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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the matter of:

DUKE POWER COMPANY, et al

(Catawba Nuclear Station,
Units 1 & 2)

Docket No. 50-413 OL
50-414 OL

Location: Charlotte, N. C. Pages: 1969 - 2230

Date: Wednesday, May 23, 1984

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY & LICENSING BOARD PANEL

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In the Matter of:

DUKE POWER COMPANY, et al., Docket No. 50-413 OL
50-413 OL

(Catawba Nuclear Station,
Units 1 and 2) ASLBP No. 81-463-06A OL

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BB&T Center, Fourth Floor
112 South Tryon Street
Charlotte, North Carolina

Wednesday, May 23, 1984

Hearing in the above-entitled matter was convened, pursuant to recess, at 9:05 a.m.

BEFORE:

MORTON B. MARGULIES, Chairman
Atomic Safety & Licensing Board Panel
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

FRANK F. HOOPER, Member
Atomic Safety & Licensing Board Panel
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

ROBERT M. LAZO, Member
Atomic Safety & Licensing Board Panel
Washington, D. C. 20555

APPEARANCES:

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C O N T E N T S

WITNESSES	DIRECT	CROSS	REDIRECT	RECROSS	VOIR DIRE	BOARD
T. E. Potter) W. M. Kulash) R. F. Edmonds) M. A. Casper) R. M. Glover) L. W. Broome)	1983	2007	2178	2206	1990	2171

EXHIBITS	MARKED	RECEIVED
Applicants' Exhibits:		
EP 18, Press Release *	1982	1982
EP 19, Panel Testimony (prefiled) **	2006	2006
Intervenors' Exhibits:		
EP 42, Resolution *	1982	1982
EP 43, Chart, Population & Density *	2017	2017
EP 44, Map *	2150	2150
EP 45, 1982 High Accident Locations *	2159	2159
EP 46, All-Hazards Plan *	2162	2162
EP 47, Memo for File (Glover) *	2165	(rejected - 2165)

* Indicates 1 copy received by Court Reporter.
** Indicates 3 copies received by Court Reporter.

P R O C E E D I N G S

JUDGE MARGULIES: Good morning.

This is the tenth day of hearing Emergency Planning issues in the Application of Duke Power Company, and others, seeking an operating license for Catawba Nuclear Station, Units 1 and 2.

We have scheduled at this time witnesses for Contention 11.

We will proceed with Applicants' presentation of their direct case this morning.

We have another matter to consider, the filing of supplemental petitions for subpoenaes. The supplemental petition was received five days after the due date; and we have not had an opportunity to review it.

We will attempt to take that up some time during this session of the hearings.

Are the Applicants ready to call their panel?

MR. GUILD: Mr. Chairman, before you begin, if I might?

JUDGE MARGULIES: Yes?

MR. GUILD: First, I saw what was the difficulty with the application for subpoenaes; it was mailed on the date I understood was right; and I appologize if there was some difficulty in getting to the Board.

JUDGE MARGULIES: It was made clear on the record

that the subpoenaes were to be in the hands of the Board on Wednesday -- I don't have my calendar -- the 16th of -- I don't recall the date; but it was on Wednesday.

MR. GUILD: Wednesday, the 16th --

JUDGE MARGULIES: Yes.

MR. GUILD: As I recall, Judge, I was operating under the instructions I understood that they would be filed on the 16th; and they were filed on the 16th. They were mailed.

JUDGE MARGULIES: Well, it was made clear on the record that they were to be in the hands of the Board on that date.

MR. GUILD: Well, sir, if I'd understood that, I certainly would have had them in your hands on that day; but I was relying on them being placed in the mail that day, and that is when they were placed in the mail.

I apologize for the misunderstanding. But I was operating under the -- my understanding of your instruction which was that they be mail-served on that date; and they were.

Mr. Chairman, before you proceed with the Applicants' panel on Contention 11, on behalf of Carolina Environmental Study Group and Palmetto Alliance, pursuant to our responsibilities to bring to the attention of the Board facts which bear on the matters in controversy, I wish to ask

the Board to take notice of a recent decision by a committee appointed by the Commissioners of Mecklenburg County to study the adequacy of emergency planning for the Catawba facility, specifically, the adequacy of the ten-mile emergency planning zone.

Last Wednesday the Charlotte-Mecklenburg Emergency Management Planning Review Committee by majority vote adopted a Resolution which I wish to distribute to the Board and parties at this time.

The Resolution makes findings with respect to the matters in controversy relating to the local emergency planning needs and capabilities which we believe to be material to the Board's findings on Contention 11.

And on the basis of the factual findings reflected in the Resolution, that Committee recommends the extension of the emergency planning zone -- plume exposure pathway, EPZ -- to cover the City of Charlotte.

I wish at this time, pursuant to 10 CFR 2743(i), the provisions for official notice, to ask that the Members of the Board to take notice of the documents that I am distributing at this time.

(Counsel distributing documents to Board and parties.)

I have just distributed to the Board and parties a series of documents: the last document is a Resolution; this

is the text that was adopted last Wednesday by this Committee.

Appended to that Resolution are the -- the first document is dated 9-13-83, a form entitled Request for Board Action; and that reflects the initial establishment of the Review Committee.

The second document, the list of persons appointed to membership on the committee and those serving in advisory capacities, including representatives from Carolina Environmental Study Group and the Applicants, Duke Power Company; a sheet entitled Background; a third page that is entitled -- a fourth page entitled -- Study Committee for Emergency Management Planning Charge, listing six paragraphs including explicitly the instructions to review the adequacy of the ten mile emergency planning zone at the Catawba facility. And, lastly, the Resolution of last Wednesday, itself.

As we understand, the matter is now referred for consideration on the agenda of the Mecklenburg County Commission at a meeting to be scheduled subsequent to this date; but the Committee, itself, conducted a series of investigative hearings in around a six-month period of time, and reached the conclusion that is reflected in the Resolution.

We believe that this is directly material to this Board's responsibilities to consider the adequacy of the

configuration and size of the EPZ in light of local emergency response needs and capabilities, as reflected in 10 CFR 5047(c)(2).

And we would ask at this time that the Board take notice of this action by the review Committee and that the documents that I have distributed be marked and received as an exhibit in evidence pursuant to the official notice provisions of the Rules of Practice.

JUDGE MARGULIES: Is there any objection to it being admitted as an exhibit?

MR. MC GARRY: Your Honor?

JUDGE MARGULIES: Just one minute.

JUDGE LAZO: Mr. Guild, I believe you said it was a majority vote. I notice there are nine members of the Review Committee.

MR. GUILD: The vote, Dr. Lazo, was four in favor; six members of the Committee attended. I was present, Mr. Broome was present, and I am sure representatives of Applicants were there as well; so with six members in attendance, I understand that to represent a quorum within the procedures followed by the Committee.

There were four who voted affirmatively, in favor of the Resolution; one opposed; and the Chairman abstained.

DR. LAZO: I see. Thank you.

MR. MC GARRY: Mr. Chairman, and Members of the

Board, we are not certain that this is the entire set of documents that apply to the blue-ribbon citizens' committee.

Subject to our ascertaining the correctness of the documents, we have no objection.

However, to points: In the event we find there are additional documents that have a bearing we would bring them to the Board's attention and we would submit that they be made a part of the record.

We also have a document that we would like to be a part of the record. This is in response to the document that has been handed to the Board by Intervenors. And that is a press release from Dr. Harry A. Nurkin, who is the Chairman of the Emergency Management Planning Review Committee.

And I would like to read one paragraph --

MR. GUILD: Mr. Chairman, may we ask that that be distributed before it is read into the record? I circulated my proffered exhibit to the parties, and I have not seen this document.

MR. MC GARRY: And the paragraph would be the second paragraph.

(Counsel for Applicants distributing documents to Board and parties.)

MR. MC GARRY: 'It has been reported in the media--"

JUDGE MARGULIES: We haven't had a chance to read it.

(Pause)

#2-1-ST

MR. GUILD: Mr. Chairman, we would like an opportunity to be heard briefly before Mr. McGarry puts this matter in record.

MR. MCGARRY: Your Honor, I think it's our turn to speak.

JUDGE MARGULIES: I will give you a chance to speak first, Mr. McGarry, but there is no date on this.

MR. MC GARRY: Our understanding is this was based on Friday, that would be the 18th of May.

JUDGE MARGULIES: You may proceed.

MR. MC GARRY: Thank you, Your Honor. Quite frankly, I think our objective is to get to this panel today. We don't want to belabor the matter.

Intervenors request that a document be marked for identification and received in the record. We don't have any objections subject to the caveat, and similarly so that the complete story is on the record, we request that the document pages captioned "For Immediate Release", and it pertains to a statement of Dr. Harry A. Nurkin, be marked for identification as Applicant's Exhibit EP-18 and received.

MR. GUILD: Mr. Chairman, we would object. First, we ask that the Resolution which we represent to be the

#2-2-SueT

official action of the Committee with the documentation attached to it that reflects the Committee's charge and composition by the Commissioners of Mecklenburg County be received.

We understand that Dr. Nurkin, who was the Chairman of the Committee, abstained from voting one way or the other on the matter. He has expressed strong views in past meetings of the Committee which he has attended, which have been limited in number, opposing the consideration of the extension of the EPZ. And I'm sure he would feel strongly about his point of view on the subject.

But the press release, if that's what it is, and it appears to be -- we don't doubt that it is -- of a member of the Committee, even a Chairman, does not speak for the Committee.

The Resolution that we have offered represents the official decision of the Committee. We think it is inappropriate to offer a press release. I would just suggest that if press releases were given evidentiary value we would have saved ourselves a lot of argument about the propriety of including a number of Duke Power press releases and public relation materials that we spent lots of time arguing about early on in this proceeding. And we offered press releases on the other side of the issue.

#2-3-SueT

Further, we could hear from the four members of the Committee, who were present in voting the day the Resolution was approved, and other members of the Committee who were unavailable that day, who would also vote to support the Resolution as passed, and hear what their views are. Because one member of the Committee who abstained issues a press release, that I don't know what it adds frankly, but offers his personal view on the matter does not have evidentiary value and should not be received in evidence.

Mr. Chairman, if we could ask that the Resolution of the Charlotte/Mecklenburg Emergency Management Planning Review Committee be marked and received as indicated, as Intervenor's Emergency Planning Exhibit 41 --42.

MR. MC GARRY: Your Honor, our position is they both should come in, or both should be out, one or the other.

Our document is written by the Chairman of the Committee. I think the complete picture is both documents.

MR. GUILD: Mr. Chairman, it wasn't approved by the Committee in any form or fashion. It's Mr. Nurkin's personal views, and it's not a decision of the body.

JUDGE MARGULIES: We will admit the both of them. And the Nurkin press release will be considered his dissenting

#2-4-SueT

opinion to the vote on the Resolution. What is your next number?

MR. MCGARRY: That will be Applicant's Exhibit EP Number 18, Your Honor.

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JUDGE MARGULIES: It will be so admitted.

(The document is marked as Applicant's Exhibit EP-18 and received in evidence.)

MR. MC GARRY: Thank you.

JUDGE MARGULIES: And the Resolution is admitted as Intervenor's EP-42.

(The document is marked as Intervenor's Exhibit EP-42 and received in evidence.)

MR. GUILD: Thank you.

JUDGE MARGULIES: You may proceed with calling the panel.

MR. MC GARRY: Thank you, Your Honor. At this time we would call Applicant's panel to the stand to testify on Emergency Planning Contention 11. It consists of Mr. Broome, from the left, Mr. Potter, Casper, Kulash, Mr. Edmonds and Mr. Glover.

#2-5-SueT

Mr. Potter and Mr. Casper and Mr. Edmonds have not previously been sworn. I would note that Mr. Casper had previously testified in the safety hearing and has been sworn. But so we don't complicate the record, we request that they be sworn again.

Gentlemen, would you three please stand?

(The witnesses identified above are sworn by Judge Margulies.)

Whereupon,

THOMAS E. POTTER,

WALTER M. KULASH,

ROBERT F. EDMONDS, JR.,

MARK A. CASPER,

R. MICHAEL GLOVER,

-and-

LEWIS WAYNE BROOME

were called as witnesses on behalf of Duke Power Company and, having been duly sworn, were examined and testified as follows:

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DIRECT EXAMINATION

BY MR. MC GARRY:

Q I will address these questions to Mr. Glover, to

#2-6-SueT

Mr. Potter and to Mr. Kulash. Gentlemen, do you have a document in front of you which is your testimony concerning Emergency Planning Contention 11?

Mr. Potter?

A (Witness Potter) Yes.

Q Mr. Kulash?

A (Witness Kulash) Yes.

Q Mr. Glover?

A (Witness Glover) Yes.

Q Do you have any corrections or additions to make to the testimony?

A (Witness Potter) No.

(Witness Kulash) One correction.

Q Yes, Mr. Kulash, what is that?

A On Page 3 of the testimony.

Q Page 3, yes, sir.

A Line 22.

Q Yes, sir.

A The sentence on Line 22 should end after the phrase "one route."

The next three words, "by 30 minutes," should be struck.

#2-7-SueT1

Q Any other correction?

A On Line 24, the same page, the number "50%" should be struck and replaced with 70%.

Q Does that complete your corrections?

A Yes.

Q Mr. Glover?

A (Witness Glover) No corrections.

Q Mr. Potter, I believe you have two attachments to your testimony; is that right? Your resume and then your analyses?

A (Witness Potter) That's correct.

Q Do you have any corrections or additions to that document?

A No, I do not.

Q And, Mr. Kulash, I believe you have three attachments. One is your statement of professional qualifications and then you have two analyses; is that correct?

A (Witness Kulash) Yes.

Q Do you have any additions or corrections to make to that?

A No.

Q Mr. Glover, you have no attachments?

#2-8-SueT

A (Witness Glover) That's correct.

Q Gentlemen, do you adopt your testimony together with the relevant attachments as your testimony for use in this proceeding?

A (Witness Potter) I do.

(Witness Kulash) Yes.

(Witness Glover) Yes.

Q If I asked you the questions set forth in this document today, would you provide the answers set forth in this document?

A (Witness Potter) Yes.

(Witness Kulash) Yes.

(Witness Glover) Yes.

DIRECT EXAMINATION

BY MR. CARR:

Q I would address these questions to Mr. Edmonds, Mr. Casper and Mr. Broome, and I would ask each of you gentlemen if you have before you your testimony on Contention 11 in this proceeding?

Mr. Edmonds?

A (Witness Edmonds) I do.

Q Mr. Casper?

#2-9-SueT1

A (Witness Casper) Yes.

Q Mr. Broome?

A (Witness Broome) I do.

Q And, Mr. Edmonds and Mr. Casper, attached to that testimony is there a statement of your professional qualifications?

Mr. Edmonds?

A (Witness Edmonds) That's correct.

Q Mr. Casper?

A (Witness Casper) That's correct.

Q Do you gentlemen have any corrections or additions that you wish to make at this time, either to your testimony or to the attachments?

Mr. Edmonds?

A (Witness Edmonds) Yes, I have two corrections. On Page 4 of my testimony --

Q That's the first in the packet; is that correct?

A Yes. It's first in mine. On Page 4, Line 17, after "a" insert "peak day recreational."

JUDGE MARGULIES: Would you repeat that?

WITNESS EDMONDS: Okay. Line 17, after the word "a" insert "peak day recreational." The sentence should

#2-10-SueT

end after "1982."

BY MR. CARR: (Continuing)

Q Put a period after "1982" in Line 18 and strike the remainder of that sentence?

A That's correct.

Q Does that complete your corrections?

A I have a correction on the Table on Page 7. The column entitled "Sector," Line 16, Sector should actually read east southeast.

And also on Line 27, Sector should read --

MR. GUILD: Excuse me, sir. The Line 17 --

WITNESS EDMONDS: Line 16 under Sector, it should read east southeast. And Line 27, under Sector, it should read east.

BY MR. CARR: (Continuing)

Q Does that complete your corrections and additions?

A Yes.

Q Mr. Casper?

A (Witness Casper) Yes. I have two corrections. On Page 3 of my testimony -- 13, I'm sorry, Line 3, "Page 6" should read "Page 7."

Q That's on Line 3?

#2-11-SueT

A Line 3, Page 13. And on Line 11 of the same page, Page 13, Line 11, "also" should be striken.

Q Does that complete your corrections, Mr. Casper?

A Yes.

Q Mr. Broome --

MR. GUILD: Line 11, Page 13, strike what?

MR. CARR: "Also."

BY MR. CARR: (Continuing)

Q And, Mr. Broome, you have no corrections?

A (Witness Broome) That's correct.

Q If I were to ask each of you gentlemen the questions that are set forth in your testimony, would your answers be the same as they are set forth therein?

A (Witness Broome) Yes.

(Witness Casper) Yes.

(Witness Edmonds) Yes.

Q Do you gentlemen adopt this testimony with its attachments as your testimony in this proceeding?

A (Witness Casper) Yes, I do.

(Witness Edmonds) I do.

(Witness Broome) I do.

MR. CARR: Your Honor, at this point I would ask

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that the document entitled "Applicant's Testimony on Emergency Planning Contention 11" with its attachments be marked for identification as Applicant's Exhibit EP-19 and received into evidence.

MR. GUILD: Mr. Chairman, we would ask the opportunity to direct some questions by way of voir dire to members of the panel.

MR. CARR: I perhaps wasn't clear, but my motion would intend, of course, that the exhibit be subject to the normal motions to strike.

JUDGE MARGULIES: You may proceed with the voir dire.

VOIR DIRE EXAMINATION

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BY MR. GUILD:

Q Mr. Kulash, if you would, sir, turn to the portion of your testimony reflecting the corrections you have just made. I believe you said it was Page 3.

A (Witness Kulash) Yes.

Q Line 22. Was this original testimony a typographical error?

A No. The testimony was correct at that time as given, and then we made a revision at a date after the original testimony.

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Q When did you make that revision?

A It was probably within a week after the testimony was filed.

Q A week after April 16th?

A It was somewhere in that period, yes.

Q Did you inform Counsel for Applicant of that?

A No, we didn't.

Q Did you inform applicant? Duke personnel?

A No.

Q You just kept it to yourself?

A It was a fairly minor adjustment.

Q It may be a minor adjustment, but it seems to alter your conclusion, doesn't it?

A No, it doesn't alter my conclusion.

Q You strike thirty minutes. What is the significance of striking thirty minutes with respect to hindering EPZ evacuation?

A I refer you to the complete breakdown that is given in Attachment B, on page 9.

Q Page 9 of Attachment B?

A Page 9 of Attachment B, and I think this will put it in perspective for you better. This was, in fact, a fairly minor change. The previous version of this Table from which I gave the testimony that we changed this morning, had a somewhat different -- had a somewhat different

point at which congestion appeared, and because of some refinements in the modeling process that we were doing, these times changed by some percents.

And we reflected the latest. We reflected the latest revisions in the attachment. These revisions were not reflected in my earlier testimony.

Q Refer me specifically to that revision, Mr. Kulash, so I can follow you.

A All right. The corrected text refers to the fact that on page 9 of the Attachment, that a delay first occurs at the point that seventy percent of the area residents voluntarily evacuate. Our previous computation on which my earlier testimony was based would have had a fifty percent at that point.

And it would have shown a thirty minute delay in the first, or in the second column, rather. So, the net result of the change in testimony is that delay doesn't appear to EPZ residents until seventy percent of these residents are evacuating voluntarily. And that that delay, at the seventy percent level, results in fifteen minute delay to EPZ residents.

I believe this correction was also referred to in my earlier testimony in exactly the same terms.

Q It was referred to I understand in somebody's testimony, but you are the only person sponsoring it, and you

are sponsoring it now, and I am trying to find out where it came from. The Attachment I have says February '84 is the date of the publication. Is that correct? Your Attachment B?

A Yes.

Q Well, your testimony says April 16th is the date it was published.

A But the Attachment is not carrying the revision date, clearly.

Q Doesn't carry any revision dates. It says February '84, doesn't it?

A That is right.

Q So it wasn't published in Feburary of '84.

A It was first published in February of '84.

Q But not with the data that is included at Page 9 in Exhibit 4 of the table you are referring to.

A That is correct. The Table was revised.

Q Why didn't you correct your testimony? Why wasn't your testimony reflective of this analysis instead of reflective of the original version?

A The analysis revisions were not completed until after my testimony was given.

Q What should the date be then that appears on the publication cover of your Kulash Attachment, the date that now says February '84. What should it be?

A The final revisions to that are a -- the current revision date should read, obviously, at some point after my testimony was given.

Q Right. How about a date? Do you know?

A I think we would be safe in saying that some time between the date in which the testimony was filed and enough time that would have allowed this Attachment B to have been prepared and reach you, and we can go by the date that this attachment reached you.

Q All right. Now, if you will sir, can you tell me first why you didn't share with us the basis for the revision?

A I can right now if you would like.

Q Well, it would have been a little bit more helpful, don't you think, to have shared it before you took the stand?

A In my judgment, it is not a substantial change, and I am trying to point that out to you by having you understand Table 9 -- the Table that is on page 9. The revision came about because of the analysis that resulted in the previous numbers, and recall the previous number said that delay to EPZ residents first occurs when fifty percent of the shadow population chooses to evacuate voluntarily. It now reads delay first occurs when seventy percent --

Q Chooses to evacuate?

A Chooses to evacuate, and our initial analysis did not make any attempt to balance the flow of traffic on the evacuation routes. That is, the flow of traffic by voluntary evacuees. We simply assigned them to their evacuation routes and let that be the estimated traffic flow. This is what gave us the times -- this is what gave us the finding of delay first occurring when fifty percent choose to evacuate.

On further analysis, after my initial testimony was filed on that basis, we examined the imbalance in traffic on the various evacuation routes, and determined that this imbalance would not exist even without any traffic control whatsoever, that the evacuating traffic would seek a more balanced way of the shadow evacuation area.

In other words, we are saying they would not tolerate, for example, a two hour congestion on one route when they knew an adjacent route which is know to them, as local drivers, was now empty.

Q What would they do, let them take their vehicles and move over to the other route out of the queue?

MR. McGARRY: If I can just interject something. In looking at the documents, I found in terms of the correction that has been made, this identical correction was made in Contention 14 and 15 testimony that Mr. Kulash provided on page 5. It is line 1 through 6, and that was on

May 7, 1984. He struck the five thirty minutes and changed fifty percent to seventy percent.

MR. GUILD: That is helpful as far as dating the reference, Mr. Chairman, but my question is pending.

BY MR. GUILD: (Continuing)

Q Would you answer the question, Mr. Kulash?

A We are saying that motorists would use another route. I think they would get to the other route by driving on the surface street system.

Q Did you make any efforts to empirically demonstrate that a person who is in a queue a half mile or a mile in length, bumper to bumper, waiting in congested -- on a congested roadway is going to be able to physically move his or her vehicle to a more expeditious route?

A There are connecting roadways between the routes which had this imbalance of traffic. We used only adjacent routes, and then there were always reasonable connecting routes from the zone of origin of that traffic on to the evacuation routes.

Q Are you expecting that there would be traffic control to permit that transfer from one route to the other?

A No. We would not assume traffic control.

Q No traffic control?

A No.

Q And how is it that the drivers are to have such omniscience to know that the route that they are traveling may be queued up, but the parallel or neighboring route is available so that they can, without traffic control, move their vehicles over to the more expeditious routes?

A Just that they would be in congestion, or would see congestion on the route, and simply would not use that and continue on a crossroad until they came to another evacuation route which was not as crowded.

Q Look at page 7 of that Attachment, Mr. Kulash. Population assignment. Does that reflect the change; that paragraph?

A Exactly.

Q The sentence that preliminary assimilation shows that our initial assignments gave congestion that is much worse on one or two parallel routes than the other; population assignments are adjusted to reflect drivers preference for a less congested route?

A That is correct.

Q So if your analysis doesn't show sufficiently expeditious evacuation, you reanalyze and move drivers to the more expeditious route, and therefore shorten the evacuation time?

A No. I look at it exactly the other way around.

If our estimates showed unreasonably expeditious times on routes, we would move the traffic from other routes to those routes to prevent showing unrealistically expeditious times.

Q Is there any other basis for that change?

A No.

Q One other, if you will. Just capsule, please, what further analysis did you perform? Was it simply a matter of -- well, you tell me what further analysis underlay the change that reflects this shifting of route preferences.

A We reaassigned traffic until there was more of a balance of the routes, until there was no disparity in adjacent routes that had equal access to a zone of origin of more than -- I would have to look into our data to see the exact number, but I think it is in the order of magnitude of an hour and a half difference or so.

In other words, one group would still tolerate having an hour and a half or so more congestion than an adjacent route, and it varies on a route by route basis, and you have to --

Q Did you make a route by route analysis?

A Oh, yes.

Q Thank you. Mr. Glover, we have been together on this subject for quite some time, and I don't mean to denigrate your familiarity and experience with these issues,

but let me ask, sir, do I understand correctly the import of your testimony is that you are offering expert opinion evidence on the proprietary of the existing emergency planning plume exposure pathway EPZ, and on the efficacy of extending it, as proposed in Contention 11?

A (Witness Glover) I would say that would be correct.

Q Why don't you, if you would, just briefly explain what the basis for your qualification to express an expert opinion? I don't mean to suggest that you don't have an opinion on the subject, but an expert opinion.

A I have been Duke's Emergency Response Coordinator since September of 1980 to study the rules and regulations that apply to the area. Have been a part of the planning that went on for Catawaba since its beginnings back several years ago. Been involved in meetings with the North and South Carolina county people to review the establishment of the EPZ, which I think is the question in this Contention.

Have been a part of every exercise that we have held, as well as planning and developing these exercises.

Q Do you find your qualifications primarily on your experience in that capacity?

A Experience in that capacity. My background as well in nuclear engineering, I believe, gives me some further technical competence in the ability to interpret the

regulations that have been established by the Commission.

Q Your technical training then, formal education, is in engineering?

A Nuclear engineering, yes, sir.

Q You don't hold yourself out as having formal education or training in planning?

A I have had a one week course at Harvard University on planning for nuclear emergencies last summer, which includes some very well rounded speakers in the area of emergency planning from FEMA, from the NRC, from Harvard University.

Q Let me ask you about that. Who sponsored that?

A Harvard University sponsored it.

Q Anybody else?

A No. They just brought in speakers from the various --

Q No sponsorship by the nuclear industry?

A No.

Q No sponsorship by Federal agency involved?

A No.

Q What was the name of the course, and who sponsored it?

A It was sponsored by the Harvard University Public Health Department. It was entitled, Planning for Nuclear Emergencies, and it was held, I believe in June of 1983.

In addition, I have gone to a number of workshops that have been held for emergency response coordinators of the various companies, of which we have discussed common problems in the industry of emergency planning. The aspects of alert notification. Aspects of planning for nuclear emergencies in the areas of public information, organization responsibility, emergency facilities, communications, and things of this sort.

Those are generally held in the fall of each year down in the Atlanta area.

End 3.

Q Sponsored by the Institute of Nuclear Power Operations?

A Yes, sponsored by the Institute of Nuclear Power Operations.

Q Do you have any formal academic training in emergency management?

A No.

Q How about in demography?

A I would say no.

Q If you have something that's close, you know, tell me, anything that's relevant.

Topography?

A Formal academic training in areas of topography, I would say no.

Q How about transportation planning?

A Just in having been involved with the state and local officials in planning each of our evacuation time estimate studies, I've been able to review the inputs to the models that are used to be able to plan the times that we rely upon as a basis for establishing whether evacuation-sheltering is an appropriate option.

Q Yuh, I understand that's the experience you've had. But what I'm focusing on is background, formal academic training?

A No.

Q And I think you said the same as far as planning is concerned?

A So far as emergency planning, I have -- other than my experience at the Harvard course and the INPO workshops, there is no formal emergency planning training at universities which I received.

Q How about planning generically, say, planning in the sense of urban planning; planning in political science; governmental relations -- anything such as that?

A I have an engineering background.

Q Okay.

MR. GUILD: Mr. Chairman, with that, we have no objection to Mr. Kalash's testimony as corrected, but we would reserve our right to explore the matter in more detail on cross.

With respect to Mr. Glover's testimony, we suggest that Mr. Glover's opinion evidence be excluded, stricken, if that's appropriate; focused primarily on his testimony at page 8, beginning on line 1, "In my opinion Charlotte should not be part of the Catawba plume EPZ."

We believe that it is inappropriate that Mr. Glover be offered as an expert in the technical sense of presenting expert opinion. I say that with regard to the man's obvious knowledge of the subject, but, frankly, I say it also with regard to the expectation that the Applicants, as they have

done in the past, will challenge the expertise of each and every witness regardless of qualifications offered by Intervenors on these subjects. They've done it every time. I expect that tney'll do it this time.

And we think that the principle that ought to apply here is the principle of parity; and that is, that a gentleman of Mr. Glover's experience should have his opinion considered in light of that experience, but also in the light of the absence of more traditional forms of academic background in the disciplines that are relevant.

And, by comparison, Intervenors witnesses who are offered to present similar opinion evidence should be held to no higher stnadard than the standard that's being supported by Applicants in their tendering of an expert witness.

So, more by way of an anticipatory expression of our view, and not to slight Mr. Glover in the abstract, we ask that his expression of expert opinion on the subject of EPZ configuration be excluded for lack of adequate qualification.

JUDGE MARGULIES: Mr. McGarry?

MR. MC GARRY: Your Honor, based on Mr. Glover's responses, I think it is clear he is qualified to present his opinion. The gentleman has been working in the emergency planning area on a daily basis since September 1980. He indicated that he worked closely with emergency planners at the

State and counties involved; he's expressed opinions to this Board in previous panels. I think he has displayed an intimate familiarity with the subject matter.

He is not relying on the fact that he has read treatises in some library. The man is emergency planning for Duke Power. And he should be entitled to give an expert opinion.

MR. GUILD: Mr. Chairman, I would ask the record reflect I am not asking Mr. Glover's opinion on nuclear power or what organization he is a member of that has a position of nuclear power, although that was a line of voir dire by the Applicants by our experts. I think the record shows the man has a partisan position on the subject.

But our view is there really ought to be parity in these matters among the parties.

MR. MC GARRY: In terms of parity, then, we will make the comment: there was an observation made that we opposed every single witness of Palmetto Alliance and moved to strike the testimony; and that's simply not correct. The record will bear us out on that.

(The Board conferring.)

JUDGE MARGULIES: The motion to strike the opinion testimony is denied.

You may continue with your examination.

MR. GUILD: Mr. Chairman, that completes

our voir dire; thank you.

MR. MC GARRY: Your Honor, we request at this time the document be received in evidence subject to any subseuqent motion to strike.

JUDGE MARGULIES: Any objection?

MR. GUILD: No.

JUDGE MARGULIES: It will be admitted as requested.

MR. MC GARRY: Thank you.

(The document referred to was marked Applicants' Exhibit EP-19 for identification, and was received in evidence.)

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MR. MC GARRY: The panel is available for cross-examination.

CROSS-EXAMINATION

BY MR. RILEY:

Q Mr. Edmonds, referring to your testimony on page 2, you state the 1980 census shows there are 93,483 people who were residents of the Catawba EPZ; is that accurate, sir?

A (Witness Edmonds) Yes.

Q And on that same page, there are 5,724 Mecklenburg residents in the EPZ?

A Right.

Q On page 3 you anticipate the EPZ population will be 104,700 -- that would be line 4?

A That's correct.

Q And on page 4, line 7, you give population density information for the interval of zero to 10 miles, zero being the Catawba plant; in 1980 you show a population density of 251; is that correct?

A That's correct.

A That's correct.

Q Now, moving on to page 5, lines 1 to 2, you discuss the population of southwest Charlotte; in the context of Contention 11 as revised by the Board, you put that population at 124,000; is that correct?

A That's correct.

Q What is the population density for that region?

A I don't believe I prepared that information in my testimony.

Q Do you know what the area of the region is?

A No, I don't know the exact area.

Q Mr. Glover, do you?

A (Witness Glover) Yes.

Q Could you provide it?

A It's around 77 square miles. I believe if you do the computation it's somewhere between 1,800 and 1,900 people per square mile, as an average.

Q That was 1,800 to 1,900?

A People per square mile.

Q Do you find that acceptable, Mr. Edmonds?

A (Witness Edmonds) Yes, I do.

Q We simply take 1,850, then, and divide it by 251, and we come up with a ratio of about 7.4 to 1, 7.4 or thereabouts is the high population density in southwest Charlotte as the rest of the EPZ out to ten miles?

A You're taking 1,850 as the area in southwest Charlotte --

Q No, I'm taking that as population density.

A Population density in southwest Charlotte; 251 is the population density in the rest of the 10 mile --

Q That's right.

A I would agree that that's a fair representation.

Q All right.

Do you have a forecast of what the population will be in the EPZ at the year 2020 -- page 4, line 9 -- I'm sorry -- page 4, line 7, that's within the 10 mile radius?

A That is correct, that represents the 10-mile radius, and not the EPZ.

Q Now, you do have a figure for the EPZ, itself in 2020?

A No, I don't.

Q Would you be able to give us a number which would let us ratio it?

A The methodology that was used here to project out to 2020 could be run through again. I couldn't do it in a short time frame, but I could do it, I think, for you and provide it later.

Q Well, perhaps we could do it now. The ratio, referring to line 7 of the 2020-80 population, the 1980 population?

A Would you repeat that question?

Q Would you use the same ratio for the 1980 population of the EPZ, bring it up to 2020, as you used in line 7 for the zero to 10 mile radius population?

A We can do that.

Q All right.

Would you agree that that is a 20 percent increase?

A That's approximately 20 percent; right.

Q Well, that, then, would bring the population for the EPZ up to 112,076, or thereabouts; does that seem reasonable?

A Let me get that straight: you are referring to the population of the EPZ with an increase over what time period, now?

Q A 40-year period. The base of this is the 93,483 people at line 21 on page 2, which you said is correct; and increasing it by the same ratio as used in the table on page 4?

A Okay.

Q All right.

Now, what number, what ratio would you use for the increase in the southwest Charlotte population to the year 2020? Would you expect also a 20 percent gain there?

A I would think it would be a little bit higher than that. We're talking about a metropolitan area, but I don't have an exact figure for what that might be.

Q All right.

Well, let me say a little bit higher; could you give us a number that you would find acceptable, credible?

A Somewhere between 1 and 1½ percent I would think,

per year, would probably be representative.

Historic projections of recent growth trends are in this area.

Q And accumulated over a 40-year period, what would that be?

A If you used 1 percent, roughly that would be 40 percent -- of course, that's not compounded; but for the purposes of this I think we could assume 40 percent, assuming a 1 percent per year growth.

Q And if we used the 1½ figure --

A About 60 percent.

Q -- it would come out at 60 percent.

A Yes.

Q And that's not compounded, either?

A That's correct.

Q So would it seem reasonable to you, without compounding, to increase that 124,000 by 60 percent?

A I would say somewhere between 40 and 60 percent; I wouldn't want to go with the higher figure necessarily.

Q Well, the higher figure gives us 246,000, a quarter of a million; does that sound correct?

A I think the questions you're asking probably aren't in a logical sequence, because we're talking about a declining area here; and I can't imagine that growth rate is going to be continuous at that rate forever. I think we are

are way on the high side.

Q Would you like, then, to say what you think would be a fair number to you?

A I think I would probably stick with the 1 percent per year and increase this number by 40 percent.

Q That figure was 173,600?

A Yes.

Q Now in the analyses that were made in respect to the traffic movement and so forth, have you used population figures which would correspond roughly to that period of presumed final use of the Catawba plant?

A No.

Q Would you expect that building more roadways and drawing more people that the evacuation times would change?

A It's possible they would change.

Q And it is not your testimony that the evacuation times that you give are for the lifetime, the operating lifetime, of the plant; but, rather, for a situation that is temporary, is that right?

A That is correct.

Q Mr. Edmonds, on page 5 you note that the enrollment of schools in the present EPZ is approximately 25,310; is that correct?

A (Witness Edmonds) That is correct.

Q What is the school population in southwest

Charlotte? -- the best you can give me?

A I don't have that number.

Q Would you be able to provide us with that number?

A I think we probably could.

We could give you an estimate of what that would be, probably.

Q Mr. Broome, would you happen to know?

A (Witness Broome) Not without looking at some data. I can give you that.

Q Well, what was your estimate?

A You want the schools including the three schools currently inside what is the EPZ boundary?

Q Well, I just want it in the area considered in Contention 11.

A Both public and private?

Q Yes? Schools, children in all cases?

A I would estimate among public and private excluding the three schools to be about 25,000.

Q Mr. Edmonds, would it be convenient for you some time during the break to see what your information sources would give in response to the same question?

A (Witness Edmonds) I'd be glad to do that.

Q Thank you.

On page 6 you were asked: What is the 1980 population and density from 5 to 30 miles in the north through

east sectors; and your response is: These numbers are shown in a table titled "Catawba Nuclear Station 1980 Population and Population Density, 5-30 miles, North through East Sectors,", attached to Duke's letter to the Board dated August 25, '83.

Would you please read those for the record?

A I would be glad to distribute that table, I have it with me.

Q Thank you.

(Applicant's counsel distributing documents to Board and parties.)

A Do you still want me to read them?

Q No, I have them now; thank you.

Referring now to this table, the NNE Sector by the year 2020 -- and we could probably with more relevance talk about the year 2025 as we anticipate the initial commercial operation of the plant in 1985 -- would it be correct to say it would be true of a fixed line -- in other words, could the interval 5 to 10 miles -- that there would be some correction factors to be applied there for the year, say, 2020; and would you indicate what that factor would be?

A You are talking about a population increase?

Q Right.

Well, let me give you a little more background here: you pointed out the urban rate of growth in this table

would be higher than your rates of growth rate?

A Yes.

Q Do you find it acceptable to make the 10 mile radius the boundary transition point between rural and urban?

A In this particular sector area, north through east, I think that probably would be correct for that particular sector or area around the Catawba plant.

Q Right, as you qualified it.

Now, what factor do you believe would apply, then, for a full 20 years of growth in the interval of 5 to 10 miles?

A I would think, since I say 1 percent for the area of southwest Charlotte, I would say something less than that 1 percent; maybe .7, .8, something like that.

Q In other words, a 28 percent increase to a 32 percent increase?

A Yes.

Q And going back to the region of 10 miles to 30 the rest of the areas could have a 40 to 60 percent increase?

A I think that would be okay.

Again, in my opinion it would be on the low side of that range.

Q Yes. But 40 is definitely a part of your reference?

A That's true.

Q Now, again, as I've been saying before, is it your

understanding that the farthest distance of the Charlotte City limit to the Catawba plant is 25 miles?

A I believe it's in that range; yes.

Q Well, you are pretty sure?

A I would agree.

Q So 25 to 30 might be a rural region?

A I think probably the population would start to drop off there; that's correct.

Q And could we go back to 28 to 32 percent for a rate of growth there?

A I would agree with that.

Q All right.

MR. CARR: Excuse me, could you move that light from my eyes.

JUDGE MARGULIES: Now you have it in our eyes now.

(Pause)

MR. GUILD: Mr. Chairman, we would ask that the document the witness has been reading from be identified as Intervenors Emergency Plan Exhibit 43 and be received in evidence.

JUDGE MARGULIES: Any objection?

MR. MC GARRY: No, sir.

JUDGE MARGULIES: It will be so marked and received.

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(The document referred to was marked Intervenors EP Exhibit No. 43 for identification, and was received in evidence.)

BY MR. RILEY:

Q Mr. Edmonds, turning now to page 7 there's a question: Are there any nuclear plants either operating or under construction which have permanent population concentrations similar to or greater than Catawba from 10 to 20 miles from the plant?

Your response is, yes.

And in response to the question: What are some of them? -- you list, I believe, 17 plants in addition to Catawba; right?

A (Witness Edmonds) Correct.

Q And the populations in the 10 to 20 mile range go from a minimum of 95,716 to a maximum of 419,223 at Davis Besse?

A That's correct.

Q You also identify the sector of the plant

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Q You also identify the sector of the plant in regard to position to the plant. And Catawba, for example, is northeast of the plant, and similarly for the other plants; is that correct?

A (Witness Edmonds) That's correct.

Q Now, are you familiar with NUREG 2239?

A Does it have another name?

Q Yes, it does. It's "Technical Guidance for Siting Criteria Development." If you like, I would be glad to show it to you.

A Yes, just to make sure. I think I'm familiar with it.

MR. JOHNSON: It's NUREG CR2239.

WITNESS EDMONDS: Yes, I'm familiar with that.

BY MR. RILEY: (Continuing)

Q Now, would you take a look at Table -- I would like to show you Table A.4-1 in this report.

MR. CARR: What page is that?

MR. RILEY: Perhaps the witness can --

WITNESS EDMONDS: Page A-21, the table is identified as Table A, as in Alpha, 4-1.

BY MR. RILEY: (Continuing)

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Q Does this table give the incidence of wind direction for the sectors that we have been discussing on Page 7?

A (Witness looking at document.) I believe that it does. I refer you to Mr. Casper, who is our meteorological expert witness. And I think you may want to ask him these questions. But if they have to do with populations, I will try to answer your questions.

Q Well, I would like to stick with you awhile, because you said you had familiarity with that table.

A No, I said I had familiarity with --

Q With the report.

A With the report, correct.

Q Then, if you will, please pass it to Mr. Casper.

Mr. Casper, Catawba is on the first page of the Table. Is the incidence of wind from the northeast sector in relation to the Catawba plant point two zero seven?

A (Witness Casper) Towards the northeast sector, it is, yes.

Q And is the incidence at random chance, point zero six two five?

A That is correct.

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Q And this question I will have to throw up to whoever on the panel feels qualified to respond.

Is not the product of wind incidence and population an indication of potential exposure level to a release occurring in a chance fashion?

A That could be considered as an indication, yes. One of many, I guess.

Q All right. The purpose of this Table, Mr. Edmonds, I will ask, is to indicate that the risk level for Catawba is not especially high in comparison to these other sixteen plants; is that correct?

A (Witness Edmonds) The purpose, if I could answer with my own words, the purpose of the Table is to compare the population in this ten to twenty mile sector around operating plants, or plants under construction, with the same population numbers around Catawba.

Q Would you agree that if the wind always -- always, a hypothesis -- blew away from that sector, that no matter how large the population, the risk would be zero?

A That's a rather absurd assumption, but I would agree with it.

Q It's an extreme hypothesis, but you would have

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to agree?

A Yes.

Q So is it, in your judgment, a reasonable thing to relate the number of the population to the incidence of the wind in that direction?

A As Mr. Casper already answered, I think that's one way of relating those numbers.

Q All right. Now, I don't know if you have a calculator handy, and I don't know whether the tribunal would care for us to go through the wind incidence for each of these plants as taken from Table A.4-1, so I will ask you to accept, subject to check, that the product of wind incidence at population is twenty-nine thousand zero seven four for Catawba?

And that the second highest is twenty-three thousand seven hundred and seventy-one for Indian Point. That the third highest is eighteen thousand six hundred and forty-seven for Limerick. That the fourth highest is eighteen thousand one hundred and ninety-nine for Waterford.

And that for Davis-Besse which has the largest population, the rank is fifth, with seventeen thousand one hundred and eighty-eight.

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A What you are doing is taking the population number and simply multiplying it by the frequency of winds in that direction.

Q That's correct.

A And coming up with a factor. I would agree that those numbers look reasonable. I would also point out that in the report referring to, the people who prepared the report and have done that very same thing in a slightly different manner, and I think Mr. Casper could probably shed some light on that.

Q We will be moving on to that.

A All right. It certainly makes the answers, the ranking of these, come out differently, so that's why I pointed it out.

Q That's right. But Catawba is Number One when we do it in the manner just described.

Do you agree with that?

A In the manner that you did it, I would agree with that.

Q Would I be correct in assuming that you have made a quick check on the appearance of the math, and you agree that it appears to be correct?

A I would like to check the wind frequencies, or have Mr. Casper check the wind frequencies. It looks correct in the case of Catawba, so I assume your methodology is okay. But I'm not sure of the frequencies in these other cases.

Q But that's a reasonable demur, and perhaps at the break you would have the opportunity to check that. If you would like, I could read the incidences that were used in making these calculations.

A If we could do that real quickly, I think we could check it.

Q All right. Quad Cities is point zero four two. Turkey Point, point zero six two. Salem, point zero six seven.

JUDGE MARGULIES: Why don't you just give him the one you gave him the figures for, Mr. Riley?

MR. RILEY: I would be glad to do that.

BY MR. RILEY: (Continuing)

Q Indian Point, it's point one three five. For Davis Besse, it's point zero four one. For Limerick, it's point one five zero. For Waterford, it's point zero seven seven.

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A Okay.

Q Moving on to Page 8, you give us your opinion that Charlotte should not be a part of the Catawba plume EPZ. Excuse me, this is Mr. Glover's testimony.

And you say the reason is twofold. You refer to statements in NUREG 0396 and NUREG 0654 which seem to address the very issue here in this case.

What is your understanding of the very issue, Mr. Glover?

A (Witness Glover) Well, the very issue here is whether or not there should be planning in southwest Charlotte as opposed to the use of the existing plans within southwest Charlotte and whether or not in the contemplations that NRC and EPA went through in developing 0396, whether they established in that document that the type of plans that are already established in Charlotte are adequate for a decision as to whether or not the zone should remain at ten miles or go further.

Q And in your dealing with officials in other towns in this vicinity, did you meet any people from Rock Hill?

A Yes.

Q Does Rock Hill have an emergency plan?

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A Yes.

Q Is it an emergency plan that is independent in its existence from the requirements for NRC planning?

A No. Rock Hill is included entirely within the plume exposure EPZ for Catawba.

Q Yes. But I'm saying, does Rock Hill have an emergency plan that was freestanding with respect to the Catawba plant?

In other words, the All Hazards Plan for Charlotte, as referred to, and that plan would have its existence whether or not the Catawba plant were located where it is; is that correct?

A Well, the South Carolina plan for --

Q Excuse me. I asked about the Charlotte All Hazards Plan.

A Maybe you could rephrase your question. I seem to be lost at what you are looking for.

Q All right. Just answer the question. Would Charlotte have an All Hazards Plan regardless of there being a Catawba plant in your opinion?

A Yes.

Q Does Rock Hill, or would Rock Hill, have such a

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plan regardless of the existence of the Catawba plant?

A It does not have an All Hazards Plan at this time. I believe that would be up to the concerns of the local political structure in Rock Hill as to whether or not they felt that there was a need for that type of plan or not.

Q Well, when you say All Hazards Plan, that's highly specific. Does it have emergency plans?

A Does the City of Rock Hill have emergency plans?

Q Yes.

A The City of Rock Hill, as being a part of York County, has emergency plans for all hazards in that if you review the York County Emergency Operations Plan it gives detail response to all types of emergencies, including chemicals, hazardous materials, fires, natural events, things of this sort, as well as any nuclear-related emergencies that are detailed in Annex Q of that plan.

Q What is the greatest distance between the Catawba plant and the Rock Hill City Limits?

A Thirteen point one miles.

Q And what is the greatest extent of the EPZ? Is it not thirteen point eight miles?

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A No. That, I think as we discussed in the earlier parts of the hearings, was moved back into the Rock Hill City limits.

Q It would not be thirteen point one miles?

A That's correct.

Q Why do you not find it reasonable to argue in the Rock Hill case that the EPZ did not have to go beyond ten miles, seeing that there are emergency plans in York County which could tie in with the EPZ plan?

A Well, it's mainly because of the location of the city in relationship to the plant. If you remember, the map that we had in the last hearing the City of Rock Hill begins at about, oh, maybe five to seven miles from Catawba, in that range. And a major portion of the City is within the ten mile radial area.

And so that we would not split a city as a part of it being within the zone and a part of it being outside of the zone. Primarily, using a ten mile radial circle we extended it, or State and local people extended it, and we concurred in that extension to include the entire city.

Q When you say "we" it's just that you participated in the process?

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A Yes.

Q In other words, you made inputs with respect to designating where the EPZ would lie?

A No. I said I believe in my earlier deposition when we talked about this, I said that the EPZ was established by State and local officials, and that Duke Power Company took a retrospective view of the process, in that after the EPZ was developed they came to Duke and they said: This is the EPZ that we have come up with. Do you have any input to that?

And we did have some input. And I believe I spoke to those in my testimony.

Q Is it your testimony that you had no input on the drawing of either the North Carolina or the EPZ in the first draft?

A That's correct.

Q Did any other Duke employee have input in that respect?

A No.

Q Were revisions made of the EPZ as a result of Duke input?

A Yes, there were.

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Q Would you mind telling us what they were?

A In my testimony in another contention, I believe I addressed that Fishing Creek which is along the southwest portion, as the southwest boudary of the EPZ in one area, was recommended by Duke as a part of the EPZ boundary, to give a better definition of what initially had been establishe there.

There was one other. I can't recall right off-hand.

Q What problem would you see in having a ten mile radius run through the City of Rock Hill?

Wouldn't it reduce the number of potential evacuees?

A Certainly it would reduce the number of potential evacuees, but the problem I would see with that would be in trying to define for area residents who is included and who is not. To say that the EPZ runs down Black Street at the intersection with College Street and over to South Street and go on that type of a measure is fairly difficult, plus the approach that we have taken, you can say that all of the city residents of Rock Hill are included in Zone C-2 and as a result should take whatever protective action

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is appropriate for that zone.

Q Would it have saved you some siren costs if the radius of ten miles had been used throughout?

A Yes.

Q Now, you indicate that your opinion is related to matters addressed in NUREG 0396?

A That's correct.

Q Do you know the date of NUREG 0396?

A (Witness looking through documents.)

MR. JOHNSON: Let the record show that it's an official document, it says December 1978.

WITNESS GLOVER: Yes, I would agree with that.

JUDGE MARGULIES: Thank you.

WITNESS GLOVER: It's listed on the front cover.

BY MR. RILEY: (Continuing)

Q Do you have that document in front of you, Mr. Glover?

A Yes, I do.

Q Is it correct that on Page 13 there is a discussion of emergency planning, population, environmental conditions, plant conditions?

A Yes.

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Q And on Page 15 there is a discussion of the size of the emergency planning zone?

A Yes.

Q And on Pages i-6 and 7, there is a discussion of class line accidents?

A Yes.

Q And also on Page i-9, a discussion of accidents and the paragraph, as discussed in Appendix 3 the Task Force has concluded that both the design basis accidents and less severe core melt accidents should be considered when selecting a basis for planning predetermined protective actions and that -- I emphasize this -- certain features of more severe core melt accidents should be considered in planning to ensure that some capability exits to reduce the consequences of even the most severe accidents.

Is that correct?

A That's correct.

Q Now, do you have a date on -- first, you are using the revision of NUREG 0654?

A Yes. Revision 1.

Q Will you give us the date on NUREG 0654?

A It indicates published in November of 1980.

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Q All right. Now, do you also have a copy of the final environmental statement for the Catawba plant, NUREG 0921?

A I do not.

MR. RILEY: Would counsel like for me to make it available to the witness?

end #5

JOE flws

Q Will you please refer to Table 5-11. It is page 580 is the DES.

MR. McGARRY: What table is it?

MR. RILEY: 5-11. Titled Summary of Environmental Impacts or Probabilities.

MR. McGARRY: Table 5 11.

MR. RILEY: Table 5.11 I think is the same thing.

MR. McGARRY: Summary of Environmental Impacts Proability?

MR. RILEY: That is the one.

MR. McGARRY: Let me check the FES and see if it is the same one.

MR. RIELY: Let the record show there is a comparison of the DES and the FES and the relevant part of the two are the same.

BY MR. RILEY: (Continuing)

Q Do you have the table there, Mr. Glover?

A Yes.

Q The lowest line Table deals with persons exposed over 200 rem. It lists forty-four thousand, is that correct?

A Yes. I might say, Mr. Riley, I was not a part of the development of this to really understand the background of how these numbers were derived, but that number does appear in Table 5.11 of this document.

Q For whatever it may be worth, that number is present. Just to the right of it, there are persons exposed to over thirty-five rem, that is two hundred and seventy thousand, is that correct?

A That is the maximum number shown in that column, yes.

Q Right. Now, is it your knowledge as a nuclear engineer, to say that that projected consequence is related to a severe core melt accident?

A Yes.

Q Now, would you move on to Table 5.12, immediately following, which is called Summary of Early Fatalities and Probabilities.

Do you have that?

A Yes.

Q Is it not true that the bottom line, the worse case, early fatalities for evacuation of EPZ reads nineteen thousand?

A Yes.

Q And in the column just to the right of it, headed Early Fatalities for Evacuation of EPZ, and Relocation, at ten to twenty five miles, reads four hundred and seventy?

A Yes, that is correct.

Q That is a reduction then of about eighteen thousand, five hundred, is that correct?

A Yes.

Q Let's move on now to the Appendix of the same report. Pages F.2 -- I am sorry -- Pages F.3 and F.4.

A Okay.

Q Is there not a discussion of post exposure medical treatment ranging from minimal through supportive, to heroic?

MR. Mc GARRY: Objection. The issue of the adequacy of medical facilities has been ruled out by the Board, and that was on September 29, 1983, page 5, and the basis for that ruling was to be consistent with Commission ruling in San Onofre's decision.

MR. RILEY: We are not dealing with the adequacy of medical facilities. We simply want to make it as a qualification to the number that we referred to, because going along to page F.4, it is indicated in the absence of supportive medical treatment, the number of fatilities would be twenty-four thousand for the scenario.

MR. GUILD: The position of this party is the ability to provide those medical services is contingent upon the adequacy of emergency planning in the extended EPZ in the Charlotte area. It does not talk about the issue of the adequacy of the adequacy of medical facilities, and does not contravene the guidance of San Onofre. We don't seek to litigate that issue. We simply seek to point out that

that ameliorative affect is dependent on the adequacy of emergency planning in Charlotte , and does have the effect of significant increase or decrease in the lives lost in the event of a serious accident.

JUDGE MARGULIES: The objection is overruled.

BY MR. RILEY: (Continuing)

Q All right. In referring then to page F.3, there is a distinction between levels of medical treatment and going on to page 4, does it not read as part of the sentence an increase from nineteen thousand to twenty-five thousand early fatalities under conditions of minimal medical treatment?

A I think maybe it might be best to read the entire version of those last two sentences. It says to gain perspective on this element of uncertainty, the Staff has also performed calculations using the most pessimistic dose mortality relationship, based upon minimal medical treatment and using identical assumptions regarding early evacuation as made in Section 5.9.4.5.(3).

This shows one hundred early fat lities at the one chance in one million per reactor year level, an increase from nineteen thousand to twenty-four thousand early fatalities , at the one chance in one hundred million per reactor year level. And an overall doubling of the annual risk of early fatalities. The major fraction of the

increased risk for early fatality in the absence of supportive medical treatment would occur within twenty miles, and virtually all would be contained within eighty five miles of the Catawba site.

MR. RILEY: Thank you. Mr. Chairman, have you in mind a morning break some time?

JUDGE MARGULIES: I think about eleven o'clock.

MR. RILEY: If I might have just a few moments.

JUDGE LARGULIES: Certainly.

BY MR. RILEY: (Continuing)

Q What is the date of that final environmental statement you just read from, Mr. Glover?

A January 1983.

Q Thank you.

Q Mr. Casper, I would like to turn to your testimony, page 11. And in lines 8 through 10, you talk about the use of meteorological data gathered at Catawba from the most representative time period. What do you mean by, 'most representative?'

A (Witness Casper) Well, we have sample meteorological data through time periods at the Catawba site. A one year period early in the '70s. 1970 through 1971, something like that, and then a later period after we had established our permanent meteorological sampling tower, which is the time period stated in my testimony, and it is my opinion

that the permanent site is a more representative sampling of the meteorological data over a thirty year period, if you will, plus the fact that it is over a two year period, where the earlier sample was only a one year period.

Therefore, it would be more representative in that respect also.

Q It is more extensive.

A More extensive.

Q Is there some testimony that has been presented or what was provided in discovery that would indicate that there was -- what shall we say, a more perfect frequency of sampling in this later period, or more representative?

A What are you asking?

Q I am asking if, in the other periods in which there is meteorological data, there were missed samples, or more missed samples?

A I don't know the answer to that question. It is possible.

Q Mr. Glover, are you in a position to --

A No.

Q Page 12, starting at line 2, and this of course is referred to you, Mr. Casper, -- the Piedmont area is generally know to have bimodal prevailing winds, that is prevailing wind directions from both the southwest and the northeast sectors.

Just so the record has it, will you define the term, 'bimodal?'

A When you look at the wind rows for the Catawba site, or for airport data in the Piedmont region, you will see that there are two prevailing wind directions, if you will.

Although there is one with a frequency a little bit greater than the other, if you look at the wind rows you can see that the wind is blowing from the northeast at about the same frequency as the winds blowing from the southwest throughout the year.

Q Is it a little lower from the northeast?

A Generally a little lower, yes.

Q Now, that would represent a difference in direction of approximately a hundred and eighty degrees?

A That is correct.

Q Well, if we go on to page 14, you are discussing changes in wind direction starting with line 1, the other case of sudden wind direction change is the passage of a frontal system, but in terms of the direction reversal of a plume, the direction change is moot.

Now, is it not your earlier testimony that there is a bimodal distribution of wind directions?

A Yes, there is a bimodal.

Q And when you exclude the case of within a reasonable

period, certainly within the time duration of a plume, that a wind reversal from southwest to northeast could occur?

A I don't see where that would occur over a short time period, no.

Q What do ycu mean by, 'a short time period?'

A Over a period of a few hours.

Q Are you familiar with scenarios in which releases take place over a period of days?

A Not intimately familiar with accident scenarios, no.

Q Are you aware that such accident scenarios do exist in which releases take place over a period of days?

A I can imagine that would happen, yes.

Q Would you confirm that, Mr. Glover?

A (Witness Glover) Yes.

Q Then, is it not compatible with your meteorological data that there would be times where a slow release occurred, there could be a reversal in the direction of plume movement?

A (Witness Casper) There could be a reversal in the plume movement from a source, but probably not a direct reversal of the plume itself. Not a one hundred and eighty degree reversal, at least until after it has been dispursed enough .

Q Let's consider an arbitrary particle A that has been released in an accident. The wind is blowing from

the southwest at five miles an hour.

This particle is not large enough to have settled out at the end of two hours, at which time it is at 10 miles in Charlotte city limits. Let's consider now a period of quiet air. Don't wind velocities usually drop around the time of sunset. Don't they go through a minimum velocity at that time?

A Yes, there is a minimum at that time.

Q And is it not common to have a wind reversal after that time. I have in mind my sailing experience.

A You can have a wind reversal due to sea breeze effect on water. Under general scanoptic conditions, no.

Q We have had this particle now three hours from the time of its release. We haven't let it settle yet. Aren't there some other conditions in which it would, at least in part, reverse its path?

A There are conditions where it would meander about a certain range. Maybe even possibly reverse itself. But I wouldn't see where that reversal would be very strong or very prominent.

Q Would not that particle be borne by the wind, whatever its direction would be, or put differently, is it not true that the particple has no independent locomotion?

A No, it does not.

Q And it will go in the direction the wind blows.

A That is correct.

Q And we can hypothesize then that if allowed a little more time that particle got out to fifteen miles, and it was over Charlotte, there could be a period in which the wind velocity was very low, and that there would be a wind shift which might carry it back more or less to its previous direction, or might carry it in another direction.

A Might carry it into another direction. I can't foresee a direct reversal unless there was a frontal passage of some sort, in which case you wouldn't probably have that situation.

Q Now, on page 15, you refer to a uniform wind direction. What did you mean?

A I think it is your term of random wind direction, which is the same.

Q Line 14, page 15, you are asked, What is the Urban Heat Island Effect? Will you briefly summarize for the record your testimony on that point?

A The urban areas, such as Charlotte, have a different structure to them in terms of more buildings, more obstacles, more surfaces that will heat better, reflect the sun's radiation, better than rural surfaces, such as grassy areas, forests, fields. During the day, solar radiation on a city, these buildings, parking lots and so forth, will collect this long wave radiation. They will

heat up, and as the sun goes down they will emit long wave radiation in terms of heat, and direct radiation, where in rural areas this heat would not be dissipated, and therefore, as a rural area will cool faster, an urban area will not, and therefore the incidences of, and the duration of,stable air conditions, inversions will not be as great as in rural areas.

Q Is it not true that a great deal of heat is given off in unit area of a rural -- of an urban area compared to a rural area. What I have in mind is that in summer is it not the additional heat from the air conditioning, and in the winter is it not the additional heat from residence and business heating?

A Yes, there is heat to that effect also.

Q And both of those heating effects will cause the density of the air to decrease compared to what it was at a lower temperature, is that correct?

A That is correct.

Q The result is that there would be an effective flue effect, and that will be a rising stream of air over the city, is that not correct?

A It would make the air rise, and therefore would be unstable also.

Q An extreme case of this would be a fire storm, which has been seen as a result of bombings and that sort

of thing, is that correct?

A In a very extreme case, yes.

Q When there is a rising column of air above a city, will not air be brought in from the periphery to avoid the pressure reduction which otherwise would occur?

A That is correct. There is a circulation cell that develops when air is brought in, and that air also rises with a column of air that is rising into the atmosphere.

Q So there is a constant influx of cooler air around the periphery which does become heated and joins this other rising column?

A For some time period, yes.

Q And this would become -- termed the convection phenomena?

A Yes.

Q All right. Will you agree, then, that the air that would be involved coming in, would be low level air and if there were materials released in an accident, that would be drawn in, as well?

A (Witness Casper) It would be drawn in.

Q Do you agree that the average rainfall for Charlotte is 42.72 inches?

If you'd like to make reference to the NOAA Climatic Data for the U. S. for 1982, I have it here.

A Yes.

(Document handed to witness panel.)

A What page am I supposed to be looking at?

Q I'm sorry, I can't give you a page; at the front there is a breakdown.

(Pause)

42.72 inches?

A It's not much in an order here.

42.72 inches; that is correct.

Q All right.

Now, on line 9 of your testimony I take it perhaps a correction is called for. Will you read the question and say whether or not a correction is called for?

A What page are you looking at, sir?

Q Page 16?

A Line 9?

Q Yes?

A Would you say that the Piedmont Region has an unusual amount of rainfall? I see nothing wrong with that.

Q "Piedmont has an usual" -- ?

A It should be "unusual."

Q All right.

Now, your response is: No, it is average for the southeastern United States, even below average.

Is that correct?

A Yes.

Q Subject to check would you agree that for the 246 Continental United States stations that are given in this NOAA Report, the average annual rainfall is 63.11 inches?

MR. CARR: A point of clarification, your Honor. It appears that the question referred to the Piedmont region, and the answer refers to the Southeastern United States.

Are the stations Mr. Riley referred to limited to the Piedmont region and Southeastern United States?

MR. GUILD: The question is clear, Mr. Chairman.

MR. CARR: It is not clear.

MR. GUILD: He said the 246 Continental U. S. stations and that is clear, as reflected in the document as a whole.

MR. CARR: Then I object to the question as being beyond the scope of the direct testimony.

JUDGE MARGULIES: Dr. Hooper would like to see a copy of the document.

(Document handed to Board.)

JUDGE HOOPER: I'd like to know the table you are talking about.

MR. GUILD: Page 80.

(Pause)

JUDGE HOOPER: Mr. Riley, I don't know if there's comparative climatic data for the U.S., and presumably page 89 is for the U. S., is that correct?

MR. RILEY: That's right.

JUDGE HOOPER: And what I am trying to get at, I can't understand this argument: this is the southeastern part of the U.S. you are going to in your examination; is that

MR. RILEY: The sense of this, Judge Hooper, the question was asked: Is Charlotte high in rainfall for the Piedmont?

And the answer: Not particularly, no.

But when we take a look at the context of the entire country --

JUDGE HOOPER: That's very true, I accept that in terms of the entire country. But this was not clear to me and not clear to the attorneys for the Applicants that you were talking about the entire U. S.

Isn't that correct?

MR. RILEY: Right. I had used the term "Continental United States" in my question, and in my question that was apparently overlooked.

BY MR. RILEY:

Q Now, if you will, let us go back to the question, Mr. Casper; you find that an average value of 33.11 inches or 246 Continental stations --

MR. CARR: Excuse me.

Your Honor, I have a pending objection to the question which is beyond the scope of the direct testimony; secondly, it is irrelevant to this contention and this proceeding, which deals with the Catawba plant, which is located in the Southeastern U.S. and Piedmont region.

MR. RILEY: Mr. Chairman, we have a phenomenon we call rain-out and if a plume is released in a region in which the probability of rain is very very low, we can count on a relatively slow rain; the worst accidents involve rain-out; and the incidence of rain in our consideration here is an important one with respect to the probability of getting high consequences in terms of fatalities.

MR. GUILD: Mr. Chairman, I would also point out that while I have questions about the issue of comparing Catawba with all plants in the country, it is a matter that was raised first by Applicants in respect to the number of tables that attempt to compare population data and

meteorology precisely all over the United States. Again, the principle of parity seems to offer some guidance and suggests we should be able to make a point of comparison on the same basis the Applicants do, and appropriately identify that it should be permissible to question the witness whether or not the Catawba site and Charlotte has an unusually high incidence of rainfall compared to the average for the Continental United States.

MR. CARR: Your Honor, that's a totally inappropriate comparison, and is the best example yet of ducks and geese.

The question of population around the plant is not region-dependent. The question of climatology or meteorology around the plant is region-dependent, and it is the limit of the direct testimony.

MR. GUILD: That is just not accurate. The Applicants use a table that identifies wind direction by sector and they use that in comparing tables for the nation as a whole, using Davis-Bessie and a number of facilities that aren't representative of the Southeastern United States.

JUDGE MARGULIES: I am going to sustain the objection.

MR. GUILD: Mr. Chairman, we would ask as an offer of proof that the data that is reflected -- we ask that the data in the identified report, pages -- beginning at 89 and

extending through page 94 of the previously identified report prepared as climatic data of the United States to 1982, a publication of the National Oceanic and Atmospheric Administration, which we would represent reflects the figure of an average annual rainfall of 33.21 inches for a list of 246 Continental United States stations, be received as an offer of proof in respect to the previous question.

JUDGE MARGULIES: Any objection?

MR. CARR: No objection, subject to check to determine that is really what it is; no.

MR. JOHNSON: No objection. Is the document to be supplied?

MR. GUILD: The document is a government document, it's available.

JUDGE MARGULIES: The offer is accepted.

MR. JOHNSON: Is it my understanding that he is not going to distribute the report or portions of it?

MR. GUILD: Mr. Chairman, the document is a government publication. Mr. Johnson, our public servant here, expects the Intervenors to distribute multiple copies of a generally available government publication to save him or his agency the time of looking it up for themselves.

I would object to doing that. He is more than welcome to examine the portions of the document we have identified. We asked that those be noted as an offer of proof.

JUDGE MARGULIES: I will not require the Intervenors to provide an individual copy of the document, it is available in the hearing room; you may consult it.

We will now take a 20 minute recess.

(Recess.)

JUDGE MARGULIES: Please come to order.

You may continue with your examination, Mr. Riley.

BY MR. RILEY:

Q Mr. Casper, going back to page 16 in response to the question, you reply it is average with regard to rainfall for the Southeastern U.S., even below average; is that correct?

A (Witness Casper) That is correct.

Q Would you say we could fairly conclude the Southeastern U.S. would include South Carolina?

A Yes.

Q Georgia?

A Yes.

Q Virginia?

A Yes.

Q Alabama?

A Yes.

Q Tennessee?

A I wouldn't call that a Piedmont region. That's getting towards the Midwest.

Q Your answer was for the Southeastern United States.

So in the context of your answer, is Tennessee in or out?

A It would be in; yes.

Q All right.

And subject to check, would you agree that based on the national weather record which Mr. Guild has just returned to you, that the average annual rainfall for Georgia is 48.67 inches?

A Yes. Subject to check.

JUDGE MARGULIES: Excuse me, Mr. Riley, if the people at your table could shift over a bit? Mr. Wilson isn't hear and that would make it easier for us.

(Pause)

Dr. Hooper will now be able to see Intervenor's counsel.

Thank you.

BY MR. RILEY:

Q Have you had a chance to look at the Georgia data?

A (Witness Casper) Yes.

Q Would you agree that 48.67 is reasonable?

A Yes.

Q South Carolina, 48.67?

A Yes.

Q North Carolina, 46.84?

A That sounds good.

Q Virginia, 41.14?

A Yes, that sounds reasonable.

Q Alabama, 55.21?

A Yes.

Q Tennessee, 49.16?

A Yes.

Q And the average of all those is 48.28; does that sound reasonable?

A Yes, that sounds reasonable.

Q Does it sound reasonable that 42.72, the Charlotte rainfall, is 88 percent of that average value of 48.28?

A Yes.

Q Now, the numbers that we just looked at -- do you still maintain on lines 14 - 16, "Therefore, since the Piedmont region is neither coastal nor mountain, the rainfall amounts tend to be minimum for the Southeastern United States."?

A Yes, I do.

Q Dr. Potter -- or is it Mr. Potter?

A (Witness Potter) Mr. Potter.

Q You testified in regard to the consequences of the exposure of individuals to hypothesized radioactive releases?

A That's right.

Q In your background have you done studies in

mathematical probabilities?

A I have taken courses in probability.

Q Is the sort of mathematical reasoning that leads to what the probability of coin falls would be heads or tails a probabilistic type of discpline matter?

A Yes.

Q And the likelihood of drawing a certain hand, say, a straight flush, is that again a probability type thing?

A Yes.

Q And in doing probabilistic studies of this sort would it be fair to say that we have a well defined postulational system of which -- it enables us to draw rationally defensive conclusions?

A Yes.

Q Are there not other meanings of the word "probability" in the context in which I just used it?

A That's a fairly broad context, I would say, and includes it all.

Q What of actuarial probability, where the average life of a certain male and life expectancy, a certain likelihood of being involved in an auto accident; is that another type of probability?

A I would not consider that a different type of probability.

Q Well, is it based on an aggregate of postulations? -- like the equal likelihood of a coin coming up heads or tails?

A Well, even the likelihood of coins coming up heads or tails depends upon an analysis of a physical model of a coin. We develop a physical model of the population and derive probability estimates based on observations.

Q Well a model with assumed symmetry with respect to characteristics responding to Catawba, is that correct?

A I don't think a model of a coin would assume symmetry, a priori.

Q To get a 50 percent chance of heads or tails we have to assume a symmetric disc, don't we?

A You develop a model of a system with two states.

Q When you talk about a system with two states can you date the language that you are using?

A Date it?

Q Yes?

In other words, that conceptual framework, I submit to you, arrived on the scene much after the mathematics of claimed probability were established?

A No, I think that conceptual framework was in position all along; it may not have been explicit.

Q As the actuarial number, be what it may, say, average age of American adult male, is that based on a model?

A It is based on a model constructed from observation of the population.

Q You would agree, then, it is based on empirical experience?

A Sure.

Q And it is subject to change when that experience changes?

A Yes.

Q And we could say it is also closely coupled to that experience?

A Yes.

Q And with respect to such statistics as mean height, weight, et cetera, we have a very substantial sampling base; is that so?

A We have sampling bases that range -- substantial is a value judgment; it would probably need to be applied to an individual -- to individual systems.

I would not say that we have what I would call substantial data bases of these types of things.

Q Would it be fair to say that there is a universe out there or there would be a mode of sampling that will provide us a fund of material?

A For some things, yes.

Q Some I've just been referring to?

A Yes.

I would agree.

Q Now, in the area of nuclear accidents do we have a similar large inverse to sample?

A It would be difficult to compare in a qualitative or quantitative sense the extent of substantial, or a measure of the adequacy of data bases for different types of systems.

I would judge the adequacy of the experiential data base used in probabilistic assessments for nuclear reactors to be sufficient to support the conclusions that are usually drawn from these types of things.

Q All right.

How many meltdowns have we had to date?

A In LWRs, we have not really had any.

Q All right.

In other words, there is no meltdown at TMI?

A I think it would be premature to call it a meltdown.

Q So it's in the term of, right now, not a proper data base; is that correct?

A One meltdown is not part of our data base right now, I think.

Q Right.

Then how can we conclude that a meltdown of considerable severity has a probability of occurring as the FES puts it, 1-in-10 to the minus -- sorry -- 1-in-10^8 reactor

years?

A That sounds like a low estimate. I would like to see that.

MR. MC GARR: 5-11, 5-12, FES Tables.

(Document handed to witness panel.)

WITNESS POTTER: Perhaps I misunderstood the question.

BY MR. RILEY:

Q Go to the left-hand column, Probability Impact Per Reactor Years, 5.11, also 5.12; 10^{-8}; that would mean one impact in 10^{8} years, is what I was questioning?

A (Witness Potter) I thought your question had to do with the probability of a core melt. I thought you were expressing the probability of the core melt accident, once in 10^{8} years.

Q All right.

This particular version is the core melt accident; what number would you use for a probability of core melt accident? And would you please qualify why you think it would be correct?

A This isn't really the -- let's see -- this is a number that pulls in the combined probability of a core melt accident, for one; another being the probability of a certain kind of -- or a certain combination or set of releases that might result from the core melt accident, that could be

severe enough to produce effects like this.

And then third, the probability of the existence of meteorological conditions that, in association with those releases could be part of the effects.

So we're really talking about a number of probabilities.

Now, does your question go specifically to one of those?

MR. RILEY: If Mr. McGarry would like to --

MR. MC GARRY: I was going to ask: what in the FES are you making reference to?

MR. RILEY: As I said before the probability of impact per reactor year.

MR. MC GARRY: What numbers?

MR. RILEY: Table 5.11, also Table 5.12.

BY MR. RILEY:

Q Going back to your response, Mr. Potter, you point out demography, meteorology, as well as release; and one of the, shall we say, major initiating factors would be a melt of the core, which would make these other things possible; your point is, we should accumulate multiplicatively the probability of these other events in combination in order to come up with a figure; is that correct?

A (Witness Potter) That's basically correct.

Q Now, somewhere there's a number -- would you care to

put a value to it -- for a core melt, like, 10^{-6}, or -- where would you put it?

A Well, a number of assessments have been performed for probability of core melt, which is analyzed typically at 10^{-4}, with a factor of 3 or 4.

Q That would give us what? 10^{7}.

A Say 10^{9}.

Q With a factor of 3 or 4. Okay.

Now, if we're talking about 10^{4} once in 2,500 to 40,000 years, is that right?

A Yuh, if you want to make the discussion simple, make it 1 in 10,000.

Q All right.

How many operating years of experience do we have in LWRs?

MR. MC GARRY: Your Honor, I will object to the question. DES Contention 1, which was not admitted by the Board in its December 1st, '82 Order at page 8, reads as follows:

The probability of severe accidents, radiation exposure and damage as in Figures 5.3, 5.4, et cetera, of the DES, the DES recognizes only one serious accident in the 400 years of reactor operation.

We believe Mr. Riley is going down this same road, the use of the DES and he is echoing precisely what is

set forth in this contention which was rejected by the Board.

So we maintain the line of questioning is objectionable in that it is irrelevant to the instant contention.

MR. RILEY: Mr. Chairman, the point of the questioning of the witness does discuss probability, and his whole set of conclusions involves probabilities and is expressed in the language of probabilities. And I am trying to find out what basis he has for using the probabilities that he comes up with.

MR. GUILD: And, Mr. Chairman, it is this party's view that if it is acceptable to the Applicants and Staff to offer what is purported to be expert testimony of the probability of events occurring as a basis for proposing extension of the EPZ to Charlotte, then it should be available to this party and Mr. Riley's organization to impeach that expert testimony in the cross-examination by judging the basis for probabilistic analysis.

MR. MC GARRY: May we confer with you, Mr. Riley?

(Pause)

After hearing your position, we withdraw the objection.

WITNESS POTTER: I think I recall the question. The question was: what is the experience base for LWRs?

I haven't analyzed that question specifically, but

I think there is a note in my report that talks about the experience of power reactors in the free world, some of which are not light water.

JUDGE LAZO: Is that on page 8, Mr. Potter. Attachment B?

WITNESS POTTER: Yes, that's it, on the bottom of page 8.

And that is approximately 1,600 reactor years, approximately.

BY MR. RILEY:

Q Those reactors, all of them, are not subject to NRC regulation? Is that correct?

A That is true.

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Q Would it not seem appropriate to restrict our considerations to the category of reactors with which we are dealing here?

A (Witness Potter) Not necessarily. I think in terms of plant behavior, the potential that leads to the accidents of the kind that we are talking here, that experience is worth something. It may not be appropriate to weight it exactly the same. But let's say something in the range of a thousand reactor years would be appropriate.

Q All right. Let's use a thousand reactor years, then. If we are then talking about the event that occurs in ten thousand reactor years, on the average you would agree it's on average that we are saying. Is that a considerable extrapolation involved coming to that number, based on one thousand years of experience?

A It's not a direct extrapolation, of course. It's based on the phenomenological analysis and it's based on statistical analysis of the performance of plant components.

But in any case, it is not what I would call a massive departure from the experiencial base.

MR. GUILD: Mr. Chairman, could the record

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reflect the witness' affirmative answer to the initial question? He nodded his head on the question of, it's an average probability.

JUDGE MARGULIES: Yes. The record will so reflect.

BY MR. RILEY: (Continuing)

Q When you talk about the approach used in arriving at this projected probability, we are now talking about a probability that depends on its value on an analytical operation of presumed related factors rather than on a sampling of experience; is that correct?

A Not entirely, because that analysis incorporates the performance of components systems plants that shows up in the experiencial data base of a thousand reactor years.

Q Though there is a phenomenological element in arriving at this, is there not also an analytical operation on that phenomenological basis to arrive at the number?

A There is an analysis, a phenomenological analysis.

Q And the correctness of that analysis depends upon the assumptions that enter into it, does it not?

A True.

8-3-SueT

Q At the time of WASH 1400 with which I assume you are familiar --

A Yes.

Q You are? It was assumed that a fault tree eight would provide a reliable result; is that not correct?

A I would agree with that conclusion.

Q And is it also not true that an underlying assumption of that analysis was that only one fault would occur, that we would not have a sequence of inadvertent or accidental occurrences; is that correct?

A No, I don't agree with that characterization. Furthermore, I think it would be most appropriate to not limit our conversation to fault trees but include event trees and methodologies as well.

But in answer to your last question, I would not agree that only single faults were considered.

Q Would you elaborate on that, please?

A Many of the most severe accidents or severe accident sequences that were analyzed in WASH 1400 were in fact multiple failures.

Q Were the other factors consequent events rather than initiating events?

#8-4-SueT

A In some cases they were. I'm not certain that in all cases they were.

Q I would expect, Mr. Potter, that you are familiar with Part 50, Appendix A of 10 CFR. Do you have a copy available of the 1983 edition?

A I don't.

Q Look at Page 447, the definition of single failure. Single failure means an occurrence which results in the loss of capability of component to perform its intended safety functions. Multiple failures resulting from single occurrence are considered to be a single failure.

Would you concur with that definition?

A As used in the regulatory process, that's correct. That has no bearing on how a probabilistic analysis would be performed.

Q And the WASH 1400 study, would the reference material be a correct description of the procedure used?

A I don't believe so.

Q Turning to Line 17 on Page 3 of your testimony, you are discussing the size of the plume exposure EPZ, and you say that it's based primarily on four considerations.

B reads: Projected doses from most core melt

#8-5-SueT1

sequences would not exceed protective action guide levels outside the zone.

Tell us what you had in mind by using the word "most" there?

MR. MC GARRY: May I just correct, Mr. Riley? Line 17 is a quote of 0654. Are you aware of that?

BY MR. RILEY: (Continuing)

Q Well, what is your understanding, then, of "most" in that context, Mr. Potter?

A More than fifty percent.

Q Well, in this context,what are the worst core melt sequences?

A You are referring to Item C there?

Q Yes.

A They are the accident, the core melt accident, sequences that lead to the highest doses.

Q But that does not tell us what the sequence is physically.

A Generally speaking, it is a sequence of events that involves core melt followed by containment failure early in the development of the accident, within a couple of hours. And release of a substantial fraction of the

#8-6-SueT1

inventory of radioactive material in the core, and dispersion under conditions that would tend to maximize the dosage resulting from those risks.

Q And your response would not involve situations which developed leading to the melting of the core?

A Leading to the core melt itself?

Q That's right.

A It would include that.

Q But your response did not include that?

A My response did not. It would start -- the accident would start with an initiating event proceeding to early melt, early containment failure, and so on.

Q Is it more than one initiating event for such a scenario?

A Yes.

Q How many initiating events do you recognize?

A It depends upon the plant. But there are many kinds of initiating events that could conceivably lead to this. Typically in terms of probability. A few of them are dominant.

Q Well, for Catawba BWR, how many do you contemplate?

#8-7-SueT1

A Probably, like WASH 1400 and other plants. You could probably identify a dozen or so, many initiating events that could conceivably lead to this with probably a few of them dominant in terms of probability.

Q And would it be true that some of those initiating events under a circumstance could be avoided by proper operation and go on to cause more serious consequences?

A The initiating event does not directly lead to the consequences that we are talking about. But only leads there depending upon the performance or the failure to perform of plant systems later on in the event.

Q In a sense you are agreeing with the question I put to you?

A Maybe I better have another listen at your question if I could.

Well, simply, that actions taken subsequent to the initiating event can determine whether or not it will conclude with core melt or some other lesser consequence?

A Oh, yes.

Q Now, further in Item C of the NUREG quote, reads: For worst core melt sequences immediate life threatening doses would generally not occur outside the zone.

#8-8-SueT

What is your understanding of the word "generally?"

Most was greater than fifty percent. Now, what about generally?

A Generally would be a small probability. It is not defined in neither NUREG 0654 or NUREG 0396. But something on the order of a ten percent chance or less.

Q Now, is that ten percent chance or less your particular reading of it, or does it represent some consensus of people with your types of expertise and responsibility?

A I did not really have to make a quantitative interpretation, because in my testimony I simply performed an analysis that produces an estimate of the probability and compare it to an analysis that was done for NUREG 0396, a similar analysis.

Q My question was, does your view of being perhaps as much as ten percent reflect a consensus amongst people with your types of expertise and occupation, or is it your own interpretation as far as you know?

A It's my own interpretation, and it's in general agreement with the results of NUREG 0396.

#8-9-SueT1

MR. RILEY: If I may have just a moment, sir?

JUDGE MARGULIES: Certainly.

(Pause.)

BY MR. RILEY: (Continuing)

Q You -- do you use a set of specific probabilities for various severe accidents which could result in core release?

A In my analysis, I do use such a set. Yes.

Q Could you tell us how you arrived at the specific numerical values?

A I -- my analysis is not based on discreet analysis of the individual accident sequences of event for the plant proper but rather on an analysis as based on probability for release categories. And if I could, I think it would be important to describe the distinction.

The situation is that a core melt release can lead to a wide variety of -- or core melt accident, can lead to a wide variety of releases which vary greatly in their characteristics. They range from the most severe which, as I discussed in the answer to an earlier question, is typically associated with a core melt that occurs soon after the initiating event followed by containment failures

#8-10-SueT

soon after that, and the consequent release of substantial fraction of the radioactive material inventory in the core. However, a core melt can also lead to less severe which would typically occur, may occur, because the core melt occurs later in the development of the accident.

The release itself typically occurs somewhat later in the development of the accident and it's characterized by smaller release magnitudes, and usually these release magnitudes are smaller because of the performance of containment systems such as sprays and coolers and so on.

These releases are not particularly important from the emergency planning standpoint beyond a few miles. And then in between those extremes we have a continuous spectrum, and the spectrum for purposes of analysis is divided into groups we call release categories.

WASH 1400 used this kind of discreetization of the spectrum, so to speak. Based on an analysis of the plant, probabilities are assigned to each release category. And they are calculated for each release --

Q Excuse me. You used the word "are assigned." If I interrupted at this point and asked you to define it at this point --

#8-11-SueT

A Define the assignment?

Q "Are assigned" is the phrase you used.

A Yes. I modified that to say calculated, they are calculated.

Q All right.

A The -- okay. So the probabilities for each of these release categories are calculated in the probabilistic risk assessment. These probabilities are really the sum of probabilities for a large number of kinds of different accidents that lead to similar releases, or a release similar to that that represents the category.

We started with WASH 1400 as a candidate for characterizing the release categories and the probabilities of release in our analysis for Catawba, but we did not immediately accept that characterization because WASH 1400 BWR model was Surry. And Surry has a large dry containment. Catawba differs from Surry in that it has an ice condensor containment.

And we recognized the possibility that that difference in design could affect the difference of release or the probabilities of different release categories, so to speak.

#8-12-SueT1

We did review other information available. A probabilistic risk assessment specific for Catawba has not been performed so we did not have that available to us. There was one probabilistic risk assessment performed for Sequoyah as part of the RSSMAP program -- that's R-S-S-M-A-P -- and we did make use of that to some extent. But there was a major problem with the RSSMAP study in that the results were misleading because they failed to account for hydrogen mitigation system.

The effect of this was that in the development of the accident sequences, the authors made conservative assumptions that hydrogen burn would fail containment early in the accident. 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. The hydrogen mitigation system, it was recognized by the authors of RSSMAP that had hydrogen not failed containment earlier that the result of the release would be a much less severe release than would occur some time later.

So, the RSSMAP was helpful even though it was deficient in that regard. It was helpful in helping us identify what the releases might be, assuming the hydrogen

#8-13-SueT1

mitigation system was defective. It also was helpful in establishing a reasonable estimate for core melt frequency.

And it turned out that that estimate was close to the result calculated in WASH 1400 for Surry. And the RSSMAP was also helpful in providing estimates of the frequencies for the most severe releases.

In these cases, the presence or absence of a hydrogen mitigation system is not a factor. These are typically containment bypasses. And the RSSMAP study found that there was an approximate equivalence between the ice condensor plant and Surry there.

end #8

Joe flw

So based on our observations of this, and also based on the review of analyses of containment performance for certain of these accident sequences, for which the hydrogen mitigation system would be important in this analysis, was performed or sponsored by Duke, and is referenced in my report.

It is the McGuire Study. I have the number. Reference No. 11. We took the RSSMAP release category frequencies and made an estimate of what they would be if small break loss of cooling accidents with containing systems operating were shifting from an early containment failure to a hydrogen -- to a later failure, and when we did that, we found that the resultant release category spectrum was virtually identical to that for WASH 1400 Surry Plant, and then since the NUREG 0396 was based on the WASH 1400 Surry plant, we simply adopted that for purposes of our study.

There are additional, more recent studies that indicate the release of spectrums somewhat less severe than WASH 1400, but those studies are not fully comprehensive, and we didn't rely upon those in this study.

Q What does, I believe, you were saying 'RSSMAP?'

A R-S-S-M-A-P. It stands for Reactor Safety Study Method Applications Program. And the RSSMAP Study itself is cited as a reference in my report. It is No. 9.

Q You indicated in the RSSMAP study for Sequoyah that containment failure is the consequence of a hydrogen burn, is that correct? And you --

JUDGE MARGULIES: Did you complete your question, Mr. Riley, or are you going to ask more than one question.

MR. RILEY: I was going to, but we can stop at that point.

WITNESS: We found that most accident sequences the way they modeled the performance of the containment, the containment did fail by hydrogen burn, and that was based upon an assumption of a hydrogen burn effectively all at once, and that assumption implicitly assumes no hydrogen mitigation system which would result in gradual burning of the hydrogen without generation of pressure sufficient to fail the containment.

BY MR. RILEY: (Continuing)

Q So, your assumption then is the hydrogen mitigation systems will operate effectively, and there will be no effective peak as a result of hydrogen burn, is that correct?

A We made the assumption that in small break LOCO sequences with containment systems operable, that the hydrogen mitigation system would be effective, that is correct.

Q Did you consider the case of loss of off-site and on-site power?

A In those cases, you would not have containment systems operable.

Q That is correct, and my question is: Did you consider it?

A Yes.

Q And you have a probability associated with that in terms of release?

A Those are effectively -- effectively adopted the RSSMAP probabilities for those sequences.

Q What did you use as the threshold pressure for containment failure?

A We didn't do specific containment analysis. I didn't do that. But the McGuire Study that I cited previously did involve an analysis, and I believe the pressure for that analysis was 72 psig. I think I will have to check that number.

Q Are you aware of the testimony by Staff in the McGuire proceeding in which it gave two Sigma limits at an average value of containment breach pressure?

A I am not familiar with that testimony.

Q The average value was 82 Sigma. It was 40, with a minimum value one chance in 19 of 40 Psi. Would that effect your conclusions?

A There was substantial margin, as I recall, between pressures generated and the failure pressure of 72 psig, but

I would have to go back and look at that.

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

So, effectively we have accommodated the small chance that the hydrogen system would not be effective.

Q So, if I understand what you have been telling me, to recapitulate, it would be something like this: You have considered a series of circumstances, and attribute to them various probabilities based on information and analysis, and accumulated some probability which could result in a serious release, as you earlier defined, is that correct?

A That is correct.

Q And that means then that no small part of arriving at your result required you to conceptualize the situation and make judgments on possible occurrences.

A Maybe I am not interpreting properly the conceptualization process that you discussing.

Q The model.

A I didn't do that myself, but I did review studies

in which that was done.

Q With respect to the worse release considered, what fractions of core inventory were involved during a nuclear release?

A Those were shown in Table 1 of my report in Appendix B.

Q I don't know whether you have it in front of you, but have you compared it to the releases assumed in the final environmental statement?

A I have looked at that at various times.

Q Do you have the related FES Table, Table 5.10 in front of you, as well as your own Table 1?

A Yes.

Q Now, with respect to Xenon-Krypton releases, the highest you show is a ninety percent, and the highest they show is a hundred, which is a relatively small difference, is that correct?

A Yes, particularly in view of the fact that for those releases, the noble gases Xenon and Krypton don't really contribute much to the dose in any case.

Q And you have seventy percent of iodine as the maximum, and FES has sixty-four.

A Yes.

Q And Cesium-Rubidium you have about half of what the FES shows as the worse case, is that right?

A Yes.

Q And Tellurium-Antimonies, for all intents the same.

A Yes.

Q And Barium-Strontium you show about half what the Staff shows, five percent versus ten?

A Yes.

Q You show ten times as much Ruthenium.

A That is correct.

Q And Lanthanum you show half as much?

A That is right.

Q Have you read the testimony of Jacques Reed given for the NRC Staff in weather related contention which occurred in earlier session of this proceeding?

A No, I have not.

Q He used -- his sample, actual plant meteorological conditions and found that there are some very bad conditions which relate to the high levels of early death and injuries which we have had as part of the earlier testimony today. For the sort of -- well, do you know the worse case meteorologically that was assumed by the Staff in making these estimates?

A Well, really what matters is the combination of meteorology and release.

Q It certainly does, but I was assuming a major

release.

Now, the question is: What meteorology really was used? Do you know what the staff used?

A I don't know what the staff used; I know what I used.

Q Could you tell us what you used?

A Yes. We used the one year data base, meteorological data collected from the Catawba site, and it is discussed in my report, page 7.

Q Page 7?

A Yes.

Q Using worse case meteorology, and this I assume would involve wind from southwest because the topography would be appropriate for the large consequences of that direction. How far from plant site did you estimate a lethal dose would be received, and what assumptions did you make of that context?

A That is not a part of my analysis. The purpose of the analysis was to compare the results of a site specific analysis, Catawba specific analysis, if you will, to the results of a generic analysis in REG 396 to the extent that bear upon the contention.

Q And in your Table 3, you discuss probabilities of getting doses to the whole body and thyroid of one five, two hundred rem respectively, at distances of ten, twelve

and sixteen miles?

A That is right.

Q And would I be correct in saying that from this information you cannot say, as a physical possibility, as opposed to a probability, the greatest distance for the conditions we have been discussing, worse release, least favorable meteorology, at which early deaths would occur?

A No, I cannot extract that information from these papers.

Q And you do not have that information; you did not develop it yourself?

A If I did, it was in the form of intermediate output that I didn't analyze.

Q And you do not have this available to you now for the record.

A No, I do not.

Q The same would be true of early illnesses.

A That is true.

Q At what threshold rem dosage would you put forth for the development of early illnesses?

A That is not a part of my testimony. My testimony was limited to the analysis of dose.

Q All right. Why did you choose the whole body dose at 200 rem in Table 3?

A The information in NUREG 0396, which forms the

analytical basis for the selection of ten miles as an EPZ, included curves for those doses; 200 rem is about the dose above which the probability of fatality from acute radiation syndrome become significant.

Q It would be fair, at looking at Table 3, in thinking of the 40 year life of a two unit plan, to increase all these probabilities by a factor of eighty, or for the total situation, more or less a factor of a hundred?

A The probability then expressed would not be per reactor year.

Q It would be for the whole operation. That would be correct then.

A I think that would be a reasonable approximation.

Q Right. And that probability is very dependent on the proposition that the probability six times ten to the minus fifth of this event occuring, is that correct?

A Based on the core melt probability?

Q Yes.

A Yes, that is correct.

Q And if we eliminated the core melt probability term -- It would be correct to say that the numbers that you show on Table 3 are quite sensitive to the value that you use for core melt probability.

A They would be directly proportionate.

Q Directly proportionate. And if the core melt

probability were actually a thousand times larger, we could subtract a three from all of the exponents shown on the Table. In other words, it is N-6, you have a minus three and so forth.

A I would not agree with the premise, but I think it is correct.

Q That is what I was asking about.

Now, going back to page 4 of your testimony, you used the probabilistic approach in NUREG 0396, and your result was estimates of the probabilities -- estimates, is that correct?

A That's right.

Q Going to line 21, you say, Available data indicate the Catawba core melt spectrum would be less severe than that calculated for the Reactor Safety Study; -- I thought your testimony earlier was there were fairly good comparisons for Catawba?

A That was when I compared modified risk results to the Reactor Safety Study, there was fairly good agreement.

But there is no information that suggests the Reactor Safety Study results for releases from Catawba and other plants -- that release spectrum would be much less than assumed in the Reactor Safety Study.

However, we do not rely upon that information.

Q How does the Catawba source term compare with the Surrey source term?

A Could you --

Q 650 day operation.

A I need a little better definition of the term source term? You mean the core at Catawba?

Q Yes?

A Quite comparable.

Q Are they both 1150?

A They're both -- within about 10 percent.

Q Now, on page 5, line 19, you discuss results of Tables 2 and 3 and describe that as being "absolute" probabilities.

Would you elaborate on your meaning of the word "absolute" in this context?

A My testimony and the report discuss two kinds of probabilities, absolute and conditional; conditional probabilities being dependent upon the occurrence of some or the existence of some condition, for example, the probability of core melt, the probability of a given core melt. Absolute means no conditions.

Q But in the common parlence your use of the word "absolute" has a technical meaning rather than a common meaning?

A I am not -- I used --

Q It's a term of art, then?

A I am not familiar with the common parlence application.

Q Well, I'd say the vast majority of the members of the public agree that this is the 23rd of May; the general public agrees as an absolute?

A I didn't mean to use the term in the sense of

of an absolute meaning precise to within a very narrow range.

Q That is helpful; thank you.

Now, on page 7, line 13, the word "generally" is used again for the worst case core melt sequences, immediate life threatening doses would generally not occur outside the Catawba plume EPZ.

Do you have the same meaning for the word as you did before, within 10 percent?

A As I said before, I didn't really quantify the term "generally," but I simply prepared the numbers I got with the numbers in NUREG 0306. In the evaluation in NUREG 0396 result, the authors of the Commission report used the term "generally" in the application if the numbers were the same, or very close.

I simply adopted their definition of the term.

Q In other words, you bought in their conclusions?

A Yes.

Q And if their decision used the word "generally," it would also apply to your conclusion?

A This is true.

Q Does it strike you as a little unusual that in the probabilistic study that such an amorphous word as "generally" comes up regarding conclusions?

A No.

Q Would you elaborate?

A It is very difficult to express in words the results of probabilistic risk assessments without using terms like "generally". The very idea is that there is variation in dose consequences, variations in number of health effects; and when one attempts to characterize these results with words, one is reduced to using words like "generally".

But that's the way we tried to do it, and also to present the quantitative result; so you can see the distribution.

Q Your report, Table 3, for example, there you discuss probabilities in relation to certain parameters; was it a deliberate choice on your part that you did not use the same sort of expression the Staff did in the FES at Tables 5.11 and 5.12, where people exposed to different levels are numerically iterated, and early fatalities are mentioned?

A Well, in the sense that the analysis I performed was intended to basically replicate NUREG 0396 analyses; and those NUREG 0396 analyses did not include these, I guess you could say it was a conscious choice to select the measures of impact that we did.

Q All right.

Now, you are aware 0396 goes back to 1978?

A Yes.

Q And you are aware that the FES was published in 1983?

A Yes.

Q Did you have access to the FES when you did the work?

A Yes, I reviewed it.

Q All right; thank you.

Mr. Broome, were you a part of the study of emergency planning boundary for Charlotte-Mecklenburg, the Catawba plant?

A (Wintess Broome) Yes.

Q Would you tell us, please, the considerations you had in mind in arriving at the EPZ, and also whether the present EPZ represents a revision of the first selection?

A The considerations that I used in my selection for the boundary was well recognized growth, natural geographic type boundaries, and also local jurisdictional boundaries.

To my knowledge, the boundary has not been changed.

Q Did anyone participate with you in this selection of the boundary?

A Yes.

Q Who?

A I worked with Duke Power on it; I worked with the people who would be responding to the situation.

Q When you say that, you mean city and county, or just county officials?

A Both.

Q Both.

How long ago was that selection made?

A I don't know exactly.

Q Approximately?

A When we looked first at the requirement as set forth by regulation, that's when we addressed it.

Q You were familiar then, of course, with NUREG 0396?

A I am more familiar with 0654.

Q 0654.

And the phrase "about 10 miles"?

A That is correct.

Q Did the Director of the Emergency Management Office participate in this?

A He did, but he turned the majority of the work over to me.

Q You say he was not a decisional factor in the present selection of the boundary?

A He was the Director of that Department; he was a decisional factor; yes.

My work passed before him for review; his comment was made.

Q He approved it?

A Yes.

Q Without modification or comment?

A He approved it as I developed it.

Q As you developed it.

JUDGE MARGULIES: Mr. Riley, we can recess for lunch at any time that would be appropriate to your examination.

MR. RILEY: Just a little bit more, please?

BY MR. RILEY:

Q Now, page 1 of your testimony, I would ask if you discussed with Duke Power officials the possibility of identifying alternate EPZ boundaries in the study of Charlotte? When was that?

A I would say it was probably about a year ago. I'm not sure of the exact date.

Q To your knowledge was it a result of Contention 11?

A I talked to Duke Power about this; they didn't indicate the reason behind it. We looked at determining different EPZ boundaries, alternatives, and what was already in place.

Q Mr. Glover, what are your recollections about that? Was this in response to Contention 11?

A (Witness Glover) Yes.

Q Did you contact Mr. Broome in this connection?

A Yes, I did.

We looked at this in the aspect of, if there were the need to establish a boundary in Charlotte, for instance, at a distance of about 12 or 13 miles, what roads could be used

as a boundary in that area; that's what we looked at.

Q Your testimony, Mr. Broome, is there are no written records of this; is that correct?

A (Witness Broome) No, we just looked at a map.

Q But there was no correspondence exchanged, there was no report of the results?

Would I be correct in saying that you and Mr. Glover got together, looked at it and discussed it, and concluded there was no need for a change?

A No, you would be incorrect to say that.

Q Good. Tell me?

A We looked at it to redefine, if we had to go out to a more definable area, where that definable area would be.

And that's the extent of the discussion.

A (Witness Glover) We were looking at the aspect of changing the boundary; we were saying: if there came up the need to expand the zone, say, to this 12 - 13 mile point, we looked at the aspect of: where would we move it?

Q What would you have anticipated as generating the need to so do?

A Just the aspect of the contention, itself; if there was some need to sit down and say, well, if by chance this contention does get approved by the Board, what would be a design that would be in that distance of 12 to 13 miles that we could sit down and between us, as local planners, Duke

Power planners, consider for Catawba.

Q In an affidavit you filed last November or December, which included, I believe, 5 maps, and a study of what the siren requirements would be for the drafted contention, you are sure it corresponded closely to the contention; is that correct?

A Yes.

Q Did you at any point discuss with Mr. Broome that particular EPZ boundary?

A No.

Q Okay.

MR. REILLY: This is where I would like to recess.

JUDGE MARGULIES: We will recess for lunch until two o'clock.

(Whereupon, at 12:50 p.m., the hearing was recessed, to reconvene at 2:00 p.m., this same day at the same place.)

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Suefls

#11-1-Sue

(Whereupon, the hearing was resumed after the luncheon recess at 2:01 p.m., this same day.)

JUDGE MARGULIES: Back on the record. You may continue.

MR. RILEY: Judge Margulies, I think we have about an hour and a half left. Is that correct?

JUDGE MARGULIES: You have one hour and forty-five minutes.

MR. RILEY: Thank you, sir.

Whereupon,

THOMAS E. POTTER,

WALTER M. KULASH,

ROBERT F. EDMONDS, JR.,

MARK A. CASPER,

R. MICHAEL GLOVER,

-and-

LEWIS WAYNE BROOME

resumed the stand as witnesses on behalf of Duke Power Company and, having previously been duly sworn, were examined and further testified as follows:

CROSS EXAMINATION

BY MR. RILEY:

#11-2-SueT

Q Mr. Broome, on Page 2 of your testimony on this same subject of how the EPZ was set up, starting at about Line 3 you testify you would consider that to be adequate especialliy in view of the NRC investigation which preceded the decision to set the EPZ radius at about ten miles.

You refer to a general investigation there, or that a Catawba site specific investigation?

A (Witness Broome) I would refer to the documents that are footnoted in 0654 and 0654 itself with reference to determining ten miles to be an adequate distance for planning around a nuclear facility.

Q Right. So it was not site specific?

A No, it was not.

Q Now, is this ten mile radius a reflection of your own judgment, or are you accepting the judgment in the NRC documents?

A From the position I'm in, I have to accept the judgment of the regulations.

Q All right. At the bottom of Page 2, you are asked this question: Assuming that the EPZ is not expanded, if a situation arose where there was some possible need to

#11-3-Sue

take protective action with respect to people in southwest Charlotte, do you have any existing mechanism for doing that.

And as part of your reply, you say: There is enough flexibility built into both the All Hazards Plan and the basic emergency plan for the Catawba Nuclear Station and the supporting documents that will be developed out of this office so that you can take the concept of operation that applies for a ten mile EPZ and expand to eleven miles, twelve miles, fifteen miles.

Now, my question is that if you do expand it to, say, fifteen miles how would you go about alerting that area which would have maybe eighty thousand or so people in it?

A You would rely on the resources, utilizing the resources of the emergency response departments of city and county government.

Q Would you please walk us through any specifics of how people would be alerted? In other words, would it be mobile sirens? If so, how many?

What decibel levels? Just how would these people know unless they tuned into the EBS?

#11-4-SueT

A Well, there are several methods that could be developed with regard to tuning into the EBS. Mr. Glover indicated in recent testimony that sixty percent, I think, of the people at any one time, with the exception of a range of hours, early in the morning or late at night, would be listening to the radio or television. The emergency broadcasting system would be used.

We have a police helicopter with a PA system available to us that would also be used.

We have approximately one hundred sixty blue and white police cars that could be utilized by travelling the routes.

We have one hundred and eleven volunteer department sirens and PA systems that could be utilized. We have approximately twenty units out of the medical community that could be utilized.

We have sixty --

Q Now --

A We have sixty-two fire department vehicles that could be utilized. We have eighty-three county vehicles that could be utilized. Thirty-nine units from the Sheriff's Department, I think, would be utilized.

#11-5-SueT

And then there is other organizations with three or four units each.

Q These are all basically -- they would send a siren signal so the people, presumably a fair proportion, would hear the sirens; is that correct?

A Yes.

Q Now we have all become familiar with the brochure that is circulating in the EPZ.

A That is correct.

Q And that brochure informs the recipient to turn on the EBS on hearing the siren. For the people between ten and fifteen miles who we are considering here, how would they know that siren means that they should turn on the EBS?

A If you are speaking of a vehicle siren, I indicated that the vehicle also has a PA system on it, and a message would be broadcast. All you would have to do is to get the attention of the people with the siren, make the announcement with the PA system and go from there.

Q Is it true that not all siren-containing vehicles are PA systems?

A That is incorrect. All of them do.

#11-6-SueT1

Q All of them do?

A Yes.

Q Including the helicopter?

A Yes. The helicopter does not have a siren, to my knowledge. But I know it has a PA system.

Q Okay. You have heard the testimony with respect to how many decibels loss you have between the outdoors and the interior of the house, depending on time and construction, when the windows were opened and closed?

A No, I have not heard that.

Q That was Dr. Bassiouni's testimony?

A I did not hear that.

Q I see. Well, he said depending on construction, it went down three to nine debibels for a house; that depending upon what was taking place in the house, you could have almost as high as one hundred ten decibels just by the t.v. being on; that there is no guarantee that under those circumstances that a siren would be heard by the resident of the house.

If you would accept that subject to verification, I would ask you, wouldn't that apply in this situation to the public address system announcements?

#11-7-SueT

A I will respond to that, Mr. Riley, in this method. I think also in reference to testimony that I did hear, Bob Phillips, who was the Director in Gaston County, indicated that regulations require a mobile siren to be heard at a distance of one thousand feet.

Q But he did not say whether it was heard inside a house with the television on, or whether it was heard outside?

A Well, that's true, but one thousand feet, I don't think you will find any home or any residence more than a thousand feet from a major road that would be travelled in the area that we are speaking of.

Q Are we to construe that as saying that you feel that the emergency force that you have just described would achieve one hundred percent notification of people inside and out, out to a fifteen mile radius?

A If that was the objective, one hundred percent, yes, I think it could be achieved.

Q Now, would this PA system announcement on a moving vehicle or helicopter be able to advise people on whether or not they should shelter, and if they were to evacuate where they should go?

1-8-SueT

A It could be one of several different messages. All your would have to do is to simplify the message, make it short, which could be to stay in your homes, to seek shelter, to turn on the radio and television. It could be any number of things.

Q And what about the matter of advising how to locate your child who might be in school at the time, and the matter of relocating parents and children, regrouping them?

A Well, if you are looking at it in that manner: (a) if school is in session, the children are going to be in school, and they will take the necessary protective action at school as opposed to trying to get home; (b) if they were at home, they would follow the instructions of the parents.

Q Yes. But the question was, if they are in school and will certainly be taken care of in school, what provisions would there be for reuniting parents and children?

I believe you were present during the testimony of the Red Cross. The Red Cross had a major role in this. It was going to have a registration at each shelter, that

#11-9-SueT

it was going to take the names of children registered and parents registered, not necessarily the same children, and bring the two together.

What provision is there here?

A There is no provision, because the plans -- the regulations currently don't require it.

Q But you are saying that you could quickly put in place a flexible All Hazards Plan which would, I assume, achieve the objectives of emergency planning?

A Yes.

Q But you also say that you are not committed to certain requirements there, because you are not part of the regular EPZ plan?

A I just responded to that. I think that answers itself.

Q Now, you already referred to people being tuned in to the EBS via television or radio. I am sure you will agree that there are times of day that people are not listening to an electronic device of that sort?

A We could assume that, yes.

Q Like, for instance, the time that people, by and large, are sleeping; right?

#11-10-Sue

A (Witness Broome nodded in the affirmative.)

Q And that means that when we refer to the situation that is conditioned upon a person being awake and listening to a radio or television, we are not covering the total time in the life of that person; right?

A I'm not sure I understand your question, Mr. Riley. Would you rephrase it or repeat it?

Q I'm saying that we live twenty-four hours a day, and the number of hours that we listen to radio or television are appreciably less than twenty-four. So, there are going to be blank spots with respect to receiving electronic communications; is that correct?

A Yes, if we define electronic communications as radio and television.

Q Which I did. Now, it's my understanding that you have used the All Hazards Plan before?

A That's correct.

Q And it had to do with the Baxter-Harris chemical fire?

A That's correct.

Q About three thousand people were involved in that, I suppose in the sense that they were moved from

#11-11-Sue

their homes?

A That's correct.

Q How well did the plan work?

A Overall it worked very well.

Q Did you observe any clinches or faults in it?

A Yes.

Q And, if so, what were they?

A There was a minor problem associated with the shelter activation. That has since been resolved.

Q Could you tell us what the problem was and how it was resolved?

MR. MC GARRY: Excuse me. I believe the word was shelter activation. Is that correct?

WITNESS BROOME: Yes. It would appear a lag time between staff, shelter staff, arriving at the designated location as opposed to the shelter population arriving there first.

That system has since been corrected through utilization of a simplification of the procedure.

BY MR. RILEY: (Continuing)

Q Now, do I recall correctly that notification is basically door-to-door in that circumstance, in that

#11-12-Sue

situation?

A Basically, yes.

Q How long did the door-to-door notification take?

A I'm not sure of the exact time, Mr. Riley. There was several different evacuations not -- it did not all occur at once.

Q This was due to wind shifts?

A Due to wind shift, yes.

Q Now, you found the forces adequate for dealing with this particular emergency situation? You didn't find it deficient in the number of police, fire or other emergency workers?

A We had more than sufficient resources to cover.

Q All right. Now, you heard earlier today some of the numbers that in the extreme case could be involved in a nuclear accident, and those numbers run as high as two hundred and seventy thousand.

Now, that's necessarily all of the City of Charlotte, but the City of Charlotte is the most populace place. In that extreme case which represents one hundred

#11-13
SueT

times more people than the three thousand involved in the Baxter-Harris, would your forces still be adequate to cope?

A Yes.

Q Now, would you say something that would convince me?

MR. CARR: Excuse me. Let me just ask for a point of clarification. For two hundred seventy thousand I don't recall whether that number specifically came up or not, but are you referring to numbers that were projected out?

MR. RILEY: That's Table 5.1-1 in the FES.

MR. CARR: Mr. Riley, aren't we speaking here of the segment which is under consideration in this contention, and I believe the population there is somewhat less than half the number you just threw out?

And if that's the case, then I object. Let's address the numbers in this segment that we are actually talking about.

MR. RILEY: I will be very happy to do that. Let's make that number a hundred and thirty to fifty thousand, and that's based on the temporary population

#11-14-ST

established as forty percent or more, which Mr. Edmonds indicated would be appropriate by year 2020.

MR. CARR: A hundred twenty-four thousand?

MR. RILEY: Times one point four to one point six.

WITNESS BROOME: I'm lost.

BY MR. RILEY: (Continuing)

Q May I try to define the thing so that it will be more understandable, then?

MR. CARR: Perhaps since I seem to have gotten things confused, perhaps I can clarify it.

I have no problem if we base the number in the question on the part of Mr. Edmonds' testimony that gives one hundred twenty-four thousand as the population of southwest Charlotte, which is what we are talking about based on the 1980 census, because that's the number and Mr. Broome is aware of the resources available today to handle that number.

If we are going to project the population out to 2020 by a factor of one point four, or one point five, then I think we have to assume that Mr. Broome is going to be able to project his resources out to the year 2020,

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because that is not going to remain static either. Roads will change, numbers of policemen, firemen and emergency facilities will change. So, I have no objection to the question per se, but let's make sure we are balancing both sides of the equation.

MR. RILEY: I have no problem with Mr. Carr's evaluation. Let's deal with the number a hundred and twenty-four thousand.

WITNESS BROOME: 1980?

end #11 Joe flws

Q Your answer still is -- please persuade me that that isn't the case.

A As an emergency planner, Mr. Riley, you don't necessarily look at everything differently with regard to implementing a procedural plan. There are concepts in emergency planning that are basically, regardless of the situation, are numbers that you are dealing with. Those concepts are alert notification, getting the people informed about what is going on, and there is a million ways to do that.

Transporting those people who do not have transportation. We did that. We know we can do it. We have experienced it. And sheltering people. And feeding people. There are four basic things that you look at. It doesn't matter. If you have the resources it doesn't matter what situation you are dealing with. It could be a nuclear war. The concept stays the same, and that is true whether you are dealing with a nuclear power plant, a chemical fire, or you are talking about Charlotte, North Carolina, or Portland, Oregon, or Honolulu, Hawaii. The concept stays the same, and with the resources that I have identified, I feel confident that we can do it.

Q Well, page 4, you say something very similar to what was just testified. Basic concept is to ensure -- this is on line 5 - the maximum extent possible the protection

of the public, correct?

A That is correct.

Q That is that you think the All-Hazard Plan is a very good plan.

A I think it is adequate for its intended purpose, and I also testified earlier that any plan that is adequate automatically has room for improvement. The best plan has never been written.

Q Do you think that the All-Hazards Plan is a better plan with various elements that you pointed out in it than the present plan for the EPZ?

A Do I think it is better than the plan that we have identified for the area inside the EPZ?

Q That is right.

A No, I do not.

Q Then how can you say it will ensure them to the maximum extent possible, the protection of the public, if you don't think it is as good a plan?

A I didn't say that. I said the concept. I said the concept is to ensure to the maximum extent possible the safety of the people. I didn't say the plan.

Q Okay. Thank you for the distinction. In other words, you are saying the concept is one thing, but the actuality is different?

A I would not say the actuality is different. I

would say the implementation is different.

Q Is there a Mecklenburg All-Hazards Plan as well as a Charlotte Plan?

A Yes.

Q Could you relate the two plans; how they are similar, and how they are different. Not in great detail, but give us a little feel for it.

A You could probably take the name off of the Charlotte Plan, and insert Mecklenburg, and you would have an identical plan. There is basically no difference.

Q Okay, thank you. Now, still in this discussion of relating the All-Hazards Plan to a nuclear emergency at Shoreham, you say in response to this question, when you say expand on it, do you mean expand on it if the occasion arises, or expand on it through advance planning? Your answer is, I think if the situation were to arise, if regulations dictated it, or if the request from the City mandated it, you could expend -- it could be any number of things.

Now, you regard that answer as responsive to the question?

A You are speaking here of the All-Hazards Plan is that correct?

Q That is right.

A I am saying you could expand on it or you could

improve it. Improvement has already been identified in one area.

You could expand on it by the implementation or the development of more definitive procedures that would be more specific with regard to responsibility.

Q If an accident were to occur there, and lets postulate it today, are there areas in which the implementation would be less than adequate?

A No, not in my opinion.

Q Then, can you explain to me how the Plan could be improved on?

A I have already done that.

Q Then, -- well, I am having a little trouble understanding your response. If the Plan is adequate today, then what is the point of discussions involving improving it?

A If you have something adequate, and you want to make it good, don't you improve it. If I have an All-Hazards Plan --

Q I just wanted to clarify that I didn't use the word, 'inadequate.' I said if you have an adequate plan.

A And I indicated that I thought it was.

Q Right, and I am saying how can you improve on if it is good enough already.

A And I indicated that you could develop specific

procedures outlining specific details with regard to responsibility and function that would improve the situation.

Q Well, I suppose a practical question with sort of a philosophical sound, which is, in effect, how can you improve the unimproveable?

A I didn't say it was unimproveable. You said it was adequate. I said an adequate plan implies room for improvement.

Q I see your distinction now. I find a little difficulty relating that to ensuring the maximum extent possible protection of the public.

A I can clarify that if I might.

Q Let me just go on a bit more to help simplify it. I am saying that if the criterion of adequacy is that it does everything that needs to be done, what more is there to do? What improvement can be made?

A Refining what is in place.

Q All right. Now, can you give us some examples to indicate what refining what is in place means?

A Yes. I can be very specific in that regard. In the All-Hazards Plan there is a list of shelters. Some of the shelters that are listed in the All-Hazards Plan are elementary schools. Elementary schools in the Charlotte-Mecklenburg system do not have adequate shower facilities. I would remove those shelters from that list.

Does that --

Q That is specific. Thank you. What it amounts to, then, is that you can deal better with an evacuee once that person had moved from wherever he or she might be, in terms of showering and decontamination, but you would not improve on your method of getting people away from the hazard scene. Is that essentially correct?

A If I implemented all the resources that I have identified, I don't think there is room for improvement.

Q And yet you said a little bit earlier that you would not be able to say that the All-Hazards Plan was better than what is presently within the EPZ, without relating to the fact that the EPZ has more specific provisions for such things as decontamination?

A My testimony reflects the specificity in the Catawba Plan.

Q Would you kindly just answer the question.

A Repeat it, please.

Q You said before that you would not substitute the All-Hazard Plan for the present EPZ plan. We have established from your testimony that if All-Hazards Plan could evacuate everyone who needed to be evacuated, there would be no improvement in this area.

A I didn't say that.

Q Beg your pardon. I thought you did.

A You said the plan was adequate. I said an adequate plan implies room for improvement. I did not say that areas of improvement would not address the alert notification procedure.

Q Okay. The example you gave had to do with Charlotte.

A That is correct.

Q And what I asked was, was one of the differences in which the EPZ plan was superior to the All-Hazards Plan be in better provisions for decontamination, which involves showering?

A Yes, I would agree with you there.

Q In the alert notification procedure you have in mind, assuming that you are notified that it was desirable to alert people up to fifteen miles, is there in place a plan of what streets would be covered by which vehicles?

A It is not required.

Q Would it be essential to the smooth working of an operation to -- before the event, have an agreement or instruction as to roles of the various participants in the emergency?

A Not necessarily.

A (Witness Glover) Just one quick point on that. I think the testimony at the bottom of page 5, in lines 24 through 26· page 6, lines 1 through 4, give a little bit

more on that aspect of assigning emergency vehicles to specific routes.

Q Yes. You state there there would be some minor logistic problems until there is some coordination, and we could identify who was going to be doing what in the EOC environment. Have you some ideas of how long that would take?

A I would say it would be relatively short, and I say short, with a definition of probably less than thirty minutes, because you have got the leadership and controlling force of the resources already in place in the EOC.

Q In response to the question how do you determine what areas should be alerted in an emergency, at the top of page 7, taking a fragment of the sentence -- I am sorry, taking the whole sentence -- the function of law enforcements, that is, warning and notifying the public was carried out in such a manner that it didn't cause any undue concern on the part of the population in there.

Now, what I wondered was what the definition of 'undue concern' was, and how you determined that there was no undue concern caused?

A Undue concern would probably parallel to some extent panic. That was not present there. How do I know? Because I got direct feedback from the law enforcement people who were actually carrying out the process.

Q Do you think that people generally or universally would equate undue concern with panic behavior?

A No. I think if they were not concerned about it, the situation, a person who is leaving an area, undue concern would be to get out as quickly as you can, but don't kill yourself in the process. Panic would be more or less get out any way you can. Your own health and safety with regard to possible accidents. In the process of getting out of an area might be secondary to what you might think as primary, and that is to get into a safe environment.

Q You have earlier testified as to the number of emergency vehicles in a number of classes that would be available.

A Yes.

Q Do you know how many emergency vehicles and personnel were involved in the Baxter Harris situation which you describe on page 8?

A No. And I think as an emergency management planning person, I coordinate and manage resources of people and parks. That being the case, I dictated or indicated, and the law enforcement carried out their responsibility as outlined in the All-Hazards Plan.

Therefore, when they called me that the situation was resolved, I went to the leadership of the police department. He verified it, and therefore accepted their

conclusion.

Q All right. Recognizing that, there was an opoortunity to get some empirical evidence, some actual experience here in terms of how many vehicles or persons were involved in handling actual situations where three thousand people were involved, but it is your testimony that you did not find out the number of vehicles or persons involved in that particular event.

A Well, do you want to look at alert notification, or do you want to look at the entire --

Q Alert notification comes first.

A The only way that I can address that is that the in place shift resources available at the time carried it out without calling in any additional resources.

Q All right. It is also your testimony that in an accident, there might be as many as sixty thousand or a hundred thousand people involved, is that correct?

A What page are you referring to?

Q I am referring to page 3, line 7.

A That is correct.

Q That would be somewhere between twenty and thirty times as many people as there were involved in the Harris fire?

A That is correct.

Q Would it not be helpful if we knew how many vehicles

and persons would have the job there, to see if twenty times that many vehicles and persons would be involved in a larger incident?

A No, it would not, not when you look at the total resource capability that you have.

Q I feel more comfortable, Mr. Broome, with actual numbers.

A I am a planner, Mr. Riley. I probably know better than you.

Q I won't dispute that. But I am simply saying that in order to be precise, to me, I would think you could get some numbers.

A I indicated you are dealing with a concept, and it does not matter concerning the numbers. If you have the concept in place, you have basic procedures in place, and you have the total capability with regard to resources in place. You can deal with the situation.

And it does not matter if you have the resources for a hundred thousand people, and you have some basic concepts and procedures in place, then it doesn't matter.

Q Page 9, you are asked would that include, and this is the matter of moving people, Mr. Broome, would that include persons who could be moved from hospitals? Then you say hospital population might or might or might not be moved. What is the hospital population between

city limit and the two --

A There is only one hospital in that area, and that is Charlotte Memorial.

Q And that has how many beds?

A I think in the neighborhood of about 750 to 800 beds.

Q Do you have any idea how long it would take to evacuate the hospital?

A I sure do. Four to five hours under perfect conditions, nine to ten hours under adverse conditions.

Q That was 4 to 5. That is under perfect conditions. And what number of ambulances does that assume?

A That assumes everything that we have available. In addition to the MLS Plan, which is a mutual link support plan with the eight surrounding counties.

Q All right. If you throw all those resources that you are evacuating for a hospital, those resources would not be simultaneously available in other spots?

A No ambulance is committed to another responsibility.

Q Well, are there other ambulances available?

A Yes.

Q Can you tell us about them.

A North Mecklenburg Ambulance Service, which is

independent. You have rescue squads that are associated with voluntary fire department, and those vehicles and rescue squads are not committed to any other thing. They are available. People that would ride in them are trained. In addition, you have all the resources of the EMS region, and I don't know the total resource capabilities, but it is eight counties, and it includes all the rescue squads and ambulance services of all eight counties.

End 13

Q Did you use the EMS, Emergency Medical Service?

A That's correct.

Q And did you say you did not know the number of vehicles involved in that eight counties?

A Mechlenburg County; I do not know the ones offhand for the other counties. That is identified in the plan.

Q You indicated a separate group of ambulances was in effect committed to taking people out of Memorial; could you tell us how many ambulances were there?

A I did not state that, Mr. Riley. I said all available ambulances would be used to evacuate.

Q All right.

Now, then, I have a sense that the reasoning of the 4 to 5 hour optimum evaucation; what is the number of ambulances available, and the time for an ambulance trip or a required roundtrip; that would raise a question, also, of where these patients could be taken, what hospitals were committed to receive them?

A I think I can solve the whole problem by answering your question in this manner:

I did not pull those numbers out of the hat.

The Director, Emergency Medical Department for the Memorial Hospital and Medical Center provided that information to me; and it is based on his knowledge of the community.

I indicated I was in emergency management, and a planner. He is the expert. He told me this. I have absolutely no reason to question his judgment.

Q Did he discuss with you where these patients would be housed after they left Memorial?

A That would be a decision that the medical people would make. I am not a doctor, Mr. Riley.

Q The question was: did he tell you?

A No. And I did not ask.

Q Later on in the same page 10. lines 17 to 19, I appreciate your explaining the definition here in the sense that you would be looking at specific resources there, as opposed to general resources; what is the difference between the two?

A A specific resource is an ambulance, and a general one is anything that would carry people.

Q On page 11 the question at line 18 is: Are there any other special facilities in that area that you care to mention?

And your answer is: Well, there are numerous day care centers.

Can you tell us about the day care center number and population?

A Yes, I can.

Q Would you, please?

A The number of day care centers with 5 or less children is 16; the number of day care centers with 6 or more children is 43.

Q I beg pardon?

A 43.

Q And you state you know there are schools, both private and public; can you obtain some information on the normal enrollments of those schools in toto?

A Yuh, I gave you an estimate earlier of between 20,000 and 25,000. I'll stick to that estimate.

Q You'll stick to that estimate. Okay.

A (Witness Edmonds) Mr. Riley, I would like to add now as to that number, I have no disagreement with the 25,000 number.

Q Thank you, Mr. Edmonds.

You go on to mention the hospitals and rest homes; do you have a population and a number for the rest homes?

A (Witness Broome) I am presently collecting that data on rest homes.

Q On page 13 of your testimony you are asked if you are familiar with any other evacuations in other cities where you might have had to move some comparable numbers of people; 60,000 to 100,000 people? Is that right, I gather?

A I was thinking more in terms -- yes; that would be correct.

Q And your answer: "Well, yes, there was an incident that occurred a year and a half or two years ago in Missasaugus County, which is right outside of Toronto, Canada. They evacuated nearly a quarter of a million people in about 12 hours. There were no disabling automobile accidents and there were no serious injuries on the part of the evacuation people, and they got out of the area. I think it speaks well for the people, and I think it negates the panic factor."

Have you personal knowledge of that evacuation in the sense of, have you talked to anyone who was, like yourself, an official involved?

A No, I have not; it was a report.

Q Do you know of the changing nature of the accident as it develops?

A That's my understanding of the accident, as I interpret the document, is that it was done in a stayed environment with the majority of the evacuation taking place in the early period of the accident.

Q Is it your knowledge that there was no hazard from ground levels during the early stage of the accident because the fire was so vigorous that it carried the fumes to a high altitude?

A I understood the total involvement of the accident scene, there was chlorine there; and with chlorine you've got a

potentially deadly problem.

Q We talked about the effect of a large fire on air movement a little bit earlier in our discussion with Mr. Casper; if you've got a big fire, you're going to suck up chlorine or anything else that's around, I understand?

A Based on the area the accident covered, that might not be necessarily so in regards to this Canadian situation.

Q Do you know of the ethnic make-up of the people in Missasaugus County, what it is -- French Canadians, English Canadians?

A It doesn't matter; the ethnic background of a population does not matter.

Q Would it surprise you to learn that the fire chief of Missasaugus County thought that it mattered and decided it was relevant?

A The ethnic population does not matter with regard to concept, but with regard to implementing procedures; yes, it would.

Q All right. Thank you very much.

MR. RILEY: That concludes my examination of the panel.

BY MR. GUILD:

Q Mr. Broome, I know that you've been present for a number of the meetings of the -- what's been called the Nurkin Committee, the Blue-Ribbon Committee, Charlotte-

Mecklenburg Emergency Response Planning or Review Committee?

A (Witness Broome) That is correct.

Q And I think you were present last Wednesday, as I was, when the Committee adopted the Resolution that's been received as an exhibit today.

I know I've heard you make a presentation to the Committee.

Is it a fair representation of your position, Mr. Broome, that if your leadershilp, the County Board or Commissioners, the City Council, your boss, provide for enhanced emergency planning for the City of Charlotte, that it would be consistent with your position to respond to develop what further plans were necessary?

A If they asked me, if they tell the Commission to develop more specifics, yes; I will do it.

Q And that would include, would it not, I gather from your prior testimony, the provisions that apply to the emergency planning zone, the plume EPZ, that now in part includes Mecklenburg County?

In other words, if the EPZ was expanded into portions of Charlotte, you would carry out your responsibilities to see that additional planning was needed to implement that expansion?

A If the EPZ was extended due to a recommendation by the Council or Commission, I would improve the All-Hazards Plan

to -- if it was extended based on regulation, I would follow the guidelines of the regulations.

Q And is it fair to say, Mr. Broome, given what you have said to the Committee -- and I've heard you sit here -- you would not anticipate any difficulty in accomplishing that, if that were your instruction?

A Nothing except time to implement and plan it.

Q Now, I notice in your testimony -- I'm looking at page 4, Mr. Broome -- you are asked the question, essentially, what's the difference in being in the EPZ and being out of it; and doesn't it basically boil down to sirens being the difference.

And you say, that's only one element, and you go on to explain what the real differences are in your view.

Is it fair to characterize that as there is more of a concept of operations; as it stands now in the All-Hazards Plan as compared to a very detailed plan within the 10 mile EPZ?

A No. I am not sure I understand the question, Mr. Guild; but the concept for an area inside the EPZ and the concept for an area outside the EPZ, would not change.

Q I didn't mean to imply that.

Let's go specifically to page 4, line 15, you say, inside the 10 mile EPZ the magic line that is drawn, you've got a very, very specific function?

A With regard to function, that's correct.

Q And you say, you go on to say, outside that, the specificity is not there, but the concept is there? That's the distinction I was trying to draw?

A That is correct.

Q More specificity in the EPZ, but the concept remains the same?

A I would say so, and probably the regulations dictate it.

Q All right.

At line 18, you now talk within the EPZ, and you've got a very detailed, well identified plan for the 10 mile EPZ which looks at, for example, day care centers and schools and hospitals, prisons, and evacuatin routes, and this type sof thing.

Outside the 10 mile EPZ you don't need to identify these matters in the specific terms that you do inside that; but that is not to say that you can't expand on it, because you are dealing with a concept.

A Correct.

Q Do you think there's anything negative or harmful about having an enhanced degree of specificity that's involved in the plan that exists for the EPZ portion of Mechlenburg County applied to portions of Charlotte?

A Do I think it would be harmful to do the same things

outside the EPZ as opposed to doing it inside the EPZ?

Q No.

By expanding the EPZ you have to expand the specificity of the plans that now we all have as plans that are less specific, as described in your testimony. What I am trying to understand is: do you think there is anything wrong or harmful or bad about the idea of being more specific in the rest of your jurisdiction?

A I don't want to evade the question, Mr. Guild; but in the position I'm in, I would respond this way: I am dictated to by the regulations with regard to planning inside the EPZ. Outside the EPZ my function is dictated to me by by the membership of the City and County Government.

A (Witness Glover) Can I make a point on that, Mr. Guild?

Q Sure, Mr. Glover.

A As far as addressing any concerns that you might have for having more specificity in an All-Hazards Plan outside of the EPZ, I personally do not have a lot of concern for that; except for the aspects of the effect that might have on resources or commitment of resources away from those people that are close-in to the plant, who have a specific need.

In NUREG 0396, on page I-51, Appendix 1, there in the middle of that paragraph, it says to this effect:

Therefore, given an atmospheric accident, responsible authorities should concentrate their immediately available resources on limiting the life-and-injury-threatening doses to individuals in the closer areas.

And there's a footnote at the bottom that relates to that, it says: then, when time permits protective measures might be implemented for individuals at larger distances or where PAGs are likely to be exceeded.

So that would be my only concern.

Q And of course that's a principle, Mr. Glover, that's not universally applicable. You, yourself, have given us a lot of insight into the fact that it depends on the specific scenario, such as wind travel speed, and direction toward the effected population?

A That's correct. It is just the concept you would tend to operate under in an emergency, it would be tempered by the specific emergency.

Q If, in fact, the plume was traveling over a very low populated area, but heading for a very densely populated area, the more remotely situated densely populated area might be the target of more resources than the nearer area, because of the greater threat?

A It depends upon, you know, you might say the specific meteorological conditions at the time, the extent and size of the release, whether you have particulates or

gasses, things of this sort. It would be hard to lay out-- but that's the concept we would operate under.

Q Yes.

Now, back to you, Mr. Broome, the Company, Duke Power Company, opposed the admission of the contention that's been offered that we're talking about, Contention 11.

And I think earlier in the day today there was a reference to the fact that there was a filing that's from November of last year where Duke -- I forget the date exactly -- excuse me one second.

(Pause)

That's November 3rd, 1983, and it's a document that's entitled Applicant's Motion for Reconsideration of Order Revising and Admitting Contention 11, and For Rejection of Contention for Application of 10 CFR 2.758 Procedures, or Referral of Ruling Pursuant to 10 CFR 2.730(f). And that's the document Mr. Glover had an affidavit attached to; it had a discussion of siren coverage, some maps of the EPZ boundaries.

Are you generally familiar with that document I am talking about?

A (Witness Broome) No.

(Laughter)

Q Mr. Glover, did you consult with Mr. Broome when you prepared your affidavit that's attached for that

submission?

A (Witness Glover) I don't believe I did in preparation of that submittal.

Q Well, the point is this, Mr. Broome -- if you don't have this, I want to share some of it with you right now.

But, Mr. Glover, you recall having submitted an affidavit with that document; don't you?

A Yes, I do.

Q And I think previously it was described, and, essentially it was your affidavit explaining what would be involved in expanding the EPZ to that boundary that Judge Kelley's Board postulated as part of the Revised Contention 11?

A Right.

Q Now, I am looking specifically at Exhibit D to your affidavit, Mr. Glover -- and I want to ask Mr. Broome about this: I'll read the substance of this to you, Mr. Broome, so you don't need to have it;, but if you can get it, perhaps it would be helpful.

The Exhibit is entitled: Actions to Be Accomplished to Formally Extend Catawba's Plume EPZ.

(Document handed to witness panel.)

Have you seen that before, Mr. Broome?

A I don't recall it.

Q Okay. It's a list of numbered items, and the introduction says as follows:

The following actions will be required if the full extent of planning (as present within the existing plume EPZ) is deemed necessary outside of 10 miles.

Do you see that?

A Yes. I follow you.

Q Okay.

And you have items listed 1 through 8 on that page, and sub-items, item 9 on the third page, and then sub-items underneath; correct?

A That's correct.

Q I want to look briefly at these things, and I want to see if those look to you to be a fair -- you, Mr. Broome, a planner -- a fair representation of the additional actions that would be involved in enhancing planning for portions of Charlotte by extension of the EPZ over and above the existing state of planning as present under the All-Hazards document.

Do you get the drift of my question?

A Can I make a quick point on that?

When this was developed, though, it did not say these were the things that would have to be done beyond what's already being done and you all haven't done. This just said you have to develop specific plans to do that. I mean, you can

draw from what's already there; but it did not say: this is above and beyond what's already in place.

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Suefls

#14-1-Sue

Q That's helpful. I frankly read this as supplementary to existing, Mr. Glover. Some of these things are perhaps already in place, Mr. Glover?

A (Witness Glover) Yes.

Q Mr. Broome, with that explanation now, look at the items here and help me understand if these, in fact, reflect things that would need to be done over and above the All Hazards Plan as it exists now.

Do you see the first item there? Would there have to be developed a State plan and a city plan, to paraphrase that item?

A (Witness Broome) A State plan and a city plan, no. The State plan, I think, would remain the same.

Q Okay. You would have to have a city plan, though, right?

A Let's call it local plan, would be a joint plan. It would not be a city plan and a county plan. It would be a joint effort plan.

Q Charlotte/Mecklenburg?

A Yes.

Q That's the concept you employed by having a joint planning agency such as your office?

#14-2-SueT1

A My office is a joint planning agency, yes.

Q So, you would have to do that Item 1 and you would have to submit those plans for approval to the Regional Advisory Committee, that's the FEMA joint federal agency advisory committee; correct?

A The plan would have to be approved.

Q And Item 3, you would have to basically review the comments that come back from the RAC, from the RAC committee, and include those comments with revisions in the plan; that's item 4, right?

A Well, I think with Steps 1 through 4, you are going through a draft concept. You submit a draft, the revisions come back. You submit another draft before all parties can finally agree on a final document.

Q Five, you conduct a test of the plan and you have a critique of that test and a public meeting, right?

A That would be correct.

Q And that was done, for example, for the existing EPZ, including parts of Mecklenburg County, which now include parts of Mecklenburg County, correct?

That's the exercise we had in February that you were involved in?

#14-3-SueT

A That's correct.

Q And you would have an exercise, presumably that would include those portions of the City of Charlotte that were the subject of an extended EPZ?

A Well, you go back -- I go back to the concept, Mr. Guild, the plan would be revised to incorporate the additional area that would be defined by regulation and the resources to cope with that area. The next scheduled exercise. All these things would be pulled together at an EOC. You would not hold a separate exercise just because you took in part of another area.

Q Right. And that's a helpful point of clarification. I'm not suggesting otherwise. But if part of Charlotte was in the EPZ, we would have an exercise that exercises the plan as it relates to part of the City of Charlotte?

A It would exercise the revised plan; let's put it that way.

Q At the appropriate time.

A The next scheduled exercise.

Q And as of now, I think it's fair to say, given testimony earlier in this case that the scenario modeled in the exercise in February did not include any protective actions

#14-4-SueT in the City of Charlotte, correct?

The plume did not come to the City of Charlotte, did it?

A I don't think so. I don't recall all the specifics with regard to plume and path and so forth.

Q Okay. I think the record reflects that the plume modeling direction was wind from a hundred and seventy degrees blowing to three fifty, between Gastonia and Charlotte, but missing the city.

And, in any event, below the protective action guides not requiring any specific protective response. Mr. Glover, was that correct?

A (Witness Glover) That's correct.

Q Okay. Number Six, FEMA and NRC file reports. Number Seven, Duke, the State and the city resolving any problems discovered, and those items would have to happen in due course if the EPZ was extended, to review the effectiveness of that plan, correct?

A (Witness Broome) Here again, you would review the effectiveness of the revised plan. I think we have a misnomer here by just confining this to the City.

Q All right. Item 8 on the list, to prepare the

#14-5-Sue1

plans, the following must be accomplished pursuant to NUREG 0654, Parts 1.A through 2.P, as in Paul, and Appendices 1 through 5, and 10 CFR 50, 47.B.1 through B.16. And then we have a list of items.

Let's quickly go through these, Mr. Broome, and you tell me -- I want to understand, as Mr. Glover indicated, any of these items that you think are already adequately and fully handled under the All Hazards Plan. What I'm trying to do is just identify items that are things that would have to be done or would be done if we had an EPZ extension into Charlotte over and above what exists for the All Hazards Plan.

A Wait a minute. Let me see if I understand what you want to do, is go through and item by item, for Item 8, which includes all of Page 2 and part of Page 3 in addition to part of Page 1, which is Exhibit D --

Q Right.

A -- and you are looking for what is in place with regard to these items in the All Hazards Plan.

Q Let's make it as simple as possible. You see, I read this document as basically what the Company was saying back in November was the difference between All Hazards Plan

#14-6-SueT1

and having an EPZ in Charlotte. The things that you get in addition to the All Hazards Plan if there was an EPZ extension.

Now, Mr. Glover has been helpful in saying some things are already in place, okay, under the All Hazards Plan. Now if you just would flag for me the things that are already in place, I don't need detail because our time is limited, but I would like for you just to tell me if we touch on an item where you think no change is required in the All Hazards Plan under an extension of the EPZ. You just tell me.

City commence organization of resource. Any changes?

A It would be no changes there. There was a joint signature by leadership of city and county with regard to both the All Hazards for city and All Hazards for county.

Q So, Duke was erroneous in stating that was something that had to be done over and above what exists?

A No, not necessarily. You are speaking of All Hazards now?

Q I'm talking about the EPZ extension.

A Then, you would have to go back and you've got the organization there but you would have to go back with regard to identifying more specific, more numbers, with regard

#14-7-SueT1

to resources.

Q That's a help. Just tell me things that you think don't require any changes at all now if we were extending the EPZ.

City establishes adequate capability to support federal response. City establishes a methodology --

A Wait a minute. Wait a minute. I don't want to take up your time, Mr. Guild, because I know it's limited but I would go back and state this.

The revised plan would be joint. If the EPZ was extended, all the items that are listed, whether they were in place or not, would have to go back and be readdressed in order to lend specificity that is required by regulations before a fixed nuclear facility is operative.

Q Well, that's a help. That's a short answer to the question.

Let me just make a couple of observations, then. For example, Duke establishes an area wide siren system under city control for operation, tone alert radios provided for all special facilities (schools, hospitals, prison camps, major industrial).

Now, assuming that the fixed siren system was what

14-8-SueT

was going to be used for alert notification, not an automatic telephone system or some other device, that's one that would have to be done in an extension of the EPZ, Mr. Broome?

A What page are you on?

Q I'm on the first page, Item 8, about halfway down the list of sub-items, under item 8.

A Duke establishes an area wide siren system under city control.

Q Right.

A Well, I don't know that it would be under city control. It probably would be associated with the control point we've got now.

Q You don't have an adequate siren system, fixed siren system, now, do you?

A Where?

Q In the City of Charlotte?

A No, we do not.

Q You've got some sirens in the City of Charlotte, don't you?

A Yes, we do.

Q Five sirens?

A Four.

#14-9-SueT1

Q You had five?

A We lost one.

Q Do the other four work?

A We will find out shortly.

Q Did they work last time you tried them?

A No.

(Laughter.)

Q Those are civil defense sirens, and you don't rely on those. You can't rely on those for effective notification, can you?

They have not worked effectively, have they?

A It's like everything else, we all deteriorate with age.

Q Right before your very eyes. So, you would have to get a new fixed siren system if that was the method that was being used, right?

A You would have to get an approved alerting system.

Q Now, I think -- I cannot find the item right off, but Duke, just for one other item, would have to incorporate public information and education programs for the city, including, let's say, specifically circulating its brochure, or a brochure, to members of the effected population residing

#14-10-SueT

in the extended EPZ. That's another specific ennancement required, right?

A That would be correct.

MR. GUILD: Mr. Chairman, I would ask that -- this is already a pleading in the record in this proceeding, and just to save a little bit of time and avoid having to read all of these items, I would ask that this Board, if there is any question about this, take note of this as a pleading in the docket.

And it's with the title I stated earlier. I can read it again if it will help. Exhibit D to that document. It's to Mr. Glover's Affidavit, and the Exhibit D specifically is entitled "Actions to Be Accomplished to Formally Extend Catawba's Plume EPZ.

JUDGE MARGULIES: What is the date of the document?

MR. GUILD: The document is November 3rd, 1983. It's -- I can read the title again. It's quite long. It's Applicant's motion for reconsideration, et cetera, with respect to Contention 11.

I would ask the Board to take note of it.

(The Board members are conferring.)

#14-11-SueT

JUDGE MARGULIES: Any objection?

MR. MC GARRY: No, sir.

MR. CARR: No, sir.

JUDGE MARGULIES: We will take note of the document which is already in the record.

MR. GUILD: Thank you, Mr. Chairman.

BY MR. GUILD: (Continuing)

Q We, last session, had a large map that was on display here in the hearing room.

Mr. Glover, what happened to the map? Where is the map?

A (Witness Glover) The map has disappeared into the night somewhere I imagine.

Q It's gone?

A It's gone forever.

(Laughter.)

Q Is it fair to say that Applicants, after due diligence, have decided they are not going to distribute a copy of the map to the parties?

MR. MC GARRY: I don't think we concluded that. We are having problems, as we indicated, in getting the map reproduced.

#14-12-Sue

MR. GUILD: All right. It would be helpful, Mr. Chairman, and we would renew our request.

In the meantime, if I can, let me attempt to circulate a much less glorious substitute.

(Mr. Guild passes out a map among the witnesses and counsel, as well as the Board members.)

BY MR. GUILD: (Continuing)

Q Gentlemen, if you could, just identify this map, Mr. Glover, first.

Does that appear to be a fair representation of the City of Charlotte and surrounding environs?

A (Witness Glover) Yes.

Q Do you want to pass that on down to Mr. Broome and see if he agrees?

A Yes.

Q As stated, does --

A (Witness Broome) Is this supposed to represent the city limits of Charlotte?

Q I don't know where the city limits are, Mr. Broome. Does it appear to represent the City of Charlotte, including the environs of the City of Charlotte?

I want to go to the issue of where lines are in a

#14-13-SueT

moment.

A It represents a core area of the City of Charlotte. It does not represent in total the Charlotte city limits and associated environs.

Q That would be helpful if you could tell me what the problem is with it.

What I'm focusing on really is where is the plant locale with respect to the portions of Charlotte that are in issue in Contention 11, and does it include the south and southwest portions of the City of Charlotte?

A Let me back up. It does include the city limits of Charlotte; however, the city limits of Charlotte are not defined by this map.

Q That's helpful.

JUDGE MARGULIES: Let's get the document identified counsel.

MR. GUILD: Yes, sir. Can we -- on that basis, Mr. Chairman, can we identify this as Intervenor's EP-44, please?

JUDGE MARGULIES: Is there any objection to its admission?

MR. GUILD: We offer it, Mr. Chairman.

#14-14-SueT

JUDGE MARGULIES: It will be admitted into evidence as Intervenor's EP-44.

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(The document referred to, a map, is marked as Intervenor's Exhibit EP-44 and received into evidence.)

MR. GUILD: Thank you.

BY MR. GUILD: (Continuing)

Q Now, looking at the documents, Mr. Glover, let me give you one so you won't have to pass it all the way back and forth down the table.

(Mr. Guild provides Mr. Glover with a copy of Intervenor's Exhibit EP-44.)

Mr. Glover, can you identify the proposed extended EPZ that is referenced in Judge Kelley's revised contention from the map here, please?

A (Witness Glover) Yes, I can.

Q Would you, please?

A If you go from Highway 51 at the Pineville city boundaries, which are -- let's see, down there around, just to the left of the Route 51 mark on 51, somewhat to the south-east of the word "Pineville" on there --

#14-15-Sue

Q Okay. Highway 51 crosses the North Caroline, South Carolina line?

A That's correct.

Q Okay. I found that if others have.

A If you follow from the eastern edge of Pineville there at 51 over to Route 16, which is termed Providence Road, it forms somewhat maybe the southern extent of --

Q 51 is also identified as Matthews --

A It's the Pineville-Matthews Highway.

Q Okay. And it intersects 16?

A It intersects 16.

Q And it looks like it's Quadrant -- well, it has a letter D in it, 16-D.

Do you see the -- it's a Number 16 in the center of the four blocks, and the letter D?

A Yes. Quadrant 16-D is where 51 intersects 16 fairly close.

Q Okay.

A Then, you take Highway 16 north --

Q Yes, sir.

A and you will see it bear off the right where Queens Road intersects it.

#14-16-SueT

Q Yes, sir.

A Then, if you follow it up to Third Street and next to Third Street is 16 until the intersection with Independence Boulevard, which is Highway 74, so it kind of bears to the right. Then, it heads directly towards the downtown area for just maybe an eighth of an inch on the map, to Route 74. And then you would follow Highway 74 out to the west.

And in my look at defining areas of this EPZ population, I have broken off of Route 74 at Moore's Field Drive down to the Billy Granam Parkway, Billy Graham Parkway to New Dixie River Road, going west on New Dixie River Road, over to Byrum's Drive --

Q Slow down one second, please. Billy Granam Parkway down to what road?

A New Dixie Road.

Q I'm having a hard time finding that.

A It's where West Boulevard intersects Billy Granam.

Q You are just missing the Charlotte Douglas International Airport?

A Yes, around the airport down to Byrum Drive.

#14-17-Suel

Q Okay.

A And then Byrum Drive going down to Shopton, down there on Byrum Drive which intersects the existing EPZ.

Q You turned on 160; is that correct?

A Yes. Well, came down to 160 there. Byrum Drive actually intersects 160 there.

Q And 160 is the current border?

A Yes. Right there at Shopton Road, Dixie River Road and Byrum Drive is the existing EPZ. I could show you this on a larger map if you wanted to see it.

Q All right. Tell me -- why do you -- I read the Board's Order admitting Contention 11 as simply saying, for example, running out 16 and then 74 and we have sort of depicted the proposal as extending to the Charlotte city limits to include the Douglas International Airport.

Why have you dropped that out in your version?

A Well, in my view, what we were planning for here was a plan that would take into effect protective actions for the population within this area and right in that environ, right around the airport you will not find any major concentrations of population. And as such, I drew it around it.

Q Are there any other considerations in excluding

#14-18-SueB

the Douglas Airport?

A Not in my view.

Q Douglas is the assigned locale for the North Carolina State Emergency Response Team headquarters, correct?

A Yes. But they have identified an alternate location if that facility became unavailable for some reason.

Q Would one or the considerations in designating Douglas as a facility be its locale in the EPZ?

end #18

Joe flws

I wouldn't see that as a major consideration, though, because emergency response team members are all considered emergency workers; whether the area was considered for evacuation or not they would be able to stay.

Q All right. Now, Mr. Broome, do you follow that? Is that consistent with -- first of all, just stick with the 74 and 16 part of it. Is that consistent with your understanding of the identified proposed extended EPZ?

A (Witness Broome) Consistent with the revision that the Board made, as I understand it.

Q Are you aware of any other basis for what Mr. Glover just stated, for doing as he did, jogging around Douglas Field.

A I would concur with him as far as the population concentration.

Q Are you aware of any other reasons for excluding Douglas?

A None that I could recognize.

Q All right. Now, Mr. Kulash, let's turn to you for a second, sir. I believe in your --

JUDGE MARGULIES: This might be an appropriate time for a twenty minute recess. We will reconvene at quarter to four, and that will give you twenty minutes, counsel, to conclude your examination.

MR. GUILD: Thank you.

(Short recess taken)

JUDGE MARGULIES: We are back on the record. You may continue.

BY MR. GUILD: (Continuing)

Q Mr. Broome, give us an idea more specifically what other options you and others looked at with respect to possible extensions in Charlotte, other EPZ boundaries or configurations.

A Mr. Glover indicated previously that he and I met in my office. We looked at a map about the possibility of redefining the EPZ based on Contention 11. Beyond that, I have no memory of any other reconsiderations.

Q Do you have recollection, Mr. Broome, of specific roads that you looked at or highways, or natural boundaries, other than the 16 and 74 that are set out on the revised contention?

A Other roads were looked at, but because we did nothing definite with regard to that review, I don't specifically recall the roads.

Q Mr. Glover, do you recall any specific roads you looked at?

A (Witness Glover) I have a map that I drew up after our meeting. I looked at some areas out to about 12 or 13 miles that I could talk about if we felt the need.

Q Would you mention those briefly, the ones that you did look at?

A Looked at the use of 160 up to Byrum Drive. Again, taking Byrum Drive over to York Mount Road, over to Beam Road, and Beam Road down to Highway 49, 49 up to Woodlawn Road, south -- well, I guess kind of east on Woodlawn Road down to 77, 77 south to Tibola Road, Tibola Road over to South Boulevard, South Boulevard south to Sheran Road West, Sheran Road West over to Park Road, Park Road south to Johnstone Road, Johnstone Road -- excuse me -- Johnstone road down to Highway 51, to Tidewell Matthews Highway, Tidewell Matthews Highway east to the Park Road extension area, east-west boundary, and then taking in the city to include Park Road-Palma Road extension area, back over to the Pineville city limits.

Q And that is a radius of approximately --

A Approximately 12 to 13 miles.

Q Do those seem appropriate if you are going to extend 12 to 13 miles, does it seem appropriate identifiable boundaries?

A Yes.

Q Now, Mr. Kulash, back to you, sir. I believe in your attachment -- if I can get my hands on it -- your Attachment C, sir, your evacuation time estimate for the City of Charlotte, you conclude that given your assumptions, the City of Charlotte, the entire city, could be evacuated in nine hours?

A (Witness Kulash) Yes.

Q What about the southwestern portion of the City, the part that has been referenced in the proposed extended EPZ?

A We had an evacuation time of about five hours for that.

Q On page 10 of that Attachment, does that reflect a listing of the evacuation routes that you modeled, and the times for each of the routes?

A Correct.

Q And again, those estimates are with the understanding that people would take the most expeditious route out as we discussed earlier. They would move to a less congested route if they find themselves in a queue for an extended period of time?

A That is right.

Q Have you done a study of the incidence of accidents on the routes that you assume people would be traveling out of the City of Charlotte?

A We have done an analysis of accident rates in general as they apply to a mile driven, regardless of the roadway that it is on.

Q All right, sir. I will ask you to take a look at a document. Mr. Kulash, this is a document that is entitled, 1982 High Accident Locations Priority Order.

It is from the City of Charlotte Department of Transportation, and it lists 111 intersections by City Order of Ranking, and that is the column that appears to the right of the street names, ranked with respect to property damage and injury involvement, involving accidents.

Will you agree, subject to check, that of the 111 on that list, some 50 reflect intersections involving your evacuation routes as reflected in page 10 of your Attachment?

A Subject to further checking, I think that would be correct.

MR. GUILD: Mr. Chairman, I ask that this document be marked and received in evidence as Interveners 45, please.

JUDGE MARGULIES: Any objection?

(NOTE: No response.)

JUDGE MARGULIES: It will be marked and admitted into evidence.

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(The document referred to above was marked Intervener's Exhibit EP-45, and received into evidence.)

BY MR. GUILD: (Continuing)

Q Okay. Now, Mr. Glover, Mr. Broome, we have talked a good bit in the testimony with both of you gentlemen about the adequacy of the All-Hazards Plan for Charlotte, and it

has not been offered by either of you gentlemen in evidence. Is there a reason why you are not offering for this Board the consideration of the actual plan itself, Mr. Broome?

A (Witness Broome) It is not relevant as to whether or not the EPZ should be extended.

Q Mr. Glover, do you have a reason why you are not offering it?

A (Witness Glover) You might ask our legal staff, but I am not certain why we didn't attach it.

Q How about if we see if you can identify this document as the All-Hazards Plan, and I ask that it be marked and received. Again, this is an attachment. We have copies and we might ask that it be independently received, but this was an attachment to the same pleading by applicants on November 3, 1983, request for reconsideration. That was Exhibit F to that document. Or perhaps Exhibit F to Mr. Glover's affidavit.

Gentlemen, is that the City of Charlotte Protective Response Plan for All Hazards 1982?

A (Witness Glover) Yes, it is. Lew might want to take a quick look at it.

Q Mr. Broome?

A (Witness Broome) Yes, that is correct.

Q It has a date of 1982, and was circulated in November of '83. The second page says Record of Changes.

Are there any significant changes that have been made to this document since then?

A Changes have been addressed, but they have not been incorporated into the document due to the priority of developing the standard operating procedure for Catawba.

Q Is it true that the plan itself is a document of seven pages in length, Mr. Broome?

A More like 14 pages, counting the front and back.

Q Well, I am counting the number of pages, and I see a number 1 thru No. 7, and then there are some annexes.

A With the annexes and so forth, it would be about a fourteen page document as it stands now.

Q Seven pages?

A Seven pages.

MR. GUILD: Mr. Chairman, we ask that the identified document, the All-Hazards Plan, be marked and received in evidence as Intervenor's EP Exhibit 46.

JUDGE MARGULIES: Is there any objection?

MR. MC GARRY: No, sir.

JUDGE MARGULIES: It will be so marked and admitted.

(The document referred to was marked Intervenors' EP Exhibit 46 for identification, and was received in evidence.)

xxxxINDEXXXX

BY MR. GUILD:

Q Now, Mr. Glover, the Company in the past has tried to get the Commission to change its emergency planning rule to reduce below the 10 mile standard, to require emergency planning -- particularly to include the prompt notification only within about 5 miles; isn't that correct?

MR. CARR: Objection on the grounds of relevancy. We are here to discuss whether or not the EPZ should be extended beyond 10 miles, and not actions by Duke, whatever they may be, in regard to reducing it.

MR. GUILD: Mr. Chairman, we offer to show that

Applicants in fact have attempted to avoid the issue that is now before us, of an EPZ of 10 miles that is contiguous with the 9.7 mile distance from the City limits of Charlotte; so we wouldn't have to deal with the obvious question of the adjacent population of the City of Charlotte.

We believe that goes to the weighing the validity of their position that now 10 miles is the appropriate position.

And I have a document that I would ask Mr. Glover to identify with a question of yes-or-no. I am approaching the end of my 20 minutes examination of the panel.

But I believe it's relevant to show motive.

(The Board conferring.)

JUDGE MARGULIES: Counsel, I don't see the relevancy of it, but if you want to make an offer of proof on it, feel free to do so.

MR. GUILD: Yes. Well, let me ask if the witness can identify a document, and I'll let the document represent my offer of proof.

Could I ask the witness to answer yes-or-no the last question, and then submit the document as an offer of proof.

WITNESS GLOVER: What was the question?

MR. GUILD: Is that all right, Mr. Chairman?

JUDGE MARGULIES: Yes.

BY MR. GUILD:

Q The question is, Mr. GLover, is whether Applicants -- Duke Power Company -- sought to revise the emergency planning rules to reduce the 10 mile EPZ to 5 miles?

A (Witness Glover) They did not.

Q Can you identify the document over your signature of July 20, '82?

A This is a July 20, 1982 memorandum to file reference a meeting held July 13, 1982 with Victor Stello and others of the NRC Staff.

Q And the last paragraph, "After the meeting it was agreed that we would attempt to poll the NRC Commissioners on their view of the need for fast alerting beyond 5 miles."; doesn't that reflect your efforts to try and amend the rules?

A At that time it indicates that our position was we were going to go forward and speak with the Commissioners. I believe if you review future documents after that you will find that it was decided that that would not be a fruitful effort; and that at least in this area of EPZ reduction that that would not be possible; and in terms of reducing the area needed for prompt alerting coverage that in the period in which Catawba would be licensed, that we would not be able to effect any change there; and, as such, there was no recourse for us but to go forward with the 10 mile system.

Q The second paragraph of the document states, "Throughout both of the intervals from 0 to 10 miles, the importance of a rapid and efficient implementation of either evacuation or sheltering is evident. Page 1-50 and 1-51 provide further information relating to distinctions between these two intervals; however, these distinctions, in my view, do not provide evidence that 'fast alerting systems are not warranted in the areas beyond 5 miles from the plant.'"

Does that reflect your views, Mr. Glover?

A Yes. I did not see in NUREG 0396 where Mr. Stello was specifically stating that in his view NUREG 0396 already provided for a fast alerting system would only be required for out to 5 miles; and I just didn't see it in looking at that document.

MR. GUILD: Judge, we ask the document be marked as Intervenors' Emergency Planning Exhibit 47; we offer it in evidence.

JUDGE MARGULIES: It will be marked as Exhibit EP 47 for identification and be included in the record as the offer of proof on this matter. The request it be admitted into evidence has been denied.

(The document referred to was marked Intervenors' EP Exhibit 47 for identification, and was rejected in evidence.)

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BY MR. GUILD:

Q Mr. Broome, I think we all agreed in a previous exchange that enhanced emergency planning was a good thing and not a bad thing; you can always improve on something that is even adequate as it stands; correct?

A (Witness Broome) You can probably improve on the best plan.

Q All right.

Would you agree that the FEMA Exercise Report which has been received in evidence as NRC Staff Emergency Planning Exhibit No. 4, reflects deficiencies in the performance of personnel of the City of Charlotte in the February exercise? Deficiencies which could be improved by enhanced training and more effective planning?

A I have not seen the document.

You spoke of the critique that was held; the only deficiency that was directly related to me was a better status board.

Q Would you agree at page 13 of the document it is reflected, inadequate training of Charlotte police department and Charlotte firemen with respect to use of radiation protection equipment, and decontamination procedures? Do you recall that subject?

A With regard to a weakness of fire department personnel, I would agree. With regard to a weakness for

police department pesonnel, I would not, because the police department personnel are at traffic control points; and traffic control point is not a monitoring nor decontamination point.

Q All right.

Charlotte policemen -- quote -- "(traffic control) and Charlotte firemen (decontamination) have no knowledge of appropriate levels of radiation exposure for emergency workers in fixed nuclear accidents."

Do you recall that criticism?

A I told you, I have not seen the document.

Q Do you recall the criticism?

I would be happy to show it to you?

A I indicated firemen need additional training; law enforcement personnel at traffic control points are not a monitoring point.

That situation will be resolved with FEMA and off-site authorities to reflect that.

Q All right.

Page 11, emergency operations center, Mecklenburg County: Players were enthusiastic but a few were unsure of their duties, and some were unfamiliar with terminology; additional training of back-ups is suggested.

Do you recall that criticism?

A That is true, and true only because there were one or two departments that were in there for the first time.

Q Continuing: While the plan states the County Manager is in charge, three different individuals appeared to function as decision-makers.

Do you recall that criticism?

A That is not a criticism.

Q You don't see it as a criticism?

A There were three people assisting the County Manager in his decision-making process. The decision-making process is a team effort, the final authority being with the oerations crew chief in the EOC.

Q All right.

Who were those persons?

A Myself, Lou Bishop (phonetic) and Mr. Fox, and John Knowles (phonetic).

Q And who is Mr. Knowles?

A The Fire Marshal for Mecklenburg County.

Q And Mr. Fincher is -- ?

A A director for emergency planning.

Q You work for him?

A Yes.

JUDGE MARGULIES: Your time has run out, counsel.

MR. GUILD: Thank you.

BY MR. MC GURREN:

Q Mr. Potter, I just have a few questions for you.

Do you recall being asked by Mr. Riley this morning

about release categories with regard to Sequoya?

A (Witness Potter) Yes.

Q And I think this had to do with large dry containments versus ice condenser type containments, and what would be the most appropriate type of containment to use in terms of development release categories.

What I am not sure is: why did you use Sequoya in determining release categories?

A I didn't use Sequoya specifically, the RSSMAP representation of Sequoya, because the authors of the RSSMAP study did not account for the effectiveness of the hydrogen mitigation system.

When one does account for the effects of the hydrogen mitigation system, one effectively reduces the frequency of release categories PWR 3, 4 and 5, fairly severely; and increases by the same magnitude the frequency of release category 7, a relatively benign release, one that is not factored in emergency planning beyond a couple of miles.

Q So that I understand, what did you end up doing here?

A Well, when I did that, I basically wound up with release category treatments that usually were very close to those in the Reactor Safety Study; so I simply used the Reactor Safety Study's.

Q This question is for Mr. Casper:

What would be the impact of the Charlotte proposed heat island on projections of trajectories of plumes traveling from Catawba towards Charlotte?

A (Witness Casper) There would probably be no effect whatsoever, because the plume would probably hit the Charlotte area eventually anyhow, regardless of the urban heat effect.

Q (Witness Potter) Can we elaborate on that?

A (Witness Casper) There would be some additional, maybe.

MR. GUILD: If the witness would not confer off the record, please?

WITNESS POTTER: I'd like to chime in.

There might not be much difference in terms of trajector, but there would be additional surge being trapped in the circulation.

BY MR. MC GURREN:

Q So what you are saying is there would be more dispersion?

A (Witness Potter) That's right.

Q Would there be difference night versus day time?

A (Witness Casper) There would be differences at night time; I can't quantify them right now.

Q Greater or lesser?

A Less dispersion at night, probably less effective.

(Pause)

MR. MC GURREN: That's all we have, your Honor.

JUDGE MARGULIES: Judge Hooper?

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EXAMINATION BY THE BOARD

BY JUDGE HOOPER:

Q I might pick up on this last point about the -- I guess I didn't quite understand your answer; I want to pick up on this last point about dispersion and the effects of heat.

Are you saying that dispersion is increased as a result of the heat from the city?

A (Witness Casper) Yes, because the heat, in itself, makes the area around the city unsafe, more unstable to the degree of the surrounding rural area, and it does increase dispersion.

Q What does this do to the amounts of material being transported, then, as far as the people are concerned?

A Well, it disperses the material better; the consequent doses to those people would be less.

Q Thank you.

Are there any other dispersion mechanisms involved in the transport of this to the City of Charlotte?

A Well, other than maybe heat due to what's happening at the plant; if it is a heated release it would be buoyant.

Q Are large water heat sinks of any consequence in

dispersion in this regard?

A Not for the Catawba plant; no; there's no water body large enough to do that.

Q Is Lake Wylie such a water body?

A It's not large enough; it is a water body.

Q It would have no effect upon dispersion?

A Not in the Charlotte area; no.

Q But it would have an effect on material enroute to Charlotte?

A Very slight, if any at all.

Q It wouldn't be of any consequence.

I think the other question I have is for Mr. Potter. This goes to the methodology used in calculating in the testimony; let me see if I understand what you did:

You took two years' meteorological data from the site, did you not?

A (Witness Potter) Yes. I actually used one.

Q You actually used only one.

A One.

Q And you had two years available?

A That's right.

Q Let me ask you, first: why didn't you use the second year?

A The Consequence Analysis Code, as we commonly use, in this kind of analysis is set up for one year's data. We have

found with using different years of data and different data sources that -- date from the same site -- is a reasonable; one year of good data is usually sufficient.

Q That brings up my next point:

Have you ever heard in meteorology of the 100 year flood, a counterpart in meteorology of the 100 year flood?

A You are asking about the 100 year --

Q Wind stability crisis?

A Right.

The question relates to, I believe, the ability to identify probability, extremely low probability of meterorologica conditions.

Typically in the range of probability that we are interested in for my analysis, those extremes are not important when you're looking for the probability of exceeding certain doses conditional on releases but varying meteorology.

The severe releases, given the severe release, at the distances we're talking about, the probability of receiving PAGs is quite high. And the probability of seeing life-threatening doses is 10 percent or less; whether it's 1 percent or 2 percent does not particularly interest us.

For the less severe releases, the probability of receiving PAG is virtually zero, simply because there's not enough material.

So we don't have that kind of problem in this

kind of analysis. It does present a problem in risk assessments where you are trying to compute the distribution of a number of people affected, the probability of exceeding certain numbers; but it's not such a problem here.

Q Well, I guess that you do, if I understand your methodology, is for this one year of data, you do -- you pick certain times and ates and sampling points; do you not for that period?

A Correct. Randomly selected.

Q You randomly select certain times for that period?

A Right.

Q And what is the -- I never did know exactly how many times you took and what the sampling universe was? Could you give me some information on that?

A Sure.

From one year's data you have the same universe of 8760, that's the number of hours. We sample for the more severe accidents, up to about 300.

Q 300.

A And for the less severe, 96.

Q About 100.

A The sampling strategy was stratified, it was random, but it was stratified. We picked equal numbers of day and night samples, and we assured ourselves we had an equal number of samples for each.

And, as I say, we have calculated distribution based on subsets.

Q Excuse me, but right now this is what I want to ask you: But you did not stratify them according to stability classifications, did you?

A No, we did not.

Q So that, really, the universe you were using for your stability classification, was whatever that year presented; wasn't it?

A That's right.

END T16JRB
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#17-1-sue

Q I guess what I want to get at is how much assurance did you have that you didn't have -- the year you used was not really an odd ball from the standpoint of stability, stability classification?

A You mean a year, for example, in which there was an inordinately low occurrence of highly stable --

Q That's exactly right. Say, the Bermuda high and the substance of Bermuda high was particularly great and there was low stagnation that year, how do you know that that was a situation that was not the case for your use?

A This year was more than two submitted in support of part of the efforts. I looked at the data after we had compiled for use, just as a reasonable check, so to speak, but my understanding is that the data has been reviewed by Duke meteorologists. And perhaps Mr. Casper can speak to that.

(Witness Casper) Yes. We, as part of the FSAR analysis, we took at least two years' worth of data from which this was a subset and made sure it was a representative data set in terms of the thirty year climatology of the surrounding area. And we used the Charlotte airport data to compare our subset with the thirty year climatology set.

#17-2-Sue

And we found it was a representative --

Q You found a statistical test that you used to be sure that this was a normal year with some other normal known set of data?

A We did not use a statistical test as such. We did look at the data and saw that it was comparable.

Q This was nothing more than a surveillance that you said: Well, this looks like this?

A That is correct. I might also add that there isn't, in terms of a one hundred year flood, there isn't a one hundred year dispersion event. We have our worst case dispersion events happening quite frequently throughout the years.

Q Well, what I wanted to know, if you compiled, if you had a universe of meteorology for the last hundred years, if there would be certain years where there would be a preponderance of very, very low stability or situations where there is very, very low stability and whether you happen to hit one of these. I just used the hundred year flood as an analogy obviously, but you really have no measure to determine whether either of these two years was in concert with the average.

#17-3-SueT

A Other than comparing percentages between thirty year average and that two years, no.

If you would look at the number of stability cases for the thirty year period, for that two year period they are in a percent or two.

Q Well, let me ask you this, then. How does it compare with other sites, nuclear power plant sites, in this area, the stability characteristics of your site?

A It's pretty comparable in terms of, it's a region. We are in a high stability, high stable case situation in this area. High frequency of stable air condition. And in that case we are probably higher than most. But I think that's also reflected in the data that we use for any of our analyses.

JUDGE MARGULIES: Redirect?

MR. CARR: Yes, I have a few questions, Your Honor. And Mr. McGarry will follow.

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REDIRECT EXAMINATION

BY MR. CARR:

Q Mr. Edmonds, you and Mr. Riley talked this morning at some length about the various population figures that are set out in your testimony, and you talked about

#17-4-Suem

projecting things to the year 2020, and whether you had figures for population densities within the EPZ.

Let me just ask you if the population figures set out in the FSAR and those figures that form the basis for the emergency plans or emergency planning done for Catawba, and those figures set out in your testimony, have all been prepared in accordance with the NRC regulations and regulatory guidance?

A (Witness Edmonds) That's correct, they have.

Q Now, Mr. Edmonds and Mr. Casper, Mr. Riley asked you this morning some questions about the Sandia report which is, I believe, NUREG CR2239, and he referred specifically to Table A.4-1 of that report.

He performed some calculations and asked you if you agreed with those results. What is your understanding of, first, what that table represents and, second, what those calculations that you all talked about represent?

Either one of you can respond to this.

A (Witness Edmonds) I will take the first crack at it. Mr. Riley asked us to look at windrose data out of NUREG 2239, which I did, by the way, and I agree with everything that he gave me this morning in terms of windrose data,

#17-5-Suet

except in the case of Waterford, as you recall I changed the sector designation there from north northwest to east and that changes the windrose frequency from point zero seven seven Mr. Riley gave me to point zero four nine.

With that exception, I agree with what he did. And, secondly, Mr. Riley multiplied those windrose frequencies by the population to come up with some factor that was -- that would represent a combination of those two circumstances, sort of a risk factor, if you will.

Q By what population did he multiply?

A He used the population figures which are in my testimony on Page 7.

I would point out that the NUREG CR2239 does a very similar type of calculation except that I think they use a more rigorous type approach than Mr. Riley did. And they attempt to try to come up with this risk factor, which takes into consideration the population and wind frequency data.

If you do that, then I think Mr. Casper can speak to this more directly. But if you do that, you find out that Catawba ranks somewhere around ten or eleven on the list as opposed to number one on the list, using Mr. Riley's technique

#17-6-SueT

Q What table was this?

A That would be Table D.3-1 of NUREG CR2239.

Q Mr. Casper, do you agree with Mr. Edmonds' explanation of both Mr. Riley's approach to the Sandia report, Table D.3-1?

A Yes. I agree with both of them. In addition, that they both were sort of a measure of risk. The one in the Sandia report took into account risk of other sectors rather than the one sector, including those with high populations, the next highest population, the next highest wind direction frequency, I should say. And in that case, it was probably more all encompassing.

Q Do you gentlemen believe that that approach, that in Table D.3-1, is the more appropriate; is that the sense of your responses?

A More representative. It doesn't deal with just one sector. It deals with all sectors.

Q Let me just ask you, both of you, perhaps maybe Mr. Kulash or Mr. Potter would like to listen and provide a response as appropriate, let's just assume for a moment that in the calculations or tables presented by Sandia, Catawba did rank toward the top of the list of plants, the Catawba

#17-7-SueT

site, even if that were the case wouldn't the Catawba site still be within the regulatory requirements of the NRC and the applicable guidance documents?

A (Witness Potter) To my understanding, they would be.

(Witness Casper) Yes.

MR. GUILD: Mr. Chairman, I object to the calling for a legal conclusion as beyond the scope of the witness' direct cross-examination or qualifications.

MR. CARR: It is not a legal conclusion. It is a conclusion of fact based on an assumption. I asked a hypothetical question.

The question is that if you take the table and disregard where Catawba actually ranks and assume that they rank first, don't all the sites on that table come within the Commission's siting criteria.

MR. GUILD: Mr. Chairman, I think that calls for a legal conclusion that frankly goes to the ultimate issue that is before you in this contention. I just think it's a waste of space in the record to ask these witnesses to draw legal conclusions for this Board to draw, frankly.

I object.

#17-8-SueT

MR. CARR: That's not a legal conclusion. It is set out in the document.

JUDGE MARGULIES: We accept their expertise in the field and we will permit them to answer.

BY MR. CARR: (Continuing)

Q Mr. Edmonds?

A (Witness Edmonds) I would agree with that statement.

Q Mr. Casper?

A (Witness Casper) I would agree with that statement.

Q Mr. Potter?

A (Witness Potter) I would agree.

Q Mr. Glover?

A (Witness Glover) Yes.

Q So the position on the list, whatever position it might have on the table, is irrelevant; is that correct?

A (Witness Edmonds) I would agree.

Q Mr. Edmonds, you and Mr. Riley had a discussion with respect to, I believe, a projected population within the northeast quadrant from five to ten miles, about the projected growth to 2020. I think you said that was less

#17-9-Sue1j

than one percent.

Isn't a large part of that area an industrial park?

A That's correct. The area around I-77, which is right down the ten mile circle and inside of that is highly industrialized and probably would not experience the kind of growth rates that would be experienced elsewhere.

Q Mr. Casper, you and Mr. Kiley had a colloquy this morning first about bimodal wind directions, and you had said that the wind direction or prevailing winds from the northeast were a little lower than those from the northwest.

Do you recall that?

A (Witness Casper) Yes, I do.

Q How much lower in terms of time?

A Well, by a percentage or two lower than the southwest direction winds.

Q So for all essential purposes, they are equal?

A Within a percentage or two, yes.

Q And I believe you also talked about a hypothetical particle that went hither and yonder from time to time.

A Yes.

Q And the question was whether, and to what extent,

#17-10-Sue

you would have a complete reversal of direction of wind, and whether the particle would follow that.

Do you recall that?

A Yes, I do.

Q First, now often, just on a per year basis, would this wind reversal occur?

And -- strike that. would the wind reversal be over a short period of time? would it blow one way and then turn around and blow a hundred and eighty degrees, say, within a matter of a couple of hours the other way?

A No, not necessarily. Except in the case of a frontal passage, although even then it may not be exactly a hundred and eighty degrees. But in the case of that frontal passage that particle will never reverse its direction.

Q The particle would not reverse its direction?

A No. It would follow its original air band.

Q Now, you had indicated earlier that there was a potential for reversal of wind direction due to a body of water if the body of water is large enough.

Is Lake Wylie wide enough to have this phenomenon occur?

A No.

#17-11-Sue

Q In the discussion that it states to the southeast an average rainfall and above and below average, whether North Carolina, the Piedmont was above or below the average, should Florida be added to that list?

A I would add Florida as a southeastern state, yes.

Q Do you know roughly what the average rainfall in Florida is?

A No, but it's greater than Charlotte, probably somewhere around fifty inches per year.

Q Mr. Broome, you and Mr. Riley had some discussions about the Baxter-Harris fire and evacuation, and the role of the All Hazards Plan.

You also talked about notification. Let me just ask you, sir, during the Baxter-Harris fire, was the EBS system activated?

A (Witness Broome) Yes, it was activated I think on three different occasions.

Q And what information did the EBS system give people? Do you recall?

A If I recall correctly, the most important information that we disseminated was that for people who had left their homes with exposed food, the food should be

#17-12-Sue

disposed of in a proper manner and not be consumed. Shelter information was also provided. Those two I recall in specific terms.

Q Now, exclusive of the EBS activation, was there immediate coverage of the situation as it was going on?

A Most definitely. As a matter of fact, we had to evacuate WSOC TV studios due to chemical fumes and they were live, so to speak, on the scene.

Q And were other television stations there?

A Yes.

Q And radio stations as well?

A To my knowledge, every media organization -- and I know Charlotte had at least one representative there.

Q Now, you were also asked about whether, assuming there was notification through loudspeakers on vehicles, that people would be advised whether or not to shelter, where to pick up children, what to do about school if it were in session.

Would it be possible, Mr. Broome, for the EBS to carry out these functions once the initial notification is made?

A Yes. We would depend on the EBS to some extent

#17-13-Sue to carry out the information, yes.

end #17

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Q With respect to school children specifically, you were asked if school was in session what provisions are there in the All Hazard plan in southwest Charlotte, first to register children in shelters, and then to reunite the parents and the children.

Is there any need to have such a procedure in place now, or could it be handled following evacuation and people informed by media announcements of the situation?

A It could be handled based on the situation. The Red Cross, as Dennis Johnson I think testified, in previous testimony, has a procedure in place for registration. We might inconvenience the parent in getting to their child, but our primary concern would be the safety of the child.

Q On the All Hazards Plan, you spoke briefly about elementary schools, and the fact that they didn't have adequate shower facility, but that you would change that, or the process of thinking about changing. If it became necessary, would you assure that adequate showers are available?

A Yes. As a matter of fact, we have identified the shower capability for the showers that have been specifically assigned to Catawba, and most of the facilities that are identified in the All Hazard Plan are also identified for Catawba shelters.

Q With respect to the EOC and potential logistical

problems referred to in your testimony, and you mentioned it in cross examination about getting notification to people out, when will the EOC be manned, Mr. Broome?

A If you are speaking of a radiological incident associated with a fixed nuclear facility, the facility would be manned at the alert stage, which is one stage beyond a nuclear event.

If you are speaking of a situation that is not associated with a radiological incident, it would be manned based on the decision of the commanders of the emergency response organizations at the mobile command post if we deemed it necessary, or that it would go beyond the capability, the EOC would then be activated and would be fully staffed.

Q During cross examination, Mr. Riley suggested to you that it might be helpful to the Board if you could give them the resources, the number of resources available to you in Mecklenburg County and the City of Charlotte in the event that you could call on them in the event of a radiological emergency . Can you outline those resources?

A Yes. School buses, there are 627. City of Charlotte transportation buses, there is 100. City of Charlotte fire department, there are 630 personnel. Volunteer Fire Department in Mecklenburg County, there are 800 personnel. City of Charlottee Police Department, there is 800 personnel.

MR. GUILD: Can I ask Mr. Broome to indicate what

he is reading from? The question was asked of him last time and he did not elicit this spontaneous response. He obviously now has some documents available to him. It would be helpful to identify the source.

A The source was the Emergency Management Planning Review Committee, in which Mr. Riley was in attendance.

MR. GUILD: If you could just indicate. Is it a document. That is what I am asking.

A I wrote down the information at the meeting. Mr. Riley was in attendance at the same meeting, as was Mr. Guild.

JUDGE MARGULIES: Does that answer your question, Counsel?

MR. GUILD: If it is Mr. Broome's notes he is reading from, that helps me.

JUDGE MARGULIES: You may continue.

WITNESS BROOME: Mecklenburg County Police Department, 100 personnel. The Medic Staff, which is the county-owned, county-operated, 93 personnel. City of Charlotte Fire Department vehicles, 62, and these vehicles that I am identifying all have sirens and PA systems.

City of Charlotte Police Department has 160. County Police Department has 83. County Fire Department, which is the Administrator's Office, has 4. Volunteer Fire Department has 111. Sheriff's Department has 39.

Medic, 19. North Mecklenburg Ambulance Service has 4, and the North Mecklenburg Rescue Squad is approximately 3. That total is 485 mobile units, 2,433 personnel units, in addition to the buses that were identified. That does not count the local highway patrol, which I think there are 22 units in Mecklenburg County.

Q And it does not count the eight county medical vehicles?

A No, it does not.

Q With respect to Mr. Siebroele (Spelling).

A I don't know how to spell it either.

Q I can't spell it. But a question was asked about the ethnic makeup of the people up there. Is there any reason for you to conclude that the ethnic makeup of the people in Charlotte would preclude an effective response in an emergency?

A I would not look at ethnic makeup when I was looking at the basic planning principle by which any emergency plan is dictated by or governed by.

Q Now, with respect to the FEMA Report that you and Mr. Guild discussed, are you aware of any deficiency noted in either the City of Charlotte or Mecklenburg County on their part in the drill that can't be corrected?

A No. The items that were indicated as deficient, I think were deficient from the standpoint of clear definition

and adjustments in the training program.

Q And is there any reason for you to believe that such correction, including training if necessary, will not be done in a timely fashion?

A Some of the items that Mr. Guild made reference to has already been addressed in draft form. All the changes that FEMA dictates to me, recommendations will be incorporated into any document that I revise.

MR. CARR: That is all I have, Your Honor. Thank you, gentlemen.

BY MR. McGARRY:

Q At the beginning of the cross examination this morning, Mr. Kulash, you were asked the question whether or not you used current data or projected 20-20 data. I believe you indicated you used current data in your analysis, is that correct?

A (Witness Kulash) Correct.

Q Why do you use current data?

A That is what is called for in the requirement in Appendix 4 to NUREG 0654. It further suggests that you use census data. In that appendix they suggest that, which further implies current.

Another reason we use current data only is that the current situation is the only representation of the road network that we have, and we have no indication of what the roads are going to be twenty years hence, and until such

projection of road network is furnished, we can't make a corresponding traffic road projection.

Q Mr. Glover, in the event the population does change, is Duke in a posture that it will continue to examine its emergency planning and response capabilities?

A (Witness Glover) Yes, it is. Part of the rules that we work under, NC Part 50, Appendix E, where they state, at least on an annual basis, the licensee will review its emergency plans, and make changes as appropriate due to the extent or concept of planning that is detailed, whether it is state, local, or within the utility itself. So we would indeed review our plans and make any changes -- make information available to state and local people for changes that are necessary, as far as changes in population.

Q Mr. Potter, I believe the question involved you, and that was with respect to FES Table 5-11 and 5-12. Do you recall questions on that?

A (Witness Potter) Yes.

Q I believe one member of the panel was asked a question, I can't remember which one, but don't feel slighted. Chime in. What was -- what were the assumptions underlining that table, if you know?

A Table 5-11?

Q Yes.

A In Table 5-12, there was a question raised in

connection with the difference in the number of fatalities which would be computed at different probability levels for two different emergency response assumptions; one being for evacuation of the EPZ. That is the ten mile EPZ. The other for evacuation of the ten mile EPZ, plus relocation of people from ten to twenty-five miles.

The underlying assumption for the first case is that people beyond ten miles take no emergency response for at least twenty-four hours after the passage of the radioactive -- the airborne radioactive material. The underlying assumption in the second case is that people between ten and twenty-five miles take no emergency response until eight hours after the passage of the radioactive material.

Q And there would be some period of time associated with the time it takes for the plume to pass, is that correct?

A From the time it takes the -- between the initiating event and the core melt release, and between the time the release occurs and the time the radioactive material passes over people up in the range of ten to twenty-five miles.

Q So, in respect to the second assumption, it would be a period of time in excess of eight hours, is that correct?

A That is correct.

Q Mr. Broome, do you feel that based on your All Hazards Plan that the City of Charlotte, or the southwest

section of the City of Charlotte could be evacuated in a period -- not in excess of eight hours? Approximately eight hours.

A (Witness Broome) Yes, I think so. My testimony reflected, I think, seven hours.

Q Mr. Potter, you were cited to a section of the Federal Register with respect to the definition of -- strike that. The Code of Federal Regulations, and I hand you 10 CFR, Part 50, Appendix A. It is page 447 of the 1983 Edition, and under the caption single failure, if you could read those first two sentences -- I believe those sentences are the ones that Mr. Guild made reference. I want you to read it for the record.

A Single failure means an occurrence which results in the loss of capability of a component to perform its intended safety functions. Multiple failures resulting from a single occurrence are considered to be a single failure.

Q Did you apply that definition to your analysis?

A I did not do the plans and analysis upon which I relied, either the Wash 1400 or the RSSMAP. However, the conduct of those studies do not really consider these design criteria. These are design criteria for constructing licensing a plant, probablilistic risk assessments take into account the occurrence of multiple failures. Whether they in fact are dependent, that is caused by some common

event, or independent; that is, random without -- occur from independent causes. Random failures.

Q There was discussion, Mr. Potter, concerning the criteria set forth in 0654, NUREG 0654. Criterion B and C. We focused on the word, 'most' in respect to criterion B, and you were asked to place a percentage figure on that, and you said in excess of fifty percent, and then we focused on Criterion C, the use of the word, 'generally,' and you put a percentage on that, something -- approximately ten percent, is that correct?

A That is right.

Q With respect to Catawba, what percentages do you attach to Criterion B and C? Based on your analysis.

A What may not have been clear before was that I did not have to make a quantitative definition of those two terms. I calculated the probabilities based on a Catawba specific analysis, and I calculated, and I went to NUREG 0396 and drew from data there the corresponding probabilities; and 0396, the numbers were very close, and to the extent the 0396 numbers can be -- results can be characterized using the terms 'most' and 'generally,' mine can as well.

Q Mr. Potter, concerning Sequoyah RSSMAP, directing your attention in that regard, Mr. Riley mentioned loss of power. Did the Sequoyah RSSMAP consider the loss of power

scenario, accident scenarios?

A Yes. The Sequoyah RSSMAP and reactor safety study considered sequences initiated by loss of power.

Q Did you modify the frequency of those sequences?

A No. I modified only those sequences in which containment systems were operable. Other contingencies.

Q So that I am clear, you used the same categories as RSSMAP --

A The same frequencies for the other accidents as RSSMAP.

Q There was some discussion concerning the containment integrity. Do you recall that discussion?

A Yes.

Q I believe you indicated in your analysis you used 72 psig, is that correct?

A I believe my response was that I didn't perform the analysis, but I remember -- I recall from an analysis upon which I relied. The figure was 72 psig.

Q And Mr. Riley asked you if you were knowledgeable with respect to the testimony in the McGuire proceeding that reflected a 40 psi, is that correct?

A I recall the question.

Q And I believe that was the staff testimony?

A Yes.

MR. RILEY: May I correct that. I said that the

average value was 80, the 2 Sigma was 20, and the 2 Sigma down from the average is 40.

BY MR. McGARRY: (Continuing)

Q And that would have been the Staff testimony?

MR. RIELY: Staff testimony.

BY MR. McGARRY: (Continuing)

Q Mr. Potter, directing your attention to the Safety Evaluation Report that is in evidence in Catawba, directing your attention to page 3-24, am I correct -- am I reading it right? It says the Staff met with the Applicant on June 4, 1982, to discuss containment analysis design procedures, including ultimate strength and buckling analysis.

In this meeting, the Applicant indicated that the containment shell can withstand an ultimate internal pressure of 72 psig. The Applicant has provided the final information on this subject for the Staff's review. The Staff has reviewed the additional information, and found it acceptable.

And it goes on to make some conclusions. Is that correct?

A That is correct.

Q Mr. Potter, your Table 3, which is part of your testimony, assumes a six times ten to the minus five formula, is that correct?

A Core melt probability?

Q Yes, sir.

A That is correct.

Q What is the basis for that, for the useage of that?

A Part of that is based on risk assessment from the Reactor Safety Study for the Surrey plant and it's about the same as for the RSSMAP study.

Q Mr. Riley had a discussion with you in regard to this figure, and for several areas of inquiry; let me pursue that.

The first is if one were to base analysis solely on the experience to date -- I believe the discussion was that one would then use 1,000 reactor years; is that correct?

A If one looked at the raw experience, which basically says we have not had a core melt accident in 1,000 reactor years of experience, and gives an approximation about that.

Q And in your judgment would that be proper if it were done that way?

A No, it would not.

Q Why not?

A It fails to make the best use of the data.

The best ways to make use of the data is system-by-system, plant-by-plant in a systematic evaluation. When one does this, the -- you effectively do not have to wait for the occurrence of a sequence which involves a large number of low probabilities.

You can project from the parts to the whole, so to speak.

Q Perhaps you can help me with this, Mr. Potter: Mr. Riley, I believe, asked you some questions to the effect that if the probability is 1,000 times larger, would you subtract 3 from the value?

You said: I don't agree with the premise, but the arithmetic is okay.

MR. RILEY: Three from the exponent.

MR. MC GARRY: Thank you.

BY MR. MC GARRY:

Q Why don't you agree with the premise?

A (Witness Potter) The premise would imply that a core melt probability 6×10^{-2} per reactor year would be a reasonable representation of core melt probability. If core melt probabilities at power plants were that high, we would be experiencing core melt -- a core melt -- every couple of years or so.

Q You have assumed 6×10^{-5}; what impact would 10^{-4} value have on your results?

A It would increase the number in Table 3 and Table 2, but by a factor of less than 2.

Q Would that increase the significance?

A No, I would not regard that increase as significant.

Q You made reference to Surrey; the question was asked: was Surrey and Catawba comparable?

I believe you indicated, yes, within 10 percent.

Is that a correct statement?

A The question had to do with a combination of reactor core inventory and power level. I had mentioned that Surrey was a model plant, model PWR for the Reactor Safety Study.

I think the question was aimed at identifying whether we used a sufficiently high inventory of radioactive material in our analysis for Catawba.

In fact, we used the Catawba power level for our analysis; so the question doesn't really relate.

But to clarify the response to the question, Surrey is about an 800 megawatt plant. But for the WASH-1400 for the Reactor Safety Study, the core inventory for the PWR was calculated as thought it was an 1100 megawatt plant.

Q Mr. Kulash, the question was asked of you if you considered accidents in your analysis?

A (Witness Kulash) Yes.

Q would you explain how you considered that in making your analysis?

A Well, we determined the expected number of accidents that you get in the aggregate from all multi-evacuating traffic under the different extended EPZs we looked at, and then we also looked at the likelihood of accidents obstructing the evacuation traffic flow; and determined that the accidents that we could expect would not

significantly hinder evacuation traffic flow.

Q You are -- you were shown a copy of a document which is now an exhibit, which was accidents at various interesections in the City of Charlotte?

A That is correct.

Charlotte urban area.

Q Is such a listing common in your experience at the sites you have evaluated?

A It's common in urban areas. This kind of listing is common in built-up urban areas.

Q And is such a listing factored into your analysis of accidents?

A It is not directly. We examine -- we would examine such a listing; but these listings depend in large part for the accidents on which these listings are based -- they depend on daily traffic flows, morning and evening traffic flows.

And these flows are not relevant, are not necessarily relevant in an evacuation traffic flow; and maybe some of the high accident locations are not even on the evacuation routes.

Q So am I clear, the [illegible] accident analysis takes into consideration the evacuation phenomena that is ongoing?

A That is correct. It is based on that.

Q Mr. Casper, just to wind this up, Dr. Hooper

directed some questions to you concerning the use of the one-year meteorological data, and asked you if you were familiar with meteorological data in any of the surrounding nuclear power plants.

I ask you: are you familiar with meteorological data at these other nuclear plants, such as McGuire, Oconee?

A (Witness Casper) Yes, I am.

Q Is the data accumulated there similar to the data that has been accumulated for Catawba?

A The data for McGuire is similar; but not Oconee.

Q Why would that be?

A Mainly its location in the valley, not too far from the mountains; you have all kinds of different flows you don't find here in the Piedmont region.

Q So the record is clear, Mr. Casper, how did you satisfy yourself that the Catawba meteorological data was representative? I believe you made that statement; is that correct?

A That is correct.

Q How did you satisfy yourself?

A I would compare the two years of the data with the 30 year climatological record and I would compare the percentages in terms of percentages of those stable conditions, unstable conditions; the percentages of wind direction, frequencies from all sectors; percentages of different wind

speed categories. I would compare those to the 30 year data and satisfy myself the two year period was representative.

Q So the record is clear and there's no mis-impression: Was this a slap-dash effort?

A No.

I had done this in preparation for a previous contention in this area. I don't remember the contention number -- in which we had shown or had said that the data for the two year period was representative of the 30 year period.

MR. MC GARRY: No further questions, your Honor.

JUDGE MARGULIES: Recross?

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RECROSS EXAMINATION

BY MR. RILEY:

Q Referring to page 7 of your testimony, Mr. Edmonds, with respect to the ranking of the sector population by wind direction, is not the contention we are dealing with today concerned with population of this region and the emergency plans --

MR. CARR: Did I hear you say the sector prevailing wind direction?

MR. RILEY: That's right.

I quote: "Largest Population Section in the 10 - 20 Mile Ring."

WITNESS EDMONDS: I'm confused now; I am not sure

what the question is.

MR. CARR: I have a poblem with prevailing winds, but go ahead. I am sorry.

BY MR. RILEY:

Q Well, can you tell me what would be a more relevant factor with respect to getting an indication of risk from a release from Catawba than the product of wind in the population sector -- the population of the concerned sector?

A (Witness Edmonds) No. I can't tell you what a more relevant factor would be. I would agree that is one way of looking at it. I am sure there are other ways, but I haven't thought of other ways it could be done.

Q Mr. Casper, same question?

A (Witness Casper) I would tend to probably look at all three sectors in Charlotte, and not just southwest. In terms of risk to Charlotte, that is probably a good comparison; but I don't know what it really means.

Q Well, with respect to weather, on the same basis as before, subject to confirmation would you say the average rainfall for Florida would be 64.1 inches per year based on the NOAA document?

A Subject to check, I woudl; yes.

Q And would you take the average for Florida as being 49.44 inches?

A Something like that.

Q And would you then take the percentage of Charlotte rainfall in relation to that average as being 86 percent?

A Yes, I would.

Q Mr. Kulash, is accident indicence at the intersection in part a function of the, you might say, geometry and geography of the intersection?

A (Witness Kulash) Yes, it is.

Q Mr. Potter, was there a meltdown -- and this is not a pressurized water reactor -- a sodium-cooled breeder -- was there a meltdown at Fermi, a partial meltdown?

A (Witness Potter) You are talking about the breeder?

Q That's right.

A Yes, there was.

Q Is it true that the returns aren't in, that we don't know if there was a partial meltdown on TMI-2?

A I think that is probably a fair characterization at this point. I think there is indication; the breeder, of course, there there's a question of relationship to a light water reactor.

Q Is it true the breeder reactor was licensed to operate by the predecessor the NRC, the AEC?

A It was an entirely different reactor.

Q Would you please answer my question?

A Yes.

Q Were there safety considerations entertained at

that time?

A I would not consider the safety consideration comparable.

Q Were there safety considerations entertained at that time?

A Yes, there were.

Q Mr. Potter, you have clearly much more than a passing acquaintance with m thematics; you are familiar with the properties that characterize the distributions of phenomena? Probabilistic distribution, frequency distributions?

What about plain old averages of standard deviations? Are you familiar with those, too?

A Yes.

Q Would you expect that the distribution in the ultimate strains of reactor containments?

A Yes.

Q Would you have difficulty, then, in feeling that one could settle for 72 psig as a failure point for the Catawba containment, or would you say that this must be viewed in terms of properly attributed standard deviation?

A I am a bit far afield in terms of analyzing the strength of containments. That's not my area of expertise.

I would simply state that such a broad

distribution does seem to be -- or such a distribution does seem to be broader than distributions I am familiar with from other probabilistic risk assessment.

Q Would you consider it an oversimplification to discuss a precise breach point of 72 psi as opposed to a 72 psi average point plus or minus an appropriate standard deviation?

A It depends upon the context, if the standard deviation is small, I would not consider it an oversimplification.

Or if the likely failure pressure -- if the likelihood that failure pressure would be lower than 72, I would not consider it an oversimplification.

Q Would you challenge the standard deviation for McGuire of 20 psi which was performed by the Iowa State College Department of Engineering?

A I have not had an opportunity to evaluate it.

I would simply state it appears to be a little broader than what I am used to.

Q You would say it is a fairly large standard deviation?

A I can't recall the numbers right offhand, just off the top of my head.

Q I need some help at this point, and perhaps one of the witnesses can give it to me:

I believe that there was a discussion in the testimony -- and I can't locate it right now -- of data from NUREG CR 2339 involving Table D-3-1 and the product of windrose from SNF?

A (Witness Edmonds) I think that was addressed to myself and Mr. Casper.

Q Where is that material? I'd like to ask you some questions on it?

A (Witness Edmonds holding document in air.)

That's in 2339, but not testimony involving that information. I don't know of any previous testimony.

MR. CARR: It's not in the direct testimony. It was in response to my questioning him on redirect, which derived from your cross this morning.

MR. RILEY: No, a numerical table giving the SNF product data.

MR. CARR: No.

MR. RILEY: A question of how Catawba ranked in relation to other stations; I would like to ask some questions on it if I could find the table.

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A (Witness Edmonds) To my knowledge, that was not introduced today. I simply referred to it in response to Mr. Carr's question.

Q Could you tell us where that Table is published, then?

A It's in the Reg Guide. I can't remember the name of it. NUREG CR2239 at Table D.3-1, at Page D-55.

Q There is in here a Table 3-1 on Page 3-6 entitled "SPF and WRSPF Values for Five NRC Administrative Regions." Is that correct?

A That's correct.

Q And the Catawba station is in the south administrative region; is that correct?

A Yes.

Q And SPFs are given for five, ten, twenty and thirty miles; is that correct?

A Right.

Q Subject to check, would you agree with me that the values for Catawba is point zero two eight?

A Correct.

Q As compared to point zero three for the south district and point one six for the northeast, where the

#20-2-Sue

report says the values are highest; is that correct?

A Right.

Q And that for SPF 10, the value is point zero four eight compared to point zero five for the south district, and point one seven for the northeast?

A I think that should read point --

Q Zero nine eight?

A Zero nine eight.

Q All right. I revise what I said. Thank you for doubling it.

And for SPF 20, is it point two zero two for Catawba compared to point zero eight for the south and point two zero for the northeast?

A Correct.

Q All right. Now, SPF 20 is relevant then to the southwest part of Charlotte; is it not?

A That's correct.

Q And the value is essentially equivalent to that for the northeast where values are said to be higher and two and half times larger than that for the south; is that correct?

A That's correct. I would also point out there

#20-3-Sue

is some very large air bands on those numbers. In this case, the mean being point zero eight and the deviation being point zero six plus or minus.

Q Right. Now for SPF 30, which is getting out a bit past Charlotte now, Catawba is point one nine three --

A Correct.

Q For the south, point zero nine.

A Correct.

Q For the northeast, point two five?

A Correct.

Q All right. So we can say then that in the region of Charlotte, the SPF factors are about the same as they are in the northeast; is that correct?

A I would agree with that.

Q Now, let's take the product of the windrose factor by the SPF factor, and for Catawba it is at the five mile radius point zero one five as opposed to point zero four for the south, and point one seven for the northeast?

A That's correct.

Q And for the ten mile radius, it's point zero five nine for Catawba compared to point zero five for the south and point one eight for the northeast?

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A That's correct.

Q And for the twenty mile radius, which is relevant to Charlotte, it is point two five zero for Catawba.

A That's correct.

Q Compard to point zero eight for the south, and point two two for the northeast?

A That's correct.

Q And for the thirty mile radius, the value is point two four one for Catawba.

A That's correct.

Q Compared to point zero nine for the south, and point two six for the northeast?

A That's correct.

Q Again, the magnitude is essentially the same as that for the northeast?

A I would agree with that.

Q Now, it would be proper to explain the terms that are being used in here. Those terms are given on Page D-54 of NUREG CR2239, and reading Table D.3-1 presents the site population factor, SPF (SUB N), and the windrose weighted site population factor WRSF -- I'm sorry, WRSPF (SUB N) for each of the ninety-one reactor sites discussed

#20-5-Sue

in Chapter 2 of Appendix A.

Now, Mr. Broome, you were testifying that there are between twenty and twenty-five thousand students in the private and public schools, and you said that in the event that these children were put at risk in a nuclear accident that the emergency broadcast system would provide information that would be useful in matching up parents and children; is that correct?

A (Witness Broome) I said that would be one element that could be utilized.

Q You did say that. That's correct.

A (Witness Broome nodded in the affirmative.)

Q Now, would it be reasonable to assume that communicating on the EBS, the information with respect to the child, information that would say where the child was, might take on the order of a minute?

JUDGE MARGULIES: You are speaking about an individual child by name?

MR. RILEY: An individual child.

WITNESS BROOME: That might be done, Mr. Riley. We would make a statement over the emergency broadcasting system that children were evacuated from school, A, B and C

#20-6-Sue

shelter locations as one, two, three, your child will be at one of those locations.

I indicated it might make an inconvenience for the primary but our primary concern was the safety of the child.

Q In other words, you feel that there would be no exceptions and that the categories would remain preserved in going from the school to the shelter in what might be a fairly tense situation?

A would you define category?

Q Well, I don't have a photo recall in the sentence I just made.

Would you repeat the portion that causes you --

A I don't know. That's why I asked the question. If you would define it?

Q The sense of the question was, if you were evacuating school children, will they all stay in their appropriate envelopes so that all the children who were in School A end up in Shelter M?

A Not necessarily, Mr. Kiley. I indicated the primary concern was the safety of the child, to get the child to the closest available shelter to ensure them that

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they are going to be handled in a proper manner by qualified people. The inconvenience to a parent is not my concern.

Q Well, I think the anxiety of a parent would be a very strong concern.

A It the parent knows they can pick up their child at Schools 1, 2 and 3, it's going to be an anxiety but if they also know that their child's welfare and safety was primary I don't think they are going to consider anxiety to be that important of an element.

MR. RILEY: That will be all.

JUDGE MARGULIES: Mr. Driver.

MR. RILEY: Mr. Chairman, I ill considered saying that would be all. I have more material here. May I re-track?

JUDGE MARGULIES: How much more material do you have?

MR. RILEY: Not really much, sir.

JUDGE MARGULIES: Could you pretty well summarize it?

MR. RILEY: It is material pertaining to what Judge Hooper asked about.

JUDGE MARGULIES: All right.

#20-8-Sue1

BY MR. RILEY: (Continuing)

Q Mr. Casper, I believe you are probably familiar with this document?

It's called "South Carolina Air Quality 1982 Annual Report?"

A (Witness Casper) Yes, I've seen parts of it before.

Q And I show you one page, a map which shows the incidence of stagnation in the southeast over a three year period; is that right?

A That's correct.

Q Does it include the region of the Catawba plant and the highest incidence of the stagnation zone of three hundred and fifty in thirty years?

A Yeah. The incidence of days of stagnation, one of them is the high in the Catawba area, yes.

Q That would be approximately twelve such events a year?

A Eleven or twelve, somewhere between there, yes.

Q And the ground rule for return of another stagnation event is that it exists for four more days?

A You would have low wind speed conditions and a

#20-9-Sue1

high pressure situation continuing for four days. You would not necessarily have a poor dispersion situation around the immediate area, but the stagnation.

Q But in the context of stagnation, then we can say that it's reasonable to expect forty- five to fifty stagnation days per year on the average?

A That's correct.

MR. RILEY: Thank you. That will be all.

JUDGE MARGULIES: Mr. Guild?

MR. GUILD: Yes, thank you.

RECROSS EXAMINATION

BY MR. GUILD:

Q Mr. Broome, with respect to the existing state of preparedness of Charlotte under the All Hazards Plan, would you agree that the minor logistics problem that you identify in responding to an accident at Catawba under the All Hazards Plan would be largely remedied by the more detailed planning that would occur if you were required to extend the EPZ into parts of Charlotte?

MR. CARR: I would object to that, Your Honor. That's not a proper subject for Mr. Guild's question. That was not brought up on redirect. This is simply additional

#20-10-Sue

recross examination.

MR. GUILD: Mr. Chairman, I maintain that Mr. Carr himself said: Is there any reason that the minor problems that you acknowledge cannot be readily corrected, and --

MR. CARR: That dealt with a FEMA report that you questioned him about, Mr. Guild. It did not deal with the portion of his testimony that you are directing his attention to at this time.

MR. GUILD: I beg to differ, Mr. Chairman.

MR. CARR: The record speaks for itself, Mr. Guild.

MR. GUILD: Mr. Chairman, if I can direct this to the Chairman -- I don't want to argue with Mr. Carr, I am responding to Mr. Carr's effort on redirect to address the issue of problems that have been identified already with respect to the operation of emergency response under the All Hazards Plan.

I simply direct the witness' attention to the specific terms he used in his own prefiled testimony, and that's minor logistics problems. I want to know whether or not these problems would not be specifically remedied if

#20-11-Sue more detailed planning requirements were imposed through the extension of the EPZ.

I think that's consistent with his testimony and more clearly reflects the state of emergency preparedness.

JUDGE MARGULIES: I will permit the question. You may answer.

WITNESS BROOME: Would you rephrase it?

BY MR. GUILD: (Continuing)

Q Surely. I will try again. You have experienced some problems in emergency response under the All Hazards Plan, and I think you identify in your own testimony minor logistics problems that might occur in extension of emergency response into Charlotte under the All Hazards Plan.

My question is, wouldn't those kinds of problems be alleviated by advanced detail planning that would be called for under extension of the EPZ?

A Well, the question that is associated with this particular response deals with emergency vehicles to drive through neighborhoods to the southwest part. The minor logistics problem represents getting those additional resources that are not already in the area to a resource staging area or into the area, directly into a specific area for alert

#20-12-SueT notification that is not already being done so by existing units that are already in the area patrolling.

Logistics means resources to some extent. So, what you are doing, you've got resources in the area. You already initiated the alert notification process with those resources that are there. You are bringing in additional resources.

The minor logistics problem is coordinating those additional resources so that you don't have an overlap in your alert notification process.

(witness Glover) Mr. Guild, before we go beyond this, can I add something that I think is germane to this point?

Q Let me see it I can pursue this with Mr. Broome for another moment, Mr. Glover. And please do add something.

Mr. Broome, Page 4 of your testimony, back to this point with the EPZ: You are very, very specific with regard to function. Those are your words, Line 15?

A Yes.

Q And including, for example, which specific vehicles would be responsible for alert backup, alert responsibility?

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A That's correct.

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Q Transporting the dependent persons, those kind of things. Isn't it apparent, Mr. Broome, that if you had an EPZ extension, and you were obligated under regulation to have those kind of very, very specific more detailed planning, that you would alleviate a large number of the logistical problems that you have when you have to do it on an ad hoc basis?

A Well, not really, because as I indicated, the logistics is resources. You would have identified additional resources for specific purposes, but you would still be bringing in additional logistical components.

Q And it is your belief that the prior identification plan for the implementation of those resources would not aid you in avoiding logistical problems in implementation?

A If we had to go out to the area that is in question, under regulatory guidelines for planning purposes, 0654 indicates that you would identify -- I think the term was used, 'special essential facilities.' That being the case, we would be more specific in our identification process, because of the roads in area, you might look at a different alert notification method, because you got probably several thousand roads in the area that you have to be assured of being traveled by a particular vehicle, so you might want to look at another method. That is not

to say that we wouldn't use that method.

Q Mr. Broome, page 2 of your testimony, you speak of supporting documents that will be developed out of this office.

Are these standard operating procedures among those supporting documents? Earlier, I think you referred to them, to be expected within ninety to a hundred and twenty days, approximately?

MR. CARR: Objection, Your Honor. This is way beyond the scope of redirect. This did not come up at all in redirect. In fact, it didn't even come up on initial cross.

JUDGE MARGULIES: Which standard documents are these?

MR. GUILD: I think the witness nodded his head affirmative in response to my question, is that right?

JUDGE MARGULIES: My question is which documents are you speaking about?

MR. GUILD: The documents that are referred to on page 2 of Mr. Broome's prefiled testimony, and it is germane to recross. It is with respect to being more specific about implementing procedures that identify a number of things, perhaps including vehicles and routes and that sort of thing, and I just want to establish what he is speaking of here, and whether this is in part remedial

for the logistical problems that he has identified. It is connected, Mr. Chairman. At least I believe it is, and that is the purpose of the question.

Lines 23 and following, Mr. Chairman. The question is: Are these SOPs, standard operating procedures, which he earlier referred to be promulgated within ninety to a hundred and twenty days;in previous testimony, he referred to such procedures.

MR. CARR: I withdraw my objection.

BY MR. GUILD: (Continuing)

Q Mr. Broome, is that what you are referring to?

A Since we are speaking in the context of a basic planning document, then the response where you drew up the documents, it would be anything that would improve either the basic document or the All Hazard Plan.

Q What specifically do you have in mind here? Those are standard operating procedures?

A It could be the standard operating procedures. It could be the readdress of the shelter activation procedure. It could be any number of things that would support --

Q Is it both of those things?

A It could be any number of things.

Q I guess what I am not clear about, Mr. Broome, what do you mean when you use the term, 'supporting documents that will be developed.' Lines 24 and 25, page 2.

A Supporting documents could be any standard operating procedure, any procedure that simplifies the activation of a particular element, whether it be shelter, EBS, alert notification, it really doesn't matter. It would be any document that supports an existing document that improves the accuracy of the response organization to respond to a situation.

Q I misread the testimony. You don't have the particular documents in mind. You are talking generally, is that right?

A And previous testimony alluded to specific documents.

Q But here on page 2, lines 23 through 25 you are talking general?

A We are talking general plans, yes.

Q Mr. Broome, lastly, would you have any difficulty in the same vein as you talk of here developing supporting documents, phasing in enhanced emergency preparedness requirements for an expanded EPZ in Charlotte?

MR. CARR: Again I will object, Your Honor, on the same grounds as before. It was not brought up in redirect, and Mr. Guild covered this with Mr. Broome in cross examination. If he has a question he thinks he should ask on cross, it should have been done then.

This has been additional cross examination. It

has not been based -- this entire last ten minutes has not been based on earlier redirect.

MR. GUILD: Eight of the ten minutes has been Mr. Carr postulating. It really does relate, and I did have my time cut off, it is true, but I am trying desperately and diligently to be brief, and to try to wrap up this series of examination questions.

JUDGE MARGULIES: Does this conclude your examination counsel? I will permit the question.

WITNESS BROOME: Would you rephrase it please, Mr. Guild?

BY MR. GUILD: (Continuing)

Q You identified that you have additional supporting documents in mind that you could promulgate at a later time. You identified the need to remedy logistical problems, perhaps.

In that context, would you have any difficulty Mr. Broome, with the concept of phasing in enhanced emergency planning under a direction to expand the EPZ in part of Charlotte. One step at a time, including various items, for example, on the list of steps that Mr. Glover's affidavit included, for example?

A Well, I can respond to it this way, and although it is not relevant to the issue, it is germane to your question. An annexation occurred in the northern part of Mecklenburg County, in which the city went into the EPZ from McGuire.

All I did was go in and address the issue, and instead of assigning county resource, I assigned a city resource. The situation was resolved.

Q And you can follow a similar course here?

A I can.

A (Mr. Glover) Before you leave that --

JUDGE MARGULIES: I think we ought to leave the record as it is.

Is there anything further of the panel?

(NOTE: No response.)

JUDGE MARGULIES: There being nothing further, the panel is excused.

(Panel steps aside.)

JUDGE MARGULIES: We will resume tomorrow morning at 9:00 with Interveners prefiled testimony on Contention 11.

(Whereupon, at 5:40 p.m., the hearing was adjourned, to reconvene at 9:00 a.m., Thursday, May 24, 1984.)

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CERTIFICATE OF PROCEEDINGS

This is to certify that the attached proceedings before the NRC COMMISSION

In the matter of: DUKE POWER COMPANY

Date of Proceeding: May 23, 1984

Place of Proceeding: Charlotte, North Carolina

were held as herein appears, and that this is the original transcript for the file of the Commission.

James Burns
Official Reporter - Typed

James L. Burns Jr.
Official Reporter - Signature

Myrtle Traylor
Official Reporter - Typed

Myrtle Traylor
Official Reporter - Signature

Garrett Walsh
Official Reporter - Typed

Garrett J. Walsh, Jr.
Official Reporter - Signature