UNITED STATES ATOMIC ENERGY COMMISSION

IN THE MATTER OF:

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
(Indian Point Station, Unit No. 2)

Docket No. 50-247

FILED

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UNITED STATES OF AMERICA

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In the matter of:	
CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.	Docket No. 50-247
(Indian Point Station, Unit No. 2)	

Hearing Room,
8120 Woodmont Avenue,
Bethesda, Maryland.

Thursday, April 12, 1973.

Hearing in the above-entitled matter was reconvened, pursuant to adjournment, at 9:00 a.m.

BEFORE:

SAMUEL W. JENSCH, Esq., Chairman,
Atomic Safety and Licensing Board.

DR. JOHN C. GEYER, Member.

MR. R. B. BRIGGS, Member.

APPEARANCES:

(As heretofore noted.)

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C O N T E N T S

WITNESSES:	DIRECT	CROSS	REDIRECT	RECROSS
Victor Stello, Jr.) Denwood F. Ross, Jr.)		10,834		
James White) Walter Sawicky) Robert Bremmer) Kenneth Deluse)			10,984	
George G. Uram) John B. Roll) Lowell H. Bowman)	10,996			
William J. Cahill			11,022	

(Answers to Hudson River Fishermen's Association Questions for Bertram Schwartz on Testimony Concerning Restricted Operation of Indian Point 2 dated February 5, 1973, bearing date of April 9, 1973, having been received into the record on April 9, 1973, is included in this hearing record following page 10,028.)

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PROCEEDINGS

CHAIRMAN JENSCH: Please come to order.

Does the Citizens Committee have further cross-examination of the Staff?

MR. ROISMAN: Yes, Mr. Chairman.

MR. KARMAN: Mr. Chairman, I believe at this time Messrs. Stello and Ross have some responses that were open from the Board inquiries of yesterday.

CHAIRMAN JENSCH: Is that agreeable to Citizens Committee?

MR. ROISMAN: Yes, Mr. Chairman.

CHAIRMAN JENSCH: Will you proceed, please.

Whereupon,

VICTOR STELLO, JR.

and

DENWOOD F. ROSS, JR.

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

WITNESS ROSS: There were two questions.

The first related to a curve in Chapter 2 of the Staff Supplemental Testimony for the ECCS hearing. The question was, were there data points beyond the range of 2.4 which was the extreme of the curve?

We have rechecked the raw data, the most extreme

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number was 2.2.

The second question is related to page 10,824 of yesterday's transcript and it goes back a couple of pages to a question about one of the proposed technical specifications for the IP-2 reactor. It is where Mr. Briggs said that:

> "This suggests that one may approach peaking factors of 2.7 rather frequently in the operation of the reactor."

I gave a partial answer on 10,824 that being outside of the offset range from plus 7 to minus 12 percent does not imply that the FQ factor is greater than 2.7.

Incidentally, the transcript says 27. It should be 2.7.

We discussed this subsequent to yesterday's hearing, and that answer is indeed true.

The notion of the eight hours in the proposed specification has an analogous situation in other technical specification requirements concerning times that pumps or diesel engins may be considered to be out of service. Time limits such as these are intended to give the plant operator time to correct the situation.

However, from the nuclear standpoint the indication of an axial offset outside of the range indicates a certain axial peaking factor generally labelled F_Z which

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is only part of the total peaking factor of 2.7.

Based on our experience with operating plants such as was described on figure 2.1 of the ECCS Supplemental Testimony, it is unlikely that the product of this axial factor times the other factors, in particular the radial factor would yield such a number for these eight hours, or in fact for any eight hours while we are on full power.

MR. BRIGGS: Why is it then that you require that power be reduced after eight hours if the offset numbers are exceeded?

WITNESS ROSS: I believe the answer would just be the converse of the two arguments. The eight-hour limit will give the operator time to correct it. The peaking factor of 2.7, as I stated, is a number that is not likely to be achieved and I recall saying yesterday that it certainly is possible during one part of the plant lifetime.

So if there were not a time limit, the operator would have more freedom to operate for longer periods of time and therefore this would render the probability basis inapplicable.

MR. BRIGGS: You offer no alternative to the reduction in power if the axial offset stays out of limits. You don't permit him to look to see whether the radial distribution is such that the peaking factor would not be 2.7.

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The only alternative you offer is to get back within the axial offset range, or reduce the power.

Is there reason for not allowing alternatives?

WITNESS ROSS: The alternatives that the operator has and the methods he has at his disposal, move in the vertical direction. He has part length rods that he can do something to axial power shapes. He has nothing he can move on a reasonable basis to do anything with his radial power distribution.

MR. BRIGGS: But the operator has no alternative to bringing the axial distribution back within range. He must either do this or he must reduce the power and this is -- he does not have the alternative by showing by calculations that his peaking factor is below 2.7, is that right?

END #1

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WITNESS ROSS: Mr. Briggs, we are checking the tech specs. But you are speaking not hypothetically, I presume, what could the operator do, but what exactly do the tech specs permit?

MR. BRIGGS: Yes. But as one reads the tech specs the operator does not have an alternative. He can bring his axial offset back within the range that is permitted or he can reduce power. These are his two choices.

WITNESS ROSS: That's correct, yes.

MR. BRIGGS: All right. Thank you.

CHAIRMAN JENSCH: Citizens Committee, will you proceed?

MR. ROISMAN: Yes.

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CROSS-EXAMINATION (Continued)

BY MR. ROISMAN:

Q Can I direct your attention to pages 10,747 and 10,748 of the transcript from yesterday? That was the point at which we were discussing the transition boiling heat transfer correlation, and I had been asking you if the one that was used in Indian Point No. 2 was a departure from the one that was prescribed in the emergency core cooling system's Interim Criteria.

Mr. Stello, I think you were answering. You indicated yes, it was, and then you added this on page 10,748:

"It is a more conservative assumption."

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What was the significance of that? I mean why did you happen to mention that particular fact?

A (Mr. Stello) In plants for which you return into the transition boiling regime following dryout, the heat transfer coefficient would be higher if you would permit the return to transition boiling.

Q No, I'm sorry, I understood you meant it was moving the conservative way. But what difference did it make that it was conservative? Did you feel that, for instance, changes in the ECCS Interim Criteria that went in the conservative direction were all right? I mean is that the implication of your statement?

A The implication of my statement was just to give information. I was not trying to relate it in any other form but that to convey information.

Q In other words, what I'm trying to find out is there is no Staff position that so long as the changes in the emergency core cooling system Interim Criteria move in the conservative direction, that it is all right to change them without going through Commission regulatory procedures?

MR. KARMAN: Did you have that in mind when you answered the question?

WITNESS STELLO: No, I did not have that in mind when I answered the question at all.

BY MR. ROISMAN:

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Q Does the Staff have a position --

MR. KARMAN: Mr. Chairman, I question whether that question is relevant to the particular questioning at hand. Mr. Stello responded that what he was saying was that this just was a conservative position. I don't believe the Staff position with respect to this matter as to any future ECCS changes are relevant to this line of questioning.

MR. ROISMAN: I think it is very relevant, Mr. Chairman, because if the Staff position is that the Interim Criteria are, in their opinion, changeable so long as they move in a conservative direction, we don't have any problem because we are not trying to move the Interim Criteria any direction but conservative.

We would like to change the peak temperature from 2300 to 1500; that's a conservative move. And I'm just trying to find out what the Staff's position is with respect to this because there are some other fixes for this problem of fuel densification which we have not talked about which involve moving the Interim Criteria in a conservative direction.

I think it is pertinent if,for no other reason, for purposes of subsequent legal argument, to know whether or not the Staff technical people in their operation-- I mean we have found here a specific instance in which the Staff has varied the Interim Criteria. Now this Board, of course, will have to decide whether or not that variance

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in the Interim Criteria is acceptable or not, and whether they can allow the plant to be licensed with that variation from the Criteria involved.

But irrespective of that, we feel that it is pertinent to know what the Staff position is, not their legal position but how these technical people operate, and that's the reason for asking the question.

MR. KARMAN: Mr. Stello is not qualified to discuss whether or not we would hold subsequent hearings or change the regulations. Mr. Stello is a technical witness here today who is testifying as to the technical aspects of fuel densification, not as to what the Commission or the Regulatory Staff will do some time in the future with respect to changing the Interim Criteria.

MR. ROISMAN: I'm not talking about that at all, Mr. Chairman. This is a change. The witness testified yesterday that it is a change in the Interim Criteria and that it moved in the conservative direction. It has nothing to do with a rule-making; it has to do with the fact that they did it without going through a rule-making.

CHAIRMAN JENSCH: Well, the question in its present form may be a little too broad. I think the witness however should be permitted to speak as to his own position on the matter. He may not be able to say what the Staff position is. It may be a composite judgment, but what would

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be his recommendation, based on these facts.

The objection is overruled.

MR. ROISMAN: I will restate the question if you want, Mr. Stello.

WITNESS STELLO: I don't think that's necessary.

BY MR. ROISMAN:

Q Go ahead if you will, please.

A (Mr. Stello) I will answer it, in my opinion, if there were a change in the evaluation models proposed by an applicant and it were more conservative and it were clear to me, I would find that acceptable in my judgment.

Q And what if there were a change proposed to the evaluation model by an intervenor, if it were more conservative, would you find that also acceptable?

A If the intervenor were proposing an evaluation model for a plant, yes.

Q And you would accept that for purposes of evaluating the plant?

A For his plant, yes.

Q No, no. The intervenor, you see, does not have a plant. It's the other side that has a plant. The intervenor has an analysis.

A We only review evaluations of facilities that are proposed to us. A hypothetical situation--

Q No, no. Let's say we submit to you an evaluation

eb6

model for Indian Point No. 2 that includes more conservative assumptions than the ones contained in the evaluation model now proposed by the applicant. Would you accept our evaluation model?

MR. KARMAN: Mr. Chairman, I think we are wandering off as to whether or not Mr. Stello would accept an intervenor's evaluation model for a utility's plant. I don't think this is an appropriate line of questioning for this witness.

CHAIRMAN JENSCH: I think what the question is seeking is the recommendations this gentleman would make. Now he has said-- It is rather unusual I believe in the present status of the record. He said if the applicant proposed a conservative model that would be fine with him, but he hasn't quite come to the question if somebody else proposes it. And I think we are talking about what would be his recommendation for, I presume, the conservatism that is related to safety. And I think these are questions that are sought to be developed here.

The witness may answer.

WITNESS STELLO: I cannot answer the question, would they be considered. Most certainly they have been--

BY MR. ROISMAN:

Q No, the word was "accepted," since that was the word you used.

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A (Mr. Stello) I understand.

If they were proposed, which they in fact have been, they certainly will be considered. Whether they would be accepted or not depends on the technical basis to justify that change. That is in fact the essence of the ECCS hearing.

There have been changes to the Interim Criteria proposed by intervenors, by vendors, and by the Staff in both directions, i.e., more conservative and less conservative. The technical basis to justify changing the model in either direction is a matter that is currently under review.

Q Well, do you want to change your earlier answer then, when I asked you what you would do if a more conservative model were suggested and you said, "Well, if it were suggested by the applicant you would accept it." Do you want to change that to say "After evaluation and determining, in your opinion, that it was a good change or a necessary change, you would accept it," or do you want to stick to your original answer which was you would accept it without qualification?

A If my original answer was to be interpreted as accepting without qualification, I most certainly want to change it because that would mean that anyone could come up with any idea and call it a more conservative change without any evaluation. And one can then say that I would suggest

eb8

I would accept it, and the answer is no.

I'm saying that--

Q Well, why don't you--

A I haven't finished.

The particular instance in question relates to the transition boiling heat transfer correlation which was discussed at great length in the ECCS rule-making hearing.

Q You understand I don't care what you discussed at the ECCS rule-making hearing. I'm not allowed to get into that record here for challenging those Criteria. So you would make both of our times a lot easier if you would forget your history in that and focus on this plant.

Now all I want to know is:

Once you determine that an applicant has suggested to you a change in the ECCS evaluation model which is conservative, do you accept it automatically?

A No.

Q All right.

What do you go through after you have determined that it is conservative before you determine whether to accept it?

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A. Why don't we take the sequence of events?

Something is proposed. It may or may not be more conservative. The basis is presented to describe whether or not it is more conservative given that that conclusion is finally reached and it relates to some particular facility. Our basis would be explained in the Safety Evaluation Report pertaining to that facility describing why the proposed action and if that is accepting a more conservative approach than some previously used one, it is so explained, and why we think it is appropriate to do that.

The part that comes after, knowing it is conservative, is proposing it and explaining it in a Safety Evaluation Report and presenting it to the public and all other parties that are interested in the matter.

Q. But I am trying to figure out what portion of your judgment enters in. Once you determine that the Applicant comes in and they make a proposed change that they say is conservative, you evaluate it and you conclude that it in fact is conservative, is there any additional judgment of the Staff that is applied. Or, do you say well, as long as you guys want to go int the conservative direction and we have concluded that it is conservative to go that way it is okay with us.

MR. TROSTEN: Mr. Chairman I object, I think

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Mr. Roisman has gone on quite long enough with this line of questioning. He has been afforded an opportunity to probe into this general thesis of conservatism and general argument that he has with the Regulatory Staff, and I think he has really been allowed to go far enough in this respect and I object to further questioning on this.

CHAIRMAN JENSCH: Well I understood these questions were to find out just what was the process and that the witness, a few moments ago seemed to indicate a difference in the handling of presentations.

Now he corrected it in some respects. He said if the Applicant filed something conservative they will accept it.

Then he said, we would evaluate it.

MR. KARMAN: I question whether he changed it, Mr. Chairman, or whether some interpretation could be made of what he said.

MR. TROSTEN: Mr. Roisman has asked the same question about four different times. He has had the answer four different times. He doesn't like the answer he is getting, and he now wants to ask it a fifth time.

I think the Chairman should rule it out of order.

CHAIRMAN JENSCH: Well I think there is some difference as to what has been reflected in the answer by the witness. He has said that they evaluate it and that sort of

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thing.

Now what does that mean?

I don't know what the process of evaluation is. The questions now are to what extent does judgment play a part? And I think that--

MR. KARMAN: No, I beg to differ. When Mr. STello indicated he evaluated, I don't think Mr. Roisman is trying to figure out why he evaluated.

CHAIRMAN JENSCH: It isn't a question of why, it is how.

MR. KARMAN: Or even how he evaluated.

CHAIRMAN JENSCH: Well how is this evaluated?

I am kind of a layman in this thing. I don't know what they churn up or what they consider in these things and it gets down to the point of, well, it is judgment.

Judgments on what? What does he consider.

MR. KARMAN: He indicated that they put out a Safety Evaluation which gives the entire history of this and our evaluation.

CHAIRMAN JENSCH: That is right. That is the summary, that is the end result.

Now what is the process before you reach the end result? I think that is what the questions are about.

Is that your purpose?

MR. ROISMAN: Yes, sir.

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And particularly it seems to me Mr. STello suggested it is a two-part analysis. Part one is to determine whether what is being proposed is conservative as asserted or not. And then part two is having once determined that it is conservative, a decision is made as to whether a change will be allowed.

I am really focussing on part two. The analysis has been done, it has been concluded that the proposed changes are conservative ones. The Applicant is the proposer of the change.

Now we come to part two, whether the Staff accepts the proposed change or not, given that it knows that it is conservative.

And I am trying to find out from Mr. Stello, is that automatically accepted, or is there some judgment applied? And if there is judgment applied, what are the criteria that are used in deciding whether to accept it?

MR. TROSTEN: Mr. Chairman, may I suggest that by the nature of his explanation and his question, Mr. Roisman is asking for some kind of a discursive discussion of conservatism. How the Staff goes about making its judgments, it is the same subject that he has been discussing since the outset of the hearing. We have gone over this time and time and time again with different witnesses, and I really suggest that it is time to cut him off in this respect.

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CHAIRMAN JENSCH: Well we suggest the other way. WE don't know that he really has gone over this time and again.

I think the question is, if the witness would directly deal with it, is once it has been determined, what do they do with the determination that it is conservative?

Do they accept it automatically, or is there an application of judgment?

I don't mean to suggest that this is primarily subjective, but there must be some process that he can describe since he has intimated that it is a complicated arrangement. I think it is difficult to describe it, but I think, unfortunately, he perhaps used broader terms originally than intended; when the Applicant suggests something conservative they will accept it. But he qualified that to say that they would evaluate it.

I think the question is, what do you do once you have determined it to be conservative?

I think that is a process that is quite important.

MR. KARMAN: Possibly it might be helpful, Mr. Chairman, if on a semantic question, a semantic matter where we are discussing Applicant coming in with a change for a more conservative type thing, in discussing this with Mr. Stello and Mr. Ross, I believe we might change the word "change" to variance for this particular plant, or any

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particular plant. A variance from the model, rather than changing the model itself. And I believe the Commission does give the Staff the right to make such variances where they feel that they are appropriate for a particular plant with a particular model.

CHAIRMAN JENSCH: Well let's let the interrogator proceed with his language, and if you find that inadequate, we will give consideration to an objection.

Your objection is overruled.

BY MR. ROISMAN:

Q To keep it clear, Mr. Stello I will restate the question at this point.

The question is this, once the Staff has determined with respect to a proposed change, that the change is conservative, and that the change has been proposed by an Applicant, what else does the Staff do before it accepts or rejects the proposed change?

Does it apply some judgment?

A (Mr. Stello.) I think in order to provide a full and complete answer, what we would like to do is to take one of the few examples that we have been able to think of and thatis the approach that was used in our evaluation of the Palisades facility where a variance more conservative than what was specified in the Interim Acceptance Criteria was in fact proposed, evaluated, and finally approved by us.

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Mr. Ross is familiar with the details, so I would like him to go through that example as an illustration.

Q Fine.

A (Mr. Ross.) In the general time frame of the fall of 1971, in this case we are speaking of the Consumers Power Plant called Palisades, we received a proposal from Consumers to operate their plant at 60 percent of power.

And they used an evaluation model and proposed some variances in the conservative direction.

Upon receipt of that, we performed some calculations of our own both at our Bethesda office, and as I recall, we had our consultants do some calculations.

In determining the results of these calculations which did include sensitivity studies, we undoubtedly used judgment. Different engineers doing different parts of the calculations would recommend different things and all of this taken together would constitute what I would call first-line judgment.

Now when the pieces were put together and I was one of the assimilating editors, I am sure that another layer of judgment would be involved.

The Staff Safety Evaluation is reviewed by line management and judgment again is involved.

The difficulty we have been having the last ten minutes is, how do you quantify judgment? And what does

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automatic mean?

We really don't understand either way you are using these questions.

We will tell you what we did, but that is all we can do.

Q Well let me see, because I am not sure that what you answered there with the Palisades example quite reaches the point that I am asking.

After your judgment, analyses and all of the other things that lead into this, have persuaded each person along the review line, and finally whoever makes the ultimate decision, that the proposed change is conservative, is more judgment then used to determine whether to allow the change to be made, given that it is conservative. And relate to the Palisades example, if that is helpful.

end 3

A No.

Q No additional judgments are made? My term was automatic, that is, as soon as you concluded through all of your reviews that it is conservative, it is then allowed?

A As far as the Regulatory Staff is concerned, Mr. Stello was reminding me that although this was not the case as Palisades, there might be other people at other forums, contested hearings, that could alter what we did.

The Regulatory Staff issued its report and at Palisades the adequacy of the ECCS at 60 percent was not contested. At another forum, it might have been, which would have rendered the thing maybe semi-automatic.

Q No, no, I understand; the Staff position becomes "go-ahead". I realize of course it has to go to a board and be approved, and through the appellate process if it is contested.

A Then my answer No, still stands.

Q Now, if a similar proposal were made by a party to a licensing proceeding but not the Applicant, and it also involved a suggested change in the conservative direction, first, would you also go through an evaluation to determine whether or not the suggested change was in fact conservative?

MR. TROSTEN: I object to the question.

MR. KARMAN: I object to it, also.

CHAIRMAN JENSCH: On what grounds?

MR. KARMAN: I object on the ground that the

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technical staff of the Commission will be working on something that will be before them, and there may be other matters which would negate the question as to whether or not this will be taken up in a particular manner by people other than the technical staff that is here to testify today. I'm not sure they are in a position to say how they would act on something.

There may be somebody else in the Commission would say, "Let's not act on this." I don't think they are qualified to say.

CHAIRMAN JENSCH: I think your point is well taken, and it has to be understood that the gentlemen are speaking from their own personal point of view on what their recommendations would be.

MR. KARMAN: If you are going to ask them if this is put on your desk to evaluate, then I have no objection to the question.

CHAIRMAN JENSCH: Unfortunately the witness said something about what the Applicant would do, and by using the term "what the Applicant would do," invited the question, "Well, supposing somebody else did it?" So, having already distinguished the process for the Applicant, I think the question follows as a corrolary: "Well, supposing somebody else does it, don't they get equal treatment?"

I think that's what he's asking.

MR. TROSTEN: Mr. Chairman, I object to the question

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on the grounds that it's speculative, it's vague; it should be followed up by a very particular example. It also asks for some general discussion of the innerworkings of how the Staff generally does its business.

I think it is far afield from the inquiry at hand, which is fuel densification. I just don't see any pertinence at all to this question; and I think it is objectionable.

CHAIRMAN JENSCH: Well, I think that's one of the problems that hearings reflect, that when there is probing into what the process is by any technical witness, or any witness, there's a feeling that they should not tell their process. I don't know that that is necessarily within the scope of the administrative hearing.

I think he has described what he does if the Applicant comes in; I think the question now is because he made the distinction in his earlier testimony asking, "Do you get the same kind of treatment for an Intervenor?", and it does not seem to be particularly objectionable in having him describe what he does if the Applicant suggests it, but somehow it is suddenly objectionable if the Intervenor suggests it.

I don't understand the basis of your objection.

MR. TROSTEN: The basis for my objection is that at the outset, and with particular reference to the fuel densification hearings, Mr. Roisman and his client desired to

turn this hearing into some sort of a generic proceeding; it's perfectly obvious that's what he wants to do. And it's perfectly obvious that this is not what the Commission's rules intend and that the Board does not intend that that be permitted.

And that's the reason why I'm objecting to this sort of a question, which is obviously a predicate for some further line of questioning, or for some further interrogation into the generic subject of how the Regulatory Staff does its business, some general criticism of the Regulatory process, or the Atomic Energy Commission, or the administrative process generally, or something like that.

I just don't feel it's proper that this particular hearing be the focus for Mr. Roisman's discontents with these general problems in the administrative area.

CHAIRMAN JENSCH: Well, perhaps your premise is in error. I don't think it clearly appears that it is wide-ranging, since the Staff has come in with two presentations on fuel densification; one is the broad -- if I may say, -- "generic report"; the second is one particularly applicable to the Indian Point procedure. Now the conclusions which have been indicated here yesterday and today, there's been a great deal of historical reference.

I don't know that it adds a bit to, really, the question propounded; but there has been an easy reference,

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"Well, this is what we are doing over here in the ECCS area" -- I don't know why he gets into the ECCS hearing -- but it has been, time and time, volunteered by these two witnesses.

And I don't know know whether that was what was intended by the question, or is the line of questioning; but, certainly, the evidence from the witnesses indicates that they want to tie in something other than what fuel densification involves.

Now, I don't think there's any wide ranging difficulty in saying what do you do when you have something presented to you? And that's really what the question is. And all of a sudden, if it is the Intervenor making the suggestion there seems to be an abundance of objection. I don't think that the process of determining some of these matters is secretive at all.

MR. KARMAN: Mr. Chairman, might I say that there was no intent whatever on the Regulatory Staff, and my objection was based upon the possibility of having these witnesses testify as to what policy would be determined by the Commission -- that was the sole purpose of my objection.

CHAIRMAN JENSCH: All right. On that basis we can understand the suggestion; the objection should be sustained as to the policy of the Commission. But what I was trying to point out is that the questions are proper when they are limited to "what would be the recommendations of these two

witnesses and what their personal judgment is of the matter". We don't have any problem with it.

Do you have anything further?

MR. TROSTEN: I don't have anything further to say, Mr. Chairman.

CHAIRMAN JENSCH: At this time? Very well.

The witness may answer.

MR. ROISMAN: Would you like the question again?

WITNESS STELLO: I think I have it.

I will start with the hypothetical assumption that an Intervenor did in fact put together an application of some sort, and it was put on my desk, and I was asked to evaluate it.

BY MR. ROISMAN:

Q Can I just sort of stop you as I go along, so that we don't have to go back all over it, because I suspect it will be a long answer.

Did these matters come to your desk from the public document room, or does someone exercise a judgment as to whether it comes to your desk? I don't mean "yours" or "somebody else's," I mean does it come to somebody like you desk if it comes in; or does it have to be initially evaluated?

A As I move on I think I will be citing examples and mechanisms as to how I do in fact get information from

intervening groups to evaluate.

The first was a hypothetical situation of an application being put on my desk; yes, if I was told to evaluate it, we would. And we would go through the procedures that we used, or any other evaluation. If an evaluation model for ECCS were proposed, we would evaluate it. If a model for analyzing the physics of the core were proposed, it would be evaluated -- any aspect.

Now, specifically, on various applications there are contentions by intervenors which I think can be placed in this general framework of your question; and they are in fact very often suggestions for different ways to do things. These are evaluated by the Staff, and our answers are presented as part of whatever proceeding there is in question.

The mechanism by which we can get them is as a result of any particular case, it might be through the Office of General Counsel, through the project organization in our group.

Q All right.

Now, if the item gets to your desk, and let's just assume that it is in this case a proposal that a change alleged to be conservative be made in the fuel densification analysis, i.e., that the peaking factor be established at a different level, moving into a conservative direction -- just to have something to talk about.

And you are told, "Evaluate this;" and you would go through the evaluation and conclude, first, "Yes, that is a conservative direction, the allegation by the party submitting it, that it would be in a conservative direction is correct."

Now, the next question is: do you then automatically recommend it, automatically oppose it, or do you apply some judgment as to whether or not it should be incorporated into the Staff analysis and the proposed tech specs or however it would be manifested.

A Automatically we neither accept it nor reject it. Certainly judgment is used. That judgment will reveal whatever the answer is.

576

I don't believe I could give a set of criteria to decide one way or the other; judement is applied just as it would be in the case of --

Q I thought we were distinguishing here in the case of the vendor or the applicant -- which I guess is more appropriate. You previously testified that once you have concluded, that is, you and the people in the chain of command above you who look at these things have concluded that the proposed change is conservative, then, except for subsequent licensing action that may take place, it will be approved.

A I believe it is a mischaracterization, and I think you are referring to what Mr. Ross has said.

What I thought he said was there were a variety of engineers reviewing it, and certainly there was judgment applied by each of the engineers reviewing each of the phases of the problem, and each level of the management within our organization in turn reviews it before it is finally issued as a report.

Once it is issued as our report, it is our position, but there is judgment applied throughout the process.

Q Well, let's go back:

We have the "horse's mouth" here, so we can go back to Mr. Ross.

Do you remember the question on which you said, "Yes, my answer would be No"? Isn't that the question we're talking about now: Is any judgment applied by the Staff after the Staff concludes that the proposed change by an applicant is conservative?

MR. KARMAN: Judgment as to what is going to be done? I think you had better be a little more explicit. You indicated that the Staff has determined that something is conservative, and that judgment is to be used for what purpose?

MR. ROISMAN: Deciding whether or not they will allow the change to be made.

MR. KARMAN: Thank you.

WITNESS ROSS: When I said No, it was to the question -- I specifically stated it had been reviewed by

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line management.

Now, I could have added a further specific, that that is the point at which our safety evaluation is finished. It's literally mailed out, served to the Board or whoever is the recipient of it. There is nothing left to judge. The job is done.

5 ebl

I don't know how we can execute judgment on a finished product. We're onto the next case.

We're not communicating too well, I believe.

BY MR. ROISMAN:

Q It seems to me you have a two-step process. An applicant comes to you and says, "We want to make a change. We think it is a conservative change."

The first thing you want to find out is are they right? Is it a conservative change or is it a non-conservative change? And that's evaluated and a determination is made, yes, that it is a conservative change.

Now once that determination is made, and it's made all the way through your chain of command within the Staff, the conclusion has now been reached at the highest Staff levels that the proposed change is a conservative one. Is there any additional judgment applied to determine whether to allow the applicant to make the change? Staff does have to sign off on changes.

MR. TROSTEN: Mr. Chairman, I object. This is clearly getting into the area of the over-all question of policy again. The Chairman has ruled before that Mr. Roisman was to be allowed to question on the individual experience of the Staff. He is now getting back into the over-all Staff position on these things. I just think it is completely out of order.

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CHAIRMAN JENSCH: I think it must be borne in mind that we have to limit ourselves.

MR. ROISMAN: I'm sorry, Mr. Chairman. I'm expecting this witness to answer from his own experience. He obviously cannot answer if he doesn't know as to the experience of dozens of other Staff people what has happened with them.

I am curious as to why Mr. Trosten keeps bouncing up. I mean we did find out on page 10,747 and 10,748 that an applicant in this proceeding, Con Ed, represented by Mr. Trosten, did make a proposed change in the transition boiling heat transfer correlation, that the Staff concluded that it moved in the conservative direction, and that they approved it.

We have a specific about which we can discuss and find out how did that change come about, and when the judgment stopped being made, and when was it approved by the Staff, and that-- You know, so I really don't understand the lack of specifics.

BY MR. ROISMAN:

Q But, Mr. Ross, of course I'm asking you, in your experience, what happens after the Staff completes and all the way through your chain of command its analysis and concludes that the proposed change is a conservative one?

And I thought that you had answered me before that

eb3

when that happens, the change is then allowed; no further judgment is applied. In effect, the only question the Staff investigates is whether the change is conservative.

Now is that correct?

A (Mr. Ross) That is correct.

Q Now when it is an intervenor whose material lands on the desks of one of the two of you and you are asked to evaluate it, and you first determine by evaluation that it is conservative, that they are suggesting something that is conservative, is that accepted without further judgment or not?

Now, Mr. Stello, I believe you answered "No, we neither automatically accept it nor automatically reject it. We apply judgment."

Then the question is-- Is that correct, Mr. Stello?

MR. TROSTEN: Mr. Chairman, I think Mr. Roisman has to be more specific. Is he talking about writing a letter to the Staff and saying, "Don't operate this plant"? Now that would be probably a conservative thing radiologically. Now is that the sort of thing,the sort of suggestion we're talking about here?

CHAIRMAN JENSCH: I don't know what suggestion should be in the question.

MR. KARMAN: Might I have five minutes to discuss something?

eb4

CHAIRMAN JENSCH: I think the last question, just so we are clear, was was that the substance of your previous testimony? He really should answer that yes or no, if he can recall what his previous testimony was.

Now if he cannot do that--

MR. ROISMAN: Yes. Before they break, if Mr. Stello is prepared to answer that, he can just tell me whether that was the substance of the previous testimony with regard to the procedures with which you are familiar as to how an intervenor's suggested change that has now been concluded is conservative is treated in determining whether it should or should not be adopted.

And as I understood your prior testimony it was, "We apply judgment to determine whether it should or should not be adopted. We neither automatically accept it nor automatically reject it."

BY MR. ROISMAN:

Q Is that a correct summary of your position?

A (Mr. Stello) You have, I think, clarified the point where you started to confuse what I think I had said before, and I will repeat it in its total context rather than just say yes or no, because I don't really know what I'm saying yes or no to any more.

Any information that is placed before us, any change-- I think the concept of being more or less

eb5

conservative-- Any material is processed. That process requires judgment. Judgment consists of many, many things: independent calculation, comparing it with data, assessing sensitivity, assessing conservatism. All of these things are part of the evaluation.

There certainly is judgment applied throughout the process. There are no gauges for go or no-go, be they conservative or any other suggested change. We are guided by Commission rules. The rules are set forth that we abide by. There are rules that cover various aspects of the facility design set forth in Part 50. Those are the requirements before a facility would be licensed.

There are safety guides that are used to assist us in our evaluation. There are, if you will, many evaluations of what is or is not acceptable. If you do something this way it's acceptable.

You of course can propose a different approach, so I think it needs to be taken in its total context. At least my thinking seems to become confused as to why, all of a sudden, we look at a change and automatically want to put a little tag on it and say it's conservative and somehow it goes through a different chain of review or a different kind of evaluation.

All of the information is processed in the same manner, no matter what kind of a tag it finally may have.

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Q Well, that's interesting, Mr. Stello, but (a) it is not the answer to my question and (b), it does appear not to be consistent with what Mr. Ross said.

I have just asked you what happens when the intervenor's material lands on your desk, and I understand it's a nice and healthy and worthwhile project that you go through to evaluate what the intervenor suggests, and I am not questioning that you do that, and I'm not questioning whether or not you apply judgment and that at some point along the way you can make a conclusion that what the intervenor is suggesting is conservative; it moves the conservative way.

All right.

The next question that I asked you was, and I am still trying to get this clarified:

When it is the intervenor that has suggested it and you have concluded that it is conservative, do you accept it automatically as a change, reject it automatically as a change, or apply your judgment as to whether it ought to be included as a change?

Now could you try that--

A Judgment is applied.

MR. ROISMAN: Now do you want to break for five minutes to talk to them, because I then want to ask him why the difference exists.

MR. KARMAN: There may be no difference. That's

eb7

what I want to discuss.

May we, Mr. Chairman?

CHAIRMAN JENSCH: Surely.

At this time let us recess to reconvene in this room at 10:10.

(Recess.)

End 5

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CHAIRMAN JENSCH: Please come to order.

I guess the last question was answered. Do you have a further question?

MR. ROISMAN: Yes.

BY MR. ROISMAN:

Q This is for either Mr. Ross or Mr. Stello.

In your experience, what is the difference for the different treatment given the requested change where the Intervenor makes it and you have concluded the change is conservative, and where the Applicant makes it, and you concluded that the change is conservative?

MR. TROSTEN: I object to the question, Mr. Chairman.

CHAIRMAN JENSCH: The objection is overruled.

MR. KARMAN: I don't think the record indicates that that is so, but I certainly will urge Mr. Stello to straighten it out right now.

WITNESS STELLO: In the answer before the break I described the process, and I don't believe there is a difference in the way vendors or Intervenors are treated from my point of view on evaluating information provided to us from either source.

BY MR. ROISMAN:

Q All right.

But how about deciding what to do after you have

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completed your evaluation? That is after you have determined that the proposal is conservative?

MR. KARMAN: Mr. Chairman, we have badgered this point to an extreme where Mr. Roisman keeps saying one thing and the record does not indicate that this was said by the witnesses.

And they have made lengthy explanations to indicate that there is no difference of the treatment. Whereas Mr. Roisman has indicated in one instance where a determination of conservatism is made that is sufficient, in another case it is not sufficient. And I don't believe that the record indicates that that is what the witness has said.

CHAIRMAN JENSCH: Well, lacking availability of the transcript in this regard, we will just have to rely upon our recollections.

It is my recollection that there is a distinction shown in the evidence.

MR. KARMAN: Well let's straighten it out right now.

CHAIRMAN JENSCH: ARe you suggesting a recess?

MR. KARMAN: No.

I was saying we can straighten it out by testimony right now.

MR. ROISMAN: Mr. Chairman, if it will help, I will be glad to stop this line of questioning for now, put together what this transcript shows --I think Mr. Karman has

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misunderstood the transcript, or misremembers it: I think it clearly shows the distinction we have suggested -- and lay it in the form of an interrogatory to the Staff.

MR. KARMAN: No, I think we had better straighten it out right now, Mr. Chairman, while we are here.

CHAIRMAN JENSCH: Will your witnesses be here tomorrow?

MR. KARMAN: They can do it right now, Mr. Chairman, if need be, to clarify what was said before, so that we can get the record straight at this time.

CHAIRMAN JENSCH: Well apparently there is a difference in recollection of what the record is.

Your view apparently is different than the Citizens Committee.

MR. KARMAN: If there is a misunderstanding, let's straighten it out.

MR. ROISMAN: If the Staff is going to change its position, I would like to have that clear as to what its position was as stated into the record so far. The method of getting the transcripts would not allow us to do that before tomorrow in any case, Mr. Chairman.

But what I would suggest, if this is appropriate, is that we put together the portions of the transcript that seem to show the difference in treatment between the Intervenor and the Applicant suggestion for changes, give it

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to the Staff in advance, and then once they have had a chance to look at it and decide what they want to do, Mr. Karman and I can discuss when we would like to come back to the hearing to have the answer.

It might be very short and we can do it when the hearing reresumes at the end of April.

But I would like a chance to look at that transcript. I think that now, if the Staff begins to change that we are just going to go back over the same thing, because Mr. Stello wants to answer a different question than I am asking and I have got an answer to the questions. I am only trying to find out now, why the difference exists.

They don't think the difference exists. I think I can show them in the transcript where they said that difference exists, and maybe that will make it clear.

MR. KARMAN: I think Mr. Roisman is certainly not willing, at this time, to hear what our witnesses have to say in this matter. I discussed this with the witnesses, I know what they had in mind and what they have in mind and this is the time and this is the place to straighten it out.

CHAIRMAN JENSCH: All right.

He has undertaken cross-examination.

If he desires to proceed differently in his cross-examination, he may do so.

Proceed with your cross-examination.

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BY MR. ROISMAN:

Q Mr. Stello are you familiar with a document which I am going to hand you now, which is entitled "NOte to Giambusso, General Comments on the Ginna Fuel Problem" and it is signed on the bottom by Morris Rosen, either you or Mr. Ross?

(Handing document to the panel.)

I am asking, are you familiar with that? Have you seen it before?

A (Mr. Stello.) Yes.

A (Mr. Ross.) Yes.

Q Now I am going to show you a second document, Morris Rosen, Technical Assistant Deputy Director for Reactor Project, Directorate of Licensing, General Comments on the Ginna Fuel Problem, and this one is signed by D. J. Skovolt, acting for Mr. Giambusso, and dated July 17.

The previous one was dated July 12.

(Handing document to the panel.)

Have you previously seen those?

A (Mr. Stello.) Yes.

A (Mr. Ross.) Yes.

Q Can you tell me, first of all, as to both documents, are these communications standard procedure within the Directorate of Licensing Office? That is

That is the communications from Mr. Rosen who is

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identified here as a Technical Assistant to the Deputy Director for Reactor Projects in the Directorate of Licensing, and the note back to him from Mr. Giambusso?

MR. TROSTEN: I object to the question.

CHAIRMAN JENSCH: What was the last part you were asking? Where these reflected by the procedures of the Staff, and what was the final part, I didn't hear?

MR. ROISMAN: I only referred, did both describe -- one was a letter or a note from Rosen to Giambusso, and the other was a response from Giambusso to Rosen.

And what I want to show, if the witnesses will so testify, that these are normal business records of the Commission and therefore not subject to the hearsay exemption.

CHAIRMAN JENSCH: What is the objection?

MR. TROSTEN: I objected to the question on the grounds that it appeared to me that the question was related to the general practices of the Staff.

Mr. Roisman has just clarified his question to find out if these are normal business records of the Commission and as such I have no objection to his putting that question to the witnesses for them to answer to the best of their knowledge.

MR. ROISMAN: My problem was in using the term

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"general business records."

It may be a legal term which the witnesses would -- it may not have any particular meaning to them.

MR. TROSTEN: Well what is the pending question?

Let us be sure.

CHAIRMAN JENSCH: Does the witness have it?

Do you want us to reread the question?

MR. ROISMAN: I will be glad to just restate it, if it would help.

BY MR. ROISMAN:

Q I want to find out whether such communications are a normal part, to your understanding, a normal part of the ways in which communications between someone in Mr. Rosen's position, Dr. Rosen's position, and someone in Mr. Giambusso's position, communicate?

MR. TROSTEN: I object.

CHAIRMAN JENSCH: And what is the basis of the objection?

MR. TROSTEN: On the basis that the question directed to the witness is,what are the normal ways in which members of the Regulatory Staff communicate with each other?

It is obviously beyond the scope of this hearing, Mr. Chairman. There is absolutely no pertinence between that andthe fuel densification question.

What does the question having to do with the way

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the Atomic Energy Commission Regulatory Staff members normally communicate among each other, have to do with this particular inquiry?

CHAIRMAN JENSCH: Well I assume it is a foundation question, and the next thing will be, what do the documents show, I take it?

First he has to establish how do these things get interchanged. Is this something beyond the knowledge of these witnesses, they don't know what is happening in the office in an interchange of documents?

I didn't quite understand that to be their --

MR. TROSTEN: The witnesses testified they have seen the documents. I don't think really anything else has to be done here.

CHAIRMAN JENSCH: Maybe there is. Maybe there is some foundation problem that he is having in mind.

MR. TROSTEN: I submit that he has not indicated what his foundation problem is. I think, as the Chairman is perfectly aware, of course, the interrogator has to indicate the area in which he is going, and I just don't think he has.

CHAIRMAN JENSCH: The objection is overruled, the witness may answer.

MR. ROISMAN: Maybe Mr. Trosten will just stipulate that these are Atomic Energy Commission business

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records.

MR. TROSTEN: No I will not.

MR. ROISMAN: Now will the reporter read back my last question?

(Whereupon, the reporter read from the record as follows:)

"Question: I want to find out whether such communications are a normal part, to your understanding, a normal part of the ways in which communications between someone in Mr. Rosen's position, Dr. Rosen's position, and someone in Mr. Giambusso's position, communicate?"

BY MR. ROISMAN:

Q Is this the normal method of communication between those individuals, to your knowledge?

Is it a normal method of communication?

A (Mr. STello.) It is a method.

Q And are these documents regularly circulated within the Staff? Is that how you happen to come to it?

A The distribution for each of the documents are so noted. The document from --

Q Yes, I understand.

A -- Giambusso to Rosen, the distribution is noted on page 2, and the distribution of the document from Rosen to Giambusso is noted on page 3 of that document.

mm10

Q I understand.

But neither of your names are on there. That is what I was attempting to find out.

A Okay.

These documents were documents that I knew existed My management, my immediate supervisor, Dr. Hendrie was aware of them. And in the process of putting together in excess of 300 documents for the Point Beach Hearing, a request to include documents of this type, and in that process of searching through the files to get the documents related to that request of the Intervenors in that case, is how I came physically to have both of these documents.

Prior to that time, the general content I was familiar with.

Q Now, Mr. Ross, is that essentially the same manner in which you had your exposure to the documents?

A (Mr. Ross.) I did not read them until later.

Last summer I was on an educational research program. I just was not physically in the building.

Q YOu mean at the time these documents were prepared?

A Yes.

Q Can you tell me, in doing your analysis of the fuel densification problem for Indian Point Number 2, did you gentlemen examine these documents, and did you consider the comments contained in here?

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A (Mr. Stello.) The comments were considered long before the review of Indian Point was conducted, so in that context they were also by definition considered in preparation.

Q You mean, for instance, it would be reflected in the Fuel Densification Report, that is, not reflected showing that you agreed or disagreed, but in preparing the Fuel Densification Report these positions were in mind; is that correct?

A Yes.

Q Do you have a judgment, both of you, with regard to -- now looking at the letter from Mr. Rosen to Mr. Giambusso, on page 2, paragraph 2, where he stated, and I will quote,

"Part of the approach in authorizing power resumption at Ginna consisted of a reevaluation of the LOCA, setting 1,800 degrees Fahrenheit as the limiting accident temperature for the degraded fuel, and calculating the corresponding peak allowable KW per foot." It must be recognized that this procedure assumes the validity of trading temperature margin for design peaking factor margin, and is based on the assumption that through a simple limitation of the calculated cladding temperature, the performance of degraded fuel during a LOCA will be acceptable. Not only has the Ginna fuel situation raised questions as

"to the general ability to wholly understand steady state fuel performance, but also it must certainly indicate possible limitations on a complete understanding of the performance in a transient as severe as a LOCA (considering, for example, the action of rapidly expanding, weakened cladding)."

Now, as to those statements, do you have an opinion as to whether you agree or disagree with those statements?

MR. TROSTEN: Mr. Chairman, at this point will the Chairman allow me to preserve a general objection -- to preserve my position about not waiving any objection to the introduction of this document because Mr. Roisman has read a fairly lengthy passage into the record. We had a discussion in the hearing before, and I know the Chairman does not like --- you like to have rulings on specific points rather than general objections, and I don't want to keep jumping up and raising these questions.

So how do you wish me to proceed?

CHAIRMAN JENSCH: Either way that you feel will protect the interests of your client. I think you can make a motion to strike at a later time that will embrace all the objections you otherwise might make, if you desire to do that. I think that general objections sometimes get lost in the noise; and specific objections might be more appropriate. And

don't feel that there would be any offense if you do that. I think we do have a question, however, as to the scope of your interest in some of these objections because, as I understand it, these are questions directed to the Staff position, and the utilization of Staff documents and in getting the opinions of the Staff are, I think, are a particular concern to the Staff.

MR. TROSTEN: Yes. But let me just state my position in an attempt to clarify this, Mr. Chairman.

Mr. Roisman wants to introduce these documents into evidence for the truth of the matters asserted. I think there's no basis for introducing these for that purpose.

Mr. Roisman is now going to proceed to cross-examine on the basis of these documents as he has just started to do, and is going to start to read excerpts from them, and ask the witness whether he agrees or disagrees.

This can, under certain circumstances be proper cross-examination. However, in an earlier phase of the hearing when Mr. Ford did the same thing, a subsequent question arose as to whether or not Applicant had waived objection to the introduction of the document itself, because the interrogator had read extensive portions.

I just want to be absolutely sure that I am not waiving -- that there is no question of that sort that could arise again.

CHAIRMAN JENSCH: It will be so understood.

MR. TROSTEN: Thank you.

CHAIRMAN JENSCH: Proceed.

WITNESS STELLO: As I understand the question, it is do I agree with this paragraph?

BY MR. ROISMAN:

Q As far as I have read so far. It changes to a slightly different aspect.

A (Mr. Stello.) Understood.

There are parts of it I agree with, and parts of it I disagree with, but they are not something that can be summarized simply in a sentence. The evaluation, for example, of changes in gap conductance, stored energy, and knowledge or how it need be properly --

CHAIRMAN JENSCH: Will you speak a little louder, please? We cannot hear you.

WITNESS STELLO: -- or how it should be properly evaluated are presented in the two documents that we have put into evidence in the proceeding, so that the parts of it that apply, where these particular statements raise questions, the complete answers are in the documents that I referred to. And they reflect in some cases agreement, and in some cases disagreement; so it would be necessary to go through each item by item, if that is what you would like me to do.

I cannot say I agree or disagree. Our story is

presented in the two documents.

WITNESS ROSS: There is one important point: the Staff densification report has two options; one for evaluating cladding that has or might collapse, and one that doesn't. And this paragraph deals with one that either did or might, and Indian Point #2 is in the other category.

BY MR. ROISMAN:

Q I understand that. This deals with a temperature limit.

A (Mr. Stello.) And there's one more point that I think is extremely important to note, and that's the characterization of what was done on Ginna here is not correct. The limit, the allowable limit, was set on Ginna was to effectively contain the fuel linear heat generation rate at its previous history which was well below the kilowatts per foot which would have been calculated in this particular fashion. So it does not adequately reflect what was in fact done on Ginna.

So in that context, I disagree.

Q That refers, essentially, then, to the first sentence?

A No, I think it has to do with much of what you have read relating to what was or was not done on Ginna. I think the real limitations that were imposed on Ginna are not at all reflected in that part of the paragraph you have

read.

Q Now, do I understand that before what you said was that each of the points, if you will, raised here in the portion that I have read so far, is dealt with in the Fuel Densification Report in one way or another, some agreed with and some disagreed with?

I mean, is that correct?

A I said for a complete evaluation of the various matters raised in here, they are also discussed in the two referenced documents. To the extent they reflect agreement, they agree; to the extent they reflect disagreement, they disagree.

I wanted to further note that the tone of the paragraph that sets forth what was purported to have been done for Ginna is not correct.

Q I understand that also.

A Okay.

Q Now, continuing on in the paragraph the next sentence,

"Additionally, portions of the calculational model are in question, e.g., gap conductance, stored energy, and local peaking factors."

Do you agree or disagree with that statement as of this time?

A At this time there is no question in my mind that

these matters are adequately treated.

If you meant would I have agreed with the statement that there were question regarding the treatment of gap conductance, stored energy, and local peaking factors at that time --

Q No, no. I said at "this" time. I meant now.

A That is not a correct statement in my judgment today.

Q Now, there's also a summary of the portion of the ECCS rulemaking dealing with the question of rulemaking -- excuse me -- of fuel migration. And of course that Daily Digest is not testimony in the ECCS rulemaking proceeding in any way; but can you look at that statement which I will read now, and tell me whether or not it agrees with your understanding of what is the position of Westinghouse -- Mr. Moore being a Westinghouse witness with respect to this problem?

The summary: "Dr. Buck then queried" --

MR. KARMAN: Are we quoting now from the transcript or the Daily Digest?

MR. ROISMAN: I'm quoting from the little portion that is quoted here in the Rosen to Giambusso letter.

MR. KARMAN: I hesitate to have Mr. Stello comment on a quotation which might not be an accurate quotation, or come from an accurate source.

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MR. ROISMAN: He came from the hearing. I'm trying to find out --

MR. KARMAN: I don't believe you can question his memory on 20,000 pages of testimony.

MR. ROISMAN: Well, I guess Mr. Stello has an "I don't know answer" available to him, doesn't he, Mr. Karman? That's in the "Hints to Witnesses" -- isn't it?

MR. TROSTEN: I object to this sort of query of Mr. Stello whether this summary by somebody else is -- accurately represents Westinghouse's position, filtered through two or three different situations. It seems to me to be an out of order question.

MR. KARMAN: This concerns me, too, Mr. Chairman.

CHAIRMAN JENSCH: I think the inquiry of these witnesses is limited to their view of what they think should be done. I don't think they can pass judgment on somebody else's position.

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MR. ROISMAN: Very well.

CHAIRMAN JENSCH: The objection is sustained.

BY MR. ROISMAN:

Q Mr. Stello and Mr. Ross,-- First of all, Mr. Ross, do you have any position on what Mr. Stello has stated with regard to what we have spoken about so far?

A I don't have a different position but as I just stated, when the decision-making was being done on Ginna, I physically was not present and did not participate.

Q I understand.

A So I don't have all the information he has.

Q All right.

Now looking at page 3 of the same letter from Dr. Rosen to Mr. Giambusso, in Paragraph 3 he sets forth action to be taken and says at the outset:

"There are two areas of importance, one, action related to reactors having fuel with the potential for cladding collapse and two, generic action related to all reactor facilities. With regard to either one, in my opinion we should request all facilities containing non-pressurized fuel with sufficient irradiation to cause cladding collapse to have that fuel replaced as soon as practicable. This consideration is especially significant for Indian Point 2, which will have a

eb2

full core of non-pressurized fuel.

"With regard to item two, the generic situation can be met by considering a restriction on power for all reactors which obtain a moderately high burnup fuel until a full understanding of fuel performance is attained. There is no assurance, without adequate in-pile experience which does not exist, that pressurized fuel will not also become significantly degraded."

Let's start with number one.

I take it with regard to number one, the requested action recommended here by Dr. Rosen -- and I assume by other people as well -- was taken. Indian Point No. 2 has proposed a total replacement of non-pressurized fuel with pressurized fuel. Is that correct?

A (Mr. Stello) The last half of your statement is correct. What is a fact in Indian Point 2 is a fact. To extrapolate that is to say that implementation of the recommendation as set forth in item one here has in fact been instituted is not correct.

Q You mean as to what was the generating cause of the change?

A There's a word that I will read:

"In my opinion we should request all facilities. . ."

eb3

Q I see. I'm sorry.

A To my knowledge, I do not know that we requested any facility.

Q Including Indian Point 2?

A Including Indian Point 2.

We would have evaluated Indian Point 2 with unpressurized fuel if that had been the proposal.

Q Okay.

Now looking at item two, which I assume -- and forgetting for the moment the generic situation but merely focusing it on Indian Point 2 as now being a reactor that has pre-pressurized fuel, what is your position -- opinion at this time with regard to the statement that there should be restriction on power for all reactors which obtain a moderately high burnup fuel until a full understanding of fuel performance is attained?

First, would Indian Point 2 be a reactor that obtains a moderately high burnup fuel, in your opinion?

A The burnup at Indian Point 2 is about 30,000 megawatt days per ton.

CHAIRMAN JENSCH: Will you speak a little louder, please?

WITNESS STELLO: The burnup for Indian Point 2 will be about 30,000 megawatt days per ton, and I guess that could probably be characterized as moderately high burnup.

eb4

BY MR. ROISMAN:

Q Now secondly, restriction on power. I take it that is not the alternative that is being used at Indian Point 2; is that correct, that that term refers to power reduction? Is that a correct statement as you understand it?

A (Mr. Stello) I will have to assume that what Dr. Rosen was referring to when he used the word "power" was "power level" rather than kilowatts per foot. And with the assumption that "power level" is that he intended, Indian Point 2 has no restriction on power.

Q Now as I understand what he has said here, the basis for his belief that there should be a restriction on power is that at that time, July 12th, 1972, that there was no assurance without adequate in-pile experience, which did not then exist he states, that pressurized fuel will not also become significantly degraded.

Number one, do you agree that as of July 12th, 1972, that was a correct statement, and if you want, it has got several substatements in it, if you want to take them piece by piece.

MR. TROSTEN: Which is the particular statement you're addressing? The last sentence?

MR. ROISMAN: The very last sentence of the first paragraph -- of Paragraph 3 on page 3 of Dr. Rosen's letter to Mr. Giambusso.

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And the question is: As of July 12th, '72.

WITNESS STELLO: I understand.

I am going to have a great deal of difficulty because I do not know what Dr. Rosen meant when he said ". . .will not also become significantly degraded." I don't know what he had in mind at all.

MR. ROISMAN: In that case I see no reason for you to answer. That's obviously the meat of the question and if you don't have an understanding of that term, of those words, then I think there would be no point in your answering it.

WITNESS STELLO: I was going to state what one possible interpretation might be, and answer with respect to that interpretation only.

BY MR. ROISMAN:

Q I'm not sure that would be very helpful since, if it is-- We are here talking about your agreement with respect to a position by Dr. Rosen. If it is unclear and you think it is susceptible to more than one interpretation, I would just as soon not have the answer.

Looking at the July 17th, 1972 memorandum from Giambusso to Rosen in the nature of a response, do you know of any other written response that was specifically given to Mr. Rosen from Mr. Giambusso, other than this particular one, to his July 12th, '72 memorandum?

The reason I asked is not every point in the July

eb6

12th memorandum is specifically mentioned one way or the other in the July 17th memorandum. To your knowledge, is there any other response, a written one?

A (Mr. Stello) I do not recall any other response than the one we have here.

Q Can you tell me, in terms of the way in which these two documents work within the Commission-- Obviously we know neither constitutes regulations of the Commission or of the Regulatory Staff's position such as safety guides. Do the two memoranda that we have here before us constitute information which has any different weight for purposes of doing a fuel densification analysis than the opinion of other people without -- for lack of a better word -- any more title in front of them?

I mean we talked-- I think before Mr. Ross talked about the chain of command sort of thing. Is this at the upper echelons of that chain of command, the lower echelons, or irrelevant to that chain of command?

MR. KARMAN: Mr. Chairman, I question whether this is proper questioning for these witnesses.

MR. ROISMAN: Mr. Chairman, the reason for the question: Mr. Ross indicated that there is a priority, if you will, within the Regulatory Staff, and that things are reviewed at a lower level and passed on at subsequently higher levels, and each level has some veto over what

eb7

happens at the lower level. And I'm just trying to find out where this fits in in order to determine at what point the views here that are disagreed with by the Staff have been rejected in an attempt, among other things, to discover whether there is more in writing that deals specifically with those views.

CHAIRMAN JENSCH: I think that as the witnesses had indicated, the position of the Staff is reflected in the two documents which have been filed by the Staff on fuel densification. I don't know how many documents preceded the formulation of those two documents, what interchange there was among the Staff members. To ask these witnesses who has the higher priority of direction may not contribute to what the analysis is of the Staff position.

The Staff position is in these two documents. I don't know anything about this fuel densification but my guess is that from observation of many governmental activities and Staff activities, there probably is a great deal of interchange before the final decision is formulated.

I don't know what this letter is, Rosen to Giambusso or vice versa, whether they are initial, tentative, preliminary or overruled position.

I infer also from the date you have indicated that it was shortly after the discovery of the situation at Ginna, and as I understand it, there was a great deal of

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investigation and research undertaken after the initial discovery of the situation at Ginna.

I think if we attempt to probe what preliminary positions of the Staff were, or whether these gentlemen would now agree with what one of the members of the Staff indicated should be done, we will get into such an endless round.

Witness Stello says their position is reflected in the two documents. Now I would say something not covered by those two documents then I think raises another kind of a problem, but if these factors have been reflected in the two documents, I don't think it helps a great deal to find out whether they would agree with somebody's preliminary, initial response to the situation.

Do you not agree?

MR. KARMAN: By "two documents" you are referring to the Fuel Densification Report and the Additional Testimony?

CHAIRMAN JENSCH: Correct.

MR. ROISMAN: I will not further question them. I will hold on whether I agree.

CHAIRMAN JENSCH: Very well.

End 8

BY MR. ROISMAN:

Q Now I show you a document dated September 21, 1972 addressed to the Honorable James R. Schlesinger from the Advisory Committee on Reactor Safeguards, subject: "Report on Watts Bar Nuclear Plants #1 and #2." And I would like to direct your attention in particular to the statements contained in here on the question of fuel densification, and also the additional remarks by Dr. Isbin which are directed specifically to the question of fuel densification.

(Handing document to the witness panel.)

You have that in front of you?

A (Mr. Stello.) I do.

Q First of all, with respect to Indian Point #2, has the Staff solicited the opinion of the Advisory Committee on Reactor Safeguards with respect to the proposed change in the operation of Indian Point #2 to cope with the problem of fuel densification?

A The densification matter as it specifically relates to this facility, was not reviewed by the Advisory Committee on Reactor Safeguards.

Q Did you mean to state in the way you gave the answer that perhaps it has been reviewed by the Advisory Committee on Reactor Safeguards in a general way? Was that the implication of your answer?

Or, let's put it directly: Have they reviewed it

in a general way, if not related specifically to this plant?

A The Committee is informed and is aware of what has and is going on in this area, and it was in that context, stating that they are aware of the matter, that I specifically excluded Indian Point, but was generically including everyone by saying "they are informed of what's going on."

Q To your knowledge, is there any additional written public documents expressing the Advisory Committee On Reactor Safeguard's position with regard to fuel densification subsequent to the September 21, 1972 document that we have here?

Do you understand what I am talking about?

A My recollection is it is mentioned in other letters but I cannot recall specific dates nor names at this distance. I would have to do a literature survey to verify that, and it would be subject to check.

Q To your knowledge -- I'm sorry, Mr. Ross?

A (Mr. Ross.) To my knowledge there is one. They wrote a letter on the Zion plant, but I don't know the date.

Q To your knowledge has this position as stated here in the Watts Bar letter as well as the position that is stated by Dr. Isbin as additional remarks, do these continue as far as you know, as far as you know from information which is public, to be the position of the Advisory Committee on Reactor

Safeguards on these two matters?

A (Mr. Stello.) I'm not sure I understand your question, because you seem to be referring to the remarks of Dr. Isbin, and a paragraph in the body of the letter which refers to densification as though they were the same thing; and they are not.

Q Obviously not, or Dr. Isbin would not have to say it separately.

A They are not even in the same subject.

Q Well, in the paragraph, at least the one that I am focusing on, which is, I guess you would call it the third paragraph on page 2 of the letter, the big one in the center, they are talking about that the Applicant proposes as one possibility in order to meet the ECCS criteria, a reduction in the maximum permissible linear power to 14.9 kilowatt per foot at full power.

Now, as I understand it, that means a reduction in peaking factor -- I mean, you reduce the peaking factor in order to get a reduction in the maximum permissible linear power.

Is that correct?

MR. TROSTEN: Mr. Chairman, I object to the question.

CHAIRMAN JENSCH: On what grounds?

MR. TROSTEN: There is no showing by Mr. Roisman

that the particular paragraph in question deals with the question of fuel densification.

MR. ROISMAN: Mr. Chairman, what the paragraph does deal with, at least if the witness answers the question and my understanding of it is correct, it deals with the question of whether or not the Advisory Committee on Reactor Safeguards believes that dealing with reductions in the peaking factor is an appropriate way to meet the ECCS criteria, regardless of the reason why one must reduce peaking factors in order to meet ECCS criteria.

That, of course, is exactly what we have here.

MR. TROSTEN: Mr. Chairman, I will be glad to show the excerpt to the Chairman if you have not seen it.

MR. ROISMAN: I have extra copies for the Board.

(Document handed to the Board.)

MR. ROISMAN: I would like to mark this, if I may, Mr. Chairman, for identification as Exhibit A-6.

CHAIRMAN JENSCH: And will you identify the document?

MR. ROISMAN: The document marked as Exhibit A-6 is a letter dated September 21, 1972, to the then Chairman of the Atomic Energy Commission from the Advisory Committee on Reactor Safeguards on the subject "Watts Bar Nuclear Plant Units #1 and #2".

CHAIRMAN JENSCH: Very well. The document

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identified or described by Citizens Committee for the Protection of the Environment Counsel may be marked for identification may be marked as Exhibit A-6.

(The document referred to was marked CPPE Exhibit No. A-6 for identification.)

I wonder if someone would explain to me as a layman about the peaking factor related to fuel densification. I thought we agreed we were all going to "wash our mouth out with soap" if we ever mentioned the emergency core cooling situation, and I don't want to get it established that with this we are going to take any challenge to the Interim Acceptance Criteria.

If it is a question of fuel densification or the manner in which a plant can meet the criteria, then I think those two things are proper. Does the peaking factor have relation to either of the two items?

MR. ROISMAN: Maybe the technical witness could answer; I'm not sure that a lawyer's answer to you would be very satisfactory.

MR. TROSTEN: Mr. Chairman, if I may offer the suggestion, Mr. Chairman, that you receive a statement of relevance from the interrogator, and then we can proceed from that point.

Would that be satisfactory?

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CHAIRMAN JENSCH: I would like first to understand the terms, then we can determine relevancy.

Would you gentlemen -- Mr. Ross?

MR. KARMAN: We would be glad to help.

WITNESS ROSS: The peaking factor as it is related to densification in effect has a new term; whereas you would multiply a number of items together and get, say, 2.7, with densification as a new number to go in there, it varies -- it's on the order of ten percent. So in order to accommodate the peaking due to densification, other terms have to be adjusted. The plan has to be operated in a different manner.

However, if the peaking factor remains the same, the heat generation rate remains at the same maximum level corresponding to the peaking rate, and then the accident analysis proceeds forthwith.

Certainly the peaking factors and ECCS analysis are related, and peaking factors and densification are related. So to that extent there is a thread of commonality; but I'm not sure what the specific question you want us to go into is.

I feel -- I have a feeling I took one giant step backwards.

(Laughter.)

MR. BRIGGS: Could I ask Mr. Trosten a question?

Mr. Trosten, why is it in the fuel densification

report that the Applicant has put in, it's proposed to reduce the peaking factor? Is it not related to fuel densification?

MR. TROSTEN: It is related to fuel densification, Mr. Briggs.

MR. BRIGGS: So it's related to fuel densification. But, really, why was the peaking factor proposed to be reduced? To satisfy what requirements?

MR. TROSTEN: Mr. Briggs, I will have to consult before I can give you an answer that I would feel happy about. There is a very specific answer to your question, but I really don't feel that I am in a position to give you one that I am happy with, and that I might not have to go back and restate.

MR. BRIGGS: I think the question was: Was the peaking factor reduced to stop the fuel densification, or was it reduced to meet the ECCS criteria?

MR. TROSTEN: Well, I don't think the answer to either of those questions was necessarily Yes, Mr. Briggs; but I really would have to state that's subject to correction.

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CHAIRMAN JENSCH: Well, on the basis of the present record, there has merely been a request to have the document identified.

The document has been identified.

Will you proceed with your cross-examination.

BY MR. ROISMAN:

Q Let's go back, Mr. Stello to the first question. Does the reduction in the maximum permissible linear power referred to in the ACRS letter mean the same thing, or get achieved in essentially the same way as reducing the peaking factor?

Let's start with that one.

A (Mr. Stello.) Yes.

Q Okay.

Now, when I was asking you the question before, the Committee here says that -- strike that.

The Committee implies, Dr. Isbin says, that the reduction in the maximum permissible linear power as a way of meeting the ECCS Interim Criteria, does not appear to be such a good idea, and the implication comes from the fact that they say at the bottom of the paragraph:

"The Committee believes it important that improvements in ECCS design be included in the Watts Barr plant and recommends that the final design of Watts Barr ECCS be reviewed by the

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Staff and the ACRS prior to fabrication and installation of major components."

Let's start with number one. Do you get the same implication from that statement by the Committee that I do, and that is, some -- and from the whole paragraph -- some dissatisfaction on their part with the approach of meeting Interim Criteria by reducing the peaking factor?

MR. TROSTEN: I object.

CHAIRMAN JENSCH: On what grounds?

MR. TROSTEN: ON the ground that he is asking for an interpretation of the opinion of another party. In this case, the ACRS. Asking for him to form a judgment as to what some other party means, which I think is an improper question to put to the witness.

CHAIRMAN JENSCH: May we have the question reread. I didn't get that impression.

(Whereupon, the reporter read from the record as requested.)

CHAIRMAN JENSCH: WEll there probably might have been a different way of expressing the question. I infer that the qestion is saying, what is the personal opinion of this witness as to whether he would agree that it is inappropriate to reduce the designed peaking factor just to meet the Interim Acceptance Criteria.

He gave the foundation why he thinks that is

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inappropriate by referring to some language in this letter, but I don't think he is asking for an interpretation of what the Committee thinks or believes.

He is asking -- the witness is going to have a little difficulty following some of this questioning if he doesn't stop conferring while the discussion of the question is on. Otherwise it will have to be repeated.

But I don't understand the question he is asking for the interpretation of the ACRS position.

MR. KARMAN: I think it does. I think it definitely does.

MR. ROISMAN: I confess to being guilty of the charge. I don't confess that that would have been improper to do.

I am trying to find out -- what I am after is to see if the Staff did understand this to be an ACRS disagreement because there is some significance to the ACRS opinion on these subjects for purposes of the safety review. It stands in a special category.

Now, if we look at the Regulations of the Commission, Section 50.58 is, I submit, a section which requires the Staff in a case such as this one, where there is a proposed change in the operation of a plant with regard to a major safety question, to return to the Advisory Committee and request their opinion as to the proposed change.

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Looking at 50.58 and 50.59 together as a group, that seems to be the only logical conclusion. We are told that prior to construction permit application approval, prior to operating license application approval, and then in 50.59 prior to any changes in construction permit or operating license, the ACRS must be consulted. And the happenstance of this change coming up after the ACRS had written its letter at Indian Point Number 2, and before a license had been issued, certainly would not be a basis for the ACRS's views to not be received.

Now their views in the WAtts Bar letter,if we all understand what those views are, are the only views we have in this case about what the ACRS thinks about this approach, the peaking factor change to meet ECCS Criteria approach.

Now the alternative of all of this and if that is the position of the Applicant, we will be willing to go along with that, is to put aside the Watts Bar letter and await the receipt of the Indian Point Supplement Letter from the ACRS on the question of the peaking factor change in Indian Point Number 2.

But I do not see, if I understand in reading 50.58 and 50.59 correctly, that there is any other alternative so I am simply trying to get at it with what is currently available and not get hung up on the details of actually having the letter.

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MR. TROSTEN: Mr. Chairman, I think that is an interesting argument for Mr. Roisman to include in his brief, and I suggest that that would be the best way that we should approach this problem.

I disagree with his legal interpretation and we will brief the point.

CHAIRMAN JENSCH: Well some of these things just can't wait, you know. We are going to have to -- is it your thought we will go ahead with the rest of the case and then we will brief the situation and if we decide that the matter should be recieved we will reopen the hearing and then come back again?

I think we have to resolve it now. We will be glad to have you speak to the matter now.

MR. TROSTEN: I will be glad to speak to the matter.

I think his interpretation of the Atomic Energy ACt, Section 50.58 and 50.59 is incorrect. I do not consider that there is a requirement that the matter of the new core be referred to the Advisory Committee on Reactor Safeguards. This is simply a misreading of the applicable regulations of the Commission.

I would be perfectly happy if Mr. Roisman would point out to me where in the generality of the two sections he referred to he considers that there is a requirement for

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referral to the ACRS and I will respond to that.

Insofar as what the ACRS said in Watts Bar, matter I think it is absurd for Mr. Roisman to start asking a witness what the ACRS meant. The letter of the ACRS is there for everyone to see and it says what it says.

CHAIRMAN JENSCH: The last statement by the attorney for the Citizens Committee is what is the understanding of the Staff of the view of the ACRS. I mean, these things are dicussed, I imagine when an ACRS letter comes out, it is discussed by and among the Staff.

Now, what is the Staff view of that to which they will have to respond or be thinking about in these several cases about this type of problem?

MR. TROSTEN: The fuel densification problem?

CHAIRMAN JENSCH: He asked in his last question, what is the understanding of the Staff of that. He was not asked to interpret the ACRS letter.

MR. ~~TORSTEN:~~ Trosten About the views of the ACRS and the fuel densification problem.

CHAIRMAN JENSCH: I understood it was reducing the design peaking factor by 20 percent, just to meet the ACRS -- the ECCS criteria. That is the focal point and I presume the design peaking factor has something to do with the fuel densification in this commonality that Mr. Ross described.

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So, on the basis of Mr. Ross' explanation and this letter, I would assume there is an interrelationship, so we are in fuel densification related to the design peaking factor.

The objection is overruled.

BY MR. ROISMAN:

Q I was trying to get at the ACRS position through what is said here in the letter. But I think the Chairman suggests a more direct and a better way to do it, and that is:

Are you aware of the ACRS position with respect to the propriety of changing peaking factors as a way of meeting the ECCS Interim Criteria?

MR. TROSTEN: Is this for the Indian Point 2 proceeding, Mr. Chairman? Does the question relate to that?

MR. ROISMAN: It can't. We've just been told they know the ACRS has not been consulted

..109 Indian Point 2, so it has to relate to the problem in general.

CHAIRMAN JENSCH: He just asked a question.

Proceed with the answer, please.

WITNESS STELLO: I am not aware that the ACRS believes that a change in a peaking factor is an inappropriate way to deal with the ECCS matter.

The remarks of Dr. Isbin I think speak for themselves and I think a fair reading of that would be that

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he believes it is inappropriate to do it this way.

I think -- and I am offering my own personal opinion, that a fair reading of the letter is, if the Committee agreed with Dr. Isbin, then Dr. Isbin's remarks would not have to have been set aside as additional remarks by himself.

I would say a fair reading of the letter is, except for Dr. Isbin, the Committee does not believe that it is inappropriate to reduce peaking factors to meet the AEC Interim Acceptance Criteria.

MR. TROSTEN: Mr. Chairman I think it would be highly desirable if the record reflects the particular language of Dr. Isbin since Mr. Roisman chose not to quote that.

CHAIRMAN JENSCH: Will you read it in then, please?

MR. TROSTEN: Yes.

The initial remarks by Dr. H. S. Isbin state:

"I believe that it is inappropriate to reduce the design peaking factor by 21 percent just in order to meet the AEC Interim Acceptance Criteria for emergency core cooling systems for light water power reactors."

That is the first sentence that I was referring to.

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CHAIRMAN JENSCH: Do you want to read the rest of it?

MR. TROSTEN: I will be glad to.

"Instead, increased efforts should be devoted to the experimental and analytical programs together with possible improvements in the ECCS design. These matters were noted in the Committee's October 9, 1971 Report on McGuire Nuclear Station Units 1 and 2."

CHAIRMAN JENSCH: Which raises a question, if you will excuse me for interrupting a moment.

What happened back in1971 in the McGuire statement? Is there something that the Committee itself has indicated to the same effect about design peaking facotr, or was it related solely to the ECCS possible improvements?

If you do not have it readily at hand, never mind.

MR. TROSTEN: I believe the answer to your question was, it was related to ECCS improvements, if you will accept that subject to check.

CHAIRMAN JENSCH: Fine, thank you.

VEry well. Now we are back to the Citizens Committee with its next question.

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BY MR. ROISMAN:

Q Are you aware of any different position that the ACRS has with respect to this problem in the context of operating license applications as opposed to this particular Watts Bar letter which deals with a construction permit?

And the reason I ask the question is that the Committee just seems to defer the question with regard to peaking factors by noting in their last sentence of this paragraph we have been talking about that:

"The final design of Watts Bar ECCS be reviewed by the Staff and the ACRS prior to fabrication and installation of major components."

So I agree with you, they are not taking a position as explicit as Dr. Isbin's. On the other hand, they seem to be wanting to look again at ECCS design. And I'm curious as to whether or not in a case where that was not an option, because they were dealing with an operating license, at least not the same kind of option, do you know has their

11s position been any different, to your knowledge?

Again referring to public information that would be available; I'm not asking you to discuss anything that was in private meetings of the ACRS.

Q (Mr. Stello) I am not aware, based on public or private information, that there is a different view for operating plants with regard to this general matter, but by

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"different" I am excluding the fact that I cannot recall where they said that the Committee believes that design improvements are required. I can't recall where they ever said that on an operating plant.

Q I see.

A That is the difference.

MR. ROISMAN: Mr. Chairman, I would like to offer for a limited purpose the Advisory Committee on Reactor Safeguards' letter marked as Exhibit A-6 for identification for the purpose of demonstrating what the ACRS position as stated in this letter is with regard -- and of Dr. Isbin -- with regard to the peaking factor alteration as a way of meeting the ECCS Interim Criteria, and for it to be used to the same extent but no more than the ACRS letter which has already been received in evidence in this proceeding which was written with respect to Indian Point No. 2 which, if I remember correctly, is for the fact that it's there and not for the truth of what is asserted therein.

I believe that all the parties have copies of it. I have to give the Reporter two copies and I only have two with me. I am through using it with the witnesses. If they will give that one back I will give the Reporter his two.

CHAIRMAN JENSCH: Is there any objection?

MR. TROSTEN: Yes, I object, Mr. Chairman.

CHAIRMAN JENSCH: Will you state your objection,

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please?

MR. TROSTEN: I object, first of all, because there is no basis for offering the ACRS letter for the limited purpose of showing the fact that it's there. There is a purpose to be served by offering the ACRS letter in the Indian Point 2 proceeding to demonstrate compliance with the Atomic Energy Act and the AEC's regulations. There is absolutely no requirement that the ACRS letter dealing with a different plant's construction permit, having no specific relationship to the Indian Point 2 proceeding, be received in evidence in this proceeding for a limited purpose or otherwise.

Secondly, the offer of the letter was specifically directed for the purpose of showing that peaking factors are an inappropriate means of satisfying the Interim Acceptance Criteria and this appears to me to be a far too general offer of a letter.

We are dealing with the matter of fuel densification in this proceeding and there has been no specific showing of the relevance of this to the fuel densification matter. We have had some general discussion of the thread running through ECCS peaking factors and fuel densification but Mr. Roisman still has not shown any specific relationship between these two.

So I say there is nobasis for receiving this

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letter in evidence in this proceeding for the limited purpose -- the somewhat limited purpose that Mr. Roisman stated or for any other purpose.

Furthermore, the matter is beside the point in any event because they are dealing with a peaking factor of -- a 21 percent reduction in the peaking factor which has nothing whatsoever to do with what we're talking about here.

So for all of these reasons I object to the receipt in evidence of this letter as Mr. Roisman suggested.

MR. KARMAN: Mr. Chairman, we feel that the proper foundation is really not laid to tie in fuel densification and the letter dealing with a different plant in a construction permit stage.

I don't think that the analogy of the ACRS letter which we introduced as part of our Safety Evaluation is an accurate one. Given the fact that Mr. Trosten did indicate it was shown for the purpose of compliance with the requirements of the statute and the regulations for the application for an operating license having gone through the review to the ACRS, we just feel that this foundation is too tenuous here for the record to be indicative of a relationship between the fuel densification problem and the peaking factors with respect to the ECCS as outlined in this particular ACRS letter for the Watts Bar Plant.

CHAIRMAN JENSCH: Let me just ask, as a preliminary

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matter before the Board considers this matter, and maybe this would be directed to the Applicant:

What was the peaking factor first proposed in the FSAR, do you recall?

MR. TROSTEN: I am advised it was 3.12, Mr. Chairman.

CHAIRMAN JENSCH: Maybe I won't get the right figures, but this Watts Bar letter talks about a 21 percent reduction in peaking factor. What percentage reduction in peaking factor is proposed for Indian Point 2 in comparison to the original 3.12?

MR. TROSTEN: I would have to review that, Mr. Chairman. I'm sure it is not thathard a computation.

CHAIRMAN JENSCH: Mr. Wiesemann I believe has been sworn in this case. Can he give us a quickie on that?

MR. KARMAN: We might be able to help.

CHAIRMAN JENSCH: What I really have in mind is this:

To go back to this Section 50.58 and 50.59 situation, I'm not sure that those sections deal with the ACRS consideration, but I wonder if it is a change of such magnitude within the scope of 50.59 that requires some specific consideration by the Commission for the allowance of such a change.

MR. TROSTEN: You say does it have to be considered

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by the Commission?

CHAIRMAN JENSCH: Yes. If it were to be of such a category that should have specific Commission consideration, should it somehow be referred to the Commission so it can decide whether it should go to the ACRS? I think the option of going to the ACRS is entirely within the determination of the Commission and not within the determination of this Board, for instance.

MR. TROSTEN: Mr. Chairman, this is being considered by the Commission. It is being considered -- has been considered by the Regulatory Staff. It is being considered by this Board.

CHAIRMAN JENSCH: We're even on that one. The question is whether it is of the scope that it should go to the Commission so it can refer it to the ACRS if it decides to do that before the hearing is concluded, because I understand under 50.59, the applicant can make a change so long as it does not leave an unresolved safety question.

Is this an unresolved safety question, or one which raises hazards significantly different than those considered at the time the original application was presented?

MR. TROSTEN: Mr. Chairman, I submit with regard to the full power license that we are really not dealing with a situation involving 50.59. The matter of the issuance of the full power license with this core is pending

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before this Board.

CHAIRMAN JENSCH: Yes.

MR. TROSTEN: Am I misunderstanding your question?

CHAIRMAN JENSCH: No. We will accept that as a premise so we can dismiss it.

You see, the Commission has an opportunity under the statutory arrangement of utilizing the Advisory Committee on Reactor Safeguards. Does the Commission want to have the Advisory Committee on Reactor Safeguards' consideration of this change in peaking factor so that that matter may be before this Board for instance?

MR. TROSTEN: I can only offer you a speculation, Mr. Chairman, that if the Atomic Energy Commission had chosen to utilize its statutory authority to refer this matter specifically to the Advisory Committee on Reactor Safeguards, they would have done so.

CHAIRMAN JENSCH: Well, has the matter been specifically brought to the attention of the Commission, that there is this reduction? I don't know. As I understand it, it has been reviewed by the Staff. I don't know whether the Staff has had an opportunity to consider this matter with the Commission and invite from the Commission the Commission views as to whether this matter should be referred over to the Advisory Committee.

MR. TROSTEN: I cannot respond to this question.

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CHAIRMAN JENSCH: Is this of such a significance that it should, in your opinion, be recommended to go to get the Commission view in that regard? What is your thought in that connection?

MR. TROSTEN: My thought would be that if the Regulatory Staff has reviewed this matter, if it has specifically found that the Commission's standards and criteria specifically, including the Interim Acceptance Criteria, have been satisfied, if this has been-- If this is the Staff position as a result of the extensive analysis reflected in the November 14th, 1972 analysis, and the specific analysis for Indian Point 2, with the additional pertinent fact that this matter has been presented to another Atomic Safety and Licensing Board and has been approved as well by the Atomic Safety and Licensing Appeal Board, that under these circumstances it would not be necessary for the Commission to specifically refer this to the Advisory Committee on Reactor Safeguards.

I am merely giving you my reaction.

CHAIRMAN JENSCH: I understand.

Are you suggesting then that the determinations made in these other cases would be pertinent and persuasive in this proceeding?

MR. TROSTEN: I'm suggesting that there is a pertinence, yes, just as a decision-- I'm not suggesting

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of course, Mr. Chairman, that a decision of another Safety and Licensing Board is binding on this Board but I think it has weight, just as a District Court opinion has weight with another District Court.

CHAIRMAN JENSCH: Well, the reason I ask is I understood your position has been, by your several objections, that unless we're talking about Indian Point 2 fuel, everything else is irrelevant.

So if everything else is irrelevant, doesn't that automatically take out whatever this other case is, the Point Beach determination?

MR. TROSTEN: No, I did not mean to imply that, Mr. Chairman. I was just suggesting that --

CHAIRMAN JENSCH: I mean sometimes we use it, sometimes we don't. That's the problem I'm having difficulty with; the consistency of the position, and if you can help me on that?

You say we take the Point Beach determination on fuel densification but we disregard the views on Watts Bar, and Watts Bar is only a construction permit and we're an operating license situation.

MR. TROSTEN: Well, let me try to direct myself to that, Mr. Chairman.

The reason why I think that the fuel densification hearing held in the Point Beach proceeding is

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pertinent is because -- I think Mr. Roisman would agree that it is pertinent. Mr. Roisman and his colleagues wished to consolidate these cases at one point and it was felt that this was not an appropriate thing to do and so this was not done.

Very much the same issue is being directed -- not exactly the same issue, so that's what I meant when I said that the Point Beach determination was pertinent.

CHAIRMAN JENSCH: In other words, there's a lot of common generic considerations on the fuel densification; is that your view?

MR. FROSTEN: Yes, there are many generic things; that's quite true, Mr. Chairman. I don't disagree with that.

CHAIRMAN JENSCH: Did you care to respond to the statements of the objection?

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MR. ROISMAN: I think the record reflects in the transcript, also I was looking for some discussion in the documents. The Staff Fuel Densification Report of November 14, 1972, reflects on page 64 that one of the effects of fuel densification is to increase peak power. That's because the axial gaps created when the pellets densify and then spaces appear between the pellets cause a local power peaking.

144

Now, that has to be factored in. And if you take the fuel densification analysis and try to figure out if you do nothing to the reactor, what will be the peak? You will find that the peak will be very high compared to where -- well, it will be higher than it was before; because you have to take account of fuel densification.

Then you can impose, as the Staff proposes and discusses on page 36 of its supplemental testimony, ways in which you modify the method of operating the reactor, so that even when you take account of fuel densification, the peak power in any region of the core will not exceed a certain value.

Now that means that you, in effect, reduce the peaking factor. But the reason for all the concern with the maximum local power peaking is that when you do the ECCS analysis, using the accepted codes and so forth, as I think Mr. Stello testified yesterday, one of the initial inputs is what will be the peak power in the core? And then you compute

as to that fuel rod whether or not in the event of a loss of coolant accident its stored energy will cause it to exceed the 2,300 degree Fahrenheit. So the reason you initially begin talking about the peak power of a rod, it's because you are concerned with meeting the ECCS analysis.

What densification did was enter a factor which makes it appear that the peak power in the rod will be higher than had initially been thought, and the result is, the reason it is being changed, is exactly what ACRS addressed in its Watts Bar letter, namely, using a reduction in the peaking factor through the shifts that the Staff discusses on page 36 of their testimony here, to make sure that in the even of a loss of coolant accident, the peak clad temperature does not exceed 2,300 degrees Fahrenheit.

So it is not merely that peaking factors are tangentially related to both ECCS and fuel densification, they are the heart in many respects of both discussions. And the peaking factor has got to be at a certain level, now, in light of densification in order to see to it that you meet the ECCS Interim Criteria.

The burden of the Watts Bar letter and certainly Dr. Isbin's statement is in his opinion you ought to cope with the problem of meeting ECCS criteria by an entirely different method, not merely changing the peaking factor through these shifts in axial power, or whatever those terms

are that the Staff discusses on page 36; and that's extremely pertinent.

Because it means that in the content of this hearing, the ACRS' opinion suggests that the Staff-Applicant approach is the wrong approach, and it should be going a different route.

So I think there is not any doubt: The subject discussed in the Watts Bar letter is pertinent here.

Now, for the second question, that is, whether or not assuming this subject is pertinent, it's appropriate to receive the Watts Bar letter to demonstrate what the position of the ACRS is -- not the the truth of it -- but that they hold such a position. It seems to me that it falls in the same category as the original ACRS letter in Indian Point #2 did; that so long as that's the purpose of the proffer, it is an appropriate one.

We all know that the ACRS is not available for cross-examination, and that, of course, is the reason why these letters are put in in that somewhat unusual way. But I think it is equally pertinent, particularly since the subject is generic, and therefore, what is said in Watts Bar is related to -- very directly -- what is being done in Indian Point #2.

The Staff starts with a generic report which it then embellishes upon for Indian Point #2. This generic report

went into evidence, and the Watts Bar letter relates to the conclusions in this generic report.

CHAIRMAN JENSCH: Of course, the Staff witnesses are here to support the generic report as well as the addendum. You will recall in many of these cases when the Staff has offered ACRS letter, there has been objection that they involve hearsay and that the authors were not available for cross-examination; and the offer has therefore been limited to merely show compliance with the statutory requirement and the truth of the matters have never been accepted from an ACRS letter.

MR. ROISMAN: Right. And I'm not offering for the truth, but for the existence of that opinion as reflected in the letter.

CHAIRMAN JENSCH: Yes, but you see, the ACRS stands in a position of an advisory to the Commission only. And if the truth of the matters asserted are to be accepted from the letter, in a sense denies parties the right of cross-examination. I think there is a developing program as to how far the members of the ACRS are available for attendance at these hearings, and their availability for that cross-examination.

I don't think the Commission's position has wholly been established. However, I think there is a developing program in that regard.

I think, as I understand your offer, you are primarily

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interested in Dr. Isbin's statement, which appears by a postscrips to the letter. I think his opinion does not rise any higher than if he wrote a separate letter.

MR. ROISMAN: No, I think that his opinion and the letter together are -- both relate to the same question. I think the Committee did not go as far as Dr. Isbin went, but that they expressed concern in the same subject area.

And as I read that, deferred, that is, waited to decide to go as far as Dr. Isbin went at this point -- who was willing to say, "I don't care what your subsequent analyses of improvement of ECCS designs show, my view is that it is inappropriate to change the peaking factor to meet the criteria."

But I want to make clear that I don't really see any difference between this and the purpose of the offer that is made of the Indian Point letter here by the ACRS; in both instances all that is being attempted to show is that the ACRS has done something, not that what they claim is correct is in fact correct.

Now, if merely compliance with the ACRS requirement, that is, that the ACRS write a letter is required, then, all that would have been needed, and all that would have been permissible would be to receive into evidence a statement to the effect that such a letter was written, irrespective of what the letter said.

But it went further, because the Staff put the

letter into evidence in order not only to show that it was written, but made frequent references to the fact that the ACRS has approved.

CHAIRMAN JENSCH: That matter I don't think is established as a general practice. I think as far as the ACRS letters are concerned, they are received only for the purpose of showing that the Commission has complied with the statutory requirements, and that the truth of the matters asserted cannot be established through the ACRS letter.

MR. ROISMAN: But isn't there an intermediate thing? The truth of the matters asserted means is the ACRS right when it says "X"?

But there is a separate matter: Did the ACRS say "X" -- and that's what I want to put the letters in for, to show that the ACRS said what this letter says they said.

I should point out by the way that the Applicant and the Staff through its silence have --

MR. KARMAN: We are only silent because you haven't stopped.

(Laughter.)

MR. ROISMAN: In response to our requests for admissions which were filed some time ago -- Mr. Karman, I'm referring to something else, but that was "cute"; not right, but "cute".

(Laughter.)

MR. ROISMAN: On April 4, 1973, the Applicant responded within the time to our request for admissions, one of which was the genuineness and authenticity of the ACRS letter; so we don't have any question about that. It's accepted as genuine. It's accepted as authentic. And I just want it in evidence to show that this genuine, authentic letter is what the ACRS said about this problem.

CHAIRMAN JENSCH: I think you necessarily by your statement involve the consideration of the truth of the matters asserted. In the Watts Bar situation it is important, in the Watts Bar proceeding, to know that the ACRS has written a consultation letter to the Commission -- in Watts Bar, but that's as far as it goes.

I think the problem that really concerns me at the moment at least is whether this subject is of sufficient safety significance to warrant a specific reference to the Commission for its determination of whether it desires to have an ACRS letter in this proceeding. I don't know the technical significance of reducing the peaking factors in relation to safety. I think there might be a question of whether, if this were, say, certified, whether even the Appeal Board could purport to speak for a Commission policy determination in this regard.

If this matter has had the donsideration -- the

consideration that I infer has been given to it in the several cases starting with Ginna and Point Beach and how many others are doing something in each of those cases each probably a little different from the other, whether all the activity reflects a safety significance.

And unless the Commission itself says this matter is not of the enormity or the significance to warrant a reference or does not involve an unresolved safety question, then perhaps the Commission would be indicating that it did not desire to refer this. But I think every application and any amendment which involved a significant safety matter has been as a matter of practice referred to the Advisory Committee.

Now, whether this is of that scope, I don't know. And I think the Commission has to deal with that, not a Board nor an Appeal Body. I think a great many of the certifications have involved matters wherein guidance has already been given by the Commission, and within which scope the Appeal Board can act. But if the Commission has not given guidance on some matters, then I think it is probably a matter for Commission determination.

MR. ROISMAN: If you like, Mr. Chairman, we would be glad to brief the question. I think it is at least an arguable point that not only would 50.59 be applicable, but, arguably, 50.58 under which the referral to ACRS for their

views is not discretionary; that until the license is issued and the major changes made, that it must go back to the ACRS.

But I will be glad to address that in a brief, if you wish. There is a recent decision of the Court of Appeals in Washington in the Brook versus AEC Case, which touches at least on the question of determinations under 50.59 by the Commission; and, if such a determination is made, the obligation to do so, if there is no significant hazard with some explication of the reasoning thereof.

And of course, here at the most-- Mr. Karman and Mr. Trosten suggest some inference because the Commission has not done anything, that we can assume they don't want to do anything. Brook certainly stands for the proposition that that would not be adequate if 50.59 were the one that were applicable. The Commission would have to give a position and states its reasons to meet the administrative

171 procedure requirements.

But if the Board would like, I would be glad to submit a brief.

CHAIRMAN JENSCH: The Board has not yet considered the matter and I would not undertake to express the view of the Board.

I think that there is one matter that may warrant a little consideration, and may indicate the view of the Staff. Maybe this is not appropriate to the subject matter that we

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are now discussing, but the Board has considered this at different times.

Last year, in July, the Board was urged by both the Applicant and the Staff to issue a testing license, that all factors existed to warrant the issuance of a testing license. The Board suspended, then, pending proceedings and came down from Yorktown Heights or Croton-on-the-Hudson and proceeded to give consideration to the factors involved and issued a decision to authorize the issuance of a testing license.

#13 mml

As far as we have been advised, a testing license has not been issued and the Board would like a status report from the Staff as to what has happened from its original position asserted in that licensing proceeding that all factors have been established sufficient to warrant the issuance of a testing license.

A possible inference, and I don't know whether it is a correct one or not, is that something has arisen in the mind of the Staff to indicate that the testing license should not be issued and the Board is somewhat concerned that there might be some safety significance.

MR. KARMAN: Such an inference is not well founded and I will try to tell you why.

CHAIRMAN JENSCH: Let me finish.

The procedure is somewhat unusual, we believe, to urge a licensing board to issue a decision to authorize the issuance of a license of any kind and then have it appear apparently discretionary whether they are going to carry out that decision at all unless there are factors of significance that should again be presented to the Board for its consideration.

Now, just as a possible development, and maybe wholly unrealistic and unrelated to this proceeding, but it is conceivable that after the issuance of say an interim type of license as this testing license, factors have arisen

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that cast very serious doubt on whether the license should issue, and likewise whether the factors were substantially presented in the hearing process to warrant the rendition of an interim decision for such a license.

And the Board believes it is incumbent upon the Staff to make some demonstration of the reasons through a witness, as to why this is being held up. Because it seems to be an evidentiary matter.

MR. KARMAN: No, I believe I could handle it Mr. Chairman.

CHAIRMAN JENSCH: Well I appreciate you can. But as I say, I think the Applicant is entitled to a statement on the record as to what is holding up this Staff recommended license in July of 1972?

I think not only is the Applicant entitled to it, but the public is entitled to some statement as to why an initial decision is set aside and considered kind of a shelf item, we will pull it down when we are ready.

I don't u nderstand that is the process that the Commission contemplates through the hearing, that we will get enough factors on the record and urge the Board to issue a license, a decision to authorize a license and, then sometime later the Staff will decide whether they want to issue a license, or whether the factors are, in fact, present. That there may be other things that have come up.

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As I say, it seems to me that it is incumbent upon the Staff after the issuance of an initial decision, to proceed in accordance with the authorization or to submit a statement of why not.

MR. KARMAN: May I?

CHAIRMAN JENSCH: Yes you may.

MR. KARMAN: As the Chairman so accurately stated, the Board authorized the issuance of a testing license in the amount of 20 percent.

And in accordance with Appendix D of the Commission's rules, referred the balance of the 30 percent for the application of 50 percent to the Appeal Board for its determination.

Shortly after the issuance of the initial decision and pending the completion of certain compliance requirements which the Staff will always insist upon before issuing any license, the matter of fuel densification arose.

At that time, and at the same time that the Citizens Committee for the Protection of the Environment took exception to the decision of the Licensing Board and appealed this matter to the Appeal Board with respect to the issuance of the testing license.

The Regulatory Staff at that time, in submitting its response to the Intervenors' exceptions, indicated that the fuel densification matter had arisen, but that our

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analysis at that time indicated that under no circumstances was there any problem involved with respect to testing at 20 percent.

However, we also requested that the Appeal Board delay any action concerning the balance of the 30 percent until the Staff made a further review and issued some further report or testimony.

CHAIRMAN JENSCH: Did they issue the 20 percent license?

MR. KARMAN: May I continue, Mr. Chairman?

CHAIRMAN JENSCH: Yes.

MR. KARMAN: AT that time it was the Applicant's decision to remove all the fuel from the Indian Point 2 plant, the unpressurized fuel and return it for refabrication.

This was sometime in the fall of the year, -- October -- I am not sure what it was, then fuel did not come back to the Indian Point site until sometime in February possibly the beginning of March.

Now we are close to hand, the Regulatory Staff and its compliance people after the reinsertion of the pressurized fuel had a few outstanding items which we will again, I state, always insist upon complete compliance before any testing license is issued.

CHAIRMAN JENSCH: May I interrupt?

MR. KARMAN: Certainly.

mm5 1 CHAIRMAN JENSCH: We understood in July that these
2 little driblets of compliance matters were so near at hand
3 and so minor in character that the Licensing Board can just
4 hurry about its business and not worry about all these
187 5 things.
6 We didn't understand there was anything -- of
7 course we understand the compliance section is going to be
8 sure that the head is on the core, and some of those things,
9 the door is closed to the containment.
10 MR. KARMAN: Minor items.
11 (Laughter.)
12 CHAIRMAN JENSCH: Those things we don't expect are
13 going to require any great deliberation or time. But we are
14 now, as you say, near at hand. It is April now and we are
15 kind of getting on a bit.
16 MR.KARMAN: But the fuel was not returned until
17 a month ago, Mr. Chairman, and the best I can state
18 at this time is that the information we have received from
19 both our Office of Regulatory Operations, the Regional
20 Compliance Office in New Jersey, and the Applicant, is that
21 this plant should be ready to go critical next week. I think
22 the 19th was the date that was given to us.
23 CHAIRMAN JENSCH: Wasn't there some letter from
24 Mr. O'Leary that went something like this: Our position
25 about this, the fuel is, it is all right for them to go get

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it, but we are not making any determination as to the proposed use of these prepressurized fuel rods for any purpose involving criticality.

Does that mean the subject is open in this proceeding?

MR. KARMAN: What we propose to do, Mr. Chairman, is prior to the issuance of any license, we feel we owe it to the Board, since the Board reviewed the technical specifications before issuance of the proposed technical specification, before issuance of the initial decision relating to the testing license there have been several proposed changes in the technical specifications which we intend to serve. As a matter of fact, I have copies made available so they can be present today for us to issue them to the Board and to the parties and indicate that we will unless the Board finds a problem that we no doubt have to issue this 20 percent license at the time that the plant is physically ready to go critical.

I believe that is the only significance of Mr. O'Leary's statement.

CHAIRMAN JENSCH: Well the only reason I mention all that was that maybe there is time to submit this matter of peaking factor and densification to the Commission. If we are getting separate letters on some of these fuel densification matters from the ACRS as time goes on, they

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will probably be in the process of testing for -- what is it, 90 or 100 days -- it is almost as bad as the time needed to serve a paper under the Commission's rules. You add a weekend and take out some days and you end up with three months or six months, I have forgotten what the total is.

MR. TROSTEN: It is 49 days under ideal circumstances, Mr. Chairman, and we havedoubled that as a matter of prudence.

CHAIRMAN JENSCH: In any event there will be adequate time to submit it to the Commission for consideration on whether they want to send this.

Perhaps it is something that the Board will have a chance to indicate its view on later and might suggest as to whether this should be done in order to get the Commission's policy view of the matter.

At this time let's recess to reconvene in this room at 12:05.

Did you have something further?

MR. ROISMAN: Just for the record, is the offer of the letter being denied?

CHAIRMAN JENSCH: No, it is being considered in the recess.

MR. TROSTEN: Mr. Chairman, one more word.

I had something further that I wanted to say. I am perfectly happy to say it after the recess. I just hope that the Board will afford an opportunity for some

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further argument on Mr. Roisman's offer after the recess.

CHAIRMAN JENSCH: If you have something to say, it is now or never because when we come back it will be --

MR. TROSTEN: Well the Regulatory Staff has not spoken to the matter yet.

MR. KARMAN: I thought I did.

CHAIRMAN JENSCH: I thought he did.

MR. TROSTEN: Okay, fine.

I had only two things to add. One was this, Mr. Chairman, thatthe peaking factor, in response to your question, the peaking factor of 2.70 is 13.5 percent lower than the original FSAR value of 3.12.

MR. BRIGGS: Excuse me just a minute.

It is not clear to me whether the peaking factor was 3.12 or 3.2. There is a peaking factor of 2.62 that corresponds tothe original 3.12, and it just seemed to me that maybe the 2.7 should correspond to a 3.2 rather than a 3.12 as proposed.

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MR. TROSTEN: We will have to check that.

CHAIRMAN JENSCH: Will you compute the percentage on that, assuming it is the other figure, 3.2?

MR. TROSTEN: Yes.

We will compute that, and give that information to you after the break.

The other point I wanted to make was this:

I really think that Mr. Roisman's offer of the ACRS letter in the Watts Bar proceeding in this proceeding for the limited purpose of showing that they have this opinion, it's sort of a medieval theological approach to the problem, really. It's the same sort of a thing that we have seen before, where Mr. Roisman has offered documents for the purpose of showing that Dr. Jones has this opinion -- not for the purpose of showing that you should believe Dr. Jones, but just that Dr. Jones has that opinion.

Now he's offering it not for the purpose of the truth of the matter, but just to show that the ACRS has this opinion; and I think that this is sophistry, Mr. Chairman; and it's going to confuse the record a great deal.

And I think that the offer should be rejected for that purpose.

CHAIRMAN JENSCH: At this time let us recess to reconvene in this room at 12:10.

(Recess.)

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CHAIRMAN JENSCH: Please come to order.

The Board has given consideration to the several matters which we discussed prior to the recess on the basis of the record, and the objections and arguments made in reference thereto.

The objections are sustained as to Exhibit A-6.

Will you proceed with your cross-examination.

MR. ROISMAN: Yes, Mr. Chairman.

BY MR. ROISMAN:

Q I would like to direct the Staff's attention now to the Fuel Densification Report, page 49. Page 49 is a chart or a Table, 3.2.1, that gives certain time to collapse estimates based upon clad mid-wall temperature, pressure differential, and the rest.

First, can you tell me with respect to Indian Point #2, Column 1 only -- please do not talk about Column 2, Column 1 only -- Cladding Mid-Wall Temperature; what is the cladding mid-wall temperature for Indian Point #2?

In which one of these ranges does it fall? Let's start with that -- above which figure?

A (Mr. Stello.) 635.

Q Above 635?

A That's correct.

That would be subject to check. If this is very important, we will do it now.

Q I think it could be, although, before we do that let me explain what it is I want to do, and see how, if at all, we can do this.

The items listed in Column 2, Pressure Differential, inasmuch as we know the design operating pressure for Indian Point #2 will inevitably involve making it known to all the people that are sitting in this room what the initial pressurization is in the Indian Point #2 prepressurized rods, a figure which the Applicant contends, and the Staff, Mr. Kniel, has accepted, is a Westinghouse proprietary figure, how much the fuel rod is prepressurized.

What I want to do is to take the input and find out with some greater refinement than we get in Column 3, the time to collapse, it just says "during cycle 1, during cycle 2, during cycle 3," et cetera, without much more refinement than that.

And since the Staff has made a judgment that the core will not collapse during cycle 1 at all, I am trying to get the basis for that conclusion in some more detail.

Now, unless someone has a suggestion I don't see any way we can discuss that intelligently and not reveal inferentially to the clever spies here from the other fuel rod manufacturers, who we have all seen in the audience, would not be able to compute back what was the initial pressurization of the fuel rods. But if anybody has got a suggestion, I am

all for it.

I do not want an in camera proceeding. But I am not challenging -- although I don't agree with the conclusion -- that that figure is proprietary.

So that's where I'm going, and you can understand, then, why I would like to get the specific figure here, if this chart can be made more specific.

Was a calculation done in which you took the real cladding mid-wall temperature, the real pressure differential, and decided at what burn-up cladding would occur?

A This chart could never be made specific to where it would apply directly to Indian Point #2. The whole purpose of the chart is to just illustrate for the parameters shown a sensitivity. It is certainly not intended to be reliable predictors for what would happen in any specific instance.

Q Well, did you do a detailed time to collapse estimate for Indian Point #2?

A (Mr. Ross.) We did not.

As we said yesterday, when we did Point Beach #2, we did calculations, and these are discussed on page 26.

Q Page 26 of what?

A 26 of the additional testimony by the Staff, that was filed yesterday for Indian Point #2.

As we said yesterday, our calculations on Point Beach

#2 were intended to verify the Westinghouse methods. We did not use the BUCKLE code which is mentioned on page 26 to make a separate calculation for time to collapse for Indian Point #2.

Q I am having a little trouble with that.

How did you know when the time to collapse would be without having done a separate calculation?

A The Applicant, ConEd, furnished a calculated number using the same techniques that we had verified on Point Beach #2, as being more conservative than the Staff calculational technique. Since we have previously reviewed the method on Point Beach #2 and found it acceptable, we found the method therefore acceptable for Indian Point #2.

Q Was your analysis at Point Beach #2 a generic analysis that proved the reliability of the method for more than merely the one prediction used?

In other words, did you have, in effect one data point, one prediction for one plant which showed relatively good comparison between the BUCKLE code and the Westinghouse code; or do you have many examples where you ran a test and can prove that BUCKLE and the Westinghouse code will come out essentially the same?

A More nearly the latter.

We ran what we would call base-case, and then many sensitivity calculations thereof.

In extrapolating method verification to Indian Point #2, we satisfied ourselves that the verifying data, the empirical information that substantiated the model for Point Beach #2 was also applicable to Indian Point #2. By that we referred to the similarity in fuel rod design and exposure conditions.

Q Now, is the chart on page 49 of the Fuel Densification Report, does that utilize the BUCKLE code to set the sensitivity analysis done there, or is it something else? I am aware that that chart is a direct copy from the C. R. Hahn draft report that the Staff received on this subject. But I don't have information as to what code he used, or was any code used?

A (Mr. Stello.) Subject to check, I'm relatively certain that the code used to arrive at the numbers was the BUCKLE code.

Q. The numbers on page 49?

A The numbers on page 49.

I don't happen to have a copy of the letter with me, and I will need to check it later over the lunchhour.

Q Now, for Indian Point #2, I notice that the chart on page 49 refers to a fast flux rate of $5X10^{13}$, without going through the whole thing; what is the fast flux level of Indian Point #2? Is it higher than that figure, lower than, or the same?

A (Mr. Ross.) It's my understanding that the peak fast flux would be on the order of $8X10^{13}$.

If I could give that subject a check, also.

Q If I understand correctly, the higher the fast flux rate goes, the sooner the time to collapse would occur.

A Qualitatively, yes.

Q So that for purposes of this chart, there would be some shift if your input were $8X10^{13}$ for the peak fast flux in the direction of it occurring either earlier in the cycle where it says "during the cycle" or, conceivably, in an earlier cycle, as a result of raising that peak fast flux; is that correct?

A More or less.

I'm a little hesitant to say you can jump cycles, and that's why I answered qualitatively, because there are more factors than fast flux at work. And the relative importance of the fast flux changes as the exposure temperature. It could well be that at the higher temperatures you could run the calculation at $5X10^{13}$ and run it again at $8X10^{13}$, and you would not see any change on this chart, because the flux is not dominating the number any longer. It would be below the threshold of sensitivity in terms of engineering significance. But the trend is that way, now whether it is one part out of a thousand, I don't know without doing the calculation.

jzb8

Q I understand.

Now, can you tell me in the calculations for Indian Point #2 that were conducted by the Applicant for core region No. 1, at what stage in that life did they predict collapse?

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A On page 2-1 of the Applicant's report, Fuel Densification, IP-2, January '73, for Region 1 the number is greater than 21,000 effective full power hours, which has a parenthetical statement after it: "Nominal burnup for two cycles."

Q All right.

Now do I understand that the essence of the statement in the last paragraph on that page, without making reference to the number in brackets which is proprietary, is that an examination of the Point Beach No. 1 core was made to verify the validity of the prediction? That is, a prediction was made as to when Westinghouse thought the Point Beach No. 1 core would flatten, and it was subsequently observed not to have flattened at that time; is that correct?

A It is correct that that's one point in the curve; it is certainly not the data point, the only data point that indexes the calculation.

Q That's what I was going to ask next.

In terms of indexing the calculations, focusing on the-- I don't know what Westinghouse calls this code, some acronym, I assume -- what are the other data points, not the numbers for it, but how many other reactors operate for how many other hours and so forth -- to produce that data?

A (Mr. Stello) There are several data points, near a half dozen, as I recall. The specific reactors, the

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specific conditions I would need to look up.

Q But something like six?

A I need to look up and go through the list and count reactors by name, is the way I understood the question; data points, --

Q And do I understand --

A -- many, many, many; reactors of the order of a half dozen.

Q Do I understand that what was done was the reactor was identified, the region in the core of the reactor was identified, a code analysis was made to determine when the code predicted that that portion of the core would collapse, subsequently it was determined by examination when it did collapse or if it did collapse, and the alleged conservatism of the calculation was then checked against that observed result, against the predicted result? Is that essentially what happened?

A Yes. Comparisons-- As I understand your question, comparisons between the code and experience-- Code calculations were made for the conditions to which the fuel was subjected and compared to the information taken from the reactor. That's what I understand your question to be.

This now was also done for measurements of creep rate for literally thousands of data points where creep rate was measured as a phenomenon.

eb3

Q Creep rate being one of the factors that is in the code which you are predicting in order to ultimately predict clad collapse; is that it?

A True.

Q Now are you aware of any comparison of Westinghouse predictions of collapse time calculations by any Staff or AEC contractor in which differences in the non-conservative direction were found to exist between those analyses and the analyses that Westinghouse was doing of clad collapse time?

In other words, is there any data known to the Staff where the Westinghouse model has not -- when compared to an analysis done with a different model, not proven to be as conservative as the other model would be?

MR. KARMAN: Could we have the question read back, please?

(Whereupon, the Reporter read from the record as requested.)

WITNESS ROSS: The specific answer is we don't know for sure. I have not examined any calculations; neither has Mr. Stello. The calculations by PNL are under way, comparing the Staff technique, BUCKLE, against other people, including Westinghouse.

Now this is just on-going work. The reports were discussed yesterday. It was part of the work described in the letter from PNL to Mr. Rubenstein. We cannot discuss

eb4

the results of this on-going work because we have not reviewed it. So have the calculations been done? They are being done. What do they show? We haven't reviewed it.

BY MR. ROISMAN:

Q Do you know, does the Westinghouse --

A (Mr. Stello) I think Mr. Ross said we had not reviewed calculations and I don't believe he meant that in the context of calculations previously done for the various cases. Those certainly we have reviewed. I certainly have.

On the basis of the calculations that, for example, were done for the Point Beach case showed that our calculations predicted, in a manner conservative relative to the calculations performed by Westinghouse. That is not to say that some calculation in the developmental stage of a code which could or could not be known to us may have predicted some different result. I don't think we can even address that point.

Your question was very, very broad and we are trying to address it in a very broad sense. Those calculations we finally concluded were appropriate for the various cases which we have examined. The answer to your question is in no case have we found a problem where Westinghouse has not, to our satisfaction, resulted in a conservative calculation.

Q Does the Westinghouse analysis begin with a figure

eb5

for the initial ovality of the prepressurized rod?

A Yes.

Q Is that initial ovality consistent with what is done in the BUCKLE code or inconsistent?

A (Mr. Ross) It might be, or it might not, but in any case it doesn't matter for the following reason:

The BUCKLE calculation uses initial ovality in a certain calculational technique. The Westinghouse data is indexed or uses the initial ovality in more of an empirical manner such that it is not as important to them as to what the ovality was as it is to BUCKLE.

Now when the Staff runs a BUCKLE calculation we will use data from vendors, fuel vendors, or from applicants on initial ovality to consider the mean and standard deviation of that parameter.

Q Is that parameter an estimate or an actual measured ovality of a selection of fuel rods, do you know?

A I know. It is measured.

Q And do you know how many rods out of -- what is it? Some 40,000 in this reactor? -- are initially measured to determine ovality?

A No.

Q Do you know, will the ovality of a rod differ at different places of the same rod?

A It can, yes.

eb6

Q Do you know whether the ovality measurements that were made with respect to the Indian Point No. 2 fuel were measurements made over the total length of the rods selected, or at selected points on the selected rods?

A You asked about measurements for IP-2. I think we stated previously we did not run a calculation for that plant.

Q No, but I thought you had said that Westinghouse did, that it did incorporate ovality into its code, and I was asking what ovality they incorporated, and perhaps I skipped a step.

Did they incorporate ovality into Indian Point No. 2, based upon measurements of Indian Point No. 2's fuel rods?

CHAIRMAN JENSCH: Is this something Westinghouse can supply to the Staff, and the Staff can give an opinion on it?

MR. ROISMAN: Part of what I'm trying to find out is the nature of the Staff's review of this problem. I think they were about to answer to some extent.

WITNESS ROSS: Their method that we reviewed on Point Beach 2 would call for such, and it is our understanding that they did not change that method.

We did not specifically ask them the question, did you change your method and not tell us?

eb7

BY MR. NOISMAN:

Q It would be a good general question to ask.

In the method, does it involve the checking of each point along the rod for ovality, or only spot-checking it?

A (Mr. Ross) The method is along the length.

Q In other words, it's a continuous measurement all the way down?

A The instrument is called a profilometer, and it goes around and down at the same time. It spirals down the rod.

Q I see.

And is there an average ovality taken for each rod? Is that how they factor it into their equation, do you know?

A It is my understanding that the ovality is defined as outer diameter maximum minus outer diameter minimum. I don't know that you would call that an average or not. I believe I would not call it an average.

Q That's all right. Your explanation makes it clear without the use of that term.

Westinghouse has stated in the report on Indian Point No. 2 that the Region 2 and 3 fuel which is designed to a density of 95 percent is assumed to have at least 94.3 and that is to be subsequently verified by actually

eb8

checking the pellets for that region.

I believe you testified yesterday that the numbers are now available. On the assumption that they are not proprietary, can you tell me what is the actual density as measured on the selected sample for Regions 2 and 3 for Indian Point No. 2?

A Yes. I have them written down.

Region 2, 94.52.

Q What page?

A I am referring to Table 3.2. It doesn't have a page number.

Q I have it. All right.

Now Region 2 again?

End 15

#16 mm1

A. 94.52. Region 3 is 94.3.

Q. Those figures are, just to refresh my recollection, presumably 95 percent accurate using the examination methods, sample technique, as that mean for the whole region or not?

A. That is the average. And you would use the term 50 percent, 50 percent of the pellets would be more and 50 percent less.

Q. Then this 94.3 or 94.52?

A. That is right.

A. (Mr. STello.) As I understand some information obtained yesterday from Westinghouse Corporation, these measurements were based on sampling rather large population of pellets. And as I recall, the number was 24,000 pellets in each region were used to arrive at --

Q. I am sorry, in each region?

A. In each region, in contrast to the number I gave yesterday, which is an approximately correct number for Point Beach.

What I was referring to is 1000, and based on the information, the two sigma variation I would like to confirm that there was no pellet outside of the two sigma variation.

Q. In the sample at Point Beach or the sample at --

A. The sample at Point Beach, that is what I said yesterday and I am confirming. I said I needed to check it,

mm2

and I am taking this opportunity to indicate that those numbers are correct.

Q All right.

Now, directing your attention to page 3-4 of the Westinghouse report on Fuel Densification for Indian Point 2, look at the third paragraph on the page, the fourth line thereof. The sentence begins -- I am sorry, the fifth line:

"The earlier selection of lower fuel densities for regions 2 and 3 was based upon a conservative interpretation of fuel swelling data. Reinterpretation of this data, as well as new data indicates that swelling is not as strong a function of density as expected during the three fuel cycles. The higher fuel densities for regions 2 and 3 for the replacement core will minimize the potential adverse effects of fuel densification which I discussed in reference 2."

Did you evaluate the data upon which Westinghouse reached its conclusion that it could now get rid of an earlier conservatism involving fuel swelling or the basis for getting that conservative interpretation of fuel swelling?

A We have and continue to evaluate data from fuel with respect to swelling and all other matters.

We, and our consultants, have reviewed this

mm3

particular aspect of the problem and have convinced ourselves that their interpretation is a correct and valid one. That the earlier concern for swelling, and hence the tendency to go to lower densities, has been changed based on information now available, the data base of considering all information.

So we are confirming that we have in fact reviewed it and are convinced that it is all right to increase the density to these levels.

Q. Can you tell me what was the problem, or the feared problem with fuel swelling that required the conservative interpretation?

A. The original concern was that fuel would have to be manufactured to relatively low densities to accommodate the effects of swelling based on data available a number of years ago.

And this, I might add, was a relatively high burnup fuel.

Recent information obtained from reactors and additional experimental programs has now shown that this concern for swelling was not a valid one.

Q. Are you talking about fuel pellet swelling, or fuel rod swelling?

A. Fuel pellet.

Q. Does the data show that the fuel was not swelling or that some adverse consequence anticipated as a result of

mm4

swelling, was not occurring?

A. It was not swelling as much.

Q. Now does the new data itself have in it some conservative assumption regarding possible problems of fuel swelling or have you now just completely eliminated it as an item on which conservative assumptions are required?

A. I am going to have difficulty in -- I don't understand --

CHAIRMAN JENSCH: Will you speak a little louder, please.

WITNESS STELLO: I don't understand what you mean as an item for which conservative assumptions are required.

BY MR. ROISMAN:

Q. Well I take it that initially a thought -- a prediction was made that the pellet might swell and that swelling, if it did occur, would be a problem.

In order to reduce the possibility of that swelling, and correct me at any place where I don't understand it correctly, the pellet was made less dense initially and this was a way of offsetting the possibility of swelling.

Now am I correct thus far?

A. (Mr. Stello.) Yes, in principle.

But let me make a comment that will, perhaps, make it clear why I am having difficulty with the use of the word conservatism in this regard:

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What we need to evaluate for understanding what densification is doing in terms of performance of the cores is the gap conductance. The gap conductance is sensitive to the distance between the pellet and the clad. So, if one had a very high swelling rate as an example, and he might think that was the conservative thing to do, he would have to proceed very carefully because what he is actually causing to happen is the gap between the pellet and the clad to close at a faster rate and hence cause the gap conductance, based on that calculation, to be a higher value.

Now I want to make that comment and make you understand that that is one part of the model necessary to evaluate the gap conductance in a fuel rod and it needs to be modelled properly with the end result, i.e. the output of the model, the gap conductance being calculated in an acceptable manner.

The constituent parts then, one has to be very careful about deciding they are or not conservative and you need to reserve finally that judgment, until you look at the output of that calculation.

A. (Mr. Ross.) There is something that still needs to be added.

As the fuel swells and contacts the clad, and if it kept on swelling at that rate, the clad would expand.

mm6

It would expand first what is known as elastically, and then when it got to its elastic limit, it would flow plastically.

The old way that is referred to here, refers to -- referred to here on page 3-4, is based on a criterion that the clad should not expand more than 1 percent. It should be its total strain, which of itself is not a safety limit beyond which you have unsatisfactory fuel performance.

So when you ask us what are the effects of fuel swelling, and if it swelled in a certain way, the deleterious effects previously mentioned are clad expansion.

Q In computing the peak temperature for rods adjacent to rods with densified fuel, has consideration been given in the total analysis that is done here, say on a loss of coolant accident, to the deformation, short of collapse, of the densifying rod?

A (Mr. Stello.) Yes.

Q Can you explain to me how is that done?

Does it differ with time, or do you make, like you did with fuel densification, an immediate assumption at the beginning, or what?

A The effects of a collapsed rod with regard to calculating the peaking associated with the collapsed region is incorporated whenever the first rod is believed to be collapsed. That is, if we think a rod has collapsed in the

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core, then we assume that all of the rods would have been collapsed, and it is a step change as you have described. We go from either calculating void to exist -- that is a gap within the rod, and a gas to be there. Or a case where this space is filled with water.

It is one or the other.

Q All right. But my question was, assume that -- and maybe you have answered it and I just want to get it clear.

But assume that the rod, in fact, does not operate in the sense that it starts off with initial ovality, bombs along for 10,000 hours or so, and then, whammo, collapses.

It is slowly moving from its initial ovality to a condition of what you call collapse, is that correct?

A (Mr. Ross.) Your picture is not quite correct for this reason:

There exists what is known as a critical ovality concept that where the rod becomes so oval, then it will go ahead and squash flat. Now visually you can't tell the difference.

Q The difference between which?

A Between an initial perfectly symmetrical rod and a rod which has a critical ovality.

So in terms of calculating the flux spikes, flux peaking and that sort of thing, the amount of water just

mm8

before collapse is essentially that that it was at the beginning of life. There is no half-squeezed shot, as you are thinking of.

Q YOu say it is essentially, and I guess the only thing I would like you to do now is, can you tell me some number of -- you know, a percentage of the total amount of water additional in the area, as between the initial ovality and the ovality just before critical ovality?

end 16

A We can give it to you in terms of diameter.

Q Okay that is fine.

A Start with an initial outside diameter of .43, the oval shape would be on the order of .39, about a 40 mill or thereabout depression in ovality.

So the new diameter would be the minimum would be on the order of .39 inches, and then beyond that you would predict -- that's an approximate number. But if you look at what we call the "major axis" this rod has been deformed such that it's pushing some more water out, so the total amount of water would be very nearly what it was to begin with.

Q Now when it collapses, what do you end up with then? Does it literally collapse to be completely flat, or does it still have some -- well, I guess what I would like you to do is compare for me the amount of area in a cross section of the rod that is displaced when a rod is only oval and not collapsed, compared to the amount when it is collapsed?

A (Mr. Ross.) My information is that it is contact; it's flat; it doesn't sit there as a small oval cylinder. It would be mostly all water now except for the material taken up by the cladding.

Q Well, in this case, in other words, by the thickness of the two sides of the cladding, they have now flattened out all the way?

A Which is about .024 inches.

MR. ROISMAN: I have no more questions for the

Staff, and I have no questions for the Applicant.

CHAIRMAN JENSCH: Does the Applicant have any questions of the Staff?

MR. TROSTEN: Mr. Chairman, we will probably have some redirect. Perhaps we can do it after lunch?

CHAIRMAN JENSCH: Redirect?

MR. TROSTEN: I'm sorry, cross; excuse me.

CHAIRMAN JENSCH: Very well.

Before we go to lunch, we have some questions on environmental matters we would like to submit to the Applicant and the Staff.

MR. BRIGGS: There's just one area in which I think it would be helpful if the Applicant and the Staff would provide some additional information.

It has been my understanding that on the question of fish stocking, that the Applicant is considering the feasibility of stocking the Hudson with fish that are, say, two-to-four-inches in lenth, to replace the fish that would not arrive at this length because of the killing of larvae and eggs that would pass through the plant.

And also to replace fish that would be impinged on the screens.

It has also been my impression that the number of fish that arrive at this length, progressing from eggs through larvae to a length of two-to-four inches, in the absence of

any damage by the plant is in the number of some millions, let's say ten million fish.

Now, first, I would like to get some idea of whether this is ten million fish, or a vastly different number, because in the Staff's question of Dr. Stevens the other day that in the Staff's information supplementary testimony that was given to us yesterday, there is a suggestion that the number of fingerlings that would have to be provided is on the order of half a billion, and the difference between half a billion and ten million is so large, that I would like to get some better information on what the Applicant thinks would be required, and what the Staff thinks would be required.

MR. TROSTEN: May I just have the size range? You are talking about the fish that reach a year old, shall we say? And I also wanted to have the size range fish we were discussing.

MR. BRIGGS: Well, as I say, it's my impression that the Applicant would propose to stock fish in the size range of two-to-four inches.

MR. TROSTEN: Right.

MR. BRIGGS: And this is the size range that I am concerned with.

It is not clear to me from the Staff's analysis whether they are considering in the stocking of fish that size, or the stocking of larvae in the half billion number.

But in any event, I would like the Staff's impression of how many fish of two-to-four inches would have to be provided to compensate for the effect of the plant; the Applicant's impression of the same number, and then see how this fits in with the testimony that has been provided so far.

DR. GEYER: I would like to ask the Staff witnesses a question to clarify what seems either to be a mistake or I don't understand it, on page 10,785 of the testimony. The last answer on that page says,

"The standard deviation was .5," and that between a two sigma below the mean and two sigma above the mean, one would expect to find 95 percent of the pellets.

I don't have a statistical table here, so I don't know whether that is correct or not.

Then, over on page 10,788 the statement was made that none of what I presume were the 1,000 pellets observed, were outside two sigma.

Well, this is a statistical impossibility, it appears to me. If it were 50, you would expect to find 50 outside.

WITNESS STELLO: What I referred to on Point Beach -- the number is near 1,000 pellets were tested, densities were measured, and they were plotted as a relative frequency, and to construct binomial distribution; and the mean value was calculated from these. And if I look at what was the

two sigma deviation, and --

DR. GEYER: How did you get the two sigma using the data on the 1,000 pellets?

WITNESS STELLO: Correct, from the 1,000 pellets.

But when I now look at the calculated -- the standard deviation, take twice that value, then I look at this chart, there is no pellet that fell outside that region.

Now the reason is we are going from the actual physical data to the theory of statistics, and maybe Mr. Ross could explain that more fully.

Mr. Ross is indicating that it is explained on -- is? -- on 10,787.

DR. GEYER: If 95 percent of them fall inside this, five percent have to fall outside it.

WITNESS STELLO: In theory, not necessarily in the physical measurements. If you will give me a moment I wisll try to find the actual table, the binomial distribution for Point Beach, and show you that on that table, one of the pellets did in fact fall outside that region.

DR. GEYER: Well, check this out and be sure that you're right on it, because it sounds like it's impossible.

WITNESS ROSS: Well, what I said on 10,787, I thought took care of it, was that as you proceeded away from the mean, one, two or three standard deviations, the distribution was no longer normal.

DR. GEYER: Well, I understand that.

WITNESS ROSS: So there's no reason to suppose or suspect that just because you're two sigma deviations away which was calculated just by adding or subtracting or multiplying or dividing numbers, you should find some more data points. There's only a finite number of points. There has to be a finite lower limit. And beyond that there are no points; whereas statistics says there are -- that's what I was referring to there.

DR. GEYER: It's a very peculiar distribution, then.

Well, check back.

WITNESS ROSS: We did not regard it as peculiar; but we can look it up further, if you wish.

DR. GEYER: Why don't you just supply me the analysis?

MR. ROISMAN: Mr. Chairman, I just have one more question. I had had a question, that's what I checked with Applicant about, as to whether or not the question would involve proprietary material. I have been advised that it does not, and I would like to put it to the Staff.

BY MR. ROISMAN:

Q I'm under the impression that Battelle ran some tests comparing Westinghouse cladding collapse time calculations with Battelle collapse time calculations -- not ran them

yesterday, but, you know, ran them last year; that they observed that Westinghouse used a Griffin calculation but Battelle had something different for that, and came up with a different estimate for cladding collapse time at distance by an order of magnitude.

And then Battelle went on to state that realistic creep collapse model incorporates a material creep law which controls a timewise increase in ovality of the clad tube until the clad growth has been distorted sufficiently to cause collapse at the applied external pressure, and that in their judgment at that time, Westinghouse did not have that realistic creep collapse model.

Now, are you aware of --

MR. KARMAN: Do you have that report here?

MR. ROISMAN: No, I don't. It's a proprietary report; that's why I had to check to see what this information was. I had seen it in the Staff's office and, as you remember, we agreed we would not copy from proprietary reports; so I do not have the report here with me.

BY MR. ROISMAN:

Q If you are not familiar with it, I will go back to look at it again, and maybe we can get some arrangement with the Applicant whereby we can get a copy of it.

My understanding is it is only the Westinghouse data that made the report proprietary. It's listed in those

A (Mr. Stello.) I believe I know which report you are referring to. I don't have a copy of it with me. But that report does not describe the calculations that we've been talking about this morning, that is the BUCKLE calculation, to the best of my recollection.

There were some -- I guess I could characterize them as some "simple hand calculations" that were done a rather long time ago. I think this past -- a year ago last summer. They were not using our BUCKLE calculation.

Q No, but they were comparing the calculations to Westinghouse calculations; and does your recollection indicate that they concluded that -- let's forget about the question of the difference in the order of magnitude between their calculation and the Westinghouse calculation -- the cause they thought of that difference was the failure of Westinghouse to incorporate a material creep law into their calculation. And then they explained that's one that controls a timewise increase in ovality of the clad tube until the clad geometry has been distorted sufficiently to cause collapse from the applied external pressure.

Does the Westinghouse code have such a material creep law which does what I've just stated there?

A We've got a large number of calculations now quite confused. This morning we were talking about calculations that were done with the Westinghouse code, and our

calculations that were done with our code, I will call "ours" our code, and Westinghouse's code "their" code.

The calculations you are referring to were the PNL report, were calculations, if you will, of -- hand calculations compared to some hand calculations someone else had done a long time ago; neither of these two calculations relate to the calculations we have talked about earlier. And basically what I have understood to be the line of questioning we are on all morning -- the calculations that Westinghouse has offered in predicting time to collapse and our check calculation -- the calculations that are discussed in that report are not in that vein.

Q Do either of "ours" or "theirs" -- using your term -- include a material creep law which controls the timewise increase, et cetera, et cetera, as I read a moment ago?

A Both of them now do.

Q Is that something which has occurred recently? That is, you say "both now"?

A Since last summer, Westinghouse's approximately sometime in August or September, and "ours" very late in the year, December or maybe early this year.

Q Fine. Thank you.

CHAIRMAN JENSCH: At this time let's recess to reconvene in this room at 2:30.

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(Whereupon, at 1:14 p.m., Thursday, 12 April 1973, the hearing was recessed, to reconvene at 2:30 p.m., this same day at the same place.)

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AFTERNOON SESSION

(2:30 p.m.)

CHAIRMAN JENSCH: Please come to order.

As I understand, Citizens Committee does not have any further interrogation. Is that correct?

MR. ROISMAN: That's correct, Mr. Chairman. And tomorrow I cannot be here as the result of a commitment to a conference which the Applicant is holding in New York, dealing with a related but different subject of power conservation and building code problems and the like.

I understand from Mr. Trosten that his plan this afternoon is to conduct some cross-examination of the Staff witness on fuel densification, to introduce some redirect testimony on the question of thin-wall valves, to examine over the evening the questions on fuel densification based upon the transcript so far, including this morning's transcript on fuel densification, and to submit his direct case on fuel densification tomorrow.

At this time, so long as that direct case is going to consist of the documents that I have already seen, namely, the Westinghouse proprietary and non-proprietary version of the Fuel Densification Report and conceivably an additional proprietary document on Penalty Model for Fuel Densification by Westinghouse and the addendum that was prepared on the question of fuel densification, I have no

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questions for the Applicant.

In any event, what I propose is that on Monday I will advise the Applicant and the Staff and the Board, in whatever way that can be done without violating the requirements against ex parte communications, of what I think now is a 95 percent probability that I have no further cross-examination or if I do, that I do, and try to work out with Applicant and the Staff when the hearing would reconvene for that purpose if necessary.

I also have propounded to the Applicant and to the Staff an informal interrogatory, one to the Applicant and a different one to the Staff, on the question of steam line. And that interrogatory answer -- also about an 85 percent chance it will not warrant any further cross- -- any cross-examination, but I will simply introduce that into evidence along with what I understand will be introduced into evidence, namely the Applicant's report on the steam line question that was distributed Monday, I believe, to all of the parties.

In short, I don't anticipate any cross-examination. I would like to defer until Monday by noon to be definite on that. I would not be prepared to conduct cross-examination on thin walled valves this afternoon, based upon the Applicant's redirect testimony, until I have had a chance to study it anyway.

The Applicant does not now know what more it will

eb3

put in on fuel densification, other than the four report items that I identified so assuming that is--

CHAIRMAN JENSCH: We can run late tonight rather than coming back tomorrow morning for just a few items.

MR. ROISMAN: Well, as I understand it, Mr. Trosten wants a chance, in deciding what information to put in, to review the transcript over the evening.

Also, if that is all that is going to be done, we would be prepared to stipulate that it can go in as though the hearing had been reconvened, and it will be physically accepted when you reconvene on the environmental hearing at the end of April, if that's all that is going to happen. Certainly from our point we would waive any demand that there be a formal hearing session for the receipt of those documents or for the swearing of the witnesses with the understanding that the witnesses who would be sworn would be identified, et cetera.

MR. TROSTEN: Let me say this, Mr. Chairman. We are considering, as Mr. Roisman indicated, the scope of our direct testimony on fuel densification. It will certainly consist of documents. It may also consist, in addition to the documents Mr. Roisman indicated, of some additional, specially prepared direct testimony which could be submitted in written form in lieu of somebody being here tomorrow to state it orally.

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We will be prepared to offer it tomorrow morning and we certainly will be prepared to do that.

I merely want to have the opportunity to scrutinize the transcript and consider the state of the case before putting it all on.

We would be prepared, of course, as of tomorrow, to have any responses to any questions that the Board wished to address to us on the fuel densification question.

As far as the cross-examination of the Staff on fuel densification is concerned, we have a very limited amount of cross-examination, if any. I was going to request a brief recess before we actually proceeded with cross-examination because I have been discussing the matter with Staff Counsel and I anticipate that our cross-examination of the Staff in the fuel densification area will be very brief.

CHAIRMAN JENSCH: Is it your thought you would like to request a recess now for a while?

MR. TROSTEN: Yes. If we could have a 15-minute recess, Mr. Chairman, I think we can get ourselves ready.

CHAIRMAN JENSCH: All right.

At this time let us recess to reconvene in this room at 2:55.

MR. ROISMAN: Mr. Chairman, just one thing.

If it is all right and if what I stated as what I would propose to do is acceptable, I wonder if I could

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be excused at this time?

CHAIRMAN JENSCH: The Board has no objection.

MR. ROISMAN: Thank you.

Will the Chairman accept a phone call to the Licensing Board's secretary some time around noon on Monday, reporting orally, followed up by a letter with regard to these outstanding questions as an acceptable method of communication, just so you will know by Monday noon what it is that the parties desire?

CHAIRMAN JENSCH: Yes.

You will, I take it, reflect in substance a stipulation among the attorneys?

MR. ROISMAN: That is correct. I will speak to both Mr. Trosten and Mr. Karman.

CHAIRMAN JENSCH: That may be done.

At this time let us recess to reconvene in this room at 2:55.

(Recess.)

End pm 1

CHAIRMAN JENSCH: Please come to order.

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MR. TROSTEN: Mr. Chairman, we have no cross-examination of the Regulatory Staff on fuel densification.

MR. KARMAN: There were several open items from this morning's testimony, Mr. Chairman, which Mr. Stello and Mr. Ross indicated they would try to get you information on and they are prepared to furnish it for the record.

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CHAIRMAN JENSCH: Perhaps we had better have that before you proceed with your direct case, Mr. Trosten.

MR. KARMAN: Mr. Ross first.

WITNESS ROSS: This information is with respect to the mean and standard deviation of the pellet density values which I believe Dr. Geyer had asked for.

The data in question to which I will refer were measured on the Point Beach 2 application. The sample size was 1026. Densities were measured for those pellets. The mean density was 91.8. Intervals were set up for classifying density and the interval was .3 percent wide. There were seven intervals that had one or more pellets present.

The smallest density interval having one or more pellets was located at a mean value of 90.95 and a width of .15 percent. There were eight pellets in that interval, thus any one of those eight would have a density ranging between 90.8 and 91.1.

There were no pellets below 90.8.

At the other extreme there was one pellet at a density interval of 93.05 percent plus or minus .15 percent. In between these, the histogram showing frequency of pellets with a density in a given density interval was a shape approximately normal.

The data permitted calculation of a standard

eb7

deviation but as I have said, once you got away from the mean by one or two values of sigma, the probability density function was no longer even approximately normal and indeed, there were no pellets below two sigma.

DR. GEYER: Why is this? Because they're stamped out in a certain way and you get-- This must be sort of a square distribution. It's very clipped off. Apparently the sigma really does not describe this statistical distribution; that is what you're saying.

WITNESS ROSS: Yes, it describes the general shape. By knowing sigma, you can know whether, for example, there was good quality control or poor.

Had sigma been three percent, for example, instead of a half percent, it's an indication of the quality to which the pellets are made.

Within a small range about the mean you would expect approximately normal behavior. I would expect quality control procedures to start rejecting and actually interferring with the probablistic nature of the process once you got very far out. So I think it is the feedback nature of the construction process itself that makes the appearance of pellets at extreme ends of the tail unavailable.

DR. GEYER: Well, that's what I would suggest.

However, I don't think it is worth pursuing further here. You can't judge anything about the

eb8

probabilities away from mean; if the distribution is as unusual as this one seems to be, you cannot go to a standard statistical table using the sigma and make any prediction about what you're apt to find. You use a normal curve.

WITNESS ROSS: From the normal curve I would agree that you could not calculate the probability, say, of having a five-sigma density variation. I think there would be other statistical tests you could us than just the normal curve.

DR. GEYER: You cannot do it for two sigma because if it were anywhere near normal you would expect to find in a thousand at least 50 that were outside of the two-sigma deviation and there were none, you say.

WITNESS ROSS: That's right. And in that instance it is not a true normal distribution; right.

WITNESS STELLO: There were two items left over from the discussion of the table on page 49 of our November 14th, 1972 report which has been introduced into the proceeding. The two areas which we said were subject to check was the value of cladding mid-wall temperature, and I understood the question to be what range should be be in, or what approximate number should we use, and we picked a number of about 635.

And I would indicate that the range between 600 and 635 is the appropriate range to use in this table.

eb9

I was to further check the basis of the data presented or the information presented in this table.

The table was derived on the basis of calculations which I think could be described as a forerunner to the present form of the code BUCKLE. The specific time to collapse numbers were not put in because they were not intended to be an accurate indicator or predictor but, as I described earlier, simply a table to show the relative effects.

The code, the actual physical code BUCKLE, was not used as it presently exists in deriving information in this table.

That concludes the areas which we had indicated we would check over the noon hour.

CHAIRMAN JENSCH: Thank you.

Applicant, will you proceed, please?

MR. KARMAN: Pardon me, Mr. Chairman. Is it possible at this time to have our fuel densification witnesses excused? We are not going to be getting into any more of that today, are we?

CHAIRMAN JENSCH: Does the Applicant have any questions?

MR. TROSTEN: No, sir, we do not.

CHAIRMAN JENSCH: Your witnesses may be excused.

(Witness panel excused.)

MR. TROSTEN: Mr. Chairman, let me inquire on a

eb10

procedural matter.

Is it the Board's desire that any of our fuel densification witnesses for the Applicant be present tomorrow morning and tomorrow for questioning by the Board with regard to our direct evidence, or does the Board desire that we simply put our direct evidence in writing, submit it tomorrow morning, have copies delivered by the quickest route to the Board?

We are perfectly willing to do whichever the Board pleases.

CHAIRMAN JENSCH: The Board has some questions of your witnesses.

MR. TROSTEN: Fine. So therefore, we will plan to convene tomorrow morning and have them available for cross-examination at that time.

CHAIRMAN JENSCH: Yes.

MR. BRIGGS: Excuse me, Mr. Trosten. Did you expect to take the rest of the afternoon on this subject?

MR. TROSTEN: I don't think it will take that long.

MR. BRIGGS: Why don't we ask some of the questions this afternoon then, rather than wait until tomorrow morning?

MR. TROSTEN: Certainly. And then perhaps give us the time to think about-- You mean have them put on the stand now or--

ebll

MR. BRIGGS: Later this afternoon, because it may be that the questions are not those that would take much more time than this afternoon.

MR. TROSTEN: Certainly we can do that.

All right, I would like to proceed to redirect examination of the panel of witnesses on the thin-wall valve question, Mr. Chairman.

CHAIRMAN JENSCH: Proceed.

MR. TROSTEN: By way of introduction, I would like to hand to the Board at this time a package of documents. We will have some extra copies in just a moment.

(Handing documents to the Board.)

I will identify these for the record.

I have just handed to the members of the Board and to the Regulatory Staff a package of five documents. These are sketches of the following valves, and I will identify these sketch by sketch.

The first one is identified as valve V-212.

The second one is identified as valve FCV-261-D.

The third one is valve FCV-455-A.

The fourth is valve 200-A.

And the fifth is valve 200-A.

These sketches were prepared on Applicant's behalf and they represent sketches of four valves that were the subject of the investigation that was described in earlier

eb12

testimony.

I would now like to offer these documents in evidence in this proceeding. We will provide sufficient copies for the record. Copies have previously been shown to Counsel for Citizens Committee for the Protection of the Environment.

MR. KARMAN: No objection, Mr. Chairman.

CHAIRMAN JENSCH: There is not much foundation for it but if the parties stipulate for their receipt, the Board will have no objection. I presume they are true and correct representations of the valves which they purport to depict, and the measurements are on some scale.

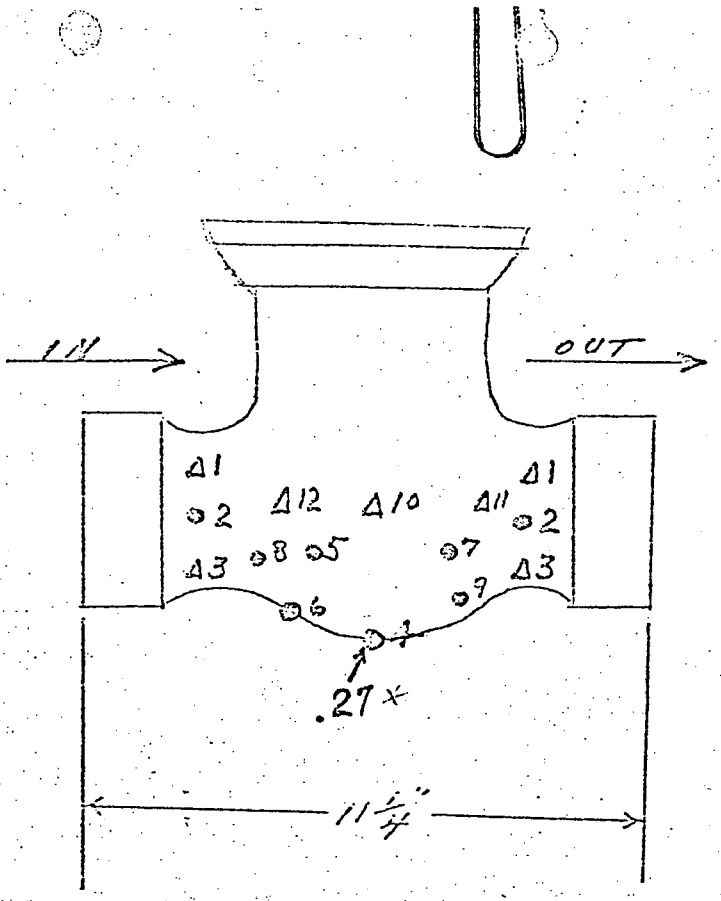
MR. TROSTEN: Yes, sir, they are.

CHAIRMAN JENSCH: Very well, the request of Applicant's Counsel is granted and the five-page document which has been identified by Applicant's Counsel, the first sheet of which has a reference to valve V-212, may be physically incorporated within the transcript as if orally identified by witnesses, and may be received as evidence on behalf of the Applicant.

INSERT 5

MR. TROSTEN: Thank you.

(The documents follow:)



Valve - V-212

Minimum .43"

	IN	OUT
1	.58	.46
2	.60	.53
3	.73	.60
4	.59	
5	.64	
6	.75	
7		.56
8	.65	
9		.59
10	.61	
11		.53
12	.60	
13		
14		

⊙ Location Point
Δ Location Point opposite Side

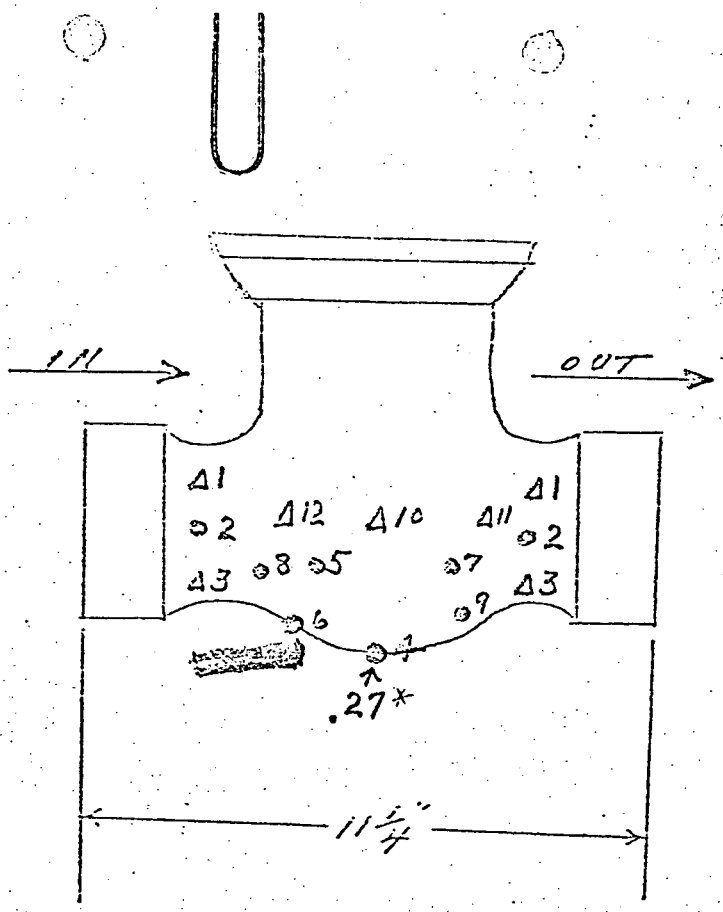
Sperry UM-721

316 Cast SS - .260, .500, .750, 1.020

1.5 MHZ upto 1/2"
5 MHZ over 1/2"

Procedure - MIP-016

* POINT INDICATION DUE TO POROSITY TYPE INCLUSION IN CASTING WS



PCV
Valve-261D

Min.-.437

	IN	OUT
1	.65	.4
2	.84	.6
3	.60	.5
4	.75	
5	.74	
6	.72	
7		.59
.35* → 8	.59	
9		.56
10	.61	
11		.57
12	.57	
13		
14		

⊙ Location Point
Δ Location Point opposite Side

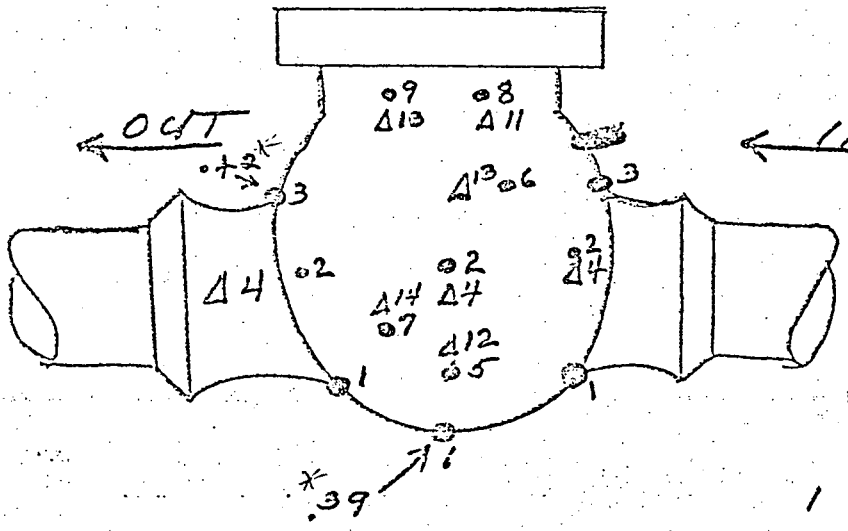
Sperry UM-721

316 Cast SS-.260, .500, .750, 1.020

.5 MHZ upto 1/2"
2.5 MHZ over 1/2"

Procedure — NIP-016

* THESE ARE POINT INDICATIONS DUE TO POROSITY TYPE INCLUSIONS IN CASTING



Minimum .625

	IN		OUT
1	.73	.7	3 *.50
2	.72	.7	0 .68
3	.86		.83
4	.88	.8	3 .8
5		5	
6	.67		
7			.67
8	.70		
9			.72
10			.77
11	.90		
12		.87	
13	.89		
14			.89
15			

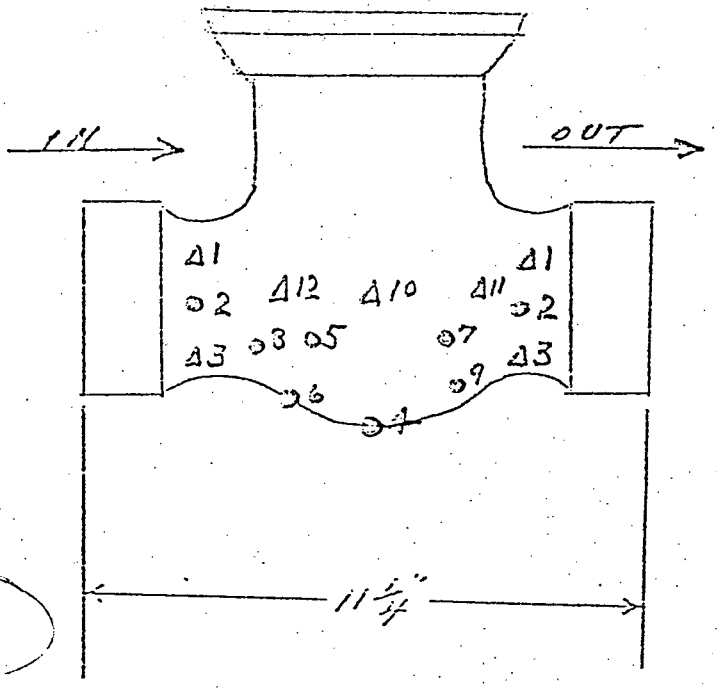
1" area →

Valve-PCV 455A

* THESE ARE POINT INDICATIONS DUE TO POROSITY TYPE INCLUSIONS IN CASTING WS

MEASUREMENTS MADE BY CONAM FOR WEPCO Walt

(ALL 3" & 3" CAST VALVES)



Valve – 200A

○ Location Point
Δ Location Point opposite Side

Sperry UM-721

316 Cast SS – .260, .500, .750, 1.020

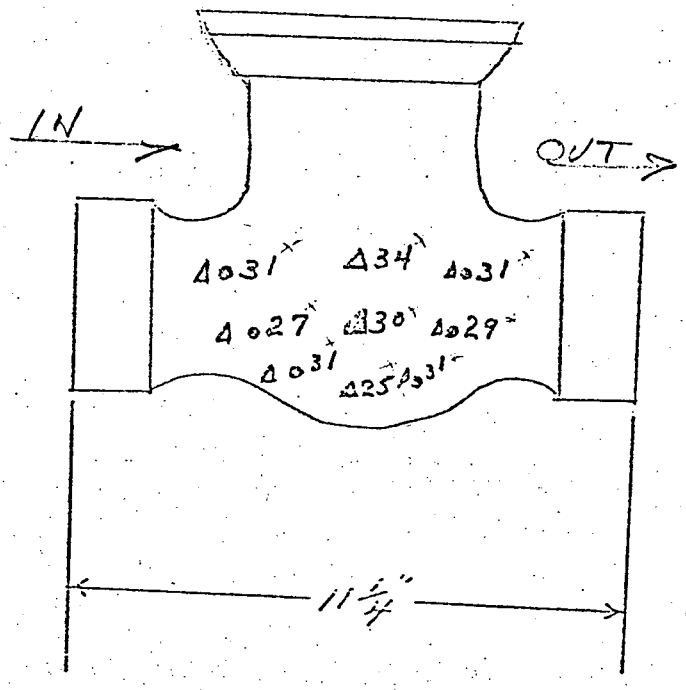
15 MHZ upto 1/2"
5 MHZ over 1/2"

Procedure – MIP – 016

Minimum – .437

	IN	OUT
1	.51	.63
2	.58	.59
3	.53	.57
4	.59	
5	.59	
6	.53	
7		.49
8	.48	
9		.56
10	.80	
11		*.43
12	.53	
13		
14		

* LOW VALUE DUE TO POROSITY TYPE INCLUSION IN CASTING WS



	IN	OUT
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

⊙ Location Point

Δ Location Point opposite side

Valve — 200 A

* THESE LOW VALUES ARE DUE TO POROSITY AND INCLUSIONS IN CASTING U.S

eb13

MR. TROSTEN: Mr. Chairman, I would now like to direct my first question to Mr. White.

We have some scale-up drawings of the four valves. These are reproductions, Mr. Chairman, of the valves that are contained in the package that has just been received in evidence in this proceeding, and I have several questions that I would like to direct to our witnesses with regard to these drawings.

CHAIRMAN JENSCH: Proceed.

End 2

PM3 mml

Whereupon,

JAMES WHITE

WALTER SAWICKY

ROBERT BREMMER

and

KENNETH DELUSE

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

xxxxx

REDIRECT EXAMINATION

BY MR. TROSTEN:

Q Mr. White, did the ultrasonic measurement technique used on the valves which are described in the first column of the Summary of Indian Point Unit Number 2 Verification of Wall Thickness in Valves, that is the document that has previously been introduced in evidence, have a demonstrated maximum error of not more than 2 percent of the wall thickness?

A (Mr. White.) That is correct.

CHAIRMAN JENSCH: May I understand that question? Will you read that again?

You said something, do they have a demonstrated error of more than 2 percent?

MR. TROSTEN: Yes, my question was:

Did the ultrasonic measurement technique used on

mm2

the valves which are described in the first column of the Summary, have a demonstrated maximum error of not more than 2 percent of the wall thickness?

CHAIRMAN JENSCH: What does that mean?

You projected a wall thickness of a certain length and the maximum variance from that was only 2 percent? Is that right, Mr. White?

WITNESS WHITE: That is correct.

MR. BRIGGS: You were talking about the calibration were you not?

WITNESS WHITE: That is the way the instrument, Mr. Briggs, was ~~calculated,~~ calibrated and then the calibration was verified on a sectioned valve where we could make actual mechanical measurements. The sectioned valve body I should say.

BY MR. TROSTEN:

Q Now Mr. White you have before you a set of these five sketches that have been received in evidence. They have been previously identified.

Now did these sketches contain recorded ultrasonic readings showing porosity inclusions in four of the valves which were examined by Con Edison?

A (Mr. White.) That is correct.

CHAIRMAN JENSCH: Excuse me.

Are these all the cast valves?

mm3

WITNESS WHITE: These are all cast valves. They are not all the cast valves. They are all the cast valves which contain porosity.

CHAIRMAN JENSCH: Thank you.

Proceed.

BY MR. TROSTEN:

Q. Mr. White, do these drawings also contain recorded ultrasonic readings in addition to the porosity inclusion readings which can show that the wall thickness in the vicinity of the porosity inclusions meets minimum wall requirements?

A. (Mr. White.) Correct.

MR. BRIGGS: May I interrupt for just a minute to make sure I understand?

MR. TROSTEN: Certainly, Mr. Briggs.

MR. BRIGGS: On the picture that you have here, point four shows a reading of .27 with porosity.

WITNESS WHITE: Yes.

MR. BRIGGS: And then you have on your table on the side, a point four and you show a .59 reading there.

Now, that represents the same area, does it?

WITNESS WHITE: Can I describe the technique?

MR. BRIGGS: Yes.

MR. TROSTEN: We were about to, Mr. Briggs, in anticipation of the questions of the Board, we were about to

mm4

take these drawings and go through them and address that particular question.

MR. BRIGGS: Fine.

BY MR. TROSTEN:

Q. The specific question that I was going to ask, Mr. White, is this:

Taking each drawing in order, would you please describe the measuring technique that was used after a porosity inclusion was found and point out each porosity inclusion?

And then I would like you to point out the nearest recorded minimum valve wall.

A. (Mr. White.) The procedure required a check of minimum wall thickness in this lower portion of the valve bowl. In the process of making that measurement a point of porosity, or I should say first a reading less than a minimum required wall was found.

What was done after that reading was found, the transducer was moved circumferentially, or haphazardly I should say, about that point, to assure maximum coverage of that general area.

Now as the transducer would move off that point there would be an increase from .27 reading to up to about .437 or thicker, and that told us that this was the local point of porosity. We continued to move around that point until we had achieved what was the minimum wall thickness.

mm5

And that is the recording that you see over here. (Indicating.)

MR. BRIGGS: Excuse me just a minute.

In that table, what is the meaning of "in" and "out?"

WITNESS WHITE: Inlet of the valve and outlet of the valve.

MR. BRIGGS: I see.

WITNESS WHITE: One, two, three is duplicated in the inlet and in the outlet.

MR. BRIGGS: And on that particular valve, why were there no readings in the neck of the valve?

WITNESS WHITE: The ~~heat~~ neck of this valve, Mr. Briggs, is extremely thick. This is a pictorial presentation, but if my recollection is right, Mr. Deluse, it is in the area of 2 1/2 inches thick up here and the readings up here were really not of significance.

We moved down lower where we could get in a thinner section of the valve. And if you look at 10, 11 and 12, that is down where we were working in the nominal wall thickness. It is quite thick up here.

(Indicating.)

This is valve PCV-261-D. On this valve there were two indications of porosity. One at this location.

(Indicating.)

mm6

The porosity reading is again .27, and at the lowest reading, minimum wall reading in that general area was .75.

There was another indication of porosity at location 8, and it is noted down here on the table, the inlet side of the valve, it is location 8 where we had a porosity reading of .35 and a minimum wall closely adjacent of .69.

Valve PCV-455-A, again at location one at the bottom of the bowl, there was a porosity indication where we had readings of .39. That indication for the wall thickness in that area is shown at the center of the table, that is .37. It is not at the inlet, it is not at the outlet, it is close to the center.

BY MR. TROSTEN:

Q You said .37, Mr. White.

A (Mr. White.) Excuse me, it is .73.

DR.GEYER: What is the size of the valve?

WITNESS WHITE: The valve is approximately 12 inches in length. These pictures are about twice size.

The pipes size?

DR. GEYER: Yes.

WITNESS WHITE: It is a 3-inch valve.

This was an area of porosity point 3 ~~3~~ at the outlet portion of the valve was an area of porosity where we measured .42. point .3 at the outlet, the recorded reading in the

mm7

adjacent area was .83.

There was a third point of porosity. That was at station 1 on the outlet side. That is this point right here where we have not recorded an adjacent reading.

The testing of this valve, however, was witnessed and the witness is here. The same techniques that we used in all of these areas.

Valve 200-A, there were several points of porosity on this particular valve and what I will do is run through them and associate a local adjacent reading with the particular point of porosity.

MR. TROSTEN: I would like to point out to the Board that the chart before Mr. White here is intended to be representative of two of the sketches in the possession of the Board, the last two sketches.

WITNESS WHITE: I might say just a few more words about this chart.

This valve is a different casting design from the others where the design is thinner up here so readings were taken up in the neck area.

I turned back for the record pointing out these points up here. This was valve PCV-455-A.

MR. BRIGGS: This figure is representative of two valves, 200-A, is that right?

WITNESS WHITE: No, sir, one valve, 200-A.

mm8

There are two figures up there, and because there was so much data we chose to -- you have two sketches there.

MR. BRIGGS: You are going to talk about the second sketch as well as the first?

WITNESS WHITE: Yes, both sketches.

Point one -- let me say this first of all:

The areas of porosity are identified and I hope the Board can see them in the orange notations on the face of the valve.

Point one, which is on the back of the valve, is associated with a porosity reading of .31. The measured wall thickness at point one, at the inlet part of the valve is .51. These two are associated.

There is a porosity reading of .27 that is on the back of the valve and it is associated with point three which is on the back of the valve. The reading at point three at the inlet side is .53.

There is a porosity reading close to the very bottom of the bowl section which is .31 and it is associated with another point close to the bottom of the bowl where the actual wall thickness is .53.

There is a porosity reading of .25 and that is associated with a wall thickness measurement at the bottom of the valve of .59.

There is a porosity reading on the back

mm9

of the valve where the porosity indication is .39 and there is an associated -- excuse me, that is .34 -- and there is an associated thickness reading which appears on the center line of .80.

Now there are certain other points on the valve. For instance, there .3 reading, a .29 reading, a .31 reading. And this .31 reading which we show no actual -- we would not say we would associate them with other points, but these readings were again witnessed and the search technique where we moved off this point to verify that there was local wall thickness was witnessed by our people.

BY MR. TROSTEN:

Q I would like to address my next question to Mr. Sawicky.

MR. BRIGGS: Excuse me just a minute.

Is this the valve, or is this not the valve that finally was unresolved until you went to the manufacturer and looked at the radiographs?

WITNESS WHITE: That is correct.

MR. BRIGGS: This is the valve where you inspected the radiographs to decide what to do with it?

WITNESS WHITE: Yes, sir.

end 3pm

DR. GEYER: All these indications appear to be at about halfway through the thickness; is there any significance to that?

WITNESS WHITE: Not that I know of.

DR. GEYER: It did not cool at some different rate or something happened?

WITNESS WHITE: Mr. Deluse, do you want to comment on that?

WITNESS BREMMER: This is an unusually porous valve. There is no question about it. The porosity does appear to be in the center of the wall thickness, which we would expect; however, the interpretation of the radiographs indicated that even though there is a large quantity as compared to inlet as compared to other valves we looked at, they were all within the acceptance criteria of the radiography.

DR. GEYER: I understood that.

MR. BRIGGS: What were the acceptance criteria on the radiography, do you recall?

WITNESS BREMMER: It's an ASTM specification. Recollecting now, I think it is E-71, Severity Level-2.

MR. BRIGGS: And what size porosity does this permit of a valve with the wall thickness that you have there?

WITNESS BRENNER: The standard is a series of

JRB2

radiographs which depict the porosity, not giving sizes to a given indication, but a pattern showing a frequency and combination of size within a given area on a radiograph, so that the comparison is a visual comparison between a standard radiograph and the actual.

MR. BRIGGS: Well, do you recall what size porosity you had in this particular valve?

WITNESS BREMMER: No, sir.

CHAIRMAN JENSCH: Will you proceed, please?

BY MR. TROSTEN:

Q Mr. Sawicky, were you present during the ultrasonic examination of these four valves?

A (Mr. Sawicky.) Yes.

Q Did you actually observe that the wall thickness near each porosity indication on the four valves we have described was ultrasonically examined to assure that such indication did not actually represent a thin wall?

A Yes.

MR. TROSTEN: I have no further redirect examination, Mr. Chairman.

MR. KARMAN: No questions, Mr. Chairman.

CHAIRMAN JENSCH: Very well. Your witnesses may be excused.

(Witness panel excused.)

MR. TROSTEN: Mr. Chairman, if you will give us

jrb 3

a moment, we can go on to the fuel densification.

CHAIRMAN JENSCH: Proceed.

Do you want to take a recess?

MR. TROSTEN: Yes. May we have a ten-minute recess, Mr. Chairman?

CHAIRMAN JENSCH: At this time let's recess to reconvene in this room at 3:40.

PM4 (Recess.)

PM5 CHAIRMAN JENSCH: Please come to order.

Applicant, are you ready to proceed?

MR. TROSTEN: Yes, Mr. Chairman.

We are about to distribute to the Board and to Counsel for Regulatory Staff, the Professional Qualifications of Applicant's Witnesses who will sponsor the direct testimony.

The names of the three gentlemen are, being from left to right, Mr. George G. Uram, U-R-A-M; Mr. John B. Roll; and Mr. Lowell H. Bowman, all of Westinghouse Electric Corporation.

(Documents handed to the Board.)

For the record, Mr. Roll has been previously sworn; Messrs. Uram and Bowman have not; and I would now like to ask that the latter two gentlemen be sworn by the Board.

Will those gentlemen stand?

(Messrs. Uram and Bowman standing.)

Whereupon,

GEORGE G. URAM,

and

LOWELL H. BOWMAN

took the stand as witnesses on behalf of Applicant and, having been first duly sworn, were examined and testified as follows; and

JOHN B. ROLL

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

DIRECT EXAMINATION

BY MR. TROSTEN:

Q Mr. Uram, Dr. Roll, and Mr. Bowman, I show you copies of documents entitled Professional Qualifications for each of you, and I ask you whether these documents are true and correct statements of your professional qualifications?

(Handing document to witness panel.)

A (Chorus of "yes".)

Q Do you desire that these statements of your professional qualifications be received in evidence as your testimony in this proceeding?

A (Chorus of "yes".)

MR. TROSTEN: Mr. Chairman, I now ask that the statement of professional qualifications of Mr. Uram,

Dr. Roll, and Mr. Bowman, be received in evidence on behalf of the Applicant, and incorporated into the transcript as if read.

CHAIRMAN JENSCH: Is there any objection?

MR. KARMAN: No objection, Mr. Chairman.

CHAIRMAN JENSCH: The request of Applicant's counsel is granted, and the statements of professional qualifications of the identified witnesses may be physically incorporated within the transcript as if orally given, and shall constitute evidence on behalf of the Applicant.

(THE FULL TEXT OF THE STATEMENTS OF PROFESSIONAL QUALIFICATIONS OF MESSRS. URAM, ROLL, AND BOWMAN, FOLLOW:)

PROFESSIONAL QUALIFICATIONS

LOWELL H. BOMAN
NUCLEAR FUEL DIVISION
WESTINGHOUSE ELECTRIC CORPORATION

My name is Lowell H. Boman. My business address is Westinghouse Electric Corporation, P. O. Box 355, Pittsburgh, Pennsylvania, 15230. I am Nuclear Engineering Branch II Manager, Engineering Department, in the Nuclear Fuel Division, Westinghouse Nuclear Energy Systems, Westinghouse Power Systems Company, and I have served in this capacity since August 1972. In this capacity, I am responsible for the nuclear engineering evaluation of certain Westinghouse reactors including Indian Point Unit 2. This responsibility includes that for the evaluation of the effects of fuel densification. In my previous position as Manager of Thermal Hydraulic Design, in the Pressurized Water Reactor Systems Division, I was responsible for the thermal design of Westinghouse pressurized water reactors.

I was graduated from Kansas State University in 1954 with a Bachelor of Science degree in Mechanical Engineering. I received a Master of Science degree in Mechanical Engineering and a Masters degree in Applied Mathematics from the University of Pittsburgh in 1959. From 1959 to 1961 I took postgraduate courses in Mechanical Engineering and instructed at Carnegie Institute of Technology.

From June 1954 to August 1960, I was a thermal design engineer on the Shippingport pressurized water reactor at the Westinghouse Bettis Atomic Power Laboratory in Pittsburgh, Pennsylvania.

From December 1961 to April 1971, I was employed at the Westinghouse Astronuclear Laboratory in Pittsburgh, Pennsylvania. As a Fellow Engineer, I was responsible for fuel element and other areas of thermal design on the NERVA reactor project. I participated in the conduct of reactor tests at the Nevada Test Site, design and

testing of fuel elements, and in the thermal, heat transfer, fluid flow, and corrosion analysis and design of the reactor. For the later years of this period, I was Supervisor of Core Thermal Design. Design efforts included analysis, development of analytical methods, component tests, reactor test monitoring, and evaluation of component and reactor test results for application to design improvement and to methods of improvement.

In April 1971, I was employed in the Westinghouse Pressurized Water Reactor Systems Division of Westinghouse Nuclear Energy Systems, Pittsburgh, Pennsylvania. I was Manager of Thermal and Hydraulic Design in Core Engineering until August 1972 when I was appointed to my present position. As Thermal and Hydraulic Design Manager, I was responsible for all aspects of the thermal design of the reactor internals and core. In my present position, I am responsible for thermal/hydraulic and nuclear design of pressurized water reactor cores.

4/6/73

PROFESSIONAL QUALIFICATIONS

GEORGE G. URAM
PRESSURIZED WATER REACTOR SYSTEMS DIVISION
WESTINGHOUSE ELECTRIC CORPORATION

My name is George G. Uram. My business address is Westinghouse Electric Corporation, P. O. Box 355, Pittsburgh, Pennsylvania, 15230. I am a Senior Engineer in the Accident Analysis Section of the Pressurized Water Reactor Systems Division (PWRSD), Westinghouse Nuclear Energy Systems, Westinghouse Power Systems Corporation, and I have served in this capacity since September 1972. I am responsible for performing analyses of the consequences of postulated accidents for the Pressurized Water Reactor Systems Division, and I am responsible for directing and coordinating the analyses related to fuel densification including those for the Indian Point Unit Number 2 Nuclear Power Station.

I was graduated from Carnegie-Mellon University in 1968 with a Bachelor of Science degree in Mechanical Engineering and received a Master of Science degree in Mechanical Engineering from Carnegie-Mellon University in 1970. I have taken additional graduate courses in the Nuclear Engineering Department of Carnegie-Mellon University.

I joined the Nuclear Energy Systems in 1968. My initial tasks included the design of reactor control and protection systems and the analysis of reactor plant operational transients and accidents. From 1971 to 1972, I was responsible for the control and protection system design of approximately twelve Westinghouse four-loop pressurized water reactors.

4/6/73

wbl

PROFESSIONAL QUALIFICATIONS

JOHN B. ROLL

NUCLEAR FUEL DIVISION

WESTINGHOUSE ELECTRIC CORPORATION

My name is John B. Roll. My business address is Westinghouse Electric Corporation, P.O. Box 355, Pittsburgh, Pennsylvania, 15230. I am Assistant to the Engineering Manager, Nuclear Fuel Division, Westinghouse Electric Corporation. My responsibilities include studies in the general area of fuel performance and, in particular, coordination of the efforts associated with evaluation of fuel performance during a postulated LOCA. Immediately prior to this current assignment I was Manager of Performance Analysis in the Nuclear Fuel Division, Westinghouse Power Systems Company, and I held this former position for three and one-half years. The responsibilities of this group included the review and evaluation of data from fuel test programs, use of this data to prepare and verify fuel performance models, and application of these models to the design and safety and performance analysis of the nuclear fuel assembly in Westinghouse pressurized water reactors.

I was graduated from the University of Detroit in 1958 with a Bachelor of Chemical Engineering degree. I received a Doctor of Philosophy degree in Chemical Engineering from Purdue University in 1962.

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I have been employed by Westinghouse Electric Corporation since 1964. Between 1964 and 1969 I was engaged in various development activities associated with fuel and materials for pressurized water reactors, advanced water cooled reactors, and sodium cooled fast breeder reactors. For the latter one and one-half years of this period I served as Manager, Plutonium Recycle Projects, and in that capacity provided the technical direction for the Nuclear Fuel Division programs to develop plutonium recycle fuel for light-water-cooled nuclear power reactors.

Prior to my joining Westinghouse Electric Corporation, I had experience with United States Atomic Energy Commission (USAEC), with Atomic Power Development Associates, and with Argonne National Laboratory. I was first employed by the Atomic Energy Commission as a chemical engineer and, later, as Chief, Engineering Evaluation Section, Army reactors, Division of Reactor Development. In this latter capacity I directed the activities of five senior technical personnel in the review, evaluation and approval of systems, components, specification, and analyses for both the operational and development plants under the Army Nuclear Power Program. While with Atomic Power Development Associates I was engaged in design and development of the fuel for the Enrico Fermi Fast Breeder Reactor. At Argonne National Laboratory I was involved in various aspects of the Chemical

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Engineering Division research and development program.

I am a member of the American Nuclear Society and am a registered professional engineer in Pennsylvania.

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CHAIRMAN JENSCH: Will you proceed?

MR. TROSTEN: Mr. Chairman, although this is a little bit unusual, we would like to defer the offer of our direct testimony until tomorrow morning, so that we can get it all in the transcript in one place. The Board has copies of the Fuel Densification Report; the proprietary and nonproprietary version has previously been served; our witnesses are here to be questioned and available to be questioned by the Board at this time in accordance with Mr. Briggs suggestion.

MR. BRIGGS: I would like to look at the fuel densification report of January 1973, and ask a few questions about some of the information that is in the report. Some of these questions may be related to fuel densification; other questions concerning some changes in the nuclear design data, and what was the reason for those changes. In other words, how did they come about?

In Table 3.4 -- Table 3.3 -- let's start out with that one -- under Structural Characteristics, No. 8 shows the water-to-uranium ratio as being 4.16 at the present time.

I copied some numbers out of the FSAR -- you can accept those numbers, I guess, as being accurate, or you can look at the FSAR; it may be that the numbers don't change enough so that you should be concerned. But in the FSAR I believe the water-to-uranium ratio was 4.01.

Were the changes that were made in the core, the recent changes in the cor, those that resulted in this change in water-to-uranium ratio?

WITNESS BOWMAN: The difference was a change in the design, in the Region 2 and Region 3 fuel rods were replaced with fuel rods of higher density uranium; and, in addition, there were other slight changes in the design that I think would account for this difference.

MR. BRIGGS: Item 13, Fuel Burn-up, you now show 16,700 megawatt days per ton; and I believe the FSAR showed 14,200 megawatt days per ton. What was the reason for that change?

WITNESS BOWMAN: Again this was a design change in Region 2 and Region 3. The density was higher in those two regions; and, in addition, the enrichment in each of those regions in the new fuel rods was .1 of 1 percent higher, and these two changes plus the addition of more burnable poison rods in the core result in a longer ~~burst~~ first cycle life and higher burn-up.

MR. BRIGGS: That's a first-cycle burn-up that you're talking about, the 16,000 megawatt days per ton?

WITNESS BOWMAN: Yes.

MR. BRIGGS: In Table 3.4 you have reactivity requirements for control rods. What is your definition for power defect?

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WITNESS URAM: The power defect is defined there as the reactivity insertion necessary to cover the cold to hot temperature swing including moderator effects and fuel temperature, Doppler feedback effects.

MR. BRIGGS: That's going from zero power to full power hot, or going from cold, zero power to hot full power?

WITNESS URAM: Hot zero power to hot full power.

MR. BRIGGS: Should the changes in the loading that you made have much of an effect on the power, the value for the power defect?

Let me indicate what numbers I have here.

You show for beginning of life 1.54 in this table, and in the FSAR, I believe it showed 1.90; and for the end of life, it shows here in this table, 2.10; and I believe it showed in the FSAR 3.05.

Is this the result of the change in loading, or is it a result of some other circumstance?

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MR. URAM: The numbers are different because we have changed the core design slightly. In other words, we have changed the amount of uranium in the core. We have also changed the burnable ~~vertical~~ poison rod configuration and the number of burnable ~~vertical~~ poison rods.

And since the time the FSAR calculations were done we have changed the nuclear design methods based upon operating data from operating plants.

Now additionally in my recollection the FSAR numbers are first-cycle EOL and third-cycle or equilibrium-cycle EOL.

MR. BRIGGS: So that these-- Did you want to say something more?

MR. URAM: These numbers are first-cycle numbers as I recall.

MR. BRIGGS: So that some of the differences may result from changes in the core design, as you pointed out, and others from changes in the methods of calculation?

MR. URAM: Yes, that's correct.

MR. BRIGGS: I would like to look at Figure 4.2. Could you explain the meaning of these points, these x's that you have on here, and how they are related to the operation of the reactor?

MR. BOWMAN: I would like to first refer to the revised figure that was submitted as an addendum to the fuel

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densification report which is also in testimony.

MR. BRIGGS: Will you explain the difference between the original and the one in the addendum as you go along?

MR. BOWMAN: Yes.

MR. BRIGGS: Fine.

MR. BOWMAN: This figure gives the total peaking factor and it is versus the axial offset. The axial offset is a normalized measure of the difference between the power generated in the top half of the core and the power generated in the bottom half of the core.

This is used in a non-normalized form as a flux difference in the control of the reactor and an indication to the operator.

What we see on this figure are the upper-limit calculated points. We have calculated these points by considering the design of the core and considering the operational restrictions on the core; in other words, the technical specifications. To the nuclear designer, why one of these items is just as important as the other.

For example, in this calculation that you see, why we took into account the maximum position the control rods could be inserted into the core. The D-bank is 30 percent as in the tech specs, and the maximum amount the part-length rods can be inserted is 70 percent. And this

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was generated as a function of axial offset.

And from this figure you see that the axial offset that we require is plus ten percent or minus fifteen percent.

The previous tech specs had larger insertion limits on ~~band~~ bank D. It was 40 percent, and the part-length rods could be inserted into the core 100 percent.

Therefore, I might point out that with those operational restrictions, why this figure would be different in that the points would all be higher, all of the calculated points.

We then looked at all of the methods of operation within these tech spec limits that the operator could perform; not really maneuvers that an operator would perform but anything that he can do without violating the tech specs. This includes items such as inserting D-bank into the core and operating for a year, a full cycle, with the D-bank in that position, and then suddenly withdrawing it and inserting the part-length rods to their 70-percent insertion limit, and then allowing a xenon transient and not taking any steps to control this except those steps necessary to stay within the technical specifications.

In other words, we consider that the operator is not going to operate this plant in the normal manner, or even a reasonable manner. He does anything possible within the technical specifications.

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On that basis we performed these calculations.

What you see here is the upper envelope of these calculations. In truth, we looked-- To develop this curve we looked at 398 different power histories with rod motion and power escalations from 100 percent to 50 percent to 100 percent, and we plotted a point or we calculated a point every hour during these maneuvers. In all for these 398 histories it was 5400 points.

You do not see all of these points on the curve. We did an automatic printout of them, but here we have just shown the top points and the nuclear designer considers that this is the absolute upper limit that can ever be obtained in that core for a peaking factor unless the technical specifications are violated or there is some other type of an accident that would be a violation of the technical specifications such as a rod misalignment, a rod withdrawal, and in all cases these are indicated to the operator and there is appropriate action taken according to the technical specifications.

The difference between the two curves is that the original curve was calculated not considering as many power histories and specifically not considering wha t I consider to be the most unrealistic of these maneuvers and that is the maneuver where you deplete your core with the D-bank at the insertion limit.

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In truth there is an alarm before you reach the insertion limit on D-bank. If that maneuver from that condition were left off this curve and in addition just the number of runs, that is, the number of maneuvers-- The original curve does not have the same number of maneuvers but since this work was done we-- This was actually done before the Point Beach submittal, and we have had-- This type of descriptions has been discussed and was submitted to the Staff for review. And they have agreed that the method used in the Point Beach analysis for Point Beach 2 was an adequate method.

Therefore, we have recalculated the figure based on that method.

You can see that the 2.7 factor did not change in the recalculation of the figure. The original figure by the nuclear designer who did this work put some additional margin in the figure. The additional margin that he put in was based on experience from looking at similar calculations that we have performed in Topical Reports, and he felt that this was a reasonable amount of uncertainty to put on his calculation.

As I said, since that time we have a much more precise and complete method of performing this calculation.

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I might also point out that the calculation that we do before we plot the point we have added on to the point a 5 percent nuclear uncertainty which has been determined on the basis of operating experience and there is a topical report describing that.

In addition, in the startup tests on the reactors when measurements are taken of the peaking factors and of the power distributions with the rods in different positions and compared to our predictions in these conditions.

MR. BRIGGS: When the operator sees that the axial offset in the instruments he has is, oh let's say, minus 15 or minus 20, it was pointed out by the Staff that this does not necessarily mean that the peaking factor is greater than 2.7, is that right?

WITNESS BOWMAN: That is certainly correct, that when the operator is outside of these axial offset ranges, why the peaking factor is not necessarily nor not realistically any of the points you see on here.

In truth, all of our experience in operating reactors has not observed a peaking factor, nor measured a peaking factor in excess of 2.4 at 100 percent operating power.

MR. BRIGGS: Well what can the operator do to find out what the peaking factor actually is if he sees that he has this larger than permitted axial offset?

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WITNESS BOWMAN: The operator if he wanted -- any time the operator wants to specifically know what the peaking factor is, rather than know what an upper-limit bound on the peaking factor is, it is necessary for the operator to measure, take a flux map of the core with the neutron detectors.

That is not necessarily what the operator would do in that situation, but that is the only method, direct method that he has of learning what the peaking factor is.

MR. BRIGGS: So if he found that he were at minus 20 in terms of axial offset, then in order to know what the peaking factor actually was, he would have to make a flux map of the core and have to have the computer do some calculations to tell him what the peaking factor was, is that the idea?

WITNESS BOWMAN: Yes, he would need to take a flux map and he would need to reduce the data from that flux map to determine what the peaking factor was.

MR. BRIGGS: How much effort is involved in taking a flux map?

Is this ssomething that the operator can do from the control room conveniently, or does it require rather special effort on the part of the technical staff?

WITNESS BOWMAN: We are not familiar in detail

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with taking the flux map as to how long it would take.

In my opinion, trying to do a complete map of the entire core would take in the order of a few hours, perhaps. But I really don't know the answer to that question.

MR. BRIGGS: Well now in the case of the original figure for point two, you indicated that certain conditions were considered at the points for well below a peaking factor of 2.7 until one gets out to -- oh, say minus 30, maybe minus 25.

In the newer figure, the points bend gracefully around the 2.7 in the range of minus 15, and then nudge the line pretty closely in this range.

Is there any uncertainty that this is the upper range of peaking factors that one could get, or is it possible that if you calculated a few more cases you would have found, for instance, an axial offset of minus 15, that you would get a point at about, oh, 2.9 or 2.8 rather than 2.7?

WITNESS BOWMAN: No.

I would like to point out that we do have a 5 percent uncertainty in the nuclear calculations and that over the period of several years we have developed a method for calculating the limiting case.

I think that it is not realistically possible that in any operating reactor, even the points we have

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calculated would be reached. However, in the abstract and considering that we would continue to develop and look for bad points as we have done for a considerable period of time, why it is certainly not impossible that we would be able to find a situation where the operator could operate the reactor in such a manner as to get to a point slightly above this curve.

MR. BRIGGS: How much hardship would it work on the reactor operator if one said, well, let's don't operate with a peaking factor of 2.7. Let's make it 2.5 or 2.4? Would this seriously affect his operation? I should not say seriously affect it, but would it have any significant effect on the operation of the reactor?

WITNESS BOWMAN: I think it is difficult for me to define the hardship that it would put on the reactor operator.

It would certainly take many additional restrictions and with a limit of that type while you are approaching the point where, even with these restrictions, it would be very difficult to design the core.

What we would do in that situation, we can for example, in the nuclear engineering, we can perform the calculations where you don't move, don't allow any rods in the core and these types of restrictions, as I said, I don't know how much hardship that would cause to the operator.

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But with that lower number you are approaching the limit that this reactor could operate at.

MR. BRIGGS: I believe that you said that you don't know of any cases where a reactor was operated with a peaking factor above 2.4.

Am I misquoting what you said?

WITNESS BOWMAN: No, that is true.

Any measurements we have in reactors have not indicated that we have operated above the 2.4.

I would like to point out that in this evaluation you see we do have the small flux spikes included due to the fuel separation.

MR. BRIGGS: And those flux spikes were not included in measurements that you might have made in the past, or you don't know whether they were included?

WITNESS BOWMAN: The measurements that I was discussing where we reported 2.4 did not include any flux spike measurements.

MR. BRIGGS: These measurements that you mentioned, are they taken from logs of reactor operation, or were they core flux distributions that you made?

What I am trying to get at here is, did your measurements extend over 10 percent of the operating life of a reactor, and maybe during the other 90 percent of the life have occasionally the peaking factor went above 2.4, or

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is there reason to believe that as has been said by others, that the reactors just don't operate under any circumstances that we know about at peaking factors above 2.4?

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WITNESS BOWMAN: The measurements which I am referring to are flux maps that were taken, and they were taken over the entire lifetime of the cycle.

In addition, we also do periodic calibrations where we take complete flux maps, then relate the measured axial or the measured power difference in the core, in the top half and the bottom half of the core, and relate that directly to the neutron detector output, that is the ex-core detector. It gives the flux difference reading that the operator depends on to know what his flux difference is, and thereby to know he's within the tech specs and meeting the peaking factors for the plant.

MR. BRIGGS: Are you acquainted with the curve that the Staff showed of, let's see, fraction of time above a given peaking factor versus the peaking factor that was shown yesterday?

MR. TROSTEN: Just a minute, Mr. Briggs, if you please?

(Pause.)

MR. TROSTEN: Are you referring to Chapter 2 of the Supplemental ECCS testimony by the Staff?

MR. BRIGGS: No. I am referring to -- yes, yes. I'm sorry; that's right.

MR. KARMAN: What supplemental testimony are you talking about, the additional testimony for Indian Point #2?

MR. TROSTEN: This is the supplemental ECCS testimony.

MR. KARMAN: I see.

WITNESS BOWMAN: I heard the discussion on that figure in their testimony, and I see the figure here.

MR. BRIGGS: Has Westinghouse made any figures like that, that you know about?

WITNESS BOWMAN: No. We have not made any figures of this type to my knowledge.

I might comment that it was my understanding from the testimony that this was made on the basis of data from a Westinghouse WCAP which I am familiar with, and in my opinion, the development of any figure like that that extends beyond the data points is not realistic.

MR. BRIGGS: You mean extends out to 2.7 or 2.9 or 3?

WITNESS BOWMAN: It's comparable to the previous discussion you had on the distribution of pellet density measurements in that this was developed, I believe, from looking at the many, many measurements we have of flux distributions, or a curve of this type could be developed by looking and noting that five percent of them are above a certain peaking factor; and then saying that must be the two-sigma limit; and I will draw a curve that has a three-sigma, four-sigma, five-sigma, when in truth five percent of the points

may be above the specific number. For example, 2.3. And none of the points would be above 2.35. And I do not believe that a statistical curve can be developed on that basis, knowing what I do of the operation of the reactor, and the way it does operate.

MR. BRIGGS: From what you have said, then, if the plant is operated within the tech specs, you would expect it to be highly unlikely that the peaking factor would go above 2.4, except in quite unusual circumstances, and that there would be no likelihood that it would go above 2.7; is that the idea?

Or maybe you would like to put your own numbers in, rather than the numbers that I have used.

WITNESS BOWMAN: In the operation of the plant I would not expect the peaking factor to exceed approximately 2.4; however, as I said, if I subtract five percent uncertainty from these points, plus the flux spike assuming for the moment that our flux spike model is absolutely true, why, if I subtract the uncertainty, these are calculated points, that it would be possible for the operator -- I could give him the pattern that he would have to follow, and he would stay within the tech specs and generate one of these points.

MR. BRIGGS: But this would require rather special operation on his part, is that right, like leaving a particular bank of rods in for the full cycle, or some such thing as

that?

WITNESS BOWMAN: It would require some special operation on his part, and it would require a lack of action on his part, in addition, that he would make a special maneuver and then, when he saw his axial offset moving to the side, he would not move the rods and stop that. It would require more lack of what I would consider to be intelligent operation of the reactor on his part.

MR. BRIGGS: And your calculations will be checked by physics tests during the start-up of the reactor?

WITNESS BOWMAN: During the start-up tests we have start-up test requirements which we must meet, with complete core maps, we must meet for F-delta-H requirements, which for this plant is a 1.65. And, in addition, the FQ cannot exceed the design value. We will verify that. And there are calibrations tests of the in-core ex-core detector that we perform comparisons of the power distributions to what we calculate for those power distributions.

We have done this on all of our reactors during the start-up, and have a large amount of these comparisons. And, in addition, of course, we have the start-up requirements that we must meet before the reactor can operate at high power.

MR. BRIGGS: Thank you.

I don't have any further questions.

MR. GEYER: In operations do they ever lock out certain combinations that would be undesirable?

The operator has certain things he's allowed to do, is anything done to prevent him from doing things he is now allowed to do?

WITNESS URAM: The things that the operator has which tell him or allow him to meet these requirements are three areas: first of all they have administrative controls via the tech specs, and he has operating instructions which go beyond the tech specs. There are a set of alarm functions which tell him if he is approaching a safety limit. And there are, of course, for example the control banks are physically wired to set the sequence of which rods are inserted. And that cannot be changed during the plant life.

Now, to go back to the administrative controls, he has controls which tell him how far he's allowed to insert the rods. He has control -- administrative controls -- full-length control rods I was referring to previously. He has controls which tell him how far to insert the --

DR. GEYER: Would you get a little closer to the mike?

WITNESS URAM: He has controls which tell him how deep he's allowed to insert part length rod banks, and he has controls which tell him --

DR. GEYER: How are you using the word "controls"?

Is there something up on the board that flashes, lights; or is something written in the book somewhere?

WITNESS URAM: Maybe a better term would be "administrative" requirements in the technical specifications.

Now, in addition to that there's a set of alarm functions, specifically rod insertion limit alarms which go off if the operator were to attempt to insert the full length control rod banks deeper than allowed. As a matter of fact there are two set points, one above the actual limit; and there's a second set point at the actual limit.

And, as I spoke of before, the sequences with which the control banks may be inserted are hard-wired physically prior to criticality, and they are changed throughout the core life; so he has those types of things available to him.

DR. GEYER: Thank you.

CHAIRMAN JENSCH: I think the last question was, so he cannot change it; and you said Yes?

You meant it is correct, he cannot change it? Is that the sense of your answer?

WITNESS URAM: If we are speaking about the bank, control rod bank sequences, yes, that is correct; he cannot change that.

CHAIRMAN JENSCH: Thank you.

That concludes the interrogation by the Board on fuel densification.

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Do you want to make a further presentation this evening?

MR. TROSTEN: Yes.

Mr. Chairman, I have one further matter to take up at this time, and I will have to recall Mr. Cahill to the witness stand in order to take care of this.

I would like to excuse the fuel densification panel.

CHAIRMAN JENSCH: Would you like to take a few minutes' recess?

MR. TROSTEN: Yes, Mr. Chairman.

CHAIRMAN JENSCH: At this point let us recess to reconvene in this room at 4:45.

(Recess.)

CHAIRMAN JENSCH: Please come to order.

Are you ready to proceed, Mr. Trosten?

MR. TROSTEN: Yes.

On transcript page 10,320, you ruled you will receive evidence regarding steam and feedwater lines, among other things, and we have received a question from Mr. Roisman relative to this matter which I will read into the record, and ask Mr. Cahill to respond.

Whereupon,

WILLIAM J. CAHILL

resumed the stand on behalf of the Applicant and, having

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been previously duly sworn, was examined and testified further as follows:

REDIRECT EXAMINATION

BY MR. TROSTEN:

Q Mr. Roisman's question which he delivered to me yesterday is as follows:

"State the date on which the modifications identified in the analysis of high energy lines dated April 9, 1973, will be completed or what actions Applicant will take with respect to the operation of the reactor if the date for a scheduled modification passes without the modification being completed."

Mr. Cahill, will you respond to this question?

A The changes referred to in our steam line break analysis are all of a relatively minor nature. Some of them are completed now. They are all underway and we plan to have them completed in a week or so.

MR. TROSTEN: Excuse me just a moment, Mr. Chairman.

(Pause.)

THE WITNESS: With regard to the second part, which is what action would be taken if these modifications were not completed, we plan to complete these modifications and as I said, some of them are complete. They are all underway.

If some portion were not completed -- I cannot

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project just which items would be not completed but any such residual items would have to be resolved in discussion with the AEC Staff and Compliance people.

CHAIRMAN JENSCH: Does that conclude your presentation?

MR. TROSTEN: Yes, it does, Mr. Chairman.

MR. KARMAN: Mr. Chairman, in addition Mr. Roisman posed an interrogatory to the Regulatory Staff which we will furnish to him in writing with copies to the Board and to the parties.

CHAIRMAN JENSCH: Well, as an interrogatory, that's a matter between you and the Citizens Committee.

MR. KARMAN: Well, the Board expressed some interest yesterday in possibly seeing what these questions are, so we will serve the Board.

CHAIRMAN JENSCH: Very well.

There being nothing further, thank you, Mr. Cahill. You are again excused.

(Witness excused.)

CHAIRMAN JENSCH: What is your suggestion for tomorrow?

MR. TROSTEN: Well, Mr. Chairman, we intend to submit our direct testimony on fuel densification tomorrow. We are at the Board's disposal. If the Board wishes further interrogation we will be here to respond to the Board's

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questions. If not, we will submit our testimony in writing and serve it on the Board and the parties tomorrow.

As far as we are concerned, there is no matter that need be the subject of an evidentiary hearing or another hearing tomorrow, in view of what Mr. Roisman has said. We are perfectly prepared to serve our testimony tomorrow and get it all wrapped up tomorrow. From what Mr. Roisman said, he is not going to be here tomorrow and desires to examine the transcript and so forth.

So on that basis it is up to the Board what it chooses to do in this respect. We are perfectly prepared to go forward.

CHAIRMAN JENSCH: I was just wondering whether it would be worthwhile even taking the time to assemble for that. If you serve everything tomorrow, there cannot be physical incorporation of the evidence in the record while awaiting the resumption of the environmental session.

MR. TROSTEN: My understanding of Mr. Roisman's statement was he would advise the Board and the parties on Monday, after conferring with Counsel, as to whether further evidence need be taken as far as his contentions are concerned.

We will, as of tomorrow, and subject to the conference with Mr. Roisman, be able to complete our evidentiary presentation by Monday. The only thing that we have

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not submitted in evidence as of this time, other than the fuel densification matter, is our report on the main steam and feedwater break.

Frankly, the reason why I'm not simply offering it in evidence now is it is not clear to me that Mr. Roisman will have a contention on the basis of the answer that we have given to his question and perhaps on the basis of the answer that the Staff will provide to his interrogatory.

If he does have a contention we would propose to offer certainly our report on this, and such other matters as appear appropriate if he says he's going to cross-examine.

It is my feeling, Mr. Chairman, that if a further evidentiary hearing is necessary, that it should be convened on Tuesday of next week and continue until concluded.

I would just like to have the record clear that as far as we are concerned, we are prepared to pick up from here, but go on until we are concluded. If Mr. Roisman were present we would be perfectly happy to stay here today and stay here tomorrow and stay here Monday until we are all finished.

CHAIRMAN JENSCH: Do you have any objection to meeting a week from Tuesday at 2 o'clock? Meeting Tuesday, Wednesday and Thursday. That is the afternoon of the 24th, the 25th and the 26th, since we are planning to be back in time for environmental matters rather than have some two sessions.

MR. TROSTEN: 24, 25, 26?

CHAIRMAN JENSCH: Yes, starting at 2 o'clock in the afternoon?

MR. TROSTEN: If the Board prefers to, then Mr. Chairman this would be all right.

Could we also set aside the 27th if necessary? I would just like to be absolutely sure that we could get concluded.

CHAIRMAN JENSCH: WE will set aside the 27th.

MR. TROSTEN: If we could set aside the 24, 25, 26 and 27, this would be satisfactory.

CHAIRMAN JENSCH: All right. With the idea that we start at 2 o'clock in the afternoon of the 24th.

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MR. TROSTEN: Would you give me just a moment, please.

(Pause.)

MR. TROSTEN: Mr. Chairman, if it is satisfactory to the Board, we would propose to have our complete direct case served in writing by Saturday. We will endeavor to have it served by tomorrow, but we will serve it by Saturday.

CHAIRMAN JENSCH: Very well.

MR. TROSTEN: We understand then that the Board will reconvene the hearing at 2 o'clock in the afternoon on Tuesday the 24 and set aside the period through the 27 for the completion of all aspects.

CHAIRMAN JENSCH: Of Indian Point 2.

MR. TROSTEN: Of Indian Point 2.

DR. GEYER: And you will serve only those things which are not already distributed?

MR. TROSTEN: That is correct.

And the material can be formally received in evidence at the next session.

CHAIRMAN JENSCH: Is there anything further?

MR. KARMAN: Nothing further.

CHAIRMAN JENSCH: At this time this evidentiary hearing will recess to reconvene in this room in the Woodmont Building, Bethesda, Maryland at 2 o'clock p.m. on

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April 24, 1973.

The hearing is now recessed.

(Whereupon, at 5:07 p.m., the hearing in the above-mentioned matter was recessed to reconvene on Tuesday, 24 April 1973 at 2:00 p.m..)

ANSWERS TO HRFA'S QUESTIONS FOR
BERTRAM SCHWARTZ ON TESTIMONY
CONCERNING RESTRICTED OPERATION
OF INDIAN POINT 2 DATED FEB. 5, 1973

Consolidated Edison Company of New York, Inc.
Indian Point Station Unit No. 2.
Docket Number 50-247

April 9, 1973

QUESTION 1

1.a. Describe the method by which the pattern of use of Indian Point 2 peaking unit was developed. In particular, does the pattern of use represent a run through a hypothetical or real summer or the derivation of a typical summer day?

ANSWER

The pattern of use for operating Indian Point No. 2 as a peaking unit was developed through a computer program which simulates the future operation of our electric generating system. The program projects the dispatch of the Con Edison system using as input, data relating to the projected system loads on a bi-hourly and chronological basis subsequently converted to monthly load duration curves, and the generating equipment that will be available in order to meet these projected loads. The operation of Indian Point No. 2 as a peaking unit was calculated on a monthly basis and cumulated for the desired time period. Knowing the number of weekdays during the period and the maximum loading level allowable on Indian Point No. 2, the average hours of operation per weekday were calculated. Over the eight year period of 1973 through 1980, the average operation of Indian Point No. 2 was determined to be two hours per weekday.

To determine the impact of operating Indian Point No. 2 as a peaking unit two computer simulations were performed in each of the eight study years. One simulation assumed that the unit would operate as a base load generating unit with a 75 to 80% capacity factor during the months in which the plant was not scheduled for maintenance and refueling; the other assumed Indian Point No. 2 to operate as a peaking unit. As a peaking unit Indian Point was the last increment of capacity dispatched to the Con Edison system after all other firm generation had been dispatched. A comparison of the two simulations yields the increase in generation of baseload, (1) steam peaking (2) and gas turbine generators, due to the restricted operation of Indian Point No. 2 as a peaking unit. The increase in energy of these alternate sources of energy as a percentage of total restricted power from Indian Point No.2 is as follows: baseload - 65%, steam peaking - 2% and gas turbines - 33%.

QUESTION 1

1.b. If a typical summer day was used, how was it derived?

ANSWER

A typical summer day was not used. Rather, an average operation was determined as described in 1.a. which resulted in approximately two hours of operation near full load per day.

QUESTION 1

1.c. How was Table 1 developed?

ANSWER

Average daily operation at full load was determined to be two hours. (See Answer to Question 1.a. above). Minimum manufacturer's recommended time to bring the turbine, after it has cooled down during 18 hours on turning gear, to full load is two hours in order to avoid excessive thermal stress. Two hours were also allocated to bring the turbine from full load to hot standby. For the remaining 18 hours of the day, the turbine would be dissipating heat while not in use.

Indian Point 2 can be operated with reduced circulating water flow commensurate with three pump operation up to approximately 50 percent power, depending on water temperature and other considerations. This would be commensurate with roughly the first hour of power ascension and last hour of power descension. Implicit in this description is a number of idealistic assumptions. The circulating pumps require an hour to start. Details of actual plant operation and load demand preclude this idealistic operation of circulating water pumps, or load assent or descent. Furthermore, operation on less than six pumps reduces plant reliability, and system reliability along with it. The table of plant operation was developed as a best faith effort to analyze the hypothetical and unconventional mode of operation suggested by the HRFA. The Table is not a practical or feasible mode of operation.

Circulating water flow was reduced further in the winter by use of a by-pass return system. The column reflecting percent flow, indicated the approximate reduction from full water flow which results from use of fewer pumps and recirculation.

The water temperature differential across the condenser are approximate for these modes of operation. The temperature differential for "Part Load $<$ 50%" is the approximate maximum temperature differential for three pump operation. The temperature for "Part Load $>$ 50%" is the approximate minimum temperature differential at 50 percent power and six pump operation. The temperatures with recirculation were increased to reflect 40 percent less circulating water..

QUESTION 2

Describe how the levelized annual economic cost for replacement fuel and operation were derived, giving per unit costs for each type of fuel and operation costs for each year and indicating the mix of fuels assumed each year. Give the basis for any escalation factor used.

ANSWER

The following table indicates the type of fuel used and the average heat rate indicative of each type of capacity.

FUEL AND HEAT RATE BY TYPE OF CAPACITY

TYPE	FUEL	HEAT RATE
Baseload (1)	Residual	10,500
Steam Peaking (2)	Residual	17,500
Gas Turbines	Distillate	14,500

The levelized annual costs for fuel replacement were derived from fuel cost estimates which were in use at the time of the study and from the increased operation of the baseload, steam peaking and gas turbine units. The fuel estimates used are listed below for each year of the study period.

FUEL ESTIMATES

YEAR	RESIDUAL (¢/MMBTU)	DISTILLATE (¢/MMBTU)
1973	67	89
1974	67	93
1975	67	95
1976	71	98
1977	73	101
1978	75	104
1979	78	106
1980	79	110

Although all units including baseload and steam peaking units incur an incremental operation and maintenance cost, operation and maintenance costs were assigned to only gas turbine units. Gas turbines incur O & M costs proportional to their use, and were assigned a variable O & M cost of 3 $/MWHR in 1973. Operation and Maintenance was escalated at 5% per year throughout the study period to reflect increases in material and labor expenditures.

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(1) Baseload units include units at Arthur Kill, Astoria, Bowline Point, Ravenswood, Roseton and East River (Turbines 5 thru 7).

(2) Steam peaking units are those at Hudson Avenue, Waterside, 59th Street and 74th Street.