910

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

DOCKETED
USNRC

'84 AUG 10 A11:40

In the Matter of	)	
	)	
DUKE POWER COMPANY, ET AL.	)	Docket Nos. 50-413 OL
	)	50-414 OL
(Catawba Nuclear Station, Units 1 and 2)	)	

NRC STAFF'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW IN THE FORM OF A SUPPLEMENTAL PARTIAL INITIAL DECISION ON EMERGENCY PLANNING

Henry J. McGurren
Counsel for NRC Staff

George E. Johnson
Counsel for NRC Staff

August 8, 1984

8408130270 840808
PDR ADOCK 05000413
G PDR

DS01

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

DOCKETED
USNRC

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

'84 AGO 10 A11:40

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

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

NRC STAFF'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW IN THE FORM OF A SUPPLEMENTAL PARTIAL INITIAL DECISION ON EMERGENCY PLANNING

Henry J. McGurren
Counsel for NRC Staff

George E. Johnson
Counsel for NRC Staff

August 8, 1984

TABLE OF CONTENTS

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

DOCKETED
USNRC

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

'84 AGO 10 A11 :40

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

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

SUPPLEMENTAL PARTIAL INITIAL DECISION
ON EMERGENCY PLANNING

I. SCOPE OF DECISION

1. This is a proceeding on application for operating licenses for the Catawba Nuclear Station, Units 1 and 2. The Applicants in this operating license proceeding are Duke Power Company (referred to as Duke or the Company), North Carolina Municipal Power Agency Number 1 (NCMPA-1), North Carolina Electric Membership Corporation (NCEMC) and Saluda River Electric Cooperative (SREC), the joint owners of Units 1 and 2 of the Catawba Nuclear Station (Catawba). The Catawba facility is located on the shore of Lake Wylie in York County, South Carolina, approximately 17 miles southwest of Charlotte, North Carolina. The Emergency Planning Zone (EPZ) for the Catawba facility extends into two counties of North Carolina -- Mecklenburg and Gaston. The facility's two pressurized water reactors are designed to operate at core power levels up to 3411 thermal megawatts, with a net electrical output of 1145 megawatts per unit.

2. This Supplemental Partial Initial Decision addresses the adequacy of the emergency planning for the Catawba Nuclear Station based on the record of litigation of the ten contentions which challenged aspects of offsite emergency plans for the Catawba facility. As is discussed below, we find that such emergency plans are adequate and that the contentions lack merit.

II. PROCEDURAL BACKGROUND[1/]

1. "The history of the Catawba operating license proceeding has been outlined in the June 22, 1984 Partial Initial Decision in this proceeding and will not be repeated here. That decision sets forth the findings of the original Atomic Safety and Licensing Board in this proceeding[2/] on the issues of quality assurance, spent fuel storage, reactor pressure vessel embrittlement, and assessment of adverse meteorology in FES accident analyses. Duke Power Company, et al. (Catawba Nuclear Station, Units 1 and 2), ASLBP No. 81-463-06-OL, ___ NRC ___ (June 22, 1984)."

2. "In that Partial Initial Decision, the Licensing Board ruled in Applicants' favor on the quality assurance issue, subject to

---

1/ Since the Staff had no disagreement with Applicants' statement of the procedural background of the case, this section has been borrowed verbatim from section II.C. of Applicants' Proposed Findings of Fact in the Form of a Supplemental Partial Initial Decision on Emergency Planning, pages 10-17. Quotation marks set off these paragraphs. Footnotes, however, have been renumbered according to the Staff's proposed findings.

2/ The original Board consists of James L. Kelley, Esq., Chairman, Dr. Richard F. Foster and Dr. Paul W. Purdom.

(1) Applicants' satisfaction of certain procedural conditions set forth in the order; (2) Applicants' demonstration of reasonable assurance that the concerns of "Welder B" as described in the decision do not represent a significant breakdown in quality assurance; and (3) Applicants' demonstration of reasonable assurance that the Catawba emergency diesel generators can perform satisfactorily. The Board retained jurisdiction over the issues raised by conditions (2) and (3) (id., slip op., at 271-272). The Board also ruled in Applicants' favor on the issue of reactor pressure vessel embrittlement (id., slip op., at 252-258). The issue of spent fuel storage became uncontested when Intervenors failed to file proposed findings of fact on it, and was dismissed (id., slip op., at 1)."

3. "The Board found against the Staff and the Applicants on the issue of whether the FES properly considered adverse meteorology in assessing the environmental consequences of design basis and severe accidents (id., slip op., at 269-270). Although the Board found the FES deficient in this respect, it ruled that this did not change the cost-benefit analysis for Catawba. It further ruled that the lack of reasonable assurance on this point constituted harmless error (id., slip op., at 269-270)."

4. "The June 22, 1984 Partial Initial Decision did not rule on emergency planning issues. In its Orders of August 17, 1983, and September 19, 1983, the Licensing Board had admitted 10 emergency planning contentions sponsored jointly by Intervenors Palmetto Alliance and Carolina Environmental Study Group (Intervenors). In brief, these contentions allege that the public information provided by Duke (in

particular, Duke's brochure) and by state and local officials is deficient (EPC-1 and EPC-7); that the offsite emergency plans do not provide for sufficient food, clothing, bedding and shelters for evacuees (EPC-3); that the offsite emergency plans do not contain adequate provisions for preventing contaminated individuals from entering decontaminated zones (EPC-6); that the plans fail to delineate clearly primary and support responsibilities (EPC-8); that the plans do not adequately provide for emergency notification (EPC-9); that the EPZ should be expanded to include part of Charlotte, N.C. (EPC-11); that Duke's evacuation time study is deficient and that the plans' provisions for transportation of evacuees are inadequate (EPC-14 and EPC-15); and that the emergency communication system is insufficient (EPC-18).[3/]"

5. "Upon completion of forty-five days of hearings on environmental and safety contentions which led to the issuance of the June 22. 1984 Partial Initial Decision, the original Board concluded that scheduling conflicts and time constraints necessitated the appointment of a separate Atomic Safety and Licensing Board to hear emergency planning contentions, in order to avoid the possibility that Unit 1 might sit idle. Accordingly, the original Board granted the Applicants' motion[4/] to bifurcate the proceeding. The NRC Staff supported Appli-

---

3/ The procedural background of each of these contentions is discussed below in the proposed findings on that contention.

4/ "Motion to Bifurcate the Hearing and Request for the Appointment of a Separate Atomic Safety and Licensing Board to Rule on the Emergency Plan Contentions," January 18, 1984.

cants' motion. Bifurcation was sought in order to prevent significant and unnecessary delay in the granting of a full-power license should the Applicants demonstrate their entitlement to such a license. See the Commission's Statement of Policy on Conduct of Licensing Proceedings, CLI-81-8, 13 NRC 452, 453 (1981)."

6. "In requesting bifurcation, the original Licensing Board specifically concluded that the Intervenors would not be prejudiced by the establishment of a new Board and the scheduling of a hearing on emergency planning issues during the approximate time frame of April-May, 1984. "Memorandum and Order (Concerning Motion to Bifurcate this Proceeding)," February 21, 1984, at 4. Subsequently, the Chief Administrative Judge, Atomic Safety and Licensing Board Panel, established this separate Atomic Safety and Licensing Board, consisting of Morton B. Margulies, Chairman, Dr. Robert M. Lazo, and Dr. Frank Hooper, to preside over all emergency planning issues in this operating license proceeding."

7. "Hearings on the emergency planning contentions were held on May 1-4, May 7-11, May 23-25, and June 5-8, 1984. All parties at the hearing were represented by counsel, presented testimony, and cross-examined witnesses. The Board heard testimony from 50 witnesses. 25 of these witnesses were called by Applicants, 4 were called by the NRC Staff, 2 were called by FEMA, 6 were called by Intervenors as part of their direct case, and 13 were subpoenaed by Intervenors and allowed to present rebuttal testimony. 86 exhibits were offered, of which 72 were

admitted into evidence.[5/] The record was closed on June 8, 1984 (Tr. 4622), with the exception of the Board's future ruling on Intervenors' proposed Contention 20. We herein reject that proposed contention.[6/] Thereafter, Duke, the NRC Staff and the Intervenors submitted proposed findings of fact and conclusions of law."

8. "This Partial Initial Decision covers the ten emergency planning contentions raised jointly by Intervenors Palmetto Alliance and

---

5/ 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 "Exh. EP-1" etc. The transcript pages have also been numbered separately from the safety phase transcript pages. The renumbering began 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., (Apps. Exh. EP-7, Pugh, at 1). Citations to the record of the safety phase of the hearing will be designated "S. Tr. ___." [It may be noted that Staff citations to the transcript do not include the date.]

6/ "Carolina Environmental Study Group and Palmetto Alliance Supplemental Contention Regarding Specific Emergency Plan for Southwest Charlotte," May 30, 1984, seeks the admission of another contention dealing with the adequacy of emergency planning for that part of Charlotte, N.C. that is within a 17-mile radius of Catawba. We have considered this late-filed contention and the Applicants' and NRC Staff's responses to it. After balancing the five factors set forth in 10 C.F.R. §2.714(a), we find that factors (i), (iii) and (v) weigh heavily and decisively against its admission. We reject proposed Contention 20. [The Staff assumes that the Board will be issuing a separate order, giving its ruling and basis for decision on proposed Contention 20.]

Carolina Environmental Study Group and litigated in this proceeding. This Board finds in Applicants' favor as to all of these contentions."

9. "In making this determination, we have taken into account the conclusions set forth in FEMA's Interim Findings Report, wherein FEMA states that, based upon its review of the North and South Carolina radiological emergency response plans and the Catawba exercise in February 1984,

> FEMA finds that the States' and local emergency plans are adequate and capable of being implemented, and the exercise demonstrated that the offsite preparedness is adequate to provide reasonable assurance that appropriate measures can be taken to protect the health and safety of the public living in the vicinity of the Catawba Nuclear Station in the event of a radiological emergency (Staff Exh. EP-3A).

We have also considered the extensive testimony of state and county emergency planning officials, who conclude that their respective plans provide reasonable assurance that members of the public would be adequately protected in the event of a radiological release from the Catawba Nuclear Station (Apps. Exh. EP-7, Pugh, at 4; Lunsford, at 4; Phillips, at 6; Broome, at 4; Thomas, at 5)."

10. "We note that in its June 22, 1984 Partial Initial Decision, the original Licensing Board in this proceeding stated that '[a] license to authorize full power operation of Unit 1 is within the jurisdiction of the separate Licensing Board constituted to consider and decide emergency planning contentions' (slip op., at 271). We rule that, as to the emergency planning contentions raised in this licensing proceeding, Applicants have carried their burden of proof on each contention, have satisfied all Commission requirements applicable to such contentions, and have demonstrated 'reasonable assurance that adequate

protective measures can and will be taken in the event of a radiological emergency.' Subject to their satisfaction of the conditions imposed in the June 22, 1984 Partial Initial Decision, Applicants are entitled to the issuance of full power operating licenses for Units 1 and 2 of the Catawba Nuclear Station." [In addition, the Staff has included four additional conditions in the Order pertaining to obligations hereinafter proposed to be placed on Applicants.]

III. FINDINGS OF FACT

A. Contention 1 - The Catawba Public Education and Information Program

1. Emergency planning Contention 1 was admitted by the Board in its entirety at the August 8, 1983 prehearing conference (Safety Hearing Record Transcript, at 1085) and reads as follows:

> Public Information provided by Applicants and State and local officials is not adequate to ensure appropriate responses to notification procedures.
>
> The principle source of information is Applicant's brochure, which is inadequate, intentionally deceptive regarding potential health effects of radiation, and misleading, in that:
>
> A significant body of scientific evidence that indicates health effects at very low levels 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 doses received before or during an evacuation. It does not specify ingestion dangers from contaminated food and water. It does not specify the importance of getting to reception

areas for registration for purposes of notification for evacuees re-entry to their homes, nor of emergency notification for evacuees, accounting for fiscal aspects of evacuation, and for the basis of establishing legal claims which might result from the evacuation, as specified in Catawba Site Specific NUREG Criteria, p. B2,#3. In fact, citizens are told they may go directly to "stay with friends or relatives living at least 15 miles from the plant" (p. 10,#5). Neither does it state that the reception areas exist to provide decontamination of people and vehicles. It states that in an emergency at Catawba, citizens "would be given plenty of time to take necessary action." This cannot be guaranteed in the event of a sudden pressure vessel rupture, where sheltering would be indicated. This eventuality is not mentioned. It assumes all recipients can read, and at a certain level of comprehension. As a primary source of information, it is imperative that all have access to and understanding of the emergency procedures to be taken. There is no information concerning the existence of a "plume exposure pathway," which would influence a citizen's choice of escape 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 Applicant's brochure has been made available. When and if such other 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. The NRC's emergency planning regulations require that a range of protective actions be developed for the public in areas surrounding a nuclear power plant. See 10 C.F.R. § 50.47(b)(1-16). Generally, the Commission bases its decision regarding the adequacy of emergency plans on a review of findings and determinations made by the Federal Emergency Management Agency (FEMA), which is responsible for reviewing offsite

emergency plans. See 10 C.F.R. § 50.47(a)(2).[7] Guidance and criteria for the development of radiological emergency plans is principally found in NUREG-0654, which contains the criteria against which FEMA determines the adequacy of offsite emergency plans.[8]

3. The specific planning standard for public education and information is found in 10 C.F.R. Section 50.47(b)(7) and the implementing criteria of Section II.G, NUREG-0654/FEMA REP-1, Rev. 1. This standard states:

> 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.

4. Additionally, NUREG-0654 contains guidance as to what information should be periodically disseminated to the public, such as: educational information on radiation; points of contact for additional information; what protective measures can be taken (evacuation routes, and relocation centers, sheltering, respiratory protection); and special needs of the handicapped. Pursuant to Appendix E to Part 50, Section IV.E., the

---

7/ Union Electric Co. (Callaway Plant, Unit 1), ALAB-754, 18 NRC 1333, 1335 (1983); Maine Yankee Atomic Power Co. (Maine Yankee Atomic Power Station), DD-83-15, 18 NRC 738, 741-42 (1983); Consolidated Edison Company of New York (Indian Point, Unit No. 2), Power Authority of the State of New York (Indian Point, Unit No. 3), CLI-83-16, 17 NRC 1006, 1014 (1983).

8/ Testimony of FEMA Regarding Emergency Planning Contentions Admitted by the Board in the Catawba Proceeding, Staff Exh. EP-2, at 4; Heard, Tr. 1471.

plans submitted by Applicants must contain much of this information as well.9/

5. Testimony on this contention was filed by the Applicants, (Testimony of Duke Power Company, R.M. Glover, P.F. Carter, M.L. Birch and S.V. Duckworth on Emergency Planning Contentions 1 and 7, Apps. Exh. EP-7); The State of North Carolina (Testimony of J.T. Pugh, III on Emergency Planning Contentions 1 and 7, Apps. Exh. EP-7); The State of South Carolina (Testimony of P.R. Lunsford, W.M. McSwain, and S.L. Finklea, III on Emergency Planning Contentions 1 and 7, Apps. Exh. EP-7); Gaston County, North Carolina (Testimony of Bob E. Phillips on Emergency Planning Contentions 1 and 7, Apps. Exh. EP-7); Mecklenburg County, North Carolina (Testimony of Lewis W. Broome on E.P. Contentions 1 and 7, Apps. Exh. EP-7); York County, South Carolina (Testimony of Phillip S. Thomas on Emergency Planning Contentions 1 and 7, Apps. Exh. EP-7); the Staff, Testimony of FEMA, by John C. Heard, Jr. and Thomas I. Hawkins, Staff Exh. EP-2; Intervenors Palmetto Alliance and CESG (Testimony of Philip Layne Rutledge, Ruth W. Pittard, and Arlene B.

9/ Appendix E, Section IV.E. requires the plans to contain:

> 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.

Andrews, Ints. Exh. EP-38).[10/] In addition, Intervenors jointly obtained, pursuant to subpoena, the testimony of Judith D. Turnipseed, public informations officer in the Division of Public Safety, S.C. Governor's Office, Marvin Chernoff, a consultant to Duke Power Company, and Brenda W. Best, a high school teacher, as rebuttal witnesses on Contentions 1 and 7. Intervenor CESG filed no written testimony.

6. The main thrust of this contention is that the public information currently available in the Catawba Emergency Planning Zone (EPZ) is inadequate to ensure appropriate public response to notification of an emergency at the Catawba Nuclear Power Station. The primary source of this public information is the Applicants' brochure entitled "Catawba Nuclear Station Emergency Plan," 1984 edition, distributed by Duke Power Company to residents in the 10 mile EPZ. Apps. Exh. EP-5. However, in addition to the Applicants' brochure, the state plans for North Carolina and South Carolina also contain provisions for periodic dissemination of information, including distribution of a brochure for farmers in the 50 mile ingestion pathway (Lunsford, Tr. 224; Apps. Exh. EP-10), display of posters or decals in public areas such as at Lake Wylie, etc. to alert public of what to do when sirens are heard (Pugh, Tr. 268; Apps. Exh. EP-9), and periodic public meetings are held as part of an ongoing educational process (Lunsford, Tr. 223). See also NC Emergency Response Plan, Part I, at 53-55; Part II, at 26-28; Part III,

---

10/ Most of Mr. Rutledge's testimony, a survey of residents in the McGuire EPZ, was stricken as not relevant to public information for Catawba EPZ residents.

at 27-29; S.C. Radiological Emergency Response Plan (SCORERP), Annex C, Appendix 1, at C-10, 11; and York County Em. Op. Plan, Annex D at D-14-15.) FEMA Testimony, Staff Exh. EP-2, at 4.

7. The primary source of public information, however, remains the Applicants' brochure, which the Intervenors allege is inadequate for a number of specific reasons, including (a) failure to cite health effects at low levels of radiation; (b) failure to state the dangers in accumulated dosage of radiation; (c) failure to give adequate information on protection from beta and gamma rays; (d) failure to specify how young "very young" is; (e) failure to contain a chart indicating dose received before or during an evacuation; (f) failure to state the dangers from ingestion of contaminated food and water; (g) failure to emphasize the importance of reception/relocation areas for registration and notification and decontamination of evacuees; (h) failure to state that in some scenarios plenty of time may not be available to evacuate the EPZ; (i) failure to define "plume exposure pathway," and finally, (j) the assumption that all recipients can read at a certain comprehension level. We shall address these concerns in turn.

8. We note at the outset that many of the alleged inadequacies of the Applicants' brochure are well beyond the planning standards and criteria of NUREG-0654, as for example, the degree of information required for educational information regarding radiation (a, b, c, e above). However, the Applicants' brochure discusses types of radiation, their effects, and what protective steps can be taken on pp. 4 and 5 of the brochure, along with a chart depicting comparative sources and amounts of radiation. FEMA Testimony, Staff Exh. EP-2, at 5; Carter, Birch, Tr. 180-185, 198-200.

9. A principal concern of Intervenors appeared to be that without the details sought to be included through the contention, the public will not understand the magnitude of the dangers they may potentially be exposed to, and would, as a result, not pay sufficient attention to the emergency instructions given. Guild, Tr. 242-46, 254-56. However, both State and county emergency planning officials did not share this concern; they noted that based on previous disaster experience, the public would, in fact, respond to instructions in an emergency, and believed that the information in the brochure along with the rest of the public information program provides reasonable assurance that the public will respond appropriately. Apps. Exh. EP-7, Lunsford, McSwain, at 19; Phillips, at 7-8; Broome, at 8; Thomas, at 7; Pugh, Tr. 243. See also, ¶ B.9, on Contentions 3/6.

10. Mr. Pugh from the State of North Carolina testified that the North Carolina Plan does not require details regarding levels of radiation to be disseminated in a brochure to the public, and, in fact, no brochures in North Carolina provide details of the effects of certain levels of radiation on individuals. Tr. 298-301, 305. Mr. Lunsford from South Carolina also testified that details regarding lethal doses of radiation are not considered necessary, but rather the intent is to educate the public about radiation in general. Tr. 306-7. The FEMA witnesses also testified that the information in the brochure on radiation exposure is adequate. Staff Exh. EP-2, Heard, Hawkins, at 4-5; Heard, Tr. 1505. The Intervenors filed no testimony of their own in support of their contention that the discussion of the hazards of radiation in the Applicants' brochure is inadequate, nor presented any witnesses to refute

the assertion of State, local and FEMA officials that the brochure is adequate in this regard.

11. Hence, the Board finds, contrary to the Intervenors' contention, that the Applicants' brochure does provide educational information on radiation exposure (a), (b), the types of radiation and protection from them (c), and does provide a comparative chart of sources of radiation (e), and is adequate in this regard.

12. With regard to (d), we note that the 1984 edition of the brochure has specified how young "very young" is by noting on page 4 that "unborn babies and children up to six years old are more likely than other people to be harmed by radiation." Apps. Exh. EP-5, at 4. See FEMA Testimony, Staff Exh. EP-2, at 5. This we find sufficient to resolve Intervenors' concerns in this regard.

13. With regard to (f), while the brochure may not specify precisely the dangers from ingestion of contaminated food and water, it does note on page 9 that water, milk and food supplies will be monitored for potential contamination and that emergency broadcast stations will notify the public of what actions to be taken, if any, in regard to food and water. Apps. Exh. EP-5, at 9; Staff Exh. EP-2, Heard, Hawkins, at 5. This we find sufficient to advise the general public that there may be danger from contaminated food and/or water and what to do in this regard (i.e., listen to EBS broadcast).

14. Intervenors' concern (g) alleges that the brochure fails to state the importance of reception areas for registration, notification and decontamination of evacuees. The current plans no longer call for reception areas; rather evacuees will be instructed to go to designated shelters.

Apps. Exh. EP-7, Glover, at 12. We note that on page 10 of the brochure there is a specific instruction to drive to a designated shelter and register for notification and information. Also, the brochure lists services to be provided at the shelters, including decontamination and distribution of radioprotective drugs if distributed by state authorities. Apps. Exh. EP-5, at 10; Staff Exh. EP-2, Heard, Hawkins, at 6. Thus, we find there is sufficient information in the brochure to advise the public of the importance of registration at designated shelters. See ¶ B.9, relating to public use of shelters.

15. The sentence stating that people "would be given plenty of time to take necessary action" (Intervenor item "(h)," above) has been deleted from the 1984 revision of the Applicants' brochure. Apps. Exh. EP-7, Carter, at 13; Heard, Guild, at 1518-1519. The brochure does tell the public that they will be instructed as to the appropriate protective action, whether it be shelter in place or evacuation. Which option will be chosen will be decided at the time of an accident by state officials, in consultation with the utility, taking into account such things as the severity of the accident, the wind speed and direction, the evacuation time estimates, road conditions and so forth. This basis for decision-making is required to be in State plans (NUREG-0654-II.J.10.m) and there is no requirement that the public be advised in advance of such information. We find the inclusion of instructions regarding sheltering and evacuation, and instructions that the public should follow the advice given over the EBS broadcast system at the time of an accident, sufficient guidance to prepare the public concerning what to do in the event of an accident at Catawba.

16. The brochure gives a list of definitions of nuclear terms and emergency classification levels, but does not explicitly discuss "plume exposure pathway" (i). This inadequacy, however, is well beyond the planning standard and criteria in NUREG-0654. Applicants' witness, Mr. Glover, testified that this was deliberately not mentioned in the brochure for fear of confusing the public. Tr. 214. Nor did FEMA consider the lack of a definition for the term "plume exposure pathway" in the brochure to be a problem. Heard, Tr. 1513. Additionally, the FEMA witness testified that "plume exposure pathway" will be defined in a news release at the time of an accident by sectors or geographic delineation. Id. We note that the brochure does divide the EPZ into various sectors and assigns specified evacuation routes for each of those sectors on maps on pages 12 and 14 of the brochure. Apps. Exh. EP-5. In addition, it does discuss the possibility that not all areas will be affected and that such things as wind speed and direction will determine what areas will be affected if there were an accident at Catawba. Apps. Exh. EP-5, at 9; Staff Exh. EP-2, Heard, Hawkins, at 6. While the brochure may not define for the public what a plume exposure pathway is, it does tell them what sector they live in and that specific instructions for protective actions at the time of an accident will specify what the people in each sector should do. The Board finds this to be sufficient information to inform the public of what their specific actions should be in an emergency, in compliance with the 10 C.F.R. § 50.47(b)(7).

17. Lastly, the Intervenors contend the brochure is inadequate because it assumes that all recipients can read at a particular comprehension

level (j). The Applicants' witness, Dr. Duckworth, a reading specialist, testified that the brochure was reviewed for reading level and that application of the readability formula to determine reading level showed that the narrative section of the brochure (information on plant operation, effects of radiation) is written on an 11th grade level, while the instructional sequences of the brochure (specific emergency protective actions instructions) are written on the 7th grade level. Tr. 444-447; Apps. Exh. EP-7, Duckworth, at 14-15. Dr. Duckworth testified, therefore, that the brochure effectively communicates how the public will be informed and what actions they should take in the event of a nuclear accident. Id., at 13; Tr. 450.

18. The Applicants have also produced a student brochure which is designed to focus information for the large number of school children or families with school children in the area. Glover, Tr. 548-549. This school brochure uses a simpler format and content than the main brochure and was produced for an audience including students, teachers and parents. Glover, Tr. 566-70. Intervenors' rebuttal witness, Brenda W. Best, a school teacher at Olympic High School, in North Carolina, testified that she did, in fact, receive this student brochure, along with instructions from the school principal to discuss it with her class. Best, Tr. 4546-47, 4561. Ms. Best also indicated that she had many questions regarding the information in the student brochure (Tr. 4551-55) but testified that she did not call any of the telephone numbers listed in the front of the emergency plan brochure (Apps. Exh. EP-5) for further information. Tr. 4591-92. We note that along with the telephone numbers listed for further information in the brochure, there is also the instruction to

read this information to those who are blind or do not read well. Apps. Exh. EP-5, at 1. There was no testimony specifically addressing (in survey form or otherwise) what the comprehension level of the general public in the Catawba EPZ actually is, but FEMA did testify that the Applicants' brochure is comparable to other brochures of the region accepted by FEMA. Staff Exh. EP-2, Heard, Hawkins, at 6. We noted earlier that considerable weight is to be given FEMA findings and that these findings constitute a rebuttable presumption in NRC hearings. See 10 C.F.R. § 50.47(a)(2). In light of the record before us, we believe the evidence supports a finding that the Applicants' brochure is adequate in regard to reading level and comprehension.

19. Intervenors' written testimony regarding the adequacy of the Applicants' brochure did not specifically address any of the cited deficiencies set forth in the contention. Rather, the testimony of Ms. Pittard and Ms. Andrews addressed the format rather than the specific content of the brochure. Pittard, Tr. 1731-32; Andrews, Tr. 1769. Ms. Pittard, an audio visual specialist, addressed whether the "design theme" was appropriate. Int. Exh. EP-38, at 4-8. Ms. Andrews' testimony was that the inclusion of information on the brochure other than emergency instruction weakens the strength of the message and does not sufficiently reduce anxiety levels of the public. Int. Exh. EP-38, at 2-6. In neither case did this testimony contend that the brochure failed to satisfy its regulatory objectives. See, Andrews, Tr. 1760; Pittard, Tr. 1731. In addition, the Board struck, as irrelevant to the question of the adequacy of the Catawba brochure, the bulk of Mr. Rutledge's testimony (see, Int. Exh. EP-38 (offer of proof)), which

contained the results of a survey of residents in the 10 mile EPZ of the McGuire plant. Margulies, Tr. 1810.

20. Also, as part of their rebuttal case, Intervenors obtained the subpoenaed testimony of Marvin Chernoff, of Chernoff/Silver Associates, who performed surveys of public knowledge about emergency planning for Catawba about residents' attitudes toward Duke and about the information they received regarding a possible accident there. See, Chernoff, Tr. 4258, 4296-97. The Board did not permit testimony on the results of the survey about emergency planning information, as being beyond the scope of rebuttal. Margulies, J., Tr. 4268. See also, Int. Exhs. EP-9, EP-10, EP-51 (offer of proof). Tr. 4277.

21. The final point raised by the Intervenors in Contention 1 concerns the asserted lack of information distributed by the State of North Carolina, although the emergency plan for North Carolina contains provisions for such dissemination of public information. Mr. Pugh of North Carolina testified that the State is in the process of adding a public information officer to its staff. Tr. 238. Mr. Pugh also noted that decals alerting the public to tune to an EBS station on hearing a steady three minute siren are available. Tr. 269; see Apps. Exh. EP-9. Mr. Carter added that 4 by 4 signs were posted at all public access landings on Lake Wylie. Tr. 271. The text of these signs was written with input from local, State and Duke officials. Broome, Tr. 274. Mr. Pugh also noted that in addition to hiring a full time public information officer for the staff, North Carolina has participated in a variety of educational programs for local groups and made use of radio and TV presentation for public education and information. Tr. 290, 293, 295-6. The N.C.

Division of Emergency Preparedness has also distributed a brochure, "Disaster and What To Do To Protect Yourself". Id.; Apps. Exh. EP-12. Similar public information activities have been undertaken by the State of South Carolina, and in the three response counties. See, Apps. Exh. EP-10; Apps. Exh. EP-7, Lunsford, McSwain, at 14-16; Phillips, at 5, 7; Broome, at 7-8; Thomas, at 6; McSwain, Tr. 316-17; Turnipseed, Tr. 4510-13, 4517, 4538-39. These State efforts will be on-going. App. Exh. EP-7, Lunsford, McSwain, at 16-18; Turnipseed, Tr. 4525. FEMA testimony confirmed that procedures are contained in the State and County plans for North Carolina and South Carolina for the coordinated dissemination of information to the public. Staff Exh. EP-2, Heard, Hawkins, at 7.

22. The essential purpose of the public information program in the 10 mile EPZ is to educate the public as to 1) how they will be notified of an emergency, and 2) what they should do if notified. Carter, Glover, Tr. 212, 213; Pugh, Tr. 275; Carter, Tr. 389-91; Lunsford, Tr. 561. This education effort is a cooperative one between the two States and the Applicants, who have worked together to develop and distribute the Catawba emergency brochure, conduct public meetings, and develop and distribute supplemental and specialized materials for particular segments of the population. Lunsford, Tr. 220-224.

23. We recognize that public education is an ongoing effort which can always be improved. Turnipseed, Tr. 4525-26. And while both North Carolina and South Carolina officials found the brochure satisfactory (Apps. Exh. EP-7, Pugh, at 7-8; Lunsford, McSwain, at 12), both States have made suggestions for improvements, which Applicants have

agreed to make. Id., Lunsford, McSwain, at 13-14; Pugh, Glover, Tr. 392-93. However, we find that the record before us does not support Intervenors' contention that this program is inadequate. Rather, we have evidence that State, local and Duke Power Company officials are in the process of diligent efforts to ensure the public is adequately informed of both how they will be notified of an emergency, and what to do in that event. We agree with FEMA that the Applicants' brochure is adequate and meets NUREG-0654 Standard II.G. and all five evaluation criteria. Staff Exh. EP-2, Heard, Hawkins, at 7. Hence, the Board finds Contention 1 to be without merit.

B. Contention 3/Contention 6 - Sheltering and Monitoring for Contamination

1. Intervenors raised two contentions relating to relocation sheltering, monitoring, and decontaminating evacuees.

2. As admitted, Contention 3 read 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 center/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 processing EPZ evacuees at reception centers with limited space and supplies.

3. Contention 3 covers three discrete subjects: first, whether the plans provide for sufficient food, clothing and bedding at relocation shelters; second, whether the number of shelters designated is sufficient to register and process all of the potential evacuees; and third, whether entry and exit is sufficiently controlled so as to prevent overcrowding (by persons directed to evacuate, and those who may voluntarily evacuate).[11/] This contention substantially overlaps Contention 6, which

---

11/ In raising Contention 3, Intervenors challenge compliance with 10 C.F.R. § 50.47(b)(8) which states: "Adequate emergency facilities and equipment to support the emergency are provided and maintained." The areas deemed by NUREG-0654/FEMA REP-1, Rev. 1, to be covered by this 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. However, in addition, under 10 C.F.R. § 50.47(b)(10), which requires, among other things, development of a range of protective actions for the public, NUREG-0654 includes as guidance for implementing this requirement the establishment of relocation centers at least 5 miles beyond the plume exposure EPZ. NUREG-0654, Standard II.J.10.h.

In light of these requirements and guidance, the question may well be raised whether each of the described subjects of Contention 3 falls within the scope of the regulatory requirements for emergency facilities and equipment, and protective response. According to the "Testimony of FEMA Regarding Emergency Planning Contentions" ("Heard/Hawkins Testimony"), at 9-10, emergency plans are not required to contain plans for uncontaminated food, clothing, and bedding, as alleged, and entry and exit need not be controlled, but need only describe the means for registering and monitoring evacuees. We tend to agree with the FEMA witnesses that these two items are not included as specific requirements or guidance; nevertheless, the availability of uncontaminated supplies at relocation shelters, and the adequacy of the facilities to accomplish their emergency response function, which includes whether the facility can accommodate the evacuees who may go there, would seem to be reasonably within the purview of the two standards described above ((b)(8) and (b)(10)). As a result, we consider these matters and decide the issues presented by the contentions below.

also deals with registration, but focuses more specifically on monitoring and decontamination, and particularly on whether monitoring and decontamination will affect evacuation times and impede traffic flow. Contention 6 states:

> The emergency plans do not provide reasonable assurance that adequate protective measures can and will be taken [10 CFR 50.47(a)(1)] in that
>
> c) There are no adequate provisions for preventing contaminated persons from entering a non-contaminated zone. The plans do not make clear whether or not registration at a reception center/shelter is mandatory or not; if mandatory, by what procedures will it be enforced and what effort will these procedures have on evacuation times and traffic flow?

At hearing, testimony on this issue focused on staffing, training and equipment for monitoring, bringing into question compliance with 10 C.F.R. § 50.47(b)(8), (b)(10) and (b)(15). While Contention 6 raises the sufficiency of monitoring and decontamination more specifically than Contention 3, it is an inextricable part of shelter processing. As the original Licensing Board noted (Safety Hearing Record Transcript, at 1087), the admitted portion of Contention 6 "concerns itself with people who may be in the contaminated area and have gotten contaminated and whether they are going to be required to go to registration or not and what will be the procedures for enforcing evacuation and related matters." For that reason we have combined our consideration of these contentions, as we did for hearing purposes.

4. Applicants presented a panel of nine witnesses on Contention 3 (Apps. Exh. EP-13): Testimony of the State of North Carolina (James Edward Neves and J. T. Pugh, III) on Emergency Planning Contention 3; Testimony of the State of South Carolina (J. Gregory, Jr., P. R. Lunsford, and W. M. McSwain) on Emergency Planning Contention 3; Testimony of Gaston

County (Bob E. Phillips) on Emergency Planning Contention 3; Testimony of Mecklenburg County (Lewis Wayne Broome) on Emergency Planning Contention 3; Testimony of American Red Cross (Dennis Johnson) on Emergency Planning Contention 3; and Testimony of the Salvation Army (Major Phillip Needham) on Emergency Planning Contention 3. The Testimony of FEMA (John C. Heard, Jr. and Thomas I. Hawkins), presented as part of the Staff's case, addressed Contention 3. In addition, Intervenors obtained the rebuttal testimony of Betty Long and Linda Anderson (of the American Red Cross) by subpoena ad testificandum.

5. Applicants also presented a panel on Contention 6 (Apps. Exh. EP-14) as follows: Testimony of the State of North Carolina (Dayne Brown and J. T. Pugh, III) on Emergency Planning Contention 6, Testimony of Duke Power Company (R. Michael Glover) on Emergency Planning Contention 6; Testimony of the State of South Carolina (W. M. McSwain) on Emergency Planning Contention 6; Testimony of Gaston County (Bob E. Phillips) on Emergency Planning Contention 6; Testimony of Mecklenburg County (Lewis Wayne Broome) on Emergency Planning Contention 6; and Testimony of York County (Phillip Steven Thomas) on Emergency Planning Contention 6. The FEMA Testimony (John C. Heard, Jr. and Thomas I. Hawkins) also addressed Contention 6. Staff Exh. EP-2. Intervenors presented no witnesses on this contention.

1. Adequacy of Relocation Shelter Facilities

6. Under the North and South Carolina plans, responsibility for relocation sheltering is a local responsibility with State agencies in a support role. Apps. Exh. EP-1, Part I, at 20, 74; Apps. Exh. EP-2,

SCORERP, Part 4 (Site-Specific Plan), Annex B; SCORERP, at 14, 16, 17. The American Red Cross (ARC) has lead responsibility in managing the shelters in York, Gaston and Mecklenburg counties. Johnson, Tr. 700; Pugh, Tr. 812, 814; Phillips, Tr. 813; McGarry, Tr. 813-14. The South Carolina Division of Social Services has lead management responsibility in Union County, S.C. Johnson, Tr. 701. Although the FEMA Interim Findings observed that a letter of agreement between North Carolina and the ARC to include its responsibilities with regard to monitoring and registration of evacuees, the same report noted this was to be provided by May 1, 1984. Staff Exh. EP-3, at 12-13. However, the FEMA witnesses testified that the NUREG-0654 criterion with respect to registering and monitoring evacuees at relocation shelters was met. Staff Exh. EP-2, Heard, Hawkins, at 10. The Board does not consider the still-to-be-supplied letter to be a matter preventing findings of compliance with the applicable regulations and reasonable assurance with respect to this issue.

7. There were several sources of evidence on the number of relocation shelters which have been designated for use in the event of an accident at Catawba. Lists of shelters available are found in the plans (Apps. Exh. EP-1, Part II, at 32, Part III, at 34; Apps. Exh. EP-2, SCORERP, Part IV, Annex B, Appendix 1), Applicants' brochure (Apps. Exh. EP-5), and in a map and list supplied by Applicants to the Board and parties after the end of the hearing (Apps. Exh. EP-22). In addition, there was testimony from several witnesses. Apps. Exh. EP-13 Pugh, at 9; McSwain, at 10, 11-12; Phillips, at 3; Broome, at 7; Johnson, at 12; Broome, Tr. 851-2; Long, Tr. 4481, 4483-4, 4490. The numbers were

not completely consistent -- a result of the fact that the ARC has been in the process of reviewing the adequacy of shelters proposed by the local authorities, and some have been deleted and others added. Apps. Exh. EP-13, Johnson, at 12-13; Johnson, Tr. 736, 739, 743-44. The ARC reviews the proposed sites under its own guidelines, particularly ARC-3074, for adequate square footage, toilets, showers, eating facilities and the like. Apps. Exh. EP-13, McSwain, at 13; Phillips, at 4; Broome, ay 4; Johnson, at 12-13; Pugh, Tr. 809, 811; Anderson, Tr. 4465 et seq.; Long, Tr. 4472, et seq. See, Int. Exh. EP-14 (marked for identification). North Carolina shelters are also reviewed for adequacy under State criteria, which are in turn based on FEMA "National Shelter Survey Instructions", PR-84, May 1982. Pugh, Tr. 809; Apps. Exh. EP-13, Phillips, at 4; Broome, at 4. The review process is anticipated to be completed within the year, if possible, and, based on the ARC experience to date, is not expected to result in a significant reduction in the number of acceptable shelters already listed. Apps. Exh. EP-13, Johnson, at 13. In any event, if significant numbers of proposed shelter sites were determined to be unacceptable, other sites in other counties would be designated. Id.

8. Applicants' post-hearing listing and map appears to be the most up-to-date information on shelters. (The list was originally identified as Int. Exh. EP-15. Tr. 821.) It lists a total of 33 primary shelters and 103 secondary shelters, 30 primary sites in South Carolina, and 3 primary sites in North Carolina. Apps. Exh. EP-22. The primary site designation means these sites are opened first. McSwain, Tr. 837. In addition to these designated sites, if necessary to prevent overcrowding,

others could be opened. See, e.g., Apps. Exh. 13, Pugh, at 10; McSwain, at 12. Red Cross and county officials testified that, based on experience, they expected only about 20% of the evacuees to use the shelters. Johnson, Tr. 717; Broome, Tr. 863. However, the planning basis in both States is based on the assumption that the entire population will be evacuated and processed through the relocation shelters. Neves, Tr. 654; Johnson, Tr. 718; Apps. Exh. EP-13, Pugh, at 9; Gregory, at 7; Lunsford, McSwain, at 8; (Broome), at 3-4. Planning assumptions are conservative in this regard, since they provide for evacuation of the entire resident population to either North or South Carolina shelters. Id.

9. A related question, raised under Contention 6, is whether all evacuees will be required to go to relocation shelters, and how this will be accomplished. The North Carolina Em. Resp. Plan discusses use of relocation shelters as a potential protective response, but does not indicate specifically what actions officials would take to make sure the shelters were used, except with respect to bussing of school children. Apps. Exh. EP-1, Part I, at 58, 59; Part II, at 27, 29, 31; Part III, at 29, 31, 33. In contrast, SCORERP states directly that all evacuees will be processed at relocation shelters. Apps. Exh. EP-2, SCORERP, Part 4, Annex B. Despite the ambiguity in the North Carolina plan, preplanned traffic control points, EBS broadcasts, the public information brochure, and mobile law enforcement and rescue resources will urge and/or guide (but not force) evacuees to proceed to shelters. Apps. Exh. EP-14, Phillips, at 1, 3; Broome, at 1-2; Brown, Pugh, at 3-4. Apps. Exh. EP-5, at 10. A similar approach would be followed in South

Carolina. Apps. Exh. EP-14, McSwain, at 1-2; Thomas, at 1; Gregory, Tr. 860. All of the emergency planners and managers who testified on this matter believed evacuees would, indeed, follow instructions and recommendations to proceed to shelters for registration and processing. Apps. Exh. EP-14, Brown, Pugh, at 4; McSwain, at 1; Phillips, at 1; Thomas, at 1; see also, Apps. Exh. EP-13, Lunsford, McSwain, at 15; Johnson, at 3. We found particularly persuasive in this regard the oral testimony of the ARC Disaster Specialist, Dennis Johnson, who noted that the fear of a nuclear threat will enhance the degree to which the public will follow instructions during an emergency. Johnson, Tr. 725-727. Even though there is no requirement, under the regulations, that registration at shelters be mandatory (Staff Exh. EP-2, Heard, Hawkins, at 12), there is reasonable assurance that evacuees will proceed to shelters, where they can be monitored for contamination, thereby reducing the likelihood that contaminated individuals will enter uncontaminated areas. The plans and brochure clearly provide for registration at shelters, and for instructions to the public to proceed to designated shelters should they be evacuated. The Board finds the plans adequate in this regard.

10. ARC procedures will be used for registering and processing evacuees at relocation shelters. Apps. Exh. EP-13, Gregory, McSwain, at 9; Pugh, at 10; Phillips, at 3; Broome, at 4. Except for checking to be sure that people are monitored and decontaminated prior to entering the shelter, the ARC is not responsible for monitoring and decontamination. Apps. Exh. EP-13, Johnson, at 11.

11. Intervenors expressed a concern that there would be no control over entry to relocation shelters leading to overcrowding and mixing of contaminated and uncontaminated individuals. With respect to overcrowding, however, traffic control will be used in the vicinity of relocation shelters, and will route evacuees to available shelters. Apps. Exh. EP-1, Part I, at 13; Apps. Exh. EP-13, McSwain, at 13-14; Apps. Exh. EP-14, Brown, Pugh, at 3; Gregory, Tr. 831. Overcrowding can be alleviated by opening additional shelters and rerouting or moving people to shelters further from the plant. Apps. Exh. EP-13, McSwain, at 12, 13; Pugh, at 10. Procedures for monitoring and decontamination prior to registration, described below, address Intervenors' other concerns. See, e.g., Apps. Exh. 14, Broome, at 1; Johnson, at 11; McSwain, at 2.

12. Once evacuees arrive at a shelter, the procedure followed is (1) monitor, (2) decontamination (if necessary), (3) registration, and (4) sign-out. Apps. Exh. EP-13, Johnson, at 10. Monitoring of evacuees and their vehicles is a county responsibility under both the North and South Carolina plans. Apps. Exh. EP-2, SCORERP, at 25-26; Part 4, Annex B, at B-2; York County Em. Op. Plan, Annex Q, at Q-28-29; Apps. Exh. EP-1, Part I, at 74; Part II, at 31-33; Part III, at 33-34. In North Carolina, monitoring at Gaston County relocation shelters is performed by volunteer firemen, the Sheriff's Department, and rescue squads. Apps. Exh. EP-1, Part II, at 32. In Mecklenburg County, this task is performed by the Charlotte-Mecklenburg Emergency Management Office and volunteer fire departments. Apps. Exh. EP-1, Part III, at 34. In South Carolina, monitoring and decontamination at shelters is also a local responsibility under guidance from the State Department of Health and Environmental

Resources (DHEC). Apps. Exh. EP-2, SCORERP, at 14, 25, 31. Personnel decontamination procedures are contained in Tab A to Appendix 9 of Annex Q (at Q-78, et seq.) of the York County Em. Op. Plan (Apps. Exh. EP-2). However, special training for administration in decontamination is not needed, inasmuch as it generally involves only soap, water and towels. Apps. Exh. EP-13, Lunsford, McSwain, at 10; Neves, Tr. 660. If a particular facility lacks sufficient showers for decontamination, portable showers are available for this purpose. Pugh, Tr. 815, 861; Johnson, Tr. 742. However, shelters without showers will not be used as primary shelters. Gregory, Tr. 841-843. Disposal of contaminated clothing and water is done per DHEC/Bureau of Radiological Health instructions in South Carolina (Id., at 11), and coordinated by the Radiological Protection Section and/or a representative from Duke Power Company in North Carolina. Apps. Exh. EP-1, Part I, at 73-74; Part II, at 34-36; Part III, at 37. See also, Apps. Exh. EP-13, Johnson, at 9.

13. Considerable testimony was addressed to the subjects of the number of trained monitors, and the availability of suitable equipment. In North Carolina, there are 110 trained radiological monitors available in Gaston County and between 300-350 in Mecklenburg County. Phillips, Tr. 926; Broome, Tr. 926. (A discrepancy between these figures and those in Apps. Exh. EP-14, Pugh, at 5, 6, was explained as possibly a result of inclusion of state employees in the N.C. State testimony. Pugh, Tr. 926.) Gaston County will provide between 12 and 24 persons at each shelter for monitoring, with fire department personnel available for decontamination. Apps. Exh. EP-14, Phillips, at 2. Mecklenburg County fire departments are responsible for coordinating monitoring and

decontamination, with support from Duke Power Company. Apps. Exh. EP-1, Part III, at 37. In South Carolina, the Radiological Defense Staff of the Emergency Preparedness Division has provided training to the following numbers of monitors: Cherokee County, 125; Chester County, 39; York County, 59; Union County, 41; Lancaster County, 75; and Fairfield County, 40. McSwain, Tr. 950. Mr. Thomas testified, however, that subsequent to the February exercise York County now has 100 trained personnel. Thomas, Tr. 951. In addition, both North and South Carolina have on-going programs for training of monitors. Apps. Exh. EP-14, Brown, Pugh, at 5-6; McSwain, at 3; Brown, Tr. 892, 906. Based on the February 1984 exercise evaluation, FEMA found that more staff trained in monitoring ard decontamination procedures is needed for Gaston County. Staff Exh. EP-3, FEMA "Interim Findings", at 12. The record did not reflect the status of corrective action on this matter, and the Board directs that Applicants to confirm to FEMA and the Staff that this matter has been addressed.

14. Applicants' panel on Contention 6 also provided a detailed list of low and high range monitoring equipment which is available in Mecklenburg and Gaston Counties, and in Columbia, S.C. Apps. Exh. EP-14, Pugh, at 5; McSwain, at 2-3. See, McSwain, Tr. 939-40. Lists for Gaston and Mecklenburg Counties are also contained in the North Carolina plan. Apps. Exh. EP-1, Part II, at 41-42; Part III, at 43-45. On cross-examination, however, it appeared that Gaston County had 300 fewer CDV-742 instruments than the panel testimony listed, but had a total of 55 sets of instruments each with 1 CDV-700 (low range survey), 1 CDV-715 (high range survey) and 6 CDV-742 (high range dosimeter) instruments,

rather than 50 sets, as indicated in the plan. Phillips, Tr. 921, 923, 924. Apps. Exh. EP-1, Part II, at 41-42. The five additional sets were acquired before the exercise. Phillips, Tr. 923. The record is not clear whether this acquisition was related to FEMA's finding that more Gaston County personnel equipped with proper radiation detection instruments were needed. See, Staff Exh. EP-3, FEMA "Interim Findings", at 12. The actual number of available instruments for Mecklenburg County was also somewhat lower than that provided in the panel testimony. Broome, Tr. 922. These listings, however, were not exhaustive. Similarly, each of the 1400 N.C. Highway Patrolmen have in their cars, and are trained in using, exactly the same equipment, with additional sources in the N.C. Department of Transportation. Pugh, Tr. 976. The large supply of monitoring equipment available from the State of South Carolina sources is listed in SCORERP, Table 5, at 67, and in Mr. McSwain's testimony. Apps. Exh. EP-2; Apps. Exh. EP-14, McSwain, at 2-3. Also, each South Carolina county is equipped with instrumentation which could be supplied, if needed. McSwain, Tr. 975. Additional equipment is available from other States, and the Federal Government. McSwain, Tr. 988; Pugh, Tr. 989.

15. The State witnesses testified that they believed sufficient personnel and equipment would be available in host and adjacent counties in the event of an accident at Catawba. Apps. Exh. EP-14, Pugh, at 4-5; McSwain, at 2-3; Pugh, Tr. 976, 977; McSwain, Tr. 975. The Board believes such a finding is supported by this record. Based upon this record, the Board finds that adequate staffing, training and equipment for monitoring and decontamination are available for relocation shelter operations.

16. Once an evacuee is determined to be free of contamination, he/she may then be let into the shelter proper for registration. Gregory, Tr. 805, 806; Johnson, Tr. 690. Staffing of the shelters will be based on considerations of the number of evacuees assigned to a particular shelter, the time required to register, and the NUREG-0654 (Standard II.J.12) guidance to monitor evacuees within 12 hours. Registration is assumed to take approximately three and one-half minutes for a family of four. Apps. Exh. EP-13, Gregory, McSwain, at 10; Johnson, at 5. See also, Johnson, Tr. 706. Monitoring and decontamination is expected to be slow enough so that, for example, 15 to 20 registrars would be sufficient to register the 5,000 evacuees assigned to the UNCC shelter in Charlotte. Johnson, Tr. 706-707.

17. The ARC is responsible for assuring that enough registrars are assigned to process evacuees. Gregory, Tr. 805-806. Given the extent of training in shelter management, years of experience in shelter management, and the ability to use inexperienced and untrained people in the ARC system, there is every expectation that the ARC, in conjunction with State and local organizations, will provide the necessary registrars. Apps. Exh. EP-13, Pugh, at 10-11; Phillips, at 3; McSwain, Gregory, Lunsford, at 9-12; Johnson, at 9-10, 14-15; Johnson, Tr. 728-729; Phillips, Tr. 730, 751. Planning for overall staffing needs, including that needed for medical treatment and feeding, also was shown to be adequate. Apps. Exh. EP-13, Gregory, McSwain, at 9; Johnson, at 10; Johnson, Tr. 691, 700, 750, 751; Long, Tr. 4495-97, 4499-4500. While it is not anticipated that persons out-

side the EPZ would go to shelters, as asserted by Intervenors, such an eventuality could be handled by opening additional shelters using resources farther from the site. Apps. Exh. EP-13, Johnson, at 14.

18. Based on the evidence summarized above, the Board finds that (1) adequate shelter facilities have or will be designated to accommodate an evacuating population, (2) adequate staffing, training and equipment has been provided under State and local plans to monitor, decontaminate, register, and process evacuees in a timely fashion, without overcrowding, and (3) adequate provision has been made for separating contaminated from decontaminated or uncontaminated evacuees.

2. Adequacy of Food, Clothing and Bedding

19. Contention 3 alleges that the plans do not provide estimates of the need for, nor provide specific information concerning food, clothing and bedding for evacuees at relocation shelters. While this may be correct in a technical sense, we agree with the FEMA witnesses that these sorts of details need not be contained in the plans. See, Staff Exh. EP-2, Heard, Hawkins, at 9. Evidence on this issue, rather, goes to the general question of adequacy of facilities under 10 C.F.R. § 50.47(b)(8), and to the overall issue of preparedness under 10 C.F.R. § 50.47(a). Extensive testimony was presented on this matter by Applicants' panel on Contention 3, which demonstrated quite persuasively that uncontaminated food, clothing, and bedding can be provided on very short notice, and, given enough time, in virtually unlimited supply. See, generally, Apps. Exh. EP-13, Neves, Pugh, Gregory, Lunsford, McSwain, Phillips, Broome, Johnson, Needham.

20. In North Carolina, food, clothing and bedding is to be supplied from stores maintained by the counties, the State Departments of Agriculture and Corrections, the U.S. Department of Agriculture, and the American Red Cross (Apps. Exh. EP-13, Pugh, at 4) with the Salvation Army as an additional source (Id., at 5). The responsible agencies have signed the plan. Id., at 4. The principal sources of food are, initially, the Department of Corrections and the public schools, which can make food available in 4 to 5 hours. Department of Agriculture warehouses contain tens of thousands of tons of food, which could be made available within 5 to 6 hours. Id., (Neves), at 5, and Attach. A; (Broome), at 1-2. The Department of Corrections can be ready to ship clothing and bedding within three hours. The Red Cross can supply 15,250 cots and 44,000 blankets within 24 hours; and more than 1,000 blankets and 3,200 cots in 4 to 6 hours. Id., (Pugh), at 6-7. The surrounding counties also have 1,000 cots on hand. Id.[12/] Planning is based on the entire EPZ populations and practically unlimited back-up supplies can be obtained from other States and Federal sources, without prior arrangement. Id., Neves, Pugh, at 7-9. This testimony was corroborated by county officials. Id., Phillips, at 1-2; Broome, at 1-2.

21. In South Carolina, schools will have approximately 196,000 potential meals on hand, based on their normal available supplies. Id., Gregory, at 5; Gregory, Tr. 800-1. USDA supplies in warehouses used to supply schools contained over 16,000 cases of food on September 30, 1983;

12/ The Catawba brochure advises the public that they may want to bring blankets and two changes of clothing with them, which, assuming they are not contaminated, would be an additional source of supplies. See Apps. Exh. EP-5, at 11.

however, the amount would vary, based on the time of year. Apps. Exh. EP-13, Gregory, at 4. Uncontaminated water is available from National Guard tank trucks and water trailers. Id., Johnson, at 9. The ARC can supply 26,000 cots and 61,000 blankets within 24 hours, and more than twice that amount in 48 hours. Id., at 5. The Salvation Army can supply several thousand sets of clothing within 4 hours, and several more thousands within 24 hours. Id., at 5-6; Needham, Tr. 599. Generally, the Salvation Army would be able to clothe over 75,000 people within 48 hours in the event of an accident at Catawba. Id., Needham, at 3.

22. The Board finds that adequate planning exists to provide sufficient supplies of uncontaminated food, clothing and bedding at relocation shelters in the event of an accident at Catawba.

3. Monitoring for Contamination During Evacuation

23. Contention 6 raises the question whether the emergency plans provide adequate means for preventing contaminated persons from entering non-contaminated zones. This issue was also raised and addressed above with respect to relocation shelter operations. Considerable testimony, however, focused on monitoring and decontamination for this purpose on evacuation routes, and this matter is addressed in this section.

24. Under the North Carolina plan, traffic control and monitoring evacuees and their vehicles are tasks assigned to the State Highway Patrol, the county sheriff and police departments (in Gaston County), and to the Environmental Health Director and county police (in Mecklenburg County). Apps. Exh. EP-1, Part I, at 13; Part II, at 5; Part III, at 4-5. Decontamination is the responsibility of the Radiological

Protection Section (Id., Part I, at 73-74), with the assistance of local resources. Id., Part II, at 35-36; Part III, at 37. Under the South Carolina plans, the counties are responsible for monitoring and decontaminating evacuees and their vehicles, under DHEC supervision. Apps. Exh. EP-2, SCORERP, at 25, 31; York County Em. Op. Plan, at Q-28, Q-29, Q-31.

25. Under the North Carolina plan, checkpoints will be used to spot check vehicles for contamination. Apps. Exh. EP-14, Brown, Pugh, at 3-4. If only a small area is contaminated, and a few vehicles are involved, vehicles could be decontaminated; however, if a large area were contaminated, vehicles would likely be impounded, and these evacuees bussed to shelters. Id., at 6-7; Brown, Tr. 908, 910-11. As noted above, each of the 1400 State Highway Patrolmen have the same radiation monitoring instruments in their cars as will be employed at the relocation shelters, and are trained to use them. Pugh, Tr. 976. In addition, Department of Transportation personnel have monitoring instruments and are trained to use them. Id. Under South Carolina plans, checkpoints are not employed for purposes of monitoring for decontamination. Vehicles will be monitored and decontaminated at relocation shelters. Apps. Exh. EP-14, McSwain, at 2; McSwain, Tr. 978, 979-980. Traffic control, however, will be employed to prevent vehicles going from a contaminated zone to an uncontaminated zone (within the EPZ). McSwain, Tr., at 980.

26. Finally, Intervenors raised the question whether, if procedures called for mandatory registration, what effect that would have on evacuation times and traffic flow. Since the plans do not provide for

mandatory registration, Intervenor's concern is technically mooted. Apps. Exh. EP-14, Glover, at 1. However, since it is anticipated that all evacuees will proceed to shelters for registration, the burden on the evacuation/shelter operation should be the same. As noted above, traffic control in the vicinity of relocation shelters will be designed to divert evacuees to additional shelters if particular sites become filled or overcrowded. Apps. Exh. EP-13, McSwain, at 12-13; Pugh, at 10. Further, evacuation time estimates were based on the assumption that all evacuees would proceed to shelters, and thus this eventuality should not impact on such times. Apps. Exh. EP-14, Glover, at 2. Finally, monitoring and decontamination is not anticipated to impact on traffic flow. Id., Brown, Pugh, at 6; McSwain, at 3; Phillips, at 3; Broome, at 2-3. See also, Staff Exh. 2, Heard, Hawkins, at 12.

27. Based on all the evidence presented on staffing, training, and equipment for radiological monitoring and decontamination, the Board finds there to be adequate provision to prevent contaminated vehicles and evacuees from going into non-contaminated zones. The Board also finds traffic control measures, particularly those designed to monitor for contamination and to route evacuees to shelters will not significantly impede traffic flow or evacuation times.

4. Conclusion

28. Having reviewed all the evidence with respect to both Contention 3 and Contention 6, the Board finds that adequate facilities and equipment, as well as staffing and training, have been provided in accordance with applicable regulatory requirements found at 10 C.F.R. §§ 50.47(b)(8), (b)(10), and (b)(15), as they bear on relocation sheltering, monitoring, and decontamination of evacuees.

C. Contention 7 - Instructions to Public Concerning Sheltering

1. The Board's Order of August 17, 1983 admitted a revised version of Contention 7 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).

2. This contention raises, by implication, compliance with Planning Standard II.G. regarding public education and information (50.47(b)(7)), which requires, inter alia, that "[i]nformation [be] made available to the public...on...what their initial actions should be in an emergency (e.g., listening to a local broadcast station and remaining indoors)...." In addition, Appendix E to Part 50, Section IV.D., requires the plans to contain a description of the basic emergency planning information, including protective actions planned if an accident occurs. Also, with regard to planning for protective response, guidance contained in NUREG-0654 FEMA REP-1 Rev. 1, par. II.J.10.m specifically discusses preparations which should be made for the choice of protective actions during an emergency, and provides that plans should include:

> The bases for the choice of recommended protective actions from the plume exposure pathway during emergency conditions. This shall include expected local protection afforded in residential units or other shelter for direct and inhalation exposure, as well as evacuation time estimates. (Footnote omitted).

3. Applicants' testimony on this contention was combined with that on Contention 1, 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. Apps. Exh. EP-7. See ¶ A.5. FEMA's testimony also addressed this contention. Staff Exh. EP-2. Intervenors filed testimony by Philip L. Rutledge, Ruth W. Pittard, and Arlene B. Andrews on Contentions 1 and 7. Int. Exh. EP-38. In addition, Intervenors obtained, by subpoena, the testimony of Judith D. Turnispeed, Marvin Chernoff, and Brenda W. Best on these contentions.

4. This contention may be broken into two issues: (1) whether the state and local plans address preparation for sheltering and what actions people should take to shelter, and (2) whether the public brochure addresses these two points. We shall first turn to the State and local plans.

5. FEMA has reviewed the State and local plans to determine the adequacy of the steps to be taken to inform the public as to the actions they should take in an emergency and found these plans to be adequate. Staff Exh. EP-2; Heard, Hawkins, at 14-15. Similarly, FEMA found that these plans adequately considered the bases for recommending protective actions [such as expected dose reduction from residential structures, etc.] and found these to satisfy the pertinent criteria. Id. Further, as FEMA correctly testified, there is no requirement that pre-planned preparations for sheltering in-place be taken. Id., at 14. However, the plans of North Carolina and South Carolina, York County, Mecklenburg County and Gaston County all address what actions the public should take when advised to seek shelter. Apps. Exh. EP-7, Lunsford, McSwain, at 22-23; Finklea, at 24-26; Broome, at 10.

6. Neither Intervenors' direct nor rebuttal witnesses addressed this contention, and there is nothing in the record before us to contradict this evidence as to the adequacy of the State and local plans in this regard. Consequently, we find this portion of the contention to be without merit.

7. Turning next to the public brochure, we note that page 9 of the brochure sets out six specific actions to be taken by the public in the event in-place sheltering is recommended. These include:

1) stay indoors until you are told it is safe to go out;

2) close all windows and doors; turn off fans, air conditioners and forced air-heating units;

3) move to a basement if possible;

4) place a damp cloth over your nose and mouth;

5) listen to your local radio or television station for more instructions;

6) water, milk and food supplies will be monitored for potential contamination. The emergency broadcast stations will notify the public of any actions to be taken in regard to food and water.

Both States have agreed to broadcast these six steps in their EBS message on sheltering. Apps. Exh. EP-7, Pugh, at 9; McSwain, at 23.[13/]

8. Applicants' witness testified that these actions are based on EPA guidance set forth in EPA-520/1-75-001, "Manual of Protective Action

---

13/ Similar instructions are also contained on page 4 of the brochure, stating that protective actions which may be taken include turning off fans, closing windows and doors, holding a damp cloth over nose and mouth and limiting the time outdoors. Apps. Exh. EP-5.

Guides and Protective Actions for Nuclear Incidents", Environmental Protection Agency, 1975 (Apps. Exh. EP-7, Glover, at 17), and that such information, along with the commitment that each State will include these six items in pre-established EBS messages, satisfies NRC criteria. Apps. Exh. EP-7, Glover, at 17. We agree.

9. In this regard, Mr. Heard of FEMA testified that while in-place sheltering requires no preparation, the public should be informed to obey instructions given at the time over the EBS, such as to as close doors and windows; this information is given in the brochure. Tr. 1543-44.

10. Intervenors contend that this information is inadequate and should include information on specific shielding factors of various structures and what the quantitative benefits of such sheltering might be. However, Intervenors offered no testimony to substantiate their position. In any event, this type of information goes to the basis for the choice of recommended protection actions by emergency management officials (under evaluation criterion II.J.10.m, cited above), rather than to any actions required to be taken by the public. Finklea, Tr. 790-91. This information is addressed in the Applicants' and State plans (Carter, Tr. 216), and there is no requirement that such information be included in the public brochure. Heard, Tr. 1544.

11. The Board finds that both the emergency plans and the public information brochure contain adequate information on the initial sheltering actions members of the public may need to take in the event of an accident at Catawba, and that Contention 7 is without merit.

D. Contention 8 - Assignment and Coordination of Responsibilities for Initial Response

1. At the August 8, 1983 prehearing conference, the Licensing Board admitted Contention 8, which 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 9 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 Foward 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. This contention has been the subject of a great deal of controversy as to its scope. Intervenors argued that "Contention 8 essentially wraps the whole ball of wax together," including the effectiveness of various protective actions. Guild, Tr. 2854-55. The Staff and Applicants, on the other hand, argued that it is limited to assignment of primary and support responsibilities for emergency response, presumably

under NUREG-0654 Standard II.A. (10 C.F.R. § 50.47(b)(1)[14/] Johnson, Tr. 2858-59; Carr, Tr. 2855-57. The Board adopted a middle ground, and considers the scope of the contention to cover not only whether primary and support responsibilities are assigned, but whether they are assigned in such a manner as to lead to effective emergency response. See, Margulies, J., Tr. 2860-61. As a legal matter, the contention raises the question of reasonable assurance primarily with respect to aspects of NUREG-0654 Planning Standard II.A., and limited aspects of Planning Standards II.F. (Emergency Communications), II.H. (Emergency Facilities and Equipment), and II.O. (Radiological Emergency Response Training). The Licensing Board does not consider Planning Standard II.P. (Responsibility for the Planning Effort: Development, Public Review and Distribution of Emergency Plans), to be raised by the contention. Compare, "Testimony of FEMA Regarding Emergency Planning Contentions Admitted by the Board in the Catawba Proceeding" (hereinafter referred to as "FEMA Testimony" or Heard/Hawkins Testimony"[15/] at 17-18.

14/ Standard II.A. states:

> 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.

15/ The FEMA witnesses were John C. Heard, Jr., Chief, Technological Hazards Branch, Natural and Technological Hazards Division, FEMA Region IV - Atlanta, GA; and Thomas I. Hawkins, Emergency Management Program Specialist, in the same office.

3. Further, as the original Licensing Board observed in admitting Contention 8, it is one that is concerned principally with "various aspects of coordination", and focuses on the initial period following notification of offsite authorities of an emergency at Catawba. See, Margulies, J., Tr. 2873, and Safety Hearing Record Transcript, at 1088-89.

4. A substantial amount of evidence was presented on Contention 8 -- in the form of prefiled testimony, oral examination of direct case and rebuttal witnesses, and documentation. For convenience, the principal sources of evidence are set out below:

(1) Applicants' Testimony on Emergency Planning Contention 8, Apps. Exh. EP-21, EP-21A;

(2) FEMA Testimony, Staff Exh. EP-2

(3) Memorandum to Richard W. Krimm, Assistant Associate Director, Office of Natural and Technological Hazards, SL-NT (FEMA), from Major P. May, Regional Director (FEMA, Region IV), dated April 18, 1984, covering "Interim Findings Report on the Adequacies of Radiological Emergency Response Preparedness for Plant Catawba, South Carolina, April 17, 1984." Staff Exh. EP-3.

(4) Memorandum to Edward L. Jordan, Director Division of Emergency Preparedness and Engineering Response Office of Inspection and Enforcement, USNRC, from Richard W. Krimm, Assistant Associate Director, Office of Natural and Technological Hazards Program, "Interim Findings on Offsite Radiological Emergency Response Preparedness (RERP) for Catawba Nuclear Station," May 8, 1984. Staff Exh. EP-3A.

(5) Oral testimony of Applicants' Panel on Contention 8, June 5 1984.

(6) Oral testimony of the FEMA witnesses, May 9, 1984.

(7) Oral testimony of Frank B. Sanders, Director, Division of Public Safety, State of South Carolina, June 6, 1984.

(8) Oral testimony of J.T. Pugh, III, Director, Division of Emergency Management, State of North Carolina, June 7, 1984.

(9) Oral testimony of Harold Mason Dickson, Chairman of the York County (S.C.) Council.

(10) Oral testimony of J. Elbert Pope, Sheriff of York County, South Carolina.

(11) South Carolina Operational Radiological Emergency Response Plan (SCORERP), August 1981. Apps. Exh. EP-2.

(12) North Carolina Emergency Response Plan in Support of the Catawba Nuclear Station, Rev. 1, January 1984. Apps. Exh. EP-1.

(13) York County Emergency Operations Plan, January 1984. Apps. Exh. EP-2.

5. Keeping in mind the focus of the contention on the initial hours following notification of offsite authorities of an accident at Catawba, the Board has treated the contention and the evidence thereon as addressing three principal, although somewhat overlapping, issues:

(1) Whether the assignment of primary and support responsibilities and lines of authority among and within the two States and three counties with respect to direction and control, are clear and adequate for effective protective action decision-making.

(2) Whether the offsite plans reasonably assure coordination of responsibilities for direction and control, activation of the sirens and EBS message, and protective action decision-making.

(3) Whether communications provided in the plans are adequate to accomplish the necessary execution of responsibilities and coordination of activities.

(4) Whether assignment of residual responsibilities of the counties, once direction and control shifts to the States, is adequate to the task of effective protective response.

1. Assignment of Primary and Support Responsibilities and Lines of Authority for Direction and Control

6. One of the principal points raised by Contention 8 is whether, because the 10-mile plume exposure pathway EPZ includes two states -- North Carolina and South Carolina -- as well as three counties -- York

County, S.C., and Gaston and Mecklenburg Counties, N.C., there will be confusion and conflict as to which governmental jurisdictions play lead roles in directing and controlling initial response actions in the event of an emergency, and as to when and how their lead roles will shift from the local jurisdictions to the states.

7. As a general matter, both the North Carolina and South Carolina emergency plans assign primary responsibility for direction and control to the State, in the North Carolina plan to the Department of Crime Control and Public Safety, and in the South Carolina plan to the Office of the Governor (with support responsibility assigned to the Emergency Preparedness Division, the Office of the Adjutant General, and the Department of Health and Environmental Control - all State agencies). Apps. Exh. EP-1, N.C. Em. Resp. Plan, Figure 4, at 28; Apps. Exh. EP-2, SCORERP, Table 3, at 55. The North Carolina Emergency Management Act of 1977 (Gen. Stat. 166 A-1 et seq. vests overall emergency authority in the Governor, but provides for delegation of such authority, and contemplates delegating of responsibility for emergency management to the Secretary of Crime Control and Public Safety, as well as for subdelegation. Apps. Exh. EP-1, N.C. Em. Resp. Plan, Part I, Attach. 1, at 1-2, 1-3; Harris, Tr. 2989. This authority has, in fact, been delegated as provided for. Harris, Tr. 3048-49. This authority is further implemented by Gen. Stat. 143B-473 et seq., and by North Carolina Executive Order (E.O.) 72, December 14, 1981, which provide for coordination of all State emergency management resources by the Secretary of Crime Control and Public Safety or his delegate. Apps. Exh. EP-1, Part I, at 1-6; Int. Exh. EP-55. This authority, in turn, has been delegated to the Division of Emergency

Management, which under the North Carolina ERP, has principal operational responsibility for emergency response by the State. Harris, Tr. 3068; Pugh, Tr. 4196, 4198; Apps. Exh. EP-1, Part I, Sec. II.B.2, at 3; Sec. II.C.1., at 12.

8. Similarly, under South Carolina Legislative Act 199, S.C. Code Title 25-1-440, and Article IV of the Constitution of South Carolina, the Governor has ultimate responsibility for decisions within the State in the event of man-made or natural disasters. Apps. Exh. EP-2, SCORERP, Sec. I.B., at 1; Lunsford, Tr. 2935, 2936, 2938, 2942; Sanders, Tr. 3099, 3104. However, under the South Carolina plan, the Office of the Governor's direction and control responsibilities are in fact exercised by the Director of the Division of Public Safety Programs, within the Governor's Office. Lunsford, Tr. 2936. While the direction and control functions and responsibility of the Office of the Governor is stated in SCORERP, Apps. Exh. EP-2, at 11, the Division of Public Safety is not referred to by name in SCORERP. Sanders, Tr. 3094. The Division of Public Safety (DPS) is an office established by South Carolina executive order, but, aside from the job description of its director, there is no formal delegation of authority by the Governor to the Director of the DPS concerning the latter's direction and control responsibilities. Sanders, Tr. 3110. Although the Director of DPS, Mr. Frank B. Sanders, testifying under subpoena as Intervenors' rebuttal witness, stated that those persons within the Governor's office who are responsible for emergency response functions are strictly defined, Sanders, Tr. 3962, they are nowhere set out in SCORERP. According to Mr. Sanders, those within the Office of the Governor included in the assignment of direction and

control responsibilities include Bill de Loche, Executive Assistant to the Governor, Mr. Sanders, Gaines Boone, Deputy Director of DPS, Perdy McCloud, Emergency Preparedness Coordinator, and Judy Turnipseed, a public information officer. Id. While lack of inclusion by name of the Director of DPS responsibilities does not prevent a finding of compliance with Planning Standard II.A., the board believes clear delineation this office in SCORERP is desireable and therefore directs Applicants to supply appropriate changes to the State plan to FEMA and the NRC Staff.

9. The support responsibilities for direction and control for the State of South Carolina are, as noted, specified in Table 3, at 55 of SCORERP. Apps. Exh. EP-2. These functions are detailed in the plan at Sec. IV.B. Id., at 12. In addition, the responsibilities of the respective organizations at the State Emergency Operations Center, in Columbia, and the Forward Emergency Operation Center, in Clover, are established. Id.; Lunsford, Tr. 2947-2950, 3021-23, 3042-3; Sanders, Tr. 3111. While York County officials would have access to State emergency response resources during the early stages of an accident (Apps. Exh. EP-21, Lunsford, McSwain, at 5; Thomas, at 8; Pope, Tr. 3981-82), the plans assume that in an immediate emergency situation, the county will be responsible for providing the resources for protective response. Apps. Exh. EP-2, York County Em. Op. Plan, at Q-11. In North Carolina, State agencies (e.g., Highway Patrol) act as supporting organizations until the SERT is established and assumes direction and control responsibilities. Apps. Exh. EP-21, Harris, at 4; Phillips, at 3; Broome, at 2. The counties can call upon State resources by contacting the State EOC in Raleigh prior to establishment of State Emergency Response Team (SERT). Id., Harris, at 5; Harris, Tr. 3019-20.

10. Much of the written and oral testimony focused on the question of who would be in charge during the initial hours of an accident, particularly one involving a fast-breaking general emergency. The North Carolina plan clearly specifies that during approximately the first 7-9 hours of an emergency, local authorities, i.e., Gaston and Mecklenburg counties, are responsible for direction and control, or at least until the SERT has been established and assumes direction and control of emergency operations within the State. Apps. Exh. EP-1, Part I, Sec. II.B., Figure 5, Sec. II.B.; Part II, Sec. II.C., D., at 2; Part III, Sec. II. C., D., at 2; Testimony of the State of North Carolina (E.H. Harris, Jr.) on Emergency Planning Contention 8 ("Apps. Exh. EP-21, 21A (Harris)"), at 4, 6-7. During the period prior to establishment of the SERT, with its headquarters at Douglas Airport in Charlotte, North Carolina, Mecklenburg County officials have full responsibility for direction and control, with State agencies in supporting roles, and have authority to take any necessary protective actions with the county. Id., Harris, Tr. at 3000; Apps. Exh. EP-21, Testimony of Mecklenburg County (Lewis Wayne Broome) on Emergency Planning Contention 8 ("Apps. Exh. EP-21, (Broome)"), at 1, 2. Although not required for establishment of the SERT, its activation is anticipated to be accompanied by a formal declaration of a state of emergency by the Governor of North Carolina. Harris, Tr. at 3000; Pugh, Tr. 4214A. According to Applicants' witness, E.H. Harris, Assistant Director for Emergency Response, North Carolina Division of Emergency Management (NCDEM), the accompanying of establishment of the SERT with a declaration of emergency is primarily an operational consideration -- giving the Governor, and those with

operational responsibilities, all available protective response options. Harris, Tr. 3003-04; Pugh, Tr. 4237, 4244. The precise point of transition from county to State direction and control is to be specified in a message transmitted from SERT to the State EOC's. Apps. Exh. EP-1, Part I, at 4, 7.

11. Under the SCORERP, and the York County plan, a similar shift in direction and control is contemplated. Under both these plans, however, York County officials are expected to exercise direction and control functions only in those circumstances in which immediate response is required. Where there is sufficient warning during a developing accident, such that immediate response is not required, the State retains direction and control. Apps. Exh. EP-2, Sec. IV.C.1.d. and 2.a., at 22; York County ERP, Annex Q, Sec. IV.A, at Q-11. As in the case of North Carolina, where protective response is immediately required, York County has the authority to take necessary protective actions. Id. Also like the North Carolina plan, the shift in direction and control is contemplated when the State Emergency Operations Center (SEOC) is established, although unlike North Carolina, establishment of the SEOC must be accompanied by the Governor's declaration of a state of emergency. Apps. Exh. EP-21, Testimony of the State of South Carolina (P.R. Lunsford and W.M. McSwain on Emergency Planning Contention 8 ("Apps. Exh. EP-21, Lunsford/McSwain)", at 6, 7, 9. There was some conflict in the Testimony of York County (Phillip Steven Thomas) on Emergency Contention 8 ("Apps. Exh. EP-21, Thomas"), at 6-7, and between that testimony, Mr. Thomas' oral testimony, and that of Messrs. Lunsford and McSwain (Lunsford, Tr. 3005-6; McSwain, Tr. 3006-7, Thomas,

Tr. 3007-8), as to whether the county or State had direction and control in a situation where only the SEOC in Columbia was open. This conflict was apparently caused by the assumption by Mr. Thomas that the SEOC would or could be opened without a declaration of emergency.16/ As noted above, and as explained by Mr. McSwain, however, both the SEOC and FEOC can only be established pursuant to the Governor's declaration of a state of emergency. McSwain, Tr. 3006. In addition, Sec. IV.C.2.a. of SCORERP notes that while both the SEOC and FEOC require the Governor's order, the FEOC need not be established for direction and control to be with the State. Apps. Exh. EP-2, SCORERP, at 22. All agreed, however, that direction and control shifted to the State with the Governor's declaration of an emergency. Apps. Exh. EP-21, Thomas, at 7; Lunsford, Tr. 3005-6; McSwain, Tr. 3006-7; Thomas, Tr. 3007-8. In summary, then, in a fast breaking accident at Catawba, the respective counties would have direction and control responsibilities until a specified point in time designated under the respective State plans. In North Carolina, this point is the formal establishment of the SERT (with or without a declaration of emergency). In South Carolina, this point is the Governor's declaration of a state of emergency (whether or not the FEOC is established).

16/ The situation in which direction and control would shift from the county to the State prior to establishment of the FEOC, i.e., upon declaration of an emergency and establishment of the SEOC, was similarly not recognized in the FEMA Testimony. Staff Exh. EP-2, at 17.

12. Another concern raised regarding direction and control was whether the authority and responsibility for ordering evacuation of the population was clearly established so as to permit effective protective action as needed. The evidence presented focused particularly on the question whether the counties or even the States had authority to order an evacuation under the situation of an immediate emergency, in light of the reservation to the respective State governors of the authority to "direct and compel" evacuation of the public. See, e.g., Guild, Tr. 2797-98.

13. Under North Carolina statute, the Governor is granted authority to "direct and compel" evacuation of the population, only upon concurrence of the Council of State. N.C. Gen. Stat. 166A-5, 6(c)(1); Pugh, Tr. 4202; Apps. Exh. EP-1, Part I, Attach. 1, at 1-3, 1-4. However, in addition, the same statute authorizes the Governor, or his delegate, without concurrence, to "take such action and give such directions to State and local law enforcement officers and agencies that may be reasonably necessary for the purpose of securing compliance with the provisions of this chapter and orders and rules and regulations made pursuant thereto." Pugh, Tr. 4209-10; Apps. Exh. EP-1, Part I, Attach. 1, at 1-4; Apps. Exh. EP-21, Harris, at 6; Apps. Exh. EP-21A, Harris, at 6. It may be noted that Mr. Harris' testimony was changed subsequent to its initial written submission; however, the only substantive change/correction was to delete the requirement to consult with the Council of State prior to Staff officials ordering (but not directing and compelling) an evacuation. Apps. Exh. EP-21, Harris, at 6; Apps. Exh. EP-21A, Harris, at 6. The signficance of this correction is that upon a

declaration of emergency by the Governor (which, in any event, precedes the State's assumption of direction and control responsibility), responsible State officials -- in this case Mr. Pugh, the Director of the Division of Emergency Management -- can order (but not compel) evacuation, without further consultation. Harris, Tr. 2811, 2816; Pugh, Tr. 4204-5, 4233.

14. As for South Carolina, Section IV.B.1 of SCORERP states that the Office of the Governor has the task of ordering evacuation, if required, while the Emergency Management Division is responsible for directing such evacuation. Applic. Exh. EP-2, SCORERP, at 11-12. The Governor alone has legal authority to "direct and compel" evacuation. This authority is found in item A.7 of South Carolina Legislative Act 199, of 1979. McSwain, Tr. 2962; Lunsford, Tr. 2962; Apps. Exh. EP-2, SCORERP, at 1. However, Mr. Lunsford testified that the authority to order, but not compel, evacuation could be and has been delegated to Mr. Sanders, as the Director of DPS. Lunsford, Tr. 2960. His testimony also indicated, however, that the protective action decisionmaking process is a consultative effort of the "Executive Team" consisting of the Governor's Office representative, the EPD director, the DHEC representative and the Deputy Adjutant General. Lunsford, Tr. 2947-49; Apps. Exh. EP-21, Lunsford, McSwain, at 6. Neither Mr. Sanders, nor Messrs. Lunsford or McSwain, however, were able to identify a specific statutory basis nor a specific delegation for the assumption of authority by Mr. Sanders to order (but not compel) an evacuation of the population, relying instead on the authority of the Governor under Article IV of the Constitution of South Carolina and an Executive Order establishing the Division of Public

Safety as the legal basis for ordering an evacuation or other protective action, absent a directive to that effect by the Governor himself. Lunsford, Tr. 2942, 2960-1; McSwain, Tr. 2961; Sanders, Tr. 3104, 3108, 3110. Thus, in an emergency requiring immediate activation of the State emergency operations centers, the key question is not whether the Governor has time to consult with the Council of State on an order to "direct and compel" evacuation, but whether he is available on very short notice to issue an order declaring a state of emergency. Extended oral examination of Mr. Sanders concerning recent experience in disasters in South Carolina, both as to communication with the Governor in an emergency, and the Governor's ability to quickly issue such an order, provided no reason to doubt such quick action can and would be taken. Sanders, Tr. 3924-34.

15. In sum, while the testimony of emergency management officials from both North Carolina and South Carolina was that they could order an evacuation without an order to that effect issued by the respective State Governors, neither the N.C. Em. Resp. Plan, nor SCORERP specifically delineate the distinction between the Governor's non-delegable authority to "direct and compel" an evacuation, and the delegable authority to take protective actions, including non-compulsory evacuation, generally. In order to eliminate any possible ambiguity in the plans in this respect, the Board directs Applicants to supply FEMA and the NRC Staff with revisions of the State plans reflecting the clarification indicated in the hearing testimony with regard to the distinction here in issue. However, the Board does not believe the need for such clarification prevents a finding of compliance with the regulations, and reasonable assurance under 10 C.F.R. § 50.47(a).

16. Finally, another issue related to the effectiveness of assignments of responsibility was the extent to which local officials, in a fast-breaking accident situation, would be able to order an immediate evacuation, should such action be deemed necessary. The plans of the respective States and counties in this case clearly specify that, in an immediate emergency prior to the time the States are able to assume direction and control, county officials are contacted directly by the plant, and are responsible for initiating appropriate protective actions. Apps. Exh. EP-1, Part 1, Part I, . II.B., at 3-6, 8-9; Part II, Sec. II.B, at 1-3; Part III, Sec. II.B., at 1-3; SCORERP, Sec. IV.C., at 22; York County Em. Op. Plan, Annex Q, Sec. IV.A, at Q-11. Mr. Harris noted that, in North Carolina, county officials have full direction and control responsibilities until SERT is in position, and have authority to order evacuation and other protective actions, without mandatory consultation with State officials. Apps. Exh. EP-21, Harris, at 4-5. Both Gaston and Mecklenburg County officials testified that under those conditions, they were authorized to assume such responsibility. Apps. Exh. EP-21, Phillips, at 2-3; Apps. Exh. EP-21, Broome, at 1-3. As to South Carolina, Messrs. Lunsford, McSwain, and Thomas, provided testimony to the same effect. Apps. Exh. EP-21, Lunsford, McSwain, at 6, 9; Apps. Exh. EP-21, Thomas, at 6-8.

17. On cross-examination, Intervenors' counsel focused on the nature of the counties' authority -- whether it was limited to merely "warning and encouraging", and whether there was legal authority for the counties to "order" an evacuation. Mr. Sanders testified that under the South Carolina Home Rule Act, the county council can empower local law

enforcement officials with the authority to order an evacuation. Sanders, Tr. 3937-38. Messrs. Lunsford, McSwain, Thomas and Dickson testified that, in fact, such authority had been granted to the County Manager of York County. Lunsford, McSwain, Tr. 2971; Thomas, Tr. 2964; Dickson, Tr. 4006, et seq. Mr. Thomas observed that the county ordinance establishing the Municipal County Preparedness Agency delegates "that type of authority. Not specifically, but generally." Thomas, Tr. 2966; see, Dickson, Tr. 4006-7, 4024-5. The York County Ordinance, adopted October 10, 1980, is set out in full in the York Plan. Apps. Exh. EP-2, York County Em. Op. Plan, January 1984, at ii-xi. Section VI of this ordinance provides for declaration by the County Council of a state of disaster or emergency if it finds that a disaster or emergency has occurred or is imminent, and, among other actions authority to "direct evacuation" of the population. However, Section VII gives the coordinator of the Municipal County Emergency Preparedness Agency numerous duties, including [a]ssuming such authority and conducting such activity as may be necessary to provide and execute the emergency operations plan. Id., at vi-viii. See, Dickson, Tr. 4021, 4024-5.

18. Intervenors' counsel introduced an opinion of the Attorney General of South Carolina, dated September 5, 1980, which states that county and municipal governments and officials lack the authority to "direct and compel" an evacuation. Int. Exh. EP-21; McSwain, Tr. 2972. Witnesses Lunsford, Thomas and McSwain all agreed, however, that, notwithstanding the Attorney General's opinion, local authorities have the power to "direct and order", not simply "warn or encourage" an evacuation.

Lunsford, Tr. 2974; Thomas, Tr. 2974-5; McSwain, Tr. 2975.[17/] Under examination by Intervenors' counsel, Mr. Sanders noted that "order" indicates legal compulsion. Messrs. Lunsford, McSwain and Thomas also agreed that use of the word "order" may be interpreted or perceived as being mandatory. McSwain, Tr. 2968-9; Lunsford, Tr. 2969; Thomas, Tr. 2969. The Board's concern here, however, is primarily with the clarity and effectiveness of assignment of responsibility, and for this purpose, the paramount consideration is whether decisionmakers and emergency response personnel are clear about what they can, and are able to, do. Thus, it is important that the distinction South Carolina State and local officials make between "order" or "direct", on the one hand, and "direct and compel", on the other, is clearly understood and acted on. There appears to be no confusion, however, among them as to the nature of their authority and to the different implications of these terms. While the Board finds this distinction to be adequately understood, it nevertheless believes the State and local South Carolina plans should be clarified in this respect. Applicants are therefore directed to supply FEMA and the NRC Staff with revisions of the South Carolina State and county plans which clarify the distinction. Although the same issue was raised with respect to the authority of local governments in North Carolina to issue orders of evacuation, the N.C. Em. Resp. Plan, Part I, Attach. 1,

---

17/ Intervenors' Exh. EP-21 also contained a letter from another Mr. Thomas of the State Law Enforcement Division, to Mr. McSwain, stating, in the context of the possibility of a precautionary evacuation or shutdown of the Carowinds Theme Park, that local authorities lack "any power as to the question of evacuation." McSwain, Tr. 2976.

at 1-17, clearly sets out this authority. Apps. Exh. EP-1, Part I, at 1-17. The oral testimony also raised little doubt that the two North Carolina counties -- Gaston and Mecklenburg -- have such authority. Harris, Tr. 2988.

19. Based on all of the evidence presented on the adequacy of assignment of direction and control responsibilities, the clarity of lines of authority, and their adequacy to achieve effective protective response, the Board finds that such assignments have been made, that authority for such assignment exists and is well understood, and that such assignment is adequate to provide for effective direction and control.

2. Assignment and Coordination of Initial Response Functions

20. As discussed above, five offsite jurisdictions are assigned principal roles in responding to an accident at Catawba -- two States and three counties. In addition, as noted, the plans contemplate that the two North Carolina counties and one South Carolina county will exercise primary responsibility for offsite protective response during the initial hours following an accident, particularly when immediate response is called for.

21. Both State plans provide for coordination by the respective States of all State and local response activity once the respective States have direction and control responsibility. Apps. Exh. EP-21, SCORERP, at 7, 12, 22; Part IV, at 10; Apps. Exh. EP-1, Part I, at 3-4, 26-27, 31 (Figure 5).

22. Officials from both North Carolina and South Carolina testified generally that operational responsibilities will be coordinated through their respective operations centers, and that key initial actions, such

as sounding the sirens and the content of the emergency broadcast system (EBS) message, would be coordinated. Apps. Exh. EP-21, Lunsford, McSwain, at 7-10; (Harris), at 4-5, 7-8; Sanders, Tr. 3948-49.

23. One of Intervenors' primary concerns was coordination of the decision and timing of activation of the siren alert system and the information content of the subsequent EBS message when such action was the responsibility of the counties (i.e., during the initial hours of an emergency situation).

24. In the event of an immediate general emergency, requiring immediate alert and notification of the public, the plant and counties will be linked by a private dedicated telephone circuit/microwave selective signaling system, or ringdown system, by which the plant control room can simultaneously communicate with all three counties' operations centers and warning points, the FEOC and SERT headquarters (when operational), the EBS control station, the Duke Crisis Management Center (in Charlotte), and the media center (also in Charlotte). Apps. Exh. EP-21, Coleman, at 2. Therefore, when the control room calls the county warning points manned by police or sheriff's dispatchers on the ringdown system, each county dispatcher would be on the line and could discuss coordination. Broome, Thomas, Phillips, Tr. 3039. Officials from each of the response counties stated every effort would be made to coordinate information among all parties concerned. Broome, Harris, Phillips, Tr. 3009. However, in an emergency requiring immediate action, there is no requirement for the counties to consult with their State officials. Lunsford, Tr. 3009-10, 3014; McSwain, Tr. 3010-11, 3014; Thomas, Tr. 3014; Harris, Tr. 3014.

25. All three county witnesses, Messrs, Broome, Phillips, and Thomas, agreed that timing of activation of the sirens, and the content of the EBS message, would be coordinated among the counties. Phillips, Tr. 3013; Broome, Tr. 3016-18; Thomas, Tr. 3011, 3016-17; Apps. Exh. EP-21, Phillips, at 4-5, Broome, at 3-4, Thomas, at 8-9, Lunsford/McSwain, at 8. In Gaston and Mecklenburg counties, the dispatcher has authority to activate the sirens and then coordinate immediately with the other county dispatchers activation of the EBS system; in York County, the procedure is to consult with the two other counties prior to activation of the sirens. Id.; Phillips, Tr. 3015, 3018. See also Pope, Tr. 3994. With the communications systems available, it is feasible for a dispatcher to activate the sirens in his jurisdiction and, in the interval of 5 minutes between the time the sirens go off and broadcast of the EBS message, to coordinate the content of the EBS message. Broome, Tr. 3016-18, 3029. Thus, upon establishment of the SEOC, dissemination of information to the public is coordinated and transmitted through the SEOC. Apps. Exh. EP-21, Lunsford, McSwain, at 7.

26. As a result, the evidence supports the Board's finding that adequate provision for coordination of the alert and notification function among the responding counties has been made.[18/] See Heard, Hawkins, Tr. 1655-56.

18/ Although not the subject of much examination, the evidence also showed that adequate provision has been made for coordination of alert and notification when it is the States exercising direction and control responsibility. Apps. Exh. EP-21, Lunsford, McSwain, at 8, 10; Harris, at 7-8.

27. A related consideration was whether, during the initial hours of an accident when neither the South Carolina nor the North Carolina emergency operations centers have taken over direction and control, there would be adequate coordination between State officials, who might be in transit, and county emergency operations centers on any necessary State support activity, and particularly with respect to coordination of EBS messages.

28. As discussed earlier, the SEOC is established in Columbia, S.C., upon declaration of an emergency by the Governor. However, there would be a delay of three to four hours before the FEOC in Clover, S.C., could become operational. Lunsford, Tr. 2843. To assure continuing coordination while the Director of the Emergency Preparedness Division (SC) is in transit, the Deputy Director is in charge at the SEOC. Apps. Exh. EP-21, SCORERP, at 23; Lunsford, Tr. 3021, 3023. During this time, coordination of the content of the EBS message between South Carolina and the other counties would be accomplished by the SEOC in Columbia. Lunsford, Tr. 2843; Apps. Exh. EP-21, Lunsford, McSwain, at 7-8. In North Carolina, continuous support can be obtained either by contacting the SERT in transit by radio, or by the EOC in Raleigh, N.C., which maintains a back-up SERT support staff. Harris, Tr. 3019-20. Until SERT is established, State agency support is coordinated through the State EOC in Raleigh. Apps. Exh. EP-21, Harris, at 5. In any case, the EBS message would have to be coordinated not only among the three counties, but the two States, so that the same information goes out to all jurisdictions. McSwain, Tr. 2844-45. Coordination of the actual EBS broadcast would be assured because the two States' EBS system are tied together. Harris, Tr. 2847-48.

29. Further questioning by Intervenors' counsel sought to determine the extent of coordination on various other protective actions. In general the evidence supports the finding that there has been extensive effort to assure adequate coordination. Representatives of the two States have met a number of times to coordinate emergency response, and have conducted a joint exercise. Apps. Exh. EP-21, Harris, at 7; Harris, Tr. 2924. Specific areas of coordination with county governments include late warning, media operations, activation of alert and notification system, decision-making for protective actions, field monitoring, operation of FEOC and SERT, communications, and traffic control. Id. Public information is coordinated among the concerned jurisdictions. Harris, Tr. 2967. Rumor control is assigned. Harris, Tr., at 2866; Lunsford, Tr. 2871. Letters of agreement provide for medical support between the two States. Lunsford, Tr. 2926. See also, Apps. Exh. EP-2, SCORERP, Part 4, at C-21. Discussions have taken place between the States to assure free flow of evacuation of traffic across State boundaries. Broome, Tr. 2983. Coordination of protective actions was also tested and observed to be good during the February 1984 exercise of the plans. Harris, Broome, Phillips, McSwain, Lunsford, Thomas, Tr. 3049-50.

30. Based on this record, the Board finds there to be adequate means to reasonably assure coordination of protective actions among the two States and three counties within the Catawba EPZ.

3. Communications in Support of Direction, Control and Coordination Activities

31. Although the adequacy of emergency communications was considered under Contention 18, the Board also heard considerable testimony in connection with Contention 8 on whether, in exercising direction and

control responsibilities and in coordinating initial protective actions, there was reasonable assurance that communications would be available to accomplish these functions.

32. Under the SCORERP, normal telephone lines are the primary means for alerting agencies and response forces, with radio and messengers as back-up means. Apps. Exh. EP-21, SCORERP, at 34-35; Part 4, Annex A, at A-1. Under the North Carolina ERP, commercial telephone lines are the the primary link among the response organizations, with radio communications providing back-up means. Apps. Exh. EP-1, Part I., at 87-88; Part II, at 43-44; Part III, at 46-47. A variety of available radio communication links are described in SCORERP (Apps. Exh. EP-2, SCORERP, at 35-37), and the North Carolina ERP. Apps. Exh. EP-1, Part I, at 87-89, Part II, at 43-44; Part III, at 46-47.

33. Applicants also presented Stan D. Coleman, a design engineer, who designed the emergency communications system, and who, along with Messrs. Harris, Lunsford, McSwain, Phillips, Broome, and Thomas, further described the communications available for coordination of emergency response. Apps. Exh. EP-21, Coleman, at 1-3; Harris, at 8-11; Lunsford, McSwain, at 11-13; Phillips, at 6-7; Broome, at 8-11; Thomas, at 2-5. Although normal Bell system telephone communications are available, communication among Catawba station and each of the emergency operations centers for the three counties and two States will be provided by the selective signaling system installed, which is not affected by overloading of normal telephone circuits and has a battery

back-up power supply. Id.[19/] Mr. Harris enumerated the communications systems available to North Carolina officials: amateur radio, 2-way radio on State frequencies, police information network, telecopying machine, courier, as well as those systems particularly linked to the SERT (Duke radio, Duke Selective Signal System) and Bell lines. Apps. Exh. EP-21, Harris, at 9. North Carolina has approximately 20 radio frequencies available to it. Id. South Carolina also has its own radio system linking York County and Catawba station with the SEOC, in addition to the Duke systems. Apps. Exh. EP-21, Lunsford, McSwain, at 11-12. As noted earlier, both South Carolina and North Carolina emergency officials can be contacted while in transit to the FEOC and SERT, respectively. The responding counties also are tied together through radio communication. Apps. Exh. EP-21, Phillips, at 7; Broome, at 11; Thomas, at 5. County law enforcement agencies also are available to contact individuals by vehicle if necessary. Id., Broome, at 10; Pope, Tr. 3994; Broome, Tr. 2888. The counties also have radio communications available as a back-up in contacting various county response organizations. Apps. Exh. EP-21, Phillips, at 6; Broome, at 8; Apps. Exh. EP-21, York County Em. Op. Plan, at Q-44, Q-45. In addition, vehicular radios provide for continuous links to key county officials.

19/ In this connection, FEMA's Interim Findings noted that while emergency communications were adequate, additional equipment was shown to be needed during the February exercise. Staff Exh. EP-3, at 8. York County communications were, apparently as a result of these comments, being upgraded, with installation of ring-down phone lines to the York County EOC expected by mid-1984. Apps. Exh. EP-21, Thomas, at 3.

34. Particular attention was also given at the hearings to the ability to contact the Governor of South Carolina and the time required to issue a declaration of a state of emergency in light of the need to obtain such a declaration to activate the SEOC. The testimony, however, indicated that responsible emergency management officials have both the procedures and equipment to assure ready contact with the Governor. Sanders, Tr. 3113-15, 3924-26, 3931-32, 3934. There did not appear to be the same concern about the actions of the Governor of North Carolina; in North Carolina a declaration of emergency is not needed to implement the State emergency plan. Pugh, Tr. 4214A.

35. Another concern was whether back-up means of communication existed in the event that an accident disrupted normal and primary emergency communications from the Catawba control room. Mr. Coleman testified that Duke has three radio systems permitting transmission from the control room -- a crisis management control facility, a Catawba security radio system, and a production and transmission control facility. Coleman, Tr. 3052, 3038. Offsite, Duke has both the production and transmission system as well as system piping and communications links to counties. Id., at 3038. In addition, if communications were lost from either the control room or the technical support center, Duke vehicles with radios and other telephones in other portions of the plant might be available. Coleman, Tr. 2995. However, even if all communications from the plan were knocked out by a major explosion, such information would very likely be known outside the plant in a few moments. Harris, Tr. 2830-31. If such an event were to occur, the North Carolina Radiological Protection Section would assume a large release, and recommend protective action

accordingly. Harris, Tr. 2932-33. In South Carolina, the approach would focus on restoring communications with the plant through law enforcement radios (used by Duke volunteers) or through the Crisis Management Center in Charlotte. Lunsford, Tr. 2833-34. There therefore appears to be adequate back-up communication from the plant, even in the event of the severest type of accident.

36. Based on all the evidence presented to the Board, we find that emergency communications comply with 10 C.F.R. § 50.47(b)(6) and Appendix E, Section IV.E.9. to Part 50,[20/] and are adequate to provide reasonable assurance of continuous communications among the various responding organizations in the event of an accident at Catawba, such that execution of direction and control and coordination responsibilities will not be impaired.

4. Residual Responsibilities of the Counties

37. Although the last sentence of Contention 8 addresses the adequacy of assignment of "residual" responsibilities to the counties for effective protective response once the States assume direction and control, this subject was not fully developed by Intervenors during cross-examination. County emergency management officials testified that the responsibilities of county departments, agencies and support organizations are clearly assigned, understood by those involved, and the resources are available

---

20/ 10 C.F.R. § 50.47(b)(6) addresses the requirement for "prompt communication among principal response organizations to emergency personnel" as well as to the public. Appendix E requires "at least one on-site and one off-site communications system."

to carry out those responsibilities. Apps. Exh. EP-21, Phillips, at 1-2; Broome, at 1, 5-8; Thomas, at 1-2, 5, 6. FEMA testimony confirmed the adequacy of these assignments. Staff Exh. EP-2, Heard, Hawkins, at 17 (citing plan sections for assignment of these responsibilities). State officials testified that county organizations with support responsibilities know what they are supposed to do, as well as who is in charge. Pugh, Tr. 4235-36; Sanders, Tr. 3962. 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. Harris, Broome, Phillips, McSwain, Lunsford, Thomas, Tr. 3049-50. The testimony of one additional local official, York County Sheriff, J. Elbert Pope, also indicated that with respect to the particular support responsibilities of his department, tasks were assigned, understood, and functioned properly in the exercise. Pope, Tr. 3980-82, 3986, 3988, 3996-97.

38. Based on this evidence, the Board finds that support responsibilities of the counties have been clearly assigned and there is reasonable assurance that they will be effective for protective action response.

5. Conclusion

39. Having reviewed the extensive record relating to Contention 8, the Board finds that the offsite emergency response plans for the Catawba plant satisfy the planning standards in 10 C.F.R. §§ 50.47(b)(1), (6), (8) and (15) and requirements of Appendix E, as they bear on the issues

here under consideration. The plans provide clear and effective assignments of primary and support responsibility, 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 implementation of such assignments, authorities, and coordination of functions.

E. Contention 9 - Alert and Notification

1. At the August 8, 1983 prehearing conference, the Licensing Board admitted Contention 9, which reads as follows:

> The plans 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: ...
>
> * * * *
>
> Secondly, 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.
>
> (c) In the event of a power outage, the public's access (and possibly the access of state and local authorities with emergency responsibilities) to emergency broadcast information could be seriously impaired. [Without a specific, reasonable plan to deal with such a contingency, the emergency plans do not meet 10 CFR 50.47(b)(6) as well as (b)(5).]
>
> (d) There are inadequate provisions for notification of special facilities. For example, neither the Carowinds Theme Park nor the Heritage U.S.A. Religious Retreat appear to have any notification plans or procedures. A conservative estimate of peak summer crowd is thirty thousand to thirty-five thousand 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 concerns of the Intervenors raised in this contention and through their cross-examination fall into the following areas which are discussed below: the alert and notification system, difficulties in

hearing the warning siren, back-up notification, and notification of special facilities -- Carowinds Theme Park and Heritage USA.

3. The witnesses presented on this contention by the Applicants were: R. Michael Glover for Duke Power Company; Dr. M. Reada Bassiouni,[21] the principal technical 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;[22] Bob E. Phillips for Gaston County; Lewis Wayne Broome for Mecklenburg County and Phillip Steven Thomas for York County. "Applicants' Testimony on Emergency Planning Contention 9," Apps. Exh. EP-17. FEMA witnesses, John C. Heard, Jr. and Thomas I. Hawkins also addressed this contention. "Testimony of FEMA Regarding Emergency Planning Contentions Admitted by the Board in the Catawba Proceeding," Staff Exh. EP-2, at 18-22. The Intervenors did not present witnesses on this contention.

1. The Alert and Notification System

4. The primary alerting system to be used in the Catawba emergency plan is the fixed siren system. Glover, Tr. 1948. This fixed siren warning system design includes 66 high-power rotational sirens, rated 125 dBC

21/ Dr. Bassiouni has a Ph.D. from Syracuse University in Mechanical Engineering with a Major in Acoustics. He founded Acoustic Technology, Inc. (ATI) and is the principal technical consultant in acoustics, vibration, and noise control for utilities, manufacturers, and agencies. His area of expertise has been design and implementation of prompt notification warning systems required by NUREG-0654/FEMA REP-1, Apnendix 3. Apps. Exh. EP-17, Bassiouni, Attachment A.

22/ Mr. W. M. McSwain was originally to testify on this contention with Mr. Pugh. Due to his unavailability, however, all references to him in the direct testimony were stricken, Tr. 1825.

at 100 feet, and one siren rated at 113 dBC at 100 feet. Apps. Exh. EP-17, Bassiouni, at 2.

5. In addition, the Applicants' witness, Mr. Glover, testified that ten additional sirens would be installed. The locations of these sirens were transmitted to Mr. Bassiouni, a consultant for Acoustic Technology, Inc. (ATI), for incorporation into his analysis of compliance with NUREG-0654, Appendix 3, as well as FEMA 43. Apps. Exh. EP-17, Glover, at 5.

6. The siren system was verified and field tested by ATI. ATI prepared a report which documents the adequacy of the warning system in meeting the guidelines set forth in the Federal Emergency Management Agency regulations at 44 C.F.R. § 350, Planning Standard E, Appendix 3 of NUREG-0654/FEMA REP 1 and the standard guide for the evaluation of alert and notification systems for nuclear power plants (FEMA-43). Apps. Exh. EP-17, Bassiouni, at 1 and 2. FEMA-43 superseded the earlier FEMA publication CPG 1-17 and accordingly is the appropriate FEMA guidance for the Catawba siren system. See Bassiouni, Tr. 1836.

7. The actual measured siren output at 100 feet, obtained through field testing for a sample number of sirens, (6 sirens were actually activated and signals measured with a total of 14 measurements for each siren) was used to predict the extent of 60 and 70 dBC acoustic coverage of the siren system for daytime summer average meteorological conditions. Apps. Exh. EP-17, Bassiouni, at 2; Bassiouni, Tr. 1831, 1832. "Average summer daytime weather conditions" were used consistent with FEMA-43 (at E-7). Bassiouni, Tr. 1859. Predicted siren sound pressure level (SPL) values for each measuring location were obtained from the ATI acoustic computer model. The predicted and measured siren SPL's were in

excellent agreement and the ATI computer model calculated slightly conservative predictions of siren acoustic coverage. Apps. Exh. EP-17, Bassiouni, at 2.

8. According to FEMA-43, the 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 provides 60/70 dBC acoustic alert coverage depending upon the population density of the area. An ambient background noise survey was conducted within the 10-mile EPZ to document the average measured outdoor ambient sound level in specific areas located outside 60 dBC siren acoustic contours. Based on the ambient noise survey, the average ambient sound level for each siren outside 60 dBC contours was determined. Apps. Exh. EP-17, Bassiouni, at 2, 3.

9. Dr. Bassiouni concluded that the installed sirens system was found to provide the required 60 and 70 dBC public alert coverage for most areas. Apps. Exh. EP-17, Bassiouni, at 3. This verified that the Catawba siren system will substantially meet FEMA-43 guidelines. He indicated, however, that there were areas located outside 60 dBC contours. However, by applying the 10 dB above-the-ambient criteria based on ambient background noise survey, he testified that these areas are reduced. He testified that the installed siren warning system provides an adequate notification to the majority of the public within 10-mile EPZ. Apps. Exh. EP-17, Bassiouni, at 3, 4.

10. Dr. Bassiouni testified that since the EPZ had been extended beyond the geometric 10-mile radius, some areas along the extended plume EPZ were not covered to meet the FEMA Guidelines. Id. Ten additional

high-powered sirens (rated at 125 dBC at 100 feet) will be added by September 1, 1984 to comply with the guidelines of FEMA-43. Apps. Exh. EP-17, Bassiouni, Attachment C; Tr. 1822. With these additional sirens the Board concludes that the guidance of FEMA-43 will be satisfied for the entire EPZ.

11. On map 2 of Attachment C to Dr. Bassiouni's testimony, a number of regions are shown in which the signal falls below the level of 50 dBC. In fact, 23 regions with levels below 50 dBC are indicated. However, Dr. Bassiouni testified that in these regions it is his judgment they are acceptable because of the present low ambient sound levels. This judgment is based on the present system as modified by the 10 additional sirens. Tr. 1856. Dr. Bassiouni further testified that because of population increases, and therefore a concern about an increase in ambient sound level during the years of future operation of Catawba, FEMA has a requirement of reviewing a system once a year. On an annual basis, a licensee should insure that essentially the 100 percent requirement is met. Bassiouni, Tr. 1857.

12. The evidence makes clear that a siren system itself will not assure completely that 100 percent of the people would be notified. However, NUREG-0654, Appendix 3, states that the design objective for the system shall be to meet the acceptance criteria of Section B of the Appendix and it makes clear that this design objective does not constitute a guarantee that early notification can be provided for everyone with 100 percent assurance or that the system when tested under actual field conditions will meet the design objective in all cases. NUREG-0654, Appendix 3, at 3-11; Bassiouni, Tr. 1952. Accordingly, the Board finds

that the fixed siren system is adequate and meets the FEMA-43 guidelines. The Board makes this finding understanding that the evidence indicates many of the people in the EPZ would be within dwellings with operating air conditioners, televisions or radios, and even possibly sleeping. However, these matters are not specific requirements of FEMA-43. See Bassiouni, Tr. 1834. Moreover, the Board fully realizes that the Catawba siren system has not yet been tested and approved by FEMA under 44 CFR 350. Heard, Tr. 1572 and Tr. 1597. However, based on the record and the acceptance criteria, we find that there is reasonable assurance that such criteria will be met. The record fully supports this finding in spite of the fact that FEMA has not completed its review.[23/]

13. Finally, regarding the Intervenors' concern about the rotational design of the fixed sirens, the rotation of the horns on the sirens creates an effect of perceived maximum and minimum sound level. Bassiouni, Tr. 1843. Dr. Bassiouni testified that the FEMA guideline calls for a steady siren signal and that the actual siren signal is steady. Tr. 1844. Moreover, he testified that the effect of the up and down modulation would attract attention. Tr. 1845. We conclude that the Catawba siren system complies with the "steady signal" requirement of FEMA guidelines.

23/ With regard to installation and testing of the siren warning system, it is important to note that this Board may rely on "predictive" findings. In the matter of Louisiana Power and Light Company (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 NRC 1076, 1103-1105 (1983). It is clear that findings on emergency planning required prior to license issuance are predictive in nature. Id. What is necessary is for the Board to make a finding of "reasonable assurance." Id. Accordingly, if implementation of a portion of a plan is not yet complete or the plan is not firm the Board may still make a finding that the plans are sufficiently detailed and concrete to provide reasonable assurance that they can and will be implemented in the event of an emergency. Id. Details of completion such as testing a siren system is the type of matter which the Commission has stated it believes to be properly overseen by the Staff and therefore predictive findings can suffice. Id.

2. Difficulties in Hearing the Warning Siren

14. The Intervenors' contention raises the issue that as a result of hearing impairments, weather conditions, or just distance from the sirens, the sirens would not be heard.

15. In cross-examination by the Intervenors it was brought out that air conditioners can contribute a 15 decibel addition to the ambient level depending on the type air conditioners used. Bassiouni, Tr. 1852. It was brought out that structures will have a range of between 15 and 20 decibel reduction moving from outdoors to indoors. Id. It was determined that conversations within a home can add a few decibels. Bassiouni, Tr. 1853. It was further determined that competing noise from TVs can be between 55 and 110 decibels depending upon how loud the TV is played. Id. However, the guidelines of FEMA-43 is based on outdoor sound levels. Apps. Exh. EP-17, Bassiouni, at 2-3; Bassiouini, Tr. 1834. See FEMA-43, at E-6; NUREG-0654, Appendix 3, at 3-9, paragraph C.

16. A witness for the Applicants, Mr. Glover, testified that a large percentage of the people are listening to the radio or TV throughout the day. Apps. Exh. EP-17, Glover, at 1. Mr. Glover indicated he had contacted a radio and TV station in the area regarding statistics. A survey was conducted by WBTV in February of 1984 on households using televisions. That survey indicated that households using televisions went from a low of 13 percent during the Monday to Friday time period from 11:30 p.m. to 1:00 a.m., up to a high of 67 percent in the time period from 6:00 p.m. to 7:30 p.m. on Mondays through Fridays. For people over 12 years of age listening to radio at various time slots for

the Charlotte metropolitan area, the survey indicates numbers anywhere from a low of 25 percent in the 7:00 p.m. to 12:00 p.m. time slot to a high of 83 percent in the 6:00 a.m. to 10 a.m. time slot. Glover, Tr. 1868-1869.

17. Mr. Glover testified that if people are listening to radio or TV during the day, whether they hear the siren or not is immaterial in that the local radio and TV stations are all a part of the operational area Emergency Broadcast System, and as such, the people would receive information on an emergency event as well as what they might need to do. Tr. 1928.

18. Mr. Lunsford of the State of South Carolina testified that regardless of operation of the sirens or initiation of the EBS system, there would be routine news announcements made on radio and television about any situation or any incident at the plant. Tr. 1928-1929.

19. With regard to the impact of weather on the ability to hear the siren, during cross-examination it was brought out that temperature and humidity can have a combined effect of 3 to 4 decibels, that rainfall can attenuate the sound by approximately 2 to 3 decibels, that rain striking a roof can generate noise to approximately a few decibels depending upon the size of the drop (although Dr. Bassiouni testified that the effect of rain striking a roof is production of a high frequency sound that would not affect the signal, Tr. 1860), that snowfall will cause some damping of the sound waves causing a reduction of 6 to 7 decibels, and a very slight attenuation due to snow particles in the air. Tr. 1860-62. From the perspective upwind from the siren, the signal

will be deflected upward. Bassiouni, Tr. 1862. However, Mr. Glover testified that the wind would enhance the signal in the direction the plume is moving. Tr. 1865.

20. Dr. Bassiouni testified that, consistent with the guidance of FEMA-43, his computer model, which shows 50, 60 and 70 decibel contours, is premised on a wind direction of 6.7 miles per hour from the southwest at a temperature of 77.4°F and a relative humidity of 54%. Tr. 1862, 1863.

21. Assurance that hearing impaired persons are alerted comes from statements in the brochure mailed to all EPZ residents that the hearing impaired should contact their local emergency management agency on receipt of the brochure. In this manner, arrangements can be made prior to the event to provide special alerting. Apps. Exh. EP-17, Glover, at 3.

22. Mr. Pugh for the State of North Carolina testified that no specific plans were in place at the State level to assure hearing impaired persons would be alerted in the event sirens are sounded. However, he testified that Duke's brochure and crawl messages on TV would provide assurance that these individuals would be alerted. Crawl messages are written emergency messages that can be made to pass along a TV screen during programming. Apps. Exh. EP-17, Pugh, at 1; see also, id., Broome, at 3. Furthermore, he testified that he believed that the volunteer firemen and the county police responsible for canvasing the area will identify these people where they live, and will ensure notification. Id.

23. Mr. Lunsford, testifying for the State of South Carolina, stated that hearing impaired individuals are being identified at the county level and that special attention is given to these individuals during emergencies. Apps. Exh. EP-17, Lunsford, at 1.

24. Mr. Phillips for Gaston County testified that during their yearly donation drives in which they go door to door in the county, members of the volunteer fire department will ask residents whether there is a hearing impaired person living at the residence. He testified that this information will be reported to him and he indicated he would advise law enforcement people, who during an emergency would make contact with such persons. Apps. Fxh. EP-17, Phillips, at 3.

25. Mr. Broome of Mecklenburg County testified that the Applicants' brochure instructs people who are hearing impaired to contact his office for special notification if needed. In addition, he testified that provisions are in place for "crawl messages" on TV screens throughout the EBS system. Apps. Exh. EP-17, Broome, at 3.

26. Mr. Thomas on behalf of York County testified that York County has a special notification list which includes hearing impaired persons and a designated contact person. He testified that York County will notify the designated contact person or go to the house of the hearing impaired person if necessary during an emergency. Apps. Exh. EP-17, Thomas, at 2.

27. The Board has reviewed the testimony as it relates to the guidance of FEMA-43, particularly the use of "average summer daytime weather conditions" design of the siren system so that the siren sound level either exceeds 10 dBC above the average outdoor daytime ambient sound levels or provides 60/70 dBC acoustic alert coverage depending upon the population density of the area (Apps. Exh. EP-17, Bassiouni, at 2, 3, FEMA-43, at E-6--E-8)) and the admission of Mr. Riley that the FEMA weather condition guidance has been met (Tr. 1859). We find that the guidance of FEMA-43 is satisfied. In reaching this conclusion, the Board

has taken into consideration that the guidance of FEMA-43 and NUREG-0654 was not intended as a guarantee that 100% of the population in EPZ will actually hear the sirens in an emergency and that other supplementary measures have been included in the plans.

3. Back-up Notification

28. Back-up notification includes word-of-mouth (Bassiouni, Tr. 1902), EBS messages[24/] broadcast over the radio and TV (Apps. Exh. EP-17, Glover, at 1), and tone alert radios for special facilities discussed below (Id. at 1-2). In addition to these forms of back-up notification, there is local route alerting. Mr. Pugh testified that for North Carolina there is a system supplemental to the sirens. This system incorporates local law enforcement and volunteer fire department personnel to drive the roads and streets to notify the residents of the action to take. Apps. Exh. EP-17, Pugh, at 1, 2. He testified that complete runs of the routes are made by the volunteer firemen or policemen with PA systems in their cars. Tr. 1882. Mr. Pugh testified that the route system includes all the road miles in the areas of the EPZ in North Carolina, i.e., in Gaston, and Mecklenburg Counties. Tr. 1885. Mr. Broome for Mecklenburg County agreed, stating that every road in the EPZ for Mecklenburg has been identified and resources been committed to that road. Id. Mr. Phillips and Mr. Thomas also agreed that such a commitment had been made. Id.

29. Dr. Bassiouni testified that the basic range of commercially available PA systems for police vehicles would be, depending on the type used, between 1000 and 2000 feet for coverage. Tr. 1933.

24/ Mr. Pugh testified that 11 of the 41 EBS stations are equipped with emergency back-up power supplies. Apps. Exh. EP-17, at 2.

30. Mr. Pugh, Mr. Broome, and Mr. Phillips also testified that they have found that mobile supplemental sources of sirens and PA systems on vehicles are used often and are effective. Tr. 1943.

31. Mr. Phillips for Gaston County testified that the back-up sirens on the mobile vehicles, along with PA systems, will go through all the areas of the EPZ in Gaston County. Apps. Exh. EP-17, Phillips, at 1. He stated that they automatically use the sirens in addition to Duke Power sirens. When the fixed sirens go off, the County's volunteer fire people go out on these routes with their PA systems and notify the public. He further testified that all the routes are already worked out and the people who manage these vehicles are already identified. Id.

32. Mr. Phillips testified that the alert process would take anywhere from 14-22 minutes, involving one unit at the station, one unit at South Point, two units at New Hope, and two units at Union Road, all vehicles having PA systems. Id., at 1, 2.

33. Mr. Broome testified that Mecklenburg County has a supplemental system which consists of the volunteer fire departments that have made a commitment to zone warning responsibility by emergency vehicles, as indicated in the Charlotte-Mecklenburg plan. Apps. Exh. EP-17, Broome, at 1. Based on this specific zone responsibility, vehicles would proceed to the specified area and alert the public by a PA system. This system would be called upon when the sirens sound. Id., at 1, 2. Specific units have been identified and they have committed to certain responsibility with regard to alert and notification. Routes have been identified in zones and sectors have been identified. Radio communications are available in the vehicles and PA systems are available on the vehicles. Further,

canned taped messages in the SOP are available and would be the same as that broadcast over the vehicle PA system to alert the public with regard to what to do. Id., at 2, 3.

34. On cross-examination, in response to a question about adequacy of notification, Mr. Broome testified that he could use any number of systems to notify every man, woman, and child. This includes use of every unit in the city and county government if necessary, which amounts to about 350 to 375 persons, with regard to volunteer fire, about 800 people, and with regard to regular fire department, about 630 people. Tr. 1889-1890.

35. Mr. Thomas for York County testified that York County also has a backup notification system which has available to it 15-18 vehicles with audio equipment, but that he may use bull horns on non-equipped vehicles. Apps. Exh. EP-17, Thomas, at 2. In addition, depending on the area involved, he would have to use door-to-door notification, using the rural volunteer firemen. He testified that procedures would be in place to specify exact routes to be followed, messages to be conveyed, and by whom and how such messages will be conveyed. Id. He finally testified that this whole process would take approximately 20 minutes to a couple of hours, the two hour period if it is necessary to go door-to-door. Apps. Exh. EP-17, Thomas, at 2; Thomas, Tr. 1911, 1955.

36. Finally, the representatives of each of the counties testified that there were sufficient resources (vehicles, and man power) to accomplish all the needs of alert and notification in addition to other needs which arise during emergency situations. Broome, Thomas, Phillips, Tr. 1929-1932.

37. Based upon all of the evidence the Board finds that there are sufficient resources, both in terms of equipment and manpower, to provide reasonable assurance that there will be adequate notification in the event of failure of the siren warning and emergency broadcast systems. This would include the situation where there was a power failure. We make this finding apart from the evidence which indicates that the primary EBS station for Charlotte-Mecklenburg, as well as ten other EBS stations, have back-up power supplies. Apps. Exh. EP-17, Broome, at 3; Pugh, at 2.

4. Notification of Special Facilities - Carowinds Theme Park and Heritage USA

38. Mr. Broome testified that his office has set procedures for assisting the Carowinds management in the evacuation of that facility by providing pickup and evacuation of unescorted children. Apps. Exh. EP-17, Broome, at 4. Furthermore, he testified that Mecklenburg County will notify Carowinds, and Carowinds will follow the recommendation of Mecklenburg, with regard to a course of action during an emergency. Id.; Broome, Tr. 1925. Mecklenburg County, aside from providing buses for getting the unescorted children out of the park, would also provide law enforcement personnel to assist in traffic control and crowd control. Apps. Exh. EP-17, Broome, at 4.

39. Carowinds has devised procedures for evacuation of the visitors and employees, and such procedures have been reviewed by York County. Furthermore, York County has discussed these plans with the officials of Carowinds. Apps. Exh. EP-17, Thomas, at 3; Staff Exh. EP-2, Heard and

Hawkins, at 21. In addition, Mr. Broome testified on cross-examination that the plans were in the process of further revision and that such revision would take place in 90 to 120 days. Tr. 1944.

40. Special plans for emergency have also been worked out by Heritage USA. These plans were discussed and worked out with York County. Apps. Exh. EP-17, Thomas, at 3; Staff Exh. EP-2 Heard and Hawkins, at 21. Both the Carowinds and Heritage USA plans have received favorable review from North Carolina and South Carolina officials. Apps. Exh. EP-17, Lunsford, at 3, 4; Pugh, at 2, 3.

41. Mr. Glover further testified that Duke Power Company will install and maintain tone alert radios in all schools, hospitals, nursing homes, day care facilities, and industrial facilities with 20 or more employees. This distribution, he stated, will be complete in July of 1984. The tone alert radios will monitor the lead emergency broadcast station in the area and will give listeners first-hand information on an emergency event. Apps. Exh. EP-17, Glover, at 1, 2. This includes providing tone alert systems to Carowinds and Heritage. Apps. Exh. EP-17, Thomas, at 2, 3; Staff Exh. EP-2, Heard and Hawkins, at 21. If there is an event, this tone alert system automatically comes on. It is activated by the EBS station. Apps. Exh. EP-17, Thomas, at 3.

42. The Applicants testified that they intended to maintain these tone alert systems. The radio, in essence, is kept plugged in 24 hours a day, and is to be tested once a day to be sure that it is producing sound from the station that it would be tuned to, WBCY. If there is a problem, upon notification to the Applicants, the radio will be picked up and replaced with another unit. Glover, Tr. 1872.

5. Conclusion

43. Based upon the evidence, the Board finds that the provisions made for notification of special facilities is adequate comports with the guidance in NUREG-0654, Appendix 3. Furthermore, based upon all of the evidence, the Board feels that the concerns raised by the Intervenors relating to Contention 9 lack merit and that there is reasonable assurance of compliance with the requirements of 10 CFR § 50.47(b)(5) and (6).

F. Contention 11 - Extension of the Northeast Quadrant of the Plume Exposure Pathway EPZ

1. By Memorandum and Order of September 29, 1983 the Licensing Board admitted Contention 11, which as revised by the Board reads as follows:

> 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.

In a discussion by the Board, in considering and rejecting Applicants' motion to reconsider the admission of this specific contention, the Board mentioned several bases for altering the size and configuration of the EPZ -- the location of certain highways, population density in the areas adjacent to the current EPZ, and meteorological conditions. See,

Memorandum and Order, dated December 30, 1983, at 2-4. The appropriate regulation, 10 CFR § 50.47(c)(2), provides in part:

> (2) Generally, the plume exposure pathway EPZ for nuclear power plants shall consist of an area about ten miles (16km) in radius and the ingestion pathway EPZ shall consist of an area about 50 miles (80km) 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....

2. The documents which support this NRC regulatory provision, 10 CFR § 50.47(c)(2), are NUREG-0654; FEMA-REP-1 entitled "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants", January, 1980, and NUREG-0396; EPA 520/1-78-016, "Planning Basis for the Development of State and Local Government Radiological Response Plans in Support of Light Water Nuclear Power Plants," December, 1978. See Staff Exh. EP-5, Soffer, at 3, 4; 10 CFR Part 50, Appendix E, footnote 1.

3. The witnesses presented for the Applicants' direct case on this contention were: Roger F. Edmonds, Jr., Thomas E. Potter,[25/] Mr. Walter M. Kulash,[26/] Lewis Wayne Broome, Mark A. Casper[27/] and R. Michael Glover. "Applicants' Testimony on Emergency Planning Contention 11," Apps. Exh. EP-19. The Staff's panel of witnesses on this contention

---

25/ Mr. Potter is a consultant with Pickard Lowe and Gerrick, Inc. with experience in performance of probabilistic analyses of off-site consequences of power reactor accidents as part of full-scope probabilistic risk assessments for nuclear power plants. Apps. Exh. EP-19, Attachment A.

26/ Mr. Kulash is the Associate Vice-President with PRC Engineering. Id.

27/ Mr. Casper is a meteorologist with Duke Power Co. Id.

consisted of: Leonard Soffer,[28/] James E. Fairobent[29/] and Perry D. Robinson.[30/] "NRC Staff Testimony of Leonard Soffer, James E. Farobent and Perry Robinson on Contention 11," Staff Exh. EP-5. The following The following three witnesses appeared on behalf of the Intervenors' direct case: Steven C. Sholly,[31/] Jesse L. Riley, and Ray Twery.[32/]

4. Based on the Board's December 30, Order, 10 CFR § 50.47(c)(2), and the particular concerns raised by the Intervenors in this Contention the discussion below is focused on the following areas: Meteorology, Radiological Considerations, Demography, Flow of Evacuees through Charlotte, and Alternative EPZ Boundary configurations.

1. Meteorology

5. Meteorology is not mentioned in 10 C.F.R. § 50.47(c)(2) as one of the factors that may be used to modify the ten mile radius of the plume EPZ because meteorological considerations were specifically employed by

---

28/ Mr. Soffer is the Section Leader of the NRC Accident Risk Section, Reactor Risk Branch, Division of Risk Analysis, whose duties include supervising research on severe reactor accident sequences and consequences and examination of such risk on the development of NRC regulations and criteria. Staff Exh. EP-5, Attachment.

29/ Mr. Fairobent is an NRC meteorologist. Id.

30/ Mr. Robinson is an Emergency Preparedness Specialist in the Emergency Preparedness Licensing Branch, Division of Emergency Preparedness, Office of Inspection and Enforcement, USNRC. Id.

31/ Mr. Sholly is a Technical Research Associate with the Union of Concerned Scientists. "Palmetto Alliance and Carolina Environmental Study Group Testimony of Steven C. Sholly on Emergency Planning Contention Number 11," Int. Exh. EP-49, Sholly, at 1.

32/ "Testimony of Jesse L. Riley;" "Testimony of Ray Twery." Int. Exh. EP-48, Mr. Twery is a statistician.

the authors of NUREG-0396 in determining that about ten miles was appropriate for the plume exposure EPZ. Staff Exh. EP-5, Soffer, at 3, 4.

6. Staff witnesses Mr. Soffer and Mr. Fairobent testified that the consequences of two classes of accidents were considered in NUREG-0396. Staff Exh. EP-5, Soffer, Fairobent, at 5 and 6. The first class considered was the traditional design basis accidents postulated for licensing purposes. These analyses employed very conservative assumptions with regard to meteorological dispersion in that they made use of site specific dispersion data that is not expected to be exceeded more than five percent of the time. Hence, doses computed with this methodology are also conservatively high since they would not be expected to be exceeded more than five percent of the time. In addition, these analyses are also wind-direction independent, that is, the doses are calculated assuming the observer to be directly downwind of any release. Data from seventy safety analysis reports were collected and used in the analysis. This consisted of 129 separate nuclear units. Id.

7. Since it could not be determined whether Catawba was one of the 70 sites analyzed during the DBA-LOCA analysis of NUREG-0396, the Staff did a separate analysis of Catawba to examine the dose consequences at a distance of ten miles. Staff Exh. EP-5, Soffer, at 6 and 7. The purpose of the analysis was performed specifically to examine how the Catawba site fit with the 70 sites examined. The analysis made use of the dose consequences of design basis accidents as reported in the AEC Staff's Safety Evaluation Report (SER) of October 12, 1973 and also made use of the five percentile meteorological atmospheric dispersion characteristics of the Catawba site (referenced to above). It also assumed that the

observer was directly down-wind of the release. Id. The results of this Staff analysis of the Catawba site showed the consequences of a DBA-LOCA would be a two hour dose of about 4.8 rem to the thyroid and about 0.3 whole body. These doses are below the lower Protective Action Guides (PAG) values of 5 rem (thyroid) and 1 rem (whole body). The Staff concluded, and we agree based on the analysis, that even if the Catawba site were not one of the seventy original sites analyzed in NUREG-0396, nevertheless, its plant design and site meteorological characteristics are such that it falls among the group of plants that were considered and consequently the site characteristics are not so unique to imply that the ten mile plume exposure EPZ is inappropriate in any way. Id., at 7 and 8.

8. The Intervenors' witness, Steven Sholly, agreed that calculated doses from the design basis accidents are not significant with respect to offsite emergency response. Int. Exh. EP-49, Sholly, at 6.

9. The Staff testified that the second class of accidents considered in NUREG-0396 in determining the size of the EPZ consisted of those beyond the design basis accidents, referred to as "Class 9 accidents." Staff Exh. EP-5, Soffer, at 8. For these accidents, a spectrum of degraded core and core-melt accidents was considered, using the release categories given in the Reactor Safety Study, WASH-1400. A range of meteorological conditions was employed representing one year of meteorological data at a particular site. A large number of accidental releases were then postulated to occur throughout the year. Some releases, therefore, occurred under relatively good dispersion conditions that would yield low doses, while others would occur under poor dispersion conditions that would yield high doses. Id.

10. Figure I-11 from NUREG-0396 demonstrates the variation in distance at which a dose of a given value can be received due to variation in meteorological conditions over the course of a year's time. Id. Figure I-11 shows that there is a rapid fall off of dose verses distance beyond about 10 miles. Those portions of the curves towards the left-hand side of Figure I-11 represent doses that are more likely to occur, and hence are representative of typical or average meteorological conditions, while those toward the right-hand side of the figure represent doses that are less likely to occur, and hence are representative of infrequent meteorological conditions associated with adverse dispersion. Thus, it is clear from the examination of Figure I-11 that selection of about 10 miles represented use of conservative meteorological conditions representing generally poorer adverse dispersion conditions which would produce doses that would be unlikely to be exceeded at that distance because of variations in meteorological conditions. Staff Exh. EP-5, Soffer, at 8 and 9.

11. Mr. Soffer testified for the Staff that consistent with NUREG-0396, given a core-melt accident, there is only about a 30 percent chance of exceeding the PAG doses at ten miles from a power plant. Staff Exh. EP-5, Soffer, at 10. This makes clear that NUREG-0396 contemplated that high doses could be experiences beyond ten miles. Id. This is also consistent with the succinct basis of the considerations that led to the determination of the sizes of the plume EPZ set forth in NUREG-0654, particularly consideration "b" which provides that projected doses from most core-melt sequences would not exceed Protective Action Guide levels outside the zone. Staff Exh. EP-5, Soffer, at 4; Tr. 2669 and Tr. 2588.

12. With regard to wind direction, Mr. Soffer testified that with both the DBA-LOCA analysis and the Class 9 accident analysis, it was assumed that the observer is directly down-wind of the release. Staff Exh. EP-5, Soffer, at 10. This means that the fact that the wind may blow more towards one direction than another at a given site has no bearing on the selection of ten miles as the plume EPZ distance. Id.

13. Mr. Soffer testified that the rule requires roughly circular EPZs because a) at real sites the wind does not blow only in one direction, and b) one does not know which way the wind will blow in advance of an accident and therefore it is prudent to plan for any eventuality. Id., at 10 and 11.

14. Mr. Fairobent further testified for the Staff that the meteorology at Catawba is not so unique. In fact, when compared with atmospheric stability, wind speed, and wind direction with such data available from other nuclear power plants in the southeastern United States, Catawba can be said to be typical. Staff Exh. EP-5, Fairobent, at 13 and 14. Also, when Catawba meteorology was compared with Indian Point, which was the site used for the Class 9 accident analysis in NUREG-0396, it was found to be comparable. Staff Exh. EP-5, Soffer, Fairobent, at 14.

15. With regard to atmospheric transport and diffusion conditions in the vicinity of the Catawba facility as compared to such conditions at other power plants in the southeastern United States, Mr. Fairobent testified that based on measurements made at the Catawba site for the period December 17, 1975 - December 16, 1977, stable conditions (Pasquill types "E", "F", and "G") occurred about 41 percent of the time. Most of these stable conditions (about 75 percent) occurred with wind speeds

less than or equal to two meters/second. Staff Exh. EP-5, Fairobent, at 11 and 12. Similar conditions were observed at the Shearon Harris facility for the period February, 1979 - January, 1980. Stable atmosphere conditions were observed about 56 percent of the time at Shearon Harris site with about 80 percent of these conditions occurring with wind speeds less than or equal to two meters/second. At the V. C. Summer facility for the period January, 1975 - December, 1977, stable atmosphere conditions were observed about 60 percent of the time, with about 40 percent of these conditions occurring with wind speeds less than or equal to two meters per second. The atmospheric stability and wind speed characteristics for a "Southeastern River Valley [site] influenced by [the] Bermuda high" identified as site "G" in the Reactor Safety Study, indicate that stable atmospheric conditions for this type of site occurred about 66 percent of the time, with about 40 percent of these conditions occurring with wind speeds less than or equal to two meters per second. Id.

16. As to comparison of wind direction conditions between Catawba and other southeastern plants, Mr. Fairobent testified that at Catawba, the prevailing wind direction is from the southwest, with winds from the south-southwest, southwest and west-southwest occurring about a total of about 33 percent of the time for the period December 17, 1975 - December 16, 1977. Staff Exh. EP-5, Fairobent, at 13. Meteorological observations at many other nuclear power plants indicate total frequency of winds in three twenty-two and one half degree sectors in excess of 25 percent. For example, winds from the north, north-northeast, and northeast occurred about 26 percent of the time at the Shearon Harris

facility for the period February, 1979 - January, 1980. Winds from the south-southwest, southwest, and west-southwest occurred about 28 percent of the time at the V. C. Summer facility for the period January, 1974 - December, 1977. Winds from the west, west-northwest, and northwest occurred about 29 percent of the time at the Hope Creek facility in New Jersey for the period January, 1977 - December, 1981. At the Limerick site in Pennsylvania, winds from the west, west-northwest, and northwest occurred about 36 percent of the time for the period January - December, 1974. Id.

17. Mr. Fairobent further testified regarding Catawba that better data would indicate even further reduction of the 33 percent wind direction frequency blowing towards the northeast, resulting in the three sector combined wind direction percentage of 28 percent. Tr. 2696.

18. Regarding the comparison of meteorology between Indian Point and Catawba, for Indian Point site stable atmosphere conditions (Pasquill "E", "F", and "G") occur about 48 percent of the time verses 41 percent for Catawba, with most of the stable conditions (about 60 percent verses 75 percent for Catawba) occurring with wind speeds less than or equal to two meters per second. Staff Exh. EP-5, Soffer, Fairobent, at 14.

19. With regard to rainfall at the Catawba facility Applicants' witness, Mr. Casper, testified that rainfall at the site is average or below average for the southeastern United States. Apps. Exh. EP-19, Casper, at 16; Tr. 2046, 2051-53.

20. Based on this evidence, the Board finds that, consistent with 10 CFR 50.47(c)(2), the meteorology at Catawba is not a factor to be considered in determining the size and configuration of the EPZ surrounding

the Catawba nuclear facility. Moreover, the evidence shows that the meteorology at Catawba is not unique but in fact is comparable to meteorology at other nuclear facilities in the southeastern part of the United States and, in fact, is comparable to the meteorology of the facility (Indian Point) used for the Class 9 accident analysis in NUREG-0396.

2. Radiological Considerations

21. Both the NRC Staff and the Applicants conducted analyses to demonstrate that dose considerations for Catawba based on traditional design basis accidents and Class 9 accidents would be consistent with the fundamental considerations that led to the development of the size of the plume EPZ of about ten miles. Those basic considerations taken from NUREG-0654 are (a) projected doses from the traditional design basis accidents would not exceed Protection Action Guide levels outside the zone (already discussed above); (b) projected doses from most core melt sequences would not exceed Protective Action Guide levels outside the zone; (c) for the worst core melt sequences, immediate life threatening doses would generally not occur outside the zone; and (d) detailed planning within 10 miles would provide a substantial base for expansion of response efforts in the event that this proved necessary, NUREG-0654, at 12. Staff Exh. EP-5, Soffer, at 4 and 5; Apps. Exh. EP-19, Potter, at 3.

22. The NRC staff assessed the individual risk of early fatality from severe accidents in the vicinity of the Catawba site at distances beyond ten miles making use of actual Catawba site meteorological conditions. Staff Exh. EP-5, Soffer, at 14. The expectation value for indi-

vidual risk of early fatality in the interval between 10 and 12.5 miles from Catawba is 6.8×10^{-9} per reactor year and for individual risk of latent cancer was calculated to be 5.0×10^{-9} per reactor year. Id., at 14 and 15. The calculations also show that the expectation value of individual risk of early fatality is very small at all distances beyond 10 miles. Id. These calculations assumed evacuation of the ten mile EPZ only. Id.

23. The calculations also show that the risk decreases generally with distance. Id. Using the probability of a core-melt for each of the Catawba reactors estimated by the Staff to be about 5×10^{-5} per reactor year, the Staff determined that the individual risk of early fatality given that a core melt has occurred for 10 to 12.5 miles is 1.4×10^{-4}, for 12.5 to 15 miles is 3.2×10^{-5}, for 15 to 17.5 miles is 9.0×10^{-7}, for 17.5 to 20 miles is 2.8×10^{-6}, for over 20 is 0. Id., at 17. When these figures are compared with Figure I-11 from NUREG-0396, which shows that given a core-melt event there is less than one chance in a hundred of exceeding life threatening doses (200 rem or more, whole body) at distances beyond ten miles, it can be seen that with the use of the Catawba site meteorology and risk figures, selection of a plume EPZ of about ten miles for Catawba is conservative. Id., at 15-17.

24. Based on the evidence, the Board finds that the Staff's analysis shows that the plume EPZ boundary for Catawba has been properly determined with regard to radiological considerations as basis for determining the size of the plume EPZ.

25. The Applicants rely on the results of assessments of doses in the Catawba FSAR with regard to consideration "a" (as identified in

NUREG-0654).[33/] Mr. Potter testified that such results can be directly extrapolated to a distance of 10 miles. Apps. Exh. EP-19, Potter, at 3, 4. He testified that plant-specific and site-specific analyses performed in the course of licensing various nuclear power plants support the conclusion that projected doses from traditional design basis accidents would not exceed upper PAG doses beyond the 10-mile zone even based on assumption of poor dispersion conditions. Id., at 6. He added that summaries of these analyses are included in NUREG-0396 and that data in Catawba FSAR, Chapter 15, indicate that this conclusion applies to Catawba. Id., at 6, 7.

26. Mr. Potter for the Applicants conducted a study designed to determined whether features peculiar to Catawba would affect considerations "b" and "c" of NUREG-0654 at 12. The study was achieved by calculating the probability, conditional on core melt release, of exceeding PAGs and life threatening doses comparable to probabilities from NUREG-0396 generic studies except for use of meteorology data from the Catawba site. Apps. Exh. EP-19, Potter, Attachment B, at 2. The methodology followed in the study was the same as that used for the generic study described in NUREG-0396. Id., at 3. Some of the more important assumptions that were used consistent with NUREG-0396 included that it was assumed that no emergency response occurs for a period of 24 hours following passage of airborne material and that doses are reduced only to the extent that would be expected in the course of normal activities. Id., at 4.

33/ Consideration "a" provides: "projected doses from the traditional design basis accident would not exceed Protective Action Guide levels outside the zone."

27. The spectrum of core-melt releases was represented by a set of release categories. Id. Each release category was a release for which important characteristics were calculated explicitly. Id. The important characteristics included the release magnitude for various isotope groups (expressed as a fraction of core inventory), the time between the initiating event and release to the atmosphere, release duration, height, heat content, and warning time prior to release. Id. The probability of each release category was calculated by adding the calculated probabilities of all accident sequences that would lead to a release similar in characteristics. The release category spectrum fully reflects the entire core melt release spectrum while keeping the number of discrete releases manageable for analytical purposes. Id.

28. The influence of variable meteorological conditions on the probability of exceeding specified doses was determined by performing a large number of computer simulations of each release category with a randomly selected release start time (month, day, hour) for each simulation. Id. Meteorological data for the corresponding time were selected from a one-year hourly data base. Sequential hourly measurements were used to calculate trajectory and concentration changes during transport downwind. Id. The approach permitted simulation of the affects of changing meteorological conditions on transport and dispersion along the trajectory. The number of simulations for each release category ranged from 100 to 300 to assure adequate sampling from the range of meteorological conditions. Id. The study showed that life threatening doses more than a few miles from the plant can occur only for the most severe release categories and, even then only in unlikely meteorological conditions. Id., at 4 and 5.

29. A modified version of CRAC called CRACIT (calculation of reactor accident consequences including trajectories) was used for the Applicants' analysis. Id., at 6. The major improvement in CRACIT relevant to its application in the Applicants' analysis was the incorporation of variable wind direction. Id. CRACIT was selected based upon its more realistic treatment of atmospheric dispersion. Id.

30. The meteorological data used in the Applicants' analysis was a one year data base of sequential hourly measurements from the Catawba site meteorological monitoring program towers. Id., at 7. The data were collected during the period December 17, 1976 - December 16, 1977 and submitted as part of the two year data base in the Catawba FSAR. Wind speed and direction data collected at the ten meter level were used in the analysis. Atmospheric stability classification was based on the vertical temperature difference measured between the forty meter and ten meter levels. Id., at 7.[34/]

The Applicants' witness testified that he started with WASH-1400 as the candidate for characterizing the release categories and the probabilities of release. But he testified that he recognized that WASH-1400 used a PWR Surry model and Surry was a large dry containment whereas Catawba is an ice condenser containment. It was further recognized that there was a possibility that differences in design could

---

34/ To satisfy himself that the meteorological data was representative for the Catawba site, Applicants' witness testified that he compared the data with the 30 year climatological record giving consideration to percentages of stable and unstable conditions, percentages of wind direction and frequencies and percentages of different wind speed categories. Casper, Tr. 2205-06.

effect the difference of release or the probabilities of different release categories. Potter, Tr. 2073; Apps. Exh. EP-19, Potter, Attachment B, at 7. Since a PRA specific for Catawba had not been performed, the Applicants made use of the "Reactor Safety Study Methodology Applications Program" (RSSMAP) for Sequoyah. But some modification had to be made to this study due to the fact that its results were misleading because it failed to account for hydrogen mitigation systems. Potter, Tr. 2074. Mr. Potter testifed that the authors of RSSMAP made conservative assumptions that hydrogen burn would fail containment early in the accident. Id. As a result, the probabilities of the more severe releases were higher than one might expect for a plant that had an effective hydrogen mitigation system. Id. It was recognized by the authors of RSSMAP that had hydrogen not failed containment earlier there would be a much less severe release. Id.

31. In spite of the deficiency noted above, RSSMAP was helpful in establishing a reasonable estimate for core melt frequency which, as it turns out, was close to that calculated in WASH-1400 for Surry. Id. It was also helpful in providing estimates for frequencies for the most severe releases. Potter, Tr. 2075, 2076.

32. The results of the Applicants' analysis with respect to considerations "b" and "c" show that the Catawba projected doses are quite similar to those from NUREG-0396. Apps. Exh. EP-19, Potter, Attachment B, at 8. The results clearly show that the probability of exceeding Protective Action Guide doses is very low and that the probability of exceeding life threatening is substantially lower. Id. Assuming the core melt release, it is likely that the Protective Action Guide doses would not be

exceeded beyond ten miles. Id., at 9. The probability of exceeding these doses is about 0.25 given such core melt accident. It also shows that even if a core melt accident should occur the probability of exceeding life threatening dose beyond ten miles is very low, about 0.03. Id., Attachment B, at 9.

33. Based upon this evidence the Board finds that the plume EPZ boundary for Catawba has been properly determined considering the radiological considerations in the basis for determination of plume EPZ size. Moreover, the Board finds that Catawba design and meteorology were fully and appropriately considered in the Applicants' analysis.

34. Mr. Sholly, who testified on behalf of the Intervenors, agreed that the dose verses distance and accident consequence calculations presented in NUREG-0396 and as well NUREG-CR-1131 are explicitly based on the characteristics of core melt accident release categories from the Reactor Safety Study (WASH-1400). Int. Exh. EP-49, Sholly, at 8. Mr. Sholly testified that the Surry Unit 1 reactor served as the surrogate in that analysis (WASH-1400) for all pressurized water reactors in the U.S. Id., at 9. He testified, however, that the Catawba reactors are different. Id.

35. Mr. Sholly testified that the NRC Staff's FES for Catawba states that the design and operating characteristics of the two plants are similar [NUREG-0921 at 5-36]. He added that while this may be accurate for normal operating conditions, under severe core damage or core melt accidents, performance of the two plants can be expected to be different. Id., at 10. Mr. Sholly testified that the single most important factor with regard to core melt release consequences is

containment integrity. Tr. 2385. He stated that Surry has a dry subatmospheric containment with a design pressure of 45 psig while the Catawba plants have ice condenser containments with a design pressure of 15 psig. Int. Exh. EP-49, Sholly, at 9.

36. Mr. Sholly testified that a probability risk assessment would demonstrate any difference in performance during a core melt accident but no such analysis of the Catawba reactors has been prepared, nor did he do one. Id., at 10; Tr. 2403. He testified that the next best choice is a PRA performed on a facility similar to Catawba. A PRA for Sequoyah Unit 1 reactor was prepared by Sandia National Laboratories for the NRC under the Reactor Safety Study Methodology Applications Program (RSSMAP) in 1980 [NUREG/CR-1659, Volume 1]. Sequoyah Unit 1 is, like the Catawba reactors, a 3411 megawatt thermal four-loop Westinghouse pressurized water reactor with an ice condenser containment. Id.

37. Mr. Sholly testified that it would be reasonable to expect similar performance under severe accident conditions for Catawba and Sequoyah with two caveats. One being that the RSSMAP study for Sequoyah did not consider "external events" (e.g. earthquakes, hurricanes, fires, etc.). Second, there may be plant specific features for Catawba that would result in differences in performance between Sequoyah and Catawba for severe accidents. Nonetheless, he testified that the RSSMAP PRA for Sequoyah represents the best available guidance as to the performance characteristics of the Catawba reactors under severe accident conditions. Id., at 10-11.

38. Testimony of Applicants' witness Potter indicates that the assertion by Mr. Sholly that the Catawba plant containments are designed to a

pressure of 15 psig is incorrect. Mr. Potter, on redirect, testified, referencing the Catawba Safety Evaluation Report (at 3-24), that the SER indicates that the Staff met with the Applicants on June 4, 1982 to discuss containment analysis design procedures, including ultimate strength and buckling analysis. In this meeting the Applicants indicated that the Catawba containment shell can withstand an ultimate internal pressure of 72 psig. The Applicants provided the final information on the subject for the Staff's review. The Staff has reviewed that additional information and found it acceptable. Potter, Tr. 2199.

39. The Intervenors questioned the use by Mr. Potter of the assumed core melt frequency of 6×10^{-5} arguing that there has only been a thousand reactor years of experience. Riley, Tr. 2063. Mr. Potter testified that just looking at 1,000 reactor years of experience and saying that we have not had a core melt accident, fails to make use of the best data. He testified that the best way to make use of the data is system-by-system, plant-by-plant, in a systematic evaluation. Using this approach, he testified that one does not have to wait for the occurrence of a sequence which involves a large number of low probabilities. Tr. 2201. He testified that if the Intervenors' core melt probabilities at power plants were as high as 6×10^{-2}, which would be the premise implied by the Intervenors, we would be experiencing core melt every couple of years or so. Id.

40. Mr. Potter testified that the basis for the use of the 6×10^{-5} was the risk assessment from the Reactor Safety Study for Surry plant which is about the same as that for the RSSMAP study. Tr. 2201. See also Tr. 2461, 2462.

41. On cross-examination, Mr. Sholly further admitted that consideration was given in the Reactor Safety Study to total loss of AC power. Tr. 2463. He also testified that he has not done an analysis of Catawba external events or how they would effect either the core melt frequency or the RSSMAP release frequency. Tr. 2462.

42. On the basis of the evidence, the Board finds that the dose consequence analyses conducted by the Applicants and Staff were based on appropriate assumptions and concludes that the plume EPZ boundary for the Catawba facility, based upon Catawba meteorological, plant design and radiological considerations, is proper.

3. Demography

43. A main argument of the Intervenors is that information provided by the NRC in the Final Environmental Impact Statement for Catawba indicates that, as a result of a serious accident, people in the present emergency planning zone would be subject to a great number of early fatalities, early injuries, and latent cancer cases. Int. Exh. EP-48, Riley, at 1. The Intervenors' specific concern is the population in Charlotte. Id. Furthermore, an attempt was made by another witness for the Intervenors, Mr. Ray Twery, a statistician, to compute the probability of fatalities for the sector in which he lives in southeast Charlotte. Int. Exh. EP-48, Twery, at 1, 3. Mr. Twery, however, acknowledged in cross-examination that he was not sure of his figures (Tr. 2348), not sure whether he was talking about fatalities or exposures over 200 rem (Tr. 2348-49), whether he was using the proper sector (Tr. 2355), whether he was using the correct distance from the plant

(Tr. 2352), or how much error his figures contained (Tr. 2356). Mr. Twery finally admitted that he was, in essence, "waving my arms". Tr. 2359. With respect to assigning cost to such fatalities or impacts of 200 rem exposures, he testified that he does not really know the costs. Tr. 2378. The Board finds that Mr. Twery's testimony was not well considered and of little use to the Board.

44. Some general information regarding permanent population around the Catawba facility (based upon 1980 census) was provided by Applicants' witness, Mr. Edmunds. The population within 12 miles of Catawba is 537, between 2 and 5 miles is 10,540, and between 5 and 10 miles is 67,692. Apps. Exh. EP-19, Edmunds, at 2. He also testified that based on 1980 census data, the 1980 population within 50 miles of Catawba was 1,405,256 for an average density within 50 miles of Catawba of 179 people per square mile. Id., at 3.

45. It was testified that based upon recreation studies, there was a peak day transit population of approximately 89,699 in 1982. Id., at 4. The maximum expected transient population at 2, 5 and 10 miles of the station is, respectively, 6,206, (0-2); 31,298 (2-5); and 52,200 (5-10). Id., at 4.

46. The population in southwest Charlotte, as defined by the contention (south of U.S. 74 and west of N.C. 16), is approximately 124,000 based upon 1980 census data. Id., at 3. Mr. Edmunds testified that parts of cities of Rock Hill, Ft. Mill and Clover were found to have areas of about 1 square mile and larger within their town limits with a population density greater than 2,000 per square mile. Id., at 5. Mr. Edmunds also

compiled a list of 16 nuclear power plants, either operating or under construction, which have permanent population concentrations similar to or greater than Catawba from 10-20 miles from the plant. Id., at 7.

47. During cross-examination the Applicants testified that consistent with Part 50, Appendix E, on an annual basis the Applicants will review their emergency plans and make information available to state and local people for any changes necessary as a result of changes in population. Glover, Tr. 2194.

48. The Staff witness, Mr. Robinson, testified that the jurisdictional boundaries were considered in conjunction with demography so as to extend the EPZ outer boundaries to include within the EPZ any incorporated areas that had major portions of their population in the 10-mile area. Staff Exh. EP-5, Robinson, at 21, 22. The objective was to prevent any such areas from being divided and, in fact, no incorporated area is divided by the Catawba EPZ boundary. Id., at 22. Mr. Robinson testified that around the Catawba site and within the EPZ, there are six incorporated areas (i.e., Clover, Fort Mill, York, Pineville, Rock Hill, and Tega Cay); all but Fort Mill and Tega Cay required a small extension of the EPZ boundary beyond the 10-mile radius. In each case, the extension of the EPZ boundary amounted to the inclusion of an area totalling just a few square miles, and the additional populations included were a small portion of the total population contained within the EPZ. Id., at 21-22. The Staff witness further testified that demography was also specifically considered in that special populations (i.e., schools, day care centers, nursing homes, hospitals, and penal institutions) lying near the 10-mile radius were included within the EPZ boundary. Id., at 22.

49. With regard to including Rock Hill, South Carolina and not Charlotte in the plume EPZ, it is clear that a major portion of Rock Hill is within 10 miles of the plant. Glover, Tr. 2027. This is not the case for Charlotte. The closest point of the Charlotte city limits to the facility is 9.7 or 9.8 miles. Glover, Tr. 344.

50. With regard to the concern about future expansion of the Charlotte city limits, Mr. Lundsford and Mr. Broome testified that population concentrations, not necessarily a municipal boundary, is key to designation of an EPZ and that a plan and response procedure could be developed regardless of the EPZ designation. Lundsford, Tr. 346-47; Broome Tr. 355, 361.

51. Based upon this evidence, the Board finds that the present configuration of the EPZ adequately reflects consideration of local demography and jurisdictional boundaries as required by 10 CFR § 50.47(c)(2).

4. Flow of Evacuees Through Charlotte

52. The Applicants conducted a study entitled "Effect of 'Shadow' Evacuation on the Time to Evacuate the Catawba Nuclear Station, EPZ". Apps. Exh. EP-19, Kulash, at 2, 3. In this study, the Applicants evaluated the effect on the EPZ evacuation traffic flow of voluntary evacuation of the entire Charlotte area. In this analysis various combinations of voluntary evacuation percentages and notification times were tested. Id. Some of the more significant assumptions of the study were with regard to EPZ residents. It was assumed that half of the evacuees leave home within 1 hour and 10 minutes after the start of

evacuation and the rest within 3 hours and 10 minutes of the start of evacuation. Id., Kulash, Attachment B, at 4. The Charlotte area evacuees would leave later and more gradually than the EPZ evacuees for two reasons. First, since there would be no siren sounding or other government efforts to notify Charlotte residents of the emergency, people in Charlotte would become aware of the situation more slowly than people in the EPZ. Second, once aware of the situation, they are likely to more fully ascertain the need to evacuate. Id., at 4.

53. Since the amount of lag between Charlotte area evacuation and EPZ evacuation was unknown, two sets of simulations were conducted in the Applicants' study. One using an assumed lag of 1 hour, the other using the assumed lag of 30 minutes. Id. With regard to evacuation routes, only routes used by both EPZ and Charlotte evacuees were modeled. All evacuees were assumed to travel radially away from the power plant until they were at least 25 miles away. Id., at 7. Following generally accepted traffic engineering practice, it was assumed that the expressways carry 1,800 vehicles per lane per hour and other roads 1,200 vehicles per lane per hour. Id. Each potential evacuee was assigned to the most direct route that would take him 25 miles away from the plant. The study assumed 0.43 vehicles per evacuee (2.33 people per vehicle). Id. This figure was developed using household auto ownership for EPZ residents. Id. All simulation runs evacuated 100 percent of the EPZ residents and a portion of the Charlotte area residents. The fraction of the Charlotte residents choosing to evacuate was varied between 40 to 100 percent. No special traffic control measures were assumed to be used outside the EPZ. Id., at 8.

54. The results of the study show that if some or all the Charlotte area population were to voluntarily evacuate because of an emergency at the Catawba Nuclear Station, severe congestion could occur in the downtown area and on main roads leading north and east from the City. Id., at 1. If one assumes the average Charlotte evacuee leaves home an hour later than the average EPZ evacuee, the congestion in the Charlotte area does not delay anyone from leaving the EPZ. If one assumes that the Charlotte evacuees depart only a half hour later the EPZ evacuees, there would still be no impediment to evacuating the EPZ on three of the four routes. (The four routes are: I-77, U.S. 521, N.C. 160 and N.C. 49). On the fourth route, I-77, backups could extend into the EPZ if 70 percent or more of the Charlotte area residents were to evacuate and if no mitigating traffic control actions were taken. In that case, if 70-80 percent of the Charlotte residents evacuated voluntarily, some EPZ evacuees using I-77 northbound would be delayed up to a half-hour. Total time to evacuate the EPZ would, however, remain at 4 hours. If 100 percent of the Charlotte residents evacuated voluntarily, EPZ evacuees using I-77 would be delayed one hour, delaying completion of the entire EPZ evacuation by 30 minutes. Id.

55. With respect to Intervenors' Exhibit EP-45 (1982 High Accident Locations Priority Order), which concerns accidents at various intersections in the City of Charlotte, Mr. Kulash stated that such a listing would be examined but that such a listing is based on daily traffic (morning and evening) flows. Tr. 2204. He testified that such flows are not necessarily relevant to evacuation traffic flows and that some high accident locations may not even be on the evacuation routes. Id.

Mr. Kulash testified that in his analysis accidents from evacuating traffic were considered, including under different extended EPZs. He testified that he also looked at the likelihood of accidents obstructing the evacuation of traffic flow. Tr. 2203. It was determined that the accidents would not significantly hinder evacuation traffic flow. Tr. 2203, 2204.

56. In addition, the Applicants considered evacuation times for two expanded EPZs; first, the southwest third of Charlotte encompassing an area out to 17 miles from the Catawba plant, and second, the entire city of Charlotte extending 20-25 miles from Catawba. This study was entitled "Catawba Nuclear Station Evacuation Analysis/Evacuation Time Estimate For The City of Charlotte." Apps. Exh. EP-19, Kulash, at 3; Attachment C. The results of this study show that for the southwest third of Charlotte extending to approximately 17 miles from the Catawba Nuclear Station, an evacuation time of 5 hours and 15 minutes is estimated. The study concluded that the critical determinant of this time is notification time and not traffic congestion. Any traffic congestion on evacuation routes would have dissipated by the time that all the population in the expanded EPZ is notified and prepared. Apps. Exh. EP-19, Kulash, at 4. With respect to the entire City of Charlotte extending to 20-25 miles from Catawba Nuclear Station, an evacuation time of approximately 9 hours was estimated. Id., at 4.

57. Since voluntary evacuation of Charlotte residents within the proposed extension of the EPZ would not substantially impede evacuation of residents of the current EPZ, the Board finds that the flow of evacuees

through the City of Charlotte, and the effects of voluntary evacuation by Charlotte evacuees, do not require a change in the configuration of the Catawba EPZ.

5. Alternative EPZ Boundary Configurations

58. The very contention itself asserts that the boundary of the northeast quadrant of the Plume EPZ should be reconsidered and extended. An example of such extension would be Highway 74 and 16 in southwest Charlotte. The Intervenors' witness Sholly asserts that specific planning is called for Charlotte due to the Catawba Units. Int. Exh. EP-49, Sholly, at 24-25 and 26. Intervenors' witness, Mr. Riley, advocates extension of the present EPZ emergency plan into the City of Charlotte or some better plan. Int. Exh. EP-48, Riley, at 9-11.

59. The Staff testified that it interpreted the "about 10 miles . . . in radius" language in 10 C.F.R. 50.47(c)(2) to mean configuring an EPZ to allow for a leeway of a mile or two in either direction depending upon the characteristics of a particular site as indicated in the regulations. Staff Exh. EP-5, Robinson, at 19, 20. The Staff witness further asserted that the basis for that 10 mile radius plume exposure pathway EPZ is presented in NUREG-0396 as well as NUREG-0654 and that these documents indicate that the choice of the size of the plume EPZ represents a judgment in the extent of detailed planning which must be performed to assure an adequate response base. Id. Staff considers that detailed planning within 10 miles provides a substantial base for expansion of response efforts in the event that this proves necessary. Id. As stated in NUREG-0654 (at p. 12), the size of the plume exposure EPZ was based

primarily on four specific considerations. The fourth paragraph, consideration "d", states, "detailed planning within 10 miles would provide substantial base for expansion of response efforts in the event that this proved necessary."

60. Another Staff witness, Mr. Soffer, testified that planning within the 10-mile EPZ means that there would be an ad hoc response to a situation outside the EPZ and that the ad hoc response would be aided by the fact that there was an EPZ plan. Tr. 2593. This is based on the recognition that for very unusual and very severe events there would be the possibility that response actions would be required beyond the EPZ. Id. See also Apps. Exh. EP-19, Glover, at 8-9.

61. Mr. Glover for the Applicants testified that in the case of the Catawba area and specifically Charlotte, local planners have taken the planning process one step further than envisioned in the minds of those who wrote NUREG-0654 and 0396, and, rather than waiting to react on a "ad hoc" basis, have developed the City of Charlotte "all hazards" plan to deal with an event affecting this area. Id., at 9. Moreover, he testified that the "all hazards" plan provides that Charlotte/Mecklenburg emergency management office is a tie to resources outside the EPZ in that it serves as a coordinating agency for both city and county resources. Therefore, if necessary, without extension of the existing plume exposure EPZ in the direction of Charlotte, protective action can be implemented for residents outside the EPZ. Id., at 9-10.

62. Mr. Wayne Broome of Mecklenburg County testified that there is enough flexibility built into the all hazards plan and the basic emergency plan for the Catawba Nuclear Station and the supporting documents that

will be developed out of the Mecklenburg County Emergency Management Office so that the concept of operation that applies for a 10-mile EPZ can be expanded to 11 miles, 12 miles, and 15 miles. Apps. Exh. EP-19, Broome, at 2, 3. He testified that the concept stays the same and the flexibility is there to expand the area of response if needed. He testified that the same organizations, the same departments, the same people are involved; the only change is increasing the numbers in order to cope with 60, 80 or 100 thousand people. All that is necessary, he stated, is the calling of additional people and identifying of additional resources. He further testified that if needed he could look to the surrounding counties for additional aid. Id.

63. Mr. Broome stated that he believes that he could call on enough resources to have 100% notification out to a 15 mile radius. Tr. 2099-2101. Mr. Broome further testified that the "all hazards plan" is adequate for its intended purpose, that it can handle up to 124,000 people, the population of southwest Charlotte based upon a 1980 census. Tr. 2109-2111.

64. Furthermore, Mr. Broome estimated that it would take approximately 7 hours to evacuate the area described in the contention, that portion of southwest Charlotte bounded by highway 74 and 16. Apps. Exh. EP-19, Broome, at 9. Mr. Luther L. Fincher, Jr., Acting Director for Emergency Management of Charlotte and Mecklenburg County, called by the Intervenors as a rebuttal witness, agreed with Mr. Broome that there would be no problem expanding the scope of protective response beyond the present EPZ (into Charlotte) using the all hazards plan. Fincher, Tr. 4166. The Board finds that the record furnishes no basis for challenging the sufficiency of ad hoc arrangements established to provide protective response in Southwest Charlotte.

65. Mr. Robinson testified for the Staff that he has reviewed the information in the Catawba Nuclear Station Emergency Plan, Revision 3, dated June, 1983, the Catawba Nuclear Station evacuation analysis by PRC Voorhees, dated April, 1983, information provided by the Applicants in response to Board inquiries and orders and additional information provided by the Applicants concerning the development of the EPZ boundary provided on March 15, 1984. Staff Exh. EP-5, Robinson, at 20. He also testified that he reviewed USGS topographical maps of the area and has toured the general area comprising the northeast quadrant of the EPZ and met with the Applicants and members of the Charlotte/Mecklenburg Emergency Management Office. Based on this information, as well as discussions with onsite and offsite emergency planners, he testified that the configuration of the EPZ boundary around the Catawba site was a cooperative effort between the Applicants and the State and the local authorities and that each of the factors indicated in 10 CFR 50.47(c)(2), were considered in determining the plume EPZ boundary. Id., at 20-21.

66. With regard to the EPZ boundaries in the northeast quadrant, Mr. Robinson testified that they are primarily made up of jurisdictional borders and improved public roads. He stated that jurisdictional boundaries are composed of the Charlotte City limits and the corporate limits of Pineville, beginning at the intersection of Sugar Creek and Arrowwood Road and continuing in a general southeasterly direction. Sugar Creek serves at various points not only as a jurisdictional boundary, but as a topographical one as well. The remaining portion of the northeast quadrant is composed of improved public roads. Starting at the intersection of Sugar Creek and Arrowwood Road, this portion of the

northeast quadrant of the EPZ follows a general northeasterly direction, continuing approximately to the Catawba River. Id., at 22, 23. The Staff witness concluded that the Catawba EPZ including the northeast quadrant establishes a suitable boundary for planning for a nuclear emergency at the Catawba nuclear facility. Id.

67. Witnesses for FEMA testified that the present configuration meets the about 10-mile requirements of 10 C.F.R. § 50.47(c)(2) and that the configuration of the northeast quadrant of the plume EPZ is sufficiently adequate to insure that the general public in this area can be promptly notified and will be able to take appropriate protective actions in a timely fashion. Staff Exh. EP-2, Heard and Hawkins, at 23.

6. Conclusion

68. The Board agrees with FEMA, the Staff and the Applicants that the size and configuration of the plume EPZ for Catawba as defined in the emergency plan, including the EPZ boundary in the northeast quadrant, demonstrates that there has been adequate consideration of the factors enumerated in 10 C.F.R. 50.47(c)(2), provides boundaries which are easily recognizable and distinct, and establishes a suitable boundary for planning for a nuclear emergency at Catawba Nuclear Facility. As a result the Board finds that the allegations in Contention 11 lack merit.[35/]

35/ The Board is fully cognizant of the Nurkin Committee resolution recommending to the County Commission expansion of the plume EPZ, (Int. Exh. EP-42) as well as the press release stating that the Committee's work was still in progress (Apps. Exh. EP-18). Due to the incomplete nature of the Committee's work and the fact that this Board has heard testimony under oath given by experts with knowledge of the relevant facts, it has given little weight to the Committee's resolution.

G. Contention 14 - Evacuation Time Estimates

1. As admitted by the Board at the August 8, 1983 prehearing conference (S. Tr. 1095), Contention 14 reads as follows:

> The Applicants have failed to demonstrate their ability to take effective actions to protect the health and safety of the general public in the event of an accident in that the evacuation time study presented by the Applicants is a piece of fiction in the guise of science and may not be relied upon for determining the ability of Applicants and public authorities effectively to evacuate 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, 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 Applicant's study is far too optimistic in assuming that worst case conditions will require only 156% of the time of best case conditions. The judges are asked to take notice of their own experience in Applicant's 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, Applicant's study naively fails to account for parents going first to their children's schools to pick up their children before evacuating.

Moreover, Applicant's study, by slight of hand, dismisses the major impact of the presence of large transient populations at Carowinds amusement park and Heritage USA. 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,36/ 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.

A more realistic estimate of evacuation time for the Catawba Nuclear State 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. Testimony on this contention was presented by the Applicants, (Testimony of R. M. Glover and Walter M. Kulash on Emergency Planning Contentions 14/15, Apps. Exh. EP-15); The State of North Carolina (Testimony of J. T. Pugh, III, Apps. Exh. EP-15); The State of South Carolina (Testimony of R. Lunsford and W. M. McSwain, Apps. Exh. EP-15); Gaston County, North Carolina (Testimony of Bob E. Phillips, Apps. Exh.

36/ 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. 1095.

EP-15); Mecklenburg County, North Carolina (Testimony of Lewis Broome, Apps. Exh. EP-15); and York County, South Carolina (Testimony of Phillip S. Thomas, Apps. Exh. EP-15). Testimony was also filed by the NRC Staff (Testimony of Thomas Urbanik, II Concerning the Evacuation Time Estimate Studies for Catawba Nuclear Station, Staff Exh. EP-1). The Intervenors filed no written testimony on Contentions 14, 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 for this contention and the related Contention 15.

3. Essentially, this Contention asserts that the evacuation time study prepared by PRC Voorhees for the Catawba Nuclear Station cannot be relied on by public authorities for making decisions based on the time required to evacuate residents for a number of reasons, as follows: (a) the study over-estimates the flow of traffic on evacuation routes; (b) the study does not consider the voluntary evacuation of Charlotte (evacuation shadow phenomenon); (c) the study 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 in this regard; (e) the study does not adequately address adverse weather considerations; (f) the transient population at Carowinds amusement park and Heritage USA 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 600 vehicles/hour/lane capacity, yielding a minimum evacuation time of 33 hours. Each of these points will be addressed individually.

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

1) 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

2) to identify those areas or routes in the vicinity of a site where bottlenecks are likely to occur and traffic control would be appropriate. Staff Exh. EP-1, Urbanik, at 3.

5. The criteria for judging the acceptability of the evacuation time estimates which are required by 10 CFR Part 50, Appendix E. IV. is NUREG-0654/FEMA-REP-1, Rev. 1, 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/FEMA-REP-1, Revision 1, Appendix 4. Staff Exh. EP-1, Urbanik, at 4.

6. The Applicants provided an evacuation time estimate study for the Catawba plume exposure pathway EPZ, prepared by PRC Voorhees, entitled "Catawba Nuclear Station Evacuation Analysis/Evacuation Time Estimates, April 1983" (App. Exh. EP-15, Attach. A). PRC Voorhees 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" (Attach. B); "Adequacy of Planning for School Population Evacuation, March 1984" (Attach. C); "Assumptions Underlying Departure Times for Evacuation of the Catawba Nuclear Station EPZ, December 1983" (Attach. D); "Evacuation Time Estimates for Carowinds and Heritage USA, March 1984" (Attach. E); and a report entitled "Transport-Dependent Population, April 1984" (Attach. F).

7. The Applicants' study used the PRC Voorhees EVACPLAN model to estimate evacuation times. This model was developed specifically for evacuation time estimate studies, and the method for computing total evacuation time was the distribution method which is one of the two acceptable approaches outlined in NUREG-0654/FEMA-REP-1, Rev. 1, Appendix 4. Staff Exh. EP-1, Urbanik, at 4. EVACPLAN consists of two major components: The EVACURVE module and the QUEUE 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 modules simulates the flow of traffic through the evacuation routes and identifies the location and extent of traffic congestion. Apps. Exh. EP-15, Attach. A at 52.

8. The first point (a) raised in the contention is that the evacuation time study over-estimates the flow of traffic on evacuation routes. The flow rate used by PRC Voorhees is a rate of 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 Highway Capacity Manual, 1965. The Highway Capacity 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. Apps. Exh. EP-15, Kulash, at 1; Staff Exh. EP-1, Urbanik, at 5. This 1200 vehicles per lane per hour figure 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. Apps. Exh. EP-15, Kulash, at 2; Kulash, Tr. 1052-54.

9. Staff witness Dr. Thomas Urbanik, II,[37/] testified that the capacities suggested in the contention were unreasonably low and not

---

37/ 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 NRC for reviewing evacuation time studies of nuclear facilities. Dr. Urbanik was a principal author of NUREG/CR-1745 "Analysis of Techniques for Estimating Evacuation Times for Emergency Planning Zones" (November 1980) (Staff Exh. EP-2, Urbanik, at 2). 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) (Id.). 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. 0, the results of which are published in NUREG/CR-1856 "An Analysis of Evacuation Times Estimates Around 52 Nuclear Power Plant Sites" (May 1981) (Id., Urbanik, Tr. 1298).

supported by experience or sound technical analysis. Staff Exh. EP-2, Urbanik, at 5. The Intervenors 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.

10. Turning to (b), the voluntary evacuation of residents of Charlotte outside the EPZ, testimony was presented by Applicants on this issue. PRC Voorhees 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 Charlotte. The results of these studies were contained in Attachment B to Mr. Kulash's testimony on Contention 11 (expansion of the EPZ boundary), Apps. Exh. 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 traffic, assuming 100 percent of the Charlotte residents evacuating voluntarily, could delay EPZ evacuees using just one route, I-77, one hour, which would delay completion of the entire EPZ evacuation by 30 minutes. Attach. B, at 1 and 9. We find based on this evidence, that the Applicants have, in fact, considered the voluntary evacuation of residents of Charlotte, contrary to the assertion in the contention. We note that Mr. Kulash testified that this study was beyond the scope of the original study performed for Duke Power Company, and is, in fact, not required by Appendix 4 to NUREG-0654. Kulash, Tr. 1171-75. However, since this study has in fact been performed, the results may serve as input to decisionmakers in determining what protective action recommendation may be appropriate.

11. With regard to the evacuation of schools (c), we note that schools are considered special facilities and are not generally considered in the evacuation time studies done for the general EPZ population. Urbanik, Tr. 1292. However, plans for the evacuation of schools, along with an analysis of the adequacy of such planning, are provided at Attach. C to Applicants' Testimony, Apps. Exh. EP-15. The State of North Carolina plans an early evacuation of children from schools and has adequate buses available to move the school children without multiple bus pick ups by bringing buses from outside the EPZ. Apps. Exh. EP-15, Pugh, at 4, 6. The State of South Carolina has plans to use the high school student drivers only to pick up students. Apps. Exh. EP-15, McSwain, at 4. Mr. Phillips for Gaston County pointed out that there are adequate buses so that multiple trips will not be necessary, and county employees, volunteer firemen or police could be used to drive the buses in place of the student drivers. Apps. Exh. EP-15, at 5. Mr. 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. Apps. Exh. EP-15, Broome, at 3, 5. Mr. 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. Apps. Exh. EP-15, Thomas, at 3, 4. Backup drivers are also available. Id., at 9.

12. Mr. 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. Apps. Exh. EP-15, Kulash, at 7, 8; Attach. C. 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. Tr. 1293.

13. 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, as the current plans call for relocation of the students directly. Apps. Exh. EP-15, Pugh, at 4; McSwain, at 4; Phillips, at 6; Broome, at 6-7; Thomas, at 5-6. Messages instructing parents not to attempt to pick up their children at school are also provided in the Applicants' brochure (Apps. Exh. EP-5) and the student brochure (Apps. Exh. EP-6). Although it is anticipated that some of the parents will not follow these instructions and parents would not be prevented from picking up their children, this possibility was accounted for in the Applicants' evacuation time estimates, and law enforcement officers will be provided to aid in traffic flow. Apps. Exh. EP-15, Kulash, at 12, Thomas, at 6.38/

14. Based on the record before us, we do find that Applicants' evacuation time study has, in fact, 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 planning has taken place to meet the needs identified in this regard.

38/ The Board notes the testimony of Intervenors' witness, Brenda Best, a school teacher from a high school within the EPZ, who testified that parents would ignore instructions in the brochure and "swarm to the school like they did during the riots in the seventies." Tr. 4554. However, even if parents ignore the instructions, plans have been made to accommodate the resulting traffic. Broome, Thomas, Phillips, Tr. 1215.

15. The next point raised in this contention concerns 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 (d). Data regarding this concern is contained in Applicants' Testimony, Attachment D at 11.[39/] Apps. Exh. EP-15. Moreover, the assumptions of the study were reviewed by the Staff and FEMA and found reasonable. Staff Exh. EP-1, Urbanik, at 5; Staff Exh. EP-2, Heard and Hawkins, at 27. In Attachment D, it is stated that work-to-home travel times are based on standardized trip length frequency distributions, as developed from home interview surveys throughout the United States urban areas of all sizes. Apps. Exh. EP-15, Attachment D, at 11. 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. Kulash, Tr. 1055-58. This is part of the distribution function used for preparation times in the EVACURVE module. Additionally, site-specific data compiled by PRC Voorhees revealed that

---

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

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. Kulash, Tr. 1058.

16. Also, among the assumptions used to establish the work-to-home flow rates was the assumption that driver behavior would not be unusual, that is, 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. Kulash, Tr. 1137-38. Since the average flow during an evacuation would range from 10 to 28 miles an hour, Kulash, Tr. 1050, 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. Urbanik, Tr. 1274-75. We find, therefore, that there is a data base for these underlying assumptions, that the assumptions are reasonable and that no evidence was presented challenging the adequacy of these assumptions.

17. With regard to concern (c), the Applicants' evacuation time estimate study assumed a reduction in roadway capacity of 40% for adverse weather conditions. Apps. Exh. EP-15, Kulash, at 11. This represents restricted traffic flow due to ice, snow, heavy rain and winds, not traffic totally stopped. Kulash, Tr. 1126-29. Total blockage of the roadway due to clearing 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. Id. Total blockage of a route would yield a zero flow rate. Kulash, Tr. 1198. The percentage

reduction in roadway capacity to account for adverse weather remains fairly stable, although the causes could vary. For example, the loss to traffic of roads in Buffalo, New York would not be substantially different than in York, South Carolina, but it might take a foot of snow in Buffalo to cause loss, whereas it would take only perhaps an inch in South Carolina. Nevertheless, the capacity reduction in the roadway would remain the same. Kulash, 1198-1200. 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. Staff Exh. EP-1, Urbanik, at 6; Urbanik, Tr. 1277. The plan must be flexible enough to accommodate various scenarios. Urbanik, Tr. 1282. 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. Staff Exh. EP-1, Urbanik, at 6. We agree that 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. Apps. Exh. EP-15, Kulash, at 10. 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. Id., at 9. Neither case study presented in the Voorhees 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. Id., at 3. The adverse weather scenario further reduces this to only 60% of the capacity assumed for normal weather conditions. Apps. Exh. EP-15, Kulash, at 11. 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 this concern about "worst case" weather conditions.

18. The next point raised by the contention asserts that the transient population at Carowinds amusement park and Heritage USA has not been considered in the evacuation time estimate study, (f). Peak summer traffic from Carowinds and Heritage USA was, in fact, considered by PRC Voorhees, 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. Kulash, Tr. 1245. However, this separate study is contained in Attachment E to Apps. Exh. EP-15. The study established that the transient population from both Carowinds and Heritage USA can be evacuated without lengthening the projected maximum evacuation times. Apps. Exh. EP-15, Kulash, at 13. The study was conservative (tending toward longer times) in that 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. Id., Kulash, Tr. 1244. Mr. Kulash testified that the transient populations at Carowinds and Heritage USA are at a minimum during the school year at working hours. Apps. Exh. EP-15, Kulash, at 13. James Oliphant,

loss preventions operations manager at Carowinds,[40/] testified that Carowinds has its own evacuation plan in development. Tr. 4401. He also pointed out 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. Tr. 4190-91. Mr. Oliphant testified that the entire park could be cleared in 2.5 hours and it would only take 1.5 hours to clear the parking lot. Tr. 4189, 4367. 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. Apps. Exh. EP-15, Attachment E, at 2. 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. Oliphant, 4370-72, 4400. Both Mr. Oliphant and Mr. 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. Apps. Exh. EP-15, Attachment E, at 3; Tr. 4417-4419. We have no evidence before us to refute these assertions, and are satisfied that sufficient attention is being given to problems of transient traffic by State and local officials.

19. The contention also questions the methodology and assumptions used in the Applicants' evacuation time estimate study, (g). The methodology and assumptions used are set forth in Attachment D, entitled "Assumptions

---

40/ Mr. Oliphant, whose responsibilities include fire, security, first aid and safety of Carowinds, was a rebuttal witness called by Intervenors. Tr. 4186.

Underlying Departure Times for Evacuation of the Catawba Nuclear Station EPZ," December, 1983." Dr. Urbanik testified that the methodologies use accepted and proven transportation planning, modeling and operating transportation systems, and are consistent with Appendix 4 of NUREG-0654. Staff Exh. EP-1, Urbanik, at 5. There is nothing in the record to indicate that the methodology and assumptions used in the PRC Voorhees 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. Urbanik, Tr. 1270. Additionally, the population for special facilities was derived from actual contact with the facilities. Apps. Exh. EP-15, Attachment F, at 2. 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.

20. Finally, we turn to the question as to what is appropriate to assume as a "minimum" time for evacuation of the Catawba EPZ (h). 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. Staff Exh. EP-1, Urbanik, at 8. 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 1 hour to a maximum of 12 hours. Id. 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. Id., at 6; Tr. 1277. We have no reason to assume that 33 hours is realistic for the Catawba EPZ. The evacuation time estimate 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 evacuation times presented in the study range from three hours and twenty-five minutes to six hours and fifteen minutes, including considerations of adverse weather and special facility population evacuation. Apps. Exh. EP-15, Kulash, at 15; Attachment A, at 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. Staff Exh. EP-1, Urbanik, at 7. The overwhelming evidence in the record before us supports our finding that the minimum time suggested by the Intervenors has no basis.

Conclusion

21. As a result of the foregoing, we find that the Applicants' evacuation time estimate study satisfies the criteria set forth in NUREG-0654, Rev. 1, Appendix 4, and has given adequate consideration to evacuation of schools, Carowinds and Heritage Park, USA, 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.

H. Contention 15 - Transportation-Dependent Populations

1. As admitted by the Board at the August 8, 1983 prehearing conference (Safety Hearing Record Transcript, at 1097), Contention 15 reads as follows:

> The applicant 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 TMI 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.41/

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.

2. Applicants' testimony on this contention 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.. Apps. Exh. EP-15. See ¶ G.2. FEMA's testimony also addressed this contention. Staff Exh. EP-2. 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 regarding this contention.

3. Essentially, this contention 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 Contention 14 (see ¶¶ G.13, 14) and will not be repeated here.

41/ 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. 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. Apps. Exh. EP-15, Attach. F, at 1. 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. Id., at 2.

5. Mr. 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. Apps. Exh. EP-15, Pugh, at 5. 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. Id. Evacuation of day care centers would be accomplished utilizing the staff of the facilities. Id.

6. Mr. McSwain of South Carolina testified that 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. Apps. Exh. EP-15, McSwain, at 5. 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. First of all, 250 buses are immediately

available in the county, without the resort to these student driven buses. Thomas, Tr. 1425-26. 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. Apps. Exh. EP-15, Thomas, at 3-4; Thomas, Tr. 1425, 1429.

7. 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. Apps. Exh. EP-15, Phillips, at 7-8.

8. 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. Id., Broome, at 4-5. 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. Id., at 8-9.

9. Mr. 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. Apps. Exh. EP-15, Thomas, at 5. 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. Id., at 8.

10. FEMA 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. Staff Exh. EP-2, Heard, Hawkins, at 30.

11. 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. Apps. Exh. EP-15, Attachments C and F. Both these studies show that an adequate supply of school buses is available for evacuation of both schools and the transit-dependent population in the Catawba EPZ. As noted above, additional transportation can be provided from other resources as well in each of the affected areas. See, ¶¶ H.5, 6. 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. See, ¶¶ H.6, 9.

12. 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. Apps. Exh. EP-15, Phillips, at 7; FEMA Interim Findings, Staff Exh. EP-3, at 12.

13. 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.

14. 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. Apps. Exh. EP-15, Phillips, at 3; Lunsford, at 5-6; Lunsford, Tr. 243.

15. 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.

I. Contention 18 - Adequacy of Telephone Systems During an Emergency

1. At the August 8, 1983 prehearing conference, the Licensing Board admitted Contention 18, which reads as follows:

> 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. Witnesses for FEMA testified that the appropriate standards and criteria with regard to this contention are NUREG-0654-FEMA-REP-1/Rev. 1. II.E. and II.F. "Testimony of FEMA Regarding Emergency Planning Contentions Admitted by the Board in the Catawba Proceeding," Staff Exh. EP-2, Heard, Hawkins, at 35. Standard II.E. states:

> Procedures have been established for notification, by the Licensee of state and local response organizations and for notification of emergency personnel by all response organizations; the content of initial and follow-up messages to response organizations and the public has been established; and means to provide early notification and clear instructions to populace within the plume exposure pathway emergency planning zone have been established.

3. The particular criteria of this standard noted by FEMA to be applicable to this contention is E.2., which provides:

> Each organization shall establish procedures for alerting, notifying, and mobilizing emergency response personnel.

The other standard noted by FEMA is II.F. which provides:

> Provisions exist for prompt communications among principal response organizations to emergency personnel and to the public.

4. Aside from the testimony of FEMA on this contention, 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 Steven Thomas. "Applicants Testimony on Emergency Planning Contention 18," Apps. Exh. EP-16. The Intervenors did not present testimony on this contention.

5. The Intervenors' concerns raised by this contention are addressed below under the following headings: Alternative Means of Communication, Emergency Notification Call Out from Catawba, State and County Notification, and Transportation Dependent Persons and Bus Drivers.

1. Alternative Means of Communication

6. With regard to the Intervenors' concern about the local telephone system serving the Catawba plant, Mr. Coleman testified for the Applicants that if the Lake Wylie, South Carlina exchange were overloaded, telephone calls originating at the Catawba plant could be placed by other lines connecting to the following additional exchanges: Rock Hill, South Carolina (four lines) and Gastonia, North Carolina (one line). Apps. Exh. EP-16, Coleman, at 1, 2. He further testified that in the event of the unavailability of all of these facilities, telephone calls originating at Catawba could gain access to Charlotte local exchanges by way of Duke Power microwave network. Id., 2. Mr. Coleman testified that the microwave system is a communications network that provides communication circuits from point to point that do not rely on telephone company facilities. Id., at 4. The system has both transmitters and receivers at Charlotte and Catawba. Coleman, Tr. 1346. Furthermore, the system is not dependent on AC power but has a battery charger system backed-up by a propane powered generator. Id. Finally, the microwave system has experienced minimal disruption from ionization or storms. Coleman, Tr. 1358, 1450-51.

7. Mr. Coleman testified that if all these facilities were unavailable, by dialing the appropriate access code, calls may be routed through the Catawba Construction Department Telephone System operator to the Duke network telephone switch in Charlotte utilizing nine other tie trunk circuits. He stated that the following dedicated or "Hot Line" telephone circuits are independent of any local switched telephone network and

provide communications into and out of Catawba plant: (a) Catawba control room to Duke system dispatcher in Charlotte and (b) Crisis Management selective ringdown telephone system (ties the Catawba control room to County emergency centers in Rock Hill, Gastonia, and Charlotte). Apps. Exh. EP-16, Coleman, at 2, 3.

8. If all telephone facilities are unavailable, Applicants testified that the following independent radio systems can be utilized to communicate from Catawba: (a) The crisis management radio network (this links the Catawba control room with county law enforcement centers at Charlotte (for Mecklenburg County), Rock Hill (for York County), and Gastonia (for Gaston County)); (b) Catawba Security Radio System (this links Catawba central and secondary alarm stations with the York County Law Enforcement Center); (c) Duke production and transmission radio system (this links the Catawba control room with other key operating points on the Duke system such as power systems dispatchers in Charlotte and Great Falls); and (d) South Carolina Emergency Preparedness Division Radio System (this links Catawba with South Carolina officials in Columbia). Id., at 3).

9. In addition to the above facilities, two independent tone and voice radio paging systems are available for calling out emergency personnel. Id., at 4. The range of these pagers is typically 20 to 25 miles. Coleman, Tr. 1359-60.

2. Emergency Notification Call-Out From Catawba

10. To call out the Catawba Nuclear Station Emergency Response Team following an event at Catawba, the control shift supervisor or designee, upon declaration of an emergency class (notification of unusual event, alert, site area emergency, general emergency), obtains the appropriate

emergency response procedure, which has the list of three positions/ individuals to be notified (also for individuals, there are two or more alternates that can be called if the primary individual is inaccessible). Apps. Exh. EP-16, Bolch, at 5; Bolch, Tr. 1362-63. These notifications can be made by use of: (1) private telephone lines, (2) Duke Power Co. microwave communication system, or (3) radio pagers to certain individuals. Id., at 5.

11. The first three individuals notified by the shift supervisor have been provided with an emergency response team telephone directory that includes instructions for making other notifications to the remainder of the Catawba nuclear station emergency response organization. Id., at 5. Three individuals that the shift supervisor or his designee calls are the operations duty engineer, the station manager or his designate, and the station license project engineer or his designate. Bolch, Tr. 1383-84. These individuals each have three other emergency response team members to notify, plus alternates, who can be notified in the event that the primary cannot be notified. These telephone notifications are made by private telephone lines, which include the various private telephone companies in this area. Id., at 5; Bolch, Tr. 1363.

12. The time estimated for initial notification to completion of the call-out is 27 minutes, assuming an average time per notification to be three minutes. This time period of 27 minutes is less than the specified period of time (30 minutes) that it takes to notify the general public. The requirements of 10 CFR Part 50, Appendix E, IV.D.3, specify a total of about 30 minutes within which the public shall be initially notified. Therefore, the stations emergency responders could be activated before

the public becomes aware of the situation at the site. This would ensure that the phone systems could be available for call-outs. Id., at 6; Bolch, Tr. 1366. In the recent Catawba exercise, this call-out time was determined to take only 19 minutes. Apps. Exh. EP-16, Bolch, at 7.

13. The Applicants further testified that they have enough people on the site to handle the emergency response in an initial mode (without calling in supplemental personnel). Bolch, Tr. 1375-77.

3. State and County Notification

14. Using the selective signaling system (the Crisis Management selective ringdown telephone system), the control room also notifies the county and State warning points. Bolch, Tr. 1385. All three county warning points are notified at one time using this crisis system. Id. All three county warning points can be on the line at once and pass the information at one time. Id. Contents of the messages have been planned and prepared. Bolch, Tr. 1386-87. A separate call has to be made to the States. Bolch, Tr. 1390. This includes a long distance call to Raleigh (Highway Patrol office), with a back-up relay radio link via Gastonia or Mecklenburg counties. Bolch, Tr. 1392. A separate call is also made to South Carolina in Columbia to the Department of Health Environmental Control. Bolch, Tr. 1391-92. All these calls must be made within a period of 15 minutes. Bolch, Tr. 1390.

15. The only other offsite call that must be made is a call to the Nuclear Regulatory Commission which will be made on a dedicated line which is yet to be installed. Bolch, Tr. 1394.

16. Mr. Pugh for the State of North Carolina testified that he did not anticipate any difficulties in notifying emergency personnel since

such notification will normally occur before the general public is aware of the accident situation. Apps. Exh. EP-16, Pugh, at 1. Mr. Lunsford testified for the State of South Carolina that at the State level he did not anticipate any difficulty in communications caused by overloading of the telephone system because they are out of the local area where notification is being done. Apps. Exh. EP-16, Lunsford, at 1.

17. Mr. Phillips for Gaston County testified that in case of overloading of the phone system, they could rely on radio receivers in the schools which can receive broadcasts from the EOC. Apps. Exh. EP-16, Phillips, at 1. Mr. Phillips further testified that he also has radio-equipped police, fire, ambulance, and civil defense personnel capable of receiving broadcasts from the EOC. Id. He also indicated that he could rely upon his police officers to notify on a one-to-one basis in an emergency if the need arose. Id.

18. Mr. Broome from Mecklenburg County testified that even with an overload of the phone system, there would be enough emergency workers on hand on a shift basis for the initial response. Apps. Exh. EP-16, Broome, at 1. The emergency workers that would be notified as backup or support would be notified via radio or via telephone or via one-on-one contact (by sending vehicles into an area) or by an emergency broadcast system announcement that all emergency workers or all City of Charlotte Police Department personnel or all City of Charlotte Fire Department personnel report to the station. Accordingly, he testified that there was no problem if such an overload should occur. Id.

19. Mr Thomas for York County testified that there were no designated emergency workers who were dependent on the telephone system for notifi-

cation and instruction. Tr. 1430. He indicated that there were tone and voice pagers and, in addition, that the public works department has 3910 radio communication vehicles. Id. Mr. Thomas reiterated that every person on his EOC staff, on his key alert list, has a means of being contacted in addition to the commercial telephone. Tr. 1446.

20. Based upon the evidence, the Board finds that there is sufficient backup means of communication either by radio, by pagers, or if necessary, on a one-to-one contact basis to enable emergency personnel of North Carolina and South Carolina and the three counties to be notified of an emergency even if the telephone system becomes overloaded.

4. Transportation-Dependent Persons and Bus Drivers

21. For the State of North Carolina and Mecklenburg County, Mr. Pugh and Mr. Broome testified that the school bus drivers will be notified through the school tone alert system and that it is anticipated that the bus drivers will be available on school property. No further telephone communication is considered necessary. Apps. Exh. EP-16, Pugh, at 1, and Broome at 4. Mr. Broome added that if school were not in session, backup bus drivers would be notified by a voice pager system and EBS messages. Id., Broome, at 4.

22. Mr. Phillips testified for Gaston County that the county has radio receivers in the schools which can receive broadcasts from the EOC and, as a backup, radio-equipped police, fire, ambulance, and civil defense personnel who can receive broadcasts from the EOC and can be directed by such broadcasts to stop school buses if the need arose. Apps. Exh. EP-16, Phillips at 1. Mr. Phillips testified that if school were not in

session, school buses would not be needed because they would use county transportation rather than school buses in order to pick up people who needed transportation. Id., at 5. Mr. Thomas (York County) testified that if the telephone system were overloaded, school bus drivers would be notified through the tone alert system. Apps. Exh. EP-16, Thomas at 5-6. If school is not in session, volunteer firemen would be called on to act as the drivers after notification by voice transmitter to report to a specific location to be assigned a bus. Id., at 6. Mr. Phillips also testified that as part of their annual fund raising drive by the fire departments they compile a list of transportation-dependent persons. Apps. Exh. EP-15, Phillips, at 6-7; Tr. 1434.

23. Mr. Thomas (York County) and Mr. Phillips further testified that transportation-dependent people could be instructed by EBS to tie a white flag around their door should there be a telephone overload. Tr. 1452. This would attract the attention of the vehicles that would be picking up people who needed transportation to evacuate. Id. The plan would be to have such vehicles on the road in such situations looking for such people, in addition to picking up prearranged routes. Thomas, Phillips, Tr. 1453. Mr. Pugh testified that the same would occur for Mecklenburg County. Tr. 1452-53.

5. Conclusion

24. Based upon all the evidence, the Board finds that procedures have been established for notification and mobilization of response personnnel, as well as local response organizations with planned messages, and provisions exist for prompt communications among principal response

organizations to emergency personnel and to the public even if there should be an overload of the telephone lines. Accordingly, we believe that there is reasonable assurances that there will be the requisite notification of emergency personnel, the requisite accommodation of transportation-dependent personnel, and the requisite notification of school bus drivers. We conclude, therefore, that the contention is without merit.

IV. CONCLUSIONS OF LAW

The Board has considered the entire record in this proceeding and concludes, in accordance with 10 C.F.R. § 2.760a and Section VIII of Appendix A to Part 50, that the emergency plans, with respect to all matters placed in controversy, comply with all applicable provisions of 10 C.F.R. § 50.47 and 10 C.F.R. Part 50, Appendix E, and provide reasonable assurance that adequate protective measures can and will be taken in the event of radiological emergency.

V. ORDER

IT IS HEREBY ORDERED, pursuant to the Atomic Energy Act of 1954, as amended, and the Commission's rules, that the Director of Nuclear Reactor Regulation is authorized, upon making the findings on all applicable matters specified in 10 C.F.R. § 50.57(a) and upon satisfaction of the conditions in the following paragraph and of the conditions contained in the Partial Initial Decision, dated June 22, 1984, of the Licensing Board empowered to hear and decide non-emergency planning contentions, to issue to Applicants Duke Power Company, North

Carolina Municipal Power Agency Number 1, North Carolina Electric Membership Corporation and Saluda River Electric Cooperative a license authorizing operation of Unit 1 of the Catawba Nuclear Station at 100 percent of rated power. The Director of Nuclear Reactor Regulation is also authorized, upon satisfaction of the aforementioned conditions, to issue licenses for fuel loading and operation of Unit 2 upon the completion of that facility.

This Order is conditioned upon meeting of the obligations imposed by paragraphs B.13, D.8, D.15, and D.18 of our findings to the satisfaction of the Staff as follows:

(1) Confirmation by Applicants that corrective actions regarding staff training and adequate equipment for monitoring and decontamination in Gaston County have been made.

(2) Applicants' submittal of revisions to the SCORERP including appropriate references to the direction and control responsibilities delegable to the Director, Division of Public Safety, Office of the Governor, South Carolina.

(3) Applicants' submittal of revisions to each of the two State plans clarifying the distinction between the authority of the State Governors to "direct" and "compel" evacuation of the public, and the delegable authority to "order" evacuation of the public.

(4) Applicants' submittal of revisions of SCORERP and the York County Emergency Operations Plan to describe the authority of York County officials with respect to "ordering" or "directing" an evacuation of the public.

Effectiveness and Review of Initial Decision. This Partial Initial Decision is effective immediately and will constitute the final decision of the Commission 45 days after the date hereof, unless a party appeals or seeks a stay. Pursuant to 10 C.F.R. § 2.762, an appeal from this Partial Initial Decision may be taken by filing a notice of appeal with the Atomic Safety and Licensing Appeal Board within 10 days after

service of this decision. A brief in support of an appeal must be filed within 30 days after the filing of the notice of appeal (40 days if the appellant is the NRC Staff). Within 30 days after the period for filing and service of the briefs of all appellants has expired, any party not an appellant may file a brief in support of or in opposition to the appeal. The NRC Staff may file a responsive brief within 40 days after the period for filing and service of the briefs of all appellants has expired.

Respectfully submitted,

Henry J. McGurren
Counsel for NRC Staff

George E. Johnson
Counsel for NRC Staff

Dated at Bethesda, Maryland
this 8th day of August, 1984.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

DOCKETED
USNRC

'84 AGO 10 A11:41

In the Matter of	)	
	)	
DUKE POWER COMPANY, ET AL.	)	Docket Nos. 50-413
	)	50-414
(Catawba Nuclear Station,	)	
Units 1 and 2 (Emergency Planning))	)	

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW IN THE FORM OF A SUPPLEMENTAL PARTIAL INITIAL DECISION ON EMERGENCY PLANNING" in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class, or, as indicated by an asterisk, by deposit in the Nuclear Regulatory Commission's internal mail system, this 8th day of August, 1984:

*Morton B. Margulies, Chairman
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555

*Dr. Robert M. Lazo
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dr. Frank F. Hooper
Administrative Judge
University of Michigan
School of Natural Resources
Ann Arbor, MI 48109

Richard P. Wilson, Esq.
Assistant Attorney General
P.O. Box 11549
Columbia, SC 29211

J. Michael McGarry, III, Esq.
Mark S. Calvert, Esq.
Bishop, Liberman, Cook,
Purcell & Reynolds
1200 Seventeenth Street, NW
Washington,DC 20036

Robert Guild, Esq.
Attorney for Palmetto Alliance
P.O. Box 12097
Charleston, SC 29412

Palmetto Alliance
2135½ Devine Street
Columbia, SC 29205

Jesse L. Riley
Carolina Environmental Study Group
854 Henley Place
Charlotte, NC 28207

William L. Porter, Esq.
Albert V. Carr, Esq.
Ellen T. Ruff, Esq.
Duke Power Company
P.O. Box 33189
Charlotte, NC 28242

Mr. Donald R. Willard
Department of Environmental Health
1200 Blythe Boulevard
Charlotte, NC 28203

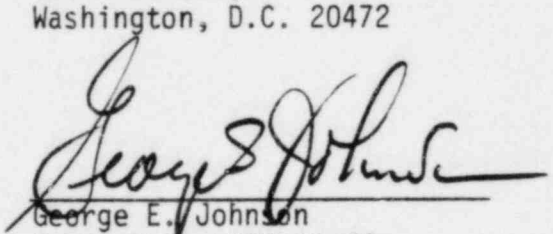
*Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Washington, DC 20555

*Atomic Safety and Licensing Appeal
Board Panel
U.S. Nuclear Regulatory Commission
Washington, DC 20555

*Docketing & Service Section
Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Karen E. Long
Assistant Attorney General
N.C. Department of Justice
Post Office Box 629
Raleigh, NC 27602

Spence Perry, Esquire
Associate General Counsel
Federal Emergency Management Agency
Room 840
500 C Street, S.W.
Washington, D.C. 20472



George E. Johnson
Counsel for NRC Staff