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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD 84 SEP 18 P2:54

BEFORE ADMINISTRATIVE JUDGES:
Morton B. Margulies, Chairman
Dr. Frank F. Hoyer
Dr. Robert M. Lazo

In the Matter of
DUKE POWER COMPANY, Et Al.
(Catawba Nuclear Station, Units 1
and 2)

Docket Nos. 50-413-OL
50-414-OL
(ASLBP No. 81-463-06-OL)
(Emergency Planning)
LBP-84-37
September 18, 1984

SUPPLEMENTAL PARTIAL INITIAL
DECISION ON EMERGENCY PLANNING

APPEARANCES

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Robert Guild for Intervenor, Palmetto Alliance.

Jesse L. Riley, Phillip L. Rutledge and Betsy M. Levitas for Intervenor, Carolina Environmental Study Group.

Henry J. McGurren and George E. Johnson for the Nuclear Regulatory Commission Staff.

Richard P. Wilson for the State of South Carolina.

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I. SCOPE OF DECISION

This is a contested operating license proceeding within the meaning of 10 CFR 2.4(n). In this partial initial decision we consider the emergency planning issues in the application of joint owners Duke Power Company (Duke or the Company), North Carolina Electric Municipal Power Agency Number 1, North Carolina Electric Membership Corporation and Saluda River Electric Cooperative (the Applicants) for operating licenses for Units 1 and 2 of the Catawba Nuclear Station (Catawba). Duke has exclusive responsibility for the design, construction and operation of Catawba.

The Catawba facility consists of two pressurized water nuclear reactors designed to operate at core power levels of up to 3411 thermal megawatts with a net electrical output of 1145 megawatts per unit. It is located on Applicants' site in York County, South Carolina, 6 miles north northwest of Rock Hill, South Carolina. The facility is in the north central part of the state and a 10 mile radius drawn from it takes in parts of Gaston and Mecklenburg Counties, North Carolina.

There were ten contentions litigated in the proceeding challenging various aspects of the off-site emergency plans for Catawba. In this Supplemental Partial Initial Decision, we rule on the adequacy of emergency planning for the facility. We find, based on the weight of the evidence, that the emergency plans for Catawba, meet the requirements of the applicable law and regulations except to the extent indicated.

II. PROCEDURAL BACKGROUND

This Board came into being on February 27, 1984, to preside over all emergency planning issues, in the captioned proceeding for an operating license.

This action came about as the result of a motion before the original Board, by Applicants supported by Nuclear Regulatory Commission Staff (Staff) and opposed by Intervenor, Palmetto Alliance and Carolina Environmental Study Group (CESG) to split the proceeding along safety and emergency planning issues. By an unpublished memorandum and order of February 21, 1984, the presiding Board concluded the procedure would prevent significant unnecessary delay and be consistent with a fair and thorough hearing process. It recommended instituting the bifurcated process to the Chief Administrative Judge, Atomic Safety and Licensing Board Panel, who followed the recommendation with our establishment on February 27, 1984.

The original Board issued a Partial Initial Decision in this proceeding on June 22, 1984. Duke Power Company, et al. (Catawba Nuclear Station, Units 1 and 2), LBP-84-24, 19 NRC ____ (June 22, 1984). It covers the safety issues and contains a relevant procedural history. The Board ruled on the safety contentions for the most part in Applicants' favor. Some matters were decided conditionally and it has retained jurisdiction to hear an additional safety matter.

By orders of August 17, 1983, and September 19, 1983, the original Board had ruled upon and admitted ten emergency planning contentions sponsored jointly by the Intervenor. These became the subject of the

adjudicatory proceeding held by this Board. Hearings were held on May 1-4 and May 7-11 at Rock Hill, South Carolina, May 23-25 at Charlotte, North Carolina and June 5-8, 1984 at Rock Hill, South Carolina. Limited appearance statements were taken at evening sessions at Rock Hill and Charlotte.

Testimony was taken from 49 witnesses, who were presented by all of the parties. Attached as Appendix A is a witness list. A total of 86 documents were identified, of which 72 were admitted into evidence.¹ Attached as Appendix B is a list of documents that were identified and admitted. The record was closed on June 8, 1984 (Tr. 4622), with the exception of the Board's future ruling to be made on Intervenors' proposed Contention 20, which was submitted on May 30, 1984. We ruled on July 11, 1984 to reject the proposed contention and closed the record for all purposes as of that date.

¹ The exhibits admitted during the emergency planning phase of this proceeding are numbered separately from those admitted during the previous safety phase, and are designated as "Ex. EP-1" etc. The transcript pages have also been numbered anew beginning with the appointment of the emergency planning Licensing Board. All transcript references are to the emergency planning hearing sessions unless otherwise indicated.

The format for citations to the emergency planning record is as follows: transcript citations include the page numbers, the speaker and the date, i.e., (Tr. 161, Carter 5/1/84); and citations to the prefiled testimony include the exhibit number, the name of the person or persons sponsoring the testimony, and the page number, i.e., (App. Ex. EP-7, Pugh, p. 1). Citations to the record of the safety phase of the hearing will be designated "S. Tr.

_____."

Applicants' proposed findings of fact and conclusions of law were submitted on July 9, 1984. Intervenor's were filed on July 27, 1984 following the grant of an extension of time, and Staff on August 8, 1984. A response was submitted by Applicants on August 20, 1984.

It should be noted that all of the proposed findings of fact and conclusions of law submitted by the parties have been considered and those not incorporated directly or inferentially in this partial initial decision are rejected as unsupported in fact or law or are unnecessary to the rendering of this decision.

III. REGULATORY REQUIREMENTS

The regulatory scheme for emergency planning issues was outlined as follows (with footnotes omitted in part) by the Appeal Board in Cincinnati Gas & Electric Co. (Wm. H. Zimmer Nuclear Power Station, Unit No. 1), ALAB-727, 17 NRC 760, 764 (1983).

Under Commission regulations, no operating license for a nuclear power reactor can issue unless the NRC finds that there is reasonable assurance that adequate protective measures both on and off the facility site can and will be taken in the event of a radiological emergency. 10 CFR 50.47(a)(1). With regard to the adequacy of off-site emergency measures, the NRC must "base its finding on a review of the Federal Emergency Management Agency (FEMA) findings and determinations as to whether there is reasonable assurance that they can be implemented." 10 CFR 50.47(a)(2). ^{3/}

- ^{3/} Section 50.47(a)(2) reads in full as follows:
(2) The NRC will base its finding on a review of the Federal Emergency Management Agency (FEMA) findings and determinations as to whether State and local emergency plans are adequate and whether there is reasonable assurance that they can be implemented, and on the NRC assessment as to whether the applicant's on-site emergency plans are adequate and whether there is reasonable assurance that they

can be implemented. A FEMA finding will primarily be based on a review of the plans. Any other information already available to FEMA may be considered in assessing whether there is reasonable assurance that the plans can be implemented. In any NRC licensing proceeding, FEMA finding will constitute a rebuttable presumption on questions of adequacy and implementation capability. Emergency preparedness exercises (required by paragraph (b)(14) of this section and Appendix E, Section F of this part) are part of the operational inspection process and are not required for any initial licensing decision.

Central to the development of off-site emergency response plans is the concept of emergency planning zones (EPZ). The regulatory scheme contemplates the establishment, for planning purposes, of two such zones: a plume exposure pathway (plume) EPZ, a more or less circular area extending approximately ten miles from the plant, and an ingestion exposure pathway with a fifty mile radius. The plume EPZ is concerned principally with the avoidance in the event of a nuclear facility accident of possible (1) whole body external exposure to gamma radiation from the plume and from deposited materials and (2) inhalation exposure from the passing radioactive plume. The duration of those exposures could vary in length from hours to days. The ingestion EPZ is established primarily for the purpose of avoiding exposures traceable to contaminated water or foods (such as milk or fresh vegetables), a potential exposure source that could vary in duration from hours to months.

Off-site emergency response plans must meet the 16 standards set forth in 10 CFR 50.47(b). In addition to the criteria contained in 50.47, Appendix E to Part 50 sets forth in greater detail certain information which Applicants' emergency plans must contain.

Guidance as to how these regulatory standards can be satisfied is provided by an NRC regulatory guide, 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).² These criteria are intended for use in drafting and reviewing emergency plans. Reviewers of emergency plans may determine that measures other than those the criteria recommend are adequate to bring the plans into conformity with the standards in 50.47(b). See Pacific Gas and Electric Co. (Diablo Canyon, Units 1 and 2), ALAB-644, 13 NRC 903, 937 (1981). NUREG-0654 is entitled to "considerable weight" by NRC licensing boards when evaluating emergency plans.³

The finding a board must make on emergency planning is necessarily a predictive finding. Emergency planning is an ongoing process and should continue through the life of a plant. Thus the NRC does not require that all aspects of the plans be complete before a final licensing decision is reached. See Detroit Edison Co., et al. (Enrico Fermi Atomic Power Plant, Unit 2), ALAB-730, 17 NRC 1057, 1066 (1983).

² This document was written by a joint committee of staff from the Commission and the Federal Emergency Management Agency (FEMA). It is cited hereafter as NUREG-0654. This Board has taken official notice of NUREG-0654 (Tr. 4615-17, Margulies 6/8/84).

³ NUREG-0654 was specifically considered in the rulemaking proceeding in which current emergency planning regulations were developed, and the language of the regulations restates the standards set forth in NUREG-0654. The regulations require that emergency response plans must meet the standards addressed in NUREG-0654. See 10 CFR §50.47(b) and footnote 1 thereto and 10 CFR Paragraph IV, Appendix E to Part 50 and footnote 4 thereto. This NUREG has therefore been held to carry "considerable weight." Public Service Co. of New Hampshire, et al. (Seabrook Station, Units 1 and 2), LBP-83-32A, 17 NRC 1170, 1177, n.5 (1983). See also Duke Power Company v. NRC, No. 80-2253, slip op. at 1 (D.C. Cir. Sept. 29, 1981).

Furthermore, boards do not need to inquire into the details of implementing procedures. Louisiana Power & Light Co. (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 NRC 1076, 1103-04, 1106-07 (1983). On the basis of the record before us, we need find only reasonable assurance that adequate measures can and will be taken.

The Commission's regulations do not require that extreme or unreasonable emergency planning measures be taken. See Southern California Edison Co., et al. (San Onofre Nuclear Generating Station, Units 2 and 3), CLI-83-10, 17 NRC 528 (1983). The planning standards of 10 CFR 50.47(b) and NUREG-0654 provide a reasonable planning basis rather than absolute planning requirements. This Board does not have to find that all individuals are covered by the plans under all circumstances. The Commission explained in San Onofre:

It was never the intent of the regulation to require directly or indirectly that state and local governments adopt extraordinary measures, such as construction of additional hospitals or recruitment of substantial additional medical personnel, just to deal with nuclear plant accidents. The emphasis is on prudent risk reduction measures. The regulation does not require dedication of resources to handle every possible accident that can be imagined. The concept of the regulation is that there should be core planning with sufficient planning flexibility to develop a reasonable ad hoc response to those very serious low probability accidents which could affect the general public [17 NRC at 533].

Therefore, in reaching our decision on the Intervenors' contentions, we have applied the basic test of whether or not the Applicants' emergency plans take the necessary "prudent risk reduction measures."

The Commission gives great weight to FEMA's views on the need for and adequacy of specific off-site protective planning measures. San Onofre, CLI-83-10 at 533.

We are a body of limited authority with a responsibility to determine if the emergency response planning is in conformity with regulatory standards. Although we recognize Intervenors' "desire that the level of emergency preparedness for those residing near the Catawba Nuclear Station be enhanced to the maximum extent possible", our function is not to require that measures be taken which exceed the Commission's requirements. The agency is charged with establishing standards that are adequate to preserve the public's health and safety. We accept that the Commission's laws, rules and regulations establish requirements that will accomplish the intended purpose. Our role is not to substitute other standards for those set by the Commission, which are binding upon us.

In apparent recognition of the complexities of the Commission's emergency planning requirements and the limited control that applicants exercise over off-site emergency planning, 10 CFR 50.47(c)(1) provides that a failure to meet the standards set forth in 10 CFR 50.47(b) will not necessarily result in the denial of an operating license. Rather, the Applicant will be given "an opportunity to demonstrate to the satisfaction of the Commission" that deficiencies in the plan "are not significant for the plant in question," that "adequate interim compensating actions" have been or will be taken, or that there are "other compelling reasons" to permit plant operation.

IV. FINDINGS OF FACT

A. Intervenors' Emergency Planning Contentions
1 and 7 - Public Information and Education

These contentions have been treated together throughout the proceeding and the practice will be followed here.

1. Intervenors' Emergency Planning Contention 1 (EPC 1) reads as follows:

Public information provided by Applicants and state and local officials is not adequate to ensure appropriate responses to notification procedures.

The principal source of information is Applicants' 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 eva-

cuation, 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 route. 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 likelihood. 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.

2. EPC 7 provides as follows:

The Applicants' emergency plans and public brochure and the plans of 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 10 CFR 50.47(a)(1).

The regulations governing public education and information efforts as part of emergency planning are set forth at 10 CFR 50.47(b)(7) and Part 50, Appendix E IV.D.2.

10 CFR 50.47(b) provides that on-site and off-site emergency plans must meet certain standards, including:

(7) 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.

Part 50, Appendix E IV.D.2 provides that an Applicants' emergency plans should contain information needed to demonstrate compliance with various elements, including, as to notification procedures:

Provisions shall be described for yearly dissemination to the public within the plume exposure 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 be helpful if an accident occurs.

3. Guidance as to how these regulatory standards can be satisfied is provided in NUREG-0654, Section II.G. Paragraph 1. provides:

Each organization shall provide a coordinated periodic (at least annually) dissemination of information to the public regarding how they will be notified and what their actions should be in an emergency. This information shall include, but not necessarily be limited to:

- a. educational information on radiation;
- b. contact for additional information;
- c. protective measures, e.g., evacuation routes and relocation centers, sheltering, respiratory protection, radioprotective drugs; and
- d. special needs of the handicapped.

Means for accomplishing this dissemination may include, but are not necessarily limited to: information in the telephone book; periodic information in utility bills; posting in public areas; and publications distributed on an annual basis.

4. The thrust of Intervenors' position on the contentions is 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. It levels specific criticisms at the design and content of Applicants' emergency plan brochure. They believe that whatever useful information is contained in the brochure is undermined by the public relations efforts conducted by Duke and directed at the Catawba EPZ population. Intervenors' claim state and local authorities have failed to demonstrate effective implementation of the commitments made in their own emergency plans and fail to share in the coordinated responsibi-

lities for effective public information.

5. More particularly as to Contention 7, Intervenors contend that the efforts of Applicants and state and local authorities, including the brochure fail to adequately address the subject of in-place sheltering such that inadequate protective action would result if sheltering were the advised response. It is alleged there has been a failure to provide clear, concise and adequate instructions on the subject for the public to adequately protect themselves.

6. Central to the Contentions is the 1984 emergency plan brochure for Catawba (App. Ex. EP-5), which was prepared by Duke. The brochure is 14 pages in length and has a tabular index with headings: How a Nuclear Plant Works; About Radiation; Definitions; Emergency and You; Evacuation Procedures; and Protective Action Zones and Maps. Distribution was to all plume EPZ households in January 1984. An updated version will be distributed in September 1984 which will reflect comments of state and local officials.⁴ Annual revisions will be made to improve upon it.

7. The 1984 brochure replaced a 1983 version (App. Ex. EP-8), on which Contentions 1 and 7 were based. Applicants responded to the criticisms in the contentions by specifying in the revised 1984

⁴ By letter dated September 7, 1984, Applicants advised that because of a delay in preparation the next edition of the brochure is expected to be distributed in November 1984, rather than in September.

brochure: how young "very young" is; by setting forth procedures that will be taken when there are "ingestion dangers from contaminated food or water"; by noting that in evacuations there should be registering at shelters before "choosing to stay with friends or relatives"; by adding information about the services of insurance companies being available at shelters and that shelters would have facilities for decontamination of evacuees and their vehicles; and by omitting from the brochure the statement that in an emergency people "would be given plenty of time to take necessary action." We find these areas in which objection was raised are no longer matters of contention and will not be considered further.

8. FEMA has reviewed Duke's 1984 brochure and has found it complies with all five evaluation criteria of the NUREG-0654 emergency planning standard applicable to public information (Staff Ex. EP-2, Heard and Hawkins, p. 7; Tr. 1519, Heard 5/9/84).⁵

9. The 1984 brochure was further changed from that preceding it in response to Intervenor's allegation in Contention 1 that the 1983

⁵ FEMA issued an Interim Findings Report on the adequacy of radiological emergency response preparedness for Catawba on April 17, 1984. The Interim Findings Report, Staff Ex. EP-3, and its conclusions are referred to throughout the findings. On July 27, 1984, following the close of the record, FEMA in a letter to the NRC, confirmed its prior findings as to the adequacy of State and local emergency plans for off-site preparedness for Catawba. The letter was prepared after inquiries about the plans were made by FEMA to the States of North and South Carolina and their responses were received. The Interim Findings referred to in these findings remain unchanged.

brochure "assumes all recipients can read, and at a certain level of comprehension." Duke revised the earlier version of the brochure to reduce complexity and verbosity. Narrative portions of the current brochure are written on an eleventh grade level, while instructional sequences are written on a seventh grade reading level (App. Ex. EP-7, Duckworth, pp. 14-15, Tr. 444-446, 450, Duckworth 5/2/84). It is stated on page 1 of the brochure, "If you know someone who is blind or does not read well read this information to them. Talk to them about what to do in an emergency."

10. Duke's reading specialist Dr. Susanna V. Duckworth testified that in her opinion, the 1984 brochure effectively communicates how the public would be notified of a radiological accident at Catawba and what actions the public should take in such an emergency (Id., Tr. 450-451). She is an expert in the area and we find her testimony convincing.

11. Intervenors contend the required information in the brochure is obscured by secondary information thereby assuring the reader of the plant's safety and Duke's goodwill. To substantiate their position they presented the testimony of Arlene Bowers Andrews, a doctoral candidate in Clinical-Community Psychology at the University of South Carolina and Ruth Wanzer Pittard, the Director of Audio Visual Services at Davidson College.

12. Ms. Andrews' critique of the brochure is "As presently designed (it) does not provide the clarity and direction needed by individuals in a state of anxiety and potential psychological crises" (Int. Ex. EP-38, p. 4). In her opinion the brochure fails to adequately promote

effective emergency response by individuals because information regarding what to do is "embedded in lengthy text about the power plant and radiation" (Id. at pp. 4-5). Ms. Andrews further testified she was not familiar with Commission regulations and guidance on emergency planning (Tr. 1759, Andrews 5/10/84); and was unaware of whether Duke's brochure complied with such requirements (Id. at 1760).

13. Ms. Pittard found the required message specified in NUREG-0654 to be obscured by the "design theme" of the brochure. The design theme involves factors such as the location of the message within the text, repetitiveness of the message, use of illustrations to enforce the message, boldness of print, use of colors, placement of the message, the language made and volume of the material to be read (Int. Ex. EP-38 at 7). She acknowledged that the brochure repeats at least 8 times that the public should listen to the EBS broadcasts in the event of an emergency (Tr. 1735-42, Pittard 5/10/84). The witness admitted that Duke's brochure minimally complies with the requirements of NUREG-0654 but objects that the required message is not presented effectively (Id. at 1731).

14. We agree with the Licensing Board in Consumers Power Company (Big Rock Point Plant) LBP-82-60, 16 NRC 540, 544 (1982) that the purpose of the emergency planning brochure is to provide information to the readers that they are to respond to audible alarm systems and to be sufficiently knowledgeable to understand the importance of responding. In order to do that the brochure must be clear, concise and well organized. See also: Louisiana Power & Light Company (Waterford Steam

Electric Station, Unit 3) LBP-83-27, 17 NRC 949 (1983). We find the 1984 Catawba brochure meets these requirements.

15. We agree with Dr. Duckworth, the reading specialist that the 1984 emergency planning brochure effectively communicates the information required by the regulations. Even Intervenor's expert Ms. Pittard agrees that the requirements of NUREG-0654 are met. No one would deny the brochure cannot be enhanced but in its present form it meets the regulatory requirements as found by FEMA.

16. The testimony of Ms. Andrews is insufficient to upset that conclusion. The brochure has its first 6 pages devoted to general information with the last 8 pages given to emergency response information. Tabular indexing identifies the various sections. What minor spillover there is in the various kinds of information is not sufficient to render the brochure inadequate under the regulations and evaluation criteria. The message still comes across effectively. The brochure must be directed to normally functioning individuals. In that it is always available to the public the opportunity is there to read it in other than an emergency situation when crisis is not a factor. The emergency response information is readily available to a reader even in a crisis situation because of the way it is segregated and identified.

17. There is no convincing evidence of record that Applicants have prepared the brochure in such a manner so as to obfuscate or defeat the effective transmission of the message required by the regulations. Emergency planning is an ongoing process which is fully recognized by all of the parties. Although the brochure meets the regulatory

requirements that is not to say it cannot be improved. That is a reason why the brochure is to be revised annually. No one is precluded from offering recommendations for its improvement and they have been accepted in the past.

18. Specific criticism of Intervenor's of the content of the brochure includes the claim that the brochure fails to cite "a significant body of scientific evidence that indicates health effects at very low levels of radiation" and that people with compelling reasons to stay such as farmers 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 unlikely.

19. Basic elements of the charge are unsupported in this record. The uncontroverted testimony is that there is no significant body of scientific evidence that indicates health effects at very low levels of radiation (App. Ex. EP-7, Birch, p. 7). There is no evidence of record that people such as farmers have been told repeatedly in the past that radiation is not particularly harmful. There is no basis for the criticism in this record or evidence that a material problem exists that must be rectified.

20. Applicants' response in part to the above criticism is that the brochure clearly indicates that radiation is harmful. It relies upon 3 of its aspects. The first is the statement contained at page 4 of the brochure, "Exposure to high levels of radiation causes health effects." The others are that the brochure gives instructions as to what to do in

an emergency and that it does not attempt to discount the possibility of an emergency at Catawba (App. Ex. EP-5, pp. 4, 9).

21. Of the 3 we cannot accept Applicants' claim that the statement "Exposures to high levels of radiation causes health effects" makes very clear to those to whom the brochure is directed that radiation is harmful. Although it may be so to those familiar with health physics that the term health effects means that radiation is harmful, i.e., Intervenor employed the very term in Contention 1 to that end, at best to the lay individual it is obtuse. The language used should state directly that high levels of radiation are harmful to health and may be life threatening. Also it would better serve the reader of the brochure for it to at least contain such a statement within that section of the brochure that deals with action to be taken in the event of an emergency.

22. Intervenor alleges that the Duke brochure "does not indicate that there is danger in accumulated radiation dosage"; that it does not contain a chart indicating "over exposure during non-routine releases or accident" to put into perspective the possible dose received before or during an evacuation; and that it does not give adequate information on protection from beta and gamma rays. On the one hand Intervenor takes the position the brochure is overly voluminous to be effective and on the other they want to add to it. We find the brochure through the protective action it instructs be taken inherently addresses the matters sought to be covered. We agree with FEMA's findings that nothing more

is required. Intervenors have not established the need to specifically add such additional information to the brochure.

23. Intervenors allege that the brochure contains no information "concerning the existence of a 'plume exposure pathway,' which would influence a citizen's choice of escape route," and that "it is important for citizens to be aware of this phenomenon beforehand." In paragraph 107 at page 69 of their brief Intervenors cite with approval a description of the plume transport phenomenon in Big Rock Point Plant, LBP-82-60 supra. The equivalent is contained in the 1984 brochure at page 9, where it is stated, "The areas affected [within 10 miles] would depend on such things as wind speed and wind direction. It would also depend on how serious the accident is." Intervenors' criticism is without merit.

24. Other specific criticism leveled at the 1984 brochure is contained in Contention 7. It alleges the information presented is inadequate because it does not address preparations for effective sheltering or the actions that should be taken when one is advised to seek shelter. We agree with FEMA that NUREG-0654 does not require that any "pre-planned preparations" for effective sheltering be addressed in emergency plans (Staff Ex. EP-2, Heard and Hawkins, p. 14). We find no regulatory requirement for that which Intervenors seek.

25. The brochure contains 6 steps that should be followed when one is advised to be sheltered. Intervenors find them inadequate. It notes, for example, the instructions call for the placement of a "damp

cloth over your nose and mouth", whereas there are more effective measures that can be taken.

26. We find that the brochure addresses the subject of sheltering adequately and meets applicable regulations. The steps listed are in conformity with Environmental Protection action guides. They are in accord with NRC standards as found by FEMA (Id.). The instructions provide the reader with the necessary basic information on what to do when sheltering is called for. That more detailed and informative information can be provided is unquestionable. The information contained in the brochure represents a reasonable approach in getting the required message to the public. That there may be other methods does not render that employed as inadequate.

27. Duke had prepared and distributed a Catawba emergency plan brochure designed especially for school children (App. Ex. EP-6). It is directed to familiarizing students, their parents and teachers with their respective roles in the event of a radiological emergency at the facility. There is no regulatory requirement for such brochure. Intervenors are critical of the brochure in the same manner they were of the brochure for general distribution, i.e., not accomplishing stated purposes and suffering from design and content problems. We find the brochure to provide valuable information to a segment of the plume EPZ populace with special concerns. It makes a positive contribution to emergency planning. As with the other brochure it is capable of being improved upon. A local high school teacher, Ms. Brenda Best testified that although the brochure states that the students' teachers and

principals had been taught what to do, she had not been effectively educated in that regard (Tr. 4565-66, Best 6/8/84). We expect that the brochure plans will be implemented and the education will be provided in the near term.

28. Intervenors further contend the public information provided to transients is inadequate. Applicants have posted signs at Lake Wiley, where recreational boating is popular. The signs read that "[I]n the event of an emergency requiring evacuation of the lake you will be notified by sirens and red smoke or flares. If these signals are observed, please (1) Leave the lake immediately; (2) Turn on radio or television for information and instructions." Decals, 3" x 5" in size are being distributed to public facilities that were unspecified. They contain the message, "You are in an area covered by an emergency warning system. If you hear a steady three minutes siren, tune a radio to an Emergency Broadcast System station and follow the broadcast instructions (App. Ex. EP-9, Tr. 269-72, Carter 5/2/84). Intervenors' criticism is that there is no evidence that the information is being disseminated to transients at places where they usually are, including the Carowinds theme amusement park and the Heritage U.S.A. religious retreat. They are locations where there are large numbers of transients.

29. The posting of signs and decals is required by Evaluation Criteria II.G.2 of NUREG-0654, which provides:

2. 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. The programs should include provision for written

material that is likely to be available in a residence during an emergency. Updated information shall be disseminated at least annually. 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.

30. Although we agree with the North and South Carolina emergency planning officials that the more general wording of the warning signs and the decals enhanced their effectiveness by broadening their applicability to all hazards (Tr. 276-78, 526-28, Pugh and Lunsford 5/2/84, 5/3/84), they are sufficiently cryptic that the importance of the message is defeated and lost. The signs and decals should specify the emergencies covered, to at least include nuclear.

31. The messages contained on the signs and decals do not conform to NUREG-0654 Evaluation Criteria II.G.2 for providing information to transients. The last sentence of the guide provides that the notices should refer the transient to (1) the telephone directory or (2) to a comparable other source of local emergency information, and also (3) should guide the visitor to appropriate radio and television frequencies. Applicants' messages eliminate steps (1) and (2) and only provide for step (3). There is good reason for steps (1) and (2). The health and safety of a transient is of no less importance than that of a resident and they should be treated equally, within reason. Transients too should have the opportunity to become aware of how to cope in a

nuclear emergency before the event occurs. Further, it cannot be expected that the overwhelming number of transients will have accessibility to radios and television receivers at the time an emergency occurs. Information as to how they are to react in an emergency should be made available to them before any event. Evaluation Criteria II.G.2 provides the methods as to how this should be done. Applicants have the option of making such information available in the telephone directory or other source of local emergency information. The signs and decals should state the method being used and if it is (2), where the information is available. If Applicants choose not to make the information available in the telephone directory the comparable source should be similarly accessible to the transients.

32. We require the foregoing changes to be made in the signs and decals and that emergency response information be made available to transients in the manner indicated. There shall be reflected in Applicants' emergency plans the kinds of locations within the plume exposure EPZ where the signs and decals and emergency response information will be placed and the procedures employed to assure that sufficient numbers are being distributed to effectively reach the transients. Applicants shall promptly implement the foregoing and make the appropriate distribution.

33. Intervenors urge that the overall impact of Duke's public information program for the facility is to falsely reassure the public regarding the hazard in a potential nuclear accident and, therefore, lulls the public into a false sense of security and reduces the

likelihood of effective response in the event of an actual accident. They rely in large measure on an internal Duke memorandum authored by Duke's General Manager for Community Relations, entitled "Catawba Information Programs." The memorandum reports on Duke's public acceptance efforts, which focus on issues admitted in some form as contentions. It states that media efforts are "designed to humanize the plant." A number of its community programs were reported to have focused on the emergency planning zone for Catawba. Examples of activities included, "We let people know the sirens were going in and what their purpose was." Emergency planning matters, presented at 13 meetings, were handled by Duke staff with presentations made by county and state emergency planning personnel. Various public relations activities were also reported upon. The memorandum stated that opinion researching in the facility emergency planning zone "confirmed the success of our Catawba information programs" (Int. Ex. EP-7, p. 5). In further support of their position Intervenor's rely on a statement made in a brochure, by Michael E. Bolch, the Emergency preparedness Coordinator for the Catawba Nuclear Station that "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." Intervenor's assert Applicants' unduly emphasize Duke being a good neighbor rather than providing effectively communicated information on emergency preparedness.

34. Marvin Chernoff, a subpoenaed witness of Intervenor's, who was responsible for Duke's opinion research found that Catawba EPZ residents

are less concerned about radiation effects and the possibility of a radiological accident than the general population as a whole. He felt the residents are "comfortable with the information in support of Duke" (Tr. 4304-05, Chernoff 6/7/84).

35. Rather than accepting Intervenors' interpretation that the residents have been "lulled into a sense of false security" by Duke, Applicants position is that the Catawba EPZ residents have sufficient information to be reassured that if there were an accident, the officials involved know what they're doing about helping to protect the people (Tr. 4521, Turnipseed 6/8/84).

36. We see nothing nefarious in Applicants' seeking to find acceptance with the affected populace through public information programs which relied heavily on public relations but also have an edifying content. It would be rather unusual to expect Duke to want to exist in a community where there was acrimony and hostility rather than accord and harmony. Fully accepting Mr. Chernoff's public opinion findings, we have no reason to conclude that Applicants' through design or otherwise undertook a program to destabilize and undermine the public information and education plan required to be provided to the public by Commission regulation. We find on the evidence of record, the required information and education plan, except to the extent noted, has been made available to the public in accordance with the applicable law. We find no support for the claim that the public has been lulled into a false sense of security which has reduced the likelihood of an effective response in the event of an actual accident. Intervenors' allegations

are belied by Applicants' continuing effort to improve its program, including making revisions, in response to Intervenor's criticisms. Intervenor's citing Applicants' Emergency Planning Coordinator that a nuclear accident is possible and that there is an extensive emergency plan for the plant is not consistent with the argument that emergency planning and education is being denigrated but to the contrary indicates its significance.

37. Intervenor's criticize North Carolina for not utilizing the means called for in its plan for getting out required educational information. There are nine methods provided, ranging from the Catawba Nuclear Station Emergency Brochure to programs presented to civic organizations. The plan provides that the means used "May include, but not necessarily be limited" to the nine specified (IV.D.2). The plan further provides, "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" (Id.).

38. We find as FEMA did, North Carolina is following the requirements of its plan. Under the plan it need not follow any number of the means listed. It has opted to use the Catawba brochure as its principal medium. North Carolina has input in its content so that it is a collaborative effort. As we have found, except for transients, the brochure provides the required educational information under the regulations.

39. The State of North Carolina uses other methods for providing education and information to the public. It prepared and distributes an all-hazards brochure entitled "Disaster and What To Do To Protect Yourself," which has a segment on nuclear power plant emergencies (App. Ex. EP-12). The Division of Emergency Preparedness participates in various educational programs presented to civic organizations and interested groups. There are radio and television interviews of state emergency planning officials (Tr. 293, 295-6, Pugh 5/2/84). Emergency planning is an ongoing process, which the State of North Carolina recognizes. It is in the process of hiring a full time public information officer, who will expand public information efforts (App. Ex. EP-7, Pugh, p. 6; Tr. 532 Pugh 5/3/84). We find the North Carolina plans for providing information and education on emergency planning satisfactory and that they are being fulfilled adequately.

40. Intervenors find the South Carolina plans adequate but complain there is no evidence of real effort at implementation. Like North Carolina we find South Carolina meets the regulatory requirements. It too relies primarily on the brochure which is permissible. For farmers they distribute a brochure, that contains information on protective action that should be taken for livestock and agricultural commodities in the event of a radiological release (App. Ex. EP-10). A FEMA booklet, "In time of Emergency; A Citizen's Handbook on Nuclear Attacks and National Disasters" (App. Ex. EP-11) is distributed to the counties (Tr. 316-17, McSwain 5/2/84). Planning officials participate in annual press briefings to provide information on emergency planning

exercises (Tr. 4514-16, Turnipseed 6/8/84). State officials have attended public meetings sponsored by Duke, previously referred to. The Chief Area Coordinator of the Emergency Preparedness Division and the Public Information Officer for the Division of Public Safety in the South Carolina Governor's Office each agree that not enough has been done and that it requires a continuing effort (App. Ex. EP-7, Lunsford, p. 16; Tr. 223-24, Lunsford 5/1/84; Tr. 4530-31, Turnipseed 6/8/84). There is no reason to doubt that the State of South Carolina will not continue in its efforts to continually improve implementation of its plans.

41. We likewise find, as FEMA found that public information and efforts at the county level fulfill the regulatory requirements. The counties also rely heavily on the brochure, which is acceptable. Their planning officials speak to interested groups. They publicize planning efforts on radiological response in local newspapers. They respond to requests by the public for information (App. Ex. EP-7, Phillips pp. 5, 7; Broome, pp. 7-8; Thomas, p. 6). The efforts are commensurate with the local government responsibilities. There is no requirement that they each formulate and implement a wholly separate and independent program.

42. Philip Layne Rutledge, who has assisted CESG in other licensing proceedings and is informed in the area of emergency planning, was permitted to testify regarding recommendations for improving Catawba emergency planning (Int. Ex. EP-38, pg. titled Recommendations, Tr. 1788 Rutledge 5/10/84). His first recommendation is that a public committee

be established to perform most of the public information functions now performed largely by Duke. His second recommendation is that the funds Duke spends on public education planning be placed in a "community chest", the use of which would be determined by a public committee. The Commission's regulations place responsibility on Applicants for emergency plans. See Part 50, Appendix E IV.D.2. There is no basis legal or otherwise to place authority in public bodies to carry out emergency planning activities and use Applicants' funds to do it, where Applicants have the responsibilities regarding those functions. The recommendations if implemented would result in a violation of fundamental rights and are without merit.

43. As to the third recommendation, Mr. Rutledge is concerned that the brochure might be misplaced or lost and suggests that a better medium would be a poster that could be hung in a permanent location where it can always be found. The record fails to indicate that possible misplacement or loss of the brochure will present a problem. There is no reason given why the brochure cannot be kept in a permanent location. The question of whether the necessary message would fit on a poster was not addressed. We find no basis to support the recommendation.

44. The fourth recommendation is that there is a clear need to strengthen the involvement of educational groups, civic groups and the media in disseminating information. An example given is to have the media repeat pertinent public service announcements. We have found that existing public information and educational efforts meet regulatory

standards. Our function is not to review measures that might be taken which exceed the Commission's standards. It is up to Applicants and state and local governments to decide in what way they might enhance the current program. They are free on a voluntary basis to incorporate into the program whatever they may wish from the recommendation.

45. The last recommendation is that emergency plans should be reviewed and updated annually using results of surveys performed by an independent research firm responsible to a public body. The action that Mr. Rutledge recommends as to using surveys in the manner described to update the program is beyond the requirements of NRC regulations. Again it is not our function to review such measures. Applicants, state and local governments can on a voluntary basis decide on whether to employ survey information to revise existing programs, which we have found meet regulatory standards.

46. Except to the extent found in paragraphs 21, 30, 31 and 32 we find the Catawba off-site emergency planning for public information and education is in conformity with regulatory requirements and Intervenors' Contentions 1 and 7 are without merit.

B. Intervenors' Emergency Planning Contention 3 -- Adequacy of Food, Clothing, Bedding and Shelters

1. EPC 3 reads as follows:

The Emergency plans do not provide for adequate emergency facilities and equipment to support the emergency response as required by 10 CFR 50.47(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 14 reception centers/shelters are adequate to register and process some 75,000 evacuees. Indeed, the Catawba Nuclear Station Site Specific Plan (Part 4, SCORERP) provides that "all evacuees, both those ordered and those spontaneous, will be processed through their respective reception centers" (p. B-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 proceeding EPZ evacuees at reception centers with limited space and supplies.

2. The contention raises two basic concerns: First, the alleged 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 alleged inadequacy of the plans to provide for reception centers or shelters which can accommodate the registration, monitoring, decontamination and housing of the large numbers of persons who may evacuate upon instructions or spontaneously in the event of an accident at Catawba.⁶

⁶ In raising Contention 3, Intervenors challenge compliance with 10 CFR 50.47(b)(8) which states: "Adequate emergency facilities and equipment to support the emergency response are provided and maintained." The areas deemed by NUREG-0654 to be covered by this
(Footnote Continued)

3. The initial plans had proposed 14 designated reception centers to process evacuees, which the contention raised as an issue. The reception center concept was then abandoned and instead evacuees will be directed immediately to 38 primary shelters. It is estimated that these shelters can accommodate the entire population of the Catawba plume EPZ, from 70,000 to 80,000 people (App. Ex. EP-13, Pugh, p. 9). In addition, over 100 secondary shelters have been identified in the plans as well, which would be called upon if necessary (Id., McSwain, pp. 11-12).

4. Under both the North and South Carolina plans, which address providing food, clothing and bedding to evacuees (App. Ex. EP-13 Pugh, pp. 4-5; Gregory and McSwain, pp. 2-3) the items will not be stored at the shelters on an ongoing basis. The supplies will be called upon as needed from the Red Cross, the Salvation Army and existing stocks controlled by the county, state, and/or federal governments (Id.). The plans are not limited to providing for a specific number of people or a sheltering period of a specific duration (Tr. 688-89, 697, 750-51, Johnson 5/3/84). The plans provide that should the situation develop that more supplies are required, they can be drawn from more distant areas. (Tr. 664, Neves 5/3/84). We find the plans to be

(Footnote Continued)

requirement include, in pertinent part, provision for timely activation and staffing of the facilities and centers described in the plan, and the listing and maintenance of emergency equipment and instruments.

adequate and are convinced there should be sufficient supplies of uncontaminated food, bedding and clothing at the emergency shelters designated for a Catawba emergency.

5. The witnesses testifying on the emergency evacuation and sheltering issues are highly qualified in the areas of providing disaster relief and very credible in their testimony. The Red Cross Disaster Specialist called to testify by the Applicants, Dennis Johnson, was personally involved in the sheltering of 52,000 refugees in a war in Nicaragua. The testimony of the witnesses was supported by specific figures as to the quantities of supplies that could be provided in an emergency situation. There is no reason of record to doubt the accuracy of the quantities involved or that they could be provided.

6. Under the State plans the primary foodstuffs would come from school lunch supplies located at the schools and in warehouses. This would be immediately available. Additional sources can be drawn from the Red Cross, the North Carolina Department of Corrections and commercial warehouses (App. Ex. EP-13, Neves and Pugh, pp. 4-6, Gregory and McSwain, pp. 2-4).

7. The State plans call for bedding to be supplied by the Red Cross. Large supplies of cots and blankets could be supplied immediately. All evacuees may not have a cot on the first day but we agree with the Red Cross that it is not necessary for all evacuees to have a cot immediately for the plan to be viable and adequate (Id., Johnson, pp. 7-8).

8. The Salvation Army, under the State plans will provide clothing to those persons who have become contaminated. The Salvation Army can clothe up to 75,000 people in 48 hours (Id., Needham, p. 3).

9. The arrangements already made for food, bedding and clothing will reasonably satisfy the needs of the 70,000 to 80,000 people that may be evacuated. We are convinced based on the experience and expertise of the witnesses in disaster relief that should additional supplies be needed they can be promptly located and made available (Tr. 750-51, Johnson 5/3/84; App. Ex. EP-13, Pugh and Neves, p. 8; Gregory, pp. 6- 8).

10. We find as did FEMA that the 38 primary relocation centers, which are capable of servicing the populace of the plume EPZ and the 100 secondary centers are sufficient to accommodate the number of people expected to seek shelter (Staff Ex. EP-2, Heard and Hawkins, p. 9). Intervenors expressed concern about individuals outside of the planning areas who might evacuate to the shelters even if told not to do so. The Red Cross disaster specialist found the "shadow effect" hypothesis contrary to his experience. In his opinion people in a disaster follow instructions (Tr. 725-27, Johnson 5/3/84). FEMA's experience is that approximately 20 percent of the people who evacuate actually seek shelter at the public facilities (Staff Ex. EP-2, Heard and Hawkins, p. 9). The witness from the Red Cross confirmed this (Tr. 717, Johnson 5/3/84). Even if the "shadow effect" exists, although the record is to the contrary, there are ample sheltering facilities for all

of those who can reasonably be expected to evacuate, including all of those from the plume EPZ.

11. FEMA has reviewed the plans submitted for the Catawba facility and found them to be adequate under NUREG-0654, which requires that the means for registering and monitoring evacuees at shelters be described (Staff Ex. EP-2, Heard and Hawkins, p. 10). The Red Cross in conjunction with the North and South Carolina Departments of Social Services, will have responsibility for administration of the shelters related to Catawba (App. Ex. EP-13, Pugh, p. 10; Gregory and Lunsford, p. 9). We agree that the planning conforms to the regulatory requirements.

12. Responsibility for the operations of the shelters in North and South Carolina will be that of the Red Cross, except in Union County, North Carolina, where the County has the lead role (Tr. 699-701, 728, Johnson 5/3/84). In North and South Carolina state and county officials selected the shelters based on FEMA standards. The Red Cross standards are somewhat more stringent and will be employed for final site selection. As a result of the differing standards shelters in York County were eliminated from the list because of inadequate showers. If any facilities are eliminated, as has occurred, others will be located and added to the list.⁷ The Red Cross review has confirmed the shelter

⁷ Applicants' post hearing listing and maps shows a total of 33 primary shelters and 103 secondary shelters. There are 30 primary (Footnote Continued)

selection in Mecklenburg Counties and the review of all shelters should be completed by the end of the year, if possible (App. Ex. EP-13, Johnson, pp. 12-14; Gregory, p. 13; Tr. 735-36 Johnson 5/3/84).

13. Considering that the shelters already designated meet FEMA standards and that an upgrading is in the process, where needed, to assure that they will meet the Red Cross standard, we are satisfied that adequate facilities will be available to properly shelter any affected populace. Under Fermi, ALAB-730, supra, and Waterford, ALAB-732, supra, the emergency plans need not be complete or fully implemented before we make our finding.

14. Intervenors claim that the planning for employing shelters will not be carried out effectively, is not founded on convincing evidence and is without merit. The few examples given to support Intervenors' allegations are not of material significance. The Red Cross Shelter Coordinator for York County was not made aware of her assigned tasks until the January 1984 revision of the York County plan had been published (Tr. 4463-64, Anderson, June 8, 1984). In carrying out her duties she found the York County shelters did not meet Red Cross guidelines (Id., Tr. 4465-67). The 1984 brochure listed 4 York County shelters as being available for use (App. Ex. EP-5, p. 13). The January 1984 revision of the Mecklenburg County of the North Carolina Plan,

(Footnote Continued)

sites in South Carolina and 3 primary sites in North Carolina (App. Ex. EP-22).

placed in evidence, shows the University of North Carolina, at Charlotte, to have 20,100 designated shelter spaces (App. Ex. EP-1, Part 3, p. 34). The Red Cross had rated the facility as having space for only 5,000 evacuees, when it reviewed the matter 2 years earlier in connection with another matter (Tr. 4474-81, Long, 6/8/84).

15. The planning for the facility is in an early shake down stage. It must be expected that not everything will go perfectly at the start. What has occurred has not established any major flaw and what did happen is correctable and is being corrected. The Red Cross Coordinator for York County is working very effectively. She eliminated from use the facilities that will not meet the higher Red Cross standards. The fact that 4 shelters were listed in the January 1984 brochure that should not have been can be corrected in the September 1984 brochure. Responsible officials will direct away any individuals that might seek out the York County facilities, despite the change in the brochure (Tr. 830-34, Gregory 5/4/84). Despite the incorrect listing of the capacity of the University of North Carolina, at Charlotte, there are enough spaces available for the County's affected population of 7,000. There are more than 20 additional shelters that can be activated in Mecklenburg County, if necessary (Tr. 851-852, Pugh and Broome 5/4/84; Tr. 4482-84, Long and Anderson 6/8/84). The deficiencies that were disclosed were magnified out of proportion to their importance.

16. Staffing and logistical requirements for sheltering have been planned for and should be adequately met. Red Cross shelter

managers will have received Red Cross shelter management training. Shelters will be staffed by a combination of Red Cross, state and volunteer personnel. Training of these individuals is not an important factor because the Red Cross is experienced in utilizing volunteers with little or no experience (App. Ex. EP-13, Johnson, pp. 9-10). Red Cross procedures will be followed for registration. It will require approximately two minutes to register a person and three and one-half for a family of four (Id., 15). There should be adequate staff to register the number of evacuees within required time limits. If additional staff is required to overcome bottlenecks, they will be found and put on the job, i.e., early evacuees can be used to assist in registration and shelter operations (App. Ex. EP-13, Pugh, p. 10). We find the registration of evacuees should not hinder the functioning of shelters.

17. Monitoring and decontamination will be performed at each of the 38 shelters, which will be prior to registration. The procedures have been prepared and are ready for implementation. Trained personnel will be provided by the counties (Tr. 702, Johnson 5/3/84). Supplies necessary for decontamination at the shelters are soap, water and towels, all of which are obtainable. The equipment necessary for monitoring has been identified and will be provided (App. Ex. EP-13, McSwain, p. 10). Sufficient personnel and equipment should be available to assure that evacuees are monitored within 12 hours (Tr. 803-4, Gregory 5/4/84). See findings C.6-10 infra. If there is any

significant build up of evacuees waiting to be monitored they can be sent to another facility (Tr. 703, Johnson 5/3/84).

18. Based on the foregoing findings of fact we conclude that Emergency Planning Contention 3 is without merit. Adequate provision has been made to give us reasonable assurance that sufficient uncontaminated food, clothing, and bedding will be available promptly at shelters in the event of an emergency. The 38 designated primary shelters and 100 secondary shelters should assure that there is adequate sheltering space for all who would call upon it for use. The Staff and equipment at shelters should also prove adequate to complete necessary registration, monitoring and decontamination functions without undue delay.

C. Intervenors' Emergency Planning Contention 6 -- Preventing Contaminated Persons from Entering Non-Contaminated Zones

1. EPC 6 provides as follows:

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:

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 effect will these procedures have on evacuation times and traffic flow?

2. The issues raised by the contention are whether the emergency plans are adequate for preventing contaminated persons from entering a non-contaminated zone, whether adequate personnel and equipment will be available to perform decontamination functions and

whether it can be accomplished without adversely affecting evacuation times and traffic flow. Intervenor's participation on the contention was to rely upon cross-examination. In the proposed findings they remain skeptical on the assurances given in the testimony that the tasks can be accomplished. We arrive at a different conclusion than that of Intervenor's.

3. FEMA witnesses noted that NUREG-0654 has no requirement for off-site plans to contain provisions for preventing contaminated persons from entering non-contaminated zones or that registration at shelters be mandatory (Staff Ex. EP-2, Heard and Hawkins, p. 12). Information is provided to the public through the brochure about the need of going to the shelters, registering and being decontaminated (App. Ex. EP-5, pp. 4, 10). The information will be further provided through EBS messages (App. Ex. EP-14, McSwain, p. 1).

4. The expert opinion of several experienced emergency specialists is that the public will follow procedures for registration at shelters and for preventing contaminated persons from entering a non-contaminated zone (App. Ex. EP-14, Brown and Pugh, pp. 3-4; Broome, p. 2; Thomas, p. 1; App. Ex. EP-13, Johnson pp. 2-3).

5. North and South Carolina emergency plans are designed to assure that evacuees will report to shelters to be monitored for possible contamination. In the event of an evacuation, personnel at

checkpoints would monitor the vehicles and passengers and advise people to go to a shelter for further monitoring and registration (App. Ex. EP-14, Brown and Pugh, pp. 3-4). Procedures to be followed at the shelter will keep contaminated persons from associating with the general population and keep from spreading contamination. Contaminated vehicles will be washed down for decontamination (App. Ex. EP-14, Broome, pp. 1-2; McSwain, p. 2). Once an area has been evacuated, all persons would be monitored when entering and leaving the evacuated area (Tr. 915-16, Brown 5/4/84). The measures to be taken should result in keeping the rational individuals, who may be contaminated, from entering a non-contaminated zone. That is the recognized planning objective. Compare San Onofre, CLI-83-10, supra.

6. The testimony of North and South Carolina emergency planning personnel indicate that there will be a sufficient number of trained personnel and sufficient instrumentation available to screen all contaminated individuals and their possessions at the shelters (App. Ex. EP-14, McSwain, p. 2; Brown and Pugh, pp. 4-5; Tr. 977, Pugh 5/8/84; Tr. 975, McSwain 5/8/84).

7. South Carolina has large stocks of monitoring equipment available to it in addition to that in the counties in and adjacent to the plume EPZ (App. Ex. EP-14, McSwain, pp. 2-3). Additional equipment can be acquired from other states (Tr. 2882-83, Lunsford and Harris 6/5/84). In North Carolina there are stocks of monitoring equipment in Gaston and Mecklenburg Counties. The State Highway Patrol has monitoring equipment in its cars (Tr. 976, Pugh 5/5/84).

8. There is reasonable assurance that the monitoring equipment will be operated by properly trained personnel. Existing numbers of monitors in the involved counties are Mecklenburg, 300 to 350; Gaston County, approximately 110; and York County, about 100 (Tr. 926, Phillips and Broome 5/4/84; Tr. 951, Thomas 5/4/84). Gaston County expects to have a minimum of 12 persons at each shelter to monitor with the capability of increasing the number to 24. There are ongoing training programs for monitors in the states and counties involved (App. Ex. EP-14, Brown and Pugh, pp. 5-6; McSwain, p. 3; Phillips, p. 2; Tr. 987, Pugh 5/4/84). Additional resources could be provided by neighboring counties or states (Tr. 981, Phillips 5/4/84; Tr. 984, McSwain and Brown 5/4/84). See also findings B. 9 and 17.

9. From the testimony of Bob E. Phillips, Director of the Gaston County Emergency Management Agency on May 4, 1984, we are satisfied that Gaston County will provide necessary monitoring in an emergency. Because based on the February 1984 exercise evaluation, FEMA found that more staff trained in monitoring and decontamination procedures is needed for Gaston County (Staff Ex. EP-3, FEMA "Interim Findings" at 12), and the matter was not resolved of record, we direct that Applicants confirm to FEMA and the Staff that this matter has been addressed. The action that we order be taken does not involve a matter of sufficient consequence to the planning that we make it a basis for a licensing condition.

10. Registration at shelters is not expected to affect evacuation times and traffic flow since shelters are located outside the

EPZ (Staff Ex. EP-2, Heard and Hawkins, p. 12). It is not anticipated that procedures for screening individuals, their possessions and their automobiles for possible contamination will have any significant adverse effect on traffic flow or evacuation times (App. Ex. EP-14, Brown and Pugh, pp. 6-7; McSwain, pp. 3-4; Phillips, p. 3). Having people go to shelters to be checked for radioactive contamination and to be decontaminated, if needed, should not have more than minimal impact on evacuation time and traffic flows since the evacuation time study makes the assumption that everyone who is a willing evacuee goes to a shelter (Id., Glover, p. 2).

11. After review of all of the evidence we conclude that Intervenor's EP-6 is without merit. We find that there is adequate provision to prevent contaminated vehicles and evacuees from going into non-contaminated zones. We further find that traffic control measures designed to monitor for contamination and to route evacuees to shelters will not significantly impede traffic flow or evacuation times.

D. Intervenor's Emergency Planning Contention 8 --
Coordination of Emergency Response Activities

1. Intervenor's EPC 8 reads as follows:

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 7 to 8

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 Operations Center (FEOC), located dangerously within the 10 miles 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 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.

2. In admitting the contention the Board ruled that the first few sentences were introductory and that it substantively started with the third sentence (S. Tr. 1088 Kelley, J. 8/8/83).

3. As provided in 10 CFR 50.47(b)(1) off-site emergency planning 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.

The planning standard II.A. of NUREG-0654 repeats the above.

Evaluation criteria include the following:

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.

Appendix 5 of NUREG-0654, a Glossary, provides the following under State organizations:

... 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.

4. FEMA found that the emergency plans of the States of North Carolina and South Carolina and the counties of Mecklenburg, Gaston and York assign clear and effective primary responsibilities for emergency response and specific responsibility of the various supporting organizations (Staff Ex. EP-2, Heard and Hawkins, p. 15). FEMA conducted an exercise testing the Catawba emergency planning in February

1984 and found that the assignment of responsibilities worked well (Id.). FEMA officials further found that North and South Carolina worked effectively together and demonstrated an efficient and cooperative relationship throughout the planning and implementation of the exercise (Tr. 1660-63, Heard and Hawkins 5/9/84).

5. Intervenors contend that the exercise selected by FEMA was an ineffective test of the abilities of the authorities to respond because it involved a gradually unfolding incident with a minor release of radiation occurring on the second day and only involved Gaston County and not Mecklenburg County in North Carolina. Further, the Forward Emergency Operations Center (FEOC) for the South Carolina Emergency Response Team (SERT) had been set up at the Clover, South Carolina Armory in advance of the exercise.

6. We do not find the FEMA exercise inadequate to test the effectiveness of the Catawba emergency plan. Although the test was not as severe as Intervenors would have liked it to be, it presented a reasonable accident scenario. It would have been more realistic had not the FEOC not been set up in advance of the exercise, but we find acceptable FEMA's satisfaction with this aspect of the exercise on the basis that the State of South Carolina had on at least 3 occasions previously demonstrated its capability of moving out of Columbia, South Carolina to a forward armory to be used as a command center (Tr. 1643-44, Heard 5/9/84).

7. Nothing Intervenors have presented rebuts the FEMA findings on the adequacy of the state and county plans assigning clear

and effective primary responsibilities for emergency response and specific responsibility to the various supporting agencies and the plans workability in an actual test.

8. Intervenors' first charge is that primary and supporting emergency roles are not clearly and effectively delineated during the initial period after a radiological accident, before the South Carolina Forward Emergency Operations Center (FEOC) and the North Carolina State Emergency Response Team (SERT) headquarters are established. Intervenors' contention indicates that SERT is to assemble and travel to the South Carolina FEOC. This is not part of the plan. It is asserted that conditions of conflict, confusion and lack of coordination may be the worst during the 7 to 9 hours after notification of state authorities of the existence of an accident at the Catawba facility. The evidence of record is contrary to Intervenors' allegation.

9. In the event of a radiological emergency at Catawba the plant will notify the states of South and North Carolina and the counties of York, Gaston and Mecklenburg. Procedures for alerting state agencies are set forth in the South Carolina plan (App. Ex. EP-2, SCORERP, pp. 21-22). The State Emergency Operations Center (SEOC), which coordinates the off-site emergency response activities of state agencies, local governments, federal agencies and contiguous states, would be activated in Columbia, South Carolina. The field command headquarters, FEOC, would be dispatched to the Clover National Guard Armory, which is at the periphery of the 10 mile plume EPZ (App. Ex. EP-21, Lunsford and McSwain, pp. 3-5). It is anticipated it will take

3½ hours to become operational (Id., Lunsford and McSwain, pp. 4-5). Once the FEOC is established, the role of the SEOC will be to support the FEOC (App. Ex. EP-2, p. 22; App. Ex. EP-21, Lunsford and McSwain, p. 9).

10. Upon notification by the plant, the Director of the Division of Emergency Management of North Carolina would activate the state Emergency Operations Center (EOC) in Raleigh and notify members of the State Emergency Response Team (SERT) to assemble. SERT would then travel to its field command post at the North Carolina Air National Guard Headquarters at Douglas Airport in Charlotte, North Carolina. The estimated time required to complete activation of the SERT field command post is 7 to 9 hours (App. Ex. EP-1, pp. 4).

11. A joint field post for North and South Carolina officials is not feasible because of the large number of people involved (Tr. 2977-80, Harris, Lunsford and McSwain 6/5/84). To insure coordination of the states' emergency response efforts North Carolina will have a liaison in the FEOC in Clover, South Carolina and there will be a representative of South Carolina at SERT headquarters in Charlotte (Tr. 3948-49, Sanders 6/6/84).

12. Intervenor raised for the first time, in their proposed findings, Appendix 5 of NUREG-0654, which states "to the extent possible, however, one state should be designated lead". The record fails to establish any need for this to be done in the North-South Carolina plans. The two states have elected instead to act in a coordinated manner, with a representative in each other's command post.

The coordination worked well during the February exercise. See FEMA's comments above. We do not find the failure to designate a lead state to be a breach of the regulatory guidance, so that a change would be required in their procedures. The guideline is not absolute but permissive in nature.

13. Until such time as the FEOC is operational in South Carolina and before SERT begins operations at Douglas Airport in Charlotte, emergency response officials in the counties in the respective states have primary responsibility for off-site response (App. Ex. EP-21, Pugh and Harris, pp. 4-5; Lunsford and McSwain, p. 9; Phillips, p. 2; Broome, pp. 1-2). County officials, operating out of their individual Emergency Operations Centers (EOCs), have the authority and responsibility to implement protective actions for the respective counties (Id., Pugh and Harris, pp. 4-5). During this time, the counties have access to state resources, if needed and state emergency personnel (Id., Lunsford, McSwain, Pugh and Harris, p. 5).

14. In North Carolina, primary responsibility for off-site emergency response shifts from Gaston and Mecklenburg counties once the SERT is established and is ready to assume its role. SERT then directs state agency participation in emergency operations and coordinates actions involving state and county agencies (App. Ex. EP-21, Pugh and Harris, p. 4; Tr. 3000-01, 3020, Harris 6/5/84). There need not be a declaration of emergency by the Governor for SERT to assume control (Tr. 3000-01, Harris 6/5/84; Tr. 4214A-15, Pugh 6/7/84).

15. In South Carolina the shift of primary authority from York County to the state is accomplished by the Governor's declaration of an emergency (Tr. 3005-06, Lunsford 6/5/84). Prior to this point state officials would have been working to ready the SEOC in Columbia for operation and would have dispatched the FEOC to Clover. Once adequate state resources are in place and are operational, the Governor would declare the emergency. The declaration formally establishes the SEOC and the FEOC (Tr. 3006, McSwain 6/5/84; App. Ex. EP-21, Lunsford and McSwain, p. 9). However the FEOC may not yet be operational at this point.

16. County emergency management officials confirmed that the responsibilities of county departments, agencies and support organizations are clearly assigned, understood by those involved, and the resources are available to carry out those responsibilities. (App. Ex. EP-21, Phillips, pp. 1-2; Broome, pp. 1, 5-8; Thomas, pp. 1-2, 5-6). State officials found that county organizations with support responsibilities know what they are supposed to do, as well as who is in charge (Tr. 4235-36, Pugh 6/7/84; Tr. 3962, Sanders 6/6/84). These evaluations were borne out by these officials' observations that, during the February exercise, the various state and county organizations worked together without confusion as to who was in charge, and who was responsible for what (Tr. 3049-50, Harris, Broome, Phillips, McSwain, Lunsford, Thomas 6/5/84).

17. Sheriff J. Elbert Pope was subpoenaed by Intervenors to testify on his responsibilities in a radiological emergency. Sheriff

Pope testified that he had delegated his responsibilities in this area to his Chief Deputy (Tr. 3969, 3978, 3980-81, 3984, Pope 6/6/84), who had in turn familiarized himself with the York County plan, attended various meetings with other county emergency response personnel, participated in the Catawba exercise, and generally assumed the lead role in the County Sheriff's Office on this matter (Tr. 3969, 3991-2, Pope 6/6/84). Accordingly, Sheriff Pope's personal knowledge of the plan's details and specific procedures was limited. Sheriff Pope corroborated earlier testimony of the county's response responsibilities in the event of a radiological emergency. He specified what the primary responsibilities of the Sheriff's Office would be in the event of an accident at Catawba (Tr. 3972-73, 3980, 3988, Pope 6/6/84). Sheriff Pope testified that his department had not noticed any confusion or lack of coordination during the Catawba exercise as to lines of authority or communications between state and county officials (Tr. 3986, Pope 6/6/84). This record shows that the York County Sheriff's Department is adequately prepared to function effectively in accordance with the York County Emergency Plans.

18. The foregoing establishes that the off-site emergency plans for Catawba satisfy the applicable planning standards in that the plans provide clear and effective assignments of primary and support responsibility. There is nothing to support Intervenors' assertions that the assignments of responsibility and coordination of emergency response activities would be at the weakest during the first hours after a radiological accident at Catawba. The roles of the counties and

states are clearly set forth as well as when they are to be exercised. No inadequacies were established as to the ability of each of the entities to fulfill the planning requirements right from the start. The Board further finds based on the foregoing evidence that support responsibilities of the counties have been clearly assigned and that there is reasonable assurance that they will be effective for protective action response.

19. Another claim of Intervenors is that there is a confusing and ineffective array of consultative and delegative authority that appears to cloud the lines of primary responsibility. We find lack of merit in this allegation. The authorities enabling the counties and states to take necessary protective actions under the plans are readily understandable so that the operations can be conducted effectively.

20. Proof of lack of substance of the claim is that existing authorities in the plans permitted the carrying out of a successful exercise in February 1984. As discussed above, this was confirmed by state and county emergency response personnel as well as FEMA officials. In addition North Carolina officials pointed out that their respective plans have both been used in exercises for various nuclear power plants within the states, and have thus been "critiqued and fine tuned many times in the past" (App. Ex. EP-21, Pugh and Harris, p. 3).

21. Because the plans have been successfully tested, Intervenors' criticisms are more academic than substantive. One of their areas of concern is the delegation within the Office of the Governor of South Carolina. Under the state constitution and by statute

the Governor has ultimate responsibility for decisions within the state in the event of man-made or natural disasters. He alone has legal authority to "direct and compel" evacuation (App. Ex. EP-2, SCORERP, Sec. I. B.3, p. 1; Tr. 2935-36, 2942, Lunsford 6/5/84; Tr. 3099, Sanders 6/6/84). He has delegated to the Director of the Division of Public Safety, Frank B. Sanders, the authority to order (but not compel) evacuations. The Division of Public Safety is a unit within the Office of the Governor and SCORERP states that the Office of the Governor has the task of ordering evacuations (App. Ex. EP-2 SCORERP, p. 1).

22. Intervenors raise as an issue whether the Office of the Governor is legally empowered to exercise the command and control responsibilities assigned to it under the South Carolina plan. In effect Intervenors are requesting us to legally interpret the state constitution and a South Carolina statute to determine if the Office of the Governor is acting lawfully. That is not our function nor is it necessary for deciding the emergency planning issue at hand. Section II.A.2.b. of NUREG-0654 only requires that the plan contain, by reference to specific acts codes or statutes, the legal basis for such authorities. No legal interpretations by this Commission are called for. There is a presumption that state officials are carrying out their duties in a proper and lawful manner. If Intervenors question that, they should seek a more appropriate forum than this licensing proceeding. We conclude on the record before us that the Office of the Governor can exercise the command and control responsibilities assigned to it under the South Carolina plan. Furthermore, the Office of the

Governor of the State of South Carolina readily functions effectively during emergencies under existing delegations as it has done recently in instances caused by tornados and a threatened dam rupture (Tr. 3923-35, 3965-66, Sanders 6/6/84). There has been a similar delegation by the Governor of North Carolina and for the same reason we make the same finding as to the adequacy of the assignment of command and control responsibilities in North Carolina and the sufficiency of the North Carolina plan in regard to it. The State of North Carolina also responds effectively under the existing delegation as it did during recent tornados (Tr. 4214A-20, Pugh 6/7/84).

23. Intervenors note that SCORERP makes no reference to the existence of the Division of Public Safety and the assignment to it of responsibility for ordering an evacuation. Neither does it name key individuals by title. Although this does not prevent a finding of substantial compliance with Planning standard II.A., because the Division is a unit within the Office of the Governor, we believe the matter should be clarified in SCORERP and therefore direct Applicants to supply changes to the State plan, to FEMA and Staff.

24. No one disputes the authority of the Governor of South Carolina to "direct and compel" an evacuation and the Governor of North Carolina, with the concurrence of the Council of State, to do the same. It is understood that the ability to compel empowers the use of force and the ongoing delegations of authority by the Governors to order evacuation do not empower the subordinate officials to compel it. The thrust of Intervenors argument appears to be that there is an attempt to

bestow on the county level the authority to compel an evacuation. Local governments in North Carolina including Gaston and Mecklenburg Counties are authorized to issue orders of evacuation (Tr. 2988, Harris 6/5/84). The 1980 York County Ordinance provides for "directing evacuation".

25. Much examining was done about the authority of York County, as to whether it was limited to "warning or encouraging" an evacuation or "directing and ordering" it. South Carolina state emergency management officials and the emergency response official for York County all agreed, notwithstanding a differing Attorney General's opinion, that local authorities have the power to "direct and order" not simply "warn or encourage" an evacuation and that the use of the word "order" may be interpreted or perceived as being mandatory (Tr. 2968-69, 2974, Lunsford 6/5/84; Tr. 2968-69, 2975, McSwain 6/5/84; Tr. 2969-70, 2974-75, Thomas 6/5/84). At no point did anyone contend that York County could compel an evacuation.

26. The nature of the authority that the counties have in South and North Carolina in regard to evacuation is more academic than real for purposes of providing an effective emergency response. The decisionmakers and emergency response personnel are clear as to what their responsibilities are and the limits of their authority during a radiological emergency, under current authorities. All recognize they can recommend or encourage residents to evacuate but they cannot force or compel them to do so. No more authority than that given the counties is necessary to provide for an effective protective response. Even in a fast breaking emergency, the plans do not call for the forceful removal

of anyone. The counties can effectively execute their roles under existing planning and regulatory requirements by recommending or encouraging residents to evacuate. The responsibilities and authorities of the various entities are adequately set forth in the state and local plans. The states and counties know what their roles are and are equipped to respond with what is required.

27. With respect to the York County plan, Intervenor's assert there is "a confusing and ineffective assignment of primary responsibility to York County officials". They point out that the 1980 York County Ordinance provides that the County Council may direct evacuation. They further note that Annex Q to the York Emergency Operations Plan, which applies to radiological accidents at Catawba, places responsibility for direction and control in: (1) the County Manager; (2) the Director, General Services; (3) the Emergency Preparedness Director; and (4) Support Services. (App. Ex. EP-2, York County Plan, Annex Q, p. Q-12). We find no real inconsistency in the assignment of responsibility within the emergency plan. The York County Ordinance Section III establishes the Municipal-County Emergency Preparedness Agency as "the instrument through which the York County Council" shall exercise its authority in disasters. Responsibility for operation of the Emergency Preparedness Agency is delegated in Section III of the ordinance to the Emergency Preparedness Coordinator (Director) who is responsible to the County Manager. In an emergency the Director calls the County Manager and support staff (Tr. 4008, Dickson 6/6/84). Under the delegation the County Council would not be

in charge. The Director has the necessary authority to call for an evacuation, if that is required, without a County Council meeting. The responsibility of responding to a radiological emergency rests with the County Manager (Tr. 4021-25, Dickson 6/16/84). The Board concludes the responsibility for a radiological emergency response in York County is adequately set out by the ordinance and there is no conflict between the ordinance and Annex Q to the York Emergency Operations Plan.

28. Applicants and state and local officials will be able to effectively coordinate emergency response activities through the availability of an adequate communications system. A "ring down" system is employed which avoids the use of local telephone lines. It is composed of both microwave and leased telephone circuits and has battery power as a back up. The system is like a party line and links Duke's emergency center at Charlotte, North Carolina, and Catawba, the 3 counties EOCs, the FEOC, the SERT, the EBS control station and the Media Center in Charlotte (App. Ex. EP-21, Coleman, p. 2). Officials at any of the places can contact each other and will not be affected by possible overloads on the local phone system (Id., Coleman, p. 3). There are also redundant communications systems that link the various centers.

29. The Board finds that the communications system will permit necessary coordination between the various state and county organizations, which helps to provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at Catawba.

30. We find that the off-site emergency response plans for Catawba satisfy the applicable regulations and guides as they bear on the issues under consideration. The plans provide clear lines of authority and the legal basis therefor, provide for the necessary coordination among the responding states and counties, and subunits thereof, and provide for adequate means of primary and backup communications to permit effective coordination and response. The action that we ordered be taken in D. 23 is for a minor clarification that does not significantly affect the adequacy of the response plans. The matters involved are not of sufficient magnitude so as to consider them the basis for licensing conditions.

E. Intervenors' Emergency Planning Contention 9 --
Public Notification

1. In EPC-9 the Intervenors allege:

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 affected 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 would 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.

2. The Applicants presented as witnesses on the contention: R. Michael Glover of Duke; Dr. M. Reada Bassicuni, consultant for Acoustic Technology, Inc. (ATI); J. T. Pugh, III for the State of North Carolina; P. R. Lunsford for the State of South Carolina; Bob E. Phillips for Gaston County; Lewis Wayne Broome for Mecklenburg County and Phillip Steven Thomas for York County. FEMA witnesses John C. Heard, Jr. and Thomas I. Hawkins addressed this contention.

3. On this contention the Intervenors called a rebuttal witness, James Thomas Oliphant, who testified on notification and evacuation of the Carowinds theme park. They also developed their case through cross-examination. Their examination focused on 3 primary issues: (1) the adequacy of the Catawba prompt alerting siren, (2) the effectiveness of the Emergency Broadcasting System (EBS) in the event of a power outage, and (3) the adequacy of notification and evacuation plans for Carowinds theme park and the Heritage U.S.A. religious retreat.

ADEQUACY OF SIREN SYSTEMS

4. Siren systems are evaluated by FEMA using the guidance of NUREG-0654, Appendix 3 and FEMA-43, the Standard Guide for Evaluation of Alert and Notification Systems for Nuclear Power Plants (September 1983). We have taken official notice of the latter document (Tr. 1597, Margulies, J., 5/9/84). FEMA had not evaluated the Catawba siren system

at the time of the hearing. However we have considered the acceptance criteria in the above FEMA documents and whether these criteria will be met in our evaluating of this contention.

5. According to FEMA-43, a siren alerting system may be designed so that the siren sound level either exceeds 10 dBC above the average outdoor daytime ambient sound levels, or be designed so that it provides 60/70 dBC acoustic alert coverage. Depending upon the population the area, one or the other of these designs can be used (App. Ex. EP-17, Bassiouni, pp. 2-3).

6. Applicants contracted with ATI of Boston, Massachusetts, to verify and field test the acoustic coverage of the siren system installed within the Catawba EPZ and to evaluate the sirens against the criteria of FEMA-43 (App. Ex. EP-17, Bassiouni, pp. 1-2). In its verification of the acoustical coverage of the sirens, ATI used field measurement of sound levels and an ATI computer model. Measured siren outputs at 100 feet were obtained through field tests of a sample number of sirens. These outputs were used to determine the extent of the 60 and 70 dBC acoustic coverage of the siren system for average daytime meteorological conditions. A series of predicted siren sound pressure levels for each of the measuring locations was then obtained from the ATI computer model of the Catawba siren coverage. These predicted sound levels were then compared with measured values and were found to be in excellent agreement (App. Ex. EP-17, Bassiouni, p. 2). ATI then mapped the composite 60/70 dBC siren acoustic coverage (See App. Ex. EP-17, Bassiouni Attachment B, Map 1). For those areas outside the 60/70 dBC

acoustic contour but inside the EPZ, ATI conducted a survey to measure average outdoor ambient background noise (App. Ex. EP-17, Bassiouni, pp. 2-3). The average outdoor ambient noise levels were then compared to the 50 dBC acoustic coverage contours plotted for each siren location (See App. Ex. EP-17, Bassiouni Attachment B, Map 2).

7. Applicants' witness Bassiouni testified that ATI's evaluation verified that the Catawba siren system will meet FEMA-43 guidelines. ATI found that the installed siren system provides the required 60 and 70 dBC coverage for most of the Catawba EPZ (App. Ex. EP-17, Bassiouni Attachment B, Map 1; Id., Bassiouni, p. 3). There were areas outside the 60 dBC contours. However the installed siren warning system provides adequate notification in most of these areas because the siren levels will be more than 10 dBC above the ambient background noise (App. Ex. EP-17, Bassiouni, pp. 3-4). The ATI analysis showed that acoustic coverage was not adequate to meet the FEMA guidelines for the remaining areas outside the 60 dBC contours in which the plume EPZ has been extended beyond 10 miles (Id., Bassiouni, p. 4). The Applicants identified locations for ten additional sirens to be installed by September 1, 1984 to meet these deficiencies and bring the Catawba siren system up to guidelines for the entire plume EPZ (App. Ex. EP-17, Bassiouni Attachment C; Tr. 1822, Glover 5/11/84). The Board concludes that there is reasonable assurance that this commitment will be met and the Catawba siren system will provide adequate prompt public notification coverage for the plume EPZ. (See Fermi, ALAB-730 and Waterford, ALAB-732, supra).

8. One of the Intervenor's concerns with the sirens was the influence of weather conditions upon their operation. Witness Bassiouni however testified that FEMA considered weather conditions in setting the siren standards (App. Ex. EP-17, Bassiouni, p. 2). The "average summer daytime weather conditions" may be used in the analysis establishing the 60/70 and 10 dBC above-the-ambient criteria (FEMA-43, E-7). The Applicants used average summer conditions as reported for the Charlotte, North Carolina airport in its model (Id., Attachment B, pp. 6-8). We therefore conclude that we are not required to give special consideration to the influence of weather conditions upon operation of the Catawba siren system in order to meet the guidance of FEMA-43.

9. The Intervenor's have also questioned whether or not individuals that are indoors will be able to hear the sirens. Bassiouni testified that the FEMA-43 and NUREG-0654 requirements for sirens are expressly based on outdoor sound levels (App. Ex. EP-17, Bassiouni, pp. 2-3; Tr. 1834, Bassiouni 5/11/84; See FEMA-43, p. E-6; NUREG-0654, Appendix 3, pp. 3-9). There may be situations where the ambient noise inside a building may exceed the siren volume, however these do not make the siren system inadequate. The requirements of FEMA-43 and NUREG-0654 were not intended as a guarantee that 100 percent of the population in the EPZ will actually hear the sirens in an emergency but rather were meant to establish a design objective for the siren system (See FEMA-43, pp. E-4 - E-5). We find Catawba sirens meet this objective and are in compliance with the acceptance criteria.

10. Individuals who do not actually hear the sirens can receive notification by other means. This can be done by word of mouth (Tr. 1903, 1874-75, Bassiouni 5/11/84) and by the EBS network which will broadcast messages on radio and TV (App. Ex. EP-17, Glover, p. 1) and by the tone alert radio system which will be used to notify special facilities (Tr. 1873, Glover; Tr. 1874-75, Bassiouni 5/11/84).

11. Route alerting will be another means of supplemental notification. Under the North Carolina Plan, local law enforcement and volunteer fire department personnel will drive the roads and streets of the EPZ using loudspeakers to notify residents to take action (App. Ex. EP-17, Pugh, pp. 1-2). In both Gaston and Mecklenburg Counties, this system of notification is initiated immediately upon activation of the fixed siren system. The vehicles, routes and personnel have already been designated in these two counties (App. Ex. EP-17, Phillips, pp. 1-3; Broome, pp. 1-3). In South Carolina, supplementary route alerting is the responsibility of York County (App. Ex. EP-17, Lunsford, p. 2). York County has available 15 to 18 vehicles with installed audio equipment for route alerting. Additional vehicles not so equipped will be provided with bullhorns and used if necessary (App. Ex. EP-17, Thomas, p. 2). In York County route alerting will not be utilized automatically but will be used in areas where volunteer firemen report that the sirens have not been heard (Tr. 1911-12, Thomas 5/11/84).

12. The Board finds that means of notification supplementary to the siren system which include route alerting, tone alerting, the EBS network as well as word of mouth, are sufficient to give reasonable

assurance that the population within the Catawba plume EPZ will be promptly notified.

13. Concern was expressed by the Intervenor on cross-examination as to the large differences in perceived sound intensity which is created as the sirens rotate through 360 degrees (Tr. 1841-42, Glover 5/11/84). The siren signal is constant but rotation creates relative minima and maxima in the perceived acoustic output, depending upon the listener's location and the direction of the horn at any given time (Tr. 1843-44, Bassiouni 5/11/84). The FEMA guidelines for sirens refer to the steady signal strength, and not to the effective minima due to modulation in the signal caused by rotation. This modulation also acts to attract people's attention (Tr. 1844-45, Bassiouni 5/11/84). The Board finds that modulation due to the rotation does not make the sirens inadequate and does not decrease their effectiveness.

14. Contention 9 also considers the problem of notifying the hearing-impaired. The public information brochure mailed by the Applicants to all plume EPZ residents includes a statement that hearing-impaired persons should contact their local emergency management agency upon receipt of the brochure. The new brochure will contain a mail-back card for this purpose. In this way, arrangements can be made for special prompt alerting prior to an emergency (App. Ex. EP-17, Glover, p. 3). Provisions are also in place in the emergency plans for printed "crawl messages" on EBS television broadcasts (App. Ex. EP-17, Broome, p. 3). Steps are also being taken by local organizations to

assure prompt notification of the hearing-impaired. Specialty notification lists are being compiled to identify hearing-impaired individuals to enable contact persons to go to their homes if necessary (App. Ex. EP-17, Thomas, p. 2; Phillips, p. 3; Tr. 1913-14 5/11/84).

15. The Board finds that the brochure statement, the TV "crawl messages" and the steps being taken by local organizations to notify the hearing-impaired are sufficient to give reasonable assurance that these individuals will be promptly alerted in an emergency.

16. The Board has considered all of the issues raised by the Intervenors in regard to the adequacy of the siren system at Catawba and finds that there is reasonable assurance that the sirens will meet the requirements of FEMA-43 and in the event of an emergency will provide an adequate prompt alerting system.

EFFECTIVENESS OF THE EMERGENCY BROADCASTING SYSTEM (EBS)
DURING A POWER OUTAGE

17. The Intervenors contend that, in the event of a power outage, public notification could not depend upon broadcasts from EBS stations. A power outage would eliminate some of the broadcast systems and thereby limit notification to battery operated radios. However Applicants' witness Pugh testified that of the 41 EBS stations in the Charlotte area, 11 are equipped with emergency backup power sources (App. Ex. EP-17, Pugh, p. 2).

18. Backup public notification will also be provided by the mobile alerting system discussed above (See E. 10 and 11). In Gaston County vehicles with sirens and PA systems will be used to go through

neighborhoods notifying people and advising them with appropriate messages. Vehicles, routes and personnel for this notification have already been identified. It is estimated that these routes can be completed in 14 to 22 minutes (App. Ex. EP-17, Phillips, pp. 1-3). In Mecklenburg County, the volunteer fire departments are committed to this responsibility. Radio communications and PA systems are available in their vehicles, and standard operating procedures provide a taped message to broadcast over the vehicles' PA system (App. Ex. EP-17, Broome, pp. 1-3). The maximum time to complete this function in Mecklenburg County is estimated to be 45 minutes (Tr. 1913, Broome 5/11/84). In York County, 15 to 18 vehicles with installed audio equipment and other vehicles with bullhorns will be utilized for backup notification. In some rural areas volunteer firemen will be used for door-to-door notification. Notification will require between 20 minutes and 2 hours (App. Ex. EP-17, Thomas, p. 2). The longer time will be required only for door-to-door notification (Tr. 1955-1956, Thomas 5/11/84).

19. The Board finds that there are reasonable assurances that the Backup facilities and personnel are adequate for prompt public notification, in the event of a power outage.

NOTIFICATION AND EVACUATION OF CAROWINDS AND HERITAGE U.S.A.

20. A final Intervenor's concern is the adequacy of plans for notification and evacuation of Carowinds and Heritage U.S.A., two facilities within the plume EPZ. The contention argues that these special facilities require specific plans for notification and

evacuation, and that these plans are not yet formulated. Carowinds is a theme amusement park, mostly in Mecklenburg County, North Carolina and extending into York County, South Carolina. It is on the fringe of the plume EPZ and is open each year from March to October. Heritage, U.S.A. is a religious retreat in York County.

21. Notification of Carowinds in an emergency will be the responsibility of Mecklenburg County (App. Ex. EP-17, Broome, pp. 3-4). Notification will be made by tone alert radio (App. Ex. EP-17, Thomas p. 3). Mecklenburg County has made contact with Carowinds' officials and has discussed a procedure to provide support for an evacuation of Carowinds which will include bases for pickup and evacuation of children, and law enforcement personnel to assist in traffic and crowd control (App. Ex. EP-17, Broome, p. 4). The York County Sheriff's Department will also assist in traffic control for a Carowinds' evacuation (App. Ex. EP-17, Thomas, p. 5). Mecklenburg County cannot order Carowinds to close, but Carowinds management has agreed to accept the protective action recommendation of Mecklenburg County--whatever that recommendation might be (Tr. 1925-1926, Broome 5/11/84).

22. Notification of Heritage U.S.A. in an emergency will be by telephone and by tone alert radio (App. Ex. EP-17, Thomas, pp. 3, 5). Heritage U.S.A. has internal plans and procedures for notification and evacuation of visitors and employees in the event of an emergency (App. Ex. EP-17, Lunsford, p. 3). York County has been in contact with officials of Heritage U.S.A. and has reviewed their plans and procedures for evacuation. The York County Sheriff's Department will assist in

traffic control; standard operating procedures to be relied upon to handle evacuating automobiles have been reviewed with Heritage U.S.A. (App. Ex. EP-17, Thomas, p. 5). There was no dispute during the hearing concerning the adequacy of the Heritage U.S.A. plans.

23. During cross-examination of the Applicants' panel on this contention, the Intervenor introduced into the record three documents describing emergency planning at Carowinds. These were: (1) the seven page Carowinds all purpose emergency evacuation plan with a covering letter dated December 27, 1983 (Int. Ex. EP-39), (2) a two page letter from the Emergency Preparedness Division of the Office of the Adjutant General of the State of South Carolina titled "Carowinds/PTL Planning Meeting, 1 February 1983, York County ECC", which contains an agenda for a planning meeting for the evacuation of Carowinds (Int. Ex. EP-40), and (3) a two page letter from Jerry Lutes of PRC Voorhees, an Applicants' consultant planning research corporation, to John Lee of Duke Power Company, dated March 9, 1981, titled "Carowinds Evacuation", which includes a discussion of evacuation routes from Carowinds (Int. Ex. EP-41). These documents contain the Carowinds all purpose emergency plan and describe on-going emergency planning efforts.

24. During cross-examination regarding the relevance of these documents, Broome, Administrative Officer, Charlotte-Mecklenburg Emergency Management Office, testified that many of the items considered in Intervenor's Exhibit EP-40 were outdated and either had been re-addressed or would be re-addressed in procedures within the standard operating procedures to implement the Mecklenburg County Emergency Plan.

Included would be items discussed in E. 21. He stated that these procedures will be completed within 90 to 120 days (Tr. 1924-25, 1944, Broome 5/11/84).

25. The Intervenor's subpoenaed Mr. James Thomas Oliphant as a rebuttal witness on EPC 9. Mr. Oliphant is the Loss Prevention Operations Manager at Carowinds and is responsible for emergency planning. Oliphant testified that because of the large number of people at the park and the time it will take to evacuate them, Mecklenburg County will provide Carowinds with an advance notification of any emergency at Catawba and as a precautionary measure Carowinds would evacuate prior to receipt of the public alert. He testified that Carowinds would give a "precautionary notice" of evacuation because of the numbers of people at this one location (Id., 4352, 4417-18, Oliphant 6/7/84).

26. Witness Oliphant stated that, through discussions with Broome, he was refining the Carowinds evacuation plan to take into consideration nuclear emergencies and that this would be accomplished before the plant goes on line (Id., Tr. 4424-26). The record is indefinite as to the status of this plan. When examined by the Intervenor's counsel, it was clear that it was not near completion (Tr. 4401-02, Oliphant 6/7/84).

27. The in-park count at Carowinds during peak usage can be 26,000 people (Tr. 4188, Oliphant 6/7/84). In his letter to Duke Power Company (Int. Ex. EP-41), the Applicants' planning consultant Jerry Lutes states:

"In summary, it appears that evacuation of Carowinds on a peak day is a monumental task requiring careful planning and good traffic control. But the time required for evacuation is well under the three hours and twenty-five minutes required to evacuate the residential population."

The Board notes the consultant's concern for planning and traffic control, and we conclude that a detailed and carefully coordinated plan for evacuation of Carowinds is required. We do not find such a plan to be in place.

28. The documents introduced into the record by the Intervenor dealing with planning at Carowinds (Int. Ex. EP-39, 40-41) and testimony of witnesses Glover, Broome and Oliphant demonstrates the existence of a general plan and the on-going process of revision. This record, together with the testimony of FEMA witnesses Heard and Hawkins which finds that plans have been made for evacuation of Carowinds (Staff Ex. EP-2, Heard and Hawkins, p. 21) provide the basis for a finding that there is reasonable assurance that the regulatory requirements will be met. However the plans and procedures for Carowinds are not yet fully in place. Because of their importance in emergency planning for Catawba, we make the completion of adequate plans a condition of the operating licenses. We require that there be a comprehensive plan for early notification to Carowinds of a radiological emergency at Catawba and for evacuation of Carowinds. It shall describe the responsibilities of the emergency response organizations of Mecklenburg and York Counties and how their efforts will be coordinated among themselves and with officials at Carowinds. Provisions in the plans shall be made to

immediately notify patrons and staff of Carowinds at the time of the precautionary closing of the park, of the cause of the emergency.

29. The Board's conclusion regarding EPC 9 is that there is reasonable assurance that the Catawba Prompt Alerting (siren) system, as augmented by the ten additional sirens to be installed, will meet the guidelines of FEMA-43 and therefore will be adequate. We conclude that the influence of weather conditions and the reduced sound levels to people indoors were considered in establishing these FEMA guidelines. We find that supplemental means of notification available, such as word-of-mouth, the tone alert system, the EBS network and mobile sirens provide reasonable assurance that individuals within the plume EPZ will be notified of an emergency. We find that adequate measures have been taken to provide special notice to the hearing-impaired. We conclude that there are adequate plans for emergencies involving loss of off-site power; the fact that there is backup power available to many of the EBS stations and that local route alerting procedures are in place gives us reasonable assurance that timely public notification can be achieved. Finally, we conclude that provided the requirements of E.28 are met for Carowinds, the plans for evacuation of Carowinds as well as for Heritage U.S.A. will be adequate and that they will meet the requirements of the regulations and NUREG-0654.

F. Intervenors Emergency Planning Contention 11 -- Expansion of the Plume EPZ into Southwest Charlotte

1. Contention 11 alleges:

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 access routes also indicates the need for evacuation planning for southwest Charlotte. There appear to be 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, meteorological and access route conditions.

2. The appropriate regulation, 10 CFR 50.47(c)(2), provides

in part:

Generally, the plume exposure pathway EPZ for nuclear power plants shall consist of an area about 10 miles (16 km) in radius and the ingestion pathway EPZ shall consist of an area about 50 miles (80 km) in radius. The exact size and configuration of the EPZs surrounding a particular nuclear power plant 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.

3. The Applicants and Staff argue that the plume EPZ boundaries which were established by local and state emergency planning officials conform to the Commission standards of "about 10 miles" and that the Catawba site does not differ from the average site contemplated by the Commission in regard to possible radiological hazards,

demography, meteorology and access road conditions. Thus the plume EPZ does not require extension beyond the existing boundaries.

RADIOLOGICAL CONSIDERATIONS

4. Guidelines stated in NUREG-0654 give the basis for establishing the "about 10 miles" requirement for the plume EPZ.

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.

5. Projected doses from design basis accidents (consideration (a) above) were not in dispute. Both Applicants' witness Thomas E. Potter and Intervenors' witness Steven C. Sholly found that design basis accidents would not exceed upper Protective Action Guide (PAG) doses beyond the established plume EPZ (App. Ex. EP-19, Potter, pp. 6-7; (Int. Ex. EP-49, Sholly, pp. 5-6).

6. For analysis of considerations (b) and (c), the Applicants relied on an analysis by witness Potter which compared possible core melt accident sequences calculated specifically for Catawba with comparable analyses used by the Commission in establishing the 10 mile

EPZ (NUREG-0396). His analysis showed that there was no significant difference between the probability of exceeding PAG doses or life-threatening doses beyond the 10 mile EPZ at Catawba compared to similar probabilities calculated for the generic core melt accident contained in NUREG-0396 (App. Ex. EP-19, Potter, p. 7).

7. A somewhat similar set of calculations of probable doses beyond the 10 mile zone were performed by Intervenor's witness Sholly. His analysis projected early severe releases, and he therefore recommended emergency planning for southwest Charlotte (Int. Ex. EP-49, Sholly, pp. 12-13, 22-23).

8. Witnesses Potter and Sholly both used probabilistic risk analysis (PRA), the approach used in NUREG-0396. Since a PRA based upon specific release categories for Catawba had not been performed, it was necessary for both Potter and Sholly to use data from other BWR reactors for which a PRA had been performed. Potter used WASH-1400 as a source for data characterizing the release categories and the probabilities of release for the Catawba analysis. Because WASH-1400 used Surry as its model BWR, and Surry has a large, dry containment whereas Catawba has an ice-condenser containment, Potter realized that this design difference between the 2 plants might make the WASH-1400 data inappropriate for use in calculating Catawba releases (Tr. 2073, Potter 5/23/84). Absent a plant-specific PRA for Catawba, Sholly used the data of the Reactor Safety Study Methodology Application Program (RSSMAP) for Sequoyah Unit 1 (NUREG/CR-1659, Vol. I). Although he recognized that there were large uncertainties involved, Sholly felt the risk posed by Catawba was

reasonably approximated by Sequoyah (Int. Ex. EP-49, Sholly, pp. 10-11, 16-17).

9. Potter considered using as a data base the probabilistic risk assessment performed by the RSSMAP program for Sequoyah because it, like Catawba, has an ice-condenser containment. However he did not use the Sequoyah RSSMAP analysis because it did not account for the presence of a hydrogen mitigation system, which is present at Catawba. Since Sequoyah sequences are premised on early containment failure due to explosive hydrogen burn, he considered the Sequoyah RSSMAP data misleading if applied to Catawba because the probabilities of severe radioactive releases to the atmosphere in the Sequoyah RSSMAP analysis were higher than one would expect at Catawba, which has an effective hydrogen mitigation system (Tr. 2074-75, Potter 5/23/84).

10. Potter made use of a study of the hydrogen mitigation system at the McGuire plant to calculate the impact of this system upon the release frequencies from RSSMAP study of Sequoyah. When this was done, the resultant release frequencies were virtually identical to those calculated for the Surry plant in WASH-1400 (Tr. 2076, Potter 5/23/84).

11. When questioned about the possibility of failure of the hydrogen mitigation system, Potter stated that his probability analysis allowed for failure of this system (Tr. 2074-75, 2079, Potter 5/23/84).

12. A second difference between Sequoyah and Catawba is the containment failure pressure. The Sequoyah containment, modelled in the Sequoyah RSSMAP, has a failure pressure of 30 psig, while the Catawba

containment has a failure pressure of 72 psig. A higher containment pressure would delay failure and release of fission products. Sholly appeared to be unaware of this difference between these plants (Tr. 2407-08, Sholly 5/24/84).

13. The Board finds Potter's probability analyses of the accident sequences to be more credible than Sholly's because a more appropriate data base was used and because Sholly failed to consider the effects of a hydrogen mitigation system and the higher containment pressure at Catawba, as compared to Sequoyah.

14. Potter analyzed the probabilities of exceeding specified doses at various distances from the site using Catawba meteorology, and also using meteorological data from NUREG-C396. He then compared the Catawba specific probabilities of exceeding given doses with those in NUREG-0396. His analyses evaluated considerations (b) and (c) above and established that there is no significant difference between the probabilities of exceeding PAG doses or life-threatening doses beyond 10 miles at Catawba, compared to similar probabilities calculated for the generic core melt accident analyses contained in NUREG-0396 (App. Ex. EP-19, Potter, pp. 6-7; Id., Potter, Attachment B, pp. 8-10).

15. The Intervenors presented two additional witnesses on Contention 11 whose testimony was directed to the need for extending the plume EPZ into southwest Charlotte. Mr. Ray Twery's testimony attempted to show that southwest Charlotte was exposed to an unusually high risk which justified an expansion of the plume EPZ (Int. Ex. EP-48, Twery, pp. 1-4). Cross-examination developed serious flaws in his analysis

(Tr. 2343-59, 2364-84, Twery 5/24/84). The Board concludes that his testimony is entitled to little weight and that it does not demonstrate any unusual risk to the population of southwest Charlotte.

16. Intervenors' witness Jesse L. Riley relied on the Sandia Laboratories' study "Technical Guidance for Siting Criteria", NUREG/CR-2239 ("the Sandia Siting Study") and the Catawba Final Environmental Statement ("FES") to arrive at estimates of injuries and fatalities in the event of a radiological emergency at Catawba (Int. Ex. EP-48, Riley, pp. 1-3). Riley did not accept the fact that the Sandia Study does not represent risks and that it assumes no emergency responses beyond 10 miles for 24 hours (Tr. 2312-14, Riley 5/24/84).

17. Riley also criticized the practicality of estimating the probability of a reactor accident, as used in the Sandia Siting Study, in the FES and in the Reactor Safety Study (WASH-1400). (Int. Ex. EP-48, Riley, pp. 3-5). Riley asserted that WASH-1400 did not consider accidents such as occurred at Three Mile Island, Browns Ferry and Enrico Fermi (Id., Riley, pp. 4-5). Riley asserted that the FES's worst case analysis projected the possibility of 24,000 fatalities of which the largest fraction would occur in Charlotte, but he was unwilling to accept the calculated probabilities associated with these fatality estimates (Id., Riley, pp. 2-3; Tr. 2427, Riley 5/24/84).

18. Applicants' witness Potter refuted Riley's allegations in his discussion of "phenomenological analysis" which is an analysis based on a statistical analysis of the actual performance of plant systems and components over the approximately 1000 reactor-years of operating

experience (Tr. 2061-64, Potter 5/23/84). By making a system-by-system treatment of reactor component failure data, it is unnecessary to wait for the occurrence of a major accident to estimate its probability since the major accident is based on the occurrence of a sequence which involves a number of low probability events. In effect, the probability of the whole is projected from the probability of the parts (Tr. 2201, Potter 5/23/84).

19. The Board concludes that the testimony of witnesses Riley and Twery does not provide a justification for extending the plume EPZ into southwest Charlotte. None of the testimony presented by these witnesses calls into question the correctness of the evidence presented by the Applicant and Staff. The Board accepts the method of calculation of probabilities outlined in Potter's testimony.

20. Potter's projected doses from most core melt sequences would not exceed the EPA's PAG levels outside the Catawba plume EPZ. For the worst case core melt sequences, immediate life-threatening doses would generally not occur outside the Catawba plume EPZ. This is consistent with the generic analyses in NUREG-0396. Thus expected radiation doses at Catawba are no different from those accepted by the NRC in setting the plume EPZ at "about 10 miles". Hence there is nothing about Catawba in this respect that would justify altering the plume EPZ size (App. Ex. EP-19, Potter, pp. 7-8). From these findings, the Board concludes that the plume EPZ boundary for the Catawba facility has been properly determined in relation to radiological considerations.

21. The fourth consideration used by the NRC/EPA Task Force that established the plume EPZ standard at "about 10 miles", item (d) above, states that "detailed planning within 10 miles would provide a substantial base for expansion of response efforts in the event that this proved necessary". The Task Force also stated "Therefore, although protective actions may be required for individuals located in areas further than 10 miles from the reactor, for an atmospheric release the actual measures used and how rapidly or efficiently they are implemented will not strongly influence the number of projected early health effects" (NUREG-0396, Appendix 1, at 52). We find NUREG does not require emergency planning beyond the 10 mile plume EPZ. However, Applicants' witness R. Michael Glover interpreted the guidelines as approval of "ad hoc" planning outside the 10 mile zone. He testified that the City of Charlotte All-Hazard Plan addresses the need for "ad hoc" planning outside the 10 mile zone (App. Ex. EP-19, Glover, pp. 8-9).

22. The All-Hazards Plan (Int. Ex. EP-46) outlines protective action for residents of Charlotte and Mecklenburg County. Applicants' witness Lewis Wayne Broome, Administrative Officer, Charlotte-Mecklenburg Emergency Management Office, testified that this plan together with the resources of his agency are adequate to provide protective actions in southwestern Charlotte outside the 10 mile zone. He testified that the people and resources are identified in this plan to provide protective actions for a distance of 15 miles from Catawba for an additional 100,000 people (App. Ex. EP-19, Broome, pp. 2-3).

This plan was used successfully to notify, evacuate and shelter 2000 to 3000 residents of Charlotte during a chemical fire in 1982 (Id. Broome, pp. 6-8).

23. In case of emergencies in southwest Charlotte, the All-Hazards Plan provides for notifying the affected population by means of mobile sirens, public address systems and the Emergency Broadcast System (EBS). It also provides for the necessary coordinating mechanism for protective action (Id., Broome, pp. 3-5).

24. The testimony of Glover and Broome addresses consideration (d) of NUREG-0654, and demonstrated that current emergency planning in southwest Charlotte exceeds that contemplated in NUREG-0654 for areas outside the plume EPZ. Because of the planning in place in the All-Hazards Plan and the resources available from the Charlotte-Mecklenburg Emergency Planning Agency, the Board finds that protective action, if needed, can be implemented for Charlotte and Mecklenburg County residents outside the EPZ without extending the existing plume exposure EPZ in the direction of Charlotte.⁸

⁸ There are various deliberations underway (Nurkin Committee) aimed at improving emergency planning in the Charlotte area. The ultimate results to be reached in the matter are not necessary to our deciding the relevant issues in this proceeding and they will not be given any further consideration.

METEOROLOGICAL CONSIDERATIONS

25. One of the Intervenor's concerns expressed in Contention 11 is that local meteorological conditions are such that an accident at the facility would pose a threat to the residents of southwest Charlotte. They suggest that the 10 mile radius of the plume EPZ should be extended because of the unique meteorological conditions of this area. Testimony of Applicants' witness Mark A. Casper and Staff witnesses James E. Fairbent and Leonard Soffer (1) provided information on site-specific meteorology, (2) compared the meteorology of this area with that of other plant sites, and (3) showed how site meteorology is related to meteorological conditions anticipated by the authors of NUREG-0396.

26. The applicable regulation in regard to size and configuration of the plume EPZ is 10 CFR 50.47(c)(2) which provides:

Generally, the plume exposure pathway EPZ for nuclear power plants shall consist of an area about 10 miles (16 km) in radius and the ingestion pathway EPZ shall consist of an area about 50 miles (80 km) in radius. The exact size and configuration of the EPZs surrounding a particular nuclear power plant 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...

Witness Soffer explained that this regulation considers conditions which might determine the exact configuration of the plume EPZ, including demography, topography, land characteristics, access routes and local jurisdictions, but does not mention meteorological considerations because meteorology was taken into consideration by the authors of

NUREG-0396 in determining that "about 10 miles" was appropriate for the plume EPZ (Staff Ex. EP-5, Soffer, pp. 3-4). Thus, only meteorological conditions existing at this specific site, which are not anticipated by NUREG-0396, and which pose a threat to residents of Charlotte outside the existing EPZ, are relevant to this contention.

27. Witness Soffer testified that in NUREG-0654 FEMA and the Staff took into consideration not only design basis accidents but also the most severe core melt sequences (Class 9 accidents) in determining the size of the plume EPZ and that very conservative meteorology was used in calculation of dose and in considering consequences from these accidents. Doses were calculated assuming the exposed individual was directly downwind of releases for both design basis and core melt accidents. This means that the fact that the wind may blow more in one direction than another at a given site had no bearing on the selection of 10 miles as the plume EPZ distance (Staff Ex. EP-5, Soffer, pp. 8-10).

28. Staff witness Fairbent's testimony was directed toward showing that meteorology at Catawba was not unique and was within the range of conditions considered in analysis of severe core melt accidents in NUREG-0396 (Staff Ex. EP-5, Fairbent, pp. 11-14). Fairbent compared atmospheric transport and diffusion conditions in the vicinity of the Catawba facility to conditions at other power plants in southeastern United States. At the Catawba site for the period December 17, 1975 - December 16, 1977, stable conditions (Pasquill types "E", "F" and "G") occurred about 41% of the time. Most of these stable

conditions occurred with wind speeds less than or equal to 2 meters/second (Id., Fairobent, pp. 11-12). He noted that similar stable atmospheric conditions were observed at the Shearon-Harris facility for the period February, 1979 - January, 1980, and at the V.C. Summer facility for the period January, 1975 - December, 1977. He testified that at Catawba, the prevailing wind direction is from the southwest, with winds from the south-southwest, southwest and west-southwest occurring about 33% of the time for the period December 17, 1975 - December 16, 1977 (Id., Fairobent, p. 13). Meteorological observations at other nuclear power plants indicate that total frequencies of wind in the three 22½° sectors are in excess of 25%; they range from 26% at Shearon Harris to 36% at Limerick for equivalent time periods (Id.). On cross-examination Fairobent acknowledged that the difference between Limerick (36%) and Catawba (33%) was not significant (Tr. 2614, Fairobent 5/25/84).

29. Fairobent testified that better data available for Catawba would bring a reduction of the 33% wind direction frequency blowing towards the 3 northeast sectors to 28% (Tr. 2695-96, Fairobent 5/25/84).

30. At Indian Point, the site used in analysis of severe accidents in NUREG-0396, stable atmosphere conditions (Pasquill "E", "F" and "G") occur about 48% of the time, compared to 41% at Catawba, with most of these stable conditions (about 60% versus 75% at Catawba) occurring with wind speeds less than or equal to 2 meters/second (Staff Ex. EP-5, Soffer and Fairobent, p. 14). On cross-examination, Fairobent

acknowledged that these differences between Catawba and Indian Point were based upon temperature differences at the observation sites which did not take into consideration the effect of other inversions aloft (Tr. 2623-25, Fairmont 5/25/84).

31. Applicants' witness Casper testified that rainfall at the site is average or below average for the southeastern United States (App. Ex. EP-19, Casper, p. 16).

32. The subject of the combined effect of prevailing wind direction and concentration of population arose in the testimony of Applicants' witnesses Robert F. Edmonds and Mark A. Casper. Edmonds' testimony contained a table showing that there were a large number of nuclear plants with adjacent population concentrations similar to Catawba (App. Ex. EP-19, Edmonds, p. 7). Witness Casper testified that there were a number of these plants at which there were large populations within the sector of the prevailing wind direction or within a sector with a greater wind direction frequency than given by a uniform distribution (Id., Casper, p. 13).

33. The subject of the relationship of wind direction and population concentration was further explored in the cross-examination of Edmonds and Casper by Riley. In this examination, data on incidence of wind direction and population in NUREG/CR-2239 (Technical Guidance on Siting Criteria Development) were considered. Table A.4-1 in this document contains windrose data for plants listed in Edmonds' table. When windrose frequency was multiplied by population to give a risk

index, Edmonds acknowledged that Catawba became number one in risk among the plants listed in his table (Tr. 2021-23, 2179-80, Edmonds 5/23/84).

34. On re-direct examination, Edmonds identified Table D.3-1 of NUREG/CR-2239 which used an approach similar to that in Riley's cross-examination. This table combined population data and wind direction frequency data to arrive at a factor representing risk. This approach used data from all sectors, rather than a single sector. When data from this table are used, Catawba ranks tenth or eleventh on the list (Tr. 2180-81, Edmonds and Casper 5/23/84). Witnesses Edmonds, Glover, Casper and Potter agreed that all plants listed in this table, including Catawba, meet the Commission's siting criteria (Tr. 2182-88, Edmonds, Glover, Casper and Potter 5/23/84). The Board finds that this approach used by Edmonds is more encompassing and therefore is preferable and accepted.

35. Casper testified that the city of Charlotte would create an Urban Heat Island effect which would increase dispersion and lower the frequency of inversions, and thus would give rise to a lower frequency of stable air conditions. He also testified that mechanical dispersion due to surface roughness increases dramatically as a plume travels from rural to urban areas (App. Ex. EP-19, Casper, pp. 15-16). The Board finds the above meteorological conditions at Charlotte would reduce the potential hazard from severe accident releases.

36. Based on the testimony of the witnesses, the Board finds that the site specific meteorology at Catawba is not a factor to be considered in determining the size and configuration of the plume EPZ

surrounding the Catawba nuclear facility and that meteorological conditions at this site are within the limits anticipated by the authors of NUREG-0396. Moreover, the evidence shows that the meteorology at Catawba is comparable to meteorology at other nuclear facilities in the southeastern United States and is comparable to the meteorology at the facility (Indian Point) used for the severe (Class 9) accident analysis in NUREG-0396.

DEMOGRAPHIC CONSIDERATIONS

37. Contention 11 alleges that the demography of the Catawba area requires an extension of the plume EPZ into southwest Charlotte. The Intervenors allege that there is a substantial resident population in the southwest part of Charlotte near the plume EPZ boundary. Edmonds testified that the current plume EPZ boundary with southwest Charlotte approximates the transition from rural to urban conditions (Tr. 2015, Edmonds May 23, 1984). The population density outside the current plume EPZ does not exceed 1300 persons per square mile until reaching 12 to 13 miles from the plant in the ENE sector, and 13 to 14 miles in the NE sector (Int. Ex. EP-43). Thus only if southwest Charlotte was added to the plume EPZ would there be a "substantial populations" adjoining the EPZ boundary.

38. The plume EPZ boundaries were established by the state and local officials and were based on local topography, demography and jurisdictional boundaries, in accordance with 10 CFR 50.47(c)(2). Duke Power Company made a review of the boundaries after their selection by the government officials which led to an after-the-fact expansion of the

plume EPZ in York County so as to make the boundary conform to an easily identifiable geographical feature. Jurisdictional boundary considerations caused these officials to include all of the city of Rock Hill within the plume EPZ (Tr. 2028-30, Glover 5/23/84; Tr. 2090-91, Broome 5/23/84; App. Ex. EP-10, Broome, p. 1).

39. There were good reasons for including Rock Hill, South Carolina, but not Charlotte, North Carolina, in the plume EPZ. The city limits of Rock Hill come as close as 5-7 miles from Catawba, with most of the city within 10 miles of the plant. The state and local planners did not want to divide Rock Hill so that most of the city would be in the plume EPZ, and a small part would be outside (Tr. 2027, Glover 5/23/84.)⁹ Charlotte, on the other hand, at only one point comes as close as 9.7 or 9.8 miles from the plant. The city extends to some 15 miles beyond the plume EPZ boundary. Thus the planners used 9.7 or 9.8

⁹ By letter dated September 7, 1984, Applicants advised that it was their understanding that the plume EPZ was altered, in that a portion of Rock Hill was excluded. The new boundaries follow an unnamed creek, railroad tracks and a highway in addition to parts of the Rock Hill city limits. It was stated that the excluded portion of Rock Hill contains a city landfill area, the Plaza Shopping Center, and Castle Heights Junior High School. No permanent residences are said to be involved. The excluded area is 10.5 to 11 miles from the plant. The change alters the previous situation where all of the City of Rock Hill, as a jurisdictional entity, was included within the EPZ. This represents a minor change geographically and demographically. Although the point of using an undivided Rock Hill as an example for not splitting a municipality by the boundaries of the EPZ is lessened, it does not advance Intervenor's position for extending the EPZ boundary into Charlotte. Most all of Rock Hill is within a 10 mile radius of the plant, whereas the converse is true for Charlotte.

as "about 10 miles" and excluded Charlotte from the plume EPZ (Tr. 344, Glover May 2, 1984; Tr. 2670, Robinson 5/25/84).

40. The Board finds that the present EPZ boundaries reflect reasonable consideration of local geographic and jurisdictional boundaries, and that there is no compelling demographic consideration which would require extension of the plume EPZ into the southern portion of Charlotte.

EVACUATION CONSIDERATIONS

41. The Intervenor's concern in Contention 11 that the flow of evacuees through Charlotte would necessitate expanding the plume EPZ was addressed by Applicants' witness Walter Kulash, a traffic planning consultant. Kulash's firm conducted two studies relating to evacuation of Charlotte. From these studies he testified that without expanding the plume EPZ, given normal weather southwest Charlotte could be evacuated in about 5½ hours and all of Charlotte in about 9 hours. Only with very adverse assumptions would any "voluntary" evacuation of Charlotte residents impede the evacuation of the current plume EPZ, and then only by lengthening slightly the evacuation time on only one route (App. Ex. EP-19, Kulash Attachment C, pp. 5-10; Id., Attachment B, pp. 8-9). We find the Kulash testimony is convincing and conclude that expansion of the plume EPZ would not materially assist in evacuation and therefore is not required.

42. Based upon all of the evidence presented, the Board's finding is that the allegations in Contention 11 lack merit. We find that the size and configuration of the plume EPZ as defined in the

emergency plan have met the requirements of 10 CFR 50.47(c)(2), and that expansion of the boundaries into southwest Charlotte is not warranted. In arriving at this conclusion, the Board considered the potential radiological hazards to the population of southwest Charlotte, meteorological and demographic conditions of this area, and requirements for evacuation.

G. Intervenors' Emergency Planning Contentions 14 and 15--Evacuation

Contentions 14 (EPC 14) and 15 (EPC 15) raise closely related issues and have been treated together throughout the proceeding. Accordingly, that practice will be continued here.

1. EPC 14 alleges:

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 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/lane/hour should be assumed, according to preliminary estimates by Sheldon C. Plotkin 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 congestion. They fail to account for backups caused by extra-EPZ congestion, especially on I-77 in Charlotte.

The Applicants' 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 allotted for finding drivers.

The Applicants' study is fundamentally useless to making a determination regarding the time within 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 conditions, rather than best case conditions. The Applicants' 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 snowstorm to Yankee eyes, but which had plainly immobilized the entire vicinity.

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

Moreover, Applicants' 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 an 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,¹⁰ any study presented in support of the 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.

¹⁰ This paragraph relating to the necessity for a drill to test the system was not admitted as a substantive claim for relief (See S. Tr. 1095).

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 vehicles/lane/hour vehicle travel time. Applicants are, thus, unable to provide 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 requirement 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.

2. EPC 15 alleges:

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 inadequate with regards to transportation and related evacuatory 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 families are without vehicles. But in many of these homes, that 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 sixteen 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 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.¹¹

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

Evacuation plans which fail to assume that human beings--and not computer modelled 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.

3. Contention 14 alleges that Applicants' evacuation time estimates are flawed and unreliable due to their failure to account for various factors. Similarly, in Contention 15 the Intervenors allege deficiencies in the state and local emergency plans concerning evacuation.

¹¹ This paragraph relating to the necessity of a drill to test the system was not admitted as a substantive claim for relief (See S. Tr. 1096).

4. Testimony on these contentions was presented by the Applicants (Testimony of R. M. Glover and Walter M. Kulash); The State of North Carolina (Testimony of J. T. Pugh, III); The State of South Carolina (Testimony of R. Lunsford); Gaston County, North Carolina (Testimony of Bob E. Phillips); Mecklenburg County, North Carolina (Testimony of Lewis Broome); and York County, South Carolina (Testimony of Phillip S. Thomas). Testimony was also presented by the Staff (Testimony of Thomas Urbanik, II, Concerning the Evacuation Time Estimate Studies for Catawba Nuclear Station). The Intervenors filed no written testimony on Contentions 14 and 15, but relied extensively on cross-examination. Intervenors also relied on the subpoenaed testimony of rebuttal witnesses: Brenda W. Best, J. Elbert Pope, Luther L. Fincher, Jr., Nathaniel Davis, Jr., and James T. Oliphant.

5. Essentially, Intervenors assert that the evacuation time study prepared for Applicants by PRC Voorhees for the Catawba Nuclear Station cannot be relied on by public authority for making decisions based on the time required to evacuate residents for a number of specific reasons: (a) the study over-estimates the flow of traffic on evacuation routes; (b) it does not consider the voluntary evacuation of Charlotte (evacuation shadow phenomenon); (c) it does not give adequate consideration to the evacuation of schools, the number of buses and bus drivers required, and parents picking up their children at school; (d) the study lacks a data base for the estimates concerning work/travel times and, hence, uses erroneous assumptions; (e) it does not adequately address adverse weather considerations; (f) the transient population at

Carowinds amusement park and Heritage U.S.A. was not considered; (g) the assumptions used are not valid and the methodology is unsound; and finally, (h) the study uses too high a vehicle/lane/hour capacity, and should assume a 600 vehicles/lane/hour capacity, yielding a minimum evacuation time of 33 hours. Each of these points will be addressed individually.

6. Evacuation time estimates are required by 10 CFR Part 50, Appendix E. IV and are used for two principal purposes:

- a. to provide decision makers during an emergency with knowledge of the length of time required to effect evacuation under various conditions, which allows an informed choice of protective actions (e.g., between in-place sheltering and evacuation); and
- b. to identify those areas or routes in the vicinity of a site where bottlenecks are likely to occur and traffic control would be appropriate.

7. The criteria for judging the acceptability of the evacuation time estimates which are required by 10 CFR Part 50, Appendix E. IV. are set forth in NUREG-0654, Appendix 4. NUREG-0654 discusses several elements which the NRC and FEMA believe should be included in evacuation time studies. These considerations include: (a) an accounting for permanent, transient, and special facility populations in the plume exposure EPZ; (b) an indication of the traffic analysis method and the method of arriving at road capacities; (c) consideration of a range of evacuation scenarios generally representative of normal through

adverse evacuation conditions; (d) consideration of confirmation of evacuation; (e) identification of critical links and need for traffic control; and (f) use of methodology and traffic flow modeling techniques for various time estimates, consistent with the guidance of NUREG-0654, Appendix 4.

8. The Applicants provided an evacuation time estimate study for the Catawba plume exposure pathway EPZ, prepared under contract by PRC Voorhees (PRC), entitled "Catawba Nuclear Station Evacuation Analysis/Evacuation Time Estimates, April 1983" (App. Ex. EP-15, Attach. A). PRC also produced a number of subsequent reports in connection with this evacuation time estimate study including: "Summary of Method for Estimating Evacuation Time for Catawba Nuclear Station EPZ, March 1984"; "Adequacy of Planning for School Population Evacuation, March 1984"; "Assumptions Underlying Departure Times for Evacuation of the Catawba Nuclear Station EPZ, December 1983"; "Evacuation Time Estimates for Carowinds and Heritage U.S.A., March 1984"; and a report entitled "Transport-Dependent Population, April 1984." App. Ex. EP-15, Attach. B-F.

9. The Applicants' study used the PRC EVACPLAN model which was developed specifically for evacuation time estimate studies. The method for computing total evacuation time was the distribution method which is one of the two acceptable approaches outlined in NUREG-0654, Appendix 4. EVACPLAN consists of two major components: The EVACURVE module and the OUEUE module. The EVACURVE module calculates the final departure curves giving the distribution of times at which the

vehicle-owning population completes preparations to leave home and enters the road system. The QUEUE module simulates the flow of traffic through the evacuation routes and identifies the location and extent of traffic congestion.

Traffic Flow Rates

10. The first issue (a) raised in Contention 14 is that the evacuation time study over-estimates the flow of traffic on evacuation routes. The flow rate used by PRC is 1200 vehicles per lane per hour, which is a figure that is adjusted downward from the actual hourly flow of traffic on a single lane of surface highway of 1800 vehicles per lane per hour, taken from the 1965 Highway Capacity Manual. This manual was compiled by the Transportation Research Board of the National Academy of Sciences and is the standard reference in the transportation profession for determining capacities. Use of the figure 1200 vehicles per lane per hour assumes a vehicle headway of 3 seconds, reflecting a level of traffic interruption that could be expected in an evacuation assuming the absence of traffic control measures.

11. Staff witness Dr. Thomas Urbanik, II,¹² testified that the capacities suggested by Intervenors in the contention were

¹² Dr. Thomas Urbanik, II, is Assistant Research Engineer, Texas Transportation Institute, Texas A & M University, and serves under contract to Battelle Pacific Northwest Laboratories, which is responsible under contract to the NPC for reviewing evacuation time studies of nuclear facilities. Dr. Urbanik was a principal author of NUREG/CR-1745 "Analysis of Techniques for Estimating Evacuation
(Footnote Continued)

unreasonably low and not supported by experience or sound technical analysis. The Intervenor did not present a time estimate study of their own, nor an analysis of the study presented by the Applicants. Given the record before us, we have no reason to doubt that the traffic flow rate assumed in the Applicants' study is appropriate.

"Shadow" Evacuation

12. Testimony on the voluntary evacuation of residents of Charlotte outside the EPZ (b) was presented by Applicants. PRC performed two studies related to the evacuation of areas beyond the EPZ, one encompassing the voluntary evacuation of the entire Charlotte area, and the other, the southwest one-third of the city of Charlotte. The results of these studies were set forth in Attachment B to Mr. Kulash's testimony on Contention 11 (expansion of the EPZ boundary), (App. Ex. EP-19). However, we have considered this attachment here, since it is relevant to the impact, if any, on the traffic evacuation time study for the EPZ as currently drawn. This study indicated that impact of this

(Footnote Continued)

Times for Emergency Planning Zones" (November 1980). He also provided input to the development of current guidance for evacuation time estimate studies which appears in Appendix 4 to NUREG-0654, Rev. 1 "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants" (November 1980). Dr. Urbanik reviewed the initial evacuation times estimates study submittals of approximately 52 operating and near-term nuclear facilities for the NRC in light of NUREG-0654, Rev. 1, the results of which are published in NUREG/CR-1856 "An Analysis of Evacuation Times Estimates Around 52 Nuclear Power Plant Sites" (May 1981).

traffic, assuming 100 percent of the Charlotte residents evacuating voluntarily, could delay EPZ evacuees using the only impacted route, I-77, one hour, which would delay completion of the entire EPZ evacuation by 30 minutes. Based on this evidence we find, contrary to the assertion in the contention, that Applicants have, in fact, considered the voluntary evacuation of residents of Charlotte.

Use of School Buses

13. Intervenors allege numerous difficulties with the evacuation of schools (c). Plans for the evacuation of schools, along with an analysis of the adequacy of such planning, were presented in Applicants' testimony. The State of North Carolina plans an early evacuation of children from schools and has adequate buses available to move the students without utilizing multiple bus pick ups by bringing buses in from outside the EPZ. The State of South Carolina plans to use the high school student drivers only to pick up students. Phillips for Gaston County pointed out that there are adequate buses so that multiple trips will not be necessary. County employees, volunteer firemen or police could be used to drive the buses in place of the student drivers on return trips. Broome of Mecklenburg County testified that enough buses are available to avoid multiple trips, that these buses are a maximum of 30 minutes away, and only adult bus drivers would be allowed to return to the EPZ, not student drivers. Thomas of York County testified that student drivers might be used for multiple trips to evacuate the particular school they are assigned to, but would be

replaced by volunteer firemen for any other evacuation purposes. Backup drivers are also available.

14. Kulash testified that he conducted a study entitled "Adequacy of Planning for School Population Evacuation/Catawba Nuclear Station Emergency Planning Zone," and that this study determined that an adequate number of buses exists to complete the evacuation in less than two trips per vehicle in each county. Dr. Urbanik testified that multiple trips could be conducted within the four hour evacuation time estimate due to the fact that a number of the buses are on-site, can respond quickly, and can then return.

15. Each of the state and local officials pointed out that their policy is to discourage parents from driving to the schools to pick up their children because the current plans call for relocation of the students directly. Messages instructing parents not to attempt to pick up their children at school are also provided in the Applicants' brochures. Although it is anticipated that some parents will not follow these instructions and would not be prevented from picking up their children, this possibility was accounted for in the Applicants' evacuation time estimates.

16. Based on the record before us, we find that Applicants' evacuation time study has given careful consideration to the evacuation of school children, the number of buses and trips required, and the necessity of providing alternative bus drivers (other than student drivers), and adequate planning has taken place to meet the needs identified in this regard.

Assumptions About Habits and Behavior

17. Contention 14 also alleges (d) the lack of a data base for the assumptions presented in the evacuation time estimate study concerning the length of time assumed for workers to return home for their families in preparation for departing the EPZ. Data regarding this concern are contained in Applicants' Exhibit EP-15, Attachment D at 11.¹³ Moreover, the assumptions of the study were reviewed by the Staff and FEMA and found reasonable (Staff Ex. EP-1, Urbanik, p. 5; Staff Ex. EP-2, Heard and Hawkins, p. 27). Work-to-home travel times are based on standardized trip length frequency distributions, as developed from home interview surveys throughout United States urban areas of all sizes. These distributions have proved to be predictable and stable for comparably sized areas. A maximum travel time of 20 minutes was adopted for a worker with both residence and work place in the EPZ (corresponding to a distance of over 13 miles). The actual work trip length frequency distribution used in the study assumed a work/trip length of up to 45 minutes; however, the small percentage of trips of between 20 and 45 minutes resulted in inclusion of this percentage within the 20 minutes figure. It also assumed that at a length of more than 45 minutes, the driver would not return home or would be denied access to the EPZ. This is part of the distribution function used for

¹³ Attachment D is entitled, "Assumptions Underlying Departure Times for Evacuation of the Catawba Nuclear Station Emergency Planning Zone," December, 1983.

preparation times in the EVACURVE module. Additionally, site-specific data compiled by PRC revealed that 85 percent of the people who work in York county also live in York county, lending further support to the assumptions regarding work/trip frequency distribution used in the Applicants' evacuation time estimate study.

18. One of the assumptions used to establish the work-to-home flow rates was that driver behavior would not be unusual, that is, not characterized by speeding, disregard of traffic regulations or using opposing lanes. Rather, congestion would limit urban speeds to 20 miles an hour, while rural speeds could reach 40 miles an hour. Because the average flow during an evacuation would range from 10 to 28 miles an hour, the actual time is determined by congestion, rather than unusual driver behavior. Dr. Urbanik testified that the assumption of rational driver behavior is based on actual experience in disasters. We find, therefore, that there is a data base for these underlying assumptions, that they are reasonable and that no convincing evidence was presented challenging their adequacy.

Consideration of "Worst Case" Weather

19. With regard to Intervenor's concern (e), we note that Applicants' evacuation time estimate study assumed a reduction in roadway capacity of 40 percent for adverse weather conditions (App. Ex. EP-15, Kulash, p. 11). This represents restricted traffic flow due to ice, snow, heavy rain and winds, and traffic not totally stopped. Total blockage of the roadway due to clearing of snow, fallen trees or floods was not considered, as it is expected that average snowfall could

accumulate as much as 3-4 inches before the roadways became completely blocked and resulted in a zero flow rate. The percentage reduction in roadway capacity to account for adverse weather remains fairly stable, although the causes could vary. Dr. Urbanik pointed out that if total blockage of roadways occurred due to snow, for example, the time to clear the roads must be added to the evacuation time estimates. The plan must be flexible enough to accommodate various scenarios. Consideration of adverse weather conditions is not intended as a "worst case" scenario, but rather assumes the roadway is still passable, at a reduced flow rate. There is an inherent danger in basing time estimate studies on only worst case scenarios: it could lead to advising the population to shelter when evacuation is feasible and safer. Moreover, there is an overwhelming probability that any accident would occur during the time periods defined as "normal" or "adverse" weather as defined in Appendix 4 to NUREG-0654. Neither case study presented in the PRC analysis assumes best case conditions. Normal evacuation already reduces the flow level from 1800 vehicles to 1200 vehicles which represents a reduced level of highway capacity. The adverse weather scenario further reduces this to only 60 percent of the capacity assumed for normal weather conditions. While this may not be "worst case," neither can either scenario be said to represent optimum conditions. If decisionmakers only had worst case estimates available to them, they would be denied the flexibility essential to making a realistic determination of what protective action recommendation would best serve the public health and safety. Therefore, we find that the "normal" and

"adverse" weather conditions used in the Applicants' evacuation time estimate study are appropriate and provide the best information to emergency planning officials for their decisionmaking. Accordingly, there is no merit to Intervenors' concern about "worst case" weather conditions.

Transient Populations at Carowinds and Heritage

20. The next point raised by Contention 14 (f) asserts that the transient population at Carowinds amusement park and Heritage U.S.A. has not been considered in the evacuation time estimate study. Peak summer traffic from Carowinds and Heritage U.S.A. was, in fact, considered by PRC, but this study was not submitted as a separate study in the original evacuation time study since this did not impact the time estimates to any significant degree. However, this separate study is contained in Attachment E to Applicants' Exhibit EP-15. The study established that the transient population from both Carowinds and Heritage U.S.A. can be evacuated without lengthening the projected maximum evacuation times. The study was conservative (tending toward longer times) because such peak transient population, which would likely occur on a summer holiday, is assumed at the "critical" time period for working hours during the school year. However, the transient populations at Carowinds and Heritage U.S.A. are at a minimum during the school year during working hours. James Oliphant, Loss Preventions

Operations Manager at Carowinds,¹⁴ testified that Carowinds has its own evacuation plan in development. He also stated that the current state plan calls for the evacuation of the park before the general population evacuation, that is, at the alert stage before the sirens are sounded to notify the general population. The entire park could be cleared in 2.5 hours and it would only take 1.5 hours to clear the parking lot. Since the flow out of the parking lot will start as soon as the Carowinds staff begins directing people out of the park, congestion in the parking lot will have dissipated by the time the park itself is completely empty. The plan calls for Carowinds employees to direct traffic out of the parking lots and access routes, but State police have the responsibility to route traffic on the highways. Both Oliphant and Kulash testified that traffic from Carowinds will not back up on I-77 to a degree significant enough to have a major impact on the evacuation time estimates for the general population EPZ. We have no evidence before us to refute this testimony, and are satisfied that sufficient attention is being given to problems of transient traffic by State and local officials.

Assumptions and Methodology

21. Contention 14 also questions (g) the methodology and assumptions used in the Applicants' evacuation time estimate study. The

¹⁴ Mr. Oliphant, whose responsibilities include fire, security, first aid and safety of Carowinds, was a rebuttal witness called by Intervenor.

methodology and assumptions used are set forth in Applicants' Exhibit EP-15, Attachment D. Dr. Urbanik testified that the methodologies used are accepted and proven transportation planning, modeling and operating transportation systems, and are consistent with Appendix 4 of NUREG-0654. There is nothing in the record to indicate that the methodology and assumptions used in the PRC study are unsound, or have no empirical data base. The population figures used in the study are taken from the 1980 US census, which provides a solid data base. Additionally, the population for special facilities was derived from actual contact with the facilities. In short, the Intervenors have not presented us with any basis from which to question the adequacy of the methodology and assumptions used, nor are we aware of any.

Minimum Evacuation Time

22. Finally, we turn to the question (h) as to what is appropriate to assume as a "minimum" time for evacuation of the Catawba EPZ. The Intervenors assert that 33 hours is the minimum time that should be assumed. In this regard, we note that Dr. Urbanik, who has the primary responsibility for reviewing time estimates for the NRC, testified that there is not even one site in the US where such an estimate would be reasonable. He pointed out that the general range of general population evacuation time estimates for all sites in the US under normal weather conditions is from a minimum of one hour to a maximum of 12 hours. While Dr. Urbanik did not directly address what the time range is under a "worst case" scenario, he testified that a decisionmaker could add the amount of time necessary to clear the roads

(e.g., a heavy snow) to the times estimated for adverse weather conditions. We have no reason to find that 33 hours is realistic for the Catawba EPZ. The evacuation time estimates before us for the Catawba EPZ considers various components, including adverse weather, special facility populations, transient populations, evacuation of school children, and the general population evacuation. The total evacuation times presented in the study range from four hours to six hours and fifteen minutes, including considerations of adverse weather and special facility population evacuation (App. Ex. EP-15, Kulash, Attach. A, p. 4). We have no evidence to support Intervenors' theory that 600 vehicles per lane per hour is realistic. Dr. Urbanik drove the roadways in the Catawba EPZ and performed independent calculations of volume-to-capacity ratios to determine if any parts of the network required times longer than those indicated in the Applicants' study, and found the analysis reasonable. The overwhelming evidence in the record before us supports our finding that the minimum time suggested by the Intervenors has no basis.

23. The longer evacuation time raised by the Intervenors involves an old, discredited estimate of the evacuation time for Catawba produced prior to NUREG-0654, which indicates that about thirty-three hours would be required to evacuate part of the plume EPZ near Rock Hill, South Carolina. This outdated document was apparently prepared under the loose guidance on estimating evacuation times which predated NUREG-0654. Contrary to Intervenors' assertion, none of the emergency

planners who testified could recall having reviewed this old time estimate, let alone having endorsed it as accurate.

24. The mere existence of an earlier, conflicting estimate of evacuation time does not in any way cast doubt on the validity of PRC's estimate. Comparing the backgrounds of the two studies leaves no doubt as to which was the more accurate. The thirty-three-hour estimate was based on an unknown method, produced results that cannot be duplicated, and is documented in a single-page letter. No witness was called who could testify to its validity. The three- to four-hour estimate, in contrast, is the product of a widely used, generally accepted method approved in NUREG-0654. It is supported by unrefuted expert testimony and is documented in an extensive series of reports. The method and results have been endorsed by independent experts and by State and local emergency management officials.

25. The Intervenor's have identified no feature of the earlier estimate that is more reasonable or realistic than the PRC estimate. This Board has heard no evidence that calls into question either the accuracy of the evacuation time estimates produced for the Applicants by PRC or the use of these estimates by the emergency planning officials.

26. As a result of the foregoing, we find that the Applicants' evacuation time estimate study satisfies the criteria set forth in NUREG-0654 Appendix 4, and has given adequate consideration to evacuation of schools, Carowinds and Heritage Park U.S.A., adverse weather and has used acceptable methodology and assumptions regarding

flow rates and people's work and living habits. We are fully satisfied that this time study provides decisionmakers with additional information and a basis on which a decision as to the feasibility of an evacuation could be made in the event of an emergency at the Catawba Nuclear Power Station. Thus, the Board finds that the allegations in Contention 14 lack merit.

27. Applicants' testimony on Contention 15 was combined with that on Contention 14, and consisted of a panel of witnesses from Applicants, the State of North Carolina, the State of South Carolina, Gaston County, N.C., Mecklenburg County, N.C. and York County, S.C. FEMA's testimony also addressed this contention. Intervenors filed no written testimony on Contention 15, but relied on cross-examination and testimony of rebuttal witnesses Nathaniel Davis, Jr., James T. Oliphant and Brenda Best.

28. Essentially, EPC 15 asserts that proper provisions have not been made for the evacuation of the transit-dependent population, and the population in special facilities, such as hospitals and nursing homes, due to a possible shortage of buses and bus drivers. The problem of parents picking up their children at school and the evacuation of school children was addressed in the discussion of Contention 14 and will not be repeated here.

29. Components of the transit-dependent population include households who do not own vehicles, those people in vehicle-owning households who are at home while the family vehicle is away, and the institutional population of schools, nursing homes, hospitals and

prisons in the EPZ. Each hospital, nursing home and penal institution in the EPZ was contacted to determine the number of evacuees, and a survey of EPZ residents was conducted to determine the number of household residents who would require transport in an emergency.

30. Pugh of North Carolina testified that while the North Carolina plan anticipates that most people without their own means of transportation will be able to secure transportation from neighbors or friends, nevertheless this planning includes the establishment of pick-up points by publicly controlled buses for those in need of this service. Additionally, the State emergency medical services has established agreements with all rescue squads and ambulance services to respond for evacuation of threatened hospitals and nursing homes. Evacuation of day care centers would be accomplished utilizing the staff of the facilities.

31. In York County, volunteer firemen and rescue squads would be used to evacuate hospitals and nursing homes. School buses would be used to transport those without private vehicles, and these buses would be driven by volunteers and could be supplemented by use of National Guard trucks. While it is true that these school buses are kept at the homes of the student drivers overnight, York County has adequate plans to deal with this contingency. The testimony shows that 250 buses are immediately available in the county, without the resort to these student driven buses. However, if these buses are subsequently needed, volunteer firemen would then be instructed to either report to the individual bus locations to pick up the buses, or would gather at a

central location from which they would be taken as a group and let off one by one at the student drivers' homes.

32. The Gaston County plan calls for police officers and the central transport service to pick up the transit-dependent. The one day care center would also be evacuated by use of the central transportation vans. There is no hospital in the Gaston portion of the EPZ, and the one nursing home has but five residents who would be evacuated by private auto.

33. The Mecklenburg County plan includes provisions for use of the City Department of Transportation buses as a primary source of transportation for the transit-dependent. While student drivers drive school buses in North Carolina, they would only be used to evacuate school children. If needed for transport of any of the dependent population, adult volunteers (firemen, police, emergency workers) would be used. There are no hospitals within the Mecklenburg County portion of the EPZ, and only one nursing home, which can handle its own needs. The day care facilities have not indicated any need for transport assistance, with one exception, and a bus will be provided for this center.

34. Thomas of York County testified that the York County plan calls for the use of school buses driven by volunteer firemen to evacuate the transit-dependent. While buses driven by students will be used to evacuate schools, they will not be used for any other purpose. All of the hospitals and nursing homes and day care centers in the York

County portion of the EPZ have been contacted to determine the number of buses required for evacuation.

35. FEMA witnesses testified that each of the State and county plans contain provisions for evacuation of the transit-dependent population using school buses, ambulances and rescue squads.

36. The school bus supply and demand was analyzed in the Applicants' time estimates study in connection with separate studies of evacuation of schools and evacuation of the transit-dependent populations. Both these studies show that an adequate supply of school buses and additional transportation from other sources are available for evacuation of both schools and the transit-dependent population in the Catawba EPZ. We note that only York County anticipates the need for multiple bus trips to evacuate its school districts 2, 3 and 4, and while this will be carried out by student drivers, any other use of these buses for the remainder of the transport-dependent population will be restricted to volunteer firemen as drivers.

37. Given the record before us, we find nothing in the record to contradict the assertion by both State and local emergency planners that an adequate number of buses and drivers will be available in the event of an emergency at the Catawba Nuclear Station. Identification of the mobility-impaired and transit-dependent population is in the process of being carried out in North Carolina and South Carolina.

38. We find that, contrary to the assertions in the contention, careful attention has been paid to the needs of the

transit-dependent population, including schools, and the Board is satisfied that the plans provide reasonable assurance that effective protective actions can be taken with regard to protection of the transit-dependent population.

39. Finally, regarding the concern that citizens will refuse to leave their homes, no evidence was presented by the Intervenors supporting this assertion. Instead, the record indicates that in emergency situations people follow the instructions of public officials.

40. We find that the emergency response plans developed by the States and counties are adequate and provide reasonable assurance that the EPZ can be safely evacuated. Thus, we find that the allegations in Contention 15 lack merit.

H. Intervenors' Emergency Planning Contention 18--
Adequacy of Local Telephone System

1. EPC 18 alleges that:

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 communications system will be effectively knocked out. This applies especially to the notification of school bus drivers as specified in the plan.

2. The appropriate standards and criteria in regard to this contention are NUREG-0654 II.E. and II.F. Criterion II.E.2. provides that: "each organization shall establish procedures for alerting, notifying and mobilizing emergency response personnel". Planning Standard II.F. provides that: "provisions exist for prompt

communications among principal response organizations to emergency personnel and to the public".

3. Applicants presented a panel of witnesses consisting of Stan D. Coleman, Jr., Michael E. Bolch, J. T. Pugh, III, P. R. Lunsford, Bob E. Phillips, Lewis Wayne Broome and Phillip Stevens Thomas. John C. Heard, Jr. and Thomas I. Hawkins testified for FEMA. The Intervenor did not present direct testimony on this contention.

4. In their proposed findings in paragraphs 3 and 4 on page 186, the Intervenor state:

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 keepers, to accomplish notification of at least the key emergency personnel in the event of an emergency at the facility.

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. From the above statements we find that certain issues have been adequately addressed by the Applicants' witnesses and thus they are beyond the concern of the Intervenor and are no longer in controversy. These issues are (1) notification of the station response team, (2) notification of officials of the three counties, and (3) notification of state and local officials. Applicants' witnesses Bolch, Coleman and Lunsford have addressed these aspects of this

contention in detail and have found that a variety of communication systems are available for notification (App. Ex. EP-16, Coleman and Bolch pp. 1-7; Lunsford pp. 1-2). Their testimony leads us to agree with the Intervenors. We therefore find that the various means of communication other than public telephone lines are adequate for notification of these key emergency personnel in the event of an emergency at Catawba.

6. Remaining concerns of the Intervenors are the availability of the local telephone systems in the event of an emergency to (1) lesser emergency workers and (2) members of the general public who would seek to communicate with emergency management officials.

NOTIFICATION OF EMERGENCY RESPONSE PERSONNEL

7. In Gaston County, word of an emergency will be received by telephone or by radio at the county warning point and the county communications center. The warning point is staffed 24 hours a day, seven days a week; at least two telephone communicator would notify 25 county department personnel on a priority basis if an emergency occurs. There is radio communication capability from the EOC to radio-equipped police, fire, ambulances and civil defense personnel (App. Ex. EP-16, Phillips, p. 1). Persons to be notified are listed in a standard operating procedure at the communications center. These persons would normally be contacted by the telecommunicators. However, in the event that the system became overloaded, radio communication would be used or a police officer would be sent to their residences (Tr. 1440-41,

Phillips 5/8/84). Also, Gaston County has acquired a radio for two-way communication with EBS (Tr. 1404, Phillips 5/8/84).

8. In Mecklenburg County, if telephone systems become overloaded, emergency response personnel could be notified in a timely manner by radio, by sending a vehicle or by an emergency EBS announcement (App. Ex. EP-16, Broome, p. 1). Ten minutes is the maximum estimated time anticipated for notification of the essential personnel to man the Mecklenburg County EOC (Id., p. 2). If emergency management personnel are not in their office, they can be reached by pager or by broadcast to their radio-equipped cars. If they are at home and cannot be reached by telephone, a police car could be sent for them (Tr. 2887-88, Broome 6/5/84).

9. The York County Emergency Operations plan states that the first person in York County's government to be notified in the event of a radiological emergency at Catawba is the dispatcher at the sheriff's department in Rock Hill (App. Ex. EP-16, Thomas p. 1). The dispatcher has a pre-determined list of persons to contact which includes the Director of the Emergency Preparedness Agency, people in the law enforcement system, his supervisor, the sheriff, etc. This can be accomplished either by telephone or through radio communication. The Emergency Preparedness Agency Director must in turn call four persons. It is estimated that this will take no longer than 5 to 7 minutes (Id., pp. 1-2; Tr. 1423, 5/8/84). No problem is anticipated even if telephone circuits are overloaded in contacting emergency workers since backup methods of communication are available (Tr. 1438-39, Thomas 5/8/84).

Backup sources of communication which are available for volunteer firemen, the emergency preparedness director and emergency management support (EMS) personnel are tone and voice pagers. EMS personnel also have walkie-talkies (Tr. 1430, Thomas 5/8/84).

10. The Board finds that in the event that telephone systems in Gaston, Mecklenburg and York counties become overloaded, there is reasonable assurance that other means of prompt notification of county emergency response personnel will be available.

TRANSPORTATION-DEPENDENT PERSONS

11. In the event the telephone systems are overloaded, there are several ways of communicating with transportation-dependent persons. An EBS message would be used that would indicate locations at which people could be picked up. The supplemental mobile system for siren notification would also be available for people who need assistance. Persons needing transportation could contact personnel in these emergency vehicles (App. Ex. EP-16, Broome, p. 3).

Transportation-dependent persons would be told by an EBS message to stand on their front porch or hang a handkerchief on the door. Also the Duke information brochure advises transportation-dependent persons to identify themselves to their local emergency management office in advance of an event as to their need for transportation (Tr. 1435-36, 1432, Thomas 5/8/84). Gaston County compiles a list of transportation-dependent persons annually (Tr. 1434, Phillips 5/8/84). In addition to picking up persons on prearranged routes, there would be emergency vehicles on the road looking for people who need

transportation (App. Ex. EP-16, Phillips, p. 5; Tr. 1452-53, Thomas, Phillips and Pugh 5/8/84). In York County, school buses would be utilized to transport transportation-dependent persons. Rural volunteer firemen will serve as school bus drivers to transport these persons. Firemen can be notified by the sheriff's department through their tone and voice pagers (Tr. 1424-25, Thomas 5/8/84). In Gaston County, county vehicles rather than school buses will be used to pick up people who need transportation (App. Ex. EP-16, Phillips, pp. 4-5).

12. From the above, the Board finds that in the event of an emergency there are adequate means of notification of transportation-dependent persons in Gaston, Mecklenburg and York counties.

NOTIFICATION OF SCHOOL BUS DRIVERS

13. Witness Broome testified that overloading of the telephone system would not interfere with notification of school bus drivers in Mecklenburg County because, if school were in session, drivers would be at the schools and would be notified by the tone alert system. If schools were not in session, there would be no problem or concern with school evacuation (App. Ex. EP-16, Broome, p. 4). Witness Phillips testified that in Gaston County if the schools were in session, to notify drivers he would call the principal of the school. If the schools were not in session, the school buses would not be needed (App. Ex. EP-16, Phillips, pp. 4-5). Witness Thomas indicated that in the event the telephone systems of York County were overloaded, school bus drivers could be notified by the tone alert radios in the schools which

would alert personnel to listen to EBS broadcasts. Bus drivers would be at the schools and would be notified by school officials (App. Ex. EP-16, Thomas, pp. 5-6).

14. The Board finds that in the event of an emergency when schools were in session and the telephone system were to become overcrowded, there are adequate provisions for notification of school bus drivers. If schools are not in session, notification of bus drivers is not required except where buses are to be used for transportation-dependent people. In these instances, the tone-alert and voice pagers can be utilized to contact drivers.

15. After consideration of all evidence bearing on the availability of the local telephone systems in case of an emergency, to lesser emergency workers and members of the general public who need to communicate with emergency management officials, we find that adequate alternate means of notification are available. We find that there is reasonable assurance that the requisite notifications can be accomplished even with overloading of local telephone systems. If there is overloading of the telephone systems, we find that transportation-dependent persons would be able to arrange for, or signal for transportation. Finally, we find that school bus drivers can be notified in a timely manner even though there is overloading of the local telephone systems.

V.

CONCLUSIONS OF LAW

The Board has considered all of the evidence submitted by the parties in this proceeding on the emergency planning issues. Based upon a review of that record and the foregoing Findings of Fact the Board concludes that:

1. the emergency plans meet the requirements of 10 CFR 50.47, and Appendix E to 10 CFR Part 50, as well as the criteria of NUREG-0654, and provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency.

2. the issuance of operating licenses to the Applicants, as conditioned in the Order, will not be inimical to the common defense and security or to the health and safety of the public, and

3. pursuant to 10 CFR 2.760a and 10 CFR 50.57, that the Director of Nuclear Reactor Regulation is authorized to issue to the Applicants, upon making requisite findings with respect to the matters not embraced in this Supplemental Partial Initial Decision, licenses authorizing operation of Catawba Nuclear Station, Units 1 and 2, subject to the satisfaction of the conditions set forth in the Order.

VI.

ORDER

Wherefore, It Is Ordered, in accordance with 10 CFR 2.760a and 10 CFR 50.57, that the Director of Nuclear Reactor Regulation is authorized to issue to the Applicants, upon making requisite findings with respect to matters not embraced in this Supplemental Partial Initial Decision, the licenses authorizing the operation of Catawba Nuclear Station, Units

1 and 2 provided that the following conditions are met within 180 days following the initial issuance of an operating license.

1. (a) Applicants' Brochure shall state that high levels of radiation are harmful to health and may be life threatening and such statement shall be contained within that portion of the brochure that deals with actions to be taken in the event of an emergency; (b) the warning signs and decals shall specify the types of emergencies they cover including nuclear; (c) the warning signs and decals shall notify transients as to where they can obtain local emergency information, as provided in NUREG-0654 Evaluation Criterion II.G.2; and (d) Applicants' emergency plans shall reflect the kinds of locations within the plume exposure EPZ wherein the warning signs and decals and emergency response information will be placed and the procedures employed to assure that sufficient numbers are being distributed to effectively reach the transients, and that the plans be implemented.

2. We require of Applicants that there be comprehensive plans for early notification to Carowinds of a radiological emergency at Catawba and for evacuation of Carowinds. They shall describe the responsibilities of the emergency response organizations of Mecklenburg and York Counties and provide for their efforts to be coordinated among themselves and with Carowinds' officials. Provisions in the plans shall be made to immediately notify patrons and staff of Carowinds at the time of the precautionary closing of the park, of the cause of the emergency. The means to implement the plans shall be made available.

3. Applicants shall fulfill the above conditions to the satisfaction of the Staff, within the time specified above.

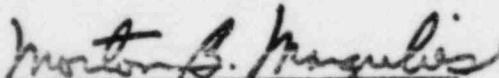
Furthermore, not as a condition of the licensing, we direct that: (1) Applicants confirm to FEMA and the Staff that FEMA's finding arising from the February 1984 exercise, that more Gaston County personnel be trained in monitoring and decontamination procedures, has been addressed; and (2) Applicants obtain charges to the South Carolina Emergency Plan which will show the role and responsibilities of the Division of Public Safety in the Office of the Governor of South Carolina in ordering evacuations along with the identification of key individuals by title, and provide copies to FEMA and Staff.

Pursuant to 10 CFR 2.760(a) of the Commission's Rules of Practice, this Supplemental Partial Initial Decision will constitute the final decision of the Commission forty-five (45) days from the date of issuance, unless an appeal is taken in accordance with 10 CFR 2.762 or the Commission directs otherwise. (See also 10 CFR 2.764, 2.785 and 2.786).

Any party may take an appeal from this decision by filing a Notice of Appeal within ten (10) days after service of this decision. Each appellant must file a brief supporting its position on appeal within thirty (30) days after filing its Notice of Appeal (forty (40) days if the Staff is the appellant). Within thirty (30) days after the period has expired for the filing and service of the briefs of all appellants, (forty (40) days in the case of the Staff), a party who is not an appellant may file a brief in support of or in opposition to the

appeal of any other party. A responding party shall file a single, responsive brief regardless of the number of appellants' briefs filed. (See 10 CFR 2.762(c)).

THE ATOMIC SAFETY AND
LICENSING BOARD


Morton B. Margulies, Chairman
ADMINISTRATIVE LAW JUDGE


Dr. Robert M. Lazo
ADMINISTRATIVE JUDGE


Dr. Frank F. Hooper
ADMINISTRATIVE JUDGE

Dated at Bethesda, Maryland
this 18th day of September 1984.

APPENDIX A

LIST OF WITNESSES

Linda Harris Anderson	Director, Chapter Manager of the Rock Hill Chapter of the American Red Cross
Arlene Bowers Andrews	College of Social Work University of South Carolina
Dr. M. Reada Bassiouni	Acoustics consultant, Acoustic Technology, Inc.
Branda Wagnon Best	Schoolteacher, Olympic High School
Mary L. Birch	Systems Engineer, Radwaste Engineering Section, Duke Power Company
Michael E. Bolch	Emergency Preparedness Coordinator, Duke Power Company
Lewis Wayne Broome	Administrative Officer, Charlotte-Mecklenburg Emergency Management Office
Dayne Brown	Chief of the North Carolina Radiation Protection Section, Division of Facility Services
Phillip F. Carter	Director, Community Relations, Duke Power Company
Mary Cartwright	General Manager Public Relations, Duke Power Company

Mark A. Casper	Meteorologist for the Design Engineering Department, Duke Power Company
Marvin Chernoff	Polling Consultant, President, Chernoff Silver Associates
Stan D. Coleman, Jr.	Design Engineer, System Communications Transmission Department, Duke Power Company
Nathaniel Davis, Jr.	Director of Transportation for York School District, No. 1
Harold Mason Dickson	Chairman of the York County Council
Dr. Susanna V. Duckworth	Assistant Professor, Winthrop College
Robert F. Edmonds, Jr.	Senior Engineer, Civil/Environmental, Duke Power Company
James E. Fairobent	Meteorologist, Meteorology Section, Meteorology and Effluent Treatment Branch, Division of Systems Integration, Office of Nuclear Reactor Regulation, Nuclear Regulatory Commission
Luther L. Fincher, Jr.	Acting Director for Emergency Management of Charlotte and Mecklenburg County
Dr. Samuel L. Finklea, III	Bureau of Radiological Health, South Carolina Department of Health and Environmental Control
R. Michael Glover	Emergency Response Coordinator, Duke Power Company

Kathleen B. Gordon	Emergency Management Planning Review Committee, Mecklenburg County
James Gregory, Jr.	Planner, South Carolina Emergency Preparedness Division
E. H. Harris, Jr.	Assistant Director for Emergency Response, North Carolina Division of Emergency Management
Thomas J. Hawkins	Emergency Management Program Specialist Radiological Emergency Planning FEMA Region IV, Liaison with North and South Carolina
John C. Heard, Jr.	Chief, Technological Hazards Branch, Natural and Technological Hazards Division FEMA, Region IV
Dennis Johnson	Disaster Specialist for the American Red Cross
Walter M. Kulash	Consultant emergency management planning, Associate vice- president, PRC Engineering
Betty Long	Director of Service to the Armed Forces and Disaster Services for the American Red Cross covering Charlotte/Mecklenburg
Paul R. Lunsford, Sr.	Chief Area Coordinator, Emergency Preparedness Division, Office of the Adjutant General, State of South Carolina

William M. McSwain	Exercise Training Officer South Carolina Preparedness Division
Major Philip Needham	Divisional Secretary of the Salvation Army for North Carolina and South Carolina
James Edward Neves	Regional Director, State Division of Social Services for the Western Region of North Carolina
James T. Oliphant	Loss Prevention Operations Manager, Carowinds
Bob E. Phillips	Director of the Gaston County Emergency Management Agency
Ruth Wanzer Pittard	Director of Audio Visual Services, Davidson College
J. Elbert Pope	Sheriff of York County, South Carolina
Thomas E. Potter	Consultant on health and safety aspects of nuclear power, Pickard, Lowe and Garrick, Inc.
Jesse Thomas Pugh, III	Division Director, North Carolina Department of Crime Control and Public Safety, Division of Emergency Management
Jesse L. Riley	Carolina Environmental Study Group

Perry D. Robinson	Emergency Preparedness Specialist, Emergency Preparedness Licensing Branch, Division of Emergency Preparedness, Office of Inspec- tion and Enforcement, Nuclear Regulatory Commission
Philip Layne Rutledge	Market Researcher, Astrovision
Frank B. Sanders	Director, Division of Public Safety, Governor Riley's Office, State of South Carolina
Steven C. Sholly	Technical Research Associate Union of Concerned Scientists
Leonard Soffer	Section Leader of the Accident Risk Section, Reactor Risk Branch, Division of Risk Analysis, Office of Nuclear Research, Nuclear Regulatory Commission
Phillip Steven Thomas	Acting Director of Emergency Preparedness, York County, South Carolina
Judith D. Turnipseed	Public Information Officer, Division of Public Safety, Office of the Governor of South Carolina
Ray Twery	Lecturer in Statistics, Department of Mathematics and Computer Science, University of North Carolina, at Charlotte
Dr. Thomas Urbanik, II	Associate Research Engineer associated with Texas Transportation Institute of the Texas A&M University System

APPENDIX B

LIST OF EXHIBITS

<u>No.</u>	<u>Description</u>	<u>Tr.Pg. Ident.</u>	<u>Tr.Pg. Rec'd</u>
<u>Applicants' Exhibit</u>			
No. 1	North Carolina Emergency Plans	128	588
No. 2	South Carolina Emergency Plans	128	588
No. 3	Catawba Nuclear Power Station Emergency Plan	129	588
No. 4	Duke Power Company Crisis Management Plan for Nuclear Stations	129	588
No. 5	Catawba Nuclear Station Emergency Plan brochure, 1984 edition	130	588
No. 6	Catawba Nuclear Station Student Emergency Plan	130	588
No. 7	Applicants' Testimony on Emergency Planning Contentions No. 1 and No. 7	141	519
No. 8	Catawba Nuclear Station Emergency Plan brochure, undated.	170	588
No. 9	Public Warning Decal	270	270
No. 10	Brochure: "Agriculture and Nuclear Power in South Carolina"	373	588
No. 11	Brochure: "In Time of Emergency, A Citizen's Handbook on Nuclear Attacks and Natural Disasters"	373	588
No. 12	Brochure: "Disasters, What To Do To Protect Yourself"	373	588

No. 13	Applicants' Testimony on Emergency Planning Contention 3	603	603
No. 14	Applicants' Testimony on Emergency Planning Contention 6	883	883
No. 15	Applicants' Testimony on Emergency Planning Contentions 14 & 15.	1005	1005
No. 16	Applicants' Testimony of Emergency Planning Contention 18	1343	2809
No. 17	Applicants' Testimony on Emergency Planning Contention No. 9	1825	1825 1829
No. 18	Nurkin Press Release	1982	1982
No. 19	Applicants' Testimony on Emergency Planning Contention 11	2006	2006
No. 21	Applicants' Testimony on Emergency Planning Contention 8	2809	2809
No. 21A	Ltr. 5/30/84 from Ms. Cottingham w/revised pp. 6 and 6A of Harris/Pugh testimony in Appl. Exhibit EP-21	2817	2817
No. 22	Operations Map Catawba Nuclear Station, of January 1984		Board Order of 6/15/84 assigning- exhibit numbers
No. 23	Ingestion Pathway Map Catawba Nuclear Station, Sheet 1		Board Order of 6/15/84 assigning exhibit numbers
No. 24	Ingestion Pathway Map Catawba Nuclear Station, Sheet 2		Board Order of 6/15/84 assigning exhibit numbers
<u>Intervenors'</u> <u>Exhibits</u>			
No. 1	Letter of April 13, 1983 to Jane Lesser	169	
No. 2	Letter from Pugh to Glover dated 6/28/83	395	397
No. 3	Letter from Glover to J. Moore, et al. dated 4/21/83	401	

No. 4	Letter dated 4/22/83 from Duckworth to Carter	422	
No. 5	Letter dated 8/24/83 from Duckworth to Carter	442	
No. 6	Letter dated 2/8/84 from S. Duckworth to P. Carter	443	443
No. 7	"Catawba Information Programs" prepared by Mary Cartwright, dated 8/26/83	467	519
No. 8	"The New Generation," Volume II, No.4, 12/83	478	482
No. 9	Chernoff/Silver & Associates Community Issues Survey	493	
No. 10	Community Issues Survey dated 9/83	497	
No. 11	Brochure, "How Much Radiation Do You Receive?"	499	501
No. 12	Letter from Pat Osborne, addressed "Dear Neighbor" dated 5/6/83	571	572
No. 13	Applicants' Answers and Objections to CESA and Palmetto Alliance's First Round of Interrogatories, Questions 7-3 and 7-7; and 3/20 pleading, Applicants' Supplemental Answers	617	
No. 14	"Guidelines and Procedures, American Red Cross Disaster Services, Shelter Management Guide for Trainees"	734	
No. 15	List of Emergency Shelters	821	4504
No. 16	Letter dated 7/16/80 to H. R. Denton, from W. O. Parker, Jr., with 7pp attachment	1163	1165
No. 17	Letter dated 5/7/80 to Devine Savior Hosp. & Rock Hill Convalescent Ctr. from J. W. Hampton	1170	1170
No. 18	Letter dated 10/31/83 to Lee from Lutes	1178	1178
No. 19	Letter dated 11/8/83 to Hendricks from Glover (cover) with Attachments of 2 letters	1180	1182
No. 20	Letter dated 12/2/83 to Hendricks from Glover	1183	1184
No. 21	Letter dated 1/18/83 to McSwain from Thomas	1184	1191

No. 22	Memo PRC Voorhees dated 1/24/83 to Kulash from Lutes, 12 pp. attachment	1206	1208
No. 23	Interoffice PRC memo 2/4/83 to Lee from Kulash & Lutes, w/attachments	1206	1208
No. 24	Letters dated 2/7/83 from Hager to Phillips, Carroll, Broome, Self and McSwain	1207	1208
No. 25	Letter dated 2/16/83 to Lee from McSwain	1207	1208
No. 26	Letter dated 2/17/83 to Kulash from Edmonds, with attachment	1207	1208
No. 27	Letter dated 3/9/83 to Lutes from Hager, with attachment	1207	1208
No. 28	Memorandum dated 3/17/83 from Carroll Ref, Draft Emergency Evac. Time Estimate	1208	1208
No. 29	Memorandum dated 3/18/83 from Lee to Tucker, Attn: Glover with PRC 2-page attachment	1208	1208
No. 30	FEMA letter dated 8/9/83 from Woodard to Moore, with 3-page RAC enc.)	1601	1602
No. 31	FEMA letter dated 8/18/83 from Woodard to Pugh with 2-page RAC encl.	1601	1602
No. 32	Letter dated 11/16/83 to Woodard from Moore & Pugh	1604	1629
No. 33	Hypothetical Plume Projection Catawba Exercise 0802 hours, 2/16/84	1628	1628
No. 34	Critique Sheet for Controllers/Evaluators, /s/ Morgan 2 pp.	1645	
No. 35	Critique Sheet for Controllers/Evaluators /s/ Conolly 3 pp.	1646	
No. 36	FEMA letter dated 3/23/84 from Woodard to Pugh, with 1-page RAC enc.	1647	1647
No. 37	FEMA letter dated 3/23/84 from Woodward to Moore, with 1-page RAC enc.	1647	1647

No. 38	Intervenors' Testimony of: Rutledge, Pittard and Andrews	1724 1754	1810
No. 39	Letter dated 12/27/83 to Hampton from Carowinds, emergency plan attached	1917	1918
No. 40	"Carowinds PTL Planning Meeting," 2/1/83	1919	1966
No. 41	Memo dated 3/9/83 from Lutes to Lee	1920	1966
No. 42	Request for Board action on extension of EPZ	1981	1982
No. 43	1980 Population and Population Density	2017	1017
No. 44	Map Core Area of City of Charlotte	2149	2150
No. 45	Document entitled, "1982 High Accident Locations Priority Order"	2159	2159
No. 46	Charlotte All-Hazards Plan, 1982	2162	2162
No. 47	Glover memo to file dated 7/20/82	2165	
No. 48	Testimony of Riley & Twery	2248	2308
No. 49	Testimony of Sholly	2248	2308
No. 50	Map of City of Charlotte	2295	2295
No. 51	Document entitled "Tracking Survey"	4277	
No. 52	Report on Chemical Fire	4442	4442
No. 53	Letter dated 1/31/84 to teachers at schools in Catawba EPZ from S. Isola	4545	4545
No. 54	Announcement on Drills	4550	4550
No. 55	North Carolina Executive Order No. 72 dated 12/14/81		Board Order of 6/15/84 assigning exhibit numbers

Staff Exhibits

No. 1	Testimony Urbanik, Concerning Evacuation Time Estimate Studies	1258	1258
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No. 2	Testimony FEMA Witnesses Heard and Hawkins	1463	1463
No. 3	FEMA Interim Findings Report	1468	1468
No. 3A	Memo dated 5/8/84 to Jordan from Krimm	4081	4180
No. 4	FEMA Exercise Report 3/5/84, Catawba Nuclear Station Exercise 2/15-16/84	1662	
No. 5	Testimony of Soffer, Fairbent, and Robinsen	2573	2573