the emergency broadcast stations.

Id., p. 4. Opposite this obscure acknowledgment regarding some unspecified, neutral "health effects," is a full page entitled, "Sources of Radiation," featuring a soothingly green and blue pie chart reflecting in milligrams the sources and amounts of background and man-made radiation to which one is normally exposed. The only reference to a nuclear plant is in the observations that only .15 percent of the total exposure comes from "releases from nuclear industry," and that "living next to an operating nuclear plant" exposes one to less than one milligram per year.

86. How one may be convinced that plowing through the remainder of this ponderous brochure serves any point at all, let alone that preparedness for protective response in the event of an actual accident might save the life and health of the reader and his or her family, one can only wonder. The nature of the hazard involved in emergency planning for radiological accidents is clearly information required to be communicated effectively in the Catawba public information and education program. As previously discussed, both the North Carolina and South Carolina plans explicitly call for information on the "potential hazard"

and the effects of accident releases of radiation on human beings to be communicated.

87. NUREG-0396 at page I-7 makes clear that the reduction of early severe health effects, defined as serious injuries and deaths, is the first priority for emergency response. At page I-51 of the same NUREG, the term "early health effects" is used as synonymous with early fatalities and injuries. Further, in NUREG-0654, the description of the planning basis for establishment of the plume EPZ speaks explicitly in terms of "early severe health effects (injuries or deaths)".

88. Witness upon witness in this proceeding points to the passage at page four of the Catawba brochure cited above as the sole reference to the nature of the hazard to which this emergency plan is directed. We find this sheepish, apparently embarassed effort to hide the obvious facts which are required to be communicated to the public as reflecting a clear failure on the part of Applicant's public information effort. We are convinced that the public not only deserves but wants some simple, plain truth communicated by Duke and its emergency planning officials. We have no doubt that the public response, and the effectiveness of its emergency preparedness, could be nothing but enhanced by some simple, plain, unadulterated honesty regarding the nature of the hazard, as unlikely as we all hope it to be, for which all of the efforts of Duke Power Company, the Nuclear Regulatory Commission, the State and local planners, all

those who are called upon to demonstrate emergency response capability are directed.

89. We think that, as Ms. Andrews suggests, a clear and concise and straight-forward acknowledgment of the threat will go a long way toward preventing shock, psychological crisis, panic and inappropriate behavior which would result if the public only learns of the nature of the hazard at the time of the actual accident. Duke Power's efforts to obscure the unlikely but real hazard of a severe nuclear accident which could, indeed, cause injury and death, is clearly counterproductive to insuring effective protective response on the part of the public. We will require that this deficiency be remedied in the revised materials which we are directing be produced as part of this decision.

90. We agree with the observations of the licensing board in Consumers Power Company (Big Rock Point Plant), LBP-82-60, 16 NRC 540 at 546 (1982) regarding the brochure in that proceeding. They viewed that brochure as reassuring the plant's neighbors that plausible accidents could lead only to minimal doses:

> Such an unmitigated reassurance might, however, have led people to disregard evaculation warnings. After all, why respond when no harm could come to one anyway?

The Board encouraged and Applicants agreed to a language change which states:

> However, prudent emergency preparedness includes planning for less likely "worst case" accidents in which larger, even life-threatening doses of radiation might be released within the five mile EPZ. Id.

Such simple straight acknowledgment of the facts upon which emergency planning is based must be effectively communicated in the materials for the Catawba EPZ public.

91. We agree, further, with the Licensing Board in the Big Rock Point proceeding that the importance of emergency planning information, including the meaning of the siren signal and the evacuation routes, is more effectively communicated if presented "in a more prominent position at the beginning of the pamphlet." Id. at p. 552. This same point is effectively made by Intervenor's witnesses Andrews and Pittard. Int. Ex. EP-38, Andrews, pp.4-5, Pittard, p. 6. Ironically, Applicant's own reading specialist, Dr. Duckworth, makes the same point, perhaps unwittingly, in her acknowledgment that the critical instructional information which is written on the "average reader's" seventh grade reading level is set forth towards the rear of the brochure on pages 9, 10 and 11; while the narrative portions of the brochure describing plant operation and information concerning radiation on pages 2 and 4 of the brochure are written on the higher eleventh grade level. Appl. Ex. EP-7, Duckworth, pp. 14-15.

92. Dr. Duckworth makes clear that she left the choice of vocabulary and decisions as to comprehension with the Duke brochure's authors. Tr. p. 421, 5/2/84. She also acknowledges that the 1984 brochure still contains material of a technical and verbose character. The only real response to this critical evidence with respect to the placement of the required emergency

response information is provided by Applicant's Mr. Carter in his pre-filed testimony:

> Preliminary information on the operation of a nuclear station, facts about radiation, and definitions of nuclear terms were placed in the front of the brochure to aid the reader in understanding the importance of emergency planning and protective actions.

Appl. Ex. EP-7, Carter, p. 5.

93. Mr. Carter may well fairly reflect Applicant's motives in designing the brochure as it is with the critical information at the lower reading level buried in the rear of the dense 14 page document; however, such an explanation does not effectively justify such a design which has the effect of embedding and obscuring the critical information behind this lengthy and verbose introductory material which we conclude is, at best, supplementary, and, at worse, irrelevant and distracting from the important and required message.

94. We agree with Intervenor's position that the format of the Catawba brochure's presentation is ineffective and inadequate to establish compliance with the Commission's requirements. We find that it does not effectively inform the public as to how they will be notified and what their initial actions should be in the event of a radiological emergency at the Catawba station. The information which does communicate this required message should be provided in a revised replacement emergency planning information material which is clear, accurate, and concise in both form and content.

95. While we cannot and do not specify the specific language or design features, we commend to the Applicants and the responsible state and local officials the recommendations and volunteered assistance of Intervenor's witnesses, and direct that Applicants submit such reviewed public information materials to the parties and this Board for review and approval in order to establish compliance with the Commission's public information and education requirements and to prevail on Contention 1.

96. Although our fundamental findings which support Intervenor's position on the public information contention focus on the important generalized inadequacies in the program and its principal vehicle, Duke's 1984 Catawba brochure, for its failure to effectively communicate the required emergency information, we feel it necessary to touch briefly upon a number of remaining Intervenor criticisms regarding content and textual matters in order to emphasize what we find appropriate and inappropriate to guide the parties in their efforts at revision. We stress, again, the important part that neither the numerous textual changes already made or agreed to by Applicants nor further changes in response to the following criticisms will cure the fundamental inadequacies of the brochure and the present informational program. Our decisions which follow on textual and editorial matters should be understood in the context of our requirement for a general revision and improvement of the program.

97. Intervenors make the point that in treating the subject of radiation, Duke's brochure fails to focus on the hazard for which preparedness and emergency planning is necessary: "The effects on the human body and the environment of an accidental release of nuclear radiation in the atmosphere," Appl. Ex. EP-1. North Carolina Plan, Part I, p. 53. In similar language, the South Carolina plan also makes clear that subject of radiation to be included in the public information program must effectively communicate "potential hazards resulting from a nuclear facility incident." Appl. Ex. EP-2 SCORERP, NXC-9. Intervenors in Contention 1 which targeted the earlier brochure, criticized the failure to site evidence indicating health effects of exposure to very low levels of radiation and emphasized that the public receives a general message that "radiation is not particularly harmful, and that a serious accident is extremely unlikely."

98. They chide Applicant's brochure for failure to indicate that there is danger in accumulated radiation dosage and for its failure to include information such as a chart as the one used to depict "normal" exposures from background and man-made sources to indicate levels of exposure during non-routine releases or under accident conditions. Each of these criticisms is treated individually by Applicants' witnesses and the FEMA representatives either as treated sufficiently with reference to obscure and ineffectively presented passages in the brochure, or reflecting information not required by Commission regulations and guidance. Appl. Ex. EP-7, pp. 1-19; NRC Staff Exh. EP-2, 4-7.

99. For example, Applicant's witnesses Glover, Birch and Carter responds to Intervenor's criticism that the brochure does not show a chart reflecting exposure under accident conditions to put into perspective the chart regarding background radiation which has been included:

> First, the NRC regulations do not require such a chart. Second, the composition of such a chart would be voluminous due to the number of scenarios that would need to be covered. Finally, the brochure contains adequate information concerning radiation levels on page two.

Appl. Ex. Ep-7, p. 10.

100. These responses by Applicants are not only wrong, but they miss the fundamental point. As the Licensing Board in the Big Rock Point Plant proceeding observed, 16 NRC 540 at 546, "after all, why respond when no harm could come to one anyway?" There, the agreed upon remedy was to state simply that under worse case accidents for which prudent emergency planning is required, "even life-threatening doses of radiation might be released ..."

101. The point is that, as required by both the North Carolina and South Carolina state plans and the Commission's regulations, public information and education programs must adequately inform the public to assure effective protective action in the event of an emergency, and that the brochure or other public information material must communicate simply and clearly that exposure to radiation under severe accident conditions can cause serious injury and/or death. The point must

be made that the hazard for which we are planning is a serious one involving threats to life and health and that, therefore, the public must prepare to respond and take the threat seriously. In our view, such information is required by NRC regulations, need not require voluminous treatment in order to communicate the simple point that radiation released from the plant in a severe accident could cause injury and death, and, finally, the existing brochure is wholly inadequate to communicate this message.

102. We pass next to Intervenor's criticism that the brochure is written at an inappropriate reading level which will not be effectively comprehended.

103. Duke's witness, Dr. Duckworth, performs a quantitative measure of readability but, herself, disclaims any expert analysis of the brochure as to comprehension and vocabulary which were "Duke's business not mine." Duckworth, Tr. 421, 5/2/84. The revised brochure, at best, contains instructional information, though buried at the back of the brochure, which is in her opinion "appropriate for the average reader," written on a seventh grade reading level. Appl. Ex. EP-7, Duckworth, pp. 14-15.

104. Applicants offer no expert evidence, whatsoever, on the effectiveness of the brochure in terms of its comprehension or vocabulary; nor do they establish the appropriateness of targeting the "average reader" with a public information vehicle which is required to reach the entire general adult population residing or transient in the plume EPZ for Catawba. Applicants

and the NRC staff simply fail to carry their burden of establishing the effectiveness of the brochure in terms of comprehension or reading level.

105. We note that in Waterford, supra, 17 NRC 949 at 968, the Licensing Board there approved the Applicant's revised brochure on the basis of expert testimony that the overall material is written at the sixth grade reading level with critical instructional information at the fourth grade level characterized as written to "the lowest level that he could, consistant with accuracy and appropriateness." In reviewing that brochure, Applicant's expert explicitly "did not aim at the average reading level," for the EPZ public. Dr. Duckworth acknowledges that, even as revised, Duke's 1984 brochure continues to include material that is "verbose in terms of being wordy and pithy ..." Appl. Ex. EP-7, Duckworth, p. 456, 5/2/84.

106. Next, Intervenors fault the brochure for failing to explain the term "plume exposure pathway" or to provide information concerning the phenomenon of radiation transport in order that the public will understand the necessity for and general means of taking protective action when directed. While it is clear that the anticipated emergency broadcast system messages will employ these very terms in instructing the public concerning evacuation or sheltering, Applicants have chosen to omit references to these terms or belated information although they define in detail 14 "Nuclear Terms" employing an entire page of the 1984 brochure. Applicants' Exhibit EP-8, p. 6. If a

brochure is to contain this sort of definitional or background information, at all, it certainly should include information on this subject. Applicants' explanation that such information is not required and that its inclusion may cause public confusion is, simply put, unpersuasive. Applicants' Exhibit EP-7, Glover, pp. 15-16.

107. We note that the Licensing Board in the Big Rock Point Plant case endorses a revision to include in simple terms a description of the plume transport phenomenon:

> Since an accident's severity and the wind's direction determine the pattern of radiation releases during an emergency, radio, T.V. and public address systems will advise you whether to evacuate and what routes to take.

16 NRC 540, at 549. Applicants' own "initial version" of the Catawba brochure, Appl. Ex. EP-8, itself, is more helpful in communicating the fundamentals of radiation exposure mechanisms in a passage which was deleted in the 1984 edition:

> How radiation would harm you depends on "....the type of radiation to which you are exposed; the amount of radioactive material you breathe or take into your body; the length of time you are exposed; the amount of your body exposed and which part."

Id. at p. 4. Such simple information makes comprehensible and persuasive the EBS instructions which would likely be given in the event of an accident. Such information should be included in public information materials to provide a sufficient base of understanding to prompt effective public response.

108. We note in passing that troubling questions remain as to the effectiveness with which Duke and the state and local

authorities have actually disseminated what little public information materials that exist for the Catawba EPZ permanent and transient population. The Big Rock Point Plant Licensing Board emphasizes this same concern:

> However, whether because of lack of resources or lack of commitment, these officials have not developed information that would let them know whether the tasks they initiated have been effectively carried out. They were concerned that steps were taken to fulfill the requirements that a pamphlet be distributed, but they did not find out how well those steps were carried out or whether the pamphlet was received.

16 NRC 540 at 551-552.

109. That Board requires a demonstration of effective remedial efforts to ensure thorough dissemination of the public information materials to the affected public. And observes that it is comforted by what was then the commitment to regularly review the effectiveness of the dissemination and understanding of the public information materials.

> We take some comfort that the regulations require annual, methodologically sound ("a statistical sample") sampling of people living and working in the vicinity of the plant, to determine if they are aware of the meaning of the prompt notification signal and if they have information available to them about what to do in a radiological emergency. In addition, corrective measures must be taken if the level of knowledge is substantially short of 100%, the level specified as an objective. This survey requirement, properly administered, can provide useful empirical information for improving the booklet's ability to "get through" the intended information.

16 NRC 540, at 545.

110. Sadly, on the basis of the record in this proceeding, we can express no similar comfort in such a commitment for performance of such an empirical verification of the

effectiveness of the public information program. FEMA has conducted no such survey although their own guidance, FEMA-43, requires such a survey to be conducted and endorses the importance of such empirical verification.

111. For their part Intervenors have attempted to obtain just such empirical evidence in the form of the survey conducted by Intervenors' witness Mr. Rutledge. Unfortunately, for justifiable and, we are sure, praiseworthy reasons, Mr. Rutledge was able to survey only the Duke's McGuire EPZ population. His survey results were excluded by the Board as not sufficiently relevant to the questions of the Catawba program. We note, without reliance thereon, that Mr. Rutledge's survey results raise troubling questions as to the effectiveness of the dissemination of information and its understanding in the McGuire EPZ. Intervenors' offer of proof, Tr. 1811, 5/10/84. We trust that the NRC staff and FEMA will take advantage of the availability of this empirical information with respect to the McGuire planning and take appropriate and effective action to correct any deficiencies.

112. Suffice it to say, here, that Applicants have not demonstrated that either the brochure or other public information materials have been effectively disseminated to the required audience. We note that although Applicants have conducted detailed and repeated scientific surveys of the EPZ population and including questions concerning the receipt of public information materials, they have declined to offer the results of

those surveys in evidence in support of their case. We can only conclude, as Intervenors have offered to show, that such evidence reflects adversely upon Applicants' claims that their public information program is effective in this regard.

113. We note further, that in Waterford the Licensing Board endorses Applicants' plans there, where

> Brochures will be distributed in bulk, or posters containing such information will be provided to area industries, hotels, motels, post offices, libraries and other public areas. Information will also be provided in local telephone directories ... The NRC staff will verify that this distribution has taken place prior to issuance of the operating license.

17 NRC 949, at 956. Applicants have made no such commitments, here, and we find the absence of evidence of otherwise effective means for disseminating required information reflect an important inadequacy in Applicants' and the state and local authorities public information programs. We will require submission of proposals by Applicants and others to the parties and board for review of adequate remedial measures to hear these deficiencies in dissemination of required public information.

114. In addition to its principle, "Catawba Nuclear Station Emergency Plan" brochure (1984 edition), Applicants' Exhibit EP-5, Duke Power Company has published a brochure designed especially for school children, parents and teachers, Applicants' Exhibit EP-6:

> Written because I had a perception that there was a need to focus information for the larger number of schools and school children that we have in this area, particularly to make parents aware of particular plans that were being developed for the schools, for evacuation of those facilities, and to

highlight any information at all, let alone the critical "what to do" message. The boldest text is employed in the first two words "Dear Student." All other text appears in the same dense type face. Except for the front cover and map, the entire contents are dull, colorless black and white text. The cover, itself, inexplicably depicts pleasant scenes of students passing in the hall, playing football and disembarking from a school bus: subjects which have no bearing on the nature of the hazard or action to be taken in the event of an emergency at the Catawba facility. Once again, use of the "alert" colors of red and orange are reserved for these irrelevant color photos and are not employed at all in the balance of the material.

117. Intervenors presented the rebuttal testimony of a local high school teacher, Ms. Brenda Best, who observed the mock evacuation of two bus loads of students from her school during the February 1984 Catawba emergency plan exercise and was asked to distribute the student brochure to her class and to lead a discussion with her students regarding emergency planning for Catawba. She expressed the opinion that neither she nor her students had been effectively educated regarding how they would be informed and what actions they should take in the event of an accident at the facility. Best, Tr. 4565 6/8/84. She expressed particular concerns about the false assurances in the brochure that:

> Your teacher will look after you. Stay calm. Your teachers and principal have been taught what to do.

Appl. Ex. EP-6, 2nd page. Ms. Best explained, "I was never taught to do anything ...." Best, Tr. 4551, 6/8/84. She had never been informed of the existence of an evacuation plan for the Charlotte Mecklenburg schools or of the roles and responsibilities of teachers under such a plan. Id. at Tr. 4555.

118. Although the plan assumes that her privately owned vehicle at the school will be utilized to evacuate students, she has never been asked if she could perform this function in an emergency. And in fact, since she has the only car in the family, she might well be forced to look after the needs of her family first. Id. Tr. 4557.

119. Despite her best efforts to explain the importance of the information to her students many were simply left behind, "and the trash cans of Olympic High School were full of these cards, these booklets." Id. at Tr. 4559. Ms. Best strongly urges that the deficiencies in the public information program be corrected prior to plant operation.

> I don't see how it can happen if people don't know the information, haven't taken it home and people don't know what to expect or what to do and when I have raised these questions before, people say, "It is going to happen. We are going to teach the teachers how to do it and we are going to do these things." But you don't get a driver's license until you can drive the car, until you pass the driver's test and I want all these things done so that my students will be safe. If I am supposed to look after them, I need to know what I am supposed to do, what the plan is, where to go and who is going to do what. If I don't understand it, I cannot make them.

Id., Tr. 4567. We agree with Ms. Best's observations and conclude that Applicants' required remedial plan reflect specifically on means for curing the identified deficiencies in the program targeted for students, teachers and parents.

CONTENTION 7

1. Intervenors' Emergency Planning Contention 7 challenge the adequacy of public information and education to achieve effective in-place sheltering in the event that sheltering is ordered as a protective measure in the event of an accident. As admitted, Contention 7 reads:

> The Applicants' possessive emergency plans and public brochure and the plans of the relevant state and local authorities do not adequately address the preparations that should be made to achieve effective sheltering, nor the actions that people should take when advised to seek shelter. Hence, the plans and brochure fail to provide a reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency as required by 10CFR 50.47(a)(1).

2. The contention was admitted as revised by the Licensing Board in its Memorandum and Order (ruling on remaining emergency planning contentions) of September 29, 1983 at p. 7. Contention 7 was treated by all parties as a corollary to the more general Contention 1 challenging the adequacy of the public information and education program to achieve effective protective action. Contention 7 targets one of the two likely choices for protective action: that of in-place sheltering. The focus of the discussion on Contention 7 at hearing was on the inadequacy of the information provided in Applicants' Catawba brochure, Appl. Ex. EP-5, regarding preparations that should be made to achieve

effective sheltering and the actions that people should take when advised to seek shelter. Since we view the general public education and information program of Applicants and state and local authorities as inadequate to achieve effective protective action, those general inadequacies compel the conclusion that such inadequacies would also preclude effective sheltering.

3. Applicants presented testimony of Dr. Samuel L. Finklea, III of the Bureau of Radiological Health, South Carolina Department of Health and Environmental Control, to discuss the information provided on actions which members of the public should take if and when they are advised to take shelter. As provided in the plans, protective actions would be advised to minimize the exposure of individuals in the event of an airborne release of radioactivity in an accident at the facility.

> ... Evacuation before exposure is the recommendation of choice ... but ... this may not always be possible. Furthermore, untimely evacuation may in some instances result in greater exposure than one would receive while remaining in available shelter until conditions were more favorable. ... All else being equal, larger buildings, buildings with more massive construction, and buildings with basements provide more protection than smaller, lighter buildings without basements... In those situations where evacuation cannot be completed before exposure begins, the plans provide for a recommendation of sheltering in-place to be made.

Appl. Ex. EP-7, Finklea, pp. 25-26. Since structures commonly found in the plume emergency planning zone may vary in their shielding effectiveness and therefore their dose reduction factors by a factor of 20, Finklea, Tr. 632-633, 5/3/84, faced with the choice of seeking shelter in two different structures,

individual and concerned would be "better advised to go to the one with the better protection factor." Finklea, Tr. 618, 5/3/84.

4. The question, then, raised in Contention 7 is whether sufficient information is provided the public to enable them to choose the superior structure in order to achieve effective in-place sheltering. According to Dr. Finklea such information would be broadcast in the EBS message. Finklea, Tr. 618, 5/3/84. However, no such information is provided for in the present plans with regard to EBS broadcasts. Finklea, Tr. 620, 5/3/84.

5. It is clear that the Catawba brochure (1984 edition), Appl. Ex. EP-8, contains no such information. Its only instructions with regard to in-place sheltering are contained at p. 9 under the heading in bold "You Might Be Told To Stay Indoors". There, after telling you to close windows and doors, the brochure states, "move to a basement if possible." This reference, while good advice, is obscure in the absence of even the simplest explanation that the mass of the structure enhances your level of protection, may well be gratuitous since, as we note, basements are indeed uncommon in the southeast region where the Catawba facility is located.

6. We direct that in Applicants'' revised public information materials, they include simple and concise information, such as that stated by Dr. Finklea in his own testimony, Appl. Ex. EP-7, Finklea, p. 25, to enable the public to understand the comparative effectiveness of various structures

for use during in-place sheltering. Such information should, of course, include the caveat that one should remain in one's present structure unless one can reach a superior structure in time to avoid exposure to the plume while in transient. The EBS message should provide the basis for such a decision. However, the public is entitled to be informed of this rudimentary information to enhance their level of protection.

7. The allied question raised by Intervenors relates to the adequacy of information provided in order to achieve effective respiratory protection for members of the public. Applicants' Catawba brochure (1984 edition), in the section entitled "You Might Be Told To Stay Indoors," at p. 9, states only: "4. Place a damp cloth over your nose and mouth."

8. Intervenors urge that this information is clearly inadequate to achieve effective respiratory protection, and we agree. Intervenors asked Applicants in discovery, "What was the effectiveness of breathing through a damp cloth for removing airborne radioactive volatiles and particulates?" Applicants' witness Burch responsed with reference to a study of readily available materials measured by Cooper and published in NUREG-2272. It appears that the dose reduction by 6 layers of damp sheet is only 9% for .4 micron particles. Clearly, for only 1 layer of damp sheet, the dose reduction would be much less, although Ms. Burch disclaimed specific information. Burch, Tr. 201-204, 5/1/84.

9. While the Catawba brochure specifies only "a damp cloth over your nose and mouth", a very large difference in

effectiveness depends on whether the filter medium is simply held or fully taped over the nose and mouth. For example, a surgical mask, merely tied in place, permits 36% of the material to get through; while if fully taped, all but 4.2% of the particulates are filtered out. Further, a respirator such as a commonly available 3-M dust mask is demonstrated by the NUREG study to be 10-20 times more effective at particulate removal than a damp cloth, depending upon how it is attached. Burch Tr. 206, 5/1/84. We see no reason whatsoever why a simple, concise and accurate information should not be provided so that members of the public can choose the more effective respiratory protection available to them. A damp cloth over the nose and mouth is simply inadequate to accomplish effective sheltering. The language approved in the Big Rock Point Plant case, supra 16 NRC 540, at p. 549 at least provides some additional information as to the preferred alternative and the purpose for such respiratory protection:

> ...Put on a dust mask or breathe through a damp handkerchief to filter out any dust in the air.

Id. We think simple and clear information as to the relative effectiveness of commonly available materials should be included so that the public can enhance their level of self-protection. We direct Applicants and others to include such information in their revised materials.

11. We conclude that Intervenors prevail on Contention 7 as discussed above. While the FEMA witnesses endorse the adequacy of the emergency plans and brochure, they do not explain at all the basis for their confidence and assert that such information

is not required by NUREG 0654 for in-place sheltering. NRC Staff Ex. EP-2, Heard and Hawkins at p. 14. Accordingly, we attach little weight to the FEMA endorsement since it is given without any apparent factual basis.

12. Having ruled in Intervenor's favor on both Contentions 1 and 7 based on our findings of inadequacies in the public information and education program for Catawba area citizens, we now turn to the question of remedies and take up the recommendations of Intervenors including those made by their witness, Mr. Philip Rutledge.

13. As previously discussed, Mr. Rutledge, who is trained in psychology, sociology and research including conduct of opinion surveys, offered testimony presenting the results of a telephone survey he had conducted of the effectiveness of Duke's public education efforts for its nearby McGuire nuclear station. Based upon his experience, and in part upon the survey results, Mr. Rutledge presented a series of recommendations for improving the public education and information program under review here, for the Catawba EPZ public. While we excluded Mr. Rutledge's McGuire survey and related testimony on relevance grounds, Tr. 1810, 5/10/84, we did agree to consider Mr. Rutledge's recommendations. Int. Ex. EP-38, Rutledge. We find these recommendations helpful and meritorious in a number of particulars. They will aid us in the formulation of remedies designed to make needed improvements in the public education and information program for Catawba.

14. In his first recommendation, Mr. Rutledge urges that a public body be established to exercise control of the public information functions now performed almost exclusively by Duke Power Company. Such a committee would be comprised of representatives of

> Duke Power Company, government officials, ordinary citizens, and representatives of organizations who's concerns for public health and safety are well documented. Input should be openly encouraged from everyone and decisions should be made in meetings open to the general public. Particular input should be encouraged from educational and other groups with the EPZ. This will also stimulate greater public awareness of these issues.

Id.

15. This suggestion is premised upon Intervenor's assertions that Duke faces a conflict of interest in its dual task of assuring the public of the safety of its Catawba station, while at the same time communicating frankly the potential hazards of a nuclear accident and the need for emergency preparedness for such an eventuality, however remote. Duke's conflicting roles take on even greater significance where, as here, state and local officials have deferred so thoroughly to Duke in the performance of the public education tasks. As we have concluded above, Duke has largely monopolized responsibility for the information program.

16. This recommendation has clear merit. There is a strong need to establish a specific mechanism for insuring that complete and accurate information is disseminated to the public in the most effective manner. Ironically, perhaps, the relevant state plans each prescribe that such efforts are to be a "joint

responsibility" to be conducted with "coordination" of the various state, local and Duke Power participants. North Carolina Plan, Part I, p. 55, Appl. Ex. EP-1; SCORERP, p. C-8-9, Appl. Ex. EP-2.

17. While we are convinced that we have full authority to require the establishment of a vehicle to effectively administer the public education program required by Commission regulations, as well as by the North and South Carolina state plans, we believe that the specifics of the composition of such a body and its operating procedures are best left to the formulation by the parties involved. We stress that such a body should, to be effective, encourage the fullest participation by all interested parties, particularly Palmetto Alliance and Carolina Environmental Study who have demonstrated that their interest in this subject is a sound basis for effective contribution to this program.

18. While it is clear that Applicants bear the final responsibility for demonstrating compliance with Commission regulations in this regard in order to receive authority to operate the Catawba facility, that responsibility cannot be discharged in a vacuum, nor can it be effectively discharged without the fullest cooperation of all concerned.

19. Mr. Rutledge's second recommendation urges that the financing of such a committee's efforts in managing and implementing the public education program be made independent through the establishment of an independently controlled fund

intended specifically for the public information program. While this Board does not have the direct authority to require the establishment of any particular funding mechanism for effectuation of an adequate program, we can and do require whatever remedial measures are necessary to assure that the end result - an effective public education program - is realized.

20. Each of the participants inherently now bears costs associated with their performance under the program. Presently such costs include Duke Power's present public information program, including the publication and distribution of materials such as the brochures, and what limited public information efforts are presently conducted by the state and local authorities. We urge the various parties to consider adoption of a mechanism of the sort recommended by Mr. Rutledge in order to more effectively implement the joint responsibility through coordination of the efforts of all involved.

21. In his third recommendation, Mr. Rutledge suggests use of a better primary instrument to be used in communicating basic emergency planning information, given the apparent ineffectiveness of Duke's Catawba brochure as reflected in his experience with the McGuire survey results. His suggestion, which seems helpful and meritorious to this Board, is that a hanging poster be distributed by Duke which would most suitably be hung in a permanent location where it would be easily found in the event of an emergency. We are very concerned that whatever

the vehicle employed is, it be readily available to EPZ residents when most needed in the time of an actual accident.

22. As reflected earlier, it appears that local emergency planners, themselves, rely upon the ready availability of the Catawba brochure for reference by residents in an actual emergency. York County EOP, D-14, Appl. Ex. EP-2. A vehicle such as that suggested by Mr. Rutledge should be considered carefully by the parties in their submission of proposed remedial measures as required by our decision. We note, also, that the NUREG-0654 suggestion that including emergency information in telephone directories might similarly insure easy access in the event of an actual emergency.

23. In his fourth suggestion, Mr. Rutledge urges that the involvement of "educational groups, civic groups and the media in disseminating information" be strengthened. He suggests specifically that the use of periodic public service announcements would increase the visibility of this information. We, of course, agree. The involvement of such local groups as the PTAs, Tr. 4595-96, 6/8/84, is bound to increase the effectiveness of the public information and education programs. The use of public service announcements is already identified in the North Carolina plan, Appl. Ex. EP-1, Part I, p. 55, though not presently utilized.

24. Unless we accept the notion that the information regarding the nature of the hazard of an accident at Catawba and the appropriate emergency response by the public should be kept a

secret, it seems obvious that the more broadly the public and interested participants are in the process of disseminating this information the more effective will be the level of public understanding and preparedness. We urge that this principle and these specific mechanisms be incorporated in the necessary remedial measures.

25. Finally, Mr. Rutledge urges that the emergency plans and their implementation be the subject of annual review and revision in order to assure their maximum effectiveness. He stresses that such a review be based upon the impirical evidence supplied through the conduct of annual surveys of the EPZ population conducted by an independent research firm.

26. The value of such survey evidence is indisputable in this record. The original version of NUREG-0654 required just such an annual survey to verify effectiveness or permit needed corrective action to be taken. While, apparently, that annual requirement has been since deleted in the revised NUREG, the use of survey data as a basis for reviewing the effectiveness of the plan's implementation continues to be endorsed by FEMA in its guidance document FEMA-43. Applicants Duke Power Company themselves have chosen to rely upon such survey evidence for their own internal use in confirming the success of their general public information program, although they have chosen not to offer such survey evidence in support of the effectiveness of their program in accomplishing this Commission's public information objectives.

27. While we may not have direct authority to order the conduct of an annual survey, we can and do emphasize that our level of confidence in the adequacy of the public information and education program for Catawba, after needed revisions have been made, would be significantly enhanced if we could rely upon the knowledge that such annual reviews and corrective actions, based upon imperical survey evidence, would be committed to by the parties. Consumers Power Company (Big Rock Point Plant), LBP-82-60, 16 NRC 540, 545 (1982).

INTERVENORS' EMERGENCY PLANNING CONTENTIONS 3 AND 6

THE ADEQUACY OF PLANNING FOR SHELTERS TO BE USED IN AN EVACUATION

1. Palmetto Alliance and Carolina Environmental Study Group's Emergency Planning Contention 3 was discussed and admitted at the pre-hearing conference of August 8, 1983. Tr. 1086. Order (Concerning Miscellaneous Matters) August 17, 1983. As admitted, Contention 3 reads:

> The emergency plans do not provide for adequate emergency facilities and equipment to support the emergency response as required by 10 CFR 58.47 (b) (8) in that:
>
> (a) The plans do not provide for sufficient uncontaminated food, clothing, and bedding for persons who are evacuated. The plan does not attempt to estimate these needs nor provide specific information on how they are to be met.
>
> (b) The plans do not demonstrate the unlikely proposition that just fourteen reception centers/shelters are adequate to register and process some seventy-five thousand evacuees. Indeed, the Catawba Nuclear Station Site Specific Plan (Part IV, SCORERP) provides that "all evacuees, both those ordered and those spontaneous, will be processed through their respective reception centers" (p. B-2).

2. With no clear plan for controlling entry and exit from the reception centers, and no restrictions on who may enter, it is very likely that reception centers will become overcrowded. Persons from outside the evacuation area will be understandably concerned about whether or not they have been exposed to radiation and might well proceed to a nearby reception center -- exacerbating problems of crowding that already loom as serious given the enormity of the task of processing EPZ evacuees at reception centers with limited space and supplies.

3. The contention targets two basic concerns: first, the absence of planning for provision of the specified "food, clothing, and bedding" to be utilized in the shelters in the event of an evacuation; and, second, the adequacy of the plans to provide for reception centers or shelters which can accommodate the registration, monitoring, decontamination and housing of the large number of persons who may evacuate upon instructions or spontaneously in the event of an accident at Catawba.

4. Applicants and the responsible state and local officials respond to these concerns of Intervenors by (1) supplying the absent information as to the available supplies of the necessary items and the means for obtaining them at the shelters; (2) changing the plans to address the obvious problems of overcrowding created by the reception center concept; and (3) undertaking a review of the adequacy of the designated shelter facilities. App. Ex. EP-13. We remain troubled by a number of concerns which surfaced in the trial of this contention and find ourselves unable to make our reasonable assurance finding absent further submissions by Applicants to resolve our doubts.

5. Applicants and their witnesses, who include state and local officials as well as representatives of the Red Cross and Salvation Army, respond to Intervenor's concerns regarding the absence of plans for provision of food, clothing, and bedding by supplying a listing of sources and quantities of such items believed to be available for use in shelters in the event of an accident at Catawba. App. Ex. EP-13, Neves, pp. 5-7. While it

is somewhat troubling that Mr. Neves, for example, who serves as a member of the North Carolina State Emergency Response Team and would be responsible for the provision of such items, disclaims either personal or indirect knowledge of the detailed identification of the food stuffs he lists in his testimony as available, Neves, Tr. 671-677, 5/3/84. The fundamental position of Applicants and their allied emergency response authorities is that given enough time to be able to draw resources from suppliers at greater distances, a sheltered population could be maintained for an indefinite period of time. Neves Tr. 664, 5/3/84.

6. This casual confidence that the Catawba Emergency Plans are rather effortlessly expandable pervades the position of Applicants, responsible officials and the NRC Staff on this and a number of other contentions. We remain unpersuaded that effective protective action can be taken on the basis of essentially ad hoc efforts over the wide range of accident scenarios and consequences.

7. Closely allied to Contention 3 are the concerns reflected in Contention 6 which relate to adequacy of provisions for dealing with contaminated persons, including registration, monitoring and decontamination. Contention 6, as revised by the Licensing Board in its August 8, 1983 pre-hearing conference was admitted in the following form:

> The emergency plans do not provide reasonable assurance that adequate protective measures can and will be taken (10 CFR 50.47 (a) (1)) in that:

(c) There are no adequate provisions for preventing contaminated persons from entering a non-contaminated zone. The plans do not make clear whether or not registration at a reception center/shelter is mandatory or not; if mandatory, by what procedures will it be enforced and what effort will these procedures have on evacuation times and traffic flow?

8. The position of Applicants and the NRC Staff, as well as state and local officials, on this contention is that although registration is not mandatory, all potentially contaminated members of the public would in fact be expected to register, be monitored, and be decontaminated at designated shelters in the event of an accidental release at Catawba. App. Ex., Pugh p. 4; Glover, p. 1; McSwain, p. 1. Here, too, the Catawba plans are optimistically viewed as capable of ad hoc expansion over a wide range of accident scenarios and, therefore, a wide range of demands in terms of numbers of persons affected and severity of exposures. We can only be skeptical about such casual assurances in the absence of more detailed planning to cope with this wide range of response requirements.

9. The scale of emergency response capability for which the Catawba plan should effectively assure implementation is large indeed, particularly as compared to the scale of emergency response capability actually demonstrated in past experience. For example, the North Carolina officials assume a planning basis for evacuation at Catawba of from 70,000 to 80,000 people, Neves, Tr. 653-654, 5/3/84, and the final environmental statement for the Catawba facility, NUREG-0921 projects an exposure to over 200,000 persons of a dose in excess of 25 rem in the most severe

accident scenario. Id., Figure 5.3, p. 5-60. These extremely large numbers of people who would require registration, monitoring, decontamination and sheltering services contrast starkly with the largest number of persons for which sheltering services have actually been provided, and with actual experience limited to "several hundred." Neves, Tr. 678, 5/3/84; Gregory, Tr. 803, 5/4/84.

10. The responsible state officials rather blithely rely on the assurance that enough people and enough monitoring equipment would be available under any scenario to register and monitor within the asserted twelve hour maximum standard established by the Commission. Gregory, Tr. 807, 5/4/84. Yet, if it took as little as six minutes per person to register, monitor and decontaminate each of those 240,000 potentially affected persons, 2,000 separate sets of registration, monitoring, and decontamination personnel facilities and equipment would be required in order to accomplish such a monumental task in the required twelve hour period. It belies believability to simply assume that such a level of resources could be marshalled without any more advanced planning than has been demonstrated here. Approached another way: assuming 15,000 evacuees requiring two minutes registration time alone it would take the twenty registrars (which the Red Cross' Mr. Johnson thought sufficient) a total of 25 hours to complete that portion of the process alone; Johnson Tr. 707-709; or: "if we need more people, there will be more people available;" or: "if we need 100 registrars,

we will have 100 registrars." Id., Tr. 710. It seems obvious to this Board that no prior thought whatsoever had been given to either analyzing the staffing and logistical requirements to accomplish the task at hand or to planning for the delivery of such resources to the shelters where they would be required in the event of an actual emergency.

11. Most troubling to this Board is the strong evidence which we heard with regard to these contentions on sheltering which demonstrates a wide disparity between the cavalier assurances of the Applicants and emergency planning officials as to the effectiveness with which their plans will be implemented and the cautious skepticism, and sometimes ignorance and incompetence, reflected in the testimony of those who are charged with the tasks of actual implementation of the written plans. Palmetto and CESG raised this troubling disparity between the "paper plans" and the capabilities of implementation, at the outset of these proceedings. Opening statement on behalf of Palmetto Alliance, Guild, Tr. 108-121, 5/1/84. The evidence in this proceeding gives us grave concern that there is, indeed, pervasive disparity "between the ability to implement and the ability to write," Tr. 120, where the plans on paper may appear effective and adequate to meet regulatory requirements, but strong evidence casts doubt on the likely effectiveness with which those written plans can be implemented.

12. While such a disparity between written commitment and demonstrated implementation is well reflected in our earlier

discussion of failures to effectively implement the state plans' public information and education commitments, supra, this same "gap" between planning and implementation is equally clear in the area of shelter management.

13. The Catawba emergency plans and the testimony of Applicants and planning officials underscore the heavy reliance placed upon the American Red Cross for effective implementation of the plans in an emergency in the critical areas of evacuation shelter management. The Mecklenburg County plan, North Carolina Plan, Part 3, p. 8, Appl. Ex. EP-1, assigns the following responsibilities to the Mecklenburg County Red Cross Director:

1. Operate the shelter at UNCC (University of North Carolina at Charlotte) or at any other designated shelter location as required.
2. Assign shelter staff members to radiological monitoring training.
3. Augment Mecklenburg County medical personnel, equipment, and blood products.

14. The Gaston County plan assigns the same responsibilities to the Red Cross for directing sheltering operations there. North Carolina Plan, Part 2, p. 11, Appl. Ex. EP-1.

15. Under the South Carolina Plan, the American Red Cross is assigned support responsibility for the Social Services function primarily assigned to the State Department of Social Services. SCORERP, p. 56, Appl. Ex. EP-2. The York County Emergency Operations Plan sets forth the assigned responsibilities to the American Red Cross (ARC) for shelter management:

> ARC will assist with sheltering of evacuees by providing food, bedding, and clothing. ARC will register evacuees upon arrival at designated shelters. Health Services will receive assistance from ARC in providing medical care to evacuees.

York County EOP, p. Q-7. Then, having conveniently assigned these critical responsibilities to the American Red Cross under the Catawba plans, Applicants and the responsible planning officials blithely presume that effective implementation has also been established:

> (T)he agencies responsible, i.e., Red Cross, Department of Corrections, Department of Human Resources, and Department of Agriculture, have signed the plan thereby accepting responsibility for their assigned mission.

Appl. Ex. EP-13, Pugh, p. 4. However, the Red Cross officials themselves tell a rather different story.

16. By way of rebuttal testimony, Intervenors Palmetto Alliance and Carolina Environmental Study Group presented evidence from two representatives of the American Red Cross who had direct personal involvement in the actual implementation of the paper plans. Linda Harris Anderson is the Chapter Manager of the Rock Hill Chapter of the American Red Cross. In the York County emergency plan she is identified as the "Shelter Coordinator" for York County. Anderson, Tr. 4460, 6/8/84. Betty Long was also presented as a rebuttal witness. She is Director of Disaster Services for the American Red Cross in Charlotte covering Charlotte and Mecklenburg County. Long, Tr. 4459, 6/8/84.

17. Ms. Anderson of Rock Hill describes the process by which she became familiar with the tasks assigned her chapter of the Red Cross and the manner in which very serious planning inadequacies came to her attention. The sequence of events described by Ms. Anderson reflect very adversely upon not only the likely effectiveness of implementation of the Catawba plan in regards to sheltering; but also the derelict and, indeed, backwards approach to planning shown here raises significant questions about the effectiveness of emergency planning for this facility, generally. First, Ms. Anderson was not even made aware of her assigned tasks as Shelter Coordinator for York County until after the most recent January 1984 revision of the York plan had already been published. Anderson, Tr. 4463-4464, 6/8/84. The late York County emergency planning official, Mr. Carroll, had inaccurately informed Ms. Anderson that the shelters to be utilized in the event of a radiological accident at Catawba were the same shelters as would ordinarily be used under the county's standard disaster plan.

> So I was not concerned that we would be doing anything particularly different.

Id. Tr. 4463. Only after learning of her countywide responsibilities under the plan did Ms. Anderson consult with the Red Cross' Disaster Specialist, Dennis Johnson, and begin to survey the shelters designated in the York plan to determine their adequacy employing Red Cross guidelines. All shelters checked were found inadequate:

> ... I personally visited the first two shelters on the list which were listed as primary shelters. And when

> I went I found the capacity overstated in the York County Plan and that they did not have adequate shower and toilet facilities for the capacity stated. They didn't have showers at all, which would be necessary for decontamination and is included in our separate guidelines that Ms. Long referred to for shelters involved with nuclear functions.
>
> And I then telephoned the other -- the principals of the schools on the other shelters and the manager of Kings Mountain State Park. I didn't visit any of those shelters personally. I telephoned the principals and found out that they did not have ... showers ... I made the county people aware as soon as I knew. But I really am not sure about who I made aware.
>
> They then immediately began to make plans, alternate plans, because their shelters were not suitable.

Id., Tr. 4465-4467. Thus, all of the shelters listed in the York County Plan, Appl. Ex. EP-2, p. Q-98, were determined by the Red Cross to be inadequate for use in the event of a radiological emergency. Bethany ARP Church and Bethany Elementary School are listed there as primary shelters. Sharon Elementary School, Hickory Grove Elementary School, and South Carolina State Park (Kings Mountain) are listed as secondary shelters. The January 1984 shelter and capacity listing is prefaced with the following description:

> The shelters listed in this appendix are in compliance with American Red Cross Disaster Services Guidelines and Procedures, ARC 3074, dated August 1976.

Id. Yet, neither Ms. Anderson, nor any other Red Cross official to her knowledge, had given any prior approval for the listing of these shelters. Tr. 4469. Not only were these shelters listed erroneously and inexcusably in the revised York Plan without prior Red Cross knowledge or approval, but their designation as

approved shelter facilities was widely published in both the initial and 1984 edition of the Catawba Nuclear Station Emergency Plan brochure. Appl. Ex. EP-8, p. 13; Appl. Ex. EP-5, p. 13. The former brochure, which was the subject of criticism in Intervenors' emergency planning contentions, identifies Bethany Elementary School and Bethany Presbyterian Church as "reception centers" where York County evacuees are to be processed, monitored and decontaminated prior to being sent onto shelters. In the 1984 brochure, Sharon Elementary School and Hickory Grove School are listed as York shelters along with Bethany Church and Elementary. Both brochures had very wide distribution with the EPZ. Several thousand of the earlier version were distributed to local citizens who attended meetings or plant tours. Applicants testify that the 1984 edition was mailed to all 95,000 households in the plume EPZ. While we are assured that the next revision of the brochure will delete these inadequate shelters, and perhaps others found only later to fail to meet Red Cross standards or be otherwise inadequate, the damage that's been done is likely serious and irreparable. How many evacuees might improperly rely upon one of the superseded brochures with the erroneous listing, even after the corrected version is published, we would likely never know. However, such potential for confusion, with the very real possibility of resulting harm, is, indeed, inexcusable; particularly where, as here, all such confusion is entirely unnecessary and solely the product of inexcusable failure by emergency planning authorities to verify the contents of their

plans with the authorities tasked with implementing it. Subsequent to the Intervenors' criticism of the plans' reliance upon 14 reception centers, including the inadequate York County facilities, as contained in their July 1983 emergency planning contentions, the South Carolina authorities scrapped the reception center concept and have designated a system of 38 primary and over 100 secondary shelters which are still in the process of review for adequacy.

> We took a hard look at the reception center concept for Catawba and based upon the size of the population felt it would not be feasible to use such a concept, thus we went to a sheltering system where the public would go directly to shelters rather than first to a reception center and then to a shelter. We have approximately 38 primary and well over 100 total shelters designated in the state and local plan for Catawba that could be called on if the population warranted it.

Appl. Ex. EP-13, McSwain, pp. 11-12. We understand that beyond the York facilities a number of other listed shelters may be determined inadequate, such as elementary schools still listed for South Carolina which commonly have no shower facilities at all. Id., McSwain, p. 13. While the review by the American Red Cross of the adequacy of presently designated shelters will be completed, "within the year, if possible," Id., Johnson, p. 13, we are not comforted by either the prospect of plant operation before the review of shelter adequacy is complete, or the failure by Applicants and planning officials to perform the necessary review for adequacy long ago, and certainly prior to their designation in the plans as "adequate" and the wide publication of such designation such as in Duke's Catawba brochures.

18. Lest we leave the impression that only the South Carolina authorities are guilty of planning inadequacies, or that cur only criticism is for the late Mr. Carroll who can no longer defend himself; we turn to strikingly similar evidence of planning deficiencies in North Carolina on the part of Charlotte-Mecklenburg planning authorities. The January 1984 revision of the Mecklenburg County part of the North Carolina Plan for Catawba, Part 3, p. 34, lists a single designated shelter for all Mecklenburg County evacuees:

Shelter	Spaces
University of North Carolina at Charlotte Highway 49 Charlotte, N.C.	20,100

Appl. Ex. EP-1. Applicants' Mr. Glover prepared and submitted a list of designated shelters for Catawba identified during the hearings on May 4, 1984, Tr. 821, also listing the University of North Carolina at Charlotte with a capacity of 20,100 evacuees. That same day Mr. Wayne Broome of the Charlotte Mecklenburg Emergency Management Office pointedly corrected his prefiled testimony, Appl. Ex. EP-13, Broome, p. 1, l. 15, to delete the plural reference to "shelters":

> WITNESS BROOME: Just remove the plural designation from "shelters", remove the "s" on "shelters" and just make it "shelter".

Broome, Tr. 600, 5/3/84: a "minor change in my testimony." Id. Mr. Broome is less than forthcoming on this point.

19. In fact, the American Red Cross had rated the Univeristy of North Carolina at Charlotte as adequate for only

5,000 evacuees in the event of a radiological accident on the basis of their review of the facility in connection with the Duke McGuire Nuclear Station exercise some two years before. Long, Tr. 4474-4480, 6/8/84. In much the same fashion as in the case of the York County planning officials and Ms. Anderson of the local Red Cross, Ms. Long was not aware of the Catawba listing of UNCC's capacity as 20,100 until after the January 1984 Plan was actually published. She promptly pointed out the incorrect listing by letter of February 3, 1984. Id., Tr. 4480. In place of UNCC as the sole shelter, the Catawba Plan for Mecklenburg evacuees will now designate some 24 public schools for shelters which have not yet been reviewed for adequacy by the Red Cross. Id. Tr. 4484. The so-called "All Hazards Plan" for the City of Charlotte lists some 30 schools as general duty emergency shelters, Int. Ex. EP-46, a number of which may prove inadequate since the Red Cross recognizes enhanced requirements, such as decontamination facilities, for shelters to be used in radiological emergencies. Id., Tr. 4484. Whether the North Carolina Plan's failure to accurately reflect the two year old review and downgrading of the University of North Carolina at Charlotte's shelter capacity is itself explainable as mere ineptitude or administrative oversight, the consequent failure to consult with the Red Cross authorities responsible for plan implementation which is disclosed by such error is indeed blameworthy and reflects a significant planning failure. As was the case with the York County South Carolina shelter errors, the

designation of UNCC as the sole shelter for Mecklenburg evacuees was widely published through both the original and 1984 revised editions of the Duke Power Catawba Emergency Plan brochure. Appl. Ex. EP-8, p. 13; Appl. Ex. EP-5, p. 13. The prospect of some fraction of the improperly listed 1500 evacuees streaming in the direction of UNCC in reliance on the old brochures, even if later corrected, adds significant weight to the Intervenors' concerns regarding evacuation problems in Charlotte and is chilling indeed.

20. We direct Applicants to demonstrate that a final listing of shelters to be employed for Catawba evacuation has been the subject of full Red Cross review for adequacy prior to authorization for plant operations above 5% power level.

INTERVENORS' EMERGENCY PLANNING CONTENTION 8 -- INADEQUATE COORDINATION OF EMERGENCY RESPONSE ACTIVITIES

1. The initial Licensing Board admitted Palmetto and CESG's emergency planning Contention 8 on the subject of coordination of emergency response activities at the close of the prehearing conference held August 8, 1983, to consider admission of emergency planning contentions. As admitted, the contention reads:

> There is no reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency in that the emergency plans of Applicants, the states of North Carolina and South Carolina, and the counties of Mecklenburg, Gaston and York fail to assign clear and effective primary responsibilities for emergency response and fail to establish specific responsibilities of the various supporting organizations. Conflict, confusion and lack of coordination are likely to prevail. Conditions may be the worst during the seven to nine hours after notification of state authorities of the existence of an accident at the Catawba Station while the North Carolina State Emergency Response Team (SERT) assembles and travels from Raleigh to the South Carolina Forward Emergency Operation Center (FEOC), located dangerously within the 10 mile EPZ at Clover, South Carolina.
>
> The FEOC itself would require at least three and one-half hours to be assembled and staffed from Columbia, South Carolina. While the formal authority to order an evacuation of the plume exposure pathway EPZ straddling the North Carolina-South Carolina border rests with the respective state governors, a confusing and ineffective array of consultative and delegative authority appears to cloud the lines of primary responsibility. The residual responsibilities of the respective county governments, agencies, and the support organizations are either unspecified or inadequate to the task of effective protective response.

Order (Concerning Miscellaneous Matters) August 17, 1983. Tr. 1088-1089, 8/8/83. In admitting Contention 8, the Licensing Board Chairman observed:

> No. 8 is a contention that is concerned with the various aspects of coordination. We are going to allow this contention. Again we thought on some specifics it was a rather close call, but we decided that it was sufficiently specific.
>
> Another interpretive comment that we would make that I thought is merely consistent with what we said earlier today. The first couple of sentences of this contention are quite general. We read them as really introductory sentences and not as substantive complaints. But with that understanding then starting with the third sentence, the sentence that begins "Condtions may be worse" and so on, there are three or four different points that are made that we understand to be the focus of concern.

Id.

2. The siting of the Catawba Nuclear Station virtually astride the North Carolina-South Carolina state boundary on the South Carolina shore of Lake Wylie presents rather unique problems for coordination of the various licensee, local and state response organizations charged with tasks in the event of an emergency at the station. While the plant is physically located in York County, South Carolina, thus requiring assignment of primary responsibilities to public officials in York County and South Carolina state government, the prevailing wind blowing toward the northeast and the close proximity of such a populous metropolitan area as the city of Charlotte, located in Mecklenburg County, North Carolina, only 9.7 miles from the facility requires the demonstrated capability for close coordination and timely response by public officials in

Mecklenburg County and North Carolina state government also charged with primary responsibility under the Catawba Plans. See, gen., discussion of Contention 11, infra.

3. While this coordinated response has been the subject of an exercise at Catawba in February 1984, reflecting, apparently, satisfactory efforts in the eyes of the FEMA observers, Heard and Hawkins Tr. 1660-1663, 5/9/84, we are unable to conclude with confidence that Applicants and their allied state and local officials have demonstrated that effective assignments of primary and support responsibilities and the coordination of such response activities can and will be realized in the event of an actual radiological emergency at the Catawba facility. We believe that the Intervenors' concerns expressed in Contention 8 are well founded and will require remedial measures in order to support a reasonable assurance conclusion as to the adequacy of emergency planning for Catawba.

4. As Palmetto and CESG point out in their contention, the most critical problems of coordination are likely to arise during the first several hours after the initiation of an accident at Catawba. It is during this period of time that the South Carolina and North Carolina state officials who are ultimately charged with primary responsibility for directing protective action will not yet be assembled and sufficiently organized to undertake that ultimate task.

5. In the case of the South Carolina authorities, located in the state capitol of Columbia some ninety miles from the

Catawba site, their assembly and relocation to the Forward Emergency Operations Center to be established at the Clover National Guard Armory just inside the 10 mile plume EPZ is estimated to take a minimum of three and one-half hours. Applicants' Exhibit EP-21, Lunsford & McSwain, pp. 4-5. In North Carolina the principal state authorities who will ultimately take command are located in the state capitol of Raleigh, some 150 miles from their field command post located at the North Carolina Air National Guard Headquarters at Douglas Airport in Charlotte. The North Carolina State Emergency Response Team (SERT) would require seven to nine hours to activate the near site command post. North Carolina Plan, Part 1, p. 4, Appl. Ex. EP-1.

6. During these first few hours prior to the assumption by state authorities of primary responsibility for offsite protective response such primary responsibility is assigned to various emergency response and local government officials in Gaston, Mecklenburg and York Counties. Appl. Ex. EP-21, Pugh and Harris, pp. 4-5; Lunsford and McSwain, pp. 3-4, 9; Phillips, p. 2; Broome, pp. 1-2; Thomas, pp. 6-7; NRC Staff Ex. EP-2, Heard and Hawkins, p. 15.

7. It is in just these critical few hours, when the assignments of responsibility and coordination are at their weakest, that the most severe core melt accident sequences with gravest offsite consequences requiring prompt and effective protective action to accomplish life and injury savings would occur. See, Sholly, Int. Ex. EP-49. It is jus such an accident

for which promptest protective action would be required where the effectiveness of emergency planning is most critical. We are much less troubled by the likely ability of the responsible parties to effectively coordinate and respond under circumstances of a slowly developing accident scenario moving only gradually from an alert through a general emergency and calling for offsite protective action only hours or days after initial notification of the distant state officials. However, the test of effective planning is rarely the easy cases where the stakes are lowest. Here, where the stakes are highest and the life and injury savings to be realized from effective response are at their greatest, we would, indeed, be remiss in failing to require demonstrated effectiveness.

8. In relevant part Commission's emergency planning regulations, 10 CFR, Section 50.47 (b)(1) require that the offsite emergency response plans, here, must meet the following standard:

> Primary responsibilities for emergency response by the nuclear facility licensee and by state and local organizations within the Emergency Planning Zones have been assigned, the emergency responsibilities of the various supporting organizations have been specifically established, and each principal response organization has staff to respond and to augment its initial response on a continuous basis.

9. The Commission and FEMA's NUREG-0654 evaluation criteria, IIA "Assignment of Responsibility (organization control) provide in relevant part:

> 1.a. Each plan shall identify the state, local, federal and private sector organizations (including utilities), that are intended to be

part of the overall response organization for Emergency Planning Zones. (See Appendix 5).

b. Each organization and suborganization having an operational role shall specify its concept of operations, and its relationship to the total effort.

. . . .

2.a. Each organization shall specify the functions and responsibilities for major elements and key individuals by title ... The description of these functions shall include a clear and concise summary such as a table of primary and support responsibilities...

b. Each plan shall contain (by reference to specific acts, codes or statutes) the legal basis for such authorities.

NUREG 0654 Appendix 5-1 provides:

10. There may be more than one state involved, resulting in application of the evaluation criteria separately to more than one state. To the extent possible, however, one state should be designated lead.

Applying these evaluation criteria we conclude that the assignments of primary and support responsibilities under the Catawba plans are inadequate to provide reasonable assurance of effective protective action and that where such primary responsibilities are assigned under the plans, such assignments are not supported by reference to adequate legal bases for the authority of such organizations or individuals to perform the assigned responsibilities.

11. Of course, there are, indeed, both the states of North and South Carolina involved in emergency response within the plume emergency planning zone for Catawba. As noted, above, each state's emergency response team is organized independently, is

located independently at separate command posts at great distance from each other; even after the state authorities have traveled from their respective state capitols to the facility area and have assumed control from the local county officials. The evidence reflects that each state reserves unto itself the independent responsibility to determine protective action and to control emergency response activities within its own jurisdiction. No evidence was offered to suggest that one state or the other had been "designated lead;" nor was any evidence offered by Applicants, the NRC staff, or the respective state officials on the question of to what extent, if any, such designation of lead responsibility had been determined possible or not; or whether such designation had even been given consideration. Failure to address this important question ignores the NUREG 064 regulatory guidance, Appendix 5-1, confirms the concerns the Intervenors as to lack of coordination, and reflects a clear failure to demonstrate reasonable assurance that effective protective action can and will be taken at Catawba.

12. Turning, now, to claims by Applicants, state and local officials, that primary responsibilities under the plan have been effectively assigned and that such responsibilities are supported by appropriate legal authority.

13. The South Carolina Operational Radiological Emergency Response Plan (SCORERP), Appl. Ex. EP-2, p. 1, asserts the following legal basis for the assignment of primary

responsibility for emergency response activities under its provisions:

1. South Carolina Legislative Act No. 199, Section 21, 30 July 1979, establishing the Emergency Preparedness Division (EPD) in the Office of the State Adjutant General. This act places responsibility for emergency planning for natural and manmade disasters on the Emergency Preparedness Division and provides extra-ordinary powers to the Governor to direct operations.

2. Article X, Constitution of the United States, specifically recognizes that pursuant to the sovereign power of the State of South Carolina, the state has the responsibility for the health, safety and welfare of its citizens.

3. Article IV of the Constitution of South Carolina provides that the Governor has complete responsibility for all activities of the state.

4. Legislative Act No. 223 of 1967 and subsequent amendments thereto relating to atomic energy and radiation control, places the overall responsibility for protecting the health and safety of the general public in the event of a radiological incident upon the State Department of Health and Environmental Control.

In its Table 3, "REP Responsibilities Summary Table to SCORERP," the South Carolina Plan specifies the assignments of primary and support responsibilities to various agencies with regard to each of the specified emergency response functions set out in the planning criteria. For the function "Command and Control" the plan assigns primary responsibility to the "Office of the Governor." Support responsibilities are assigned to the Emergency Preparedness Division, the Office of the Adjutant General, and the Department of Health and Environmental Control. Primary responsibility for the function of "Protective Response" is assigned to the Department of Health and Environmental Control

with support responsibilities for this function assigned to some 12 other organizations including the Emergency Preparedness Division and local governments. Appl. Ex. EP-2, SCORERP pp. 55-58.

14. South Carolina Legislative Act No. 199 of July 1979, cited in SCORERP as the primary authority for assignment of responsibilities under the Plan has been codified as Sections 25-1-420 et seq., Code of Laws of South Carolina (1984) and provides in Section 25-1-440, entitled "Additional Powers and Duties of Governor During Declared Emergency," as follows:

> (a) The Governor, when an emergency has been declared, as the elected Chief Executive of the State, shall be responsible for the safety, security and welfare of the State and shall be empowered with the following additional authority to adequately discharge this responsibility:
>
> ....
>
> (7) Direct and compel evacuation of all or part of the populace from any stricken or affected area if this action is deemed necessary for the preservation of life or other emergency mitigation, response or recovery; to prescribe routes, modes of transportation and destination in connection with evacuation; and to control ingress and egress at an emergency area, the movement of persons within the area and the occupancy of premises therein.
>
> (b) The Governor shall be responsible for the development and coordination of a system of Comprehensive Emergency Management which shall include provisions for mitigation, preparedness, response and recovery in anticipated and actual emergency situations.

15. The York County, South Carolina Emergency Operations Plan, Appl. Ex. EP-2, indicates as its legal basis for assignment of responsibilities the following legal authority:

1. York County Ordinance dated October 10, 1980.
2. South Carolina Act No. 223 of 1967, as amended.
3. South Carolina Act No. 199, July 30, 1979.

Id. at p. 1. The cited 1980 York County Ordinance provides for comprehensive emergency response activities and the assignment of responsibilities for such activities to county authorities:

> A state of disaster or emergency may be declared by the County Council if it finds a disaster or emergency has occurred, or that the threat thereof is imminent, and extra-ordinary emergency measures are deemed necessary to cope with the existing or anticipated situation. Once declared, the state of emergency shall continue until terminated by proclamation of the County Council.
>
> ....
>
> In addition to any other powers conferred by law, the County Council may, under the provisions of this Ordinance:
>
> ....
>
> (F) Direct evacuation of all or part of the population from any stricken or threatened area within the county if such action is deemed necessary for preservation of life or other disaster mitigation, response or recovery;

Id. at pp. vi-vii. In direct conflict with the provisions of the Ordinance which assigns responsibility for emergency response to the County Council Annex Q to the York Emergency Operations Plan, which applies explicitly to radiological accidents at Catawba, responsibility for the function of "direction and control" is assigned, not to County Council, but to the "County Manager." Id. p. Q-12.

16. It is abundantly clear that not only is there this internal inconsistency and therefore lack of appropriately assigned responsibility within the York County Emergency

Operations Plan for Catawba but there is a confusing and ineffective assignment of primary responsibility to York County officials, regardless of whether to be exercised by County Council or the County Manager in the face of clear statutory assignment of the authority to evacuate the public to the Governor of South Carolina as specified in Act 199 of 1979. There is, simply put, no adequate legal basis for the assignment of primary responsibility to York County officials to effect evacuation as a protective response during the critical early hours of an emergency at Catawba. The correctness of this legal position advanced by Palmetto and CESG is endorsed by the opinion of none other than the Attorney General of South Carolina in an official opinion of September 5, 1980. Int. Ex. EP-21. There, the Office of the Attorney General responds to the following question presented:

> Do "local" officials or governing bodies have the authority to order and compel an evacuation of all or part of the populous within their respective jurisdictions?

Id. The Attorney General of South Carolina concludes that notwithstanding the passage of home rule legislation in South Carolina, these powers are reserved expressly to the Governor of South Carolina or his designated successor but are not available to local authorities. He concludes:

> It is accordingly the opinion of this office that, under existing law, neither a county nor municipal governing body or official has the authority to direct and compel an evacuation of any of its populace. This is not to say, however, that local public officials, including law enforcement, should not continue to warn or encourage evacuation when hazardous or dangerous conditions exist on a local level.

> Should the General Assembly decide to expressly grant this extra-ordinary power on a limited basis to counties and municipalities (i.e. evacuation to other areas within the control and jurisdiction of the entity involved), I see no impediment to such legislation.

Id., p. 4. The language of the Attorney General's Opinion is absolutely clear. The Applicants have pointed to no subsequent legislation granting such power to local officials as is claimed in the York County Ordinance. Further, the significance of this opinion seems well understood by responsible South Carolina state authorities who communicated the effect of such a legal limitation in advising Mr. McSwain in the course of his planning for Catawba. Lt. Thomas of the South Carolina Law Enforcement Division wrote in January 1983:

> I met with Assistant Attorney General John Wilson on this date in reference to our problem at Carowinds. He advised I was correct in stating that only the Governor in the State of South Carolina could ask for an evacuation. Home Rule is in effect in this state; however, it does not give local authority any power as to the question of evacuation.
>
> Specifically speaking of Carowinds, Jim Carroll's office can advise the management of each phase in the emergency process and can suggest an early close-down as they normally would, but should not tell them to evacuate. The term evacuation should be avoided unless an order has been signed by the Governor; this is true for any large private employer in York County.

Int. Ex. EP-21. The point of Lt. Thomas' letter to Mr. McSwain, which we think is very well-taken, is that regardless of the semantics employed, whether one chooses such words as "direct, compel, order" or even "warn or encourage" the power to effect an evacuation is reserved under South Carolina law to the Governor

of South Carolina: which, even then, must be exercised through the process specified in the statute involved.

17. It is abundantly clear to this Licensing Board that the NUREG 0654 planning criteria requiring citation of legal authority to support assignments of responsibility under the plan serves a critical purpose. It must be presumed that a plan can only be effectively implemented when the organizations and officials assigned responsibilities under that plan have sufficient legal authority to perform the tasks with which they are charged. Under South Carolina law, not only as we interpret it, but as is interpreted via the Attorney General's Opinion on the subject, York County authorities cannot be assigned the primary responsibility for accomplishing an evacuation as presently assigned under the South Carolina and York County Plans during the critical early hours of an accident prior to or in the absence of specified action by the Governor. We conclude that the South Carolina and York Plans are deficient in this regard and that such deficiency must be corrected in order to establish the "reasonable assurance" conclusion required by Commission regulation. 10 CFR Section 50.47(a)(1).

18. By way of rebuttal Palmetto and CESG presented the testimony of Harold Dickson, Chairman of the York County Council, the senior elected official of York County. Dickson, Tr. 4012, 6/6/84. As specified in the York County Emergency Operations Plan, p. 15, Appl. Ex. EP-2, under the heading "Direction and Control" the line of succession of authority in York County is

headed by the York County Council, followed by the County Manager, Director of General Services, and Director of the Emergency Preparedness Agency. Yet, at p. Q-12 of the York Plan under the same heading "Direction and Control" authority is assigned to first, the County Manager; second, the Director of General Services; and, then, the Director of Emergency Preparedness. Mr. Dickson saw no contradiction in this obviously conflicting assignments of responsibility specified in the Plan. Tr. 4015. When asked to comment on the apparent conflict between the October 1980 York County Ordinance claiming powers on the part of County officials to evacuate the public and the contrary Attorney General's opinion, Mr. Dickson responsed:

> I believe since that Ordinance has been enacted, it has been overruled by the Attorney General ... that particular part of it as far as taking control of maybe moving people or compelling people to do certain things as far as the county is concerned.

Q. Do you mean the Attorney General said you couldn't do that?
A. I believe that is correct.

Dickson, Tr. 4011, 6/6/84. If actually called upon to perform responsibilities in an emergency, we can only doubt Mr. Dickson's effectiveness since he disclaimed any knowledge of the emergency plans for Catawba and did not participate at all in the February 1984 exercise. Id. Tr. 4017-4018.

19. Intervenors also presented the rebuttal testimony of J. Elbert Pope, the Sheriff of York County. Sheriff Pope disclaimed knowledge of responsibilities assigned under the plan to the Sheriff of York County explaining that he had designated a subordinate to "attend all these meetings and so forth." Pope

Tr. 3969, 6/6/84. Sheriff Pope disclaimed knowledge of what plans are in existence for an emergency at Catawba, had read "not a one of them," and was not aware of the other agencies and officers in York County which were assigned responsibilities under the plan. Id., Tr. 3977. Despite the fact that the York County Sheriff is assigned primary responsibility under the plan, p. Q-56, for all "traffic control, security and law enforcement" Sheriff Pope disclaimed knowledge of what his department's responsibilities were even in the area of law enforcement. Id., Tr. 3980-3981.

20. Intervenors presented the rebuttal testimony of Frank B. Sanders, the Director of the Division of Public Safety in the Office of the Governor of South Carolina.

> As Director of the Division of Public Safety, I have responsibility for the Office of Emergency Preparedness in the Governor's Office. Within the Governor's Office we are responsible for the possible command and control of local and state governments to reduce or eliminate any damage to state government or to property or to persons in case of an accident at a fixed nuclear facility.

Sanders, Tr. 3085, 6/6/84. The South Carolina Plan makes no reference whatsoever to the existence of the Division of Public Safety yet alone the assignment to it of primary responsibilities for command and control. Id., Tr. 3094. The Plan does make express reference to the Governor's press secretary or authorized representative to whom public information responsibilities are assigned. Id. Tr. 3096-3097.

21. South Carolina state government is dominated by the legislative branch with most executive functions performed by

independent boards and commissions whose professional staffs are answerable directly to them. Such a system contrasts strikingly with the more common structure where the Governor as Chief Executive controls the executive departments through the appointment of secretaries as in a cabinet system. Important South Carolina state government offices with responsibilities under the Catawba Plan such as the Office of the Adjutant General and the Department of Health and Environmental Control are independent of the Governor's authority. The Adjutant General is an independent elected constitutional officer who reports to the Governor only under the limited circumstances where the Governor has called out the National Guard. Similarly, the staff of the Department of Health and Environmental Control, including those who are assigned responsibilities under the Catawba Plan, report to the head of that department and its board and not to the Governor. Sanders Tr. 3100-3103, 6/6/84.

72. Under such a legal structure it is very difficult for this Licensing Board to understand in what sense the Office of the Governor is legally empowered to exercise the command and control responsibilities assigned to it under the South Carolina Plan. With the various actors such as the Emergency Planning Division of the Adjutant General's Office, the Bureau of Radiological Health of the Department of Health and Environmental Control and the Office of the Governor assigned various responsibilities under the South Carolina Plan, it is very difficult for us to have confidence that anyone is in charge at a

particular point in time. The only clear legal foundation for assignment of such command authority rests upon the Governor only after his declaration of an emergency as provided by statute. Since this is the case, we can only conclude that the Catawba Plan's assignments of responsibility otherwise are ineffective and without appropriate legal authority. This deficiency must be remedied either through the revision of the plans to reflect appropriate assignments of responsibility only to those with the requisite legal authority, followed by a commensurate showing of the ability to take effective protective action under such a revised plan; or, a demonstration that the requisite legal authority exists, as with the passage of the needed legislation suggested in the correspondence to Mr. McSwain, Intervenors' Exhibit EP-21, such that those now assigned responsibility under the South Carolina Plan are given the needed legal authority to carry out their assigned tasks.

73. The situation is little better in North Carolina. The North Carolina officials make similar claims that county officials have full authority to effect an evacuaation in the first seven to nine hours before the state officials themselves take command. Appl. Ex. EP-21, Pugh and Harris, pp. 4-5.

74. Attachment 1 to the North Carolina Emergency Response Plan - in support of the Catawba Nuclear Station, Appl. Ex. EP-1, Part 1, is entitled "Authorities, References and Agreements," and reproduces verbatim the statutory legal basis for the assignments of responsibilities as reflected in the plan. As they bear on

the legal support for the assignments of primary responsibility under the plan, the authorities referenced include the North Carolina Emergency Management Act of 1976 (North Carolina General Statutes 166A1 et seq.=; and, as to the "authority of local government," a reference to North Carolina General Statute 14-288.1 et seq. and North Carolina General Statute 166A-1 et seq.

75. A review of these asserted legal authorities makes clear that with respect to affecting an evacuation, the assignment of primary responsibility to local government in North Carolina during the first few hours of an accident is as untenable as such assignment under the South Carolina Plan. The operative provisions of the North Carolina Emergency Management Act with respect to the authority of the Governor are as follows:

> State of Disaster. The existence of a state of disaster may be proclaimed by the Governor, or by resolution of the General Assembly if either of these finds that a disaster threatens or exists. Any state of disaster shall be terminated by proclamation of the Governor or resolution of the General Assembly. ...
> b. Powers of the Governor, with the concurrence of the Council of State: (1) to direct and compel the evacuation of all or part of the population from any stricken or threatened area within the state; to prescribe routes, modes of transportation and destinations in connection with the evacuation; and to control ingress and egress of a disaster area, the movement of people within the area, and the occupation of premises therein.

NCGS 166A-6. Such provisions is strikingly similar to the terms of the statute authorizing the Governor in South Carolina to effect an evacuation upon declaration of a state of emergency. In North Carolina, however, the Governor's powers are exercised only with the concurrence of the Council of State. Id.

26. Turning now to the referenced authority of local government cited in the North Caroldina Plan, we find no support for the assignment to county officials of primary responsibility to effect an evacuation. Section 166A-1, et seq. clearly does not extend powers narrowly given to the Governor to local officials with respect to evacuation. The other authority cited NCGS 14-288.1 et seq. appears codified as Article 36A, entitled, "Riots and Civil Disorders." The thrust of the article is to provide for the exercise of extra-ordinary powers by the Governor or the chief elected official of local governing bodies, such as mayors and chairman of boards of county commissioners to declare states of emergency to cope with riots and civil disorders through the imposition of special criminal penalties for the violation of special ordinances authorized under this statute. By its terms the enactment has no application to emergencies or accidents at fixed nuclear facilities, nor does it empower local authorities to effect evacuations. We think it is clear that the carefeully worded and conditioned statutory authorization for the Governor of North Carolina must be understood as excluding any implied extensions of the same authority to others not of the Governor's stature or delimited with the procedural restrictions applicable to him.

27. Mr. J. T. Pugh of the North Carolina Division of Emergency Management attempts in his prefiled testimony to avoid the obvious implications of such a restriction. In his initially

prefiled testimony Mr. Pugh is asked the following questions beginning at p. 5:

> Q. DO STATE OFFICIALS HAVE THE AUTHORITY TO ORDER EVACUATION OR OTHER PROTECTIVE ACTION?
> A. Yes, they do, on issuance of a declaration of a disaster by the Governor.
> Q. WITH WHOM MUST THEY CONSULT BEFORE DOING SO?
> A. They must consult with the Council of State, however, copies must be on file with the appropriate County Clerks of Court and the Secretary of Crime Control and Public Safety prior to compelling evacuation.

Appl. Ex. EP-21, pp. 5-6.

28. When he took the stand Mr. Pugh offered a "clarification" to this testimony, Appl. Ex. EP-21A:

> Q. WITH WHOM MUST STATE OFFICIALS CONSULT BEFORE ORDERING EVACUATION?
> A. There is no requirement that they consult with anyone.
> Q. DO STATE OFFICIALS HAVE THE AUTHORITY TO COMPEL EVACUATION OR OTHER PROTECTIVE ACTION?
> A. Yes.
> Q. MUST ANY SPECIFIC ACTIONS BE TAKEN BEFORE EVACUATION CAN BE FORMALLY COMPELLED?
> A. Yes. The Governor must issue a delcaration of a disaster, and state officials must consult with the Council of State. In addition, NC State Law require that copies of a declaration of disaster be disseminated promptly and in a manner designed to bring the declaration to the public's attention. If time and circumstances permit, copies of the declaration are to be filed with the appropriate County Clerks of Court, the NC Secretary of State, and the Secretary of Crime Control and Public Safety, before evacuation is compelled. It should be noted, however, that by the time this step of formally compelling evacuation has been taken by state officials, evacuation would already have been ordered and would be underway.

29. We think this attempt at clarification merely emphasizes the absurdity of the positions taken by Applicants and the state and local officials in their efforts to avoid the

obvious implications of the plain meaning of their own statutory laws. It would make meaningless, indeed, the carefully crafted statutory provisions empowering the governors of South Carolina and North Carolina to "direct and compel" evacuations, etc., to imply that the power to accomplish the same as resides in these lesser officials. We note that even in prescribing a sample message to be communicated on the emergency broadcast system in the event the protective action of evacuation was necessary, the South Carolina Plan remains schizophrenic in its treatment of the subject:

> (PROTECTIVE ACTION, EVACUATION)
>
> Those persons living in the affected area are (advised) (requested) (ordered) by the Governor to proceed with an orderly evacuation over (the nearest route) to the reception center located at _____.

SCORERP, Annex C-17, Appl. Ex. EP-2. We note in passing that no mention is made in these messages of any authority other than the Governor "directing," "compelling," "ordering," "advising," "requesting," or "warning," or "encouraging" evacuation of the EPZ population. We are convinced that the lack of clear legal basis for the assignments of primary responsibility to effect an evacuation in both South and North Carolina reflect deficiencies in the plan and its implementation capability requiring remedial measures in order to permit a "reasonable assurance" finding.

30. We are urged to accord substantial weight to the findings by FEMA reflected in their testimony and in the results of their observations of the Catawba exercise conducted in

February 1984 in support of Applicants' and Staff's position on this contention. We decline to do so for a number of reasons, and conclude that the FEMA views should be accorded very little weight.

31. The scope of their analysis is limited in the extreme. The pre-filed testimony of the FEMA witnesses Heard and Hawkins is, as typical of their testimony generally, extremely brief; here, consisting of one and one-half pages. The review reflected is limited solely to an analysis of the content of the respective written plans. While deficiencies in the content of those plans are noted, NRC Staff Ex. EP-2, Heard and Hawkins, pp. 17-18, there is no indication whatsoever that the review extended to either an analysis of the implementation capability of those charged with responsibilities under the plan, or even a review of the sufficiency of the legal authority referred to in the plans as the basis for the plans assignments of responsibility.

32. We are directed to the FEMA witnesses' observations regarding the Catawba station exercise as a basis for crediting their endorsement of the Applicant and Staff position on this contention. Heard and Hawkins Tr. 1660-1663, 5/9/84. However, by design, the exercise itself was an ineffective test of the abilities of the authorities to respond under the severe accident scenario which is the subject of Intervenor's concern. The accident scenario actually modeled reflected a very gradually unfolding incident with only the most minor release, with a projected 50 milligram offsite dose, which occurred only on the

morning of the second day, long after all emergency response personnel had been in place and prepared to respond as such limited response was necessary. While a more realistic exercise would clearly have projected a plume that followed the prevailing meterology, FEMA's concern here seemed only to be that the exercise tests the Gaston County response, thereby missing all together Mecklenberg County and the populous city of Charlotte. Heard and Hawkins Tr. 1626-1631, 5/9/84.

33. The rather rosy FEMA critique of the Catawba exercise appears, further, unduly colored by their failure to receive and consider criticisms actually observed by participating exercise evaluators who did not happen to be working for FEMA. Int. Ex. EP-34, 35, for identification.

> We got nothing from other evaluators. We would not need anything. We do not use other peoples' evaluations for preparation of our report.

Heard, Tr. 1641, 5/9/84.

34. Yet, evaluation form shown the witness by Palmetto signed by one Ray Connolly, DHEC (FEOC) Controller/Evaluator, reflects the following comment on the Catawba exercise:

> The Clover Armory was set-up before the exercise. Consideration should be given to not doing this in future exercises to add additional challenge to the participants.

Int. Ex. EP-35, for identification.

While neither FEMA witness had seen this evaluation form, nor was either aware of the participation of these additional evaluators, Tr. 1642, they were aware that the Clover National Guard Armory, the Forward Emergency Operations Center for the

South Carolina Emergency Response Team (SERT) had been set up in advance of the exercise. Under normal circumstances no staff or equipment would be pre-located at Clover; and, instead, they would require some three hours to arrive from Columbia. This lack of realism did not concern the FEMA witnesses since they believed that the South Carolina authorities had shown the ability to set up armories in other exercises for other facilities. Heard and Hawkins Tr. 1643-1644, 5/9/84. We are not comforted by this reliance by the FEMA witness on prior performance in other settings and find very disturbing this and other limits on the realism of the Catawba exercise. For these reasons, we are attach little weight to the FEMA position on Contention 8; and, in fact, find that the lack of zeal reflected in the FEMA review enhances rather than relieves our concerns.

INTERVENORS' EMERGENCY PLANNING CONTENTION 9 PROMPT ALERT AND NOTIFICATION OF THE PUBLIC

1. As admitted by the initial Licensing Board at the close of the August 8, 1983 pre-hearing conference, Tr. 1089-1092, Order (Concerning Miscellaneous Matters), August 17, 1983, Palmetto and CESG's Emergency Planning Contention 9 states as follows:

> The emergency plans for Catawba do not adequately provide for the early notification and clear instruction to state and local response organizations and the public that are required by 10 CFR 50.47(b)(5) in that:
>
> (a) [If] the sirens do sound, not all citizens who would be effected and therefore require notification would be able to hear a warning siren. Such a situation could arise as a result of hearing impairments, weather conditions, distance from sirens, etc.
>
> (b) In the event of a power outage, the public's access (and possibly the access of state and local authorities with emergency responsibilities) to emergency broadcast information could be seriously impaired. Without a specific, reasonable plan to deal with such a contingency, the emergency plans do not meet 10 CFR 50.47 (b)(6) as well as (b)(5).
>
> (c) [N]either the Carowinds Theme Park nor the Heritage U.S.A. religious retreat appear to have any notification plans or procedures. A conservative estimate of a peak summer crowd at Carowinds is 30,000 to 35,000 people. For such a crowd to be notified and given instructions on how to leave the park in a quick, orderly and safe manner clearly requires some set of special procedures that is yet to be formulated.

We find for Intervenors on important parts of Contention 9 and will require that remedial measures be performed by Applicants and others, and submitted for our review prior to our reaching a "reasonable assurance" conclusion on this issue as required by

Commission regulations. In short, we agree with Intervenor's assertion that there has been no effective demonstration that all citizens who require notification of an accident or emergency at the Catawba facility will actually hear the siren warning signals or otherwise receive the prompt alert and notification which is required by Commission regulations. Required verification of the effectiveness of the Catawba prompt alert and notification system has yet to be accomplished. Therefore, the full extent of deficiencies in this system has yet to be determined; and, consequently, corrective actions have yet to be either undertaken or completed. In the face of Intervenor's contention to this effect and the evidence of record, we cannot simply trust that the matter will be satisfactorily taken care of through post-hearing NRC staff and FEMA action. Prior to the authorization for power operations above five per cent testing level, we must be assured that the alert and notification system for the Catawba EPZ has been tested, reviewed, corrected where necessary, and is acceptable.

2. As we noted, supra, with respect to emergency planning Contentions 1 and 7, serious deficiencies exist in the public information and education program for the Catawba EPZ permanent and transient populations. These deficiencies underscore the importance of effective design and implementation of the alert and notification system. Because of the public education and information program deficiencies, we have even less confidence that the unproven prompt alert and notification system will serve

its intended purpose of reasonably assuring effective protective action in the event of an actual radiological emergency at Catawba. This point is particularly appropriate with respect to planning for the special problems involved in the concentrations of transient populations, in excess of 30,000 persons at summer peak, at the busy Carowinds Theme Park and Heritage U.S.A. retreat, both located within the ten mile plume EPZ. Where virtually no program exists to disseminate information to transients at Catawba, the deficiencies in the planning for these two facilities are magnified in their effect on the likelihood of effective response.

3. In addition to the general regulatory requirement of 10 CFR 50.47 (a)(1) that prior to licensing there be demonstrated a reasonable assurance that "adequate protective measures can and will be taken in the event of a radiological emergency," specific regulations and guidance are established for reviewing the adequacy of the prompt alert and notification system to be employed to inform the public in the Catawba EPZ of an accident or emergency at the facility and what their initial actions by way of protective response should be.

10 CFR 50.47 (b)(5) requires that:

> Means to provide early notification and clear instruction to the populace within the plume exposure pathway Emergency Planning Zone have been established.

Appendix E to 10 CFR, Part 50, Part IV D "Notification Procedures," establishes the standard by which the effectiveness of such a system is to be judged:

> The design objective of the prompt public notification system shall be to have the capability to essentially complete the initial notification of the public within the plume exposure pathway EPZ within about fifteen minutes.

10 CFR, Part 50, Appendix E, IV D 3.

4. In the NRC and FEMA emergency planning evaluation criteria guidance, NUREG-0654 FEMA-REP-1 (Rev. 1), criteria E-6 provides:

> Each organization shall establish administrative and physical means, in the time required for notifying and providing prompt instructions to the public within the plume exposure pathway Emergency Planning Zone. (See Appendix 3) It shall be the licensee's responsibility to demonstrate that such means exist, regardless of who implements this requirement. It shall be the responsibility of the state and local governments to activate such a system.

Appendix 3 to NUREG-0654 establishes the following "Criteria for Acceptance," for the prompt alert and notification system:

> 1. Within the plume exposure EPZ the system shall provide an alerting signal and notification by commercial broadcast (e.g., EBS) plus special systems such as NOAA radio. A system which expects the recipient to turn on a radio receiver without being alerted by an acoustic alerting signal or some other manner is not acceptable.
> 2. The minimum acceptable design objectives for coverage by the system are:
>
> (a) Capability for providing both an alert signal and an informational or instructional message to the population on an area wide basis throughout the ten mile EPZ, within fifteen minutes.
>
> (b) The initial notification system will assure direct coverage of essentially 100% of the population within 5 miles of the site.
>
> (c) Special arrangements will be made to assure 100% coverage within 45 minutes of the population who may not have received the initial notification within the entire plume EPZ.
>
> The basis for any special requirements exceptions (e.g., for extended water areas with transient boats or remote hiking trails) must be documented. Assurance of

continued notification capability may be verified on a statistical basis. Every year, or in conjunction with an exercise of the facility, FEMA, in cooperation with the utility operator, and/or the state and local governments will take a statistical sample of the residents of all areas within about ten miles to assess the public's ability to hear the alerting signal and t eir awareness of the meaning of the prompt notification message as well as the availability of information on what to do in an emergency. The system plan must include a provision for corrective measures to provide reasonable assurance that coverage approaching the design objectives is maintained.

NUREG-0654, Appendix 3, pp. 3-3, 3-4. Further, the Appendix provides:

Sirens

Wherever proposed as a part of a system, subject to later testing by statistical sampling, the design concept and expected performance must be documented as part of plan submitted by licensees, states and local governments. The designs of such systems must take into account the demography and topography of the areas being considered...

As an acceptable criteria at most locations 10 db above average day time ambient background should be a target level for the design of an adequate siren system. In cases involving industrial operations, a special survey to determine design sound level targets or an inside system may be needed to provide an audible 10 db dissonant differential. Sirens on vehicles may be used to supplement fixed alert systems outside the inner five mile radius of the plume exposure EPZ.

p. 3-8.

FEMA 5. will observe or receive a statement of the annual statisti al sample of population in the EPZ hearing a test based on a field test or in conjunction with an exercise. FEMA will approve corrective measures necessary to provide assurance that siren systems are meeting the objectives for alerting the population (where they are the specific means for such alerting) approved jointly by NRC and FEMA.

p. 3-13. The NUREG-0654 Appendix 3 concludes with a description of other systems which may be employed to supplement the primary method of initial notification including the Emergency Broadcast

System, NOAA weather or emergency alert radios, telephone automatic dialers, and aircraft with loud speakers. pp. 3-13 thru 3-16.

5. FEMA performs its evaluation of Applicant's siren system according to the guidance of NUREG-0654 and FEMA-43, "Standard Guide for the Evaluation of Alert and Notification Systems for Nuclear Power Plants," (September 1983). The Board has taken official notice of these regulatory documents. Tr. 1597, 5/9/84; Tr. 4615-17, 6/8/84. The required FEMA review has not been performed. The posture of this issue is reflected succinctly in the prefiled testimony of the FEMA witnesses, Messrs. Heard and Hawkins:

> Q57. Is the siren system adequate to provide early notification to the persons in the EPZ (plume) (1) generally, (2) who have hearing impairments, (3) who are inside homes with perhaps competing sounds from t.v. programs and record players, and (4) who are asleep, giving consideration in each case to the effects of weather conditions such as snow or excessive winds with howling or strong wind noise? Explain.
>
> A57. Alert and notification systems have been satisfactorily operationally tested periodically. The official, engineering and acoustical testing will be accomplished utilizing guidance provided by the publication entitled "FEMA 43" at some future date.

NRC Staff Ex. EP-2, pp. 20-21. In short, the answer to the questions posed both by Intervenors in their Contention 9 and asked of the FEMA witnesses is, in all respects, "We don't know." And, importantly, we can't know since the actual field testing of the sirens and conduct of the statistical survey of the EPZ populace to determine whether the sirens have been heard and their meaning understood have, themselves, not been conducted.

(Such surveys have, apparently, been conducted by Applicants Duke Power Company of the Catawba EPZ population to determine, at least, whether Respondents have received Duke's emergency planning brochures which contain information regarding the siren notification system. Such survey results have not been offered in evidence by Applicants or the NRC Staff. They were offered by Intervenors in support of their position on Contentions 1 and 7 regarding the inadequacies in the public information and education program at Catawba. While their offer in evidence was refused, the summary results of the surveys have been identified as offers of proof, Int. Ex. EP-9 and 10. We note that in response to a February 1984 survey question some 25.7% of the respondents indicated they had not received any brochures or pamphlets telling them what steps to take in the event of an emergency at the plant. Int. Ex. EP-9, Offer of Proof, Q21. We are not relying, here, on these survey results but simply point out that Applicants have, apparently, conducted such surveys themselves prior to the conduct of these hearings. Regardless of the significance of the survey data, it seems clear to us that Applicants, FEMA and other parties were fully capable of compliance with the regulatory guidance to determine the effectiveness of siren coverage and understanding and to at least identify necessary corrective action if not fully remedy identified deficiencies.)

6. Applicants present the testimony of their consultant, M. Reada Bassiouni of Acoustic Technology, Inc. who performed

studies of the Catawba siren system assertedly as required by FEMA-43. FEMA-43 describes the means for satisfying the design criteria of NUREG-0654. These criteria are satisfied:

> When the design report shows that, for those geographical areas to be covered by fixed sirens, either (a) the expected siren sound level generally exceeds 70 Ddc where the population density exceeds 2,000 persons per square mile and 60 DBC in other inhabited areas, or (b) the expected siren sound level generally exceeds the average measured day time ambient sound levels by 10 db ... where the estimated siren sound level does not generally meet the specified level based either on population density or a 10 db differential between the measured average ambient sound and estimated siren sound level, the siren system must be enhanced by other alerting methods which must be described in the design report.

FEMA-43, p. E-7, 8. FEMA-43 proceeds to describe specifically the required and comprehensive elements which must be included in the licensee's design report regarding the use of such other alerting methods as mobile siren vehicles, tone alert radios, and other "special alerting methods." Neither Applicants nor the NRC Staff have submitted any evidence of design reviews for such other alerting methods.

7. Mr. Bassiouni's own study showed that for some areas the existing siren acoustic coverage fails to meet even these design standards. Some ten additional sirens must be installed to remedy even these design deficiencies. Appl. Ex. EP-17 Bassiouni, pp. 3-4; Bassiouni Attachment C; Glover Tr. 1822, 5/11/84. However, designing a siren system to meet these projected sound levels does not assure that the sirens will actually be heard which, of course, is the only basis for relying on such a system to accomplish the regulatory requirement of

essentially 100% notification. Limits on actual audibility can only be identified through the actual field testing of the sirens and the conduct of a statistical survey to determine whether the sirens have in fact been heard and their meaning understood.

8. Weather conditions will effect the ability of the sirens to be heard and do their job. Falling rain will raise ambient noise levels by several decibels. Bassiouni, Tr. 1860, 5/11/84. Snowfall on the ground can absorb the siren sound up to six or seven decibels. Bassiouni, Tr. 1860-61, 5/11/84. And a siren signal propagating against the wind will be attenuated based on wind velocity and direction deflecting the siren signal upward and limiting its audibility in positions that are upwind from the siren. Bassiouni, Tr. 1862, 5/11/84. Further, as contrasted with the FEMA-43 guidelines which specify a steady siren signal, the Catawba sirens, but one, rotate four times per minute through a full 360 degree arch providing a maximum signal §some 25 decibels louder than the minimal signal= only when the horn of the siren is pointing directly toward the listener. All of Dr. Bassiouni's testing presumes the maximum signal as if the siren is pointed continuously at the listener, thus, even assuming all other conditions are as modeled by Dr. Bassiouni, the 10 decibel above ambient standard will not be met at distances from the siren when it is directed away from the listener. Bassiouni Tr., 1842-1845, 5/11/84. The Catawba sirens will only produce their design sound levels from the perspective of the listener for a

period of between 2.4 and 5 seconds during each rotation. Tr. 1851.

9. Many people in the EPZ also will not likely hear the sirens if indoors where such normal life functions as the operation of an air conditioner with closed windows during the hot months or the sound levels from a t.v. or stereo may generate ambient noise levels which drown out the sirens. Bassiouni, Tr. 1852-1854, 5/11/84.

10. Without an empirical measurement of the degree to which the limitations on siren audibility will adversely affect reliance upon the siren system as a means for prompt notification there is no basis for establishing the design requirements to be applied to the use of supplemental notification means to notify those which the siren system has not reached. On the state of this record we are simply unable to reach meaningful conclusions as to the effectiveness of the alert and notification systems to be employed in the Catawba EPZ. These deficiencies must be identified and remedied. Either FEMA must perform the analysis and review charged to it in its own guidance or Applicants must propose and implement a sufficient substitute measure on its own to accomplish the required verification of system adequacy. In either event, it shall be Applicant's responsibility to demonstrate the adequacy of these prompt alert and notification means. NUREG-0654 II E-6.

11. We pass now to the remaining subject of concern in Intervenor's Contention 9: The adequacy of the alert and

notification systems for the largely transient populations at the special facilities, Carowinds Theme Park and the Heritage U.S.A. religious retreat, both located within the ten mile EPZ of the Catawba facility. On these issues we heard testimony from York County's Mr. Thomas and Mecklenberg County's Mr. Broome as well as Mr. James T. Oliphant, the Loss Prevention Operations Manager with Carowinds Theme Park, whose responsibility includes fire, security, first aid and safety at the facility. Oliphant Tr. 4186, 6/7/84. Carowinds projects a peak total park population of 26,000 persons, Tr. 4688, with 5,800 visitor cars, Tr. 4356, 300 buses, 700 employee vehicles and another 200 trailers or recreational vehicles at the park campground. Tr. 4356. As acknowledged by Duke Power's traffic planning consultant, Int. Ex. EP-41, "evacuation of Carowinds on a peak day is a monumental task, requiring careful planning and good traffic control."

12. Officials early on identified the unique problems presented by the Carowinds and PTL (Heritage U.S.A.) facilities. In one of several meetings conducted to discuss these problems, the following topics were included in the meeting agenda:

> (1) Who will notify Carowinds of the situation at Catawba Nuclear Station?
> (2) Who will make recommendation that Carowinds be closed or evacuated?
> (3) At what stage or level of emergency will (2) above take place?
> (4) Will we (local government) open shelters for a precautionary evaculation?
> (5) How will EBS be handled for a precautionary situation or evacuation?
> (6) Will volunteers respond to a precautionary condition versus a declared emergency?
> (7) Is Carowinds the only special facility that is to be considered for precautionary action?

(8) Will an early precautionary evacuation do more harm than good from the standpoint of local and state credibility?
(9) How will the media view an evacuation of Carowinds when no other action is planned for special facilities?

Int. Ex. EP-40.

13. Mecklenburg County's Mr. Broome is responsible for the initial notification of Carowinds. He addressed the status of these concerns:

> WITNESS BROOME: I might be able to clear the whole thing up, Mr. Guild. I think if you took this document dated February 1983 you can just about eliminate everything on here because everything on here is going to be readdressed.
>
> BY MR. GUILD: Q. When is that going to happen, Mr. Broome?
>
> A. (Witness Broome) Some of it has already been readdressed with the allocation of resources to the park to assist them and a procedure will be attached to an SOP that we have indicated to be developed. It will incorporate a course of action that we and Catawba deem necessary in order to protect the people.
>
> Q. When Carowinds writes a new plan?
>
> A. When Carowinds writes a new plan or when I go down there and address those people in the theme park themselves to look what is in place and what we can do.

Broome, Tr. 1924-1924, 5/11/84. With respect to this list of nine problem items Mr. Broome explained:

> They will either be closed out or in the process of being closed out, and they will be addressed in the SOP when it is completed.

Broome, Tr. 1944, 5/11/84. Mr. Broome projects that such resolution will occur within the next 90 to 120 days. Id.

14. The existing so-called emergency plan for Carowinds was identified and introduced by Intervenors. Int. Ex. EP-39. Its

cover letter indicates that "We will be revising the plan prior to opening on March 18, 1984." However, no such revision has yet been made to cover nuclear accidents at the Catawba facility.

> That is by another plan that will be developed that will cover all the aspects of this.
>
> Q. Where is that plan now?
>
> A. Most of it is in my head and Mr. Broome's head, I imagine, because the plant is not on line yet.

Oliphant Tr. 4401-4402, 6/7/84.

15. No plan exists to address the contingency of an easterly or westerly evaculation route being interdicted by the plume passage from Catawba, Oliphant Tr. 4385; no plan exists for sheltering any of the park guests, despite the availability of indoor space for several thousand, Oliphant Tr. 4387; no plan exists for training Carowinds' staff, Id.; nor is there any plan for the distribution of information or brochures to park visitors regarding the proximity of the Catawba facility or the emergency plan for the plant. Oliphant Tr. 4389.

16. In the face of this conceded monumental task of evacuating or taking other protective action for the largest single concentration of people in the Catawba EPZ, it is simply unbelievable that those responsible remain as casual about the task at hand. We simply cannot accept on the basis of wishful thinking or glib promises of future planning that effective protective action can and will be taken to protect the largely transient and uninformed visitors at these facilities in the absence of concrete and effective plans for our review. Further,

the wholesale failure to provide for any public information and education whatsoever for these critical transient populations underscores the inadequacies of the plans to effectively alert and notify the visitors to these facilities. We are requiring submission of completed plans to address the special needs of the Carowinds and Heritage U.S.A. populations to include an effective program for the provision of emergency planning information as required by Commission regulations.

INTERVENORS' EMERGENCY PLANNING CONTENTION 11 - EXPANSION OF THE PLUME EPZ INTO SOUTHEAST CHARLOTTE.

1. The Intervenor's original contention of July 11, 1983 alleged that emergency planning should be required for the City of Charlotte. In order to assess this argument, the original Licensing Board requested Applicants to provide certain information which included a map depicting the northeast boundary of the plume EPZ, Charlotte's city limits, and recent data on population densities in the area.

2. Both the Applicants and the Staff argued this contention was an impermissible attack on the pertinent NRC rule, which in part reads:

> Generally, the plume exposure pathway EPZ for nuclear power plants shall consist of an area about 10 miles ... in radius ... The exact size and configuration of the EPZs surrounding a partiular nuclear power reactor shall be determined in relation to local emergency response needs and capabilities as they are affected by such conditions as demography, topography, land characteristics, access routes, and jurisdictional boundaries ...

10 C.F.R. 50.47 (c)(2).

3. Because a plume EPZ for all of Charlotte would have to extend some 25 miles from the facility, the Board concluded on September 29, 1983 that:

> Although the guideline in the rule -- "about 10 miles" -- is purposefully imprecise, it cannot be stretched as far as 25 miles. We conclude that this contention as drafted is an impermissible attack on the rules and reject it on that basis.

Memorandum and Order (Ruling on Remaining Emergency Planning Contentions), Sept. 29, 1983, p. 2).

4. The Board, however, did not agree "that the concept of including some portion of Charlotte in the plume EPZ should be excluded altogether." Sept. 29th Order, pp. 2-3. The Board noted that Intervenors expressed an interest in including part of the city in the plume EPZ and cited several factors which are relevant to extending the plume EPZ, including demography, access routes, and meterology. Sept. 29th Order, p. 3.

5. While explicitly accepting the first two factors mentioned above, the relevance of the third factor, meterology, was discussed in the ruling:

> Both the Applicants and the Staff argue that meteorological conditions are not a permissible consideration in determining the boundary for the plume EPZ. The Staff states that "adverse meterological conditions ... have been factored into the planning basis assumptions and analyses which led to the Commission adoption of the 'about 10 mile standard' ..." A difficulty with this argument is that it rests entirely on inferences from Staff documents. Neither in the rule nor in associated Commission documents has the Commission itself ever said or indicated that meterological conditions are irrelevant under the rule. The language of the rule itself points to the opposite conclusion ... It is clear ... that the list of "conditions" is not intended to be exclusive. Presumably any relevant local condition can be considered. Meterology certainly qualifies under that standard.

Sept. 29th Order, pp. 3-4.

6. Thus, accepting meterology as a legitimate factor, the Board admitted the following revised version of Contention 11:

> The size and configuration of the northeast quadrant of the plume exposure pathway emergency planning zone (Plume EPZ) surrounding the Catawba facility has not been properly determined by State and local officials in relation to local emergency response needs and capabilities, as required by 10 CFR 50.47 (c)(2). The boundary of that zone reaches but does not extend past the Charlotte city limit. There is a substantial

resident population in the southwest part of Charlotte near the present plume EPZ boundary. Local meteorological conditions are such that a serious accident at the Catawba facility would endanger the residents of that area and make their evacuation prudent. The likely flow of evacuees from the present plume EPZ through Charlotte acess routes also indicates the need for evacuation planning for southwest Charlotte. There appear to be a suitable plume EPZ boundary lines inside the city limits, for example, highways 74 and 16 in southwest Charlotte. The boundary of the northeast quadrant of the plume EPZ should be reconsidered and extended to take account of these demographic, metorological and access route conditions.

7. Subsequently, Applicants filed a motion for reconsideration, arguing that the revised contention is an impermissible attack on 10 C.F.R. 50.47 (c)(2). Appl. Motion of Nov. 3, 1983. However, the Board determined that they had "mischaracterized" the revised Contention 11 as "proposing" a 17 mile EPZ when in fact the Board merely cited potentially suitable boundaries in the form of Highways 16 and 74. Memorandum and Order (Denying Applicants' Motion for Reconsideration Concerning Revised Emergency Planning Contention 11), December 30, 1983.

8. In addition, the Board clarified that a 17 mile plume EPZ is not ipso facto inconsistent with the regulation and noted that "the problem should be viewed, not in the abstract, but as a rather complex regulatory requirement in a realistic factual setting." Dec. 30th Order, p. 3. Indeed, Applicant's attempt to cite the huge additional population in the southwest part of Charlotte under consideration (124,000 people) as evidence supporting dismissal of the revised contention was interpreted quite differently by the Board:

> These statistics argue in favor of the revised contention. A central purpose of the EPZ rule is to ensure that appropriate protective action plans are in place for nearby areas of high-density population.

Dec. 30th Order, p. 4, (emphasis added). Thus, the Board denied Applicant's motion for reconsideration and reaffirmed the factual considerations supporting the revised contention.

9. Hearings on this contention were held from May 23 through May 25, 1983. After considering all of the evidence presented by Applicants, the NRC Staff, and the Intervenors, this Board concludes that there is substantial basis for extending the plume EPZ to include the high-density population of southwest Charlotte.

10. We agree with the original Licensing Board that the determination of the plume EPZ cannot be made with "scientific precision" and that it must involve "large elements of judgement." With the health and safety of the potentially affected public as out highest priority, we find the evidence overwhelmingly suggests that it is in the best interests of the potentially affected public in southwest Charlotte to receive the benefits of enhanced emergency planning. This ruling conforms with the original Board's interpretation that one of the central purposes of the EPZ rule is to ensure that nearby areas of high-density population have appropriate protective action plans in place.

11. As the Board sees it, it is the Applicant's burden to demonstrate that the allegations in Contention 11 lack merit and that the size and configuration of the plume EPZ sufficiently

address local emergency response needs and capabilities in such a way as to ensure the health and safety of the public. This Board concludes that Applicants have failed to (1) adequately demonstrate that the substantial resident population in southwest Charlotte would be unaffected by a serious accident at the site or that existing protective action mechanisms will ensure their safety should they be threatened; (2) demonstrate that local meteorological conditions are such that a serious accident at the site would not pose a threat to residents of that area; and (3) adequately demonstrate how the likely flow of evacuees from the proposed plume EPZ through Charlotte access routes would not suggest a need for appropriate planning for southwest Charlotte.

12. Correspondingly, Intervenors have addressed these issues sufficiently to cause the Board to question whether State and local officials have properly determined the plume EPZ in relation to local emergency response needs and capabilities, as required by 10 C.F.R. 50.47 (c)(2).

13. Jesse Riley of Caroline Environmental Study group explains that the Intervenors' efforts to seek more effective emergency planning for Charlotte are founded upon the unique risk of exposure for the city due to its location a mere 9.7 miles downwind from the Catawba plant. Int. Ex. EP-48, Riley, p. 7; Glover, Tr. 344, 5/2/84.

14. As the NRC Staff's analysis of severe accident consequences in the Catawba FES, NUREG-0921 (January 1983), makes clear, the key parameters for projecting radiological

consequences of such an accident are Catawba-specific meterological data (such as wind direction) and population. Id., pp. 5-37. All early fatalities projected from such an accident at Catawba are within 20 miles of the site, i.e. in major portions of the City of Charlotte. Id. pp. 5-40.

15. Applicants' witnesses Edmonds and Casper attempt to obscure the uniqueness of the Catawba-Charlotte accident exposure by targeting in isolation the factors of population and wind direction for a number of other reactor sites as compared to Catawba. App. Ex. EP-19, Edmonds, p. 6; Casper, pp. 11-15. What is inescapable from the consideration of these two key factors together (population and prevailing wind) is the confirmation of Catawba's unique position among the reactor sites considered. Of the 17 reactor sites considered by Applicants' population and meterology witnesses, App. Ex. EP-19, p. 7, Catawba, indeed, ranked number one; well ahead of Indian Point, Limerick, Waterford, Davis-Besse and the others in magnitude of potential accident exposure. Edmonds and Casper, Tr. 2019-2022, 5/23/84.

16. Of course, it is for people, first and foremost, that emergency planning is required, not acreage or political subdivisions. The Commission's emergency planning rules recognize demography as the principal condition affecting local emergency response needs and capabilities which are the basis for establishing the plume EPZ size and configuration. 10 C.F.R. 50.47 (c) (2). It is only through the application of the meterological forces of wind direction, speed and atmospheric

conditions such as stability class and precipitation to the site demographics that planners can project the radiological consequences for which emergency response is required.

17. The initial Licensing Board itself recognized that such extremely adverse weather conditions as stable air inversions and low wind speed "occur frequently in the Catawba-Charlotte area" and account for large accident consequences there. Partial Initial Decision, June 22, 1984, p. 260. Consideration of these Catawba site specific demographic and meterological data in the severe accident consequence projection by the NRC Staff in the Catawba FES amply substantiates Intervenors' concerns: some 270,000 persons are projected to be exposed to radiation doses in excess of 25 Rem and some 24,000 early radiation fatalities are predicted in the absence of effective protective response. FES, pp. 5-81, 5-82. Commission regulations require that Applicants demonstrate that adequate protective measures can and will be taken in the event of a radiological emergency. 10 C.F.R. 50.47 (a)(1). The NRC Staff assumes that such protective measures are extended to those persons who are exposed to radiation between 10 and 25 miles from the facility. The Staff predicts, for example, that 5,000 lives will be saved if "supportive" medical treatment is provided to persons exposed to over 200 Rems of radiation, Id., p. F-4; and that 18,530 of the 19,000 early fatalities projected to occur beyond 10 miles are avoided if effective relocation after plume passage is accomplished. In order to reasonably assure that such protective measures, and others as

necessary, can and will be taken for the large population of the City of Charlotte, we agree with Intervenors that enhanced emergency planning is required.

18. Applicants and tne NRC Staff have attemped to demonstrate that the proposed plume EPZ satisfies the NRC's regulatory guidance criteria by arguing that there is nothing unique about the Catawba circumstances -- that they are indistinguishable from the NUREG-0396 generic case -- and that current planning would provide an adequate base for expansion into Charlotte if necessary. App. Ex. EP-19, Glover, pp. 8-9.

The planning basis for the plume EPZ size was developed in NUREG-0396 which notes that:

> The potential consequences of improbable but nevertheless severe power reactor accidents ... do require some specialized planning considerations. We do not suggest that these specialized planning considerations are or ought to be excessively burdensome. Rather, we recommend that they be considered and developed as a matter of prudence.

Id., Appendix III, pp. 1-2. This document dictates that the size and shape of the EPZ should take into account local conditions such as demography, topography, land use characteristics, access routes, and jurisdictional boundaries, Id., p. 14., and that emergency planning must consider a spectrum of postulated conditions, including adverse meteorological conditions. Id. , Appendix 3, A 10. Although a radius of "about 10 miles" was selected, "the actual shape would depend upon the characteristics of a particular site." Id., p. 16.

19. NUREG-0654 also addresses the plume EPZ guidelines:

> The size (about 10 miles radius) of the plume exposure EPZ was based primarily on the following considerations:
>
> a. projected dose from the traditional design basis accidents would not exceed Protection Action Guide levels outside the zone ...;
>
> b. projected doses from most core melt sequences would not exceed Protective Action Guide levels outside the zone;
>
> c. for the worst core melt sequences, immediate life threatening doses would generally not occur outside the zone; and
>
> d. detailed planning within 10 miles would provide a substantial base for expansion of response efforts in the event that this proved necessary.

NUREG-0654, Rev. 1, p. 12.

20. To refute the allegation that the Catawba site has such unique characteristics as to justify additional planning, Applicants have attempted to show that the Catawba site is not unusual when compared with the generic analysis used in NUREG-0396 which establishes the plume EPZ at "about 10 miles." In one aspect of their attempt to do this, Applicants commissioned Mr. Thomas E. Potter to compare the Catawba site with the generic case on points "a", "b", and "c" of the NUREG-0654 considerations.

21. The first consideration, involving the exceeding of PAG levels outside the zone from traditional design basis accidents, was not contested by the Intervenors. Int. Ex. EP-49, Sholly, pp. 5-6. The thrust of this contention involves beyond design basis core melt sequences and possible consequences. In accord with the Reactor Safety Study (WASH 1400) and NUREG 0603, the

size and configuration of the plume EPZ should be determined by core melt accidents because these accidents dominate public risk considerations.

22. Mr. Potter's analysis for core melt accidents used PWR release categories from the Reactor Safety Study (WASH-1400) to represent core melt releases from the Catawba plant. As the Board sees it, this is one of the key technical factors which Applicants and Intervenors disagree on. Applicants' analyses and conclusions are premised upon the adequacy of using the WASH-1400 model reactor, Surry Unit 1, as the surrogate for Catawba. Thus, Applicants' conclusions are based primarily upon inferences made about the Catawba site using the Surry unit 1 reactor as the model. App. Ex. Ep-19, Potter, pp 3-6.

23. However, we find that the Applicants have failed to adequately demonstrate that core melt releases from the Catawba plant can be reliably modeled from the Surry design. To be sure, Applicants were aware that the design differences between the facilities -- Surry has a large dry containment while Catawba has an ice condensor containment -- could affect the difference of release categories, thus making the WASH-1400 data inappropriate for use in modeling Catawba releases. Potter Tr. 2073-74, 5/23/84.

24. Mr. Potter therefore reviewed other information available and considered "to some extent" the RSSMAP program for the Sequoyah plant as a data base, because Sequoyah also has an ice condensor containment. However, Mr. Potter rejected the

Sequoyah model, despite this similarity, because the Sequoyah RSSMAP did not account for the presence of a hydrogen mitigation system such as is present at Catawba. Potter, Tr. 2074, 5/23/84.

25. Mr. Potter's rejection of the Sequoyah RSSMAP model is based entirely upon the presumed effectiveness of the hydrogen mitigation system in preventing a hydrogen explosion which would cause the containment to fail early in the accident. Should such an explosion occur, Mr. Potter recognizes, then the probabilities of the more severe releases would be higher. However, it is assumed that the hydrogen mitigation system at Catawba will typically be both operational and reliable, and thus will reduce the probabilities of the more severe radioactive release. Potter Tr. 2074, 5/23/84.

26. Using the McGuire hydrogen mitigation study, Mr. Potter postulated the impact of a hydrogen mitigation system on the Sequoyah RSSMAP release frequencies. Assuming an effective hydrogen mitigation system, he concluded that the release category frequency spectrum was sufficiently similar to that from the WASH-1400 study and thus he adopted the WASH-1400 release categories and probabilities as his model for application to Catawba. Potter, Tr. 2076, 5/23/84.

27. The Board finds, however, that Mr. Potter's entire rationale for disgarding the Sequoyah model in favor of the Surry model rests upon an as-yet unproven site-specific component - the hydrogen mitigation system. The reliability and effectiveness of the hydrogen mitigation system is still an unresolved generic

issue. Applicants have presented a case in which their established probabilities of release are dependent on the proper functioning of a particular site-specific component which is the subject of a pending rulemaking. Such an argument is, at best, inappropriately premature because it presumes the issue will be resolved entirely in favor of the adequacy of the Applicants' system.

28. This is not to deny the existence of what may turn out to be the key mitigating component that Applicants have suggested this system to be. We merely assert that Applicants' basis for rejecting the Sequoyah model at this time is flawed. We cannot presume to know what the outcome of the future rulemaking will be. Thus we cannot accept the premise that the existence of the hydrogen mitigation system at Catawba ipso facto renders Sequoyah as a weaker model than Surry.

29. Mr. Potter claims he has accounted for the fact that the hydrogen mitigation system could fail to operate. However his purpose was not to empirically investigate this scenario per se:

> In any case, when we shifted the frequencies we actually wound up shifting only ninety percent of the frequency, and the reason we did that was not so much that we thought the hydrogen system would be effective over ninety percent of the time, but that we did want to leave some residual contribution for releases from sequences like that in the original categories.

Potter, Tr. 2079, 5/23/84. In effect, it appears that Mr. Potter arbitrarily assumed a 10% failure rate on an unexplained and less than scientific basis, and his purpose in doing so was merely to leave in some small "residual contribution" from the original Sequoyah releases.

30. The Board also notes Mr. Riley's testimony that the hydrogen mitigation system may work in a counter-productive way and actually cause a severe accident which otherwise might not have occurred. Riley Tr. 2454-57, 5/24/83. The point here is that we are not in a position to decide the technical merits of the hydrogen mitigation system. Whether its failure rate is an arbitrary 10% or whether it may actually be counterproductive in some cases is not for this Board to decide.

31. Emergency planning for radiological accidents cannot afford to make liberal or careless assumptions. Mr. Potter and Applicants realized that the differences between Surry and Catawba "could affect the difference of release or the probabilities of different release categories," Potter, Tr. 2073, 5/23/84, and also realized that in the case of off-site and on-site loss of power the probabilities associated with the Sequoyah model are more appropriate. Potter, Tr. 2077-78, 5/23/84. Yet Mr. Potter and Applicants dismissed the Sequoyah model because of a liberal assumption regarding an unresolved issue that neither they nor this Board can make at this time.

Clearly, the more appropriate model, and the more conservative, -- at least until this generic issue is resolved -- is the Sequoyah model.

32. Intervenors presented an expert, Mr. Steven Sholly, whose analysis was based upon the Sequoyah model. Mr. Sholly notes that "accident progression (timing) results for sixteen accident sequences at Sequoyah are found in the RSSMAP analysis ... [and] ten of the sixteen sequences analyzed will be accompanied by containment failure within about four hours or less." Int. Ex. EP-49, Sholly, pp. 12-13. Using NUREG-0654 for guidance on plume transit times he determines that the plume transit time for a distance of 17 miles ranges from one and a half to six hours, compared with one to four hours within 10 miles. According to Mr. Sholly:

> When the core melt accident timing considerations are combined with the plume transit times, we obtain time periods ranging roughly from five and a half to ten hours from the beginning of the accident to the arrival of the plume in the vicinity of Charlotte (assuming the wind is blowing in the direction of Charlotte).

Id., pp. 13-14. Mr. Sholly's comments are in the context of his conclusion that "given a large release with the wind blowing toward Charlotte, even in the mean (average) case protective actions will be necessary beyond the existing 10 mile EPZ." [emphasis added] Id., p. 21.

33. Thus the Catawba site is relatively unique in that a technical analysis using the closest-fit model of inference -- the Sequoyah model -- suggests a severe accident at the site has

a greater than "acceptable" chance (using NUREG-0396 probabilities as the "acceptable") of threatening lives beyond the proposed plume EPZ. The Board concurs with this finding.

34. The Board notes that whether the Sequoyah or the Surry plant provides the more appropriate model of inference for Catawba is largely a "straw man" debate. Applicants have staked much of their case on the issue of probabilities of exceeding certain doses beyond 10 miles. They chose the Surry model in their attempt to show that the probability of exceeding PAG doses beyond the proposed EPZ is within the bounds considered "acceptable" by NUREG-0396. App. Ex. EP-19, Potter, p. 7. Thus conceding that serious accidents "could" threaten people in Charlotte, Applicants have argued that this "threat" is no more than "average." Intervenors, through Mr. Sholly's testimony, demonstrate that the probabilities of exceeding PAG doses beyond 10 miles are somewhat greater than that envisioned in NUREG-0396 as "acceptable risk." Whether or not the Board accepts Applicant's argument here -- and we cannot -- the risk differences between the Surry and Sequoyah model are marginal at best. The FES states that its severe accident probabilities may be off by a factor of 100. The issue in Contention 11 is whether the size and configuration of the proposed EPZ has been properly determined in relation to local emergency response needs and capabilities such that a serious accident at Catawba would not endanger the residents of southwest Charlotte. We presume a serious accident. In other words, the issue is, given a serious

accident -- which Applicants acknowledge might affect residents of southwest Charlotte -- are there factors relative to Catawba sufficiently compeling to warrant extending the plume EPZ? The NRC Staff, itself, presents such a severe accident analysis for Catawba which supports enhanced emergency planning for Charlotte.

35. The consequence reduction benefits from enchanced emergency planning for the city of Charlotte are demonstrated very effectively in the NRC Staff's own severe accident analysis presented in the Catawba Final Environmental Statement (FES). NUREG-0921 (January 1983). Application of the rebaselined Reactor Safety Study (RSS) core melt and containment breach severe accident scenarios to the Catawba site meterology and demography makes clear that because the prevailing winds at the site blow toward Charlotte with its large urban population the consequences of such an accident here would be extremely grave. The dose and, therefore, consequence reduction benefits of enhanced protective action capability to be realized from improved emergency planning for Charlotte would also be great.

36. The effects of emergency response capability are integrated into the Staff's consequence projections:

> (T)he consequence model also contains provisions for incorporating the consequence reduction benefits of evacuation, relocation, and other protective actions. Early evacuation and relocation of people would considerably reduce the exposure from the radioactive cloud and the contaminated ground in the wake of the cloud passage.

Catawba FES, p. 5-38.

37. The need for such protective action is not limited to the 10 miles radius plume EPZ in the event of severe accidents, but is required beyond.

> Early evacuation within and early relocation of people from outside the plume exposure pathway EPZ (see Appendix F) and other protective actions as mentioned above are considered as essential sequels to serious nuclear reactor accident involving significant release of radioactivity to the atmosphere. Therefore, the results shown for Catawba include the benefits of these protective actions.

Id. With early evacuation alone of the plume EPZ population the Staff projects near-zero fatalities within the EPZ itself, but some 19,000 early fatalities "all within 32 KM (20 MI) of the site." FES, pp. 5-40 and 5-82. When the population between 10 and 25 miles is relocated within 8 hours after plume passage to avoid more extended exposure to the significant ground contamination from passange of the radioactive cloud and the EPZ is evacuated, early fatalities are reduced to only 470. Id. pp. 5-40; 5-82; F-3.

38. The projection of 19,000 early fatalities without relocation assumes "supportive" medical treatment consisting of medical care facilities and services for all persons exposed in excess of about 200 Rems. With only "minimal" medical treatment, the Staff projects an additional 5,000 early fatalities for a total of 24,000 deaths without effective relocation. Id., p. F-4. The 200 Rem dose is identified as the threshold at which hospitalization would be required for treatment of radiation injury. A 25 Rem dose is identified as the threshold for

clinically observable physiological effects. Id., p. 5-39. Assuming early evacuation of the plume EPZ only, p. 5-39, this severe accident scenario would produce exposure of 44,000 persons to a dose of over 200 Rem and exposure of 270,000 persons to over 25 Rem. Id., p. 5-81.

39. The initial Licensing Board which admitted the revised Charlotte emergency planning contention recognized these unique circumstances presented by the Catawba site meterology and demography in its Partial Initial Decision of June 22, 1984. There, the Board chided the NRC Staff for deficiencies in its delineation of the significance of frequently encountered severe weather conditions on severe accident consequences at Catawba. The Board observed:

> (T)here is no dispute among the parties that conditions of stable air inversion and low wind speed occur frequently in the Catawba-Charlotte area ... Maximum health consequences are associated with such conditions.

Id. at p. 260.

40. It is the minimization of these enormous potential health consequences which is the objective of effective emergency planning. The NRC Staff's severe accident analysis, itself, reflects that some 5,000 lives are to be saved if "supportive" medical treatment is provided to the 44,000 persons exposed to doses of 200 Rem or greater. 18,530 early fatalities are avoided if the population between the present EPZ boundary of 10 miles and 25 miles is successfully relocated within eight hours. The 270,000 persons exposed to doses in excess of 25 Rem, and those

with unknown lower levels of actual exposure, would require effective monitoring and decontamination services in order to identify dosage and prevent further exposure. None of these consequence reduction benefits will be realized without effective protective response, the likelihood of which can only be enhanced through advance emergency planning.

41. Demography-people-represents the principal condition which effects local emergency response needs and capabilities.

> Our general guidance is that we include concentrations of population that don't necessarily have a municipal boundary. But we strive to include, where there are any concentrations of population.

Lunsford, Tr. 346, 5/2/84.

42. The 1980 census showed a popoulation of 93,483 people within the present Catawba EPZ, Edmonds, Tr. 2007, 5/23/84, with a population density of 251 people per square mile. Id. By contrast in 1980 124,000 people resided in the southwest Charlotte area reflected in the revised Contention 11 zone. Id. That area, including only an additional 77 square miles has a population density of 1,850 people per square mile, some seven times greater than in the present EPZ. Id., Tr. 2008. Detailed population and density data for sectors out to 30 miles from the facility reflect the high population concentrations in the Charlotte area out to about 20 miles. Int Ex. EP-43.

The existing emergency plan for the people of Charlotte is embodied in a seven page document (with eleven additional pages of "Annexes") entitled "City of Charlotte Protective Response Plan for All Hazards, 1982," Int. Ex. EP-46. As its name

reflects, the "All Hazards Plan" is a general-duty document more accurately described as a functional statement of what is to be done in the face of a hazard rather than a detailed plan to accomplish any particular protective action. It pales in comparison to the detail and specificity contained in the hundreds of pages of plans required for the Catawba EPZ response organizations. NC Plan, including Gaston and Mecklenburg County Plans, App. Ex. EP-1; SC Plans, SCORERP, STRERP, York County Emergency Operations Plan, App. Ex. EP-2.

44. The Applicants themselves offer the most comprehensive analysis of the "Actions to Be Accomplished to Formally Extend Catawba's Plume EPZ" into Charlotte and thereby identify the comparative planning disparities between the "All-Hazards" plan now in Charlotte and "the full extent of planning (as present within the existing plume EPZ) ..." A listing of these required planning actions was submitted as Exhibit D to the Affidavit of Duke's Mr. Glover in support of "Applicants' Motion for Reconsideration of Order Revising and Admitting Contention 11," etc., of November 3, 1983, filed (and denied) in this proceeding. We took official notice of this filing, here. Tr. 2146, 5/23/84. Some 52 separate planning actions are identified on a three page list which are characterized by Mr. Glover as showing that:

> ...extensive changes would be required within the previously submitted plans of the State of North Carolina and the Charlotte-Mecklenberg Emergency Management Agency.

Id., p. 3. The list includes such items as installation of additional sirens, commitment of city resources, establishment of reliable communications systems, procedures for alerting and mobilizing emergency personnel, provision of Duke brochures and public information to residents and transients, establishment of traffic control plans, new procedures for transport of the handicapped and institutionalized, training of planners and emergency personnel, and the conduct of plan reviews and exercises. Suffice it to say that a largely ad hoc response capability would be supplanted by detailed advance planning.

45. The only significant test of the All-Hazards Plan to date involved the evacuation of some 2,000 people during a chemical fire at the Baxter-Harris Chemical Warehouse in 1982. App. Ex. EP-19, Broome, pp. 6-8. Significant deficiencies were noted in the post fire report including the exposure of unevacuated members of the public to toxic smoke when the wind shifted. Over 100 civilians sought medical attention after the incident. Int. Ex. EP-52. A review of the All-Hazards Plan was recommended to determine needed revisions. Id.

46. Access routes in and around the City of Charlotte present a further specific condition which affects local emergency response needs and capabilities in a manner warranting expanded emergency planning for Charlotte. Under present conditions, without such additional planning, Mr. Broome estimates about seven hours would be required to evacuate the proposed southwest Charlotte zone. App. Ex. EP-19, Broome, pp.

9-12. He estimates that four to five hours would be required to evacuate Charlotte Memorial Hospital under "perfect" conditions and nine hours under adverse conditions. Broome, Tr. 2121, 5/23/84. Applicants' consultant Mr. Kulash estimates five hours and fifteen minutes for southwest Charlotte and evacuation of the whole city in nine hours under existing plans. App. Ex. EP-19, Kulash, p. 4; Attach C, p. 11. Clearly such estimates reflect an acknowledgement that significant evacuation time reductions can be realized with enhanced planning including notification, education, routing, traffic control and use of transportation resources.

47. The present emergency plans call for evacuation of part of the EPZ population north into the city of Charlotte on several routes: I-77, SC/NC 160, SC/NC 49, and I-85. Even Applicants' consultant acknowledges that the voluntary evacuation of Charlotte would lengthen evacuation of one of these routes. App. Ex. EP-19, Kulash Attach B, p. 9. We believe that unplanned evacuation of parts f Charlotte, either "voluntary" or directed by the authorities would more likely produce confusion and chaos on these and other access routes. Of the evacuation routes bound for Charlotte from the EPZ, three of the four are represented on the City of Charlotte listing of "1982 High Accident Locations," each more than once. Int. Ex. EP-45.

48. A review of the conditions affecting local emergency response capability for the city of Charlotte convince this Board that effective protective action for this substantial population in the event of a radiological accident at Catawba will indeed require enhanced levels of emergency planning for Charlotte.

49. The actual size and configuration of the plume emergency planning zone for Catawba is to be determined on the basis of local emergency response needs and capabilities. 10 CFR 50.47 (c)(2). We find very little evidence of any thorough, deliberative or particularized consideration of such needs and capabilities in the original determination of the present EPZ configuration in the NW where the zone boundaries have been established as contiguous with the City Limits of Charlotte, North Carolina.

50. Mr. Wayne Broome of the Charlotte-Mecklenburg Emergency Management Office considered the present EPZ adequate "in view of the NRC investigation which preceded the decision to set the EPZ radius at about ten miles,"by which he means the generic investigation of NUREG-0396. App. Ex. EP-19, Broome, p. 2. The present ten mile radius at Charlotte does not reflect the results of any local investigation of needs and capabilities, nor even Mr. Broome's judgement:

> From the position I'm in, I have to accept the judgement of the regulations.

Broome, Tr. 2096, 5/23/84.

51. The Charlotte city limit boundary was selected by Broome with input from Duke Power. Broome, Tr. 2090, 5/23/84. No evidence was offered by Applicants or the NRC Staff showing any further consideration of local emergency response needs and capabilities. It simply appears that the Charlotte city limit, then 9.7 miles from the Catawba plant, seemed "about ten miles" and was selected as the most convenient boundary, despite its exclusion of the large concentrations of population over the line in southwest Charlotte.

52. With respect to the establishment of the plume EPZ boundary, Applicants and planners have relied upon political boundaries as the determinative factor which accounts for their having accepted the present EPZ configuration. Applicants' and local planners' justification for including Rock Hill in the EPZ is as follows:

> Well, it's mainly because fo the location of the city in relationship to the plant ... the City of Rock Hill begins ... maybe five to seven miles from Catawba ... and a major portion of the City is within the ten mile radial area ...
>
> And so that we would not split a city as a part of it being within the zone and part of it being outside of the zone. Primarily ... we extended it ... to include the entire city.

Glover, Tr. 2027, 5/23/84.

53. In the case of Charlotte, which is 9.7 miles from the plant, Applicants and planners again chose to use the city limits as the principal boundary guideline, except in this case their decision was to exclude the entire city. Essentially, Applicants

and planners saw Charlotte's city limits as "about ten miles" from Catawba and used Charlotte's political boundaries as EPZ boundaries. In the words of one planner, "The ten-mile EPZ for Mecklenburg county was extended to Charlotte to give identifiable boundaries for the people living inside the ten-mile EPZ." Broome, Tr., p. 331, 5/2/84. In the view of one planner, splitting a city, for example, Rock Hill with the EPZ boundary would "reduce the number of potential evacuees, but the problem I would see with that would be in trying to define for area residents who is included and who is not." Glover Tr. 2029, 5/23/84.

54. The Board has a number of concerns with Applicants' argument on this matter. Applicants essentially argue that to extend an EPZ into a city's limits would not only create more evacuees -- which is not necessarily the undesirable consequency that these planners imply -- but would also cause confusion over who is or is not advised to take protective action. This argument presumes that the public is incapable of understanding anything but a political boundary. The Board reminds Applicants and planners that political boundaries are themselves abstract concepts which should be defined by concrete physical phenomena such as roads, creeks, etc. Indeed, some of the same planners who participated in delineating the current proposed EPZ are aware that one of the primary deficiencies of the so-called All-Hazards Plan for Charlotte is in its current reliance upon evacuation by political precinct -- an abstract political concept

which is recognized by planners today as essentially meaningless for evacuation purposes and which must now be modified to provide more concrete and recognizable landmarks for effective evacuation. Fincher, Tr. 4140, 5/6/84.

55. Thus, while the public may be aware of whether they live within a city's limits, the public is also likely to be aware of key physical landmarks which help define their city limits as well as various partitions within their city. Indeed, the original Board recognized this fact when they suggested highways 16 and 74 as possible alternative boundaries for the EPZ. These are major routes within the city which are clearly marked and easily recognizable. A review of a street map of the city, Int. Ex. EP-44, shows other city routes which would also suffice as potential EPZ boundaries. Duke's Mr. Glover and Charlotte planner Mr. Broome identified strees boundaries between 12 and 13 miles which would be appropriate EPZ boundaries in southwest Charlotte. Glover and Broome, Tr. 2156-7, 5/23/84.

56. The Board also notes that Applicants' argument that including only a portion of a city within the EPZ would cause confusion directly counters their faith in the presumed efficacy of Applicants' public information program. We remind Applicants that a central purpose of this program is to provide vital information to the potentially affected public regardless of abstract or physical boundaries and we would expect that this

program be directed to all of the EPZ population in an effective manner whether or not they live within a particular political boundary.

57. Perhaps most troublesome to the Board are our observations of conflicting testimony by Applicants and planners themselves over the criteria used in delineating the EPZ. In the words of one planner, "Our general guidance is that we include concentrations of population that don't necessarily have a municipal boundary ... We strive to include, where there are any concentrations of population." Lunsford, Tr. 346, 5/2/84. Another planner ignored the site-specific heavy concentration of Charlotte population just beyond the proposed EPZ in his zeal to "accept the judgement of the regulations," which in his eyes apparently did not permit an EPZ to be extended into Charlotte. Broome, Tr. 2096, 5/23/84. Yet, the Catawba planners see no problem with the Rock Hill proposed EPZ of 13.1 miles, Glover, Tr. 2026-27, 5/23/84.

58. While Applicants' predict confusion would result from extending the EPZ into a portion of Charlotte's political boundaries, they have no qualms about citing examples to show that Charlotte's eventual growth into the proposed EPZ will pose no similar problems or confusion. Indeed, this has already occurred at McGuire. Mr. Broome notes that Charlotte's partial inclusion within McGuire EPZ does not pose any significant planning or resource problems. Broome, Tr. 2229-30, 5/23/84. Here, Applicants and planners cite political boundaries as

essentially irrelevant yet elsewhere political boundaries are cited as a key determinative factor in their decision to exclude portions of Charlotte from their proposed EPZ. The Board reminds Applicants that you simply can't have it both ways.

59. NUREG-0396 clearly identifies a number of factors which must be considered in the matter of EPZ boundary definition -- and political jurisdictions are merely one of these factors. It is essential that additional factors be considered, particularly where these factors interact to produce unique effects at the site specific level. This is the essence of the Intervenors' argument.

60. In September 1983, local citizens, including members of the Carolina Environmental Study Group, approached the Mecklenburg county Commission to request their review of Charlotte's emergency planning needs related to Catawba. Riley Tr. 2266-67, 5/24/84. In response to this request and in order to identify local emergency planning needs and capabilities, the County Commissioners established the Charlotte-Mecklenburg Emergency Management Planning Review Committee (hereafter referred to as the Planning Review Committee). The nine member committee, chaired by Dr. Harry Nurkin, was given the following charges in October 1983 by the Mecklenburg County Commission:

> 1. Identify and consult with federal and state agencies regarding the establishment of the 10-mile Emergency Planning Zone (EPZ) and the adequacy thereof.
>
> 2. Identify and consult with parties advocating extension of the 10-mile EPZ.

3. Review and determine the adequacy of current emergency plans for radiological responses and other related emergency plans.

4. Consult with the Charlotte-Mecklenburg Emergency Management Office and other local emergency and public safety departments/agencies concerning roles in executing emergency plans.

5. Determine the consequences, legal and otherwise, of Mecklenburg County developing radiological response plans which may deviate significantly from state and federal planning.

6. Make recommendations to the County Commission on what steps need to be and can be taken by Mecklenburg County to improve emergency plans and enhance the public safety in the event of a radiological or related incident.

Int. EP-42.

61. The Board notes that the official purpose stated at the committee's establishment is for "a Blue Ribbon Citizens Committee to advise the Commission and staff on adequacy of Emergency Response Plans for Radiological Incidents." Int. EP-42.

62. The Committee has met for more than seven months on a frequent and regular basis. it has reviewed evidence and heard presentations by Duke Power, CESG, staff from the Charlotte-Mecklenburg Emergency Management Office, fire departments, police, medics, environmental protection agencies, and other interested organizations during this period. In addition, three public meetings were held to gather input from the general public. Gordon, Tr. 4310-14, 6/7/84.

63. On May 16th, 1984, the Planning Review Committee officially adopted a resolution requesting that the County Commission "contend to the Atomic Safety and Licensing Board for the extension of the Emergency Planning Zone limits of the Catawba Plant to provide further security to residents and others in the affected areas of the southwestern quadrant of the county." Int. EP-42. This recommendation was made "in order to assure the citizens of Mecklenburg County that the response capabilities in the event of a catastrophic emergency at the Catawba Nuclear Station on the part of the utility operator and of local, state, and federal officials are, in fact, effective, flexible, and of sufficient scope to warrant public confidence." Int. EP-43.

64. According to the testimony of Ms. Kathy Gordon, a member of the Planning Review Committee, the recommendation to extend the Catawba EPZ is based upon a number of factual conclusions which were adopted by the Committee:

> -- Whereas, the Atomic Safety and Licensing Board hearing the Operating License proceeding for the Catawba Plant has admitted a contention for expanding the Emergency Planning Zone an additional seven miles into a heavily-populated area of Mecklenburg County; and,
>
> -- Whereas, numerous studies have shown the existence and implementation of well-designed emergency plans can greatly reduce fatalities and injuries; and,
>
> -- Whereas, the location of the Catawba plant just ten miles from the city limits of the City of Charlotte and directly upwind of that City and tens of thousands of nerby residents in the path of the prevailing winds; and

-- Whereas, the responsibility for the expense of establishing and maintaining an Emergency Planning Zone -- whatever its extent -- should be borne by all the beneficiaries of the operating plant and not merely by its immediatel neighbors;

Int. EP-42; Gordon, Tr. 4341-42, 6/7/84.

65. Upon presentation of the Planning Review Committee's resolution, the County Commission deferred action on the recommendation, pending completion of the review of all six committee charges. Gordon, Tr. 4338, 6/7/84. The Committee's recommendation to extend the EPZ is only one of several upcoming findings regarding the charges, but because fo the timeliness of the licensing hearings the Committee decided to make their findings and recommendations regarding the issue of adequacy of the present EPZ known to the County Commission before all of the charges were completed. Gordon Tr. 4309-16, 6/7/84.

66. The response by the Commissioners to delay recomendation may also have been influenced by the actions of the Planning Review Committee's chairman, Dr. Nurkin, who opposed the Committee action and abstained from voting on the resolution which was adopted. Duke Power privately lobbied the chairman to delay a decision on the issue and the chairman communicated this viewpoint as his own to the committee in his urgings to delay reaching a decision on the matter. Gordon, Tr. 4316-7, 6/7/84.

67. Chairman Nurkin may also have influenced the County Commission decision to defer action on the EPZ resolution by his transmittal letter to the Commission which emphasized the unfinished work of the Committee on the study of local emergency

response needs and capabilities and omitted the Committee's factual findings which supported the EPZ empansion resolution. Gordon, Tr. 4342-44, 6/7/84.

68. In any event, the Planning Review Committee is still deliberating on the remaining charges and a set of full recommendations can be expected sometime in the near future. The Board acknowledges that the Committee clearly represents the first in-depth effort to study emergency planning needs and capabilities for Charlotte and Mecklenburg County by an objective and nonpartisan body of distinguished citizens.

69. We credit their May 16, 1984 resolution as significant evidence supporting ezpansion of emergency planning for the City of Charlotte on the basis of their consideration of local emergency response needs and capabilities.

70. We, further, credit their on-going work in completing their remaining charges as leading to a more definitive consideration of these local factors which must be the basis for emergency planning including the determination of the size and configuration of the plume EPZ in Charlotte and Mecklenburg County. One respect for the proper work of local government and this Planning Review Committee in particular warrants our deferral to their on-going study of their own local needs and capabilities as they bear on emergency planning for Catawba.

71. Our responsibility is to weigh the adequacy of their consideration of these local factors in establishing the EPZ for Catawba. While such a local review process is underway and,

apparently, proceeding with expedition, it is only appropriate that we await their determination of these matters which are appropriately left to them in the first instarce.

72. We commend the Committee for its efforts and expect that its consideration of these issues will be communicated to us in due course. We retain jurisdiction of this matter and direct the parties to report to us on significant developments as they occur, but no later than 6 months from this decision. Thereafter, we will decide the matters before us, with or without further actions by local authorities.

73. However, on this record, in the face of the strong evidence supporting enhanced emergency planning for Charlotte, and with a rigorous process for determination of local needs and capabilities underway for the first time; we are simply unable to find reasonable assurance that the people of southwest Charlotte are adequately protected.

INTERVENORS' EMERGENCY PLANNING CONTENTIONS 14 and 15 EVACUATION

1. Intervenor's Emergency Planning Contention 14, as admitted at the close of the pre-hearing conference August 8, 1983, Tr. 1094-1095, reads as follows:

> The Applicants have failed to demonstrate their ability to take effective actions to protect the health and safety of the general public in the event of an accident in that the evacuation time study presented by the Applicants is a piece of fiction in the guise of science and may not be relied upon for determining the ability of Applicants and public authorities effectively to evacuate the residents of the Catawba EPZ in a timely manner.
>
> By overestimating the flow of traffic on evacuation routes, the Applicants' time study overestimates actual traffic movement by a factor of between three and twelve. A flow of no more than 900 vehicles/lanes/hour should be assumed, according to preliminary estimates by Dr. Sheldon C. Potkin of the Southern California Federation of Scientists.
>
> Traffic flows are further overestimated by failing to account for voluntary evacuation likely to take place from Charlotte via I-77. All of the study's estimates are premised only on estimates of traffic flow within the EPZ. They fail to account for backups caused by extra-EPZ congestion, especially on I-77 in Charlotte.
>
> The Applicant's evacuation time estimates erroneously assume quick response by school buses and multiple school bus trips. School buses in South Carolina are driven by high school kids. No public official would dare to send high school kids into an evacuation zone to transport those without vehicles. Time must be allowed for finding drivers.
>
> The Applicant's study is fundamentally useless to making a determination regarding the time in which evacuation can be accomplished in that it makes numerous assumptions regarding work and living habits which are apparently made up out of whole cloth. No references or other data bases are given for the assumptions underlying these evacuation time estimates and they cannot be credited.
>
> The evacuation time estimates should be based only upon worst case assumptions rather than best case conditions. The Applicant's study is far too optimistic in assuming that worst case conditions will require only 156% of the time of best case conditions. The judges are asked to take notice of their own experience in Applicants' counsel trying to reach York, South Carolina, in the midst of what may be a modest

snow storm to Yankee eyes, but which had plainly immobilized the entire vicinity.

Futher, Applicant's study naively fails to account for parents going first to their childrens' schools to pick up their children before evacuating.

Moreover, Applicant's study by slight of hand, dismisses the major impact of the presence of large transient populations at Carowinds amusement park and Heritage U.S.A. Those populations will take longer to evacuate than the study assumes and will co-congest I-77 with resident traffic.

The fundamental test of the adequacy of a evacuation plan is whether it can be implemented in such a fashion as to effectively avoid or minimize the radiological effects of a radiation release. Absent a real life, real time evacuation drill to test the system, any study presented in support of the adequacy of the emergency plans must be technically valid from a theoretical perspective and based upon assumptions having some relationship to the real world situation to which the study is supposed to apply. This study lacks either basis.

A more realistic estimate of evacuation time for the Catawba Nuclear Station in the South Carolina Piedmont is that evacuation will require a minimum of 33 hours, assuming a conservative 600/vehicle/lane/hour vehicle travel time. Applicants are, thus, unable to provide a reasonable assurance of being able to avoid or meaningfully minimize radiation exposure in the event of a radiation release at Catawba.

The Applicants thus fail to meet the requirements of NUREG-0654, Rev. 1, Appendix 4, in that their evacuation time estimates may not be credited by the Commission and fail to meet Commission requirements that it be able to demonstrate the ability of local and state authorities to take effective protective actions.

Intervenor's Emergency Planning Contention 15 deals with the related subject of transportation necessary in order to effect an evacuation. It was tried at hearing together with Emergency Planning Contention 14. It was admitted at the August 8, 1983, pre-hearing conference, Tr. 1095-1096. It reads:

> The Applicants and the local and State plans fail to provide adequate assurance that effective protective actions can be taken because the provisions in the several plans are inadquate with regards to transportation and related evacutory activities in the event of an evacuation.

The emergency plans fail, fundamentally, to address the peculiar conditions of the areas surrounding the Catawba Nuclear Station. Large segments of these areas are rural. Some of them contain lower income communities. The time estimates used by Applicants assume that 10% of the families are without vehicles. In many of these homes, the vehicle is not home during large parts of the day. Often, those homes will have children and elderly people at home without transportation. No census of varying conditions has been done.

Moreover, the plans are premised on using school buses to transport those without their own transportation. School buses in South Carolina are driven by high school students. Even if some public officials were prepared to leave emergency activities in the hands of 16 year old youths, none would dare send such a child into an evacuation zone. No provision is made for back-up drivers. Even if the drivers can be found, in many communities those school buses are kept at the driver's home at night and not at some central motor pool.

Applicants and the local and state planning officials have failed to demonstrate that adequate transportation facilities are available to evacuate the hospitals and nursing homes in the EPZ. Nor do the plans demonstrate that adequate provisions have been made for transporting young children at day care facilities.

Numerous parents have informed members of Palmetto Alliance that in the event of an evacuation their first response will be to personally pick up their children regardless of paper plans. The state and local plans fail to address this reaction which will slow evacuation and add to confusion.

The experience at Three Mile Island demonstrates that many citizens will not leave in the face of a major threat. Southerners have a special commitment to land and home which no government to date has been able to overcome. Absent a full-scale exercise which demonstrated that these hard-headed Scotch-Irishmen are going to leave, no assurance can be had that the public will leave in the event of an evacuation order.

The emergency plans assume, but do not demonstrate, that adequate buses are available to move school children out in a timely manner. Multiple bus pick-ups may be needed.

Evacuation plans which fail to assume that human beings -- and not computer modeled facsimiles thereof -- are to be evacuated cannot but fail in the test. Applicants and state and local emergency planners are unable to provide assurance that the plans can be effectively implemented to protect the residents.

2. We agree with the parties that the appropriate regulatory guidance by which we judge the evacuation time studies submitted by Applicants is suggested by the Licensing Board's decision in the Waterford proceeding:

> The evacuation time estimates are for use by emergency response officials who are charged with recommending and deciding on protective actions during an emergency. Evacuation, as a protective action, would be called for when it would result in dose savings to the population. There is no standard for judging the adequacy of the evacuation routes, nor has a minimum evacuation time been set. Under some accident scenarios, evacuation could reduce the dose to the population; under other situations, such as sudden release of radioactivity, evacuation may not be effective.

3. Louisiana Power and Light Co. (Waterford Steam Electric Station, Unit 3), LBP-82-100, 16 NRC 1550, 1561 (1982).

4. While we agree, thus, that there is no "right" answer to the question of how long it will take to evacuate people at risk from exposure to radiation releases under accident conditions at the Catawba plant, nor any "correct" means for accomplishing such an evacuation, the central importance of the evacuation time study and the means assumed to be employed in such a time study is that the results of this time study are to be relied upon by local emergency response authorities in reaching the critical decision to order protective action. As the Board in Waterford observes evacuation may save lives if it can be accomplished in a manner to avoid or reduce radiation dosage by getting the populace out of the way of the advancing plume. However, if the advancing plume would unduly expose members of the public who

would be caught in the process of evacuation, the clearly superior dose minimizing choice for them is to remain sheltered in their homes or other structures until after plume passage. The very worst possible consequence of either an erroneous evacuation time study or a misplaced reliance upon a study due to ignorance of its imperical limitations, would be represented by a mistaken decision to order an evacuation where it, in fact, could not be accomplished in time to minimize radiation dose. While we agree that Applicants' time studies and the state and local officials presumed means for accomplishing evacuation are not to be held to a standard of perfection, or to any magic minimum time, we conclude that they are seriously flawed and unreliable as the decisional tool for which they are assumed to serve. It is the planner's misplaced confidence in the precision of these time estimates and evacuation plans which represents the most dangerous weakness reflected in the evidence on these contentions.

5. For example, Mr. Pugh, the director of the Division of Emergency Management, the senior emergency response official for the state of North Carolina, is asked to explain his understanding of the error bounds reflected in Applicant's evacuation time estimates:

> Q. ...Is it an hour either way or is it a minute either way, Mr. Pugh? What do you think?
>
> A. I don't think you can really say because one of the basis for evacuation is the concern that you have been expressing now for about seven days: Is the evacuation prior to the warning? So, these evacuation times may be reduced substantially because of that...I don't say it's imprecise, I say our use of it must be -- it

cannot be judged, for our use, in precise terms. Mr. Kukash is, I am sure, an expert in the field and certainly has outstanding credentials, and his figures are precise. There is no question about that. But the way we use his figures must be in general and a less precise nature...you are trying to apply errors to a study that I don't the errors are in that study. I believe there is a latitude that you must have in carrying out evacuation plans...I think the three hours and twenty-five minutes that they came up with in the three zones of North Carolina are an indication of about how long it is going to take to evacuate those zones.

Q. When you say "about," what I am trying to understand is what as a planner do you have in mind when you use the term "about"? Is an error bound of an hour on either side or a minute on either side?

A. I can't put it in quantitative --

Q. You don't know?

A. I can't.

Pugh, Tr. 1097-1101.

6. In response to the same line of questioning, the senior South Carolina emergency response official, Mr. Lunsford, answered:

As time goes on, our familiarity with the area will become very, very good. Right now, it's very good.

I have traveled all the roads inside the 10-mile EPZ myself that are in South Carolina. I have had a radio in the vehicle to make sure that I could establish radio contact with certain people. And as we become more familiar with these routes and where people live and what the circumstances are, we will become more familiar with how accurate those times are as we move about in the ten mile EPZ during various periods.

And I believe we will be able to give pretty good judgment about the accuracy of the time estimates. More so than we are right now. Right now what we have to go by is what purports to be, and appears to me to be a reasonable approach to determining evacuation times within the ten mile EPZ. This is the fourth time that I have been involved in something like this. Three other sites included. And they seem to be reasonable. And as Mr. Pugh has stated, and I don't want to be redundant, but we have a very good process that is involved in which a number of good human beings are involved making judgments. And it is not unusual in situations like this for people to be doing this and using similar tools.

Q. So, let me just focus it. Can you, Mr. Lunsford, tell me whether in your view the error bounds in the time study are more on the order of a minute or an hour?
A. No.

Lunsford, Tr. 1112-1113, 5/7/84.

7. In response to the very same question, i.e. whether the error bounds are on the order of a minute or on the order of an hour, the Applicants' expert who sponsored the evacuation time estimates was wholly unable to provide a meaningful context for understanding the degree of precision which should be attributed to his projection. His answer in full:

> The error bounds can be computed. If you wanted to give us what you thought was a maximum reasonable time for each of the steps. In other words, instead of this notification time of substantially all the population within forty-five minutes and the shape of that curve that goes along with it. If you wanted to stipulate a different curve, we could in fact -- and you know, you wanted to call that the maximum or realistic or pessimistic time, that could be done.
> And I think what you would find is, in just qualitative terms that for the bulk of the population, like 50 or 60 per cent for the 50, 60, 70 percentile of population, evacuation times are quite insentitive to these types of variations. And the reason stems from the statistical process that simulates how people are notified and prepared to leave. To put it in more simple terms, for example. We may differ between what the actual distance from work to home is. This was an area that came up early today. Okay, there may be some disagreement and substantial disagreement about what the maximum time really is, with us saying it's more like twenty to twenty-five minutes and you saying it's more like forty to forty-five. But what we would find when we got looking at that more carefully is that the area of disagreement involves a very small segment of the population. And that in fact, we would be in agreement on the great majority of the population. We would -- with pessimistic and optimistic scenario. We would both agree, for example, that 70% of the population lives within thirty minutes of their place of work, or within twenty minutes. So what happens when you combine these things in a statistically correct manner is you get -- if I can get technical

here for a minute -- you get a curve, an "S" shaped curve that slopes very steeply in the middle so that in this area from say, the thirtieth to the eightieth percentile of population, it's quite insensitive to large changes in the assumptions. You can assume a much longer maximum time. It doesn't matter. The great bulk of the population is still back in an area that has already been simulated correctly, and the extremely pessimistic type scenarios change only that little fringe of the tail, say, the ninetieth to the one hundredth percentile population. So, to summarize this in just a nutshell, changing assumptions quite radically has a much less than expected impact on the bulk of the population. It will explain the maximum times for the last person by almost the amount that you stipulate. So if you say notification time is in fact two hours rather than forty-five minutes, it would in fact raise the last time out or the time out for the last person by about an hour and a quarter. But it would hardly change at all the ninetieth percentile time for 81,000 of the people for example. It's kind of a complex statistical thing which we need to take more time to do.

Kulash, Tr. 1113-1116, 5/7/84.

8. We find it quite disturbing that, Applicants' Mr. Kulash assuming the fullest qualifications and candor, is unable to provide a straight answer to this rather straight-forward question. And if, in fact, there is no "straight answer" to this question, the evacuation time estimates cannot be an effective decisional tool to be employed by emergency planners. If they cannot clearly understand, and they certainly reflect no such understanding on this record, whether they should assume, for example, that the three hour and twenty-five minute estimate for evacuation of the last person from the North Carolina EPZ zones may be off by a few minutes on one side or another, but is not likely to be off as much as an hour, then we can have no confidence in the effective use of these estimates in making the

critical decision whether to direct an evacuation or in-place sheltering to save injury and lives. The lack of understanding reflected in this record is precisely the precursor to the misjudgment regarding protective action which may have catastrophic results for over exposures to the public. The evacuation time estimates, themselves, are only as good as the understanding of those who will use them to decide on appropriate protective actions.

9. We conclude that many of Intervenor's criticisms leveled at the lack of basis for the evacuation time estimates factual premise as well as their criticisms of similar lack of factual basis for the evacuation plans themselves are generally well taken. Much work has obviously been done by Applicant's consultants, PRC Vorhees and the local planners to address Intervenor's concerns reflected in these contentions. This is creditable, and reflects the obvious value of subjecting the planners' assumptions to a rigorous critical review as has occurred in this proceeding. For example, as reflected in Int. Ex. EP-19, only after the admission of these contentions and Duke's efforts to secure from their consultants discovery materials sought by Intervenors, did Duke discover that, as alleged by Intervenors, PRC-Voorhees had no technical justification for its assumptions of work habits and behavior underlying its projections of preparation time. A formal technical paper reflecting such foundation was commissioned. In addition, as alleged, no analysis had been performed by PRC-

Voorhees of the effect of voluntary evacuation of the city of Charlotte just outside the existing ten mile EPZ. Such a study was commissioned by Duke. Later, Duke commissioned a number of additional studies by PRC-Voorhees to respond to Intervenor's criticisms: a formal report on the use of school buses in both states for evacuation of school children, a formal report on shelter capacity, a report on the evacuation of transportation dependent persons, procedures for evacuation of hospitals and nursing homes, and a detailed rebuttal of the issues raised in Contention 14. Int. Ex. EP-20.

10. In fact, Intervenor's most extreme assertion that evacuation of the Catawba EPZ would require thirty-three hours, is substantiated by Duke's own earlier estimates of the time to evacuate that part of its EPZ near Rock Hill, South Carolina estimated to take thirty-two hours and twenty-five minutes under normal weather and forty hours and twenty-five minutes under adverse weather conditions. Int. Ex. EP-16. These estimates were not only submitted to the Nuclear Regulatory Commission by Duke in 1980 but were submitted, for comment, to the special facilities involved and were "discussed, at length, with local and state officials. Mutual agreement was reached that these values are adequate under a preliminary basis." Int. Ex. EP-17. The three to four hour estimates made by Duke's consultants and relied upon by the local and state emergency response officials are a far cry, indeed, from the thirty to forty hour estimate previously made by Duke, and apparently endorsed by those same

officials only four years ago. We are certainly left to wonder, as we expect the local officials may also wonder, which are the accurate estimates and what levels of error should an emergency response official assume in those short minutes when an actual decision regarding protective action must be made in order to save life.

11. We conclude that Applicants' evacuation time studies and plans are inadequate to assure effective protective action and will require that Applicants propose remedial measures to cure these deficiencies.

INTERVENORS' EMERGENCY PLANNING CONTENTION 18
ADEQUACY OF LOCAL TELEPHONE SYSTEM

1. Palmetto and CESG Contention 18, admitted by the Licensing Board at the close of the August 8, 1983 pre-hearing conference, Tr. 1099-1100, Order (Concerning Miscellaneous Matters) August 17, 1983, reads:

> In the event of an emergency, local telephone systems are inadequate to handle the immensely increased volume of telephone calls. Since notification of emergency personnel relies upon telephones and since those without vehicles are expected to call for a ride, major parts of the emergency communication system will be effectively knocked out. This applies especially to the notification of school bus drivers as specified in the plan.

2. As was stipulated by the parties, Tr. 1373-1374, the overloading of the local telephone system under conditions of high volume usage, such as would likely occur once the general public was aware of an emergency at the Catawba facility, appears quite likely. Parties stipulated to facts reflected in a response to Intervenor's interrogatories:

> Should a major emergency occur which would affect the residences and businesses located within the service territory of Rock Hill Telephone Company, it is estimated that simultaneous usage of approximately 10% of the telephone lines in the service area would have the effect of tying up telephone service to remaining customers.
>
> This situation has occurred on an infrequent basis in the past. The telephone usage which resulted immediately after the death of President Kennedy is a primary example of the situation. In that case, the switching facilities of this company were effectively tied up for a period of time.

Id. We conclude on this basis that it is established that, as alleged in the contention, "in the event of an emergency, local

telephone systems are inadequate to handle the immensely increased volume of telephone calls."

3. Much of the concern which is founded upon the inadequacy of the local telephone system appears to be addressed through response by Applicants and the state and local planners who have identified a variety of alternative means including dedicated lines, various radio equipment, and personal beepers, to accomplish notification of at least the key emergency personnel in the event of an emergency at the facility.

4. We have remaining concerns, however, regarding effects of the unavailability of the local telephone system on the implementation ability as it relates to the larger number of lesser emergency response workers as well as the members of the general public who, requiring special assistance, would seek to communicate by telephone with emergency management officials.

5. It seems clear to us that any reliance, whatsoever, on the local public telephone system for any link in the emergency response process would be ill-advised. In order to understand the implications of relying on some other means for implementing the emergency plan for these participants, in the absence of the telephone system, we must look at the efficacy of the replacement link specified by Applicants and the local officials.

6. For the transportation dependent, handicapped, or other members of the public with special needs for assistance, the Applicants' assurances that the plan will function even in the face of a failure of the telephone system are likely to be of

little comfort. As emphasized by the testimony of Intervenor's witness Andrews with respect to individual response in crisis, many of these people in need will be looking for the helping resource to respond to their difficulty. Assuming that they respond as predicted by turning to their Catawba Nuclear Station Emergency Plan brochure, App. Ex. EP-5, a reference to the inside front cover reflects three bold-headed sections each directing the reader to one or more telephone numbers "If You Have Questions," "Uf You Hear Rumor," or "If You Are Hearing Impaired, or Have a Physical Limitation." If the person in need wades through ten more pages of Duke's brochure and arrives at page 11, he or she would find a section headed, "What If I Don't Have Transportation?" There he or she is told, "If you or members of your family cannot drive or do not have any transportation, call the emergency agency in your area at the number listed on the inside front cover." Now, it is true, that at this point and in the earlier section directed at the handicapped the booklet explicitly states that the call should be made "today," or that one should "make these plans now." However, nothing in this record suggests that any substantial numbers of people with these needs, who we must presume are in fact represented in significant numbers in the EPZ population, have called these numbers to register their needs at this time. Applicant's own consultants, for example, reflect that some 10% of the EPZ households are without access to a vehicle and must thus be counted as transportation dependent. Persons with such

needs would, thus, number in the thousands. Many of them will wait until the time of the actual emergency to attempt to call. The panic and fear response of these people to finding the telephone system inoperative will likely be great. We are not comforted by Applicants' suggestions that the EBS messages will effectively accomplish the needed communication with these people particularly in the face of the brochure's explicit commitments that the telephone will be the needed link.

7. Mr. Thomas of York County seems to confirm our fear that the telephone is, indeed, relied upon to perform such a link:

> Q. Yes. You have got the need to take protective action, and those persons require some special assistance in the protective action. You have not identified them as of yet. How do they get assisted in your plan?
> A. Okay. Those that have been unidentified, and an event takes place, then the identification burden would fall on them to get in touch with us. We don't know they are there. Obviously we can't communicate with them, because we don't know who they are. So they would have to identify themselves to us. Most probably they would use a commercial telephone.

Thomas, Tr. 1431-1432, 5/8/84. Mr. Thomas' further explanation provides little additional comfort:

> If they needed to get assistance, they would be directed that there is a procedure to follow, by EBS, if an event has taken place, if they hadn't already notified them. Hang your handkerchief on the door, sitting at the front door screaming, whatever it took. They would be notified over the EBS, if they hadn't already notified us and gotten special notification. If they tried to phone in and have a lengthy narrative over a commercial phone, I am sure it would be very difficult because of the great numbers on the phone. But that doesn't mean they can't communicate with us.
> Q. How about if they just want to call and say, "Help"?
> A. EBS will tell them to stand on the front porch and yell help. Somebody will pick them up. They may get it over the phone; they may not.

Thomas, Tr. 1435-1436, 5/8/84.

8. We are not persuaded that such an ad hoc response will effectively communicate as necessary the means by which persons with special needs will receive assistance in the event of an emergency. We are especially troubled by the inconsistent assurances implicit in the brochure that "if you need help," the telephone would be an effective means to communicate that need and have communicated the means by which those needs will be met. We will require further demonstration of an effective means for accomplishing this communication in the absence of the availability of the local telephone system at Catawba.

CONCLUSION OF LAW

Having considered the entire record in this proceeding, we are unable to conclude that the emergency plans for Catawba comply with 10 CFR Section 50.47 and 10 CFR, Part 50, Appendix E, or that Aplicants and the NRC Staff have demonstrated that deqquate protective measures can and will be taken in the event of a radiological emergency at the facility. We will require remedial measures by Applicants and others, as specified in this decision, in order to satisfy this Board that such "reasonable assurance" is demonstrated. Applicants should submit to us and the parties a proposed remedial plan within 30 days of this decision. We retain jurisdiction of this matter until further order.

Respectfully submitted,

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Carolina Environmental Study Group

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket Nos. 50-413
DUKE POWER COMPANY, et al.	)	50-414
	)	(emergency planning)
(Catawba Nuclear Station, Units 1 and 2)	)	

'84 AUG -6 P1:57

CERTIFICATE OF SERVICE

I hereby certify that copies of "Palmetto Alliance & Carolina Environmental Study Group Proposed Findings of Fact and Conclusions of Law in the Form of a Partial Initial Decision" in the above captioned matter have been served upon the following by deposit in the United States mail this 27th day of July, 1984.

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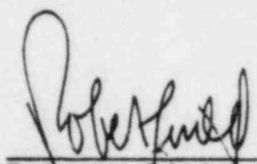

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