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PRESIDENT'S COMMISSION ON THE

ACCIDENT AT THREE MILE ISLAND

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DEPOSITION of LOUIS H. RODDIS, JR., held at the offices of Weil, Gotshal & Manges, Esqs., 767 Fifth Avenue, New York, New York, on the 27th day of August, 1979, commencing at 3:25 p.m., before Robert Zerkin, a Notary Public of the State of New York.

BENJAMIN REPORTING SERVICE
CERTIFIED SHORTHAND REPORTERS
FIVE BEEKMAN STREET
NEW YORK, NEW YORK 10038

[212] 374-1138

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PRESIDENT'S COMMISSION ON THREE MILE ISLAND:

MICHAEL R. HOLLIS, ESQ.
Associate Chief Counsel

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MR. HOLLIS: Please mark the following documents as Roddis Deposition Exhibits 1 and 1-A for identification.

(Biographical sketch of Louis H. Roddis, Jr., as of September 1976 and brief biography with attached supplemental biographical material as of March 1978, herein marked, respectively, Roddis Deposition Exhibits 1 and 1-A for identification, this date.)

L O U I S H. R O D D I S , J R . ,

having been first duly sworn by Michael R. Hollis, Esq., took the stand and testified as follows:

DIRECT EXAMINATION

BY MR. HOLLIS:

Q Mr. Roddis, let me just go over a few ground rules which I think, if they are agreed to, would expedite the deposition taking today.

First of all, I would ask you if you do not understand a particular question that I am posing, please state that you do not understand it, and I will attempt to rephrase it.

Secondly, I would ask that you permit me to complete asking my question before you commence your answer. This is simply to make sure that the court reporter accurately reflects the question which I pose.

I in turn will wait until you finish answering your question before I commence asking another question.

The Commission will provide you an opportunity to read your deposition transcript, and to submit an errata sheet, if you deem that appropriate.

We would ask that you send the signed sheet in the deposition transcript back to the Commission within ten days of the receipt of the deposition transcript, which you can send to me, if you like.

Would you state for the record your full name?

A Louis Harry Roddis, Jr.

Q What is your current employer, Mr. Roddis?

A I am self-employed as a consulting engineer.

Q What is your current position?

A My current position is self-employed as a consulting engineer.

Q Would you give me your company name?

A I trade as Louis H. Roddis, Jr., P.E., Professional Engineer, and C.Eng., which is Chartered Engineer in the United Kingdom.

Q What is your current business address and telephone number?

A 110 Broad Street, Charleston, South Carolina 29401, and the telephone number is area code 803 723-0319.

Q I have before me what has been marked as Roddis Deposition Exhibits 1 and 1-A, which

apparently are resumes prepared by you, is that correct?

A That is correct. The one marked Number 1 is current as of September 1976. I have not updated it since then. Number 1-A, entitled "Brief Biography" and its attachment entitled "Supplemental Biographical Material," March 1978 are, to the best of my knowledge, current to this date.

Q Before I ask specifically about certain things in your resume, let me just ask you to describe what you do presently in your consulting role?

A I am a consultant to several companies and agencies principally in the area of energy policy. Attached to my resume is a client list and a list of various appointments to Government Agencies.

I am a consultant specifically to Gould, Inc.; I am also a member of the Board of Directors of Gould, Inc.

I am a consultant to Hammermill Paper Cor any, and I am a member of that Board.

I am a consultant to Exxon Corporation; and I am a consultant to General Public Utilities Corporation to the Applied Physics Laboratory of the Electric Power Research Institute; and I am a

member of the Department of Energy's Research Advisory Board, a non-paid position; and I am chairman of the Central Intelligence Agency's Nuclear Intelligence Panel, as a consultant.. I have other consulting activities from time to time, as is reflected in the client list.

Q I take it that in your consulting roles, you would simply perform whatever request that your client would make of you?

A That is correct.

I typically, as I say, am in the area of energy policy, energy conservation, possible business relationships involving a manufacturing company and a utility.

Q Would you say that your work is primarily limited to nuclear energy?

A No, not at all. As a matter of fact, until 1979 I have had almost no clients in the nuclear field.

Q In reviewing your resume, I would like to request that you send us two copies of articles that you have apparently written, one being that listed under your detailed biography on page 2, an April 14, 1979 article entitled "Let's Put

Perspective in Nuclear Plant Siting," Which apparently appeared in the Electrical World, and secondly your article dated September 4, 1974 entitled "The Conservation Ethic and the Utility Industry."

The Commission would be most appreciative if you provide us copies of that.

A I can do that. I will not be back to my office until Friday of this week.

Q That will be fine.

I am sure that many of the items listed in your resume, which is quite extensive, will come out during the course of the deposition, and perhaps at times I will refer to specific places in it.

I see that you were employed by GPU during the period 1958 through 1969, is that correct?

A Yes, April 1, 1969

Q Did you come on as president and director of Pennsylvania Electric in 1958?

A Not quite. I spent one month as a consultant of the parent company, the month of August 1958, and on the first of September, I think it was, I was elected president of Pennsylvania Electric. The reason for that one-month hiatus was simply the resignation and creation of a vacancy by the

previous president.

On September 1, 1958 I actually was employed by Pennsylvania Electric.

Q How long did you serve as president of Pennsylvania Electric?

A Until some time in the middle of 1967.

Q From there, I take it, you went to become the director of the Nuclear Power Activities Group, or did you remain as president during that time?

A I moved up to the position of chairman, and became the director of Nuclear Activities of the parent company.

Q I take it then you are intimately familiar with the Nuclear Power Activities Group?

A I hired the initial cadre of people, or formed the initial cadre of people actually dating back to the time when I was president of Pennsylvania Electric. You will note from the record that I was also chairman of Saxton Nuclear Corporation, which was a small company, a second tier subsidiary company that owned and operated a small experimental nuclear plant in Western Pennsylvania.

Q Mr. Roddis, at whose request did you

head up the formation of the Nuclear Power Activities Group?

A Mr. Kuhns.

Q And Mr. Kuhns, I take it, was then president of GPU?

A He had just succeeded shortly before that to the presidency and chief executive position of GPU.

Q Was this decision regarding the formation of the Nuclear Power Activities Group one in which you took part from the inception?

A I certainly agreed to do it from the inception; it was not my idea, if that is what you mean.

Q Yes, that is what I was referring to.

Where did the idea or concept come from?

A I participated in the discussions, but it was certainly not my idea.

Q Was it Mr. Kuhns' idea, or are you familiar with who first proposed the formation of the Nuclear Power Activities Group?

A I believe it was Mr. Kuhns' idea initially.

Q What is your understanding, Mr. Roddis, of the purpose for having a Nuclear Power Activities Group within the GPU structure?

A You are talking about in 1967?

Q Yes.

A Prior to that day, each of the three principal subsidiaries of GPU, Pennsylvania Electric Company, Metropolitan Edison and the two Jersey companies which later merged, each of those three entities operated as an essentially fully integrated electric utility. The General Public Utilities corporate holding company was a small operation which exercised financial and ethical control, but did not have a fully staffed operation in the engineering, construction, or for that matter, accounting and other fields.

In the period prior to 1967 commitments had been made within the GPU system for a total of four nuclear plants, and prior to the summer of 1967 the only one I had any significant part in was the Saxton Nuclear Experiment Station, which was committed in the early 60's as an effort to train some people in this technology.

In 1964, I guess it was, Oyster Creek 1 was ordered by Jersey Central, and in probably 1965 or 1966, Three Mile Island 1 was ordered by Metropolitan Edison, and Union Beach Number 1, which ultimately became Three Mile Island Number 2 was ordered by

Jersey Central, and I had played essentially no part in any of those selections. I was knowledgeable about them as president of the sister company,but was not active.

The Oyster Creek Number 1 unit was a turnkey contract. It was GE's turnkey contract to build a nuclear plant.

Q Can you explain your understanding of what "turnkey" means?

A Well, the understanding that was intended by the term was that the plant would be built for a fixed price complete and turned over to the utility in a complete and paid-for condition.

Q Under this system, I take it, there would be no engineering or design input from the purchaser, is that correct?

A I would say that is probably correct.

I was not a participant in these decisions at this time. I think it is obvious, since the purchaser had to be the licensee, that there had to be some engineering input, but they were relatively limited.

After the middle of 1967, the situation changed somewhat, but clearly in the original concept

the turnkey plants had relatively little input from the user utility.

T-2 RZ/mf

Q Now, I would like to have some further elaboration of your understanding about the purposes behind the formation of the Nuclear Power Activities Group.

Oyster Creek, being a turnkey operation, was GPU satisfied with the work thatwas done on Oyster Creek 1? In other words, I am trying to get the triggering mechanism down in terms of why or what triggered the Nuclear Power Activities Group, and the reasoning behind it.

A First, I do not think I can tell you because I don't know the exact triggering event. I do know for a fact that they were unhappy with the performance of GE and its contractors, and there was also apparently a distinct feeling that with the two other plants, Three Mile Island 1 and what was then Union Beach, that we needed to concentrate as much of our total corporate strength in the nuclear area as possible. The growth and the size of electric production plants were such that instead of each relatively small company being able to maintain a continuous engineering and construction staff that is always busy with

building small plants, and since you build very large plants relatively infrequently, it is obviously more difficult to keep a good staff going, and the solution which was adopted by GPU was to form a service company of which the Nuclear Power Activities Group was a precursor. I cannot tell you what the triggering event was; I just don't know. I know that I was asked to come east and do that, and I was happy to do so. It was an interesting and challenging assignment, and I had completed some nine years as chief executive of Pennsylvania Electric, so I was happy to move east to do it.

Q When were you asked to organize the Nuclear Power Activities Group?

A Since we physically moved in the summer of 1967, it was some time in the spring of 1967. I can't fix an exact date. It was probably in March or April.

Q At that time, that is, when the idea had first come up and your involvement was determined, what was envisioned as the structure of the Nuclear Power Activities Group, and here I am particularly interested in whether or not this group's concentration would be that of engineering and operating, or

simply the engineering function?

A Well, my concept of it was that it was going to be responsible for the engineering and construction management of those plants and ultimately for the technical backup of the operation. Since each of the subsidiary companies had employment contracts with unions to operate the power plants in their area, it was essentially necessary that the operating staff be on the subsidiary payrolls. It was clearly my intention and clearly the total corporate intention of moving in the direction of engineering construction and technical management of the plant; certainly, the providing of the fuel, the providing of the detail people necessary to handle the technical problems of the several nuclear plants was to be done uniformly and in one central group. It was also quite clearly our intention, long-term, to form a service company operation. It was not formed during the time I was there because of some administrative and legal and tax problems that had to be straightened out, but we put under one management the several people concerned with the design and construction management of these plants. Obviously, they didn't get into operation.

Meanwhile, of course, I was still responsible for Saxton, which was our only operating nuclear plant.

MR. HOLLIS: Off the record.

(Discussion held off the record.)

MR. HOLLIS: Let the record reflect that Mr. Matias Diaz has arrived and will now sit in on the deposition.

Mr. Diaz, are you here to represent Mr. Roddis?

MR. DIAZ: Yes.

Q Is it your understanding that Mr. Diaz will represent you as your attorney?

A Yes.

MR. HOLLIS: Would the reporter please read the last question and answer.

(Record read.)

MR. DIAZ: Off the record.

(Discussion held off the record.)

Q I take it from the inception that the Nuclear Power Activities Group and then later the GPU Service Corporation were envisioned as the top, so to speak, engineering arm or department within the entire GPU structure, is that correct?

A That is correct, except, of course, I was gone by the time the service company was formed, and so I can only say what the intentions were at the time when I was there.

Q How did you go about organizing the Nuclear Power Activities Group?

A Well, we pulled together in one location, which was actually the office building that is now GPU's headquarters, Parsippany, the people that had some nuclear background in the company. These were three or four, or a representative number from each of the subsidiary companies, and I then recruited a number of additional people, many of whom are still with the service company in responsible positions. I guess by the time I left in 1969 we must have had 18 or 20 technical people plus secretaries that were committed to the Nuclear Power Activities Group operation.

Q In putting together the three or four representatives from each of the subsidiaries and recruiting additional staffs, what was determined as the primary weakness in terms of capabilities within that group of the GPU family that required attention to the matter of recruiting outside in

order to strengthen the engineering staff?

A Primarily the question of numbers. We were talking about building three large stations, one of which was a turnkey, and the other two of which were being designed by contractors to the subsidiary companies. I am trying to remember the people that we recruited into the Nuclear Power Activities Group, and one of which was Dr. Bart --

Q I have some exhibits here that might help you, and perhaps we should go over these to refresh your recollection as to some of the divisions of the Nuclear Power Activities Group, and you can elaborate on it then.

Referring to what has been marked as Neely Deposition Exhibits 7 and 9, let the record reflect that these are GPU Corporation memoranda, dated March 18, 1968 and September 6, 1968.

Referring first to the memorandum dated September 6, 1968, Exhibit Number 9, do I correctly characterize it as a memorandum that was written by you, Mr. Roddis?

A It is my signature, and I assume it is.

Q It sets forth, beginning on page 2, what appears to be various divisions of the GPU

Nuclear Power Activities Group, is that correct?

A Yes, that was basically the way I had it organized in mid-1968.

Q What was the thinking behind this organization?

A To make maximum use of the people available in the areas concerned.

Could I describe my recollection of these people and their capabilities?

Q Sure.

A There were a total of six people identified as project managers, and these were the key people in tying the Nuclear Power Activities Group into the subsidiary for the engineering and construction phase of the project. Mr. Ritter was, I guess, an assistant vice president at that time of Jersey Central. Mr. Bierman was a manager for Three Mile Island 1 for Metropolitan Edison, and both of these were experienced engineers. Mr. Neely was project manager for Jersey Central for what was at that time Oyster Creek Number 2, and had been Union Beach and eventually became Three Mile Island 2. Mr. Montgomery was running the Saxton Nuclear Corporation, and physically was located at Saxton,

Pennsylvania, where the operating plant was. Mr. Hetrick was a Jersey Central employee. He was, I believe, at that time detaching himself from Saxton to come back and work on the breeder project which we had active at that time with North American Rockwell, and Mr. Hirst was defined as acting for the breeder, was moved temporarily into that spot from another assignment.

Eventually we had a Major Fuels Division, which Dr. Bartnoff, president of Jersey Central was brought in from Westinghouse to manage that. This was the principal buildup area. These were nuclear technologists. At this time we only had two, Karish and Bartnoff, and I was recruiting some others.

The Safety Division was of importance because the licensing activity was a strong one, and had Heward, Mr. Roome, Mr. Reppert, and Behrle. Mr. Heward was recruited by me and Mr. Rees was a specialist.

Q These are consultant specialists you are referring to?

A They were employees of the company, who were responsible directly to me for special areas. These were specialists in a technical sense.

Mr. Rees was an employee of Metropolitan Edison and spent a good bit of time at Saxton, and was concerned with a professional development program principally. Mr. Williams had just come in from one of the aerospace companies, I think it was North American, and he is a mechanical engineer and a very fine one. He was responsible for some of the problems in mechanical engineering we were having.

As you can see, there were vacancies in the specialist position in the control room and instrumentation areas. We had employees in specialist positions as shown here in Reactor Systems and Quality Control. These three people are actually Quality Control and these two were stationed out at other locations. The main activity at Three Mile Island -- Oyster Creek was to get geared up for the testing and licensing for that plant, and Finfrock, who was a Jersey Central employee with strong experience at Saxton I had as head of that group which I viewed at that time as very important, and he is well staffed, and the Administrative Group is simply the secretaries, and the library, I decided to build up a technical library.

Q I noticed that among the divisions that

you have listed such as Fuel Division, Safety Division, Project Managers, what you call Consulting Specialists, Inspection and Test Division, and then Administration, I do not see one for Operations.

Did you have an Operations Division?

A No. There was not an Operations Division at this time because, as I mentioned earlier, the actual operating people were employees of the subsidiary companies, and my Inspection and Testing Division was the interface with the operating companies. At this time, the only plant that had any operating staff of any significance assigned was obviously Oyster Creek 1. The other two plants were at such an early stage that I don't think we had even identified who the prospective plant superintendents would be.

Q But at this time why wasn't the option taken of going out and recruiting people who had operations experience?

A At Oyster Creek?

Q No, in terms of the formation of the Nuclear Power Activities Group, why didn't you have an Operations Division?

A We didn't have an Operations Division because,

as I said, that it was contemplated that the operation would be done by the service company, and I was assisting the service company in contacting people, and there were people hired in from the outside in those organizations, as I am sure the record will show.

T-3 RZ/mf

Q What are you referring to when you say "service company"?

A I mean the subsidiary companies, the operating companies, Metropolitan Edison and Jersey Central.

Q I take it that it was envisioned in the initial stage that you would have the Nuclear Power Activities Group performing the engineering, construction, maintenance, technical assistance functions, and the subsidiary companies would be attending to the operational concerns?

A That is the way it was when I left, yes.

Q Were you ever involved in discussions during the formation period in which you or anyone suggested that the dichotomy between engineering and construction supervision and operation may not be the most beneficial or efficient way to operate?

A I discussed it several times.

Q Could you elaborate on those discussions

or your view at that time?

A My best recollection of discussions at that time centered on the formation of the service company and how it was going to relate in the operating sense to the operation of, specifically, the nuclear plants, although there was some concern with respect to the fossil fuel plants figuring in.

At the time I left, it was still an unsettled matter so far as I know. It was my feeling that the nuclear plants should be for all safety matters, under my direct responsibility. The only plant then in operation was, in fact, under my direct responsibility. I suspect if Oyster Creek had moved to operational status while I was still there, I might have insisted on a clearer role in operating charge, but it was never faced with this specific problem.

Q Why would you have insisted that the Operations Divisions of the various nuclear power plants in the total GPU structure fall under the purview of the Nuclear Power Activities Group?

A It is a matter of responsibility. I felt a direct personal relationship with Montgomery who was running the Saxton plant, and I would like

to feel that responsibility with anybody that was operating a nuclear plant that I was responsible for.

You must realize that at this time, except for Saxton, which was clearly in a well defined organizational structure, that we were in a transition stage, and I never had any unsatisfactory feelings that we were not going to work this out in a manner that I was comfortable with. We simply were not faced at Oyster Creek with it in a direct sense immediately.

Q Would it be fair to say that you recommended or suggested that the operations aspect of the GPU activities fall under the Nuclear Power Activities Group structure?

A At least as far as the technical and operational direction goes. There were some difficult problems with the bargaining units that we never fully talked through.

Q I take it then that your recommendation would not have gone as far as saying that the plant and site operations, the actual physical running of the plant, was not necessarily within the compass of your recommendation?

A That is probably a fair thing to say. I can't recall at this moment the exact context, but I would have had to have been satisfied that I had effective control over the operations of the plant. I felt that I had that effective control at Saxton. True, the organizational structure was a little different there, and it was a very small plant, but I believe in principle that if I was going to be responsible, it was not going to be as a staff responsibility with somebody else calling the signals.

Q Notwithstanding the tax or legal issues that had to be addressed with respect to the formation of the GPU Service Corporation or the labor problems that were mentioned and that were discussed earlier, having all operations come under the Nuclear Power Activities Group; in looking back now, do you think it would be best or more prudent to have the operations aspect and the site managment and operations under a structure which houses the engineering and construction responsibilities under one hat?

A Yes. I think that the technical backup is intimately related to the engineering, and for that

matter, because of the quality control, the construction side of the operation, and I certainly feel that the operating function has got to be closely interelated with the technical support. There are many ways that this could be achieved.

During the time I was director of Nuclear Activities, I had no corporate entity as a single thing, but I never had the slightest problem in working with the three subsidiary company managements and the parent company management as a unified whole, so that I think you can make things work as long as it is clearly understood who is in charge, and I don't think at the time that I was there, that there was any doubt about that.

Q Were you functioning from the standpoint of a department, if you will, of the GPU, or how would you describe your function within GPU?

A Well, organizationally, it would probably be described as an organic department of the parent company. I had a title of director of Nuclear Activities. It was clearly recognized by the presidents of the three subsidiary companies that anything in the nuclear area I was speaking for the parent company and acting for them. I represented

Jersey Central in licensing hearings; I represented Metropolitan Edison in licensing hearings; I actually continued on the Pennsylvania Electric Company payroll and the other people in the Nuclear Power Activities Group were all on the payroll of one company or another, and during the time I was there we never satisfactorily resolved administrative problems to make a service company out of it. I believe that happened some time in 1971 or so. I don't really know exactly when it happened. It was after I left.

Q Now, I would like to get your understanding of how you functioned, and to do that I would take one specific issue and see if we can go through its development in that respect.

It is our understanding that the control room design was initially undertaken by Burns & Roe as architect-engineer, is that correct?

A Yes, Jersey Central had selected Burns & Roe as the AE for Union Beach plant.

Q Could you tell us the direction that the Nuclear Power Activities Group may have given, and what guidance the Nuclear Power Activities Group had given Burns & Roe in the selection of criteria

for the control room?

A I have no current recollection of any detail of that at all.

Q You mentioned earlier that as of September 6, 1968 there was a vacancy in the control room and instrumentation design area. Would this have been the position under the Nuclear Power Activities Group Division with responsibility for the control room?

A It would have had a major portion of it. The project manager and very likely the consulting specialist for mechanical engineering would have been involved also.

Q Did GPU, and just for the record, when I am referring to GPU at this time, please assume that I am referring to the Nuclear Power Activities Group, and if I am not, I will specify.

A Okay.

Q Did GPU ever undertake a review of the control room design at Oyster Creek Number 2?

A As a separate project distinct from plant approval of other natures?

Q Yes.

A Not to my knowledge.

Q What type of review would it have done in any event?

A As for all other important plans, they would have been reviewed by the technical people in the group. I would imagine on a plan like a layout plan, I would have looked at it myself. I have no recollection of having done so, but I probably would have; certainly, Mr. Neely would have. It would clearly have been discussed with the prospective plant superintendent if one had been established, and if not, at least with the generating peoole in the company concerned, which at that time would have been Jersey Central, so Mr. Ritter was probably involved in the discussions. We did not call for any special analysis of the control room design, but it was clearly one of the key plans which we would have approved.

Q Let me take one issue. It is our understanding that Burns & Roe basically laid out two conceptual designs for the control room, one being a low console format and the other being a combination bench board. It is our understanding that the low console format was the one eventually adopted.

Would you be able to recall who made

that decision within the GPU family?

A No, I have no recollection.

Q Who would have been involved in that decision process under the Nuclear Power Activities Group?

A Well, Neely, Ritter, and probably Rees. I would have rather guessed that Hetrick and Finfrock and Montgomery might have been involved as operators. They were people who had done most of the operating at Saxton. I have no recollection that this took place, but they are the kind of people that would have been involved. I don't even know the time frame that those plans were approved.

Q Mr. Roddis, are you familiar with the concept of human engineering?

A I certainly am.

Q What do you understand that concept to be?

A Well, the concept is to try to match both the perceptual and the manual skills of people to the information they are obtaining from a piece of equipment they are trying to run.

Q In your capacity as the director of the Nuclear Power Activities Group, were you ever involved in discussions as it related to Oyster Creek 2

or TMI 2 on this issue?

A Not to my knowledge; not to my recollection.

Q Are you aware of whether other human engineering concepts were discussed or considered in the context, for example, of the control room design?

A I am not aware of it.

Q I take it that the same individuals that you have mentioned earlier would have been those who had input into this, as well?

A The people I mentioned were the ones either directly concerned with Union Beach, Oyster Creek 2, TMI 2, or were the operating people who had special operating experience that I would have relied on.

Q I realize that this concept has evolved over a period of years, and that the concept of human engineering referred to today may be quite different from the concept back then.

A In those days, I don't recall it referred to as human engineering. I think it was control room design.

Q Do you recall the concept of man-machine interface?

A Yes. The knowledge that you had to relate

people to how things worked, I was personally very familiar with this in the design of the early Navy control stations. I was quite actively involved in that work, but I do not have any recollection of that taking place in TMI 2 or, for that matter, TMI 1 or, of course, Oyster Creek; we had no way to change Oyster Creek.

Q How important is this concept in your professional judgment to the design of something as complex as a control room? What importance would you attach to this as the director, for example, of the Nuclear Power Activities Group?

A Well, I would attach enough attention to it that if it had been at that stage during the time I was there, I think I would have recollected something about it. I do have some recollection of trying to do some things at the Oyster Creek plant to make information presentation a little better. On principle, I believe that with proper training and care you can make a fairly poor layout workable, but I don't think that is the way you ought to go. The object ought to be to make things as easy as possible for the operators to understand.

Q Did you instill this concept or philosophy

of yours in your staff, who were then in the Nuclear Power Activities Group?

A I believe so. I believe they would have had that general concept as the senior engineers would, yes.

(Continued on the next page.)

4.1 LC

Q Are you familiar, Mr. Roddis, with the B&W simulator facility?

A I am going to see it this week. I have never seen it. It is the Rancho Seco, I think, that is simulated.

Q Were you ever aware of its existence during the time you served as director of the Nuclear Power Activities Group?

A No, I was fairly sure it didn't exist then.

Q It is our understanding that B&W proposed sometime in 1968, or had decided in 1968, that they were going to construct a simulator facility. Were you aware of that?

A I was probably aware of that. I have no specific recollection, but I know all the manufacturers at that time were talking about simulators.

Q Referring you now, Mr. Roddis, to what has been marked as Gottilla Deposition Exhibit 11, do I correctly characterize it as a December 27, 1968 memorandum from Mr. Gahan to Mr. Gottilla regarding control room panels?

A Off the record?

Q Yes.

(Discussion held off the record.)

4.2

A It appears to be. I don't think I have ever seen that.

Q In it, Mr. Gahan states that B&W had recommended that the B&W simulator facility be duplicated in the design of the control room at TMI 2. Are you familiar with that recommendation having been made by B&W?

A I have no current recollection. In reading this, I think they are addressing the B&W-furnished panels, and I believe those are identical, but I don't recall seeing that memo.

My own philosophy on simulators, if I might express it --

Q Please do.

A -- is perhaps best represented by what I did accomplish at Consolidated Edison. Consolidated Edison has an on-site training facility for Indian Point 2 with an identical control room simulator to the Indian Point 2 plant. I, together with one other person in Consolidated Edison at the time, were largely responsible for seeing that that got installed. I feel quite strongly that an on-site simulator that is as near as possible an exact duplicate of the unit is a valuable training tool. I know that I had those same

4.3 feeling when I was in GPU's Nuclear Power Activities Group. I doubt that at that time I was pressing the issue very hard for any place except Oyster Creek because the time frame was just not there.

Q Did B&W represent this simulator as being an operator training device back in 1968?

A I suppose so, in the sense that operator training is a very broad word.

Q I am trying to distinguish whether or not, to your memory, B&W simply stated that they were going to build a simulator and use it for their in-house engineering purposes, or rather, they were building the simulator, in which it was contemplated that that would be an ongoing operator training usage?

A Let me answer this way, if I might.

I think that I knew, but I am not sure that I knew in 1968 and 1969. I knew in the time frame of 1968 to 1973 that all of the manufacturers were developing simulators which they wanted to use for operator training, and I knew that B&W was going to install one at Lynchburg; whether I knew that in 1968 or not, I simply have no recollection of it now.

MR. HOLLIS: Let the record reflect that Mr. Roddis, from April to October 1969, served

4.4 as the vice-chairman and member of the Board of Trustees of Consolidated Edison, and that from November 1969 to August 1973, he served as the president and member of the Board of Trustees of Consolidated Edison, which Mr. Roddis listed on his resume as the nation's second largest privately-owned utility.

Q You had mentioned that you recommended or put into place at Consolidated Edison a policy regarding the on-site usage of simulators.

A Yes.

Q Can you elaborate on that so we can have a clearer understanding as to the reasoning behind having a simulator on-site.

A There is a question of availability of training time. The operators of a nuclear station normally do not see much happening. The normal status is that everything is going along pretty quietly. Under these circumstances, I have always thought that it was especially necessary that they have an opportunity to train in as realistic an environment as it is reasonable to achieve with, always, limited funds, on off-standard kinds of operations and off-standard things that are happening, and unless you have that facility very near

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at hand, and it would not necessarily be on-site, and a few companies such as Commonwealth have them not physically on-site but very close to the units concerned. If you try to send people away any distance, you are involved in a whole lot of problems. You are usually having union people travel, and there are overtime problems. The net result is that they don't get very much time on the simulator, and I just have always thought that it was a good thing to have people able to make use of the simulator on a pretty regular basis.

Q Can you recall the amount of time that was required at Consolidated Edison in terms of training for operators?

A I can't specify, no.

Q I take it that there was a policy to put them in front of the simulator on a very regular basis?

A You realize the simulator was not completed until after I left the company, so I can't say that when I was there that was the policy, to use the simulator regularly. But that unit had -- I don't think it had yet started; it was just in the startup phases, and during the time of startup, your operators are getting a lot of experience for the first year or so; they are still fresh on this, and it is just a question, like

flying an airplane, at least the guy takes off and lands frequently, but they exercise him in abnormal procedures, and I just think it should be done.

Q Do you have any idea of the cost involved with that particular simulator?

A It isn't only a control room simulator; you are talking about a training facility, a building, and other training devices.

My recollection of the Consolidated Edison training facility, including the simulator, was something like $7 million of 1972-73 dollars. Incidentally, the training facility there was integrated with a visitor's facility, and I believe the cost of the facility includes the visitor-s facility that is integrated as part of the building.

Q Have you at any time recommended to GPU that simulators be built on-site?

A Are you talking about the time that I was director of Nuclear Activities?

Q Yes.

A The answer is, not to my knowledge at that time frame, except for discussions with respect to Oyster Creek.

Q Did you recommend at that time that a

simulator be put on-site?

A I recommended that we study putting a simulator on-site at Oyster Creek.

Q What was the disposition of that recommendation?

A Well, it wasn't funded.

Q Who did that recommendation go to?

A The recommendation was to study doing it. I do not recall that there was ever a written document concerned with it. It would have gone to Jersey Central Power & Light, and I very likely discussed it with Mr. Kuhns, but I do not believe there was ever anything in writing on it. This was still a matter in tra sit at the time I left.

Oyster Creek was not operational, and it was also a complicated problem down there at Oyster Creek, being a turnkey job, and it was rather difficult to do any other construction job until the General Electric Company got their job finished.

Q You are talking about Oyster Creek 1?

A Yes.

Q What is your understanding of the reason for that rejection of your recommendation to place a simulator on-site at Oyster Creek Unit 1?

A At that time, it was not considered as common industry practice to do so, and it was, I am sure, rejected as an item of lower priority than other items on the cost list.

I want to be fully responsive here. I am currently engaged in a contract with GPU looking at this very matter, and I would like to explain that.

Q Please do.

A I have not yet made any recommendations, but it is probably fairly obvious that our thinking is going in that direction.

Q Has GPU specifically asked you, in your role as consultant to GPU, to look at the whole issue of this simulator usage for operator training?

A Somewhat broader than that. I have been asked to form a Senior Committee, which I have done, and we are in the process of looking at a number of things in the operator selection and training area, and what is commonly called the "man-machine interface problems" of all of their plants.

In terms of meetings, we are about one-quarter of our way through this, with the intention of having an interim report in November and a final report in February.

Q You mentioned a Senior Committee.

A Yes.

Q Could you please define that and tell me who is on it.

A I am the chairman, and the only one with specific background in the nuclear utility business.

This was specifically formed by Mr. Kuhns and Mr. Dieckamp to get industries outside the utilities to consider these problems.

The other members are Dale Myers, who just recently was Under Secretary of the Department of Energy, and was a manager of the Apollo Program for NASA.

Q He was Under Secretary of the Department of Energy?

A Yes, he was Under Secretary until about six weeks ago. He is from the aerospace industry, and his special involvement as manager of the Apollo Program for NASA is of interest here.

There is Mr. Paul Solderlind, who is a retired chief pilot of Northwest Airlines, and has a distinguished record in the airline industry, including many awards, and qualified in just about every kind of aircraft.

There is Mr. Chalmer Kirkbride, president of

Kirkbride Associates, who was formerly the science advisor for Bob Seemans when he was head of ERDA, and was vice president of the Sun Oil Company, and prior to that, president of Houdry Process; they are the people who developed the catalytic cracker.

There is Dr. David Lanning, professor of Nuclear Engineering at MIT, specialist in Reactor Control; Professor Tom Sheridan, director of the Man-Machine Interface Laboratory at MIT, and was for a while editor of the Institute of Electric and Electronic Journal on Man-Machine Interface; Captain John Donelan, retired from the U. S. Navy, who recently was responsible for the training of 24 crews for 12 POLARIS submarines for the last 25 years and qualified submarine operator chief of staff for the development of Group II, and responsible for the training of the crews of these POLARIS submarines; General Sam Donnelly, whose initials, I think, are E. C. Donnelly, retired Lieutenant General of the Air Force and responsible for the nuclear weapons surveillance in the Air Force, and for five years, AEC operations manager for Albuquerque, responsible for nuclear weapons shipment and production and storage; Mr. Charles Elmendorf, retired assistant vice president

of ATT, and he is responsible for operator training for the Bell System for a number of years; Mr. R. V. Laney, deputy vice president of the Oregon National Laboratory, and for a number of years, general manager of the General Dynamics Quinsey facility. He was one of the early nuclear submarine people along with me in Rickover's program.

I am sorry I do not have a list with me, but that is my recollection.

Off the record?

Q Yes.

(Discussion held off the record.)

A If there is an eleventh member of the Senior Committee, I can add that as a correction. I think there are 11 members including me, which would be correct if I named ten people, but I would like to verify that.

(Continued on Page 44.)

Q Let me make sure I understand what as are discussing here. You said that as a consultant to GPU that you had been asked by Mr. Kuhns and Mr. Dieckamp to establish this Senior Committee to look at the operator selection and training area, is that right?

A Yes, operator selection and training, the term, "operator," being broadly used to apply to all people in a plant associated with the operation of the reactor, maintenance and technical people and so on.

Q As well as the issue of man-machine interface?

A Yes, and related communications, internal and external.

Q I take it that you had various meetings with Mr. Kuhns and Mr. Dieckamp discussing this issue?

A Yes.

Q When was it first proposed that you undertake this task?

A Probably some time in June.

Q That is June of this year?

A June of this year, yes.

Q In your meetings with Mr. Dieckamp and Mr. Kuhns in discussing the formation of this group, Mr. Roddis, can you state for the record your understanding of the basis for the formation of this group, and how your findings will be integrated or related to these areas within the GPU structure?

A Well, the origin of this was to get a group of senior experienced people from industries that operate highly complex modern technology systems, and look at these two related areas which by the time we were discussing this on a couple of occasions or on three or four occasions in the late spring and early summer, were quite clearly key items, so that was the origin of the idea, and it originated with Mr. Kuhns and Mr. Dieckamp, as I indicated.

Q Was it triggered by the TMI 2 incident?

A Oh, I am sure that the timing of it was triggered. I have no way personally of knowing whether they were thinking along these lines previously or not.

Q Why were the other areas like aerospace, the airline industry, et cetera included within the committee?

A They operate complex modern machinery, such as

in the refinery, petrochemical industry, the airline industry and the aerospace industry, nuclear submarines ex the nuclear power plant itself.

We have considered the submarine power plant experience also in that several people have some background in that area, and Admiral Rickover has put a good resume of his philosophy on training and so on into the record.

The concept here was basically not just to ask the nuclear industry but to ask other industries that operate complex machinery how they do it. The inclusion of the people from the MIT Man-Machine Interface Laboratory is obvious, and I might say that the gentleman from ATT was recommended to me by Dr. John Pierce at Cal Tech which is the other leading laboratory which is concerned with this man-machine interface problem. So I went to the best technical schools and the people from the industries; I tried to choose senior experienced people who had done things and who were aware of these problems.

Q I take it then that the charge by Mr. Kuhns and Mr. Dieckamp to you was to select and organize the group?

A Yes, chair it and organize it.

Q How many meetings have you held thus far?

A We have had, as a group, one two-day meeting with all the members at Three Mile Island plus a lot of discussions. We are embarking tomorrow morning on another three-day meeting, and I have two other meetings visiting places and looking at things which are scheduled plus a meeting to write an interim report which will also involve some visiting.

In addition to that, I and one or two other members have made visits to localities that we simply could not get the whole group together at.

Q I take it that in undertaking this assignment that you will attempt to put together the various experiences in these areas of man-machine interface and the other operator selection and training areas into some type of report in which recommendations would be made to the company?

A It is our intention to do so, yes.

Q Do you plan to visit or look at any other nuclear power plant utility group's training and man-machine interface policies?

A Yes.

Q Which ones?

A Well, specifically as a group, we are going to visit each of the four manufacturers at a facility related to their plant.

Q What manufacturers?

A Combustion Engineering, B&W, GE and Westinghouse, and GE and Westinghouse we are visiting the two facilities in the Chicago area. The two others, Combustion Engineering and B&W will be at their sites at Windsor Locks and Lynchburg.

Q What would be the purpose of visiting these manufacturers and touring their sites?

A We are, first, looking at the simulator they have at each of these sites; secondly, we are talking with their design personnel about their philosophies of control room design. We are also visiting a number of non-nuclear sites.

Q Would you give me an example of some of those.

A We are going to go to an aircraft operation maintenance and training facility; I am not positive of which airline it will be. Mr. Solderlind is making the arrangements. It is probably going to be the Eastern facility of Miami, but it isn't settled

yet. We are visiting the NASA complex at Houston, and while there will visit also both the petrochemical and a refinery. I can't define them yet; arrangements are still being made.

In addition to that, I and one of the other members are visiting some other nuclear facilities, but that is not as a total group. We are visiting Oyster Creek and going to visit Three Mile Island as a group, but I think that we will break up and visit some of the other facilities.

Q Do you know which those facilities are, or any of them?

A Several of us are fairly knowledgeable about other facilities, people like Lanning and I am planning on visiting Susquehanna, and have an appointment to go to Indian Point the week after next, and probably going to try to get to the TVA facility, depending on the time frame.

Q Where are the TVA facilities?

A One at Brown's Ferry and the other still under construction, the name of which I have forgotten, but they are in the TVA area.

Q When is this report due, Mr. Roddis? What is the deadline?

A The final report is due, if I recall correctly, one in February, and I think one in April, and I have committed to an interim report in early November.

Q Why do you have two reports, one in February and one in April?

A This originally started out as two committees, one concerned with operator selection and training and one concerned with man-machine interface and communication problems.

At our first meeting, which was deliberately a joint meeting at the site, we had some extensive discussions as well as the site visit, and concluded that we could accomplish the job as a package, combining the two instead of just two reports, but whether the outcome of this is going to wind up with one final report in February, which I suspect it is, although I am not positive -- it could be that some pieces of it will come in later. It is a pretty tight time schedule.

Q When you visited Three Mile Island, did you talk to any of the operators?

A We talked with a complete shift; I think there were two absentees in the shift, and we planned to do the same thing at Oyster Creek.

Q What was the purpose of those talks?

A To get the individual operators, shift foremen, auxiliary operators, and everybody else's direct feelings.

Q Direct feelings under total issue, or concerns they had based on TMI 2?

A No, on the issue of what do they think of their training. We have been talking to the training people. We talked with the trainees and asked them what they thought of the training and asked them what they thought of the plant, the control room layout.

Q Did you ask them what they thought of the training and control room and layout of TMI 2?

A Not only the control room, the man-machine interface problems and training which are not limited to the control room, and I would make that clear, that we have not centered on the control room. Inevitably it tends to dominate things, because it is the most interesting and complex, but we are trying to think also in terms of the simulation of equipment, and other than just the control room panel itself.

Q Can you recall the operations people or

operators that you talked to at TMI 2?

A By name, I don't.

Q What about at B&W?

A We haven't been there yet. We are going down Wednesday.

Q During the course of this consulting work which you have undertaken starting in June 1979, I take it?

A You asked me when the discussions were held. The actual date of the contract is July 13th.

Q You are saying that a contract was executed between you and GPU on July 13?

A Right.

Q During the course of this work, I take it that you have had full authority to organize and supervise the process, is that correct?

A That is correct. They have appointed a very able young man to be the executive secretary, Gary Broughton, who has helped in making arrangements, and so on, but I have full authority to run the committee any way I want to.

Q What type of budget are you operating?

A The only budget we have is one of time commitment, which is like twelve days for the consultants

involved.

Q Twelve working days?

A Yes, twelve working days.

Q And that is for each of the consultants?

A As a matter of fact, I think the actual wording is six to eight two-day meetings, so there are twelve to sixteen days. There is no budget. I have no control over any number budget.

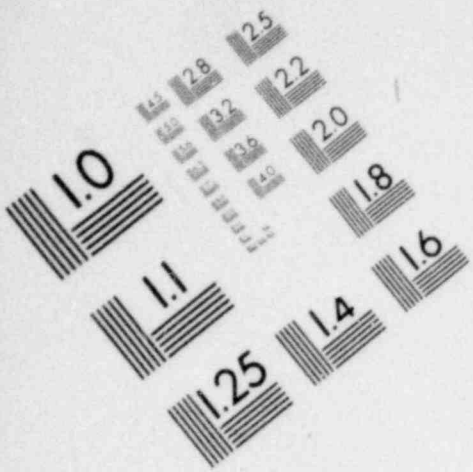
Q I take it then that the persons that you have identified to be a part of the Senior Committee are more or less consultants?

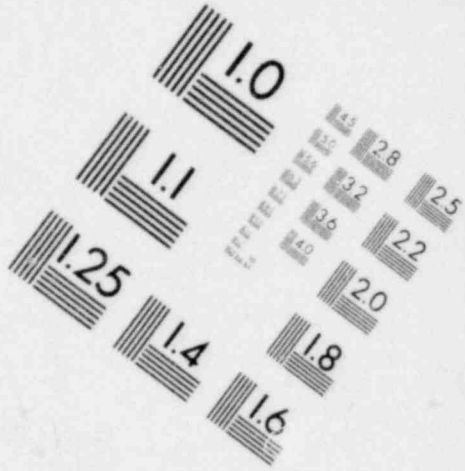
A They are all individual consultants to GPU, and the letter simply specifies that they will work with me in getting a report together. There is no other mechanical way of doing it. They are all individual consultants to GPU.

Q And none will work more than twelve days?

A I think the actual wording is, "It is expected that you will commit to six to eight two-day meetings." So twelve to sixteen days is the expected time commitment except for me, which is expected to be something like double that.

Q How much time have you spent on this





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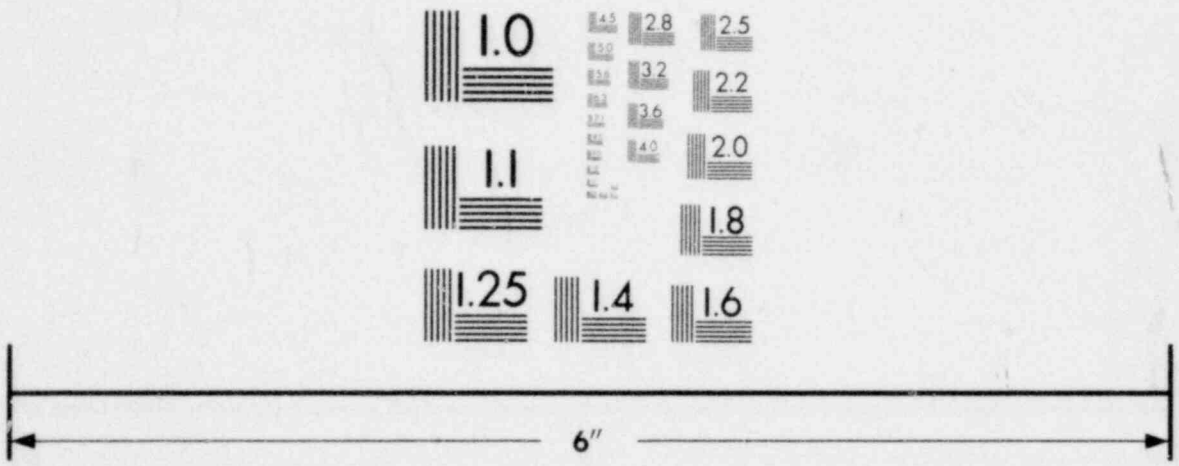

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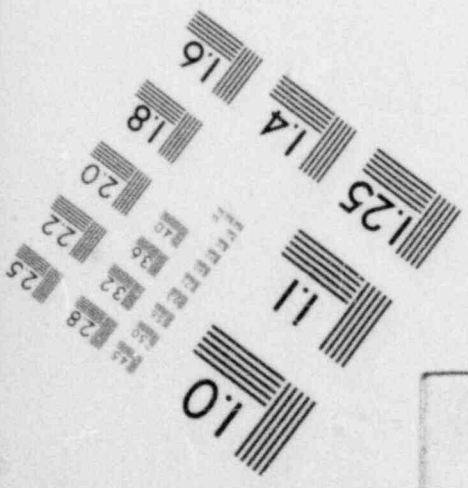

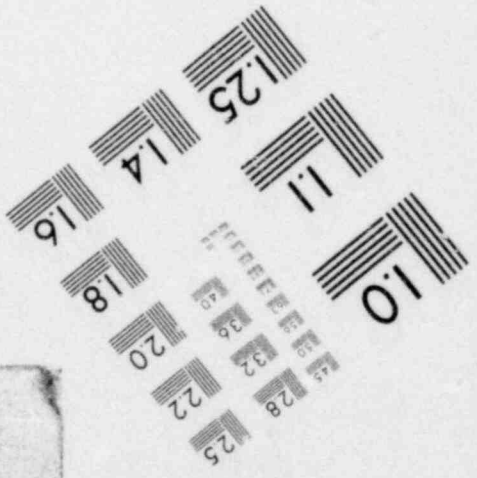

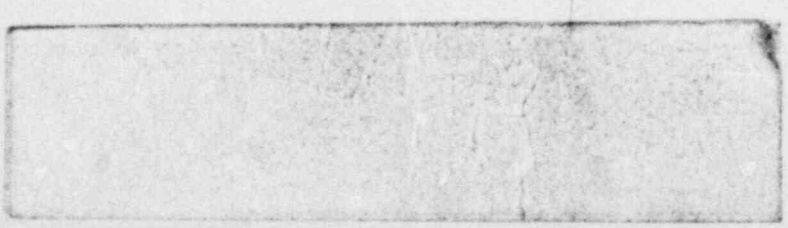

project since June and July?

A Probably 12-14 days. I also do some other things for GPU that feed into this. I am on both the Oyster Creek and TMI General Office Review Board, and those meetings provide me some input in terms of knowledge acquisition. If you add that in, it is probably closer to 20 days.

Q I was trying to narrow down on the issue of this Senior Committee in terms of how much time you are spending on it.

A I am committed to spend eight days a month of direct meeting time and eight days of support time, and I am spending that, depending on how things work out.

Q How are you communicating with the Senior Committee members between meeting times? I am trying to get an understanding of the level of involvement of the group.

Do the members of the Senior Committee work during the intervals between meeting times?

A Some. Different people have different involvements. Mr. Elmendorf lives not far from Parsippany and is involved to a somewhat greater extent than training recommendations. General Donnelly did

do some work in communications, And several people worked in setting up meetings. We have had no general communications except to send out some information that various people have communicated, and two packages of those have gone out.

Q During the period in which you have worked in organizing this Senior Committee and getting into the substantive work subsequent to your organizing of it, I take it that you have accumulated a certain amount of correspondence or reports or memoranda on this subject, is that correct?

A Yes, some. The report of our first meeting which was at Three Mile Island, which is really an organizational schedule layout. There have been some bits and pieces of information passed around that could have bearing on this, from various industry sources.

Q I take it that the organizational schedule layout that you referred to would be some type of agenda and minutes from the meeting?

A Yes, the agenda and the minutes essentially summarize what happened; they are not verbatim minutes or anything like that is what I am trying to say.

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Q If you take the expertise that you have on the Senior Committee, for example, Mr. Elmendorf, who, as you indicated, was the retired assistant vice president of ATT, and in that position was responsible for operator training for the Bell System --

A Among other things in later years.

Q Have you given Mr. Elmendorf an assignment or task to put together some of the operator training materials from his industry to bring to the group for discussion?

A Not so much in terms of a piece of paper, but how it is done in the industry. He has written a couple of letters on the subject and is also doing some work in connection with Oyster Creek's training program directly for GPU in the Review Committee which is charged with this activity, which is separate.

Q What about Mr. Dale Myers? You indicated he had aerospace background.

A Dale Myers has arranged a meeting for us at Houston with the people down there, and what we are trying to do is to show these people how some of these nuclear plants are run and then get their reactions as to how this differs, and we have just started this process, so I can't say that we have

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gotten all of those inputs back.

I have some special assignments out; for example, Mr. Lanning has pulled together a list of all the simulators in the nuclear industry plants, and organized some thoughts on them.

Q Has he sent that to you?

A Yes, he has. It was actually pulled together by some people in the Nuclear Regulatory Commission and sent to him as the most up-to-date list.

I think we are still at too early a stage to have much except just first impressions. The group has only been together for the two days at Three Mile Island. None of these people have ever been at a nuclear plant or in any kind of power plant before. Their impressions derived from that were quite interesting and quite different from what they saw in their own kinds of activities, and there is also the vintage problem that, after all, the plants were designed ten years or more ago, and clearly they don't represent today's technology, and these people have got to relate how our plants that are ten years old look like, and what have we done to tackle that problem, and we have spent quite a bit of time talking to Training Division people and quite a bit of time

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talking to trainees.

I have just recalled the name I previously forgot, who is a member of the Senior Committee, William Shoup, retired vice president of Research of Westinghouse, and he is one of the very early pioneers in the nuclear business. Incidentally, he is a member, as are many others, of the National Academy of Engineering, the NAE.

Q I know that you are early in your evaluative process, Mr. Roddis, but could you give me some indication as to what your findings may be with respect to improving operator training, the selection process, and the man-machine interface, and related communications issues, which could be of some benefit. I understand it would be preliminary, but it would be most appreciated if you could just elaborate or say whatever you can for the record, in terms of what you think is coming out of this committee.

Q Let me try to be careful and distinguish between what I thnk the committee is going to say and what I think are my personal opinions.

Q Please qualify it as you wish.

A We have talked as a committee about the concept of an on-site training center, or perhaps it might be

characterized as a local training center accessible to the people. We have talked about the necessity for a program that aims broader than just the control room operator to include the maintenance technicians and how they do things with which we are clearly concerned, so that our concept of a training center includes maintenance and the training of operators and even some of the engineering staff, not just the control room operators.

The third area we have talked about jointly is the specific one at Three Mile Island, which is the improvement of internal communications.

I think those are the only three items that I can truthfully say we have had any degree of discussion about.

Q The three items would include, then, one, a local training facility; two, broadening the idea of training from the control room operators to include maintenance people and some engineering staff plus the control room operators; and three being the improvement of internal communications of TMI 2, is that right?

A TMI 1 and 2; that is a very specific, narrow kind of recommendation, but it is a clear one that we have discussed.

Q Have you preliminarily concluded that the internal communications at TMI 2 were lacking?

A No, I don't think it is fair to say that it was lacking. It was just slower and more difficult than it need be with today's technology.

Q Have you preliminarily concluded or resolved that there are certain concepts or devices or methods or procedures utilized in some of these industries that you are looking at that might bear application in terms of improving these processes in nuclear power plants?

A Oh, yes, I think that very clearly we are all in agreement with, that there are things to be learned from these other industries, and we are trying to distill these into meaningful, useful inputs.

Q Have you learned any specific ones or identified any specific ones to this date?

A No, I could not say we had identified anything to the extent of having discussed it broadly beyond the three points I have made.

Q Have you, as chairman of the group, identified any?

A That is another question. I think it is fair to say that I have identified two areas that I hope

we will take a very hard look at.

Q What are those?

A One is the very general area of what I would call status boards, as distinct from the basic control instrumentation; and the second and related point is to try to avoid updating everything to 1980 technology by tearing everything out and starting over again. I don't think that is the right way to go.

Q Would you please elaborate on that.

A I would say that updating rather than replacing in existing plants -- in other words, and I have not discussed this to any extent, but I have discussed this with one or two members but not to any extent with the whole committee. It would be pretty simple to say that you have got to start over again and put in 1980 vintage control room technology. I do not think that is necessary or desirable. I think you can do it -- it is related to my first point. You can do it with a status board and some reorganization of how information is presented.

Q Has this process that you are undergoing ever been undertaken in the nuclear industry, to your knowledge?

A Only to the extent that some architect-engineers

with somewhat broader experience in the refinery and petrochemical business tend to provide a control room with somewhat more advanced design than others. There has been no conscious effort to attempt, in my knowledge, to look broadly at other kinds of modern technology, but I think that some of the AEs who have a somewhat broader spectrum have tended to bring some of that into the design of their nuclear power plant control rooms.

Q Therefore, to the best of your knowledge, this is the first time it has been undertaken by a utility?

A To the best of my knowledge, it is the first time that a utility is trying to ask itself consciously, how do other people face this problem, and to ask itself about problems of this kind and nature.

Q Why do you think it was not done with respect to Oyster Creek 2 or other plants which have been planned by GPU?

A I can't answer that. I don't know.

Q In this process, have you given any concentration to the issue of computers, or the use of computers within the control room, or the use of computers in the other industries, and how that might

be applied in the control room setting?

A We clearly will do so.

Q Has this computer issue been identified as something you want to concentrate on?

A Yes, and I have indicated that my own feelings are that you do not necessarily have to tear everything out and go back with a four-color computer presentation of all information; maybe that is the way you go in future plants.

Some of the manufacturers have provided such concepts, but I think that clearly a greater use of computer assistance to the operator is called for. It exists to varying degrees already in different plants, and could very well be upgraded in different locations as an aid, and also as a historical recording, so-called event recording kind of thing which I guess TMI 2 had somewhat more than average of event recording. I don't know that for a fact. I am simply saying that in reading the data that they have, they seem to have a pretty good after-the-fact record.

Q You have looked at the TMI 2 computer?

A I, personally?

Q Yes, in your role as chairman of this Senior Committee.

A We have looked at what its capabilities are for data recording and what its deficiencies are, but as in all other things related to the accident, we have made no independent verifications or independent looks at anything. We are trying to get hold of copies of the pertinent pieces of the various reports that apply, but beyond that, we are not trying to re-invent the wheel that you all are doing and others.

Q Have you submitted to Mr. Kuhns or Mr. Dieckamp your recollections based on what you have done thus far as chairman of this Senior Committee?

A No. As a matter of fact, I plan to get the group to agree on a, I guess you would call it, an "interim-interim report" at this next three-day meeting that is starting tomorrow, which will, I hope, make the points that I have just made here.

Q Have you received any comments or memoranda from any committee consultant other than Mr. Lanning or Mr. Elmendorf?

A I can't answer that. We have circulated a dozen or so different documents, but I think they have all been extracts that Gary Broughton has made from

documents that are available publicly or that I have put in. I don't think there have been any put in by anybody else beside the two I mentioned.

Q I noticed in your resume on Page 2 of your client list that you have indicated that you are a consultant on the Three Mile Island 2 accident recovery for GPU. Is this in reference to your work as chairman of this Senior Committee, Mr. Roddis, or would that encompass other issues?

A It encompasses one other issue.

Q Could you tell me about that.

A Which is related entirely to the long-term recovery problem and is concerned with simply thinking about what kind of directions that GPU will be going in, but most of that contract is the chairmanship of these two committees.

Q Were you called on during the March 28, 1979 crisis at all?

A No. The first contact I had was in May, early or late May, I think, that led to this committee.

Q What specifically have you been asked to undertake in reference to the long-term recovery process?

A To try to do some thinking about what directions

they might go on.

Q Can you be a little more specific in terms of what you have attempted to do thus far.

A Well, I have made myself familiar with the Bechtel Study. I, like a number of other people, are awaiting the information on the analysis that was taken the day before yesterday on the water. I have really been concentrating in that assignment in terms of the committee functions and getting up to speed on what the current status of the plant is, and I have written nothing, and I have done nothing in the long-range future.

Q In your capacity as chairman of the Senior Committee, Mr. Roddis, can you provide an overview picture of your undertaking, which apparently from GPU's perspective is deemed very important. What do you think will come out of this evaluation that might be beneficial to nuclear power plant operation in the country, and I am not just talking about TMI 2?

A Well, it is quite clear that I hope and I know Mr. Kuhns and Mr. Dieckamp hope that the recommendations of this senior-level committee are thoughtful and useful to the entire industry. I think it is

too early to say what we are going to say beyond the points that I have already made that I think are fairly clear.

Q I would then request that you furnish the Commission copies of any correspondence or memoranda that you have generated or received in your capacity as chairman of this senior-level committee, such that we could review it and take whatever action the Commission staff that works in this area may deem appropriate, and I would like to request that at this time.

I am aware, however, that you have stated that the several circulated documents were publicly available. I would still appreciate it if you would send us copies of those that were circulated among the committee members emanating from Mr. Elmendorf, Mr. Lanning, or whatever other consultants or committee members have furnished memoranda, as well as the minutes and the original schedule layout that has been circulated as well.

I would also request a copy of your contract with GPU. I would add here that I do not think the Commission is concerned about whatever salary or terms are contained in the contract.

A Off the record?

Q Yes.

(Discussion held off the record, followed by a brief recess.)

Q You mentioned, Mr. Roddis, that you are a member of the General Office Review Board, known as GORB. What is the function of that board, and what is your involvement in relation to that function?

A It has a charter. It is basically an advisory board to the top management of the operating company concerning the safe operation of the reactor in question. It is written into the tech specs for Oyster Creek 1 and TMI 1, and it is not written in the tech specs for TMI 2, but it is my understanding that it has always functioned as though it was a part.

Q Is that simply an oversight board?

A An oversight board. I created it when I was in the company. It was one of those efforts to make sure that there was, on a top level, an inside and outside board that periodically reviewed the goings on at the site and functioned as an on-site and off-site review board.

Q I take it that this is made up of outside specialists or experts?

A It is both. It is composed of people who are entirely not in the operating line authority; some of them from the GPU service company, some of them from other subsidiary companies, and some are outsiders. I have been on both boards, Oyster Creek and Three Mile Island, since January of this year. The boards have been in existence ever since the plant started.

Q What issues have you addressed since your membership on the GORB in January of this year?

A In specifics?

Q Yes.

A The last Three Mile Island meeting was concerned with the accident and what happened and the training program for the restart of Unit 1. The most recent Oyster Creek meeting was concerned, I would say, 85 per cent with lessons learned from TMI 1 and from the May 10 incident at Oyster Creek, and what is being done about them, plus some long-term issues that had been before the board for a long while, like the torus problem at Oyster Creek. In my mind, I can't recall more detail than that.

Q What incident are you referring to when you say the May 10 incident at Oyster Creek?

A The May 10th Oyster Creek incident, they had a

feedwater problem and low level and an NRC investigation of it. The core was not uncovered. The unit was restored to service after about two weeks or something.

Q Has the cause of the problem been surmised?

A Yes. I can't construct the details of it just clearly from memory. It was a feedwater failure and a trip, followed by a loss of water level control because they inadvertently had all five recirculating pumps shut off.

They realized shortly into the incident what the problem was and opened a couple of valves. There is a thorough incident report on it in the official records of the NRC.

Q Before we started our discussions on the Senior Committee that you are chairing for GPU, we were discussing, within the context of the Nuclear Power Activities Group, the control room and the human engineering issues that may have been addressed during the design of the Oyster Creek and TMI 2 control room. Along that line, I have a couple of questions to ask.

It is our understanding that once the site was changed from Oyster Creek 2 to TMI 2, that there were a series of discussions wherein the issue of control

room conformity came up. Do you remember this issue being discussed?

A I think it was just starting to be discussed at the time I left.

Q You left in what month in 1969?

A April 1, 1969, and my involvement came before that in the broad issues of who was still going to be the design agency for various parts, and I guess the only positive contribution I could say I made there was to pull Gilbert in on those elements of the site design that were related to the site, the cooling towers and the river pumphouse and so on, and some of the work on the air intakes, and the airplane proofing and tying together the two fuel pools, but the discussions on the control room configurations, which clearly I knew and everybody knew was different because two different AEs had developed them with two different turbines and two different steam cycles and everything different, was just beginning to be addressed when I left, and I don't recall participating in any of those discussions. If I did, they were superficial.

Q It is our understanding that Metropolitan Edison, which later became the operator of the plant, suggested that there be conformity or similarity

between the control rooms of both units, and that the GPU position was that there would be no basic changes in the control room design engineering.

Can you recall that as being your understanding of the basic positions at issue?

A I have no recollection of the control room issue. I have clear recollection that we looked at the fact that we had a committed architect-engineer and constructor in Burns & Roe, which had been done a long time ago, and clearly they weren't going to be the constructor, and a conscious decision was made, and I was involved in that, that they would go with UE&C as the constructor for both units, but we would keep the designer of Unit 1 as Gilbert and Unit 2 as Burns & Roe because there was well over two years of design effort completed, and all the pumps and heaters and turbine and generator and everything else was different, so it wasn't simply a matter of duplicating the Gilbert design.

I have no recollection of being involved past that stage. I do recall that we were going to go into the control room design issue because of the shift in operators. I don't recall being in any meetings or discussions about that. I can't say I

didn't, but there was a lot going on there.

Q If there was conflict, for example, between Metropolitan Edison, on the one hand wanting conformity, and Jersey Central, on the other hand wanting the design and work to remain as it was up until that time, would it be the function of the Nuclear Power Activities Group to resolve that?

A I would say it would have been, yes.

Q Therefore, would it be fair to say that whatever positions were staked out vis-a-vis this issue of control room conformity, the Nuclear Power Activities Group had an important role in that deliberative process?

A It should have; to the extent that I was still there, it would have, and I certainly would have given heavy weight to Met Ed as the operator in their interfacing on operating problems, but I just have no recollection of being involved in that at that time frame, and I can only conclude -- perhaps you have evidence of this -- I can only conclude that those discussions were principally after I left. I remember them being brought up, but I don't remember any resolutions of them.

Q Do you recall any specific impact the site change had on the control room that may have been

identified earlier during the year before you left?

A Only as related to things like the cooling tower. There were obvious changes that were going to be required in the control room, and this was one of the areas that there was some detailed discussion going on with a new operator and a new cooling water system.

Q Let me ask you now about a situation where you have two nuclear power plant facilities on one site which are mirror images of each other, and when I refer to mirror images, I am talking about mirror images of the entire plant; in other words, where you have TMI 1 on a site, you just flip it for TMI 2.

A That is not always the best way to do it. You sometimes want to build them just alike side by side. Certainly the control rooms should never be mirrored; they are to be as nearly unlike as possible with everything on the right on the right and everything on the left on the left.

Q Let us focus now on the issue of having identical plants, and I am not now talking about any specific system. Do you think it is best or wisest, or would you recommend that the utilities move in that direction?

A I clearly recommend that we move in the direction

of more multiple plants of identical design, or at least in pairs, and better yet, probably in fours, and in my opinion, one of the outstanding plant designs in the North American hemisphere is in Canada, where they have done that, where they have built four, and then built four more.

Q What plants are those?

A The Pickering and Douglas plant. The reason we haven't done it in this country is that it is fundamentally tied up with the concept of antitrust. The one effort I know to produce more than two plants--there are several places where they have built two identical units, and Salem is one example. The only effort I know where they have produced a standardized design on a SNUPPS. They ordered six and then wanted to order six more. These were to be built by four different utilities. When they wanted to order six more, they were told very clearly they couldn't order six more like it, that they had to have a new competition, and got four reactor suppliers, four or five turbine suppliers, nine architect-engineers, and when you permutate these, you get the custom plants that you have in this country, and I do not think it is a good thing.

If out of this Commission comes some recognition of that to make it more possible to have standardized designs, I think the industry and the manufacturers would both welcome it, provided the manufacturer's design was the one that was standardized on, and it is a fundamental problem with our industry.

Q Therefore, you would, given your experience in this industry, then tend toward the concept of standardization?

A Yes. I have made a couple of speeches about that a long while ago.

Q Are those speeches listed in your resume, and could we have copies of them?

A Yes, they are listed.

Q Then let me just make the general request that you furnish them, without your identifying them now necessarily.

A Off the record?

Q Yes.

(Discussion held off the record.)

MR. HOLLIS: We would like to request that Mr. Roddis provide us any articles or speeches that he has given on the issue of standardizing the design and construction of

nuclear power plants.

Q You mentioned the fact that, and I am quoting you, "They were told."

What did you mean by that? Who raised the question of a potential antitrust problem in this area?

A I am told that the people involved in this SNUPPS procurement, and I was not the one told, that if they ordered another set, that they had to go through the competitive process again and choose another reactor supplier other than Combustion Engineering.

Q If they did not do that, they would be charged with some type of antitrust violation?

A Yes.

Q What utility was that?

A I would have to look it up. It is well known in the industry.

Rochester Gas & Electric, I think, is one. One of the Iowa companies is involved. One of the Wisconsin companies is involved, and I would just have to get out a list.

MR. HOLLIS: Off the record.

(Discussion held off the record.)

MR. HOLLIS: I would request whatever

correspondence or memoranda or articles or anything that Mr. Roddis might have in his file that might identify the various utilities involved in the SNUPPS effort which he referred to.

A (Continuing.) With respect to the SNUPPS effort, I can give you a list of names; that would be no problem.

Q That would be fine.

A I don't have any correspondence or anything of that nature.

Q Just the names would be fine. I am trying to identify those utilities in case we should want to follow up on that recommendation.

Would this be a recommendation, based on your experience, that you would make to the Commission?

A I would recommend that the Commission should look at the issue of how you get standard plant designs in this country. It is a fundamental problem with the organization of our industry, both on the supply side and the utility side, and in SNUPPS, certainly the utility side showed a willingness to try and face up to this problem and order a package, and of course some companies have made big enough orders by themselves to order a significant number. The so-called

"Duke Six Pack," where they ordered six identical units, but of course now nobody has ordered any nuclear units anyhow, so it may be a totally academic issue, but I think that if we are to have more nuclear plants, which I firmly believe we need, although I don't know if we are going to be able to do it because of the financing and the public acceptance problems, then a very forthright thing would be to address this problem of how you produce something other than custom-designed plants, because right now we have essentially individual custom-designed plants. There are a few identical units around, but they are few and far between.

If you want to look into this further, I am sure there are people in the Atomic Forum that would pull the story together and would be delighted to go into it in some depth because it is a clearly perceived problem in the industry.

(Continued on Page 80

Q I take it that the mirror concept would not be to your satisfaction, as related to control room design?

A No. A mirror image of something is the most confusing thing you can get in a control room, as opposed to identical control rooms.

Q Referring you to what has been marked as Caplan Deposition Exhibits 67 and 68, which both reflect the minutes or information pertaining to a December 23, 1968 meeting at GPU's Corporate Headquarters in New York to discuss the change of the Oyster Creek 2 facility to TMI. I notice that on what appears to be the signature page there is an "L. Roddis, GPU."

A That is not my signature. Probably somebody, and Stout appears to be in the same handwriting, so somebody -- I can't identify the handwriting, but somebody put "L. Roddis" and "Stout" at the bottom because we were most likely sitting at the head of the table and the list had not circulated up there.

Q You were present at the December 23, 1968 meeting?

A Yes, it was just before Christmas.

Q In what capacity did you attend?

A As director of Nuclear Activities of GPU.

Q Referring you to page 2 of Exhibit 67, it states that Mr. Kuhns announced that you had decided to relocate the unit being designed for Oyster Creek 2 to TMI.

Can you recall what reasons Mr. Kuhns may have given for that change, or whatever reasons you might be aware of as to why this site was changed?

A I can tell you why it was done. What he said at that time, I don't know.

The problem was related to construction labor difficulties in the central New Jersey area at that time frame, which were basically resolved after the Colonial Pipeline cases came to trial and were settled. It was just a very unfavorable labor climate to operate in. We were trying to get Oyster Creek finished or GE was trying to get Oyster Creek 1 finished, and were having a great deal of cost and difficulty doing it, and for us to open a new major construction site right there was clearly going to pose very serious problems.

We had taken enough of a look at the cooling tower costs at Three Mile Island versus the ocean discharge tunnel problems at Oyster Creek to

believe that there was no significant economic difference between the two places.

Q What would have been the subject matter of those cases that came to trial that you referred to?

A Bribery and union coercion. I don't know the details beyond what I read in the press at the time in the early 1970's, but there were a couple of public officials who went to jail, and some labor leaders.

Q Are you suggesting that the reason for the site change was some type of bribery or extortion by some union leadership?

A It was basically to avoid getting involved in that kind of problem which we could perceive was going to be a problem in that area, and just didn't want to be involved.

Q Had this so-called bribe offer or extortion, to your knowledge, been made by any specific union official which was directed at any GPU official?

A If there had been, we would have gotten in touch with the FBI. I know of none, but it was just our perception of what was going on that proved subsequently to have been fairly accurate.

May I go off the record?

Q Yes.

MR. HOLLIS: Off the record.

(Discussion held off the record.)

MR. HOLLIS: Let the record reflect that Mr. Roddis indicated that he does not recall ever having seen the minutes by Burns & Roe, but has stated that he remembered the meeting and the content or purpose of the meeting, and in that regard he was referring to the meeting notes which were exhibited to him.

Q Referring you now to a document which has been marked Neely Deposition Exhibit 10, which comprises a serious of attachments, including memoranda and studies undertaken at your direction for Mr. Kuhns, is that correct?

A Well, certainly this material was prepared at my request, principally by Jim Neely and the Burns & Roe people with some other inputs from the planning people; that long memo in here on transmission and so on. I don't know whether I ever transmitted this document in this form, and I suspect I may not have. I see it is not signed, although that is not -- this indicates it was revised at a later date.

Q It indicates it was revised on the 10th

of December 1968?

A Yes. I probably asked him to revise it in some fashion, and that is why this isn't signed, and I probably signed a later version. I recall the general issue and the kinds of things we mentioned here.

Q I take it that Mr. Kuhns requested that you undertake this, such that GPU would have all the facts it needed to make an assessment as to whether they should change the site?

A Yes, that was the purpose of the memorandum.-

Q This memorandum was dated originally November 19th, and you are saying it may have been revised on the 10th of December?

A Well, it probably was revised, since I didn't sign it, and if it had been a permanent final memo I would have signed it.

Q Was this undertaken at the request of Mr. Kuhns?

A Whether it was undertaken at the request of Mr. Kuhns or by our joint agreement that we would look at it, I couldn't answer at this point in time. I suspect that it may well have been the latter. We were in constant communication. I had an office in

New York with him, and we were together there all the time, and we saw each other frequently, so that certainly these matters would have been discussed before the memorandum actually was written.

Q Then let me understand the importance of what you are doing here. Would your findings or recommendations have served as the basis for making the decision to change the site, or was the decision already made to change the site based on the labor problems that you alluded to earlier?

A This would have served as the basis for the final decision. This was an attempt to look at all of the various possible variables, and as you can see, the first two are how much is this going to mean in delay time, and how big is our labor problem, and the labor problem here refers to the productivity, which is after all a cost factor, and you notice that in this draft in what I would guess is probably Mr. Neely's handwriting, the 75 percent productivity cost estimate was revised downward to 60 percent, whereas the cost estimate was based on a 90 percent factor, so it is quite clear that the construction problem was foremost. The cost was related to the electrical transmission reliability and the

operating labor costs, recognizing that Metropolitan Edison would be the ultimate operator. The ocean discharge had gotten so expensive that the cost of the cooling towers was no longer a problem. We had to look at the special problems of a second plant at Three Mile Island. I clearly would have and did recommend that the same constructor be continued.

Q Why?

A Simply because if you got any major construction job you don't want two contractors active on the same site. All they will do is bid all your labor costs up against each other, so that is common sense in a major construction job.

(Continued on the next page.)

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Q At this time, December 1968, how much money had been spent by GPU on Oyster Creek 2 with respect to the engineering and design work?

A On the engineering and design work, I don't know. There has got to be something in the records, but it was probably something in excess of 75 per cent of the engineering and design effort which had been spent, but the real commitment was in the hardware items which would have represented at that time almost all of the major hardware items.

Q You mean the nuclear steam supply?

A Yes, the turbine generator, certainly the main pumps, main feedwater, heaters, a lot of the emergency system pumps, and so on, would have been committed by that time, and they were all different than TMI 1.

Q Could you give an estimate as to how much engineering or design expenditures had been made at the time of the site change?

A I am sure I had that available in the data. I don't have any recollection now. It is probably contained in the numbers there from Neely. I just have no current recollection of what they would have been.

Q Would $4 million-$5 million be close in

terms of the engineering and design expenditures?

A I would have thought it would have been more than that. I would have thought it would have been more like $20 million. I don't really have any current recollection.

Q I would just ask you to simply flip through this Exhibit 10 and see if it might be in one of these charts.

MR. HOLLIS: Off the record.

(Discussion held off the record.)

Q Referring you again to Caplan Exhibit 68 under the heading of "Design Principles on Oyster Creek Relocation to TMI 2," it states:

> "Minimum possible changes will be made in Unit 2 to permit both the construction permit and actual construction to proceed with the least possible delay. Incidental design differences from Unit 1 will be accepted."

MR. DIAZ: Would you please identify again what document you are reading from.

MR. HOLLIS: I am reading from Caplan Exhibit 68, which is a summary of the meeting held at GPU in New York, December 23, 1968. We do not know the author of this particular summary.

Q Mr. Roddis, referring you to Caplan Deposition Exhibit 67, which is Burns & Roe's Conference Note 235, and quoting from Page 3, it recites basically that a policy decision had been made to minimize changes.

Are you aware of this policy decision, Mr. Roddis?

A Yes.

Q Who made it?

A Well, as far as any one person made it, I probably did, but it would not have been a unilateral decision. It would have been a decision evolving out of the discussions with the several people involved, including the two other operating companies, and as a matter of philosophy at this stage of being caught with the situation that we were moving to, it seemed to be the best that could be done under the circumstances. An alternate, which I certainly considered and rejected, would have been to try to have Gilbert re-design the whole thing, but the trouble is you then would not have evolved anything that was like Unit 1 either, because already, except for the nuclear steam supply, every other piece of equipment in there and the overall power cycle was different. It had been procured by Jersey Central under a different set of ground rules and assumptions.

Q I take it also this was the basis for the minimum change policy, the difference between the plants?

A Yes, they were already two different plants.

Q How important were the financial considerations in that decision, that is, the fact that millions of dollars had already been expended for the engineering and design work?

A I don't think that entered into the question at all. The only question was one of time and the fact that some two plus years of engineering design had gone into it, and that was a factor, but not the dollars that had gone into it. In fact, it shows that in the next sentence of Conference Note 235.

Q And you are referring to Exhibit 67, Page 3, under the heading of "Redesign Concept No. 4," the second paragraph, which states:

"It is a requirement that the minimum possible disturbances be made to the existing design so as not to distract from the schedule. A design will be used, even though not optimum, provided it is adequate and can save time."

I think the first sentence reflects what you just said, that you wanted a minimum possible disturbance

in a design, such that the schedule could be met, is that right?

A Yes.

Q How would you explain the second sentence, which states, "A design will be used, even though not optimum, provided it is adequate and can save time"? What does "optimum" mean under the circumstances, in your view?

A You always are faced in any design with differences of opinion between engineers and even the same engineers at different periods of time, and it is much like the production decision you make in an automobile. The designs for the 1980 automobiles were decided three years ago, and it is the same kind of decision. One lesson you learn in the construction business fairly early is that there are no small changes. Any change you make is a major change, and that is incidentally one of the things that happened to the nuclear construction industry when they got saddled with all of these changes, each of which looked like a little thing in itself, but upsets your whole construction design and sequence, and there is great merit, then, in having duplicate units on the same site.

The Ontario Hydro is a great example of how it

should be done. I am not saying, nor am I trying to say that is the best reactor design, but that is an example of the construction philosophy.

Q You do not view that statement, "although not optimum" as saying not the best in terms of quality?

A No. No.

Q Or not satisfactory?

A "Optimum" in a form of a design is the least cost or the most efficient or something. I think the sentence went on to say, if I recall correctly, if it was acceptable. I mean there is a difference between an acceptable design and the very best and most efficient design.

Q To quote it accurately, "A design will be used, even though not optimum, provided it is adequate and can save time."

A Yes.

Q For your purposes, you viewed this design as being adequate?

A You are talking about the whole Three Mile Island 1 design done by Burns & Roe?

Q The Oyster Creek 2 design.

A The Oyster Creek 2 design?

Q Yes.

A Yes, it was adequate. It was in the licensing process at an advanced stage. It was being done by an architect-engineer that was competent. There was not reason -- it was different than Unit 1, but there was nothing that said necessarily that any feature of it was better or worse. As a matter of fact, the one measurable difference is that it had a slightly higher overall thermal efficiency. The output from a given number of megawatt-hours was more electricity by, I think, 13 megawatts.

Q Were you involved in the selection of Burns & Roe as the AE for Oyster Creek 2?

A No, sir.

Q That was determined before you came there?

A Yes.

Q Once the site change decision was made, were there discussions on changing the architect-engineer to, say, Gilbert Associates? I think you alluded to that earlier, but I simply want to make sure I have it in the record.

A There were discussions about it, but it all centered around the delay issue. There was a clear feeling on the part of all involved that to change the AE at this stage would certainly have involved

a delay, and I don't even know if the ethics would have permitted the switch at this point.

Q What do you mean by the "ethics"?

A For one architect-engineer to pick up a design in midstream is a very difficult thing to do, and I am not sure that either of the companies involved would have felt that it was a professional engineering thing to do. It was never discussed in that vein, but I just don't see how you make such a transition.

(Continued on Page 95.)

Q In that context, in the area of site change, was there a discussion or conversation within the GPU structure that the Oyster Creek 2 design will be abandoned and in place of that, that TMI 2 would be designed by Gilbert Associates, which was at that time the architect-engineer for TMI 1?

A It was considered and rejected because it would have required a complete new design to accommodate the elements of the system that were different. I think that if it had been a simple matter of taking identical components and duplicating the TMI 1 design, that would have been the simple way to go, but we were not presented with that alternate.

Q Who discussed this?

A I suppose it was discussed in the Nuclear Power Activities Group, I am sure, among the two project managers and myself. I probably would have discussed it with Mr. Kuhns, but certainly it was the time delay, not a cost problem that was involved here, and I would like to emphasize the fact that these plants are really very different. The fact that they have the same nuclear steam supply system does not make them twin sisters. They are half-sisters, if you will.

Q You are referring to TMI UNits 1 and 2?
A Yes. A lot of people have tended to think that they are identical things; they are not. There is a great deal outside the nuclear steam supply system that are different.
Q Which one is a better plant?
A You want my personal opinion?
Q Yes.
A TMI 1.
Q Why?
A Gilbert is a better design engineer.
May we go off the record?
Q Yes.
MR. HOLLIS: Off the record.
(Discussion held off the record.)
Q I take it, based on your comment here, Mr. Roddis, that if you had the opportunity to decide de novo, or from the first instance on an architect-engineer for the design of TMI 2, you would have chosen Gilbert Associates?
A At that time, if we did not have the time constraints of the delay incident to a complete new design, yes, but we did not have that option, we felt.

Q When you say that TMI 1 is a better designed plant, can you give me a couple of instances or examples of that assertion?

A Well, it has the feel in the plant of having been laid out with somewhat more consideration for the operator. For instance, I was looking, when I was out there a few weeks ago, at the purification system, the water cleanup system, the control panel is much more thoughtfully laid out, and the valve locations are near the things you are trying to control. The same unit in Unit 2 is put together with much less thought to the operator being able to perform his functions easily; some of the access into the area around the turbine is better. Those are a couple of examples that I can think of.

Q Do you think the control room for Unit 1 is better laid out?

A The controls I am talking about are associated with the water purification system down in the lower level of the turbine room. I also think that the control room of TMI 1 is a more thoughtfully laid out control room.

Q In what way?

A It is smaller. The operator has a somewhat better

view of things.

Q Would you think that these differences, the control room layout or the water purification system design, were by and large a result of the differing philosophies or approaches or expertise that an architect-engineer would bring to a project of this magnitude?

A I think so, yes.

May we go off the record?

Q Yes.

(Discussion held off the record.)

Q Given what you know about TMI 2, its size, the location, the need of GPU at that time as well as the load or power needs of the region at that time, and given whatever elements you would factor into a decision-making process as a director of a utility's Nuclear Power Activities Group, and given those variables and the fact that a decision has been made that a TMI 2 unit will be placed there at that site, what architect-engineer would you choose as between Gilbert Associates and Burns & Roe?

A Without regard for time?

Q Yes.

A We will accept an additional delay of two years?

Q Sure.

A In other words, accepting that we will be going to have power problems, but I am not allowed to take that into account?

Q You can take that into account in the question. Basically I am saying, if you have to start with a design and engineering of a plant, and that no work had been done in that area, which architect-engineer would you choose?

A If we were building TMI 1 and TMI 2 as a paired plant at that location, I ceratinly would have one AE for the whole job, and in the time frame of 1966, or whenever that decision was made by Metropolitan Edison to choose Gilbert, it would have been the one for both of them. We didn't have that option. That was the point I am trying to make.

MR. HOLLIS: Off the record.

(Discussion held off the record.)

Q Were you involved in the selection of B&W as the nuclear steam supplier?

A NO.

Q During your term as the director of the Nuclear Power Activities Group, did you have occasion to discuss the selection of the containment isolation setpoints for TMI 2?

A No. The containment isolation setpoints are contained in the tech specs, which were set much after I left the system.

Q Let me refer you to some documents here that might help in our discussion of this, and I now refer you to what has been marked as Zweckler Deposition Exhibit 78, which appears to be one of the sheets from the Preliminary Safety Analysis Reveiw, PSAR, for Oyster Creek 2, which, it is our understanding was submitted in 1968.

A The Oyster Creek tech specs would have been formed at that time, but not the TMI.

This is Oyster Creek 2?

Q Yes. Would the PSAR report be the same as the tech specs?

A No, the tech specs come much later and represent the operating limits that are set on a number of things.

Q Who would have set the operating limits?

A They are set by discussion between the NRC

and the licensee at the time of the operating license. This document, Zweckler Exhibit 78 and the documentation that goes with it on the PSAR is concerned with the issuance of a construction permit. The only tech specs I was involved with was Oyster Creek 1, which was at that stage in its licensing.

Q You were involved in the Safety Analysis Report?

A Yes. I was involved in the sense that I was generally familiar with what was in it, and it evolved as most of those things do, from previous ones.

Q Referring you to Section 5.2 of Zweckler Exhibit Number 78, which is entitled "Isolation System," can you tell me who within the Nuclear Power Activities Group was involved on the isolation issue?

A It would have been principally involved in the safety and licensing, which was Dick Heward at that time.

Q In the second segment, referring to Section 5.2.1 entitled "Design Behavior," it states:

"Reactor building isolation occurs on a signal of approximately 4 psig in the reactor

building."

What entity was responsible for setting this isolation setpoint?

A I can't answer clearly because I don't know now. The evolution of these FSAR's, generally the criteria are set up by the nuclear steam supplier and the AE and the licensee in discussions. Things like this usually are carried forward from some previous units. Since this was a follow-on with at least four previous units in existence, the Oconee and TMI 1, I would think that there probably is similar language in corresponding FSAR's in this time frame. The consideration as to why it was set there as if that is the whole focus of the basis of containment was based on a maximum credible accident kind of thing. Why somebody picked 4 psi, I don't know. I had no conscious part of it. I have no recollection. This is part of a document that is six volumes.

Q Would Dick Heward have been the person who would have reviewed or been involved in discussions relating to the setting of the set points at that time?

A He would have been.

Q What guidance did you give him as director of the Nuclear Power Activities Group on that issue?

A On this issue, I certainly didn't give him any.

(Continued on the next page.)

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Q Was there any discussion during the time period of 1968 concerning the use of multi-actuations to trigger containment isolation?

A Well, it is triggered on several signals at Oyster Creek, I know, and at this time frame, things like setpoints, which after all are actually set not by the FSAR, but what the tech specs finally establish, because they are variable; it is just a matter of adjusting things. I certainly wouldn't have focused on it at that time.

Q Would the selection of the containment isolation criteria be deemed important from the perspective of the Nuclear Power Activities Group?

A Well, certainly that there was adequate containment isolation for the maximum credible accident would have been an important thing to consider, yes. In 1968, the whole analysis of small breaks and their potential was in its infancy.

As I say, you would probably find that similar language with similar setpoints in other FSARs at about that time.

Q Do you recall any discussion with the AEC or the ACRS regarding the diversity issue of containment isolation criteria at this plant?

12.2

A No.

Q Would that have come to you normally if something had been written?

A If something had been written, or if something had been a matter of controversy between us and the licensing agency, but if it was not a matter of substantive discussion, I probably wouldn't have heard about it.

Q Referring to what has been marked as Zweckler Deposition Exhibit 77, and for the record, realizing that it is very difficult to read, it appears to be a letter from a Mr. Zabel, who is the chairman of the Advisory Committee on Reactor Safety, writing to a Mr. Seaborg, who was chairman of the AEC in January 1968, regarding the issue of isolation criteria, and I will read the relevant portion, which states:

"The ACRS recommends that in the interest of diversity another method different in principle from the one proposed should be added to intiate this function," and "this function" refers to the containment isolation.

"The diversity thus achieved would enhance the probability that this vital function would

be initiated in the unlikely event it is needed."

Do you recall this issue ever coming up or coming to your attention as director of the Nuclear Power Activities Group?

A I have no current recollection. I undoubtedly saw that letter.

Q What would have become of this issue? What would you have done upon receiving this, notwithstanding your present lack of recollection?

A At that time, I certainly would have had it entered into our list of unresolved issues between us and the regulatory agency, and I would be greatly surprised if down the road there hadn't been some discussion between the AEC and Metropolitan Edison on the licensing thing that settled this. All of these things were items which were kept track of both by us and the licensing agency and were resolved in one way or another.

Q During this time, there was no requirement from the AEC that there be diversity in the containment isolation signals?

A No. In the normal course of events, if the AEC licensing people had decided that it was necessary, it would have been put in. If they judged it was not necessary, it would not have been required.

Q Do you think it ought to be required? I take it it is now under the Standard Review Plan?

A Under the Standard Review Plan, it is now, and I think it should be.

Q Was that your position, basically, in 1968 as well?

A I can't tell you. I don't know.

Q Just to make sure I understand your thinking along this line, Mr. Roddis, are you saying that there were no discussions on the issue of multi-actuation signals for the project at that time?

A There were certainly none that I have current recall on. There may well have been such discussions, but I have no current recall on it.

Q Do you have an idea as to the cost that would be involved in simply adding another signal for isolation?

A Well, it obviously depends on what you mean by diversity. The letter appears to call for a method differing in principle.

Q That is, differing from high pressure.

A Differing from a pressure actuation.

Q That could be a radiation alarm utilization.

A That would be another example. I wouldn't think

that the addition of any system would be a particularly expensive problem. It might cause some reliability problems, but I don't think that the containment isolation signal, the generation of a signal from a transducer, should be very expensive.

Q Would it be fair to say that at that time there was no formalized GPU policy that there be multi-actuation signals used in the containment isolation area?

A That is very clear, and at that time there was no AEC policy in effect.

Q During your time as first vice chairman and then as president of Consolidated Edison, do you recall whether Consolidated Edison had a policy to have multi-actuations for that system?

A I can only state that Consolidated Edison had a clear policy of complying with what the licensing agency required.

On the specific matter of containment isolation multiple signals, I don't know.

Q Would it be fair to say that you or GPU would view this containment isolation issue as a safety issue?

A Oh, yes, it clearly is a safety issue, as related

to what the requirements of the AEC or the NRC would view as the safe solution.

MR. HOLLIS: Off the record.

(Discussion held off the record.)

Q Just for the record, so that we will have your view of how the selection process relating to the setpoints evolved, is it fair to conclude from your statements that the actual selection of this setpoint and the criteria associated with it was a group decision by B&W, Burns & Roe and GPU, or did one of the entities author this setpoint or the usage of high pressure as a criteria for containment isolation?

MR. DIAZ: If you know.

A I don't really know. A group decision versus somebody proposing and the other people accepting is a very hard thing to sort out, and I have no current recollection of any of this.

Q What I do not understand is the process in which this decision would be made and the role that the Nuclear Power Activities Group, which I understand to have been an oversight engineering function, would have had in that decision, and that is what I am trying to determine.

A First, we would clearly have had a feeling as

to whether this did or did not comply with the current position of the AEC in this matter. If we deemed there to be an important difference in safety in our mind between a 4 psi setpoint with one instrument and something else, we would have done somethi about it. I certainly don't see, in the light of the knowledge of 1968 and 1969, that anybody would have been perceptive enough to have seen that problem, and it is interesting that the ACRS letter which actually, of course, is advice to the Commission with copies to the prospective licensee, did not make any issue at all of the 4 psi setpoint; it made an issue of the diverse signal, which ultimately was viewed by everybody as being a proper condition.

Q That is, having more than one signal?

A More than one signal. These things all evolve over time, and if there was a policy in this matter in the Nuclear Power Activities Group, it was obviously, first, to do everything that was required by the licensing agency that could be reasonably understood to be required, and secondly, if you had any real reservations yourself, we were going to do them, too, but on this particular point, I certainly have no current knowledge of any discussion of the 4 psi

setpoint, and I really don't have any current recollection of the specifics of the ACRS letter. I know we got one, and that we would be reacting to the points that were raised, and to study them and understand them.

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Q Was there a concern by you or others on your staff that having only one criterion to trigger containment isolation was satisfactory, or not good enough?

A I have no recollection of taking any position on it.

Q Do you recall whether Mr. Heward ever memorialized his views on this?

A I don't think so. I have no recollection of it. I'm fairly sure if Heward had had some strong feelings about it, I would have a recollection.

Q Notwithstanding what the current NRC provisions might be, Mr. Roddis, do you think that it is safer or wiser from an engineering and safety standpoint to have multi-actuations to trigger containment isolation?

A I do not see that it decreases safety any. The key thing is how soon do you isolate, and how totally do you isolate. When you isolate containment totally, you cut off certain functions that are going on inside there, such as bearing cooling; the question of how soon you isolate is not an open-and-shut issue. It is one you have to identify in a series of systems, and the industry has taken a look

at this. You may not want to just shut everything off.

Q I was trying to follow up on your comment earlier when you said that this also related to the issue of reliability when you have more than one signal?

A Yes.

Q What do you mean by that?

A Most things that have happened in plants have happened when somebody was doing a surveillance on an item, or changing a pump, or changing a valve setting, or something. The more of these you have, the more chances you have of an inadvertent trip. As a small example of this, the May 10th incident that I mentioned at Oyster Creek was basically the result of a surveillance on a pressure sensor which in the course of doing the check, the operator caused a slight pressure transient which created a situation that tripped the turbine and then tripped the reactor so that it resulted in this incident which was a result of the extraneous instrument checks and extra surveillance.

MR. HOLLIS: Off the record.

(Discussion held off the record.)

Q Returning again to the discussion of the GPU struction and formation of the Nuclear Power Activities Group and the eventual formation of the GPU Service Corporation, let us look for a moment at the Oyster Creek 2-TMI 2 design and engineering process.

Was GPU equipped to do a design review of this process? Were you really equipped to do that?

MR. DIAZ: What period of time are we talking about?

A I was about to say that when I left, we were equipping to do this. I think you have got to remember that with the limited number of people we had and with the problems we were having in Oyster Creek 1 that our biggest focus was on those problems. We were having some very large problems there, and I think we were able to handle our end of the technical review on those problems. We were staffing and trying to poise ourselves to do that adequately as time moved on.

After I left, I was tremendously busy in New York. You may recall that in the summers of

1969 and 1970 and 1971 we had periods of tremendous stress in the Consolidated Edison System and were building gas turbines all over the place, and I lost touch with the GPU organization, and have only recently restored that contact within the last few months. They have come a very long ways, and they have a lot of very good people. I am not prepared to say now whether it is adequate. I suppose in one sense the manager is never satisfied with the adequacy, but they have got a lot of very good people, and I think they handled themselves as well as any major utility can be expected to handle themselves.

Q Referring to the 196-1968 time period during which design decisions were being made and engineering decisions were being made relative to Oyster Creek 2, you have stated that it was during this period that the formation of the Nuclear Power Activities Group took place; is that correct?

A That's right.

Q And that the purpose of the Nuclear Power Activities Group in a broad sense was to strengthen GPU's in-house engineering construction management capabilities, is that correct?

A Right.

Q In that regard, the Nuclear Power Activities Group, by definition, would have the responsibility to oversee and give guidance and direction on various engineering and design matters, is that correct?

A That is correct.

Q Given those factors, the engineering and design work that was required to move the Oyster Creek 2 process towards completion on the one hand, and the formation and putting together of the Nuclear Power Activities Group on the other hand, and looking back at that, do you think that the Nuclear Power Activities Group in its formative stage was really adequately equipped to do the type of engineering and design overview that was necessary for a project of that magnitude?

A I think we did as good a job as anyone in the industry was doing in that time frame, although I was not satisfied with that job. We were extending ourselves to do a better job.

You simply cannot put organizations together overnight. I was emphasizing high quality people. The people that I got are almost all still with the corporation, which is most of them, who are in

positions of great responsibility, and I really think that for the time frame we were doing at least as good a job as most utilities were, and holding up our end.

Q Given these two factors again, Mr. Roddis, were you in a position as director of the Nuclear Power Activities Group of having to rely more than perhaps you wanted to on the expertise or capabilities of your AE?

A Yes; that is always the situation you are in when you are strapped for personnel.

Q The guidance and direction of Burns & Roe in its engineering and design efforts represented what percentage of that which you would have desired?

A I can't answer that one. I think we were giving them less overview and guidance than we would have liked, and more than they would have wanted.

Q Did Consolidated Edison have a similar group to GPU's Nuclear Power Activities Group?

A Essentially. It went by a slightly different name. It was a group of people under a vice president, and I guess at the time I was there in 1969,

there may have been 25 people. It was called the Nuclear Engineering Group, and then separately in another department there grew up a Nuclear Fuels Group, both of which were encompassed in GPU's Nuclear Power Activities Group.

Q Did you increase the size of those groups?

A Yes, markedly. I think at the time Indian Point 3 was being completed, I guess they were probably comparable in size to similar parts of GPU, with 60 or 70 technical people.

(Continued on the next page.)

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Q Were you involved in the formation of the GPU Service Corporation?

A No, no way.

Q Do you understand the purpose of the GPUSC, the intent of it?

A I have never seen any charge or charter or anything. I assume its intent is the intent of any other service company operating in the utility industry. I really have not been involved in it.

Q Was the Service Corporation contemplated at the formation of the Nuclear Power Activities Group?

A Yes. I think I used the word "precursor" of it, and I believe we probably would have formed the Service Corporation earlier if some of these administrative problems had been more manageable. I had no operating problems. I am trying to say that I got the best of cooperation from the operating companies, and with respect to whatever decisions had to be made in terms of who was working for what, there was no doubt in my mind, and to the best of my knowledge, no attempt on anybody's part to do anything except make our group work.

Q Would the Nuclear Power Activities Group and the Service Corporation have had the same function?

14.2

A Well, the Service Corporation clearly has a broader scope. It is involved in a whole lot of other things, too.

Q Would you respond to the contention or argument that has been made that you should not have one organization responsible for design and construction of the plant and another for operation? What do you think about that argument?

A You mean just as an open question?

Q Well, as it relates to GPU, in terms of having one organization responsible for design and construction of the plant, which would be, I suppose, the Nuclear Power Activities Group, then one of the subsidiaries being in charge of operations.

A You are talking about today or in 1967 or 1968?

Q 1967-68.

A There was no practical alternative in that time frame. It just would not have been possible in an organizational framework to have turned the thing around any quicker and formed a generating company or something like that.

Q Would it be wise or prudent to have that dichotomy today?

A I don't know. The industry has gone in both

directions. The New England Electric System, which is a holding company system, has a generating company. In nearly all of the other holding company systems, the actual operation of the power plant is done by a subsidiary company and not by a service company, and to the best of my knowledge, one company still does not have a service company at all.

Q Let us take as an example the situation relating to TMI 2, where you have Metropolitan Edison as the licensee responsible for the safe operation of the plant. Should it not have the direct responsibility for the design and construction of the plant, and that is, ideally?

A Ideally, if they were big enough to support the staff. I think what we are getting at is the whole issue of the organization of the utility industry and the size of the corporate units versus the technology, and that is a subject on which there are a lot of opinions, and I do not think mine are particularly germane because I am no longer part of the industry.

MR. HOLLIS: I want to establish for the record, Mr. Diaz, if you are acting here as counsel for GPU?

MR. DIAZ: Yes.

MR. HOLLIS: Therefore, I would request that GPU, the Service Corporation, or any of the subsidiaries or entities thereof, furnish to the Commission any and all correspondence, memoranda, reports, articles, records of telephone conversations, minutes of meetings, diagrams, or any other memorialization pertaining to the Senior Committee, or Senior Advisory Group that Mr. Roddis has discussed during the course of his discussion today, and that is the group which Mr. Roddis, at the request of Mr. Kuhns and Mr. Dieckamp, organized and formed to undertake an analysis from the viewpoint of operator selection and training and man-machine interface and related communications, of which Mr. Roddis is chairman.

THE WITNESS: Do you want all the individual consulting contracts, then, too, which are just one-page contracts?

MR. HOLLIS: Just to make sure that we have the record straight, yes.

THE WITNESS: And we have permission to block out the terms and conditions of employment, because they are all different?

MR. HOLLIS: Sure.

MR. DIAZ: I take it this request relates to all these documerts to the extent they are not already to be supplied by Mr. Roddis in response to your request of him?

MR. HOLLIS: Yes. We do not need duplication. There may be some internal memoranda or correspondence relating to this issue that Mr. Roddis would not have in his file, and we simply would want a complete record of whatever has transpired or has been discussed pertaining to this issue.

Off the record.

(Discussion held off the record.)

MR. HOLLIS: For the record, let me just note that the Commission is requesting that Mr. Diaz telephone me at the Commission office by Friday, giving me an update as to how this search is going.

I would also request that these documents be available to the Commission by September 7th.

MR. DIAZ: For the record, I will state that I undertake to let you know on Friday what the status of my progress in finding these

is, and we will undertake to provide the documents as quickly as possible.

Q Mr. Roddis. I am now going to recess your deposition at this time. You are subject to recall if we deem it is necessary. I do not think it will be necessary, but if so, we will advise counsel.

(Whereupon, at 8:00 p.m., the within deposition was recessed.)

_____
Louis H. Roddis, Jr.

Subscribed and sworn to
before me this____day
of_____1979.

_____
Notary Public

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I N D E X

Witness	Direct
Louis H. Roddis, Jr.	3

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STATE OF NEW YORK)
) ss.:
COUNTY OF NEW YORK)

I, ROBERT ZERKIN, a Notary Public of the State of New York, do hereby certify that the foregoing deposition of LOUIS H. RODDIS, JR. was taken before me on the 27th day of August 1979.

The said witness was duly sworn before the commencement of his testimony. The said testimony was taken stenographically by myself and then transcribed.

The within transcript is a true record of the said deposition.

I am not related by blood or marriage to any of the said parties nor interested directly or indirectly in the matter in controversy; nor am I in the employ of any of the counsel.

IN WITNESS WHEREOF, I have hereunto set my hand this 28th day of August 1979.

Robert Zerkin
ROBERT ZERKIN