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NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF:

DUKE POWER COMPANY

(Oconee-McGuire)

Docket No. 70-2623

Place - Charlotte, North Carolina

Date - 26 June 1979

Pages 1632 - 1979

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

: In the matter of: :
: : :
5 DUKE POWER COMPANY : :
6 (Amendment to Materials License : Docket No.70-2623
SNM-1773 for Oconee Nuclear Station :
7 Spent Fuel Transportation and Storage :
at McGurire Nuclear Station) :
8 : :

Board Room, Fourth Floor,
Mecklenburg County
Administration Building,
720 East Fourth Street,
Charlotte, North Carolina.

Tuesday, 26 June 1979.

The hearing in the above-entitled matter was reconvened, pursuant to adjournment, at 8:00 a.m.

BEFORE:

- MARSHALL F. MILLER, Esq., Chairman,
Atomic Safety and Licensing Board.
- DR. EMMETH A. LUEBKE, Member.
- DR. CADET H. HAND, Member.

APPEARANCES:

On behalf of the Applicant:

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Debevoise & Liberman,
1200 Seventeenth Street, N.W.,
Washington, D. C. 20036.

WILLIAM LARRY PORTER, Esq.,
Associate General Counsel,
Duke Power Company,
Charlotte, North Carolina.

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1 On behalf of the Regulatory Staff:

2 EDWARD J. KETCHEN, Esq.,
3 RICHARD K. HOEPLING, Esq.,
4 JAMES R. FOURTELLOTT, Esq.,
5 Office of the Executive Legal Director
6 United States Nuclear Regulatory Commission,
7 Washington, D. C. 20555.

8 On behalf of the State of South Carolina:

9 RICHARD P. WILSON, Esq.,
10 Assistant Attorney General,
11 Office of the Attorney General,
12 State of South Carolina,
13 2600 Bull Street,
14 Columbia, South Carolina 29201.

15 On behalf of Intervenor Carolina Environmental Study
16 Group:

17 SHELLY BLUM, Esq.,
18 Blum & Sheely,
19 730 East Trade Street,
20 Charlotte, North Carolina 28202.

21 On behalf of Intervenor Natural Resources Defense
22 Council:

23 ANTHONY Z. ROISMAN, Esq.,
24 Natural Resources Defense Council,
25 197 - 15th Street, N. W.,
Washington, D. C. 20005.

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<u>Witnesses</u>	<u>Direct</u>	<u>Re-direct</u>	<u>Cross</u>	<u>Re-cross</u>	<u>Board</u>	<u>Ex. 34</u>
Jerry E. Jackson)		1635	1639	1640	1643	1654
C. Vernon Hodge)						
Resley D. Glenn)						
(Continued)						
D.H. Sterrett	1675		1678	1695	1698	
Lionel Lewis	1704	1705				
	1706		1729			
Thomas B. Cochran	1844		1920			
Dimitri Rotow)		1858				
Arthur Tamplin)						

<u>Exhibits</u>		<u>Iden.</u>	<u>Evi.</u>
App. 13	Sterrett testimony	1675	1704
App. 14	Tabulation of capacity factors	1696	
App. 15	Lewis testimony	1711	1924
CEEG 2			1735
NRDC 13	Resume and Testimony of Rotow.	1836	
NRDC 14	Testimony of Tamplin and Cochran (Later re-marked as 14A, B, & C.)	1839	
NRDC 14A	Testimony of Tamplin and Cochran	1849	
NRDC 14B	Tamplin's Professional Quals.	1849	
NRDC 14C	Cochran's Professional Quals.	1849	
NRDC 15	Testimony of Tamplin dated 5-25-73	1843	
NRDC 16	Affidavit of Tamplin (VI)	1843	

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Exhibits (Continued)Iden. Evid.

2	NRDC 17 Testimony of Cochran dated 5-25-79	1843
3	NRDC 17A Testimony of Cochran	1853
4	NRDC 17B Testimony of Cochran, Attach. A.	1853
5	NRDC 18 Affidavit of Cochran dated 5-1-79	1854
6	NRDC 13E ("No Need for AFRs.")	1923
7	App. 16 (Rancho Seco Survey of spent fuel managers.)	1966
8		
9	App. 17 (Detailed Notes re: Brunswick 1 & 2 and Robinson 2)	1967
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Whereupon,

JERRY E. JACKSON,

C. VERNON HODGE,

and

RESLEY D. GLENN

resumed the stand on behalf of the NRC Regulatory Staff and, having been previously duly sworn, were examined and testified further as follows:

CHAIRMAN MITTNER: The panel is present. Are we ready to resume the evidentiary hearing, Mr. McGarry?

MR. MC GARRY: Thank you, Mr. Chairman.

CROSS-EXAMINATION (Continued)

BY MR. MC GARRY:

Q Discussions last night centered upon the calculation that was performed I believe by Mr. Hodge.

Do you remember that calculation, Mr. Hodge?

A (Witness Hodge) Yes, I do.

Q And I believe the final result was that you calculated that for 300 shipments, there would be a one in 50 chance of an accident. Is that correct?

A There seems to be some question about the meaning of the number. The number we calculated was 0.02, which was equivalent to one out of 50. The units of the number are accidents per campaign where campaign is defined as 300

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1 shipments of 170 miles each.

2 Q Mr. Hodge, to ascertain the probability for one
3 shipment then you would multiply 50 times 300. Is that correct?

4 A To derive the number of accidents, you multiply
5 by 50 campaigns to get one accident.

6 Q And the accident we're talking about is a minor
7 accident; is that correct?

8 A It is true we calculate the number by taking the
9 number of accidents in our experience and dividing by an
10 estimate of the number of shipment miles, or shipment kilo-
11 meters. These accidents are minor in nature but they, in my
12 opinion, would represent the whole class of accidents.

13 Q There was some discussion yesterday, gentlemen,
14 about the proposition if an individual stayed beside a cask
15 at a distance of one meter for two hours, that individual
16 would get about 100 millirem dose.

17 Do you recall that discussion?

18 A (Witness Glenn) Yes.

19 Q Is that the correct figure?

20 A Let me go through it again.

21 Q The individual positioned one meter from the
22 cask for two hours would received 100 millirem dose. Is that
23 correct?

24 A That's correct.

25 Q Is that dose less than the permissible

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1 occupational limits?

2 MR. BLUM: Objection. I'm not sure how that's
3 relevant to anything, what the occupational limits are, when
4 you're concerned with an individual firefighter or some passer-
5 by from the public.

6 CHAIRMAN MILLER: You may ask on cross.

7 Objection overruled.

8 WITNESS GLENN: It would be less than the occu-
9 pational limits.

10 CHAIRMAN MILLER: Would you describe what you mean
11 by the occupational limits?

12 WITNESS GLENN: To me, occupational limits are
13 the 5 rem per year.

14 BY MR. MC GARRY:

15 Q Discussion also focused upon two accidents that
16 have occurred with respect to spent fuel shipments. Do you
17 recall that discussion?

18 A (Witness Glenn) I recall it, but that wasn't
19 part of my testimony.

20 A (Witness Holge) Can I have the question repeated?

21 Q Do you recall the discussion that focused upon
22 two accidents that have occurred in spent fuel shipments?

23 A Yes.

24 Q Was there damage to the cask in either one of
25 these two shipments?

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1 A There were some surficial markings on the cask,
2 but the cask was not ruptured to the extent that radioactive
3 material was released.

4 Q Gentlemen, yesterday do you recall a discussion
5 that treated the matter of cavity coolant release?

6 A (Witness Glenn) Yes.

7 Q Have you gentlemen considered cavity coolant
8 release in your dose computations?

9 A Yes.

10 Q Have you assumed a situation which would take into
11 consideration 100 percent cavity coolant release?

12 A We have.

13 Q And have you factored those calculations into your
14 opinions and your testimony?

15 A Yes, we have.

16 MR. MC GARRY: No further questions, Mr. Chairman.

17 CHAIRMAN MILLER: Any cross-examination limited to
18 the scope of redirect?

19 MR. BLUM: I have some.

20 CHAIRMAN MILLER: Will you proceed?

21 MR. HOEFLING: Mr. Chairman, they're my witnesses.

22 I haven't redirected yet. I think we're still on cross.

23 CHAIRMAN MILLER: I don't think it's really cross.

24 MR. HOEFLING: I agree with that. I don't know

25 what it is but....

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CHAIRMAN NELLER: I think we understand. When Counsel are interrogating witnesses whose position is essentially similar, we examine, we don't cross-examine, but everybody has been doing that.

Do you wish the witnesses next?

MR. HOEFLING: Yes, I have some redirect.

REDIRECT EXAMINATION

BY MR. HOEFLING:

Q Dr. Hodge, yesterday in responding to some questions from Mr. Blum at transcript page 1616 the following exchange took place. Mr. Blum posed the question:

"With that limitation -- and I will agree to that -- that's what you would expect, one chance in 50 that there will be some accident that would physically disable the tractor-trailer."

And your response was Yes.

Was that interchange correct?

A (Witness Hodge) As read, it is correct. The discussion of probability might not be correct.

Q Will you explain?

A What I mean to agree to is that the number is 0.02 accidents per campaign or one accident per 50 campaigns, each campaign being 300 shipments of 170 miles each.

Q And in the development of that number, what period

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1 of time did you use?

2 A Well, I agreed to the accident rate calculated by
3 Mr. Blum of 4×10^{-7} accidents per shipment mile, and I believe
4 that number would correspond to a decade of shipping at the
5 rate of 254 shipments per year.

1.090

6 Q So a ten-year period was used?

7 A Yes.

8 Q In your judgment is that a reasonable period?

9 A The accidents in question are the only accidents
10 in our experience and so I think it would be proper to relate
11 them to all spent fuel shipping which has occurred over the
12 past 30 years.

13 Q What effect would that have on the one accident
14 in 50 campaigns?

15 A That would reduce that number by a factor of
16 three.

17 Q Thank you.

18 MR. HCEFLING: That's all, Mr. Chairman.

19 CHAIRMAN MILLER: Mr. Blum.

20 MR. BLUM: Yes, sir.

21 RECROSS-EXAMINATION

22 BY MR. BLUM:

23 Q Now on that last point it is true, is it not,
24 that traffic has gotten increasingly heavier over time with
25 respect to spent nuclear fuel?

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eb7 1 A (Witness Hodge) I do not know the time-dependence
2 of the number of shipments.

3 Q Isn't it true that there were -- prior to the
4 70s, there were not very many commercial nuclear reactors in
5 business? Isn't that true?

6 A What do you mean by "many"?

7 Q Do you know how many commercial nuclear reactors
8 there were operating prior to 1970?

9 A I don't have that number offhand.

10 Q Was it greater than ten?

11 A It could be greater than ten.

12 Q Do you know how many are operating at this time?

13 A About 70.

14 Q Do you have any knowledge of any accidents--- Do
15 you know that there were no accidents connected with military
16 transport of wastes, the equivalent of spent nuclear fuel?

17 A No, I do not.

18 Q Those would be classified, would they not?

19 A Not necessarily. I'm just not aware if there
20 were any accidents of military shipments.

21 Q It is a fact that those two accidents took place
22 within an eight-year period, one in '71 and the other in '78?
23 Isn't that true?

24 A I think that's true, yes.

25 Q Dr. Glenn, did you testify that the occupational

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1 dose is 5 rem per year?

2 A (Witness Glenn) For occupationally exposed, yes.

3 Q And that amounts to about 2.4 millirem per hour?

4 Isn't that true?

5 A Yes.

6 Q So this postulated individual receiving 100-
7 millirem dosage in a couple of hours is receiving about 50 --
8 well, 100 over 2.4 times the occupational dosage?

9 A The only limit on the rate that you can obtain
10 occupational exposure is 1.25 rem per quarter, and you can
11 pick that up in one second.

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12 Q The occupational dose rate doesn't have much to
13 do with this fellow, the passer-by rescuing the driver of the
14 truck, for example, does it?

15 A The question is hard to understand. The indivi-
16 dual performing the rescue-- I'll answer that question no.

17 Q All right.

18 Now, Dr. Hodge, there was one accident I believe
19 in which the cask came off or toppled over and landed on a
20 soft surface. Wasn't that the '71 accident?

21 A (Witness Hodge) Yes.

22 Q By the way, did that break the trunions or did
23 the trailer cask unit overturn?

24 A As I recall, the trailer was still attached to
25 the cask and wound up on top of the cask.

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1 Q Do you have any idea what might have happened if
2 that combination -- if that cask had landed on a hard surface
3 or had hit a bridge abutment in that particular accident?

4 A No, I actually do not know the exact behavior of
5 the cask under such circumstances, whether the cask would
6 break open -- excuse me, whether there would be leakage of the
7 material would depend on the hardness of the surface involved.

8 MR. BLUM: No further questions.

9 CHAIRMAN MILLER: Anything further?

10 MR. WILSON: I would like, if we could, please.

11 BY MR. WILSON:

12 Q What's the non-occupational dose rate? We've
13 talked about occupational being 5 rem per year. What's the
14 non-occupational?

15 A (Witness Glenn) It would be one-tenth of that,
16 with an average of 170 millirem.

17 MR. WILSON: That's all.

18 CHAIRMAN MILLER: The panel may be excused.

19 MR. HOEFLING: I was going to move the Exhibits

20 8 and 9 --

21 CHAIRMAN MILLER: Dr. Luebke has a question or

22 two.

23 EXAMINATION BY THE BOARD

24 BY DR. LUEBKE:

25 Q It was mentioned yesterday that some of the

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1 shipping casks were out of service or grounded like a DC-10.
2 Is it just one or is it the entire group?

3 A (Witness Hodge) I believe we have called Pump
4 Service and Transportation System, all fabrications of that
5 one design.

6 Q Of one design? Which design?

7 A The model number is NFS-4.

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8 Q And that includes the one that Duke Power pro-
9 poses to use to ship fuel from Oconee to McGuire and maybe
10 to Catawba?

11 A Yes.

12 Q What are the circumstances that brought this
13 situation about? Is it a deficiency in meeting regulations
14 or an operational act? How did you get that?

15 A As I understand it, the vendor noticed on in-
16 spection that a particular cask had been fabricated differently
17 from the specifications and that a copper patch had been
18 placed on the shielding and also that there was a bow in the
19 alignment of the cavity. Not knowing if this had safety
20 ramifications until analysis was made, the NRC moved to with-
21 draw from service those casks.

22 Q I see. From service, all casks.

23 Now does this end up as a show-cause order where
24 somebody now has to prove that the deficiencies have been
25 corrected and that they may then be placed in service, or

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1 what is the next action?

2 MR. HOEFLING: Could I respond to that,
3 Mr. Chairman?

4 CHAIRMAN MILLER: Yes. Can your witnesses?

5 MR. HOEFLING: It's a question of--

6 CHAIRMAN MILLER: They're under oath, and you're
7 not.

8 MR. HOEFLING: I was only concerned with the
9 question of show-cause order. That's a legal document.

10 CHAIRMAN MILLER: Very well. As far as the legal
11 or procedural aspect, yes, we'll accept Counsel's explanation,
12 but we still want to hear from the witnesses.

13 MR. HOEFLING: The only thing I wanted to point
14 out is there is a show-cause order which has issued and it's
15 suspended the certificate until such time as it could be shown
16 that the casks that were affected met the certificate.

17 In other words we have here an approved design.
18 The question is whether or not the cask meets the design.
19 And until that is shown, the casks have been withdrawn from
20 service.

21 DR. LUEBKE: So if they wanted to ship next week
22 they couldn't. But will this be months, or years?

23 MR. HOEFLING: It is my information, and perhaps
24 the witness can respond more to this, that two of the casks
25 appear to meet the certificate -- excuse me, three of the

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1 casks appear to meet the certificate. The remaining casks
2 appear to exceed the specifications of the certificate.

3 CHAIRMAN MILLER: How many casks are we talking
4 about altogether?

5 MR. BLUM: I would like this under oath if we're
6 giving factual testimony.

7 CHAIRMAN MILLER: You're going to get it under
8 oath.

9 MR. HOEFLING: My understanding is that six are
10 completed and one is in construction.

11 CHAIRMAN MILLER: We would like to get these
12 matters under oath. Now are there more explanations, Counsel?

13 MR. HOEFLING: No, Mr. Chairman.

14 WITNESS GLENN: Mr. Chairman, we have read the
15 record and that information on the number of casks is in the
16 record.

17 CHAIRMAN MILLER: I think you're right, but let's
18 have it in again to be sure.

19 BY CHAIRMAN MILLER:

20 Q What's the total number of casks?

21 A (Witness Hodge) I have seen that number and I
22 think it is six casks, one under construction.

23 Q So it is six plus one under construction cr--
24 What's the one? Is it off the six or in addition to the six?

25 A I'm not totally sure whether we have five built

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1 and one under construction or six built and one under con-
2 struction.

3 Q All right.

4 Are these the NFS-4 type of casks?

5 A Yes, they are.

6 Q Are there any other casks that are involved in
7 the shipment of spent fuel at the present time or in the fore-
8 seeable future?

9 A Yes, there are.

10 Q These are not, however, the type that are con-
11 templated for use by the Duke Power Company. Is that correct?

12 A That's true.

13 Q How many of these are there in use?

14 A I'm sorry, I don't have that number.

15 Q Could you approximate it for us, estimate it?

16 A It's on the order of ten, I would think.

17 Q All right.

18 And those are all in one place, one company, or
19 is it spread around the country?

20 A There are several companies involved. We have
21 certified six designs.

22 Q Six designs?

23 A Six designs.

24 Q And out of those six certified designs, how many
25 have been built and are in operation?

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1 MR. HOEFLING: Mr. Chairman, just for the sake
2 of the record, last Wednesday, June 20th, Mr. Spitalny pro-
3 vided some testimony in this area at transcript 585 going
4 through 587, where he presented information as to how many
5 cask designs are authorized, and the number of casks in opera-
6 tion under each authorization.

7 I just want to mention that here so that if some-
8 body is reading this part of the record they can refer back
9 to that information which was provided by Mr. Spitalny.

10 CHAIRMAN MILLER: Thank you.

11 Is there any difference between the testimony
12 being given today and that which you tell me is in the trans-
13 cript?

14 MR. HOEFLING: There's a point of-- No. A
15 point of clarification:

16 There are six-- Referring to the NFS casks, there
17 was some confusion whether there were six and one or five and
18 one. This makes it clear that there were six and one, six
19 spent fuel casks available, one under construction.

20 DR. LUEBKE: And some of these are at users, like
21 at Duke Power? They are delivered?

22 MR. HOEFLING: Yes.

23 BY DR. LUEBKE:

24 Q I have another series of questions that gets back
25 to the testing at Sandia.

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1 Mr. Blum asked the question of whether the shipping
2 cask tested at Sandia was the same or different from the one
3 that Duke Power plans to use in their shipment, and I think
4 the answer came back that it was different, so I think the
5 follow-up question would be, in what respects is it different
6 from the ones that are in operation?

7 A (Witness Hodge) Well, I don't know all the
8 differences in detail.

9 Q Well, the important ones? If one is painted
10 green and the other is painted red, that's probably not im-
11 portant.

12 A The first important one is that the cask tested
13 was not designed to carry present generation light water
14 reactor spent fuel, it being, in my understanding, smaller
15 cask.

16 BY CHAIRMAN MILLER:

17 Q Do you have any judgment as to the size, its
18 weight, and other significant factors which would illustrate
19 the differences between the two?

20 A I don't recall how big the cask tested was, but
21 I can say that I think it was a GE cask of the same genus as
22 the IP-100 design.

23 The size of LWR casks -- Pressurized water
24 reactor spent fuel is on the order of 14 feet long. The cask
25 is about 20 feet long to accommodate that. We have two

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1 certified designs which carry one pressurized water reactor
2 spent fuel element each or two boiling water reactor elements.

3 We have one design to carry three PWR elements,
4 PWR meaning pressurized water reactor, one design to carry
5 seven BWR elements, and two designs of the IF-300 cask of
6 General Electric which will carry -- I believe it carries
7 seven PWR elements or 18 BWR elements.

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1 And then there was one designed for 10 BWR
2 elements or 24 BWR elements.

3 So the casks tested could be said to be smaller
4 than the light-water reactor cask under discussion.

5 BY DR. LUEBKE:

6 Q How about the motion limiters, is that the correct
7 word?

8 A (Witness Hodge: The impact limiters?)

9 Q The impact limiters.

10 A I do not know the exact differences, but I under-
11 stand there are differences in the impact limiters and in the
12 tie-down arrangements.

13 Q The concept was at least involved?

14 A Yes.

15 Q How about anything else like lead shielding versus
16 uranium shielding, is that a reasonable example?

17 A Well, you have examples of either uranium --
18 denatured uranium or lead shielding in LWR casks, so
19 it would not be a strong difference.

20 Q How about other structural features, the cylinder,
21 the inside container, anything significant?

22 A No, the designs would be quite similar in that
23 regard.

24 Q So it wasn't a case of you had an object you
25 tested at Sandia and there were some, let's say, less than

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expected results and the engineers improved on the design and so that the things that are out in service are the improved design, that's not the chain of events necessarily here? Or is it?

A I think you're right, yes.

Q That is the chain of events?

A Excuse me, there was no improvement of LWR design as a result of tests.

Q Mainly just to change its size.

We now read that there will be some more testing related to this new proposed regulation. Will that be with a genuine article now in service or will that be on the so-called test object?

A Excuse me, to what did you refer?

Q Surrounding this publication of the new regulation on -- what is it called? --

MR. HOEFLING: Mr. Chairman, can I comment?

CHAIRMAN MILLER: Yes.

MR. HOEFLING: There is going to be some research testing surrounding the new regulations but that testing, it's my understanding, goes to release fractions and not crash tests of casks.

DR. LUEBKE: I guess I'm asking are we going to give Sandia an example of a modern-day cask or the old-fashioned one?

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2 BY CHAIRMAN MILLER:

3 Q What do you know about that.

4 A (Witness Hodge) The research program is in a
5 fledgling stage. The purpose in issuing will be to study the
6 behavior of fuel in explosive environments. And eventually,
7 a full-scale test will be envisioned, in which case, an LWR
8 cask design will be used or might be used, but at the moment,
9 one cannot answer that definitely.

10 BY DR. LUEBKE:

11 Q I was wondering about it because it sounds like
12 a destructive-type test that people might be reluctant to
13 put one of their goodies in here. On the other hand, if you
14 don't use the genuine article, you may not learn as much as
15 you could.

16 A That's right.

17 DR. LUEBKE: I think that's all I have. Thank you.

18 MR. BLUM: Do I have a chance to question on this
19 ground?

20 CHAIRMAN MILLER: You've had two or three rounds.

21 MR. BLUM: It's just on these two areas, just
22 on these areas.

23 CHAIRMAN MILLER: When the Board examines at the
24 end, it assumes that all questions have been asked. It isn't
25 meant to open up a new round.

We'll make an exception, but keep in mind that the

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1 Board's questions are meant to be the terminal point rather
2 than the source point of a lot more questions.

3 You may inquire.

4 CROSS-EXAMINATION ON BOPRE QUESTIONS

5 BY MR. BLUM:

6 Q Do you know whether the defect in the cask that
7 resulted in the show cause order was first noted in 1974?

8 A (Witness Hodge) No, I do not.

9 Q You don't know when it was first noted?

10 And is it not true that the Sandia test cask did
11 not have a neutron shield outside, an external neutron shield?

12 A I don't know that detail.

13 Q Do you know whether there was a difference in the
14 lid design between the Sandia test cask and the NAC-1 cask?

15 A To my understanding there is a difference.

16 MR. BLUM: No further questions.

17 CHAIRMAN MILLER. Thank you.

18 Anything further?

19 MR. WILSON: I have a couple of short questions,
20 Mr. Chairman.

21 BY MR. WILSON:

22 Q Mr. Hodge, can you tell us whether the analysis
23 that was used in the Sandia studies on the other cask was
24 later applied to the NFS-4?

25 A (Witness Hodge) What do you mean by --

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requirements.

Q Am I to understand, then, that a defective cask can actually go into service before the errors in manufacture are discovered?

A That may be a possibility, yes.

Q And at present I understand there are no safeguards, as far as NRC inspections, prior to the placing of the cask in service, is that correct?

A Oh, no. There are some preliminary determinations to determine that the cask is roadworthy.

Q And what are those briefly?

A I don't know how to describe it briefly. I don't know the detailed answer.

Q Can you give us some answer, some idea of just what is involved here, briefly or otherwise?

A No, I can't.

Q Can any other member of the panel?

A (Witness Glenn) (Negative indication.)

Q Is there any other witness -- I take it that was a no because of the negative shaking of the head, is that correct?

A No.

Q Is there any other witness who may be able -- who can testify as to the safeguards just briefly and as to the techniques that, as Dr. Hodge indicated, are implemented

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1 Q Was it an analytical method or study method that was
2 applied?

3 A There was an analysis involved in the testing
4 program, yes.

5 Q And that was after the Sandia original test, is
6 that correct?

7 A Yes.

8 Q And was a similar analysis applied to review the
9 NFS-4?

10 A Not to my knowledge.

11 Q All right, sir.

12 Earlier also you mentioned the fabrication defect
13 with the casks that had been taken out of service. Now, does
14 that indicate a manufacturing defect that was initially
15 incorporated into the cask at its manufacturing point?

16 A Yes, I think it would indicate that, but I do
17 not know that.

18 Q All right, sir.

19 And the cask had been certified, is that correct,
20 by the NRC and then was subsequently decertified?

21 A The practice of the NRC is to certify cask designs.
22 And recently, we have instituted quality control requirements,
23 including fabrication, and then we include that in the
24 certification. The fabrication of a cask from a certified
25 design can go forward subject to the quality control

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1 before the cask goes into service to indicate its roadworthi-
2 ness?

3 CHAIRMAN MILLER: Do the witnesses know of any
4 other persons who may have that information?

5 WITNESS HODGE: I may be able to procure that
6 information from my home office.

7 MR. WILSON: Mr. Chairman, I presume at some later
8 time the witness would be available to present that information.

9 With that one reservation as to that question,
10 I believe that's all we have.

11 CHAIRMAN MILLER: Well, we'd better find out.

12 Is the witness going to ascertain the information,
13 Dr. Hodge, and then are you going to be available?

14 WITNESS HODGE: Yes, I will try to obtain that
15 information.

16 CHAIRMAN MILLER: Thank you.

17 I take it, counsel, this is in accordance with
18 your plan?

19 MR. HOEFLING: We will provide the information,
20 I'm not sure whether it will be provided by Dr. Hodge or
21 by someone else.

22 CHAIRMAN MILLER: All right.

23 Does that conclude the examination of the panel
24 and the members thereof?

25 (No response.)

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1 CHAIRMAN MILLER: Thank you. You're excused,
2 subject to the one reservation.

3 (The witness panel excused.)

4 MR. HOEFLING: I'd like to move Staff Exhibits
5 8 and 9 into evidence.

6 CHAIRMAN MILLER: Any objection?

7 (No response.)

8 CHAIRMAN MILLER: There being none, it will be
9 accepted into evidence.

10 (Whereupon, the documents
11 previously marked as Staff
12 Exhibits 8 and 9, were
13 received in evidence.)

14 MR. HOEFLING: Yesterday I provided the Reporter
15 with the necessary copies to have it bound into the record.

16 CHAIRMAN MILLER: It may be combined with the
17 transcript of the record.

18 (The documents follow:)

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)

DUKE POWER COMPANY)

Docket No. 70-2623

(Amendment to Materials License
SNM-1773 for Oconee Nuclear Station
Spent Fuel Transportation and Storage
at McGuire Nuclear Station))

AFFIDAVIT OF C. VERNON HODGE, WILLIAM H. LAKE, JR.
AND R. DANIEL GLENN

Introduction

Our names are C. Vernon Hodge, William H. Lake, Jr. and R. Daniel Glenn. Copies of our professional qualifications are attached.

This affidavit addresses a contention which reads as follows:*/

Transportation of spent nuclear fuel from the Oconee Nuclear Station for storage at the McGuire Nuclear Station will create an unacceptable hazard by significantly increasing the radiation doses to persons in the region near the proposed transportation routes between the two facilities, specifically:

(c) There is likely to be an unacceptable incremental burden of radiation dose to persons in the vicinity due to an accident**/ or delay in transit.

*/ This contention is raised by both the Carolina Environmental Study Group and Carolina Action as Contention 2 of "Stipulations" dated October 18, 1978. Only Part (c) is addressed in this affidavit. Parts (a) and (b) are addressed elsewhere by the NRC Staff.

**/ Accident as related to this contention includes the likelihood of a melting or breach of cask accident.

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Discussion

Spent fuel is highly radioactive and requires heavy shielding for safe handling. Massive, durable, heavy casks are required to transport these materials. The form of spent fuel is the same as that of new fuel except for differences in chemical composition and physical properties due to irradiation - spent fuel pellets containing fission products in both gaseous and solid state. The pellets are clad with light metal and assembled in rods and elements which are tightly inserted into spent fuel casks. Both the form of the material and the heavy casks in which it is shipped protect against consequences to public health and safety that would otherwise result from transportation accidents.

A spent fuel cask is generally cylindrical in shape and about 20 feet long. The basic components include a steel inner vessel which contains the fuel elements and spacers or neutrons absorbers to assure nuclear subcriticality. The inner vessel is surrounded by several inches of shielding (dense metal for attenuation of gamma radiation) encased in a steel jacket. Several inches of hydrogenous material (such as water) for attenuation of neutron radiation surround the gamma shield. A steel outer jacket completes the package. The cask may also be equipped with sacrificial impact limiters to absorb forces involved in impact accidents. The closed inner vessel is filled with the primary coolant (air, helium, water) to aid in the dissipation of heat generated by radioactive decay.

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The designs of spent fuel casks are regulated by the Department of Transportation (DOT; 49 CFR Parts 170-189) and by the Nuclear Regulatory Commission (NRC; 10 CFR Part 71). The NRC reviews the designs for certification of compliance with the requirements of 10 CFR Part 71. The review addresses the capability of the package design under both normal and accident conditions to retain its radioactive contents, to shield the external environment from the radiation of its contents, to dissipate its internal heat to the external environment at a safe rate, and to assure nuclear subcriticality. In addition, the package design is reviewed with respect to quality assurance in acceptance, operations, and maintenance. Standards for these aspects are also prescribed in 10 CFR Part 71.

In seeking to protect public health and safety from the effects of transportation accidents, the NRC regulations prescribe a performance standard and an acceptance standard for each package of radioactive material. In the case of a spent fuel cask, the performance standard is a series of tests applied sequentially and the acceptance standard is essentially no release of radioactive material. It must be recognized that under the test conditions some coolant or gaseous material entrained in the coolant or in the gap between fuel cladding and fuel pellet may be released from the cask. Release of this material would not be significant to public health and safety; the acceptance standard limits the quantities of such releases to assure that they would not be significant.

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These casks are designed to withstand, without release of radioactive material in excess of the regulatory limits specified in 10 CFR Part 71.36(a)(2), a severe accident damage test sequence to simulate the effects of severe impact, puncture, fire, and immersion in water as specified in Appendix B of 10 CFR Part 71. The test sequence includes:

- 1) a free fall from a height of 30 feet onto an essentially unyielding horizontal surface, striking the surface in a position for which maximum damage is expected;
- 2) a free drop of 40 inches striking (in a position which is expected to cause maximum damage) the top end of a vertical cylindrical steel bar, 6 inches in diameter and at least 8 inches long, mounted on an essentially unyielding horizontal surface;
- 3) a thermal test in which the cask is exposed to a heat input equivalent to that of an oil fire (1475°F for 30 minutes); and
- 4) immersion in water to the extent that all portions of the cask are under at least 3 feet of water for a period of not less than 8 hours.

These test conditions make up the design basis accident for a spent fuel cask, meaning that package designs which meet the criteria under the above conditions provide reasonable assurance that the cask will withstand most severe transportation accidents without the release of significant radioactivity.

Spent fuel casks have been subjected to many tests and analyses to find the most vulnerable aspects of the package designs. Recently, the Department of Energy (DOE) sponsored full-scale impact testing of casks mounted on trucks and a rail car by colliding the vehicles with concrete abutments or speeding locomotives. In these tests, the casks were not damaged significantly and conclusions were drawn that the abilities of the casks to contain and shield their contents were not impaired

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in the tests.^{1/} In a full-scale fire test described in the same document, the rail cask was set in a large pool of jet fuel which was ignited and burned for about two hours. After an hour and a half, the lead shielding had all been melted but was still contained. After that time, a small crack appeared in the outer steel skin of the cask and molten lead was slowly expelled.^{1/} The results of these full-scale tests are interpreted by the NRC staff as data which increases its confidence in the NRC regulations and in the NRC reviews of each cask design submitted for approval.

Spent fuel casks have been allowed in the public transportation system for the past thirty years or so. In a recent survey conducted by the NRC, the annual shipping rate for spent fuel in the United States was estimated for 1975 as about 270 shipments per year.^{2/} As of 1972, about 3600 shipments of spent fuel had been made.^{3/} Two accidents to spent fuel casks have occurred during that time. On December 8, 1971, a truck carrying a spent fuel cask was overturned on a highway in Tennessee.^{4/} The accident was apparently caused by an oncoming tractor-trailer veering into the lane of the cask vehicle on a curved portion (150 foot radius) of the road. The driver of the cask vehicle negotiated about 300 feet of the curve, but lost control of the vehicle. The vehicle came to rest upside down in the ditch beside the road with the leading end of the cask embedded three feet deep in soft soil. The cask had skidded about thirty yards along a ditch with the tractor-

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trailer attached. Only minor cask damage was discovered in the initial investigation and no additional damage was discovered in subsequent more detailed inspection. The driver of the cask vehicle was killed in the accident; no other injuries occurred. An Atomic Energy Commission (AEC) emergency response advisory team from its nearby Oak Ridge Operations Office arrived on the scene within an hour of the accident and determined that no radioactive material had escaped from the cask. Later, careful health physics surveys also revealed no additional radiation from the cask due to the accident. The wreckage and cask were removed from the highway and traffic was restored by law officers. The cask was transported to its destination on the same day, having been delayed by the accident by seven hours.

In the other accident, which occurred February 9, 1978, on a highway in Illinois, a truss-type trailer in which a spent fuel cask was being carried experienced a structural failure.^{5/} The vehicle was traveling about 50 mph when it struck a sharp road surface heave, causing the top trailer longerons (structural supports) to buckle and the trailer bottom to drop to the road surface, after which the driver maneuvered the vehicle to a stop at the edge of the road. Early observations, later confirmed by closer visual examination, indicated no visible damage to the cask. No injuries or other property damage occurred. An Illinois agency responded to the

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accident. Radiological surveys showed no abnormal conditions. The trailer was cut away from the cask and the cask was loaded into another trailer and transported the next day to its destination. Traffic was restored by law officers; the highway had been closed to traffic for fifteen hours.

The analysis of transportation accidents involving radioactive materials shipments begins with a study of how severe they are, how frequently they occur, and what might be the possible consequences of them. In 1972, the Atomic Energy Commission (AEC), the predecessor agency to the Nuclear Regulatory Commission (NRC), issued "Environmental Survey of Transportation of Radioactive Materials to and from Nuclear Power Plants," WASH-1238. In this document, accident severity is broken down into five categories. In order of increasing severity, they are minor, moderate, severe, extra severe, and extreme. The categories are described in Table 6-1 of "Environmental Impact Appraisal Related to Spent Fuel Storage of Oconee Spent Fuel at McGuire Nuclear Station - Unit 1 Spent Fuel Pool" (EIA).^{6/} This table includes estimates of the frequencies of these accident severities. These frequencies become more meaningful when they are applied to the proposed shipping campaign. Assuming this campaign consists of 300 shipments in one year of 170 miles each, the number of years between accidents of the same severity is given by:

Minor	14 years
Moderate	50 years
Severe	2500 years
Extra Severe	25,000,000 years
Extreme	1,000,000,000 years

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In WASH-1238, the staff considered that spent fuel casks would meet the regulatory standards for containment, shielding, and criticality in accidents classed as minor, moderate, and severe. The DOE sponsored accident tests described above indicated that the particular spent fuel cask tested would meet these standards in accidents of greater severity. Accident scenarios of greater severity than the severe category have been considered in both WASH-1238 and in the EIA. The evaluated consequences in these documents (Appendix B of WASH-1238; Section 6.1 of EIA) lead to the conclusion that the risk to public health and safety from transportation accidents involving radioactive materials shipments is small.

The contention refers to a melting or breach of cask accident. Such an accident would belong to either the extra severe or extreme category described above. As discussed above, the probability of an accident severe enough to cause either of these types of package damage is extremely small. The joint probability of both melting and breach of cask occurring in the same accident would be even smaller. In many accident scenarios considered, the wreckage resulting from a collision serves to shield a package from fires. Extensive quantities of fuel are required to maintain fires capable of elevating to high values the temperatures of packages that happen to be located nearby.

Even in the event of the accidents postulated above, it can be shown that melting of the nuclear fuel is not credible.

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Considering for the moment the source of heat within the cask, it should be noted that the maximum internal heat load for a spent fuel cask is limited by an approval condition specific to each cask design. In setting a maximum acceptable internal heat load, the applicant must demonstrate that the heat can be passively dissipated (that is, without the assistance of active auxiliary heat removal systems that may be mounted on the cask vehicle) from the cask following the accident damage tests discussed above, while the cask meets all the shielding, containment, and sub-criticality requirements of 10 CFR 71.36. The maximum internal heat load is not sufficient to melt the fuel (uranium dioxide melting temperature exceeds 4500°) or the fuel cladding (typical cladding material melting temperature ranges from 2600°F to 3300°F). It is concluded that melting under normal or accident conditions from an internal heat source is not credible.

With respect to external heat sources, the regulatory accident tests include a half hour fire, equivalent to a heat source at 1475°F with an emissivity coefficient of 0.9 radiating to the cask which is assumed to absorb 80 percent of the incident radiant heat which completely surrounds it. Each spent fuel cask is evaluated against the design basis accident conditions described above to assess the effects of the accident conditions on the ability of the cask to dissipate heat after the sequence of tests. Authorization to use a cask means that the cask can dissipate such heat and therefore the contents will be maintained at temperatures below the melting temperature.

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It has been determined that such an accident would not result in fuel melt but might result in some creep rupture of the fuel cladding. Creep failure is a temperature time phenomenon evident at elevated temperatures, each material being characterized by its own onset temperature well below its melting temperature. It is observed as progressive failure under fixed stress and temperature. Increasing the load on the material or increasing the temperature results in accelerated failure.

Such failure may yield subsequent release of noble gases and possibly small quantities of volatile solid radionuclides such as cesium and tellurium through an assumed breach in the containment vessel. The consequences to public health and safety from such releases are not significant. For example, the maximum individual whole body dose commitment is estimated in Table 6.3 of the EIA as 0.28 rem. The population whole body dose commitment estimated in Table 6.3 of the EIA for Population Center B is 370 person-rem. The average individual dose commitment is estimated as 0.032 rem. Considering that one million person-rem of whole body population dose results in about 120 latent cancer fatalities,^{2/} this population dose would mean 0.04 latent cancer-fatalities, that is essentially no health effect.

Temperatures sufficient to produce creep rupture were observed in an analysis of a cask containing more than one fuel element. For casks containing one fuel element, such as are proposed to be used in the Ocone-McGuire transfer of spent fuel, significant creep rupture of fuel cladding would not be expected for loss of coolant or fire accident conditions.

The NRC staff has recently examined its regulations on packaging and transportation of radioactive materials.^{2/} Transportation accidents of all severities were considered to obtain an expectation value for public health and safety consequences. Assumed accidents involving spent fuel casks shipped at the 1975 rate infer an expected value of about 0.00004 latent cancer fatalities from that year's spent fuel shipping. Another way to express this result is that if the shipping rate is constant at the 1975 value, one would expect accidents to spent fuel casks to result in about 4 latent cancer fatalities in one hundred thousand years of shipping. These health effects would not be manifest at the time of any given accident, but might occur within significant fractions, say 30 years, of individual lifetimes after the accident.

Applied to the proposed shipping campaign, and assuming the proposed shipping rate is constant, the expected rate of latent cancer fatalities from accidents is roughly a factor ten smaller than the national value for 1975. Recognizing that the proposed shipments will not continue indefinitely, the expected health effects must be smaller yet.

The discussion above leads to the conclusion that for all but the most severe transportation accidents, the cask integrity will not be reduced. That is, one would not expect the cask to be breached in an accident so that a significant quantity of radioactive material could be released into the environment. An accident may bring about some reduction in shielding

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capability of the cask. The regulations require that under the package test conditions specified in 10 CFR Part 71, Appendix B, the reduction of shielding shall not be sufficient to increase the external radiation dose rate to more than one rem per hour at three feet from the external surface of the package (10 CFR 71.36(a)(1)). This dose rate includes both gamma radiation and neutron radiation that might emanate from the cask. Under these conditions, the distance at which the dose rate would be the regulatory limit (10 mrem/hr) for routine exposure at six feet from the truck is estimated to be about 30m (100 ft). It is unlikely that individuals in the general public would acquire significant doses under such circumstances.

In summary, the effects of a transportation accident involving shipments of radioactive materials are not expected to be significantly different from other transportation accidents.

Finally, the contention refers to an unacceptable incremental burden of radiation dose to persons in the vicinity due to a delay in transit. If the delay is caused by an accident, persons in the vicinity, whether they are delayed in transit or not, have been considered in the analysis of health effects presented above. If the delay is caused by a stop of the cask vehicle because of a traffic jam in a high density population area, a population dose of about 0.01 person-rem per hour of delay plus about 0.005 rem/person/hour for persons parked in vehicles along side the cask during the delay would be incurred. Assuming two persons per vehicle and

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four cars beside the cask at an average distance of 3 meters from the truck for three hours, the population dose would be about 0.2 person-rem and the maximum individual dose would be about 0.015 rem. Those doses would not result in any readily discernible health effects and thus would not be unacceptably large.

Conclusion

Spent fuel casks are designed and certified to contain and shield their radioactive contents during all likely transportation accidents. Testing, accident experience, and intensive review of cask designs assure us that no significant radioactive releases will occur because of transportation accidents involving these packages. These considerations lead us to the conclusion that an unacceptable incremental burden of radiation dose from transportation accidents involving spent fuel casks is not likely. In the extremely unlikely event of a release of radioactivity, the release would be limited to noble gases and possibly small quantities of volatile solid radionuclides such as cesium and tellurium; the incremental burden of radiation dose would not be significant. In the event of a delay in transit, the incremental burden of radiation dose is small and acceptable. Furthermore, in view of the very small consequences projected from accidents to all

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spent fuel shipments made annually, the risk of consequences to public health and safety from the proposed transfer of spent fuel is acceptably small.

We certify that the above statements are true and correct to the best of our knowledge and belief.

C. Vernon Hodge
C. Vernon Hodge

William H. Lake, Jr.
William H. Lake, Jr.

R. Daniel Glenn

Subscribed and sworn to before me
this 10TH day of MAY, 1979.

Nadine C. Sides
Notary Public

My Commission Expires: July 1, 1982.

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- 1/ Jefferson, Robert M.: "Statement for the Senate Subcommittees on Science, Technology, and Space and Surface Transport," Sandia Laboratories (August 16, 1978).
- 2/ "Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes," NUREG-0170, U.S. Nuclear Regulatory Commission, Office of Standards Development (December 1977).
- 3/ "Environmental Survey of Transportation of Radioactive Materials to and from Nuclear Power Plants," WASH-1238, U.S. Atomic Energy Commission, Directorate of Regulatory Standards (December 1972), P. 61.
- 4/ Chandler, John M.: "The Peach Bottom Spent Fuel Element Shipping Cask Accident, December 8, 1971," ORNL-TM-3844, Oak Ridge National Laboratory (July 1972).
- 5/ Best, Ralph E.: Letter to C. E. MacDonald, U.S. Nuclear Regulatory Commission, with attached memorandum on the subject: "Transportation Accident Involving NAC Truss-Type Trailer and NAC-1 Cask Serial Number C," Nuclear Assurance Corporation (February 22, 1978).
- 6/ "Environmental Impact Appraisal Related to Spent Fuel Storage of Oconee Spent Fuel at McGuire Nuclear Station - Unit 1 Spent Fuel Pool," (EIA), Docket No. 70-2623, U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards (December 1978).

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PROFESSIONAL QUALIFICATIONS

JERRY E. JACKSON

My name is Jerry E. Jackson. I have been employed by the U. S. Nuclear Regulatory Commission since September 1975. I am in the Transportation Branch in the Division of Fuel Cycle and Material Safety which is in the Office of Nuclear Material Safety and Safeguards. The Transportation Branch is responsible for review and approval for use of shipping packages for fissile material and quantities of other radioactive materials exceeding Type A quantity limits, in accordance with the requirements of 10 CFR Part 71. One of my responsibilities is to review the heat transfer and thermal analyses of Safety Analysis Reports provided by applicants in support of approval requests under 10 CFR Part 71.

In addition to my primary technical functions as a heat transfer specialist, my responsibilities also include: 1) coordination of the technical evaluations of the various disciplines involved in issuance of a certificate of compliance and preparation of a staff position; 2) review of containment performance of packages from the standpoint of thermodynamics; 3) evaluation of operating procedures proposed for the handling of packages (i.e., loading, unloading, etc.); and 4) evaluation of specific test procedures determined to be significant to safety.

I had been employed by Pratt and Whitney Aircraft at their Florida Research and Development Center from March 1973 until joining the U. S. Nuclear Regulatory Commission. There I was employed as a Senior Analytical Engineer in the Systems Analysis Department. My various assignments included work in the high energy laser group, the RL-10 rocket engine program, and the F100 air breathing engine program. I performed thermodynamic, thermo-chemical and heat transfer analysis of various high power gas dynamic and chemical laser systems. I was in charge of upgrading the existing regenerative cooling heat transfer programs for use in the NASA Space Tug Engine proposals. In the air breathing engine group, I performed test analysis related to component improvement program for the F100 engine used in the Air Force F-15 and F-16 fighters.

Prior to my employment at Pratt & Whitney Aircraft, I was employed as a Senior Engineer with Martin Marietta Corporation from January 1969 until March 1973. I was assigned to the Aerophysics Department in the Thermodynamic Section where I performed the thermal analysis of and designed the environmental control systems for the SPRINT and SPARTAN missile systems Universal Transporter Loader. I supervised the arctic phase of the system qualification test for this vehicle. I constructed an analytical thermal model of the complete SPRINT missile launch cell and environmental control system. I performed the thermal analysis of and designed the environmental control system for the SPRINT service vehicle. I performed the interacting gas dynamic plume analysis of SPRINT missile which allowed the first ripple fire launch from Kwajalein Island in the Pacific.

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Prior to my employment at Martin Marietta Corporation, I was employed as a Senior Thermodynamist with Lockheed Missiles and Space Company from August 1963 to January 1969. I was assigned to Aero-Mechanics Department in the Propulsion Section where I performed gas dynamic analysis of various missiles and launch vehicles. I determined flowfields and performance characteristics of rocket motors. I also calculated rocket engine plume characteristics for continuum and non-continuum plumes, conducted shear layer mixing and combustion analyses. Most of the analysis performed were for NASA in connection with the Apollo project.

Prior to my employment with Lockheed Missiles and Space Company, I was a graduate student in the Mechanical Engineering Doctoral Program at Auburn University under a NASA Fellowship from September 1967 until August 1968. There, I majored in Thermal Sciences with a minor in Applied Mathematics.

Prior to my graduate work in the doctoral program at Auburn University, I was employed as a Senior Experimental Engineer with Pratt & Whitney Aircraft from December 1961 until September 1967. I was assigned to the Applied Research Department in the Heat Transfer and Combustion Sections. There I gained heat transfer design experience in both cooled and uncooled experimental rocket propulsion systems. I was involved in the analytical analysis of various heat transfer problems related to the experimental rocket engine programs. I was also involved in data reduction techniques as applied to uncooled rocket engines.

I have published the following technical papers:

"Two Dimensional Heat Flux Measurements in Uncooled Rocket Nozzles,"
Proceedings of the 6th Liquid Propulsion Symposium, September 1964.

"Internal Pressure Changes to Liquid Filled Shipping Casks Due to Thermal Environment," Proceedings of the 5th International Symposium Packaging and Transportation of Radioactive Materials, May 1978.

I have earned both my Bachelor of Mechanical Engineering and Master of Science (Mechanical Engineering) degrees from Auburn University in 1960 and 1961 respectively. In my graduate work I majored in Heat Transfer and Fluid Flow with a minor in Applied Mathematics. I was a Graduate Research Assistant with the Auburn Research Foundation and as such was involved in investigating a thermal scaling theory for solid propellant rocket motor response to thermal shock. My masters thesis was entitled, "A Study of Thermal Probe Devices in Natural Convection Heat Transfer."

I am also a member of Pi Tau Sigma mechanical engineering honor society. I am a Registered Professional Engineer in the State of Florida, PE No. 21246, and in the State of Maryland, PE No. 11165.

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CHAIRMAN HILLER: All right. Who's next with witnesses?

MR. ROYMAN: Mr. Chairman, before we go to witnesses, I'd like to raise one point now, one procedural point now so that if there's going to be some controversy about it, the parties can be prepared to deal with it.

As the Board is aware, during the month of -- the latter part of May and the first of June, the Staff took the equivalent of about two days' worth of depositions of our witnesses, Drs. Cochran and Tamplin and Mr. Rotow.

The Staff has provided us with one copy of those. My experts have read over it and made some minor corrections in the depositions where there were typos or where numbers were incorrectly stated.

We would like to take the position that these depositions should be received in evidence, and that this cross-examination of the parties to the proceeding should not be allowed to replew the identical ground that is contained in the depositions.

That is not to say that they cannot ask questions that arise as a result of the depositions, but in order to preserve the time element here, it seems foolish after two days of what was, in effect, cross-examination by Mr. Ketchen, that he should be allowed to ask the identical questions a second time in order to get the identical answers, or that

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1 Mr. McGarry should be allowed to ask questions which were,
2 in effect, already asked by Mr. Ketchen and answered and made
3 part of the record.

4 I have raised this point with Mr. Ketchen and he
5 has indicated that he does not agree with that position.
6 I wanted to raise it now with the Board so that there would
7 be some opportunity, if the Board wanted, to take a look at
8 the depositions before Drs. Cochran, Tamplin and Mr. Fotow
9 are called to testify, which I suspect will probably be
10 tomorrow.

11 CHAIRMAN MILLER: Does counsel wish to respond?

12 MR. KETCHEN: Yes, sir.

13 First of all, a preliminary point. We haven't
14 gotten the corrections on Dr. Cochran yet.

15 MR. ROISMAN: He's making them now.

16 CHAIRMAN MILLER: I think that is the least
17 significant aspect.

18 MR. KETCHEN: I just wanted to get that one out
19 of the way first.

20 CHAIRMAN MILLER: All right.

21 MR. KETCHEN: We have one copy of the depositions
22 available, aside of our copy.

23 CHAIRMAN MILLER: How many copies are available
24 for the Reporter?

25 MR. KETCHEN: One.

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2 CHAIRMAN MILLER: Well that answers that right
3 then and there.

4 However, I will say we really don't like that
5 procedure too well. We don't want to get into the situation
6 where the Board has to start reading and comparing what
7 happened in the deposition, how it compares to the prefil-
8 testimony, how it might compare with the transcript, we're
9 just getting too many documents, frankly.

10 I don't see that the taking of depositions would
11 preclude the asking of the questions, I take it, on cross-
12 examination, nor do we want to have to have a whole series
13 of examinations by the Board of the testimony.

14 If counsel among themselves could stipulate
15 something, that would be one thing. But it is apparent that
16 hasn't been done, it's apparent we don't have a sufficient
17 number of copies, so we think that the most cleancut method
18 would be to proceed to interrogate the witnesses.

19 Now you have the benefit of the depositions, we
20 would expect that this would shorten it in the sense of
21 permitting you to focus your interrogation, but I think that's
22 more a professional matter for counsel than anything for the
23 Board, at least initially, to intervene in. We will decline
24 the invitation.

25 MR. KETCHEN: That would be our position.

CHAIRMAN MILLER: Thank you. In that event, we'll

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1 rule in support of your position, since you supported ours
2 it seems only fair.

3 MR. KETCHEN: Mr. Chairman, you made my argument
4 better than I could have made them, thank you very much.

5 CHAIRMAN MILLER: I'm only kidding you. Thank
6 you.

7 Who has a witness and who wishes to go forward?

8 We've had witnesses of Applicant and of Staff
9 and Mr. Roisman has indicated he's ready to go, too, so what
10 is the order, or have you talked among yourselves so you know
11 which is easiest for the witnesses.

12 MR. MC GARRY: Yes, Mr. Chairman. I believe the
13 agreed-upon order was to have the two Applicant witnesses,
14 Sterrett and Lewis. And we propose to put on Mr. Sterrett
15 at this time followed by Mr. Lewis, and then I think we get to
16 Mr. Riley. That will probably take us all of today.

17 CHAIRMAN MILLER: Well I understood from Mr.
18 Roisman that he had two witnesses, two or three, ready to go.

19 MR. MC GARRY: I believe his witnesses would
20 then come after, and we would get to them tomorrow morning.

21 CHAIRMAN MILLER: Let me ask Mr. Roisman.

22 Mr. Roisman, why are you waiting until tomorrow
23 to get to your witnesses, is there some reason, is it a
24 matter of preference?

25 MR. ROISMAN: What Mr. McGarry just described is

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1
2 an accurate description of the order in which we had agreed
3 to do it. It's true we had anticipated that the other
4 witnesses would be done, but I'm perfectly willing to stick
5 by that order unless some party wishes to change it.

6 MR. MC GARRY: I would submit that the Applicant
7 would prefer that procedure.

8 CHAIRMAN MILLER: Well how late in the day do you
9 consider it will take us to have the testimony of the two
10 Applicant witnesses, Mr. Starrett and Mr. Lewis and then
11 Mr. Riley, now what time of day do you think we're going to
12 conclude that?

13 MR. MC GARRY: I think that could take all day,
14 is my guess, I hate to say it.

15 CHAIRMAN MILLER: Well then, what do you
16 contemplate doing at the session tonight, if we're going to
17 take all day for those two witnesses and we have ahead of us
18 another, we're getting right into a night session.

19 That's not a very substantial day's production.
20 Maybe in terms of the quantum of testimony or the quality of
21 witnesses, but it certainly isn't doing that much for
22 disposing of the remaining evidentiary aspects of this
23 hearing.

24 MR. MC GARRY: Mr. Chairman, all I can say,
25 I'm just trying to give you my best guess. I feel the
two Applicant's witnesses will probably take us into this

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afternoon. I would imagine the Intervenor's counsel have a better feel for that.

And then I just can speak for myself that I have many questions for Mr. Riley. It's my guesstimate that we would go this afternoon, and if we go this evening we can get to their witnesses.

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(The Board conferring.)

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1 MR. ROISMAN: I wonder if, in answering this
2 question, he could indicate what the areas are. I can never
3 keep the names straight, and some of the witnesses will be
4 testifying in different areas.

5 CHAIRMAN MILLER: All right.

6 MR. KETCHEN: Contention No. 1: Mr. Roberts,
7 Mr. Spitalny; Contention No. 2, Mr. Spitalny; Contention
8 No. 3, Mr. Spitalny and Mr. Glenn.

9 CHAIRMAN MILLER: The Mr. Glenn whom we just had?

10 MR. KETCHEN: Yes, sir. And Dr. Nash, and
11 Mr. Carter and Mr. Pittiglio. Mr. Carter will also offer
12 testimony on Contention No. 5.

13 On Contention No. 4, Dr. Nehemias and Dr. Parsant.
14 I think that accounts for all of them.

15 CHAIRMAN MILLER: It sounds to me like you've got
16 about eight witnesses.

17 MR. KETCHEN: I might indicate that my intent is
18 to put-- I've heard from Mr. Roisman today that he doesn't
19 have many questions for Dr. Parsant, if any. I don't think
20 Intervenor CESG has many questions for Dr. Parsant. So he may
21 take very little time. He's here anyway.

22 The other witnesses on Contention 3 and Contention
23 No. 1, I'm contemplating putting that group on as a panel.
24 1, 3 and 5. Because they are interrelated types of conten-
25 tions.

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Contention 2 is sort of a catch-all. It's the ultimate question here, I think. So that sort of piggybacks on the rest of it, although Mr. Spitalny is here on that.

CHAIRMAN MILLER: It sounds to me that there's a substantial body of witnesses left. I think we prefer to have Mr. Riley testify at a little later point. In the first place, his testimony was just handed up yesterday and you were all very startled and surprized that you hadn't had time to look at it.

MR. BLUM: I think you should ask Mr. Ketchen on his position about that this morning.

CHAIRMAN MILLER: They're prepared to go forward at any time, I assume.

MR. KETCHEN: We're ready to go forward with Mr. Riley today.

MR. ROISMAN: Let me just say that the number of witnesses from the Staff, at least insofar as the bulk of the time that has been taken up in cross-examination so far we are responsible for, we do not anticipate a whole lot of questions for the Staff depending upon the answers to a relatively few questions. We haven't done anything much beyond looking at the 300 transshipments. It's acknowledged we're not going to try to get blood out of a turnip but we're not going to give them an opportunity to create a new record on that issue, since we want an Environmental Impact:

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1 Appraisal.

2 So my guess is that there is much less cross-
3 examination for their witnesses on the same subjects on which
4 we had extensive cross-examination of the Applicant's
5 witnesses.

6 The Applicant's witnesses have knowledge about
7 what Duke has done. If the Staff witnesses don't have that
8 knowledge and haven't done any studies in that area, that
9 pretty well wraps it up for us, I mean, that makes the legal
10 point we want to make and allows us to make our arguments
11 to you at an appropriate time on that point.

12 So while they may have a lot of them, I don't
13 see that they would necessarily run even a full day for that
14 whole group in the areas that Mr. Ketchen identified.

15 CHAIRMAN MILLER: We don't know what Mr. Blum's
16 position may be. We still have cross-examination. It all
17 takes a certain amount of time. You don't bind him and
18 vice-versa.

19 MR. ROISMAN: I just wanted you to understand
20 the amount of time that I would have, so you could do the
21 scheduling and so that -- you have now offered us the stick,
22 I hope you also offer us the carrot which is that we're all
23 good boys and we don't drag the hearing out during the day,
24 maybe you won't bring us back here at 8:00 tonight to run
25 for another four hours.

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CHAIRMAN MILLER: That's true, I'd prefer not to, but I feel more comfortable once the witnesses have testified and I know that the evidence is in. Anticipation sometimes works out and sometimes not, but I do appreciate the evaluation you have given.

Mr. Blum, since that's partly in your domain, that group of witnesses, what's your estimate?

MR. BLUM: I think we'll have some cross of Dr. Lewis. Beyond that, I don't think that we would spend too much time on anybody else, it being my position as well that they have just taken what Duke gave them, and that probably would summarize my argument as well.

CHAIRMAN MILLER: I see.

MR. BLUM: However, I would be just as happy to be back here tonight if there's a chance that we could save Friday.

CHAIRMAN MILLER: Well we'll think about it.

MR. KETCHEN: I think we can finish up on the schedule Mr. McGarry suggested today with that group. I think Wednesday, I think we can finish with Mr. Roisman's witnesses, leaving Thursday and Friday for the Staff witnesses.

MR. ROISMAN: Don't you have one witness, however, who is not available?

MR. KETCHEN: He'll be here Thursday and Friday.

MR. ROISMAN: He's not available these days?

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MR. KETCHEN: Tomorrow.

2 So Thursday and Friday, based on Mr. Roisman's
3 statement and Mr. Blum, we should be able to finish up it
4 seems to me like Thursday and Friday with the Staff.

5 DR. LUEBKE: I hope you're talking about Friday
6 noon.

7 CHAIRMAN MILLER: Airplanes have to be caught on
8 Friday at 1:00, I believe.

9 Well now, all right, this is the first chance
10 we've had to get the feel of it. We do have the feeling that
11 we should go ahead, however, and finish the Applicant, since
12 his two witnesses are available. Let's try those two and see
13 where it takes us.

14 However, we are inclined to feel that at the
15 conclusion of the Applicant's, that either Staff or
16 Mr. Roisman should be prepared to go ahead with the witnesses.
17 We will know a lot more about the scope and extent of
18 cross-examination when we see it in action.

19 So we'd like to extend our feel. We won't try to
20 work tonight. We will accept your representation to that
21 extent. We will expect to have a pretty full day's work going
22 into Friday and we would like to see just how many witnesses
23 we can cover, certainly the two of the Applicant. And I
24 still think I might like to see one of Mr. Roisman's and one
25 of the Staff panel's. That will give us all an opportunity

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1 to gauge truly the extent and nature of the further time for
2 cross.

3 MR. KETCHEN: Mr. Chairman, unfortunately we
4 have scheduled ourselves based on the discussions next week.

5 CHAIRMAN MILLER: Next week is too late.

6 MR. KETCHEN: I'm sorry, last week. And we
7 sort of geared our preparation to that, and we were antici-
8 pating that we would get to Mr. Riley today so we spent the
9 time --

10 CHAIRMAN MILLER: I think we told all of you to
11 stay flexible and be prepared to move. You wanted to have
12 the hearing, and we're going to do it. I don't think
13 Mr. Riley's testimony should be the linch-pin in this pro-
14 ceeding.

15 We'll try to accomodate counsel, but we're not
16 going to get this thing locked in concrete. The Staff was
17 very good about going ahead yesterday when we had time and
18 we appreciate it. We would like to have -- you could surely
19 put on one panel today if we have time, couldn't you?

20 MR. KETCHEN: They're not here.

21 CHAIRMAN MILLER: They're not here?

22 MR. KETCHEN: No, sir. We scheduled based on the
23 order that we discussed early last week: the Applicant first,
24 the Intervenor second and the Staff third. Some of them are
25 here but some are not. You know, it's that kind of a thing.

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2 CHAIRMAN MILLER: All right. Can you tell us
3 either now or at the recess who is available that you can
4 put on this afternoon on behalf of the Staff. We'll recess
5 shortly and give you a chance to see who's available or
6 can be made available.

7 Mr. Roisman, I guess you could probably tell us at
8 the same time, do you have one or more witnesses whom you
9 could put on this afternoon at the conclusion of the
10 Applicant?

11 We'll recess now for about 10 minutes. Why don't
12 you talk to your people?

13 MR. ROISMAN: My team is ready.

14 CHAIRMAN MILLER: Your team is ready to go?

15 MR. ROISMAN: They're champing at the bit.

16 CHAIRMAN MILLER: Keep them on the bench, coach.

17 (Recess.)

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CHAIRMAN MILLER: All right, are we ready to resume?

MR. MC GARRY: Mr. Chairman, at this time I would recall Mr. Sterrett. He has been previously sworn.

I believe the state of the record is that we have discussed his professional qualifications at transcript page 652, and I have asked him if he adopted that statement of professional qualifications as his professional qualifications for use in this proceeding, and he said he did.

Then, if you remember, at that point in time we had a group of witnesses up there, and Mr. Roisman focused upon one. So I believe at this point in time we're at the voir-dire phase of Mr. Sterrett, if that's necessary.

CHAIRMAN MILLER: Very well. Mr. Sterrett has been sworn, and he remains under oath.

Whereupon,

D. H. STERRETT

was recalled as a witness on behalf of the Applicant, and having been previously duly sworn, was examined and testified further as follows:

CHAIRMAN MILLER: Is there any voir-dire examination on the qualifications as an expert of Mr. Sterrett?

(No response.)

CHAIRMAN MILLER: Apparently not. You may proceed to examine Mr. Sterrett.

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DIRECT EXAMINATION

BY MR. MC GARRY:

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3 Q Mr. Sterrett, have you prepared testimony for use
4 in this proceeding?

5 A I have.

6 Q Do you have a copy of that testimony before you?

7 A I do.

8 Q Is it captioned, "Testimony of D. H. Sterrett?"

9 A That is correct.

10 Q The first page and a half is your statement of
11 professional qualifications, is it not?

12 A The first page and a third or so.

13 Q And then running from page 2, through 3, 4 and
14 5 lines on page 5, I take it that is your testimony?

15 A It is.

16 Q Do you have any corrections to make to that
17 testimony?

18 A I have one or two minor corrections.

19 Q Please make them, Mr. Sterrett.

20 A On page 2, the paragraph starting with the words,
21 "The Ocone units are not designed..." instead of saying,
22 "this mode of operation," I would substitute the words,
23 "for cyclic operation."

24 Q Striking "this mode of?"

25 A Striking "this mode of.

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1 MR. ROISMAN: Are you saying "cycling" or "cyclic?"

2 THE WITNESS: Cyclic.

3 BY MR. MC GARRY:

4 Q Are there any further corrections?

5 A On page 3, the next to the bottom line of the
6 middle paragraph, I would like to add the word, "nuclear"
7 between the words, "first-off" and "generation."

8 The sentence would then read:

9 "The concept of 'last-on, first-off' nuclear
10 generation dispatch..."
11 in that line.

12 And then the following line, replace "a simplistic"
13 with the word, "an." This is an approach. And scratch the
14 word "simply," and then scratch, "in the real world," and
15 substitute instead, "on the Duke system or on any other
16 system with which I am familiar."

17 Q Does that complete your corrections?

18 A I have one more correction.

19 At page 4, bottom paragraph, the opening line
20 says, "Applicant's response to Intervenor's Contention..."
21 I would scratch that and simply say, "I have pointed out."

22 MR. ROISMAN: Say what?

23 THE WITNESS: "I have pointed out." Substitute
24 that language. And that concludes the corrections.

25 MR. ROISMAN: Thank you.

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1 BY MR. MC GARRY:

2 Q As corrected, is this testimony true, Mr. Sterrett?

3 A It is.

4 Q Do you adopt it as your testimony for use in
5 this proceeding?

6 A I do.

7 MR. MC GARRY: Mr. Chairman, I would request
8 that the testimony of D. H. Sterrett be marked for identifica-
9 tion as Applicant's Exhibit 13.

10 CHAIRMAN MILLER: It will be marked.

11 (The document referred to was
12 marked for identification as
13 Applicant's Exhibit 13.)

14 BY MR. MC GARRY:

15 Q Mr. Sterrett, on page 3 of your testimony you
16 make reference to the figure, \$111,412,000.

17 Do you have that figure before you?

18 A Yes, I do.

19 Q Could you please explain to the Board and the
20 parties the component parts of that figure?

21 A That figure represents the total system production
22 cost for the year 1980 with Oconee running at half capacity.
23 This is the penalty derived from two numbers. It was derived
24 by, first of all, running the system normally in 1980, with
25 all units dispatched according to normal dispatch.

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1 The study was then repeated with Oconee at one-
2 half capacity. With Oconee at one-half capacity, total sys-
3 production cost was \$913,402,400.

4 The cost with everything normal for the same
5 period of time, was \$801,990,300.

6 The difference, \$111,412,100, represents the
7 penalty for operating Oconee at one-half capacity.

8 Q Mr. Sterrett, did you perform the calculation that
9 gave rise to that number?

10 A These calculations were performed on a digital
11 computer program. I did not write the program, nor did I
12 fill out the forms to input the data. However, the studies
13 were under my direct supervision and I instructed those
14 making the studies the input parameters to be used.

15 Q You are familiar, then, with the input parameters,
16 are you not?

17 A I am.

18 CHAIRMAN MILLER: The way Duke operates, is it
19 computer dispatched, with the most efficient units being
20 brought on line by the computerized analysis, and so forth?
21 Central dispatch, computer operated?

22 THE WITNESS: There's a separate dispatch
23 computer by itself. This is not part of the corporate nuclear
24 process. It's set up at a special room.

25 CHAIRMAN MILLER: Thank you.

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BY MR. MC GARRY:

Q Mr. Sterrett, on page 5 of your testimony there appears the figure \$165,000 per day.

Do you have that figure before you?

A I do.

Q Again, would you please explain for the Board and the parties the component parts of that figure?

A That was assumed that we'd run at full core reserve by 1981. Therefore, a study was run for the year 1981, as in the preceding description.

In other words, in all cases --

MR. MC GARRY: Mr. Sterrett, I believe the court reporter is having a little trouble hearing you. If you would slow down a little, perhaps, and --

CHAIRMAN MILLER: Yes, and turn up your volume.

THE WITNESS: We ran a normal case for the year 1981, with all systems in normal operation.

We then re-ran the case without Oconee Number 1 units. Again, the difference between the two costs represent a penalty charged to a not-operating unit.

The actual numbers involved, normally in 1981 the total system production cost would be \$780,846,400. Without the Oconee units, the costs would be \$840,526,200. The difference, \$59,679,800, represents the cost to the system for not operating Oconee Number 1.

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1 Now, his number was divided by 350 to derive
 2 the \$165,000 shown in my testimony.

BY MR. MC GARRY:

3 Q Now, Mr. Sterrett, I believe you've indicated
 4 in your testimony you've relied upon information obtained from
 5 others, is that correct?

6 A That is correct.

7 Q Is this the type of information that you, as a
 8 system planner, routinely rely upon in order to make opinions
 9 and judgments?

10 A It is my responsibility to know something about
 11 the power system which we're planning. So it is incumbent
 12 upon me as a planning engineer to keep abreast of the
 13 developments in the engineering field relative to my job.

14 So it is in keeping with my responsibility to
 15 know these things.

16 MR. MC GARRY: Mr. Chairman, at this time I
 17 have no further questions of Mr. Sterrett.

18 CHAIRMAN MILLER: Cross-examination?

19 CROSS-EXAMINATION

20 BY MR. ROISMAN:

21 Q Mr. Sterrett, is it the burden of the testimony
 22 on pages 4 and 5 that retention of a full-core reserve by
 23 the Company is really important for economic reasons? Is
 24 that a fair statement?

25 A That is certainly a major part of the total ---

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1 CHAIRMAN MILLER: I can't understand you. What
2 did you say?

3 THE WITNESS: Yes. Economics is a major factor
4 in the determination.

5 CHAIRMAN MILLER: Thank you.

6 BY MR. ROISMAN:

7 Q Do I understand correctly that you feel that the
8 cost that might be incurred if a full-core reserve were not
9 retained and the plant were shut down, and you needed to be
10 able to discharge the full core would be very significant?

11 A That is correct?

12 Q All right.

13 Now, I think your counsel just put next to you
14 two things that I want you to look at. One of them is
15 NRDC Exhibit Number 8. That's probably the loose sheet of
16 paper, is my guess.

17 A Yes, I have it.

18 Q All right. Now, NRDC Exhibit Number 8 is a
19 memorandum written on October 17, 1978 by Mr. Glover, and
20 has been received in evidence. It's entitled, "Basis for
21 Keeping Full-Core Reserve at Oconee."

22 The first sentence of that memo says:

23 "Cost of keeping full-core reserve includes
24 transportation, to maintain it, and the additional
25 capital expense of holding 177 spots idle."

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1 Do you agree that those are the components that
 2 should make up a calculation of what the cost is of keeping
 3 a full-core reserve?

4 A I would say this is a part of the total cost.
 5 This does not speak to the loss in production.

6 Q I'm sorry? The loss in production by retaining ---

7 A If the unit is shut down --

8 Q You don't understand my question. Listen again,
 9 Mr. Sterrett.

10 Mr. Glover has attempted to calculate in this
 11 memorandum the cost of keeping a full-core reserve -- not the
 12 cost of losing it -- and he says it includes transportation,
 13 to maintain it, and the additional capital expense of holding
 14 177 spots idle.

15 My question to you is:

16 In your judgment, does that represent what you
 17 would have to calculate in order to calculate what it costs
 18 you to keep a full-core reserve?

19 A This is not in my area. The responsibility is
 20 in the Company, but it would appear reasonable. Yes, sir.

21 Q Wait. Do you mean you've done a calculation of
 22 what it would cost to lose a full-core reserve, but you do
 23 not know what it costs to keep a full-core reserve?

24 A My calculation assumed that Oconee would be
 25 shut down because it was required to, with no place to put

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1 the core.

2 Q I understand that side of the question. I'm
3 asking about the other side.

4 Do you have any basis to believe that the full-
5 core reserve retention is not more expensive than losing it?

6 A I would suggest that losing it is probably the
7 higher cost of the two.

8 Q I understand that. I'm asking: Do you have any
9 basis for that?

10 A I did not make those calculations in this
11 Exhibit Number 3, so I cannot speak to these directly.

12 Q You say on page 5 of your testimony:

13 "The cost of transporting the fuel to maintain
14 full-core discharge capability is insignificant when
15 compared with the alternative of shutting Oconee
16 down."

17 Did you have in mind what the cost of transporting
18 the fuel to maintain full-core discharge capability would
19 be?

20 A Yes, I did.

21 Q And what was the basis for that?

22 A The transportation of fuel from McGuire to
23 Oconee --or Oconee to McGuire.

24 Q And how did you learn what that cost would be?

25 A I would certainly assume it would not be \$165,000

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1 a day.

2 Q Again, how did you learn what it was?

3 A Just from my own knowledge of what it costs to
4 haul things in a truck.

5 Q Do you have some personal experience with hauling
6 spent fuel in a truck?

7 A Not spent fuel. I've moved in a truck.

8 Q You mean household goods?

9 A Household goods.

10 Q And it's your testimony that the experience there
11 is comparable to moving spent fuel in a cask in a truck?

12 A Mr. Roisman, \$165,000 a day is a lot of money,
13 and ---

14 Q I'll accept that. We can stipulate to that, Mr.
15 Sterrett.

16 A And I think that would exceed considerably, in
17 my own judgment, any cost of hauling spent fuel.

18 Q But in point of fact you haven't done any analysis
19 of what the cost of transporting fuel to McGuire is?

20 A Not as such, no.

21 Q Nor do you have any knowledge specifically of
22 what it is?

23 A I know it's less than \$165,000 a day.

24 Q Do you know that because you know what it is, or
25 because you assume it must be less?

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1 A I assume it must be less, using common sense.

2 Q You also have not calculated how much it costs
3 to retain 177 spent fuel element spaces someplace in the
4 system, is that correct?

5 A Mr. Glover has done that.

6 Q You have not?

7 A I have not.

8 Q You say on this page 5 that:

9 "...to maintain full core discharge capability
10 is insignificant when compared with the alternative
11 of shutting Oconee down."

12 Accepting \$165,000 per day as the cost of the
13 loss of the full-core reserve if you needed to have it at
14 a particular time, what is the cost that, in your judgment,
15 would be significant? You say this is an insignificant cost.
16 What would be a significant cost?

17 A Well, if it approached anywhere near the cost
18 of shutting Oconee down.

19 Q Give me a number. What do you call approaching
20 it? \$100,000?

21 A Well, somewhere between \$50,000 and \$100,000.

22 Q Now, when you make that statement, do you factor
23 in the extent to which there is a certain probability
24 involved here? That is, it's not that every single day you
25 do not have a full-core reserve at Oconee you lost \$165,000,

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1 isn't that correct?

2 A That is correct.

3 Q It's only on the day that something happens at
4 the plant, isn't that correct?

5 A That's correct.

6 Q Okay. So, what account do you take when you make
7 the statement that it is insignificant when compared with
8 the alternative of shutting down Oconee of the probability
9 that the full-core reserve will, in fact, have to be
10 utilized?

11 A If it became necessary to shut Oconee down for
12 whatever reason to remove the core and we did not have full core
13 reserve, and the outage should be for an extended period of
14 time, perhaps several months or longer. And at \$165,000 a
15 day, that cost amounts up very rapidly.

16 Q You're missing the point I'm trying to address.

17 That occurrence -- that is, absence of a full-core
18 reserve, does not in and of itself produce any dollar loss.

19 The dollar loss only occurs if, while the full-core
20 reserve is lost, the plant has to be shut down, isn't
21 that correct?

22 A That's correct.

23 Q In fact, isn't it the case that today Oconee
24 does not have a full-core reserve?

25 A I don't know.

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- 1 Q You don't know whether they're rereacking?
- 2 A That is correct.
- 3 Q If the rereacking goes as it's supposed to go,
- 4 isn't it true that at some period of time the Occnee units
- 5 will be without a full-core reserve capability?
- 6 A At some future date, right.
- 7 Q Okay. At some future date between now and, like,
- 8 November, probably?
- 9 A Right. Sometime.
- 10 Q So that fact indicates that at least in the
- 11 judgment of the Company the \$165,000 per day doesn't go
- 12 automatically with simply losing full-core reserve. It goes
- 13 with losing it and needing it, isn't that right?
- 14 A That's correct.
- 15 Q How did you calculate the probability of it being
- 16 needed in making your statement that the transportation costs
- 17 are insignificant when compared with \$165,000 per day? How
- 18 did you weight the \$165,000 per day in light of its proba-
- 19 bility of occurrence?
- 20 A Well, there are several ways in which this could
- 21 be done. The program we used for computing the cost is
- 22 a probabilistic program and it considers the probability of
- 23 using the unit and so therefore, the production cost which
- 24 we arrived at included the probability of losing a unit as
- 25 a part of the computation.

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WEL/eb2

1 Q Let's see if I understand that correctly.

2 You're telling me that \$165,000 a day is not the
3 actual out-of-pocket cost that Duke would incur if in fact
4 there were no full-core reserve available and it was needed
5 and therefore, one of the units had to be shut down?

6 A \$165,000 a day would be the cost, the additional
7 cost to the system for not having that Oconee unit available.

8 Q Now I'm asking you to discount that by the
9 probability that that will ever occur if you don't have a full-
10 core reserve. Have you discounted it?

11 A As a system planner, Mr. Roisman, we are obli-
12 gated to --

13 Q Please, Mr. Sterrett, it makes it awfully hard
14 if you don't answer my question. I'll give you all the time
15 you want to explain.

16 A This is the background of system planning. I
17 think it's necessary --

18 Q Give me the explanation after you give me the
19 answer.

20 CHAIRMAN MILLER: Answer the question directly.

21 Rephrase the question, Mr. Roisman.

22 BY MR. ROISMAN:

23 Q Mr. Sterrett, have you discounted \$165,000 per
24 day cost in light of the probability of its occurrence?

25 CHAIRMAN MILLER: The question is "have you,"

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WEL/eb3

1 and then you may explain.

2 THE WITNESS: No.

3 BY MR. ROISMAN:

4 Q Now if you wish, go ahead and explain.

5 A We are responsible for the reliability of the
6 system's capacity to meet our load requirements. Therefore,
7 we have got to recognize the possibility of the forced outage
8 of a number of units. And we have done the cost of these
9 outages along with the outage of the unit.

10 This is part of our responsibility. Therefore,
11 the number we derive, we assumed the Oconee unit -- the con-
12 tingency of the Oconee unit being shut down, and under those
13 conditions, this is the cost we arrived at.

14 Q You're not telling me that part of what you do
15 is plan for every event, no matter how improbable it might be,
16 and always calculate the cost of protecting against that
17 event-- Strike the question.

18 As a planner, what you do is you anticipate
19 events occurring and then take steps to make sure that you
20 have mitigated the consequences of those events. Is that
21 right?

22 A Yes. We design a set of contingencies and we
23 are willing to evaluate the costs of meeting these contin-
24 gencies in various alternative ways of doing it.

25 Q All right.

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446-087

WEL/eb4

1 The transshipment proposal that is in front of
2 the Board here, 300 fuel rods -- fuel assemblies to be shipped
3 from Oconee to McGuire, how much does that cover you? How
4 long do you get protection against the loss of a full-core
5 reserve?

6 A In our planning studies we assumed that was a
7 contingency outage of Oconee as a result some time in 1981 or
8 beyond.

9 Q What I'm saying is how much protection do you
10 get from this transshipment proposal? How long will you be
11 able to retain a full-core reserve if you have the right to
12 transship 300 spent fuel rods?

13 A That was one of a number of options we looked at,
14 and although I was not directly involved in that phase of the
15 studies, we provide the cost to not have the capacity avail-
16 able.

17 Q So you don't know how much it buys you for the
18 cost of transshipping in terms of the period of time during
19 which you will be free of the worry of the loss of full-
20 core reserve?

21 A No. We simply planned the system on the con-
22 tingency it would happen.

23 Q Isn't it pertinent to know not only how many
24 full-core reserves you're going to retain but also for how
25 long you are going to be able to retain them, in evaluating

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WHL/ eb5

1 the alternative?

2 A Well, so far as we're concerned, this could occur
3 at any time, the loss of an Oconee unit, at any time in the
4 future. So consequently we considered that as one of our
5 contingencies in all our studies in the future. Because
6 some other unit was shut down, we have to consider that as
7 a contingency.

8 Q In other words what you're doing is your focusing
9 on a contingency that some day a full-core reserve might not
10 be available, and trying to see what planning has to be done
11 to make sure that that situation never occurs in effect?

12 A That's correct.

13 Q What have you done to deal with that problem for
14 the year 2000 and beyond?

15 A We have run basic studies up to the year 1994.
16 We have not gone beyond the year 1994.

17 Q Why not? Isn't that part of planning?

18 A Because that is as long as our current modeling
19 program can handle.

20 Q So you have not examined what actions ought to
21 be taken now, if any, to assure that you cannot lose a full-
22 core reserve at some time after the year 1994; is that correct?

23 A That is correct.

24 Q So you wouldn't know then whether or not there
25 are some measures that might be taken now better than or in

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WEL/eb6

1 lieu of transshipment that would provide you with a longer
2 term protection against loss of full-core reserve than the
3 transshipment option? Is that correct?

4 Q Yes. But let me qualify that by saying that we
5 consider the loss of an Oconee unit as another of several
6 contingencies we examined and therefore, we considered the
7 loss from whatever source as simply a contingency.

8 We do not evaluate the nature of the contingency.
9 We also look at the loss of other units, the Cherokee unit
10 or the Goose Creek unit in addition. These are all viable
11 alternatives we look at as possible contingencies that could
12 occur and therefore, the mechanics that caused the outage
13 is not our responsibility.

14 Q I understand that, but I do understand your
15 testimony to be that the one thing that this testimony is
16 addressed to is the loss of a unit as a result of the failure
17 to have available a full-core reserve when you need it. Isn't
18 that correct?

19 A Yes, but this testimony speaks to the cost of
20 not having it available. We run the production cost studies.

21 Q But these costs presumably would be at least
22 this high in the year 1995 or the year 2000, wouldn't they?

23 A Yes, sir.

24 Q So it's possible that, for instance, if the costs
25 were \$50 million that you would spend today to assure that

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WEL/ak7

1 you would retain a full-core reserve through the lifetime of
2 the Oconee units, that might be cost-effective given the
3 \$165,000 per day costs for loss of a full-core reserve. Is
4 that right?

5 A I'd have to look at the numbers and see, I pre-
6 sume.

7 Q You haven't really calculated that?

8 A No.

9 Q So you wouldn't know whether that would be an
10 insignificant cost compared to the loss of -- shutting down
11 the Oconee unit?

12 A That is correct.

13 MR. ROISMAN: No further questions.

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14 CHAIRMAN MILLER: Further cross?
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BY MR. BLUM:

Q Mr. Sterrett, do you know what the smallest system load was for Duke Power in 1978?

A It was roughly 30 percent of I'd say --

MR. MC GARRY: I'm going to object to that question, Mr. Chairman. I really don't see what system load has to do with Mr. Sterrett's testimony.

CHAIRMAN MILLER: Mr. Blum?

MR. BLUM: It has to do with cycling.

CHAIRMAN MILLER: Units are not designed for cycling modes of operation; is that your point?

MR. BLUM: Yes, sir.

MR. MC GARRY: I don't see the connection between--

CHAIRMAN MILLER: I don't either, but on the other hand, I don't see a non-connection at the moment.

Well, you may the question, but demonstrate the relevance if you will, Mr. Blum.

BY MR. BLUM:

Q You said it's 30 percent of peak and you were about to give me --

A About 3700 megawatts, as I recall.

Q How frequently was that accounted for?

A It could occur during the spring months for several weekends in a row perhaps, three or four times during that time period.

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WBL/eb2

1 Q During that would you shut down or reduce the
2 output of any Oconee units?

3 A As I recall, we had the Oconee units shut down
4 during that period this past year.

5 Q Do you use that opportunity to refurbish or re-
6 fuel or whatever?

7 A During the light load periods every year we do all
8 of our major unit maintenance, including refueling, if possible.

9 Q Can you estimate or do you know on how many
10 occasions last year an Oconee unit was out back without being
11 shut down?

12 A I don't have a specific number. I know it was
13 on several occasions for various auxiliary outages, one thing
14 and another.

15 Q Several occasions? Can you give me a range on
16 that?

17 A Oh, we had several times in the year when a pump
18 might have been out or a piece of auxiliary equipment, re-
19 quiring cutting back the total capacity of the plant.

20 Q Would that be ten times?

21 A Perhaps. I have no specific measure.

22 MR. BLUM: Thank you.

23 CHAIRMAN MILLER: No questions?

24 MR. KETCHEN: No questions.

25 CHAIRMAN MILLER: The State of South Carolina?

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WEL/eb3

MR. WILSON: We have no questions, Mr. Chairman.

MP. MC GARRY: There was one open item I neglected to ask. Mr. Roisman I believe some time last week inquired as to the actual capacity factors and actual outage factors of Oconee.

THE WITNESS: Yes.

REDIRECT EXAMINATION

BY MR. MC GARRY:

Q Do you have those figures?

A The actual capacity factors? I do. I have them for the years 1975 through 1978. These are annual capacity factors.

CHAIRMAN MILLER: Do you have those in a tabular form? That might be easier to examine if we put it in evidence.

THE WITNESS: Yes, I have a tabulation on a piece of paper here.

CHAIRMAN MILLER: Any objection, Mr. McGarry, to the use of it?

MR. MC GARRY: No, I don't, Mr. Chairman.

CHAIRMAN MILLER: All right, let's mark it then as --

MR. MC GARRY: -- Applicant's Exhibit 14.

CHAIRMAN MILLER: -- Applicant's Exhibit 14.

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WEL/eb4

1 (Whereupon, the document
2 referred to was marked
3 as Applicant's Exhibit 14
4 for identification.)

5 CHAIRMAN MILLER: Would you read those into the
6 record?

7 THE WITNESS: These are plant capacity factors
8 for the entire Oconee plant.

9 In the year 1975, the plant capacity factor was
10 66.80.

11 In 1976, it was 56.54.

12 1977, 57.56.

13 1978, 70.37.

14 BY MR. MC GARRY:

15 Q Do you have the outage factors, Mr. Sterrett?

16 A I have them in the annual reports for each year.
17 I could get them out.

18 Q Are they contained in Applicant's Exhibit 14,
19 marked for identification?

20 A All I have in Applicant's Exhibit 14 is simply
21 the capacity factors by years by units.

22 Q So they are not contained in that document, is
23 that correct?

24 A That's correct.

25 Q But you can furnish the outage factors, is that

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WEL/eb5 1 correct?

2 A Would you define what you mean by outage factors

3 Q The amount of time that the Oconee units were out
4 of service, not for refueling. We're talking about forced
5 outages for non-anticipated repairs.

6 A Yes, we have those.

7 MR. MC GARRY: Let me ask a question if I might,
8 Mr. Chairman.

9 Mr. Roisman, is that the figures you're seeking?

10 MR. ROISMAN: Yes.

11 CHAIRMAN MILLER: Are these unplanned outages
12 you're inquiring about?

13 MR. MC GARRY: Yes, Mr. Chairman.

14 CHAIRMAN MILLER: Very well.

15 Can you produce them?

16 THE WITNESS: We can produce them, yes.

17 CHAIRMAN MILLER: Now?

18 THE WITNESS: No, I have to get the information
19 from the office. We have them available.

20 CHAIRMAN MILLER: We will ask you to supply them
21 to your Counsel.

Madelon fls22 Mr. Roisman, do you wish to cross-examine the
23 witness himself on those? He's getting them from the office.

24

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End WEL 2

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MR. ROISMAN: Well, let me ask him a couple of questions about the capacity factors, if I could, and maybe I will and maybe I won't.

FURTHER CROSS-EXAMINATION

BY MR. ROISMAN:

Q Mr. Sterrett, why don't you have the numbers for the years before 1975 for the capacity factors?

A We started keeping records in detail beginning in 1975. I have a report which comes out month'y which summarizes the performance of the various units.

Prior to 1975 we did not keep statistics, which they are available today.

I would guess -- I could go back through my records and check the capacity factors if necessary.

Q Are you familiar with something published by the Nuclear Regulatory Commission euphemistically called the Gray Book?

A No, sir, I'm not.

Q Well, you don't mean to tell me that Duke doesn't know how much the Oconee units ran in the years before 1975?

A Oh, yes, sir, we do.

Q It's just that you don't have them handy?

A I don't have them handy, that's correct.

Q Do you have an assessment as to whether you would expect the numbers were lower or higher?

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A There is a six unit curve on most large units, and I would expect the first couple of years would be low capacity factors, and as the bugs are worked out and an operating sequence is established, the capacity factors would increase substantially.

Q Do you have the capacity factors unit by unit?

A Yes.

Q Do you have them handy?

A I have them on Exhibit 14, yes.

Q Okay.

Would you mind also giving us those just briefly? Why don't you just run them on Unit 1, and we'll assume you're going to go '75, '76, '77, '78 and you don't have to repeat the numbers --

A All right, fine.

Q -- and just take Unit 1 and read the numbers, then take Unit 2 and Unit 3.

A All right, sir.

Q Okay.

A Oconee number 1, 69.27, 52.20, 52.36, 67.09.

Oconee number 2, 65.11, 55.27, 50.77, 63.53.

Oconee number 3, 66.02, 62.15, 69.54, 80.50.

Q What are you using in computing the capacity factor as your 20 percent operation number? You're using rated capacity, licensed capacity?

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A We do not capacity factor or use input as a parameter. The program calculates what the capacity factor will be based upon the energy produced and the given constraints.

The capacity factor is a calculation following the dispatch of the generation. It is not an input data.

Q I'm sure I didn't understand virtually anything that you said. I'm going to try to ask my question again not because I think that you didn't give me an answer, but I'm going to try to get a different kind of answer, one that I can understand.

To get a capacity factor, don't you first have to decide this is a capacity of what, what's 100 percent so you know whether you're getting 66 or 33 or what?

A That's correct.

Q For these units, what was 100 percent calculated as, licensed capacity? Yes or not?

A I don't know what the licensed capacity was.

Q Okay.

Rated capacity, the manufacturer's rated capacity?

A No, it was not rated. It is what Duke Power Company rated the units at.

Q What was the basis for determining how to rate them? What did you rate Unit 1 at?

A Test runs. They're all rated 860 megawatts.

Q They're all rated at 860 --

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A 860 megawatts.

Q All right.

Did you in any year reduce the rating in light of any restrictions imposed by the Nuclear Regulatory Commission on operating?

A No, sir.

Q And did you reduce it in light of any restrictions imposed by environmental conditions?

A No, sir.

The rates were changed as a result of Duke's experience as they operated units.

Q What did they start off being?

A They were high. They were 873 originally.

Q Now that original rating, what was that based on, the 873?

A That was the manufactured rating, as I understand.

Q And what accounts for the reduction? What sort of things? When you say "experience" what do you mean by "experience"?

A Well, this is out of my area of expertise. This is beyond the steam production people's responsibility.

Q I see.

MR. ROISMAN: I have no further questions, Mr. Chairman.

But I also cannot tell whether I may want to ask

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questions after we hear the forced outage rates.

CHAIRMAN MILLER: All right.

And you'll obtain those figures on the forced outage and make them available?

THE WITNESS: Yes, sir.

You want them for the whole years?

CHAIRMAN MILLER: Yes, please.

MR. ROISMAN: Yes.

CHAIRMAN MILLER: Very well.

Any further examination or cross-examination?

Mr. McGarry?

MR. MC GARRY: No, Mr. Chairman.

I would imagine we'll probably put Mr. Sterrett on either today or tomorrow for a brief time and provide that information.

CHAIRMAN MILLER: Very good. Thank you.

You are excused, and I guess you'll be coming back later.

(The witness temporarily excused.)

MR. MC GARRY: At this time, Mr. Chairman, I'd like to call Mr. Lionel Lewis to the stand.

CHAIRMAN MILLER: Is there any reason why Applicant's Exhibit 13 couldn't be offered at this time that anyone knows of, that being the prepared written testimony?

MR. ROISMAN: Mr. Chairman, that last sentence

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of the testimony --

CHAIRMAN MILLER: Page 5?

MR. ROISMAN: Yes.

I'm sure that the cross-examination disclosed that the weight is almost nil. I think I'd like the Board to strike it. I don't think the witness indicated that he really had a basis for determining whether there was a significance in the comparison between the cost of shutting down the plant and the cost of transporting, he having testified he didn't know what it would cost to transport.

They thought his only basis was household goods transportation experience.

CHAIRMAN MILLER: Well, I think that the matter is admissible.

I will say, however, that there is serious doubt as to whether in that last sentence we would regard him as testifying as an expert. However, I think the record will show that we deem it to be admissible, but there is a very serious question as to the expertise and I'm not even mentioning the question of weight.

MR. ROISMAN: All right, Mr. Chairman.

CHAIRMAN MILLER: I take it then, Mr. McGarry, you are moving the introduction into evidence of Applicant's 13, being the prepared direct testimony of Mr. D. H. Sterrett?

MR. MC GARRY: Yes, Mr. Chairman.

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CHAIRMAN MILLER: There being no objection, it will be admitted into evidence.

(Whereupon, the document previously marked as Applicant's Exhibit 13 was received in evidence.)

MR. MC GARRY: I would at this time call Mr. Lewis to the stand.

Mr. Lewis has been previously sworn.

CHAIRMAN MILLER: Yes.

You are still under oath, Mr. Lewis.

Whereupon,

LIONEL LEWIS

was called to the stand as a witness on behalf of the Applicant, and, having been previously duly sworn, was examined and testified further as follows:

MR. MC GARRY: Unlike Mr. Sterrett, I don't believe I did ask the qualification questions of Mr. Lewis. I'll proceed at this time.

DIRECT EXAMINATION

BY MR. MC GARRY:

Q Mr. Lewis, have you prepared a statement of professional qualification for use in this proceeding?

A Yes, sir, I have.

Q Is that statement of professional qualifications

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attached to a document called Testimony of Lionel Lewis?

A Yes, it is. It's the beginning portion of the testimony.

Q And does it encompass the first page, running over to page 2 down to the second from the bottom paragraph?

A Yes, sir, that's correct.

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

A To the qualifications or to the testimony?

Q To the qualifications.

A No, I do not.

Q Do you adopt the statement of qualifications as your statement of qualifications for use in this proceeding?

A Yes, I do.

MR. MC GARRY: Mr. Chairman, Mr. Lewis will be offered as both a fact and opinion witness.

CHAIRMAN MILLER: Very well.

Any voir dire examination as to qualifications or expertise?

MR. ROISMAN: Yes, Mr. Chairman.

CHAIRMAN MILLER: You may proceed.

VOIR DIRE EXAMINATION

BY MR. ROISMAN:

Q Mr. Lewis, what experience have you had with actually measuring radiation exposures as a result of people

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working with radiation materials?

A Well, I've been involved in health physics for 25 years. Up until this very recent job where I'm in charge of health physics for Duke Power Company I have been the health physicist at various power reactor facilities and was directly involved to a greater or lesser extent at that time in measurements of exposures of people, directing the activities of people, and before that more and more involved, going backwards in time, more and more directly involved.

So I would say I've had at least ten years of direct experience in measurement of doses.

Q So that you have had experience in making sure that measuring devices were placed at the appropriate points to get measurements and reading the output of those measuring devices?

Is that your testimony?

A Yes. I interpreted your question as meaning directly myself doing it or in charge of it.

Q No, I meant you doing it.

A Well, I answer, then, I did it personally for about ten years. I've been in charge of it for perhaps 15 additional.

Q So the ten years were some time ago?

A Well, in the beginning years.

Q Yes, okay.

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And then your answer to my question was that before those ten years is yes, that you were directly involved in making sure they were placed in the right places, and that they were read correctly.

A Yes, that's correct.

Now I'm involved in the supervisory or managerial sense.

Q I understand that.

Has the equipment changed much in the last 15 years?

A Yes.

Q The techniques for doing the measurements changed much?

A Well, the techniques for doing the measurements, the sampling, has not significantly changed. The equipment has increased in complexity by a considerable amount.

Q Can you tell me, when you calculate the amount of exposure that a worker gets from handling spent fuel, do you do it on the basis of actual exposure, or do you extrapolate from the amount of radioactivity that is being emitted by the spent fuel itself?

A In the values in my testimony we have used actual experience data at Oconee Nuclear Station in previous refuelings, principally 1977, 1978 data.

Q And will you be able to testify as to the accuracy of the experimental data gathered from earlier experience?

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Will you, of your own personal knowledge, know whether the measuring devices were in the right places and all the employees were properly checked and that kind of thing?

A Yes.

MR. ROISMAN: That's all the voir dire I have, Mr. Chairman.

CHAIRMAN MILLER: Very well.

You may proceed.

MR. MC GARRY: Thank you.

DIRECT EXAMINATION (Resumed)

BY MR. MC GARRY:

Q Mr. Lewis, have you prepared testimony for use in this proceeding?

A Yes, I have.

Q Do you have a copy of that testimony before you at this time?

A Yes, I do.

Q Is it entitled the Testimony of Lionel Lewis?

A Yes, sir, it is.

Q And the first two and three-quarter pages contain your statement of professional qualifications, is that correct?

A That's correct.

Q And your testimony begins with the last paragraph on page 2 and runs for 7 pages, is that correct?

A Yes, sir, except I have some changes and

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deletions.

Q And I will ask you to please make those changes and deletions.

All right.

On page 2, the last paragraph, the first part of the sentence, strike the words "the various contentions concerning".

And also strike the last sentence on page 2.

On page 3, I have some number changes in that table, the first one being item 3 under Total Dose. Change that value to 49 instead of 48.

And under item 5, change the value from 56 to 65.

Then also under Dose Differences, the values change slightly from 36, number one, that is, from 36 to 35.

Number 2, from 59 to 58.

Number 4, from 24 to 23.

And number 5 would change from 8 to 16.

And on page 4, the value 8 again at the top of the page should be 16.

It says 'for alternative 4 there's a value of 1.13.' Change that to 1.04.

It says 'for alternative 5 there's a value of 0.14.' Change that to 0.13.

On page 5, strike the last paragraph, and then also the remaining pages 6 and 7.

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MR. MC GARRY: Mr. Chairman, I might note for the record that the Applicant has struck from the testimony of Mr. Lewis, as he's indicated, the bottom of 5, all of 6 and 7. The reason that testimony was in Mr. Lewis's prepared testimony was to address the contentions raised by Carolina Action, Davidson PIRG. Inasmuch as they are not parties to the proceeding at this time, we have chosen to strike the testimony in that regard.

This is not to say that if the Board has questions, Mr. Lewis we submit has the information to provide whatever responses the Board deems necessary.

CHAIRMAN MILLER: Thank you.

We believe the record is clear on that. If the Board should have questions which touch upon the stricken information, we would advise both counsel and the witness.

BY MR. MC GARRY:

Q Mr. Lewis, as corrected, do you adopt the testimony of Lionel Lewis as your testimony in this proceeding?

A Yes, I do.

MR. MC GARRY: Mr. Chairman, at this time I would request that the testimony of Lionel Lewis be marked for identification as Applicant's Exhibit 15.

CHAIRMAN MILLER: It will be so marked.

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(Whereupon, the document referred to was marked as Applicant's Exhibit No. 15 for identification.)

BY MR. MC GARRY:

Q Mr. Lewis, turning to page 3 of your testimony, focusing your attention upon the chart contained on page 3, would you explain to the Board and the parties the component parts of each one of those total dose (person-rem) figures, what specifically goes in to making up the 84?

A All right.

I'll just outline the general aspects of it first, and if you have additional questions we can break that down further.

On item 1, there was the reracking work which totals 76 person-rem, and the additional transfers of spent fuel assemblies due to the reracking over to Unit 3, for example, which were eight, totalling 84.

Under item 2, the reracking with poison racks for Units 1 and 2 were 72 person-rem, the reracking Unit 3 was 25 person-rem, and the additional transfers of spent fuel assemblies due to circumstances involved in the numbers of assemblies and what was required to work gave an additional ten person-rem.

For item 3, there were several components. The

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dose to the driver to transfer the spent fuel from the existing spent fuel pit to an AFR on the Oconee site was .04 person-rem, the dose for essentially loading and unloading the fuel was 40, and the routine operation of the facility led to occupational dose for the year of 9.3 man-rem.

CHAIRMAN MILLER: Did that consist of 40 plus 9.3 plus .04?

THE WITNESS: .04, 40, 9.3, and there's an additional .04 dose which is annual dose to the local population from routine releases, totalling 49.38, which I rounded off to 49.

Item 4 consisted of several components, dose to drivers to transport the fuel to a storage facility, in this case we assumed near Durham, North Carolina, so as to get a maximum dose. Anything located elsewhere on our system would be less dose.

BY MR. MC GARRY:

Q How far is Durham, North Carolina, from Oconee, approximately?

A My understanding is approximately 270 miles.

1.6 man-rem dose to drivers to inspect the shipment at Oconee prior to departure, ten person-rem dose to drivers to stop and inspect the shipment en route, ten person-rem dose essentially for loading and unloading, the 40 again, as previously, routine operation of the facility, 9.3 again, as previously. Annual dose to the local population

~~446 111~~
574 103

mpb3

from routine releases, .08 person-rem, and there's an annual population dose to persons living along the transportation route of 1.04 person-rem, totalling 72.02, which I rounded to 72.

Item 5, various factors involved. Dose to drivers to transport spent fuel from Oconee to McGuire, .8 person-rem, dose to drivers to inspect the shipment at Oconee prior to departure, 10 person-rem --

MR. ROISMAN: Excuse me.

Can the witness slow down and start again with Item 5? It's just not possible to write as fast as he's talking.

THE WITNESS: Certainly.

Item 5, Shipping/Storage at McGuire. The dose to the drivers to transport the spent fuel from Oconee to McGuire, .8 person-rem. The second component of that, dose to the drivers to inspect the shipment at Oconee prior to departure, ten person-rem. Dose to driver to stop and inspect the shipment en route from Oconee to McGuire, one fifteen minute stop, essentially, five person-rem. Dose to handle, prepare, and inspect shipment, essentially load and unload, 40 person-rem, routine operation of the McGuire spent fuel pit with the fuel in it, 9.3 person-rem, annual dose to the local population from releases at McGuire, .03 person-rem, and the annual population to persons along the

574 104
446 112

mph4

transportation route transporting the fuel was .13 person-rem, totalling 65.26, which I have rounded to 65.

The change principally that I've given before from 56 to 65 was not adding in the routine operation value of 9.3, just an inadvertent omission when this was prepared.

The dose differences are due to the fact that we have a couple of number changes, and the subtraction leaves 35, 58 instead of previous numbers.

BY MR. MC GARRY:

Q Now, Mr. Lewis, these total dose figures that you have just provided the background information for were calculated upon the basis of 400 shipments, is that correct?

A Yes, that's correct.

Q And if one were to calculate them upon 300 shipments, you would simply scale them down, is that correct?

A There is a factor in several of them that involves the 400 to 300, so it would not be a simple ratio. We would have to scale that component, whether due to 400 or 300, and add them up.

Q But each one of these total dose figures would be lower, would they not, if we were to assume 300?

A That's correct, they would be in the same sort of general proportion to each other.

Q Mr. Lewis, directing your attention to page 4 of the testimony, you have figures for alternative 4 and

446-113
574 105

mpb5

alternative 5.

A Yes, sir.

Q Would you again provide the component parts and the thought process that went into the derivation of those respective numbers?

A You mean the 1.04 value and the .13?

Q Correct.

A All right.

Dose to the population living along the route, we essentially did a scoping calculation and found that the NRC value of .1 man-rem was the appropriate value. We did our own calculations; they vary slightly from that value.

We multiplied it in the first case, ratioed it by the population difference, the Durham population over to McGuire Nuclear Station, which was 327,000 over 42,000, and then also multiplied it by 400 shipments instead of 300 shipments to come up with the value of 1.04 man-rem.

Similarly, with alternative five, we took the value of .1 man-rem that we had scope and found the NRC answer was approximately correct, multiplied it by the ratio difference of 400 over 300 shipments, and it comes out .13 man-rem.

Q Mr. Lewis, on the bottom of page 4 you state that:

"The transportation dose is, in my opinion, as low as reasonably achievable, ALARA."

446-114
574 106

mpb6

What's the basis for that opinion?

A Well, there are a number of aspects that go into the dose. For one thing, the cask is licensed for fuel that could bring the radiation levels on the outside of the cask to 200 mr per hour on contact, ten mr per hour six feet from the outside of the transport vehicle.

This fuel will essentially be 20 to 40 mr per hour on the surface of the cask, and about three mr per hour at six feet. So we have a considerable ratio downwards of radiation levels that actually will occur based on our experience versus what is permitted by regulations.

Now there are other factors that go into the transportation dose, as we've discussed, in each one of these. We ourselves have policies limiting doses to people at the plant at work, and taking as many measures as we can to see that the doses remain as low as reasonably achievable in the plant.

Q Could you give me a 'for instance' of one of the policies and procedures, or several of them, for that matter, that you take at the plant?

A All right.

Fundamentally the NRC regulations, we are considerably -- our policies, our administrative policies for exposure to personnel are in general considerably less than permitted by NRC regulations. For example, NRC -- in

446-115

574 107

mpb7

NRC regulations people can, in accordance with the regulation go up to -- certain people can go up to 13 rcm a year. We have always had an administrative limit at Oconee Nuclear Station of 4500 millirem per year, and we have not exceeded that either for our people nor for outside people as to the dose we allow them to get at our station.

We also have quarterly limits of 2500, where the regulations say 3000. We have step procedures that need approvals to get significant increases in dose up to those limits from the station manager in many cases. So we exert a great deal of control over the actual dose that people can incur.

We take a great number of steps, for example, in the reracking work to assure that the work was done as low as reasonably achievable. And as we go along we keep modifying that. In other words, we don't just set it at the beginning of the work, but we modify it as we go along based on actual experience.

The first day you do it in advance of the work. In a sense you're going on in your own engineering judgment. So you make certain conservative assumptions, so you can find certain aspects of it that you've overestimated and underestimated. We correct as we go along.

We have done that in the reracking work that's progressing right now.

446 116 574 103

mpb8

Q And are you going to do that with respect to this transportation activity?

A Yes, sir.

And so the doses that we've figured here involve looking at every aspect of the dose and making sure it's ALARA. And as far as transportation dose, of course there are occupational components of that. There's components of dose to the public. As far as the public is concerned, I think it's the ratio of the dose difference on the transport container versus what is allowed that makes it as low as reasonably achievable.

Q Now with respect to the occupational dose, can you explain to the Board and the parties what measures does Duke take when it loads an assembly in a cask?

A Well, we try to work with crews that are familiar with the cask so that they're not in the process of learning, for example, as they do the work. We've made a great many shipments from one pool to the next, I think something like 284 or more shipments.

These are done by crews that are familiar with the cask and can do it rapidly as compared to new people coming in day by day. We decontaminate casks. We load them, of course obviously load them under water and put the lid on under water and bolt it, decontaminate it, load it remotely, obviously because of the weight, there's many measures that

446 117

574 109

mpb9

are taken, both exposure control and in handling, which reduce the dose.

Are you getting at something in particular that I'm not covering?

Q No, Mr. Lewis. I think you're doing fine.

CHAIRMAN MILLER: You're happy with it, aren't you?

MR. MC GARRY: I'm smiling.

BY MR. MC GARRY:

Q Mr. Lewis, on page 5 of your testimony you make reference on line four to 0.4 millirem.

Do you see that figure?

A Yes, sir.

Q Again would you please explain the component parts or how you derived that figure?

A All right.

I just assumed that there was a car or school bus, whatever, following at 50 feet behind the transport vehicle containing the cask, carrying the cask. I took the actual dose rates that we have observed on fuel, typical fuel value that we have observed on this cask and just did it by inverse square law at 50 feet, assumed someone followed it for ten hours, say, to Durham. And the dose works out to .4 millirem.

Q And could you please go through the same process with respect to the 30 millirem figure that appears at the

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mpb10

bottom of that first paragraph on page 5?

A All right.

We assumed that the spent fuel cask on the truck was stalled or stuck on one lane of a super highway and that there was a car or bus or whatever in the adjacent lane next to it, and the nearest person or people in that car were an average six feet from the cask.

The dose rate is 3mr per hour, and they're there for as much as ten hours; the dose would only be 30 millirem.

I assumed that that would be very conservative. A traffic jam would get cleared in much less time than that, but that seems like an upper limit value.

Q Mr. Lewis, directing your attention to the middle paragraph of page 5, there appears a figure 400 millirem.

Just so I'm clear in my mind, does this paragraph address the situation where a truck carrying a cask has been involved in an accident, perhaps run into a ditch, the cask is not impaired, but you are faced with a recovery activity to put the cask back up on either that truck or another truck.

Is that what this paragraph is directed to?

A Yes. I assumed that the truck carrying the cask, for whatever reason, has fallen over, and that the operation would be the removal of the cask and relocating it on another truck to transport it to McGuire.

~~446 119~~

574 111

mpb11

Q Mr. Lewis, yesterday I volunteered you, pursuant to the Board's questions and I believe some of the parties' questions with respect to a matter that had come up during the course of these proceedings, and that concerned Duke's experience with a particular shipment to the Crystal River Plant of Florida Power Corporation.

Are you familiar with that particular activity that I have made reference to?

A I am.

Q Now, that was a contamination incident, is that correct?

A That's correct.

Q That did not involve leakage, did it?

A It did not.

Q And to put the matter in perspective for the Board and the parties, would you please describe how a cask in the first instance becomes contaminated?

A All right.

In order to be loaded, of course, the cask is immersed, lowered into the spent fuel basin, and the fuel is loaded into the cask and the cover is put on.

Q Now is that basin contaminated?

A Oh, I was going to say the basin is usually contaminated as a result of somewhat being the same as the reactor water during refueling, and from the fuel assemblies

574 112

~~446~~ 120

mpbl2

that sit in the pool. So casks are usually washed down as they're removed from the pool. Then they may also be decontaminated using various methods ranging from automatic high pressure rinses to hand-cleaning in order to get them down to the shipping limits.

Do you want me to continue and describe this incident?

Q Yes.

Now with respect to this particular instance, did this activity take place? In other words, you did load the fuel in the pool, is that correct?

A That's correct.

Q They did take the cask out of the pool, is that correct?

A That's right.

Q They did wash down the cask, is that right?

A Yes.

Q What did they do once they washed down the cask?

A All right.

In accordance with our procedures, we have sort of a form. We have to make sure that the radiation levels and contamination levels are in compliance with shipping limits, DOT regulations for shipping.

These measurements were made and recorded. They took about, ranging variously, 65 to 85 smears of the container.

446-121-574 113

mp013

You're supposed to take a representative sample over the surface of the container.

Q Now what do you mean by "smears"?

A A smear is a wipe with a small paper or cloth circle which you wipe over a given area, like 100 square centimeters we use as a unit. Then this is taken and counted on radiation counting equipment to make sure that you do not have loose contamination in excess of the shipping limits on the outside surface.

So in order to do this they take 65 to 85 samples, smears, wipes, count them, and ensure that at least what they've sampled is less than the limit, and therefore the regulations permit you to ship it.

When this cask -- Now, these measurements were also verified by an NRC inspector who was onsite at the time. He confirmed -- He happened to be there and he looked at the values that they received.

Q And the values received were within limits, is that correct?

A The values that they measured were within the limits to ship.

When the cask got to the Crystal River Plant, the people at the other end take smears and count them to see that it is within the shipping limits when it gets there, or they may have to clean it possibly before it goes into their pool.

446-122
574 114

mpbl4

They took samples and found in a couple of cases there were certain spots which read considerably higher than the shipping limits. Of course, they had to report this, in accordance with the regulations, which they did, and the NRC reported this to Duke Power Company.

WRB flws

~~446 123~~

574 115

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fld Madelon

2 Now there are several phenomena that would serve
3 to answer how this thing could occur:

4 One: you obviously don't smear the entire cask
5 when you take sixty-five samples, and someone else could smear
6 a place where you neglected to, and have found something.

7 There's another phenomenon which, in layman's
8 terms, seems to be that a cask can be clean; in other words,
9 let's say, less than the limits, and if you smeared the thing
10 totally; and, as a result of being transported, heating up
11 and so forth, it seems like the pores of the metal open to some
12 extent as it expands temperature-wise, and, as you get there
13 and then smear it you'll find high levels sometimes. This is
14 something that they have found for years in the nuclear
15 industry.

C6
16 At any rate, Duke has taken corrective action,
17 much more care and concern in future measurements. It did not
18 represent a hazard to the health and safety of the public.

19 Q Why didn't it present a hazard to the public
20 health?

21 A Well, it was a small amount, it was localized.
22 The dose that you might get from the contamination on the out-
23 side of the cask added to the total dose coming from the fuel
24 within the cask was still much less than the limit of 200 milli-
25 rem per hour on the outside of the cask, although normally
that is not additive. But I'm just saying for the purposes

POOR ORIGINAL

574 116

446 124

wb2 1 here of stating that it's not a hazard to the public.

2 I would expect you would have to have an extreme
3 contaminated cask, very large areas on most of the casks, to
4 get into a problem area with the public.

5 But this is the regulatory limit, and we were
6 considerably in excess in several spots, and it was not leakage
7 of the fuel.

8 Q How is Duke going to assure the public and this
9 Board that it's not going to ship a contaminated cask of the
10 nature that you were just describing that in your view would
11 present a hazard to the public?

12 MR. BLUM: Objection to the leading.

13 CHAIRMAN MILLER: Pardon me?

14 MR. BLUM: I object to the form of the question.

15 CHAIRMAN MILLER: I think he asked him "How."
16 What does that lead to? What answer does it suggest? --which
17 is the test of the leading question.

18 MR. BLUM: It's not really leading, although that
19 was the first thing that came to mind. What it does do is
20 assume facts not in evidence. And it is a compound question in
21 that the question-- well, assumes a great many things that
22 there has been no testimony about.

23 CHAIRMAN MILLER: We appreciate your suggestion.
24 The basis is getting more slender all the time.

25 I think we'll overrule the objection.

574 117

~~446-125~~

wb3

1 You may answer "How."

2 This is based now upon your knowledge of Duke's
3 procedure, and it's related to something reasonably tangible.
4 It's not a hypothetical question: you understand that?

5 THE WITNESS: Yes.

6 CHAIRMAN MILLER: Very well.

7 THE WITNESS: We already had procedures at the time
8 these shipments got through which required us to document on
9 the shipment form the radiation levels and the contamination
10 level.

11 I think when this happens everyone is very con-
12 cerned that it not happen again. If you receive from the NRC
13 a notice of violation of the shipping limit it's not a pleasant
14 thing to go through. You take extra care and concern next
15 time to insure that this is the case.

16 But if we run into this phenomenon and it is
17 literally true that the cask expands and contamination comes
18 out of the pores, then it's going to get worse from time to
19 time. But we certainly will take more care and concern, using
20 the same procedures we already have, which require us to take
21 samples, require us to insure that there is no leakage, require
22 us to measure radiation levels, and to see that they comply
23 with the regulations.

24 MR. MC GARRY: No further questions.

25 CHAIRMAN MILLER: Cross-examination. Mr. Roisman.

6.040

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~~446-126~~

574 118

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fls wb3

1 MR. MC GARRY: Excuse me. I misspoke. I do have
2 one final question.

3 CHAIRMAN MILLER: Okay.

4 BY MR. MC GARRY:

5 Q Mr. Lewis, in your testimony I believe you rely
6 upon information you obtained from others. Is that correct?

7 A I rely on information I obtained from others;
8 that's correct.

9 Q The information that you rely upon, is that the
10 type of information that a health physicist like yourself
11 routinely relies upon in order to make the decisions that
12 you're called upon to make?

13 A Yes, that's true, except that I don't necessarily
14 rely upon it in the sense of accepting them without critical
15 judgment. I would determine in my mind if the number seems
16 legitimate or not, and try to get the basis of it in any
17 event, to insure that it is correct when I use it.

18 Q Thank you.

19 MR. MC GARRY: No further questions.

20 CHAIRMAN MILLER: Cross-examination, Mr. Roisman?

21 MR. BLUM: If possible, Mr. Chairman, Mr. Roisman
22 asked me if I would initiate cross-examination.

23 CHAIRMAN MILLER: Very well. Suit yourself.

24 MR. BLUM: Mr. Chairman, this is a document that
25 has previously been identified as CESG Number 2, and I have

446 127 574 119

eb2

1 obtained copies of that for all persons. That was an inspec-
2 tion report.

3 (Distributing documents.)

4 CROSS-EXAMINATION

5 BY MR. BLUM:

6 Q Mr. Lewis, do you recognize CESH Number 1?

7 A Yes, I think so.

8 Q And what is that?

9 A Well, it's a report from the NRC Office of
10 Inspection and Enforcement to Duke Power Company, part of one
11 anyway.

12 Q Beginning with paragraph 11 --

13 MR. BLUM: I should note for the record that the
14 identification of this document is CESH Number 2, Inspection
15 Report. The word "Why" at the bottom and the underlinings
16 and parallel linings in the right-hand margin were not ori-
17 ginally a portion of this. Those were performed by us.

18 BY MR. BLUM:

19 Q Beginning in paragraph 11, Mr. Lewis, is that not
20 the description of the inspections performed on the Crystal
21 River shipments?

22 A We shipped four assemblies from Oconee to Crystal
23 River and the inspector was there at the time, so I guess 11-A
24 is a statement of that.

25 Q Well, no. I mean the other parts of 11 which

446 128 574 120

eb3

1 continue on the next three pages, do they describe the NRC
2 inspection of those -- I guess two of those Crystal River
3 shipments?

4 A Yes, in their terms, in their words.

5 Q Now let me ask you first of all whether -- at one
6 place....

7 Let's see. In looking at paragraph c on I-8,
8 in that paragraph it refers to a plant's beta-gamma limit of
9 2,000 dpm, disintegrations per minute, per 100 square centi-
10 meters, and then a few lines further down it refers to a 200
11 dpm rate.

12 Which is the actual plant limit, if you know?

13 A Both of those are plant limits. They are each
14 for different things.

15 Also, there's some confusion in this report with
16 the plant limit and the DOT limit for shipping. Apparently
17 in this case they're talking the plant limit which is a factor
18 of 10 less than the DOT limit for shipping. And I'm not clear
19 on why the confusion. I think it was on the health physics
20 people's part, interpreting our system health physics manual
21 to mean that a shipment has to be decontaminated to the normal
22 plant limit which would be a factor of 10 below the regulation.
23 I think that was an error on their part.

24 Q The intraplant limit is 200 disintegrations per
25 minute?

446 129

574 121

eb4

1 A No. I was making the point we have we have
2 contamination limits for work inside the plant which are
3 written into our system health physics manual.

4 The people, mistakenly in my opinion, used this
5 value, the health physics people were using this value as a
6 contamination limit on the cask and on the truck, rather than
7 the DOT regulations for the shipment.

8 Q What limit is called for in the DOT regs?

9 A They can ship a cask with up to 22,000 disinte-
10 grations per minute per 100 square centimeters on the cask.

11 Q And what is your plant limit?

12 A The plant limit is 2,000.

13 Q What is the factor for 200?

14 A Anything going outside of the restricted area of
15 the plant has to be essentially less than -- at that time at
16 least, less than 200 dpm per 100 square centimeters. So they
17 interpreted then the truck, not being a cask, should be at
18 the lower limit.

19 Q What is the limit now? You implied that was
20 changed.

21 A We're in the process of revising our health physics
22 manual, and we left it a range of 200 to 2,000 for anything
23 going out of the plant, with a preference of 200.

24 Q Now as I understand this report, the first truck
25 to arrive at the Crystal River facility showed, in the swipe

446 133

574 122

eb5

1 test, ranges between 30,000 and 100,000 disintegrations per
2 minute per 100 centimeters squared.

3 A You're over on page I-9?

4 Q Paragraph F.

5 A Yes, sir, that's the statement.

6 Q Well, do you know whether that's true?

7 A I believe that that is correct.

8 Q And I take it that no one really knows the source
9 of this increase in contamination. Is that true?

10 A Well, I think I've testified to the fact that it
11 was either a spot that we did not sample, because you can't
12 sample the total area of the cask, or we had this phenomenon
13 which leads to increased contamination on a relatively clean
14 surface after it heats up, and over a period of time.

15 Q Do you know for a fact that there isn't a faulty
16 weld on that cask?

17 A A faulty weld that would let water through from
18 the inside?

19 Q That would hold pool water?

20 A I don't know about any weld that could hold pool
21 water.

22 It says, in the middle of that paragraph:

23 "Tests were inconclusive but did not
24 appear to indicate that the excessive surface con-
25 tamination resulted from any leakage of cask

446 131

574 123

eb6

1 contents."

2 It also talks about the subsurface contamination
3 that comes up during transit.

4 Q You don't know whether there are any scratches,
5 scrapes, any other indentations on the surface of that cask
6 that could hold pool water, do you?

7 A When you're talking about pool water, are you
8 talking about a drop, or gallons?

9 Q Either.

10 A I do not have knowledge of that but casks are
11 usually smooth and I don't see how it could hold large amounts
12 of water.

13 Also the casks are washed down quite thoroughly
14 during the decontamination and upon removal from the pool.

15 In any event I also testified that even though
16 it was considerable above the shipping limit in some places
17 on that cask, that I did not believe it to represent a hazard
18 to the public. And I don't think the regulations were written
19 so that anything in excess of that value would be a hazard.
20 They're all considerably less than a value that would be a
21 hazard.

22 Q Then I take it there was a second assembly which
23 left Oconee some time later, and that also reported this same
24 problem, hot spots on arrival. Is that true?

25 A Yes, sir, that's correct.

446-132

574 124

eb7 1 Q Had you not changed your procedures in the in-
2 terim?

3 A We had changed the procedures after the second
4 one because we realized then that it was an instrument
5 calibration problem in addition to the hot spot.

6 In other words, if you don't calibrate an instru-
7 ment precisely for the energy that you're measuring, you can
8 run into considerable errors. When we calibrated exactly for
9 the energy that we were -- the energy of the radionuclides
10 on the smears of contaminations, we found something like a
11 factor of three error which has been corrected.

12 Subsequent shipments with all the problems we had
13 previously and all the concerns were taken, were in compliance
14 with the regulations.

6.180

15 Q I also take it that the first shipment to go out
16 had a trunion tie-down bracket that was not correctly tied
17 down.

18 A I have no knowledge of that, not being in the
19 health physics area, but that's what the page states.

20 Q You were not present when this cask actually
21 left the area, left Duke Power Station at Oconee?

22 A That's correct. Besides, the actual tie-down
23 work is not a health physics area, so I don't have direct
24 knowledge of that.

25 Q Do you know anything about the bolts not being

POOR ORIGINAL

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574 125

eb8 1 torqued, that is, being closed without the application of a
2 torque wrench?

3 A I do not know anything about that other than what
4 the statement says on the page.

5 MR. BLUM: Mr. Chairman, I don't know that this
6 is the correct time but I would like to offer Exhibit 2 into
7 evidence for this hearing.

8 CHAIRMAN MILLER: Well, let's see if there's any
9 objection to the offer.

10 Does anyone object to the offer of CESC Exhibit 2
11 for identification, which appears to be-- At least the
12 paragraph denominated "Shipment of Irradiated Fuel Assemblies,"
13 Number 11, refers to the Crystal River Plant incident which
14 has been described.

15 MR. MC GARRY: Inasmuch as the Board has asked
16 about it, Mr. Chairman, we have no objection.

17 CHAIRMAN MILLER: The Staff?

18 MR. KETCHEN: No objection.

19 CHAIRMAN MILLER: Apparently there is no objection.
20 It will be admitted, CESC Number 2.

21 (Whereupon, CESC Exhibit 2,
22 having been previously
23 marked for identification,
24 was received in evidence.)

25 BY MR. BLUM:

~~446 134~~

574 126

eb9

1 Q Mr. Lewis, looking at your testimony-- Actually
2 if I can get back to the cask:

3 Are you familiar with the status of the NAC-1
4 casks owned by Duke Power?

5 A I understand that they are not licensed at the
6 present time, and that's about the extent of my understanding.

213

7 Q Now when you calculated this total dose in your
8 table, I notice that the difference between the total dose
9 and the dose difference appears to be 49 person-rem.

225

10 A That's correct. I took Item Number 3, alternative
11 3, which was 49, and assumed that to be zero, and subtracted
12 that from every other value and wrote the difference in. I
13 just put the lowest value and subtracted it from all the others
14 to show a dose difference between any alternatives and alterna-
15 tive 3.

16 Q Does that figure, the 49, contain any reference
17 to the background dosage?

18 A This is a dose in addition to background.

19 Q All right.

20 Now how do you calculate total dose?

21 A I'm sorry?

22 Q What is total dose? How do you calculate that?

23 A Oh. Well, I've gone through that upon examination
24 by our Counsel showing the various components that went into
25 the various alternatives. Do you want me to review that again?

57A 127

446-135

eb10

1 Q Does it involve the number of people in these
2 various activities?

3 A Yes, and the time they work, and the fields they
4 work in.

5 Q Is the figure, for instance 49 for item 3, is
6 that inflated because of the additional number of people that
7 would be working at construction?

8 A No-- Construction of the Oconee site?

9 Q Yes, construction of a separate fuel storage
10 facility at Oconee.

11 A You mean we might be loading fuel in there while
12 they're constructing it?

13 Q No. I'm saying that if there were more people
14 involved in that activity than would be involved in shipping
15 storage at McGuire, would that cause the construction figure
16 to be higher, 3 higher than 5?

17 A I don't understand where construction enters into
18 the dose. In accordance with ALARA principles, we only give
19 dose to people that need to receive dose as part of their
20 work. And we try to minimize any unnecessary exposure.

21 It would assume that the fuel was placed in there
22 after it was constructed and there are no construction people
23 left.

24 Q All right, I think I've got that.

25 Now how did you arrive at this figure of \$1500

446 136

574 128

eb11

1 per person-rem as an occupational exposure dollar value?

2 A All right.

3 The requirements in regulations to keep all ex-
4 posures as low as reasonably achievable is really a quali-
5 tative requirement. There is not a quantitative method of
6 determining it. So in order to make evaluations we often use
7 an appropriate value. We have chosen the \$1500 value as the
8 value of person-rem for occupational exposure because -- mostly
9 from people, from the Canadian work and people in Ontario
10 Hydro in Canada have done a great deal of work on this over the
11 years, and I've been in touch with them for a good number of
12 years.

13 Their most recent value that I'm aware of is
14 \$1500 for a person-rem, not involving critical path shutdown
15 time for a reactor. And I've adopted that as a good, appro-
16 priate value for our use.

17 Q Well, I'm concerned with how you evaluate person-
18 rems, which I suppose relate to cancers, in dollar amounts.

19 A Well, if you make ALARA evaluations it requires
20 you to look at the cost-benefit aspects, the state of the
21 technology, the socio-economic aspects, and so you have to have
22 something to evaluate cost-benefits on.

23 The value of 1,000, which is the companion figure
24 in there, was the value derived at the Appendix I hearings,
25 10 CFR 50, Appendix I, as the medical costs of radiation

446-137
574-129

eb12 1 exposure. During the hearings they showed that various inves-
2 tigators had come up with figures of from \$12 to \$600 as the
3 medical cost value of a man-rem of exposure.

4 It was rounded off during the hearing to a figure
5 of \$1,000, so I am applying it appropriately to any public
6 exposure, and the value of \$1500 I feel is appropriate right
7 now, not having any quantitative values to go on from NRC or
8 other regulations as appropriate for our work.

9 We use \$1500 when we figure our own jobs at work,
10 whether to put up additional shielding or not.

11 Q I take it that doesn't have a mortality factor
12 in it then?

13 A The figures originally were derived-- Well, the
14 \$1,000 was derived from the medical value, the expense value
15 of a man-rem.

16 Q You're saying so many man-rem's cause so many
17 cancers which cause so much in medical costs to repair them
18 and then--

19 A That's how they were derived, and they were
20 rounded off to \$1,000 at the Appendix I hearing.

21 At this hearing I understand that Dr. Hamilton
22 has spoken about the medical effects of the various doses.
23 My testimony does not get into that aspect.

24 Q So that that does not include any value figure
25 for the impact on the person who is undergoing the operation,

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1 the cost of which you consider, or the death of that person?

2 A The \$1500 figure includes the value of that ex-
3 posure occupationally to a company. As I say, the \$1,000 is
4 based on the medical cost. The extra increment of \$500 would
5 be a value of that exposure to the company, plus medical cost
6 aspects which are in the \$1,000 figure.

7 Q You haven't looked at the value of that exposure
8 to the employee, I take it?

9 A Well, the employee is working in the plant; he
10 receives a salary which is a benefit, and he receives the
11 exposure which he knows of. He's aware of it, and he knows
12 he works within occupational exposure limits established by
13 the NRC and leading authorities in the world. So he assumes
14 whatever risk goes with that exposure.

15 Q Looking down a little bit on page 5, you have a
16 series of parenthetical remarks that begin "such as approxi-
17 mately four million dollars," and ends three lines below.

18 A On page 5?

19 Q Page 3, I'm sorry.

20 A Yes, sir.

21 Q You don't know any of those dollar figures of your
22 own knowledge, do you?

23 A Those figures were given to me by other people
24 who testified as to those values in this hearing.

25 CHAIRMAN MILLER: I think we'll take our morning

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recess at this time, about ten minutes.

(Recess.)

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2 CHAIRMAN MILLER: The evidentiary hearing will
3 resume, please.

4 BY MR. BLUM:

5 Q Looking at the next page, page four, Mr. Lewis,
6 I did not understand why it was that the person-rem along the
7 route to Durham, which is alternative four, was about almost
8 10 times as high as the person-rem along the route to
9 McGuire. Can you explain that again?

10 A All right.

11 Taking the same average dose per assembly multi-
12 plied by the ratio of 400 to 300 and the population differences
13 which, I believe, were something like 327,000 people over
14 42,000, gives that figure.

15 Q So the difference is that there are a lot more
16 people within a half-mile of the route to Durham?

17 A Yes, and since it's a longer distance you have
18 more people.

19 Q Well but the distance is only about twice as
20 great, so you're factoring in the closeness of people to
21 Interstate 85, Lexington, High Point and Greensboro?

22 A You have the ratio of 42,000 to something like
23 327,000.

24 Q What's the source of the 327,000 people?

25 A These were values given to me by our design
engineering people who researched it from Census figures, I

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1 believe.

2 Q All right.

3 So as you understand it, though, that would be
4 because there are people in Lexington and High Point who live
5 close to Interstate 85?

6 A It's due to more people within a half-mile of the
7 transport route than along the route to McGuire and also
8 greater population densities getting up toward Durham.

9 Q I assume, then, if you had built your alternative
10 storage facility away from Oconee but at some place in an
11 unpopulated area or where the roads to it led through an
12 unpopulated area, that you would have come out with a much
13 lower total dose for alternative four?

14 A That's correct, we chose Durham because it would
15 represent a conservative value, it would be sort of like a
16 maximum upper limit of population dose and any other location
17 would be less.

18 Q Well, it's a maximum upper limit for what the
19 construction of a spent fuel storage facility away from
20 Oconee but not at McGuire could be?

21 A If we're talking about page four, the two values
22 there are population doses due to the transportation. The
23 .04 value is due to dose to the population along the route
24 within a half-mile on either side of the route transporting
25 fuel from Oconee to Durham.

446 142

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1 Q You couldn't get any further away from Oconee
2 than Durham and still stay within the Duke system?

3 A I understand that's correct.

4 Q So almost anywhere other than Durham that you
5 chose for this facility would be -- would give you a lesser
6 value than this 72 total dose?

7 A Yes, that's correct -- No....Well okay, it would
8 only change the increment due to population dose which is
9 104. So the dose, the only change you would see in there
10 would be dose to drivers which would be somewhat less and
11 dose to the population. But the main components of dose would
12 still be there.

13 Q Well if you got it closer, for instance, you
14 could do with only one on-route driver inspection as opposed
15 to two?

16 A Yes, in the case of Oconee/McGuire, we did just
17 that.

18 Q All right.

19 Now what is the background, the natural background
20 rate in North and South Carolina?

21 A I have values which I've averaged between the
22 two states of 140 millirem. They range from an average of
23 135 to 145 in each state.

24 Q Does that include just giving everybody a
25 medical X-ray per year?

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2 A That includes natural background, radio-
3 activity, terrestrial and cosmic ray components of dose as
4 listed in EPA documents, which I can reference.

5 Q I'm confused because I understand that normal
6 figures range from 80 millirem up.

7 A 80 might be the terrestrial component. This
8 includes the cosmic ray component of essentially 40 to 45
9 and the internal exposure component due to natural radio-
10 activity in the body of about 25. So it brings the average
11 for South Carolina to 135 and North Carolina 145 and, there-
12 fore, the value of 140 that I chose is between the two.

13 This was taken from an EPA document reference,
14 "Radiological Quality of the Environment in the United States,"
15 1977.

16 Q There's a difference -- if you're including cosmic
17 rays, I guess there must be a difference between the mountains
18 and the piedmont.

19 A It varies with altitude within certain latitude
20 areas, yes.

21 Q Looking at your last sentence on this page four,
22 you calculated the transportation -- or you believed the
23 transportation dose to be as low as reasonably achievable.
24 But it is not, according to your calculations, the lowest
25 dosage.

26 A That's correct.

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Q In fact, the lowest dosage would be the construction of a separate fuel storage facility at Oconee.

A That's correct. But when you make a determination you have to look at cost-benefit aspects and you have to evaluate them.

Q But you're looking just in terms of radiation, radiation received. If that is going to be set as low as reasonably achievable, it would be the construction of the separate fuel storage facility?

A There is no requirement to determine as low as reasonably achievable based on dose rate or dose alone. You have to consider cost-benefit aspects, the state of the technology and other sociological aspects.

MR. ROISMAN: Move to strike the answer to witness' testimony about the legal requirements, not qualified.

CHAIRMAN MILLER: Correct, the answer is stricken.

It's stricken for whatever reason.

Now what's your question?

BY MR. BLUM:

Q The lowest of these five alternatives that you have listed, the one that gives the lowest dosage is three, the construction of a separate fuel storage facility at Oconee.

A I've already said that's correct.

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1 Q Looking at the top of page five, and I believe
2 in your testimony as well, you're discussing a car or a bus
3 or whatever that's parked alongside the shipment in a traffic
4 jam. Is it your testimony that it makes no difference as
5 to whether it's a car or a bus?

6 A No, I didn't say that, I just said it may be a
7 car or a bus or whatever next to it in a traffic jam.

8 Q You're giving -- supposing you did have a school
9 bus, for example, alongside a spent fuel shipment in a traffic
10 jam, and the school bus or activity bus or church bus or
11 whatever was loaded with people or children; wouldn't you
12 really have to consider the cumulative dose to the total number
13 of people postulated to be in that bus as opposed to the
14 individual dosage?

15 A If you wanted to do what?

16 Q If you wanted to calculate the total probable
17 effects of the radiation that those people would receive.

18 A You could use either dose to the individual
19 and calculate the risk to that individual or you could take
20 the cumulative dose and calculate the risk to the population
21 that received that dose, yes.

22 Q In terms of calculating the consequences, there's
23 no difference between one person receiving, let's say --
24 Let me think a second so I can phrase this correctly.

25 (Pause.)

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There's no difference between one person receiving 1000 millirem and 10 people receiving 100 millirem, is there?

A As far as calculation of the total risk, I believe that statement is correct.

Q So if you had a 64-passenger school bus parked alongside this cask, as far as the consequences go, you would have 64 times what you calculated?

A You may have up to 64 times as a maximum upper limit of the dose to one individual, yes.

Q And isn't it true that some individuals and particularly children are particularly susceptible to radiation?

A It has been stated, but I don't know if it has been conclusively proven that there are certain people who are particularly susceptible to radiation.

Q Aren't there differences in population sensitivity to radiation?

A I would assume that there were, yes.

Q It's just that the state of the art is such that we can't determine who is more susceptible and who is less susceptible to radiation?

A I don't think that you can necessarily pick out an individual and say that he is, unless he is obviously ill, but among healthy people, I believe the statement may be correct. However, the dose is small and Dr. Hamilton has

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1 spoken to the health risks of those kind of doses.

2 MR. BLUM: If I may go over my notes for just
3 a second.

4 (Pause.)

5 BY MR. BLUM:

6 Q On page five you talk about occupational doses
7 of up to 12,000 millirem per year. That's not a total-body
8 dose, is it?

9 A Yes, it is.

10 Q Is that for hands and arms?

11 A Hands and arms or even higher. For extremities,
12 you can go up to 75 rem per year.

13 Q How many people did you assume it would take to
14 put the cask on another truck?

15 A My assumption here was that whatever people were
16 involved, one individual, the highest individual might get as
17 high as an upper limit of 400 millirem.

18 Q It might be a half a dozen individuals getting
19 doses up to that level?

20 A Yes.

21 MR. MC GARRY: For the record, Mr. Blum, you're
22 referring to page five in that last line of questioning?

23 MR. BLUM: Yes. The middle paragraph, or the
24 last paragraph, I guess, now on page five.

25 THE WITNESS: If I might add to that. I think

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1 that figure is rather conservative. Talking of people who
2 have done this work of picking up casks and reloading it,
3 they're talking of maybe 30 minutes to an hour. I just assumed
4 the man was exposed to the highest level for 10 hours, so
5 I think the number is rather conservative.

6 BY MR. BLUM:

7 Q What kind of a traffic accident did you assume?

8 A Whatever kind of accident which led the truck to
9 turn over and the cask to be lying on the side where it
10 needed to be picked up and put on another vehicle.

11 Q You assumed no releases --

12 A That's correct.

13 Q -- from the cask, you assumed the neutron shield
14 were not perforated?

15 A That's correct.

16 Q Thank you, Doctor.

17 MR. BLUM: No further questions.

18 CHAIRMAN MILLER: Any further cross-examination?

19 MR. ROISMAN: Yes, Mr. Chairman.

20 BY MR. ROISMAN:

21 Q Mr. Lewis, in making your conclusion about what is
22 ALARA and what is not, did you assume that if you did
23 transshipment now, that it would take care of the spent fuel
24 storage problem for the lifetime of the Oconee Plant?

25 A I believe that -- May I explain the answer to that?

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1 I don't know if I can answer yes or no.

2 Q Sure.

3 A The statement that I said that the transportation
4 was ALARA, meaning the transportation dose from Oconee to
5 McGuire Nuclear Station, the dose that people receive loading
6 it, transporting it and including the public dose was as low
7 as reasonably achievable.

8 Q Compared to what?

9 A Compared to what they could have received from
10 such a shipment.

11 Q If the total shipment was going to be 400?

12 A This assumes a shipment of 400, yes.

13 Q Have you made any calculation of what would be
14 ALARA for the total handling of the spent fuel from the
15 Oconee facility over the lifetime of the Oconee facility?

16 A You mean in a so-called cascade type program?

17 Q That or any other option, yes, anything that will
18 take care of the handling of that spent fuel from the Oconee
19 facility short of permanent disposal.

20 A I have been told by fuels people that perhaps as
21 many as 4000 assemblies might be involved in the so-called
22 cascade shipping program.

23 I would say as a first order as to that if you
24 take the dose, the total dose from shipping and storage at
25 McGuire and multiply that by 10, the ratio of 400 up to 4000,

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1 that that would give you an upper limit of the total ions
2 occupationally and to the population for the transmission of
3 4000 assemblies.

4 Q You say you've been told, do you know where the
5 4000 number comes from? Do you know if that is the lifetime?

6 A I have no personal expertise in fuel management.

7 Q All right. Let's not talk about it, because
8 I happen to know where the number comes from and since I
9 calculated it, you don't know how I calculated it, we're not
10 going to get very far with the 4000 number.

11 CHAIRMAN MILLER: Unless you wish to reverse
12 roles.

13 (Laughter.)

14 MR. ROISMAN: That's right.

15 BY MR. ROISMAN:

16 Q Let's go back, though, to the question I've got.

17 When you make a calculation about ALARA, what
18 you are doing is you are taking the exposures and transmitting
19 them into person-rem and you are taking the dollar cost of
20 reducing those exposures assuming 100 -- assuming \$1500 per
21 person-rem being an adequate return on one's investment, so
22 to speak, and anything in excess of that being more than it's
23 worth, is that correct?

24 A We used the \$1500 value to evaluate taking
25 certain action which would tend to lower the doses.

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1 Q All right.

2 So it would be possible using that kind of a
3 calculation, would it not, to start with today and calculate
4 all the different ways in which one might handle the spent
5 fuel to be discharged from Oconee between now and the end
6 of the lifetime of the plant -- calculate, using the kinds of
7 assumptions you've used here, what the person-rem exposure
8 would be of each of those alternatives -- get from your
9 Engineering Department or whatever a calculated cost, the
10 economic cost of pursuing each of those alternatives and
11 then do the way you did, an ALARA calculation of what each
12 alternative would be and what was truly ALARA over the
13 lifetime of the plant, is that not true?

14 A I would not say that what is shown on page
15 three of my testimony is ALARA calculation. We do these
16 kind of evaluations normally between alternatives --

17 Q Wait. Excuse me, Mr. Lewis, I didn't ask you
18 anything about page three, I just asked you a question.
19 And if you could answer that question, and then if you want
20 to give me an explanation, that's all right.

21 I asked you, is it possible to do, and then I
22 gave you what it was.

23 A Well I wasn't sure I could answer your question
24 yes or no, and therefore, I was trying to get at it in my
25 understanding of the question.

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I think you were asking me to evaluate the \$1500 figure and so forth like the various alternatives, one, two, three, four and five on page three, which I don't consider to be ALARA evaluations.

Once you decide on what you want to do, like shipping and storage at McGuire, then you take all the possible steps you can to reduce the exposure to a level as low as reasonably achievable, that is your ALARA work. The other is sort of a cost-benefit evaluation between alternatives.

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1 Q I trust you're not offering me a legal conclusion
2 you're telling me your own understanding of ALARA?

3 That's my understanding of ALARA.

4 Q Let's operate for a moment on my understanding of
5 ALARA. And you can take my word for it that at least one
6 licensing board thinks that I'm right; okay? --just so you'll
7 know there's a basis for my assumption.

8 Let's assume that the ALARA calculation does
9 involve attempting to compare alternative courses of action,
10 and go back to my question:

11 Isn't it possible to calculate the methods by
12 which one might handle spent fuel from the Oconee plants
13 through their lifetime which has been testified to to be
14 around the year 2012, get a calculation of what you would
15 expect the person-rem's to be as a result of those various
16 handling methods, get a calculation of the economic cost of
17 pursuing those various options, and, on the basis of that,
18 then be able to make a comparison between the alternatives
19 using, for purposes of my question, your \$1500 per person-rem
20 value, and see which one is ALARA over that time period?
21 Isn't that possible to do that?

22 MR. MITCHELL: Objection, Your Honor, for the
23 same reason, the continuing objection that I stated the other
24 day.

25 CHAIRMAN MILLER: Objection overruled.

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1 THE WITNESS: I believe it would be possible to
2 do that, yes.

3 BY MR. ROISMAN:

4 Q Well, now, you've not done that; is that correct?

5 A Looking at every single alternative and--

6 Q Out through the lifetime of the Oconee facility.

7 A I've not done that, other than the evaluation that
8 I gave for, say, the 4000 assemblies, which would be a multiple
9 of the 65 person-rem. You can multiply by any number of
10 assemblies you want and you get an upper limit, essentially.

11 Q If we assume a permanent cascading program--

12 A Yes, sir.

13 Q If we assume a cascading program that starts now
14 and ends in 1993, and then is picked up with an independent
15 spent fuel storage facility at the Oconee site, we might come
16 to some different conclusions; is that correct?

17 I mean, that would complicate your calculation?

18 A If you make changes you're going to get different
19 conclusions.

20 Q All right.

21 Now let's get back to how you got these numbers for
22 the 400 spent fuel assemblies.

23 First, where did you get the 400?

24 A Well I was told that that was the figure they would
25 expect to be involved in this shipment.

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wb3 1 Q You were told by whom?

2 A The fuel management people.

3 Q That they thought there were going to be 400 ship-
4 ments?

5 A They said, Use 400 and we can scale the figures to
6 whatever it is, 375, 412.

7 Q Do you remember roughly when that happened?
8 When did they ask you to do these?

9 A Well I believe at the time we were preparing
10 testimony, and so forth, answering questions -- not preparing
11 testimony; answering questions of interrogatories in regard
12 to fuel shipments, and preparing testimony.

13 Q Now when you did the calculation of the person-rem
14 associated with, let's take your Alternative No. 1, Modifica-
15 tion of existing Oconee nuclear spent fuel pool, how did you
16 do that calculation in the sense of how did you know how much
17 you should assign to the various elements? I think you said
18 in answer to your counsel's direct examination, you had 76
19 for the reracking and 8 associated with transfers between the
20 1 and 2 pool and the Unit 3 pool; is that correct?

21 How did you know it was 76 associated with re-
22 racking?

23 A Those are major elements, and we have broken it
24 down further into the component parts.

25 There are, for example, in the backup material,

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1 five different sub-aspects to the reworking --

2 Q Before you lengthen the transcript with that
3 answer, tell me in this sense: how did you know that whatever
4 values you put in for there were the right values to use?
5 What were you basing the numbers on?

6 A We had to evaluate the jobs that had to be done
7 in this work, so it was basically work that had to be done:
8 actual radiation levels in the plant, actual experience to date
9 in handling fuel, making transfers, loading and unloading
10 casks, using actual experience from the plant for the most
11 part these numbers were derived by, I guess you could ultimately
12 call it, engineering judgment, if you do it in advance of the
13 actual operations.

14 Q All right.

15 Now in terms of the engineering judgment that you
16 used in conjunction with Unit 1 and 2, did you make an assump-
17 tion as to what the release level was that was coming off the
18 fuel rods that are in the Unit 1 spent fuel pool right now?

19 A We had our design engineering people calculate
20 this number for us. And the figures seemed to be appropriate.
21 And I've used them variously in the alternatives.

22 Q Now when you say "calculated," is that different
23 than actually going in and physically measuring it? Is a
24 calculation different from a physical-- Did they stick some-
25 thing in the water and find out just what the radiation level

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1 was?

2 A Measurements are being made of radiation levels
3 in the pool, radioactivity in the pool, the component
4 radionuclides of this activity. We continuously require for
5 the operation of Oconee a measuring of the total activity
6 being released from the plant, of which the fuel pool is a
7 component.

8 Q For your 76 person-rem calculation, was that based
9 upon actual measurements or a calculation of what actual
10 measurements it was believed would show?

11 A These were based on actual measurements plus
12 estimates of the working times required to do certain aspects
13 of the job.

14 Q Roughly, when were those actual measurements made?
15 I don't mean the day. But two months ago? Six months ago?

16 A Well, we used data -- for the most part, an average
17 of 1977 and '78 refuelings, and up until, say, March of this
18 year.

19 Q In the actual work being done on the Unit 1 and 2
20 pools are you monitoring the radiation exposure levels that
21 are being experienced?

22 A Yes, we are.

23 Q Are they proving to be higher or lower than what
24 you had anticipated when the population was--

25 A Well, for example, one component of the dose, which

wbs

1 was rack removal, work being done by divers, which is a major
2 component of the dose, because of the ALARA work that we
3 have done to lower the doses to the divers -- and this is a
4 continuing, sort of dynamic thing that's hard to write down
5 one time and just keep doing it, the divers, we're estimating
6 now that they may receive about 65 percent of the dose we
7 estimated for that work.

8 Q You mean per diver?

9 A The total for the job.

10 We had estimated the diver work, rack removal
11 and installation -- well, the total work: the rack removal
12 and installation, 64 man-rem. The diver portion of that,
13 which is about half of that, is running about 60 percent.
14 We're estimating now that they will end up about 60 percent
15 of what we had estimated.

16 Q And you are measuring what they're actually being
17 exposed to, or you're calculating what you think they're being
18 exposed to?

19 A We're actually measuring what they're being exposed
20 to.

21 Q They are wearing some kind of a badge or device?

22 A Thermo-luminescent dosimeters are on their body
23 and their extremities. And they're using survey meters under
24 water that we rigged up in special Lucite containers to be
25 waterproof. And keeping certain distances from the fuel; and

wb7

1 everything else.

2 We have done underwater vacuuming to reduce the
3 dose from the crud that may be on the bottom prior to them
4 going in there.

5 So some of that work has served to reduce the
6 dose down to the 60 percent level.

7 Q Now I seem to remember -- and I may be wrong --
8 that one of the Company's witnesses indicated that there was
9 some problem being experienced with the reracking as a result
10 of exposure levels being a little bit higher than had been
11 anticipated. I think it came up in the context of whether
12 or not one could eliminate that ten-foot water barrier that
13 has been established between where the divers are going to
14 work and where the spent fuel is still stored in the pool.

15 Can you give any illumination on that? Is there
16 some problem that has arisen down at that end of the pool in
17 which the exposures are appearing to be higher than they had
18 been anticipated to be?

19 A Of course I don't know what someone else has
20 testified. I wasn't here when they did. But I will say, as
21 I think I've just previously said, that the total dose for the
22 divers, if continued at the present rate, as a result of the
23 ALARA precautions we have taken, the ALARA measures that we
24 have taken, will run about 60 percent of what we anticipated
25 for the divers. I see no problem of the nature you appear to

wb8

1 be describing.

2 Q In other words, you have not heard of any such
3 thing?

4 A I have not heard of a problem of that nature.

5 Q Okay.

6 And if such existed, I assume you're the guy in
7 the Company who would have been likely to have heard of it?

8 A Yes. And it could have been a problem that
9 existed in a moment in time and then, by corrective measures,
10 it disappeared.

11 Q Okay.

12 Now, in the reracking analysis I noticed that
13 there is no amount included in there for a routine operation
14 exposure. Can you explain to me why is that eliminated from
15 the reracking?

16 A We subtracted that out --or I subtracted that out
17 of the analysis because it is not-- We would get exposure
18 from routine operation whether they reracked or not, in a
19 sense, because we are operating the Oconee nuclear station,
20 we are refueling, we are handling fuel. So I didn't want to
21 attribute the dose that we would receive now to the reracking
22 operation.

23 Q But isn't it true that the more spent fuel you
24 handle the more dose you get, and that's represented by the
25 number 9.3 from routine operation, which is contained in some

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wb9 1 of your other calculations, such as under No.--

2 A The 9.3 was added where it was appropriate to add
3 it. It was something that-- Essentially Ocone will get 9.3.
4 Maybe there'll be a little change in that due to the reracking
5 work. But a small increment; which I have not added. It may
6 be 1 or 2 person-rem.

7.180 7 Q Now do I understand that your calculations show
8 that if you rerack, looking at Alternative No. 2, if you
9 rerack Units 1 and 2 with poison racks, that the total
10 exposures, holding aside transfers for the moment, from the
11 reracking operation itself will actually be smaller than
12 reracking with the non-poison racks? 72 for the poison versus
13 76 for the non-poison?

14 A The reracking, to my knowledge, is taking place
15 in the 1 and 2 pool, and the reracking with poison racks
16 would be in 1 and 2 and in 3.

17 Q But I'm just looking now... You had broken it
18 out, in answering Mr. McGarry's question, into the portion of
19 it associated with reracking just 1 and 2. And the number I
20 wrote down was 72 person-rem.

21 A Versus the 76?

22 Q Versus the 76 for reracking 1 and 2 with non-poison.

23 A Yes.

24 Q What is the reason for that difference?

25 A Part of the reason for that is that this is an

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1 on-going thing. There's work going on at Oconee. And if you
2 take certain steps to eliminate those-- We see, for example
3 the underwater vacuuming has been quite successful in limiting
4 dose. So now-- Well we had to do the underwater vacuuming
5 for the reracking work. If we would then take a cleaner
6 pool and use it with poison racks we would get less dose.

7 So, in a sense, all these calculations are not at
8 the same instant in time. They account for what has been
9 done at the station to date.

10 Q You mean that the reracking that is now going on,
11 the 76 number includes 4 person-rem for exposures associated
12 with vacuuming that you would not expect to get if you then
13 turned around and reracked with poison racks; is that what
14 your testimony is?

15 A Underwater vacuuming, we would get about 2 person-
16 rem if we did it with the poison racks, versus 3.6 for the
17 reracking.

18 We are trying to carefully attribute each dose
19 to where it really belongs, apportion it properly. And we are
20 doing work while this hearing is going on. And things change
21 day by day. And this poison rack came in later. We had done
22 a certain amount of work for the reracking.

23 Q Are you assuming the poison racks are going to be
24 installed after the existing modifications have been completed,
25 when you did your calculations here?

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wb11 1 A Well, they are working on reracking at the present
2 time.

3 Q So the poison racks will follow it.

4 So when you did the calculation you assumed the
5 pool had already once been reracked with the non-poison racks
6 in making calculations like how much fuel is in the pool and
7 where it will be physically located?

8 A I believe the answer would be Yes to that. And
9 also an additional factor:

10 As a result of experience during the reracking
11 we could see that some doses were going to be lower if we got
12 involved in poison rack work.

13 Q Well, now, wait a second.

14 As I understand, this testimony of yours was pre-
15 pared before you started doing any reracking. How could
16 experience have changed it? June 4th is the date of the testi-
17 mony. The reracking wasn't approved until about the 15th.

18 A We did a lot of preparation work for the reracking
19 in advance of getting the licensing approval to rerack.

20 Q You mean preparation work that formed the basis
21 for your conclusion that poison racks would involve less
22 exposures; not paperwork, but physical work?

23 A The physical work at the station in advance of
24 the reracking, in advance of reracking the pool.

25 Q All right.

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1 Now on page 4 of your testimony you purport to put
2 the doses to the public into -- and these are your words: "in
3 perspective" by comparing them to the annual average dose that
4 a person, or people along the route receive from natural back-
5 ground radiation.

6 Can you explain to me why is that putting it into
7 perspective? What is the relevance of the fact that we are
8 getting, people in North Carolina and South Carolina are getting
9 an average of 140 millirem from the natural background?

10 A All right. Laymen do not understand units, and so
11 we often put it in perspective by comparing it to x-rays doses,
12 and so forth. In this case we're comparing it to the doses
13 of radiation that these people or persons receive from back-
14 ground, as just a means of comparison.

15 Q So that if we're dealing with laymen, don't you
16 think that laymen might find it more relevant to simply be
17 told that if the spent fuel is transshipped through your com-
18 munity there is a definably larger probability that you'll
19 get cancer than if it is not? Wouldn't that be something
20 that laymen would understand better, and wouldn't that be
21 accurate?

22 A It's a very qualitative statement which doesn't
23 leave the person able to make some judgments about the magnitude
24 of the dose they receive.

25 Q Well, but it would be an accurate statement, wouldn't

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1 it? Is it a true statement that if the cask gets through
2 a community, the people there will have a greater chance of
3 getting cancer than if it didn't, assuming all other things
4 remain equal? Isn't that a true statement?

5 A The risk probability would increase infinitesimal-
6 ly. So, yes.

7 Q Thank you.

8 Now, to someone who lives along the route, you
9 don't think that might put it into better perspective for
10 them, just so they'd understand it? I mean like if they had
11 the choice between having a cask go through their town or
12 not, you don't think it would help them to know that it might
13 increase their chance of cancer if it went through?

14 A I think if we said that to them -- and we do,
15 we also put the risk figures in there so that they can
16 understand that.

17 Q You think most people evaluate in terms of their
18 own day-to-day operations in terms of risk figures such as
19 you've calculated on page 4?

20 A It's extremely difficult to talk to people in
21 terms of risk, because people ordinarily, including ourselves,
22 don't like to think of risk, or don't think of risk in a
23 numerical sense.

24 And yet, of course, actuarial figures available
25 from insurance companies list risks for every single thing,

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1 from a single cigarette to a millirem of radiation.

2 Q Then I still don't understand. If this is the
3 calculation, this 1 in 42,000, or 1 in 10,000 that people
4 don't ordinarily do, why does it put it into perspective for
5 them to give them that number?

6 A I'm trying to show people, whoever is reading or
7 listening to testimony, or whatever, that we're talking of
8 an incremental dose that's equivalent to a very small fraction
9 of the radiation background they receive. Because in the
10 terminology you're using it, if you talk that way to the
11 public, they think they're getting a fantastic over-exposure
12 which will send them to the hospital with cancer, or whatever.

13 Q Are you testifying now about human reaction to
14 facts? Is that what you're testifying to?

15 A I'm talking about trying to put it in terms that
16 people can understand more readily.

17 Q All right. That's what I'm trying to get at.

18 Your testimony is based upon some assumptions
19 you're making about -- quote -- what people understand --
20 unquote. Is that correct? This piece of your testimony?

21 A It was an attempt to put it into perspective,
22 so that people could compare the doses which they would
23 receive from a shipment with what they normally get from
24 radiation background.

25 Q Well, that's only a useful comparison for people

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1 if that's the kind of comparison they're used to making,
2 isn't it?

3 MR. MC GARRY: Mr. Chairman, I'm going to object.
4 Whether or not it's useful to a person is a determination for
5 that person to make, not for Mr. Lewis to make.

6 CHAIRMAN MILLER: The testimony does get into
7 perspective, and I guess perspective depends upon the angle
8 or the perception of the viewer. So we will permit him to
9 answer.

10 THE WITNESS: To answer the questions that you
11 have been asking -- not necessarily the last one, but the
12 actual risk, increase in risk, due to the shipment, in my
13 understanding, has been addressed by Dr. Hamilton in his
14 testimony. My testimony does not go into the risk aspect
15 other than stating what the doses are, and trying to make some
16 comparisons to how much this represents.

17 BY MR. ROISMAN:

18 Q Let's go back to my questions now. I'm trying to
19 find out if you are saying that you put this into perspective
20 for people, do you put it into perspective if you give it to
21 them in the context of a calculation which does not
22 represent a comparison that they normally make in their
23 day-to-day life? Does that increase their perspective on it?

24 A I think it does. In all the talks I give to the
25 public on radiation exposure, and so forth, we talk about

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1 natural background, we talk about doses from the plant, we
2 talk about risk aspects. But people don't usually understand
3 what 10^{-5} risk means, or 10^{-10} . We have to take those
4 40,000, 50,000 automobile deaths a year. This will lead to
5 one-tenth of one person getting cancer. And we try to
6 explain it in terms that they are familiar with.

7 Q But isn't it true that there are still plenty
8 of people who you would say that to who still come back to
9 you and say, "But I'm afraid of the radiation from your plant
10 or your cask or your waste," isn't that true?

11 A Yes.

12 Q So at least for that body of people, you're not
13 putting it into perspective when you give it to them in
14 1 in 42,000, or 1 in 10,000 increase in the risk?

15 A We have to try, and we try different methods.
16 And this was one attempt at such a comparison.

17 Q My only question is, and the only point I'm
18 trying to get at is, that for people whose perspective is
19 different than yours, they might have found it more in
20 keeping it in perspective to just tell them you've got a
21 greater chance of getting cancer if this cask goes through
22 your community than if it doesn't, isn't that true, if they
23 have a different perspective than you do?

24 A Yes, and I think we have done that in this case
25 by Dr. Hamilton's testimony.

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1 Q I'm just talking about what you've said in this
2 paragraph on page 4.

3 A The statement you're making appears to be correct,
4 yes.

5 Q And the statement at the bottom of page 4, where
6 you say the transportation dose is, in my opinion, as low
7 as reasonably achievable, ALARA, I just want to be clear on
8 this: You're not making a conclusion about what you think
9 the law requires, is that correct?

10 You're not trying to tell me what you think the
11 law requires, are you?

12 A I'm giving you an opinion as a qualified expert
13 in health physics that the doses resulting in transportation
14 to McGuire are as low as reasonably achievable.

15 Q In light of a certain set of factors that you
16 testified to earlier you're taking into account in making
17 the calculation?

18 A And also in my understanding which I have of
19 interpreting regulations which say keep exposures as low as
20 reasonably achievable, and the Regulatory Guide which gives
21 me the general policy, goals and objectives in doing that.

22 MR. ROISMAN: Mr. Chairman, just as long as it's
23 clear that the witness is giving an interpretation, not an
24 expert opinion, on that --

25 CHAIRMAN MILLER: Yes, he's giving his understanding

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1 in view of the circumstances he has described. I think the
2 record reflects that

3 BY MR. ROISMAN:

4 Q Now, over on page 5 of your testimony, in the
5 middle paragraph, near the bottom you have the phrase,
6 "Doses received for this job..." referring to the
7 putting of the cask back on the truck again, "...would
8 correspond to occupational exposure where the dose limits
9 routinely permissible are 5,000 mrem per year and 1,250 mrem
10 per quarter..." and then you cite a regulation.

11 What do you mean by, or what's the relevance of
12 this statement, "...would correspond to?" Is that another
13 one of these comparisons that you're doing?

14 A I would not consider a person doing the recovery
15 work necessarily would necessarily be a member of the public,
16 in a sense, but rather he would be a more restricted body,
17 which may be occupationally exposed people.

18 It could be people who are receiving this exposure
19 and it being handled as occupational exposure.

20 Q So what you're trying to say is that for people
21 who are normally in the radiation handling business, the
22 amount of radiation involved here is comparable to what they
23 might reasonably expect to get in their occupation?

24 A Yes.

25 Q You're not trying to say that you think it's

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necessarily good or desirable?

A There's no statement that it's desirable or good. It was a statement of what they might receive and would be put in the occupational exposure frame.

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1 Q This next sentence, "Occupational doses up to
2 12,000 mrem per year and 3,000 mrem per quarter are also
3 permitted by present NRC regulations under certain conditions."
4 Is that based upon your reading of that regulation, or are
5 you telling me something that you've been told by someone
6 who did read the regulation?

7 A Again, that would be my interpretation of the
8 regulation, by having worked with it for a good number of
9 years.

10 MR. ROISMAN: I think, Mr. Chairman, the record
11 would be a lot cleaner if that sentence were out. It's just
12 not--I mean it's a statement that's either irrelevant because
13 his perception of what he thinks the regulation means in this
14 context doesn't improve things at all, or he's giving us a
15 legal opinion of what 10 CFR Section 20.101(b) means, which
16 obviously he's not competent to do.

17 MR. MC GARRY: Mr. Chairman, I would submit that
18 he's indicated on at least three occasions he is stating his
19 understanding of ALARA, and that's the purpose of this
20 testimony.

21 CHAIRMAN MILLER: The question now is what is his
22 understanding of these permissible occupational doses under
23 certain NRC regulations or under certain conditions, which
24 he then cites the 10 CFR 20.101(b). And that's going a step
25 further than his understanding of ALARA.

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MR. MC GARRY: Obviously the regulations speak for themselves.

CHAIRMAN MILLER: In that event, do you wish for him to cease speaking about it and we'll strike that sentence? Perhaps it would be cleaner.

MR. MC GARRY: If we're getting into legal conclusions, yes, Mr. Chairman.

CHAIRMAN MILLER: All right, you're agreeing then, really?

MR. MC GARRY: As far as it goes in asking for a legal conclusion of what this means, legally. I'm saying he has indicated his understanding, and if he's familiar with it he can respond to questions based on his familiarity.

MR. ROISMAN: All I'm trying to do is in terms of the record. I've got a man here who has been qualified as an expert in an area. I do not want to have to worry that if I've got a case that disagrees with his legal interpretation, that in the bottom half of the next to the last sentence and all of the last sentence, that that's somehow or another an expert opinion in his judgment as to what this regulation means.

As long as it's understood that that's not what it is, as I say, I think the record will be cleaner if it's not there, but if we've got the ruling that that's not what it could be used for, that's almost as good.

CHAIRMAN MILLER: All right. We will rule that

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1 it cannot be used for legal interpretation, nor will it be
2 given any weight or purport to be any legal interpretation.

3 BY MR. ROISMAN:

4 Q Now, Mr. Lewis, I'm going to ask you some questions
5 with a great deal of trepidation. They involve things that
6 my technical people have pointed out to me. One of them is
7 written with Greek letters in it, and right away I'm in
8 trouble.

9 So, if I haven't asked it quite right, before
10 you answer Dr. Cochrane will lean over and say to me what it
11 is. So you wait one second after I ask you the question,
12 okay?

13 A Fine.

14 Q Now, you've talked about the contamination that
15 would come from people who are around this cask, and you've
16 talked about a smear which I take it is a removable type of
17 contamination.

18 Isn't there also direct exposure limits relating
19 to beta and gamma shine exposures, and they are two separate
20 sets of exposure limitations associated with the cask?

21 A I think I understand the general context of your
22 question, unless you wish to rephrase it.

23 CHAIRMAN MILLER: You may answer if you understand.

24 BY MR. ROISMAN:

25 Q All right, if you say you understand, let's see

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1 what the answer is.

2 A There are limits for outside surface contamination
3 on the casks. There are also limits from what they call
4 external radiation, meaning gamma radiation from the material
5 inside the cask that you can measure on the outside.

6 Q And they're two separate sets of limits? You
7 don't simply combine the two to get a combined number?

8 A That's correct. I combined them in addressing it
9 previously, but I said I was combining them, where it's not
10 required or asked for by regulation.

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11 Q Okay. When you've done the calculation that you
12 did on page 3, did those calculations include only the
13 external exposures, or did you also have a factor in there
14 for internal exposures associated with people coming into
15 physical contact with the cask where it has removable
16 contamination on it, like had occurred with the Crystal River
17 casks?

18 A These figures represent essentially external
19 whole-body dose the people would receive from doing this
20 work.

21 Our experience at Oconee, because of you might
22 call it the ALARA program for contamination and internal
23 exposure control, has been extremely good. Of all the people
24 that worked there, we only have an extremely small fraction
25 of them that have any radionuclide material in the body, and

1 the resulting doses from that are small components of the
2 total dose for the year.

3 So, in other words, the internal exposure is a
4 very small increment of any of these doses.

5 Q Let's take those casks that went to Crystal
6 River. I take it that one possibility is that the contamina-
7 tion was on the cask from the time that it was at the
8 Oconee facility, and that some worker did take some internally
9 as the result of contact with that cask, and you didn't
10 discover that the material was on the cask until it got to
11 Crystal River and a smear was taken.

12 Isn't that true?

13 A That may be, that contamination was on there
14 to Crystal River. But people work in protective clothing
15 also, to prevent material getting into their bodies when
16 they work with contamination at nuclear plants.

17 We also take measurements of internal exposure
18 of people, and I presume other nuclear plants do the same,
19 to see what doses are. And our experience of thousands of
20 these measurements a year is that only a few receive any
21 dose at all, and these are very small doses.

22 So I felt I could give you the internal doses in
23 this respect.

24 Q How are you monitoring the internal dose?

25 A We use a whole-body counting type device, using

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1 the sodium iodide crystals, multi-channel analyzers, computer
2 based multi-channel analyzer programs to evaluate the type
3 material in the body and the amounts, and then assign doses
4 based on standard methods of calculating these.

5 Q Do you take fecal and urine samples also for
6 measuring internal doses?

7 A Normally with radioactive materials at a nuclear
8 power plant you get beta gamma emitters, and therefore you
9 can make all of the measurements necessary with a whole-body
10 count. You don't need to take those. Those are, in a sense,
11 used for specialized measurements like for someone who is
12 working with plutonium, or possibly tritium, which is not the
13 exposure in these cases.

14 Q What was the exposure on that, in the high levels
15 that were recorded on the casks that ended up at Crystal
16 River? Were those beta gamma, or were some of those alpha?

17 A The radioactive material was beta gamma.

18 Q That they discovered on the surface of those
19 casks?

20 A Yes.

21 Q Do they do a smear for alpha? Would they have
22 detected alpha if it was there?

23 A Yes.

24 Q Do you have any sort of bounding calculation, or
25 any estimate as to the accuracy of the numbers that you've

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1 calculated on page 3? I notice that in your testimony today
2 you changed one number from 48 to 49. What's the range of
3 the accuracy of that number? What's the low and what's the
4 high, in your judgment, of any of those numbers?

5 A The rounding from 48 to 49 was due to rounding
6 the number of 97 for the millirem to 100. I rounded it from
7 97 to 100, so that would change the limit.

8 I think I previously testified that the divers
9 were receiving about 60 percent, that they should end up, if
10 things go the same, with about 60 percent of the dose that
11 we had projected for their work.

12 So I would say in my judgment that these figures
13 probably would not vary by more than 30, 40 percent -- 50
14 percent.

15 Q Either way?

16 A Yes, sir.

17 And if you changed them with relation to each
18 other, one at a time, I think you would still come to the
19 same conclusions here.

20 Q I understand that, if you're going to be doing
21 that.

22 Now, when you did the shipping and storage at
23 McGuire, which is essentially the proposal on the table, 400
24 fuel rods shipped from here to McGuire, were you calculating
25 the driver exposures on the assumption that there would be

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1 two people in the truck, in the cab of the truck?

2 A Yes.

3 Q How about in terms of any escort vehicles going
4 along with the truck? In other words, a vehicle which would
5 be continuously within a certain range or distance from the
6 truck?

7 A The escort vehicle was not a part of that dose.
8 There is no statement, of course, that the escort has to be
9 within 50 feet. I do have a statement of dose to a truck,
10 or whatever, following for 10 hours.

11 Q Yes, I remember that you had that number.

12 Okay. Are you at all familiar with these require-
13 ments that the Nuclear Regulatory Commission has imposed that
14 would appear to include requirements for certain kinds of
15 escorts?

16 A Yes. I've read them.

17 Q You indicated before that the smears that you
18 do on the casks, like the Crystal River casks, where you
19 measured beta gamma, you also measure alpha.

20 How do you measure the alpha, in light of the
21 high beta gamma count that you get? How are you able to
22 distinguish?

23 A You can do it with the zinc sulfide detector,
24 which would effectively discriminate out the beta and gamma
25 and count the alpha with higher efficiency.

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1 There are also more modern types of equipment
2 today -- Bhoswich's they call them --

3 CHAIRMAN MILLER: How do you spell that?

4 THE WITNESS: B-h-o-s-w-i-c-h.

5 CHAIRMAN MILLER: Thank you.

6 THE WITNESS: They're a scintillation type device
7 that would be sensitive to alpha and beta, and you can read
8 them separately.

9 BY MR. ROISMAN:

10 Q And that's what was done at Crystal River for
11 making the alpha measurements?

12 A That's what we'd use for making them. I'm not
13 aware of what the actual method used at Crystal River was.

14 Q You don't know for sure that they measured for
15 alpha at Crystal River when the casks were --

16 A I do not know for sure.

17 Q Is there a limit that is applied by Duke for
18 smear for alpha?

19 A Yes.

20 Q What is that?

21 A It depends on where it is located, whether it's
22 inside a restricted area of the plant or outside the plant.

23 Q We're talking about now just for purposes of once
24 you'd get a smear on a cask.

25 A We would have a limit of 50 disintegrations per

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1 minute per 100 square centimeters for a cask.

2 Q Now, is it a reasonable conclusion to draw from
3 experience with the Crystal River shipment that it is at
4 least a reasonable possibility that the washing down and
5 decontamination procedures at the Duke plant were not
6 sufficient to remove external radiation from the cask?

7 A Were not sufficient to remove contamination from
8 the cask, I think would be a more appropriate way to say it.
9 And I would say did not remove all of it, perhaps.

10 Q And in your judgment was the amount that was
11 found on the smears -- was that a significant amount? I
12 mean an amount which you would not like to see casks shipped
13 out with that amount on it?

14 A Yes, obviously.

15 Q One last question:

16 In terms of the ALARA to the general public, do
17 you require that the trucks that ship the spent fuel have
18 any lettering or statement on them in a conspicuous way that
19 warns people that the closer they come to the vehicle, the
20 more dangerous it might be, and that they should -- quote --
21 keep their distance -- unquote?

22 A The answer to the question is no, and then I'll
23 explain it.

24 The only lettering used are those required by
25 the regulations which, I believe, would require the word,

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1 "Radioactive" in large letters on four sides of that vehicle.

2 Q In your judgment, would it be ALARA to also
3 include a statement that says, "Keep your Distance." Would
4 that help, going back to this question of public perception,
5 would that help people stay away?

6 A Someone might get exposed going close enough to
7 read what the sign said.

8 (Laughter.)

9 Q You could make it big, right? That's like those
10 little things, "If you can read this sign, you're too close?"

11 A Yes.

12 Q How about a little sign, "If you can read this
13 sign, you just got cancer?" Would that --

14 MR. MC GARRY: Objection.

15 CHAIRMAN MILLER: Sustained.

16 MR. ROISMAN: Sorry, Mr. Chairman.

17 CHAIRMAN MILLER: I think the subject is covered.

18 BY MR. ROISMAN:

19 Q Let's go back to the lettering question. I take
20 it that you would not like to see a bus load of school
21 children happily looking at the cask from a close distance
22 and asking their driver to stay there next to the truck
23 because it's a very big thing, and, you know, the excitement
24 of the thing? That you would prefer that not to happen in
25 an ALARA context, is that not true?

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1 A I personally would have no objection to putting a
2 sign on it to tell people to keep their distance, but we've
3 found that the word "Radioactive" is plenty sufficient to make
4 people in the public keep away from such vehicle.

5 MR. ROISMAN: No further questions.

6 CHAIRMAN MILLER: Any further cross?

7 MR. KETCHEN: I'd like to ask counsel to identify
8 the case he mentioned while he was questioning this witness.

9 You mentioned a case during the course of your
10 examination --

11 MR. ROISMAN: Which case? Oh, it's the Commonwealth
12 Edison decision involving the transshipment and the ruling on
13 admissibility of contentions.

14 MR. KETCHEN: Was that the -- if I may inquire,
15 Mr. Chairman -- was that the Licensing Board decision? Was
16 that the one you were referring to?

17 MR. ROISMAN: I always consider it respectable
18 to cite Licensing Boards to Licensing Boards.

19 CHAIRMAN MILLER: It was called the equal dignity
20 rule when you were in law school, I suspect.

21 (Laughter.)

22 BY MR. KETCHEN:

23 Q I've heard your 60 percent several times, and you
24 had estimated a number for the divers. I'm not sure I ever
25 clearly got what the particular number was that you were

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1 referring to.

2 A For the component retacking work for the divers,
3 looking at my figure here, it's essentially 34.3 mrem.

4 Q So it's 60 percent of that?

5 A About 60 percent of that.

6 MR. KETCHEN: Thank you, Mr. Chairman.

7 CHAIRMAN MILLER: I think that we have a question
8 from the Board. Are there any further questions of counsel,
9 first?

10 MR. WILSON: Yes, sir, I do have a couple, please.

11 BY MR. WILSON:

12 Q Earlier, when you were talking about the
13 occupational dose limitations you were mentioning what they
14 were, and I don't believe we had an explanation.

15 If you could, would you please give us a brief
16 explanation of who was covered by the occupational dose limits
17 and who was not?

18 A All right. My understanding of these regulations
19 as a health physicist working with these year after year,
20 people who do work or are employed by the Licensee are re-
21 quired to comply with the regulations.

22 In this particular case I'm talking about NRC,
23 10 CFR 20 regulations, which list occupational dose limits.

24 Q All right, sir.

25 Now, would that, under your understanding, apply

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1 to perhaps the security personnel who may be assigned to
 2 accompany the transshipment units? Would they be covered under
 3 the occupational limits?

4 A I would assume that these people would be our
 5 employees, and could come under those limits. Not that we
 6 would necessarily expose them to those.

7 Q I understand. But personnel outside of Duke Power
 8 Company employment would not, then, in your understanding,
 9 be subject to those occupational dose limits?

10 A Unless they were working for another person who
 11 had to comply with those regulations.

12 Q I see. So people like highway patrolmen, firemen
 13 or rescue personnel or other members of the public would
 14 not be subject to those occupational limits?

15 A They ordinarily would not.

16 Q All right.

17 I also notice in your prepared testimony in a
 18 portion which was struck you referred to the emergency response
 19 teams.

20 If I might take this occasion to ask you to please
 21 briefly outline for the record the emergency response planning
 22 that has been done in regard to South Carolina's participation
 23 in this transshipment operation?

24 MR. ROISMAN: Objection. The witness has just
 25 had the testimony in that area struck on the ground that

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1 there's no contention here, that it's not relevant. If it's
2 coming in now, then it opens up an area for cross-examination
3 for the parties, I take it?

4 CHAIRMAN MILLER: That's true.

5 I think it was withdrawn, but counsel did
6 indicate that if the Board, at least, had any questions, even
7 though it was being withdrawn because the contentions were
8 made by parties who have since been dismissed from the action,
9 counsel at least kept it open to that extent.

10 As I understand now, Counsel for the State of
11 South Carolina, which is a party as an interested State,
12 wishes to go into those areas. If he wishes to go into it,
13 the Board will permit it. This will, however, open up
14 whatever is gone into in that direction for cross-examination.
15 That is correct.

16 MR. WILSON: Since we did start at 8:00 o'clock
17 this morning, Mr. Chairman, and this might well open up a
18 cross-examination area, it might just be a good place to
19 break for lunch before that happens.

20 CHAIRMAN MILLER: All right. We'll take our
21 luncheon break --

22 MR. KETCHEN: Mr. Chairman, before we break,
23 could you give us a sense of the schedule for the rest of
24 the day?

25 MR. MC GARRY: I was going to suggest that perhaps

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we all approach the Bench and just discuss this off the record.

CHAIRMAN MILLER: All right, we'll go off the record and start the break for lunch. We will resume at 1:30.

(Whereupon, at 12:00 noon, the hearing was recessed, to reconvene at 1:30 p.m., this same day.)

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AFTERNOON SESSION

(1:45p.m.)

CHAIRMAN MILLER: All right, the hearing will resume.

Whereupon,

LIONEL LEWIS

resumed the stand as a witness on behalf of the Applicant, and, having been previously duly sworn, was examined and testified further as follows:

CHAIRMAN MILLER: I believe, Mr. Wilson, that you wished to ask a few questions.

Go ahead.

MR. WILSON: Thank you, Mr. Chairman.

CROSS-EXAMINATION (Continued)

BY MR. WILSON:

Q Mr. Lewis, I understand from your testimony that has already been marked for identification as Applicant's 15 that one of your duties is to establish and direct the radiation safety program at all of Duke's nuclear power stations, is that correct?

A Yes, sir, that's correct.

Q And in the conduct of those duties -- that particular duty, rather, are you involved in the preparation of emergency planning or emergency response plans?

A Yes. The establishment and implementation of

bmp2 1 emergency radiological response plans for each nuclear station
2 is also a part of my responsibility.

3 Q Can you tell us, Mr. Lewis, briefly, what the plan
4 is at this time and any developments that are coming in this
5 area regarding South Carolina?

6 A Well, we are in the process of developing a
7 radiological response capability for the shipments of spent
8 fuel from Oconee to McGuire Station. The plan will involve
9 interactions with the plans of the states of North and South
10 Carolina and will provide response from the health physics
11 organization at the Oconee Nuclear Station, the McGuire
12 Nuclear Station, and my general office capabilities as a
13 health physicist from the general office that would be avail-
14 able to respond.

15 So the plan that we're working up would involve
16 interaction with various state plans, particularly, as you
17 asked, with South Carolina.

18 Q All right, sir.

19 Do you know of any particular efforts that are
20 currently underway to develop a plan for South Carolina?

21 A Well, South Carolina, to my knowledge, has a
22 viable radiological emergency response plan, and they also
23 have an emergency radiation response team that works out of
24 the Bureau of Radiological Health in peacetime emergencies.

25 We interact with them a great deal in planning for

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nuclear station emergencies. We are and will interact with them in developing this plan, as we are doing in the State with comparable organizations in the State of North Carolina.

Q All right, sir.

Have you been the individual who's been in contact with the State of South Carolina officials concerning the preparation of emergency response teams, a legal task force in particular I'm talking about, to the governor's office?

A I have been in touch with one of the governor's aids, At the moment I do not recall his name, who has been involved in that task force and have sent him some information, particularly some testimony that I gave before a federal house congressional committee investigating emergency response. This would explain Duke's position.

I understand they're investigating the state capability for response throughout the state and reporting to the governor.

Q All right, sir.

In the viable state plans, state emergency response plan that you referenced earlier, what notification is involved from Duke to the State Bureau of Radiological Health in the event of an occurrence?

A There would be an immediate notification of State Radiological Health people, as they have in their plan. They have certain numbers, and we would contact them

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immediately, as we have done in the past if we had situations where they needed to be notified.

Q All right, sir.

Is there any -- Could you briefly describe the circumstances under which a report to the Bureau of Radiological Health would be required, say, in a transshipment context?

A Oh, are you referring to notification prior to shipment?

Q Yes, and then also through shipment if there were something to occur. How would this notification take place?

A It's my understanding that there was a law or regulation in North Carolina which requires notification of the State Highway Patrol in advance of shipments. I'm not aware of such a law in South Carolina.

But should there be, or if there is, we will obviously perform that notification.

In an emergency situation such as a truck accident with carrying a cask, whatever aspects are involved, I understand the Highway Patrol immediately notifies the Bureau of Radiological Health. But we would also, upon notification by our carrier that there was this accident situation, or upon notification by an escort, if we are required to send escorts.

Q Mr. Lewis, can you tell us about any delays in transit, for instance, do you know when notification would be required, for instance, a flat tire or other delay in transit

mpb5

that might change the time table, what kind of notification would you envision being appropriate in those circumstances, if any?

A I would assume if there were a requirement for notification of the state in advance of a shipment telling them of the times, the route, that if there was a delay or a problem that this would have to be reported back to the state and we would do so.

Q Is that yes, then, to things like a flat tire or some other mechanical breakdown that may not affect the integrity of the shipment or the conveyance itself other than in a minor way, but is that correct?

A Yes. I have a listing, as a matter of fact, where we have called the Radiological Health and asked them about incidents that have occurred in recent years. And looking at a good number of these, of 13 incidents that occurred involving radioactive material from the middle of 1976 to the beginning of '79, a great number of them are sort of minor or even trivial incidents that get reported to the Bureau. They respond in one way or another, whether by phone or by personally going to the scene and handling it.

In one case all that was involved was a driver was sick, suspected of being bitten by a spider or an insect. So from trivial to very significant aspects are reported to the state.

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MR. WILSON: I believe that's all we have, Mr. Chairman. Thank you.

CHAIRMAN MILLER: Any further questions?

MR. ROISMAN: Mr. Chairman, I have a few.

CHAIRMAN MILLER: Yes.

BY MR. ROISMAN:

Q Mr. Lewis, what basis do you have for believing that North or South Carolina's emergency response will be adequate in the event of a major emergency, that is that they will be on the scene in time to do what it is that their current plans say they're supposed to do?

A Well, the basis in working with them over the years to establish emergency plans for our nuclear power station from contacting them, as I said, to see what their experience was -- and I've got a great deal of information that we've summarized on this paper from them as to their response, also from North Carolina, and my organization, and I guess principally myself by name am a part of their emergency response team in North Carolina.

We have filled in for them until they were able to respond on the scene to incidents. We know what time it takes them to respond, and that they do and have responded to accident situations involving radioactive materials, particularly transport in this case, on numerous occasions over the years.

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Q Have you had any experience with them responding to a situation in which what we'll call a "major" release of radioactivity has been involved, say something of the order of three or four rems an hour worth of activity being released?

A To my knowledge there have been no such incidents.

Q If such an incident occurred, I take it the speed with which the emergency response took place and the breadth of the exclusion of the public from the area where it was occurring would be more crucial than if we had a spill that was five millirem as opposed to five rem?

A Yes. In both cases they assume that the State Highway Patrol -- that is both cases, North and South Carolina, the State Highway Patrol would likely be the first agency person to respond. And they each have procedures, and the Highway Patrol people have been trained, maintaining an exclusion distance -- In fact, North Carolina just has a procedure for their offices, 1500 feet arbitrarily.

I've seen them do this in one incident where a state truck containing a very small source, six microcuries source, overturned. Technically they needed an exclusion area of about ten feet; they were out to about 400 yards. So they responded --

Q How fast?

A Well, as fast as it takes; whenever the Highway Patrol is able to get to the scene.

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Q Could it be as long as an hour, depending on where they were?

A Depending on where people are, the response could be up to several hours. But usually a great number of these things are handled by phone or by radio communication with the Highway Patrol.

There was a recent accident in South Carolina on super Highway I-26 on June 18 in which the chief of the Bureau of Radiological Health himself responded on the scene within 15 minutes. It was fortuitous in that it was close to his residence.

So the response can vary.

Q And do I take it that if the response does vary up to an hour or more, it is conceivable that the consequence of the accident could be the exposure of members of the public who would not have been exposed if the response had been quicker, assuming that the response had been effective in keeping people away from the area?

A Except that Highway Patrol people are trained in a part of their procedure to keep people away. So depending on how long it took for someone to get there --

Q That's my question.

A -- that may be the case.

Also people seeing a sign 'radioactive' may keep their own distance. Again in my experience, people are very

mpb9

concerned about the word "radioactive".

Q You've had no experience with people's curiosity, people coming closer to such an event?

A I expect you may get incidents such as that, people getting involved in an accident for whatever purpose.

Q Or if the accident were to occur in a relatively crowded section of an interstate where there were simply a lot of people around who weren't led to believe that it was really crucial, to get out of their cars and get away, given that the cars couldn't physically move; you could get some exposures there, right?

A Yes.

Q Is there some emergency plan that you could imagine that one might implement that could further reduce that danger other than simply waiting for the forces of the state to converge on the spot?

A One of the greatest -- The greatest control measure over shipments of radioactive material is the integrity of the cask or shipping container, and it is in proportion to the hazard of the material being shipped.

Like in shipping spent fuel, we depend to a great extent on the integrity of the cask to prevent a release that would expose the public to radiation from the contents of the cask.

Q Yes, but obviously if that happens you're not

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mpb10

going to worry about emergency response plans at all.

My question was premised on the assumption that we do have an emergency that genuinely warrants a response because there is in fact a release coming out of the tank.

What could you do if that eventuality occurs other than simply relying upon the present emergency response that would further reduce the risks that members of the public would get exposed?

A Well, if in the case of fuel, and if escorts are required, the escort people will be trained in this aspect, and they would presumably be there at the time of the accident and could take that action.

Q Well, you said "presumably" and so forth. All right.

Does Duke now have a specific plan to make the escort people who -- I take it their initial function is to be guards to prevent some untoward malevolent act -- to be trained in exactly what to do in the event of an accident so that there will not be any unnecessary public exposure?

A I believe as part of the development of our radiological emergency plan that we would train guards to the immediate action --

Q Are you making a commitment now on behalf of Duke Power Company that the people traveling with the shipment will be trained to take necessary protective measures to

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reduce the risks of public exposure to radiation if there is an accident involving a shipment of spent fuel?

MR. MC GARRY: I would object to that question, Mr. Chairman.

I believe the record reflects that pursuant to the regulations that have just come out, we're in the process of developing the plan --

MR. ROISMAN: This gentleman is testifying about the people who happen to be there for safeguards purposes, if they are being used for emergency planning, which he has been put on the witness stand to testify about.

CHAIRMAN MILLER: I think this testimony is a result of the examination by the State of South Carolina, is it not?

MR. ROISMAN: Yes.

CHAIRMAN MILLER: In that event it was not proffered by the Applicant. So I take it that for that portion of his testimony that Mr. Lewis is the witness for the State of South Carolina, and that you are cross-examining.

MR. ROISMAN: Yes.

CHAIRMAN MILLER: So I doubt if you're in a position to extract commitments as such from this witness.

We would sustain the objection if that is the purport of your question.

If not, you may rephrase it.

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mpb12

MR. ROISMAN: Well, the witness said "I believe", and I guess I'm trying to find out whether we're to treat that belief as something --

CHAIRMAN MILLER: You may ask about that, yes.

BY MR. ROISMAN:

Q Are you making a commitment on behalf of the company?

A I'm not sure that I'm in a position to commit the company at the present time, or whether I could commit the company in my position.

Q So your beliefs may be more accurately stated as a hope on your part?

CHAIRMAN MILLER: What do you mean?

THE WITNESS: I am drawing up an emergency response plan involving Duke Power Company personnel, to be able to assist in any radiological emergency involving transportation of our fuel; should this become necessary, would the company commit to such a plan; necessary as a result of law, will the company commit to such a plan?

We will have the capabilities --

Q You mean if the law requires you to do it, you will do it? You are not saying you would do it voluntarily?

CHAIRMAN MILLER: He didn't say that. He said if the company decided to do so, they have the capability.

THE WITNESS: I'm drawing it up as a contingency.

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574 192

mpbl3 1 If the company decides to do it or if the law requires us to
2 do it, we will do it.

3 BY MR. ROISMAN:

4 Q Are you intending that in this plan you're
5 developing that along with the people traveling with the
6 shipment there will be radioactive monitors that could be
7 immediately set up around the site of an accident to deter-
8 mine how much radioactivity was being released, if any?

9 A It may include radiation monitoring equipment so
10 that it could measure radiation.

11 Q That would be carried on the vehicle to be set
12 up as soon as the accident occurred, assuming the people were--

13 A Yes, that's possible, it could be included with
14 the plan.

15 Q But you don't have a plan to do that now, that's
16 part of the plan you're putting together?

17 A A copy of our draft plan I believe has been
18 given to you, and it speaks to response capabilities for
19 the most part. I don't think it covers the area that you
20 just mentioned, although we would certainly make guards
21 aware of the radiological aspects and tell them certain
22 preliminary things to do.

23 Q Like?

24 A Like safeguarding anyone immediately around the
25 accident scene and notifying us and notifying other authorities

mpbl4 1 Q Would you anticipate that they'd have training
2 in making judgments about which directions the radiation
3 might be heading toward in order to first clear people from
4 the area that seemed to be most dangerous?

5 A Well, you seem to be hypothesizing a release from
6 the cask which --

7 Q That's true, I am.

8 A But the likelihood would be just the cask giving
9 off the normal radiation as it does in shipment. So you're
10 just keeping people away from that.

11 But obviously if Highway Patrol people can be
12 trained to keep people 1500 meters away or whatever, these
13 people could receive the same instructions.

14 Q Well, but I take it -- My question was if there
15 is a spill there's one direction that will be argueably more
16 dangerous than another, either influenced by wind, if we're
17 talking about something in the air, or by what the downhill
18 area is if we're talking about something running on the ground.

19 A There would be no problem in training people to
20 respond that way to it.

21 Q Is that something that you're now including in
22 your plan, in your draft plan?

23 A I don't think you'll find it like that in the
24 draft plan, except that we would provide radiological training
25 of some sort to these guards.

446 202
POOR ORIGINAL

ebl

1 Q Do you know, is there anything within Duke's
2 interrelationship with the State authorities, say North Caro
3 and South Carolina, which would enable you to learn if they
4 were not living up to what you perceive to be their responsi-
5 bilities under their emergency plans, for you to do something
6 about it if that became known? Would you notify somebody to
7 stop your shipments until it got fixed?

8 What I mean is, for instance, if you had been
9 dependent upon the knowledge in the hands of certain local
10 officials of routing and you learned that the local officials
11 didn't know they were supposed to know that and weren't con-
12 cerned with it or weren't taking any actions with it, does
13 Duke have some responsibilities that it assumes in that case
14 to do something about that problem?

15 A I think it would be prudent on our part to make
16 sure that the notifications got to the people and that they
17 understood what they had been notified of and what they were
18 expected to do.

19 Q I don't mean the notifications when an accident
20 occurs, but the advance planning so that the people understand
21 that there might be a notification coming.

22 A Well, we are required in North Carolina to notify
23 the State in advance of shipments and the routes, dates, and
24 so forth, the plants.

25 Q All right.

446-203

MFB/eb2

1 But what if you discovered you were sending the
2 notice to the State officials but the State officials are
3 doing nothing on it, that as you went through the local com-
4 munities you made some spot checks and you found that the
5 Highway Patrol people had had no advance notice that you might
6 be coming through, the local police officials didn't know
7 that you would be coming through, and that essentially the
8 State was taking the information you sent them but due to some
9 slippage in their implementation of their responsibilities, it
10 wasn't going any further than that.

11 If that occurred, what would Duke's response be?
12 What would you do in that case?

13 A It seems to me that if we were complying with
14 what was required of us, that that would be all the response
15 that we could do.

16 Q And if the State wasn't doing its job and you
17 learned of that, that would simply be something that was not
18 your business because you were doing your job of letting them
19 know.

20 A No, we would endeavor to-- I'm not sure I'm
21 answering your question right now, what we could do. We would
22 be interested in having them pay appropriate attention to this.

23 Q Okay.

24 Let me offer you some possibilities and you see
25 whether these are things you might do:

574 196
~~446 204~~

MPB/eb3

1 Call a press conference and renounce the State
2 authorities for refusing to adequately implement their emer-
3 gency response plan. Would you consider doing that?

4 A I think we would rather notify them, to make them
5 aware of the fact that we had notified them and there does not
6 seem to be an appropriate response.

7 Q And if that didn't help?

8 A Radioactive materials have been shipped long be-
9 fore there were requirements to notify State and local agen-
10 cies if they're complying with federal DOT transportation
11 regulations. And there's been millions of shipments of these
12 materials throughout the country without notification of local
13 agencies. So I think we would do our part, where we try to
14 get them to respond as they are supposed to respond but I don't
15 know how we could twist their arm, and I don't think we would
16 hold a press conference to denounce them, no.

17 Q Now would you suspend the shipments until they
18 came into compliance, announcing that as long as the shipments
19 were suspended, your plants were in danger of being shut down?

20 A I don't think the safety of the shipment is
21 dependent on the State response in the way that you are re-
22 ferring to, since millions have been made and there are
23 emergency response capabilities in the federal government and
24 locally through Duke Power Company.

25 Q Are you saying there have been millions of truck

574 197

446 203

MPB/eb4

1 loads of spent fuel shipped around the country?

2 A I'm talking about radioactive materials in general
3 of all types.

4 Q Is there more radioactivity in one of these spent
5 fuel casks than in most of what constitutes that "millions"
6 you were just talking to me about?

7 A I don't think so. You can get very large tele-
8 therapy sources and stuff are shipped around the country.

9 Q Comparable to the quantity of wastes in a spent
10 fuel --

11 A Not comparable, but in total, when you add them
12 all up.

13 Q I'm talking about each shipment. Have we had
14 anything approaching millions of shipments of the radio-
15 activity content of a fuel assembly, of a spent fuel assembly?

16 A I would say no.

17 Q Thousands?

18 A No. I just said no.

19 Q Well, I'm-- Thousands?

20 A There may be a good number of shipments that
21 added together were equivalent to a fuel assembly.

22 Q No, I'm talking about each shipment. I'm trying
23 to get some magnitude here per shipment. You're the one
24 that brought these "millions" in here, Mr. Lewis, not me. I'm
25 trying to find out whether the "millions" have any relevance

574 198 446 206

MPB/eb5

1 to the case if they're not comparable shipments.

2 So we've had thousands of shipments where each
3 shipment had an amount of radioactivity comparable to a fuel
4 assembly, a spent fuel assembly?

5 A I don't have personal knowledge about the materials
6 that were shipped around the country, particularly from NRC
7 contracts and AEC contracts for the '70s, and so I can't really
8 answer the question.

9 MR. ROISMAN: I have no further questions.

10 CHAIRMAN MILLER: Are there further questions?

11 MR. BLUM: Yes, Mr. Chairman.

12 BY MR. BLUM:

13 Q Mr. Lewis, do you have an estimate of the noti-
14 fication time to Duke in the event of an accident that dis-
15 ables the driver, assuming no escort?

16 A I would imagine it could be 15 minutes, with
17 the Highway Patrol responding and making their notification
18 and us getting a phone call perhaps from the Radiation
19 Protection Branch of North Carolina or the Bureau of Health in
20 South Carolina.

21 Q Have you studied the question or is that just off
22 the top of your head?

23 A That's my judgment, based on reviewing responses
24 that they have had to emergencies in the past several years.

25 Q You have actually studied response times of the

MPB/ac6

1 Highway Patrol, studied response times of the Fire Departments
2 and the Police Departments?

3 A No. In this particular case I was referring to
4 the State agencies and the Bureau of Radiological Health in
5 North Carolina and South Carolina, and Radiation Protection
6 Section in North Carolina. Some response time is by phone
7 within 15 minutes.

8 For others, people actually getting on the scene
9 if that were necessary, it could be up to several hours.

10 Q Do you know how long it would take to evacuate
11 Clemson University or West Charlotte High School in the event
12 of a serious accident?

13 A Judging from the way the people in Huntersville
14 evacuated when the Highway Patrol asked them to when the six
15 microcurie source was in an overturned truck, I would say
16 there would be no problem whatever in getting prompt evacua-
17 tion in an emergency situation involving a lot of radioactive
18 materials.

19 Q How long did it take to evacuate Huntersville?

20 A I would say within a half hour they had everyone
21 cleared out within 400 yards in all directions.

22 Q 400 yards.

23 How long would it take to clear everyone out for
24 half a mile, do you know?

25 A It depends on the manner in which you notify them,

574 200 446 208

MPB/eb7

1 how many people there are. Obviously if people heard this
2 by radio or if they had been notified by loudspeaker or person
3 to person, it could vary.

4 Q Do you know if the City of Charlotte has any
5 plans available to it to evacuate, let's say, Thomasboro,
6 that corner of Charlotte?

7 A I'm not sure where Thomasboro is, but I don't
8 know if the State -- I'm sorry -- if the City of Charlotte
9 has a plan to evacuate Thomasboro. I don't know, except that
10 the Civil Preparedness Agencies have general evacuation pro-
11 cedures for any natural disaster or whatever. I assume that
12 would include Thomasboro.

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3 Q Well do you know if there are any concrete plans
4 made by the City of Greenville, the City of Spartanburg,
5 Gastonia, Charlotte, for evacuation of people from homes for
6 the elderly or day-care centers that might be close to the
7 scene of an accident?

8 A I imagine as part of the general Civil Disaster
9 Preparedness Plans that require evacuation, such as tornado
10 or earthquake or flood or whatever, that they have an evacuation
11 plan.

12 Q Do you know of any concrete -- have you read any?

13 A Yes.

14 Q And what have you read?

15 A In setting up emergency plans for McGuire Nuclear
16 Station, for example, we worked with four county Civil
17 Preparedness Agencies. They themselves have this type of
18 evacuation plan and they have set up separate special plans
19 for evacuation of people that might -- in their counties that
20 might be affected by an accident at the McGuire Nuclear
21 Station.

22 Q Those plans are the same as plans for a flood
23 or something of that nature, aren't they?

24 A I'm saying the evacuation would be similar to
25 the required evacuation from the type of natural disaster or
whatever.

Q The Charlotte-Mecklenburg Office of Civil

POOR ORIGINAL

446-210

574 202

agb2

1 Preparedness has a response plan, I think you said in your
2 testimony.

3 A Yes, sir.

4 CHAIRMAN MILLER: He said that in that part of
5 his testimony that was withdrawn.

6 THE WITNESS: I misunderstood the question.

7 BY MR. BLUM:

8 Q The Charlotte-Mecklenburg Office of Civil Pre-
9 paredness has a plan, a response plan for accidents, or is
10 that true?

11 A Are you talking about radiological accidents?

12 Q Yeah, okay, radiological accidents.

13 A I have a copy here of a plan that they are
14 developing for hazardous material and radioactive materials.

15 Q And do you know whether the Charlotte-Mecklenburg
16 Office of Civil Preparedness has any operations staff?

17 A I understand that they do not, that they work
18 through fire departments, police departments, sheriff and
19 other agencies in the city and county.

20 Q Do you know what training, then, the Charlotte
21 Fire Department, the Charlotte Police Department, the
22 Mallard Creek Volunteer Fire Department, any of those units
23 have had in the handling of radiological accidents?

24 A I've heard Mr. Williams, Ken Williams, describe
25 the training before the county government here, the City Council

446-211
574 203

ag 33

1
2 And he has trained people within like fire departments,
3 police departments, other agencies and services that would be
4 like to respond. They've trained supervisors in particular.
5 They have distributed to all these agencies and supervisors
6 radiological monitoring equipment.

7 Q Do you know whether there's any radiological
8 monitoring equipment carried on the Charlotte Fire Department's
9 tanker trucks?

10 CHAIRMAN MILLER: Let me inquire now, we're
11 starting to spend a lot of time on a matter which has come
12 in through the back door, it's not proper direct testimony
13 of the witness, it was brought up by the State of South
14 Carolina.

15 Now, under the guise of cross-examination, do
16 you intend to prolong this matter much longer?

17 MR. BLUM: No, I have about three more questions.

18 CHAIRMAN MILLER: Very well.

19 BY MR. BLUM:

20 Q The Charlotte Fire Department tanker trucks have
21 no monitoring equipment, isn't that true?

22 A I can't answer that question. My knowledge of
23 that, according to Mr. Williams, is that all supervisors
24 carry this equipment. Whether the supervisor would be on the
25 tanker truck, I don't know.

Q Do you know whether there has been any plan for

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1 instructing Charlotte Fire Department members or any fire
2 department members how to deal with the smoke plume from one
3 or these trucks if that should be the case?

4 I believe the proper precaution is listed in the
5 draft plan that I've seen from the Civil Preparedness Agency.

6 Q Do you know who is in charge at the scene of an
7 accident if it takes place in Charlotte?

8 A The way I understand it, again from the same
9 draft plan, is that if it is a police matter, the highest
10 ranking police officer is; if it is a fire matter, the
11 highest ranking Fire Department member would be, at the
12 scene.

13 Q And who decides on evacuation?

14 MR. MC GARRY: That's the fourth question,
15 Mr. Chairman.

16 CHAIRMAN MILLER: Is it your last one?

17 MR. BLUM: The last one.

18 CHAIRMAN MILLER: All right. We'll give him the
19 last one.

20 BY MR. BLUM:

21 Q Do you know who makes the decision about
22 evacuation?

23 A You mean at the scene?

24 Q Yes, sir.

25 A As a part of the plan itself, it would be prudent

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1 to keep people at various distances from the sources, and so
2 that would be the Police Department, the Sheriff or whoever
3 on the scene would carry out the evacuation.
4

5 MR. BLUM: No further questions.

6 CHAIRMAN MILLER: Any further examination?

7 (No response.)

8 MR. ROISMAN: Mr. Chairman, I would just like to
9 get a ruling from the Board on this because if this is going
10 to -- if the process here utilized is going to continue, I
11 want to file an objection.

12 I understand the State of South Carolina has the
13 right, under the rules of participating states, to open up
14 areas. But I believe if they do open it up, there is no
15 limit to our right to cross-examine as long as we're within
16 the scope of what, in effect, becomes their direct. If they
17 open up a question that takes us two days to cross-examine,
18 I think that is irrelevant to any consideration that is
19 rightfully before the Board, our due process includes it.

20 Now Mr. Lewis has started to testify here about
21 all kinds of things that I don't think we should necessarily --
22 or should have been necessarily limited in the time.

23 It deals with an issue the State of South Carolina
24 wanted to raise and I don't have any objection to them doing
25 it. But I sensed in the Board's talking to Mr. Blum, and
even to some extent with me, that if we had chosen to make

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1
2 two hours' worth of cross-examination on it, the Board would
3 have ruled it out.

4 And if that's going to be the ruling, I'm going
5 to object to the State of South Carolina being allowed to
6 open up the record to put in an issue which has been withdrawn
7 from the case, as was the case with this emergency planning.

8 CHAIRMAN MILLER: Well we think if that be your
9 desire, that you should make your objection known when it
10 commences. We don't want to get into the middle of these
11 things, and we point out also we do have certain discretionary
12 power over cross-examination, we regard this kind of cross-
13 examination as being the bag to our theory and we suggest
14 at least to Mr. Blum if he really wants to get this evidence
15 in the record he's perfectly capable of bringing in by
16 subpoena or otherwise witnesses who have had direct knowledge.
17 We permitted it because there was no objection when it was
18 initiated by the State of South Carolina. I think that is the
19 time you'd better make your objections if we're going to get
20 into matters which could be opened up.

21 MR. ROISMAN: All right. I just wanted to be
22 clear on that because I think that we will take a much
23 tougher line on it with regard to future questioning by the
24 state.

25 CHAIRMAN MILLER: Yes, I think that's the time to
raise the question.

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1 Anything further now?

2 (No response.)

3 All right. Mr. Lewis, I guess you're excused,
4 thank you.

5 (The witness excused.)

6 MR. MC GARRY: Mr. Chairman, at this time, I
7 would move Applicant's Exhibit 15, which has been marked
8 for identification, the testimony of Lionel Lewis be received
9 into evidence.

10 CHAIRMAN MILLER: Any objection?

11 MR. BLUM: Yes, sir, I object to two portions
12 of that testimony.

13 The first is on page three, it commences in the --
14 below item five, four lines below that with the sentence
15 that starts:

16 "Reviewing the dose table and con-
17 sidering the economic costs of various
18 alternatives...", and runs to the end of that paragraph
19 on page four, ending with, "facility at Oconee."

20 The basis for that objection is that these
21 figures have been given by other witnesses, they've been
22 testified about, the record has a lot more detail in it than
23 the basis he used for making his conclusion.

24 And, furthermore, it has various legal conclusions
25 in it, I think, and it's not proper testimony from this witness.

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2 MR. ROISMAN: We would join in the objection,
3 Mr. Chairman, on essentially the same ground. It just looks
4 sort of like the equivalent of Mr. Bostian's testimony that
5 the Board previously ruled was summary of some other witness'
6 testimony.

7 CHAIRMAN MILLER: Well in this instance the
8 witness himself has purported to take more action himself.
9 But he does, as I recall his testimony, base it upon certain
10 information which he related on cross-examination he did
11 obtain from other witnesses.

12 MR. ROISMAN: The only thing that he did,
13 Mr. Chairman, was he did the dose table. The \$4 million, the
14 \$7 million, the \$44 million -- which incidentally, is sort
15 of an outdated figure in this record anyway; the testimony
16 is actually 62, which only underscores the unreliability of
17 this testimony -- and the \$984,000 which is also, by the
18 way, an outdated number. I believe the number used in the
19 Bostian testimony for that was \$738,000.

20 It doesn't make sense to have this man in here
21 telling us what another witness said. If he wants to say that
22 the dose table -- if he wants to draw a conclusion about his
23 dose table, that's fine, but I don't see that he's qualified
24 to make a second comparison, particularly since he can't
25 support the numbers, and the record contradicts the numbers
that he uses.

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2 And he does have on page four the statement,
3 "the best alternative..." which is a judgment that I don't
4 think he's qualified to make, beginning at the end of the
5 first line on page four.

6 CHAIRMAN MILLER: "The transportation dose is, in
7 my opinion..." is that the one you mean?

8 MR. ROJSMAN: No, at the top of page four the
9 end of the line. It says: "Shipping the spent fuel to
10 McGuire and storing it there is the best alternative..."

11 MR. MC GARRY: Mr. Chairman, if I might be heard.

12 CHAIRMAN MILLER: Yes.

13 MR. MC GARRY: I believe Mr. Lewis stated that he
14 did rely upon information received from others, however, he
15 utilized that information in a purpose that was meaningful
16 to him in a fashion that he normally performs his job. In
17 other words, in this instance he said while he was not
18 performing a NEPA or an ALARA comparison, he did find it
19 important in this particular position with the company to
20 obtain cost data, to obtain the doses and to compare them
21 so he can make recommendations to the company as to which
22 course to follow from a health physics point of view.

23 I believe the testimony is clear in that regard,
24 and that's exactly what this testimony is going to.

25 With respect to the validity of the numbers,
those numbers we've already discussed and those numbers stand

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1 or fall based upon the cross-examination that was had on them
2 last week.

3 MR. ROISMAN: Mr. Chairman, I don't think
4 Mr. McGarry's recollection of this witness' testimony would
5 coincide with what the testimony actually shows. He did not
6 say that in the normal course of his duties he does the
7 type of comparison of what is the best alternative. In fact,
8 it seems to me that the record discloses, and Mr. Bostian
9 testified that he and the Executive Committee are the people
10 within the company who make those judgments, not Mr. Lewis
11 who's a health physicist.

12 And if I understand how the company works,
13 Mr. Lewis' job is to do what he did to the table and give
14 them the dosages that he would anticipate occurring with
15 alternatives, if at all, if he does that at all, and also
16 to give them if he has it some dollar value that he attaches
17 to each person-rem of exposure. But not to go and make a
18 conclusion there about what is the best alternative.

19 CHAIRMAN MILLER: He did testify as to the source
20 of the economic value of the person-rem. He related keeping
21 in touch with experience in the field including academian
22 experience and so forth. I think there he was within his
23 field and I think that testimony is proper.

24 MR. ROISMAN: That's right.

25 MR. BLUM: That's the sentence before the one

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1 that I'm interested in striking.

2
3 CHAIRMAN MILLER: Now the question is, using the
4 dose table which he himself has prepared and is again within
5 his expertise and considering the economic costs of various
6 alternatives shown, was not that based upon the total doses
7 as one component and some assigned economic value per person-
8 rem as the other. Is it not there for an extension of the
9 two things he did within his own area of expertise? Wouldn't
10 that be within his own area?

11 MR. ROISMAN: If he does have the qualifications to
12 do the final group of totaling -- because I never heard him
13 testify about doing that -- or else if the words "can be seen"
14 are meant to say that anybody can read it, then he's drawing
15 the conclusion that the Board is uniquely required to draw.
16 If it can be seen, then it can be seen, we don't need him
17 to tell us it can be seen.

18 CHAIRMAN MILLER: That's true, and it would
19 probably be true --

20 MR. ROISMAN: It's the best alternative language.
21 He's not giving us an opinion as to what the best alternative
22 is if the best alternative involves a whole bunch of
23 considerations including the accuracy of numbers from other
24 parties that he's relied upon as well as exactly how one
25 does the calculation of what the scope of the alternatives
are.

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2 I think all he means there is that if all you're
3 going to do is ship 400 spent fuel assemblies from Oconee,
4 the best alternative is, but he doesn't qualify it exactly
5 that way.

6 MR. MC GARRY: Again Mr. Chairman, I am repetitive,
7 but the argument has been repetitive, that is, he's looking
8 at this from a health physicist point of view, that's what
9 his testimony reflects.

10 CHAIRMAN MILLER: That's what's troubling us.
11 So far as he is testifying as a health physicist, we have no
12 problem and we have admitted that much of the testimony.

13 We're not certain, though, about putting in
14 some dollar figures on alternatives and purporting to discuss
15 them in alternative language especially stemming in view of
16 the past without other qualification. We're not certain
17 that it is within his expertise.

18 MR. MC GARRY: I believe when he testified
19 there, he is not making a comparison, as Mr. Bostian. We're
20 not going to hold him out as Mr. Bostian. He was here
21 looking at -- he had to compare as a health physicist. A
22 health physicist compares the cost and the doses, that's
23 an ALARA exercise.

24 This man is a health physicist. Now, while he
25 didn't compare all the alternatives from an ALARA point of view,
he did employ this technique. In his own personal judgment,

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1 he employed this technique to get a handle on what the costs
2 were, to get a handle in terms of economics and in terms of
3 dose. So as a health physicist, he had a feel for the
4 relative positions of these.

5 CHAIRMAN MILLER: Well we're going to strike the
6 expression of opinion on alternatives on the grounds that this
7 is not an alternative witness and it's not within his area
8 of expertise. And as far as the best alternative, the same
9 ruling.

10 However, we do intend to let stand both the
11 viable alternatives as he has described in the figure that he
12 has there, his own views of the economic value of a person-
13 rem, exposure and the like.

14 We don't see the predicate frankly, though, for the
15 portion of the testimony starting: "Review of the dose table,
16 including the economic costs..." We really don't see the
17 predicate for that. Frankly, we don't think it makes that
18 much difference, I might also add.

19 We're going to strike, therefore: "Review
20 of the dose table..." we'll strike the balance of the sentence.
21 We will let stand whatever predicate there may be and we also
22 are permitting to stand the expressions of opinion that he
23 gave as he understand ALARA and the transportation dose and
24 so forth, his ALARA testimony as kept within the purview of
25 his own expertise.

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2 MR. MC GARRY: We would simply note our objection
3 for the record, Mr. Chairman.

4 CHAIRMAN MILLER: Very well.

5 MR. BLUM: Mr. Chairman, I would also move to
6 strike the last sentence on page four.

7 CHAIRMAN MILLER: No, that'll be overruled. He's
8 entitled to express his views, not as a matter of law but
9 it's within his understanding of ALARA, and we do think there
10 is sufficient predicate to overrule that.

11 Any other objections?

12 (No response.)

13 CHAIRMAN MILLER: Then Applicant's Exhibit 15
14 will be admitted with the exception of the portion that we
15 have described as sustaining the objection.

16 (Whereupon, the document
17 previously marked for identifi-
18 cation as Applicant Exhibit 15,
19 was received in evidence.)

20 (The document follows:)

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)
)
DUKE POWER COMPANY)
) Docket No. 70-2623
(Amendment to Material License)
SNM-1773 for Oconee Nuclear)
Station Spent Fuel Transportation)
and Storage at McGuire Nuclear)
Station))

TESTIMONY OF LIONEL LEWIS

My name is Lionel Lewis. I am the System Health Physicist for Duke Power Company. My job in the General Office in Charlotte, North Carolina is to establish and direct the Radiation Safety program for all of Duke's nuclear power stations.

I received a BA degree from the University of Vermont and an MS degree in Biophysics from the University of Rochester, after completing an Atomic Energy Commission Fellowship in Radiological Physics.

I have over 25 years experience as a Health Physicist in the nuclear industry, including Brookhaven National Laboratory, the Martin Company, and Combustion Engineering where I also served at the U. S. Navy S1C Submarine Prototype Reactor. Before joining Duke Power Company, I was Health Physics and Safety Coordinator at the Carolinas-Virginia Tube Reactor (CVTR)

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in Parr, South Carolina which was the first nuclear power plant in the Southeast. I also served as Plant Superintendent at the CVTR for the first year of power operation.

I have served on Scientific Committee 46 of the National Council on Radiation Protection (NCRP), and am presently a member of the American Nuclear Society, the Health Physics Society, the American Industrial Hygiene Association, the American Public Health Association, and the EEI-Health Physics Task Force.

I am the author of numerous technical papers over the years; one of which was included in the First Geneva Conference on the Peaceful Uses of Atomic Energy and have more recently served on a technical committee that prepared a safety guide on radiological protection at nuclear power plants for the International Atomic Energy Agency in Vienna, Austria.

I am Certified in Health Physics by the American Board of Health Physics.

This testimony addresses the various contentions concerning the radiation dose aspects of shipping spent fuel and the alternatives to shipping. It includes a comparison of dose to occupational workers and the public for the proposed actions and for the alternatives. This testimony also addresses emergency response plans.

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I have reviewed and estimated the dose aspects involved in the proposed action and the alternatives. The following table, based on the shipment of 400 spent fuel assemblies, summarizes my conclusions in this regard.

<u>Viabile Alternatives</u>	<u>Total Dose</u> (person-rem)	<u>Dose Differences</u> (person-rem)
1. Modification of Existing ONS Spent Fuel Pool, Unit 1 - 2	84	36
2. Installation of Poison Racks, Units 1, 2 and 3	107	59
3. Construction of Separate Fuel Storage Facility at Oconee	48	0
4. Construction of Separate Fuel Storage Facility away from Oconee but not at McGuire	72	24
5. Shipping/Storage at McGuire	56	8

The economic value of a person-rem for exposure of the public can be as much as \$1,000 and we at Duke Power Company have generally been using a value of \$1,500 per person-rem for occupational exposure considerations. Reviewing the dose table and considering the economic cost of the various alternatives shown (such as approximately 4 million dollars for alternative 1; and approximately 7 million dollars for alternative 2; and about 44 million dollars (1976 dollars) for alternatives 3 and 4; versus about \$984,000 for alternative 5) it can be seen that even assigning a value of as much as a million dollars per person-rem for the differences in radiation exposure received will still make

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shipping the spent fuel to McGuire and storing it there, the best alternative, despite the approximately 8 person-rem higher dose over the lower dose alternative, that of a Separate Fuel Storage Facility at Oconee.

The specific transportation doses to the public which are included in the total dose in the above table are as follows:

For alternative 4 - 1.13 person-rem; avg. dose 0.003 mrem

For alternative 5 - 0.14 person-rem; avg. dose 0.003 mrem

The doses to the public can be put into perspective by comparing them to the annual average dose that a person (or the people along the route) receives from natural background radiation in North and South Carolina, which is approximately 140 mrem per year. Therefore, the average dose that members of the public living along the route might receive from 400 shipments of spent fuel to McGuire is only about 1/42,000th of the dose they receive annually from natural background radiation. Correspondingly, the highest individual dose for 400 shipments is 0.01 mrem which is only about 1/10,000th of the natural background dose to that individual. The transportation dose is, in my opinion, as low as reasonably achievable, ALARA.

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The highest total dose that any given person might receive such as in a car or a school bus closely following a spent fuel shipment along the highway for 10 hours is 0.4 mrem. The corresponding dose to a person in a car or bus remaining immediately alongside the spent fuel shipment at a traffic jam or accident scene for as much as 10 hours would be at most only 30 mrem.

If the truck carrying a loaded spent fuel cask was involved in a traffic accident such that the truck overturned, persons involved in the tasks of removing the cask and transferring it to another truck, if that were necessary, might receive doses as high as 400 mrem (assuming 40 mrem per hour maximum dose rate on surface of cask for as much as 10 hours). Doses received for this job would correspond to occupational exposure where the dose limits routinely permissible are 5,000 mrem per year and 1,250 mrem per quarter. 10 C.F.R. 20.101(a). Occupational doses up to 12,000 mrem per year and 3,000 mrem per quarter are also permitted by present NRC regulations under certain conditions. 10 C.F.R. 20.101(b).

The States of North and South Carolina have emergency response capabilities for radiological accident situations as do local civil preparedness agencies. The State of North Carolina has an emergency radiological response plan

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which involves the Radiation Protection Section of the Department of Human Resources. Duke Power Company, System Health Physics personnel are local members of the North Carolina Emergency Response Team. In the past, Duke personnel have responded to two incidents involving radioactive materials on behalf of the State of North Carolina.

The Charlotte/Mecklenburg Office of Civil Preparedness has also developed a response plan for accidents involving radioactive materials which utilizes many city and county agencies.

As part of the State plans, Highway Patrol personnel in both states are trained in the proper procedures to follow in a highway accident involving radioactive materials. They are usually among the first to arrive at an accident scene and have demonstrated their ability to protect the public in actual accident situations where radioactive materials were involved. Duke Power Company will also make Health Physics personnel from Oconee and McGuire Nuclear Stations and from the General Office staff available to help local authorities in any such accident situation involving the spent fuel shipments.

There have been eighty-one incidents involving the transport of radioactive materials in North Carolina. Eleven of these incidents have occurred since 1976. The only incident involving transportation in the Charlotte area occurred April 24, 1975

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in Huntersville, North Carolina. None of these incidents involved spent fuel or posed a threat to the public health or safety since source integrity was maintained. The State response time for these emergencies depends on their evaluation of the information available from the Highway Patrol.

Generally, a two person survey team is mobilized within 30 minutes during working hours and within one hour at other times. The team determines if a hazard to the public health or safety exists and takes action to correct any existing hazards. The duration of this corrective action may be a few minutes to several days as occurred with a train derailment near Rockingham, North Carolina in 1977.

Dated: June 4, 1979

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2 CHAIRMAN MILLER: Does that conclude the
3 Applicant's testimony at this time?

4 MR. MC GARRY: At this time, Mr. Chairman.

5 CHAIRMAN MILLER: We understand you have at least
6 one more witness Friday. We're not cutting you off.

7 MR. MC GARRY: That's right. We have Dr. Garrick
8 on Friday, and I believe Mr. Sterrett will be back tomorrow
9 morning sometime.

10 CHAIRMAN MILLER: Very well.

11 We will then pass over to -- I believe the next
12 in order is the Intervenor, NRDC witnesses. Are you pre-
13 pared, Mr. Roisman, to go forward with either one witness or
14 one panel?

15 MR. ROISMAN: Yes, Mr. Chairman, we would put
16 our three witnesses on as one panel for the convenience of
17 all involved.

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1 MR. TOURTELLOTTE: Mr. Chairman, I'm supposed to
2 cross-examine a couple of the members of the panel of NRDC,
3 and I was just notified of the change in schedule a short time
4 ago. I wonder if we could have a few moments before we begin
5 this so I could discuss it with Counsel.

6 CHAIRMAN MILLER: Yes. Ten minutes?

7 MR. TOURTELLOTTE: Yes.

8 CHAIRMAN MILLER: Very well.

9 (Recess.)

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10 CHAIRMAN MILLER: We'll be on the record

11 Whereupon,

12 THOMAS B. COCHRAN,

13 DIMITRI ROTOW,

14 and

15 ARTHUR TAMPLIN

16 were called as witnesses on behalf of the Intervenor NRDC and,
17 having been first duly sworn, were examined and testified
18 as follows:

19 MR. TOURTELLOTTE: Mr. Chairman, before the direct
20 begins, the Staff would like to make a motion.

21 CHAIRMAN MILLER: Very well.

22 MR. TOURTELLOTTE: As a predicate for the motion
23 I would indicate that I have prior to the break, that I have
24 the responsibility of cross-examining two of the three members
25 of the panel. I was just notified late this morning of the

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1 change in schedule and it materially affected my ability to
2 prepare cross-examination for these two witnesses.

3 And moreover upon the discussion of the procedural
4 background with co-Counsel, I'd like to move that the Board
5 reconsider its previous ruling this morning and instead, take
6 this panel and move them into the proper position so that we
7 can be given the opportunity to properly prepare cross-
8 examination.

9 It's our general feeling that our due process
10 rights are being infringed upon by having to proceed at a time
11 out of time --

12 CHAIRMAN MILLER: You had better develop that out
13 of time because we totally disagree with you on that,
14 Mr. Tourtellotte. You're not out of time. This should have
15 been done yesterday as the Board had encompassed it, so you're
16 proceeding on some different kind of plan.

17 MR. TOURTELLOTTE: Well, I'm aware of the fact
18 that the schedule has been slipping right along but neverthe-
19 less, as I understand it, the panel on casks was presented by
20 the Applicant on Saturday and we anticipated to go on at that
21 time with Mr. Riley's people.

22 And then Mr. Riley did not get on because the
23 Applicant's people did not get through. And we came in Monday
24 morning and again we were anticipating Mr. Riley would be
25 getting on, and Mr. Riley did not get on because of certain

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1 papers that he was filing at that time.

2 But we still anticipated, as late as yesterday
3 evening, that today Mr. Riley would be on and would be up for
4 cross-examination, direct examination and so on, as a part of
5 that over-all problem that was address by both the Applicant
6 and the Staff.

7 And for some reason that is not quite clear to me,
8 Mr. Riley, who is addressing the same subject that the pre
9 vious panels were addressing, has been put after a panel which
10 in effect is not discussing that issue. And it seems to me
11 that that is placing him out of time. It's an out-of-sequence
12 thing.

13 And I don't really-- Perhaps if the Board could
14 give me a good rationale for why Mr. Riley has suddenly
15 slipped and this panel --

16 CHAIRMAN MILLER: Yes, we can. He hasn't slipped
17 at all.

18 You've been out of the case apparently, or you
19 haven't been here, and you're rewriting history, Mr. Tourtellotte,
20 and I'll be glad to go over it with you as soon as you are
21 finished your argument.

22 MR..TOURTELLOTTE: I'd be glad to know what the
23 history is if that's not correct.

24 CHAIRMAN MILLER: The history is about three or
25 three and a half weeks ago by telephone the Board advised

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1 the parties that it was our judgment that there had been
2 enough changes, that the issue should be straightened out by
3 a prehearing conference which would start when the eviden-
4 tiary hearing was scheduled, and that the evidentiary hearing
5 would start three or four weeks thereafter.

6 That was declined by the Staff and the Applicant
7 and others, with the exception I think of NRDC which didn't
8 think we should ever get to trial at all. So that's point one.

9 We then decided that the consensus was that the
10 parties and Counsel wanted to start the hearing, the eviden-
11 tiary hearing on the reasonable date as it was scheduled, which
12 was Tuesday of last week. Now there hasn't been any scheduling
13 other than on the part of Counsel themselves, who may have
14 talked among themselves. There has been no scheduling on the
15 order of witnesses with the Board.

16 The Staff did request the opportunity to put their
17 witnesses on last, and the Board inquired generally and
18 generally we indicated that we would do that although an ex-
19 ception was made when the Staff yesterday desired to put on
20 witnesses.

21 So far as Mr. Riley is concerned, we never at any
22 time intended to have him on at any particular time and not
23 early in the proceedings. Yesterday for the first time the
24 suggestion was made by Mr. McGarry that we had some scheduling
25 matters which involved both Applicant's witnesses and I think

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1 at that point the Staff did put on some of their witnesses,
2 and said that at about four o'clock if we still had time that
3 we could still put Mr. Riley on.

4 That was the first mention that was made, so far
5 as the Board is concerned, of Mr. Riley. We said, "Yes, if
6 it is suitable." We did not intend then to nail down Mr. Riley
7 at any particular time.

8 We have stated several times that since Mr. Riley
9 resides here, we've had his written testimony -- there was
10 a change made in it yesterday -- but that we were perfectly
11 prepared some evening to accommodate Mr. Riley if necessary
12 to accommodate our evidentiary hearing which we want to con-
13 clude by or about noon Friday.

14 So Mr. Riley is available. We have never said
15 when he was going to go, other than the fact that we were
16 prepared to, and are prepared to schedule him some evening if
17 necessary.

18 So wherever you get Mr. Riley in there as a bottle-
19 neck it's a matter coming from elsewhere, not from the Board.

20 Now so far as the order of the witnesses is
21 concerned, the Applicant did put on witnesses last week. They
22 put them on Saturday. There were several that they could have
23 put on Monday, but Mr. Roisman was not available Monday, as
24 was previously made known to the Board and to the parties.

25 So therefore, the Applicant stopped putting on

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1 witnesses when it reached those where Mr. Rossman would have
2 an interest in cross-examining. That had been discussed
3 among Counsel and with the Board.

4 The Staff as a result yesterday did put on
5 certain witnesses in a panel, out of order if you like, but
6 it didn't matter. It was with the Board's consent and it
7 helped to carry forward the context of the hearing.

8 The Board is not breaking this down into certain
9 issues. I know the Staff keeps saying Issue 1, Issue 2, Issue
10 3. We're interested in the witnesses. We're not on some
11 rigid plan that has been established and devised, rewritten
12 history, cast in concrete, that says to the Board if it doesn't
13 follow that it's doing something different. We've not.

14 We don't agree with your assertions, Mr.
15 Tourtellotte. We don't think that they're accurate, and that's
16 why I'm taking the time and the trouble to inform you.

17 Now we always intended, and any time the question
18 has come up if it did come up, that we wanted to hear from
19 NRDC, so the Applicant put on its witnesses. For the most
20 part, NRDC's witnesses are here now. Their testimony has
21 been prefiled for some extensive period of time. We don't
22 understand why you're not prepared to cross-examine, if that's
23 what you're contending.

24 It was obvious from the start that the testimony
25 was there, as well as their affidavits attached to the motions.

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1 Those are important, significant issues and certainly there
2 is nothing unusual, in our judgment, or unreasonable about
3 having Intervenor's testimony, or certain Intervenor's,
4 follow the App' cant's and precede the Staff's.

5 Now that's what we're doing. We don't think that
6 by coming in here at this late date and making charges about
7 procedural due process that you're being either accurate or
8 fair to the Board.

9 MR. TOURTELLOTTE: Well, let me say that I don't
10 disagree with the history that was recited by the Board, nor
11 do I believe that anything that I said really took exception
12 to that history.

13 CHAIRMAN MILLER: Perhaps we misunderstood you
14 then.

15 MR. TOURTELLOTTE: The one thing I guess that
16 was difficult for me to understand, and perhaps I do under-
17 stand it now, it was difficult for me to understand, in light
18 of the fact that in most proceedings that I have been in-
19 volved with we either proceed on a party-by-party basis or
20 an issue-by-issue basis.

21 Now since in this proceeding it was decided early
22 on that the Applicant would go and then the Intervenor's and
23 then the Staff, it generally followed in my mind that it was
24 also on an issue-by-issue basis. Now the Board is telling
25 me that that assumption was incorrect.

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1 Now the Board is telling me that that assumption
2 was incorrect.

3 CHAIRMAN MILLER: If that assumption was made,
4 yes, it was incorrect because the Board never either realized
5 or actually assented. We do accommodate Counsel when you
6 have witnesses you prefer. If you tell us on an issue basis,
7 we try to accommodate you.

8 We never either understood nor agreed to some
9 kind of an issue-by-issue order or whatever it was you might
10 have had in mind.

11 MR. TOURTELLOTTE: Well, I think the Board should
12 also understand that that's not an assumption that was made
13 in a vacuum. It's an assumption that was made on the basis
14 of all the experience that I've had before --

15 CHAIRMAN MILLER: How many cases have you been
16 in which have involved issues herein about the transportation
17 of spent fuel? There is only one other, Mr. Tourtellotte,
18 now pending, is there not?

19 MR. TOURTELLOTTE: That's true.

20 CHAIRMAN MILLER: So your experience is addressed
21 to something else.

22 Now three times I've heard from your co-Counsel
23 that the Staff proceeded routinely. This is not a routine
24 case; it never was a routine case. And if you're relying upon
25 either your past experience or your belief as to the originality

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1 of it, I suggest you're not addressing yourself to realities.

2 R. TOURTELOTTE: I'd have to disagree with
3 that because procedures are procedures and the factual material
4 that's involved in the case does not have anything to do with
5 the procedural --

6 CHAIRMAN MILLER: Well, in the first place we
7 proceeded with Applicant, Intervenor and Staff generally.
8 Certainly the Board and certainly the parties upon request
9 can have some flexibility but essentially that is tradi-
10 tionally done in a courtroom. It's done in administrative
11 proceedings in the NRC, and it's being done here.

12 So where you find some strange departure it's
13 something the Board doesn't understand, but nonetheless we've
14 taken a lot of time now with these preliminary matters. We've
15 been trying to get to the Intervenor NRDC witnesses. We deem
16 it important and we intend to proceed now.

17 Are there any further motions?

18 (No response.)

19 Very well.

20 Mr. Roisman, the witnesses have been sworn,
21 Proceed.

22 MR. ROISMAN: Mr. Chairman, we have discussed
23 Mr. Rotow's testimony, which consists of two parts, a brief
24 resume and then an affidavit, with the Staff and we've agreed
25 to strike certain portions of that testimony which I will now

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1 inform the Board and the parties of so it will show on the
2 record. All right?

3 CHAIRMAN MILLER: Let's see what we're referring
4 to now.

5 MR. ROISMAN: Let's mark it as NRDC Exhibit
6 Number 13.

7 CHAIRMAN MILLER: What are we marking?

8 MR. ROISMAN: This is a brief resume of Dimitri
9 Rotow which consists of two pages, and then attached to that
10 is the affidavit of **Dimitri Rotow which consists of seven pages**.
11 It consists of his testimony.

12 Now there are two attachments--

13 CHAIRMAN MILLER: Wait a minute. I'm not with
14 you. We have two pages, the brief resume of Dimitri Rotow.
15 We have a one-page survey of utility spent fuel managers--
16 It doesn't belong there?

17 WITNESS ROTOW: No, that was something
18 Mr. Ketchen had asked for.

19 CHAIRMAN MILLER: Then you wish it detached?

20 MR. ROISMAN: Yes, detached; that's correct.
21 Someone may want to refer to it but it's not being offered as
22 evidence.

23 MR. ROISMAN: Then following that there should be
24 the affidavit of Dimitri Rotow.

25 CHAIRMAN MILLER: Received 5/23/79? Is that the

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1 one?

2 MR. ROISMAN: I don't know when it was received
3 It's dated May 21, '79, on the seventh page.

4 CHAIRMAN MILLER: That's the one.

5 MR. ROISMAN: We'd like the entire thing marked
6 as NRDC Exhibit Number 13.

7 CHAIRMAN MILLER: That is to say the resume also?

8 MR. ROISMAN: Yes, just make the resume and the
9 affidavit all one exhibit.

10 CHAIRMAN MILLER: Okay.

11 (Whereupon, the document
12 referred to was marked
13 as NRDC Exhibit 13
14 for identification.)

15 MR. ROISMAN: Then in the affidavit itself we
16 would strike the following:

17 The third line, the sentence that begins:

18 "I have been trained...."

19 CHAIRMAN MILLER: The beginning?

20 MR. ROISMAN: Yes, on the very first page, delete
21 that sentence.

22 On page 3 --

23 CHAIRMAN MILLER: Page 3 of what?

24 MR. ROISMAN: Of the affidavit. I'm sorry.

25 CHAIRMAN MILLER: Okay.

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1 MR. ROISMAN: Beginning with the words, about a
2 third of the way down, "As can be seen...." Delete everything
3 on the remainder of the page --

4 CHAIRMAN MILLER: Very well.

5 MR. ROISMAN: -- through the period on the top of
6 page 4, at the end of the first carryover sentence.

7 CHAIRMAN MILLER: Very well.

8 MR. ROISMAN: Then at the bottom of page 4, the
9 third line from the bottom, strike the word "doubly" and strike
10 the word "both."

11 In the second line from the bottom strike every-
12 thing after the word "impossible."

13 CHAIRMAN MILLER: That will be "impossible." then?

14 MR. ROISMAN: Yes.

15 Then on the top of page 5 strike from the be-
16 ginning of that page down to the end of the first full para-
17 graph, "can only be worse."

18 On the bottom of that page, the very last line,
19 the second and third words, "and economical" strike.

20 CHAIRMAN MILLER: I don't see that-- Oh. All
21 right.

22 MR. ROISMAN: On page 6, the paragraph that be-
23 gins with the little (2), the third sentence, strike that,
24 beginning with "In my reading," down to "options."

25 In the very next sentence, change the word

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eb13

1 "inertia" to "plan."

2 And strike the final phrase of that sentence,
3 starting with "as opposed," all the way down to "public good."

4 In the following sentence, the next to the last
5 word before the colon, strike the word "better."

6 And at the bottom of the page, the fifth line
7 from the bottom, strike after "AFR" all the words to the bottom
8 of the page, plus the first word on the top of page 7.

9 CHAIRMAN MILLER: What's the last word that re-
10 mains?

11 MR. ROISMAN: "AFR." -- No, no, I'm sorry, it
12 doesn't become a period. There is an "and" and it completes
13 on page 7, that sentence.

14 You're going to strike after "AFR" but not put a
15 period or any other punctuation there, strike everything after
16 "AFR" on page 6, and the word "scheme" at the top of page 7,
17 the first word.

18 CHAIRMAN MILLER: All right. Those changes will
19 be made.

20 MR. ROISMAN: Secondly, just to re-emphasize what
21 happened earlier this morning, we had originally filed an
22 affidavit of Arthur R. Tamplin and Thomas B. Cochran dated
23 May 25, 1979, an 11-page document. We have replaced that
24 with --

25 CHAIRMAN MILLER: Is that the one you handed up?

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1 MR. ROISMAN: We replaced it with an eight-page
2 document dated June 23, 1979.

3 CHAIRMAN MILLER: An eight-page document?

4 MR. ROISMAN: It's eight pages long; that's correct.

5 CHAIRMAN MILLER: All right. We have it. And what
6 are you doing with that?

7 MR. ROISMAN: That is simply substituting for the
8 earlier one, and I have here, and I will give to the Reporter
9 a copy of the original signed affidavit. These were done in
10 affidavit form.

11 CHAIRMAN MILLER: Is that to be given an exhibit
12 number?

13 MR. ROISMAN: Yes. This should be NRDC Exhibit
14 Number 14.

15 (Whereupon, the document
16 referred to was marked
17 as NRDC Exhibit 14
18 for identification.)

19 CHAIRMAN MILLER: Are you changing that from
20 affidavit to testimony?

21 MR. ROISMAN: Well, we just called them all affi-
22 davits. They're being offered as testimony.

23 CHAIRMAN MILLER: Maybe you had better mark them
24 testimony so somebody a year from now doesn't think we fouled
25 it up.

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MR. ROISMAN: Okay. Rotow also then should be changed, and that will be one additional change, the word "affidavit" changed to "testimony of," on the first page. That's on Exhibit Number 13, the third page of the exhibit which is the first page of the substantive text.

Then on the first page of Exhibit Number 14, "affidavit" should be changed to "testimony."

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1 CHAIRMAN MILLER: Now the balance of the statements
2 the affidavits and whatever, that have been filed previously
3 are not being offered, at least at this time; is that correct?

4 MR. ROISMAN: No, that's not true. I'm going to
5 offer the package so we've got it all together there at one
6 point.

7 CHAIRMAN MILLER: All right.

8 MR. ROISMAN: At this point I'll have to turn to
9 the witnesses. Dr. Tamplin has a change, and he'll have to
10 make that. And I will get to Mr. Rotow later. He also has
11 a minor change.

12 Now, Mr. Chairman, we have two affidavits of
13 Arthur R. Tamplin. On the first of these, which is the longer
14 of the two, and is seven pages long, dated May 25th, 1979, on
15 the cover page change the word "Affidavit" to "Testimony", and
16 mark it as NRDC Exhibit No. 15.

17 Then we have a very small one, a one-page affidavit
18 of Dr. Tamplin.

19 CHAIRMAN MILLER: Is that the one with the Roman
20 numeral II on it?

21 MR. ROISMAN: That's correct. We'll mark that
22 as NRDC Exhibit No. 16.

23 Change "Affidavit" to "Testimony" on the cover.

24 And, finally, an affidavit just of Dr. Thomas
25 Cochran, six pages long, dated May 25th, 1979. Mark that as

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1 NRDC Exhibit No. 17. Change the word "Affidavit" to
2 "Testimony."

3 CHAIRMAN MILLER: It has some attachments.

4 MR. ROISMAN: Yes. It includes an attachment,
5 "Analysis of Space Available for Storage of Spent Fuel at
6 Existing Operating Reactor Sites," dated July 1973.

7 And, for the record, Mr. Rotow's testimony includes
8 two attached exhibits. Exhibit 1 to his testimony is entitled
9 "NRDC Findings on the Alleged Need for Acquisition for Con-
10 struct-on of an Away-from-Reactor Spent Fuel Storage Facility,"
11 prepared by Dmitri Rotow. And Exhibit No. 2, dated May 1st--
12 By the way, that was dated March 26th, 1979. There is a
13 May 1st, 1979 Exhibit 2 attached to Mr. Rotow's testimony
14 entitled "No need for AFRs," by Dmitri Rotow.

15 Those are exhibits attached to his testimony. And
16 when we offer the testimony we're also offering the exhibits
17 along with the person's testimony to which it is attached.

18 CHAIRMAN MILLER: Well, now, Exhibits 1 and 2 in
19 the document you described, are those to be regarded simply
20 as attachments to Exhibit 13?

21 MR. ROISMAN: Yes, Mr. Chairman.

22 CHAIRMAN MILLER: Which, itself, has two parts,
23 a brief resume and longer testimony.

24 MR. ROISMAN: That's correct.

25 CHAIRMAN MILLER: What about this joint affidavit?

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1 Is that superceded?

2 MR. ROISMAN: The joint affidavit is the one that
3 is now NRDC Exhibit No. 14, and it's eight pages long.

4 CHAIRMAN MILLER: That's the original version,
5 then, that has been superceded?

6 MR. ROISMAN: That's correct.

7 (Whereupon the documents referred to
8 were marked for identification as
9 NRDC Exhibits 15, 16 and 17.)

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1 DIRECT EXAMINATION

2 BY MR. ROISMAN:

3 Q Mr. Rotow, direct your attention, please, to
4 NRDC Exhibit No. 13.

5 A (Witness Rotow) Yes.

6 Q Do you have any additions or corrections to make
7 to that, other than the ones which have already been noted in
8 terms of portions that have been stricken?9 A Yes, sir. There's one minor point, it occurs as
10 a typographical error occurring on page 4, the sixth sentence
11 down in the third paragraph.12 MR. MC GARRY: Is this page 4 in the testimony or
13 in one of the attachments?14 WITNESS ROTOW: Page 4 in the testimony, printed as
15 the affidavit.16 It says, "To defend this figure (approximately
17 500 mT."18 The "m" is not supposed to be there. And I suppose
19 for the sake of clarity you should replace that with "tons."

20 BY MR. ROISMAN:

21 Q Are there any additional corrections?

22 A (Witness Rotow) I think that's it.

23 Q Then NRDC-13, Mr. Rotow, including your resume,
24 your testimony, and two attachments to it are--

25 CHAIRMAN MILLER: I think we're going to have to

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1 break this down, so we don't have confusion.

2 Why don't we make the resume 13-A, the testimony
3 13-B and the two exhibits C and D respectively.

4 MR. ROISMAN: Fine, Mr. Chairman.

5 (Whereupon the document referred to
6 heretofore marked NRDC-Exhibit 13
7 for identification was remarked as
8 NRDC Exhibit 13-A, 13-B, 13-C and
9 13-D for identification.)

10 BY MR. ROISMAN:

11 Q Mr. Rotow, then are Exhibits 13-A, B, C and D
12 true and correct to the best of your personal knowledge, and
13 do you adopt them as your testimony for purposes of this
14 proceeding?

15 A (Witness Rotow) Yes, they are, and I do.

16 MR. ROISMAN: Mr. Chairman, I thought what I would
17 do would be simply to go through each of the witnesses to make
18 sure they adopt the testimony, make them available for voir
19 dire or anything else at that time.

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1 Q All right. Now, Drs. Tamplin and Cochran
2 directing your attention to NRDC Exhibit Number 14, do you
3 have any corrections to make to that testimony?

4 A (Witness Cochran) I have one notation that I
5 would like to make, and this occurs in another exhibit as
6 well.

7 On page 3, second line, it shows 380 gigawatts,
8 and the discussion that preceded that indicated that that
9 was a government figure.

10 The Department of Energy upper estimate for the
11 gigawatts of nuclear power in the year 2000 is now 300
12 gigawatts.

13 And so the conclusions as drawn from the upper
14 limits where they are made by people should reflect that
15 scale.

16 Q All right. Let's just stick to the correction in
17 this document, and if it appears in another document we can
18 make it there.

19 MR. KETCHEN: Excuse me. It's on page 3 that
20 380 is now 300?

21 MR. ROISMAN: Is now 300.

22 MR. KETCHEN: Thank you.

23 MR. ROISMAN: Mr. Chairman, I'm sorry, but
24 attached to NRDC Exhibit Number 14 are the affidavits, the
25 resumes, of Drs. Cochran and Tamplin.

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WITNESS COCHRAN: Let me make a clarification of the statement I just previously made.

MR. ROISMAN: Surely.

WITNESS COCHRAN: For purposes of the NRC counsel, the 380 is the correct figure from the document that is referenced. I'm simply clarifying the fact that the new DOE data --

MR. KETCHEN: Mr. Chairman, objection. Excuse me. Corrections I think at this time should just be made. I think on direct that that would be an appropriate time, and I think you should advise Dr. Cochran that he could give the explanation at that time.

CHAIRMAN MILLER: Has the correction been made?

MR. ROISMAN: Yes, it was just changing the 380 to the 300 on page 3.

CHAIRMAN MILLER: All right. We don't seem to have the resumes that you speak of. They're probably in the preceding motions.

MR. ROISMAN: They were attached to the NRDC Exhibit Number 14, the 11-page affidavit. So if you just tear them off the back of that, you'll have it all together.

CHAIRMAN MILLER: That's assuming I have that.

I only have the affidavit of both of them. Is that what it's attached to?

MR. ROISMAN: That's correct, it's the last . . .

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1 you'll see there.

2 CHAIRMAN MILLER: Yes. All right.

3 Okay, we have the resume.

4 BY MR. ROISMAN:

5 Q Dr. Cochran, do you have any other additions or
6 corrections?

7 A (Witness Cochran) In Exhibit Number 17, on the
8 first page --

9 Q Wait. Just to keep it straight, just stick to
10 Exhibit 14 at the moment.

11 A No.

12 Q Dr. Tamplin?

13 A (Witness Tamplin) No, I have no changes.

14 Q Do you gentlemen adopt NRDC Exhibit Number 14 as
15 your testimony, and is it true and correct to the best of
16 your personal knowledge?

17 A (Witness Tamplin) I do.

18 A (Witness Cochran) I do, yes.

19 MR. MC GARRY: Mr. Chairman, may I suggest that we
20 mark the testimony as NRDC Exhibit 14A, Dr. Tamplin's
21 professional qualifications as 14B, and Dr. Cochran's
22 qualifications as 14C? I think that would be easier.

23 CHAIRMAN MILLER: Yes, we'll mark them that way.

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(The documents referred to were
 remarked for identification as
 NRDC Exhibits 14A, 14B and
 14C.)

MR. TOURTELLOTTE: Mr. Chairman, could we also
 have an indication of to whom it is Mr. Roisman is directing
 his question, and a direct response? Because I noticed one
 of the witnesses was nodding his head, and I'm not sure
 whether the question was even going to all three.

CHAIRMAN MILLER: Specifically direct your
 question, Mr. Roisman, and the witnesses will respond as
 directed.

BY MR. ROISMAN:

Q Dr. Cochran, do you adopt NRDC Exhibit 14A and
 14C as your testimony, and is it true and correct to the best
 of your personal knowledge?

A (Witness Cochran) I do, and yes.

Q Dr. Tamplin, do you adopt NRDC Exhibit Number
 14A and 14B as your testimony, and is it true and correct to
 the best of your knowledge?

A (Witness Tamplin) I do, and it is correct to the
 best of my knowledge.

Q Now, Dr. Tamplin, looking at NRDC Exhibit Number
 14, entitled "Testimony of Arthur R. Tamplin, Ph.D," do you
 have any corrections or additions to make to that testimony?

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1 CHAIRMAN MILLER: That's 15.

2 MR. ROISMAN: 15, yes. I'm sorry.

3 WITNESS TAMPLIN: Yes, I do have a correction,
4 which is on page 4.

5 There's a table there which indicates shipments
6 from Oconee, McGuire and Catawba to Cherokee.

7 I just recently learned that --

8 CHAIRMAN MILLER: Just make the corrections, and
9 we'll have it explained later, Dr. Tamplin.

10 WITNESS TAMPLIN: All right.

11 In the first column, under Cherokee discharges,
12 the 1986-1987, there's 60 there. That should be crossed off.

13 CHAIRMAN MILLER: Just crossed out?

14 WITNESS TAMPLIN: Crossed out.

15 The total at the bottom of that column should be
16 360 instead of 430.

17 For the second unit, the 1988-1989, those 60's
18 should be crossed off, and the total of that column then
19 becomes 240.

20 Column 3, or for unit 3, that whole column should
21 be struck.

22 CHAIRMAN MILLER: The whole column?

23 WITNESS TAMPLIN: Yes.

24 CHAIRMAN MILLER: And hence the total?

25 WITNESS TAMPLIN: And hence the total, right.

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1 The transshipment under Oconee stays the same.
2 Under McGuire, the 140 in 1993 should be struck, and the
3 total for that column then is 140.

4 At the bottom of the table, total storage
5 capacity, the 2079 should be struck, and 1386 should be put
6 in place of it.

7 The total storage used, the 1840 should be
8 struck, and 1220 put in its place.

9 And then the remaining, the 239 should be struck
10 and replaced with 166.

11 If we continue into the paragraph below that
12 table, the second line from the bottom reads, "Would require
13 in 1993 from one station..." That should be two stations.
14 And then it proceeds, "...and all four stations, 10 reactors."
15 That should become 9.

16 Then if we go to page 5, the table there should
17 be crossed, and the paragraph directly under the table should
18 be crossed.

19 CHAIRMAN MILLER: The table itself, you're
20 striking that whole table?

21 WITNESS TAMPLIN: That whole table, and the
22 paragraph below it.

23 CHAIRMAN MILLER: Okay.

24 WITNESS TAMPLIN: Those are the only changes.

25 CHAIRMAN MILLER: Thank you.

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BY MR. ROISMAN:

Q Dr. Tamplin, with those changes do you adopt NRDC Exhibit Number 15 as your testimony, and is it true and correct to the best of your knowledge?

A (Witness Tamplin) Yes, it is. It is my testimony.

Q Dr. Tamplin, addressing your attention to NRDC Exhibit Number 16, entitled, "Testimony of Arthur R. Tamplin (II)", do you have any additions or corrections to make to that testimony?

A No, I don't.

Q Is it true and correct to the best of your personal knowledge, and do you adopt it as your testimony?

A It is correct to the best of my knowledge, and I adopt it as my testimony.

Q Turning to NRDC Exhibit Number 17, Dr. Cochran, do you have any additions or corrections to make to that testimony?

A (Witness Cochran) On page 1, line 5, I would like to insert the words, "one of" after the word "solve," so that the line reads, "of how to solve one of the most serious."

Q Are there any other additions or corrections?

MR. KETCHEN: Excuse me, Mr. Roisman. Could you tell me the date of that document?

MR. ROISMAN: Yes, it's dated May 25, 1979.

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MR. KETCHEN: Thank you.

WITNESS COCHRAN: I have no further corrections.

MR. KETCHEN: I'm sorry, I got behind, Dr. Cochran. Could you make that again?

WITNESS COCHRAN: On the first page, the fifth line, insert the words, "one of" immediately following the word, "solve." "...to solve one of the most serious..."

MR. KETCHEN: Thank you. And that was number 17?

WITNESS COCHRAN: That's correct.

BY MR. ROISMAN:

Q Is that all the corrections and additions you have to make to that testimony?

A (Witness Cochran) That is correct.

MR. ROISMAN: Mr. Chairman, following previous practice, there is an attachment to this. I'd like to suggest we mark the attachment B, and the testimony proper A, all under NRDC Exhibit Number 17.

CHAIRMAN MILLER: What is the exhibit? Is that attached to it already?

MR. ROISMAN: Yes, it should be physically attached, "Analysis of Space Available for Storage."

CHAIRMAN MILLER: All right. That will become Exhibit 17B?

MR. ROISMAN: That's correct.

CHAIRMAN MILLER: All right.

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1 (The documents referred to were
2 marked for identification as
3 NRDC Exhibits 17A and 17B.)

4 CHAIRMAN MILLER: Was there just the one
5 attachment, Mr. Roisman?

6 MR. ROISMAN: Yes, just the one attachment.

7 BY MR. ROISMAN:

8 Q Dr. Cochran, is NRDC Exhibit Number 17 true and
9 correct to the best of your personal knowledge, and do you
10 adopt it as your testimony?

11 A (Witness Cochran) Yes, and I do.

12 MR. ROISMAN: Lastly, Mr. Chairman, I'd like to
13 have marked as NRDC Exhibit Number 18 the affidavit of Dr.
14 Cochran dated May 1, 1979, seven pages. It was initially
15 filed as an affidavit in support of an NRDC motion for
16 summary disposition, filed on May 1, 1979.

17 CHAIRMAN MILLER: I'm sorry, I don't have it.
18 But if it were attached to a motion, I -- I have it now.

19 MR. ROISMAN: That's how all the affidavits we've
20 referred to were filed. They were never filed separately.

21 (The document referred to was
22 marked for identification as
23 NRDC Exhibit 18.)

24 BY MR. ROISMAN:

25 Q Dr. Cochran, do you have any corrections or

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1 additions to make to WRDC Exhibit Number 137

2 A (Witness Cochran) No.

3 Q Do you adopt it as your testimony, and is it true
4 and correct to the best of your personal knowledge?

5 A I do, and yes.

6 Q Now, Dr. Cochran, --

7 MR. ROISMAN: Mr. Chairman, may I go to the direct
8 examination to have they lay the base for their changes, or
9 do you want to do a voir-dire before that? I'll follow either
10 process.

11 CHAIRMAN MILLER: Well, let us have just a
12 moment.

13 (Pause.)

14 What was your question, now?

15 MR. ROISMAN: Whether you'd like me to go to a
16 brief direct examination to simply have the witnesses explain
17 the basis for the changes they've made in the testimony,
18 or would you rather have a voir-dire first?

19 CHAIRMAN MILLER: Well, the changes might get
20 into substantive matters, and might or might not be matters
21 that counsel would wish to object to.

22 So I think the simplest procedure would be to
23 allow Staff, Applicant and other counsel to voir dire on
24 expertise, and testimony within the area of expertise first.

25 MR. ROISMAN: The witnesses are available.

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1 MR. MC GARRY: Mr. Chairman, a point of order, or
2 clarification:

3 Are all of those witnesses being offered as fact
4 and opinion witnesses?

5 CHAIRMAN MILLER: Mr. Roisman?

6 MR. ROISMAN: Mr. Rotow is being offered as a
7 fact witness with respect to the facts that he testifies to
8 in his testimony, and to the extent that he's an opinion
9 witness, it's only an opinion on the inferences to be drawn
10 from those facts which relate to the question of how the
11 Department of Energy is conducting its analysis of the need
12 for building a government away-from-reactor storage facility.

13 Dr. Tamplin and Dr. Cochran are being offered both
14 as fact witnesses and opinion witnesses on the subjects
15 covered by their testimony; namely, in Dr. Cochran's case,
16 his opinion as to how an appropriate investigation would be
17 made and what are the environmental, radiological, and
18 economic impacts of a proposed course of action and alterna-
19 tives to it; his opinion with regard to the management of
20 nuclear wastes, and the proper way in which they should be
21 managed; and his opinion with regard to the handling of
22 spent fuel and the potential for handling it in alternative
23 ways.

24 Dr. Tamplin is being offered with respect to his
25 opinions on the same waste and spent fuel questions, as well

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1 as his opinions regarding the limited statement that is made
2 in his affidavit marked with a Roman II; to wit, the health
3 effects associated with exposures to any level of radiation.

4 CHAIRMAN MILLER: Do you need more information,
5 Mr. McGarry?

6 MR. MC GARRY: No, I believe that's sufficient.

7 But that leads to an additional point. With
8 respect to Mr. Rotow, he's being offered as a fact witness
9 as to his survey and his study. He's being offered as an
10 opinion witness as to what DOE's thinking is with respect
11 to his testimony.

12 We submit that the survey and the study is based
13 totally upon hearsay, conversations with people he contacted
14 on the telephone, and that survey evidence comes through
15 experts.

16 There's been no demonstration of expertise. He's
17 not being offered as an expert in this regard. And we move
18 that that portion of his testimony be stricken at this point
19 in time, and we'll voir-dire him as to the DOE situation.

20 CHAIRMAN MILLER: Well, we haven't read his
21 testimony, so we're not going to prejudge it. However, there
22 has been testimony offered here that we don't understand is
23 limited to experts, where they derive information that's
24 within the scope of their studies, analyses, and the like,
25 which has shown to be reliable. The fact that something is

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1 hearsay doesn't mean under our rules of procedure that they
 2 are subject to being excluded. On the other hand, they're
 3 not admissible, either, just because they're hearsay. There
 4 are the standard tests for reliability and the like. I
 5 think that's the rules the Board has at least been implicitly
 6 following in the case of your witnesses and the Staff's, as
 7 far as they've offered them. And we expect to follow the
 8 same kind of rules. We will look to the subject matter that
 9 is involved. A non-expert can make studies, for example.
 10 We don't know. We haven't read this.

11 MR. MC GARRY: It's simply, as I said, as a
 12 point of clarification. I'm prepared to voir-dire Mr. Rotow,
 13 Mr. Chairman.

14 CHAIRMAN MILLER: Very well. You may proceed.

15 VOIR-DIRE EXAMINATION

16 BY MR. MC GARRY:

17 Q Mr. Rotow, how old are you?

18 A (Witness Rotow) I'm 23 years old. I'll be 24
 19 on July --

20 Q Just answer the question, please.

21 Do you have a college degree?

22 A No, I don't.

23 Q Are you opposed to nuclear power?

24 MR. ROISHAN: Objection.

25 CHAIRMAN MILLER: What's the ground for the

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1 objection?

2 MR. ROISMAN: There's no basis for the question.
 3 What possible relevance can that have to the witness'
 4 testimony?

5 CHAIRMAN MILLER: I don't know whether it would.
 6 It could go to bias, prejudice, I suppose, which is to say
 7 credibility. However, I don't know whether this is the
 8 proper time to go into it. I think such questions are
 9 permissible as to credibility, but nothing more than that.

10 Why do you wish to go into it, Mr. McGarry?

11 MR. MC GARRY: That's precisely the point, Mr.
 12 Chairman. If it's the Board's ruling that we defer that

14 CHAIRMAN MILLER: Well, unless there's some
 15 reason why you wish to do it on voir dire as to qualifications.

16 MR. MC GARRY: No, sir, there is not.

17 CHAIRMAN MILLER: Then we suggest you defer it
 18 as a matter to be gone into in the cross-examination of the
 19 witness.

20 BY MR. MC GARRY:

21 Q Mr. Rotow, do you claim to have any expertise
 22 in assessing the independent utility option?

23 A (Witness Rotow) Which options?

24 Q The options that are before this Board for
 25 consideration; namely, transportation of spent nuclear fuel.

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1 away-from-reactor storage, on site, off site.

2 A What do you mean by ---

3 Q Reracking, poison racking.

4 A What do you mean by utility?

5 Q What do you mean by utility?

6 CHAIRMAN MILLER: I think we're going to have to
7 have a little more foundation. If you're referring to
8 something specific, you'd better direct the witness'
9 attention to it. If you try to deal with the subject
10 generally, I doubt if either one of you will get anywhere.

11 Are you referring to that matter from the
12 Commission's Federal Register notice, and the like, Mr.

14 MR. MC GARRY: Yes, I am, Mr. Chairman.

15 CHAIRMAN MILLER: In that event, I think in
16 fairness it should be shown to the witness.

17 BY MR. MC GARRY:

18 Q Are you familiar, Mr. Rotow, with the Commission's
19 decision in 1975 concerning a petition from NRDC?

20 A Not in detail, no.

21 Q You're not aware of any of the specifics of
22 that notice?

23 A No.

24 Q Are you familiar with the Commission's reference
25 to the term "independent utility?"

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1 A No, I'm not.

2 Q Are you familiar with the Commission's reference
3 to the term, "foreclosure of options?"

4 A As the Commission uses it, no. I haven't read
5 that particular notice.

6 CHAIRMAN MILLER: Then your testimony is not based
7 on that, to the extent that you're aware of it?

8 WITNESS ROTOW: Not that I'm aware of. This may
9 be that same document Mr. Ketchen brought to my attention in
10 Washington when he took my deposition.

11 CHAIRMAN MILLER: That may well be. We don't
12 have your deposition before us, but we'll have the document
13 shown to you, or to any other witness, when you're asked
14 about them, or when your testimony touches upon them.

15 WITNESS ROTOW: Yes, sir.

16 BY MR. MC GARRY:

17 Q Have you ever worked for a utility, Mr. Rotow?

18 A (Witness Rotow) You mean a utility in the sense
19 of a power producing company?

20 Q That's correct.

21 A No, I haven't.

22 CHAIRMAN MILLER: I didn't get the answer.

23 WITNESS ROTOW: No, I haven't.

24 BY MR. MC GARRY:

25 Q Have you ever worked for the Nuclear Regulatory

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1 Commission?

2 A No, I haven't.

3 Q Did you ever work for any company appearing as
4 either an applicant or a licensee before the Nuclear
5 Regulatory Commission?

6 A Not to my knowledge, no.

7 Q Have you ever been involved in any litigation,
8 other than the instant case, involving the NRC?

9 A No, I haven't.

10 Q Have you ever been involved on a day-to-day
11 basis with the licensing of a nuclear power plant, or any
12 nuclear facility?

13 A It depends on what you mean by day-to-day basis.
14 If you mean have I spent a consecutive term of days in
15 researching such matters, the answer is yes.

16 If you mean day-to-day basis as extending over
17 a period of years of consecutive terms of days occupied in
18 exclusively that, the answer is no.

19 Q Have you ever been involved in licensing a
20 nuclear project?

21 A Insofar as testimony before the NRC, no.

22 Q So far as before any Board or anything.

23 A The answer to that question -- I'm trying to get
24 what you mean, when you --

25 CHAIRMAN MILLER: Yes, what is the scope of your

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1 question --

2 WITNESS ROTOW: I've offered testimony --

3 CHAIRMAN MILLER: Just a minute. Just a minute.

4 Define your question just a little bit more.

5 The Board really doesn't understand.

6 MR. MC GARRY: I thought the question was

7 perfectly clear.

8 BY MR. MC GARRY:

9 Q The question is:

10 Have you ever been involved in the licensing of
11 a nuclear facility?

12 MR. ROISMAN: Mr. Chairman, I think the problem
13 with this is that to an agile and intelligent mind like Mr.
14 Rotow's, the word "involved" is much too vague. He has been
15 involved in this licensing proceeding. I don't know whether
16 that's what Mr. McGarry means.

17 Does he mean was he writing documents for it, or
18 did he participate in the hearing? I think that's the
19 problem Mr. Rotow is having.

20 CHAIRMAN MILLER: Yes, that is a problem.

21 We want the witness to testify fully and candidly, Mr.
22 McGarry, just as we want all witnesses to do. The Board is
23 not certain that your delineation of the question is
24 sufficiently meaningful to the witness, or to the Board.

25 Now, if you want to describe it or delimit it a

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1 little bit, we'll give you full leave to find out. But
2 we're not just sure what that involves. That could be a
3 term that would confuse the witness, who is trying to give
4 a full and complete answer.

5 However, we will ask the witness:

6 Have you been involved in any licensing proceed-
7 ings involving the Nuclear Regulatory Commission and any
8 utility as such?

9 WITNESS ROTOW: In a direct way, no.

10 CHAIRMAN MILLER: Now, if you wish to go, Mr.
11 McGarry, into any indirect ways, or into any other matters,
12 we will permit you to do so.

13 WITNESS ROTOW: Aside from the present case.

14 CHAIRMAN MILLER: We are assuming that you except
15 the present case, yes.

16 BY MR. MC GARRY:

17 Q Mr. Rotow, are you familiar -- do you know from
18 first-hand experience how a utility schedules its activity
19 with respect to licensing? By that I mean -- strike the
20 word licensing -- designing and constructing a nuclear
21 facility?

22 A (Witness Rotow) To some degree, yes.

23 Q Explain your familiarity.

24 A Approximately two months ago I spent about two
25 days going through the Duke Power Company's internal

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1 memoranda which have been a part of the discovery motion in
2 this case, and that was a fascinating experience for me, to
3 be able to see --

4 CHAIRMAN MILLER: Don't digress, don't editorialize.
5 We're not interested in the deposition.

6 You're testifying here for the first time, Mr.
7 Rotow.

8 Have you ever testified before?

9 WITNESS ROTOW: Not in a hearing like this, no.

10 CHAIRMAN MILLER: In court?

11 WITNESS ROTOW: Well, traffic cases.

12 (Laughter.)

13 CHAIRMAN MILLER: We'll exclude that.

14 All right. Let me explain to you:

15 Your function -- and that of all witnesses -- is
16 to answer questions, answer them fully, fairly and candidly.
17 Don't volunteer. Don't make speeches. And don't regard
18 yourself or yourselves as advocates.

19 WITNESS ROTOW: Yes, sir.

20 CHAIRMAN MILLER: Answer fully and fairly, but
21 don't try to anticipate, and we'll all get along much better
22 and much faster. If you'll just try to do that -- and I
23 think you're trying, to the best of your ability, to
24 respond.

25 Mr. McGarry, do you have anything further along

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1 that line?

2 MR. MC GARRY: Yes, I do, Mr. Chairman.

3 BY MR. MC GARRY:

4 Q Is that the limit of your experience in that
5 regard?

6 A (Witness Rotow) Other than my discussions with
7 the utility spent fuel managers mentioned in the survey,
8 yes.

9 Q Have you ever conducted surveys, other than the
10 one that is in your testimony?

11 A Yes, I have.

12 Q What other surveys?

13 A It goes back a long way. I believe the first
14 survey I did was when I was Chairman of the Mayor's Youth
15 Advisory Council in Lancaster, Pennsylvania, and --

16 CHAIRMAN MILLER: Chairman of what?

17 WITNESS ROTOW: The Mayor's Youth Advisory
18 Council, Lancaster, Pennsylvania.

19 At the time, I authored, directed and evaluated
20 the results of the survey of approximately 4,500 high school
21 students in the City of Lancaster area.

22 BY MR. MC GARRY:

23 Q What year was that?

24 A (Witness Rotow) 1971, I think.

25 Q In 1971 how old were you?

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1 A Sixteen. I think fifteen. I don't think I had
2 a license to drive yet.

3 CHAIRMAN MILLER: What was the nature of that
4 survey?

5 THE WITNESS: Basically a survey to ascertain
6 what youth attitudes were, how they'd like to see public
7 funds which were allotted for expenditure by the Youth
8 Advisory Council to be spent --

9 CHAIRMAN MILLER: A little slower. You see, our
10 court reporter has to get every word you say.

11 THE WITNESS: Yes, sir.

12 The aim of the survey was to ascertain what high
13 school students were thinking about, how they spent their
14 time, what they viewed their problems as being. Because at
15 the time, the Youth Advisory Council had just gotten some
16 funds from the Mayor's office to be expended, and --

17 CHAIRMAN MILLER: I suppose you regarded yourself
18 as a youth at that time?

19 THE WITNESS: Yes, sir.

20 CHAIRMAN MILLER: Very well. You may proceed.

21 BY MR. MC GARRY:

22 Q Have you ever had any specific courses with
23 respect to how to conduct a survey?

24 A It depends on what you mean by specific.

25 CHAIRMAN MILLER: Well, now, give your understanding.

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1 WITNESS ROTOW: I took a Professor Raiffa course.
 2 It was entitled, "Decision Making Under Uncertainty." That
 3 talt with the design of surveys and interrogatory techniques,
 4 especially oral interrogatories that should be applied to
 5 experts that might have biases, and which are designed to
 6 eliminate those biases.

7 That course had an extensive amount of time
 8 devoted to differences in probabilities in the use of a
 9 base theorem for judging experts and their evaluations.

10 So, yes.

11 BY MR. MC GARRY:

12 Q What else did that course entail?

13 A (Witness Rotow) It was general discussion of
 14 decision making under uncertainty.

15 Q Could you be a little more specific? You were
 16 fairly specific with respect to surveys. Can you be
 17 specific with respect to other aspects of the course?

18 A Yes. It was how to apply this methodology in
 19 a very general way to nearly all aspects of decision making
 20 under uncertainty. The basic goal of that particular science
 21 has been highly developed over many years, and is to show
 22 how an individual decision maker can proceed to resolve a
 23 very complex, difficult problem under uncertainty and
 24 contemplate, point by point, and then assemble his individual
 25 judgments into a final decision that he knows and can prove

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1 is consistent with his fundamental beliefs involving risk,
2 uncertainty, gain, profit, that sort of thing.

3 Part of this decision-making procedure is the
4 assemblage of information; assessing the value of the
5 information; where one encounters the need, to make surveys;
6 and to evaluate the probability distributions.

7 Q Is this a one-term course?

8 A It depends what you mean by term. We did it over
9 the entire year, plus I followed it up with a subsequent
10 independent study process under Professor Milton Langstein,
11 who is a professor at the School of Public Policy Administra-
12 tion-- holds a joint chair, School of Public Policy
13 Administration and the Harvard School of Public Health.

14 Q Where did you take the course?

15 A Harvard.

16 Q Harvard, or Harvard School of Public Health?

17 A Well, I don't know if you're familiar with the
18 administrative structure out there, but if you'd like me to
19 lay it out for you, I will.

20 CHAIRMAN MILLER: I don't think we need the full
21 details of Harvard.

22 MR. MC GARRY: I don't need a lecture from you.

23 WITNESS ROPOW: Well, you asked.

24 BY MR. MC GARRY:

25 Q Where did you participate in --

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1 A (Witness Retow) I was an undergraduate student at
2 Harvard University, and the structure at Harvard is such that
3 undergraduates can take classes that are offered by some of
4 the graduate schools.

5 The course of Langstein was an independent study
6 project done as an independent study course that was taken by
7 me as an undergraduate with him, who at the time happened to
8 be a prof or holding a joint chair at two graduate schools,
9 the graduate School of Public Policy Administration and the
10 Harvard School of Public Health Administration, I believe
11 it's now called.

12 Raiffa at the time was offering a joint class at
13 the Kennedy School of Public Policy Administration at Harvard
14 and the Harvard Graduate School of Economics. And I took that
15 as an undergraduate.

16 Q Aside from your 1971 experience with surveys, do
17 you have any other experience with surveys?

18 A Well, I've done numerous surveys over the years.
19 I don't recall any in particular. That was the landmark one,
20 because it was the first big one for me at the time.

21 Q Let's hear some other ones.

22 A Well, there was this one that I did for NRDC.

23 Q This one? You mean --

24 A What everybody refers to as a survey, although if
25 you really want to be accurate in your use of the term, I

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1 survey here in all of the tidings because I didn't intend --
2 I intended to use a term that would be understandable by the
3 layman. Really, this should be called -- together with, say,
4 for example, the others in Exhibit 133, was subtitled, --

5 Q Well, as a layman, I'll use the term survey.

6 A Or, let's use the word survey.

7 So far as other surveys, I once did a survey of --
8 a very similar survey, taken over the telephone, of potential
9 clients for an aircraft leasing operation, involving the
10 lease of Corvaix-880s for the Mideast Trading Company of
11 London. It's covered in my resume, the time period when I
12 did that.

13 Q When was that?

14 A That would have been two years ago.

15 Q How many people did you contact?

16 A I don't recall. A couple of dozen.

17 Q Any other surveys?

18 A Several others, directed to -- informal ones --
19 directed to ascertaining economic conditions of a particular
20 commodity.

21 I once did a survey in the Cambridge area of all
22 the local stores that were interested in the purchase of
23 Loofah sponges.

24 Q How many people did you contact?

25 A I really don't recall. Again, about a dozen or

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1 two dozen.

2 Q When did you take the course in -- Harvard, was
3 it?

4 A Yes. That would have been in, I think, 1975, I
5 believe is correct.

6 Q By whom are you employed?

7 A Are you talking to me?

8 Q Yes.

9 A Okay. Counsel over here asked that you address
10 each of us by name, so --

11 CHAIRMAN MILLER: You're being questioned now.

12 WITNESS ROTOW: I'm a consultant to the Natural
13 Resources Defense Council.

14 CHAIRMAN MILLER: Would you repeat that?

15 WITNESS ROTOW: I'm a consultant to the Natural
16 Resources Defense Council.

17 BY MR. MC GARRY:

18 Q I asked you by whom you were employed.

19 A I just told you, I'm a consultant to the --

20 Q You're employed by the Natural Resources Defense
21 Council, is that correct?

22 MR. ROISMAN: Mr. Chairman, the witness said he's
23 a consultant. There is a distinction between employment and
24 consultation.

25 CHAIRMAN MILLER: Well, there may be, and I wish

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1 we would get right down to having responsive answers to
2 questions that are meaningful.

3 You were asked where you were employed.

4 WITNESS ROTOW: I'm -- well, I --

5 CHAIRMAN MILLER: Are you employed by anyone?

6 WITNESS ROTOW: No, I'm self employed.

7 CHAIRMAN MILLER: All right. If you're asked an
8 employment question and you're self employed, just state that
9 you're self employed.

10 BY MR. MC GARRY:

11 Q Will you please explain your role as a consultant
12 with Natural Resources Defense Council if, indeed, that is
13 your role?

14 A (Witness Rotow) That is my role. My role has
15 changed slightly in the past few months. I was hired
16 initially --

17 Q When did it change? May I have that date?

18 A No clear-cut date.

19 Q Can you start at the beginning and tell me about
20 the change of that, what time that change took place?

21 A I started working for the Natural Resources
22 Defense Council in . . . let's see, October of 1978. And I
23 was hired largely to assist in the preparation of a contract --
24 of a study contracted for by the Department of Energy. It
25 was a Department of Energy contract with the NRDC to do the

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1 study, and WRDC hired me as a research assistant.

2 I spent the first few months working on that
3 contract, and then my role was somewhat expanded. That's
4 what I mean by changing role.

5 My role was to be -- as it turned out, was to be
6 one of the three co-authors on the study, and I largely dealt
7 with questions of distributive economics, theories of justice,
8 and so forth, and how they impact on possible mechanisms and
9 criteria for radioactive waste disposal in the long term.

10 CHAIRMAN MILLER: For what?

11 WITNESS ROTOW: Radioactive waste disposal in the
12 long term, particularly focused on the geologic disposal of
13 nuclear waste.

14 CHAIRMAN MILLER: You're speaking much too fast,
15 and we can't hear you.

16 WITNESS ROTOW: Towards the end of that study,
17 I was asked by Dr. Cochran, who I understood was asked by
18 John Deutsch of the Department of Energy, to undertake some
19 research into the need -- the alleged need -- for away-from-
20 reactor storage. And Dr. Cochran suggested that this should
21 take the line of this survey, if you will, of utility spent
22 fuel managers.

23 At the time there was a fact sheet issued by the
24 Department of Energy that seemed a little bit off base, and it
25 seemed to me, anyway, that the numbers weren't accurate.

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1 CHAIRMAN MILLER: What's the question before you?

2 WITNESS ROTOW: I guess it's my role -- I'm
3 supposed to explain the role.

4 You see, I don't have a list of responsibilities.

5 CHAIRMAN MILLER: Well, it seems we're spending
6 a great amount of time, and there's an underlying sense of
7 utility about these questions and answers.

8 Now, what's the difficulty? Why can't we have
9 straightforward questions and straightforward answers,
10 without getting into a lot of explanations or even personal-
11 ities?

12 What's the problem, counsel?

13 MR. MC GARRY: I have no problem, Mr. Chairman.

14 CHAIRMAN MILLER: All right. Ask your questions
15 in a straightforward way. Let's get on with it. Remember,
16 now, I don't think this gentleman is proffered as an expert --
17 at least I'm not sure that he is.

18 MR. MC GARRY: I believe he was, to the extent
19 he is going to give opinions with respect to DOE, Department
20 of Energy, views as to some of the topics that are before
21 this Board for consideration.

22 CHAIRMAN MILLER: Let me inquire:

23 What is his role? Expert or non-expert, Mr.
24 Roisman?

25 MR. ROISMAN: Mr. Chairman, the bulk of his

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1 testimony relates to this survey that he conducted, which was
2 designed to do two things:

3 (1) to find out whether or not the DOE representa-
4 tions about the need for an away-from-reactor storage
5 facility were well founded, and what the basis for them was.

6 (2) to --

7 CHAIRMAN MILLER: Is he expressing opinions or
8 views on that subject?

9 MR. ROISMAN: No. He's just relating what it is
10 that he discovered in conducting his survey.

11 Secondly, in conjunction with doing that work, he
12 met with and participated in discussions with officials of
13 the Department of Energy who had the responsibility for
14 preparing the numbers which were the subject of the
15 investigation. And in the course of that he formed opinions
16 regarding what it was that DOE was attempting to do in
17 preparing their predictions of the need for an away-from-
18 reactor storage facility, and how proposals like Duke's
19 limited transshipment proposal gave support for or did not
20 give support for what it was that DOE was attempting to do.

21 CHAIRMAN MILLER: That sounds like the expression
22 of some opinion.

23 MR. ROISMAN: That is correct.

24 The whole purpose of the testimony as it fits
25 into the case is that Mr. Rotow makes the connection between

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1 Duke taking a limited look at how to handle its spent fuel,
2 and the tendency of them being allowed to take that step and
3 its substantial biasing the ultimate choice of a way to deal
4 with the away-from-reactor storage problem; to wit: use of--
5 I'm sorry -- the spent fuel storage problem; to wit: the use
6 of a government owned away-from-reactor storage facility.

7 CHAIRMAN MILLER: It appears to us that there is
8 some expert opinion involved in this.

9 MR. ROISHAN: Yes, it's limited to that part of
10 it, but that is correct.

11 CHAIRMAN MILLER: All right.

12 MR. MC GARRY: As I understand it, then, I should
13 focus my questions upon Mr. Rotow's activities at DOE, is that
14 correct?

15 CHAIRMAN MILLER: Not necessarily. The question
16 is he's being offered as an expert in a certain field, whether
17 limited or not, and the testimony should be, if it's to be of
18 an opinion nature, within that field of alleged expertise.

19 Now, we're not going to bind you, counsel, and
20 you have a right to go into other matters. However, we do
21 think that it might be more fruitful if you went primarily
22 into it, unless in your judgment it affects credibility.
23 There we won't tie your hands. But we ask you to exercise
24 discretion.

25 MR. KETCHEN: Mr. Chairman, may I interject here?

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1 This dialogue that I just heard draws me to the
2 conclusion that Mr. Rotow is offering opinion as a well-
3 informed layman, not as an expert in this case.

4 CHAIRMAN MILLER: I don't know, frankly.

5 MR. KETCHEN: What it sounds to me like is going
6 on here is Mr. Rotow, as anybody else could do without any
7 qualifications shown yet, goes and speaks to people and then
8 suddenly forms opinions about what an agency of the Federal
9 Government is doing. And once he's made that survey, he's
10 coming into this proceeding and bootstrapping himself into
11 giving expert judgments on what DOE is doing or not doing
12 or thinking or not thinking.

13 I think there's a question of reliability here,
14 and competency. I think we get to the question of maybe
15 if we want to know what the DOE did or is not doing, maybe
16 we ought to subpoena DOE witnesses.

17 But I think that if that explanation is correct
18 that I just heard Mr. Roisman give, then this witness is
19 nothing more than a well-informed witness who did some phone
20 calling and talked to some DOE people. Anybody can do that.

21 CHAIRMAN MILLER: We don't know, until we get
22 down to the testimony, to the substantive nature of it.
23 We're now on voir-dire of qualifications, and there are
24 certain areas of expertise that Mr. Roisman has stated which
25 may bear upon certain opinions and questions which are

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1 available to experts and generally not to non-experts,
2 although the term expert is very broad and flexible in some
3 situations.

4 . We don't know the merits of what you say. You
5 may be right. You may not. We won't know until we get to
6 the testimony in a substantive way.

7 So, Mr. McGarry, you may proceed with voir dire.

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BY MR. MC GARRY:

2 Q Mr. Retow, in your description of your role as a
3 consultant with NRDC, you indicated that at-- not a specific
4 point in time, but at a point in time you began to focus upon
5 the AFR, that is, the away-from-reactor storage issue, is
6 that correct?

7 A That's true, yes.

8 Q Can you give me a time frame, please, of when you
9 began to focus on that issue?

10 A To the exclusion of most of my other responsibilities
11 it would have been, I believe it was February, early February
12 of 1979.

13 Q Prior to that time, had you focused any of your
14 attention upon the away-from-reactor storage?

15 A Yes, certainly.

16 Q Have you been following this for some time is
17 that your testimony?

18 A Since I've joined NRDC, yes.

19 Q When did you first come into contact, personal
20 contact, with officials at DOE, employees of DOE?

21 A That would have been in March of 1978.

22 Q Before you joined Natural Resources Defense
23 Council, is that correct?

24 A That's correct.

25 Q Can you explain your contact with the Department

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WEL/sgb2

1 of Energy?

2 A Yes, that was when I dealt with -- my attorneys and I
3 dealt with Dr. -- largely with Dr. Donald Kerr and other
4 officials largely connected with the Defense Program Section
5 of the Department of Energy.

6 You see, I had just written and published --
7 well not published, but written a book on nuclear weapons
8 design.

9 Q Let me amend the question, if I may, Mr. Rotow.

10 As it relates to your role at NRDC, when did you
11 first come into contact personally with employees of the
12 Department of Energy?

13 A Oh, I suppose it would still be March of 1978,
14 because nuclear waste management has many safeguards and
15 preparation implications.

16 Q Just so we get the correct perspective, from the
17 day you walked in the door as a consultant at NRDC, and I think
18 you said that was September or October, 1978 --

19 A It would have been the very next day.

20 CHAIRMAN MILLER: What day?

21 WITNESS ROTOW: I don't know exactly, sir,
22 October of 1978.

23 CHAIRMAN MILLER: All right. Thank you.

24 BY MR. MC GARRY:

25 Q Who did you meet with?

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WEL/rgb3

1 A Well by come in contact, I assume telephone calls
2 -- I phoned Dr. Kerr who at the time, I believe, was still
3 acting as Assistant Secretary for Defense Programs to let him
4 know that I was working with NRDC, and I'd also talked to
5 Tom Raney, who was one of the security chiefs of Defense
6 Programs.

7 Q Perhaps it would save us a lot of time -- as I
8 understand it, when you first joined NRDC, you were focusing
9 on specific waste issues, is that correct?

10 A No, sir, it wasn't specific.

11 Q I'm not trying to trip you up, I'm just trying
12 to get at the facts, not trying to trip you up.

13 A Yes, sir, I understand.

14 Q What I want to get at is when did you start
15 focusing on the issue, the issue in this proceeding,
16 that is, the AFR, as I understand it.

17 A To the exclusion of all other issues, on
18 February of 1979.

19 Q When did you start having contact with the
20 Department of Energy as it relates to AFR?

21 A That would have been October, 1978. We talked about

22 CHAIRMAN MILLER: Hold it, hold it, now, hold it.

23 WITNESS ROTOW: Yes, sir.

24 CHAIRMAN MILLER: We're having entirely too much
25 quibbling, we're wasting a lot of time on preliminaries.

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1
2 You seem to have some feeling of resentment,
3 just answer the question. Give him the answer and stop there.

4 Mr. McGarry, there's a little bit of hostility
5 in some of the undertones of yours which perhaps were unintended
6 but they're being taken that way.

7 So I'd suggest let's lower the temperature on
8 both sides, get on with these matters, give direct factual
9 answers and proceed.

10 MR. ROISMAN: Mr. Chairman, let me just say,
11 because I have known Mr. Rotow longer than the Board or
12 Mr. McGarry, Mr. Rotow has what may be called a favorable flaw,
13 he has an overly precise mind.

14 Mr. McGarry's questions are unduly vague, and it's
15 very difficult for Mr. Rotow, who feels very constrained by
16 the being under oath, to answer those questions without
17 understanding them precisely right.

18 And I admit that the answer that he's giving would
19 be categorized by most of us as nitpicking. But I have also
20 gone through this with Mr. Rotow, even when he wasn't on the
21 witness stand, when I personally deal with him, it deals
22 with a precise mind.

23 If the questions can't be very precise -- Mr.
24 McGarry has been trying to ask him now for about five minutes
25 when did he first start talking to a DOE official about
away-from-reactor storage questions and he hasn't quite put it

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quite that way and so Mr. Rotow is having some difficulty.

First he asked him when did he first start talking to DOE officials at all, that was in 1976, in March when he was talking about weapons.

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2 Then he wanted to know, 'Well, when after you
3 came to NREI did you start talking to them?' Well,
4 it was that day. It happened he was still talking about
5 weapo.

6 The questions aren't getting as clear and precise
7 as to what is the best way to deal with Mr. Rotow. And all
8 I can say is -- to tell Mr. McGarry how to do it is if you
9 will make them very precise, Mr. Rotow is a very responsive
10 witness, sometimes overly so, but that's not your problem.

11 You're worried he's not being responsive enough,
12 and it's because he's concerned that the questions are not
13 precise enough. He doesn't want to say something under oath
14 that's wrong.

15 CHAIRMAN MILLER: Well, we don't think either
16 the questions or the answers are too precise. We tend to
17 think that both, but more the answers, tend to be in the form
18 of fencing.

19 We'd just like to have that sort of calm down by
20 everybody without trying to assess the responsibility. Let's
21 get on with the normal kind of interrogation of voir dire,
22 which is simply to find out certain facts.

23 And, Mr. McGarry, try to get your questions in
24 the nature that they won't elicit questions of you which
25 obviously are not proper.

MR. ROISMAN: I know what Mr. McGarry wants to get

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1 at.

2 I'll be more than happy to stipulate that
3 Mr. Rotow's knowledge in any detail of the away-from-reactor
4 storage problem really didn't begin until February of 1979.
5 He had passing contact with the issue in the course of doing
6 the waste study that he was hired as a consultant to do.
7 But insofar as any detail certainly related to the subject
8 that his testimony relates to, it didn't really start until
9 February of '79.

10 CHAIRMAN MILLER: Well, it's up to Mr. McGarry
11 whether or not he wants to accept that stipulation.

12 MR. ROISMAN: Well, it's offered only on the
13 assumption that he will quit this particular line of question-
14 ing and accept that as a stipulation.

15 MR. MC GARRY: I think we pretty much have that
16 already on the record, Mr. Chairman, so I'd like the record
17 to stand as it is.

18 CHAIRMAN MILLER: Very well.

19 Proceed.

20 MR. ROISMAN: The stipulation is withdrawn.

21 CHAIRMAN MILLER: The record will reflect that.

22 BY MR. MC GARRY:

23 Q Mr. Rotow, with respect to the AFR interest that
24 you have, who are your principal contacts at DOE with whom
25 you discussed this matter?

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mpb3

1 A (Witness Rotow) Worth Bateman, Mike Lawrence,
2 and Jim Fiori.

3 I haven't discussed it with them for some time
4 and I'm not in the course of discussing it with them now.

5 Q I didn't understand that last comment.

6 CHAIRMAN MILLER: Well, let's strike it. Let's
7 just answer it directly.

8 You asked who, he gave you three names. Now
9 either proceed or have him spell them if you don't know them.

10 MR. MC GARRY: Mr. Chairman, I did not hear the
11 last comment.

12 CHAIRMAN MILLER: What it was is 'I haven't
13 talked with them in some time and not now.' I don't think
14 the Reporter got it.

15 And we're all having difficulty following both
16 the interrogation and answers, as I've indicated twice now.

17 And if you gentlemen -- All right. I won't go
18 further.

19 Proceed.

20 BY MR. MC GARRY:

21 Q Who is Mr. Bateman?

22 A (Witness Rotow) Mr. Bateman is one of the acting
23 assistant secretaries at the Department of Energy. I'm not
24 exactly clear on what his title is, but I'll check.

25 He's the fellow who has overall responsibility for

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POOR ORIGINAL

mpb4 1 implementation.

2 A (Witness Cochran) Could I answer that question?

3 CHAIRMAN MILLER: No, sir.

4 WITNESS ROTOW: He's the acting principal deputy
5 assistant secretary for energy technology.

6 BY MR. MC GARRY:

7 Q And who is Mr. Lawrence?

8 A (Witness Rotow) Mr. Lawrence is, I believe, the
9 head project manager for away-from-reactor storage studies.
10 He was the project manager for the group that produced
11 DOE/ET-0075, the Department of Energy Report on Away-From-
12 Reactor Storage.

13 CHAIRMAN MILLER: Mr. Ketchen, did you have a
14 motion or something?

15 MR. KETCHEN: Sir, I just heard a word "responsible
16 for implementation". Was that the correct word?

17 WITNESS ROTOW: Yes.

18 MR. KETCHEN: That was the correct word. Okay.
19 Thank you.

20 BY MR. MC GARRY:

21 Q Who is Mr. Fiori?

22 A (Witness Rotow) Mr. Fiori works for Mike
23 Lawrence. He's apparently one of the co-authors of the
24 aforementioned DOE report.

25 Q Do you meet with these gentlemen routinely?

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- 1 A No.
- 2 Q Do you talk to these gentlemen routinely?
- 3 A No.
- 4 Q How often do you meet with these gentlemen?
- 5 A From this point on, not at all. I've met with
6 them on the order of half a dozen times.
- 7 Q And that commenced in February of '79?
- 8 A Actually commenced in March of '79.
- 9 Q And how many conversations have you had with them
10 as opposed to meeting with them, if you've had additional --
- 11 A I don't recall. Numerous times over the tele-
12 phone, again on the order of, say, between one dozen and two
13 dozen. But certainly not more than two dozen.
- 14 Q Were your conversations and meetings equally
15 divided among the three gentlemen?
- 16 A No. I've had only one meeting with Worth Bateman,
17 the principal meeting. We did encounter casually once.
- 18 Q And who was your principal contact? Would it be
19 the other two gentlemen?
- 20 A Yes.
- 21 Q Did you meet with Mr. Fiori more than Mr. Lawrence?
- 22 A No.
- 23 MR. MC GARRY: Mr. Chairman, I'm trying to go
24 over my voir dire notes and complete this.
- 25 If this is a good time for a break -- I don't know

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mpb6 1 if it is.

2 CHAIRMAN MILLER: All right.

3 We'll take a ten minute recess.

4 (Recess.)

5 CHAIRMAN MILLER: All right, let's start to begin
6 to commence.

7 MR. MC GARRY: Mr. Chairman, one matter that would
8 speed up this voir dire, and that is I have numerous questions
9 I would like to ask concerning the survey and the thought
10 process of the survey, and various aspects of the survey.

11 Am I to understand that those are deferred until
12 that material comes in?

13 CHAIRMAN MILLER: I think so, unless you have
14 some special reason. I think it would be better because
15 you're going to be mixing expertise voir dire type of things
16 with what was done subsequently.

17 I believe it would be a little more clear-cut and
18 a little more easy for the Board to follow if you could defer
19 it.

20 MR. MC GARRY: I would like to do that. There may
21 be some questions on the survey that seem to be voir dire --
22 they're not meant to be. But I would like to defer that at
23 this time.

24 CHAIRMAN MILLER: All right.

25 BY MR. MC GARRY:

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1 Q Mr. Rotow, some brief questions about the office
2 of the NRDC.

3 How many people are in your office?

4 A (Witness Rotow) In Washington?

5 Q Yes.

6 A About 35, I think.

7 Q And are they all involved, as you are, I take it,
8 with nuclear power issues?

9 A No, sir, they're not.

10 Q How many are involved with nuclear power issues?

11 MR. ROISMAN: Mr. Chairman, just for the record --

12 WITNESS ROTOW: I don't know.

13 MR. ROISMAN: -- the witness is unlikely to know the
14 answer --

15 CHAIRMAN MILLER: He's already said he doesn't
16 know, so....

17 WITNESS ROTOW: Five professionals, some support
18 staff.

19 CHAIRMAN MILLER: Now he knows.

20 WITNESS ROTOW: That's a guess.

21 CHAIRMAN MILLER: That's a guess, and it's stricken.

22 Mr. Rotow, now when you don't know, it's a fair
23 answer to stop there.

24 WITNESS ROTOW: Yes, sir.

25 BY MR. MC GARRY:

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Q Who are the people that you deal with on a daily basis at NRDC?

A (Witness Rotow) Tom Cochran, Arthur Tamplin, Tony Roisman, Peggy Snider, Jonathan Lash, Frances Binekey, Fran Jacobson, Hazel Ali. We're getting to support staff, the receptionist.

Q I think you've answered my question.

CHAIRMAN MILLER: I think that's enough.

MR. MC GARRY: That's fine.

BY MR. MC GARRY:

Q They're professionals that you've identified, is that correct?

A (Witness Rotow) Yes.

Q Do you consider yourself knowledgeable of the NRDC's concerns with various nuclear power issues?

A To a reasonable degree, yes.

Q When did you first become aware of NRDC's intervention in this proceeding?

A February of 1979.

Q And at that time were you aware of the various contentions that were being raised by the Natural Resources Defense Council?

A No, sir.

Q When did you become aware of those contentions?

A April, I believe it was, of '79.

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mpb9

1 Q I believe you stated with respect to the away-
2 from-reactor matter that you have been following the Natural
3 Resources Defense Council. That was triggered by a DOE
4 document, a Department of Energy document of February, 1979,
5 is that correct?

6 A It was actually a fact sheet that was contained
7 in this folder.

8 (Displaying document.)

9 Q What's the date of that folder?

10 A There is no date on it. It just says DOE Fact
11 Sheets, Reference Information From the Department of Energy,
12 Press Service Division, Office of Public Affairs, and then
13 it's scrawled on there in handwriting 'Spent Fuel'.

14 Tom gave this to me at the office.

15 Q Do you have an idea of when that fact sheet was
16 handed out by DOE?

17 A Yes, I do.

18 Q Approximately what would that date be?

19 A February of '79.

20 Q And not to belabor the point, but at that point
21 in time, pursuant to discussions with Dr. Cochran, you began
22 to follow the AFR issue on a full-time basis, is that correct?

23 A Yes.

24 Q And you followed it pursuant to a contract that
25 NRDC had with DOE, is that correct?

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mpbl0

1 A Yes.

2 Q And what was the nature of that contract? Was it
3 to critique a position of DOE?

4 A It was a general --

5 MR. ROISMAN: Objection.

6 The witness is now going to have to testify to
7 hearsay, and the gentleman sitting to his right knows the
8 information directly. If it's important to know it accurately,
9 I'd like Dr. Cochran to answer the question.10 All Mr. Rotow knows is what Dr. Cochran told him.
11 The contract was oral and was made on the telephone, and
12 related to an extension of a contract.

13 CHAIRMAN MILLER: Well, let me inquire:

14 Is this part of voir dire or are you seeking
15 factual information?16 MR. MC GARRY: It's part of voir dire. And I
17 won't be able to point again --18 CHAIRMAN MILLER: In that event, let him answer.
19 We'll recognize if it is hearsay.20 WITNESS ROTOW: Could I ask you to state your
21 question again?

22 BY MR. MC GARRY:

23 Q Yes.

24 To the best of your knowledge, what did the
25 contract encompass?**POOR ORIGINAL**~~446 300~~

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mph11

1 A (Witness Rotow) It was very broadly stated. It
2 was largely on the basis of personal contact between Roger
3 Lagasse and Tom. And generally we were to look into radio-
4 active waste from an environmental point of view.

5 That was more or less my understanding of it.

6 Q Did it relate specifically to consideration of
7 the away-from-reactor storage proposal?

8 A In February of '79, yes, I believed it to be.

9 Q Had DOE, the Department of Energy, taken a posi-
10 tion, to the best of your knowledge, in February, 1979, with
11 respect to away-from-reactor storage?

12 A Yes.

13 Q And was that position embodied in any document
14 or policy statement?

15 A As far as I understand, it was embodied in a
16 series of policy statements starting with a press release
17 issued in 1977 from the White House, which I mention in my
18 testimony, the written testimony, which triggered the first
19 idea of a federal away-from-reactor storage facility that
20 would accept, for a fixed one-time fee, spent nuclear fuel
21 for reactors owned by private utilities.

22 The position has been constantly changing, and
23 I've only been aware of the degree to which it has been
24 changing since I started following it full-time.

25 Q To your knowledge, did NRDC have a position with

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mpb12 1 respect to the viability of the away-from-reactor storage
2 concept?

3 A Did it have it?

4 Q Yes.

5 A Yes, it did.

6 Q And what was that position?

7 A As I understand it now, or as I understood it
8 in February of '79?

9 Q As you understood it then.

10 A I didn't really understand what it was in February
11 of '79.

12 Q Did you have a position with respect to away-from-
13 reactor storage in February of '79?

14 A Yes, I did.

15 Q And what was that position?

16 A I didn't think it was a very good idea, as stated.

17 Q And when did you become aware of NRDC's position
18 with respect to away-from-reactor storage?

19 A It was largely in my reading of the interrogatories
20 and contentions which -- I made a mistake, it was actually
21 late March of '79 that I first heard the contentions. And
22 then I had some discussions with Tom and Tony and Jacob Sharp
23 about it.

24 Q And to your knowledge, what is the NRDC position
25 with respect to away-from-reactor storage?

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mpbl3 1 A As far as my understanding is concerned, under
2 certain conditions away-from-reactor storage in the NRDC
3 view might be appropriate for foreign, for return of foreign
4 fuel in order to further in our proliferation concerns.

5 However, there is clearly no evidence for a
6 near-term away-from-reactor storage facility for domestic
7 spent fuel, and that the federal policy encouraging one is
8 detrimental to the general public good.

9 Q And that's consistent with the position that
10 you maintained in February of '79?

11 A I think it's fairly consistent, yes.

12 (Pause.)

13 Q One final question, Mr. Rotow:

14 You indicated that you commenced your research
15 of the documents as they relate to this case in March of '79.

16 Were you aware of this NRDC's intervention prior
17 to that time?

18 A Before I commenced research, yes.

19 (Pause.)

20 No, actually I commenced it without knowing of
21 NRDC intervention. I had already produced the survey questions
22 when Tom told me that, you know 'We're intervening in a Duke
23 proceeding, so you should check these particular Duke reactors.

24 Q Now when did Tom -- parenthesis Dr. Cochran --
25 tell you that NRDC was intervening?

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mpbl4 1 A I'd say it was about six hours after I started
2 a full-time effort in this matter to investigate this
3 particular fact sheet, which was attached to this Figure 1 --
4 I should say to NRDC Exhibit 13-C.

5 This is the particular thing I started checking.

6 Q I'm just trying to get the time and the year,
7 Mr. Rotow, that's all.

8 You began work with the NRDC in 1978. Were you
9 aware at that time that NRDC had petitioned to intervene in
10 this proceeding?

11 A No.

12 Q And you didn't know that fact in October, November,
13 or December?

14 A That's correct.

15 Q Or January?

16 A Or January.

17 Q Amazing.

18 Yet you meet with these gentlemen routinely, you
19 discuss matters with them routinely?

20 A Well, sure, but they work on many other things
21 besides this intervention.

22 Q And the intervention of this proceeding never came
23 up in any of those discussions? That's your testimony? I
24 won't belabor the point.

25 A I don't recall. It may have come up at one time

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mpb15 1 or another. I could ask Tony or Tom.

2 MR. MC GARRY: I have no further questions,
3 Mr. Chairman, if that's the answer

4 CHAIRMAN MILLER: Very well.

5 Any other voir dire?

6 MR. KETCHEN: Yes, Mr. Chairman, we have a few
7 questions.

8 CHAIRMAN MILLER: Okay.

9 BY MR. KETCHEN:

10 Q Mr. Rotow, I would like to go back to the October,
11 1978 date. You were asked questions about when you first
12 became a consultant to NRDC. I believe you said it was
13 October, 1978, is that correct?

14 A (Witness Rotow) Yes.

15 Q In October, 1978, you also indicated that you
16 had begun talking to the Department of Energy people right
17 after you became a consultant for NRDC, is that correct?

18 A I said I talked with them right after. I didn't
19 say I "began". It was actually a continuation of talks that
20 I'd had since March of 1978.

21 Q But the subject of those discussions were not
22 discussions with DOE people about away-from-reactor storage
23 at that time?

24 A That's correct.

25 Q And as the stipulation indicates, your knowledge

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mpb15 1 or awareness of the away-from-reactor storage matter didn't
2 begin until about February, 1979.

3 MR. ROISMAN: Mr. Chairman, there is no stipula-
4 tion.

5 MR. KETCHEN: No, that's withdrawn. I've just
6 got these dates all messed up.

7 CHAIRMAN MILLER: I think that is the testimony,
8 though.

9 BY MR. KETCHEN:

10 Q Is that the testimony?

11 A (Witness Rotow) Could you repeat your question?

12 Q Let me backtrack.

13 What I want to know, you started talking to DOE
14 people in October, 1978, about something other than away-
15 from-reactor storage.

16 A Well, I continued talking to them as I normally
17 did throughout the entire time.

18 MR. ROISMAN: Mr. Chairman, Mr. Ketchen is asking
19 the line of questions that Mr. McGarry belabored when he
20 asked them.

21 I do not see that we are doing anything but allow-
22 ing the Applicant and Staff to delay the cross-examining of
23 these witnesses through an overly extensive and, as best as
24 I can determine, irrelevant voir dire.

25 I would like the Chairman --

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CHAIRMAN MILLER: We expect them to start moving forward, but maybe they expect to break him down on voir dire. I don't know.

(Laughter.)

MR. ROISMAN: All right, Mr. Chairman.

CHAIRMAN MILLER: You may proceed.

But I'm sure Mr. Ketchen has in mind, and they'll seek to differentiate from questions previously asked.

MR. KETCHEN: I'm just simply trying to get the dates straight, Mr. Chairman. It's very confusing about when Mr. Rotow knew what.

BY MR. KETCHEN:

Q Now when did you first start talking with Worth Bateman?

A (Witness Rotow) I believe it was March of '79.

Q Okay.

Prior to that -- Is he someone different, a different subject matter with respect to those people that you were talking to from October, '78, to March, '79?

A Yes.

Q Okay.

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Q During that time, as I understand about February '79, you suddenly became aware of the sway-from-reactor storage problem.

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4 A That's not true. That's when I began working on it full-time. I was aware of it well before that, you know, as a big issue, and I was doing a waste disposal contract.

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7 But it was only in February of '79 that I started working full-time on the AFR issue, if that helps.

8
9 Q Let's go back again.

10 A Yes, sir.

11 Q You mentioned a contract. Tell me about the contract.

12
13 A In October of 1978 I joined the Natural Resources Defense Council as research assistant to work on a contract that they have with the Department of Energy, which I explained earlier was a very general contract, more or less trying to ascertain the environmentalists' view of waste disposal and waste management issues.

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18 The title of our study is "Radioactive Waste Management," and it's in three parts.

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21 The first part is criteria, general criteria which tend to focus on criteria for long-term geologic disposal of radioactive wastes.

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24 The second part is a discussion of implementation along through the defense-in-depth concept.

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1 AND the third part is more or less general re-
2 search and development, suggesting future lines of attack.

3 MR. ROISMAN: Mr. Chairman, could Mr. Ketchen
4 be asked to at least indicate where all this is going and what
5 relevance it has, at least in the detail that he is now trying
6 to get into it, as to when Mr. Rotow began to do what?

7 CHAIRMAN MILLER: Let him conduct his voir dire.

8 MR. KETCHEN: Mr. Chairman, I just don't think
9 I'm getting responsive answers.

10 CHAIRMAN MILLER: You asked him about a contract.
11 He gave you the date and he gave you a full explanation of
12 the various points. What more do you want in response to a
13 question like that?

14 Maybe he's not understanding your question. Maybe
15 the Board isn't. When you ask about a contract, if you're
16 really serious about it, you're going to get information about
17 a contract. Now it's already in the record and we won't stop
18 you right now but you are going over matters which have been
19 covered.

20 MR. KETCHEN: Okay.

21 BY MR. KETCHEN:

22 Q When did you begin your own research with respect
23 to the away-from-reactor storage project -- or matter?

24 A (Witness Rotow) February 1979.

25 Q Okay.

446-309

574 301

eb3

1 At what point in time did you talk to Dr. Cochran
2 about doing a more formal type of study with respect to away-
3 from-reactor storage?

4 A It would have been the same time period.

5 Q Okay.

6 A My discussion then triggered my initial full-time
7 involvement.

8 Q Then at what time did you begin or start to-- Let
9 me backtrack. I want to talk about your survey now.

10 A Yes.

11 Q It is my understanding that you conducted a
12 survey of utilities. Is that correct?

13 A Of what I thought were responsible spent fuel
14 management personnel at the utilities.

15 Q Okay.

16 When did you formulate some questions to ask the
17 utilities as part of your survey?

18 A That would have been in late February on the same
19 day that all this was initiated by my conversation with
20 Dr. Cochran. Dr. Cochran --

21 CHAIRMAN MILLER: Just when. You were just asked
22 when, and you've given a date.

23 BY MR. KETCHEN:

24 Q At that time were you aware that there was another
25 contract that NRDC had with DOE with respect to away-from-

446-310

574 302

ebd

1 reactor storage?

2 A (Witness Rotow) Another contract?

3 Q Any contract?

4 MR. ROISMAN: Objection.

5 MR. KETCHEN: I'll withdraw that and put it another
6 way.

7 BY MR. KETCHEN:

8 Q A contract?

9 A (Witness Rotow) I don't understand.

10 Q Okay.

11 When Dr. Cochran came to you and discussed the
12 research project, did any discussion of the purpose of the
13 research project come up?

14 A Yes.

15 Q During that discussion was there a discussion of--
16 Okay, what was the purpose then?

17 A The purpose was to investigate the factual basis
18 of the Department of Energy fact sheet attached as Figure 1
19 to NRDC Exhibit 13-C entitled "Estimates of Reactors Requiring--"

20 CHAIRMAN MILLER: A little slower.

21 WITNESS ROTOW: -- entitled "Estimates of Reactors
22 Requiring AFR Storage." The purpose was to investigate whether
23 the data presented in here was true or not, as far as it was
24 understood at the time and--

25 CHAIRMAN MILLER: That's it. You've answered.

446 311

574 303

ab5

1 BY MR. KETCHEN:

2 Q And at that time were you aware that there was a
3 DOE contract with WRDC and that was part of that contract
4 responsibility that was assigned to you?

5 A (Witness Rotow) Yes, sir.

6 Q Okay.

7 Now that contract was different from the other
8 contract that I asked you about a few moments ago. Is that
9 correct?

10 A No, sir, the same contract.

11 Q The same contract?

12 A Yes.

13 Q During the discussion of your responsibilities
14 with respect to site availability re: away-from-reactor
15 storage, I'd like to know what triggered the project or the
16 survey requiring phone calls to utilities about availability of
17 onsite storage space.

18 A Well, there was never any discussion of my respon-
19 sibilities in reference to site availability, so I'm not
20 exactly sure what you're referring to.

21 CHAIRMAN MILLER: Well, if you're not sure, just
22 stop right there.

23 BY MR. KETCHEN:

24 Q Mr. Rotow, when, if at all, were you assigned the
25 responsibility to conduct a survey of utilities concerning

574 304
~~446 312~~

eb6

1 away-from-reactor storage?

2 CHAIRMAN MILLER: When?

3 WITNESS ROTOW: February 1979.

4 BY MR. KITCHEN:

5 Q You indicated before that you did draw up some
6 questions.

7 A (Witness Rotow) Yes, sir.

8 Q When did you draw up the questions?

9 A The same day, February '79.

10 Q Now Mr. Rotow, you had indicated in response to
11 Mr. McGarry's question I believe that you didn't think away-
12 from-reactor storage was a good idea. Is that correct?

13 A I indicated that for domestic spent fuel, yes,
14 that's true.

15 Q Did you have that idea before or after you took
16 the survey in February of 1979?

17 A Well before.

18 Q Well before?

19 A Yes, sir.

20 Q Let me ask you this:

21 When you drew up questions to contact the-- When
22 you drew up questions in preparation for contacting the
23 utilities, did you show those questions to anyone else?

24 A Yes, sir, I did.

25 Q Who did you show them to?

574 305

~~446 313~~

eb7

- 1 A Dr. Cochran.
- 2 Q When did you actually conduct the survey?
- 3 A February and March of 1979, late February, early
4 March.
- 5 Q And during the course of that survey, did you
6 include or exclude Duke Power Company?
- 7 A I excluded it.
- 8 Q How come you excluded Duke Power Company?
- 9 A Because I was asked specifically by Dr. Cochran
10 and Mr. Roisman to exclude Duke Power Company to prevent any
11 possible conflict of interest.
- 12 Q Can you indicate to me what the conflict of in-
13 terest would be?
- 14 MR. ROISMAN: Objection.
- 15 CHAIRMAN MILLER: Sustained.
- 16 MR. KETCHEN: Can I have the last answer read
17 back?
- 18 (Whereupon, the Reporter read from the record
19 as requested.)
- 20 BY MR. KETCHEN:
- 21 Q Your statement to avoid -- I am paraphrasing --
22 any possible conflict of interest, is that your conclusion
23 or is that what Dr. Cochran told you?
- 24 A (Witness Rotow) That was my conclusion.
- 25 Q And could you give us the basis for your making

eb8

1 that statement on this record?

2 I just understand that it's a professional matter,
3 many people doing analyses and surveys, that they-- If the
4 organization for which they work has some personal interest
5 in the matter, they exclude it. They usually do. It didn't
6 mean very much to me at all because there were many utilities
7 on the particular list, and I was interested in checking the
8 factual basis.

9 Q Well, I'm still concerned. Why was Duke ex-
10 cluded?

11 MR. ROISMAN: Objection.

12 CHAIRMAN MILLER: Sustained.

13 BY MR. KETCHEN:

14 Q You say you don't know? You were just asked to
15 conduct the survey, and they were to be excluded? Is that
16 correct?

17 A (Witness Rotow) That's correct.

18 Q Other than showing Dr. Cochran your questions
19 that you were going to ask the utilities in your survey, were
20 there any other controls placed on you by NRDC?

21 A No.

22 Q Did you show those questions to the Department of
23 Energy?

24 A Eventually, or at the time of--

25 Q At the time you drew them up but before the survey?

574 307
446 315

eb9

1 A Oh, no.

2 Q I mentioned were there any other controls on
3 your research studies put on by NRDC. Now I'd like to ask
4 you about other kinds of controls that you may have put on.

5 Were there any controls on your study, any
6 statistical controls on your study?

7 A Will you define what you mean by "statistical
8 controls"? I mean if you want to ask me a technical question
9 I'll have to be very precise in answering it.

10 Q Okay. Let me try.

11 For example, did you do any planning of your
12 study with any anticipation of putting any kind of sampling
13 statistical bands of errors on your study?

14 A The question doesn't apply.

15 Q Why doesn't it?

16 A It's a survey, a subjective opinion.

17 Q So there weren't any-- Okay.

18 How many utilities did you survey?

19 A 19 I believe.

20 Q Let me ask it another way. What I want to know is:

21 Did you survey all-- Did you intend when you
22 began the survey to survey all the utilities with the ex-
23 ception of the ones you were asked to exclude?

24 A Yes.

25 Q Okay.

574 308
446 316

ab10

1 And did you ask these questions of all the
2 utilities?

3 A Yes, I did.

4 Q Okay.

5 Other than the ones that you were asked to ex-
6 clude?

7 A That's true.

8 Q Okay.

9 Did you ask each question of every utility?

10 A Yes, I did. That's why I used the standard
11 format, if that's what you're getting at.

12 Q Okay.

13 When you presented yourself to the utility -- I
14 assume you did this on the telephone. Is that correct?

15 A Yes, that's correct.

16 Q When you conducted the survey of each utility by
17 telephone, did you talk to people in authority for making
18 decisions with the utility?

19 A Yes, I believe so.

20 Q Was that one person in every case?

21 A No.

22 Q Was it several people-- Obviously it was several
23 people.

24 You indicated just previously that you were making
25 a survey of subjective opinion. Would you indicate for the

574 309

~~446 317~~

eb11

1 record how you knew you had the right person to give the
2 proper answers to the questions?

3 A I should clarify that because although we're
4 discussing here the nature of utility plans, in many cases
5 those plans can be tied to physical realities.

6 For example, although there was some equivocac-
7 tion responses from Maine Yankee personnel -- particularly
8 I was lied to by their chief plant engineer -- I was told
9 by several people there that there is no problem with expand-
10 ing the pool capacity, spent fuel storage capacity. In effect,
11 they already had a proposal to NRC to do that. That can be
12 checked by going to the Public Document Room in Washington,
13 D. C., as I did, at 1717 H --

14 MR. KETCHEN: I don't think that's responsive
15 to my question.

16 CHAIRMAN MILLER: What was your question?

17 MR. KETCHEN: Mr. Chairman, I'm trying to find
18 out when he called up on the phone, how he knew he had a
19 person of responsibility to answer the questions.

20 CHAIRMAN MILLER: What difference does that make?

21 MR. KETCHEN: He could have gotten a secretary
22 for all I know.

23 CHAIRMAN MILLER: He could have gotten anybody.
24 My question still is what difference does it make on voix
25 dire?

446-318

574 310

abl2

1 MR. KETCHEN: Well, it's got to do with his
2 credibility to report that information to this Board.

3 CHAIRMAN MILLER: That he got Mickey Mouse or
4 somebody, or something? I don't follow you. I don't think
5 this is voir dire. I think you're getting into cross-
6 examination.

7 MR. KETCHEN: I'm trying to test the --

8 CHAIRMAN MILLER: What are you testing? Remember,
9 you're not going to get two bites either. Questions that are
10 used up now are going to be questions you're not going to be
11 permitted to ask on cross-examination. I think you would be
12 well-advised to save it for cross when it will be more mean-
13 ingful.

14 MR. KETCHEN: Well, Mr. Chairman, this witness
15 is-- Well, I will continue. I think it does make a dif-
16 ference. This witness I think can give the answer. I'm not
17 trying to --

18 CHAIRMAN MILLER: I have no doubt he can give
19 the answer. My question is why are you taking the Board's
20 time on ostensible voir dire which does not at this point
21 seem to be voir dire? That's a question for you, not for the
22 witness.

23 MR. KETCHEN: Well, sir, I've heard him-- I'm
24 going to make a motion later but I've heard him testify to
25 questions Mr. McGarry asked on other surveys that he's done

446-319

574 311

eb13

1 in the last two years, and he gives guesses, like very im-
2 precise answers to those questions.

3 And I'm trying to test the same...for example,
4 ask about a survey two years ago-- Well, first of all
5 Mr. Rotow is held out as being very nitpicking and giving very
6 precise answers but yet when Mr. McGarry asked him a question
7 about a survey two years ago, he says, "How many people did
8 you contact?"

9 "6 or 12 people."

10 I'm sorry, it wasn't 6 or 12 people, it was a
11 dozen or two dozen.

12 Well, there's a lot of problems that I have with
13 that, not being a great statistician, but I just question
14 the credibility of this witness to conduct surveys if he is
15 taking those kinds of samples and doesn't know the preciseness
16 of his sample.

17 And I'm asking how he verified that when he
18 called up a utility he got any kind of an answer that this
19 Board ought to put any reliance on, even as a fact. It's all
20 hearsay.

21 So I think it does get near cross, but I think
22 it also is testing his ability to call people up and conduct
23 those kinds of surveys.

3a

446 320

574 312

3B WRB/wb1

1 CHAIRMAN MILLER: I don't know that we're really
2 interested in his ability, or alleged ability to call people
3 up.

4 Now my question to you five minutes ago was, in
5 what respect is this proper voir dire examination rather than
6 cross examination of a witness on the particular survey or
7 surveys we're interested in? --and you've not given us any
8 answer.

9 Now we're about to conclude that it is not proper
10 voir dire.

11 MR. KETCHEN: Mr. Chairman, we're trying to,
12 under voir dire, figure out his qualifications to conduct
13 the survey. And it goes to trying to support a motion to
14 strike his later testimony on whether he's qualified to
15 give testimony about his survey.

16 CHAIRMAN MILLER: Well, so far we don't see much
17 connection between his voir dire and your burning desire to
18 know whether he got a secretary or administrative assistant
19 or a female technician or a male technician, or what-not.
20 It seems to me you're wasting the Board's time under the guise
21 of voir dire by going into matters that you may well wish to
22 go into on cross-examination. You're not going to be permitted
23 to do both, and you're not going to be permitted much longer
24 to do one, when we do not deem it to be proper voir dire;
25 which you, as a lawyer, should know.

446 321

574 313

wb2

1 MR. KETCHEN: Mr. Chairman, I do know that. And
2 I think we were, in my view, conducting proper voir dire.
3 I don't mean to argue, so we will just move on and try to get
4 into some other areas.

5 BY MR. KETCHEN:

6 Q One other question I'd like to ask:

7 Did you identify yourself to the people you talked
8 to on the telephone?

9 A (Witness Rotow) If they asked me what my name
10 was, yes.

11 Q Did you indicate what your affiliation was?

12 CHAIRMAN MILLER: Objection sustained.

13 You're getting into particular surveys. Now if
14 you want to do it in a serious way, do it on cross-examination.

15 BY MR. KETCHEN:

16 Q I would like to move along now to the March 1979
17 date, Mr. Rotow, when you were having discussions with DOE
18 officials.

19 It's my understanding you talked to Mr. Worth
20 Bateman.

21 A Yes.

22 Q Mr. Jim Fiori, and Mr. Lawrence.

23 A Mike Lawrence; yes, sir.

24 Q What were the circumstances-- Why were you talking
25 to them? Why did they call you to talk to them?

446 322

574 314

wb3

1 A That's a good point: they called me.

2 We had just published the predecessor document to --
3 I should say predecessor document to NRDC Exhibit 13-C. And
4 I believe that was called NRDC Survey of Spent Fuel Managers.
5 And that particular document took great issue with the
6 Department of Energy fact sheet. And, as a result, I was
7 called by the Department personnel -- the Department of Energy
8 personnel who were responsible for printing and forwarding
9 the fact sheet. And all these events occurred in the course
10 of about a week. And they wanted to talk.

11 Q And did you meet with them?

12 A Yes, I did.

13 Q How many meetings did you have?

14 A I don't recall precisely. I think it was on the
15 order of six with Lawrence and Fiori, and one with Worth
16 Bateman.

17 Q Did you know these people before you met with them?

18 A No. I believe I had met Bateman once underneath
19 the Forrestal Building when I was involved in another matter.
20 We talked informally.

21 Q What was that--

22 CHSIRMAN MILLER: This is all very interesting.

23 But what are we going to?

24 Just answer the questions, please. Don't elaborate.
25 just answer the questions, please, and to the point.

574 315
446 323

wb4

1 BY MR. KETCHEN:

2 Q Was this the first time that the DOE officials
3 were aware of your survey?

4 A (Witness Rotow) I believe so.

5 Q And these meetings you described: how long did you
6 meet with these people?

7 A All day.

8 Q Six times?

9 A No.

10 Q Were there any minutes of these meetings?

11 A No.

12 Q Did they ever communicate with you in writing?

13 A No.

14 Q Can you tell me how many of these meetings lasted
15 all day, and how many of them were short? I'm trying to get
16 the sense of--

17 A I'd say one all day, two half a day, and the rest
18 very brief and informal. And by "brief," say an hour. The
19 smeeeting with Worth Bateman I believe was three hours, something
20 like that, maybe less.

21 CHAIRMAN MILLER: I think that's pretty significant
22 now.

23 MR. KETCHEN: Mr. Chairman, can you give me a
24 couple of minutes?

25 CHAIRMAN MILLER: All right. Five minutes?

446-324
574 316

wh5

1 MR. KETCHEN: That'll be fine.

2 (Recass)

3 CHAIRMAN MILLER: We'll be on the record.

4 Mr. Ketchen.

5 MR. KETCHEN: Yes, sir.

6 BY MR. KETCHEN:

7 Q I have one question, Mr. Rotow. I think in response
8 to Mr. McGarry's questions, one of Mr. McGarry's questions,
9 you indicated that the telephone -- your survey flowed from
10 an extension of a contract -- flowed from the extension of a
11 contract, and oral contract. Do you recall that answer?

12 A (Witness Rotow) I believe I recall it was part
13 of an oral contract, yes.

14 Q Do you know that directly, or did somebody tell
15 you that?

16 A Dr. Cochran told me that.

17 CHAIRMAN MILLER: Any further voir dire?

18 Mr. Roisman, you may proceed.

19 MR. KETCHEN: Mr. Chairman, before Mr. Roisman
20 proceeds, I would like to make a motion. I think I would like
21 to move at this time that this witness' entire testimony be
22 stricken. And I would like to give my basis.

23 CHAIRMAN MILLER: We haven't yet seen it or heard
24 it, so we're not in much position to rule on it. We have
25 nothing before us to rule on.

574 317
446 325
POOR ORIGINAL

wb6

1 MR. KETCHEN: Then at the appropriate time I'll
2 make my motion.

3 CHAIRMAN MILLER: Very well. You may be given
4 leave to do so.

5 Mr. Roisman.

6 MR. ROISMAN: Mr. Chairman, at this time I would
7 like to offer into evidence NRDC Exhibit No. 13-A, B, C and D,
8 which is the testimony of Dimitri Rotow, including his
9 statement of professional qualifications, and two studies
10 prepared by him.

11 CHAIRMAN MILLER: Is there additional or supple-
12 mental testimony you intend to present by Mr. Rotow?

13 MR. ROISMAN: No, Mr. Chairman, I consider this
14 testimony to be complete in the written papers.

15 CHAIRMAN MILLER: We'll defer ruling on your
16 motion to admit NRDC Exhibit 13 until cross-examination has
17 been concluded.

18 Who wishes to cross-examine first?

19 MR. MC GARRY: Mr. Ketchen, do you wish to proceed?

20 MR. KETCHEN: You go ahead.

21 CROSS-EXAMINATION

22 BY MR. MC GARRY:

23 Q Mr. Rotow, in conjunction with your survey I
24 believe you made reference to a survey sheet; is that correct?

25 A (Witness Rotow) Yes, I did.

XXXXXX

446-326

574 318

wb7

1 Q Do you have that survey sheet before you at
2 this time?

3 A Yes, I do.

4 Q That survey sheet is not part of the testimony,
5 is it, to the best of your knowledge?

6 A It should be attached to one of the parts. I
7 believe it was Part B that mentions it. -- No, it wasn't
8 attached to that, but it should have been included as one
9 of the other parts.

10 CHAIRMAN MILLER: We did tear that one off.

11 WITNESS ROTOW: It wasn't the one we tore off.

12 CHAIRMAN MILLER: What was it?

13 WITNESS ROTOW: The same sheet, but it should be
14 part of Exhibit 13, in one of the parts of Exhibit 13, other
15 than 13-A.

16 I'm looking through to see where it's mentioned
17 here.

18 CHAIRMAN MILLER: All right. Find out which one.
19 We want to give it an exhibit number for identification.

20 MR. ROISMAN: Mr. Chairman, I think that these
21 surveys, particularly NRDC Exhibit 13-D, did have originally
22 as part of them some underlying documents which -- that survey
23 sheet was one of the documents, and then a number of pieces
24 of material obtained from the Public Document Room relating
25 to several reactors that are discussed in there. We left it

574 319

446-327

wb8

1 all out because it didn't seem crucial to the study, although
2 we had made it available to the applicants, the staff, the
3 parties and the Board through a filing that we made.

4 When we--

5 CHAIRMAN MILLER: Well let's find out what it's
6 associated with, first of all, among the exhibits.

7 WITNESS ROTOW: It's 13-D, the first page.

8 CHAIRMAN MILLER: And what's the title of 13-D?

9 WITNESS ROTOW: The title is "No Need for AFRs."

10 On the first page, under Introduction, the last
11 paragraph, the second sentence, "These people were inter-
12 viewed over the telephone using the standard questionnaire
13 format (Exhibit A)."

14 You see up at the top here, this is marked
15 "Exhibit A." So that, in addition to photocopies from the
16 NRC Public Document Room, was originally attached to NRDC
17 Exhibit No. 13-D.

18 MR. MC GARRY: Mr. Chairman, I'm simply trying
19 to expedite this matter. I think it would be helpful to the
20 Board and the parties, if the document isn't contained in
21 Exhibit 13-A, B, C and D, to have that document before the
22 Board and parties. Because I'm going to be asking questions
23 about it.

24 CHAIRMAN MILLER: We've asked to have it marked.

25 MR. ROISMAN: It's the piece that was thrown away.

446-328

574 320

wb9

1 I will mark it as NRDC Exhibit 19.

2 MR. MC GARRY: 13-E, wouldn't that be better?

3 MR. ROISMAN: That's all right.

4 CHAIRMAN MILLER: Headed "Survey of Utility
5 Spent Fuel Managers, Exhibit A," et cetera?

6 WITNESS ROTOW: Yes.

7 CHAIRMAN MILLER: I just retrieved it from the
8 waste basket, or the waste repository, or whatever you wish
9 to call it.

10 And what are we going to mark it now? NRDC-13-E?

11 MR. ROISMAN: Is that a permanent or an interim
12 storage facility?

13 CHAIRMAN MILLER: I don't know. AF-something or
14 other.

15 (Whereupon the document referred to
16 was marked NRDC Exhibit 13-E for
17 identification.)

18 CHAIRMAN MILLER: All right. The witness is
19 responding to Mr. McGarry describing the survey sheet which
20 has now been marked for identification as NRDC 13-E.

21 You may proceed.

22 MR. MC GARRY: Thank you, Mr. Chairman.

23 BY MR. MC GARRY:

24 Q Mr. Rotow, this document referred to as NRDC 13-E
25 is the document you relied upon to conduct your survey, is it

574 321
446-329

wb10

1 not?

2 A (Witness Robot) As a guide, yes.

3 Q And did you draft this document?

4 A Ye- I did.

5 Q Turning to the first category, the first line,
6 "How many assemblies in a full core?" Why did you ask that
7 question?

8 A Just for general background information.

9 Q Why was that important to you in your survey?

10 A For several reasons. When I first set out the
11 standard questionnaire I thought, since I'm going to be
12 talking to these people I may as well ask them--

13 Q Excuse me; did you say "sent out?"

14 A Set out.

15 When I first set out to conduct the survey to
16 gain the information that I desired I knew that there were
17 various points involved in spent fuel management at plants.18 I felt since I was developing some information I
19 should develop a reasonable, coherent grouping of information.
20 And I was also aware that when you talk to people over the
21 telephone and you wish to elicit their unbiased judgments, you
22 should begin by asking them questions not directly relevant
23 to something which might upset them. So that's a very routine
24 question.

25 Q That sounds like a routine course of action.

POOR ORIGINAL
446 330

574 322

wb11

1 A It's a routine question that people are used to
2 answering in a lockstep manner.

3 Q Now the second line, "How much capacity in the
4 spent fuel pool?" Would your answer be the same if I asked
5 you the same question?

6 A Yes.

7 Q And the same for the third line?

8 A Yes.

9 Q The same for the fourth line?

3.485

10 A "When is the next discharge?"

11 Q Yes.

12 A Yes.

13 Q The same with the fifth line?

14 A Yes.

15 Q The same for the sixth line?

16 A Now we're getting into an interesting point.

17 Q Why did you ask that question?

18 A Because I was investigating the factual basis of
19 the Department of Energy's fact sheet that we've already
20 identified.

21 Q That's the February document?

22 A That's the fact sheet that's headed as Figure 1
23 in NRDC Staff Exhibit 13-C.

24 Q 13-C. Bear with me now:--

25 CHAIRMAN HILLER: Wait a minute. Let's find 13-C.

446 331

574 323

wbl2

1 All right. I have it.

2 BY MR. MC GARRY:

3 Q 13-C.

4 A (Witness Rotow) I wanted to check the truth of
5 this. As you can see, at the bottom it says "This is based
6 on minimum present planning case. It assumes: (a) utilities
7 can carry out latest expansion plans; (b) intra-utility
8 shipments are possible; and (c) 70 percent capacity factors."

9 So therefore I wanted to know what are the
10 expansion plans, and I just happened to phrase it as "future
11 expansion plans."

12 But I should emphasize that I didn't simply go
13 down this in a lockstep manner.

14 Q We'll go through it.

15 A Okay, we'll go through it.

16 Q -- step-by-step.

17 In Figure 1 to NRDC Exhibit 13-C you made refer-
18 ence to a footnote.

19 A Yes, sir.

20 Q And Category A of that footnote says, "Utilities
21 can carry out latest expansion plans." And your question
22 states, "What are future expansion plans?"

23 Why didn't you ask: What are the latest expansion
24 plans?

25 A Well I thought that was a better way of phrasing it.

446 332

574 324

wb13

1 Q Do you know what DOE meant by "latest expansion
2 plans?"

3 A They've told me what they meant, but they've
4 contradicted themselves so many times that, no, I don't know
5 what they mean by it. And I don't think they know what they
6 mean by it.

7 Q What did you mean by "future expansion plans?"

8 A I meant what expansion of spent fuel storage
9 capacity will they undertake in the future that has not already
10 been done.

11 Q How about that under construction?

12 A That would have occurred in the course of the
13 conversation.

14 Q Would that have occurred-- Where would that have
15 occurred in the course of the conversation?

16 A That would have occurred in my interrogation of
17 the person to whom I was speaking.

18 Q Under what category?

19 A Under that category, under "What will utility
20 do if no government AFR is available? What are the utility's
21 plans vis-a-vis juggling? How much space is filled at
22 present? How much capacity in spent fuel pool?"

23 If the capacity were changing at the time then
24 various people would tell me, Well we started out with such-
25 and-such capacity and, as a result of the on-going rerack, we

446-333

574 325

wb14

1 will have such-and-such capacity.

2 Q But you didn't ask them that specific question,
3 did you?

4 A What are you asking me? Which specific question?

5 Q You didn't ask the specific question of whether
6 they had spent fuel pool modifications on-going?

7 A Oh, yes.

8 Q It's not contained here in your survey, is it?

9 A It doesn't appear to be, no.

10 This survey was a guide, not an exclusive state-
11 ment.

12 Q Well, to be precise, let's go through the questions
13 that you asked. I was under the impression that these were
14 the specific questions you asked.

15 Are you now stating that you asked additional
16 questions?

17 A If you want me to be precise: I did say I asked
18 these questions; I did not say I asked these questions to the
19 exclusion of all others.

20 Q All right.

21 Did you ask additional questions related to the
22 first category, "How many assemblies in a full core?"

23 A Yes, in general. Of course. In the ordinary
24 dialogue one would expect. I did it bang-bang-bang. I asked
25 them this-this-this.

446 334

574 326

wb15

1 Q Let's get right down to it. I'm talking about
2 substantive questions.

3 A Yes.

4 Q Not the polite conversational questions.

5 A There's no difference in this matter.

6 Q Well, then, let's go through the polite conversa-
7 tion.

8 A Is the reactor a boiling water reactor or a
9 pressurized water reactor? It makes a difference.

10 If someone would tell me -- if I asked "How many
11 assemblies do you have in a full core?" and they say something
12 like 121, there's a difference between how many assemblies
13 in a full core -- well, 560.

14 Q Mr. Rotow, let's be clear. I want to know exactly
15 the questions you asked. I don't want at some point later
16 in time to have the statement made: Well I meant to say this.
17 Or, I asked this question but I didn't convey this to the
18 record.

19 I want to know the questions you asked, the sub-
20 stantive questions. I don't want, as I said, the polite
21 conversational questions. If they are one and the same, let's
22 go through it.

23 A They're one and the same.

3C fls

574 327

~~446 335~~

25

WRB

30 ebl

1 Q Let's go through them.

2 A I did not keep a detailed tape regarding of every
3 dialogue that I held, and it should be emphasize that eliciting
4 information from an expert is a dialogue. It's a very
5 interactive thing.

6 I used this as a guide just to make sure that I
7 at least asked these questions of every person that I talked
8 to.

9 Q I want to know what other substantive questions
10 you asked.

11 MR. ROISMAN: Mr. Chairman, I believe the wit-
12 ness has said that he cannot recount every single question
13 that he asked.

14 CHAIRMAN MILLER: Well, he has so indicated.

15 WITNESS ROTOW: I think I can --

16 CHAIRMAN MILLER: However, can you give us your
17 best memory of the substance of the questions that were asked
18 in these interviews, without limitation as to whether or not--

19 WITNESS ROTOW: I could go through my notes for
20 each particular entry and we can do that.

21 CHAIRMAN MILLER: It will be tedious but-- Do you
22 have notes for each one?

23 WITNESS ROTOW: Yes, I do.

24 CHAIRMAN MILLER: Do you want to pick one?

25 WITNESS ROTOW: How about Maine Yankee?

POOR ORIGINAL

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574 328

eb2

1 CHAIRMAN MILLER: You're volunteering now. I
2 told you, answer the questions, period.

c4

3 BY MR. MC GARRY:

4 Q Would it be safe to conclude that the questions
5 set forth in the Survey of Utilities' Spent Fuel Managers
6 comprise the scope of your inquiry?

7 A (Witness Rotow) It depends on what you mean by
8 "safe." I think it's an accurate reflection of the tone.

9 CHAIRMAN MILLER: You were asked about scope and
10 not tone. Now what is your answer?

11 WITNESS ROTOW: No, it would not be safe to so
12 conclude.

13 BY MR. MC GARRY:

14 Q What future expansion plans were you interested
15 in ascertaining?

16 A (Witness Rotow) I was interested in ascertaining
17 more than just future expansion plans. It depends on what
18 you mean by "future expansion plans." I'll tell you what I
19 mean by "future expansion plans." Okay? So we understand
20 each other?

21 Q That will be fine.

22 A I was interested in what the state of spent fuel
23 storage capacity was at each reactor now, what it has been in
24 the past points, and what it would be in the future. In par-
25 ticular I most interested in if the utility had done any

POOR ORIGINAL

~~446~~ 337

574 329

eb3

1 contingency planning in dealing with the spent nuclear fuel
2 in the event that no government AFR were given to it, or
3 that it had no place other than its own site to deal with
4 spent fuel.

5 Q Can you give me the last part again? I'm sorry.
6 You were going so fast. The last part about the AFR?

7 A I was most interested in contingency plans the
8 utilities might have had in the event that no government
9 away-from-reactor storage facilities would be forthcoming.

10 Q Now can you define the term "contingency" for me?
11 What do you mean by that as you just used it?

12 A In the present context it's something along the
13 lines of well, what are your future expansion plans and what
14 will you do to maintain full-core reserve, or what will you
15 do if no government AFR is available; that sort of questional
16 context.

17 People told me well, you know, if the government
18 AFR is made available to us we'll look at exactly what the
19 service charge is. We don't know what those folks at DCE
20 or NRC are doing. It's very uncertain. But if they offer us
21 a fee we'll assess it. If it's cheaper to rerack on site
22 we'll rerack on site. If it is cheaper to build an interim
23 storage facility at one of our sites, we'll do that. If no
24 AFR is forthcoming, well, then, I guess we'll have to either
25 transship to such-and-such a site or we'll have to build it,

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POOR ORIGINAL

574 350

eb4

1 rarrack on site or we'll have to build an entirely new spent
2 fuel storage po

3 People gave me a wide variety of answers, most
4 of which said Well, we don't worry about full-core reserve
5 because we're already in the process of rarracking on site
6 so we think we can handle our own waste right here.

7 Q Now the contingency plans that we are discussing
8 or that you were discussing --

9 A That I mentioned.

10 Q -- where the various people that you had con-
11 versations with in the survey --

12 A What they believed the utility's planning was.

13 Q Excuse me?

14 A What they believed the utility's planning was.
15 I didn't ask them how do you personally feel about this, I
16 asked them in the context of what is your organization planning
17 to do.

18 Q Fine.

19 Did you get a sense of the commitment of the
20 utility to these various contingency plans?

21 A I think I did in some cases. In some cases it
22 was difficult to tell. I generally made note of that in my
23 personal notes.

24 Q How did you determine when you got a firm response
25 and when you got a wishy-washy response?

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POOR ORIGINAL

574 331

eb5

1 A Well, if somebody said Hell, we don't worry about
2 FCR, we have a petition in at NRC to expand our spent fuel
3 storage pool, then I would say it's a firm commitment.

4 If they say something, as in the case of Rancho
5 Seco, well, we know it's technically no problem to expand
6 our onsite spent fuel storage capacity, however we're very
7 worried about political intervenors, then I say the commit-
8 ment is less clear.

9 But if they tell me that in the absence of a
10 federal AFR we will definitely do this, we have no choice,
11 I'd say that's a strong commitment.

12 Q Do you know-- Strike that.

13 So we can put this in context, what future
14 expansions were utilities referring to? What sorts of alter-
15 natives? Can you give me a range?

16 A Let me give you an example. Maine Yankee has
17 a petition in before NRC to expand its spent fuel storage
18 capacity utilizing the technique known as pin-packing densi-
19 fication.

20 Q So pin-packing is one.

21 A Use of neutron absorbing racks, reracking with
22 Boral racks, reracking with stainless steel at higher density
23 racks; the normal, using more, better, more refined codes
24 for criticality calculations.

25 Q Independent spent fuel storage facilities?

446-340
574 352

2b6

1 A Those were mentioned at times, yes.

2 Q Would that embrace the future expansion plans,
3 those four options?

4 A Well, no, I don't think that's necessarily
5 true. Some people mentioned transshipment as a possible
6 option.

7 Q Fine.

8 With that addition, does that embrace the alter-
9 native plans that you discussed with the various people?

10 A Short of not starting up, yes. Some of the
11 reactors-- Five of the reactors on the list were actually in
12 fact not operational.

13 Some people expressed sentiments like Well, if
14 we ever get going again.

15 Q Did you ask them if that was their future ex-
16 pansion plan?

17 A No.-- Well, expansion of the spent fuel storage
18 capacity.

19 CHAIRMAN MILLER: Now you've answered.

20 BY MR. MC GARRY:

21 Q I'm just trying to find out some things,
22 Mr. Rotow.

23 A (Witness Rotow) It's getting confusing, but I'll
24 answer as best I can.

25 Q Now I take it you inquired as to, for want of a

574 333

446 341
POOR ORIGINAL

eb7

1 better term, the thought process of each utility with res-
2 spect to these alternatives. Is that correct?

3 A Not thought process. I never used that term.

4 Q Did you inquire as to each one of these alter-
5 natives in each conversation that you had?

6 A Yes, I tried to.

7 Q Let me just ask my question--

8 A Yes, I did. Let me just make that clear. Yes,
9 I did.

10 Q In other words, under "What are future expansion
11 plans," in your mind there was a category A, B, C, D, E, and
12 that would embrace high density racks, thin storage, ISFS,
13 those categories?

14 A I don't think like that, no.

15 Q But you did ask those questions under the cate-
16 gory; is that correct?

17 A Well, you're asking me if in my mind do I
18 characterize things that way.

19 CHAIRMAN MILLER: No, you're a question behind.
20 Is that what you asked or not?

21 WITNESS TOTOW: We talked explicitly about all
22 those options that we mentioned, yes.

23 MR. MC GARRY: Thank you.

24 BY MR. MC GARRY:

25 Q In each case?

574 334
~~446 342~~

eb8

1 A (Witness Rotow) In each case.

2 Q And I imagine you elicited a response with res-
3 pect to each one of those inquiries. Is that correct? In
4 other words they'd say Yes, we're going to do this, No, we're
5 not going to do this, this looks marginal?

6 Is that correct?

7 A Yes, I think that's fair.

8 Q Did you identify yourself during these conversa-
9 tions as a DOE consultant?

10 A Yes, at times. I was very rarely asked that.

11 Q Did you ever mention your affiliation as a
12 consultant with NRDC?

13 A No. No one asked.

14 CHAIRMAN MILLER: Your answer is No then; is
15 that right?

16 WITNESS ROTOW: No.

17 BY MR. MC GARRY:

18 Q Was there any reason why you did not?

19 A (Witness Rotow) Yes, because no one asked.

20 Q Did anybody inquire as to DOE's interest in this
21 matter?

22 A Yes, they did. Generally when I would call I
23 would identify myself. I would say, "I'm calling from
24 Washington. I'm doing a survey for the Department of Energy."
25 People at times have asked well, what does this

446-343
574 335

eb9

1 survey have to do with the survey we just answered from the
2 Subcommittee or the survey that NRC just sent us, or the one
3 that the General Accounting Office just sent us?

4 And at times I would say when people asked me
5 this, "Well, there's a fact sheet that's been issued with
6 reference to information. I'm checking it out."

7 The very first reactor I called, the utility
8 was the Susquehanna 1, where the public relations staff was
9 extremely incensed to discovery that the Department of Energy
10 was saying their reactor was running out of FCR I believe in
11 1983 when in fact it could run past 1994.

12 And so I would explain to people, you know, that
13 I'm checking this fact sheet for accuracy, and giving them
14 the example of the Susquehanna 1 and saying, "The folks there
15 were very incensed to find out this was the case."

16 And almost invariably the other party would
17 say, "Yes, I'd be pretty mad about that, too."

18 Q Now with respect to these alternatives that you
19 discussed, did you get a sense from the person whom you were
20 discussing the matter with as to the relative commitment on
21 a scale of one to ten of the utility to the specific alter-
22 native?

23 A I don't think you could characterize it as being
24 on a scale of from one to ten. I did get a sense of the
25 relative commitment.

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574 336

eb10

1 Q Can you explain to me how you got that sense?

2 A Yes.

3 As I explained earlier, if the utility told me
4 Yes, we are reracking and we have a petition in at NRC to
5 rerack, that's one way of telling you that they have a strong
6 commitment.

7 Q Now take me to the next one.

8 A The next step is going to be more difficult.

9 If I was told by an authoritative person at the
10 utility -- and by "authoritative" I mean someone whom I be-
11 lieved was authoritative because in the space of 15 minutes,
12 through several different sources in a large organization,
13 the consensus is that this man holds the hot seat for decision-
14 making in this regard.

15 If he tells me that if the Department of Energy
16 does not give us an AFR or we're not trusting the Department
17 of Energy and their AFR plan, we're reracking, then that seems
18 to be a commitment that's less strong than actually having a
19 petition in with NRC.

20 Q Did you ask this person if he or she-- Strike
21 that -- if the utility had designs on the drawing board?

22 A Designs? Whether they had gone out for bids?

23 Q Bids. Had they received bids?

24 A Had they received bids; that type of thing. It
25 was part of the conversation.

446-345
574 337

b11

1 Q Had they issued--- Had they entered into a con-
2 tract?

3 A I don't recall ever asking them, had they
4 actually entered into a contract, no.

5 Q Tell me how far you walked it down the chain,
6 went out for bids? Where did you start? What was your first?

7 A I believe in one case-- You see, you're looking
8 at many different alternatives when you have a very small
9 sample and most of the people, by the time you reach this
10 level, had already been excluded by virtue of something higher
11 up.

12 In other words, there were five people that al-
13 ready had proposals in at NRC, so now we --

14 Q Well, let's start with the number of samples.
15 T sample was 19?

16 A Correct. Actually --

140

17 CHAIRMAN MILLER: Wait until we get the question
18 completed before you start. The Reporter can't catch it if
19 both of you are talking.

20 BY MR. MC GARRY:

21 Q The sample was 19; is that correct?

22 A (Witness Rotow) No.

23 Q What was the sample?

24 A 22 reactors.

25 Q Did you contact all 22?

~~446-346~~

574 338

eb12

1 A They were at 19 different geographic sites, some
2 of which were --

3 Q Did you contact all 22, yes or no?

4 A 22 what? Reactors?

5 CHAIRMAN MILLER: Whatever you said, 22.

6 WITNESS ROTOW: Yes, I did.

7 BY MR. MC GARRY:

8 Q So we're clear: When you say 22, what does 22
9 mean?

10 A (Witness Rotow) I'm saying that's the physical
11 number of reactors which were distributed among 19 different --
12 actually, less than 19, 17 different sites. And I don't
13 recall exactly what the cross-section was of the number of
14 utilities.

15 Some, for example Brunswick 1 and Brunswick 2,
16 have two different entries and they're at the same site and
17 they belong to the same utility.

18 Q So there were 22 plants, and how many utilities?

19 A I believe 17 different utilities.

20 Q You contacted each one of these utilities?

21 A Yes.

22 Q The first one I see here is Oconee 1, 2 and 3.

23 A Right.

24 Q That's Duke Power Company, isn't it?

25 A No.

446-347

574 339

ab13

Q Did you contact Duke Power Company?

A No. I said that earlier.

Q Well, I'm asking you now.

MR. ROESMAN: Mr. Chairman, I'm not going to let him keep asking questions that were asked before, and I don't like Mr. McGarry's tone, which won't be reflected in the record. He sounds like he's getting snotty with the witness and I'm getting a little tired of it.

If he's going to get snotty he'd better be pretty good with the questions or this record is going to be full of objections. I've been pretty lenient sitting here, but he's asking him a lot of questions he asked him just less than an hour ago.

MR. MC GARRY: Mr. Chairman, ---

CHAIRMAN MILLER: Let's everybody calm down now.

The witness, however, is giving several different answers. If he counts up in his head he gets 22, 17, 19, and then he gives me a footnote, so I'm going to ask the witness now, just calm down, don't start talking until the question is finished and until you know what the final answer is going to be, the bottom line.

And Mr. McGarry, try to keep yours so they can be answered in that fashion, so we do keep on the same wavelength.

Now what's the pending question?

574 300

446-348

b14

BY MR. MC GARRY:

Q Let's start from the beginning, Mr. Rotow.

A (Witness Rotow) Yes.

Q I'm looking at Figure 1, --

A Yes.

Q -- which is attached to NRDC Exhibit 13-C. Is that correct?

A Correct.

Q It lists 22 reactors. Is that correct?

A No.

Q How many reactors does it list?

A There are 27 reactors. You asked me how many reactors --

CHAIRMAN MILLER: Just a minute now. How many reactors are on the sheet?

WITNESS ROTOW: 27 reactors, sir.

CHAIRMAN MILLER: Have you counted them?

WITNESS ROTOW: I've counted them.

CHAIRMAN MILLER: 27 is the answer.

BY MR. MC GARRY:

Q Now how many utilities are associated with those 27 reactors?

CHAIRMAN MILLER: Now look through and give us the number of utilities. It will be the number after you've looked through it and thought about it.

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574 341

eb15

MR. FRIEDMAN: While the witness is looking, can the Board advise us of what its plans are (a), with respect to dinner, and (b), with respect to an evening session to-night?

CHAIRMAN MILLER: I told you previously that we wouldn't have an evening session, which is the only reason we are not.

We will have an evening session tomorrow, Wednesday and Thursday, unless our count shows us that we're within a pace that we're not now.

This evening's session will run, oh, probably until a quarter to seven, seven, something like that. We will then recess for the evening.

Tomorrow, however, all of you make your plans for an evening session because we are going to provide enough time for examination of all the witnesses.

WITNESS ROTOW: 16 utilities.

3c1

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574-312

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BY MR. MC GARRY:

Q Did you contact all 16 utilities?

A (Witness Rotow) As I said before --

CHAIRMAN MILLER: You can say yes or no.

WITNESS ROTOW: No.

BY MR. MC GARRY:

Q Which ones didn't you contact?

A (Witness Rotow) Duke Power Company.

Q You contacted the remainder, is that correct?

A Yes.

Q 14 is the number we're working with, is that correct?

MR. ROISMAN: Objection.

CHAIRMAN MILLER: Sustained.

BY MR. MC GARRY:

Q Now when you contacted these 14 utilities --

A (Witness Rotow) I never said I contacted 14 utilities.

CHAIRMAN MILLER: You didn't wait until he finished the answer, and there was no objection either.

BY MR. MC GARRY:

Q So I'm clear, you contacted 16 utilities, is that correct?

A (Witness Rotow) No, that's incorrect.

Q I'm sorry, I'm just trying to get a -- will you

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574 343

WRB/agh2

tell me the number, sorry.

CHAIRMAN MILLER: 16 minus one I assume is 15.

WITNESS ROTOW: Mr. Chairman, I can summarize this very quickly.

CHAIRMAN MILLER: Did you contact 16 or did you contact 16 utilities involved minus Duke, which would make it 15?

WITNESS ROTOW: I contacted 15, sir.

CHAIRMAN MILLER: It's simple. 16 minus one is 15. That was the basis of the objection. That's why I sustained it.

MR. MC GARRY: I'm not trying to be snide, I'm just simply trying to find the blasted number. 15 were contacted. Okay, let's go.

BY MR. MC GARRY:

Q With respect to the 15 utilities that you contacted, 10 or 15 minutes ago, when we started into this, I believe you indicated that some of these utilities, based upon the response that they gave to you, eliminated themselves from further inquiry as to alternatives, is that correct?

A (Witness Rotow) No, I didn't exactly say that.

CHAIRMAN MILLER: Well what are the facts.

WITNESS ROTOW: I said --

CHAIRMAN MILLER: Did any of them or not, eliminate themselves?

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574 344

WITNESS ROTOW: I said that beyond a certain point I didn't ask them about bids and the exact contractual status of their future expansion plans, not alternatives.

CHAIRMAN MILLER: Whatever.

BY MR. MC GARRY:

Q How many of those utilities fall in that category?

MR. ROISMAN: Objection, that question is not comprehensible. "Those utilities" and "that category" in the context of the last 15 minutes of cross-examination is gibberish.

CHAIRMAN MILLER: Sustained.

MR. TOURTELLOTTE: Mr. Chairman, I understood the question.

MR. ROISMAN: Good, maybe you'd like to answer it.

MR. TOURTELLOTTE: I don't have to answer it, but I'm certainly interested in the answer.

It seems to me that what went on was he was asked how many of those 15 utilities that remained did he treat in the manner that he just got through describing.

CHAIRMAN MILLER: I'm not sure whether that's what he was asked or not. The indefinite pronoun "it," and then the context in which it came it, it will only lead to problems. It can be restated with clarity.

BY MR. MC GARRY:

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574 345

wrb/agb4

Q Did you ask each of the 15 utilities whether or not they had future expansion plans?

A (Witness Rotow) Yes, I did.

Q Did you ask each of the 15 utilities whether or not they intended to rerack their spent fuel pools with high density racks?

A No, I didn't.

Q How many did you ask, how many of the utilities that you contacted did you ask if they were going to utilize high density racks.

A I'll have to go through my notes.

Q Could you?

A Sure.

MR. ROISMAN: Mr. Chairman, maybe it would be easier -- he'll have to go through his notes a lot of times -- if Mr. McGarry would indicate all of that kind of information that he wants. The witness can make a note of it, and he can provide him with the answer.

CHAIRMAN MILLER: There is a possibility, Mr. McGarry, are you going to go through each one of the 15 utilities?

MR. MC GARRY: Each one of the 15 utilities and each of the options that he made inquiry into.

WITNESS ROTOW: It might be faster if I just covered each utility and described the interplay at each one

446 ~~354~~ 346
514

qgb5

specifically.

CHAIRMAN MILLER: Just answer the question.

MR. MC GARRY: Perhaps we couldn't take a short recess and we could --

MR. ROISMAN: I would suggest the witness provide it in the morning rather than have to calculate it on a short recess. I would like the record -- we may not have any more -- I would rather not have any short recesses and finish then at 7:00 tonight. He's got the notes.

CHAIRMAN MILLER: If it's convenient to Mr. McGarry, he's the interrogator, to have the witness do it overnight or in the morning, if not, we'll do it now, you have your choice.

Which do you choose, Mr. McGarry?

MR. MC GARRY: Can you give us one minute to decide?

CHAIRMAN MILLER: Okay.

MR. MC GARRY: If I say yes, I'll wait, then I'm wondering as to the next line.

CHAIRMAN MILLER: You can think about it.

(Pause.)

~~446 355~~

574 347

WFB/wbl
cass.
Pls 3C

1 MR. MC GARRY: Mr. Chairman, if I can just defer
2 for a moment, my cross-examination may very well lead us to
3 each of the surveys that he conducted. If it doesn't, I
4 would like that information. And if he could furnish it
5 tomorrow morning that would be fine.

6 CHAIRMAN MILLER: We'll defer the ruling at the
7 moment. We will await the outcome of the examination.

8 Proceed.

9 BY MR. MC GARRY:

10 Q Now let's move to the next category; that is,
11 "What is utility's position with respect to FCR capability?"
12 Full core reserve; is that what you mean?

13 A (Witness Rotow) That's what I mean.

14 Q What was the question that you asked them in
15 this regard? --the basic question.

16 A What is your utility's position with respect to
17 full core capability?

18 Q And you were attempting, then, to ascertain
19 whether or not they will run with a full core reserve; is that
20 correct? And, when I say "run," I mean operate.

21 A Without a full core reserve, yes.

22 Q What do you mean in the second line, will run
23 "until full, then will shut down?"

24 A Which second line?

25 Q I'm sorry.

446-356

574 348

WEB/wb2

1 CHAIRMAN MILLER: Withdrawn?

2 MR. MC GARRY: Withdrawn, please.

3 BY MR. MC GARRY:

4 Q Mr. Rotow, with respect to your next category:
5 that is, "What will utility do if no government AFR is
6 available?"

7 A (Witness Rotow) Yes.

8 Q Did you put that into a time when you discussed
9 this matter with the fifteen utilities?

10 A Do you mean did I ask: what will you do if no
11 governm. at AFR is--

12 CHAIRMAN MILLER: No. What did you do with
13 reference to time?

14 WITNESS ROTOW: I didn't designate any particular
15 time period, no.

16 BY MR. MC GARRY:

17 Q Now the next category, "What are utility's plans?
18 West Valley? Barnwell? Morris?"

19 Were you inquiring there as to private away from
20 reactor storage?

21 A (Witness Rotow) In general, yes.

22 Q "Juggling?"

23 A Transshipment.

24 Q Now, as a result of compiling the responses to
25 your survey, what use did you make of those results?

446 357

574 349

wb3

1 A Which results? All of them?

2 Q The results of your survey.

3 A All of them?

4 CHAIRMAN MILLER: Well,-- Go ahead. What did you
5 do, if anything?

6 BY MR. MC GARRY:

7 Q What use did you make of the survey?

8 A (Witness Rotow) I condensed them into the chart
9 shown on -- attached at Table 1 to NRDC Exhibit 13-C, and in
10 an earlier paper as well, the predecessor document.

11 Q And that result would be embodied under the
12 column identified as "NRDC Survey," with a Footnote 1; is
13 that correct?

14 A As well as DCE assumption and NRDC survey with
15 Footnote 4, plus the attached footnotes on the following page.

16 Q Now, looking at Footnote 1, that footnote reads,
17 "Assumes no shipment between reactors owned by the same
18 utility." Is that correct?

19 A That's what it says, yes.

20 Q Did you assume shipment between reactors owned
21 by another utility?

22 A No.

23 Q Now can you explain to me the last column, the
24 column on the far righthand side of Table 1, which is captioned
25 "DOE Assumption and NRDC Survey?"

A Yes.

574-350

~~446-358~~

1 MB/agbl

Q Would you please explain?

2 (lws wrb)

A Sure. You see the Department of Energy Fact Sheet,

3 Figure -, on the footnote there at the bottom says:

4 "...this is based on minimum prudent
5 planning case. It assumes (B) intra-utility
6 shipments are possible."
7

8 All right. Now as I explained it in the body of the
9 NRDC findings and then later on in the body of "No Need for
10 AFR's," NRDC in my awareness has different policy viewpoints
11 than the Department of Energy on transshipment.

12 Now we want to report the results of our survey
13 in as concise and clear a form as possible and also to
14 present them in a form that was directly comparable to that
15 utilized in the Department of Energy Fact Sheet, so I appended
16 a column there that indicated, if transshipment strategies
17 were available and made a difference in the loss of FCR
18 date, say by extending it, I included that date there in the
19 column just so it would be directly comparable with the
20 DOE assumptions to show that even in its own frame of reference
21 the DOE Fact Sheet was quite wrong.

22 Q Now going back to the column identified as
23 NRDC survey --

24 A Yes.

25 Q I notice you have a number -- Strike the question,
please.

PREMIUM

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1 For clarification, Mr. Rotow, I note on the far
2 left-hand side of Table 1 you identify the plants, and you
3 have -- the third plant is Brunswick 1, and you have informa-
4 tion for that. The fourth plant is Brunswick 2, you have
5 information for that.

6 A Yes.

7 Q And similarly, you have Diablo Canyon 1 in a
8 separate category and Diablo Canyon 2 in a separate category.

9 A That's correct.

10 Q You have Hatch 1 and 2 in the same category. Why
11 is that?

12 A Because that's the format that was used in the
13 Department of Energy Fact Sheet, appended as Figure 1 to
14 NRDC Exhibit 13-C.

15 Q Do you know why the Department of Energy treated
16 Hatch 1 and 2 as one category?

17 A No.

18 Q And you don't know why they created Brunswick 1
19 as a separate category and Brunswick 2 as a separate category?

20 A No.

21 (Pause.)

22 Q Mr. Rotow, going back to the fourth column on
23 Table 1 --

24 A The one under DOE Assumption in NRDC Survey?

25 Q That's right.

574 352

446 360

PREMIUM
mpo2

1 As I understand it -- not to belabor the point --
2 you assumed, in addition to your survey results, that there
3 would be intra-utility shipments, is that right?

4 A No, sir, that was the reporting of the utility,
5 it was not the results of the survey.

6 You see, there were many results of the survey,
7 and people at times would say -- in the cases of Brunswick 1,
8 Brunswick 2, Robinson 2 and Oyster Creek, that, well, 'If
9 we don't get a government RFR we will rerack and then we can
10 transship; we need to maintain FCR beyond the rerack date.'

11 And so by supplying that fourth column, I'm
12 supplying that breakdown that the people from the utilities
13 told me; that's not my analysis or conjecture.

14 Q I see.

15 And only Brunswick 1 and 2 and Oyster Creek told
16 you they would transship, is that correct?

17 A No, no. Only Brunswick 1 and 2, Robinson 2 and
18 Oyster Creek said the dates made a difference if they adopted
19 a transshipment strategy.

20 Some, for example, San Onofre --

21 Q Let me just try to get to this:

22 I understand that the DOE date column, you got
23 that from DOE.

24 A Their comments.

25 Q The DOE data column.

POOR ORIGINAL

PREMIUM
mpb3

1 A Yes, sir, that's from Figure 1.
2 Q And I understand your NRDC survey column. That's
3 a result of your survey, that's what you determined.
4 A Sort of the results, yes, sir.
5 Q I'm really simply having problems identifying
6 the reason why there's a fourth column. Tell me why Brunswick
7 1, which has under the NRDC survey column, has a date of
8 1987--and I take it that's the result of your survey--why,
9 then, is there an additional column which then would bear the
10 date 1992.
11 I don't understand.
12 CHAIRMAN MILLER: Can you explain that?
13 WITNESS ROTOW: Sure, I'll be happy to.
14 CHAIRMAN MILLER: Go right ahead.
15 WITNESS ROTOW: As a footnote to the column
16 marked NRDC survey it indicates:
17 "Assumes no shipments between reactors
18 owned by the same utility."
19 DOE assumptions and NRDC survey, the next column,
20 footnoted with 4, says:
21 "DOE assumes shipment from one reactor
22 site to another reactor site for several plants.
23 If this assumption is adequate, the data from
24 the NRDC survey at the time period prior to
25 loss of FCR is extended as shown."

POOR ORIGINAL

574 354

PREMIUM
mpb4

1 It might have been more clearly stated as saying
2 that when I spoke to the utilities' spent fuel managers
3 and they indicated to me that should they need to extend FCR
4 beyond that date available through onsite racks or onsite
5 management techniques utilizing transshipment and would in
6 fact utilize transshipment to extend that date, then the
7 date would be reflected in the fourth column there.

8 BY MR. MC GARRY:

9 Q That's what I thought.

10 A (Witness Rotow) Great.

11 Q I thought I had asked the question earlier --

12 A You did.

13 Q -- and that's why I pursued it.

14 I understood that the fourth column was related,
15 then, to an additional transshipment activity.

16 A Is that a question?

17 Q Is that correct?

18 A I'm not sure what your understanding of it was.

19 To summarize, the last two columns report the
20 results of the NRDC survey.

21 Q Fine. That's fine.

22 A Great.

23 Q Now, Mr. Rotow, looking at Table 1 --

24 A Yes, sir.

25 Q -- the column NRDC Survey

574 355

POOR ORIGINAL

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A Yes, sir.

Q -- were those dates, as well as the fourth column, were those dates the exact dates that the utilities that you contacted gave you?

A Yes, sir.

Q You didn't apply any judgment to information that you had obtained to derive these numbers?

A No, sir, I did no derivations. This is straight reporting.

Q Now let's just turn to one of the survey sheets.

A Yes, sir.

Q And let me ask --

MR. MC GARRY: Does the Board have the survey sheets?

CHAIRMAN MILLER: No, but we'll listen. Don't worry about it.

You're going to ask the witness to turn to his survey sheet?

MR. MC GARRY: That's correct, Mr. Chairman.

CHAIRMAN MILLER: Yes.

WITNESS ROTOW: Mr. Chairman, I have a copy.

CHAIRMAN MILLER: We have the form. Is that what you mean?

MR. MC GARRY: No. I'm going to turn now to a specific utility where the information was --

574 356

POOR ORIGINAL

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CHAIRMAN MILLER: No, we don't have it, but we don't need it. We'll follow you.

Which one do you want the witness to turn to.

MR. MC GARRY: Rancho Seco.

CHAIRMAN MILLER: Rancho Seco, please.

WITNESS ROTOW: Yes, sir.

BY MR. MC GARRY:

Q Now under the category captioned "What are Future Plans", please read into the record the information that you have on your survey sheet.

A (Witness Rotow) Okay.

"What are Future Expansion Plans?"

These are my personal notes, by the way, I should say.

"Have already reracked once to reach current figure, which maintains FCR through 1981" --

CHAIRMAN MILLER: Slower, slower.

WITNESS ROTOW: "If they rerack with poison racks (which Whitney says can be done with the rack system they're now using)"--

CHAIRMAN MILLER: Slowly.

WITNESS ROTOW: "...they would "at least double" capacity and could run with FCR into the "1990s". However"--

PREMIUM
mpb7

1 CHAIRMAN MILLER: Slow, slow. Remember we have
2 a Reporter who has to follow you.

3 WITNESS ROTOW: "However, the last
4 rerack caused a licensing fuss by local
5 groups and Whitney does not believe that
6 they could get through the license for
7 another rerack only as a result of the
8 activity of local intervener groups."

9 BY MR. MC GARRY:

10 Q Now based on that information, what did you
11 report on Table 1, NRDC Survey, with respect to Rancho Seco?

12 A (Witness Rotow) I reported 1992.

13 Q Now why did you report 1992?

14 A Because my handwritten notes --

15 CHAIRMAN MILLER: Slower.

16 WITNESS ROTOW: Because my handwritten notes
17 indicated that was the correct figure.

18 When somebody would ask me -- would give me a
19 figure like 'into the 1990s', I would ask 'Well, how far into
20 the 1990s, give me a figure.'

21 Q And that was the information, then, the figure
22 that you received that you placed on your NRDC Survey column.

23 A 1992, that's correct.

24 Rancho Seco was explored in detail in the testi-
25 mony.

574 358

PREMIUM
mpb6

Q That was the significant number, is that correct, the 1992 in this particular instance?

A I believe it is, yes.

Q And yet that significant number wasn't contained in the write-up that you have just read into the record, is that correct?

A That's correct, yes.

Q Well, wasn't it contained with that information if that was the significant number?

A It was contained in my personal notes.

I don't know what you're looking at there, but I can give you every scrap of paper that I ever produced. This particular typewritten distillation is my personal notes that you apparently are referring to. It is a very quickly written summary, typed summary, of handwritten notes which are -- how do you say it? -- illegible to anyone other than myself which I produced largely for the benefit of other researchers in this matter. It was not intended as the final determinant.

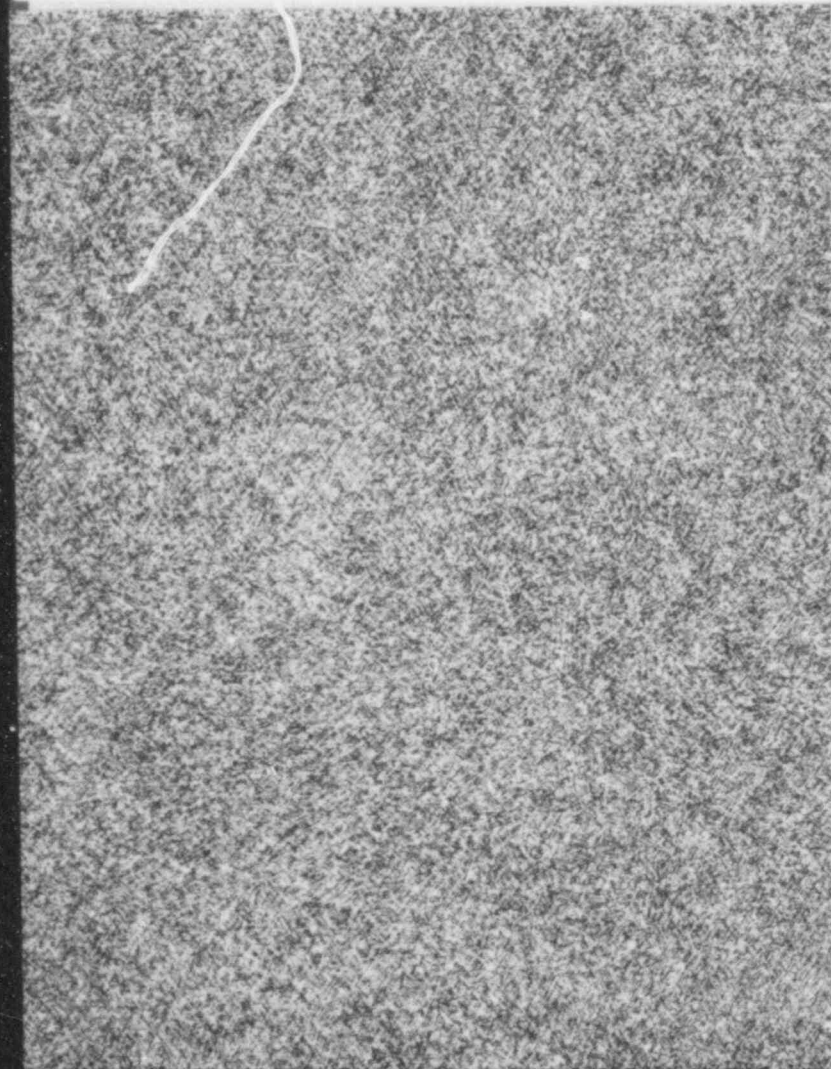
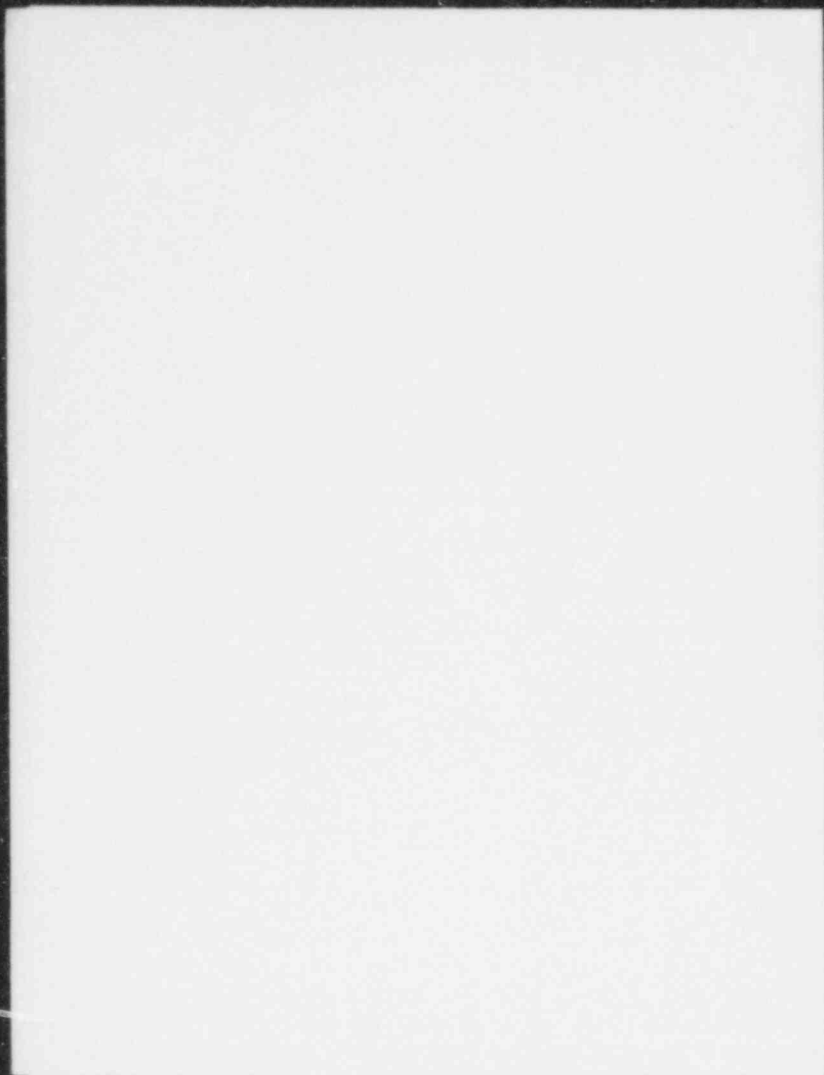
Q Shouldn't you have provided the significant data point in that document if other researchers were going to rely upon it?

A No.

Do you know what I mean by the researchers?

CHAIRMAN MILLER: Now you're volunteering.

WITNESS ROTOW: I'm sorry, sir.



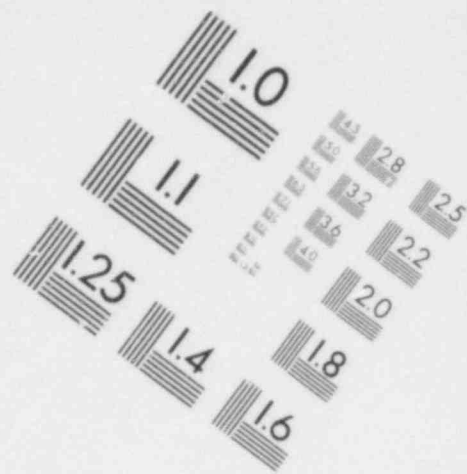
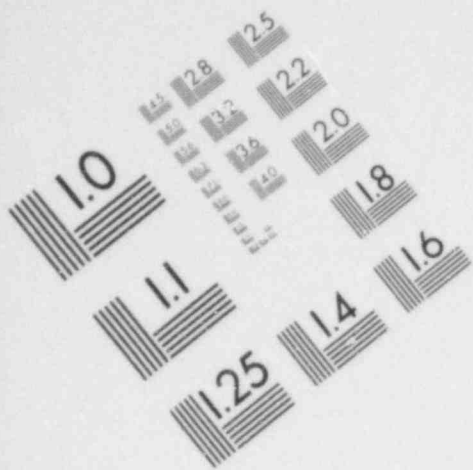
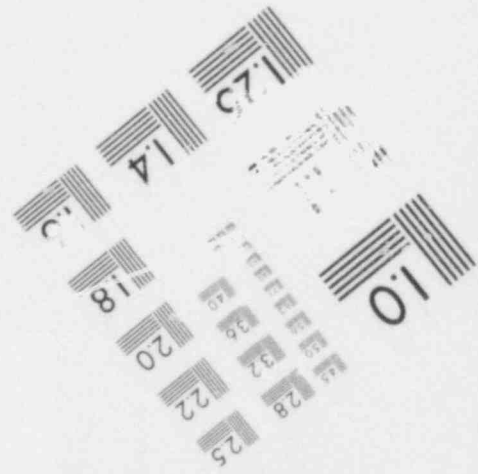
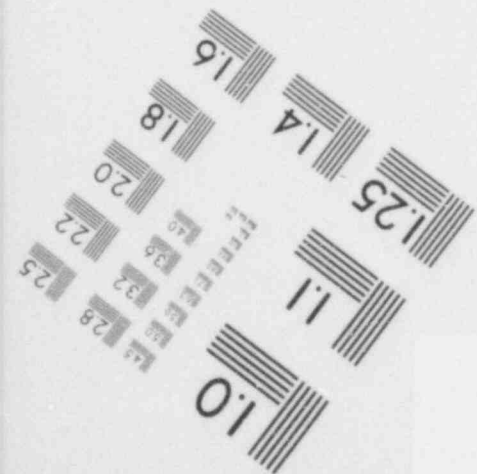
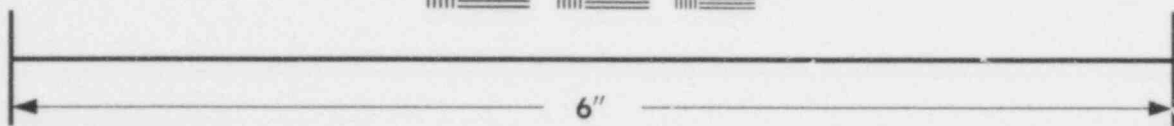


IMAGE EVALUATION
TEST TARGET (MT-3)



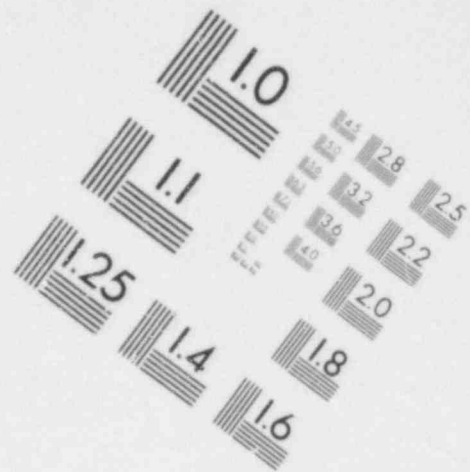
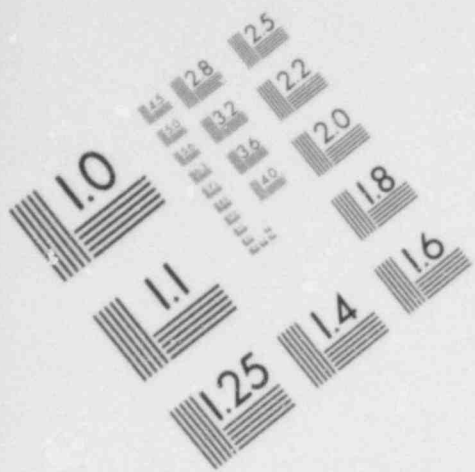
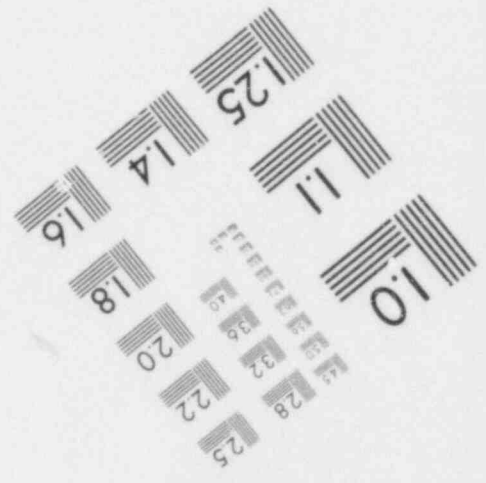
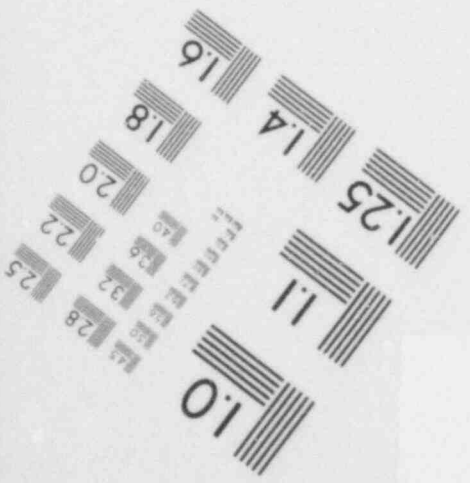
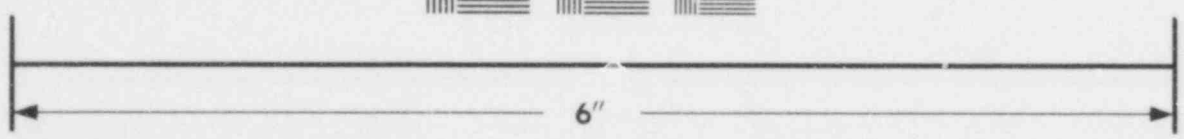


IMAGE EVALUATION
TEST TARGET (MT-3)



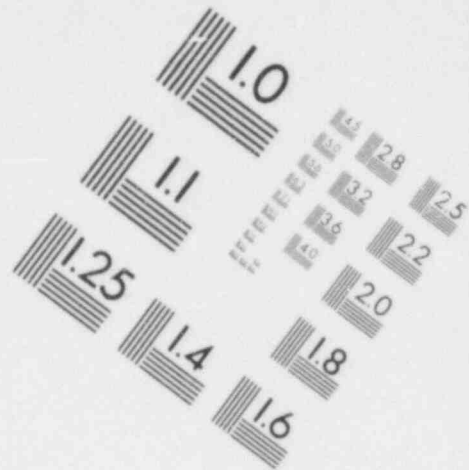
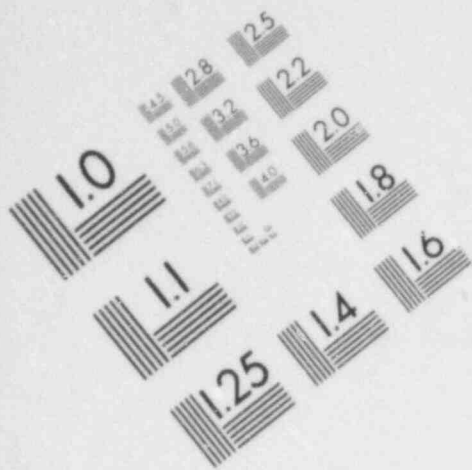
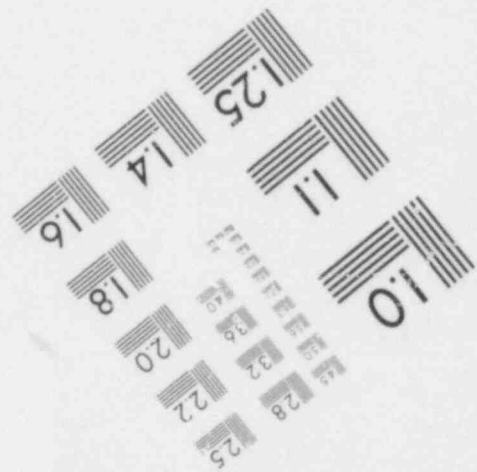
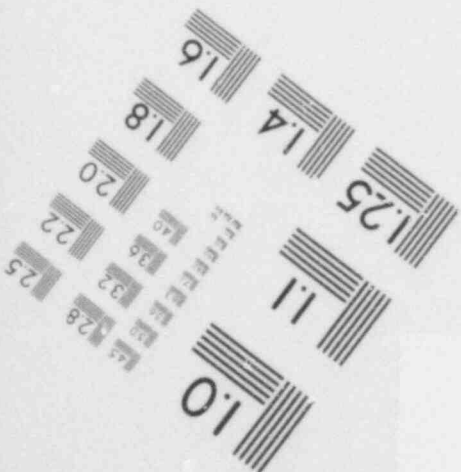
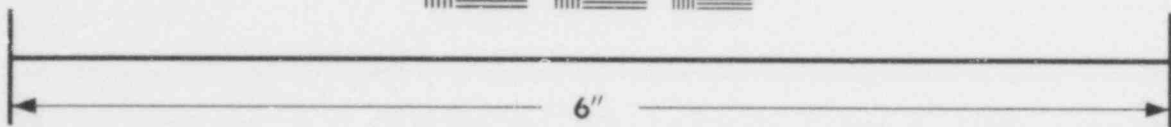


IMAGE EVALUATION
TEST TARGET (MT-3)



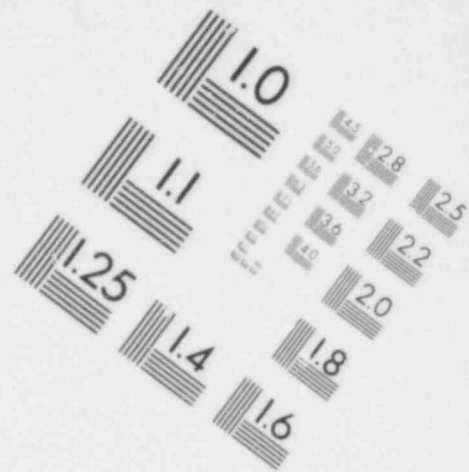
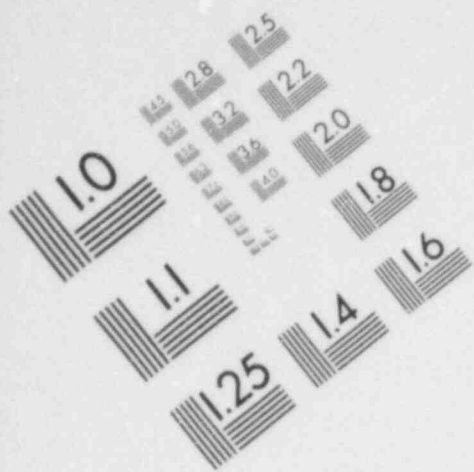
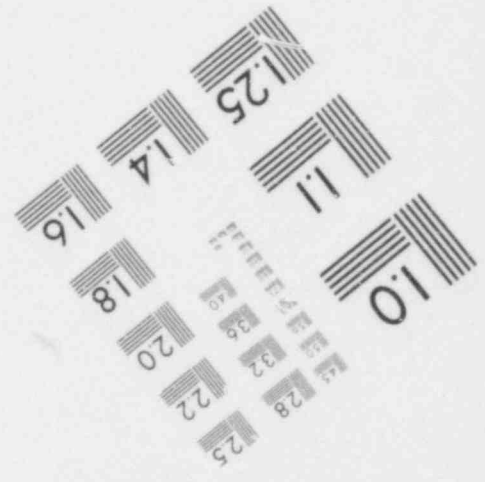
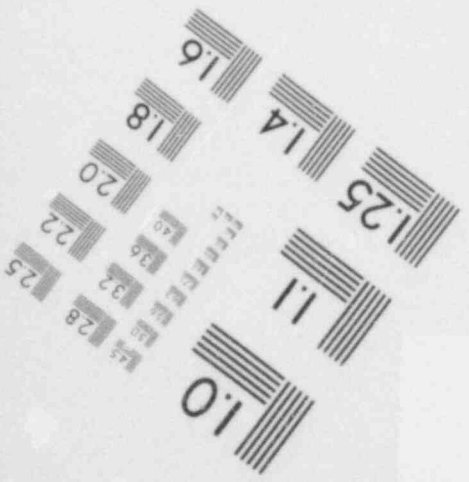
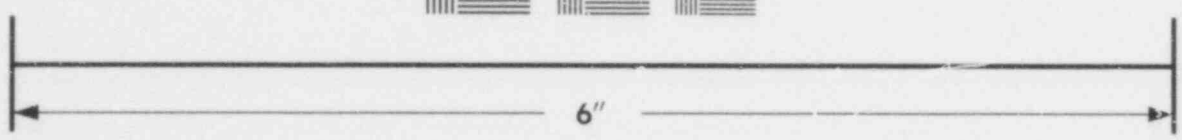


IMAGE EVALUATION
TEST TARGET (MT-3)



4B MADELON 1
c8 mpbl

BY MR. MC GARRY:

2 Q Now Bill staying with Rancho Seco, based on
3 the information that you have read into the record, didn't
4 the utility state that they didn't think they could rerack
5 because of the licensing climate?

6 A (Witness Rotow) That's something which I treated
7 in detail in 13-C, our exhibit.

8 CHAIRMAN MILLER: Would you please just answer
9 the question.

10 WITNESS ROTOW: Yes, they say that based on what
11 I read into the record.

12 BY MR. MC GARRY:

13 Q And they had told you that they could currently
14 only run up until 1985 with full core reserve, isn't that
15 correct?

16 A (Witness Rotow) They did not say they could "only"
17 they say that that's the capacity they have on line now.

18 Q And did that lead you to believe that they were
19 good up until 1987 with respect to spent fuel storage capabil-
20 ity, allowing for a full core reserve?

21 A No.

22 Q What did you think when they told you that?

23 A That told me that if they could get the licensing
24 by the intervenor groups they could be good until 1992.

25 Q But didn't they tell you -- You say right here:

PREMIUM

mpb2

1 "However, the last rerack caused a
2 licensing fuss by local groups, and Whitney
3 does not believe that they could get through
4 the license for another rerack."

5 A That's what it says on the document you're read-
6 ing.

7 Q And despite that information you assumed that
8 they would get it through the --

9 A No, sir, I didn't --

10 CHAIRMAN MILLER: Now wait a minute. He hasn't
11 finished the question.

12 Finish your question.

13 BY MR. MC GARRY:

14 Q You assumed that they would be able to license
15 another reracking application, is that correct?

16 A (Witness Rotow) No, sir, that's not true at all.

17 Q All right.

18 Focusing on Rancho Seco, based on the information
19 that you received, what did you determine to be the current
20 status of Rancho Seco's spent fuel discharge capability in
21 terms of how far in the future can they properly store fuel?

22 A Their plans or their current status?

23 Q Their current status.

24 A The current status, I would say that they're
25 good until 1985 with full core reserve.

575 002

PLWSmpb2

4901

1 Q Now you have the date 1992 in your Table 1,
2 is that correct?

3 A That's correct.

4 Q Now why did you jump from 1985 to 1992?

5 A Because on Figure 1, Department of Energy Fact
6 Sheet, Footnote A says:

7 "Note: This is based on minimum
8 prudent planning case. It assumes: (a)
9 utilities can carry out latest expansion
10 plans."

11 There are numerous intervention problems at all
12 of the reactors having to do with their fundamental operation.

13 If the Department of Energy, in its presentation
14 to Congress on the alleged need for AFR's indicated that it
15 would not be swayed by possible Intervenor activities in
16 the presentation of this data, if they assumed that they
17 could carry out their plans, I also assumed it.

18 This was a comparison against DOE's allegations,
19 not my conjecture as to what would happen in the future.
20 That's in the document --

21 Q Now following up on that, let's still stay with
22 Rancho Seco, would you please read into the record the
23 paragraph under your caption: "What Will Utility Do if
24 No Government AFR is Available."

25 A Yes. "They are now 'counting on' government

POOR ORIGINAL
575-005

MPB/agb2

1 action by 1985. Since they feel this is their only hope,
2 they are doing 'absolutely no planning.' They do not feel
3 that they could get the license for a reactor by the
4 Intervenors."

5 Q Now in light of that information, what was the
6 basis for you to assume that Rancho Seco would have storage
7 capability in 1992 in light of the fact that they say they
8 were doing absolutely no planning?

9 A All right. "Absolutely no planning," if you want
10 to take it in the context of these personal notes, which were
11 typed up largely for the use of Dave Berg of the Environmental
12 Policy Center --

13 CHAIRMAN MILLER: Now slow down, slow down.

14 WITNESS ROTOW: I used a different report from
15 my meaning of "planned" here. If someone tells me quite
16 clearly that he knows they could "at least double the capacity,
17 could run with FCR to the 1990's," and then picks quite
18 positively 1992, he's telling me there's no physical or
technical problems with expansion, they know that.

19 Now away-from-reactor storage has not been repre-
20 sented as a means for bypassing local citizen dissent and
21 bypassing the normal review process. If DOE assumes that this is
22 not going to stop them, then I assumed that exact same thing
23 in my presentation.

24 BY MR. MC GARRY:
25

JPE/agh

Q Now did you ask Rancho Seco whether or not they had actual designs for an additional spent fuel pool modification?

A (Witness Rotow) No, I didn't.

Have you read 13 --

CHAIRMAN MILLER: Now you're volunteering. Now just learn patience. Wait until you're asked, then answer it and stop.

WITNESS ROTOW: Yes,

(Pause.)

BY MR. MC GARRY:

Q Now with respect to Brunswick 1 and 2 --

MR. MC GARRY: Excuse me, Mr. Chairman, since we were talking about Rancho Seco, I'd like to have Rancho Seco "Survey of Utility Spent Fuel Managers," marked for identification as Applicant's Exhibit 16.

CHAIRMAN MILLER: All right. We'll have it marked.

(Whereupon, the document previously referred to was marked for identification as Applicant's Exhibit 16.)

MR. MC GARRY: Mr. Chairman, we'll provide the appropriate number of copies tomorrow.

575 005

CHAIRMAN MILLER: All right. Very well.

POOR ORIGINAL

MPB/agb4

BY MR. MC GARRY:

Q Now turning your attention, Mr. Rotow, to the Brunswick 1 and 2 write-up.

A (Witness Rotow) Yes.

Q And I'd like -- and Robinson 2, is that correct?

A What are you referring to?

Q Your write-up, "Detailed Notes re: Brunswick 1 and 2 and Robinson 2." Do you have that document?

CHAIRMAN MILLER: Is that contained in one document?

WITNESS ROTOW: Yes.

BY MR. MC GARRY:

Q And does that document comprise two pages?

A (Witness Rotow) Yes, it does.

MR. MC GARRY: Mr. Chairman, I'd like that document which is captioned, "Detailed Notes re: Brunswick 1 and 2 and Robinson 2," be marked for identification as Applicant's Exhibit 17.

CHAIRMAN MILLER: It may be marked.

(Whereupon, the document previously referred to was marked for identification as Applicant's Exhibit 17.)

MR. MC GARRY: Thank you, Mr. Chairman.

BY MR. MC GARRY:

575 006
POOR ORIGINAL

PREMIUM
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Q Now, Mr. Rotow, I notice that this write-up is in a different form from the form survey, as well as the Rancho loco survey, is that correct?

A (Witness Rotow) Pardon me?

Does it stem from the same questionnaire?

CHAIRMAN MILLER: No, a different form.

WITNESS ROTOW: It is written in a different form.

BY MR. MC GARRY:

Q I anticipated my next question.

This information did stem from the questionnaire, is that correct?

A (Witness Rotow) Yes, originally.

Q To help me, Mr. Rotow, can you please tell me where in this document the information concerning future planning begins?

A That's contained throughout the entire document.

Q I was afraid you were going to say that.

(Laughter.)

MR. MC GARRY: Mr. Chairman, if you would just bear with me a moment?

CHAIRMAN MILLER: Yes, take your time.

(Pause.)

BY MR. MC GARRY:

Q Mr. Rotow --

A (Witness Rotow) Yes.

575 007

POOR ORIGINAL

mpb2

Q -- looking at Table 1, the column captioned NRDC Survey, look at Brunswick 1. It has a date, 1987, and then another date in the next column, 1992.

A Yes.

Q Going down one line for Brunswick 2 under NRDC Survey, it has a date 1988, and then in the fourth column, 1992.

A Yes.

Q And then going down to Robinson 2, it has the date 1992 with a footnote 2, and I just ask you:

Directing your attention to Applicant's Exhibit 17 marked for identification, where in that document do you get the information that results in the 1987, 1992 date --

A Second page, last sentence.

CHAIRMAN MILLER: Would you read that, please?

WITNESS ROTOW: Yes, sir.

"If no transfer from Robinson occurs, B-1 plus B-2 get six years more for each reactor. Therefore B-1 FCR runs to 1987 and B-2 FCR to 1988."

MR. TOURTELLOTTE: Mr. Chairman, I don't want to interrupt the witness except that the record doesn't indicate that Mr. Roisman is up there talking to his witnesses and writing on paper while they're testifying.

MR. ROISMAN: I'm putting the Applicant exhibit

575 008

POOR ORIGINAL

mpb3

numbers on them.

CHAIRMAN MILLER: I think the numbers were being put on the papers.

You may proceed.

BY MR. MC GARRY:

Q Mr. Rotow, that information that you've just read into the record, is that information that you received from Carolina Power and Light Company?

A (Witness Rotow) Yes, it is.

Q I see many names here. Who gave you that?

A Mr. Bob Kunita, K-u-n-i-t-a. He's an assistant to Mr. Lou Martin, manager of the Nuclear Fuel Department.

MR. KETCHEN: Lou Martin?

WITNESS ROTOW: L-o-u M-a-r-t-i-n.

BY MR. MC GARRY:

Q Mr. Rotow, I'm curious. In the Brunswick document I see some handwritten notes.

A (Witness Rotow) Yes, sir.

Q I take it that's your handwriting, is that correct?

A Yes, it is.

Q And in the Rancho Seco document you make reference to handwritten notes, but we didn't see any handwritten notes.

A Where?

Q No, you made reference to your handwritten notes in the Rancho Seco document.

575 009
POOR ORIGINAL

mpb4

A Yes.

Q But I didn't see any handwritten notes on that document, is that correct?

A That's correct.

Q Why are there handwritten notes on the Brunswick document and not handwritten notes on the Rancho Seco document?

A Because I went and typed this as rapidly as I could to get them to Dave Barrick of the Environmental Policy Center. I'd look at some things after -- as you can see, it's a rough draft, a very rough draft, and there are some corrections and additions.

CHAIRMAN MILLER: Slower, slower.

WITNESS ROTOW: And there are some corrections and additions.

I'm not an expert typist.

BY MR. MC GARRY:

Q You're not so qualified.

(Laughter.)

What is Carolina Power and Light Company's present spent fuel storage capacity?

A (Witness Rotow) Present policy?

Q Let me strike that question and I'll rephrase it.

CHAIRMAN MILLER: All right, rephrase it.

BY MR. MC GARRY:

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FOUR ORIGINALS

PREMIUM
mpb5

Q At the time of your conversations with Mr. Kunita -- is that it?

A (Witness Rotow) Yes.

Q What was Carolina Power and Light Company's spent fuel storage capacity?

A They appear to be planning --

CHAIRMAN MILLER: No, what was the capacity.

BY MR. MC GARRY:

Q At that time?

A (Witness Rotow) Okay.

Let's see, for Robinson 2 they gave me -- they say there are two spent fuel pool that can hold 276 assemblies---

CHAIRMAN MILLER: Slow it down.

WITNESS ROTOW: -- can hold 276 assemblies, but they use 270 as a planning figure since a number of the slots are damaged, plus some space is used up on baskets, machinery, and other odds and ends.

They figured they could get the full 276 if they need it. B-1 and B-2 fuel ponds are modular assemblies, B-1 and B-2 referring to Brunswick 1 and 2.

The capacity for Robinson-type fuel is $38 \frac{1}{2}$ times 2 times 16. These are exactly what I was told. This was being explained to me. That is, boiling water reactor capacity at Brunswick 1 plus Brunswick 2 is 2772 assemblies --

CHAIRMAN MILLER: Slow down, slow down.

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PREMIUM
mpb6

WITNESS ROTOW: -- pressurized water reactor capacity at Brunswick 1 plus Brunswick 2 is 1232 assemblies.

BY MR. MC GARRY:

Q Now do you know if Brunswick 1 has a separate spent fuel pool from Brunswick 2? Does each unit have a separate spent fuel pool with respect to the Brunswick Plant?

CHAIRMAN MILLER: Do you know?

WITNESS ROTOW: Not for certain, no.

BY MR. MC GARRY:

Q And the numbers you've just stated were the -- that was the present capacity of the Brunswick Plant given a BWR scenario or a PWR scenario, is that correct?

A (Witness Rotow) As a generalized comparison, yes, sir.

Q Do you know what racks are used -- what type of rack is used in a Brunswick spent fuel pool or pools?

A It's a modular type rack, sir.

Q Do you know if it's a high density rack, do you know if it's what we refer to as neutron absorbing rack?

A I don't believe it's a neutron absorbing rack. I do believe it's a rack that allows higher density than was -- than occurred in the earlier cycle of design, say, in the 1960s.

Q What do you base that --

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A On my recollection of discussions with these

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premium
mpb7

people. The modular concept is a new one.

Q So your recollection is that Brunswick had had already the spent fuel pool modification, is that --

A No, sir.

Q Well, I believe you just stated they had an original design and now they have a modular design.

Was that your testimony?

A No, sir.

I said the modular design is a newer type design than that that was used in the plant cycles in the 1960s. I don't know when Brunswick 1 and 2 were done.

Q Do you know what the present loss of full core reserve dates were for the Brunswick Plant at the time of your conversation?

A Yes, sir, I do.

Q And what were those? What was that date or dates?

A As reported, 1987, 1988, for Brunswick 1 and 2, if it assumes that Robinson 2 fuel does not dump there.

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1 Q Excuse me; let me reword the question. The
2 answer may be the same, but I just want to make sure the record
3 is clear.

4 Given the present known spent fuel storage
5 capacity at Brunswick -- and I don't care which mode you
6 want to assume, BWR or PWR, and not assuming any additional
7 expansion, what was the loss of full core discharge date
8 that you received in your conversations with them,
9 with Carolina Power and Light?

10 A That depends on strategies followed in the future,
11 which contingency plans that had been laid are followed.

12 Q Now slowly, because I want to follow this up, and
13 it's getting late. But will you please just tell me what
14 were the various -- what did you refer to them as, contingency
15 plans? In other words, are they going to ship to the Robinson
16 pool? Are they going to go BWR, PWR? Walk me through that.

17 A Okay. That all depends on whether or not they
18 transship assemblies. And it was believed to be 304 assem-
19 blies requested from Robinson into the Brunswick fuel pool

20 Q That would be the only factor that would enter
21 into this discussion; is that correct?

22 A It's the main factor.

23 Q Now, assuming that they don't transship, that
24 Carolina Power and Light does not transship Robinson fuel to
25 Brunswick, what were you told would be the loss of full core

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1 reserve "ce for Brunswick?

2 A 1987 and 1988 for Units 1 and 2 respectively.

3 Q That was from Mr. Kunita; right?

4 A Those seem to be my notes to that effect, yes.

5 Q Now, with respect to a scenario where the 304
6 Robinson assemblies were indeed shipped to Brunswick, what
7 was the loss of full core reserve data for Brunswick that
8 you received in your conversations?

9 A May, sir. I was told -- since you wanted me to
10 walk you through this -- that they could manage the situation
11 so as to maintain no more than one FCR outage in the three-
12 reactor system: Brunswick-1 and 2 and Robinson-2, and that
13 this could be maintained until the Harris facility came on
14 line, in which case they could continue exercising trans-
15 shipment to maintain FCR at all three facilities until the
16 given dates -- until the given date, 1992.

17 MR. FOURTELLOTT: Mr. Chairman, if I may interrupt
18 for a moment. We only have about fifteen minutes left, and
19 before the fifteen minutes is over I would like to suggest a
20 few things.

21 One: that it appears to me that on the basis of
22 both the voir dire and what cross-examination has gone on now,
23 that Mr. Rotow's testimony is the rankest form of hearsay. It
24 is not simply relating someone else's precise words, it is a
25 characterization in summary form of this witness' impression

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1 of what someone else said. It is concededly subjective and
2 highly interpretive. And it is totally unworthy of evidentiary
3 value.

4 My suggestion is that it should be admitted and
5 stricken without delay; for three reasons:

6 (1. It does not possess either qualitatively or
7 quantitatively information which can assist the trier of
8 fact in arriving at its determination on the issues in this
9 case;

10 (2) Failure to act now will only delay the pro-
11 ceedings and burden the record. We've already had a consider-
12 able amount of time and a considerable amount of people sitting
13 through this part of the cross-examination.

14 (3) Permitting Mr. Rotow to testify allows him
15 to bootstrap himself into expertise for future purposes in
16 future NRC hearings.

17 The reason I mention this at this time: the
18 Board has indicated they haven't viewed the testimony, but
19 what I would like to do is to suggest, ever how long the appli-
20 cant's cross-examination may continue, I would like to suggest
21 that it may save us some time tomorrow if the Board will re-
22 view the testimony in light of the remarks that I've just made,
23 and perhaps it will see fit to strike at least a large portion
24 of what has been proffered, so that it won't be necessary to
25 go through this endless cross-examination of testimony that

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1 really isn't competent, and really is unworthy of evidentiary
2 consideration.

3 I'm not moving necessarily that the Board make an
4 immediate ruling. But I would like to bring it to their
5 attention and ask that perhaps in the morning we might have a
6 better consideration. I don't want to see the hearing go on
7 another three or four hours, another half day, on something
8 which might ultimately be stricken. And it seems to me there
9 is enough evidence in the record to substantiate it being
10 stricken right now.

11 CHAIRMAN MILLER: Well, we're going to recess for
12 the evening at this point anyway. The Board has been reading
13 some of the testimony as we've been going along, and will
14 read it.

15 We'll resume at eight o'clock in the morning.

16 MR. MC GARRY: Mr. Chairman, excuse me. Would it
17 be helpful if the Board and parties were furnished Applicant's
18 Exhibits 16 and 17? Would that assist the Board in their
19 consideration?

20 CHAIRMAN MILLER: Which exhibit is that?

21 MR. MC GARRY: The Rancho Seco survey and the
22 Brunswick Survey.

23 CHAIRMAN MILLER: If you have it we'll certainly
24 consider it.

25 MR. MC GARRY: I don't have it now, but perhaps I

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1 could--

2 CHAIRMAN MILLER: In the morning you think you'll
3 have it?

4 MR. MC GARRY: Or we could deliver it to the
5 hotel.

6 CHAIRMAN MILLER: We'd be glad to consider it.

7 WITNESS ROTOW: Do you want the originals?

8 CHAIRMAN MILLER: No, I never take anybody's
9 originals.

10 Are we ready to go off the record? We'd rather
11 go off the record now, unless counsel have something particular
12 for the record.

13 Very well. This concludes our hearing this
14 afternoon. We'll resume at eight in the morning.

15 (Whereupon, at 6:35 p.m., the hearing in the
16 above-entitled matter was recessed, to reconvene at
17 8:00 a.m., the following day.)

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