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SECRETARY'S OFFICE
Public Utility Commission

COMMONWEALTH OF PENNSYLVANIA

PUBLIC UTILITY COMMISSION

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C O N T E N T S

WITNESSES	DIRECT	CROSS	REDIRECT	RECROSS
Michael Gruber				
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William B. Hall				
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E X H I B I T S

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Trial Staff-Statements		
MJG-1 (Gruber)	2990	2992
WBH-1 (Hall)	3018	3019
RAR-1 (Rosenthal)	3038	3040
Trial Staff-Exhibits		
MGJ-1 (Gruber)	2990	2992
WBH-1 (Hall)	3018	3019
RAR-1A (Rosenthal)	3038	3040

E X H I B I T S (Continued)

NUMBER	FOR IDENTIFICATION	IN EVIDENCE
OCA-Statements		
1 and 1A (O'Brien)	3064	3068
OCA-Exhibits		
86 (IR-PECo-OCA-10-1)	3066	3068
PECo-Exhibits		
10 (Interrogatory Responses)	3069	3069
8 (Major Commodity Manpower By Facility)	3129	3183

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P R O C E E D I N G S

ADMINISTRATIVE LAW JUDGE JOSEPH MATUSCHAK: Is Counsel ready to proceed?

MR. HALL: Yes, Your Honor.

MS. SMITH: Yes, Your Honor.

JUDGE MATUSCHAK: Does Staff have a witness?

MS. SMITH: Yes, Your Honor. We call Mr. Gruber.

Whereupon,

MICHAEL GRUBER

having been duly sworn, testified as follows:

JUDGE MATUSCHAK: You may proceed.

MS. SMITH: Thank you, Your Honor.

DIRECT EXAMINATION

BY MS. SMITH:

Q. Would you please state your name and address for the record?

A. My name is Michael J. Gruber and my business address is Pennsylvania Public Utility Commission, Post Office Box 3265, Harrisburg, Pennsylvania 17120.

Q. In what capacity are you employed by the Public Utility Commission?

A. I am a fixed utility evaluation engineer in the engineering section of the Electric Division of the Bureau of Rates.

MS. SMITH: Your Honor, at this point I would like

to have marked for identification Trial Staff Statement MJG-1 and Trial Staff Exhibit MJG-1.

JUDGE MATUSCHAK: They will be so marked.

(Whereupon, the documents were marked as Trial Staff Statement MGJ-1 and Exhibit MJG-1 for identification.)

BY MS. SMITH:

Q. Mr. Gruber, do you have those documents before you which have just been identified?

A. I do.

Q. Were these documents prepared by you or under your direct supervision?

A. They were.

Q. And do these documents consist of your direct testimony and exhibits in this proceeding?

A. They do.

Q. Do you have any changes or additions or corrections to any of these documents?

A. Yes, I do.

On page five, lines three through five, the sentence reads, "There should be a corresponding reduction in the annual depreciation expense as well, however, at this time I do not have sufficient information to calculate its value." Line three would remain the same but I do have the information to make the calculation now.

The sentence would read, "There should be a

corresponding reduction in annual depreciation expense of $245,000 for direct costs and $119,000 for AFUDC, for a total of --

JUDGE MATUSCHAK: Wait a minute. It was $240,000 for direct costs?

THE WITNESS: $245,000 for direct costs, and $119,000 for AFUDC costs, for a total adjustment of $364,000.

JUDGE MATUSCHAK: What was the total?

THE WITNESS: $364,000.

The same general change would be made on the summary page of my testimony under number three of the proposed adjustments. It would read, "A corresponding adjustment to annual depreciation expense should also be made," and it would be $245,000 for direct costs and $119,000 for AFUDC costs, for a total adjustment of $364,000.

That's the only change I have.

BY MS. SMITH:

Q. With that change would you state, Mr. Gruber, that the information that you have provided in these documents is true and correct to the best of your information, knowledge and belief?

A. Yes, it is.

Q. And if I were to ask you these same questions would your answers be the same today?

A. They would.

MS. SMITH: Your Honor, I would request that Trial Staff Statement MJG-1 and Trial Staff Exhibit MJG-1 be moved into evidence at this time subject to any timely motions to strike.

JUDGE MATUSCHAK: Under those conditions the motion is granted.

(Whereupon, the documents marked as Trial Staff Statement MJG-1 and Exhibit MJG-1 were received in evidence.)

MS. SMITH: Mr. Gruber is available for cross-examination.

JUDGE MATUSCHAK: PECo.

CROSS-EXAMINATION

BY MR. JERRETT:

Q. Mr. Gruber, good morning. My name is Jack Jerrett and I'm representing the company this morning.

Mr. Gruber, would I be correct in stating that you have had no direct experience in the area of load forecasting?

A. That's correct.

Q. Would I also be correct that you do not have any direct experience in the area of capacity planning?

A. That's correct.

Q. Would it therefore be fair to say that your primary professional experience has been in the areas of depreciation in proposing various rate base adjustments?

A. I have proposed various other excess capacity adjustments before the Commission.

Q. Other than that that would be a correct statement?

A. Yes. My whole experience has been of a regulatory nature.

Q. Now, Mr. Gruber, you have proposed a $19.3 million forced outage penalty adjustment; is that correct?

A. That's correct.

Q. Now, on page two of your testimony you state that PECo has the highest company-wide average forced outage rate of all Pennsylvania electric utilities; is that correct?

A. That's correct.

Q. I would like to direct your attention to Exhibit MJG-1, Schedule 2, and go to the page labelled Enclosure 1, page 1.

A. Which page, please?

Q. Enclosure 1, page 1. This is the first set of data in that schedule.

A. You're referring to the company response?

Q. Yes.

A. Okay.

Q. Now, looking at the table on the bottom half of that page, and specifically at line four, which is entitled, "Average Forced Outage Rate," could you please tell me what

the average forced outage rate is for GPU?

A. 19.45.

Q. And what is the same rate for PECo?

A. 18.73.

Q. Therefore, would you agree with me that this table indicates that PECo does not in fact have the highest forced outage rate?

A. I think the 19.45 includes Three Mile Island. The figures I was referring to were figures that were supplied to this Commission by the companies and I don't think they included Three Mile Island.

Q. Do you know what the effect of removing Three Mile Island would be?

A. As far as this schedule is concerned I don't know what it would be, what that number would be. However, in my own calculations GPU's forced outage rate is down around 10 or 11 percent with the removal of Three Mile Island.

Q. Could we please have a copy of those calculations?

MR. JERRETT: I would make that into a transcript request.

MS. SMITH: We will provide that.

BY MR. JERRETT:

Q. Now, Mr. Gruber, turning back to page two of your testimony, line two, you state that an informal

examination of certain comparative forced outage data was performed. Why wasn't a formal and thorough analysis of this data undertaken?

A. The information I have on forced outage rates is somewhat dated. It's slow in coming, usually about a year-and-a-half old, the latest information I have. And it also does not always end in the same time periods. The companies file them at different times and some of the companies I have up further in time than other companies.

I really didn't think that it would make a good study because of the difference in dates. Some of the companies also have different ways of measuring forced outages at various points in time.

I just used it as an indication. I didn't use it to come up with any specific numbers.

Q. Would you agree with me, then, that because of these differences in the numbers and timing differences that the forced outage data are not really comparable?

A. I think it is comparable on a broad sense. I don't think that it should be the sole basis for any judgement that I make. I didn't use it as a sole basis for any judgement.

There is a period of time when the information is comparable and it is through the same time periods. And as far as that goes I think it is a good basis for

comparison.

MR. JERRETT: Could we also make that into a transcript request?

THE WITNESS: That's the same information. The information I was referring to with respect to GPU is the same information I'm referring to here.

MR. JERRETT: So that would be included in the first transcript request?

THE WITNESS: Yes.

MR. JERRETT: Would it be possible for us to get it by the end of the week?

THE WITNESS: I don't know.

MS. SMITH: We will make an effort.

BY MR. JERRETT:

Q. Now, Mr. Gruber, staying on page two of your testimony, line five, you refer to a 60 month average forced outage rate comparison between PECo and other Pennsylvania utilities. What specific 60 month period are you referring to there?

A. There again it varies because some of the data I have is more recent than other data. The time period which the 60 months cover is different. However, most of the companies are relatively consistent within their own -- the rolling 60 month average is relatively consistent.

I didn't use any specific numbers. Duquesne Light's

did come down because of the early outages at Beaver Valley. But their later outages have smoothed out to where they are running fair consistently.

Q. I take it this 16 month data will be included in the transcript request?

A. That's correct.

Q. Have you made an attempt to update your data? Is that what you're suggesting?

A. Well, part of the reason I haven't updated the data most recently is that the data is no longer filed with the Commission by all the companies. It used to be filed under the old quarterly reporting system and not all the companies file that data anymore.

I am in the process of trying to come up with some more appropriate data requests to send to the company on a continuing basis. As of yet they haven't been completed or formalized.

Q. I take it you have also not attempted to adjust for differences between the data, the differences in timing and measurement of outages that you had mentioned previously?

A. Well, I made no adjustment in the data itself because I was only using it as an indication. I wasn't using it to come up with any specific numbers.

Q. Now, Mr. Gruber, on line ten of page two of your

testimony you state that PECo's reserve capacity margin includes a 3.21 percent forced outage adjustment, which is based upon excessive forced outages. How did you determine that this was based on excessive forced outages?

A. I used as an indication the previous study we have been talking about that shows that PECo is higher. And it was my understanding that the data provided by the company on page three in the same insert that you were talking about shows that PECo -- the forced outage rate adjustment that PECo has for their reserve capacity margin is 3.21 percent.

That's where the 3.21 percent comes from. It's straight off the PJM data.

Q. Your conclusion that this represents excessive forced outages is based on your comparison with the 60 month data which you have mentioned previously? Is that the sole basis for that conclusion?

A. Not entirely, no. The way I read this chart, it says that PECo has to maintain 3.21 percent more reserve because of their forced outage rate being so high. That's the PJM chart I'm referring to, page three of the enclosure.

Q. I take it, then, that it's your understanding that the 3.21 percent was imposed because PECo's forced outage rate was higher than the PJM average?

A. That's the way it was explained to me when I talked to the company people.

Q. Now, again, you're making a comparison and I believe you stated previously that there are a number of factors which affect the level of forced outages which render such a comparison very difficult at best. Doesn't this undermine the use of such a comparison in reaching a conclusion that the forced outage rate is excessive?

A. No. PECo is relying -- I've seen it in a couple places in this case where PECo has relied on the 25 percent reserve margin because of what PJM is requiring. They are relying on the 25 so you have to look at the factors that go into the 25 percent. Their reserve margin should be 22 percent if they were the average company in PJM.

Isn't that correct? That's the way I'm reading it, anyway. That's the way it was explained to me when I asked about it.

With 3.21 percent for the forced outage rate they have to maintain 3.21 percent more plant for PJM requirements if they were the average company.

Q. But that 3.21 percent was developed by comparing the PECo forced outage rate to the average rate for PJM; is that correct?

A. I believe so, yes.

Q. And you had stated previously that comparisons of forced outage data are difficult and cannot be relied on to any great extent because of differences in the methods

in which forced outage rates are determined, factors which affect plant performance. So therefore don't these differences render such a comparison really unreliable?

A. No. I said my comparison had different factors in it. I would assume that PJM's -- I was informed that PJM's requirements for the filing of forced outage rate data was consistent. I said the data that I had was not consistent.

Q. Does the PJM forced outage rate data take into account differences in the type of generation and the age of generation?

A. I don't know.

Q. Does the PJM data also take into account other factors which might affect operating performance, such as for example the type of coal used in coal plants or whether fresh water or seawater is used for cooling?

A. I don't really know what the PJM forced outage rate takes into consideration. I don't really think that a lot of things you mentioned, whether they are using fresh water or salt water or the type of coal that they need to operate a particular plant, is really that important because what it comes down to is if a forced outage rate is higher because the company can't get the appropriate kind of coal then that was a company mistake in building that plant in the first place, building it where they did that they had

to use that type of coal. It all boils down to that that's a company decision where to build the plant and if their forced outage rate is higher because they chose one particular location over another and they have to use one particular type of coal or they are using seawater versus fresh water for coolant then that should be laid at the company's door and the customers should not be made to pay higher rates because the company made a decision that now is shown not to be the best.

Q. Mr. Gruber, have you performed any type of specific analysis to determine the limitations on operating performance between the plants in the PJM?

A. No, I haven't.

Q. Have you performed a specific analysis to determine the limitations on siting of plants within the PJM?

A. No, I haven't.

Q. Now, Mr. Gruber, are you aware that the company has experienced forced outages at its Eddystone 1 and Peach Bottom 2 plants during 1983 which contributed to the calculation of the 3.21 percent outage rate adjustment?

A. I knew that they had high forced outages at those plants, yes.

Q. Do you know whether or not those outages contributed to the calculation of that 3.21 percent rate?

A. I would assume they did.

Q. Do you know how the 3.21 percent is calculated?

A. No, I don't.

Q. Mr. Gruber, would you accept subject to check that the 3.21 percent rate represents a three year average based on the data for 1981, '82 and '83 and that it was calculated in 1984 for the planning of 1986?

A. Yes, I would accept that.

Q. Turning back to the Eddystone and Peach Bottom outages, do you know whether the Commission has had an opportunity to examine those outages and determine whether or not they were reasonable and prudent?

A. No, I don't.

Q. Mr. Gruber, are you aware that the Commission has in fact found those outages during the 1983 period to be reasonable and prudent?

A. I will accept that subject to check, yes.

Q. Well, to the extent that the Commission has made such a finding and review about those outages, do you believe that to the extent they contribute to the calculation of the 3.21 percent that their contribution to the higher forced outage rate of PECo should be eliminated from your penalty adjustment?

A. No.

Q. Why is that?

A. They are still a forced outage rate. Whether or not they were a legitimate forced outage rate or something else -- no forced outage rate is planned. Nobody wants to have a forced outage. Everybody would like to operate their plants without any forced outages at all, I'm sure. But they do occur. Everybody gets them.

Just because the Commission decided that it was a legitimate forced outage, fine; everybody else has legitimate forced outages too. But their's aren't as high as PECo.

Q. I'm not sure I understand. Why should the company be penalized for a forced outage which the Commission found to have been reasonable and prudent?

A. Because it's still there. I mean, any forced outage could be considered reasonable and prudent at any time. All companies are going to experience them. All companies are going to experience different levels of reasonable and prudent forced outages. PECo's are still higher than everybody else's.

Just because the Commission said yes it's reasonable and prudent, okay, PP&L's are reasonable and prudent too but they are still lower than PECo's. So PP&L customers don't have to have as much reserve capacity as PECo because they have a better forced outage rate.

Q. Then I take it your penalty adjustment is not

based on any consideration of whether or not the forced outage rate was reasonable or, for that matter, without consideration of what the reasons were for the forced outages?

A. No. My only consideration was that PECo has a higher forced outage rate than everybody else. PECo has different characteristics than other systems, I'm sure. But that doesn't mean that PECo's forced outage rate should be higher.

Everybody operates under the same limitations. Duquesne Light has their own nuclear plant, they have their own coal plants and they have foreign-operated plants that they have in their system. PECo has the same situation. They operate their own nuclear, they have foreign plants, they operate their own coal plants.

The fact that PECo's forced outage rates are higher, that's just -- you know, PECo's are higher. Why are they higher? I don't know.

I don't think the customers should be penalized because PECo has a higher forced outage rate.

Q. I take it, then, that your adjustment is based solely on a comparison with other plants and their forced outage experience regardless of the differences between plants which would contribute to their relative forced outage rates or experience; is that correct?

A. That's correct. PECo decided what plants they were going to have. If those plants caused them to have a higher forced outage rate, then that's PECo management's fault. They should have planned better.

If one company is planning better and they are picking all the plants that have a lower forced outage rate then why should PECo get the same benefits as they get?

Q. Mr. Gruber, have you performed any kind of specific analysis of Philadelphia Electric Company's planning decisions or planning process?

A. No, I have not.

Q. Mr. Gruber, have you performed any type of specific analysis of environmental restraints or restrictions which might affect the operating performance of nuclear plants in Pennsylvania?

A. No, I have not.

Q. Or, rather, of electric utilities in Pennsylvania?

A. No.

Q. Now, Mr. Gruber, looking at Exhibit MJG-1, Schedule 2, again, going to the page captioned Enclosure 1, page 2, again, the table at the lower half of the page -- do you have that reference?

A. Yes.

Q. Looking at line nine of that table would you

agree that under the PECo column the 7,299 megawatts for PECo represents the required capacity obligation as a result of all capacity requirements under PJM, including the force outage rate adjustment?

A. Excuse me. You said page --

Q. Enclosure 1, page 2.

A. Enclosure 1, page 2?

Q. I'm looking at the bottom of the page. I guess that's really what you have referred to as page three. It's the second table.

A. Okay. I see it. I'm sorry. I had the wrong page.

All right. 7,299. Yes.

Q. My question is would you agree that that represents the capacity obligation under PJM which includes the effect of the 3.21 percent forced outage rate adjustment?

A. All right; yes.

Q. Now, if you look at the line below it, line ten, would you agree that the 7,845 megawatts represents the total planned installed capacity for the 1986 through 1987 planning period for PECo?

A. All right.

Q. Now, Mr. Gruber, since the company's total installed capacity is greater than the capacity requirements under PJM, wouldn't you agree that the company will not be

incurring any capacity charges during the 1986 planning period?

A. From this I would assume that, yes.

Q. And therefore despite the forced outage rate adjustment of 3.21 percent, would you agree that the company's customers will not be incurring any additional capacity costs?

A. The company customers will not be incurring any additional capacity costs. However, PECo is using -- everybody is using the 25.66 percent reserve margin to determine what PECo has in the way of excess capacity. If you took off three percent and you used the 22 percent -- 22.45 percent, I guess it would be if you included the load drop adjustment -- that would change the consideration as far as excess capacity is concerned.

I don't believe that anyone really looked at it from that standpoint.

Q. But I take it you did not consider whether or not additional capacity charges were being incurred in proposing your adjustment?

A. No, I did not.

Q. Would that change your adjustment?

A. No, it would not.

Q. Why is that?

A. Because PECo still has a higher than average

forced outage rate.

Q. Well, as I understand it, the theory behind your adjustment is that the ratepayers should not be penalized because of the company's higher forced outage rate; is that correct?

A. That's correct.

Q. If the ratepayers are not suffering any injury in the form of higher capacity costs wouldn't you agree that they are in fact already not being penalized as a result of the higher forced outage rate?

A. No.

Q. In what way are the ratepayers being penalized?

A. If you use the 22 percent reserve margin that changes all the considerations for excess capacity. The company no longer has the three percent cushion there between 22 and 25 percent. That may make somebody decide that excess capacity would be a more viable adjustment than it presently is at 25 percent.

Q. Now, Mr. Gruber, in calculating the penalty which you are proposing you state at lines 16 through 17 of page two of your testimony that you have applied the 3.21 percent forced outage factor to the total PECo installed capacity; is that correct?

A. Which line are you on again?

Q. It's lines 16 through 17 on page two of your

testimony.

A. Page two. All right. It disallows the common equity return based on 3.21 percent of PECo's installed generating plant, yes.

Q. And based on our prior conversation, would you agree, turning back to Schedule 2 of Exhibit MJG-1, the page designated as Enclosure 1, page 2, that the total installed capacity for Philadelphia Electric is 7,845 megawatts?

A. On this schedule, yes.

Q. Now, Mr. Gruber, just to confirm, I believe we had established previously that in determining the PJM-required capacity obligation, the total capacity obligation under PJM is the figure set forth on line nine, which is the 7,299 megawatts; is that correct?

A. Yes.

Q. And would you agree that that figure was derived by taking the 25.66 percent total reserve margin and multiplying it by the figure in line one, which is the 5,809 peak planning capacity?

A. All right.

Q. Thus would you agree with me that under the terms of the PJM agreement the capacity requirement imposed on PECo in order to meet the risk of forced outages can be determined by multiplying the 3.21 percent

by the peak capacity figure, 5,809 megawatts; is that correct?

A. Yes.

Q. Mr. Gruber, would you accept subject to check that if this multiplication is carried out that the resulting figure in megawatts would be 186?

A. That sounds about right, yes.

Q. Now, as you stated previously in calculating your adjustment you used the total installed capacity of 7,845 megawatts. Now, if you take the 3.21 percent and multiply it by the total installed capacity, would you accept subject to check that you would get a figure of 252 megawatts?

A. All right.

Q. Therefore would you agree with me that under your proposed penalty adjustment that you have overstated the capacity required under PJM by approximately 66 megawatts?

A. No. If PECo is willing to give up all their capacity charges for anything over the 7,299 that PJM requires, then I will accept the 66 megawatt adjustment.

But since PECo has 7,845 megawatts, I think it's best to use that.

Q. But you would agree that the calculations would indicate a difference of 66 megawatts?

A. Yes.

Q. Now, Mr. Gruber, you are also proposing an adjustment to reduce the company's rate base claim to reflect 50 percent of common plant associated with the Limerick 1 nuclear unit; is that correct?

A. Yes.

Q. And as I understand it, the principal basis for your adjustment is that the Commission has adhered to a prior practice of disallowing 50 percent of common plant when a utility attempts to include in rate base a two unit facility; is that correct?

A. That's correct.

Q. I take it by what is contained in your testimony that you do not disagree with the results of the engineering-based analysis contained in Mr. Boyer's testimony that approximately 90 percent or so of the common plant is actually needed in order to operate Unit 1 or was required in order to efficiently construct Unit 1; is that correct?

A. I saw it and I can't find anything wrong with that, no. Common plant is generally needed to operate the first unit, yes.

Q. So your answer is that yes, you don't disagree with that?

A. Yes.

Q. Now, Mr. Gruber, the final adjustment which you propose relates to certain alleged contractor errors. I believe this is made up of two components, one which is comprised of claims against Bechtel and the other constitutes various back charges, I believe approximately $400,000; is that correct?

A. That's correct.

Q. Now, with regard to the claims against Bechtel, are you aware that these items only represent potential claims against Bechtel and were compiled principally to enhance Philadelphia Electric's bargaining power in contract and fee negotiations with Bechtel?

A. I know that they represent potential claims and as yet no formal claim has been made. However, if it's an error in construction I don't think the ratepayers should pay for it regardless of whether it's being used as a bargaining chip or whether or not PECo is honestly trying to get their money back.

Q. Mr. Gruber, would you agree that these claims have not been resolved and that no determination of liability has been reached?

A. I would assume that they are waiting for the conclusion of Unit 2 before any claims are resolved. That's generally the way power companies operate when they are building new plants.

Q. Then aren't you assuming a conclusion when you state that these are construction errors if, in fact, the merits of the claims have not been resolved?

A. I was told that that's what they were considered by the company. In looking over them, that's what they look like to me.

Q. Have you performed any specific analysis of each of these claims to determine exactly the specific factual circumstances involved?

A. No.

Q. Mr. Gruber, would you agree with me that to the extent that the compilation of this list of alleged errors has resulted in the company being able to negotiate a lower fee with Bechtel that this benefit should offset any adjustment proposed in this proceeding?

A. No.

Q. Why is that?

A. Because these are still errors in construction. They are still work that needed to be redone. If you left them in the rate base the customers are paying for something twice.

Q. If you're going to penalize the company for these alleged errors shouldn't the company also be able to get the benefits of instituting reasonable enough management in order to keep track of these items?

A. I'm sure the company is getting compensated for the management costs involved in finding these errors.

Q. Mr. Gruber, would you agree with me that on a project as large and complex as Limerick that a certain amount of problems and errors can reasonably be expected to occur?

A. Yes.

Q. And would you also agree that these types of errors are essentially unavoidable in a practical sense?

A. That may be, yes.

Q. Would you also agree, then, that the cost of these problem, these reasonable problems that are expect to occur, should also be considered as simply part of the cost of building the plant?

A. No. I don't think the customers should pay for anything twice.

Q. Mr. Gruber, if I can characterize your testimony properly, you have stated that these errors are something that can be expected on a plant such as Limerick, they are essentially unavoidable; by penalizing the company for these errors aren't you really imposing a standard of perfection by not allowing for any error at all?

A. That might be one way to look at it.

Q. Now, finally, Mr. Gruber, with respect to the $400,000 in back charges, do you know if any of these

items have been resolved or collected since you were provided with the $400,000 figure?

A. I keep asking the various company people informally and nobody tells me. So I assume that they have not.

Q. Well, to the extent that these items are resolved, would that reduce your adjustment?

A. No.

Q. Resolved or collected?

A. No.

Q. And why is that?

A. Because I was told they were associated with construction errors.

Q. It is your understanding that these back charges are associated with construction errors?

A. That's what I was told, yes.

Q. And if the company is compensated for these alleged errors, shouldn't that reduce your penalty to the company for these errors?

A. Compensated how?

Q. By collecting the costs incurred as a result of these errors from the various contractors and vendors.

A. So you're saying the company has already taken these costs out of their rate base?

(Pause.)

Q. I'm sorry.

A. To the extent that the company has already taken those costs out of the rate case, yes, I will agree that my adjustment might be a double counting.

Q. Mr. Gruber, are you aware of whether any of these back charges were not included by the company in its rate base claim for Limerick?

A. I would have assumed they all were because my questions were always addressed to only that which is in the rate case.

Q. I take it you have not made a specific analysis to determine whether they are included?

A. I trust the company not to lie to me.

Q. Well, to the extent that these items have not been included in the company's rate base claim would that also be a factor which would reduce your adjustment?

A. Yes. If they are not included in rate base then there's no reason to make the adjustment.

MR. JERRETT: Your Honor, if I could have just a couple of seconds.

(Pause.)

MR. JERRETT: I have no further questions.

JUDGE MATUSCHAK: Is there any further cross-examination of this witness?

(No audible response.)

JUDGE MATUSCHAK: Does the Staff have redirect?

MS. SMITH: May I have just a few minutes?

JUDGE MATUSCHAK: Very well.

(Recess.)

JUDGE MATUSCHAK: Is Counsel ready to proceed?

MS. SMITH: Your Honor, we have no redirect.

JUDGE MATUSCHAK: If there is nothing further for this witness, the witness is excused.

(Witness excused.)

MS. CHESTNUT: Your Honor, Staff would like to call its next witness, Mr. William B. Hall.

Whereupon,

WILLIAM B. HALL

having been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MS. CHESTNUT:

Q. Good morning, Mr. Hall.

A. Good morning.

Q. Mr. Hall, would you please state your name and your business address for the record?

A. My name is William B. Hall, Pennsylvania Public Utility Commission, Post Office Box 3265, Harrisburg, PA.

Q. By whom are you employed and in what capacity?

A. I'm employed by the Public Utility Commission in the Bureau of Conservation, Economics and Energy Planning,

and my title is fixed utility construction geologist.

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

A. Yes, I have.

MS. CHESTNUT: Your Honor, I had previously distributed copies of Mr. Hall's testimony to Your Honor, to the parties and to the court reporter. I would request that his testimony be marked for identification in this proceeding as Staff Statement WBH-1.

JUDGE MATUSCHAK: The motion is granted.

(Whereupon, the documents were marked as Trial Staff Statement WBH-1 and Exhibit WBH-1 for identification.)

BY MS. CHESTNUT:

Q. Mr. Hall, do you have before you what has been marked for identification as Staff Statement WBH-1?

A. Yes, I do.

Q. And does this represent the direct testimony prepared by you?

A. Yes, it does.

Q. Is the information contained in this document true and correct to the best of your information, knowledge and belief?

A. Yes, it is.

Q. Do you have any additions, changes or corrections to be made to this document at this time?

A. No, I do not.

Q. If I were to ask you today the questions contained in Staff Statement WBH-1 would your answers be the same as they are contained therein?

A. Yes.

MS. CHESTNUT: Your Honor, Mr. Hall is available for cross-examination.

JUDGE MATUSCHAK: Would you like to offer the statement?

MS. CHESTNUT: Your Honor, I would like to move into the record Staff Statement WBH-1 subject to any timely motions to strike or other objections.

JUDGE MATUSCHAK: Under those conditions the motion is granted.

(Whereupon, the documents marked as Trial Staff Statement WBH-1 and Exhibit WBH-1 were received in evidence.)

MS. CHESTNUT: Mr. Hall is available for cross-examination.

CROSS-EXAMINATION

BY MR. JERRETT:

Q. Good morning, Mr. Hall.

A. Good morning.

Q. Mr. Hall, am I correct that your principal professional experience and training is in the area of geology?

A. Yes, it is.

Q. Would I be correct in stating that you have, with the possible exception of your experience with Bechtel Constructors, generally not been directly responsible for the construction or management of a nuclear power project?

A. Yes, you would be correct.

Q. Would I also be correct that you have generally not had any direct experience in managing the engineering or operation of a nuclear power plant?

A. Well, when you say managing we might want to qualify what exactly quality control is.

Q. Excluding your experience with Bechtel.

A. Oh. No, I do not have any experience.

Q. And this last question will also be excluding your experience with Bechtel. Would you agree with me that you also have not had any direct experience in the area of licensing management for a nuclear power plant or had any direct experience in dealing directly with the Nuclear Regulatory Commission?

A. Again, if we exclude my Bechtel experience, yes.

Q. Would it be fair to say, then, that your sole direct experience in the project management or the management of regulatory changes or licensing management of a nuclear power facility came during your employment

for the approximate duration of 14 months with Bechtel Constructors?

A. It was that 14 months and the year-and-a-half I've spent here also examining regulatory matters and details.

Q. Well, focusing on your experience with Bechtel, would I be correct in stating that your principal responsibilities were to perform various testing inspections and surveillance activities in order to assure compliance with various quality assurance requirements?

A. Well, if you will examine Interrogatory-Set IV-Question 1 from the company I give a fairly complete summary of my activities while I worked for Bechtel.

Q. As I have stated it, is that a fair summary of what your responsibilities while working for Bechtel were?

A. Yes.

Q. Would I be correct in stating that while you were with Bechtel you did not have direct responsibility for managing, actually managing, the construction or engineering of the Limerick power facility?

A. Again, we might want to take a look in detail at what quality control actually is. Quality control is a management tool. It provides information to upper levels of management as to whether their system is actually operating the way they designed it and is performing in the

way they intend. So in that respect it could be considered a management tool.

In addition to that, in the normal course of events, while you don't do any scheduling yourself and in fact you are forbidden to be concerned with cost and scheduling activities in a certain way -- you must be divorced from those considerations -- you do perform an amount of coordination with the field engineers, with design engineers, with the craftsmen and the foremen and their supervisors.

Q. It take it, then, that you were not directly responsible for the planning or management of the cost and scheduling aspects of construction or engineering of Limerick?

A. Of course not. In fact if I had been it would be in violation of 10 CFR 50.

Q. Mr. Hall, did you have any responsibility for identifying new or reinterpretted regulatory requirements issues while you were employed at Bechtel?

A. Issued by whom?

A. The Nuclear Regulatory Commission.

Q. Only as they filtered down to me in terms of design change documents, of which there were a number. For example, a typical General Electric design change document would be an FDDR, a field deviation disposition request.

A comparable Bechtel document would be a design change notice of a DCN, a design -- well, that was a design change notice.

Q. Well, I take it, then, that you were not responsible for identifying when various regulatory requirements were applicable to Limerick, identifying them as they were issued by the NRC --

A. No.

Q. -- and participating in the decision that these requirements should be implemented at Limerick?

A. No.

Q. I take it, then, also that you were not responsible for assessing how these various regulatory requirements would impact the cost and schedule of the Limerick project?

A. No.

Q. Would you agree with me, then, also that you were not involved in the management process which determined how the company was going to respond to new or revised NRC regulatory requirements?

A. No. As I stated before, that is not quality control's job.

Q. Mr. Hall, were you involved in the preparation of any licensing documents or did you participate in any meetings with the NRC on behalf of the utility?

A. I participated in no meetings. However, in terms of licensing PECo had delegated the quality assurance and quality control functions, which are required under 10 CFR 50, and in that way I was involved indirectly in licensing.

Q. Now, Mr. Hall, on page two of your testimony, lines 11 through 13, you state that NRC regulatory changes have generally increased and become more prescriptive over time; is that correct?

A. Yes.

Q. And on that same page, specifically at lines 17 through 20, you also state that the reason for this increase has been the failure of some utilities to meet minimum safety requirements; is that correct?

A. To meet the original safety requirements I think is my exact wording there.

Q. Mr. Hall, are you taking the position that Limerick was a plant which failed to meet the minimum safety requirements?

A. No.

Q. Would you agree with me that they have generally had overall very favorable assessments by the NRC in the various reports and reviews which the NRC has conducted, for example the SALP reviews?

A. I believe I have seen some reference to that.

Q. Have you performed any specific analysis to determine to what extent Limerick has not complied with minimum safety requirements?

A. At what time? While I was with Bechtel or now?

Q. Now and analysis throughout the project.

A. Well, analysis throughout the project I wrote a number of nonconformance reports.

Q. In preparing your testimony for this proceeding have you performed a comprehensive analysis to determine to what extent Limerick during the course of the construction period for Unit 1 failed to comply with minimum safety requirements?

A. No, I have not.

Q. Mr. Hall, have you performed a specific study or analysis to determine to what extent the increase in regulatory changes is the result of various utilities failing to meet minimum safety requirements generally in the industry?

A. I'm not sure I would claim to have done a comprehensive analysis. However, from testimony provided in this case, for example -- I would like to refer to PECo Exhibit No. 2.

Let's start with the Browns Ferry fire. We see at the top of that page, page nine, "Following the Browns

Ferry nuclear power plant fire in 1975 the NRC made a comprehensive evaluation of those design criteria. The major regulatory requirement that resulted from this review was 10 CFR 50.48."

Let's go to page 21 on that same document. We see at the middle of the page, line 28, "Following the incident at Three Mile Island 2 the activities of various NRC task forces resulted in rapidly changing requirements in a number of different plant areas."

On page 23 again, line 41, emergency response facilities, "The incident at Three Mile Island led to studies which identified the need for improvements."

Browns Ferry again on line 27: "A fire occurred at the Tennessee Valley Authority's Browns Ferry station and as a result fire protection for nuclear power plants became a major regulatory issue."

These all seem to be resulting from specific instances.

Q. Would I be correct, then, in stating that the principal source of information that you used to reach this conclusion is the evidence which Philadelphia Electric Company has submitted in this proceeding?

A. That amongst other evidence.

Q. It take it, then, that the other evidence that you are referring to are documents that are available

publicly?

A. Yes.

Q. And one of those documents, would I be correct in stating, is the excerpt attached as Exhibit WBH-1 to your testimony?

A. Yes. That's from NUREG 1055, Improving Quality and Assurance of Quality in the Design and Construction of Nuclear Power Plants.

Q. Now, Mr. Hall, if we could turn to that exhibit for a moment...

A. Yes.

Q. Looking at the bottom of the page, I would like to have you read the couple of sentences, please. The sentence begins with, "As the civilian," and it starts on the sixth line from the bottom.

A. Yes, I see that.

Q. Could you read that to the end of the paragraph?

A. Certainly.

"As the civilian nuclear power industry grew, it became apparent that both the industry and the AEC had underestimated the complexity of ensuring safety and, therefore, the degree of regulation that would be appropriate. Regulatory activity expanded throughout the 1960's and the 1970's along with the increasing appreciation for the probability and consequences of reactor accidents; this in

turn contributed to increased public participation in the regulatory process. Regulatory guidelines also increased in scope and complexity with the rapid evolution of nuclear technology."

Q. Mr. Hall, wouldn't you agree with me that that passage suggests that to some extent the level of increased regulatory requirements was due to the increasing complexity of nuclear technology, the advancement of that technology and the increased awareness of the public and their participation in licensing proceedings?

A. I believe those are some of the factors that led in part to increasing complexities in the regulations, yes.

Q. Have you performed any type of analysis to determine to what extent those factors as opposed to the reaction to industry problems, which you stated previously, contributed to the increase in regulatory requirements?

A. No, I have not done a detailed statistical analysis of any sort to see which ways those sorts of things might have contributed to delay.

Q. Now, turning to page three of your testimony, specifically lines six through 11, you briefly quote from a document entitled Nuclear Power in an Age of Uncertainty.

A. Yes.

Q. And that's dated February, 1984.

A. Yes.

Q. And your quotation seems to further suggest that the NRC was simply reacting to problems within the industry; is that correct?

A. Yes.

Q. Do you have a copy of that document with you?

A. Yes, I do.

Q. Would you turn to page 165, please?

A. Certainly.

Q. Now, I believe the passage from which you took this quote begins at the bottom of the first column under the heading Management Controls and continues up to the top of the second column.

A. Yes.

Q. Would you please read that first paragraph?

A. Beginning with Management Control?

Q. Right.

A. "According to the industry a primary problem with NRC procedures is lack of management control within the NRC as reflected in uneven safety and other reviews and a lack of priorities and in the problems with backfitting discussed previously. There does not appear to be any true decision-making process. Rather, the NRC appears to immediate pressing problems."

Q. Please continue.

A. "As a result small problems can be given proportionately more attention than is warranted. Furthermore, the decision path within the NRC is virtually untraceable making it difficult to knowledgeably critique the staff's analysis and resolution of safety concern."

Q. Mr. Hall, wouldn't you agree that the general thrust of that paragraph is simply to recite complaints by the nuclear industry in that they believe certain problems exist with the NRC such as the attachment of too much significance to, at least in the industry's view, minor problems rather than being an explanation of the reasons for increased regulatory requirements?

A. I believe that's part of it. But I believe also if NRC is appearing to react to immediate pressing problems in anything that's probably the way the agency is reacting in other ways also.

Q. I take it, then, the conclusion that you're attempting to reach is simply an interpretation of that passage?

A. I'm perfectly pleased with the way it appears. I don't believe it requires any additional interpretation on my part.

Q. Mr. Hall, turning to page five of your testimony and continuing to the top of page six, you state there that some utilities were able to study all aspects of

engineering and design and to anticipate increasing NRC requirements; is that correct?

A. Yes.

Q. Is it your position that Philadelphia Electric Company was a utility which failed to thoroughly analyze engineering and design or failed to anticipate regulatory changes?

A. I have done no detailed analysis along those lines and without a pretty rigorous study, no, I couldn't make any such statement.

Q. So I take it, then, that you don't have an opinion as to whether or not that conclusion actually applies to Limerick?

A. I don't know.

Q. Mr. Hall, are you aware that Philadelphia Electric Company has established a separate licensing organization which has been devoted to monitoring, tracking and ensuring the timely implementation of regulatory and licensing requirements?

A. I do recall that from the testimony in this case.

Q. Are you also aware that this organization has utilized a computerized tracking system which has enabled it to ensure that such regulatory and licensing requirements are being responded to in a timely fashion?

A. No, I'm not aware of the computerized system.

Q. Mr. Hall, are you aware that PECo has implemented a formal system in which it has tracked the operating experience at its Peach Bottom plant in order to obtain additional guidance on new and revised NRC requirements as they are issued?

A. No, I wasn't.

Q. And I believe you had stated previously that you were aware generally of the results of the SALP reviews of the Limerick project?

A. I can remember testimony in this case that pointed out the SALP reviews, yes.

Q. Would you generally agree that these reports have been favorable in the area of licensing?

A. Yes.

Q. Now, Mr. Hall, turing to page six of your testimony --

A. Turning to or remaining on page six?

Q. I guess we are still on page six.

Down at the bottom of page six you indicate that regulatory changes may not have been the primary source for delay in nuclear construction; is that correct?

A. Yes.

Q. Now, turning to page seven, on lines 14 through 24 of that page, you cite the Electric Power Research

Institute report --

A. Yes.

Q. -- dated February, 1983, which lists a number of factors which caused construction delays in the nuclear industry; is that correct?

A. Yes.

Q. Do you have a copy of that report with you?

A. Yes, I do.

Q. Would you please turn to page 2-9 of that report?

A. Yes.

Q. Focusing on the second paragraph on that page, beginning with the phrase, "At the highest level," would you please read that paragraph?

A. Yes.

"At the highest level of aggregation the most important distinction to come out of the case studies was between two broad types of delay categorized according to their source: out-of-scope work, involuntary delays caused by the action of an agency other than the constructing utility, and deliberate delays, caused by the voluntary actions of the constructing utility.

"Figure 2-4 illustrates that construction lead time is equal to the inital estimate made at the start of construction plus out-of-scope and deliberate delays.

"Out-of-scope delays occur when the scope of the project is changed, usually as the result of regulatory action, both normal and shocks-related. But occasionally because of more conventional reasons such as late deliveries of materials or strikes, out-of-scope work stretches the schedule. However, active construction usually continues."

Q. Now, would you please next turn to page 2-12?

A. Yes.

Q. The full paragraph on that page beginning with, "The root causes," would you please read that paragraph?

A. Yes.

"The root causes of critical path construction delays for nuclear power plants are enumerated in Figure 2-5. The tree shows both the average months of delay per unit and the percentage of total delay caused by each root cause. The average nuclear unit from the case studies has experienced 43 months of construction-related delay of which 78 percent were related to out-of-scope work and 22 percent were deliberate delays. The dominant cause of all delay was redesign and rework problems which account for 53 percent of the delays. Thus the majority of the delays are outside the scope of normal estimating procedures."

Q. Mr. Hall, would you agree that the general thrust of those two passages is that regulatory changes in fact were the principal cause for construction delays in the

nuclear industry?

A. Well, let's examine that in some detail. I think it might be worth our while.

We see here in the second to last sentence that I read, "The dominant cause of all delay was redesign and rework problems which account for 53 percent of the delays." I think we can refer back to Figure 2-5, which is on page 2-13.

We see in their tree there redesign and rework, 53 percent. That is then split up into regulatory ratchet and redesign, which is 50 percent and 3 percent.

If we go back, then, to the previous figure, Figure 2-3, we see that somewhere in here regulatory ratchet includes new regulation, old regulation, the direct effect of it, ripple effect of each of those; and redesign is further broken up into non-regulatory redesign and ripple effect. And I notice that there are no percentages here.

So we have all these different classifications: new regulation, old regulation, non-regulatory redesign, ripple effect, all bound up into this redesign and rework of 53 percent.

Q. Mr. Hall, turning to page eight of your testimony you state that increased regulatory requirements may have been avoided if construction delay does not occur; is that correct?

A. Yes.

Q. Have you performed any type of specific analysis for Limerick to determine which regulatory requirements could have been completed sooner if an earlier completion date had been achieved?

A. No, I've done no detailed analysis.

MR. JERRETT: Your Honor, could I have a couple minutes?

(Pause.)

BY MR. JERRETT:

Q. Mr. Hall, turning back to the discussion we had on the EPRI report, and specifically the table on page 2-11 --

A. Yes.

Q. -- I believe we were discussing the fact that redesign and rework problems accounted for 53 percent of the delays. Doesn't this table define redesign and rework as the result of regulatory effects whether they be new, old, revised, ripple effect or direct effect?

A. Yes.

MR. JERRETT: I have no further questions.

JUDGE MATUSCHAK: Is there any further cross-examination of this witness?

(No audible response.)

JUDGE MATUSCHAK: Is there any redirect?

MS. CHESTNUT: Could we have just a moment, Your Honor?

JUDGE MATUSCHAK: Very well.

(Recess.)

JUDGE MATUSCHAK: Is Counsel ready to proceed?

MS. CHESTNUT: We have no redirect for Mr. Hall, Your Honor.

JUDGE MATUSCHAK: Very well. The witness is excused.

(Witness excused.)

MS. CHESTNUT: Trial Staff would call Robert A. Rosenthal.

Whereupon,

ROBERT A. ROSENTHAL

having been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MS. CHESTNUT:

Q. Good afternoon, Mr. Rosenthal.

A. Good afternoon.

Q. Would you please state your name and business address for the record?

A. My name is Robert A. Rosenthal. My business address is Pennsylvania Public Utility Commission, P. O. Box 3265, Harrisburg, Pennsylvania. The Zip Code is 17120.

Q. By whom are you employed and in what capacity?

A. I'm employed by the Pennsylvania Public Utility Commission as supervisor of valuation and rate structure in the Electric Division of the Bureau of Rates.

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

A. Yes, I have.

MS. CHESTNUT: Judge Matuschak, I have distributed copies of Mr. Rosenthal's prefiled direct testimony. I would request that it be marked for identification for use in this proceeding as Staff Statement RAR-1.

JUDGE MATUSCHAK: Do you have some exhibits also?

MS. CHESTNUT: And I would like to note, also, Your Honor, that at a later date I distributed copies of a revised summary schedule which is to be included in Staff Statement RAR-1.

JUDGE MATUSCHAK: Very well.

MS. CHESTNUT: And I would also like to note that also included in Staff Statement RAR-1 is Staff Exhibit RAR-1A, which consists of three schedules.

JUDGE MATUSCHAK: They will be so marked.

(Whereupon, the documents were marked as Trial Staff Statement RAR-1 and Exhibit RAR-1A for identification.)

BY MS. CHESTNUT:

Q. Mr. Rosenthal, do you have before you the documents which we have marked for identification as Staff Statement RAR-1?

A. Yes.

Q. Was this document prepared by you for use in this proceeding?

A. Yes.

Q. Do you have any additions, changes or corrections to make to this document?

A. I have only one change and that is on page five, line 15, the reference to the number of megawatts should read "1,152." That's 1,152 megawatts rather than the reading of 1,155.

Q. Do you have any other changes, Mr. Rosenthal, at this time?

A. None that haven't already been previously submitted. The summary schedule did make adjustments, removed the ITC amortization from rate base which had been included in there and reduced under the expense category increase in income tax associated with ITC to that level.

Q. With these changes you have noted, Mr. Rosenthal, is the information contained in Staff Statement RAR-1 and Staff Exhibit RAR-1 true and correct to the best of your knowledge, information and belief?

A. Yes, it is.

Q. If I were to ask you today the questions contained in Staff Statement RAR-1 would your answers be the same as they are therein?

A. Yes, they would.

MS. CHESTNUT: Your Honor, I would like to move into the record at this time Staff Statement RAR-1 and Staff Exhibit RAR-1A subject to any timely motions to strike or other objections.

JUDGE MATUSCHAK: Before we get to that, what changes did you make in your summary?

(Document handed to Judge Matuschak.)

JUDGE MATUSCHAK: Under those conditions the documents are admitted.

(Whereupon, the documents marked as Trial Staff Statement RAR-1 and Exhibit RAR-1A were received in evidence.)

MS. CHESTNUT: Mr. Rosenthal is available for cross-examination.

CROSS-EXAMINATION

BY MR. HALL:

Q. Good afternoon, Mr. Rosenthal.

A. Good afternoon, Mr. Hall.

Q. Mr. Rosenthal, would I be correct that a principal purpose of your prepared testimony in this

proceeding is to summarize the Staff's position at least as respects Limerick-related rate base expense adjustments?

A. Yes.

Q. Referring to page one -- actually page two -- of your statement, Mr. Rosenthal, would you describe for me the procedure by which Staff has consolidated its Limerick common plant adjustment and its Limerick penalty adjustment in order to avoid double counting?

A. Effectively to eliminate the potential for double counting we have taken the penalty adjustment first to generate a new value for common plant. At that point we determined effectively what we were seeking, which was the reasonable cost for the common plant. And that value was then reduced by 50 percent pursuant to normal Commission practice and as testified to by Mr. Gruber.

Had we retained the common adjustment that Mr. Gruber has in his testimony that would have been effectively double counting a portion of the effect of the two adjustments.

Q. And how have you apportioned the Staff's penalty adjustment between Limerick 1 and common plant?

A. That has been done pursuant to the calculations developed by Mr. Dougherty through his audit of the accounts of the company, and he provided the quantification in his statement last week.

MR. HALL: If I recall correctly, Ms. Chestnut, Mr. Dougherty deferred those questions to Mr. Rosenthal.

BY MR. HALL:

Q. Could you describe how the procedure was done?

A. Effectively Mr. Dougherty developed estimates for the escalation in the plant. What I have done is removed the escalation that he determined from the value of the claimed level of the Limerick unit used in this proceeding.

Additionally, from those claimed levels we have removed Mr. Hill's adjustment for the Bradshaw property which he provided in his supplemental direct statement.

In reviewing the Commission's order originally in the Limerick investigation the use of the April, '81, date was claimed to be the effective or announced on-line date for the Limerick unit. We have examined the costs in comparing the books of the company as of October, 1984, with the books of the company in April of 1981. We have examined effectively the labor and materials incurred and have reduced the value of those manhours through the deescalation process that he described.

Q. Mr. Rosenthal, I think you're answering my question somewhat more broadly than it was intended. I

believe you just gave me an explanation of what Mr. Dougherty explained in his testimony; is that not correct?

A. He reviewed most of that, I believe.

Q. What I'm interested in, Mr. Rosenthal, is your adjustment on Schedule 1. As I understand it, you are the Staff witness who has taken the separate adjustments proposed by Mr. Dougherty and by Mr. Gruber and sought to combine those into a single adjustment to avoid double counting.

I believe at this time you have explained to me that you did that by assigning Mr. Dougherty's adjustment between Limerick 1 and common plant; is that not correct?

A. Yes, as it was developed.

Q. And my question is what was the basis of that assignment that you made?

A. The basis of the assignments between Limerick 1 and common was developed by Mr. Dougherty through his analysis of the records. As I recall there was an apportionment necessary to the April, '81, data which was available for the October, 1984, data. Effectively those ratios have been carried forth to establish that difference.

Q. Well, looking at your Schedule 1 I note that you have a section of that exhibit, being the middle exhibit, which says "Less Adjustments to Claim," and you show Mr. Dougherty's direct and AFUDC, you show his total

adjustment, which I recall in his testimony, and then in addition you show an adjustment -- you show that adjustment divided between Limerick 1 and common; is that not correct?

A. Yes.

Q. And are you saying that those numbers were provided to you by Mr. Dougherty?

A. Yes. They come from Exhibit DPD-4. Effectively, the direct costs are the summation of the Bechtel and the PECo costs shown on that page and the AFUDC is taken directly from that page. There is rounding involved in my numbers to the nearest thousand.

Q. Mr. Rosenthal, could I see that copy of Mr. Dougherty's testimony?

(Document handed to Counsel Hall.)

Q. Thank you.

(Counsel Hall perusing document.)

Q. Thank you, Mr. Rosenthal.

(Document handed to Witness Rosenthal.)

A. The identification of the direct and AFUDC separate pieces are necessary for later calculations involved in taxes.

Q. Yes. I'm aware of that.

Mr. Rosenthal, going forward, at page four of your testimony you note that in reliance upon Mr. Dougherty's

belief -- you make the following statement:

"As explained by Mr. Dougherty the calculation reflects both the findings and spirit of the Commission's decision at I-80100341."

In making this statement and the ones that follow on the page with respect to the meaning of that Commission order are you relying on Mr. Dougherty's judgement there or are you stating your own judgement?

A. In this regard it was the combined judgement that the Commission found -- his reliance was on the order for the April, 1981, data. My examination of the adjustment and also of the order deals more with the findngs and the spirit of the Commission dealing with their evaluation of the delay decisions and the fact that they believed that the company did not balance those gains anticipated with the delay with an evaluation of the impact on ratepayers, as they stated further on.

Mr. Dougherty effectively isolated those pieces between AFUDC and direct dollars for the difference between the October data he examined and the April, '81, data he also examined. He dealt with the findings of the Commission dealing with the April, 1981, decision, the finding of the Commission; I dealt, I believe, more with the spirit of the Commission's decision in interpretting that order.

Q. Now, Mr. Rosenthal, would I be correct that

you were not a member or did not testify on behalf of the Trial Staff in that docket proceeding?

A. I did not testify; that is correct.

Q. And would I be correct that you had no role in the drafting of the Commission's order in that decision?

A. That is correct.

Q. And at the time of the issuance of that order you had no role in terms of advising the Commission or of participating as a member of a Commissioner's staff with respect to the development of that order?

A. That is correct.

Q. And would it be fair to say, Mr. Rosenthal, that your understanding and interpretation of that order is no different nor more expert than, shall we say, anyone's in this room who has a familiarity with this Commission and its orders?

A. I believe we can all read the order and make our own interpretations of it, yes.

Q. Now, Mr. Rosenthal, at page five of your testimony you make the statement that by making a much greater adjustment to the AFUDC accrued the Staff is proposing to more directly impact the shareholders who were benefited by the company's imprudent decision; and that is at lines one through five.

Why, in your judgement, does the disallowance of

AFUDC as opposed to the disallowance of direct costs more directly impact the shareholders?

A. Effectively, AFDC when it is disallowed has a more substantial impact on the company's bottom line through it's direct flowdown as a write-off without tax effects such that it would more severely impact the company financially as a result of this adjustment. Were it all direct dollars the effect to the company would be halved.

Q. And has it been a purpose of the Staff in developing this adjustment here in this proceeding to seek to impose such a maximum penalty?

A. To some extent, yes, because of the decision, or I should say the reading of the Commission's decision, because it was the management of the company who made the decision to delay and that was the imprudent decision that the Commission found and in order to exert stockholder influence on the management that would be the most direct method to achieve that end.

Q. And I take it Mr. Dougherty, with your concurrence or assistance, has developed these calculations with that as a purpose? That is the effect of your testimony here today?

A. I would not say that Mr. Dougherty developed his numbers with that in his mind specifically. He is the one who looks at the numbers and examines them for what they

are and makes his evaluations after the fact as to how he has found them.

That interpretation that it's more directly impacting on the shareholders is my interpretation rather than Mr. Dougherty's.

Q. Now, at page five, Mr. Rosenthal, in lines 10 through about 19, you speak of the company's construction of the Peach Bottom and Salem plants and you contrast that with the company's construction of the Limerick plant, suggesting that construction of the Limerick plant was a more risky venture because the company relied solely on its own resources. Do you see that?

A. Yes.

Q. Is that your stated purpose for that contrast?

A. Principally, yes.

Q. Is it not correct, Mr. Rosenthal, that the company in building the Peach Bottom and Salem projects, while it did in fact share those projects with other utilities, those two projects involved four units in which the company had an approximate 50 percent interest in each unit, whereas the Limerick plant involves only two units?

A. Those projects involved four units and I believe the company's share was around 42 percent. And it is only two units involved in the Limerick station;

that is correct.

Q. So in fact there really is not a major difference in the number of MW being added as between those two sets of projects?

A. That is correct.

Q. At line 19 to line 22 of page five, Mr. Rosenthal, you notice or you mention that PP&L sought and secured an outside participant in their own capacity development program. Do you see that reference?

A. Yes.

Q. If you know, Mr. Rosenthal, is it not true that Philadelphia Electric Company involving the Limerick plant also considered a number of alternatives for obtaining outside participation and in fact sought to obtain such participation?

A. I'm sure they have sought it. I am not sure of the time frame in which they sought that participation. I'm not aware of when they might have done that or had they done it during this period.

Q. But you have made no specific analysis of the extent to which PECo sought to obtain such participation, if at all?

A. That is true. I do not believe that they, for instance, discussed with PP&L in post-'74 time periods any attempt to, for instance, have joint participation in both

the Susquehanna and Limerick units. I believe there were prior discussions to '74 in that area. I believe there were also prior discussions in that area dealing with the Hope Creek unit.

Q. And you don't know whether there were similar discussions in the early 1980's with each of those two utilities?

A. I believe I saw some blurb on Hope Creek but I do not believe I saw one on Susquehanna. I know the Commissioners have expressed such an interest.

Q. But you at this point only have a very vague recollection as to whether there were or were not and can't really say?

A. That is true.

PP&L, I know, has sought to sell shares of its ownership. They issued general documents requesting bids throughout the eastern seaboard. I do not believe PECo made such an effort to that extent.

Q. Did you specifically inquire of the company during the discovery phase of this proceeding?

A. On that issue?

Q. Yes.

A. No. But I believe there are some others in that area.

Q. You did not, though?

A. No.

(Pause.)

A. Certainly PP&L's efforts in securing an outside participant were more successful than PECo's efforts.

Q. On page six, Mr. Rosenthal, you mention a cost for the Susquehanna 1 and 50 percent of common plant. Is that the PP&L rate base value for that unit?

A. No.

Q. Is that the total cost for that unit?

A. Yes. That is true for both.

Q. Does that include an allowance for AFUDC for the Allegheny Power portion of that unit? It is Allegheny Power, is it not?

A. It is Allegheny Electric Co-ops, who are the joint owners. And that is the total value which would have been on the PP&L books. It probably does not include anything that may or would have been approved on the Allegheny Electric books for the purposes of AFDC. It is the starting point for the investment of PP&L from which the 90 percent ownership is determined.

Q. Well, I guess I'm confused here, Mr. Rosenthal. Are you saying that the $1,846,960,000 figure which you give at line 19 in fact includes PP&L's total costs for Susquehanna 1 and 50 percent common?

A. It includes their costs in AFDC and associated

50 percent common. It includes AEC's ownership share in the unit.

Whether AEC additionally accrued AFDC on their own books in association with their investment in the project, which as being a co-op I'm unsure as to whether or not they even would, that I do not believe would carry into the PP&L books itself.

Q. And therefore might result in an understating of that unit as compared to some other utility's entirely owned facility?

A. There may be some understatement in terms of if PP&L were putting it all in themselves. The participation of AEC in the project was late. It was not at the beginning. So that certain of the expenses or accrued dollars would still be on the books of PP&L.

Q. But we are talking about several years worth of AFUDC here, are we not? AEC came into the project several years before it's completion?

A. It came in, I believe, in '78. So we are talking about a number of years, yes.

Q. On page seven, lines four to seven, you mention that the Staff is currently reviewing the financial ramifications of its proposed, I believe, over $1 billion write-off of costs in the Limerick facility. Have you concluded that review?

A. No, we have not. We have had a severe illness in the finance division which has prevented it from being completed.

Q. So in proposing the Staff's position in this case you have no, at this point, financial guidance, so to speak, as to the effect of your proposals on the company to offer the Commission at this time?

A. We have only preliminary areas. No final number has been determined.

A lot of the questioning in the financial area deals ultimately with how the company would respond in the time frame in order to mitigate the effect of the write-off. Certainly, if the company makes no efforts the effect is more substantial. We believe that there is the potential -- we would expect rebuttal from the company in this area -- that it could reach the level, potentially, of the passing of the dividend in the immediate future.

However, we haven't finalized that calculation, nor are we sure that it would ultimately result because the company has as its resources significant dollars which may not be spent which would ultimately impact the effect of the write-off.

Q. You agree, do you not, that the Commission should be concerned with such financial implications?

A. It should certainly be aware of them. How

concerned, I believe, is a question that they have to answer in their own minds.

It is a very difficult decision but it should not be the ultimate guidance in their decision. They should not make a lesser adjustment for strictly financial reasons in that regard.

Q. Well, let us assume that Staff's position in this case were to require the company to pass its dividend for a significant period and to enter into a period of very severe financial strain. Is it your testimony here today that Staff still proposes that position regardless of those assumed facts?

A. Yes.

Q. At page seven, lines 14 to 19, you speak of various agruments which can be made in your view for a penalty adjustment limited only to the equity portion of what Staff defines as excess costs; is that not correct?

A. Yes.

Q. And what are the arguments, in your view, that support that alternative adjustment?

A. The principal argument really deals with the obligation to bond holders, the debt structure and the capital structure -- that portion of the capital structure, that they have a different and more sustaining obligation than to common equity holders and we may have to account

for that. One may argue only to seek the equity portion of the level of the adjustment because those people are -- it is a stronger obligation in terms of first mortgage bonds and other debt items that could preclude penalizing those holders also. They also do not have direct control over the management of the company as the stockholders do.

Q. And would I be correct that you have not done any analysis of what the financial ramifications of that adjustment might be on the company either?

A. It certainly would be reduced from the prior level discussed. That adjustment would probably not -- if I recall the numbers for the retained earnings for the prior year being in the neighborhood of $450 million -- it would not necessitate by bond obligations or pass of the dividend. There may be other reasons to do it.

(Pause.)

A. If I might, as an AFDC adjustment, the number there would flow directly down to impacts on retained earnings and income.

MR. HALL: Your Honor, that's all the questions that I have.

JUDGE MATUSCHAK: Is there any other cross-examination of this witness?

MR. POPOWSKY: Your Honor, I just have a couple of

questions.

JUDGE MATUSCHAK: Very well.

CROSS-EXAMINATION

BY MR. POPOWSKY:

Q. Mr. Rosenthal, in your cross-examination by Mr. Hall with response to the questions concerning the financial impact of the Staff's adjustment on the company you indicated that that financial impact may depend in part on what steps the company takes to mitigate any adjustment. What steps did you have in mind that the company could take to mitigate the effect of the adjustment?

A. The steps that the company could take, much as PP&L has taken in the past year, is reducing construction expenditures of various types. It could also be reductions in salaries, reductions in maintenance -- hopefully not that -- reduction in tree trimming, things of that nature, which are day to day expenses which impact on the cash of the company and would effectively be to some extent a mortgaging of the present for the future. But they are vehicles and techniques available to the company to offset on an immediate basis the impact of the adjustment.

Q. Are you familiar with any other steps that, for example, Pennsylvania Power & Light has taken after, for example, excess capacity adjustments were made on that company?

A. Well, certainly, PP&L with its adjustments they have sought certainly to market a great deal more power to other companies and also they have reduced significantly general construction. For instance, they deferred totally the refurbishing of their main headquarters.

There is some difference in the two adjustments because in my mind the PP&L excess capacity adjustments are generally recoverable adjustments; hence if sales return or recover dollars are then recovered back to earnings. A penalty adjustment such as this is a write-off and it is not recoverable through expanded sales to any great extent because it is actually a loss of investment.

Q. In your recollection, do you recall what the company did with respect to its investment in Salem 2, for example, in the early years of that plant's life?

A. They leased it to Jersey Central for a period of -- well, it was scheduled to be five years but with the commercial date of the operation it was curtailed to four years and three months, I believe.

MR. POPOWSKY: Those are all the questions I have, Your Honor.

JUDGE MATUSCHAK: Is there any further cross-examination of this witness?

MR. HALL: Your Honor, Mr. Popowsky's questions have raised two additional matters in my mind.

FURTHER CROSS-EXAMINATION

BY MR. HALL:

Q. Mr. Rosenthal, would the company be able to sell the unit or power from the unit on a long-term sale basis assuming that only Staff's penalty adjustment were adopted?

A. I don't see how Staff's penalty adjustment would affect the ability of the company to sell power on a unit basis off-system or within PJM.

I was speaking effectively in terms of the financial effects, whereas an excess capacity adjustment reduces your earnings but does not remove plant eligible for rate base; hence if through greater sales you achieve the original earnings level that adjustment is recouped. However, when you have a write-off of this magnitude that's dollars lost now and in the future because your future rate base is always reduced also.

Q. Well, I take it even despite the Staff's adjustment the unit would be continued in rate base; would it not?

A. The unit itself would be recognized in rate base at a reduced level of cost.

Q. And would that permit the company then to also sell the unit off its system and recover its investment?

A. If the company made the effort to sell the unit

off at some dollar amount certainly they would have within that vehicle the ability to recoup a portion of this adjustment.

Q. And that would be Staff's position, that it would still permit the sale of the unit off of the company's system?

A. I believe you could sell it off the system given your scenario. What would be recognized if you were to sell the unit in total for $3.8 billion to a non-affiliate, then effectively the customers are not bearing the burden of the excess costs. That may be one may to recoup it.

If a portion of the unit were sold based upon the value of the $3.8 billion versus our value of $2.2 billion, to use the rate base allowance, there may be a ratioing of the recognition of the unit. But again, the company could effectively, I believe, secure some of this excess cost from the new owner as part of the purchase price. I believe it would have to be done in the near future before the write-off. There may be some accounting problems beyond that.

Q. But I take it you have not had the opportunity or have not taken the opportunity at this point to fully evaluate this possibility?

A. At an initial point in this case I did evaluate the potential of viewing the unit as an unregulated subsidiary and were the unit to be -- the power

from the unit -- to be valued at market rates. That is the extent to which I reviewed it, what would be the market rate for the power out of the unit.

To some extent that's the savings of the unit, at least in the initial term, though some measure above that is what I came up with.

Q. Have you or Staff made any study of the realistic possibilities of selling this -- or, really, any large base load unit -- at the current time in this area?

A. I believe you probably would receive some interest on the part of Jersey Central Power & Light. You may also receive some interest in the New England system. It is unlikely you would receive any from the south or VEPCO because of their own capacity situation becoming substantially larger this year with Bath County. I do not know exactly what state Delmarva is in right now. They would be another option, perhaps, for a piece of it. Atlantic City is normally looking for a piece of power. They have substantial contracts with the west and also with PP&L.

But your principal options would be the Jersey Central system -- in close proximity. I believe they are still under a deficiency situation.

MR. HALL: Your Honor, that's all the questions I have.

JUDGE MATUSCHAK: Is there any redirect?

MS. CHESTNUT: Could we have a moment, Your Honor?

JUDGE MATUSCHAK: Very well.

(Recess.)

JUDGE MATUSCHAK: Staff.

MS. CHESTNUT: Your Honor, I have no redirect examination for Mr. Rosenthal.

JUDGE MATUSCHAK: Very well. The witness is excused.

(Witness excused.)

JUDGE MATUSCHAK: I think this would be an appropriate time to recess for lunch.

MR. HALL: Your Honor, could we take a relatively short luncheon break? I would note that I may have as much as three to three-and-a-half hours of cross-examination.

JUDGE MATUSCHAK: How soon can the parties be back?

MS. CHESTNUT: A half-hour.

MR. HALL: A half-hour is fine.

JUDGE MATUSCHAK: We will recess until quarter after one.

(Whereupon, at 12:45 p.m., the hearing was adjourned, to be reconvened at 1:15 p.m., this same day.)

AFTERNOON SESSION

(1:35 p.m.)

JUDGE MATUSCHAK: When you're ready.

MR. WERSAN: Your Honor, at this time, the Office of Consumer Advocate presents the testimony of James J. O'Brien and Mr. O'Brien is here.

Before I present him for swearing in, I would just like to make a short statement. Mr. O'Brien is presenting the testimony and is the main witness sponsoring testimony which will be identified as OCA Statements Nos. 1 and 1A.

Due to the nature of the kind of project that is involved in reviewing construction of a facility such as Limerick, he was assisted in his efforts by other people on his staff.

And on Friday, I identified a Mr. John Plunkett who performed certain calculations and quantifications that are attached as schedules to Mr. O'Brien's testimony.

Mr. Hall has been aware of that, and it is my understanding he will have a few cross-examination questions for Mr. Plunkett after Mr. O'Brien's cross-examination is concluded.

I would further note that Mr. Ellis Sedikoff, who is also present here with me today, was responsible for much of the technical discovery and information development in the critical path analyses developed in Mr. O'Brien's testimony,

and he is here.

And to the extent the company needs through its cross technical information which is not at Mr. O'Brien's immediate hand, I would just request that he be allowed to confer if necessary with Mr. Sedikoff.

I am assuming that we probably will not have to get into that detail, but if that comes up, I would just like to make it clear that that is a possibility.

JUDGE MATUSCHAK: Why don't we swear all three of them in at the same time, then, in case Mr. O'Brien wants to refer to one of the other witnesses?

MR. HALL: I don't think that will be needed, Your Honor. I don't think I will have questions that will require Mr. Sedikoff's participation, but let's see.

JUDGE MATUSCHAK: Very well, we will just swear in Mr. O'Brien.

Whereupon,

JAMES J. O'BRIEN

having been duly sworn, testified as follows:

JUDGE MATUSCHAK: Proceed.

DIRECT EXAMINATION

BY MR. WERSAN:

Q. Would you please state your name and address for the record?

A. James J. O'Brien, and my business address is

2 South Centre Street, Merchantville, New Jersey, 08109.

Q. By whom are you employed, Mr. O'Brien?

A. O'Brien-Kreitzberg and Associates, Inc.

Q. In what capacity are you employed there, Mr. O'Brien?

A. I am the chief executive officer.

MR. WERSAN: Your Honor, at this time, I would like to mark for identification as OCA Statement No. 1 and OCA Statement No. 1A the testimony and exhibits of Mr. O'Brien and the supplemental direct testimony of Mr. O'Brien.

JUDGE MATUSCHAK: It will be so marked.

(Whereupon, the documents were marked OCA Statements Nos. 1 and 1A for identification.)

BY MR. WERSAN:

Q. Mr. O'Brien, do you have before you documents that have been now identified as OCA Statement No. 1 and 1A?

A. Yes, I do.

Q. And do these documents represent your direct and your supplemental direct testimony in this case?

A. Yes, they do.

Q. Was this testimony prepared by you or under your direction and supervision?

A. Yes, it was.

Q. And does this testimony consist of texts and exhibits going from Exhibit JJO'B-1 through JJO'B-26 between

the two documents?

A. Between the two, yes.

Q. And I would also ask you, in Statement No. 1A, is there also an appendix there and revisions to Exhibits JJO'B-17.4 and 18?

A. In 1A, yes, that's correct.

MR. WERSAN: And I would note, Your Honor, that Exhibits JJO'B-3, 4, 5A, 5B, 5C and 13 are separately bound, and copies have been provided to Your Honor, the company and the court reporter.

JUDGE MATUSCHAK: Very well.

BY MR. WERSAN:

Q. Mr. O'Brien, do you have any changes or corrections at this time to your testimony?

A. I have one minor correction at Exhibit 6 in Statement No. 1. There is a legend at the lower right on the page which shows a star and has the legend, "cash restrictions." Actually, the star should be reversed. The star is no cash restrictions.

The circle with a cross in it represents cash restrictions.

Q. And that was in Exhibit No. 6 to Statement No. 1?

A. That is correct.

Q. With that correction, Mr. O'Brien, if I were to ask you the questions contained in OCA Statement No. 1 and 1A,

would your answers be the same as set forth therein?

A. Yes, they would be.

Q. And would those answers be true and correct to the best of your knowledge, information and belief?

A. Yes, they would be.

MR. WERSAN: Your Honor, at this time, I would also like to mark for identification OCA Exhibit No. 86, which I have passed out to Your Honor and the parties. This is a response to a company interrogatory request dealing with the quantifications contained in Mr. O'Brien's statement.

And since the quantifications slightly affect . . eventual ratemaking, though not the actual development in Mr. O'Brien's testimony, I felt that I should present it at this time.

JUDGE MATUSCHAK: Very well.

(Whereupon, the document was marked OCA Exhibit No. 86 for identification.)

BY MR. WERSAN:

Q. Mr. O'Brien, do you have before you the OCA's answer to IR-PECo-OCA-I0-1?

A. Yes, I do.

Q. Was this answer prepared under your direction and supervision?

A. Yes, it was.

Q. Do you have any changes to this document at this

time?

A. On the second page of the exhibit -- and the actual original submittal was several pages in length -- but on the attached second page, the figure at 50 percent of common -- the figure is nine lines down -- the figure for Bechtel Indirects of $140.4 million, it should read $140.6 million.

Q. And with that correction, Mr. O'Brien, is your answer true and accurate to the best of your knowledge, information and belief?

A. Yes, it is.

MR. WERSAN: Your Honor, Mr. O'Brien is available for cross-examination. Before I offer him for cross-examination, could I move into evidence OCA Statements Nos. 1 and 1A and OCA Exhibit No. 86, subject to any motions to strike that are offered in a timely fashion?

MR. HALL: Your Honor, I would note that we did move to strike a portion of Mr. O'Brien's testimony --

JUDGE MATUSCHAK: I can't hear you, Mr. Hall.

MR. HALL: Your Honor, I would note that we did make a motion to strike a portion of Mr. O'Brien's testimony as with Dr. Hanauer's, which motion will be argued before you on Thursday.

JUDGE MATUSCHAK: Subject to that motion and any other motion to strike or objections, Statement No. 1, Statement

No. 1A and Exhibit No. 86 are admitted into evidence.

(Whereupon, the documents marked OCA Statements Nos. 1, 1A and OCA Exhibit No. 86 were received in evidence.)

MR. WERSAN: Mr. O'Brien is available for cross-examination.

CROSS-EXAMINATION

BY MR. HALL:

Q. Good afternoon, Mr. O'Brien.

A. Good afternoon, Mr. Hall.

Q. Mr. O'Brien, at page 1 of your prepared testimony, you state that O'Brien-Kreitzberg is listed as 37th nationally by "Engineering News-Record" among professional construction management firms, and that is at the bottom of the page. Do you have that reference?

A. Yes, I do.

Q. I would like to take a minute to examine that and understand what that in fact means. Mr. O'Brien, you provided us with an interrogatory answer, I believe, that updated the information stated on page 1, is that not correct?

A. That is true.

Q. And that interrogatory answer, I believe, indicated that O'Brien-Kreitzberg, for the year 1983, is 25th nationally.

A. That is correct.

MR. HALL: Your Honor, at this time, and before continuing with the cross, I would like to identify and ask for inclusion in the record of an exhibit that I am going to use during the cross-examination.

The exhibit, which I would ask be identified as PECo Exhibit No. 10, comprises a number of interrogatory responses that the Office of Consumer Advocate and Mr. O'Brien have provided to us.

And I would ask that it be identified as PECo Exhibit No. 10 and admitted into the record.

MR. WERSAN: Your Honor, if I may, I have no objection to marking these for identification as PECo Exhibit No. 10. I would like to reserve the right to object to inclusion of any of them after Mr. Hall's cross-examination, depending upon how he uses them or if he shows relevance of any of these answers.

JUDGE MATUSCHAK: Very well. The exhibit is admitted, subject to any timely objections.

(Whereupon, the document was marked PECo Exhibit No. 10 for identification and received in evidence.)

JUDGE MATUSCHAK: Do you have copies distributed?

MR. HALL: We have previously distributed the exhibit, Your Honor. I believe you have one up in front of you.

BY MR. HALL:

Q. And Mr. O'Brien, you have a copy as well?

A. Yes, I do.

Q. Now, Mr. O'Brien, the interrogatory response relative to the "Engineering News-Record" which I mentioned is IR-PECo-OCA-3-2, is it not, and is contained in PECo Exhibit No. 10?

A. Yes, it is.

Q. Do you have that before you, sir?

A. Yes, I do.

Q. I believe attached to the interrogatory response, you provided a copy of several pages from the "Engineering News-Record" article, which discusses the ranking of professional construction management firms, is that not correct?

A. That is correct.

Q. And is this article not in fact taken from a much longer article which reports an "Engineering News-Record" annual survey of professional design firms, is that not correct?

A. That is correct.

Q. And this is a survey of some 500 design firms as is noted on the page of the article that you have provided to us?

A. That is correct.

Q. And the particular article that you have provided, does it not, looks at specific design firms who also engage in construction management activities, is that not correct?

A. That is correct.

Q. What does the "Engineering News-Record" mean when they speak of design firms, Mr. O'Brien?

A. Firms that do design.

Q. And we are talking here primarily, are we not, of engineering design firms as opposed to professional construction management firms or architect engineer constructors, is that not correct?

A. This particular part of the article incorporates the professional construction managers.

Q. Is it not true, though, that it only includes professional construction managers who are also design firms?

A. I don't believe that to be the case.

Q. Mr. O'Brien, I take it the box that is shown in the article page which lists some 50 companies, that is the ranking of design firms, is it not, listed by the percentage of their total billings which come from construction management activities?

A. That is correct, and the "Engineering News-Record" does two surveys per year, one of the top 500 design firms, and one of the top 500 constructors.

And in both cases, as a side issue, if you will, they

look at construction management. So, they really only have two categories. So, when we respond to their survey, the design group is the one we are most closely oriented toward, so that is one we respond to.

For instance, we are listed in their -- they put out a directory, which you pay to go in the directory. They put out one every year, or every other year, I forget which.

But they have one for designers and one for contractors. When we put our marketing material in, we go in the designers' section.

So, it is a matter of -- we aren't designers, but that is the closest category we come to when News-Record does their surveys.

Q Mr. O'Brien, my question was, looking at the list of companies that are shown in the box as being construction management firms, I note that I don't see listed the major architect engineer constructors who typically build nuclear power plants such as Bechtel, United Engineers and Constructors, Stone and Webster, Yebasko and others. Why have they been eliminated from this analysis?

A. Again, they are usually listed, I believe, in the segment that handles -- you named it -- construction manager builders or AE builders.

There is in this list Gilbert/Commonwealth, who could

fall on that list, and Black & Veatch, and Sargent & Lundy. These all three have been in the nuclear business.

I don't know why they were not in this list -- probably because they didn't respond to the survey.

Q. Could it be because the "Engineering News-Record" classifies them as constructors and includes them in that group, or is it because -- this is an alternative -- or is it because this particular survey only deals with design firms, firms which are primarily design, who also as a sideline do construction management?

A. Well, the predominant part of the list would meet your description. I note that we list ourselves as doing 95 percent construction management.

I look at -- number 29 lists themselves as doing 100 percent construction management, ergo no design. There are several other 100 percent listings.

So, there are other people who are sort of in our category.

Q. But you don't know why the major construction firms such as Bechtel or UE&C do not appear in this survey, though they do construction and construction management activities?

A. They do appear in other listings by "Engineering News-Record." Why they are not in this list, I don't know.

Q. Similarly, it is correct, is it not, Mr. O'Brien,

that the major specialty constructor firms that have done business directly on nuclear power plants such as Daniel International do not appear in this listing?

A. That is right. They would appear -- when the management looks at the top 500 construction firms, that is where you would look to find them.

Q. So, in fact, this listing is a, shall we say, selected subset of companies, i.e. principal engineering design firms who also do construction management?

A. Most of the people on the list fit that description.

Q. And your ranking at 25th reflects the fact that indeed most of your business is in construction management?

A. That is right.

Q. Mr. O'Brien, are you familiar with the 1980 -- first off, the survey that you provided to us, and which is contained or attached to PECo-OCA-3-2, taken from the "Engineering News-Record," that is a 1983 survey, is it not? It covers the 1983 year?

A. That is correct.

Q. Is it not correct, sir, that there has been a survey published for the 1984 year as well?

A. Yes, there has been.

Q. And I would note, Mr. O'Brien, your ranking is just about the same in that second survey, is it not?

A. Yes, 24th.

Q. I note in that survey, sir, that it states that 100 percent of your total billings come from construction management activity, is that correct?

A. That is right.

Q. Would that 100 percent include your billings related to such activities as you are doing here today, your consulting with respect to prudency proceedings?

A. That is right.

Q. And those also have been included as construction management in your reporting to "Engineering News-Record"?

A. Yes.

Q. Now, Mr. O'Brien, have you ever been engaged as an architect engineer, or has your firm been engaged as architect engineer directly acting to design a nuclear power plant?

A. No. Our firm doesn't do any design work.

Q. Has your firm ever been engaged as a constructor to construct a nuclear power plant?

A. No, it hasn't.

Q. Has your firm ever been engaged as a construction manager to manage the construction of a nuclear power plant?

A. No, it hasn't.

Q. Has your firm or you ever been engaged in the operation of a nuclear power plant?

A. No, not as a firm. Some of our people have experience, but a very limited number.

Q. Now, Mr. O'Brien, you have appeared, have you not, in a number of proceedings involving analyses of the prudency of utility investments or construction activities related to nuclear power plants, is that not correct?

A. Not investments, but construction activities, yes.

Q. And would you agree with me, sir, that in each of those appearances, you have appeared in opposition to the utility?

A. We have not appeared for any investor-owned utility.

Q. And would you agree that in each instance where you have been engaged to review a utility's conduct, and by that I mean a private, investor-owned utility's conduct in constructing a nuclear power plant, you have been engaged in anticipation of litigation, i.e. a rate proceeding or some other sort of litigation?

A. Some other form of litigation, and not in all cases. Our Zimmer study was never formally presented to the Ohio Commission, so it was an informative study.

There was litigation that came out of it, which we were not involved in.

Q. Was a potential purpose, though, of the Zimmer analysis, both yours and that of other individuals who

analyzed the Zimmer plant, in anticipation of the possibility of a rate case involving cancellation costs of the Zimmer facility?

A. Well, Zimmer cancelled in the midst of our study. So, when we started our study, cancellation was not imminent.

Q. Is it not correct, Mr. O'Brien, that in each of the studies that you have done of nuclear power plant construction and whether the construction was prudent or not, you and your firm have found imprudence?

A. Could we have the question repeated?

Q. Let me see if I can't restate it more clearly.

Is it not correct, Mr. O'Brien, that in each of the studies that you or your firm have done of the prudence of private, investor-owned utilities in constructing nuclear power plants, that you or your firm have found imprudence?

A. That is correct, with the notation that not all of our studies were aimed at reviewing projects for prudence or reasonability. There were some for other purposes.

Q. And I take it that exception would be Marble Hill?

A. Marble Hill, WPPSS 4 and 5, and one or two others that are in litigation.

Q. But each of the studies that was an analysis for the purposes of determining the presence or absence of imprudence did find imprudence?

A. That is right. We have yet to give a perfect score.

Q. Now, Mr. O'Brien, you presented a study, did you not, in the Missouri proceeding involving the prudence or imprudence of constructions on the Calloway plant, did you not?

A. Yes, I did.

Q. And would I be correct that the Missouri Commission did not adopt your findings in its order in that proceeding?

A. Well, I didn't -- I believe to a large extent they did, but the decision--the brief suggests that OKA's study was the backbone of the Staff presentation. The decision does not identify that.

The decision also specifically was not persuaded on our overtime argument. But on the other hand, the Missouri Commission did recommend or did disallow $384 million in the Calloway case. I believe that our work had some bearing on that.

Q. But in fact, the adjustment that you proposed was not adopted, is that correct?

A. The specific adjustment, that is correct.

Q. Now, is it not also a fact that in Illinois, your firm was considered by the Illinois staff for use in performing a construction management audit on the Commonwealth

Edison Company's Byron & Braidwood facilities?

A. That is correct. We were one of 11 proposals submitted. We were one of four firms that were on a short list.

Q. And is it not correct that the Staff rejected the retention of your firm by stating, and here I quote, "...that Mr. O'Brien's opinions are simplistic, unrealistic and contrary to regulation in the public interest"? I do have that document.

MR. WERSAN: Before you go on, Mr. Hall, I would like you to provide a copy of whatever it is you are reading from.

(Document handed to the witness by Counsel Hall.)

THE WITNESS: I am familiar with the document.

BY MR. HALL:

Q. Can you answer the question that I posed?

A. I can answer the question. It's a paragraph out of context. I would like the chance to explain a little bit more after, but yes, that is in this document.

Q. Feel free to explain.

A. This is authored by a Paul Blalock, B-L-A-L-O-C-K, who was chairman of the Edison Nuclear Construction Audit/Study Committee, and he also serves as the chief of Rate of Return section in the Economics and Rates Department, Public Utilities Division, Illinois Commerce Commission.

OKA was put on the short list and requested to come

to Chicago to present with our joint venture partner, Touche Ross, our proposal to do the two studies.

Subsequent to our being selected and prior to our presentation, our Zimmer report came out. During the presentation of our proposal to review the two Commonwealth Edison plants, Mr. Blalock asked me some pointed questions as to ratemaking policy.

And he asked me a hypothetical question, which immediately precedes the statement which you read. I quote: "Staff questioned Mr. O'Brien carefully on this subject. Mr. O'Brien was asked the following question: if a utility were to prudently incur 99 percent of the cost of a facility and the last 1 percent was determined to prevent licensing, what ratemaking treatment do you recommend?

"He responded, '100 percent disallowance.'" And then he goes on to comment. I believe he misspeaks himself. I, in answer to his question, said the worth of the plant would be zero, because it will never make electricity.

Our Touche Ross partners tried to interject and tell Mr. Blalock that O'Brien is making an engineering judgment, not a ratemaking judgment, and so forth and so on.

So, we clearly had a misunderstanding, and I thoroughly disagree with the statement, and I wrote to the Commission and requested an apology, because I had this first read to me in the hearing in Calloway. He did not have the

courtesy to send me a copy beforehand.

He of course sent a copy to Commonwealth Edison, since they were on the selection committee.

Q. Did you in fact receive an apology from the Illinois Commission Staff, Mr. O'Brien?

A. No, I didn't, and I don't suspect we will do any work for them, either.

Q. Mr. O'Brien, I would like to take a few moments now to review with you the scheduling documents which you personally have reviewed and separately which your staff has reviewed relative to the Limerick plant.

Would you agree with me that the Limerick plant, during its construction, employed a number of interrelated scheduling documents?

A. Yes, I would.

Q. Can you identify for me what those documents were?

A. They utilized a CPM network, a critical path method network. They also computerized that network. These were the two principal documents that we utilized.

We utilized those documents, and as identified in my statement, that it was as of about 1975. I believe that the engineering portion was probably scheduled on CEBUS. I am not certain of that, but even if it was, we did not utilize the CEBUS work at Limerick. CEBUS is a standard Bechtel engineering scheduling device.

Beyond the documents I have just described, I am not familiar with the other scheduling tools at Limerick.

Q. And do I understand from your answer, Mr. O'Brien, that you have not reviewed nor has your staff reviewed any of the CEBUS engineering schedules at Limerick?

A. My staff may have reviewed it. I have not, and we did not use any results of CEBUS in preparing our work product.

Q. Could you describe for me what the MSCS schedule device is at Limerick, and how it was used?

A. MSCS is a commercial available scheduling system, provided by the McDonald Automation Company. It is available commercial. It is my understanding that Bechtel broadly used MSCS in the early 1970's, and later shifted over to their own system.

Q. And what was the nature of the system that they shifted over to, do you know?

A. In the case of Limerick, I don't know. I don't know if they shifted. I am familiar with other plants where they shifted to a Bechtel design system in the late 1970's.

Q. And am I correct that you and your staff, in performing your work relative to the Limerick generating station, has reviewed two MSCS schedules, one in 1974 and one in 1979?

A. I am only familiar with the 1974 review, so if

there was a 1979 review, it would be the staff.

Q. And would I be correct or do you know how often the MSCS schedule at Limerick is reissued and revised?

A. I don't know. The typical time frame would be monthly, but I don't know.

Q. Monthly or quarterly, sir?

A. I'd say the typical would be monthly, or in a large project like Limerick, quarterly would also meet the standards of the trade, if you will.

Q. And would it not be correct, sir, that when a major schedule such as MSCS is reissued on its quarterly schedule, that in fact changes are made in the construction logic, and that is the reason that the schedule is being reissued?

A. Well, it is not always true. Again, that is one way to do it, and on a project such as Limerick, it would be sensible to incorporate the changes, because Limerick was a cost-plus project, amongst other things.

In many other projects that we are involved in, the schedule is locked in and can't be changed unless it is essentially by change-order, because the purpose is to monitor a contractual schedule.

Q. Referring only to nuclear power plant construction projects, sir, is it not correct that it is typical on such projects and is typical of Limerick that the MSCS or

comparable schedule is reissued quarterly and contains changes in the projected construction logic?

A. Yes, that is typical.

Q. And could you state for me, sir, what are the conditions upon which such changes are required? Why are such changes issued?

A. It can be a wide variety of reasons: change orders; changes in scope to the work; if there has been an occurrence, a fire, there's been a strike; there's been an increase in the scope of work; even if there's a decrease in the scope of work.

There can be a variety of -- whatever the schedule is seeing or being impacted with, it would be proper to put that into the schedule and determine what effect it has, and then sometimes -- we call them "work-arounds" -- sometimes we'll come up with a plan to work the problem or mitigate a problem.

There is a whole variety of reasons why you would put changes into a -- even just an improvement in planning. Let's say there's a reorganization, management decides to work additional shifts or some such thing, a variety of things.

Productivity would be another reason for a change in your network duration estimates.

Q. Would one reason for such a change be to incorporate into the schedule and to plan to implement the

requirements of new NRC regulatory requirements?

A. To the extent that they are identified and quantifiable, yes.

Q. Would you agree, sir, that there were a number of new regulatory requirements that were imposed upon nuclear power projects in the post-1974 period?

A. There were both new regulations and there were new interpretations of old regulations.

Q. And would you agree that these regulatory requirements substantially increased the scope of nuclear power projects, including Limerick?

A. I think that would be a fair generalization.

Q. Now, is it correct that the MSCS schedule is a construction overview schedule, and by that I mean it is the top schedule of a number of scheduling tools that are used to actually perform and manage nuclear power construction work?

A. Well, MSCS can be a lot more than that. If you are asking, what was it at Limerick, I could try to categorize it for you.

Q. What I am trying to get at, sir, is: is the MSCS schedule itself actually used at the site for detailed construction work?

A. In many cases. We did an MSCS plan for a Saudi Arabian job that had 25,000 activities. Its main device

turned out to be as a paying device, to create the invoices for the contractor at the site.

But there was great interest in what was happening to that, because it generated a monthly payroll or invoice that was probably several million dollars.

Q. But is it not correct, sir, that underlying MSCS there are a number of additional scheduling tools such as the 24-month and 12-month schedules, and also down to three-week schedules, which contain additional detail and are used by the direct construction supervision in actually performing the work?

A. Well, now, again, I am trying to ask, if you will make it Limerick specific, I will answer. That is not necessarily typical.

We are construction managers on $175 million worth of work in Camden County right now. We are running that on the various hard-dollar, fixed-price -- 17 contracts are being managed as to an MSCS schedule, and there are none of these secondary schedules that you are mentioning.

So, as to broad industry standards --

Q. Sir, none of those projects, though, are nuclear power plant construction projects, are they?

A. That is true.

Q. And none of them are anywhere near approaching the size or complexity of those projects now, are they?

A. Parts of them are.

Q. And what specific project is O'Brien-Krietzberg at present managing that in your judgment is of the complexity and difficulty of a nuclear power plant project?

A. A lot of the parts of a nuclear plant are no more difficult than what we are doing in Camden right now.

Q. But are we not speaking, though, sir, of complexity as being a project with many, many parts, as compared to one project with a single part?

A. Again, that would be a definition that I could say yes to.

Q. You would agree with my characterization?

A. Yes.

Q Did O'Brien-Kreitzberg, either yourself or your staff, directly review and use in your work presented here today the detail provided in the 12-month construction schedules of Limerick?

A No.

Q Did you review and use in your work presented here today any of the detail provided in the pre-op status tables developed in the Limerick Construction/Management Reports?

A I don't believe we did. We didn't. Dr. Hanauer may or may not have. We didn't.

Q Mr. O'Brien, is it correct that you personally have never interviewed any of the Limerick project construction managers, nor have ever visited the Limerick site?

A Well, it's a two-part question. As to inverviews, I have not; as to visiting the site, I have.

Q When did you visit the Limerick site?

A May, 1984, I believe.

Q Is it correct that in performing -- and that was not in connection with the performance of your work here, was it?

A Well, I took a tour of the plant, a PECo tour.

Q Is it correct that your staff interviewed the Limerick project construction managers on only two days, November 6th and 7th of 1984, I believe it was?

A I don't know the specific dates.

Q But is the two-day characterization correct?

A Our interviews were very limited.

Q Mr. O'Brien, I would like to turn for a moment to the philosophy of the analysis that you have presented here. You have presented an analysis which looks at schedule and seeks to use CPM scheduling methods; is that not correct?

A That's correct.

Q And is it not correct that the focus of your analysis is to seek to define if the Limerick plant could be constructed on a shorter schedule than in fact occurred and to quantify what you perceive to be the cost savings had that shorter schedule been achieved?

A That is correct.

Q In your analysis, Mr. O'Brien, have you considered the effects that a shorter schedule would have had upon, for example, the unit rates obtained from labor; and if so,how?

A No, we didn't because in our study we didn't look for a higher productivity or even a stacking of trades or any way of expediting the job.

Q So in essence you have in your work assumed that Limerick could have been constructed to a shorter schedule with the same unit rate or productivity attained from labor?

A That is correct.

Q Is it not correct, Mr. O'Brien, that labor becomes less productive as one increases the number of workers attempting to perform a job?

A Again it depends where you start from. If the job is undermanned, then clearly that doesn't give you a problem. If there is optimal manpower on the job and you dramatically increase it, let's say double the amount of manpower, then you have got a probable problem. But you have to look at each one under its own circumstances.

Q And I take it you have not made any judgment -- at least I have not in reviewing your testimony seen any judgment that you have made relative to whether Limerick was undermanned or overmanned.

A We have both reviewed that, and I believe that was part of the discussions that were covered in our interviews. It is my recollection that the PECo people were very clear that they didn't believe in extensive overtime and said they didn't have extensive overtime. I think the number was around 5 percent.

They also didn't believe in too large a project population, feeling that that is inefficient.

Q And isn't it correct, Mr. O'Brien, that you have agreed with that in other work that you have done; for example, at Callaway where you suggested a major adjustment

for excessive overtime?

A Yes, absolutely.

Q Mr. O'Brien, I would like to turn for a moment to the specific exhibits and schedules that you have prepared for Limerick. You have prepared three separate schedules, have you not; and these are contained in your Exhibits JJO'B-3, JJO'B-4 and JJO'B-13?

A Basically I would say there are two schedules. There's the base line schedule and the impacted schedule as to computer output, and then the other I believe you were referring to is the network.

Q Is it not correct that your Exhibit JJO'B-3 contains a schedule which you have developed for Limerick from an original Bechtel MSCS forecast schedule prepared by Bechtel in May, 1974?

A Yes.

Q And is it not correct that you have then adjusted that schedule as shown in your Exhibit JJO'B-4 to reflect what you perceive to be the effects of the company's cash constraint circumstances in 1974 which led to its decision to defer construction in October of 1974?

A Well, it was a long question. I agree with you there are three runs. There's the initial run which simulates or is equivalent to the original Bechtel schedule that we used. The second run expands that schedule from

the actual start-up construction date out to a new fuel load date of which cash restrictions were described as part of the reason for extending fuel load to I believe it is October, 1980. And then the third run is impacted to reflect the Mark II problems. Yes, you are right; three runs.

Q And in performing these three runs you have used the same MSCS computer program or a variant of it that Bechtel used originally in scheduling the plant?

A That is correct. We own the program.

Q You own it or you are licensed to use it?

A I think your description -- we are licensed to use it, but it is not a lease; we just pay a maintenance fee.

Q In the initial run that you did, the run at JJO'B-3, what you sought to do, am I correct, is simply to review the Bechtel construction program logic and to duplicate that on your own equipment and to produce a hard copy?

A That is correct.

Q Could you define for me the term "construction logic" as you understand it, Mr. O'Brien?

A The logic lists the work activities to be accomplished and shows the interrelationship. Logic shows what precedes a particular work activity. It has to consider

what follows it, and also it has to identify what can be concurrent.

Q And is it not correct that the logic as shown through the Bechtel 1974 MSCS run and also in your replicate of it provided for construction with a critical path through the containment drywell; is that not correct?

A Yes.

Q And is it not correct -- or do you know -- let me ask the question this way: do you know: what was the length of the start-up program that was provided in that original Bechtel MSCS run?

A My recollection is it was a six-month -- if we define start-up as from fuel load to commercial, six months.

Q Defining it from the beginning of testing to fuel load?

A I don't recall the time frame.

Q Would I be correct, Mr. O'Brien, that that original Bechtel 1974 schedule was based upon estimates made by Bechtel of the scope of the Limerick project, the number of commodities to be installed, and of the manpower needed for that installation?

A I think the answer to that is yes.

Q And were there included in that construction schedule estimates made by Bechtel with respect to what are termed the unit rates at which commodities could be

installed by the workers?

A There's no statement on the face of the schedule that tells you that is the case, but that is the usual Bechtel way of going at it; they work on the banana curves, Bechtel standards, and they should use those standard unit rates in developing their time estimates.

Q Just to back up for a moment, Mr. O'Brien, would I be correct in saying that the preparation of an MSCS run such as this May, 1974 Bechtel run which you replicated in JJO'B-3, the purpose of that exercise of performing that analysis and preparing that MSCS run was to permit Bechtel to plan the various construction activities in an orderly fashion to achieve completion of the plant and to permit them to obtain the resources needed to do that, plan for the obtaining of those resources?

A That would be a proper purpose of such a scheduling effort, yes.

Q And isn't it correct that underlying such an analysis by Bechtel or another architect/engineer on a nuclear power project there would be extensive calculations with regard to how many shifts of labor would be used, the timing of their use in various facilities in the nuclear project, how many commodities would be installed, how fast the commodities would be installed per worker time period, i.e., unit rates, that kind of thing?

A Well, I'd like to think so, but we haven't seen a heck of a lot of evidence that backs up that statement, either at Limerick or at other plants.

Q Isn't it in fact correct, Mr.O'Brien, that in the May, 1974 Bechtel forecast it was estimated that Limerick could be built with a single shift of labor; isn't that correct?

A I believe it was a single-shift plan, yes.

Q And is it not correct that there were specific estimates made by the Bechtel engineers with respect to the unit rates that would be experienced or could be experienced in the installation of commodities at Limerick?

A Well, yes, that would be typical.

Q And that was used in developing the May, 1974 MSCS; isn't that correct?

A Again, I would hope it was. That application of some Bechtel generic material possibly followed by additional calculations at the plant isn't necessarily described as massive, etcetera, etcetera calculations, as you have described it.

Q Did you inquire of any Bechtel individuals as to whether they used this or not in the development of that schedule?

A I didn't, no.

Q And is it not also correct that specific

estimates were made by Bechtel of the commodities that were to be installed both in the plant -- throughout the plant and in various areas of the plant, based on a review of the engineering drawings completed at that time?

A Well, that's true, but again you should remember that this is a fast track job, and therefore some of the -- there aren't designs to review in some cases; in particular electrical and some of the hangers wouldn't be designed in 1974, so they would have to do a best estimate based on prior units.

Q Isn't it correct, Mr. O'Brien, that their estimates were made based upon experience on other jobs that have recently been completed; isn't that (a) typical and (b) reflected in the company's testimony?

A Recently completed, and I would also add currently in progress.

Q Now, as we discussed, Exhibit JJO'B-3 replicates the Bechtel May, 1974 MSCS schedule.

A Yes.

Q Now, Exhibit JJO'B-4, does it not, make a single change to that schedule;is that not correct?

A It is described in the report as five changes, but it is, in my feeling, a single change.

Q And that change in fact is to reflect your perceptions of the effects upon the project of cash

constraints experienced by the company in 1974; is that not correct?

A It seems to me we showed those restraints starting in '75.

Q Could you point out to me where that is, sir?

A (Witness perusing document.)

At page 11 the five specific activities are described, and the time frame of impact of cash flow was initiated at -- well, close to 1974; January 1, 1975. So we started it in '75 and carried the restrictions to March 8, 1978.

Q Now, what you are seeking to do by this adjustment, sir, am I correct, is to reflect the fact that in the Commission's Order at Docket I-800 -- and whatever the rest of it is, I-80100341, you are seeking to reflect the Commission's acceptance, as you perceive it, of the reasonableness of an announcement made by the company in October, 1974 delaying completion of the plant?

A That is correct.

Q Now, I'm a bit uncertain, sir; you say that you reflected cash constraints for the period of 1975 through 1978.

A Right.

Q How did you reflect cash constraints; how specifically did you do that?

A Okay. Ordinarily we have basically, in our opinion, two choices. We could have taken the Bechtel base line schedule and blocked the starting date, which we did do -- I shouldn't say the starting date; the construction permit date of July 19, 1974, and then moved the fuel load date from the current date of April 9, 1979 out to October, 1980. This would have just expanded the time frame to equal that delay which was ruled to be prudent in that hearing that you referred to.

I sometimes refer this to the -- we also have our own computer models of other projects, and it is just like taking a rubber band. If it is a five-year program you are going to make it a seven-year program. You can just prorate an expansion of all of the activities.

In the Limerick case we decided to expand the activities within the cash flow restriction period; thus, saying: look, if they are going to work slower, then they would presumably work slower while their cash was restricted. And that was the time -- so we put all of the time growth or increase in activities in the time frame as described.

So it was an effort to rather than just expanding all activities equally that we expanded them where we were told cash was slow.

Q In essence, do I understand your answer, sir, to be saying that what you did is you accepted that

following the October, 1974 announcement by the company that it could have achieved an October, 1980 fuel load, and you simply plugged that as the end date?

A That's right.

Q And then expanded the schedule proportionately as need be to meet that end date?

A That's right, with the exception that rather than expanding it across 100 percent of the activities we expanded it totally within the cash flow restriction area.

Q You did no analysis, I take it, of what the scope of the project, the Limerick project, was perceived to be in October of 1974 or in 1975 to determine whether or not the announced fuel load date as issued in October of 1974 could be met?

A Now we are talking about the new fuel load date out into 1980?

Q Right.

A That resulted in a construction permit to fuel load time frame of just over six years, about 75 months. And based upon other plants that we have looked at recently, such as Callaway and Wolf Creek, we thought that that was a reasonable schedule at that point in time.

Q Isn't it correct then that in fact Callaway and Wolf Creek took over 100 months to complete?

A Well, that's to commercial; I'm stating to fuel load. I think Callaway was in the 90s.

Q And Wolf Creek was a little longer?

A Just a couple months longer, I think.

Q About 95 and 98, something like that?

A Something like that.

But our opinion as to a reasonable schedule for both was on the order of 79 to 81.

Q And in fact you recognize that Callaway and Wolf Creek are BWR plans and BWR plans have different design and construction problems?

A That's correct.

Q In performing the Exhibit JJO'B-4 analysis would I be correct that you did no analysis -- let me ask the question this way: in connection with your Exhibit JJO'B-4 analysis, you did not produce a cash flow of the expenditures that would be incurred to try and achieve that schedule, did you?

A No, we didn't.

Q And, therefore, you did not, I would think, do any analysis to determine whether or not the company could have raised that capital?

A Well, we didn't. There are a couple of reasons why we didn't. One is we didn't have the cost information by activity from the company. Secondly there was a ready

reservoir of resources right over in Unit 2 that they could have utilized on Unit 1 most any time they chose to.

Q Looking at the first reason, did you ask the company for the cost activities by activity?

A Not specifically for cost loading of CPM, but we asked for a number of breakdowns and were told in a number of data request answers that they just didn't have the costs broken down in that fashion.

As a for instance, they didn't have manhours for the containment area;they couldn't break that out. We had to go to another device, which I'm sure you will ask me about, to come up with that.

Q Getting back to the nature of the analysis that you have made here on Exhibit JJO'B-4, would I be correct that in producing that schedule as shown in that exhibit and the associated Schedule 5 that what you have done is you have simply proportionately extended the time period required for activities being constructed in the period of October, 1974 to the end of 1978?

A To October -- I'm sorry. I think it was only up to March 8 of '78.

Q I will accept that.

A The way you described it is what we did.

Q In fact you did not do any analysis of the manpower that would be required to try and meet that

schedule, the cash flows that would be required, the unit rates, or what-have-you?

A Well, we both didn't try to and we didn't have the information available to do it.

I would note further that there is a -- although in current dollars, dollars per year, it is almost mystifying when you look because each year the cost at Limerick increased in the cumulative expenditure, and in rate per year pretty typically; but in a calculation done to run those dollars back to constant dollars there is a definite dip in activity, which does show, at least the activity as reflected by constant dollars in the time frame that we are talking about, the cash flow restriction period.

Q The next analysis that you did was Exhibit JJO'B-13; is that not correct?

A If you could describe the exhibit -- I don't have it in front of me.

Q That is the exhibit, is it not, that contains the computer printout relative to your Mark II impacted schedule?

A Yes.

Q And would I be correct in stating that that particular schedule involves adjustments made -- again it involves a single adjustment from the previous schedule, which was JJO'B-4?

A I think there is more than one. It is an adjustment both to the piping and to the electrical manpower in the containment area affecting our analysis of what Mark II would have required?

Q You say an adjustment to the manpower. Is it an adjustment to the manpower or to the durations of activities?

A Durations of activities, reflecting an increase in manpower.

Q And in fact is it not correct that what you have done is you have calculated an increase in Mark II-related manhours of 35 percent and have simply adjusted every duration related to the containment by 35 percent?

A That's correct, and I would go on to say that that means we assumed a constant work force. So when I say increased manhours, increased manhours with a constant work force. So the time frame is the manner in which we increased.

Q And in fact again, and as shown in your response to the interrogatory that you provided to us, which is in PECo Exhibit 10 -- and let me point that out.

That interrogatory is IR-PECo-OCA-5. There you performed no analysis of the manpower that would be involved in seeking to meet the schedule that you set forth in JJO'B-3, the total number of commodities that

would need to be installed, unit rates at which they could be installed, or other similar type activities?

A That is correct. What we did is took PECo-furnished information and worked backwards from that.

MR. WERSAN: Mr. Hall, are you referring to your Exhibit 10?

MR. HALL: Yes.

MR. WERSAN: I don't seem to have PECo-OCA-5.

MR. HALL: Set 5. It is in the back.

MR. WERSAN: All right.

JUDGE MATUSCHAK: Where is that?

MR. HALL: It is at the back, Your Honor. It is Ir-PECo-OCA-5, meaning Set 5. It is not Set 3-5. It is Set 5.

BY MR HALL:

Q An additional factor that you did not review, as I understand it, Mr. O'Brien, in developing your schedule as set forth in Exhibit JJO'B-13 is manpower density limitations. Is that a term which you are familiar with, sir?

A I would understand the term.

Q What does the term mean to you, sir?

A Well, in some places such as the drywell of the BWR there is a limited amount of working space available, so there is an optimum manpower density or manpower

level. We have used -- I have done similar calculations in a water treatment plant in Virginia where there was concern that because one building had so much critical work we might not have enough room to put enough mechanics in place, and we literally leveled -- we compared desistograms showing the CPM activities remaining and then we did man-power levels versus time with limits per trade, so that we could identify whether or not we believed that building was big enough. It did turn out it was big enough, so that took some of the thrill out of it.

Q Are there two problems, sir, in a BWR drywell; one is the space that is there, which is restricted, and, secondly, the fact that much of the space that is there is being used by other pipe and equipment?

A That's right. Not only is the cubage or volume inside the drywell a limiting factor, but the downcomers and other piping are just -- it's a forest in there. I was not inside the drywell at Limerick, but I was in the drywell at Zimmer and had the opportunity to experience the crowded conditions.

Q And just so that I'm sure I understand your answer, I take it that the problem then becomes twofold because of the limited space. One is the ability to put men in that space. And would there be a second problem with regard to the ability to move equipment, move piping,

and move facilities that need to be installed, adding congestion and complexity to the entire job?

A Well, if you were going to try to expedite the work in there the answer would be yes, but I would point out that our approach assumes the same level of density of equipment and people with the exception that the Mark II does make the hangers heavier and there are other changes like that, so you may have some additional crowding or density; but by and large, by assuming the same crew size we assumed that Bechtel had properly projected how long it would take them to do the basic drywell work.

Q Isn't it true, sir, that the drywell containment work was recognized as critical path throughout the Limerick project and, thus, when you started your analysis in fact the work was fully staffed with personnel?

A When we started our analysis, which was --

Q In '74.

A Okay, I was going to say two years ago. Could you ask that again, or could it be reread?

Q Let me see if I can't clarify it. Isn't it correct, sir, that throughout the Limerick project the drywell had been recognized as a major critical path of the construction and, therefore, it had been fully staffed throughout that project?

A Well, no, not in our opinion. It is sort of

a two-part question. I believe it was recognized as a critical path. I would point out something about critical path recognition. The critical path is the longest connected path through an area or through the whole project, depending on whether you look piecemeal or the entire project. But how it gets to be the longest estimated path is a function of how much manpower, how much investment of resources, how much space; in other words, you can shorten critical -- it you get an answer on the critical path that you don't like you can try to shorten it.

I would say the fact that it was on the path early on indicates that Bechtel was aware and PECO was aware that it was an important and significant area. Further, the Mark II problem had surfaced not in '74 -- in '74 it should have surfaced, but I believe it was in '75 that the NRC wrote and warned the Mark II owners that there was a problem.

I don't know if PECo knew beforehand. I wouldn't be surprised if they might have known that there was a potential serious problem coming down the road.

But then you go on to say: was it fully staffed throughout? And I'd say: absolutely not. It's our opinion that PECo and/or Bechtel consciously held off working on work in the drywell involving the Mrk II changes.

Q. Mr. O'Brien, I note that on the second page of IR-PECO-OCA-5 -- in fact, it's the third page -- you recognize that manpower density limitations are -- and I am quoting you here -- "a consideration in the development of a schedule involving a space constrained area such as containment." But you state that they are assumed to have been high enough to permit completion of the work required to support the fuel load date as indeed they were at La Salle and Susquehanna.

Do I understand from that, sir, that you've done no independent analysis of the manpower density limitations that were possible on the Limerick containment during the late 1970s?

A. We definitely did not. We had to scratch to even come up with an opinion as to what the added Mark II manpower was by gleaning information from the company.

We didn't get a very cogent picture back from the company as to what their manpower estimates were.

Q. Did you specifically ask in an interrogatory that the company provide you manpower density data?

A. Not manpower density data, but manpower relating to the Mark II work on the containment; I'm quite sure we did.

Q. Sir, as I've described the way -- let me stop and take one step back. Exhibit JJO'B-13 and the schedule that is developed from that provides for a Limerick fuel load of

December 1981; is that not correct?

A. 1981; correct.

Q. And indeed, both you and Dr. Hanauer here are recommending that Limerick should have achieved fuel load in July 1982, having adjusted the scheduled indicated result by some months?

A. That is correct.

Q. Could you state for me what is the basis of the adjustment that you've made?

A. The adjustment through December 1981 is a function of our calculation of added manpower. I guess one could say we could have said Limerick should have been the first BWR licensed and it should have been loading fuel in the beginning of 1982, as La Salle was loading just a few months later and Susquehanna loaded in July.

We felt that our calculation was more of an indication that we didn't believe Limerick could practically have done it before December 1981; and subsequent review to the run, which we have not repeated with another computer run, suggests that probably if we recalculated, we would be well into 1982.

The reason for that is that when we did our manpower calculations, in some cases PECo showed the Mark II number for labor equally divided between Unit 1 and Unit 2. It is our belief and understanding that in reality what has

happened is that most of the physical work done in regard to Mark II has occurred in Unit 1. Therefore, if we were to review our numbers, we would probably increase the manhours assigned to the Mark II work in the Unit 1 containment, and this would move us into 1982, and it brings us much closer to suggesting that we don't think Limerick could have or should have beaten out La Salle, but that it seems to validate our opinion that Susquehanna is a reasonable benchmark for what PECo could have done.

After all, we are in generally the same labor market, the same weather conditions, and we believe that the run and the calculations validate that Limerick could have and should have equalled the performance of Susquehanna in bringing Unit 1 on.

Q. Sir, have you examined the number of cubic yards of concrete in Susquehanna as compared to Limerick?

A. I haven't.

Q. You have not?

A. I have not.

Q. Have you examined the number of feet of large pipe at Susquehanna versus Limerick?

A. Are we talking about in the containment or in total?

Q. In total or in the containment.

A. We have a comparison of dates, but I don't believe

we have compared quantities. Again, I have not. My staff may have.

Q. But they have not communicated any such comparison to you, and the comparison would not have contributed to your opinions expressed here today?

A. It is my belief that the work within the dry well relating to Mark II -- now, I'm not saying the concrete work, but the pipe work and conduit -- if anything, Susquehanna is slightly heavier. They took the conservative -- they used the German design, and I base my comment upon what Dr. Hanauer has said having been in both dry wells.

Q. Have you reviewed the comparative commodity levels at Limerick versus Susquehanna for any other commodity, major commodity nuclear power plant?

A. Again, I have not. My staff may or may not have.

Q. Sir, returning to the three anaylses that you have performed, as I understand your description of them, they have built one upon the other starting with Exhibit JJO'B-3 and then JJO'B-4 and up through JJO'B-13?

A. Yes, that is correct.

Q. And by that I mean, and I believe you mean, that each of the later exhibits, the JJO'B-4 and the JJO'B-13, involve adjustments made to the earlier schedule analysis; is that not correct?

A. That is correct.

Q. So isn't it correct, sir, that when we look at Exhibit JJO'B-13, it still reflects, does it not, the Bechtel 1974 estimates of commodities, unit rates and construction logic as the project was to be constructed?

A. That would be correct.

Q. And thus, would you agree, sir, that it is not an as-built rendition of Limerick as it actually occurred?

A. I would agree. I would call it the '74 as planned and the variations subsequent as should have beens or as could have beens.

Q. Now, in Exhibit JJO'B-13, sir, you adjusted, did you not, for the effects of Mark II; is that not correct?

A. That is correct.

Q. Is it not correct, sir, that there were a number of additional regulatory changes that impacted nuclear power plants including Limerick post-1984?

A. Yes, there were.

Q. And is it not correct that you have not made any adjustments to your analysis to reflect construction logic changes that might have occurred or increased commodities to be installed associated with those additional regulatory events?

A. That's correct, and it's based upon both the review of Bechtel trends and forecasts into 1980, which appear confident they can complete the work without

regulatory impact, and also specifically on Dr. Hanauer's opinion that in the post-TMI environment that the controlling factor as to regulatory was Mark II, and that would more than encompass any remaining changes that Limerick had not accomplished.

Q. Have you had the opportunity, sir, to review PECo Exhibit No. 2 in the course of the preparation of your testimony?

A. Could you give me another description beyond --

Q. This is the exhibit in which the company provides an explanation of the reasons for cost and scheduled growth.

A. I don't believe I have reviewed it.

Q. Could your counsel provide you with a copy?

MR. WERSAN: I don't have a copy with me.

BY MR. HALL:

Q. Let me provide you with my copy, if I could, and ask you to take a brief look at the first ten pages of that, if you could -- the first 15 pages.

(Document handed to witness.)

MR. WERSAN: Excuse me. Do you want to take a five-minute break to let him take a look at that?

MR. HALL: That would be fine.

JUDGE MATUSCHAK: Let's take a short recess, ten minutes.

(Recess.)

JUDGE MATUSCHAK: When you're ready.

BY MR. HALL:

Q. Mr. O'Brien, have you had the opportunity to review the PECo Exhibit 2 that I provided to you?

A. Yes, the first about 20 pages of it.

Q. Would I be correct, Mr. O'Brien, that a number of these items reflect regulatory changes which arose after 1974?

A. Yes.

Q. And for example, one such item is the TMI-2 analysis and design changes which had a cost of about $57.5 million. Those are all items that impacted the schedule post-1974; is that not correct?

A. Yes, that would be correct. It is my understanding from Dr. Hanauer, by the way, that the TMI impacts on BWRs were much less than they were on PWRs.

Q. And similarly, Mr. O'Brien, would it be not correct that the second item in that exhibit also involved items that occurred post-1974, that being plant staffing, startup and training amounting to approximately $181.6 million?

A. That would be items not all necessarily unexpected or unanticipated.

Q. As of 1974?

A. Again, in 1974 they certainly knew they had to do a substantial amount of training. The training

requirements had become more stringent, and certainly TMI had a direct impact on training requirements; I would agree.

Q. And you would agree that there was a substantial cost increase post-1974 and activity increase relating to TMI?

A. Yes, I would. Again, this is training; not a construction activity.

Q. And similarly, if we look through PECo Exhibit 2, we see items involving fire protection and electric separation with a cost of $65.8 million.

Those also, I take it, were items that arose and the need to respond and to put those into the construction schedules occurred post-1974; is that not correct?

A. Actually post-1975 and 1976, because that would be the Brown's Ferry results, yes.

Q. And could that also be said with regard to environmental and dynamic equipment qualification and anticipated transients without scram which have a cost as shown in PECo Exhibit 2 of about $60 million?

A. Yes.

Q. Would I be correct that your analyses, any one of your analyses, either JJO'B-3, JJO'B-4 and JJO'B-13, did not reflect any analysis of the effects of these items upon construction logic, commodity levels, manpower levels or any other construction-related matter?

A. That's correct. As I testified previously, it was our belief that the extended time as a result of the delay in 1974 plus the extended time resulting from Mark II would have given enough time to accomplish all these other things.

Q. What evaluations did you make with regard to construction logic or construction manpower or cash flows that would permit you to say that?

A. As I testified, none of the above. It was an opinion based upon Dr. Hanauer's review; also, though, however, a reading of the Bechtel reports in the early 1980s.

Q. In addition, there were listed in PECo Exhibit 2 a category of cost items called "Cost increases due to estimate refinement and other causes," with a total cost of $208.6 million on page 18.

Did you take a look at that item in your review?

A. No, I didn't.

(Document handed to witness by Counsel Hall.)

(Witness perusing document.)

A. Yes, I have looked at it now.

Q. Would you agree that that item reflects the fact that there were various items that were left out of the original construction budget estimates which had to be added in during the construction of the project; is that not

A. That's correct. As I testified previously, it was our belief that the extended time as a result of the delay in 1974 plus the extended time resulting from Mark II would have given enough time to accomplish all these other things.

Q. What evaluations did you make with regard to construction logic or construction manpower or cash flows that would permit you to say that?

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(Document handed to witness by Counsel Hall.)

(Witness perusing document.)

A. Yes, I have looked at it now.

Q. Would you agree that that item reflects the fact that there were various items that were left out of the original construction budget estimates which had to be added in during the construction of the project; is that not

correct?

A. Well, yes. One was stainless steel, which seems to maybe be part of the intergranular problem.

Q. This is a stainless steel liner for a reactor well that you're speaking of?

A. No, I don't think. That would be piping.

Q. The intergranular problem was piping?

A. Yes.

Q. And similarly, your analysis would not reflect any construction logic changes that occurred after June 1974 to reflect these estimate omissions or other similar items; is that not correct?

A. Again, repeating myself, not specifically, but we had added a window of time, or let me say PECO added a window of time, which the Commission found prudent, and then subsequently Mark II added an additional window of time. So in total, I believe there was time enough.

Q. But you have done no analysis specifically related to the physical structures to be built at Limerick, the space available in those structures, the commodities to be installed, the manpower available for that installation to determine whether or not that assumption of yours and Dr. Hanauer's is correct?

A. That is correct; and also, we have not done any such analysis to determine whether or not Bechtel's optimism

in their forecasts and trends was equally optimistic.

Q. Which Bechtel forecast and trend are you referring to, sir?

A. There is one referenced in OCA Statement No. 1. I don't think it is given a number. It says that at a certain point in time that Bechtel was still believing that it could finish timely. I believe that was around 1980. I'm pretty sure there is not a specific reference on it, though.

Q. Mr. O'Brien, I would like to return for a moment to our discussion of manpower densities. As noted in your interrogatory response IR-PECO-OCA-5, you indicate that these items are a consideration in scheduling.

Could you describe for me how your analysis would be affected or impacted if such data were available to you?

A. Well, it depends what data. For instance, installation curves and commodity quantity changes could be imposed upon the original as-planned schedule, because the as-planned schedule was rather broad as to pipe in an area

If we had the information broken down by geographical area and elevation of the plant -- but I would point out PECo told us they didn't have such information available. So it is hypothetical as to what we could have done.

Q. I believe, Mr. O'Brien, in response to a previous question, you indicated you didn't ask for that data; is that

not correct?

A. I believe we did ask for productivity data, but I defer to my staff. You can ask Mr. Serdikoff if we did ask for it.

I do know -- the reason I answered in my answer before was I am aware that PECo could not give us manpower for the containment, planned manpower. So if they couldn't do that, I doubt if they could give us commodity information by level since they couldn't even do it by the containment which was critical.

Q. Well, we're talking here about different pieces of information, are we not? The information that we were speaking of originally was manpower density information. You have now switched to productivity information, which is a different set of data, is it not?

A. I thought you had switched.

Q. No, I have not.

A. Oh. We're talking manpower density. I don't recall having asked for any manpower density information, just manpower per unit of commodity work, and I don't believe we got it.

Q. Sir, referring to your Exhibit JJO'B-4 and particularly the description that you provide of that analysis in IR-PECO-OCA-5, you there speak of that analysis as showing scheduling parameters developed around early

1976.

Could you explain for me, sir, in what respect is your Exhibit JJO'B-4 analysis an analysis which reflects scheduling parameters as developed by PECo and Bechtel around early 1976, or is it such an analysis? This is at the top of the third page.

A. I'm reading, yes.

(Witness perusing document.)

A. Well, JJO'B-4 is the stretch-out period, and what we are referring to as the scheduling parameters really -- going back, the last paragraph on the prior page talks about parameters in (f) -- parameters (a) through (f), which are all the productivity things.

Now, we are changing to a new topic. Four reflects the parameters developed around early '76. Really, that really says that we are in an overview adjusting to a new fuel load date. That's all it means. It doesn't mean that new productivity factors as of '76 were introduced.

Q. Would you agree with me, sir, that the schedule that you developed in Exhibit JJO'B-4 is again based upon the 1974 Bechtel MSCS run and not a subsequent run that was prepared in early 1976?

A. We did not mean to imply that we used the subsequent run. We used the '74 and adjusted it just as you've described, and I'd agree.

Q. And, in fact, you and your staff did not review any MSCS runs in early 1976; is that correct?

A. If we reviewed them, we didn't use them in the work product.

Q. I believe we've agreed, sir, that you only obtained the one run from '74 and the second run from '79?

A. I agreed that I have only used the run from '74.

Q. Thus, would it not be correct, sir, that if there are any significant changes in the construction logic that occurred, either prior to but post-mid-1974 or that occurred in early 1976, these are not reflected in your analysis, are they?

A. No such changes are reflected; that's true.

Q. Mr. O'Brien, would I be correct that one could not manage a nuclear construction project or really any construction project using the scheduling tools that you presented here today?

A. I hope Bechtel thought better of their work product in 1974.

Q. Is it not correct, Mr. O'Brien, that the scheduling information that you have provided in particularly Exhibit JJO'B-13 is completely devoid of any analysis of underlying commodity installation rates, manpower to be used to install the commodities, unit rates, or other such data as we have discussed and which is used, as we have also

discussed, in developing schedules for construction management purposes?

A. Well, as to 13, disagreeing with a few of your adjectives, I think you categorize it reasonably. But as to JJO'B-3, I believe that was intended to be used as a useful schedule for the development and control of a project control system for a nuclear station.

I mean, I have more respect for your client's work product than I guess you do.

Q. Well, that's referring to JJO'B-3. I take it you agree with my characterization with respect to JJO'B-13?

A. Less a couple of adjectives. I don't think it would be worthwhile to separate them all now.

Q. In Exhibit JJO'B-17, is it not correct, Mr. O'Brien, that you, in conjunction with Mr. Plunkett, have developed a cash flow associated with the schedule that you propose in Exhibit JJO'B-13?

A. Yes.

Q. Would I be correct that that cash flow has not been developed directly from your JJO'B-13 schedule, but rather has been developed by Mr. Plunkett independently with, shall we say, a different set of assumptions or procedures with regard to when cash should be expended?

A. I don't want to too readily agree to that characterization. Basically, the conclusion of 13 is that

it's our belief that the project could have and should have been done by July 1982 as to fuel load.

Comparing that fuel load with actual fuel load, there is a shortfall of 27 months or let's say an overrun is a better term of 27 months.

Mr. Plunkett was then supplied with those dates, and he was aware of the actual fuel load date. We had him working the theoretical fuel load date in mid-July of '82.

From that point, Mr. Plunkett then did his independent analysis. But it keys off the results of our 13. It doesn't directly go computer to computer, as it were.

Q. And indeed, is it not correct that Mr. Plunkett has assumed that the construction of Limerick to your 1982 schedule would, in fact, contain the same shall we say pattern of construction expenditure by year than, in fact, the actual construction of Limerick contained?

A. Yes -- not patterned by year; because if Limerick were to be put in place 27 months earlier, you'd have to have a faster spending rate. But starting in 1975 and coming forward to the data developed by OKA of July '82, Mr. Plunkett's calculations were to have a curve of a same general shape but with a faster -- it would have to have faster spending rates. So you wouldn't have the same percent per year.

He went back and used the actual Limerick spending

rate as a pattern, but he had to compress that pattern.

Q. And would it not be correct that that assumption is not consistent with the use of the Bechtel 1974 initial schedule as the construction logic for the completion of Limerick? That particular schedule did not provide for a heavying up of annual expenditures at the end of the construction process; is that not correct?

A. I don't really know. We used the actual expenditures as a guideline. As I testified earlier, we didn't cost load the 1974.

Q. Isn't that precisely the point, Mr. O'Brien? You have used the 1974 Bechtel MSCS run to arrive at a conclusion that Limerick could be built and completed by July of 1982; is that not correct?

A. That's correct.

Q. That is how you have used that Bechtel --

A. That's how we used it; that's right. And then when we go into the costing of it, we haven't used that as a vehicle. What we've done is simulated a similar cost curve, and we used actual as-built experience, which is another approach we often use; what happened backed off of that as to what would have happened if you were going to finish 27 months earlier.

Q. In your answer, Mr. O'Brien, you said a similar costing curve method. How do you know that the use of the

actual construction expenditure pattern which you have used to cost out a Limerick completed in July 1982 is, in fact, similar to the construction pattern which you assume based on the Bechtel 1974 MSCS schedule to determine that Limerick in your judgment could have been completed by July of 1982, or do you know?

A. Well, it seemed reasonable to not disagree with the spending pattern of Bechtel. Now, I guess one question you could ask: well, if you compress the 27 months and if they were cash tight, where would they get the money? And my answer quickly is: slow down Unit 2 or shut it down.

Q. I don't think that's responsive to my question, Mr. O'Brien. I asked you: how do you know that these two different streams that you and Mr. Plunkett have created are similar. You stated in one of your earlier answers that you thought they were. Do you have any basis for stating that they are?

A. My discussions with Mr. Plunkett and his description of how he selected a family of -- he's really got an actual time frame of 118 months and he's compressing that to 91 months, I believe.

As I said to you, you couldn't compress that and keep the same rate of spending per year, but he tried to simulate the same pattern of spending. You would have to spend more money in a given year in order to achieve 27 months

reduction in the schedule.

Q. But you don't know how that spending pattern relates to what you are assuming in your construction analysis was the installation of construction commodities and the expenditure of manhours? You don't know whether the costs are spent in terms of dollars under Mr. Plunkett's analysis in a fashion similar to the expenditure of manhours and commodities under your engineering analysis, do you?

A. I think you are throwing apples and bananas at me. I've explained what I did and how I turned it over to Mr. Plunkett and what he did.

Q. Did you cross-check with Mr. Plunkett at all to try and see that his expenditures of cash and your expenditures of manhours and commodities were consistent?

A. Well, I didn't have any -- other than the actual as-built, I didn't have any theoretical expenditure rate of manhours and dollars.

Q. Doesn't such a theoretical expenditure rate necessarily fall out of your engineering schedule which provides that a certain amount of construction work will be done each and every year consisting of the installation of commodities and those commodities being installed through the use of manhours?

A. Okay, but they didn't get done. The job finished late.

Q. Well, but you assumed that they got done in your Exhibit JJO'B-13, and that's what I'm referring to.

A. That's right. I assumed they got done and they would be spread out even more than had been anticipated in 1974 prior to the prudent fuel slip.

Q. I take it you believe you've answered my question, Mr. O'Brien?

A. To the best I can understand it.

Q. Mr. O'Brien, you have throughout our discussion referred to Limerick 2 and your opinion that the company could have advanced construction of Limerick 1 had it concluded or terminated construction of Limerick 2. I believe you provided an example of your understanding of how that might have been done.

Would that example be stated at page 15 in your testimony?

A. Yes, it would.

Q. And there am I correct that you state that it is your understanding that at one point in time, in August of 1981, the company was employing less than its intended number of pipefitters and electricians -- I guess less than its intended number of pipefitters but more than its intended number of electricians at Unit 1, while at the same time the company was staffing Unit 2 to a much higher level in both pipefitters and electricians?

A. That's correct. I believe it says that both were understaffed. "Status Report August 27, 1981, indicates that Unit 1 was scheduled to employ 575 pipefitters and 290 electricians. Both skills were reported understaffed at Limerick 1 at 465 versus 575 for pipefitters and 250 versus 290 for electricians."

Q. And that particular conclusion you've reached based upon your review of a monthly status report involving Limerick?

A. This was actually Mr. Serdikoff's review and his hand notes taken from that review when he requested a copy of it. For whatever reason, we were declined a copy.

Q. Did you report that to your counsel?

A. Yes.

MR. HALL: I must state that I am not aware that there was any such failure to provide information.

BY MR. HALL:

Q. Mr. O'Brien, I have here today a copy of the page of the monthly status report which sets forth these figures, and I would like to discuss them with you for a moment.

MR. HALL: Your Honor, I would like to identify this as an exhibit. I would like to identify it as PECo Exhibit 8.

JUDGE MATUSCHAK: Very well.

(Whereupon, the document was marked as PECo Exhibit No. 8 for identification.)

BY MR. HALL:

Q. Have you had a chance to review PECo Exhibit 8?

A. Yes, I have.

Q. Mr. O'Brien, you have indicated in your -- or could you point out for me, Mr. O'Brien, where the figures reflected in your testimony are reflected in PECo Exhibit 8?

A. The figures as to Unit 1, as I read them before, appear under "Planned" and "Actual" for Unit 1. It appears from this exhibit that is before me that the numbers quoted for Unit 2 were quoted as the actual totals for the entire station.

Q. So, in fact, there is an error, is there not, in terms of the depiction of what was happening at Unit 1 and Unit 2 in your testimony with respect to the manpower staffing at these two units?

A. That's right.

MR. WERSAN: Your Honor, at this time I would just like to note that the monthly status reports as well as a number of documents at MLB were reviewed by OKA during their work, and some were copied and some were considered too voluminous to copy and notes were taken.

During the preparation of OCA Statement No. 1 when we decided to use the information that is being referred to

here and I knew we did not have a copy of it, I called PECo to verify the numbers.

Now, since it was over the telephone, we were relying upon information from the company to tell us that our depiction that the 790 planned was for Unit 2. So to the extent that it now appears that that 790 planned for pipefitters is a total plant as compared to Unit 2, I would just like to note that we were relying over the telephone on information from the company.

JUDGE MATUSCHAK: Can the witness tell us what the last two sentences should be corrected to?

THE WITNESS: Yes, sir. If we just take the last sentence, I think we can correct it. "At the same time, however, Unit 2 was staffed at 111 pipefitters and 16 electricians."

There is another line here described as "Distributives, Miscellaneous Piping, Other Categories Support, Shops and Unscheduled," and that line probably is total support and probably applies to both units. So to correct it, I would use the figures shown as "Actual" for Unit 2.

It shows the shortfall in pipefitters could have been made up from Unit 2, the electricians only a little bit.

MR. HALL: Your Honor, I would note that I agree with Mr. Wersan. There was a misunderstanding related to this. I would, however, like the record to be clear that these

documents have always been held available for O'Brien-Kreitzberg to review. There has been no denial of information.

BY MR. HALL:

Q. Mr. O'Brien, would you agree with me that at a two-unit nuclear plant, there is a relationship between the staffing of the first and the second unit? By that I mean that oftentimes, crafts which for one reason or another have completed their work or are blocked from continuing their work on one unit will be put to work on the second unit simply to prevent the necessity of experiencing the expense of demobilizing the craft.

A. Again, each plant varies with situations. Given your hypothetical, I would say that that is not unusual, yes.

Q. Would you agree that with regard to a nuclear power plant configured such as Limerick 1 and 2 is, is it not correct that there are certain Limerick 2 facilities that are required to be complete simply to permit the operation of Limerick 1?

A. That's principally in the civil works area, I believe. If what you are referring to is the Limerick main building is a box and that 1 and 2 are not totally segregated, then I would agree with that.

Q. Do you know how long civil work continued at

Limerick?

A. I believe Dr. Hanauer has a table to that effect. I don't recall the answer.

Q. That's fine. We can check it later.

In performing your analysis -- let me ask the question this way, Mr. O'Brien. Is it not correct that another manpower constrained area in a nuclear power plant is the wet well?

A. It's a confined area. It is a rather large area.

Q. And that's contained in the containment, is it not?

A. Yes. It is under they dry well in a Mark II.

JUDGE MATUSCHAK: Excuse me, Mr. Hall. Do you intend to offer into evidence your Exhibit 8?

MR. HALL: Yes, I do, Your Honor. Although, I have not offered I don't believe 10 yet either. I thought I'd wait until the end.

JUDGE MATUSCHAK: All right.

BY MR. HALL:

Q. Did you, in doing your analysis, examine whether the wet well under any circumstances would become critical path?

A. No, I didn't.

Q. Mr. O'Brien, in your testimony, you state that you have accepted but have not reviewed the Commission's

determination that the 1974 deferral announcement was prudent and reasonable; is that not correct?

A. That is correct.

JUDGE MATUSCHAK: What page is that on?

MR. HALL: In the statement of Mr. O'Brien?

JUDGE MATUSCHAK: Yes.

MR. HALL: That is at page 5, Your Honor. Really, I believe it runs from page 2 to 5, the discussion.

BY MR. HALL:

Q. Mr. O'Brien, you are not in your testimony, I take it, seeking to interpret the Commission's order at the 1980 docket, but are, would I be correct, merely reflecting the interpretations that have been provided to you by your counsel as to what the Consumer Advocate believes the order means? Is that a fair statement?

A. I believe that's a fair statement.

Q. Would I be correct that the 1974 announcement of a construction completion deferral at Limerick was made in October of 1974?

A. It seems reasonable, but I don't find it in my testimony. If you want to suggest that's the case, I wouldn't argue with it.

Q. I will ask you to accept that subject to check. I believe it is stated in your testimony.

A. Okay.

Q. I believe it is stated at page 5.

A. Okay. I agree. I found it.

Q. Would it not be correct that you have reflected -- let me ask this question: have you examined in any way, Mr. O'Brien, the causes or the financial circumstances of the company which surrounded the necessity for making that announcement?

A. Not really. I've read some of the Commission background material, I think the ALJ's information, but it was just a matter of reading it. I didn't analyze it. I didn't do any financial analysis.

Q. Would I be correct that you have not sought to compare the financial circumstances which surrounded the company in 1974, for example, with the financial circumstances that surrounded it in early to mid-1975?

A. That's correct. I didn't review the financial circumstances other than as we applied them in JJO'B-4.

Q. And by that you mean simply -- I take it by that, Mr. O'Brien, you don't mean that you made any financial judgments; you simply mean that you tried to reflect what you felt the effects of those circumstances were on the need to extend the schedule?

A. That's correct.

Q. And you made those adjustments?

A. That's correct.

Q. You are not, I take it, holding yourself out here as an expert in matters of finance or stock markets or what have you?

A. You are very correct.

Q. Would I be correct that in your schedule analysis, you have given effect to the company announcements in October 1974 by simply holding at the level of dollars actually spent the construction expenditures on Limerick in November and December 1974?

A. Could you restate that possibly?

Q. Is it correct that in the analysis that you and Mr. Plunkett have jointly done, the sole effect that is given to the Commission's acceptance of the 1974 deferral announcement is to hold constant at the as-built expenditure level the dollars spent at Limerick in November and December 1974, and that thereafter you increase the dollars spent to a level above that actually spent?

A. In coming to the spending curve that would be necessary to meet the July '82, yes, I believe that is correct.

Q. So, in fact, you begin showing the company as spending greater amounts at Limerick than it in fact did spend beginning with January 1975?

A. That is correct.

Q. Could you state for me on what basis did you

decide to increase the expenditures beginning in January 1975? Why do you feel that that is an appropriate -- if you have an opinion -- reflection of the Commission's order, or did your judgment in that regard have nothing to do with the Commission's order?

A. I think the latter is true. It had nothing to do with the Commission's order. It was an attempt to identify the escalation costs, the AFDC increases and other delay-related costs in what we perceived to be a 27-month overrun. And so to avoid that 27-month overrun and the substantial amounts of money related to it, respectively this is the spending level which would probably have been required.

We did not attempt to then go out and say: could the company have found this money, could they have avoided building their new headquarters; could they have done this, that or the other thing. We didn't get into that all.

Q. Would you agree, Mr. O'Brien, that if in fact it were to be assumed or proved that the company could not have obtained or expended or should not have expended additional cash at Limerick during 1975, that that would extend the schedule that you have developed?

A. It might.

Q. Why would this not be a necessary outcome of that assumption?

A. Well, again, using the critical path method, the company did claim in various writings that they kept the critical work going even in the cash restriction program. So if you defer float work, work which has scheduling flexibility, then you could still for some period of time I guess you could call it rob Peter to pay Paul and keep the project more or less on schedule.

I believe the company in certain writings has said that was their intent.

Q. If you know, Mr. O'Brien, is it not correct that in I believe it was 1975, in the summer of 1975, the company ceased containment work for a two-month period pursuant to the identification by the NRC of the Mark II hydrodynamic loads?

A. Again, this was an area which Dr. Hanauer reviewed, but it is my recollection that that seems right and that following that delay of whatever it was that the company then made certain design changes to the wet well in particular, I believe, to improve its structural capabilities.

Q. And is it not correct that that shutdown of construction on the containment, which I believe Dr. Hanauer accepts as being reasonable, is not reflected in your construction schedule, any one of the three?

A. I believe that is correct.

Q. Mr. O'Brien, would you agree that construction

schedules such as the 1974 MSCS schedule, which you have used as the basis for your analysis, may be at times deliberately optimistic?

A. I would have to admit that that can happen.

Q. Would that often happen because of a desire by the plant's owner or by the architecht-engineer to motivate the work force to produce a higher level, to give them a target to shoot for?

A. The carrot on the stick, yes.

Q. Do you believe it's appropriate that such schedules be used as the basis for an analysis such as you used here?

A. Well, it depends on whether or not that was the type of schedule which was used by Bechtel at Limerick. We don't know that to be the case.

They schedule they used was similar to ones used in many other -- maybe not many -- on several other units which started about the same time.

The industry consensus at around 1975 was that 60 months from safety concrete to fuel load was a reasonable schedule. So that Limerick was not unusually short.

Q. You mean the Limerick schedule?

A. The Limerick schedule, yes.

Q. Do you know -- you say you do not know that it was the case that the 1974 MSCS schedule may have been a deliberately optimistic schedule. Do I take it from that

that you do not know the converse either? You do not know that it was not?

A. I don't, but I believe by adding two substantial increments of time, one which we added when we made the adjustment in JJO'B-4 and, secondly, the one which we believe was imposed upon Limerick by the error in the Mark II, these two substantial amounts of time would have taken the schedule out of being an optimistic one, if it was, into being one that was achievable.

Q. Mr. O'Brien, is it not correct that in each of the schedules that you have developed, including Exhibit JJO'B-13, you have continued to use the original start-up testing schedule, i.e., the schedule from the first testing through fuel load that was projected by Bechtel in 1974?

A. That's correct. We have not changed, except we have extended the durations of, but have not changed any pre-fuel load start-up activities, correct.

Q. Is it not correct that you have not extended the duration of any such activities either?

A. That's probably true, because they would probably have fallen outside the window that we expanded.

Q. And I believe you state that in your testimony.

A. I don't recall if we have, but it sounds reasonable.

Q. Is it not correct that there were very substantial regulatory changes as we discussed in relation to PECo Exhibit 2 which increased the time required for start-up by utilities in the mid to late 1970s and even into the early 1980s?

A. Again, I would rely on Dr. Hanauer for that input, but I think it's a reasonable statement. I might just go on to note that a typical start-up is usually between one and two years and the pre-fuel load, and hopefully closer to one. So that I don't know right at my fingertips what amount of time our JJO'B-4 shows, but when you add the 14 additional months for Mark II, there should have been plenty of time for start-up in that schedule.

Q. Would you not agree, Mr. O'Brien, that there would be a number of start-up activities and tests that could not be completed until after much of the Mark II work was completed?

A. Yes. We show that on JJO'B-13. We show the cooling water start-up testing relying on the completion of Mark II.

Q. How can you know that the interrelationships between your Mark II analysis and your start-up analysis are correct when you are using the original Bechtel estimated start-up sequence as estimated back in 1974 before the many regulatory changes that occurred?

A. Again, I have to rely on Dr. Hanauer for that.

Q. Did Dr. Hanauer review your construction and start-up schedules as set forth in Exhibit JJO'B-13 and advise you to make any changes or revisions to them?

A. There were conversations between Dr. Hanauer and Mr. Serdikoff, not between myself and Dr. Hanauer. So I really can't tell you how aware he was of the start-up specifics in our critical path.

Q. And you would not be aware as to whether he proposed any specific alterations? You're not aware of any?

A. I'm not aware of any, no.

Q. Would it be correct, Mr. O'Brien, if you know, that Limerick has one of the shortest start-up times of a contemporary BWR plant?

A. I do not know, but the contemporary group includes Shoreham.

Q. It also includes Susquehanna, does it not?

A. Susquehanna, Nine Mile 2, La Salle, et cetera, WPPSS 2. When we say start-up now, are we talking start-up to fuel load?

Q. Yes.

A. Then you've proven my point. There is plenty of time for it.

Q. We will have to look at your schedules and see if

that is so.

But I take it, Mr. O'Brien, you don't know the relationship of the actual Limerick start-up length to the original 1974 proposed start-up?

A. Again, pre-fuel load, I'm not personally aware of it, no.

Q. Mr. O'Brien, did you do any examination of the Limerick project documents in the 1975 to 1979 time period to determine what the company at that time perceived to be an appropriate unconstrained cash flow for completion of Limerick to a 1982 fuel load?

A. I do not recall that we have that information. I did not make such a study.

Q. You would not know whether that information was in the forecasts and other documents?

A. The forecasts do repeatedly say -- in fact, our Exhibit 6 where I changed the legends shows that Bechtel very often was giving two projections, one projection for no problem with cash and the other is for cash limited. So we are aware of those.

We've done a number of Bechtel reviews, and we usually spend a considerable time with the forecasts and the trend systems. But Exhibit 6 demonstrates that we were aware that there were different viewpoints, yes.

We didn't do an independent evaluation.

Q. And in fact, Exhibit 6 does present certain of the both cash restrained and cash unrestrained cash flow availabilities that the company developed in its forecast?

A. Yes, but then some of the projections or forecasts show some major jumps without any -- well, there will always be the rationale. There will be the trend which is not reconciled. It is just a projection.

Q. Have you done any comparisons of the actual cash flows that you assumed in your analysis to complete Limerick for a July '82 date with those that the company was contemporaneously estimating as being needed to complete the unit by a July 1982 date?

A. It would be my belief that our knowledge is limited to what is on the forecasts and comments on forecasts, but I would defer to Mr. Serdikoff. We may have looked at more. I'm not aware that we did.

Q. Could you consult with Mr. Serdikoff? You might also consult with him with regard to whether Dr. Hanauer looked at your detailed schedule.

(Witness conferring with Mr. Serdikoff.)

A. To the two questions, we didn't have any specific input that we are aware of from Dr. Hanauer as to start-up or any advice that we should change it.

Secondly, as to looking at any PECo financial forecasts, our information was limited to what was in the

Bechtel forecast to the extent that they repeated what the company might have told them.

Q. And I take it you did not specifically inquire of the company to obtain additional information in this area?

A. It would be my belief that we didn't.

Q. Would it be a correct statement, Mr. O'Brien, that utilities in the 1974 to 1977 time frame did not foresee the extent of regulatory change and the cost of regulatory change that would be required to complete the Limerick generation of nuclear power plants?

A. I would agree with that.

MR. WERSAN: Excuse me, Your Honor. Do you have an appropriate break point so that we can put Mr. Plunkett on the stand?

MR. HALL: Right now is fine.

(Witness temporarily excused.)

JUDGE MATUSCHAK: Let's go off the record for a moment.

(Discussion off the record.)

JUDGE MATUSCHAK: Back on the record.

MR. WERSAN: Your Honor, with the company's permission, we are presenting Mr. John Plunkett of Komanoff Energy Associates. He prepared certain cost quantification tables that are presented in Mr. O'Brien's statement, and also performed the quantification that are in OCA Exhibit 86.

Whereupon,

JOHN J. PLUNKETT

having been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. WERSAN:

Q Mr. Plunkett, could you please state your full name and address and your affiliation for the record?

A My name is John J. Plunkett, and I'm a Senior Economist with Komanoff Energy Associates, and my business address is Quivey Hill Road, Hampton, New York 12837.

Q Mr. Plunkett, have you previously presented testimony before the Pennsylvania Public Utility Commission?

A Yes, I have, in the Limerick 2 investigation.

Q Have you also assisted any other witnesses in this present case in preparation of their testimony?

A Yes. In fact, I performed a substantial portion of the quantitative work in support of the testimony of Charles Komanoff in this case.

Q Could you state briefly what you did for Mr. O'Brien in this case?

A Yes. At the instruction of OKA I was asked to prepare an estimate of direct and AFUDC cash flows for Limerick 1 had it achieved a fuel load date of July, 1982 instead of its actual fuel load date of October, 1984. And I was further instructed that the period over which these cash flows should extend should begin with the commencement of the stretch-out of construction identified as the beginning of 1975.

Further and subsequent to that work I was asked also to prepare similar quantification for some indirect costs incurred both by PECo and Bechtel, and at one point, pending some information from PECo I was also asked to quantify costs associated with the Mark II rework.

Q Thank you.

MR. WERSAN: Mr. Plunkett is available, Mr. Hall.

MR. HALL: Thank you, Mr. Wersan.

CROSS-EXAMINATION

BY MR. HALL:

Q Mr. Plunkett, do I understand correctly that the principal contribution that you made with regard to the O'Brien-Kreitzberg effort in Statement No. 1 and 1-A is reformulating or formating the cash flows from the October, 1984 completion date -- not completion date, but

fuel load date to a July, 1982 fuel load date, and then calculating the associated AFUDC?

A That is substantially correct, yes.

Q And is the culmination of that effort shown in JJO'B-17.4 Revised, attached to Mr. O'Brien's Statement No. 1-A?

A Yes. I might add in addition different variants of 17.4 Revised are also included in response to a PECo interrogatory, IR-PECo-OCA-10-2, which is also included in your Exhibit 10.

Q Would I be correct, Mr. Plunkett, that in computing AFUDC associated with the schedule that Mr. O'Brien has recommended you computed that AFUDC on direct expenditures but not on overheads and taxes?

A Actually I cannot state -- cannot recall precisely right now whether or not what I have labeled as "Directs"include overhead and taxes. Sometimes I use the term "Direct" a little bit more liberally just to mean non-AFUDC, which you may have noticed when I refer to some of these calculations as "indirects:"so the short answer is: I'm not sure.

MR. WERSAN: We can provide that informatin, Mr. Hall, if you would like.

MR. HALL: That's fine. Just to assist you, along the way we believe you have left out overheads and taxes.

BY MR. HALL:

Q Do you agree, Mr. Plunkett, that overheads and taxes should be included in the CWIP accounts as specified in current regulations, and should have AFUDC accumulated on them?

A I would agree with that, yes.

Q Now, in addition, Mr. Plunkett, do I understand correctly that you have prepared the answer of the OCA to IR-PECo-OCA-10-1, which is included in PECo Exhibit No. 10 as the second to the last response?

MR. WERSAN: For the record, I would note I believe that is the same document that has been entered as OCA Exhibit 86.

MR. HALL: That is correct.

THE WITNESS: I would say that I provided the numbers, and the actual text was crafted I think with my assistance, but I didn't actually prepare all the complete answer.

JUDGE MATUSCHAK: Keep your voice up, please.

BY MR. HALL:

Q That's fine, Mr. Plunkett. My question goes to the preparation of the numbers, and specifically the interrogatory response, as I understand it, sets forth the level of adjustment that the OCA believes is appropriate associated with its Mark II and Schedule adjustment under various assumptions provided in several scenarios of levels

of Commission acceptance of that adjustment; is that a fair characterization?

A Yes.

Q And in fact the first level of assumption provides that: here is the adjustment, Commission; if in fact you adopt each of the positions that we have taken, here is our total number. Is that not correct?

A Yes. At 100 percent of common included with the 50 percent, yes.

Q I see that. And why don't we focus on the total adjustment of $847.7 million at 50 percent of common.

A Okay.

Q And one more introductory question, Mr. Plunkett: what you are doing here is you are taking adjustments that are stated through the rest of the OCA testimony and you are scaling them back so that if they are adopted in combination there will not be double counting; that is your concern, is that not correct?

A You have expressed the concern correctly. I just thought I would be a little more precise as to which I'm adjusting. It is in fact the revised costs to the 7/82 fuel load that it changed as we include more and more adjustments. The other adjustments, Bechtel indirects, PECo indirects and Mark II, those are somewhat independent and are not being changed, as you see as you go down the

page.

So it is mainly the revised cost for the earlier fuel load date that is changing.

Q And the Mark II, Unit 1 and common costs of $194.1 million which you show here, that's the same for 100 percent and 50 percent of common?

A That's my understanding. That is not my calculation. In fact, that is PECo's calculation.

Q I take that is simply a company number?

A Yes.

Q And it has been adopted as being defined as associated with only Unit 1 and common?

A Right. And my understanding is that it had nothing to do with -- it was invariant with respect to the amount of common.

Q Where did you obtain that understanding?

A Through my discussions with both OKA and OCA, but that's sort of beyond the purview of my work. I really don't have anything to do with that number.

Q Now, the Bechtel Indirects and the PECo Indirects you vary depending -- and also the revised costs of the 6/82 fuel load you vary dependent upon whether we are dealing with 100 percent or 50 percent of common.

My question is: how mathematically do you do that?

A I basically prorated the real costs or the

deflated costs associated with PECo and Bechtel Indirects; and if common over the period of time that OKA informed me that these costs were incurred, and Limerick by itself, Limerick 1, accounted for roughly two-thirds of the costs incurred for the entire plant over that period and common accounted,say,for another one-third, I took the $171.9 million and gave it 67 percent plus one-half of it, 37 percent.

Now, it is probably a little hard to follow verbally and I could provide back-up work papers.

Q Would you provide a back-up work paper on how this was done, showing specifically the calculation --

A Certainly.

Q -- for each of these figures?

Let me just see if I have the concept. As I understand it, you are saying you looked at the period over which these dollars were spent, based on your assumed calculation to tie in with Mr. O'Brien's June, 1982 fuel load, and you saw what total dollars were being spent at Unit 1 versus common?

A Actually it would have been Unit 1 -- to get it down to Unit 1 and half of common, I took two end dates, the beginning date being the 1st of August, 1982 -- it would be the day after prudent fuel load -- and through the 31st of October, 1984. Again, these dates were given

to me by OKA as the period after prudent fuel load and before actual fuel load that wouldn't have been incurred, and, therefore, those dates. And similar to the calculations I made for the revised costs with a mid-1982 fuel load, I again used Limerick's actual direct construction expenditure pattern, and thereby allocated the total number over each year, part of 1982, all of 1983 and then again part of 1984.

Once I established these costs for each year, I then calculated AFUDC accrual on them from again the start of this period through actual commercial operation -- or the latest projected date for commercial of 15 February 1986.

Q Now, a second problem that I understand that you have is when you remove a specific adjustment, the other adjustments change in magnitude, or at least the revised cost of the 6/82 fuel load changes in magnitude; in fact it increases.

Would you explain why that it?

A Yes. I'm looking for a convenient place to refer to.

(Witness perusing document.)

If you look at JJO'B-17.1 in Statement 1, two things change when you introduce the adjustments for indirects, for example; and that is, first of all, if we assume that these costs had never been spent it changes the pattern

of cash flows that PECo would have incurred. So this pattern that we used to shift changes.

The second point is that if look on JJO'B-17.1, the column headed "Actual between 31 July '82 and 26 October '84" also decreases.

Now, the point behind all this is that we want to -- we are trying to remove the escalation associated with the later fuel load date, so we simply don't want to double count escalation that has already been removed from the first adjustment by actually removing -- assuming the expenditures never occurred.

So that's why it changes as we make adjustments by straight disallowance -- that's a regulatory word -- but assuming they didn't happen you can't then remove the escalation associated with them.

Q Let me see if I understand the concept. AS I understand what you are saying, the adjustments for Bechtel Indirects, PECo Indirects and Mark II reflect the actual costs of the company. You are simply disallowing those as the plant was built; is that correct?

A Yes; again not doing any disallowing, but removing them, yes.

Q Removing them. And when you get down to the last line here where the revised cost for the 6/82 fuel load are 604.4 for 100 percent common, what you are

doing is those costs that were for the indirects and the Mark II are now being spread back to the pre-6/82 period, and the proposed disallowance there is greater because you are removing some escalation associated with that, but you are allowing the recovery of the costs themselves?

A Let me say that's correct and restate what I think you just said. By allowing those costs or not assuming they didn't happen -- assuming they happened as they did, in the bottom $604 million adjustment, for example, all we do is remove the escalation associated with them, whereas up top we remove them completely, real and escalation, and then therefore reduce the adjustment solely related to the earlier construction -- excuse me; the earlier fuel load.

Q Can I ask that you provide us with your work papers as to how you developed each of these figures?

MR. WERSAN: We can do that.

THE WITNESS: Certainly.

MR. HALL: Can we get this by Friday?

MR. WERSAN: Yes.

MR. HALL: That's all the questions I have for Mr. Plunkett.

JUDGE MATUSCHAK: Do you have any redirect?

MR. WERSAN: No redirect.

(Witness excused.)

Whereupon,

JAMES J. O'BRIEN

having previously been duly sworn, testified further as follows:

CROSS-EXAMINATION (Continued)

BY MR. HALL:

Q. Mr. O'Brien, you have testified, have you not, with regard to prudence or imprudence of nuclear plant construction expenditures and decisions by utility managements on several occasions, is that not correct?

A. Yes.

Q. In testifying with regard to prudence, would you agree that the analyst should not find imprudence which could not be knowable to the utility managers at the time decisions had to be made, and with the knowledge that was available at that time?

A. I agree with that definition, yes.

Q. Would you further agree, Mr. O'Brien, that in seeking to quantify what is alleged to be the costs associated with imprudence, an analyst should seek to quantify only those costs which are directly attributable to the specific imprudence that is found?

A. Again, that seems to be reasonable. I would agree.

Q. For example, let us assume that a utility -- let's call it Utility A -- were found to have been imprudent in its

hiring of a particular contractor, in that the contractor was not qualified to do the work, but in fact as it turned out the contractor did the work and did it ably, and there was no adverse effect.

Wouldn't you agree that there should be no imprudence adjustment, even though, analyzing the decisional process by the utility in selecting that contractor, one would find that choice imprudent?

A. If I may, an analogy in civil suits, where you are looking to entitlement to damages and damages, if there are no damages, then it doesn't matter that there is entitlement. So, I would agree.

Q. In seeking to determine the costs associated with imprudence, and indeed in seeking to determine imprudence itself, would you agree that it is unreasonable to demand a standard of perfection or perfect management activity?

A. I would agree that that is not a proper evaluation of prudence or reasonable performance. Perfection is not an appropriate standard.

Q. Would you agree that in evaluating the prudence or imprudence of a utility's decisions, one should look and see or one can look and see what other similar managements were doing during the time period in question?

A. Yes, if there is -- again, you have to look at it situation by situation. But certainly, if there were other,

specific, similar projects that can be looked at, and a comparison is proper -- by that I mean, I don't believe that looking at the bottom line is an appropriate comparison as to whether something is prudent or imprudent.

Q. Would you agree that comparisons between nuclear plants are difficult and generally imperfect?

A. Yes.

Q. Would you agree that in making comparisons between nuclear plants, one should seek to make comparisons on the broadest possible basis, and by that I mean looking at the largest number of comparable plants to determine one's judgments?

A. Well, then you get into, as the number becomes broader, the qualifications as to the comparison become more difficult and the comparisons become muddier, as it were.

So, a case in point, we have pretty much looked at Susquehanna and Limerick. LaSalle is in there, but we have really emphasized the similarities between Susquehanna and Limerick.

Q. You would agree that there are a number of other BWR Mark II and Mark III plants that you have not looked at, is that not correct?

A. Certainly there are.

Q. And that would include Shoreham, is that not correct?

A. No.

Q. Shoreham is a Mark II plant, is it not?

A. Yes.

Q. You did not look at it?

A. We are looking at it. We didn't look at it for the Commission.

Q. You did not look at it for the purposes of this testimony?

A. That is right.

Q. And you did not look at WPPSS 2 in your comparisons for purposes of this testimony?

A. We did not, that's true.

Q. And similarly, you did not look at River Bend?

A. Yes, we are.

Q. But you did not, for purposes of this testimony?

A. No, but we are aware of -- we are just in the beginnings of the study on River Bend, which is a Mark III, at any rate.

Q. It is correct, is it not, that the Mark III containments had a problem similar to the Mark II containments with regard to pressure suppression containment?

A. We expect to bring that out, yes.

Q. Would you agree that each of the plants that I have listed took a longer period of time for construction and cost more than did Susquehanna or LaSalle?

A. Can we bifurcate that? I think River Bend, I don't believe took longer, but it is costing more. River Bend really started into full swing in 1979, so it is a relatively fast plant.

But for reasons that we haven't identified yet, it is a more expensive plant than Limerick.

Q. Would it not be a perfection standard to seek to compare Limerick only to Susquehanna and not to some of these other plants which are also BWR, Mark II or Mark III plants, but which have longer schedules or have greater costs? Why is it not a perfection standard to employ in the comparison of all of these plants?

A. Well, in the first place, I don't think Susquehanna was perfect, and they had their share of problems, as has been discussed in this very forum.

For instance, River Bend, as I said, you mentioned it's a Mark III. It's post-TMI start, so it started five years after.

Shoreham started five years before Limerick, and is not commercial yet. It had so many problems that I wouldn't think it's a reasonable comparable.

Q. What about WPPSS 2?

A. WPPSS 2, I don't know. It has a somewhat different containment, even though it's a Mark II. I believe it uses steel, where Limerick uses concrete, but it might be

a reasonable -- I don't know. I haven't looked at it.

Again, in that kind of a comparison, characteristic to characteristic, I really rely on Dr. Hanauer rather than the type -- you know, he would do it, and we would review it and see if we'd accept the comparison.

Q. You are in fact, are you not, the scheduling expert? You are the one that knows schedules and construction commodities and construction features; Dr. Hanauer is an NRC regulation man, is that not correct?

A. Well, Dr. Hanauer has had a broad experience. He's an engineer, and whether he had to or he likes to, he has seen a lot of units.

And he likes to look at them in great depth, and I rely on his basic common sense in looking at construction materials and results, not let's say at productivity per se or scheduling per se.

Q. Are you testifying here today that indeed the selection of comparables for Limerick was made by Dr. Hanauer and does not reflect any judgment by O'Brien-Kreitzberg or yourself?

A. Dr. Hanauer felt the two closest units were LaSalle and Susquehanna, and especially Susquehanna, both as to time frame; in the case of Susquehanna, location, which I mentioned earlier.

Q. I don't think you have answered my question. Did

you make a judgment, or are you simply accepting --

A. We both made the judgment.

Q. So, you can speak for the judgment as well as Dr. Hanauer?

A. That is correct.

Q. What about Clinton? Did you examine Clinton as to whether it should be a comparable?

A. I am not familiar -- no, I did not look at Clinton. Is it Hanauer's list? Was it cancelled, or -- I know one Clinton unit started.

Q. But to the best of your knowledge, you did not look at Clinton?

A. To the best of my knowledge, we didn't look at Clinton.

Q. Did you look at Hope Creek?

A. We are looking at it right now.

Q. But did you look at it for the purposes of developing comparisons for the purpose of this testimony?

A. Well, Hope Creek is a Mark I. It's really the old Newbold Island reactor. It's really a 1968 or 1969 design as opposed to being a contemporary of Limerick's, and it has the interesting situation of being an old design being built almost post-TMI.

So, there were a lot of reasons to say that Hope Creek is not analogous to Limerick.

Q. Is it not correct that the Mark I design also had the pressure suppression problem?

A. It had problems, but since the ceiling of the wetwell wasn't the floor of the drywell, I think that there are different solutions to it. They had a long time to figure out a solution to that, anyway.

Q. Mr. O'Brien, referring to your initial testimony, OCA Statement No. 1, and particular the discussion of indirect costs and PECo indirect costs at page 31 --

A. Yes.

Q. -- you make a statement here, do you not, that -- I believe the statement is on page -- give me a minute.

(Pause.)

Q. -- I think the statement is made at page 32, and you are stating your assumption upon which you quantify what you refer to as PECo's indirect costs that would be saved if in fact Limerick had been constructed to a July, 1982 completion date.

Do you not state that an assumption that you made in that quantification is that direct costs follow proportionately by time period of expenditure, or that indirect costs follow proportionately,by time period of expenditure, indirect costs?

A. Yes, I make that statement.

Q. I said "indirect" twice. I meant indirect and

direct.

A. I understood what you meant, that the indirects are proportional to the direct, and when I say direct, I mean direct manual labor, and/or labor plus material, either one.

Q. Is it not correct that indirect costs include much of the startup labor used in a nuclear power plant?

A. For PECo, yes.

Q. And for other plants as well?

A. Yes, yes. I meant PECo as opposed to Bechtel.

Q. And does not this startup cost generally congregate at the end of the construction of a plant?

A. Well, yes and no. It does, certainly. Another thing that we see happening is that if the startup team is assembled prematurely, and then the project doesn't finish timely, that those costs are enormous, because you have basically a team that you are reluctant to demobilize, or in some cases you've even got a team that's not qualified to do the pre-fuel load startup.

They are there for the post-fuel load startup, and it doesn't load. So that, the answer is yes, your startup costs would be mainly in the final months and even years of the job, but also startup costs can be wasted, often are wasted.

Q. And isn't it true that total indirect costs, of

which startup costs are a major component, are increasing toward the end of a project?

A. Yes, I would say that's true.

Q. And isn't it also true that direct costs are decreasing at the end of a project, direct construction costs?

A. Not reflected by the PECo spending rate. You are referring to what I would call a generic "S" curve, but the PECo expenditures are going up at a substantial rate and not tapering off as to direct costs at the tail end.

Q. Would I be correct, Mr. O'Brien, that in your analysis of the San Onofre nuclear plant, that you stated at page 3.7 of your SONGS Phase 1B report that typically much of the indirect cost pool, such as management and administration, is relatively fixed and doesn't increase in proportion as direct costs grow?

MR. WERSAN: Before you answer, do you have the document so he can review what the context of the question is?

MR. HALL: We will have it in just a minute.

(Document handed to the witness.)

JUDGE MATUSCHAK: May we inquire as to what the reference is?

MR. HALL: This is a report that Mr. O'Brien and his firm prepared for the Staff of the Public Service Commission of California.

THE WITNESS: This is a Phase 1B report, or actually three series of reports, a Phase 1, a 1B and a Phase 2. In 1B, we were trying to identify issues and the significance of issues.

This was an attempt to correlate direct cost and indirect cost, which our page 3-8, figure 3.2-1 appears to reflect such a correlation until later in the job. Even then, there is some correlation.

Now, your question was -- if I could just read the sentences together, because I think you read two from the same paragraph -- I quote: "For typical construction projects, one expects indirect cost growth to be directly proportional to direct cost growth or to experience lower growth rates."

Now, if I can stop there, that seems to say two things, either it will be proportional or maybe it will be lower.

Going on, quote: "Typically, much of the indirect cost pool, such as management and administration, is relatively fixed and doesn't increase in proportion to direct cost growth."

And that is referring to the concept of a fixed let's say startup group or management group. These are, as I read them, generic statements as to what we would expect to find when we continue to look at the details at SONGS and

and are not a reflection of what we did find, necessarily.

Phase 1B was an identification of issues, and if you will, a request to go forward and look at some issues specifically.

It is my own opinion, by the way -- I am not sure which of our staff wrote that; probably a gentleman by the name of Rudden -- but it has been my consistent belief that usually indirects are generally proportional to directs.

BY MR. HALL:

Q. Thank you.

Looking at the specific categories of cost that you list here, Mr. O'Brien, one of the categories is power. Do you know what the major reason for power expenditure is at a nuclear power plant during the later period of construction?

A. This would be power bought for startup purposes coming into the startup transformer, probably.

Q. And would not that power necessarily be required regardless of when the startup activities occurred, either pre- or post-1982?

A. Well, if we hypothesize that it was an efficient startup, then I would think you are right. But if it were drawn out, it would probably not be true.

Q. You have not suggested that there is any concern here over an inefficient startup at the Limerick plant?

A. No, I haven't.

Q. Similarly, public notification, could you describe for me what the nature of those expenditures are?

A. Those would be in the direction of public relations, also as to FEMA type expenses for evacuation plans, things like that.

I believe Limerick, for instance, has a newspaper that is distributed to the region.

Q. Are these in fact engaged in or incurred to meet various NRC requirements relative to notifying the public with respect to emergency plans and so forth relative to the plant?

A. That is right. They are that. The other side of that is, if the job project runs 27 months longer than it has to and you put that overhead kind of operation in place, it just continues.

Ultimately, when the plant is commercial, presumably that charge would go to O and M, whereas here it is going into a capital indirect account.

Q. So, you are perceiving this as being a time related expenditure?

A. Partially, not total.

Q. Isn't it a fact that a substantial part of the expenditure is directed at meeting specific requirements prior to fuel load?

A. Again, I agree with you, that to that -- it's both time related and yet is something that has to be done.

Q. You have recommended the elimination of all of it here?

A. All of it spent after the time at which we believe the plant could have and should have been started up.

Q. And you have done no analysis of what portion is time related and portion would have had to have been spent anyway?

A. That is correct.

Q. Similarly, can you describe for me what is involved in legal?

A. No, I can't. Maybe you can tell me. I would assume it is just the very kind of thing we are in right now as well as routine legal services by house counsel. I don't know. I can't separate it out.

Q. Similarly, training, plant startup staff, maintenance, do you know specifically what those dollars would be expended for?

A. Well, training dollars are pointing toward qualifying your reactor operator and senior reactor operator staff, and that goes on. It's not a static thing.

Secondly, plant startup staff we have really discussed already. If that staff is in place and the plant could have been started up on a date, then everything after that date

is unnecessary.

On the other hand, you could argue that part of that might have been needed if you were going to meet the startup date. I don't have the information to separate the two numbers.

Q. Could we go through similar arguments with regard to plant startup staff, maintenance, that some of that could be time related and some of it may not be time related based on simply an interpretation of the words, and you have not done an analysis to determine what part is time related and what part is not?

A. That is right.

Q. Just a few more questions, Mr. O'Brien. Referring to your Exhibit JJO'B-13, as we discussed previously, you made an adjustment in that exhibit for what you perceived to be as additional Mark II manhours reflecting the additional effort required to resolve the Mark II problem, is that not correct?

A. That's correct, manual manhours.

Q. Manual manhours, and that was in fact a 35 percent adjustment extending the time durations of all containment related activities that involved manual manhours?

A. That is right.

Q. And would I be correct that you obtained that 35 percent figure by dividing your total additional manual

manhours as you developed them for the Mark II activity by the total as-built manhours experienced at Limerick, is that not correct?

A. As provided by the company, that is correct.

Q. And then you applied that 35 percent factor to the originally estimated 1974 durations in containment, is that not correct?

A. That is correct.

Q. Would it not have been more accurate, Mr. O'Brien, to have taken your Mark II developed additional manhours, divided them by the manual manhours that were estimated to be required at the time of the preparation of the 1974 Bechtel MSCS run, from which you are obtaining your durations, and then use that percentage figure to adjust the company's estimated containment durations?

A. I don't know that we have the company's figure. I think we discussed that earlier.

Q. If you had had the company's figure for actual total manual manhours at the time of the June, 1974 MSCS run, would you agree that that would have been the correct figure to use in your calculation?

A. Well, it certainly would have been a figure we would consider. That would have been 1974 combined with, I gather, an as-built figure.

I also still would have gone through trying to, from

the company-provided data, understand what it was we were being told.

So, I would have run the same calculation. As we point out here, the key to it was finding the one forecast which has both manhours and total dollars, and being able to make the conversion.

Q. Is it not correct, Mr. O'Brien, that estimated total manual manhours for the Limerick project is available from the forecast documents?

A. Total projected, yes.

Q. And in fact, you have used the Forecast 7, as-built projection or nearly as-built projection, in your calculation, is that not correct?

A. It seems to me -- that 11.1, I see Forecast 4. We have used several.

Q. Page 21, you state that you used the Forecast 7 projection of approximately 30 million manhours.

A. Okay, this is final total manual, okay. For our more specific as to the -- back at JJO'B-10.1, we used both Forecast 5, we used Forecast 4. So, we used what we could get.

Q. But in fact, in developing the 35 percent figure which you have used to develop your adjustment, you use the Forecast 7 value, do you not?

A. 35 percent -- bear with me.

Q. I believe that is reflected in the explanations that are provided on pages 21 and 22 of your testimony.

A. Well, I want to be sure I don't misspeak myself.

(Witness perusing documents.)

A. The JJO'B-8.4 is the page at which that occurs, and the source is a figure of $25.4 million, and that comes from Forecast 7, page 53, as expressed at JJO'B-8.1, so yes.

But you will note, we have used figures in here from Forecast 4, 5, 6 and 7, to come up with a rationale for the additional manual manhours in the containment.

Q. That I believe, sir, is not what I am asking you. I am asking you, how did you develop the denominator which you divided that additional manual manhour figure by? I believe that is explained on pages 21 and 22, and there I think it is pretty clear that you used the Forecast 7, nearly as-built manhours, as your denominator.

A. The denominator, and -- well, as I see the bottom of 21, what I am doing is getting a total manhours of approximately 30 million, as we say at the top of 22, and applying a percentage of 9 percent to that to come up with a total probable manhours in the containment area of 2.7 million.

And then we used the baseline manhours of 2 million, that is, you know, the second from the bottom of 22.

Q. And isn't the baseline manhours simply the

2.7 million that you derived on an as-built condition minus the approximate 700,000 manhours that you computed for Mark II additional manhours?

A. Right.

Q. Leaving 2 million manhours on an as-built condition in the containment?

A. Right.

Q. And then you developed the 34 percent percentage from that calculation, and applied it to the original 1974 proposed duration, is that not correct?

A. That is correct, but you can also derive that at JJO'B-8.1, where there is a total dollars of $25.4 million. And when you carry that over to JJO'B-8.4, the manual manhours relating to that number utilizes, if you divide 9,000 manual manhours by 25.4,-- the figure at 8.4 is dollars for manual manhours -- so you also get 35 percent doing it that way.

Q. I think that is a different figure, is it not, sir? That's a figure that you used in developing your additional Mark II manual manhours. That's not a figure related to the specific calculation from which you have derived the 35 percent that you used to adjust your time durations?

MR. WERSAN: Mr. Hall, I believe part of the confusion may be, you keep citing 35 percent.

MR. HALL: I guess it's 34 percent.

MR. WERSAN: It's 34 percent as shown on page 22.

THE WITNESS: This was 34 percent of the durations.

BY MR. HALL:

Q. Yes.

A. Okay.

Q. And what I am suggesting, sir, is: would it not be more correct to have begun your calculation using the estimate of total manhours that existed in May, 1974 which is consistent with the durations that you are adjusting?

Your durations come from a 1974 Bechtel document. Would it not be correct to use total manhours from that same document?

A. Well, the document didn't speak to manhours. It said it would take a certain amount of time to do the basic work. We have taken the time it took to do all the work, subtracted the Mark II and said, well, what's left must be the basic work.

Q. Didn't we agree, though, sir, that the 1974 MSCS document is based upon an analysis which includes an estimate of total manhours?

A. We didn't. I said I would hope it would. I don't know that it did. I have not seen a supporting document from the company that describes such a development of calculations.

Q. Did we not agree that that was the normal case and course with regard to architect engineers dealing with preparing schedules for construction such as that at Limerick?

A. No, I don't think we did agree to that, because some of the estimators have very wonderful ways of developing things that are not accurate.

Q. Well, the record will I think speak for itself.

Is it not correct, sir, that in your Zimmer study, when you did a similar calculation involving an attempt to define the effects of Mark II upon the schedule at Zimmer, you did in fact use the original estimate forecast for manhours in deriving a percentage such as the 34 percent presented here?

A. I don't recall. I mean, I would be happy to look at it if you have it.

(Pause.)

MR. WERSAN: Your Honor, perhaps the safest thing would be maybe to take a five-minute break to give him a chance to review the Zimmer testimony.

JUDGE MATUSCHAK: Very well.

(Recess.)

JUDGE MATUSCHAK: When you're ready.

MR. WERSAN: I think there is an outstanding question on the Zimmer report, Mr. O'Brien.

THE WITNESS: If we had available the manpower estimate which matched the 1974 schedule, and used that as the denominator, which would give us a higher percentage growth in the time frame -- I mean I assume it would -- I think that the gap we are leaving out here or is not being mentioned is that we took the $194 million due to Mark II, which is built up from the $136 million provided by the company and their AFDC, and believe that to be the increased cost due to the redesign, the improper design information. But that omits or doesn't look at the fact that Mark II, had it been properly designed in 1974, was going to cost more.

For instance, you're asking me to compare it with Zimmer. By the company's own estimate at Zimmer, the cost of Mark II, including AFDC, was $360 million and growing, because they had not finished their Mark II. As I told you, I was in that dry well, and they had a long way to go when they closed down shop.

So there is a difference of something like $166-plus million between the costs at Limerick 1 -- described as Limerick 1 and 2, but basically the field costs are pretty much Limerick 1, as I previously testified -- and what was

being put in place at Zimmer.

So my answer would be that there is an interim cost and time which we're looking for that additional two-years of time spread and containment to be able to absorb.

BY MR. HALL:

Q Let me see if I understand your answer, Mr. O'Brien. I believe you have agreed with me that in fact in the Zimmer study you used the original estimate of manhours; is that not correct?

A I read it. I'm not sure what we had. At one point there is an assumption that 40 percent of manhours are -- 40 percent of GE cost is manhours, and I think that may just be as to the GE subcontract. I'm not sure.

Q Doesn't it in fact speak of the budgeted manhours at the end of 1974 as being 8,621,000, and then, in fact, it uses that in the calculation relative to the effect of increased containment manhours?

A Right. And you can see, we used the same nine percent, and you can see that Zimmer expected to get done for a lot less than Limerick. It didn't work out that way.

Q Are you saying that you would vary your methodology used in determining the denominator based upon the level of your enumerator, that being the only factor?

A Well, what you describe is that if we knew what the total containment estimate was in 1974, and used that

as a denominator, we would then demonstrate growth due to two things: the additional work due to Mark II error, plus the necessary addition to basic Mark II to make it work, and we would come out with a longer time extension; and, yes, I would vary my methodology and say: well, I've got to get back in; this starts to get away from reality. How was the company going to pay for that which they had to do, and how are they going to find the time to do it?

I submit that that is in that approximately two-year increase in fuel load which they bought off on in '74; for different reasons, not for Mark II, because in '74 nobody knew what Mark II was going to ultimately result in.

Q. So you're saying that you believe that some portion of the additional fuel load period that you have accepted associated with the 1974 completion deferral, which the Commission found reasonable and related to financial factors, should be used to justify this calculation that you have made with regard to the additional effects of Mark II?

A. I wouldn't say used to justify what I've done. I would say used to mitigate a great problem that the company had to handle called Mark II.

Q. Mr. O'Brien, at page 25 of your testimony you perform a comparison of the relative construction position, as you perceive it, of Limerick, LaSalle and Susquehanna,

as respects -- and particularly my interest at the moment -- large pipe hanger installation; is that not correct?

A. Yes.

Q. And you make the statement that "Large Pipe Hanger installation started over 3 years before LaSalle and over 1-1/2 years before Susquehanna;" is that not correct?

A. That's correct.

Q. What is the basis of that statement, sir?

A. I believe it is a table in Dr. Hanauer's testimony, which takes dates or derives dates from the NRC Yellow Books.

Q. Do you have that table of Dr. Hanauer's before you?

A. I could get it, I believe.

Do you have a page, perhaps?

Q. I believe it is at the back; SHH-3.

A. Yes.

Q. And it is your understanding that this data was obtained from the NRC Yellow Books?

A. At the bottom is, "'E' is estimate given in NRC Yellow Book as of June 1982." Now, that "E", that would apply only to those dates, I guess, that have an "E" behind it.

Q. Would you know where the other data that Dr. Hanauer used came from, particularly the data with

respect to the start date for LaSalle 1 and Susquehanna 1 for large pipe hangers?

MR. WERSAN: Your Honor, if I could note, during Dr. Hanauer's cross he indicated that all of the data was from the Yellow Book, but the "Es" were estimated data in the Yellow Book, as I recollect; just so that is clear.

MR. HALL: All of the data is from the Yellow Book.

MR. WERSAN: That was my understanding from his testimony on Friday.

BY MR. HALL:

Q. Mr. O'Brien, do you have any familiarity with the NRC Yellow Book?

A. Not a lot. When I worked as a consultant, the AEC then, the Blue Book was the prevalent. This was the CP and the OL. The Yellow Book was just coming into development, so that I have not worked extensively with the Yellow Book.

Q. Do you know, Mr. O'Brien, whether the Yellow Book data, when it gives the start date for a particular commodity, such as large pipe hangers or large pipe or what-have-you for individual utilities, does the date reported always consist of the same thing for each utility? In other words, are utilities consistent in their reporting of start dates?

A. I don't know. I wouldn't be surprised if they

were inconsistent.

Q. If you know, is it the case at nuclear construction projects that particular commodities may, because of a special problem or a special reason, be started at an unusually early or late time --

A. Yes.

Q. -- on a specific plant?

A. Yes.

Q. And, thus, those individual commodities really may not be indicative of where the total construction at the plant stands at that particular time?

A. That's true.

MR. HALL: Your Honor, that's all the questions that I have.

JUDGE MATUSCHAK: Any other cross-examination of this witness?

MR. DELANEY: No, Your Honor.

MR. KLEPPINGER: No.

JUDGE MATUSCHAK: Any redirect?

MR. WERSAN: If I could have a break, Your Honor; that was a fairly long cross. I would like to review my notes.

JUDGE MATUSCHAK: We'll take a short recess.

(Recess.)

JUDGE MATUSCHAK: Back on the record.

MR. WERSAN: Your Honor, we do not have any redirect.

(Witness excused.)

JUDGE MATUSCHAK: What is the wish of counsel as to tomorrow's schedule. Do you have anything scheduled for tomorrow?

MR. HALL: No, Your Honor, we do not at this point. I think the only concern that we have is that Mr. Calvert and Mr. Rainey are working with Dr. Schinnar with regard to his computer models, and I understand there are some mechanical difficulties; that perhaps the analyses needed for cross will not be done.

I understand that Mr. Rainey and Mr. Calvert have agreed they will call you if there is a difficulty with regard to the scheduling of Dr. Schinnar's cross on Thursday.

I think we had indicated at the time we agreed to that date that that was dependent upon our ability to finish the discovery which we are starting to do at this point.

JUDGE MATUSCHAK: We intend to be around here at least some time late in the morning until some time late in the afternoon.

MR. HALL: Is there a number that we can reach you through the ALJ central office?

JUDGE MATUSCHAK: Check with the ALJ's office. I

will try to keep them informed as to where I will be.

MR. HALL: We appreciate that, Your Honor.

Your Honor, if I would also be permitted to move into evidence PECo Exhibits 8 and 10 at this time.

JUDGE MATUSCHAK: Any objection?

MR. WERSAN: No, Your Honor.

JUDGE MATUSCHAK: PECo Exhibits 8 and 10 are admitted into evidence.

(Whereupon, the documents marked as PECo Exhibits Nos. 8 and 10 were received in evidence.)

MR. POPOWSKY: Your Honor, one other matter. I believe the company has asked for oral argument on the motion to strike our testimony.

Would it be advisable to start on Thursday morning perhaps a half-hour early and have the argument before the hearing?

MR. HALL: We would have no objection to that.

MR. POPOWSKY: I am just concerned; it sounds like Thursday might be a big day.

JUDGE MATUSCHAK: Can we agree then to convene at 9:30 on Thursday?

MR. HALL: That would be acceptable to the company.

JUDGE MATUSCHAK: Very well. We will adjourn at this time, to reconvene on Thursday at 9:30 a.m.

MR. POPOWSKY: Thank you, Your Honor.

MR. HALL: Thank you.

(Whereupon, at 5:20 p.m., the hearing was adjourned, to be reconvened at 9:30 a.m. on Thursday, February 13, 1986, in Harrisburg, Pennsylvania.)

C E R T I F I C A T E

We hereby certify, as the stenographic reporters, that the foregoing proceedings were taken stenographically by us, and thereafter reduced to typewriting by us or under our direction; and that this transcript is a true and accurate record to the best of our ability.

COMMONWEALTH REPORTING COMPANY, INC.

By: Robert J. Stonaker

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By: Judith A. Toberman

Judith A. Toberman

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