NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF:

DUKE POWER COMPANY

(Oconee-McGuire) Docket No. 70-2623

Place - Charlotte, North Carolina

Date - Friday, 22 June 1979 Pages [illegible] - 1211

Telephone:
(202) 347-3700

ACE - FEDERAL REPORTERS, INC.

Official Reporters

444 North Capitol Street
Washington, D.C. 20001

NATIONWIDE COVERAGE - DAILY

327 097

264

CR4837
MELTZER/mml
ADELSON
.BACH

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the matter of:	:	
DUKE POWER COMPANY	:	Docket No. 70-2623
(Oconee-McGuire)	:	

Fourth Floor
Mecklenburg Administration Bldg
720 East Fourth Street
Charlotte, N.C.

Friday, 22 June 1979.

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

BEFORE:

MARSHALL E. MILLER, Esq., Chairman,
Atomic Safety and Licensing Board;

DR. EMMETH A. LUEBKE, Member;

DR. CADET H. HAND, MEMBER.

APPEARANCES:

J. MICHAEL MC GARRY, III, Esq., Debevoise & Liberman, 700 Shoreham Bldg., 306 15th Street, N.W., Washington, D.C. 20005, and
WILLIAM LARRY PORTER, Esq., Associate General Counsel, Duke Power Company, on behalf of the Applicant.

EDWARD J. KETCHEN, Esq., and RICHARD K.HOEFLING, Esq., Office of the Executive Legal Director, Nuclear Regulatory Commission, Washington, D.C., on behalf of the Regulatory Staff.

327 098

mm2

APPEARANCES (Continued)

ANTHONY Z. ROISMAN, Esq., on behalf of the Natural Resources Defense Council.

SHELLEY BLUM, Esq., Blum & Sheely, Charlotte, N.C. on behalf of the Carolina Environmental Study Group.

RICHARD WILSON, Esq., State Attorney General's Office, on behalf of the State of South Carolina.

mm3

CONTENTS

tm6

C O N T E N T S (Continued)

EXHIBITS: (Continued)	IDENTIFICATION	EVIDENCE
NRDC Exhibits:		
No. 7		1202
No. 8	1130	1202
No. 9	1140	1202
No. 10	1149	1202
No. 11	1155	1202
No. 12	1161	
No. 13	1181	

P R O C E E D I N G S

(8:00 a.m.)

CHAIRMAN MILLER: All right, the evidentiary hearing will come to order, please.

We're taking first two limited appearance statements. I believe that there is present a gentleman who is appearing in lieu of Mr. Donald R. Belk, who had requested the opportunity to make a limited appearance statement, and who has recently, I think, had a tonsillectomy, which somewhat impairs his capacity in that regard, so we will recognize the gentleman who asked to speak in his place, and we will ask that you limit yourself please to five minutes, and you may submit in writing any additional matters which you wish to have presented.

Would you come forward, please? You could sit down at the table here, if you would like.

LIMITED APPEARANCE OF ANDY SHACKELFORD

MR. SHACKELFORD: My name is Andy Shackelford, and I'm a --

CHAIRMAN MILLER: Will you spell that for us, please?

MR. SHACKELFORD: Yes. S-h-a-c-k-e-l-f-o-r-d. I am a student at UNCC here, and a citizen of Charlotte. I am concerned. I do not want the nuclear waste to be transported through the city, and I'll tell you why.

I feel that the chances of an accident are all too great on Interstate 77, Interstate 85, with no proper evacuation plans that I know of.

And I also feel that the chance of sabotage is not too far off in the imagination, as is evident with what happened just the other day in Chicago with the airliner.

I do not want the fuel to be shipped through Charlotte because I feel that it is not necessary to expose the people of Charlotte to the low-level radiation from the casks. I feel that if the NRC should license Duke Power Company to do anything, I think that it should be to license them to build the proper facilities for temporary storage on-site at Oconee, instead of playing a game of shipping the spent fuel from one place to the next.

And I feel that since the nuclear industry does not have the technology or capability of dealing, in any long-range plan, with the waste, that we shouldn't be victims of a shuffling process from one site to the next.

I guess that's basically all I'd like to say.

CHAIRMAN MILLER: Well, Mr. Shackelford, we appreciate your coming. Your remarks will be incorporated in the record.

MR. SHACKELFORD: Thank you.

CHAIRMAN MILLER: And we hope that Mr. Belk

recuperates.

I think that Ms. Virginia Dykes, who is here from South Carolina, has requested an appearance. We're glad to have you, Ms. Dykes. If you'll just sit down, be comfortable, give us your name and address, and tell us what you would like to have the Board consider.

LIMITED APPEARANCE OF VIRGINIA DKYES,

GREER, SOUTH CAROLINA.

MS. DYKES: I'm Virginia Dykes. I'm from Greer, South Carolina. And, Mr. Chairman, if you'll guarantee to me that this is a one-way trip out of South Carolina, I'll forget the statement.

(Laughter.)

CHAIRMAN MILLER: I don't believe it's within my power to make such guarantees, but I appreciate your request.

(Laughter.)

MS. DYKES: We have enough of it there, already.

During the Three Mile Island accident we heard a lot about radiation measured in the equivalent of the chest X-ray, or 30 millirems. Of course we know that the casks we are planning to allow to go three times a week down the highway from Oconee to McGuire contain in each load the equivalent of about one million chest X-rays per hour. The outside of the cask emits 3 to 6 X-rays per hour.

I don't believe -- there have been reports on the radio -- I think they're news releases from Duke -- that this is just ordinary hazardous material similar to chlorine or gasoline or whatever. I don't think it is.

Your own government reports say that thousands of people could be killed in an accident, and it could cause billions in decontamination costs, and I don't think there's any other material that is transported on the highways or railroads or any way that comes close to that.

No one claims these casks are perfectly secure. Your own studies show that various kinds of explosives and missiles can cause them to open, plus undoubtedly some types of accidents. To send easily recognized trucks down the same route about every 72 hours for years to come is to present an ideal target for terrorism.

The problem that Duke Power Company now faces with the storage pools at Oconee filling up is just the beginning of similar problems which are rapidly developing at many nuclear stations. Because utility companies have relied, in good faith, on government promises to provide for waste disposal. If there are any utility companies that still have this kind of faith after 20 years, I wonder, you know; I just think they ought to begin to question the promises.

The present alternatives are depressingly limited because the Nuclear Regulatory Commission and the AEC

before them, did not face the fact, over 20 years ago, that nuclear waste must go somewhere. Waste disposal provisions should have been made before the first license to build a nuclear power plant was ever issued.

I don't call -- Duke says that they plan to send it to a reprocessing plant. Well, obviously the chain doesn't stop there. It goes somewhere after the reprocessing plant. I think that the licensing should have included: Where does it go to its final resting place? And if you could tell me that, we'd be that much ahead.

If one asks: What has been done during these 20 years of licensing and operation to provide for safe disposal of fuel, the answer is "not much."

Reprocessing is no answer, since the reprocessed products are also extremely radioactive, and there is no significant difference between disposal requirements for spent fuel before or after reprocessing, according to the Department of Energy. The recent Interagency Review Group report concluded that geologic emplacement is the only method that can seriously be considered right now.

We are not going to find the perfect geologic formation, and the perfect political climate in one spot. So let's settle for the best combination that can be found, and send the waste there. Build away-from-reactor storage

pools at the same location where the permanent repository will be, so the spent fuel will need to be moved only once.

It is not acceptable to shift it around at random. Voters can and will express their disapproval of unnecessary shipping of these extremely radioactive materials through their towns with municipal ordinances to prevent it, such as many municipalities already enforce.

As you know, this would come through the city limits of Greenville. And one day, we presented a petition for voters to sign if they were interested in this type of ordinance. And we collected 1000 signatures with just a handful of us working the petitions. I hardly ever had anybody turn me down. It was just before the election, and I had cars with "Thurmond" stickers, "Ravanelle" stickers, "Riley" stickers, none of them wanted the waste coming through Greenville. So it's not a difficult matter, I think, to get it on the ballot in Greenville, and I think the ordinance would pass.

You have received strong letters of concern from the Greenville County Council and the Greenville City Council on the matter before you, which should have weight in your consideration. Governor Riley is also opposed to "hauling wastes across South Carolina."

Moving spent fuel from Oconee to McGuire to possibly Catawba resembles the Bert Lance method of

covering bank loans. When your credit runs out in one place, borrow at another, and then borrow again to cover the second. This is illegal in banking and it should be illegal in the nuclear waste business.

It is incredible that the NRC has continued to ignore nuclear waste, even in recent licensing of new plants. Duke has seven nuclear power plants under construction right now. Where will the waste from these plants go? The crunch situation on spent fuel has finally arrived, but we hear Secretary Schlesinger urging faster licensing procedures at the same time his Department reports it needs yet another 10 or 15 years to figure out where to puc waste.

If someone can explain to me how this makes sense, I wish they would do it.

It seems not to matter that utility companies, their stockholders and consumers are spending billions on power plants that may have to close when their storage pools are all full. Where will the money come from to pay the billions that have been borrowed for construction if the plants are closed?

If you don't have power to sell, it's a little bit hard to pay off the bonds.

Licensing nuclear power plants results inevitably in the production of waste, and it is justice that after

20 years of irresponsible licensing, this waste problem at Oconee is in your hands again, with a lot more of it to come.

Governor Riley also has said, "There are some tough decisions to be made about nuclear waste, and no one wants to make them. So they keep making easy decisions and putting off the ultimate ones."

You were appointed to this Board to make those tough decisions. You're here to form policy, to set precedent, not merely to approve the cheapest, most casual, and most expedient treatment of nuclear waste.

CHAIRMAN MILLER: Thank you, Ms. Dykes. Your statement will be incorporated in the record, and the concerns that you express will be considered by the Licensing Board.

We thank you for coming up. Do you have copies?

MS. DYKES: Yes.

CHAIRMAN MILLER: Would you give the reporter copies, please.

(Handing documents to the Board.)

CHAIRMAN MILLER: Is there anyone else who has not been heard who wishes to make a limited appearance statement?

(No response.)

CHAIRMAN MILLER: Very well, we will now resume

our evidentiary hearing. I think that we had a panel, and we would be pleased to cross --

MR. ROISMAN: May I --

end #1 CHAIRMAN MILLER: Pardon me?

mml T1 MELTZER

MR. ROISMAN: Mr. Chairman, I have one point of procedure. I see at least one of the people who made a limited appearance doesn't have a seat. I expect a number of those seats are occupied by Duke people.

I wonder if at least one of the Duke people who is not needed for the hearing could make a seat available for one of the members of the public.

CHAIRMAN MILLER: There are probably more chairs across the hall, maybe we can get more chairs.

MR. ROISMAN: I am wondering where we can fit them in.

CHAIRMAN MILLER: I don't really feel we have the power to establish priorities one way or the other.

I believe with the panel coming forward to the witness area, this may freeup some seats. I'm afraid we may have that problem today. We are in short supply.

We will try to do the best we can.

All right, we will resume now.

Mr. Roisman, I believe you had completed your cross-examination at that point?

MR. ROISMAN: Yes, that's correct, Mr. Chairman.

MR. KETCHEN: Mr. Chairman, before we get started, may I make a motion to the Board?

CHAIRMAN MILLER: Yes.

MR. KETCHEN: Mr. Chairman, this is with respect to

mm2

your ruling of the other day --

CHAIRMAN MILLER: The same ruling that you were talking about yesterday?

MR. KETCHEN: Scope of the proceeding ruling.

CHAIRMAN MILLER: I see.

MR. KETCHEN: Mr. Chairman, at this time I would like to make an oral motion or request that the Licensing Board refer its ruling on the scope of these proceedings to the Appeal Board while we proceed with these proceedings.

I have a question that I would ask be referred and it would be whether in determining the scope of this proceeding the Board's decision to allow evidence with respect to the so-called cascade plan as part of this proceeding, rather than limiting its review to the proposed action to transport and store Oconee spent fuel at McGuire, is the proper ruling.

I would like to state my basis.

First, the question that that particular ruling opens up is an extremely important question depending on how the proceedings go. If the Staff is right, then we could avoid large expenditures of money and manpower and commitment of resources, if, in fact, the cascade plan should not be considered in these proceedings or thereafter.

If the question is not decided now, it could

mmj

precipitate a delay in these proceedings by the fact that it would necessitate possibly the Staff conducting an extensive review and evaluation of a so-called cascade plan.

Finally, the precedent that would be set by the ruling, if we continue, we believe is inconsistent and contrary to the established law of NRDC versus Morton in 1972 case, and I can dig that citation out for you.

CHAIRMAN MILLER: We have the case right here. We are familiar with it.

MR. KETCHEN: The Supreme Court Vermont Yankee case and the Minnesota versus NRC case, particularly footnote 5, page 9.

We believe that there is no need in this proceeding to consider future actions that would be terequired for NRC licensing approval, and we believe that is a matter of law.

That completes my motion, Mr. Chairman.

CHAIRMAN MILLER: Thank you.

Your motion is recorded, your statement and the basis of it preserves your rights.

The motion is denied. The Board has very carefully considered and read several times the cases that you cite; has read back portions of it to you, as a matter of fact, and our ruling will stand.

We see no reason to suspend this or any other hearing to go to the Appeal Board. We wish to receive a full

mm4

record. We have made our ruling on the scope at the request of counsel, which we thought was a fair request in order to enable you to know what evidence to put on.

But the entire record has not yet been made on that or any other issue. Of course we haven't prejudged any of it.

MR. KETCHEN: Mr. Chairman, may I clarify one point. My motion did not -- I wasn't clear on this -- my motion was not to suspend these proceedings. If I may amend my motion, I would ask -- the request is the referral, with the proceedings to continue while the referral is being taken or being considered.

So that is the nature of my request.

CHAIRMAN MILLER: If I understand the STaff's motion then it is to continue with this aspect of this hearing, but in the meantime to send up a request or certify a request for ruling to the Appeal Board while we are engaged in that endeavor?

MR. KETCHEN: Yes, sir.

CHAIRMAN MILLER: Has that ever been done before? Simultaneous proceedings of that kind?

I won't press you on it. I doubt it, but at any rate we would decline the invitation to establish a precedent if it hasn't been done before. We would certainly decline to be in any such confusing situation as having part of our

mm6

proceedings, which affect the scope of evidence here, pending in Appeal Board while we go ahead with some sort of truncated version just while the Appeal Board can proceed with the process.

You have a right to make a motion, you have preserved the record. The motion as amended is denied.

We will proceed now with the witnesses.

Whereupon,

R. BOSTIAN

M. GLOVER

and

H.T. SNEAD

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

CHAIRMAN MILLER: Mr. Blum, I guess it is your turn, is it not, to cross-examine?

MR. BLUM: That's right.

Mr. Chairman, for the record, having finally had fuller opportunity to read 2.733, Examination by Experts, I would request the Board to alter its ruling of yesterday and allow Mr. Riley to cross-examine these gentlemen. And we can meet any other panels at that time.

I would remind -- well, I don't think that Dr. Luebke and Dr. Hand need any reminder of Mr. Riley's

mm6

capabilities in this matter.

CHAIRMAN MILLER: Read the section of the rule that you are asking us to consider here. The portions of it.

MR. BLUM: Yes, sir.

It says thata party may request the presiding officer to permit a qualified individual who has scientific or technical training or experience -- Mr. Riley has scientific and technical --

CHAIRMAN MILLER: I don't think that's what the rule says. It doesn't mention Mr. Riley at all, does it?

(Laughter.)

MR. BLUM: No, sir.

CHAIRMAN MILLER: Well, don't give us editorials.

MR. BLUM: -- on behalf of that party in the examination and cross-examination of expert witnesses.

The presiding officer may permit such individual to participate on behalf of the party where it would serve the purpose of furthering the conduct of the proceeding upon finding; A, that the individual is qualified by scientific or technical training or experience to contribute to the development of an adequate decisional record.

Skipping down.

B, that the individual has read any written testimony that he intends to examine or cross-examine, and any documents to be used or referred to. And,

nm7

that the individual has prepared himself to conduct a meaningful and expeditious examination or cross-examination. An examination -- cross-examination conducted pursuant to this section shall be limited to areas within the expertise of the individual conducting the examination.

Now, going on to the editorial portion, Mr. Riley is an individual qualified by scientific and technical training in this matter, in particular by experience having been involved in the McGuire and Catawba hearings from their inception, having fully participated without counsel at Catawba initial stages of this, and having cross-examined at the McGuire licensing hearing. Although I did the cross-examining, I believe, on the seismic aspects of that, Mr. Riley is the person who participated in the drafting of our contentions, who did all the discovery on our contentions, read through all those documents, went to Duke power and read through thedocuments that we were required to go there to read, sorted th rough them, has the expertise to examine the technical diagrams and understand the matters, and in particular we are dealing with the alternatives here, has read through all the testimony and had prepared, and last night prepared again, questions to be asked of this panel.

So that, I suppose, would be an offer of proof under section A, B and C, of this section. He is the one, who

mm3

up until yesterday at 10 minutes to 5 we had considered would do the cross-exmination of all the technical experts in this matter, because he is the person with the technical background involved in scientific matters.

He is a research associate at Celanese and has that experience lay by day, something that I do not have. And, in our division of labor, he is the technical expert for Carolina Environmental Study Group. I am not.

CHAIRMAN MILLER: Mr. Blum, what are you? Are you a lawyer?

MR. BLUM: Yes, sir.

CHAIRMAN MILLER: YYou entered your appearance in this case as an attorney?

MR. BLUM: Yes, sir.

CHAIRMAN MILLER: On behalf of what parties?

MR.BLUM: Carolina Environmental Study Group.

CHAIRMAN MILLER: I take it you have prepared yourself adequately in a professional sense to conduct whatever examination or cross-examination would be necessary, have you not?

MR. BLUM: I was --

CHAIRMAN MILLER: You can answer that yes or not and then explain it, I think, as we tell witnesses to do.

MR. BLUM: I don't know --

CHAIRMAN MILLER: Tell us what you are, rather

than what you are not, first.

MR. BLUM: I don't know that I can answer the question yes or no, Mr. Miller.

CHAIRMAN MILLER: Very well, then tell us what you are as an attorney.

MR. BLUM: I attempted to prepare for these hearings reading through the testimony of the panel: I have a BS in physics. That is a long time ago, however.

CHAIRMAN MILLER: That's a plus. I commend you. I wish I had that.

MR. BLUM: That's in 1962.

CHAIRMAN MILLER: That recently?

(Laughter.)

MR. BLUM: I have not particularly been involved in scientific matters since then. I have a law degree. Subsequently I have been engaged in the general practice of law.

CHAIRMAN MILLER: Surely. Well, I appreciate what you are saying. I don't want to spend a lot of time on it, Mr. Blum. We think you are a capable, qualified attorney, you have demonstrated that both in this and other cases.

We feel you are fully qualified to examine these experts, and that the areas of expertise so far are not that profound, are not beyond your ken both as a lawyer and as one, apparently, you said with some education in physics, which

mm10

is great.

We do believe that Mr. Riley, who has certainly expertise and is a very capable gentleman, I am sure is going to testify, has prefiled some written testimony -- we are sure that his point of view, his testimony, his expertise will be brought to bear.

We prefer, when any party is represented by counsel, that that counsel conduct the examination or cross-examination. So, with due deference to your views, which you are certainly entitled to express for the record, we think that we will adhere to our ruling yesterday and ask you as attorney, to proceed with such cross-examination as you may desire.

You may, and I see that you have Mr. Riley there with you, besides you, and you are free to confer with him from time to time to have the benefit of his expertise or suggestions. We will be considerate of both of you and in that regard we will look forward to hearing any testimony in a testimonial sense from Mr. Riley.

Now we would like to go forward with cross-examination, if you please.

MR.BLUM: Yes, sir.

CROSS-EXAMINATION (Continued)

BY MR. BLUM:

Q Mr. Bostian, has Duke Power continued to replace the racks that were in the Oconee Pool with high-density

mm11 racks?

A (Witness Bostian) That project is underway.

Q How are you removing the former racks?

If you know.

A They are being cut up underwater by divers using power saws.

Q Were they not originally bolted in?

A They were welded in.

Q There is no arrangement as far as you know, to have those bolted into the bottom of the pool?

A Mr. Blum, I am not familiar with the original design of the rack support at Oconee.

The existing rack in the 1 and 2 pool is welded to embedments placed in the concrete floor of the pool. These embedments become part of the floor and those are the attachments.

Q If you know, will the removal by sawing, leave any stubble at the bottom of the pool?

A Mr. Blum, I understand there are vacuum removal systems that are handling the stubble or the saw debris, as you refer.

Q No, I was thinking more in terms of a shaving commercial.

(Laughter.)

Are there going to be more of the stubs of these

mm12

rods, the rebar or whatever it is, stuck up out of the bottom of the pool?

A Mr. Blum, I am not that familiar with the details of the replacement. I would have to defer to Mr. Snead.

A (Witness Snead) The pipestands that will be cut where required, will be -- sanded is not the proper word.

Q Ground down somewhat?

A Ground down somewhat. Where they are not required to be ground down, they will not be ground down.

In addition, there are clips on the bottom of that fuel which serve as locating devices, on the bottom of the fuel assembly.

Where it is required to grind down those clips, they will be ground down. At the moment I don't believe, however, that there is a requirement for the grinding down of those clips.

Q How are you going to attach these high-density rods to the pool, the racks to the pool?

MR. MC GARRY: Mr. Chairman?

CHAIRMAN MILLER: Yes?

MR. MC GARRY: I have been listening to the last several questions, and I will object at this point in time.

We are talking about the actual reracking activity and specifics of --

CHAIRMAN MILLER: Pardon me, what --

mm13

MR. MC GARRY: Reracking activity and specifics of that activity were the matter under discussion and the testimony of this panel is directed to whether or not transportation of certain number of shipments from Oconee to McGuire is warranted.

I have been waiting for the connection. I just simply don't see the connection.

CHAIRMAN MILLER: Is it your point there are other witnesses than this panel whom you have not yet had the opportunity to present, who will cover those areas and that this panel in its direct has not covered it?

Am I understanding you correct?

MR. MC GARRY: The second part of that is correct.

My basic objection is one of ralevancy.

I would look at this as transportation, and here we are talking about reracking activities.

CHAIRMAN MILLER: I suppose reracking has been one of the alternatives discussed, hasn't it, quite extensively?

It doesn't become any less relevant because Mr. Blum asked the question.

MR. MC GARRY: No, I don't mean to imply that. It is simply, I am waiting for the connection. If we are talking about the specifics of this reracking activity --

CHAIRMAN MILLER: If it is going to come in detail from other witnesses, I would recommend to Mr. Blum

mmal4

he wait.

On the other hand, if it is fair to go into it with these witnesses, we would overrule your objection.

I guess you gentleman between you will have to tell me what the situation is on the other witnesses. Do you have others who are going to address this particular topic squarely, and whom it might be more profitable to cross-examine?

MR. MC GARRY: No, we have no witnesses that we plan to call to address this specific matter.

CHAIRMAN MILLER: Very well. In that event, the objection is overruled.

We do ask Mr. Blum to keep it within reasonable bounds, but nonetheless we think you are entitled.

BY MR. BLUM:

Q How are you going to attach the high-density racks?

A (Witness Snead) We are not goingto attach the high-density racks, Mr. Blum.

Q They are free standing?

A Yes.

Q And what -- how many assemblies can you get into a rack segment?

A There are fourteen segments. The total new capacity of the pool is 750 spaces, so if somebody will take

mm15

out their HP and divide 760 by 14, they will get the answer to your question.

Q What is the size of one of these segments in feet or meters?

A I'm not sure that I remember. As a matter of fact, I know that I don't remember.

Q Now, Mr. Bostian, do you know what is the status of your planning with regard to poison racks at Oconee?

A (Witness Bostian) The status of our planning with regard to poison racks at Oconee, I think that was discussed previously.

We have just received a study prepared by our Design Engineering Department. We have got some cost estimates of that.

I stated, I believe, thatthe reason we are not underway on an evaluation is this proceeding, and that evaluation will begin just as soon as this is over.

Q What is the expected completion date of the reracking of Oconee 1 and 2 with high-density racks?

A That project was scheduled for 100 days.

Q And when will that be completed?

A 100 days from Wednesday of this week.

Q Sometime in late September?

327 125

A Should be.

Q Do you know what the lead time is for ordering

wml5

poison racks?

A I can't answer forthwith.

Q Do you have any kind of approximations?

For instance, if you were to order poison racks on July 1st, when you might be getting the first assemblies?

A Mr. Blum, it is my understanding that total installation time from the time of go, including the delivery, installation is approximately two years.

Q Have you dealt at all with the vendors of poison racks?

A I have not.

Q Who has done that?

A The design engineering department.

Q That's Mr. Hager?

A That's Mr. Hager.

Q All right.

Now, who has been doing the consideration of the independent spent fuel storage facility at Oconee, whose department?

A Both the steam production department and the design engineering department.

Q Now, you are the steam production department head?

A I am the head of the systems results and fuel management group within that department.

Q Mr. Hager is the better authority, or his

mm17

department is the better source of information about the times for construction of an independent spent fuel facility?

A Not times of construction.

His department is responsible for the estimating of the cost of construction and the estimating of the time required to build such a facility.

WITNESS BOSTIAN: Can you hear me?

CHAIRMAN MILLER: I am hearing everything. There is a lot of racket next door, but we hear you, yes, sir.

BY MR. BLUM:

Q Are there any canal connections between Oconee 1 and 2 and Oconee 3?

A (Witness Bostian) No.

Q Has there ever been any consideration of building any such?

A Mr. Blum, I can't say that there is a formal consideration, but it is highly impractical.

Q Whose department would have considered that?

A Design engineering.

Q Whose department would know whether it was technically feasible to extend or build a fuel pool No. 4 adjacent to No. 3?

A Design engineering.

Q I think you have testified about the necessity to maintain a ten-foot water barrier between the divers and

amls

the work that you are doing.

Are you the person familiar with that, or is that Mr. Snead?

A That would be neither of us.

That would be Mr. Lewis.

Q Who is Mr. Lewis?

A He will be one of our witnesses at a later date.

Q Who is he?

A He is the systems health physicist in the steam production department.

Q Is he the person who would have considered putting in place, let's say, a lead barrier, as opposed to a ten-foot water barrier?

A Yes.

Q Are any of you gentlemen familiar with the coefficient of shielding of lead as opposed to water?

A I am not.

A (Witness Snead) I looked at the attenuation coefficients last week, but that was last week and I couldn't tell you what they are today, to save my life.

Q In any case, that is not your decision as to how they go about replacing a set of racks with another?

327 128

A That's right.

We have talked to Mr. Lewis about that, and he just will absolutely prohibit using lead in the pool.

mun19

Q Do you know why?

A No.

Q Mr. Bostian, isn't it true, if you are experiencing these difficulties in replacing the racks at Oconee, wouldn't the presence of Oconee fuel in the McGuire fuel pool give you the same kinds of problems when you come to replace the McGuire racks with poison racks, if you do that?

A (Witness Bostian) The circumstances would be quite similar.

Q You would have the same kind of problems about keeping your divers away from the pool?

A But don't forget, we will have McGuire fuel there as well.

Q Well, do you know what the current date for McGuire coming on line and producing fuel is?

A That schedule is under review at this time, and I do not know the final date.

Q The time for McGuire coming on line has been deferred nine times to date, has it not?

A I can't tell you that.

Q That's not part of your department?

A I can't verify that number nine.

Q Well, isn't that roughly the right figure?

A I wouldn't hazard a guess. 327 129

Q What is the current estimated date for McGuire

mm20 1 beginning operation, if you know?

2 A The current commercial operating date is 1/1/30.

3 Q But that's just been pushed back, has it not?

4 A It is under review and is being pushed back.

5 Q And then when would the first McGuire fuel be

6 coming out of that plant?

7 MR. MC GARRY: I object. That question has been

8 asked three questions ago.

9 CHAIRMAN MILLER: What was the answer? I guess I

10 missed it.

11 MR. BLUM: The question was, when will the first

12 McGuire fuel be coming out of --

13 CHAIRMAN MILLER: I don't remember that being

14 asked.

15 MR. MC GARRY: I remember it being asked about

16 three questions ago. Mr. Bostian said he doesn't know.

17 CHAIRMAN MILLER: Is that still the answer,

18 Mr. Bostian?

19 WITNESS BOSTIAN: When will the first fuel be

20 coming out of McGuire?

21 BY MR. BLUM:

22 Q Yes, sir.

23 A (Witness Bostian) It will be coming out

24 approximately one year after startup.

25 Q Thank you.

mm21

Why is McGuire not on an 18-month cycle as opposed to a 12-month cycle?

A The plant was not purchased on that basis.

Q Well neither was Oconee, is that not true?

A There is the possibility that McGuire will go to an 18-month cycle, but not to begin.

Q All right.

So it will be a fairly long time, it would be at least two years before there is any McGuire fuel in the McGuire fuel pool?

A Perhaps, a year and a half.

Q Do you have any kind of schedule in mind for reracking McGuire with poison racks?

A At this time we do not have a specific schedule.

Q Mr. Glover, did you factor into your considerations with regard to the cost of transportation, anything concerning the added difficulty in reracking McGuire in the terms that we have been discussing?

A (Witness Glover) In my specific studies that I have done for the various interrogatory questions, there have been cases where I have assumed either wet or dry McGuire reracking.

Q Well, how does that --

327 131

A Also, let me just clarify one more thing. In Applicant's No. 1 which was submitted a day or two ago,

mm22 1 you will find an estimate of wet and dry reracking at
2 McGuire. And I think that group will be able to discuss that
3 adequately.
4 Q But did you enter a factor for wet and dry into
5 your cost of the per-assembly transportation of fuel, spent
6 fuel from McGuire--from Oconee to McGuire?
7 A No.
8 Q Now, if you were to be able to put spent Oconee
9 fuel into the McGuire fuel pool prior to the operating of
10 McGuire, would that run up the cost of operating McGuire,
11 Mr. Glover?
12 A I would rather refer -- that is a management
13 type question.
14 A (Witness Bostian) Mr. Blum, we are almost through
15 with the unit No. 1 at McGuire.
16 There is a complete operating staff there. We
17 have not implemented the final security arrangement. That
18 is in the process now. The only additional cost would be
19 that associated directly with the operation of the pool.
20 Q Do you know what operating a spent fuel pool for
21 a year and a half costs?
22 A The estimate that we have gotten from the Oconee
23 Nuclear Station regarding the operation of one of their
24 pools is $66,000 per year.
25 Q Mr. Glover, did you factor that into the per-unit

mm23

transfer costs of spent nuclear fuel from Oconee to McGuire?

A (Witness Glover) No.

Q Mr. Bostian, I think you testified yesterday that in 1966 the executive committee decided to expand the Catawba fuel pools.

Is that correct?

A (Witness Bostian) 1976.

Q 1976, I'm sorry.

A The executive committee heard our presentation and approved the program presented.

Q Did they also --

MR. BLUM: There was supposed to be a memo concerning that that was drafted by Mr. Snead.

Is that available today? I think Duke was supposed to produce that.

CHAIRMAN MILLER: What were you asking?

MR. BLUM: I am asking either Mr. CMcGarry or Mr. Snead or Mr. Miller --

CHAIRMAN MILLER: Mr. Miller doesn't really know, but Mr. Miller is not acting as attorney either.

Mr. McGarry, or do any of the witnesses know what the situation is with regard to -- what document was that?

MR. MR. BLUM: It was a memo drafted by Mr. Snead on August 14, 1976.

CHAIRMAN MILLER: Oh, yes.

mm24

Does anybody know where the document is?

Let's see, is that the meeting of August 11, and the memo of August 14, 1975? I do seem to recall it being mentioned.

MR. BLUM: Yes, sir.

CHAIRMAN MILLER: I don't think I've seen it.

MR. BLUM: CAn we take a break --

WITNESS SNEAD: I'm sorry. Yes, I left with the impression that I wasn't asked to produce that document, so I didn't go looking last night.

If we just take a break -- I'm still not sure anybody has asked me to produce the document.

MR. BLUM: I was under the impression Mr. Roisman had asked for it.

MR. ROISMAN: If there is some question about it, I asked him, and I will ask again. I would like to see this document before the witness --

CHAIRMAN MILLER: It was my impression that it had been requested before the panel was excused.

At any rate, we regard that as being an existing request, and we will take a break while you check that.

(Recess.)

CHAIRMAN MILLER: The evidentiary hearing will come to order please.

We have two requests for limited appearances who were here earlier and were not in time to follow the others who made the statements today. As you know, today is the last day that we have alotted for this purpose.

If you will give us your name and address, and not to exceed five minutes a piece, we will be glad to hear from you.

LIMITED APPEARANCE OF LINDA KLEIN,

CHARLOTTE, NORTH CAROLINA.

MS. KLEIN: My name is Linda Klein, K-l-e-i-n. My address is 2215 East 7th Street in Charlotte, and I'm a representative of the Safe Energy Alliance.

I'd like to address several of the concerns that we as members of the Safe Energy Alliance have with the transport of nuclear wastes, the first being the issue of the casks.

We've all seen the films of the casks withstanding incredible odds. I'd like to say, as far as I'm concerned, that -- well, first of all, we know that the casks Duke is using are not the same ones that have been tested. And to tell us that, based on those tests, the casks will withstand any kinds of odds is nothing but speculation. And when you're gamling with the lives of a lot of unwilling victims,

assumptions are just not sufficient.

I'd like to quote from one of the members of the Nuclear Regulatory Commission in regards to those films. Robert M. Bernero from NRC Headquarters in Atlanta said, speaking of the test film, "This can be very dangerous. We must be very careful in how we analyze the results of these tests. We are told the casks were designed to take a 30-foot drop into an unyielding surface, but what that means in a real-life accident situation is not clear. You can say, gee whiz, isn't that an extraordinary casks, it withstood all that impact and it isn't even damaged; but you can also say, gee whiz, aren't those extraordinary rubber tires, they went through that crash and they aren't even flat."

People should look at those tests and say the cask can withstand a 60-mile impact. It was the truck that had the impact.

Bernero also said: "That does not mean the casks are unsafe; merely that real-life accident situations will probably not represent the same circumstances as the tests."

In other words, you know, before telling us those casks are safe, let's have some real tests that have some real meaning in relation to them.

Another of our concerns is the route. I'm sure

you've all heard- testimony about the 11 or 12 accidents that have occurred on that route. And when questioned about that in discovery, Duke said, and I quote, "Drivers will be instructed to use extra precaution at the interchange." That's not sufficient, either. There's a lot that I define as a highly populated area with a lot of working families there, and extra precaution is obviously not sufficient, because I'm sure that the people that drove that had the accidents prior to now felt they were using precaution.

In terms of constant low-level radiation, we know that in transporting the casks they're continuously emitting low levels of radiation, which we're told is safe.

On the other hand, we've been told by the Secretary of Health, Education, and Welfare that there is no known safe level of radiation.

Duke has figures showing people will be exposed to minimal amounts, but I don't think they've taken all possible considerations into account -- which is the fact that they could drive alongside a car on a two-lane highway for 45 minutes, and no one knows what effect that will have on the passengers.

Okay, there have also been, in less than five years, more than 328 transport accidents involving nuclear material. And Tri-State Motor, which I'm told Duke plans

to hire, has the worst record of any of these.

In the event of an accident, as far as I know, Charlotte-Mecklenberg has no emergency response plan, and that can cause untold consequences. At a uranium oxide spill in 1977 in Colorado, nearly 12 hours elapsed before professional health reports arrived on the scene, and it was not until 72 hours later that actual cleanup activities commenced.

Now if actual radiation had spilled and this had happened on a highly populated area of the highway, thousands of people would have been exposed to this radiation before anybody could deal with it.

Mecklenberg County has no emergency response plan, and due to the weight of the casks, a crane is necessary for recovery operations. And it's my information that crane operators in Mecklenberg county have not been notified, and they're certainly not prepared to be there in the amount of time that would be necessary to ensure our safety.

Another area that hasn't been properly investigated is the design of the trailers that will be carrying the casks. Nobody's even taken that into consideration. And there has been an accident involving that.

On February 9th, 1978, a trailer carrying a cask with spent fuel rods buckled and collapsed while

mm1

traveling along Illinois Highway 54. The report identified the lack of design and construction standards for vehicles of this type, as a contributor to the cause of the accident.

There are no federal standards for design and construction specifications for these trailers. And the report which was prepared for the Department of Transportation by the Nuclear Assurance Company of Atlanta described the accident as occurring "due to the failure of structural members of the trailer following the stress of hitting a sharp road surface heave."

I might add, this trailer was one owned by Tri-State Motor Company which is, as I said before, who Duke plans to hire.

I believe these decisions have been made on the basis of economics, because it is obviously according to Duke, much cheaper to ship than to deal with it with the safety issue.

I would like to say as a citizen I think, youknow, it is their responsibility to make safety a priority and not economics. Even if it is cheaper, you know, there are a lot of economics I don't think they have taken into account.

There has already been, two years ago in Texas, a landowner who was awarded $105,000 in damages for fear of property devaluation from a railroad spur which would be carrying nuclear materials through his land.

mm2

I think if Duke Power does bring nuclear waste through highly populated areas of Charlotte there will be similar suits by property owners and that is one of the economic issues they haven't considered.

Also if there is an accident, Sandia Laboratories has admitted there could be $700 million in damage. That is a lot more than economics and that's not even considering damage to our health and our lives.

I would just like to say transshipment of spent fuel is just an effort to avoid the issue. Duke assumes the federal government is going to take over the problem which they have created and solve it for them, and I think it is up to Duke to solve it for themselves by leaving it where it is and exposing the least amount of people possible to it.

CHAIRMAN MILLER: Thank you, Ms. Klein.

LIMITED APPEARANCE STATEMENT OF MIKE FENNELL, CHARLOTTE, N.C.

MR. FENNELL: My name is Mike Fennell, F-e-n-n-e-l-l. I am also a member of the Safe Energy Alliance.

What I would like to deal with is again dealing specifically with Tri-State Motor Transit which Duke intends to hire to do this job.

Of the several hundred accidents that Linda just pointed out, we should point out that Tri-State Motor Transit

was involved in 152 of those incidents in 1974 alone.

I would also like to point out that over a four- or five-year period, $133,000 was lost due to damages incurred from accidents involving nuclear materials or dangerous waste materials.

Tri-State Motor Transit accounted for $97,000 of that $133,000. The difference between the 97,000 and the 133,000 was taken up by 62 other carriers, not only by highway but by air and by rail and by sea. So by far, Tri-State is the worst offender in this particular area. They have had more accidents than any other carrier, they have had triple the accidents of 62 other major carriers in this country.

I think it is grossly irresponsible on Duke Power's part to hire a group of people that are that bad at what they do. I think that is something that the NRC should certainly consider, especially when we are talking about something again that is traveling through a highly populated area.

Now the Safe Energy Alliance in the last several months has conducted a good deal of canvassing and petitioning in the neighborhoods along I-85. The Thomasboro area and Ashley Park area here in Charlotte. We have several hundred signatures on petitions. The petitions, I'm sorry to say, aren't available today, but we will

certainly try and get them to the panel next week.

And, I think it is interesting to note that in our canvassing efforts, not one single person, at least in my experience with talking to several hundred people myself, not one single person said that they would like to see those transshipments come through Charlotte, or that they would like to see them come through their neighborhood.

Now I know that this is probably not that significant to Duke Power Company who is dealing exclusively with the economics of the issue, but I think it is more than relevant. I think it is the heart of the issue. This is a human issue, this involves human lives and human properties. I think that this involves dangerous materials which we can't see, we can't smell, we can't taste, but which will kill us nonetheless.

It is very hard to say to someone, look, we are bringing these trucks through and they are not going to hurt you. The levels of your exposure are going to be low. That's a very difficult thing to say to someone with any assurance, because there is no way anyone knows what damage could be done, especially given the group of people that are going to be shipping this stuff.

And that brings me to the issue of justice, which I feel is central to this entire discussion. And I think it also has to do with fairness in business.

mm5

Now, I have been involved in helping manage a small company here in Charlotte. I am not a big businessman, but I do understand a few do's and don'ts about business, and one of them is, "When you want to dance, you have got to pay the fiddler."

Duke Power Company established their nuclear program, built the Oconee plant and went right ahead with 100 percent commitment to nuclear development in North Carolina without any reprocessing, without any waste disposal systems, without any permanent storage of waste.

Duke Power took a risk and they lost. The Barnwell plant is never going to be opened, there is never going to be reprocessing in this country as far as anyone knows. Certainly not in the next several years.

But, dDuke Power Company went right ahead, built their nuclear plants without ever having considered what they were going to do with the wastes from those plants.

And, instead of taking the responsibility for their decision which was poor at best, they turn around once again to the ratepayers of this state and they say, okay, we messed up, made a wrong decision, but don't worry about it, we can make bad decisions because we have ratepayers to take up our slack.

If I make mistakes in the business, I mean, I go out of business. Any other private individual who is in

rm6

business in the private sector in this country would have the same thing happen to them if you made decisions like that.

I can't go out and build something that is going to produce something that is deadly to human beings without knowing what I am going to do with these deadly substances. In the private sector you just don't get away with doing that. We have regulatory agencies in the federal government to see that that doesn't happen.

Now I would like to know where the justice is in allowing Duke Power Company to do something like that and get away with it, and even let it be considered that they should transship this waste and play this nuclear shell game with the ratepayers, not only wasting our money but exposing us to dangerous levels of radiation and the very real possibility of an accident in these transshipments.

And I also feel that we in Mecklenburg County, we are doing our best, very best to stop the McGuire plant from ever opening, and to stop the Catawba plant from ever opening. Now why would we be working so hard to stop the McGuire plant and stop the Catawba plant if we wanted this waste in our county anyway?

We didn't generate that waste in this county. We derived absolutely no benefits from the generation of that waste or the generation of the electricity that was the

mm7

product of that waste. And we don't feel that it is fair for the people of Mecklenburg County to have to deal with that waste, not just once, but as the shell game continues one more time when they want to ship it from McGuire back down to Catawba straight through the middle of Charlotte.

So, this issue doesn't end with just what the alternatives are at Oconee,what is going to happen with the shipment of the waste through Charlotte. It goes far beyond that. It is a farreaching issue. It has to do with justice, it has to do with fairness, it has to do with good business responsibility, fair plan and practical economics.

That is five counts that Duke Power has five out of five lost. They have made poor decisions consistently from beginning to end, and now they are coming in front of the NRC and in front of the people of this state and saying, look, you know we did make bad decisions, but give us a break, we won't make any any more.

I don't think that's true and I don't think we can rely on Duke Power to make the right decisions from here on out. I think it is time that we called Duke Power on their little game, that we made them stand up and be responsible for the mistakes that they have made in the past and start correcting them. And I don't mean with ratepayers' money, I mean with shareholders' money.

327 145

And that's the way the Safe Energy Alliance

mm8

feels.

I thank you for your time.

CHAIRMAN MILLER: Thank you.

Your remarks will be incorporated in the record.

We appreciate your coming.

#3MPBLOOM
flws nm
mpbl

CHAIRMAN MILLER: We've one more limited appearance, Mr. Robert J. Reynolds, who has driven 75 miles to be with us this morning. And while we're closing off the limited appearance statements at this time, we feel that he has demonstrated appropriate good faith and has been given not to exceed five minutes in which to present his views.

Give us your name and address for the record, and we'll be glad to hear from you, sir.

LIMITED APPEARANCE STATEMENT OF ROBERT J. REYNOLDS, RESIDENT SPARTANBURG, SOUTH CAROLINA

MR. REYNOLDS: My name is Robert J. Reynolds. And I presently reside at 314 Oak Grove Road, Spartanburg, South Carolina. And I'm a representative of a group in South Carolina, Palmetto Alliance, which is an anti-nuclear group in the state there.

I'd like to apologize to you gentlemen for being late. It's a combination of poor directions and sleep habits --

CHAIRMAN MILLER: That's quite all right.

(Laughter.)

MR. REYNOLDS: -- which precluded me from getting here on time.

CHAIRMAN MILLER: That's quite all right. You may proceed.

MR. REYNOLDS: Basically what I'd like to say

mpb2

here is that my group feels that the transportation of nuclear waste from the Oconee to McGuire station is at best a partial solution. It really doesn't solve the problem at all. I think that's fairly obvious from what I've read in the papers about what's going on in this hearing.

Quite frankly, we feel that the best solution to the nuclear waste problem is to quit making it as quickly as possible.

Basically we feel that nuclear waste, the spent fuel in light water reactors should be kept onsite, if necessary through reracking and expanding facilities. Of course, we also don't want to repeat the Russian experience in Chiliabinsk in 1957 by reracking.

However this can be done, I think, within proper safety parameters.

Now what I'd like to point out here is that the eventual point of moving waste around and shuttling it around is to eventually move it to the AGNS facility in Barnwell, South Carolina. This is an eventual push toward reprocessing and breeder technology, whether you're operating on the plutonium or thorium cycle, irregardless of which one we're going to choose if we pursue the nuclear path.

We feel that this is pointless and that any attempt to justify shipping of spent fuel is simply a ploy or precludes or will open up doors that will eventually lead

mpb3

to reprocessing either on regional or multinational levels. And eventually -- Once you have reprocessing, then all of a sudden breeder technology, as I said before, either plutonium or thorium breeders look extremely attractive.

And I know that that perhaps may not be germane precisely to this issue here, but I think all of you gentlemen in the nuclear field realize my group's contention and realize the validity of it.

I ask that something like this be kept in mind, that this, if allowed to occur, will open up, as I said, doors to eventual reprocessing and breeder technology.

And with that, I close.

CHAIRMAN MILLER: Thank you, Mr. Reynolds. Your comments will be incorporated in the record and considered by the Board.

All right.

We will now resume the evidentiary hearing.

WITNESS SNEAD: I have a clarification on one of Mr. Blum's questions.

CHAIRMAN MILLER: Yes.

WITNESS SNEAD: He asked of me did we include any differential operation and maintanance costs in our transshipment type of costs from Oconee to McGuire, and as I state now and I did then, I say no. But let me just say why.

Right now the pool is in operation as far as

mpb4

operation and maintenance costs being collected for the pool holding the new fuel that's present at the sites. Any difference in operation and maintenance costs would be small in that when the fuel is shipped there we include the cost of that insertion into the pool as far as labor and time and that sort of thing.

So there would be a very small and incalculatable difference, I would feel, in terms of that point.

CROSS-EXAMINATION (Resumed)

BY MR. BLUM:

Q Well, Mr. Glover, did you make the decision to store that fuel wet instead of dry?

A (Witness Glover) If you were to ship spent fuel to a facility --

Q No, it's the new fuel we're talking about.

You say you've got new fuel in the McGuire pool right now. Did you decide to store that fuel in a wet condition as opposed to a dry condition?

A I've not made that decision, but it's being stored dry.

Q It's stored dry.

A At the time, right now.

Q Why is the fuel pool operating?

A Well, you have operation and maintenance cost involved in that there is a requirement to be able to institute

mpb5

accountability procedures -- you know, you're still going to have labor at the pool. The operation and maintanance costs are not zero at this time.

Q There is nothing in that pool at this time?

A No. There is new fuel in the pool at this time.

Q Dry.

A Dry.

Q So you don't have all the -- You're not operating your cooling pumps, for example.

A That's true.

Q You don't have an estimate of the difference in cost between operating that pool dry and operating it wet?

A No.

Q It does cost more to operate it with water in it?

A Albeit small.

Q And if you were to factor that into your transportation costs, the additional costs of operating the pool, that would increase the cost per assembly of transportation?

A However, Mr. Blum, what you're --

Q Well, now, that's the question.

It would increase the cost?

A Yes.

May I qualify that?

Q Certainly.

A As I said before, we are including transporting

mpb6

that fuel to McGuire, the costs of labor and installation of those assemblies into the pool. Any additional costs I feel would be small, to the best of my knowledge.

Q All right.

Then the effect of having fuel in the pool while reracking McGuire would also be upwards on the cost of transporting?

A The cost of transporting the fuel would not vary depending on whether that pool had spent fuel in it or not.

I see what you're trying to get at.

Q If you were to factor in the difference between reracking McGuire with or without Oconee spent fuel in it, it would increase the cost per assembly of transportation?

A However, Mr. Blum, that decision has not been --

Q Would you answer the question?

A Yes.

Q Yes.

A May I qualify?

Q Yes.

A However that decision to rerack the McGuire pool has not been made at this time.

Q That's true.

Now getting back to the decision of reference the Catawba spent fuel pool that was made August 11, 1976,

mpb7

Mr. Snead --

A (Witness Snead) Yes.

Q -- you attached this group of people listed on your memorandum which Mr. McGarry has been kind enough to give us --

CHAIRMAN MILLER: Pardon me.

We'd like to have that identified.

MR. MC GARRY: That would be Applicant's Exhibit 4 marked for identification.

(Whereupon, the document referred to was marked as Applicant's Exhibit No. 4 for identification.)

CHAIRMAN MILLER: Applicant's Exhibit 4 for identification is the memorandum for file, dated August 16, 1976, which has been previously alluded to.

BY MR. BLUM:

Q Mr. McGarry has been kind enough to supply us with photocopies of the memorandum, Mr. Snead. I take it that group decided to physically expand the Catawba fuel pool in August of '76.

A (Witness Snead) We decided to endeavor to expand the pool in August of '76. At that particular time we were not sure that we could get this job accomplished.

Q Well, has it been done?

mpb8

A It's been done.

Q The additional cost, I take it, from paragraph one was $6.5 million. Is that right?

A That's correct.

Q And is that what it actually has turned out to cost, according to your estimate?

A $6.5 million that's mentioned in the memorandum could simply be the cost of the new rack and not include the cost of the expansion, or it could be both. I don't remember at the time whether it is one or both.

Q Was there anyone to your knowledge or to the knowledge of any of the three of you who would know the cost of the expansion of the Catawba spent fuel pool, the additional cost?

A No.

Q You don't know of anyone who would be able to factor that?

A Not among the three of us, no.

Q Do you know who the correct person at Duke Power would be?

A Mr. Hager can address the cost of the expansion of the Catawba fuel pool.

Q Mr. Glover, did you factor into your cost of transportation the cost of providing this additional room at Catawba?

mpb9

A (Witness Glover) No, I would not. And if I may qualify that, the reason is that we have never made the commitment, plan, if you will, to transport that fuel to Catawba. It has been an alternative that we have evaluated.

Q But you have evaluated this alternative internally within Duke Power?

A According to this memo, we have.

CHAIRMAN MILLER: Well, is there any reason to doubt it as a fact, that it has been evaluated? Somebody said according to this memo.

WITNESS SNEAD: The expansion has been evaluated. First the cost of the Catawba pool expansion is a cost of the Catawba plant. It is not a cost of transportation.

BY MR. BLUM:

Q In 1976, Mr. Snead, it was the cost allocated to the Catawba Plant for the benefit of the Oconee Plant, was it not?

A (Witness Snead) No. That possibility remained open, and will remain open.

CHAIRMAN MILLER: Well then it is now an open question? Is that your testimony?

WITNESS SNEAD: Certainly we considered the shipment of Oconee fuel to Catawba an alternative, just as we consider the shipment of Oconee fuel to McGuire as an alternative.

mpb10

CHAIRMAN MILLER: I was talking about the cost. The allocation of cost remains open, is that correct?

WITNESS SNEAD: No. I'm sorry, I guess I misunderstood.

CHAIRMAN MILLER: Tell me the situation, then.

WITNESS SNEAD: The cost of the expansion of the pool is part of the capital cost of the Catawba facility. And that's all that cost is.

CHAIRMAN MILLER: I see.

BY MR. BLUM:

Q But that's an accounting decision, is it not, Mr. Snead?

A (Witness Snead.) Yes. The accounting decisions represent your real cost.

Q Someone decided to allocate these $6.5 or more to the cost of Catawba construction rather than to the cost of Oconee fuel storage.

A (Witness Bostian) Mr. Blum, that pool is available for the storage of Catawba fuel. If at some future date we do in fact put other fuel there, then I think that would be the time at which we would allocate the cost.

Q At this time, in August of 1976, did you make any determination about changing the McGuire fuel pool, Mr. Snead?

A (Witness Snead) No.

mpb11

Q Well, McGuire has high density racks, is that true?

A Yes.

Q When did you determine to put those in?

A The decision on the McGuire racks was made over a period of time in 1975 and 1976, and over a series of steps. There were whole point decisions where we elected to consider not fabricating the old design of McGuire racks, which was a design that was a 21 inch center-to-center spacing, which is a very conservative design in that you can demonstrate that there are absolutely no criticality problems to be addressed in that center-to-center spacing.

Then there were other decisions made down the road to cut up those old racks and reduce the center-to-center spacing to 15 and a half inches. So there was no one specific date that the decision to expand the McGuire racks was made. That was made in several meetings between Mr. Bostian and myself and the design engineering department.

Q And when did those meetings take place?

A Over the time period 1975 and 1976.

Q So at roughly the same time that you decided to expand the Catawba pool you decided to cut up the old McGuire racks and rebar and put in a different set of racks, is that true?

A Roughly the same time, yes, sir.

Q All right.

mpbl2

Mr. Glover, did you factor into your transportation costs any figure for the reracking of McGuire?

A (Witness Glover) No, sir. And for the same reason, in that at that time there was no firm commitment or plan to ship that fuel to McGuire from Oconee.

Q Well, Mr. Snead, if this August 16, 1976 memorandum does not represent a firm commitment to the cascade approach, what does it represent?

A (Witness Snead) What this represents is a decision on the part of the particular group, which included the executive committee, to plan for an additional level of fuel storage at the Catawba facility which could be used to maintain flexibilities or alternatives, depending on which phraseology that you would like to use, that could be used to provide spent fuel storage on the Duke Power system.

Q Why did you decide to keep this cascade plan a secret from the NRC?

A We did not keep the cascade plan secret from the NRC.

Q What is the meaning of the sentence:

"Transportation aspects should be handled internally and should not be addressed in discussions of expansion plans with NRC."

A That's exactly what the sentence means. It means that transportation aspects should be handled internally and

mpb13

not be addressed with NRC.

Q Doesn't that mean you're going to keep it a secret from the NRC?

A No, it means there's no point in talking with the NRC in 1976 about things which would not likely occur until well into the '80s.

Q And the sentance:

"No mention of the cascade approach in licensing documents..."

That also does not mean you're going to keep it a secret from the NRC?

A Any licensing document that would have been required on the shipment of Oconee fuel to Catawba would not have been required in this particular time frame, and therefore no mention should have been made of that particular option.

Q Yesterday, or some time in the course of this hearing, you spoke about Perkins and Cherokee being isolated as far as spent fuel storage.

Was that decision referenced in paragraph three of this document?

A Yes.

I testified on one of your questions with that regard.

Q What does the sentance, the clause, the qualifier

mpb14

"If possible" that begins that sentence:

"If possible, the Cherokee and Perkins Units are to be isolated from the remainder of the system as far as spent fuel storage is concerned."

A That indeed did qualify that sentence, and we have testified in this hearing that although we have isolated it, we would consider that to be an option down the road.

Q Isn't this document a description of a cascade plan, then, that is relatively complete with regard to Oconee, McGuire, and Catawba, and reserves the options with regard to Perkins and Cherokee?

A No. And I'd like to qualify that.

I plan to go home tonight, but I sure as heck don't know that I'm going to get there. And I think the plans of this panel are to go home tonight, but I don't know that we're going to get there either.

Q I'm tempted to ask you questions about whether Skylab is going to fall, but I guess I won't.

CHAIRMAN MILLER: We appreciate your forebearance.

(Laughter.)

BY MR. BLUM:

Q Mr. Bostian, has anybody in your group, as far as you know, considered horizontal racking of the pool, any pool, any spent fuel pools?

mpb15

A (Witness Bostian) We have looked -- we have talked with first the AEC people, and later ERDA, regarding horizontal storage of spent fuel at the Savannah River pools which will not accomodate it in the vertical position. We have not to our knowledge at this point considered horizontal storage in our pool.

Q Who would be, or which department and which person within the agency would be the person to consider horizontal racking at the Oconee?

A It would be between us and design engineering.

Q Well, is Mr. Hager, then, or is department more expert in that?

A I would expect so, yes.

Q Let me ask. I'd forgotten about paragraph five here.

Paragraph five says:

"Fuel handling equipment at McGuire Nuclear Station should be modified to accept Oconee fuel."

Now, Mr. Snead, do you know how much that costs?

A (Witness Snead) That was a very minor cost. I don't know exactly how much it costs, but I would say it was in the neighborhood of $10,000.

Q Mr. Glover, did you factor that in any way?

A (Witness Glover) No, and for the same qualification

mpb16 1 as before.

2 Q Someone testified yesterday -- I'm not sure who
3 it was -- that there was new fuel -- well, there was
4 something other than spent nuclear fuel in the Oconee pools.
5 A (Witness Bostian) I believe I did that.
6 Q What do you have in there besides spent fuel?
7 A Mr. Blum, in the 1 and 2 pool I believe there
8 are six dummy fuel assemblies, and these are fuel assemblies
9 that have the same configuration as an operational assembly
10 but they contain no fuel. They are used in the initial
11 check-out of the plant.
12 Q Is there any reason for storing them in -- well,
13 in the spent fuel pool? Could they not be stored dry?
14 A Those assemblies have been in the pool, they
15 remain in the pool. They are slightly radioactive. They
16 are used in check-out of the fuel handling equipment during
17 maintenance operations. There is no reason at this point to
18 remove them.
19 Q Well, could they be removed is the question.
20 A There is a possibility they could be removed.
21 But we don't think it prudent at this point to remove them.
22 Q They would add to your full core reserve capacity,
23 would they not?
24 A They would add that number --
25 A (Witness Glover) May I make a statement on that,

mpb17

Mr. Flynn?

Q Yes, sir.

A In our consideration of full core reserve we use a total space concept in calculating loss of full core reserve and/or loss of thermal power due to discharges into the pool. We do not consider any reduction in pool capacity for those non-fuel items.

A (Witness Bosnak) Mr. Flynn, at the present time there are 35 spaces in the Unit 1 and 2 pool that do not contain fuel. But they are included in all of our tables regarding full core reserve. There are 11 spaces in the number three pool in a like manner that do not contain fuel, but they also enter into our computation of full core reserve.

Q So those 46 places you count as available for the 177 elements in a full core reserve?

A That's correct.

Q Do you have any capacity for storage of spent nuclear fuel in the conduit from the reactor to the fuel pool?

Does anybody know that?

A Mr. Snead has done some work on evaluating that.

A (Witness Snead) There are two transfer tubes which run from the transfer canal inside the containment building to the spent fuel pool.

As far as I am aware, tubes of that type have

mpb18

never been used for the storage of spent fuel in this country in an emergency situation. I can contemplate situations, however, where it might be possible to store spent fuel in one of those tubes while leaving the other tube open for use.

Q Do you have any idea of how many assemblies you can get into this conduit?

A One.

Q Is there some space within the reactor containment that could be use for the storage of spent fuel?

A Yes, when the reactor is being refueled or defueled.

Q All right.

Well, at the time you might need the full core reserve, that would be the case, would it not?

A Yes.

Q All right.

What's the space there? How many can you cram in?

A I don't remember exactly what the space is. I would estimate six spaces, transfer canal.

Q Thank you.

One of you gentlemen testified about the rate of production of spent nuclear fuel of Oconee 1 and 2. I guess, Mr. Glover, would you have used that?

A (Witness Glover) It would have either been Mr. Bostian or myself.

327 164

Q Do Oconee 1 and 2 each produce 56 assemblies per

mpb19

year, or how many?

A At this time we are looking to go to the 18 month cycle on Oconee Units 1 and 2, at the end of this year or whenever Oconee 1 comes down for refueling. It will discharge some 68 fuel assemblies.

Now as Mr. Snead testified yesterday, that will put it on a cycle of some 390 effective full power days, which is a transition cycle to 18 months.

When Oconee 1 comes down next for refueling and for each subsequent refueling after that, which is assumed at the 18 month time period, that would be some 72 fuel assemblies.

Q On an 18 month cycle -- Well, I suppose we can calculate that on an annual basis.

And Oconee 1 and 3 is moving towards -- Well, give me the same factors, the same information for Oconee 3, Mr. Glover.

A As Mr. Bostian stated yesterday, Oconee 3 is on an annual cycle, and with the use of reinsertable assemblies as available for 56 net discharge to the pool on an annual basis; we are in the process of evaluating an 18 month fuel cycle for that unit but have not made a commitment or plan.

Q Can you tell me what a reinsertable assembly is, Mr. Glover?

A Yes, assemblies which have burnups lower than

mpb20

some level and have sufficient excess reactivity to be able to sustain power in that reactor or are able to be reinserted for as much as one cycle, excess burn over what they may have been prior to being put into the spent fuel pool.

In other words, you pull assemblies from the spent fuel pool and put them back into the reactor for one more cycle and then you discharge them.

Q Do any of you know how many casks Duke presently owns?

A (Witness Bostian) Two.

Q And what kind of casks are those?

A It's NAC-1.

Q Are either of them presently operable?

A Neither one.

Q And where are they physically located?

A They're at Oconee.

Q Now what is the status of those two casks at this time?

A Mr. Blum, Mr. Snead has been following this both with NAC and NRC. I will defer to him.

Q Mr. Snead?

A (Witness Snead) The status of those two casks at this particular time is this:

327 166

Our license has been lifted on the utilization of those casks. The cask certificate of compliance is still in

mpb21

place. And I understand from the NRC, that's a technical distinct on.

Q Are you the person working with the relicensing of those casks?

A Yes.

Q What's the timetable on it?

MR. MC GARRY: I'd like to make an observation. I don't believe "relicensing" is the appropriate term.

I might also make an observation that we do have a witness who will be proffered to the Board and the parties I believe tomorrow to speak in this matter.

MR. BLUM: Well, the witness has indicated that he's following it. I think it would be helpful if he continued answering the questions.

CHAIRMAN MILLER: Is this within your area of competence?

WITNESS SNEAD: I'll describe my area of competence here involving the cask.

I'm following it as a manager or as an administrator as opposed to a technical advisor on that particular problem. Basically I'm just trying to figure out what the heck's going on.

CHAIRMAN MILLER: It might be better, then, if you waited for a witness that I understand will be able to testify fully on that subject.

mpb22

MR. BLUM: Fine.

Who is the witness?

MR. MC GARRY: Mr. Rollins. And you have his testimony.

I might also alert the Board and parties that we may have used a coworker of Mr. Rollins, a Mr. Carlson, who will adopt Mr. Rollins testimony. There will be no change of the testimony. He's another individual from the same company.

We're hoping to have Mr. Rollins.

BY MR. BLUM:

Q When did Duke get its second cask, Mr. Snead?

A (Witness Snead) We received delivery of the second cask in February or March of '79.

Q Now was that cask purchased with this particular transfer from Oconee to McGuire in mind?

A The cask was purchased with two particular thought processes in mind.

Number one, we've made a number of transshipments between Unit 1 and 2. Both casks were purchased to help us out in that regard -- I'm sorry, Units 1 and 2 and Unit 3 spent fuel pool.

In addition, the casks were purchased to assist us in the planned application of the transfer of the Oconee fuel to McGuire.

mpb23

Q What was the cost of the cask?

A Those casks cost approximately three-quarters of a million dollars.

Q Mr. Glover, did you factor that amount into the per-assembly transfer cost?

A (Witness Glover) No, there would be no reason to transfer that entire amount into any of those casks. It would have a sale value at some time in the future should we feel that there would be no transportation plans that Duke might have.

The way that -- if you have followed the cask business any time recently, and what I have seen in terms of correspondence on this area, casks are very expensive items. There is no reason to doubt that should recertification occur we could not recover our entire value that we've spent on these items.

Q Well, in the meantime, Mr. Snead, has Duke Power made a capital output?

A (Witness Snead) Yes, sir, three-quarters of a million dollars. That money has been spent, so to speak. We considered a sunk cost. Those casks will be continued to be used at Oconee irrespective of whether or not they're used in the shipment of Oconee to McGuire.

Q How many years have you had one cask at Oconee?

A We received the delivery of the first cask in

mpb24

February '78.

Q How had you previously made transfers of spent fuel from 1 and 2 pool to the 3 pool?

A Before we purchased the cask we decided to check out the various casks that were available, and we leased this particular cask from Nuclear Assurance Corporation in moving a number of fuel assemblies between Oconee and its 1 and 2 pool and Oconee and the 3 pool.

Q When did the cask first arrive at the Oconee Nuclear Station?

A That I do not remember, when the cask first arrived at the Oconee Nuclear Station.

Q It was there for a number of years, was it not?

A No, it was there when we had a need to have it there, to move spent fuel from the Oconee Unit 1 and 2 pool to the Oconee Unit 3 pool.

Q Do you know when the first such movement took place?

A I do not remember when the first such movement took place.

Q Was it a number of years ago?

A The first movement would have occurred in 1977.

Q Have you -- Mr. Glover, you're the one who has calculated the dates of retention of the full core reserve at Oconee, is that true?

mpb25

A (Witness Glover) Yes.

Q All right.

Did you factor into those dates the delays, the inspection delays and whatnot caused in the wake of Three Mile Island?

A Our refueling schedule upon which our responses to yours and NRDC's questions on this subject in my estimation will not be affected by Three Mile Island inspection delays.

Q The plants were down for some period of time, were they not?

A That's true.

Q And that has not extended the dates of refueling at all?

A No.

A (Witness Bostian) Mr. Blum, may I comment on that?

At the time the NRC investigated the Three Mile Island incident and issued the order, the Unit number 3 at Oconee was down for a normal scheduled refueling. And somebody will have to correct me on these dates, but in the order with regard to Duke there were certain modifications that we had indicated certainly should allay the concerns of the NRC. And we were given a deadline, I believe, of May the 12th to complete these on the Unit number 2 and

mpb26

May the 19th on Unit number 1.

All of our modifications with respect to Unit number 2 were completed and the submittal to the NRC was complete and in their hands probably on Tuesday of that week. I may be corrected. But the number 2 unit was shut down on Friday night May the 11th for really two purposes:

One, we had, as I recall, a leak that needed to be repaired, and of course we had to allow the NRC sufficient time to complete their review of our submittal. The number 1 unit to my knowledge was not shut down as a result of TMI. I may be corrected on that, but I believe that's the case.

Q Do you know when number 1 went back on line -- I mean number 2?

A I can't tell you the specific date, but it was ready at a certain date and it was delayed probably three or four days for various little problems, a leak here, a leak there. And there were some primary and secondary chemical cleanups.

MR. MC GARRY: Mr. Chairman, I'm going to move that these questions and answers be struck from the record.

Mr. Glover indicated that the impact of Three Mile Island and the subsequent events in April and May respecting Oconee had no bearing on the reload schedule, and the reload schedule could only be the logical nexus with respect to this particular transportation activity.

mpb27

MR. BLUM: There was no question, Mr. Chairman. It was an answer. Mr. Bostian wanted an opportunity to say that.

CHAIRMAN MILLER: I believe it was volunteered, Mr. McGarry. It was volunteered information.

You may proceed.

BY MR. BLUM:

Q Mr. Snead and Mr. Glover, did you participate in the presentation by the vendors of poison racks?

A (Witness Glover) I have.

Q Are you an expert on that, or who would be the person to ask about the technical performance of poison racks?

A I may be able to answer some of your questions.

Q Well, do you have the technical background to compare poison racks with control rods, for instance?

A No.

Q Do you know who would be making decisions for Duke in regard to the performance of poison racks, whether they're technically feasible?

A Again I think we would defer to Mr. Hager's group.

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

CHAIRMAN MILLER: Thank you, Mr. Blum.

Counsel for the State of Carolina I think had a question too.

mpb28

MR. WILSON: Yes, thank you, Mr. Chairman.

BY MR. WILSON:

Q Members of the panel, yesterday there was some mention made of the past experience that Duke had in transshipment at the site.

If you would, if one of you is capable, would you tell me if there have been any problems associated with packaging or excessive dosages in handling the shipments between different fuel pools?

A (Witness [illegible]ead) There have been no problems in packaging or decontamination of the cask during the onsite movements. We have improved our decontamination times because of the amount of experience that we're gaining in moving fuel.

Q All right, sir.

I take it, then, there have been no violations or anything of that sort cited by the NRC or otherwise in the handling of this fuel onsite?

A No, there have been none.

Q There have been none, is that correct?

A That's correct.

Q Thank you.

Have there been any shipments offsite from Oconee to areas which also involves your experience in handling these fuel casks?

mpb29

A Yes.

Q And what is that experience?

A We have shipped four fuel assemblies to Babcock and Wilcox in Lynchburg, Virginia along I-85 and US-29. We have shipped four spent fuel assemblies to Crystal River Nuclear Facility which is a Florida nuclear facility for utilization in their reactor because they damaged four of their irradiated fuel assemblies, and in order to restart their reactor they needed four.

We were very pleased to give them four of our fuel assemblies.

There is a rather unique aspect about that shipment that the Board may be interested in. Although we could ship four fuel assemblies to the Crystal River facility, they could not ship fuel back to us.

Now if you were to stand our four fuel assemblies next to their fuel assemblies, they are identical in all respects. They were picked and matched to be identical. But because of a quirk in the regulations, they had planned to use our four fuel assemblies in their reactor, then they could receive those four from Duke.

Since we were planning on only storing their fuel assemblies that they had damaged, we were unable to get permission from the NRC to receive that fuel back at Oconee, even though the fuel was identical in all respects.

mpb30

Now one of the reasons that we wanted to take their four fuel assemblies in exchange for ours was that they were reracking -- or they had a license in to the NRC on the reracking of their pool with poison racks, and they were having considerable difficulty getting that license through the NRC.

I saw the difference in approach there, because we were not able to take their four fuel assemblies back at Duke meant that they would have to rerack their pool under water as opposed to reracking it dry, simply because they had the four damaged spent fuel assemblies in their pool. So this was a situation where we had endeavored to help the Crystal River people out by taking their four fuel assemblies, and we were prevented from doing that because of a quirk in the regulations.

Q All right, sir.

So in your experiance in handling of the offsite shipments of spent fuel assemblies, have there, to Duke's knowledge, been any excessive exposures to the public?

A No.

Q Have there been any other unanticipated releases to the environment?

A No.

Q In your total experience onsite and offsite, then, have there been any reportable occurrences regarding the

mpb31

handling of these assemblies?

A No.

During the Crystal River shipments, those procedures for packaging were personally looked at on the site at the time by the Nuclear Regulatory Commission.

Q Then I take it that at this point you're reasonably confident that you can package and ship the assemblies in a safe manner as far as the public health is concerned?

A Yes, sir.

Q Thank you, sir.

CHAIRMAN MILLER: I take it that concludes, now, the cross-examination of the panel and we're now ready for redirect by Mr. McCarry.

MR. ROISMAN: Mr. Chairman, one thing:

In this memo, Applicant Exhibit number 4, there is one question that I have to ask of Mr. Snead, and I wonder if I could ask that now?

CHAIRMAN MILLER: Yes.

BY MR. ROISMAN:

Q Mr. Snead, would you look at the paragraph numbered two in Applicant's Exhibit number 4? It begins -- Can you tell me, is that a typo? Should it say "A fallback position" or does it mean a "fullback position"?

A (Witness Snead) It is a typo. It is a fallback position.

mpb22

Q I know football is real popular down in the country and I didn't know if it had gotten into the memo.

(Laughter.)

Now the statement, "A fallback position", let's just start with that.

What do you mean by a "fallback" position? A fallback position to what?

A At this particular time, or right before this particular time, beginning in May or June, we had begun to look very strongly at our spent fuel storage program. We were looking at things like expanding pools and expanding racks and this, that, and the other.

We were at a critical point in the construction of the Catawba Plant where we thought that we could get the expansion accomplished but we were not really sure. The drawings in design engineering were essentially firmed up on a smaller pool, and the schedule was such on the construction of the plant that we were not sure whether or not we could get the expansion accomplished.

So even though we made a decision in the meeting to move ahead with the expansion, it was predicated on the basis that we would have to relook at the design and construction process to make sure we could really get it accomplished.

You might say that we were lucky in that we hit the Catawba process just at the right time to get the pool

mpb33

expanded.

Q So when you say a "fallback position", what you're saying is that since you had made the commitment to expand the Catawba pool, if you found that you couldn't expand it by physically expanding its dimensions, then you would instead go to this fallback position instead, having already decided you had to do something or you were going to do something?

A That is correct.

Q How would you have been committed to expanding the Catawba pool if you had known that there was no possibility that you would be transshipping any fuel into Catawba from outside?

A Yes, we would have.

Q Why weren't you then committed to, if you found that it was physically possible to expand the Catawba pool, to expanding it to retaining the lifetime of Catawba spent fuel discharges?

A I'm sorry?

Q Why didn't you decide at that time if the physical possibility existed to expand the Catawba pool to expand it to -- I'm going to change the question because I want to get it in a way that I think will be pertinent -- expand it to the maximum capable physical dimensions and the maximum capable density? Why weren't you going to do that?

A Physical dimensions expanded and maximum capable

mpb24

density expansion?

Q Right.

A At Catawba?

Q Right.

A I think Mr. Hager can address that question.

There was some problem in getting the 51 feet full expansion on the pool, as a matter of fact. After that process actually started, there were some construction difficulties in blasting out, I guess the engineers call it bedrock that that pool sits on. So we had problems just getting the 51 feet.

Now that leads to the question of after we achieve the 51 feet why we didn't go with the super high density poison racks as mentioned in the memorandum. At this particular time and in 1975, the year before that, we were not very enthused about the prospect of poison racks, although we considered them just like we considered our other alternatives.

You will find that in 1975 and in early 1976 we believe that just the process of what we call "canned racks" or high density racks was unproven insofar as the licensing process.

Now, it was December '75, only I guess ten months before this when utilities started throwing, so to speak, license applications to the NRC on reracking, reracking,

mpb35

whether that be high density or lower density, but more compact lower spacing racks.

We of course had made the decision running through this time frame to, as I testified to Mr. Blum before, over a series of steps, to compact the McGuire racks -- which is not a canned rack but it's an open high density rack which is not as high a density as canned rack.

I'm sure you know what I mean.

More than likely had we not already had the McGuire racks onsite -- that's the 21 inch center-to-center spacing -- and without the knowledge of knowing that we could reduce those to 15 and a half inch center-to-center spacing -- utilizing our own capability we may very well have considered this particular statement for the McGuire Plant also.

But it turns out we were well along in the process of putting the 15 and a half inch center-to-center spacing into the McGuire facility.

In addition, at this particular time reprocessing was still being considered, and we weren't contemplating lifetime storage of spent fuel at each of our reactor sites.

Q All right.

But let's just be clear. The fallback position was a plan or a commitment, if you would. But if you couldn't, if the physical difficulties of expanding the Catawba pool

mpb36

made it possible to do that, that you would then use the poison racks in spite of your queasiness about poison racks as a viable option.

A Yes. But that would have been a decision similar to the decision that I just testified.

We made the decision that we were going to look at expansion of the Catawba pools. We didn't really know whether or not we could get that job accomplished. But still we made the decision.

And the position here on the poison racks would have been the same.

Q Okay.

But the point is, just to go back to yesterday's testimony, then, as of 1976 with all of the uncertainties that you foresaw with poison racks and not knowing just how they would get approved and the like, you were still prepared to really go with them if they were the only option available. And yet yesterday you testified that as late as 1978 'we were still not ready to commit to poison racks' and that's why you wouldn't go with reracking with poison racks at McGuire or reracking with poison racks at Oconee.

A I've also testified today that in 1978 Crystal River has had problems in the licensing process associated with poison racks; problems still continue to occur in the licensing process associated with poison racks.

mpb37

I have to say that we are leery of the inertia process involved in licensing.

Q I don't understand that. What is the inertia process?

A Any process that would tend to string out a licensing proceeding. And when you moved now from canned racks to poison racks, it's my opinion that you do lengthen your licensing process.

Q But I take it if transshipment weren't available as a short term option for you, you'd be running like hell for poison rac'; because they would be the only short term ening available for you. Isn't that true?

A I'm sorry?

Q If transshipment were not available as a short term option for you, you'd be running like hell to poison racks because they would be the only other short term option available to Oconee.

A I won't testify that we would be 'running like hell' to install poison racks at Oconee. But I'll tell you, if this license application is not approved we're going to be back digging down into our bag of tricks finding another option on the Oconee pools and looking at these other facilities. And you know we previously testified that we've got a number of them. We don't look at every one of them.

Q So the availability or unavailability of the

mpb38 transshipment is going to affect the choices on these other options?

A Well, when you take an option off your piece of paper, that leaves only the others to consider.

MR. ROISMAN: That's all the questions I have. Thank you.

CHAIRMAN MILLER: We'll take a ten minute recess at this time, and then redirect by Mr. McGarry.

(Recess.)

CHAIRMAN MILLER: The evidentiary hearing will resume, please. Please take your seats.

Mr. McGarry, are you ready to proceed?

MR. MC GARRY: Yes, Mr. Chairman.

CHAIRMAN MILLER: Ladies and gentlemen, you will either have to cease talking or cease being in the room. We're going to start.

Mr. McGarry?

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

REDIRECT EXAMINATION

BY MR. MC GARRY:

Q. Mr. Bostian, during cross-examination --

A. (Witness Bostian) Mr. McGarry, I can't quite hear you.

Q. During the cross-examination, reference was made to maintaining a full core reserve on the entire Duke system. Is that Duke's plan? To maintain one full core reserve for the entire system?

A. No.

Q. What is Duke's plan?

A. Our plan is to maintain one full core reserve at each site.

Q. Mr. Bostian, during your cross-examination, Mr. Roisman inquired as to outage factors and capacity factors. You indicated you had some statistical backup.

Do you have that information?

A. Mr. McGarry, it's supposed to be on the way over here. It will be available shortly.

Q. Mr. Bostian, you made reference to an IRG study during cross-examination. Again, what does "IRG" stand for?

A. Interagency Review Group.

Q. And are you familiar with that document?

A. I am.

Q. And, Mr. Bostian, is that the type of document that you reasonably rely upon in forming opinions and inferences?

A. It is.

Q. And does that document make reference to ultimate waste repositories?

A. It does.

Q. And what does the document say about that subject?

A. The document says that --

CHAIRMAN MILLER: Pardon me. Do we have a copy of this document, now? The witness is going to tell us what it says. I prefer that he refer to it directly. If he's paraphrasing, of course, you're raising another question.

BY MR. MC GARRY:

Q. Do you have a copy of that document, Mr. Bostian?

(Pause.)

CHAIRMAN MILLER: What would be your next number for identification? Five?

MR. MC GARRY: It's five.

CHAIRMAN MILLER: I know you have four from the letter this morning.

CHAIRMAN MILLER: Mr. Bostian, would you be good enough to mark these documents -- the IRG Report -- Applicant's Exhibit 5, for identification, please.

(Whereupon, the document referred to was marked as Applicant's Exhibit No. 5 for identification.)

BY MR. MC GARRY:

Q. Mr. Bostian, with the Board's permission, why don't you just take a moment to look through that document.

CHAIRMAN MILLER: Yes, certainly.

(Pause.)

BY MR. MC GARRY:

Q. Mr. Bostian --

A. Yes.

Q. -- are Mr. Glover and Mr. Snead familiar with this document?

A. I believe so.

Q. To speed things along, perhaps you can hand the

document to them and they can find the particular page, and I'll continue with my cross-examination under direct redirect examination.

(Witnesses conferring.)

Q Mr. Bostian, is the proposal to ship -- the proposal that's before this Board -- dependent upon the use of any other alternative that you've made reference to in your testimony?

A No, sir. The McGuire pool does have the racks in place to take care of it.

Q During cross-examination, Mr. Bostian, a question was asked: Would Catawba have been sized smaller if there was no transportation? And you said, "Probably."

I ask you: Does this mean that Duke will transport Oconee spent fuel to Catawba?

A No.

CHAIRMAN MILLER: Well, does it mean that the company will consider that as a potential option?

WITNESS BOSTIAN: That's correct.

BY MR. MC GARRY:

Q Discussion was also focused upon the fact that Duke made certain judgments in the past based upon certain assumptions, and that with some of those assumptions future events have indicated have not been borne out.

Does Duke now factor -- presently factor -- such

contingencies into its spent fuel plans?

A (Witness Bostian) Yes.

Q I believe, Mr. Bostian -- you can correct me if I'm wrong -- that with respect to page 11 of your testimony, attention was directed to the technical problems Duke is aware of. Are you with me?

A Yes.

Q And I believe you indicated that Mr. Snead was the individual who could provide the background for this paragraph. Is that correct?

A Yes.

Q Mr. Snead, would you please direct your attention to page 11.

(Pause.)

Do you have that page before you?

A (Witness Snead) Yes.

Q Would you please explain the technical problems that Duke is aware of at this time on alternatives to shipments?

A With respect to each alternative?

Q As set forth in this page 11. Perhaps you should read that paragraph, Mr. Snead.

A (Nodding in the affirmative.)

(Pause.)

Yes, I will try and take just the middle of the

paragraph on a piecemeal basis.

CHAIRMAN MILLER: Very well.

WITNESS SNEAD: The second sentence addresses problems involved in backfitting plants with additional spent fuel storage place. And it refers to radiation doses to divers, disposal of old racks, leveling methods, and backfitting the cooling trains associated with spent fuel pools, but it says that it's not limited to those items.

I agree certainly that it's not limited to those items. We have, with respect to radiation dose, of course we have divers in the Unit 1 and 2 pool now. We've limited those divers to a minimum distance of 10 feet from the present spent fuel in the pool.

Already I have had one request, because of the--some of the difficulties associated with that limitation to allow the divers to get closer, and I have refused that because of my concerns with respect to the divers.

When a diver is in a pool, for instance, we carry instrumentation in front of him. He's strapped all over with instrumentation, and film badges. He carries a hand counter himself. He's carrying a vacuuming cleaner so the job is not an easy task.

We've had problems with the vacuuming equipment. We've vacuumed and then checked the doses, and they were

not as low as we thought they should be, so we vacuumed some more. We've had problems with the vacuuming equipment itself. So we went out and we bought some more vacuuming equipment. So we've got two sets there now. When one goes astray, we pick up the other and use that.

There are problems with identifying, after we cut up the racks, exactly how we dispose of those racks with respect to doses as low as possible, and we're still taking a look at that decision to be made down the road there, I believe, in that capacity.

We've built a leveling fixture, for instance, in our design to level the new racks that we're going to be putting in the pool. We took that leveling fixture down. It didn't fit, so we had to take it out and do some more reworking -- rework on the leveling methods.

I believe at this particular point in time we have our installation problem resolved. I would not be surprised, however, to get a phone call this afternoon to tell me that we've run into some other difficulty. Hopefully, we won't.

So there are a number of difficulties.

I've testified that Crystal River recently has had difficulty in poison racks. My understanding of the poison racks is that you get offgassing of certain gases, and if you don't make procedures available for the venting

of those gases from the structural material, then that will tend to swell that material. There have been instances where the fuel tubes have swelled to an extent that when the operators tried to remove the fuel assembly, they couldn't. It just wouldn't budge. It was there.

That's been primarily one of our concerns in that particular area.

I've testified to the fact that there's other equipment to be maintained -- the polar cranes, the refueling bridge -- that equipment has a tendency, like all other types of equipment, to break down and has to be repaired, and those factors have to be considered. Sometimes they limit your schedule.

BY MR. MC GARRY:

Q Does that complete your answer, Mr. Snead?

A (Witness Snead) Yes, I think that covers the paragraph pretty well.

Q Mr. Bostian --

A (Witness Bostian) Yes, sir.

Q -- have you found the reference that you were looking for?

A Yes, beginning on page 49 --

Q Mr. Bostian, would you please identify that document. What does the title page say?

A The title page is TID-29442, Report to the

President by the Interagency Review Group on Nuclear Waste Management, March 1979, Washington, D. C. It's marked as Applicant's Exhibit No. 5.

Q And now what page were you referring to?

A Page 49. The IRG group defined the range of potential technical strategies that could be utilized in the implementation of a waste repository.

Strategy one provided that only mine repositories would be considered, and that only geological environments with salt as the emplacement media would be considered for the first several repositories.

Strategy two provided that, for the first few facilities, only mined repositories would be considered. A choice of site for the first repository would be made only among -- only from what -- among whatever types of environment had been adequately characterized at the time of choice.

And then strategy three provided that for the first facility only mine repositories would be considered.

And strategy four provided that the choice of technical options, and if appropriate geological environments, be made only after information about a number of environments and other technical options had been obtained.

And after considering these strategies, the IRG

has this to say --

Q And what page is that?

A This is on page 60.

"The IRG has considered but not formulated an opinion at this stage of its review whether the interim strategic planning basis for the first repository should presume, pending decisions taken through the NEPA process, either that near-term programs would plan for an earlier choice of a first repository site from a set of potential sites covering a limited range of geologic environments, or that near-term programs would assume that the choice of the first repository site will await the availability of a set of potential sites covering a broader range of geologic environments.

"In the latter case, the choice of a site could not be made before 1984, and construction of the first repository could be completed at the earliest by 1992. Prudent planning suggests anticipating initial operation during the period 1992 to 1995.

"In the former case, the choice may be made from among sites that rely on salt as the emplacement medium as early as 1980, since generic understanding of engineering features of a salt repository are most advanced.

"Construction of the first repository could be completed as early as 1988. Prudent planning suggests

anticipating initial operation during the period 1988 to 1992."

DR. LUEDKE: Is it fair to say that any of that happening depends on appropriations, budgetary actions?

WITNESS BOSTIAN: Yes.

BY MR. MC GARRY:

Q Mr. Bostian, with respect to your written testimony you have heard the corrections that I have made, and you yourself have made corrections. As corrected, do you adopt this testimony as your testimony to be used in this proceeding?

A (Witness Bostian) Yes.

Q Mr. Snead and Mr. Glover, have you read Mr. Bostian's testimony?

A (Witness Snead) Yes.

A (Witness Glover) Yes.

Q With respect to the answers that you gave relative to statements contained in Mr. Bostian's testimony, do you adopt those portions of Mr. Bostian's testimony upon which questions were asked of you, as your testimony in this proceeding?

A (Witness Snead) Yes.

A (Witness Glover) Yes.

MR. MC GARRY: If I may have one moment,

Mr. Chairman, I think that concludes my questioning.

CHAIRMAN MILLER: Yes.

e4-A (Pause.)

b4-B MR. MC GARRY: That completes my redirect.

Mr. Chairman, I guess a procedural matter. I would move at this time that the testimony of Ralph W. Bostian be bound in the record as if read.

CHAIRMAN MILLER: Is there any recross-examination which should be limited to the scope of the redirect?

MR. ROISMAN: There is, but I'm trying to find my copy of the Bostian testimony. There was a portion of it -- maybe I could get it from -- there's a portion of it that had some question as to whether it should be included or not.

We were told during redirect the problem would be corrected. It hasn't been.

CHAIRMAN MILLER: Page 13, the last paragraph.

MR. MC GARRY: Well, we'll delete that, Mr. Chairman.

CHAIRMAN MILLER: Pardon me?

MR. MC GARRY: We'll delete that paragraph.

CHAIRMAN MILLER: There's no problem, then, because that is deleted.

MR. MC GARRY: That is -- let me, just for the record, that is the last paragraph on page 13. Is that

correct?

CHAIRMAN MILLER: That's correct.

MR. ROISMAN: That's the one that was in question, yes.

I do have some redirect.

CHAIRMAN MILLER: You may proceed.

RECROSS-EXAMINATION

BY MR. ROISMAN:

Q. Mr. Bostian, let's start with the Interagency Review Group report. I'd like you to read, if you would, into the record a paragraph appearing on page 88 of the report, marked as Applicant's Exhibit No. 5, under the general heading "Institutional Issues."

Would you read this paragraph, please, right here (indicating), beginning with the word "significant."

And I'm going to ask you questions about --

CHAIRMAN MILLER: Did we identify the page and paragraph for the record?

MR. ROISMAN: It's the second paragraph on page 88.

WITNESS BOSTIAN: "Significant institutional difficulties are involved in marshaling the resources and programs capable of accurately detailing site suitability criteria and establishment of standards; thoroughly investigating possible sites; accurately assessing site

characteristics in light of the technical criteria; carrying out credible analyses of the risks; obtaining agreement on site selection; getting the facility approved and licensed; providing for careful construction and operation of the repository (including safe transportation and handling of the waste); mitigating the accidents and responding to repository failure, if that occurs; and providing adequate long-term monitoring.

"The level of difficulty of all these problems could increase with the size of size of the nuclear nuclear waste inventory" --

CHAIRMAN MILLER: "Double"? What is this double --

WITNESS BOSTIAN: It says "nuclear nuclear."

CHAIRMAN MILLER: Oh.

WITNESS BOSTIAN: It's a typo.

" ... waste inventory and its rate of growth. Institutions that can cope on a small scale may fail as demands placed on them multiply. The IRG believes that a more detailed analysis of logistical and other institutional problems which would arise out of attempting to manage waste on the scale required should be undertaken."

BY MR. ROISMAN:

Q Now, Mr. Bostian, from your knowledge of the document, is your understanding of that paragraph of what

they are saying that as you get more waste, the problem itself may get more difficult to handle? From these various institutional problems that they list? Would that be your understanding of what they're saying in that paragraph?

A That's what they're saying.

Q And is it also your understanding of that paragraph that at this point, that detailed analysis of those logistical problems, institutional problems, is still yet to be done?

A It is still to be done, but it is being worked on.

Q All right, would you now read the first sentence of page 87 of the document, right here (indicating), beginning with the word "The."

A "The resolution of institutional issues with regard to the orderly development and effective implementation of a nuclear waste management program is equally important as the resolution of outstanding technical issues and problems."

e-4-B

T4 MM1
ZER

Q Now, is it your understanding of that statement that what the IRG is saying is that these institutional problems are themselves needing to be resolved before we can resolve the nuclear waste problem, and thatthey are of the same magnitude as the technical problems?

A The institutional problems, Mr. Roisman, are being addressed in thedocument.

There are certain recommendations in there, including the formation of a state planning council.

Q I am sorry, I wasn't asking you whether they are starting to work on them. I think you already testified to that.

I am asking you, are they saying that their resolution is as important as the technical ones, and that the problem isn't going to be solved until those also get resolved. It is not just a technical question.

A Yes.

I believe we have previously testified to that.

Q Now, do I understand your prior testimony is that you are familiar with this document?

I mean, it is a document which you have read and have some understanding of?

A Yes.

Q And as far as you know, this is a true and correct copy of the document?

mm2

A Yes.

Q And it is an official government publication.

Do I understand the TID reference and so forth, this is published by the United States Government?

A Yes.

MR. ROISUM: Mr. Chairman, at this time I would like to have offered into evidence Applicant's Exhibit No. 5 for identification on the basis that we have an official government publication that is related to a subject which is clearly relevant to the proceeding. And rather than continue to go through with witnesses reading little sections out and finding out what their understanding is, that the document will speak much better for itself if it is simply included in the record as an exhibit.

CHAIRMAN MILLER: Is there any objection to the admission of Applicant's Exhibit No. 5 for identification?

MR. MC GARRY: No objection, Mr. Chairman.

CHAIRMAN MILLER: Hearing none —

MR. KETCHEN: Mr. Chairman, I have an objection based on the theory of my case, that it is beyond the scope of the proceedings.

And, if I may, that would be a continuing objection when they are in that area. And if it is all right, I can just make that now and when it comes up later I won't have to go through this explanation.

mm3

CHAIRMAN MILLER: Yes, you may have it as a continuing objection.

I take it there is no objection to the admissibility of the document itself, but rather because of the continuing objection that we are allowing you.

MR. KETCHEN: That's correct, sir.

MR. MC GARRY: That's exactly the Applicant's position, too.

CHAIRMAN MILLER: Very well. You may have that continuing objection. And subject thereto, the Board will admit into evidence Applicant's Exhibit No. 5 for identification.

(The document heretofore marked Applicant's Exhibit 5 for identification, was received in evidence.)

CHAIRMAN MILLER: I assume the requisite number of copies will be supplied somewhere along the line?

MR. ROISMAN: Yes, I will endeavor to do that, since I am the one who offered it, even though it is marked as Applicant's Exhibit. But, obviously I don't want it bound into the record. I am not going to provide 40, I am going to provida three tothe Board.

CHAIRMAN MILLER: Yes, I understand we are not binding it into the record.

mm4

It has been admitted into evidence.

MR. ROISMAN: I need to know, and it doesn't have to be at this time, whether members of the Board and what other parties are going to need a copy of the document.

CHAIRMAN MILLER: The Board will need two copies; one at hour headquarters in Bethesda for either Dr. Luebke and myself; and the second to Dr. Hand in California.

MR. ROISMAN: Okay, Mr. Chairman. I will endeavor to do that as quickly as possible. But with the hearing schedule as it is, it is not necessarily the case that I will have it by next week.

CHAIRMAN MILLER: We understand. I think we all have had access to this, but in order to have our files complete, you will be given leave for that reason.

MR. ROISMAN: Okay.

BY MR. ROISMAN:

Q Mr. Snead, in the redirect you were asked to expand upon and discuss these difficulties that were listed on page 11 of Mr. Bostian's testimony with regard to alternatives.

Am I correct in assuming that the list of difficulties that you gave with regard to reracking -- not poison racking, but simply reracking itself that you went through -- those would all be applicable to a subsequent reracking of theMcGuire unit No. 1 spent fuel pool if any

mm5

of the Oconee spent fuel is transshiped to that pool before the reracking is done.

Is that correct?

A (Witness Snead) Yes.

And many would be applicable whether or not Oconee was shipped there or not.

I would like to give you -- may I give you an example?

Q Sure.

A When we were reracking in the 3 pool, the only time that we have reracked the unit 3 pool we completed that job in '76, and that job began in '75, as I have previously testified, and I was responsible for the installation. In that respect, I was responsible for many decisions.

I made the decision to build a freestanding rack. Now at that time there was no utility that had ever made a decision to build a freestanding rack. And I remember very vividly carrying thatdecision with me for months while other very respected Duke engineers would stop me in the hall and say, you know, what's gotten into you. You have gone off at the deep end on this freestanding process. And, I was very apprehensive for several months while the NRC was weighing feestanding versus restrained racks.

That's just one particular instance of the sort of

mm6 1 decisions that have to be made that prove difficult.
2 Q But the question I was asking you was, when you
3 went through the problems with the reracking that you were
4 talking about in expanding on Mr. Bostian's testimony on
5 page 11, as I remember your testimony, it all related to
6 problems associated with removing racks installed in a pool
7 that had already had in it -- has in it spent fuel, and you
8 talked about radiation problems.
9 A Yes.
10 Q You discussed all of it.
11 I take it that if you never, if you don't put
12 any spent fuel in the McGuire pool from either McGuire or
13 Oconee and make a decision to rerack that pool,--
14 A You eliminate some of the --
15 Q Wouldn't it be more accurate -- a substantial
16 number of the difficulties that you had testified to just
17 a few moments ago in terms of the reracking difficulties?
18 A Yes.
19 Q Now you indicated that there were difficulties
20 at Crystal River with the poison racks.
21 Can you tell me, what is the basis for your
22 testimony about Crystal River?
23 Have you traveled there?
24 A No.
25 The basis for my testimony is direct conversations

mm7

with the Crystal River people in my effort to provide space for them in my pool for four of their fuel assemblies that they had damaged in trying to restart their reactor. And in the efforts to send four replacement fuel assemblies to them so that they could, indeed, restart the reactor.

Q Now the person that you spoke to --

Let's start with you, first. As I remember, you talked about some gas and some swelling of the -- was it a swelling of the rack itself? Was that what you were talking about? And a gas being released from the rack?

I was a little unclear about that.

A Well, as I understand the difficulty, provisions have to be made for releasing the gas where the gas accumulates in the material and causes the material to swell.

Q Now, what is the expertise that we are talking about being involved?

Is that chemistry or physics, or --

A That is a materials and chemical type of expertise.

Q Is that your background?

A No, sir.

Q The people you talked to at CrystalRiver, was it their background?

A The people that I talked to at Crystal River were commercial and operating and fuel engineers.

Q YOu mean people like yourself?

mm8

A Yes.

Q So neither they nor you, then, had the expertise about exactly what this phenomenon was that you were testifying to regarding some difficulty that arose with poison racks.

Is that correct?

A They very well could have had the expertise. I didn't quiz the fellow on the phone as you are quizzing me, as to his technical capability.

Q All right.

Now you made some statement again about the difficulties, about the need to maintain the equipment associated with the pool. I think you mentioned something about the crane and that sort of stuff.

A Yes.

Q You didn't mean to suggest that reracking the pool makes the equipment more vulnerable to breakdown than it would normally be, did you?

A Absolutely not.

Now I would suppose that if you did a very omnipotent study in reracking, there might be, say, some very, very remote risk because of your using the equipment more than you usually would, that it might increase the maintenance. But we don't look at that sort of thing.

Q Then all you were trying to say was that because equipment by itself can break down, that that might slow down

mm9

a reracking?

A Certainly.

Q It wasn't that reracking was causing equipment to be damaged.

It was that equipment can have those problems, not just those down reracking.

A Certainly.

Q Mr. Bostian, you were asked the question of whether or not you now factor into your thinking about spent fuel planning, the contingency that things that you thought back in 1975 were certainties, like reprocessing, might not turn out to be certainties.

And I believe you answered Mr. McGarry's question, you said,yes you now do.

Can you tell me how do you factor in the contigency that there will not be reprocessing ever?

How is that factored into your thinking on the spent fuel planning?

A (Witness Bostian) Thatwould be factored into our assessment of the development of the waste repository. We would certainly take a look at what the government is doing with respect to the AFR. And if our assessment indicates that we do need additional spent fuel storage based on these, and if we had concluded that there will never be reprocessing, then certainly that would influence us to

mm10

certainly provide additional space on a timely basis.

Q The question I am trying to get at is, I guess really the thought process here.

I take it that a contingency can run a whole range from a best estimate that it will probably work out, that there is always the possibility, Mr. Snead, I think, told us he wants to go home today but he can't be certain that he is going to go home. From that end of the extreme all the way to, he wants to have a million dollars today and he is not certain of that either.

Now that is a whole range of contingencies. Now, how do you make your judgment about what the probability is on this contingency. Obviously I am not talkingabout some Rasmussen-type fault tree, but give me some understanding of how you really weigh the probabilities that you are going to have or not going to have in processing?

A Mr. Roisman, this is a subjective judgment based on the political considerations that we see, the technical considerations that we see, and these considerations vary. When we are talking about the word "dynamic," these are the dynamic considerations.

Q Do you do it systematically? Do you have a set of questions?

I mean, have you sat down and tried to figure out what are all the factors that can impact on whether we will

mm11

or won't have reprocessing in the future, put those down on a piece of paper, then periodically assess them based upon information that you affirmatively go out to gather on those factors.

Do you have something that is as systematic as that?

A Not on this specific basis, no.

Q Now, would that be equally true with a contigency about when, if ever, there will be a permanent waste repository?

A That's correct.

Q And what about when, if ever, there will be the availability of a government or private AFR?

A That's correct.

Q Yet you do concede that the outcome of those contingencies could be very important in the decisons on what Duke should do with its spent fuel?

A That's correct.

MR. ROISMAN: I have no further questions.

CHAIRMAN MILLER: Any further recross-examination?

MR. BLUM: No, sir.

MR. KETCHEN: No questions.

CHAIRMAN MILLER: I take it there is no re-redirect, is there?

MR. MC GARRY: No, Mr. Chairman.

327 2:0

CHAIRMAN MILLER: Very well. The testimony, Applicant's Exhibit 3, as modified, has been offered into evidence.

Are there any objections?

(No response)

All right. Applicant's Exhibit 3 as modified will be received into evidence and may be incorporated into the transcript of the record.

(The document heretofore marked Applicant's Exhibit 3 for Identification, as modified, was received in evidence.)

MR. ROISMAN: Now I am having a little trouble, which one is Applicant's No. 3.

CHAIRMAN MILLER: That's the testimony of Mr. Ralph W. Bostian as has been modified in the course of the interrogation.

MR. ROISMAN: Okay.

CHAIRMAN MILLER: Very well, thank you gentlemen, you are excused.

MR. ROISMAN: Is that going to be admitted as an exhibit or be bound into the record?

CHAIRMAN MILLER: I have directed it be admitted as an exhibit and be bound into the transcript.

When we admit exhibits, it will be simply

admitting exhibits, unless we give specific directions that they be bound into the record.

MR. MC GARRY: Mr. Chairman, another procedural point.

I believe, Mr. Roisman -- this is just directed to you -- do you want Messrs. Snead and Glover to remain? You mentioned that yesterday.

MR. ROISMAN: Yes, I think so.

The line of questioning that we are going to pursue here is going to involve the costing out of alternatives. And as I understand it, both of these gentlemen have had something to do with that.

Mr. Hager interacts with them.

It is not clear at this point that Mr. Lewis needs to be up there right now.

MR. MC GARRY: I would prefer just to put Mr. Hager up there right now.

Would you like Mr. Sterrett also?

MR. ROISMAN: No, just hold him and just put Mr. Hager up. I wouldn't think Mr. Sterrett needs to be in on this.

(Witness Bostian excused.)

MR. MC GARRY: I would call at this time, Mr. Hager. He has been previously sworn.

CHAIRMAN MILLER: Mr. Hager, will you come

mm14 forward please.

Mr. Hager, you have been sworn, you remain under oath, sir.

Whereupon,

S. B. HAGER

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

MR. ROISMAN: There has been no voir dire of Mr. Hager.

MR. MC GARRY: That's correct.

MR. ROISMAN: Is he being offered as an opinion or a fact witness, Mr. McGarry?

MR. MC GARRY: As both, Mr. Roisman.

CHAIRMAN MILLER: Are we going to be dealing with the proferred testimony of Mr. S. B. Hager?

MR. MC GARRY: That's correct, Mr. Chairman.

CHAIRMAN MILLER: Let's have that marked then as Applicant's Exhibit No. 6 for identification, please.

(The document referred to was marked Applicant's Exhibit No. 6 for identification.)

MR. ROISMAN: Mr. McGarry, can you tell me what areas you are offering Mr. Hager in as an expert, what subjects do you want him to be able to give an expert opinion

mm15

on?

MR. MC GARRY: Yes, I believe he is competent to give an expert opinion on civil and environmental matters, particularly directed to the three, I believe, modifications as set forth in his testimony.

Let me just check those.

(Pause.)

I believe that is correct, with respect to the modifications that are set forth in his testimony, the five pages. We would offer him as an expert qualified to discuss the civil and environmental aspects, particularly the design aspects of these particular modifications.

MR. ROISMAN: That's an important distinction.

I will not object to him giving opinions about designs, but I would want to have extensive voir dire on him if you want him to give opinions about construction schedules or economic costs of doing these various things. Simply what design potential as opposed to simply what design potential exists to doing them one way or another.

Do you want him in on opinion on that?

MR. MC GARRY: Yes, we do.

MR. ROISMAN: I would like to have some voir dire, Mr. Chairman.

CHAIRMAN MILLER: You may examine.

mm16

VOIR DIRE

BY MR. ROISMAN:

Q Mr. Hager, can you give me some idea of your experience with the actual construction of various physical structures comparable to, what, the kind of construction that would be involved in building an independent spent fuel storage facility, for instance.

Have you ever been involved in the construction of such?

A (Witness Hager) My involvement in construction has been coordinating with our construction department on facilities that Duke builds.

Q Does that mean that in terms of exactly how the construction work is done, they are the ones who do that rather than you?

A That is correct. The construction department performs the construction task. We consult with each other on methods, how the design may influence the way the construction activity is performed.

Q You do the design work?

A We do the design work.

Q In the course of doing that work, do you have occasion to evaluate the time it takes to physically construct some aspect of the facility or the entire facility, or whatever it is you happen to be looking at?

mm17

A Yes. We have been involved in working with our construction department in determining durations of construction.

Q What is your participation in making those determinations about duration? Do you evaluate how long it takes a worker to weld two pieces of steel together, or how long it takes to install a bolt, or how long it takes to move a crane? Is that the part that you do?

A No, sir.

Q That's the part that the construction people do?

A Yes, sir.

Q What is your part?

A Our part is how the design would relate to construction.

Q So they might say to you, say, it looks to us like it is going to take five days longer to weld, why can't we bolt? And then you would evaluate to see whether or not bolting could work in terms of the design requirements?

And if it did, then they would say, good, we just saved five days?

A That is correct.

Q But it would be their judgments as to whether bolting or welding would end up saving time?

And your judgment as to which ones fulfilled the design requirements?

A That is correct.

Q Now what about costing, figuring out what the facility itself is going to cost.

Do you get involved in making a judgment as to how much something is going to cost?

A Yes, sir.

Q And what is your participation there?

A Design engineering determines the material costs.

Q You mean you determine how much it will cost to meet your design?

A We determine the design man hours, the design labor costs, we determine how much the concrete -- if it is a concrete structure -- how much concrete is involved, how much that concrete is going to cost.

Q Okay. And --

A We, design engineering, designs the material costs. Design engineering does not determine the labor costs for placing the concrete.

Q That is done where?

A That is done by the construction department.

Q Now when you determine material costs and the like, do you use accountants, cost accountants to give you that information?

How do you go about assembling that?

mm19

A Engineers do that, provide information based on past experience in projects.

Q And that work would include making projections as to how much something is going to cost that you were in the process of designing?

A That is correct.

It is also based on obtaining information from our purchasing department if it is an item we have never done before, or from vendors.

Q Where a question arises as to what the future cost of something is going to be and a cost can change as a result of inflation or all other things that would cause costs, do you use your own judgments about that, or do you go to some other branch within the company to get their judgment on inflation factors, or cost of money factors for those kinds of considerations?

A If it is a major project such as a nuclear station, the inflation factors,we obtain from our purchasing department.

Q What if it were an independant spent fuel storage facility, or a reracking and the purchasing of the racks and their physical insetallation?

A On an item such as racking, design engineering would determine that inflation cost based on information that is available such as any equipment index, or Bureau

mm20 of Labor Statistics, that type of information.

Q Lastly, in terms of doing the analyses that are contained in this document which is your testimony marked as Applicant's Exhibit No. 6, in the Applicant's Exhibit No. 1, which I am showing you just to refresh your memory, is the study prepared of the relative costs of reracking an independent spent fuel storage dated June 15, 1979, in doing those studies, what was your direct participation in putting together of the numbers and so forth?

Did you actually prepare the numbers and make the judgments as towhat these numbers should be?

Or, did you act as a reviewer?

A I acted as a reviewer. Those numbers were put together by individuals under me. I reviewed the results, the criteria they had used to come up with the numbers.

Q For instance, if I asked you,project schedule listed for one of these is 17 months, if I asked you what were the assumptions used in deciding 17 months instead of 16 or 22 months, would you be able to answer that, or would we have to ask the person who did the work for you to give us that answer?

A I can answer that.

MR. ROISMAN: Mr. Chairman, with the following qualifications, I will have no objection to this witness testifying.

mn21

One, to the cost estimates of various alternatives, to the extent that they fall within the ambit of what he has already testified they do within their own department, he knows within his own personal knowledge.-- remember there was a distinction -- it appears that all the reracking will fall within the area.

Secondly, I will have no objection to testifying to the studies that he testifies to, unless and until we reach the point that he tells me, "I do not know of my own personal knowledge where that number came from, or how it was developed," in which case I want the alternative witness.

I will object to the witness giving opinions with regard to the question of scheduling of construction work, and believe that a witness from the construction department would have to be here.

This witness testified that he does not, himself, have any personal knowledge of the length of time these various things will take and he relies on the construction department to do that.

That would be an area of questioning that I would want to get into with the witness. And that is with regard to his opinions on that.

CHAIRMAN MILLER: Well, we will approach that when we come to it. We don't wish to rule on that one way or the other at the present time.

mm22

MR. ROISMAN: All right.

CHAIRMAN MILLER: Are there any other requests for voir dire examination on the expertise of the witness?

MR. KETCHEN: Staff has no questions.

MR. BLUM: I join in Mr. Roisman's comments.

CHAIRMAN MILLER: Very well.

In that event the Board rules that the witness has qualified as an expert in the designated areas upon voir dire examination and you may proceed, Mr. McGarry, to treat him as an expert witness in that regard.

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

I have a couple of housekeeping matters, pursuant to the Board's observations. They are fairly minor, with respect to Mr. Hager.

On page 2, the middle paragraph that begins, "My testimony," the line , the line, "Scheduling data pertinent to," strike, "Mr. R. W. Bostian's response to contentions concerning "

CHAIRMAN MILLER: It will be stricken.

FURTHER DIRECT EXAMINATION

BY MR. MC GARRY:

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

A (Witness Hager) Yes, sir, I did.

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

mm23

A Yes, I do.

Q Is it captioned "Testimony of S. D. Hager"?

A Yes, sir.

Q And I believe we have previously established the first page and a half pertain to your professional qualifications, is that correct?

A Yes, sir.

Q And beginning on page 2, and carrying over to the end to page 5, does that contain testimony that you propose to put forth in this proceeding?

A Yes, sir, with some corrections.

Q Would you please make those corrections?

A On page 3, the second paragraph, where it begins, "Duke is currently pursuing," that should read, "Duke has received the approval."

The next sentence beginning, "This expansion if approved," we should strike "if approved."

The next-to-the-last sentence of that paragraph beginning with the words "pending a June 1979 approval of the proposed license amendment." Strike, and begin with "This."

The next paragraph beginning with "Based on current discussions," strike "current discussions with" and insert "information from."

The cost listed as "$7 million," strike and

mm24 insert "5,218,000."

The last sentence of that paragraph beginning with "We are currently performing." strike the entire sentence.

Those are the changes that I have.

Q Mr. Hager, just for clarification for the Board, Parties and public, can you please explain the reasons for those changes on page 3?

A Yes, sir.

This testimony was prepared prior to receiving the license to install high-density racks in Units 1 and 2 at Oconee.

That license was received this week.

The last paragraph of page 3, the testimony was prepared prior to receiving information from poison rack suppliers. There had been discussions held with poison rack suppliers prior.

Q Mr. Hager, with these modifications, is your testimony true and correct?

A Yes, sir.

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

A Yes, sir.

MR. MC GARRY: Mr. Chairman, that is all the direct questions I have at this time.

327 223

wm25

CHAIRMAN MILLER: Thank you.

You may cross-examine.

CROSS-EXAMINATION

BY MR. ROISMAN:

Q Mr. Hager, can you describe to us the process by which you came to investigate these alternatives that are discussed in your testimony?

Is this a project that you began on your own, or were you asked to do it by someone within the company? How did it happen that you looked at these alternatives?

A (Witness Hager) The alternatives were a result of discussions with Mr. Bostian, Mr. Bostian or his people, as to what should be looked at in view of no reprocessing being available, or reprocessing being delayed at this point in time.

Q Was the availability [illegible]ailability of nuclear wastes a factor, that is, nuclear waste disposal, permanent disposal, a factor also?

A Mr. Bostian would have to answer that question.

Q What about availability or unavailability of a go[illegible]nt-away-from-reactor storage facility?

A Again that would be under Mr. Bostian's area.

Q And what about the availability or unavailability of the opportunity to transship spent fuel from the Oconee reactor to other reactors in the Duke system?

321 22A

mm26

A That would be in Mr. Bostian's area.

Q And none of those would affect these analyses here, if those were or were not available? That is, it wouldn't change any of the conclusions that you had if we assumed that transshipment was or wasn't available, or we assumed that any government available AFR were or were not available?

A It may affect it to the extent that some of these would not be looked at.

Mr. Bostian would have to make that determination.

Q But it wouldn't affect any of the conclusions about how much it would cost or how long it would take or how feasible it was, in your judgment?

A No, sir.

Q Now the first alternative that you look at here is the modification of the spent fuel pools at Oconee.

Can you describe to me the thinking process that you went through, to the extent that you participated in the determination not to rerack the Oconee unit 1 and 2 pools with poison racks?

A Are you talking about unit 3 and not reracking 1 and 2?

Q I'm sorry.

In unit 1 and 2, why was the decision made not to seek approval for a poison reracking of the unit 1 and 2

wm27 pool?

A It was, as I recall, a review of schedule and we were concerned that we could not get the racks in in time to install them prior to a refueling this fall at Oconee.

Q Now, does it therefore follow from that that if you at an earlier date decided you wanted to use poison racks and had been able to order them early enough, that that scheduling problem wouldn't have been a difficulty?

A [illegible] you made that determination early enough.

Q Do you have any knowledge as to why that determination was not made earlier?

A No, sir, that would be in Mr. Bostian's area.

Q Were you asked to provide an analysis by Mr. Bostian of the feasibility and availability of poison racks for reracking of Oconee 1 and 2 any time prior to December of 1978?

A No, sir, not that I'm aware of.

We may have discussed, or some of my people may have discussed with vendors prior to that time, poison racks. But I did not furnish to Mr. Bostian to my knowledge, other than information of vendors that may have come in.

Q Okay.

Now in evaluating the cost of the expansion that is now going to occur at Oconee units 1 and 2, what are the items that make up the total cost -- perhaps it is

mm28 easier -- what items aren't include din there that are going to be cost incurred?

For instance, is the operation and maintenance cost to the extent that they increase, occur as a result of the expansion, is that included?

A No, sir, this is capital costs only.

Q This is capital costs only?

A Yes, sir.

Q Okay.

And this number, $3,314,000 you have listed as estimated at, you have not yet got a firm contract for the racks. Is that the reason it is an estimate?

A We have a contract for the rack. There are other costs associated with the reracking besides just racks.

Q What is, in your judgment, what is the range that this number might go up or down as a result of those uncertainties?

A In our estimating we use a contingency of around 25 percent.

Q So we could see it either 25 percent higher or 25 percent lower?

A We could see 25 percent lower. We include that contingency in our estimate of 25 percent.

Q So your testimony is this is the upper limit. It is not going to be any more expensive than that, and it

mm20 might be cheaper?

A No, sir. This is what we expect it to be.

The 25 percent contingency is for unknowns that may happen in the reracking process which will increase the cost.

Q That's right. But what I am trying to get clear, it is your judgment that the 25 percent contingency covers all the possible additional costs, so that this represents an upper bound of what the costs might be?

A It represents what we see, what I see as being the cost of installing those racks.

Q Could it be higher?

A Yes, sir.

Q Do you have a judgment as to what is the reasonable range of how much higher it could be?

A Our judgment is, it would not be higher than this, but it could be.

Q But you don't have a judgment as to how much more higher it could be?

A No, sir, not at this time. You don't know what difficulties may be encountered at this time. This is a first type installation of this for Duke.

Q You have indicated that this work is scheduled to be completed in late 1979.

What do you base that statement on?

mm30

A That was based on durations for removing system racks, installing racks, the time duration for obtaining a license, duration for preparing the specifications, et catera.

Q Okay.

You have now got the license.

A Right.

Q You want to change late 1979 in any way, in light of the fact that that is now a given?

A It is now a given and our date is October 1979.

Q Is now by the end of or by the beginning of?

A It is the beginning, October 1st.

Q October 1st of '79.

Does that have a contingency factor in it like the cost did?

A No, sir.

Q Do you have any information to suggest that it might be later than October 1 of 1979?

A Yes, sir.

The contractor that is performing the diving work, is Underwater Contractors. They have indicated to us that the durations for removing racks and installing the new racks is dependent upon radiation levels within the pool.

If the levels are higher -- are high, it would increase the time.

327 229

Q Are the radiation levels now at the level that

mm31 would require more time?

A The radiation levels are high, as I understand it, based on information from my health physics people.

Q Is this a radiation in the water, or is this a gamma radiation?

A Sir, that is outside of my area.

Q I do not know?

A No.

Q So you do not, then, really have a basis to make a judgment as to whether it might be beyond October 1 of 1979 based upon a radiation problem?

A No.

Q What about -- what are the other possible things that could cause it to go beyond October 1 of 1979?

A We have received some of the modules. We have not received all of them yet from the supplier. There could be problems related to obtaining the modules that have not been delivered from the supplier.

Q Have you had direct contact with the supplier?

A We keep in almost daily contact with the suppliers, since this is the rush item.

Q Have they given you any information that forms a basis for your belief that they won't get the racks there on time?

A No. We expect to get the racks on time.

mm32

Q What is the date that you must get them on time in order to -- the date by which you must get them in order to avoid that October [illegible] date?

A I do not remember that specific date.

Q Give me roughly. Are we talking about, is it a date in July or a date in September?

A [illegible]s about another month.

Q Okay.

If they came two months -- if it slipped a whole other month after that, would that result in a direct slippage of one more month in the completion date?

A Unless a special effort was put forth to increase the manpower of the divers to reduce the installation time.

Q So you could eliminate a time delay caused by the absence of the racks on site on the schedule time by simply increasing the workforce once the racks got there, is that correct?

A In my opinion that is correct.

Q All right, let's go down to the next paragraph in your testimony that begins on the bottom of page 3.

It says "Based on information from poison rack suppliers, the estimated cost of poison racks. . ." and you go on, "and the estimated delivery time is 12 to 15 months."

Do you have that information here with you that you refer to here, based on information from poison rack

mm33

suppliers?

A I believe I do not personally have it. I believe that information is available.

It is a booklet from two suppliers, a U.S. Nuclear, and PX Engineering. I do not recall whether the dates are quoted in those publications or not. We have had meetings with both of those suppliers and these dates were obtained from the suppliers.

Q Do you consider that the dollar amount that is listed there represents a quote, a bid from them that you can accept at the $6,218,000 number?

A That includes other items, that would be required in the reracking process besides the racks themselves.

Q Do you consider that the price of the racks themselves are fixed at this point, if you want to accept the offer?

A No, sir.

Q They are subject to going up?

A They are subject to going up.

Or, could go down. We have not obtained a formal proposal from the suppliers for reracking. We have not issued a formal specification.

Q Okay.

Now, do you have any information of your own knowledge as to this estimated delivery time of 12 to 15

mm34

months?

Do you know why is there a delivery time of 12 to 15 months? What is the source of that?

A The 12 to 15 months, that was information from the two suppliers.

Q And have you queried them at all about whether if you wanted them in six months they could do it?

A I believe we asked what was the best delivery date possible, and the information given was that there is time required to obtain materials and do the fabrication, and their estimate was approximately 12 months.

Q In your experiance with ordering components for nuclear work and nuclear facilities, if you went back and said, "Look guys, we have got to have it in six months." Is it possible that what they told you is their best might be made better?

A I do not recall an instance where we have asked to make it better once it has been formally quoted.

Now the information that a supplier gives you prior to a formal quotation is subject to change.

Q So that if you went back to them and said, "We are ready to get a formal proposal, but I want to tell you in advance if you can't deliver in six months, I'm afraid we are not going to be able to go with you," there is at least a possibility that they would figure out a way to

mm35

get it to you in six months?

I mean, that would be an accurate edescription of the process that would occur?

A That might occur and save the six months.

Q I understand that.

I take it the only persons who might answer that would be the suppliers. You can't make them deliver it quicker.

end T5

A That is correct.

Q Now in terms of your evaluation of the reracking possibilities at Oconee, this information that's contained in the last paragraph on page 3 is the reracking for all three pools, is that right?

A There are only two pools --

Q I'm sorry, for all three reactors in both pools?

A Yes, sir.

Q Okay.

So do you have any sense of whether or not you might be able to get -- or whether this would help you get the racks any quicker if you got the racks for the reracking of one of the pools, you started its reracking as poison racks first and then got the racks for the other pool after that?

A In our discussions with the vendors, the 12 months was the time frame quoted by them for a pool.

Q For one pool.

A For a pool.

Q All right.

Now did that mean that it would be 24 months, therefore, before you would have all of it?

A No, sir, it does not. You've got the two vendors there.

Q All right.

Now I'd like to direct your attention to Applicant's

mpb2 Exhibit number 1.

Do you have a copy of that? That's the June 15, 1979 report, signed for you by Mr. Bradley.

A Yes.

Q Or maybe Ms. Bradley.

A Mr.

Q Okay.

Let's take a look on the first page, the first option, Oconee Units 1-2 and 3:

"Replace existing racks with high density poisoned racks and no fuel shipped off site until year 1990."

Okay?

A Right.

Q Now to begin with, did you make an assessment of whether or not it was possible to do the reracking that's outlined there under 1.a without shipping any spent fuel offsite until the year 1990? Do you know if that condition is a feasible condition?

A No, sir, that would be determined by Mr. Bostian.

Q All right.

So you simply accepted that and went ahead and evaluated the reracking.

A That is correct.

Q Okay.

mpb3

Now the project schedule, 17 to 28 months.

Can you tell me, how did you arrive at that schedule?

A That is based on prior experience with securing racks.

Q Is rack procurement the biggest single item in there?

A Yes. Procurement and installation of the racks.

Q Okay.

The 17 month number, what did you assume at the time it would take you to procure the racks?

A Two months, to prepare specifications and award the contracts.

Q And how long for delivery?

A 12 months.

Q Now in preparing the specifications -- And what was the other part of that two months, to prepare the specifications --

A Prepare the specs, obtain proposals and award.

Q How much of that is time that Duke would be spending as opposed -- Obviously obtaining the proposals is not your time.

How much of the time would you spend?

A Approximately a month preparing the specifications.

Q Could you prepare the specifications in less time

mpb4 if you were ordered to do it in less time?

A No, in most cases it has taken longer than that time to prepare a specification.

Q Now by "specification" you mean the actual drawings and design work?

A No, sir. It is a spec for the supplier to furnish you a quotation. It lists the design requirements of the racks, the configuration of the pool where the racks have got to go, that type of information.

Q Okay.

Now let's look at the 28 -- Wait a second. We've taken care of 14 of the months.

The remaining three months is installation?

A Installation.

Q All right.

That's also based upon experience?

A That is based upon experience.

Q Okay.

Now what's the 28 month number? Tell me how each of the numbers we've just talked about changes in order to get to the 28 month.

A All right.

The specification and award of the contract time would be three months.

Q Okay.

mpb5

A We would award the order at that point in time and then we would go into the licensing phase of the schedule. We would hold the fabricator from doing any fabrication until we received the license.

We estimate the licensing time to be 12 months.

Q Am I correct there was no licensing time --

A There was a licensing time of nine months in the 17 month schedule. We are saying in that schedule, the 17 month schedule, that we would go ahead with engineering and fabrication of the racks prior to receiving the license, but would not install the racks until we received the license.

Q Okay.

Now in your second option you're going to do the licensing which you're estimating at 12 months, after the specs have been done and after you have gotten back a proposal and made an award?

A That is correct.

Q Okay.

And then what comes next?

A The fabrication and delivery of the rack.

Q Which is how long in this?

A That one would be -- the fabrication and delivery time we have estimated at ten months. But the contractor or vendor could be turned loose to procure materials prior to that time.

mpb6

Q You mean like near the end of the licensing process?

A Near the end of the licensing process, right.

Q So what you're saying is it's still a 12 month, but you're going to do that much overlapping of the license.

A Right.

Q All right.

And how many months for the installation?

A Five months.

Q Okay.

My arithmetic states that this looks like 30 months. Where is the overlap occurring?

A Inbetween licensing and fabrication.

Q Oh, I see.

A And there's also overlap in the fabrication and delivery time.

Q Okay.

A You don't have to receive all of the deliveries at one given point in time.

Q In other words, you can start getting some of the racks and putting them in --

A Before receiving all of them, right.

Q Okay.

Do you have a judgment about which is the more reliable or likely number with regard to the months to prepare

mpb7 specification, obtain proposals, and award, two months or three months?

A Based on our experience, it more likely is three months.

Q Okay.

What about -- Do you have any basis for having an opinion about the licensing time at all?

A The licensing time, what we did is obtain from licensing information services a listing of all poison rack licensed projects, and they contained the licensing duration time. And by reviewing that document we selected nine months on a crash basis, 12 months on a preferred basis.

Q Okay.

And that is -- To what extent, if any, did you take account of the fact that licensing might go faster if there had been more of them approved by the time your application is available? Is that a factor in deciding --

A No, we just looked at the numbers.

Q And what, picked the average?

A It was an eyeball of the numbers. The range, as I recall, in the early days of licensing of the poison rack, the earliest was six months and the longest that had yet not been received was 25 months.

Q And did you make an analysis to find out why one was longer than another?

mpb8

A No, we did not do a detailed analysis at that time. This was just a judgment by looking at the --

Q Just looking at the numbers from the date of application to the date of approval?

A That's right.

Q What if any credit -- To what extent did you factor in the time that it had taken you to get the approval for the rerack of Oconee 1 and 2 for nine poison racks as an example of licensing time regarding a reracking, even though it's not a poison rack, any?

A No, we did not. At the time this was prepared we had not received that license.

Q Was this done even before June 15th, then, the calculations?

A Yes.

Q In the study that was done, Applicant's Exhibit 1, is any effort made here to evaluate the health and safety implications to workers or the public of the options involved?

A No, sir. This is only looking at cost and schedule.

Q So nothing to do either with how the adoption of one of these options might either encourage some future course of action or discourage some future course of action by Duke with regard to its spent fuel storage problem?

A No, sir. Mr. Bostian would have to weigh that

mph9 along with the cost.

Q I see. Okay.

Let's take a look at your option B. Now I take it option B, the first part of it, the reracking of Units 1, 2 and 3 with poison racks is just exactly like option A.

A That is correct.

Q You're assuming in this analysis that that precedes first, that that's done first. Is that correct?

A We did not run into a sequence scheduling here. All we would provide Mr. Bostian is 'These are the items you could do to obtain storage.' The actual sequencing of events would have to be evaluated by Mr. Bostian.

What we are saying is that we could install poison racks and build an independent fuel storage facility that would provide you storage to a year, approximately the year 2000.

Q Okay.

Just so that we know what we do or don't need to talk about, on the Oconee units you've got an independent storage facility evaluated where you use poison racks, you have one where you assume that you -- where you assume no reracking and you only want to get to the year 1990, and then you have a fourth one where we assume that you are going to do no reracking but you want to get to the year 2000.

Are the assumptions that make up the calculations

mpb10 of costs -- What assumptions are different for each of those options. I see that you came up with different costs for addition of spent fuel storage space in the three options.

Can you identify what are the things that changed in order to make those three differences?

A Okay.

Item C is an independent fuel storage facility only.

Item D is an independent -- let me back up.

Item C is the independent fuel storage facility with 1500 spaces.

Q Okay.

A Item D is an independent spent fuel storage facility with 3000 spaces.

Q Okay.

A That is the difference.

Q And item B?

A Is an independent spent fuel storage facility with 1500 spaces and installing poison racks in both pools.

Q By "both pools" you mean?

A Unit 1 and 2 pool and unit 3 pool.

Q All right.

Am I reading this correctly, in just looking at the difference between option C, the 1500 storage rack, and option D, the 3000 storage rack, that the price per addition

mpb11 of spent fuel space is markedly lower if the capacity of the pool is 3000?

A That is correct.

Q That is that actually the total cost of the independent spent fuel storage facility is only slightly higher for a 3000 capacity independent spent fuel storage than it would be for a 1500?

A That is correct.

Q What is that attributable to?

A Scale.

Q Being able to build a bigger one?

A The size of the facility is the same. It is including the poison racks in lieu of a stainless rack in C.

Q I see.

So you are not talking about scale in terms of making the physical dimensions of the independent facility larger?

A No, it was the same size in terms of you're getting more spaces with the poison rack, therefore the unit cost per rack comes down.

Q All right.

I take it it would be your judgment that if one wanted to build that independent spent fuel storage facility and you thought there was the possibility that you'd need 3000 spaces, that it would make more sense to build it initially

mpb12 with poison racks rather than to build it initially with non-poison racks and then rerack the independent spent fuel facility?

Is that a correct --

A Mr. Bostian I think would have to make that determination based on where he stands with fuel at a given site, what his reloads are, the duration of construction, and so on.

Q You're saying that's not a judgment which you would be qualified to make and don't make in the course of your work?

A That is correct, I do not.

Q All right.

I'd like you to get, if you would, a copy of the document called "1976 ISFSF Study" which, among other things, is attached to the April 23, 1979 letter from William O. Parker to -- of Duke -- to William J. Dircks, director of the Office of Material Safety and Safeguards, Nuclear Regulatory Commission.

MR. ROISMAN: I'd be glad to give it an NRDC exhibit number if I could remember what our next exhibit number is.

MR. MC GARRY: It would probably be more appropriate as an Applicant exhibit.

MR. ROISMAN: That's all right.

MR. MC GARRY: That would be number 7.

327 246

mpb13

(Whereupon, the document referred to was marked as Applicant's Exhibit No. 7 for identification.)

BY MR. ROISMAN:

Q Now am I correct in that the calculations --

MR. MC GARRY: Excuse me, Mr. Roisman, but I believe the Board has some confusion.

CHAIRMAN MILLER: We don't know what the document is, Exhibit 7.

MR. ROISMAN: I'm sorry.

Exhibit 7 is a document entitled "1976 ISFSF Study", which is attached to a letter from William O. Parker to William J. Dircks, dated April 23, 1979. And it has no other designation on it. All the pages of the study have the word "Draft" stamped on it.

CHAIRMAN MILLER: I don't think the Board has a copy of that.

MR. MC GARRY: We're endeavoring to get the Board a copy, Mr. Chairman.

CHAIRMAN MILLER: Okay.

You may proceed.

MR. ROISMAN: Okay.

BY MR. ROISMAN:

Q Now looking at Applicant's Exhibit number 1, can

mpb14 you and I understand Exhibit number 1 is the update of that 1976 study that we call Exhibit number 7?

A (Witness Hagar) Okay.

Q All right.

We're going to talk about those two for a while.

Now looking at Applicant's Exhibit number 1, am I correct that the calculation of the -- And I'm now looking at attachment 2, sheet number 1 of applicant's exhibit number 1 --

MR. MC GARRY: Mr. Roisman, may I just interrupt for a second?

Are you going to go back and forth between these two exhibits?

MR. ROISMAN: Yes.

MR. MC GARRY: I think it would be appropriate if we could have several minutes to furnish the Board a copy. We're just having trouble getting organized.

Would this be a convenient time to have a recess?

CHAIRMAN MILLER: Yes.

We'll resume at 1:30, recess now for lunch and resume at 1:30.

(Whereupon, at 12:00 noon, the hearing in the above-entitled matter was recessed, to reconvene at 1:30 p.m., this same day.)

AFTERNOON SESSION

(1:30 p.m.)

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

Mr. Roisman, I believe you were examining, were you not?

MR. ROISMAN: Yes, Mr. Chairman.

Whereupon,

S. B. HAGER,

H. T. SNEAD,

and

MICHAEL GLOVER

resumed the stand and, having been previously duly sworn, were examined and testified further as follows:

RECROSS-EXAMINATION

BY MR. ROISMAN:

Q Mr. Hager, right before the lunch break I had asked you to look at Applicant's Exhibit No. 7, Applicant's Exhibit No. 1. Do you have those two in front of you?

A (Witness Hager) Yes, I have.

MR. ROISMAN: Mr. Chairman, the Board now has a copy of Applicant's Exhibit No. 7?

CHAIRMAN MILLER: No. We have number 1.

MR. MC GARRY: I just asked if the people who are making copies have returned to the room, and they have

not, Mr. Chairman.

MR. ROISMAN: Shall I begin, in any event?

CHAIRMAN MILLER: Go ahead, yes.

BY MR. ROISMAN:

Q Looking at Applicant's Exhibit No. 1, Mr. Hagar, Attachment 2, sheet one lists a set of assumptions that are used in calculating the construction of a 3000 spent fuel capacity independent spent fuel storage facility at the Oconee site.

A (Witness Hagar) That is correct.

Q And one of the assumptions that's listed there is number five, the cost is based on the original 1976 estimate for an ISFSF located at Oconee. Is that estimate contained in and supported by what is marked as Applicant's Exhibit No. 7?

A That is correct, except it has been escalated from 1976 to current dollars.

Q Okay, that was the next question I was going to ask you. Is that the only difference in the dollar calculations? In other words, if I want to really get at the root of the $61 million cost for that ISFSF, I should look at the assumptions and calculations in Applicant's Exhibit No. 7?

A The other addition, other than escalation, is the poison rack cost.

Q Okay. Those two --

A Those two items.

Q -- are the only differences?

A Yes, sir.

Q All right, then if you would, let's go to Applicant's Exhibit No. 7, the pages are not numbered, but it's the page that looks to be three pages in, counting the cover as one page. It is entitled "Assumptions Employed in Study."

Do you have it?

A Yes.

Q Okay, now are there any of those assumptions that are not applicable to the study that is contained in Applicant's Exhibit No. 1?

A Yes. These are assumptions listed in the 1976 study. They were for a set of conditions in 1976. Assumption number one.

Q Is that a given assumption?

A Yes. We have listed the assumptions associated with our 3000 space capacity for the independent spent fuel storage facility on Attachment 2, sheet one.

Q All right, but I'm trying to find out, since one of the assumptions is that the cost is based on the 1976 money, are you saying that none of the assumptions listed on the page in Applicant's Exhibit No. 7 -- called "Assumptions

Employed in Study" -- affect costs?

(Pause.)

A Item 6 would affect cost.

Q Is that the same as you are using for the 1979 study in Applicant's Exhibit No. 1?

A For which conditions, sir? Which alternative?

Q I'm sorry, for the one on Attachment 2, sheet one, the 3000 storage.

A No, the 3000 storage is based on poison rack, in lieu of 15-inch space racks.

Q Okay, I was not aware whether that 50-1/2 inch center-to-center meant they were not poison racks.

A They are not poison.

Q All right, what else on Applicant's Exhibit No. 7 for listed assumptions affect cost? Obviously 11 does.

A Yes, I stated we used an inflation rate of 6 percent.

Q And you used that to get the numbers in the '76 study up to the numbers in the '79 study for those components.

A That is correct.

Q What else?

Anything else in there that would affect the cost number that shows on Attachment 2, sheet one, of applicant's Exhibit No. 1?

A I do not see any other item.

Q All right, then, let's turn to Table No. 4 attached to Applicant's Exhibit No. 7. The table is entitled "ISFSF Cost Estimate, 1976 Dollars."

Can you tell me what, if any, of those costs would be lowered were you to build the ISFSF at Oconee adjacent to the Oconee Unit No. 3 spent fuel pool?

A The purposes of this study, none would be lower, because this is a self-contained facility.

Q If you built the spent fuel pool -- an independent spent fuel pool -- next to Unit No. 3, would it be possible to utilize any existing features of that pool or of the plant to thereby reduce the capital cost of the facility?

A That has been reviewed and determined that we did not have coolant capacity available for an independent fuel storage facility, presently at Oconee in No. 3.

Q All right, so you would have to expand, or supplement the cooling capacity. Are there any features that are there that you could take advantage of?

(Pause.)

Let me withdraw the question. Let me ask the question differently.

Have you done a detailed study of the cost of utilizing as much of the existing equipment and other features that are associated with the Oconee Unit No. 3 spent fuel pool and building a 3000-capacity independent spent fuel

pool adjacent to it, to see which is more expensive -- free-standing, or one that is next to the Oconee No. 3 pool?

A We have not done a detailed study.

Q Have you done any study?

A We have looked at it from an observation standpoint, a judgment standpoint.

Q What does or 'observation standpoint' mean?

A It means looked at it on the basis of space available to put in such a facility -- the area of the ground that is available to sit on, and looked at the cooling capacity available in Unit 3.

Q Is the ground area available there?

A It is not. We are limited in space there.

Q To what size would you have to limit it?

A You're limited to about a width of 40 feet adjacent to Unit 3 pool, because of existing structures; and you are limited, to the west of that, in length, as I recall, to about 140 to 150 feet, because of condensar cooling water pipes that feed Unit 2 and 3 at Oconee.

Q If you were using poison racks, what capacity could you get in a pool that was 40 x 140? A spent fuel pool.

A We looked at that, and as I recall, the number, approximately 650.

Q That's with poison racks?

A With poison racks.

Q All right, let's look at the -- Do you have any perception of any way in which you might build an ISFSF at Oconee with a capacity of 3000 spent fuel assemblies that would be less expensive than the $61 million cost?

A Offhand, I do not know of any.

Q Let me just test you on a couple.

Have you looked at whether or not building a canal from either 1 and 2, or from 3 to the pool, to permit transfers without making cask changes from one or the other of those pools would reduce in any way the costs?

A We did look at an L-type arrangement that would require cutting the existing fuel pool wall, make the interconnection, and from our judgment, structurally the Unit 3 pool then would not be structurally sound.

It is very -- the strasses in the Unit 3 pool in the reinforced concrete are at the code allowables and we felt that we could not cut that wall because of the loading conditions on the pool.

Q What about 1 and 2?

A The same thing for 1 and 2. They are of similar designs.

Q All right, then, let's look at Table 4 in Applicant's Exhibit No. 7 for a moment. How were the numbers that are listed here calculated?

A. It is based -- the numbers are based on a breakdown of volume and the unit cost for the materials.

Q. Well, let's take grading and earthwork. You calculated how much grading and earthwork would be required?

A. That is correct.

Q. At a specifically identified spot on the site?

A. It could be at any location on the site.

Q. Which would be essentially the same?

A. Essentially the same. I calculated approximately 21,000 yards.

Q. Of material to be moved?

A. Right.

Q. Now this Item No. 1, the "grading and earthwork" item, that represents labor and materials associated with that moving?

A. That does, because that is generally a contract.

Q. Okay. Now how about -- Item 2 is "associated civil items." What does that mean?

A. That would consist of items like fence, paving, drainage, cable trench, water piping, those type items.

Q. And "structure," that's the pool itself?

A. That's the reinforced concrete structure.

Q. And the storage racks, that number was the nonpoison racks at the time these calculations were made?

A. That is correct.

Q And what is the number for the poison racks? What number substitutes in there?

A I do not have that number available right here. I can furnish that number.

Q Okay. All right, is it higher?

A Yes.

Q Then, "mechanical equipment." Is that the cooling systems, and that kind of thing?

A That's correct.

Q And it says, "including the fuel handling bridge." Does that include all of the cranes and stuff that go with that bridge?

A That particular bridge is the one that operates across the pool itself in removing assemblies from a cask and inserting them into a rack, or vice versa. There are other cranes associated with the facility.

Q Okay. Now when you calculated "mechanical equipment" and the one below it, the "electrical equipment," did you go out and actually physically design this facility to find out what sized capacity each of these were going to need in order to get your calculation of what sized mechanical and electrical equipment were required? How did you do your calculation?

A The electrical equipment required was based on previous type projects such as a spent fuel pool, looking at

what electrical equipment is associated with that type facility, and based on costs that we are -- or were incurring for purchase of that equipment at that time. And it consists of equipment such as transformers, switchgear, motors.

Q Now are the costs that you've got listed here for field overhead material, field labor, field overhead labor, those items, what's the source of those calculations?

A Just one moment. I have to look at the detailed breakdown.

e-7

b-7A

(Pause.)

I'm having trouble finding that, but I can give you, as I remember, how that number was arrived at.

Q Okay, why don't you tell me how you remember, and if I want more you can look it up later.

A It was based on a review of the construction manhours required to construct the facility times an average construction manhour cost.

Q What did you use as your base case for the construction of such a facility? Which facility that had been constructed did you have to determine how long it will take to be built?

A The manhours, as I recall, was furnished to us by our Construction Department. I'm not positive of that until I find the source document.

Q So what you mean is, you're not sure. If that's what the source is, then I'd have to ask them what they used as their base for making the calculation? Is that right?

A That is correct.

Q Okay, now in this study, Applicant's Exhibit No. 7, you have on a key-date page, again not numbered, I'm sorry, it looks like three, four, it looks like page six, or it's the sixth page in, counting the cover page?

A Yes.

Q Now how are these dates determined?

A This was determined from the bar chart that is also attached in this document. Those are --

Q Which bar -- all my copies of the charts are virtually illegible, but tell me which one you're talking about.

A That's the one (indicating) that I see that you have.

Q These two (indicating)?

A Yes, sir. They connect together.

Q Okay, how were they -- How were the times that contained on the bar chart, calculated?

A The times for the design were calculated based on experience of similar type work. The durations for the construction activities were based on a review by our

Construction Department, and a review by myself of those dates.

Q Okay, so this is a combination of actual experience, plus some judgment of the people who have had that kind of experience within the company.

A That is correct.

Q Can you explain to me the difference between the time calculated here, which looks to me to be about 39 months, and the time calculated in Applicant's Exhibit No. 1 which is a minimum of 34 months, I believe -- I'm sorry, 47 months.

A That "47" should be "45."

Q It should be 45.

What is the difference?

A The 37-month schedule was what was prepared back in 1976 when the intial study was done. We have since reviewed that schedule and had inadvertently omitted some front-end engineering, which is the preparation of general arrangement drawings, the review of those drawings, and determining the final arrangement of the facility prior to start the design, the final design.

Q How much time?

A Yes, that was six -- four months.

Q Okay, what about the remainder of it, then?

A The remainder of the difference was in analysis

and the design of the structure. It was two months, an increase in two months of the analysis and design of the structure.

Q I'm sorry, I guess you're using terms of art that I don't understand. I thought we just talked about adding five months, or four months for analysis and design?

A No, sir, that was for preparation of general arrangement type drawings, which gets you to the point of starting your analysis and then starting the design.

Q Are those all the items that add?

A Yes, that's the total of six months.

Q Okay, now tell me, how does it happen that in the 1976 study you have given this 37 months, or whatever, it looks like 39 months, the number, no additional number, no 39 to 68, or anything like that?

But in the study that you just completed, we've got this 63 months added on as an upper limit.

A Correction on that. It should be "60" as an upper limit.

The 39 months in the initial study, that is a rush schedule. That would correspond to a 45-month rush schedule.

Q Well, when you did the study -- which I assume, according to the cover sheet -- you did this study for circulation within the company. Is that correct?

A. It was circulated between Design Engineering and Mr. Bostian, as I recall.

Q. Why, if this is a rush schedule, doesn't it say so in here anywhere to alert somebody to it?

A. We did not at that time put to the rush schedule; that it was, I think, understood that it was a rush schedule.

Q. Can you point me to something in here --

A. No, it does not say that in the document.

Q. As a person who I guess would be held responsible for the study, you weren't at all worried that someone up the line in management would make a decision to go with an independent spent fuel storage facility on the assumption that it could be built and concluded in the timeframe that you had indicated here?

A. At the time it was prepared, we felt that it could be built in the timeframe stated.

Q. And you didn't feel the need to give them some other number which would be a longer term number?

A. We did not give a longer term number.

Q. Why did you feel the need to give a longer term number when you prepared Applicant's Exhibit No. 1?

A. We have since that started evaluating our schedules more closely, and we now give a range in most cases of our schedule.

Q. For all the things that you do?

A Not for all things, but for most of our items, such as an independent fuel storage facility that we consider a significant or major structure.

Q Do you do that in normal filings with the Public Utilities Commission of the State where you seek approval for funding for building a project? Do you give them a range of times?

A As I recall, we gave a range of times in our Perkins schedule, a range of times on our Cherokee schedule.

Q Which of the times listed in Applicant's Exhibit No. 1 on Attachment 2, 45 months, or 60 months, is the one that you feel you can do, if called upon to do?

A 45.

Q Now let's go back to the items that raised the estimates in the original from 30-- let's agree on a number. What is it? I can't tell, when it's 10/76 and 1/80, whether it's the beginning of the month, and of the month. How many months is Applicant's Exhibit No. 7 saying it would take to build an independent spent fuel storage facility? On that little chart that says "key dates," what are they trying to tell us?

Again, keep in mind I can't read the bar chart.

A I'm sorry, it is 39 months.

Q Okay. Now are there any things that you could do to reduce the 45-month schedule that you have indicated

in Applicant's Exhibit No. 1, such as beginning design work immediately even before any decision is made on an independent spent fuel storage facility, or beginning -- what was that other term you used to describe -- predesign work?

A Predesign work, general arrangement type work.

Q Right.

A If directed to start that work, yes, we could begin and do the general arrangement type work earlier.

Q Could you do it faster? Could you put more people on it?

A No, sir.

Q Work longer hours on it?

A No, sir, this is based on a rush schedule.

Q What about utilizing an existing design for an independent spent fuel storage facility, if one were in existence? Would that help? Would that shorten the time?

A It may shorten the time to review the prior design. I do not know of a prior design.

Q What about the -- this is a document that is attached to -- well, the place where one would find it in this record is attached to the NRDC Response to Staff Motion for Summary Disposition dated June 5th, 1979, and it is a letter and attachments dated September 6th, 1978,

from a Mr. Willoughby at Stone & Webster Engineering Corporation to a Mr. Wardell at Duke Power, which says: "I'm enclosing a brief description of" -- I'm quoting from a letter -- "the Stone & Webster interim spent fuel storage facility design, and a press release announcing the NRC acceptance of this design."

Are you familiar with that document?

A I knew that that document had been prepared by Stone & Webster.

I correct my previous statement of not knowing of a design. I do not know of one being built. We have not reviewed detailed drawings of a facility that has been done.

Q So at this point you don't know whether or not, if time were a critical consideration here, you don't know whether or not the Stone & Webster design -- which according to their letter has been accepted by the NRC -- would fulfill your needs and save you some time on an ISFSF?

A It is a possibility. I do not know that to be a fact.

Q Do you know anything about this Stone & Webster?

A I have -- I have reviewed that document; yes.

Q Am I correct in my assumption that it is very close to the size that you're analyzing in Applicant

Exhibit No. 1, Attachment 2? Do you need to look at it to refresh your memory? I'll be --

Mr. McGarry, do you have one you could let him look at, and then I -- well, I'll just stand over his shoulder.

(Counsel handing document to witness.)

I'm pointing the witness to the page where I thought this may be indicated. It's a measurement of the facility size in terms of tons.

A I would need an interpretation of this to 1300 metric tons to assembly spaces.

CHAIRMAN MILLER: Pardon me. What is this "Stone & Webster" reference you're making? Where do we find it?

MR. ROISMAN: It's attached to our Response to the Staff Motion for Summary Disposition dated June 5th, 1979. It's a document obtained in discovery from the Applicant.

Mr. Snead, or --

WITNESS SNEAD: Could it be something like 2600?

WITNESS GLOVER: Approximately 2800.

BY MR. ROISMAN:

Q 2800 sassemblies, so that would be close to the 3000 assembly unit that you have analyzed in Attachment 2.

A (Witness Hager) That's what I've been told, yes.

Q You don't have any reason to doubt Mr. Glover and his little machine there, do you?

(Laughter.)

You don't have to answer that. You've got to work with him.

Why is it that in preparing this -- Well, let's go back one. Hold that there and I'll ask you a couple of questions about it.

Applicant's Exhibit No. 1, which is this sort of updated study of, among other things, the independent spent fuel storage facility?

A Right.

Q Why was this prepared?

A This was prepared in reference to a request from Mr. Bostian to look at additional alternatives.

Q And why would you not have gone to the Stone & Webster document, of which you are at least familiar to some extent, to present in this document the feasibility or infeasibility of using the Stone & Webster designed ISFSF and its costs and its timing?

A That was not prepared by us, and I could not back that study up.

Q Well, wait, is that --

A. It was prepared by Stone & Webster.

Q. But, as I understand it, what Stone & Webster is doing is saying: We'll build you one like this -- sort of like the poison rack manufacturers told you, we'll provide you poison racks like this. Isn't that right?

A. This is a -- as I interpret it, a sales-type document.

Q. So what I'm saying is, it represents an agreement, or it could lead to an agreement by Stone & Webster, to build what they describe in there for Duke at the Oconee site. Isn't that true?

A. Yes, it could be.

Q. You don't rule out of hand the possibility of going outside Duke's own capabilities to have an ISFSF built for it, do you?

A. No, we would consider it.

Q. Why didn't you consider it in preparing this study, Applicant's Exhibit No. 1, where the question was: What is the feasibility of the ISFSF alternative?

A. This document, when we reviewed it, it does not contain detailed information. We do not know what the design is based on, what -- does it meet Duke requirements?

Q. Did you call Stone & Webster and tell them: We're now doing this study. If you guys want to get in on the action, bring in your details so we can evaluate it?

A. No, we did not.

Q. Did you design an ISFSF to as much detail as the Stone & Webster design that I show you, for purposes of making your own evaluation for Applicant's Exhibit No. 1?

A. No.

Q. Is the Stone & Webster piece of paper more detailed than your concept?

A. It has more information than we have written down, yes.

Q. I'm afraid I still don't understand why if --

A. I could not recommend this study to Mr. Bostian as it now stands, that Duke go outside for an independent spent fuel storage facility.

Q. If I understand this Applicant's Exhibit No. 1, you don't recommend anything in here, do you?

A. No, we gave him a list of alternatives.

Q. Why did not you list the Stone & Webster one as one of the alternatives? With all the qualifications you've just articulated to me?

A. We did not give him that -- this alternative.

Q. Why?

A. We did not. We did our own.

Q. Were you aware that that alternative included a shorter time period than the one you calculated here for its construction?

A I believe it is about the same, as I recall reviewing this facility.

Q Well, if you --

A There are three months for construction duration.

Q For everything --

A No, I do not interpret that that way.

CHAIRMAN MILLER: You know, this record is going to be full of "this, that, these, and those." without much identification.

MR. ROISMAN: All right, the Stone & Webster, the letter to Mr. Wardell from Mr. Willoughby, would you read in the second paragraph, the whole second paragraph.

MR. MC GARRY: What is the date of that letter?

MR. ROISMAN: September 6th, 1978.

BY MR. ROISMAN:

Q Start here. "As," and read please, so that everyone can hear it. The whole paragraph.

A (Witness Hager) As we had discussed by telephone on August the 18th, 1978, we believe that this facility could be constructed and in operation within 33 months of an authorization to proceed at a site with an existing operational nuclear power plant."

Q Go on.

A "The time of 33 months assumes that procurement activities for long lead time items start immediately upon

job authorization, and that there is no protracted federal, local, or state license. We do not anticipate protracted licensing as an operating power plant site" -- "operating plant site."

Q Okay, just going that far, now isn't that -- what does that mean to you that is not included in the 33 months that is included in your calculated 45 months under Applicant's Exhibit No. 1?

A It indicates to me that we is ready to start procurement, which means that the design has already been performed.

Q Which means that if you were to choose the Stone & Webster approach, you would not have to spend some nine months on design work, because they're already done it. Isn't that right?

A If we wanted to go with Stone & Webster, yes.

Q Okay, so what I'm asking you, again, is: Why don't you advise Mr. Bostian in Applicant's Exhibit No. 1 of the existence of a potential Stone & Webster design that could save as much as 12 months off the schedule of a Duke newly designed facility?

A We based the information we sent to Mr. Bostian is what Duke has looked at, not what someone else has looked at, or Design Engineering has looked at.

Q But you could have looked at Stone & Webster in

more detail; right? I mean, they would have presumably been more than happy to share any level of detail that you wanted with you. Isn't that true?

A. That is a possibility. I do not know that.

Q. Well, isn't that in the nature, where you're selling a product, if someone gets interested you usually tell them what they want to know, don't you?

A. If they want you to buy the product, yes.

Q. So your experience would be that you'd be surprised if Stone & Webster didn't provide you with the information; right?

A. I would, except that Duke does its own design, and from that standpoint they may be somewhat reluctant that we would incorporate their design features.

Q. Duke "always" does it own design?

A. Not always, but generally we do do our own design.

Q. Who designed the Oconee units?

A. The design was by Duke, with Bechtel as consultants on containment.

Q. Well, wait. You mean the reactor --

A. The reactor was a -- No, that was a vendor design.

Q. Okay, what is it that Duke designed?

A. The structures, the piping within the structures,

the equipment selection that goes into the structures.

Q But that's a -- What you're giving me is an historical fact. That is, that Duke -- not all the time, but at least some of the time -- does its own design?

A That is correct.

Q Now were you aware that the Stone & Webster proposal was suggesting an independent spent fuel storage facility that, according to Mr. Glover's calculation, comes to about 2900 spent fuel assemblies for around $23 million, as compared to the projected costs that you have of $61 million?

A Yes.

Q Do you feel that Stone & Webster is the kind of company that, if they give you a quote like that, it means that they're prepared to deliver?

A That is a sales document. I expect that if you incorporate the features that Duke would want in such a facility, that the cost may be higher.

Q Do you know that they're -- I'm sorry, go ahead.

A The Stone & Webster facility, as we reviewed it, was Category 1 for the pool only. Our facility that Duke scoped was a total Category 1 type structure.

Q What kind of difference would you estimate that would make in terms of cost?

A I do not know the breakdown of Stone & Webster's.

I cannot answer that. There would be a reduction in cost.

Q But you don't know whether it'll account for the difference between $28 million and $61 million?

A Not all of that difference, no.

Q 10 percent of it, do you think?

A I cannot -- I would be guessing.

CHAIRMAN MILLER: Don't guess. If you know, but you're not required --

WITNESS HAGER: I have no basis for --

BY MR. ROISMAN:

Q For saying --

A Saying one way or the other on it.

Q All right. Then to the best of your knowledge, has no one at Duke done a detailed analysis of this Stone & Webster analysis to determine any -- to what extent its design is consistent or inconsistent with what Duke would want? Or, (b) what the design would look like if you saw all the stuff and not merely the sales document? Is that a correct statement?

A We have not done a detailed analysis of the Stone & Webster document. We have looked at it with a view of how it compares with the independent fuel storage facility that we scoped.

Q Well, has anybody looked at it more than you, as far as you know?

A No.

Q So your knowledge of it is probably as deep as anybody's at Duke?

A As far as I know.

Q Mr. Glover, did you ever take a look at this document, the Stone & Webster document?

A (Witness Glover) In probably the same light as Mr. Hager.

Q Do you -- Do you share his assessment of it? That, without a lot more, it's not necessarily something that you would rely on for planning purposes?

A The only thing that I have drawn from this document is a calculation of what they estimate the per-assembly cost would be.

Q And why did you do that?

A Just as a -- to have some sort of another estimating tool.

Q Would you use the Stone & Webster numbers, like the per-assembly costs, for making calculations of the economic comparisons between an independent spent fuel storage facility on the one hand, and transshipping and reracking on the other?

A Only for the very most conservative type of basis. As far as, you know --

Q Conservative which way?

A Apart from our Duke-constructed facility.

(Pause.)

MR. ROISMAN: Mr. Chairman, I would now like to have marked for identification, NRDC Exhibit Number -- I think it's going to be 8. Well, holding that aside, I'll pass out --

DR. LUEBKE: The last one I have is No. 6.

MR. ROISMAN: The last one you had was 6? Okay, NRDC Exhibit No. 7 for identification is a memo dated January 9th, 1979. I'll give one to the witness table, one to each member of the Board --

MR. MC GARRY: I believe it's Intervenors' 8.

CHAIRMAN MILLER: 8?

MR. MC GARRY: I believe so.

MR. ROISMAN: I'll give one to the staff, one to Applicant, one to South Carolina, one to Mr. Blum, two to the reporter, and if the witnesses will give the copy I've given them to the reporter, when we're all finished, that'll be three for the reporter.

(Handing documents to parties.)

BY MR. ROISMAN:

Q Now, Mr. Snead and Mr. Glover, as best as I can tell, this looks like a joint effort. Mr. Snead, you signed on the cover page of NRDC Exhibit No. 8, titled "Memorandum to the File," "Subject: McGuire Nuclear Station,

Amendment to CNML-1973 File MC 514.26."

Is that your signature? Is this your document?

A (Witness Snead) 514.26, yes.

Q Yes --

A (Witness Glover) Can I ask a question?

Q Yes.

A Are you attempting to convey that this is one document? If it is, you're wrong.

Q Well, it was provided to us that way. If it's not one document, just show me where -- Is this a separate document that's dated 10/17/78?

A Right. It's separate from --

Q It's separate and not attached to it in any way?

A It's not attached to any of those other ones.

Q All right, are all the handwritten portions a separate document?

A Let me just go through these real quick and I can tell you.

This "10/17/78" is separate. Two pages.

Q Right.

A Okay? This, one, two, three, is a separate document. Okay?

Q Okay.

A This here (indicating), is a separate document.

And this (indicating), is as well.

The last page, I might note, is not mine.

Q Does not appear to be yours.

MR. MC GARRY: I think the record is a little unclear as to where we refer to "this."

MR. ROISMAN: Okay, now we're going to clear that up, now.

All right, for the record, the first two pages of what's marked as NRDC Exhibit No. 8, I would like to withdraw as "not marked."

The next two pages of what was Exhibit No. 8 I would like to have separated from the rest of the pages and marked as NRDC Exhibit No. 8, consisting of --

CHAIRMAN MILLER: That's two pages? How many? 10/17/78?

MR. ROISMAN: With the little "rmg" in the right-hand corner, entitled "Basis for Keeping Full Core Reserve at Oconee."

CHAIRMAN MILLER: How many pages is that? Just two pages?

MR. ROISMAN: Just two pages.

CHAIRMAN MILLER: Two pages.

MR. ROISMAN: Just two pages. And that will now be marked NRDC Exhibit No. 8 for identification.

(Whereupon, the document referred to was marked NRDC Exhibit No. 8 for identification.)

BY MR. ROISMAN:

Q Now, Mr. Glover, this document, what was the purpose of its preparation?

CHAIRMAN MILLER: Now "this document," what are you talking about?

MR. ROISMAN: NRDC Exhibit No. 8. I'm sorry.

WITNESS GLOVER: Can I just look at it for a second?

BY MR. ROISMAN:

Q Yes.

A (Witness Glover) Thank you.

MR. KETCHEN: Would you do that again, for me? I'm totally lost. The first two pages are now not marked?

MR. ROISMAN: Not marked. Disregard them. The next two pages are now marked NRDC Exhibit No. 8. They are a two-page memoranda entitled "Basis for Keeping Full Core Reserve at Oconee" dated 10/17/78, with the initials "rmg" which Mr. Glover has previously identified are his initials.

WITNESS GLOVER: Mr. Roisman --

BY MR. ROISMAN:

Q Yes.

A As you may know in looking through this various discovery material, you probably had a fairly good assessment of what, you know, I do, so far. This is another one of those type of documents, in that it was not clear in my mind as to the specifics of, at that time, what the basis for keeping a full core reserve at Oconee would be, on a cost analysis of some sort.

So what I was attempting to do in here, for my own mind -- for no other purposes; this was not a document released to anyone; it was kept in my own files -- was to, you know, to look at what I would consider to be a method of calculating a cost/benefit analysis for full core reserve.

I'm not saying that, you know, I'm the expert in terms of cost/benefit analysis. I'm not saying that this is "the" method, or "the" correct method. I'm just saying that this is something I looked at.

Now in here, that $10,000 per-space number is used. And what it's used for is, as I said, a conservative basis in terms of saying our number is one value. If you looked at a reduced value in terms of the costs of keeping a full core reserve. If I was to use my, you know, the Duke Power $34,000 per space 1976 number, you know $29,000 1976

number, that would be one method of looking at it and providing one end of the scale.

I'm using another end, trying to evaluate the basis for a full core reserve under a different set of assumptions.

Now as you will note in testimony that has been developed by Mr. Sterrett, there is a system basis for keeping full core reserve, as well. Now I would concur with his evaluation of that, as well.

It's not to say that --

Q Mr. Glover, you're giving me much more --

A Yeah, I realize it; I realize it.

Q -- not only than I asked for, but than I want.

A Yes.

Q You told me what the document is about, and I want to ask you questions about it.

A Okay.

Q Why did you choose the Stone & Webster $10,000 number? Why didn't you use the 1976 ISFSF study number, which is Applicant's Exhibit No. 7?

A For the reason I just articulated, if you will, in that I wanted to provide a, if you will, a lower cost basis for, you know, looking at the costs of keeping a full core reserve at Oconee. This may not be the correct analysis.

Q All right, but let's just see now. What you're saying is that you wanted to determine -- you wanted to sort of make, for your own purposes, an assessment of the costs and benefits of keeping a full core reserve. And to do that, you chose a number that made the cost of keeping a full core reserve the lowest that you could defend. Is that right?

A That's true.

Q Rather than the highest?

In other words, you were biasing the study toward finding that retention of a full core reserve was cost effective. Is that right?

A Well, there's another way you can look at this, as well, if I may.

Q Well, first answer that question. Is that the consequence of what you did? The study tends to bias in favor of the economics of keeping a full core reserve by using the lowest number for the cost for an independent spent fuel storage facility as your reference?

A At the time, this is the method that I evaluated.

Q You know, that's not --

A Whether it --

CHAIRMAN MILLER: You haven't answered the question, please. Answer the question.

WITNESS GLOVER: The basis was not as to whether I should use the $10,000 number to get it to look one way or to get it to look another way, this is just the number that I happened to use.

MR. ROISMAN: I asked you --

CHAIRMAN MILLER: That isn't the question. The question was as to the consequence. Now listen to the question very carefully. Please restate it.

BY MR. ROISMAN:

Q Doesn't the consequence of using this lower number for the cost of an independent spent fuel storage facility for your reference of what it costs per fuel assembly bias the study that you did here to make the full core reserve look more cost effective?

A No, it doesn't.

Q Why not?

A In that, assuming we had used the Duke Power $30,000 per space number, okay?

Q All right.

A Using the same conversion for an annual type of cost, 40-year basis that I developed below, you can still show that this would add maybe, say, what, three times that $181,000 number that's shown there? Would you agree with that?

Q Right now I don't see the $181,000 --

CHAIRMAN MINNER: Total annual cost.

WITNESS GLOVER: Total annual cost.

BY MR. ROISMAN:

Q Yes.

A Okay, assuming that's your basis, then add, say, $600,000 to that, okay?

Q All right.

A Then you look at your next page, and if you look at that last line, you'll say it shows an annual probable cost per unit of $1,217,000.

Q Right.

A And I say "this represents the basis for our need to maintain a full core reserve especially when one considers that the annual probable cost per the unit 1, 2 pool would be twice this with two reactors feeding into it (For a cost of $2,435,600 per year)."

In that case, the $10,000 -- whether I used it for a specific purpose or not -- which is your assumption rather than mine -- really has no basis. I mean, you know, it would show it to be the case, whether you look at it in terms of the $30,000 per space number, or the $10,000 per space number.

Q You mean that it would still show that there was a benefit to retaining a full core reserve, but it would

show it to be a lower, less of a benefit than if you used the $30,000 number. Isn't that true?

Isn't that the consequence of using the $10,000 number? It makes the benefits look greater than the cost than if you had used the $30,000 number?

A The consequence of using it is as you state. Okay? May I qualify that, though, as well as looking at the rest of this --

Q Yes, just as soon as you give me something that approximates an answer that will read in the transcript.

I'm going to ask you the question once again, and I'm going to ask you to give me a "yes" or a "no" and then you can give me 40 pages of explanation.

A Very good.

Q Isn't it the case that by using $10,000 per space value, that you used, instead of a $30,000 per space value, that that tends to make the retention of a full core reserve look more cost attractive than if you had merely used a $30,000 number? Yes, or no.

A Yes.

Q All right. Please explain, anything you want.

CHAIRMAN MILLER: Unless you already have.

WITNESS GLOVER: I believe I have, Mr. Chairman, in that what I was trying to do here was for my own personal way of looking at this. It has not, you know, had any effect

on any numbers that Duke has generated, as far as interrogatories, as far as this hearing here today, yesterday, whatever. It was for my own personal benefit of just looking at it on my own. It's been -- you know, as I stated when Mr. Roisman presented this originally, it was not a part of any Duke Power document.

CHAIRMAN MILLER: When did you prepare this study for your own purposes?

WITNESS GLOVER: That was prepared __ That was prepared by Mr. Sterrett's group sometime a few -- this study was prepared --

CHAIRMAN MILLER: You have a date there, 10/17/78.

WITNESS GLOVER: Yes, this was prepared by myself back in '78. The study that I referred to earlier was the system basis for keeping full core reserve, prepared by Mr. Sterrett this year.

BY MR. ROISMAN:

Q Mr. Glover, you testified before that you basically shared Mr. Hager's misgivings about the Stone & Webster study. Why would you use the Stone & Webster study as the basis for a calculation for anything, if you had those misgivings, if you hadn't reviewed it, if you hadn't checked with the Stone & Webster people to see if their design maybe met Duke's needs, or anything else, why did you

use it at all?

A (Witness Glover) At the time, what I was doing was looking at something I considered, you know, a recent type number, if you will. The Stone & Webster study was recent back in that time period. Our number had not been revised, at that time, as far as the facility.

Whether I considered the impacts of their building the facility to a certain standard versus our building a facility to a different standard was not considered in this. I was looking at a recent-type number, if you will.

Q When you took at the Stone & Webster study, when you saw that recent type number in there, did you remember that the Duke number had been like three times higher than that?

A Not specifically, sir.

Q Did you know before we started these hearings and started talking about the Duke numbers that 1976 study had been done and that the number had been some in the neighborhood of $26- to $30,000?

A I was aware of that, Mr. Roisman. You know, if you will note, as I just stated, this was -- you know, this is no cut-and-dried basis for looking at full core reserve; it's just a, you know, a study for my own purposes. I didn't really develop this for anything to use in the

analysis of a Duke Power specific document for this hearing.

Q When you discovered that a newer number was around, and that it was $10,000, did you go and tell Mr. Snead or Mr. Bostian, "Hey, I've got a new ISFSF number that looks pretty cheap!"

A I believe everyone was somewhat aware of that value.

Q But you didn't affirmatively send somebody a memorandum as you were looking at it for the purposes of this calculation?

A No.

Q Were you aware how close that number was to the cost of reracking?

You had done studies on reracking. You were aware of the reracking costs in the $8- to $9000 range, weren't you?

A Perhaps. I -- you know, I -- in this 10/78 period, I can't really say, without looking at interrogatories that we may have produced up to that time, if I knew in terms of --

Q You didn't produce any then.

A In terms of a reracking cost, how it would compare.

Q Well, isn't it fair to say that in the period during the last two or three months of 1978, one of the

things that you were doing with the company was examining the cost of reracking?

A. That's true.

Q. For instance, I'm going to show you a three-page document which I would like to mark NRDC Exhibit No. 9, which is the next three pages of that packet of documents that I have given to all parties. It's entitled "Cost Comparison -- Reracking Oconee 1, Oconee 2 pool" dated October 17th, 1978, which I think is the same day -- right?

A. Yes, sir.

(The document referred to was marked NRDC Exhibit No. 9 for identification.)

BY MR. ROISMAN:

Q. With the initials "rmg." Is this your document?

A. (Witness Glover) Yes, it is.

Q. Am I right that it is in fact a three-page document?

A. Yes, it is.

Q. Okay. Now isn't it true that this document indicates that on the same day that you discovered -- if you hadn't discovered it before -- that the cost of an independent spent fuel storage facility might be as low as $10,000, you were in the process of calculating the cost of

reracking? I assume this is with nonpoison racks?

A Yes.

Q With nonpoison racks, and making a comparison of reracking versus cascading? Is that right?

A Yes.

Q So you had in your head that day apparently the idea of looking at alternatives that Duke might have available in the costing of those alternatives. Isn't that right?

A Yes.

Q And yet you still say that it didn't occur to you to tell anybody that you'd found that an independent spent fuel storage facility might only cost $10,000 per assembly?

A As I stated, Mr. Roisman, in the best of my knowledge, the Stone & Webster study was not privileged to myself or Mr. Hager, alone.

Q I take it, neither were the pieces of information that you used to pull together the cost comparison dated October 17, 1978, either. Right?

A That's true.

Q Tell me, you said that you prepared NRDC Exhibit No. 8, which is the one that has the $10,000 figure in it, for yourself, as opposed to for distribution --

A That's true.

Q -- in your official duties? Or on lunch hour? I mean, was that work that you felt you were being paid for by Duke to do?

A I felt that it was possibly in the scope of my requirements.

Q Why did you do it? Of what use was it to you?

WITNESS SNEAD: Let me --

MR. ROISMAN: Let me get Mr. Glover's answer. You can -- I'll ask you, if I would like you to substitute.

BY MR. ROISMAN:

Q Mr. Glover?

A (Witness Glover) Would you ask that again?

Q How did it help you? Of what value was it to you to have the numbers that you calculated in NRDC Exhibit No. 8?

A Just to give me a basis for any questions that may arise on such a subject. You know, if they say -- you know, if someone was to come to me and say: Have you really looked at, you know, what is a basis for keeping full core reserve in Oconee, I might say, you know, I've taken a look at it.

Q So in other words, while this wasn't distributed to anybody -- or at least I think you testified that you didn't --

A That's true.

Q -- you were perfectly prepared, if Mr. Bostian or Mr. Snead-, or even Mr. Lee called you on the phone and said, "Can you give me a number on what the value benefit is of keeping a full core reserve against its cost," you would have used this figure? Is that right? That you calculated in NRDC Exhibit No. 8?

A No.

Q What would you have done?

A I would have said that we have reviewed it, but it is not something that we would be able to provide at this time.

Q Well, then, what was the use of doing it at all? If it wouldn't give anybody an answer if they asked you the question, why did you do it?

MR. MC GARRY: I believe the witness has stated about three or four occasions exactly why --

MR. ROISMAN: I believe the witness is on the spot --

MR. MC GARRY: I object to that --

CHAIRMAN MILLER: All right, gentlemen, let's not -- let's not -- let's not have interchange between or among counsel.

MR. MC GARRY: I have an objection.

CHAIRMAN MILLER: What is your objection?

MR. MC GARRY: My objection is the question is repetitive; he's asked the question three times, the witness

has responded three times, as to exactly why he performed that analysis, and the question has now been asked again.

CHAIRMAN MILLER: Overruled. You may answer.

WITNESS GLOVER: As evidenced --

CHAIRMAN MILLER: Do you understand the question?

WITNESS GLOVER: Yeah. Let me get you to repeat it just one more time.

BY MR. ROISMAN:

Q I'll repeat it with the interjections of the things you've been telling me.

You told me that you did it for yourself. I asked you if you had any basis for doing it for yourself; what would you do with it? You said, "If somebody called me up." I said, "would you give them this number?" You said, "no, I'd just tell them that I'd looked at it, but I wouldn't give them any numbers."

Then I came back and said, "Well, then, why did you do it?" If you wouldn't give anybody the benefit of what you did here, why did you do it at all?

A (Witness Glover) For my own --

CHAIRMAN MILLER: Do you understand the question, now?

WITNESS GLOVER: Yes, I do.

CHAIRMAN MILLER: There have been several

different kinds of answers, as counsel is pointing out to you.

WITNESS GLOVER: Right.

CHAIRMAN MILLER: He's asking you now to give us your full explanation of why you prepared the information you're being interrogated about.

WITNESS GLOVER: As I see the reason I prepared this document, it's for my own edification, I will, as far as being able to say, for myself, what is the needs for keeping the full core reserve.

BY MR. ROISMAN:

Q And you were not bothered by the fact that you might have been overstating the benefit of keeping full core reserve for your own personal needs?

A. (Witness Glover) No.

Q. You didn't think it would in any way adversely affect your judgment at some subsequent time when you had to do a calculation in which the existence of this calculation would be relevant?

A. I included such conservative assumptions in the benefit section that it really didn't -- didn't seem all that out of line, if you will.

You know, look at the assumptions in that second part on the benefits.

Q NRDC Exhibit No. 9 for identification, is that

a document which you prepared for distribution to people? Or also for your own internal use?

A My own internal use.

Q Look at the title of the document, if you would. My copy is a little blurred. You, unfortunately, are looking at one of mine, but maybe you will remember. At the end of the line under "Subject," there's a parentheses that says "(Its related transfers and doses vs. cascade" and then the next line, is that "present scheme"?

A Yes, sir.

Q What does that mean, "cascade present scheme"?

A As I stated, I think the first day I was up here, we -- I -- looked at the cost of a fully implemented transfer program through 1991. And what I was doing here was looking at another specific cascade type scheme in which reracking would occur during 1980, rather than 1979, and the shipments that would be required from Oconee to McGuire to be able to keep full core reserve under that situation.

Q And the words "present scheme," you're testifying now did not mean that was "the" present scheme?

A In other words, I said -- as I said, Mr. Roisman, what I was interpreting -- what you're interpreting what I'm trying to convey here, as far as "present

scheme," is looking at, if we were to rerack in 1980,
the transfers, the cascade scheme, if you will, that would
be required to keep full core reserve at Oconee and be able
e-7 to rerack with high-density racks.

T 8
MADELON/mml

Q Now, Mr. Snead.

You had wanted to interject something back. This is your opportunity. What is it that you wanted to say?

A (Witness Snead.) I simply wanted to point out that I don't speak for Mr. Glover. He is allowed to speak for himself.

Q That's apparent from the record.

Thank you, Mr. Snead.

Well, Mr. Snead, I think you are the one who can answer this. Is the possibility that an independent spent fuel storage facility would cost $10,000 per fuel assembly at a 2800 foot assembly size, and could be built and ready to go in 33 months from the date that they could order it would be factors which would weigh in favor of choosing an independent spent storage facility if and when you were looking at that alternative?

A Are they factors?

Q Which would weigh in favor of.

A I have testified that cost is always a factor. Schedule is always a factor.

Q Were you aware of the Stone & Webster report which --

A Yes, sir.

MR. ROISMAN: Mr. Chairman, for simplicity I would like to mark this NRDC Exhibit No. 10, which is, just

mm2 for record purposes, the identical document that is NRDC Exhibit B attached to our response to Staff Motions for Summary Disposition dated June 5, 1979, which has as its cover a letter from Mr. Willoughby at Stone & Webster to Mr. Wardell at Duke Power Company.

I'm sorry at this time I do not have copies of that, although all the parties would have gotten one in the normal course of the mail. It is the reporter I can't give one to.

(The document referred to was marked NRDC Exhibit No. 10 for identification.)

BY MR. ROISMAN: Now, let

Q Now, let me go back and ask the question with reference to the document.

With respect to NRDC Exhibit No. 10, is that a document with which you are familiar?

A (Witness Snead) Yes, sir.

Q Were you aware that Stone & Webster appeared to be offering a facility which could be built in 33 months from the date on which you made a job authorization of a cost in the $28- to $30 million range?

A I have very quickly read over the report. I was aware of the suggestions, I guess, that are being implied in the report by Stone & Webster, and I did make an

mpbl
flws
mm2

inquiry to see whether or not this NRC acceptance represented a licensed review, and the word that I got is No, it does not represent a licensed review whatsoever, and the whole gamut would have to be run over in terms of the licensing process.

And there is one other point.

When I get this type of report what I do is to send a copy to Mr. Postima. I may send a copy to Mr. Glover. That's just simply a report to us.

We're charged, by the way the company works, to take all of our official cost estimates to Mr. Hager with regard to structures of this type. Now if he wants to send me a Stone and Webster cost estimate as his work product, that's fine. I can use it then. Okay?

Q So what you're saying is it wouldn't be your duty to investigate further with Stone and Webster to verify the numbers or anything else. It would be, if anyone's duty it would be Mr. Hager's study?

A That's correct. If Stone and Webster were coming to me, I'd say 'Fine.' I'd have a cup of coffee with them, we'd maybe go out to eat, and eventually I'd send them over to see Mr. Hager.

Q Now your testimony is that this document did not excite in you any special interest to want to call Mr. Hager and say 'Hey, how about doing a real good look at the Stone and Webster thing and letting me know if you think these are

mpb2

reliable numbers that we could be using.'

A No, the document didn't particular turn me on, so. I viewed it simply as corporate propaganda, what have you, or corporate literature.

Q What if you had gotten across your desk a report from another company of the stature of the Stone and Webster in the nuclear industry, let's say Nuclear Assurance Corporation, that had about this much detail in it and purported to be able to provide you with an opportunity to transship spent fuel from one reactor to another reactor within your system at a cost half of what all your estimates had been suggesting to you transshipping would cost. They provide the cask, they provide the labor, they provide the trucks, they guarantee that they would get it moved at no more -- no slower than one assembly a day, and that came across your desk and it was of this caliber company and of this level of detail.

Would you have treated it the same way as you did this report?

A Well, first off, I'd still probably recognize that he was fibbing, that he couldn't do it for half of what we're doing. And I guess my opinion of a Stone and Webster document is that he probably can't do it for $10,000 per space, but that's only my opinion.

In the case of the transportation area where I

mpb3 have the primary -- or with respect to the other department, being the operating department, where I have a primary responsibility, I more than likely would talk to that gentleman longer than I would talk to Stone and Webster.

But you see, I have no jurisdiction in Duke Power to be talking to a Stone and Webster man relative to the cost of independent spent fuel storage facilities unless I have this gentleman with me.

Q No, but as I understand from earlier testimony with Mr. Bostian, at least, and maybe others from yourself, you all work together. If you felt something needed to be investigated, you'd investigate it, wouldn't you?

A Yes. But if we're going to investigate Stone and Webster, Mr. Bostian and I would investigate it through Mr. Hager.

Q I understand that.

Now you have testified that cost saving is a very important criteria. I think you said to you it was the principal one.

A I have testified that it's not my responsibility to give this document any credibility. And that's the way I go about conducting my position. It's Mr. Hager's responsibility.

Q But what I'm getting at is when you learn that there may be something that is markedly cheaper than anything

mpb4

that you've looked at before, and it comes from a company that I assume you would say is, in Mr. Bostian's word, a nationally known engineering company, that you would want to find out just how much puffing, if any, there was in this number. And I'm trying to understand why didn't you want to pursue it more actively.

A Well, I've stated that the reason that I didn't want to pursue it, or that I did not pursue it more accurately is I don't place a lot of faith and judgment in the document and that I did go to the problem, the inquirer, whether or not the design was licensed, and I came back with the inform - tion that the design was not licensed.

And there I let the document lie.

Q How come you didn't ask for Mr. Hager to look at that for you, or the licensing people?

A Well, you know, I'm perfectly capable of making an inquiry on whether or not the design was licensed without bothering Mr. Hager about that.

DR. LUEBKE: Excuse me.

For clarification, would such a design be licensed like we've spoken of a fuel cask as being licensed or certified?

WITNESS SNEAD: It's licensed like a Part 50 or a Part 70 fuel storage facility is licensed.

DR. LUEBKE: I see, which means that somebody has

mpb3 proposed to build it and made an application to the NRC, and they docket it and all that stuff?

WITNESS SNEAD: That's correct.

BY MR. ROISMAN:

Q I just want to keep the record straight, and far be it for me to jump to the defense of Stone and Webster, but isn't it correct, Mr. Snead, that NRDC Exhibit number 10, the first page, the letter from Mr. Willoughb[illegible], Mr. Wardell, doesn't say that anything was licensed. He refers to a press release announcing the NRC acceptance of this design. Isn't that correct?

A (Witness Snead) That's correct. It probably means they have it in a cubbyhole somewhere.

Q Well, I take it the term "acceptance" is the term of art among people familiar with licensing, is it not?

A No, I'm not sure.

Q You're not sure precisely what "acceptance" means?

A That's correct.

Q So you don't know that they were representing anything more than what they really represent?

A Stone and Webster, you mean?

Q I mean Stone and Webster.

A That's correct.

Q The same NRDC filing, NRDC Response to Staff Motions for Summary Disposition, dated June 5, 1979, has

mph6 as Exhibit C attached to it, a document which I would like to mark as NRDC Exhibit number 11.

(Whereupon, the document referred to was marked as NRDC Exhibit No. 11 for identification.)

MR. ROISMAN: The subject letter is a letter from John Houston to you, Mr. Snead, dated October 7, 1977. Mr. Houston is the assistant general manager of sales and marketing at the Nuclear Assurance Corporation, and the letter encloses a study or a proposal by Nuclear Assurance Corporation dated October 7, 1977, entitled Proposal to Increase Spent Fuel Storage at the Blank Nuclear Generating Station.

BY MR. ROISMAN:

Q As I understand it, this is a pin packing proposal, is that accurate, Mr. Snead?

A (Witness Snead) YEs.

Q If we can use that terminology.

A The man's name is Jack Houston.

Q Houston.

A Houston. He's with the Nuclear Assurance Corporation out of Atlanta.

I think the letter is a little bit strong. It was really not that firm and fast of a proposal.

mpb7

Q He says "A draft pin storage proposal".

A Yes. It's a document -- and I'm not being derogatory to NAC -- that they have carried from one utility to the next on a limited basis.

Q Okay.

Have you done an analysis or any followup on the pin packing proposal, draft proposal that Mr. Houston provided?

A We've talked to Nuclear Assurance Corporation twice on the -- not on that specific document, but on the concept of pin packing.

Q Would you say that pin packing has the potential for providing you with substantially greater storage in existing spent fuel storage pools in the Oconee unit if it were utilized?

A Pin packing has the potential for providing substantial increase in storage in any utility's spent fuel pool with certain reservations.

Q Do you agree with the NAC statement that it could be up to 80 percent?

A No, no, I don't agree with that.

Q What evaluation have you done and what is your conclusion about how much more you could get with pin packing at Oconee?

A My group has looked at pin packing, and I can't point you to any specific document or any particular person.

mpb8

In general we've looked at it and we feel like that an increase on the order of like 40 to 60 percent is probably a more realistic impact of pin packing on fuel storage.

Now you've been aware of the pin packing potential for at least a year and a half.

A It's one of those items, as you mentioned, that looks like it has potential that's sort of been making the rounds in the industry for the last year and a half, that's right.

Q Have you gone into it in detail to find out its feasibility and its cost?

A We've talked to the -- I think it's the Yankee Atomic people off and on and we've talked to them fairly recently. As a matter of fact, I've talked to them the week before last because it was my understanding that they had indicated to the NRC that they were going to move without requesting a license to utilize pin packing to increase their storage space. And I think they did this about a year or so ago, and that's kind of optimistic. And I was going back to Yankee saying -- trying to find out what the status on that was.

And as I understand it, the status is that NRC has said 'Hey, you've got to whoa here. We may let you go on without a license, but you're going to have to wait until

mpb9 we tell you to go on without a license.'

And so I think NRC is still looking at that. That's a labor intensive sort of thing that Yankee is considering. It's basically a full-time 24-hour job, year in and year out. It would be very expensive in terms of the economic ranking of alternatives, and then it has a number of other problems associated with it, like the potential breaking of fuel pins while you're manually pulling these pins one by one.

And then there's another consideration that I particularly don't like, Mr. Roisman, in that it may put your fuel in such a configuration that you may not be able to ship it out of the plant later on; say, if the government would mandate that you ship all of your spent fuel, because of your pin packing you might have it in such an array that it would be difficult to ship.

So you have to think about other things about pin packing just like you do these other alternatives, other than the fact that it just increases the storage 50 percent.

Q Well, give me some idea of the relative depth with which you have looked at pin packing compared to transshipping.

A The relative depth. You mean if I had to rank it -- if I had five alternatives and you wanted to know where it was on the chart in terms of the time that I spent looking at

mpb10 it?

Q Time and effort toward being able to make a definitive decision of go, no-go on it.

A Number five.

Q And where would you put transhipment, assuming we're looking at five.

A In terms of time spent looking at various -- I'd put transhipment number 1.

Q And reracking with stainless denser racks?

A Probably a one-plus.

Q Is that lower than number one?

A Just barely lower.

Q And reracking with poison?

A Two.

Q And an independent spent fuel storage facility at the Oconee site?

A We're getting about three.

Q Okay.

DR. LUEBKE: Excuse me. Just a point of clarification.

Did I hear you say that someone endeavored to do this pin packing without getting -- If I use my imagination of what pin packing is, it's like the front end of the Barnwell reprocessing cycle.

WITNESS SHEAD: It's similar to that.

mpbll

What Yankee is planning on doing, they have some fuel assemblies that are reconstitutable. That is, they can be taken apart with a machine.

DR. LUEBKE: But still it's a very radioactive item they're working with.

WITNESS SNEAD: Yes.

Then they have some fuel assemblies that the structural components that hold the end pieces together have to be cut and the upper end fitting removed and then they would take simply a strap similar to a pipe clamp with a screw on it and drop down over the top of the fual rod with a little wire --

DR. LUEBKE: But that's not like a dupe fuel assembly?

WITNESS SNEAD: Yes.

The Yankee assembly is smaller than the dupe assembly, but the principle would be very much the same.

DR. LUEBKE: But if you sent your fuel assemblies to Barnwell, that's about what they would do.

WITNESS SNEAD: Yes, but they chop those up.

DR. LUEBKE: I just wanted to get these relationships straight.

CHAIRMAN MILLER: I think we'll take a recess.

(Recess.)

CHAIRMAN MILLER: We'll resume the hearing.

mpb12

Mr. Roisman?

MR. ROISMAN: Yes.

Still looking at that packet of documents I have passed out to everyone, the next document is a one-page document entitled -- it's handwritten -- Notes From Meeting on Design of Racking, Dated October 16, 1978, and then the date of the document is October 17, 1978. It has the RHG initials on it.

I would like this marked as NRDC Exhibit number 12 for identification.

(Whereupon, the document referred to was marked as NRDC Exhibit No. 12 for identification.)

BY MR. ROISMAN:

Q Mr. Glover, let me direct your attention to that document just to complete the record.

At the time that you were preparing NRDC Exhibit number 8, on that same day you were also preparing this NRDC Exhibit number 12, which, as I understand it, calculates, using 1980 dollars, the cost per new space added for the Oconee 1 and 2 reactors would be $7101, not including the installation cost, and that the cost for the Oconee 3 reactor reracking with the poison racks, escalated to 1980, would be $9101 per fuel space provided.

mpb13

Is that correct?

A (Witness Glover) Those numbers were not generated in that meeting, as far as the dollars per rack space generated.

What did come out of that meeting was the first three areas at the top there.

Q Total civil?

A Total civil, total mechanical, and the 2,940,000, which was the preliminary estimate.

Q Right.

A The number of new spots that would be created, and the number that would be transferred to McGuire regardless to keep full core reserve and to give divers room to work, which was of course based on an anticipated 1980 reracking.

Q All right.

I'm just trying to get for purposes -- to get the record straight:

What number were you assuming was the cost per fuel assembly space provided to rerack Oconee 1 and 2 as of October 17, 1978?

A Okay.

As I see here, this is what I would have assumed the cost to have been at that time.

Q This 71--

A 7101.

Q And the comparable number for Oconee 3?

mpb14

A What I was looking at there was just an escalated cost up from when it was done in 1976, just for a comparison.

Q And that's 9191 was the 1976 number, the escalated?

A The 2,343,000 was the expenditure for the Oconee 3 reracking with high density, and that other is just the difference between the spaces generated.

Q Okay. Thank you.

Now, Mr. Hager, there was some testimony earlier today regarding the cost of expanding the Catawba pool, physical dimensions of the pool to make it larger during construction.

Were you here during that?

A (Witness Hager) No, sir, I was not.

Q Let me show you -- or ask you to get a copy of what is marked as Applicant's Exhibit number 4, August 16, 1976, memorandum.

Will you get a copy of that in front of you, please?

Now in paragraph one of Applicant's Exhibit number 4, that is the paragraph numbered one, reference is made to the cost of expanding the Catawba spent fuel pool 51 feet, which would add approximately 1500 fuel spaces at an estimated cost of $6,300,000.

Now do you remember, did you have anything to do

mpb15

with the calculation of that number or any subsequent work for which you could tell me what the appropriate number is for that expansion at Catawba?

A Yes. I am familiar with expansion at Catawba. And the estimate for that expansion was $6,308,000.

Q Now how much of those 1500, approximately 1500 spent fuel spaces that were provided at that cost, how much of the work was the same work that would have had to have been done if you had simply built an independent spent fuel pool to provide 1500 spaces?

A How much of the work was the same?

Q Would have been the same if you were providing an independent spent fuel pool instead of simply knocking out and expanding the sides and the top of the pool?

A I'm not sure I understand your question clearly.

Q What I'm trying to find out is obviously this cost for adding 1500 fuel spaces is substantially less per fuel space added than the cost that you've calculated in Applicant's Exhibit number 1 for the cost of adding a fuel space if you're building an independent spent fuel pool.

A Okay.

Q I'm trying to find out what makes this number so much smaller.

A This was an incremental cost. In other words, it's incremental by the addition of one-fifth of the structure.

mpb16 It requires, as I recall, a larger air handling system, increasing the pump. It's an incremental increase.

Q All right.

Let's go back to Applicant's Exhibit number 7, which is the 1977 ISFSF study, and in particular Table 4, where you list all of the components that go into making up the cost of an independent spent fuel pool.

Now going down that list, identify for me the items that wouldn't be included if you were incrementally adding 51 feet to get 1500 spent fuel spaces.

A The items that would not be included.

Q Yes.

Would you still have grading and earth work for that 1500 -- for that 51 feet?

A We would have grading. We would have some of the associated civil items, such as additional fencing.

Q Right. Okay.

A The structure would be -- You would have that, there would be additional structure, tanks -- I do not believe you would have additional tanks.

Q Okay.

Pool liner?

A Pool liner would be additional.

Q Right.

A Overhead crane would be the same.

mpb17

Q You wouldn't have to extend the crane out?

A You would extend the crane rail. The crane cost itself would be the same.

Q Okay.

A Storage racks would have to increase, additional racks.

Q All right.

A Mechanical equipment, there is a possibility of an increase in mechanical equipment because of ventilation requirements for the additional areas.

Q Okay.

A I do not know if there would be additional cooling requirements for the additional spaces at this time.

Q Okay.

A That would be a cost associated with increasing pump size and pump capacity.

Q Okay.

A And in view of the mechanical increase in pump capacity, there may be an increase in electrical requirements.

Q All right.

Now Item ten is simply a percentage of whatever happened with the other number. So that would --

A That would increase slightly, yes.

Q Field labor?

A Field labor would increase because of additional

mpb13 structures and associated --

Q And overhead presumably also.

A Right.

Q Engineering?

A Engineering would increase.

Q Okay.

General office overhead, I assume that would go up just the way it's shown there, one percent.

A Right.

Q And contingencies as a percentage, interest as a percentage.

A Right.

Q Now I guess my question to you is:

Can you give us a reliable number that would give us some idea of how much we could use the Catawba spent fuel at the pool for expansion as an actual test of the real cost of providing an independent spent fuel storage -- that is, how much -- could you carefully show whether this is linearly increased or less than linearly increased of the various items we've just discussed? Can you do that?

A I can give you a judgment. It is not a linear ratio, based on what we have looked at in the June 15 letter to Mr. Bostian, as you could increase the number of spaces the cost per space comes down.

I cannot give you --

mpb19

Q Would you have the numbers that would demonstrate what the cost is for the whole Catawba pool?

A No, sir.

Q You don't have it, or no one has it?

A No one to my knowledge has it, since that is part of the whole auxiliary building complex. It is estimated as a whole structure. The fuel pool is just part of that structure.

Q Would that be a more raliable number,if you could get it,as to what the actual cost of building a spent fuel pool would be, an independent spent fuel pool?

A No, I don't think so. I think the independent fuel storage cost that we have tabulated in Table 4 is a realistic cost. It is based on units of cost from a structure such as an auxiliary building.

Q Wait,I'm sorry. There was no independent spent fuel storage facility that you use as your model for doing that calculation, was there?

A No, what I'm saying is the independent spent fuel storage facility estimate is based on experience and unit cost from building an auxiliary building.

Q You mean an auxiliary building which includes in it a spent fuel pool?

A Yes, sir.

Q Which one?

mpb20

A It was based on McGuire.

Q All right.

What was the cost for the McGuire auxiliary building?

A I do not have here presently the total cost of the McGuire auxiliary building. I can furnish the unit cost per yard of concrete.

Q Is the auxiliary building -- Does the auxiliary building at McGuire have concrete needs that are greater than the concrete needs that would be needed for an independent spent fuel storage facility?

A Yes, sir, it is a larger structure.

Q Are any of those in any way greater, without being simply linearly greater?

A No. We use the same unit cost.

Q You say you used it? I'm asking you whether that it necessarily a -- quote -- "defensible" number.

Do you know that it is linear, that if you built the building at McGuire to be 10 x 100 or to be 100 x 50, the cost of the concrete would be directly proportional to the size of the building?

A On a unit basis, the building is similar in design and similar in construction, yes.

Q Is the one that would be an independent spent fuel storage building similar in design and structure to the

mpb21 McGuire auxiliary building?

A Yes.

Q What's in the McGuire auxiliary building?

A The fuel pools. It contains other compartments for auxiliary systems that support the plant, tanks, pumps; and this facility would contain the same type equipment, tanks and pumps.

Q But just the tanks and pumps for the spent fuel pools.

A Just for the fuel pools, yes, sir.

Q Would the building be taller at McGuire than the one that you'd need for the independent spent fuel storage building?

A Yes, sir.

Q Have you designed the independent spent fuel storage building?

A No, sir.

Q So it's somewhat an estimate on your part as to how similar its design would be to the McGuire auxiliary building in terms of calculating the costs of concrete from the McGuire experience to the Oconee estimates. Is that right?

A To the independant spent fuel storage building? Yes.

Q You say you used McGuire for the concrete work. Is that structure? Is that item three on Table 4

mpb22 of Applicant's Exhibit number 7?

A Yes.

Q What did you use for mechanical equipment? Did you use an actual experience?

A Yes, it was based, I believe, on mechanical equipment that had been placed at that time, of similar equipment, either McGuire or Catawba. It would be one of the nuclear units.

Q And the size of the mechanical equipment was the same, or did you have to adjust the size?

A It was adjusted for size.

Q And did you give credit for, or take credit for economies of size?

A No, there was no credit given to the McGuire equipment, say, being larger or more complex than an independent spent fuel storage facility.

Q Well, let's take for instance the mechanical equipment being a cooling system. Would that be one of the pieces that made up the mechanical equipment?

A Yes, it would be.

Q A big piece?

A It's a large piece.

Q I mean, 30 percent, maybe, of the total cost there, perhaps?

A I do not recall the exact number of the cooling

mpb23 system. It is a large part of it.

Q Okay. Let's go with large.

And McGuire would require a smaller one, am I correct? It's a smaller pool than the 3000 assembly proposed independent spent fuel storage pool?

A It is smaller. It has about 502 spaces, as I remember.

Q Yes, okay.

So you had to scale up to get the proper number for the independent spent fuel storage pool?

A It is not a direct scale. It is based on fuel age. So it is not a direct scale of size versus spaces.

Q You're saying it's not a one-to-one.

A Right.

Q Okay.

When you scale on up to the next bigger piece of equipment, whatever the ratio of scale-up was, did you just scale up the costs the same way?

A No, it was based on had we purchased a piece of equipment similar to that size.

Q And had you?

A In most cases, yes.

Q And in the case of cooling for a spent fuel pool, that's what I was thinking of.

A The information I have here is just the cost for

mpb24 piping and effluent system. I do not have a correlation with size.

Q What does that mean in coming up with an $14 million number to the cooling equipment itself? What are you telling me? How did you figure out how much to put in for the piece of cooling equipment?

A This was based on a review by our mechanical nuclear division on information they can furnish to me. I did not determine the size of that cooling equipment.

I am familiar somewhat with what they perform.

and mpb

Q Well, we're now talking about -- what you've told me is a large part of what is the largest single item on that list of 17 items, and I guess I'm somewhat frustrated because you're not able to tell me how you got the dollar value that you put in for that large part of the largest single item on the list.

Can you give me some help? I've got to have something reliable to go on.

Can you even tell me what the number was that was put in for coolant?

A The mechanical fluid system equipment was --

Q That includes cooling?

A That includes cooling, right; it was $2.2 million. The piping was $5.4 million.

Q Piping being an item within Item A on Table 4 of Applicant's Exhibit No. 7?

A Yes.

Q Now let's start with the piping. Where did you get the estimate for the cost of the piping?

A That estimate was furnished again by the Nuclear Division to me.

Q And how did they know how much piping to assume?

A It was based on their review of similar type systems.

Q Where in the Duke system is there a system that

is similar to a 3000-spent fuel assembly independent spent fuel pool.

A There is none -- 2000; there is one of 800 at Maine.

Q And you would simply take the piping for the 800 and do what to it to get up to what it would be for 3000?

A Here again, it was based on calculating a heat load. It is not -- the heat load is not linear objection for fuel assemblies.

Q Okay, once you got the heat load, is it linear with respect to the two different heat loads? If one heat load was 800 btus, and the next heat load was 1000 btus, and is the piping -- you simply double the amount of piping?

A No, there are other things that you can do, like increase velocities and that sort of thing.

Q Do you know if they made those calculations in doing the estimate of the $5 million for the piping?

A They reviewed what next-sized pumps they would be for furnishing the volume of cooling water needed to remove that heat from the pool.

Q And then -- well, wait. The pump is not piping, right?

A The pump would determine the pipe size, the flow

of water.

Q Would it determine the quantity of pipe, too?

A No, the quantity of the pipe would be determined based on looking at a layout.

Q But there wasn't a layout here, right?

A There is no layout. It is an estimate based on linear feetage -- footage of pipe.

Q How do they calculate the linear footage of pipe?

A I do not know that answer.

Q And the pump size needed for the heat removal purpose, do you know how did they determine what that pump would cost? Let's assume they decided that they needed a pump 1-1/2 times as large as the pump that was in the McGuire pool. Did they get that calculation by calling up the supplier of the pump? Or did they get it by multiplying 1-1/2 times the cost of the McGuire pump?

A I do not know.

Now I think someone testified yesterday -- maybe this morning -- who remembers? -- sometime yesterday, that you could give us some insights into the problem with poison racks being used by Duke as of 1976. Is that right? Did someone lay this off on you, and you're the wrong guy?

A I was not involved in the evaluation of poison racks in 1976.

Q Okay.

A Perhaps Design Engineering was involved.

Q I mean, you can't shed me any light on that?

A No, sir.

Q All right.

Well, you testified earlier that the size that you could fit in of another pool, if you wanted to get one adjacent to the Unit 3 pool, was something in the neighborhood of 40 feet by -- I think was 140?

A 140, 150, as I recall.

Q Yes, something like that. And that that would give you about 600 --

A 650 spaces.

Q Can you tell me, what is the size of the physical expansion that you got at the top, it says "an expansion of the Catawba spent fuel pool in Applicant's Exhibit No. 4," in paragraph numbered one, "51 feet," which would add approximately 1500 fuel spaces. That was 51 feet by what?

A It was the width of the fuel pool, the existing fuel pool. It was just stretching it out 51 feet.

Q And what is the width?

A The width, as I recall, is something on the order of 25 feet, inside dimension.

Q Wait a second, then. I'm really puzzled. Why is it that a spa e 40 x 140 can only get 600 spent fuel assemblies into it, and a space 51 x 25 can get 1500 into it?

A. The 1500, I did not come up with the 1500, I believe, here. The 1500 --

A. (Witness Snead) It's for two pools.

A. (Witness Hager) For two pools.

Q. All right, 750 for a space 51 x 25, versus a space 40 x 150 that only gets you 600.

A. That's the pool only. That does not include the structure that would have to -- the rest of the structure to provide the supporting equipment, such as cooling pumps.

Q. Maybe you're going to have to explain to me how the Catawba pool is set up. This -- you've sort of described it, and I get sort of the impression it's a long, narrow space that's about 40 feet wide and about 140 feet long.

Now is the Catawba -- I'm sorry, is the Oconee 3 spent fuel pool in a similar shape?

A. It is in a similar shape, but the space that you have would be coming in at a 90-degree angle to the long direction of that pool.

Q. I see. Okay. Now where are you assuming the cooling pumps and so forth would have to be placed to make an expansion right adjacent to the Oconee 3 pool?

A. Within the structure that you would be building.

Q. You have to build an exterior building there?

A. Yes.

Q Because this is all outside?

A It's outside.

Q All right, and how much of the 50 x 140 foot space can be set aside for a pool, making allowance for the building itself and the intended structures. How much pool do you get out of that much space?

A I would have to go back and look at the layout. I do not remember the exact space envelope for that pool.

Q I may be able to help you with that.

(Handing document to witness.)

I'm going to show you just a layout map here. Is this sufficient? This looks like an official map. Or do you need something more detailed than that to make ...

(Pause.)

Does that --

A The size of the structure would have to be something of this order (indicating).

Q Let the record show that the witness, on the little map that I have given him, is simply doing a pencil drawing as to the Oconee -- next to the Oconee Unit 3, to demonstrate what a 40 x 130 foot building would physically sit. And I guess what I'm trying to find out from you is how much of that space would have to be filled up with something other than pool?

MR. MC GARRY: Mr. Chairman?

CHAIRMAN MILLER: Yes.

MR. MC GARRY: First, I can't see the witness.

CHAIRMAN MILLER: I can't either.

MR. MC GARRY: And after --

MR. ROISMAN: We're not doing anything to him over here.

(Laughter.)

MR. MC GARRY: You're cutting off his air, that's for sure, with all you ganging up on him.

(Laughter.)

MR. MC GARRY: But be that as it may, I would like to see that drawing once we go through this exercise.

CHAIRMAN MILLER: You want to see the drawing?

MR. MC GARRY: Once we've gone through the exercise of marking this space, initial it and send it by me.

CHAIRMAN MILLER: Has it been completed?

WITNESS HAGER: I have marked the space where the facility would be located, adjacent to Unit 3 fuel pool.

CHAIRMAN MILLER: All right, let's have that marked as an exhibit for identification so we'll know what we're talking about, and pass it among counsel so that they may see it.

MR. ROISMAN: Okay, I'm not --

WITNESS HAGER: Now what we did then is to

determine how much space was required for the equipment to support that pool, and then the remaining space was fuel pool space, which would accommodate 650 assemblies.

I do not recall at present just how far this support facility went in the 150 foot direction. But there would be a support facility, and then the pool.

CHAIRMAN MILLER: Put your initials on the document. Let's have it marked as an Exhibit. Board exhibit, if necessary.

MR. KETCHEN: Mr. Chairman, I guess we're going to have to have a copy of that --

CHAIRMAN MILLER: Pardon me?

MR. KETCHEN: Is it going to be introduced --

MR. ROISMAN: No.

CHAIRMAN MILLER: I don't know whether it's going to be introduced, but we will be able to identify it.

MR. ROISMAN: It's not going to be introduced. It's NRDC Exhibit, for identification purposes, No. 13.

CHAIRMAN MILLER: 13.

(Whereupon, the document referred to was marked NRDC Exhibit No. 13 for identification.)

MR. ROISMAN: Let the record show I'm showing the Board where the drawing was done by Mr. Hager.

(Handing document to the Board.)

MR. ROISMAN: Now I'm showing it to Mr. Ketchen and to Mr. McGarry, and I don't see South Carolina, South Carolina's gone home.

(Handing document to the counsel.)

CHAIRMAN MILLER: Mr. Blum, have you see them?

MR. BLUM: Yes.

MR. KETCHEN: Mr. Chairman, I guess Mr. Roisman is going to ask a number of questions about the document --

MR. ROISMAN: No, I'm not going to ask any questions about the document. The witness seemed to need to be able to draw that down there, but my question just had to do with how much the physical space represented by 50 x 140 exterior structure was going to be available for a spent fuel pool.

BY MR. ROISMAN:

Q As I understand it, the witness is not able to answer that question.

A (Witness Hager) I do not recall the exact dividing line between the pool and the support building. It would probably -- this is based on just a judgment at this point in time -- possibly a 50/50 split.

CHAIRMAN MILLER: 50, what?

WITNESS HAGER: 50 percent pool, 50 percent support equipment, space.

BY MR. ROISMAN:

Q All right, so that would give us a space something in the neighborhood of a 50 x 75?

CHAIRMAN MILLER: Is that correct?

WITNESS HAGER: 50 x 70 --

BY MR. ROISMAN:

Q It would be half of a 50 x 150 -- I'm sorry, 40 x 75 would be half of a 40 x 150 foot structure?

A (Witness Hager) 40 x 75, yes.

Q Now would you explain to me why I don't get more spent fuel into that space, given that in a space in Catawba that's 51 x 25, you're getting 750 spent fuel assemblies in there?

Is it possible that you're not thinking of poison racks?

A Without looking at the exact layouts, your question is difficult to answer.

Q Well, maybe that --

A I am having to make guesses --

Q -- at the next break you could look at the layouts.

A I'm having to make judgments as to how much space is pool space, how much is support equipment space.

Q All right, so is it fair to say that at this point, without looking further, you don't have an

explanation that will tell us why a space that appears to be much smaller than what's available at Oconee can accommodate more spent fuel than the larger space at Oconee appears to be able to accommodate. You think that that's correct, but you can't explain why.

A I would need to look at the layouts, yes.

Q All right, maybe at the break you could do that. I would like you to do that, please.

Lest there be any question of whether I have formally asked, I have asked.

Now let me take you back to Applicant's Exhibit No. 1, which is the updated ISFSF study, and the reracking study.

On attachment 3, sheet three to that, it's literally the last page of the document, there's an analysis of the rerack of the McGuire fuel pool, dry conditions, and then attachment 3 sheet two, rerack of the McGuire pool, wet conditions. Okay?

A Right.

Q All right, now, is it a correct statement that in terms of your analysis of scheduling, whether you rerack McGuire wet or dry does not affect the schedule very much at all?

A That is correct.

Q Are you aware of any ways in which it does affect--

That is, any ways in which the whether it's wet or dry affects the reracking?

A Yes, as I stated earlier, on the wet you're more vulnerable, I believe, to delays.

Q So you're more likely to be at the upper end of these estimates that you've made in terms of time?

A You're more likely to be at a longer duration on the wet than on the dry.

Q Okay. Now, Mr. Hager, as I understand it, yours is the office that is most -- is the one that gets called in to do the cost of scheduling estimates for options like independent spent fuel storage facilities, or reracking, that kind of work. Is that correct?

A That is correct.

Q Have you at any time been asked by any person in the company to prepare a study that would compare the costs out through the lifetime of the Oconee reactors, 2012, 2013, of a variety of alternative actions that might be taken to provide spent fuel capacity through that period?

A No, sir.

Q And have you done such a study?

A We have started such a study to look at what would be required to supply storage space for the Oconee reactors for their 40-year life.

Q Where is -- What's the status of that study?

A It's preliminary at this point in time. It is

not complete.

Q Any conclusions that you can -- or it's not even at the preliminary conclusion stage?

A No, sir, it is not.

Q When do you expect to complete the study?

A In approximately another month to a month and a half.

Q When did you begin the study?

A We started looking at that about three weeks ago.

Q And at whose request?

A It was at our -- my suggestion: Let's look at how much space would be required for such a facility, and what the costs would be.

Q Can I ask you some questions about sort of the scope of what you're looking at? Have you gotten far enough along that you have a pretty good fix on what the scope of the study is going to be -- although I understand not on its conclusions.

A The scope would be an independent spent fuel storage facility that would accommodate approximately 6000 spaces, as I recall.

Q No, we're not -- okay, that's a helpful part of it, but I guess what I was trying to figure out: We're here today, 1979. Oconee's Units 1 and 2 have permission to rerack and they're in the process of doing it. You

know that those reracking can get you up through a certain date in 1982. I think the testimony now is that it's November or September of 1982 that they run out.

And from that point on, something else has to be done. I guess what I want to know is: Are you preparing data from which it will be possible to determine, based upon the analysis you do, what is the most cost effective and scheduling effective thing that can be done to start dealing with the problem when you would otherwise run out of full core reserve in 1982, and to solve the problem all the way through the year 2012?

A No. The only thing we're doing is an alternative consisting of an independent fuel storage facility that would provide storage for the life of the Oconee units, its cost, and its schedule.

Q So it's only for that one thing, the independent spent fuel storage facility?

A An alternative.

Q And it doesn't purport to look at that alternative compared to any other group of alternatives?

A No, sir.

Q Does it -- when does it assume the independent spent fuel storage facility would be available? Is that a premise that's included in the analysis, an assumption that you make about when it could first begin to receive

fuel?

A. Yes, we would develop a schedule, that is the number of months required to construct a facility -- to design and construct a facility.

Q. Mr. Snead and/or Mr. Glover, to your knowledge is there any place in Duke at this time where somebody is trying to sit down and do an analysis of the options available for handling the Duke spent fuel storage problem that begins to arise when you would lose full core reserve at the Oconee plants sometime in the latter part of 1982 through the lifetime of the plants? Looking at what's the best course of action to pursue if we want to handle this problem ourselves from now through the end of the lifetime of the plant?

A. (Witness Snead) And assuming that this option is approved?

Q. And assuming that this option of transshipment is not approved.

A. No. There is no one looking at the moment out to the year 2012 -- when I say "at the moment," I mean today.

Q. I understand. Is anybody -- Let's make sure that today won't change tomorrow. Have you got anybody who you're planning to have to do just that look?

A. Well, we're going to look. I'm not going to

warranty that we're going to look all the way out to the year 2012. Of course you've just heard Mr. Hager testify that he's looking out at the lifetime storage, and we'll certainly be pleased to factor that into the alternatives that we'll look at.

Q Okay, now, do any of you gentlemen have any judgment about whether or not a look that started with the date of -- let's just say the date on which you would lose full core reserve -- if the things you now have approved at Oconee get installed and run out and you get nothing else, beginning with that date, going through 2012, whether the decisions that you make as to what is the best course of action you would follow, could be affected by looking over that time span rather than only looking over the period say from 1982 to 1990?

A Okay, I don't think that the decision that we'll make regarding the implementation of our next alternative will be made on the basis of providing a lifetime storage of Oconee fuel.

Now, I may be wrong, but I don't think the decision will be made that way.

Q Okay, but I guess my question really is: Is it possible that the choice of the next thing that you're going to do at Oconee might be different if you looked at it from the porspective of "we're going to have to deal

this problem from now through 2012"?

A Certainly, if we -- if our -- if our definite planning horizon extended all the way to the year 2012, then we would use a combination of these alternatives to get us to 2012 when we took that study approach, or we would use an independent spent fuel storage facility to get us there. That's correct. That's correct.

Q But in other words, looking at that horizon as opposed to the 1990 or 1995 horizon might change the choices you'd make?

A Well, the 19-- the earlier horizon certainly assumes the availability of external alternatives; whereas the longer horizon does not assume the availability of the external alternatives. It's depending on which approach you take, you come up with different conclusions.

Q Would it even affect the choice of the next step after 1982?

A To the extent that that time frame is contained within both framing horizons, that's a decision that you have to make. But you could -- you could let it affect the next step.

Q I mean, I understand that one of the things that affects is, you see the 1982 date as a deadline at this point. You've got to get something that you think can be ready by that time so you don't lose the full core reserve

or have to shut the reactor down. I understand that's the driving force. That's going to influence which step you take next. But I'm trying to just be clear on it. I just want to make sure it's clear.

Your testimony is that another influence on the next step you take would be whether you're looking to 1990 or 1995, the shorter term, as the deadline for when you don't have to worry about your spent fuel anymore, or 2012 for when you don't have to worry about your spent fuel anymore. Is that right?

A I'm understanding where you're coming from. I think I've answered all your questions. But how about asking that one -- or please ask that one one more time?

Q I'm just trying to sort of restate what I thought you were saying so that we understand each other: That if you assume the planning horizon, as you used that term, as 2012 rather than 1995, the choice of the next step that you make after 19-- or what you're going to do with spent fuel after 1982, could be different.

A It could be different. It doesn't necessarily -- it doesn't necessarily have to be different, but it could be different.

Q I understand.

A Yes, sir.

CHAIRMAN MILLER: Let's have 10 minutes now, and

then we'll run to about 5:00 o'clock. We have some things that people said they might want to do at recess, so if we can accomplish it.

MR. MC GARRY: I think we've accomplished it.

CHAIRMAN MILLER: Fine.

(Recess.)

CHAIRMAN MILLER: Mr. McGarry, are we ready to proceed?

MR. MC GARRY: Yes, sir.

CHAIRMAN MILLER: You may proceed.

MR. ROISMAN: Okay.

BY MR. ROISMAN:

Q Mr. Hager, I saw a gaggle of people around you at the break. Are you now ready to give me some information on that question I asked you regarding how much spent fuel you could get into the space if you utilized the space available adjacent to Oconee Unit 3 spent fuel pool?

A (Witness Hager) Yes, we had to rough this out, since I didn't have the previous data available to me.

Corrections to my previous testimony are as follows: The space available for Unit 3 is still 40 feet wide. The length I think I previously stated 150 feet; that is 110 feet, length.

Q Okay.

A Okay, previously I said approximately 50 percent

of that space was support facility and 50 percent pool. The correct percentage ratio would be 70 percent of that space is for support building, 30 percent for the pool.

And if you looked at then the Catawba dimensions, that pool was 21'6" wide. We added 51 feet in length to it which gave us 750 spaces. So on a ratio basis, you would get approximately 900 spaces instead of the 650 that I had previously quoted.

Q Now are both of those spaces assuming poison racks?

A Those are assuming racks that are approximately 14 inches on center. If you went to a poison rack, less approximately 10 inches on the center, it would be four spaces.

Q Can you give me a rough calculation of what that would mean at the Catawba number, but the Oconee number, if you'd rerack?

A It would probably add another 100 spaces.

Q Another 100 spaces? Going from 14 inches down to 10 inches?

A Yes, sir. That's without going into a detailed look at it; it's a judgment number.

Q Are there advantages to being adjacent to Oconee Unit 3 that a spent -- with an additional spent fuel pool?

A This in essence is an interim facility that's

adjacent to the pool. I do not see any advantages. I think there are disadvantages.

Q Would it be -- Could it be cheaper than 1000 spent fuel assemblies with space provided completely independent from Oconee 3?

A In my estimation it would be cheaper, because you're working in a confined area adjacent to Oconee 3.

Q I'm sorry, I think your answer may appear to give the wrong answer. You mean you think it'd be cheaper to build away from Oconee 3, not next to it?

A That's correct.

Q All right, we needed to clarify that.

Would you look at page 5 of your testimony under

and JWB subsection (c).

T10A
ADELON/mm1

The statement that is there indicates that an independent spent fuel facility located neither at Oconee nor McGuire would run into certain problems that would affect both scheduling and cost.

Is that correct?

A That is correct.

Q They would affect it by making the schedule longer and the cost higher. Is that correct?

A That is correct.

Q Do you have an estimate of how much longer it would be?

Let's compare a 3000-fuel-assembly facility at Oconee, versus a 3000-fuel-assembly at a site that there is no reactor at right now.

A I did not make a study. This is a judgment that if it would be located on a site either away from McGuire or Oconee, we would have to perform the subsurface investigation, the geology studies and so on which would lengthen the duration.

Q Do you have a judgment at all in terms of whether you would expect it to add maybe 10 or 15 or 20 percent to the time?

A It would add, in my judgment, approximately 12 months.

Q Approximately 12 months. And what about in terms

mm2

of the cost, what would you expect it to add?

A The cost would not be a great adder. It would be some if we had to procure the property, that would be approximately -- say property procurement plus investigation work, I estimate would be in the range of $50- to, oh, $80- or $90,000.

Q So in terms of cost it would be a small incremental if you went away from the reactor sites for the pool?

A In my judgment, yes.

Q Would this analysis apply equally to a government away-from-reactor storage facility as well as to a Duke away-from-reactor storage facility, in your judgment, assuming that both are going to be licensed?

A Yes.

Q Now, what is your judgment about the relative cost of an independent spent fuel storage facility depending upon its size if we assume that we are starting with a base size 1500 unit, that is 1500 spent fuel assemblies, poison rack installation. Would you expect that a 3000 fuel assembly poison rack installation would be just double the cost or less than double the cost?

A It would be less than double the cost.

Q And how about a 6000 fuel assembly, assuming poison rack use.

Would it be less than double the cost of the 3000?

mm3

A Yes.

Q Is there any point at which your economies of scale would stop?

A I would think so. We have not looked that far.

Q How far have you actually looked.

A We looked at going from 1500 -- well, as I stated in our June 15 letter --

Q Right.

A -- of 1500 to 3000.

Q Now, where is the savings in your judgment that come from going from the 1500 to the 3000?

A We added the additional space by changing the racks.

Q But my assumption was that you got a 1500 one with poison racks.

A Okay.

Q If you got a 1500 capacity space with poison racks and you went to a 3000 capacity space with poison racks, would you get a savings in per fuel assembly?

A In my judgment, yes.

Q All right.

Will you tell me, have you done a study of that?

A No, sir, we have not.

Q What parts of it do you think would give you that kind of a saving? Where does the economy of scale operate?

mm4

A Essentially for the support facility for an independent fuel storage facility would not increase proportional to your pool size in view of the fact that the fuel heat load of older fuel is not as high as fresh discharge fuel.

Q Looking at Applicant's Exhibit No. 7, Table No. 4, the item that would be affected would be items Nos. 8 and 9, mechanical equipment and electrical equipment.

A That is correct in my judgment.

And also structure, structure costs.

Q The physical structure costs --

A Yes.

Q -- is not linear with the physical size of the pool?

A It is linear with the physical size of the pool, but the support structure with the pool is not linear with the pool.

Q So you are talking about the rest of the building other than the portion that forms the pool?

A That's right.

Q It wouldn't have to be made twice as big just because the pool would be twice as big?

A That's correct.

Q Okay.

Do you have some sense of what kind of asavings you would get per fuel assembly if we assumed that the 3000-unit

MPB/mpb1
flws
mm4

fuel assembly unit with the poison racks is your number on page 2 of Applicant's Exhibit number 1 than the 20,300, what would you think the cost would be per spent fuel storage space if it were a 1500 capacity and you were using poison racks?

Do you feel you can make a judgment on that?

A The amount of reduction in cost I do not believe would be appreciable. You would only be reducing the pool size itself.

Q Okay.

And if you were going from a 3000 capacity unit to a 6000 capacity unit, both using poison racks, how much would you expect the per additional spent fuel storage space to drop from the 20,300 that you estimate on page 2 of Applicant's Exhibit number 1?

A Going from 3000 to what?

Q 6000.

A Doubling it.

This was a pure judgment. Maybe somewhere in the range of 15,000 per space; that is a pure judgment, though, without doing any calculations.

Q I understand it's not a calculation.

MR. ROISMAN: Mr. Chairman, I think that's all that I have for these witnesses, except that I would like to ask that various documents which they have authored be

mpb2 introduced into evidence, having already been marked, okay?

And if you will give me just one moment to pull them together in numerical order?

CHAIRMAN MILLER: All right.

MR. BOISMAN: It will not be all of our numbers.

10Bflws

10B MPBLOOM
mpb1

MR. ROISMAN: Mr. Chairman, let me start by offering Applicant's Exhibit number 1 -- assuming the Applicant isn't going to offer it -- and Applicant's Exhibit number 4 in evidence.

Applicant's Exhibit number 1, as I understand it, was prepared by and under the supervision of Mr. Hager. And Applicant's Exhibit number 4 was prepared by Mr. Snead.

CHAIRMAN MILLER: Any objection?

MR. KETCHEN: No.

MR. MC GARRY: Subject to relevancy, no objection.

MR. KETCHEN: The same.

CHAIRMAN MILLER: Very well.

Applicant's Exhibits 1 and 4 are admitted into evidence.

(Whereupon, the documents previously marked as Applicant's Exhibits 1 and 4 were received in evidence.)

MR. ROISMAN: Okay.

Next, NRDC Exhibits number 2, which was prepared by Mr. Snead, number 3, which was prepared by Mr. Clover, number 5, which was prepared by Mr. Glover, number 7, which was prepared by Mr. Glover and is attached to the Applicant's answers to NRDC's second set of interrogatories to the

mpb2

Applicant, dated May 7, 1979, number 8, which was prepared by Mr. Glover, number 9, prepared by Mr. Glover -- he's a busy man -- number 12, which was prepared by Mr. Glover -- Before we get to 12, number 10, which is the Stone and Webster report, for the limited purpose of demonstrating that the company received this estimate from Stone and Webster and not for the truth of the statements contained therein -- and then number 12, which I mentioned before.

CHAIRMAN MILLER: Are there any objections to the proffered admission into evidence of NRC Exhibits -- NRDC Exhibits 2, 3, 5, 7, 8, 9, 10, and 12?

MR. MC GARRY: Mr. Chairman, subject to our objection as to relevancy, we have no objection.

MR. ETCHEN: The same comment, Mr. Chairman.

CHAIRMAN MILLER: All right.

There being no objection, NRDC Exhibits 2, 3, 5, 7, 8, 9, 10 and 12 are admitted into evidence, NRDC Exhibit 10 being admitted into evidence for the limited purpose stated by counsel, there being no objection stated thereto.

(Whereupon, the documents previously marked as NRDC Exhibits 2, 3, 5, 7, 8, 9, 10 and 12 were received in evidence.)

CHAIRMAN MILLER: Now what about Applicant's

mpb3 Exhibit number 6, for example, the testimony of Mr. S. B. Hager?

MR. MC GARRY: Mr. Chairman, I will move that at the appropriate time.

MR. KETCHEN: Mr. Chairman, just to avoid going through this drill every time, when I say 'no objection', it will be with the same qualification.

CHAIRMAN MILLER: All right, I understand it's subject to that same continuing objection unless and until you should advise us to the contrary.

MR. KETCHEN: Thank you.

CHAIRMAN MILLER: And the same with the Applicant's counsel?

MR. MC GARRY: Yes.

CHAIRMAN MILLER: All right. The record will so reflect.

All right. Does that conclude the cross-examination? Or, Mr. Blum, I guess it's your turn.

MR. BLUM: I have some cross-examination.

BY MR. BLUM:

Q Mr. Hager, I think you stated that the cost of extending the Catawba fuel pool was in fact $6,308,000.

A (Witness Hager) It was in that range.

Q And for that price you got 1500 more spaces?

A That's for two pools, the 1500. There were 750

mpb4 spaces gained per pool. And that gain was also related to changing the racks. This is a high density rack also.

Q All right.

But that is true that the figure 6.3 million is related to 1500 additional spaces?

A Let me verify that that is not per pool.

(Pause.)

A That is correct.

Q So that works out to about $4200 per space.

A Yes.

Q And that is with high density racks?

A That is with stainless racks.

Q Stainless racks that are 15 and a half inches center-to-center?

A No, it's not 15 and a half. I think it's about 13-something, center-to-center.

Q Well, if you'll look at Applicant's Exhibit 1, where you're talking about -- Let's see, Applicant's Exhibit 1, Part 1.c, on page 2, you're talking about the cost of an ISFSF with a capacity of 1500 storage spaces, racks 15 and a half inches center-to-center.

A That is correct.

Q All right.

Now when you rerack Catawba, were you closer to 15 and a half?

mpb5

A Yes, closer to 14. I think it is 13 and three-quarter inches.

Q Why did you rack Catawba closer than you're planning on racking this ISFSF?

A The independent fuel storage facility that was used here is the 1976 pool escalated to current cost. We did not change the rack spacing.

Q All right.

So merely by ordering the kind of racks that you'd ordered for Catawba, you could lower the cost of the spent fuel storage space there by a substantial amount.

A You could lower that to the extent that rackssat 13 and three-quarter inch space -- the number gained using that space versus 15 and a half inch spacing. There would be some additional cost, though, to the total because of, I believe the rack costs would be more.

Q All right.

You figured, looking down to D below that for the ISFSF, you racked those ten and a half inches center-to-center.

Is that still the same figure with regard to poison racking?

A Ten and a half is poison rack.

Q All right.

And that has not changed 1976 to date?

mpb6

A What we did in this study, in Item D, is use the same independent fuel storage facility without changing out the cost of the rack from 15 and a half from poison racks and estimating to current cost.

Q All right.

What I'm asking you is this:

Apparently from 1976 to 1979, the technology has advanced, so that you can, instead of using a 15 and a half inch center-to-center on a stainless steel rack, you can now use 13 and a half inches center-to-center.

Has there been any similar escalation in poison racking?

A Not to my knowledge. The poison racks, as I remember, are in the range of ten, ten and a half inches, that I'm aware of.

Q Did you have something to add to this, Mr. Glover?

A (Witness Glover) I might.

I think one thing Mr. Hager might have wanted to have pointed out but hasn't yet is that the 15 and a half inch high density racks are still, I believe, of the open lattice variety rather than being the canned rack. This canned stainless steel rack, the technology is in the 13 inch center-to-center range, whereas the other rack, which is much less expensive, is in the 15 and a half inch center-to-center.

mpb7

A (Witness Hager) That's right, the 15 and a half is not a stainless steel box that the fuel assembly fits in.

Q All right.

Now when you're talking about -- Well, Catawba costs -- The expansion of the Catawba pools costs about $4200 per space for some form of stainless steel rack.

Isn't it your experience that you can save perhaps 40 percent of that figure if you put in poison racks?

A The cost per space would probably go down, yes, I do not know if your percentage.

Q Well, if you look at your items again, reracking Oconee of 1C and 1D of Applicant's Exhibit 1, you have the cost per additional space in 1D as about $20,000 and the cost per additional space in 1C as $37,000-some-odd. My arithmetic got the one figure to be about 54 percent of the other.

CHAIRMAN MILLER: Are we testing the witness's arithmetic, or what is the purpose of this? I mean, you apparently have the data there; you're perfectly capable of making the arithmetic computation, so why are we asking the witness to do it?

MR. BLUM: I'm trying to project this onto what he did, what was done at Catawba, which he's testified about, to determine whether the cost per additional space at Catawba would have been substantially less had they reracked it in poison racks.

mpb8

CHAIRMAN MILLER: Well, you can ask that.

WITNESS HAGER: I think I responded it would be less. I do not know if it would be 40 percent. I have not run those numbers.

BY MR. BLUM:

Q You had indicated that building -- If you build a fuel pool adjacent to Oconee 3 fuel pool and racked that in stainless racks that you'd get about 900 spaces

A (Witness Hager) That is not a fuel pool, that is an independent fuel storage facility adjacent to Oconee 3 pool. You would get that number of spaces, approximately.

Q All right.

Now that would be stainless racks?

A Yes.

Q And wouldn't you expect to get something on the order of 1600 or so spaces if you racked that in poison racks?

A You would get more than the 903. I think I gave a judgment, without doing any numbers, of something like 1000. That was just a judgment, looking at the numbers. You would certainly get more.

Q Well, it would more nearly almost double, wouldn't it?

A Well, you're going from 13 and three-quarter inches to ten and a half inches, the spacing -- I could certainly run that out.

mpb9

Q Well, if we look at attachment number 1 to Applicant's Exhibit number 1, reracking the Oconee units there -- When you rerack you go from 750 to 1286 with poison capacity.

A Where are you on Exhibit 1?

Q I'm looking at attachment number 1, sheet number 1 of Exhibit number 1.

MR. MC GARRY: Would you repeat your question again, Mr. Blum?

MR. BLUM: All right.

BY MR. BLUM:

Q Looking at Applicant's Exhibit number 1, attachment number 1, sheet number 1, Oconee Units numbers 1 and 2, you give figures of present storage capacity of 750, the poison capacity at 1286.

Wouldn't you expect a similarly substantial increase over your 900 space figure to something more closely like 1600 spaces if you reracked in poison racks?

A (Witness Hager) Mr. Blum, you're asking me to make a judgment. I said it would be more than the 900; without running the calculation in numbers, I do not know what number it would come out to be. It would certainly be more with the 13 and three-quarter inch spacing.

Q I would ask you to calculate that, if you can, overnight, and give me that figure, if you will.

mpb10

A Sure.

Q Now it's your testimony that you don't know how much it costs to build the Catawba auxiliary building containing the fuel pool.

A I said I did not remember what that number was to build the entire facility.

Q Do you know what the McGuire cost of the auxiliary building containing the fuel pool was?

A From my memory, just for the structural portion alone was somewhere around 13 million. That does not include the equipment and systems that go into that building. That is material costs only, I'm sorry, that does not include labor.

Q The Stone and Webster proposal that gave you the $10,000 per space figure, do you recall whether that was for high density or for poison racks?

A I do not recall. I think they made a statement, as I remember, in their proposal, that you could use either type rack.

Q Do you remember what that figure was based on?

A No, sir, I do not.

CHAIRMAN MILLER: I think we'll recess at this time.

As you know, tomorrow is Saturday, and we will reconvene at 9:30 a.m., in the Marco Polo Room of the Quality Inn.

mpb11

(Whereupon, at 4:45 p.m., the hearing in the above-entitled matter was recessed, to reconvene at 9:30 a.m., the following day.)