UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

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GENERAL PUBLIC UTILITIES CORPORATION, :
JERSEY CENTRAL POWER & LIGHT COMPANY,
METROPOLITAN EDISON COMPANY and :
PENNSYLVANIA ELECTRIC COMPANY,
:
Plaintiffs, 80 CIV. 1683
: (R.O.)
-against-
:
THE BABCOCK & WILCOX COMPANY and
J. RAY McDERMOTT & CO., INC., :
:
Defendants. :

- -x

Continued deposition of GENERAL PUBLIC UTILITIES NUCLEAR CORPORATION by LOUIS C. LANESE, taken by Defendants pursuant to adjournment, at the offices of Davis Polk & Wardwell, Esqs., One Chase Manhattan Plaza, New York, New York, on Friday, March 26, 1982 at 11:00 o'clock in the forenoon, before Joseph R. Danyo, a Shorthand Reporter and Notary Public within and for the State of New York.



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Also Present:

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* * *

L O U I S C. L A N E S E, resumed, having been previously sworn by a Notary Public, was examined and testified further as follows:

EXAMINATION (CONTINUED)

BY MR. BENEDICT:

Q You understand that your testimony today continues to be under oath?

A Yes.

Q Yesterday, we were talking about the work that you were doing during the spring and summer of 1978, and I believe you mentioned that you were involved with an issue which somehow related or was an issue that was resolved by instituting a cross-connection of high pressure injection, is that correct?

A Yes, I was involved.

Q Did this project relate to a B&W analysis with respect to a break in the reactor coolant system at the discharge of the reactor coolant pumps?

A Yes, it did.

Q Did you receive written material from B&W with respect to this?

A Personally?

Q Yes.

A No.

Q What did you understand the issue to be?

A That as a result of a small break at the pump suction, high pressure injection from one HPI leg would or could be discharged directly out the break without going to the core and removing heat from the core.

Q You said "pump suction." Did you mean that?

A Pump discharge.

Q Did you understand that B&W had reported this to the --

A I wanted to complete the description.

As a result of that situation, the operator would be unable to determine that the flow was not reaching the core, and there was the potential for inadequate core cooling as a result of that sequence of events.

Q About how much time during the spring and summer of that year did you spend on this project in hours, days, weeks?

A Three or four days.

Q I would like to show you a document that previously has been marked as B&W 419. B&W 419 is a letter from E. G. Ward of Babcock & Wilcox to Mr. L. C. Lanese, and it is dated July 20, 1978, and it includes a multiple-page attachment.

Does this refresh your recollection that you received from B&W some written material with respect to this issue?

A No, I remember seeing the attached material. I don't remember having received it directly.

Q You don't recall the covering letter, but you do recall the letter to the NRC,to Mr. Varga at the NRC,from B& W and the report attached to that?

A Yes.

Q If you notice in the covering letter from B&W to you, it is mentioned in the second line of the text a "June 19, 1978 analysis."

Do you recall whether you received that?

A I remember seeing an earlier analysis with the Zaloudek correlation included in it, yes.

Q You understand that the analysis that you have before you in B&W 419 which you recall receiving excludes that, is that correct?

A Yes, it is.

MR. GLASSMAN: Could I just break for a moment.

(Discussion off the record between the witness and his counsel.)

BY MR. BENEDICT:

Q Do you recall receiving any other written material with respect to the pump discharge break issue whether you received it from B&W or from any other source?

A Yes, I saw other correspondence.

Q Did you see any other analyses?

A I never saw analyses; I saw results of analyses.

Q Is what is attached to B&W Exhibit 419 the results of an analysis? Is that what you mean?

A Yes.

Q Did you keep a file on this subject?

A Yes, I did.

Q Do you know whether that file was searched with respect to compliance with the document request outstanding in this case?

A I'm not sure.

MR. BENEDICT: I will request that if that file is still extant and if it hasn't been searched that it be produced.

MR. GLASSMAN: I believe, as far as I am aware, we have searched for anything in this regard, but we will double check to make sure there hasn't been anything that hasn't been

produced that should be produced.

BY MR. BENEDICT:

Q Do you recall where you kept this file or the file on this subject?

A Yes, it was in the safety and licensing central file. It would have been under accident analysis. The major numerical heading was 2358, and I believe it would have been under 2358.2 ECCS analysis.

MR. GLASSMAN: I believe we did produce that material, but we will double check.

Q When did you first hear that there had been an incident or occurrence --

A Excuse me. Let me add, there may be another source.

Q Another source document or material that you received?

A Yes, under TMI-1.

Q In other words, because, as I understand it, this letter indicates that it applies specifically, the letter being B&W 419, to 2,272 megawatt thermal plants. Unit 1 has a lower thermal rating than that, is that correct?

A That's right.

Q Was there other material with respect to the

lower-rated plants?

A No. Eventually, the 2772 megawatt analysis was the reference analysis, and it was bounding for all plants.

Q By that you mean if the analysis was acceptable to the NRC for the high termal output plants, it would of necessity be acceptable for the lower thermal output plants?

A That's right.

Q So, can you tell me about where files might be kept?

A Under TMI-1, there may have been an ECCS file on it or in the reload files. This is probably cycle 4.

Q Cycle 4 of TMI-1?

A Of TMI-1, yes.

Q Refueling?

A Right.

Q Those files are kept where?

A They were in safety and licensing. They may have been microfilmed.

Q To an entirely different subject, when did you first hear about a transient or incident or off-normal occurrence at Three Mile Island which occurred on

March 28, 1979?

A Approximately 9:30 a.m. on March 28, 1979.

Q From whom did you hear about it?

A From Mr. Nicholas Trikouros.

Q He was your boss then?

A No.

Q What relationship did you and he have professionally at that time?

A We worked for Mr. Broughton.

Q You were on the same level?

A Yes.

Q What did you hear from Mr. Trikouros?

A He had called me at home from Richmond, Virginia, where he was on a trip. He mentioned that there was a report on the radio that there had been a loss of feedwater event at TMI and that there were high radiation readings on the dome monitors.

Q You were at home at 9:30?

A Yes.

Q When do you usually get to the office on a weekday?

A I'm normally in by 8:00.

Q Is there any reason why you were home that day?

A Yes, I was traveling to Lynchburg that day and the flight was in the afternoon.

Q For what purpose were you going to Lynchburg?

A I had a meeting on the next day to discuss the asymmetric LOCA loads program and to discuss some feedline break analyses that were to be used as part of the TMI-2 feedwater redesign.

Q Did Mr. Trikouros indicate that he had any source of information about the accident other than the radio?

A No, he did not.

Q What you recall him telling you was that there had been a loss of feedwater event and there was a high radiation reading from the dome monitor, is that correct?

A Yes.

Q The dome monitor is a radiation monitor at the top of the inside of the containment, is that correct?

A Yes.

Q Did you go to Lynchburg that day?

A Yes, I did.

Q What was the next thing or bit of information you heard about this incident?

A I had lunch at my parents' house that day and driving over there, I heard a report on the radio.

Q Did it provide you with any information you hadn't already heard?

A No.

Q When you heard there had been a transient at Three Mile Island Unit 2, did you call anyone at your office to determine whether they would rather you return to the office instead of going to Lynchburg?

A Yes, I did.

Q Who did you call?

A Mr. Broughton.

Q What did Mr. Broughton tell you?

A He said there didn't appear to be any reason for me not to go to Lynchburg.

Q Did he provide you with any further information?

A No.

Q Did you ask?

A Yes.

Q He said what in response to your question?

A That he didn't have anything to provide at that time. This is approximately 11:00 o'clock.

Q In the morning?

A Yes.

Q Did he tell you whether GPU was assembling a group of people to consider the events of that day?

A He mentioned that he was talking to Mr. Arnold and Mr. Herbein, as I recall.

Q Did he mention Mr. Keaten?

A No, he didn't.

Q Other than your conversation with Mr. Broughton, did you make any effort during the day of March 28th to learn more information about the accident?

A No, my only sources of information that day were the newspapers.

Q You went to Lynchburg that afternoon, I take it?

A Yes.

Q And arrived at the Old Forest Road office sometime in the morning of Thursday, the day after?

A Yes.

Q Did you discuss at that time the Three Mile Island accident with anyone?

A It was certainly a topic of conversation, but the people who were in the meeting with me had very few details.

Q Who were those people?

A The only person I remember specifically is Bob Schumacher from safety and license. I believe Bob Vossburg was there also.

Q Were there any other Met Ed or GPU employees other than yourself?

A Dr. John Luoma was in the meeting with me.

Q Who is Mr. Luoma?

A He works for the Nuclear Fuel Analysis Group at GPU.

Q Do you know when he arrived in Lynchburg?

A The previous night also.

Q Did you see anyone, whether or not in this meeting, did you see anyone else in Lynchburg that day who worked for Met Ed or GPU?

A No.

Q What did you learn on the 29th in addition to the information you gained from your discussion with Mr. Trikouros and what you heard through the news media with respect to the accident?

A At lunchtime, I remember one of the TMI-1 project people said that there may have been some damage to the steam generator tubes and there would be a potential outage to plug and replace some damaged

tubes.

Q Do you remember whom you were speaking with?

A I don't remember the guy's name, no.

Q A B&W employee?

A Yes.

Q On the 29th, did you make any effort to learn more information about the incident?

A I don't recall what else I did to find out about it, no.

Q Did you find out anything more about it?

A Only what I was able to read in the New York Times.

Q Were you interested in it at the time?

A That would be an understatement. Yes.

Q Did you make any effort, call anyone back at your home office to ask them what information, friends, what information they could provide you?

A I'm sure I must have.

Q But you don't recall any specific conversation?

A I don't remember anything specific, no.

Q When, if ever, did you get your first job request with respect to the accident at Three Mile Island?

A The following morning, March 30th.

Q Were you still in Lynchburg?

A No.

Q You had returned the night before?

A Yes.

Q You went to the office at your normal time, 8:00 o'clock?

A I was in by 8:00 o'clock, yes.

Q What were you asked to do and by whom?

A There was a phone call from the site by Mr. Wilson, and he was asking us in general, and I got involved, directly involved. The request was to determine if there was some way to create a depressurization of the primary system in order to put the plant on decay heat removal. The problem, as I understood it at the time, was that as the RCS was depressurized, pressurizer level was going up rather than down.

Q When you said "Mr. Wilson," did you mean Richard Wilson?

A Yes.

Q When you heard when they depressurized the system that pressurizer level was going up instead of down, what did you understand about that phenomenon, if

anything, at the time you heard it?

A In relation to what was going on, I couldn't figure out why that was happening.

Q Do you know how they were trying to depressurize the system?

A No, I do not.

Q Did they tell you whether they were trying to do it by cooling down the system or did they say they were releasing fluid from the RCS through a valve?

A No, I don't remember now.

Q What information did he give you about the details of the accident at that point?

A There were none. I remember it being an extremely bad telephone connection.

Q This is the morning of the 30th, as I understand it, and at this point, is it correct that your only sources of information with respect to the accident had been conversation with Mr. Trikouros and anything you could glean from the new media?

A That's correct.

Q Did Mr. Wilson provide you with a source that you could use for information about the conditions of the plant?

A No.

Q Did he tell you anyone you should speak to in order to get necessary information?

A No. I have to add that I don't think he even knew who he was talking to on the other end. He was just making a general request to headquarters' personnel to investigate the event.

Q But you spoke to him?

A I was one of the people who spoke to him, yes.

(Discussion off the record between the witness and his counsel.)

BY MR. BENEDICT:

Q Who else was involved in the conversation with Mr. Wilson that morning of the 30th?

A Nick Trikouros, Jack Devine; for a small portion of the conversation, Mr. Don Kroneberger.

Q What other assignments were handed out by Mr. Wilson as you understood it in that phone conversation?

A That was all. We terminated the connection.

Q Did you set to work on this project at that time?

A Yes.

Q What did you do in order to familiarize

yourself or provide yourself with the information necessary to come up with an answer?

A I began looking through drawings, flow diagrams of the primary coolant system to verify a path that I thought would be available, and proposed it to Nick Trikouros, Jack Devine, and we also discussed the general idea with Jim Harrison of Energy, Incorporated.

Q Was Mr. Harrison present by happenstance?

A No, we called him on the phone.

Q You said that you were considering the flow diagrams of the RCS in order to determine a path that was available. Available for what?

A For depressurization.

Q Was it your intention then to depressurize by relasing fluid from the reactor coolant system?

A Yes.

Q Did you know what that fluid would be composed of?

A No.

Q Did you know at that time there had been substantial hydrogen generation?

A I did not.

Q What then came of your recommendation?

A When we brought it to Mr. Keaten's attention, he said that we could not subject the primary coolant system to a rapid depressurization because of the condition of the fuel.

Q What did Mr. Keaten say or what did you understand him to mean with respect to when he said "because of the condition of the fuel"?

A We weren't able to go into it. That was an unknown to me at that time.

Q Did you understand that there had been rupturing of the zirconium alloy cladding of the fuel pins at that time?

A No.

Q Were you aware of any fuel damage at that point?

A No, I wasn't.

Q Were you aware of any further information with respect to radiation readings other than what you had been able to glean from the papers and from Mr. Trikouros' conversation?

A No.

Q When during that day on the 30th did you approach Mr. Keaten with this suggestion?

A By midmorning.

Q What did you do after Mr. Keaten told you that your suggestion was unworkable at that time?

A By this time, numbers of other people had been assembled into one of the central conference rooms and we began discussing alternatives.

Q Was there any presentation made at that meeting of information that people at GPU or Met Ed had with respect to the condition of the plant?

A No.

Q Did you have any idea at that point what the cause of the accident had been? Excuse me, what the mechanistic cause had been. You said you heard it was a loss of feedwater. Had you heard anything else with respect to the mechanistic cause of the accident?

A There had been an interruption of emergency feedwater for some period of time, and the PORV had been opened for some period of time.

Q You knew both those facts by that morning?

A Yes.

Q Did you read those in the paper?

A Yes.

Q Do you recall knowing at that time anything about management of high pressure injection during the course of the transient?

A No.

Q Do you recall that you did not know anything about it?

A I specifically recall that based on the newspaper articles, I was unable to tell what pumps were being referred to as having been throttled and shut off.

Q When they referred to pumps, you didn't know what pumps they meant, is that what you are saying?

A No.

Q What transpired during the course of this meeting where you were discussing alternatives? I take it you mean alternative suggestions for depressurization of the plant?

A That was at least one of the topics, yes.

Q What other topics do you recall being discussed at that time?

A I don't remember now.

Q What topics did you involve yourself with?

A At the meeting?

Q Yes.

A None. I was basically listening, trying to catch up with what was going on.

Q Did you understand at that meeting that you had any specific assignment with respect to the events

at Three Mile Island over the last few days?

A I only knew that I was going to be there for a long time performing whatever assignments were necessary.

Q But you hadn't been given a specific task as you understood it?

A Not by 10:00 a.m., no.

Q How long did this meeting last?

A We went through lunch.

Q How many people attended?

A Perhaps 15.

Q Do you remember who any of those people were?

A Mr. Keaten, Nick Trikouros, Jack Devine, Don Kroneberger, Gary Capodanno. I don't remember the others.

Q Was fuel damage discussed at this meeting?

A No.

Q Was possible fuel damage discussed?

A I only remember coming away from the meeting without any understanding that there had been any damaged fuel.

Q Did anyone make a presentation with respect to this meeting? Did anybody stand up and say "I want to tell you all the following," whatever it was?

A A presentation?

Q Yes. Well, let's try again.

I believe you testified you don't recall any discussion or any presentation with respect to the conditions of the plant or the historical conditions of it.

Do you remember any information with respect to the plant being conveyed to the entire group by whatever means?

A There was certainly information, lots of information, conveyed. I don't remember any of the details.

Q You don't remember anything about fuel damage?

A Not about fuel damage, no.

Q Do you remember anything about management of high pressure injection?

A No.

Q Do you remember anything about the operation of reactor coolant pumps?

A No.

Q Do you remember anything about failed open pilot operated relief valves or other relief valves?

A No.

Q Do you remember discussion of a loss of coolant with respect to what had transpired on March 28th?

A No.

Q You do remember discussion of loss of main feed or absence of emergency feed for some time period and an open PORV, is that what you said?

A That is what I read in the newspapers, yes.

Q But in that meeting, you didn't learn anything more about either of those facts?

A No, that wasn't the purpose of the meeting.

Q What did you understand the purpose of the meeting to be?

A To begin recovery of the plant.

Q Was the thrust of this meeting, as you understood it, to determine a means whereby the decay removal system could be put into use at Unit 2?

A Yes.

Q What suggestions do you recall were put forth at that time?

A None.

Q Did you have any understanding at that time of the radiological qualifications of the decay heat removal system?

A No.

Q Did you understand that at least portions of the decay removal system required flow of reactor coolant outside of the containment?

A Yes.

Q Did you know whether those portions of the decay heat removal system which were outside the containment were radiologically shielded?

A My understanding was that they were.

Q That they were?

A Yes.

Q What next transpired after this meeting with respect to the incidents and events starting on March 28th at Three Mile Island?

A By that time, we had established the permanent communications with the on-site GPU people, specifically Gary Broughton, and began receiving specific requests for information, calculations and requests for any comments on possible plant operations that might help in reducing hydrogen concentrations in the primary system.

Q You said "on-site GPU people," and particularly Gary Broughton.

Do you know whether Mr. Broughton or other

GPU people were present in the control room? And for this question, I mean GPU only as opposed to GPU and Met Ed.

A These conversations were not being initiated from the control room.

Q Do you know whether Mr. Broughton had access to the control room at that time?

A No, I don't.

Q Was Mr. Broughton at the Visitor's Center?

A I don't know.

No, he was not.

Q Do you know where he was?

A Somewhere on the site.

Q On the Island?

A Yes.

Q Was any method used to record either verbatim or by notetaking the contents of the conversations that were had between GPU headquarters and GPU representatives at the site?

A I don't remember.

Q What form did this permanent communication that you spoke of take?

A It was a phone link from Mr. Keaten's office through a squawk box.

Q To a telephone on-site somewhere?

A Yes.

Q Did you receive any graphic material by facsimile transmission during that day?

A Somewhere during the day, we had a telecopier setup next to Mr. Keaten's office, and information was transmitted from there.

Q Did the graphic information go both ways? Did you send material to them and did they send material to you?

A By the end of that day, we had a flow of information both ways, either graphically or by courier.

Q Do you recall whether any effort was made to record any of the conversations that day over this permanent link?

A By notes?

Q Either notes or audio recording or any other means.

A There were definitely no audio recordings. People were taking notes.

Q Did you take notes?

A Not that day.

Q Do you --

A I may have taken a few.

Q Do you know whether there was an effort made at any time following the establishment of this permanent communication link to assemble in one place people's notes with respect to what was discussed between GPU and the Island?

A I don't believe notes were assembled in one place.

Q Was any other effort made?

A All of our calculations, all of the plant data that was recorded, was processed through a central point.

Q Who or what was that central point?

A It was a table outside Mr. Keaten's office in which all the calculations were filed and kept.

Q Do you know what became of that material?

A I think they are stored someplace.

Q Do you have any idea where?

A No.

Q Do you have any idea who would have been responsible for that material or is responsible for it now?

A No.

Q If you were going to look for that material today, whom would you speak with?

A The first person who was managing the information was somebody from the headquarters building, a guy named Brown.

Q Do you remember anything else about him, where he worked?

A I think he still works for GPU.

Q Do you remember what his first name is?

A No.

Q You don't remember what group he was from or what department?

A He wasn't from engineering.

Q How is it that you know that he came to manage this material? Did you see him around?

A He had the responsibility for keeping track of everything. Every time you completed a calculation or an information request, you processed it through him.

Q What happened when you processed it?

A He kept the original. You got a copy for your files, and he made sure it was transmitted to the correct person on-site.

Q Did it receive a file number of some kind?

A I don't remember.

Q What next occurred on that March 30th? You had the meeting which you say went through lunch.

At the end of that meeting, did you receive a specific assignment or specific assignments that you undertook to complete?

A Yes, by that time Gary was asking me for information.

Q Do you recall what information it was he was asking for?

A The task that I spent most of my time on was in trying to determine a means of venting hydrogen from the primary coolant system.

Q You mean most of your time that day or most of your time, in the early days?

A That day.

Q What, if any, conclusions did you reach with respect to that?

A By the end of the day, we, in working with Burns & Roe and also with -- principally with Burns & Roe, determined that RCV-137 which was the pressurizer vent valve was suitable for opening and for venting hydrogren to containment.

Q Do you recall when or how you came to know that there was a significant quantity of hydrogen in the reactor coolant system?

A No.

Q What did you understand to have been the source of that hydrogen or the primary source?

MR. GLASSMAN: On March 30th?

MR. BENEDICT: Yes, what he understood at that time.

A On March 30th, I don't know.

Q Did you know on March 30th that the zirconium alloy cladding of the fuel pins would oxidize and result in the generation of free hydrogen if it was heated beyond a certain point?

A Yes.

Q Do you recall considering that as a possible or probable source of the hydrogen in the RCS?

A I didn't do much recollecting on that day.

Q Was it important to you in order to perform your task to understand the source of the hydrogen?

A Not on the afternoon of March 30th, it wasn't, no.

Q Did you have any understanding as to whether hydrogen was continuing to be generated without the RCS?

A I believe that was one issue that I later became involved with.

Q On the day we are talking about, Friday the 30th, do you recall any involvement?

A There was -- that was a consideration, yes.

Q Did you come to any conclusions with respect to that issue during that day?

A It didn't appear there would be significant hydrogen generation.

Q In order to reach that conclusion, what facts did you know?

A I wasn't doing the calculations at that point, but based on the activity in the primary coolant system and the production of hydrogen as a result of radiolysis of water there didn't appear to be any immediate problem.

Q The radiolysis of water is a different source of hydrogen from the one we are talking about with respect to the cladding, is that correct?

A That's correct.

Q It is a result of the bombardment by radioactive particles of water molecules which break up, is that correct?

A That's right, gamma rays.

Q You said the RCV-137.

What valve is that?

A It is a pressurizer vent valve.

Q Did you understand that it was a valve that

was remotely operated from the control room?

A That was one of the facts I had to establish for Mr. Broughton.

Q Did you establish that?

A Yes.

Q Do you know the approximate area of this vent valve?

A I don't now know.

Q Did you understand this was a valve that was located at the top of the pressurizer or at least in the hemispherical dome?

A Yes.

Q Did you learn for the first time of the existence of this RCV-137 on that day?

A I knew that there was a valve that was used during shutdown to vent nitrogen cover gas. I did not know that it was RCV-137. I did not know that it was remote-manually operated.

Q You did understand that there was a vent valve on the pressurizer other than the two code safety valves and the pilot operated relief valve prior to the accident?

A Yes.

Q You understood that it was used at least

for venting the hydrogen overpressure gas during shutdown conditions, is that correct?

A Nitrogen cover gas during shutdown, yes.

Q What happened to your suggestion or recommendation of use of the RCV-137 on March 30th?

A I didn't recommend the use of it. It was an idea that was initiated through Gary. I supplied information from Burns & Roe that demonstrated to our satisfaction that the valve could be opened safely. It was opened that night some amount, and by the next morning hydrogen concentration was going up inside containment.

Q Do you know where or how the RCV-137 vents?

A It vents into containment.

Q Directly, to your knowledge, or does it go through the reactor coolant drain tank or some other holding tank?

A I am not positive anymore.

Q Did you, prior to the Three Mile Island accident, understand that the area circumscribed by the opening of the RCV-137 was less than the area of the PORV opening?

A I'm not sure.

Q Did you have any understanding of the

relative size of RCV-137 and the PORV on the day you were discussing this on March 30th?

A I knew that the 137 line, or at least I recollect it, was approximately a one-inch line.

Q That is the line of the valve?

A Yes.

Q What else that you can recall transpired with respect to specific work assignments for you on the day of the 30th?

A I can't recall work assignments that were specific to the 30th.

Q Did you have an opportunity on the 30th to learn more information about what had happened at the plant?

A Very little that I recall.

Q When did you leave on the 30th, leave work?

A Somewhere between 9:00 and midnight.

Q Did you go to work the next day?

A Yes.

Q Am I correct in saying the next day was a Saturday?

A Yes.

Q Did someone ask you to come in to the office on a Saturday? I take it that is not a regular workday

for you.

A No.

Q Were you asked to come in specifically?

A By Friday, we had been assigned specific work rosters in 12-hour shifts.

Q By Friday, had GPU or your section of GPU been put on a 24-hour shift?

A Yes, all of engineering had.

(Document marked B&W Exhibit 607 for identification as of this date.)

Q You arrived at about what time on March 31st at the office?

A Fairly early.

Q Did you report to someone at that time to get a work assignment or did you already have work that you needed to do?

A I remember the first thing I did was check on the plant status. I believe Mr. Keaten may have still been there. If not, someone else had the day watch, and they were providing assignments.

Q Did you not when you arrived, did you not have already an assignment that was open?

A I can't recall now what assignments initiated the evening of the 30th or began the morning

of the 31st.

Q You said one of the first things you did when you arrived on Saturday, the 31st, was check on the plant status.

How did you do that?

A Mr. Keaten's office had been set up as an information center. It was a plant status board. There was information written down on the blackboard, and there was almost always someone on the line so you could just ask for updated plant information.

Q Was there any historical information provided at that time or was it strictly current?

A No. By the 31st, we had received a printout of the reactimeter data the first several hours of the accident.

Q From whom did you receive that?

A I don't remember.

Q Do you recall whether you received it from B&W?

A That is very possible.

Q But you don't know?

A No.

Q Did you receive a copy for your own use of this?

A It was sent to Mr. Howard, I believe, who gave it to me.

Q Do you know who, if anyone else, got a copy of that reactimeter data?

A I believe that was the only copy. It was kept within the Safety Analysis Group.

Q It was available to whomever wanted it?

A Yes.

Q Was there a key for the various columns of the reactimeter data?

A No. The columns were marked on the computer printout when we received them.

Q Were they marked by hand or were they typewritten?

A Marked in hand.

Q Do you know who marked them?

A Whoever it was that provided the reactimeter data.

Q You don't recall who that was?

A No.

(Discussion off the record between the witness and his counsel.)

BY MR. BENEDICT:

Q I would like to show you a document that

previously has been marked as B&W Exhibit 409 and refer you to pages W 21837 through W 21877, and ask you if the reactimeter data that you recall receiving on the 31st or prior to the 31st was in a format similar or the same as the material attached thereto.

A No, it wasn't.

Q What, if you can describe it, are the differences in the format or if there are any similarities that you can point out to help me identify the reactimeter data you are talking about? Obviously, this reactimeter data is referring to a whole different transient. That is not what I meant. I meant, is the format similar, not is this the actual document you received?

A Only in the sense there are columns of numbers with plant data on them.

Q But the reactimeter data you recall wasn't generated in a format identical to that?

A No, it wasn't.

Q Do you know what became of that reactimeter data, the reactimeter data you got on or before March 31st with respect to the March 28, 1979 event?

A Yes.

Q What became of it?

A It is in the computer file cabinet or in my office.

Q Do you still have the original of it?

A I have the copy that I received on that day, yes.

Q It was a Xerox copy?

A No, it was a carbon copy.

Q Was it on computer paper or was it on regular-size business paper?

A It was on computer paper.

Q You can make a carbon copy of those computer printouts?

A Apparently.

Q You still have that, though?

A Yes.

Q Do you recall whether that material was provided to your lawyers in response to the document production in this litigation?

A No, I do not.

Q You don't know?

A I don't recall.

Q I show you a document that has been marked for identification as B&W 607, and ask you -- the cover of this document, which appears to be handwritten pages

of a notebook, reads "LOFW W/O EFW" and then "Lanese."

Does "LOFW" stand for loss of feedwater?

A Yes.

Q Does "W/O" stand for without?

A Yes.

Q And "EFW" I take it is emergency feedwater?

A Yes.

Q Can you identify this document for me?

A Yes.

Q Please do.

A This is a notebook that I began keeping within a day or two after the accident.

Q Did you keep this notebook chronologically? Did you fill the pages up as you went along on a day-to-day basis?

A Except for the first several pages, I did keep it chronologically.

Q The first page that has horizontal lines on it has a date at the top of 3/31,79.

A Yes.

Q Is that where you began keeping things chronologically?

A That was the first entry that I made in the notebook as I was taking notes.

Q Then on page W 028069, there is an entry for March 30, 1979.

Could you explain why there is a March 30th entry and then a March 28th entry on the next page following? Do you have any explanation for why these don't seem to appear in sequential order?

A I started the notebook on the 31st and then, subsequently, transcribed notes from the 30th and 28th into -- from the 30th anyway -- into the notebook.

I am perplexed about the 3/28/79 entry. That doesn't appear to be dated correctly.

Q Could it be that the data under the 3/28/79 entry is a recollection of what you knew on that day or information that you obtained?

A No, it is not.

Q Is the information that you say was under the entry starting -- dated 3/30 which appears beginning on page W 028069, you say that is a transcription of notes that you had taken other than in this notebook on that day?

A I'm fairly sure that it is a transcription, yes.

Q Do you recall whether the transcription was a verbatim transcript of all the notes you had taken on

that day?

A Yes.

Q It was?

A Yes.

Q Do you recall any other notes other than this notebook and the notes from which you transcribed the material appearing under the date March 30, 1979? Do you know of any other notes that you kept with respect to the Three Mile Island accident?

A There are no other notes.

Q When, if you can recall, did you write the title or heading on this front page of the notebook, "Loss of Feedwater without Emergency Feedwater"?

A The first weekend after the accident.

(continued on next page)

Q During that weekend, had you come to know that there had been an unrecognized loss of coolant at the Three Mile Island facility on March 28th for some period of time?

A I don't know.

Q What is your best recollection as to when you learned that there had been an unrecognized loss of coolant from the reactor coolant system at Three Mile Island on March 28, 1979?

MR. GLASSMAN: Objection as to form. Lack of foundation.

MR. BENEDICT: I will press my question.

(Record was read back.)

MR. BENEDICT: Is your objection based on the fact that I haven't established that Mr. Lanese knows that there was an unrecognized loss of coolant on March 28, 1979?

MR. GLASSMAN: It is based on the fact that I am not sure what you are referring to. There are probably a lot of people who didn't recognize it. I am not sure what you are referring to or what the import of the question is.

MR. BENEDICT: That is patently ridiculous. I don't understand why you get involved in these

questions. If you are going to tell me that Mr. Lanese doesn't know that there was at one time an unrecognized, what your client calls an unrecognized loss of coolant from the reactor coolant system on March 28, 1979 at the Unit 2 on Three Mile Island, then that is beyond the pale.

I wasn't going to insult him by asking him such a question.

MR. GLASSMAN: I don't know why you are making a fuss.

MR. BENEDICT: Because you are interfering. Let's just get along with this. If you have an objection to form, fine, you can preserve it, but giving a lot of speeches about it --

MR. GLASSMAN: I wasn't giving a speech. You were.

MR. BENEDICT: You told me there was a lack of foundation. You asked for the question back. The only problem I could see with it on the issue of foundation is whether you were suggesting that Mr. Lanese has never learned that fact.

MR. GLASSMAN: I made a very brief objection as to form. I permitted you to ask the question

to obtain answers. It was you who then speculated as to the nature of the form objection and who decided to engage in colloquy.

MR. BENEDICT: I will tell you what. One time your partner, Mr. Seltzer, told me that if I couldn't state the specific reason for my objection as to form, the objection was a nullity.

I challenge you to state your specific reason for your objection as to form.

MR. GLASSMAN: You received it.

MR. BENEDICT: What is it?

MR. GLASSMAN: The record stands, and whatever it is, it is. You may proceed. You are making a travesty of this for reasons I can't understand.

MR. BENEDICT: I am not making a travesty. I am discussing this issue because there has been a constant effort on your part to interfere with the examination of the witness. You are constantly counseling with the witness. You are constantly taking him out of the room to talk with him and I don't understand why.

Let's just get along with it. This is not very controversial stuff. Let's get through it and not have to lay every foundation question.

If you are suggesting for a moment that I couldn't ask that question subject to connection, your grasp of evidentiary law is limited, to say the least.

MR. GLASSMAN: Thank you for your second speech. The only new point that you have made is that I have supposedly had too many conferences with the witness at various points.

There have not been a lot of conferences and I would note that in line with requests made by your firm and we, too, by our firm, there have been points where we have attempted to be cooperative in making sure that witnesses were responsive.

MR. BENEDICT: I think both you and I know why that issue came up and I don't think we have to go into it on the record.

MR. GLASSMAN: Why don't you continue.

MR. BENEDICT: I agree. I am asking only that we can spend the rest of the day doing this relatively directly.

MR. GLASSMAN: I told you at least six times that you should continue rather than engage in speeches.

MR. BENEDICT: If you promise not to, I promise not to.

MR. GLASSMAN: Continue.

Q Could you look through this Exhibit B&W 607 and tell me whether or not it includes all the pages of your notebook as best you can recall?

MR. GLASSMAN: I assume you are asking the witness to examine every page or what is the import?

MR. BENEDICT: I am asking him to do whatever he has to do to establish, to the best of his ability, that he recognizes it as being a complete document.

A Without comparing page for page to the original, this appears to be complete.

Q You have no reason to believe that it isn't?

A Not at this point, no.

Q We had a pending question which is lurking somewhere behind all of our colloquy, and if Mr. Danyo can find it, I would like to get an answer to it.

(Record was read back.)

A I don't know.

Q Do you recall whether you learned or heard

that prior to the end of the weekend immediately following the accident on March 28th?

A No, I'm sorry, I don't.

Q Do you recall at any time that you began to consider the events that occurred on March 28, 1979 to be in at least part a loss of coolant accident?

A No, I can't recall.

Q Are you aware today that there was for some period of time at the Three Mile Island Unit 2 facility on March 28, 1979 an unrecognized loss of coolant through an open pilot operated relief valve?

A Yes.

Q Were you aware of that before our discussion commenced today?

A Yes.

Q Do you recall whether you knew that fact before the end of the summer of 1979?

A Yes.

Q But you can't be more precise with respect to when you learned?

A No.

Q On the front page, you will notice in the upper right corner of the cover of the notebook there is a handwritten file number which reads, "File: 2240.0."

Is that in your handwriting?

A Yes.

Q What does that file number indicate?

A That is a safety and licensing file.

Q What is the subject matter encompassed by that file?

A I believe it is the TMI-2 accident.

Q There are, I take it, then,other documents in that file aside from this notebook?

A As I recall, yes.

Q Are these all locuments that had you as their source?

A No.

Q Was this file a file kept generally within your group?

A No. I should add that this notebook no longer resides in the safety and licensing file. I had put it there. Subsequent to that, I took it out of the file and had it in my possession.

Q What motivated you to remove it from the safety and licensing file?

A Originally, safety and licensing and safety analysis and plant control were near each other, and when we moved from the Mountain Lakes building, the two

groups were separated, and I started retrieving some of the files that I wanted to keep so that they would be available for reference.

Q Do you recall what, if any, other materials you removed from the file No. 2240.0 at the time you left?

A No, I do not.

Q Do you recall that there were other materials that you did remove?

A No, I don't recall.

Q Do you recall that this was the only document that you removed from that file?

A I believe so.

Q Were you directed or requested at sometime following the accident to submit to a central filing system materials related to the Three Mile Island event on March 28, 1979?

A No.

Q Who, if you know, set up file No. 2240.0?

A I believe I did.

Q Did the file contain material from other people aside from yourself?

A I don't remember.

Q Was it your intention when you set up the

file to include within it material prepared by people other than or whose source was people other than you?

A I expected the licensing people to use that file, yes.

Q All the people in licensing?

A If they saw fit, yes.

Q Did there ever come a time up until today when you were directed or requested to accumulate all of the material that you had with respect to the accident on March 28, 1979 and send it to a central filing location?

A No.

Q Did you receive a document request memorandum in this litigation?

A Yes, I did.

Q Did you comply with it?

A Yes.

Q Do you recall whether you searched this file?

A By the time I had received the document request, that was a file in safety and licensing, so I did not search 2240.0.

Q Are you aware whether anyone else searched it in compliance with the document request in this litigation?

A I recall seeing a sticker on the file.

Q I am not sure I understand what you mean.

A A sticker that says "Do Not Remove," something about it being related to the B&W litigation.

Q In other words, if original material is returned to you that has been utilized for purposes of this litigation, it has some sticker on it which would indicate to you that that is what happened to it?

A That's right.

Q When was the last time you looked at file No. 2240.0 or any of the material contained in it?

A Not recently.

Q When did you see that it had a B&W litigation sticker on it?

A The last time I looked at it.

Q And you don't recall in terms of even what year that was?

A No.

Q Why did you look at it, if you can recall?

A I don't think I was looking for that file, but from time to time I go through the 2200 files in licensing because I need to find old information.

Q What do the 2200 files, as you refer to them, encompass?

A Accident and safety analysis.

Q By "safety analysis," again, are you referring to hypothetical accident scenarios analyzed for licensing purposes?

A Yes.

Q Was there any other central file to which you submitted material related to the Three Mile Island accident?

A Safety analysis and plant control has a central file.

Q Does that have a specific designation, that file?

A Yes, it does.

Q Do you recall what it is?

A No.

Q Who would you ask in safety and licensing analysis to determine which file that is?

A I would look on my file listing.

Q What is a file listing? You said you would look on your file listing.

A It is a listing by number and by cross-referenced subject.

Q Is it organized by subject matter?

A No, it is not.

Q How is it organized?

A I submit a file with one to four key phrases and a sequential number is assigned to that file.

Q Is the file listing that you referred to a file listing which pertains only to the files which you have submitted or does it include every one's files?

A It should include any other central filing information on the accident.

Q Is the file listing limited to a listing of material related to the accident?

A No.

Q How long has this procedure of using key words and receiving a number assignment been in place?

A A few months.

Q What or how were files that had existed prior to the institution of this practice, how were they incorporated into the system?

A By assignment of key phrases and reference numbers.

Q So there was an effort made to go back and catalogue the material that existed prior to the institution of the present system we are discussing

under the present system?

A Yes.

Q Did you have any responsibility in seeing to it that your materials were properly recatalogued or properly catalogued?

A I assigned file names to my material.

Q Did you get your material back from central files with instructions to categorize it in some manner and then return it?

A No, the material was in my possession and I added the key phrase and we then put it into the safety analysis central file.

Q What about the material that already resided in the safety analysis central file prior to the institution of the filing system we are discussing?

A There was no safety analysis and plant control group central file.

Q Did you retrieve any files from the licensing central files for refiling in the safety analysis central files?

A Not after files were labeled for the litigation.

Q In other words, if they were in the litigation, if they had been labeled for the litigation,

you left them where they were?

A Yes.

Q Was the system that you described instituted in other sections of GPU?

A No.

Q Who instituted the system you described?

A Mr. Trikouros.

Q It applies only to the people within your group?

A It applies to safety analysis and plant control, I believe to plant analysis, and Mr. Broughton is utilizing the central file.

Q You said that there had not been a central file for this group or this collection of people prior to that. Is there a reason why that was true?

A It was never instituted before.

Q It is not as a result of this being a new group or new assemblage, is that correct?

A No. That's right.

Q People prior to the institution of this system within safety -- what group was it?

A Safety analysis and plant control.

Q Within that group, people prior to the institution of the system we are discussing kept their

own files and there was no central system?

A That's right.

Q Were you in that group at the time of the Three Mile Island accident?

A Yes, I was.

Q How did this file come to be in licensing's central file?

A As I said, at the time --

Q This document, I am referring to B&W Exhibit 607.

A As I said before, at that time there was no central file for safety analysis. I wanted to maintain it in the central location, safety and licensing -- licensing and safety analysis were in the same proximity. I was familiar with the licensing file numbers, so I filed it in the licensing central file.

Q Did you make some effort to advise other of your colleagues that you had established this central filing number for material relative to the accident?

A No, my intention wasn't to have everyone from our group put it in that file.

Q It was only by putting your material into a central location other people could use it? That was your purpose?

A Yes.

Q But you did not see to it that other people put theirs in a central location?

A No.

Q Do you know whether any of the other people did set up a central location for their material with respect to the accident?

A I don't know what you mean by central location.

Q Do something similar to what you did, which was to send this to licensing central files.

A No.

Q You don't recall whether anyone did that?

A No.

Q Is it your recollection that no one did?

A No one within the entire company?

Q I will withdraw the question.

I take it that you removed this document, B&W 607, from file 2240.0 prior to the time that that file was reviewed for purposes of the litigation?

A Yes.

Q Because this file didn't have a sticker on it, as you recall?

A That's right.

Q Did you put this into a file after you removed it from the licensing central file? What became of this document? Did you keep it again in your personal files or did you then refile it in this new central system in safety analysis?

A It stayed in my desk for a year or two and when we implemented the central system, I put it in our central file.

Q What other material, if any, did you submit to central files at that time which related to the Three Mile Island accident?

A All of my hand calculations are in the safety analysis and plant control central file.

Q Other than the filing system that you set up personally in order to assure that material you created was in a central location and the filing system that has been set up in safety analysis in the last few months, was there any system instituted whereby material related to the Three Mile Island accident would be centrally filed?

A I understand that there was.

Q What do you recall about that system?

A There are microfilm copies of calculations and documents that relate to the accident, and they are

available in Parsippany. I don't recall where.

Q Have you ever heard of something called the GPU System Libraries at TMI?

A No.

Q Prior to the accident at Three Mile Island, in the beginning of your creation of what has become B&W Exhibit 607, did you keep a chronological notebook of work you were doing or information that you obtained in the course of your job?

A At times I did.

Q What times do you recall having done it?

A I had a chronological file most of the time that I was the TMI-2 safety and licensing engineer. I also maintained a separate chronological file with regard to the emergency and main feedwater modifications to TMI-2 and a separate chronological -- I have been saying file. I mean notebook -- with regard to asymmetric LOCA loads.

Q Was it a notebook like this notebook, a steno notebook?

A Yes.

Q Did you maintain any material after, did you maintain any chronological notebooks after this?

A Yes. On occasions I still make entries into

the notebook on asymmetric LOCA loads, and I have a chronological notebook that I started as a result of the chairmanship of the analysis subcommittee.

Q Other than the notebook that has been marked as B&W Exhibit 607, were any of the other notebooks you mentioned or any other notebooks that you kept provided to your lawyers for possible production in this litigation?

A Yes.

Q Which, if any? Which, if not all of the ones you mentioned, were provided to your lawyer?

A Of the ones that I mentioned, all except the analysis subcommittee notebook.

Q What is tne analysis subcommittee?

A The analysis subcommittee is a subcommittee of the B&W owners group. It was chartered by the executive committee in 1981.

Q I'm sorry. Is this the asymmetric LOCA loads analysis subcommittee?

A No.

Q It is different?

A Yes.

Q When was it chartered?

A In late April, early May, 1981.

Q What is its charter or responsibility?

A Its charter is to oversee and review all generic analysis work that is performed for the B&W owners.

Q You, I take it, are a member of that committee?

A Yes, I am.

Q I would like to turn your attention in B&W Exhibit 607 to a page numbered for this litigation as W 028090 which has the date at the top of the page in handwriting 4 or April 5, 1979. Before I ask you any questions specifically on this page, is there any handwriting in this document B&W 607 that is not your own?

A Not that I can -- not that I have seen.

Q Looking at the second entry on page W 028090, it reads, "Safety valve leak J.P. Moore. Leaked 6 GPM at 2100 psig. Estimate 93 GPM leak now."

Is that an accurate reading?

A No.

Q Can you tell me what it says?

A It should be"estimate 9.3 GPM leak now."

Q What valve were you referring to when you made that entry?

A I presume that was the code safety valves.

Q Were you referring to conditions existing prior to the accident at Three Mile Island, conditions at Unit 2?

A First of all, I have to correct myself. That 9.3 may also be .93. Without seeing the original, I am not sure.

As to the question, was that a condition that was existing at TMI-2 --

Q Is this entry an entry of actual conditions existing at sometime at Unit 2 on Three Mile Island?

A My recollection is that at some point there was a measured 6 GPM leak at 2100 pounds in the system and by extrapolation, the estimated leakage on April 5 would have been, I presume, .93 GPM.

Q It is your understanding that --

A Let me say could have been .93 GPM.

Q Is it your understanding this entry relates to conditions existing on April 5, 1979?

A Yes.

MR. BENEDICT: In your bag of tricks, do you have the original of this notebook?

MR. GLASSMAN: Certainly we have it available, but I do not happen to have this

original with me which doesn't seem to be sufficiently readable, but we can, of course, provide that to you.

MR. BENEDICT: I guess I might as well make the record clear at this point. I was up quite late last night and I came to the conclusion that I couldn't finish today, and the reason was not because necessarily I didn't just have enough time, it was because as a result of your delivering to me documents on the eve of this deposition that I didn't have a chance to review until the evenings during the deposition, I have discovered documents that either were illegible when you provided them to us or copied illegibly and I couldn't use them, and I also discovered engineering documents that I am not sure I am competent fully to interpret.

As you know, this is a difficulty that each side has had in terms of the timing of document production, but I suspect at least I will not be able to finish today. There are portions of this notebook that I find very hard to read. That is to be expected when you are xeroxing off green paper. I understand that,

but I may have to ask for access to the original.

I will think long and hard before I ask Mr. Lanese to come back. I hope I can finish the things that are important today and decide I can get stuff from somebody else down the road, but I am afraid I can no longer promise to tie things up. I am going to have to leave it open at the end of the day and read the things over the weekend.

MR. GLASSMAN: We hope that you can finish it up. We will be cooperative if it is necessary to bring him back, but we sincerely hope that you can finish it today.

If it would help speed things, we could, of course, attempt to arrange to deliver the original of this notebook today, and we can make a phone call right now and attempt to do that.

MR. BENEDICT: Unfortunately, the notebook is really not the major offender. This was an issue I was hoping to resolve since we don't know where and if there is a decimal point in this number, but it is an issue that we can come back to at some later date, but if you can get the notebook down here this afternoon, we can try at

least to clear up these issues, but there are some ones that are open with respect to some of the other files I got on Monday before this deposition.

MR. GLASSMAN: I will just note that we will again try to be cooperative. While I recognize the difficulty of going through documents to ascertain whether each page is or is not readable in the reproduced form, if in the future it would be possible to, as soon as you receive such documents, identify any such problem, we could, of course, make the originals available before the examination starts and in that way avert this kind of a problem.

MR. BENEDICT: As I say, I agree that would be the best of all possible worlds, but unfortunately when I am confronted with a box of documents on a Wednesday before the deposition and another box of documents on a Monday the day before the deposition was supposed to commence, I didn't have an opportunity to read them. There is a disagreement.

I may be giving you the benefit of the doubt when I said I got them on Monday. I have

been told I may have gotten them on Tuesday morning.

MR. GLASSMAN: They were sent Monday, but regardless --

MR. BENEDICT: The timing of the production of the documents I am afraid made it impossible for us to be as thorough in their review as we might have been, and I am afraid I am going to have to at least put Mr. Lanese over for another day, but maybe we can decide we can cover the same issues with somebody else.

MR. GLASSMAN: I will make only one more point, and perhaps we can go on.

As you know, we have had this problem frequently with B&W witnesses, but particular documents produced here several days I believe before the deposition began were not that weighty. Nevertheless, we will try to be cooperative.

Q Referring to page W 028090, it is your recollection then that this entry was with respect to conditions existing on or about April 5, 1979, is that correct?

A No.

Q What can you tell me about when these conditions existed?

A They may never have existed.

Q Was this a calculation attempting at least to determine the conditions that existed on or about April 5, 1979?

A As I recall, the intention was to calculate that if there really were that 6 GPM leak that had existed at sometime and that leak source was now reinitiated, what would it be at the present plant conditions, and that was the calculation that Jim Moore made.

Q Who is Mr. Moore?

A At that time, he was components engineering manager, and he was at the site by this time.

Q Why do you have this entry in your notebook?

A It would have related to hydrogen generation or a transport of hydrogen to containment from the pressurizer.

Q Because the valve you were discussing is one of the valves on the top of the pressurizer?

A Yes, having a leak in the valve would have been beneficial.

Q Because it would have been a pathway for the

release of hydrogen in the system?

A That's right.

Q What did you understand to be the condition of the valve at issue here prior to the Three Mile Island accident?

A I didn't have an understanding.

Q Have you since come to learn whether or not that valve was leaking prior to the accident?

A No.

Q You identified it or it is identified as a safety valve here. I take it that means it was one of the two code relief valves as you understood it?

A I don't recall.

Q At that time, did you know the distinction between the pilot operated relief valve and the code safety valves?

A Yes.

Q Would you have referred to -- at that time, did you ever refer to the pilot operated relief valve as a safety valve?

A No.

Q Could you turn to page, I will just read the last three digits, to page '103. Since you seem to be a better reader of your handwriting than I am, can

you read the contents of that page?

A I am not sure I agree with that presumption. On 4/12/79, this page indicates I had a conversation, it was a phone conversation --

Q Let's just get the text in first. It says "King House ITI."

A Yes. The next line says, "Relief valve to quench tank." Following the written line, it begins, "Piping configuration of piping from valve to quench tank - pipe sizes and lengths." Next line, "-sent him drawing No. 2403,2644."

Q Is King House a person?

A Yes.

Q Who is Mr. House?

A I don't recall. I presume he is a person.

Q Who or what is ITI?

A Intermountain Technology.

Q Incorporated?

A I believe that is right.

Q Is that an organization that GPU uses for consultation?

A No.

Q What was ITI's involvement with the Three Mile Island accident?

A They were doing some analysis for someone with regard to the TMI-2 accident.

Q Could you tell me what -- do these notations reflect a conversation you had with someone at ITI?

A Yes.

Q What was the substance of the conversation?

A I recall that among other people, ITI was one of the vendors or consultants or analysts that we were providing modeling information to in order that they might investigate the accident.

Q Is the information this person is requesting related to what is called here the quench tank, is that the same as the reactor coolant drain tank?

A Yes.

Q Do you know what purpose ITI was going to put this material to, the information you sent to them?

A It was related to modeling the relief valve discharge to the quench tank.

Q What do you mean when you say "modeling" something?

A Developing a computer model with which to analyze the response of a system.

Q Did you ever see any results or any models prepared by ITI with respect to the reactor coolant

drain tank?

A No.

Q Do you recall having any other contact with the people at ITI other than the conversation partially recorded here?

A I believe I provided them with other information, yes.

Q Was it on the basis of him calling you up and asking you for specific information?

A Yes.

Q Aside from providing him with specific information at his request, did you have any other responsibilities with respect to modeling the piping and valves of the reactor coolant drain tank?

A Yes.

Q What other involvement did you have?

A I worked with Energy Incorporated in developing a model of the drain tank.

Q For what purpose was this model developed?

A It was an attempt to determine the mass flow out of the PORV during the TMI-2 accident.

Q Was it used for such purpose?

A We attempted to use it for such purpose, yes.

Q Did you receive results that you considered satisfactory?

A No.

Q Was the project abandoned?

A Yes, it was.

Q Who other than you at GPU worked on this project?

A Mr. Broughton provided supervision with respect to the project, and Mr. Trikouros provided comments from time to time.

Q Were you the principal GPU employee on the project, as you understood it?

A I was the principal contact with EI.

Q Did EI in fact create the model?

A Yes.

Q Did you review their work?

A Yes.

Q Did you conclude as a matter of engineering judgment that it was not going to be effective at analyzing -- it would not be effective at modeling the flow through the PORV?

A I didn't make that determination, no.

Q Do you recall who did?

A Yes.

Q Who?

A Mr. Broughton and Mr. Trikouros.

Q Was that the end of that project?

A Yes.

Q About when did that occur?

A Summer of '79.

Q Do you know of any other projects undertaken by or for GPU to determine the mass flow rate through the PORV during the accident at Three Mile Island?

A Yes.

Q Could you describe that project or those projects?

A There was a task that I undertook using a pressurizer model to determine flow rate through the PORV by duplicating the pressurizer pressure response.

Q When you say "model," do you mean a computer model?

A Yes.

Q Were your efforts successful in creating an acceptable model or acceptable result?

A Only in a very limited sense.

Q Is it true that today, even today, no one knows the mass flow through the PORV during the first hours of the Three Mile Island accident?

A I don't know.

Q Do you know?

A I don't know the mass flow rate, no.

Q Within what range in terms of a percentage or an error range have you estimated the mass flow through the PORV during the first few hours of the accident?

A I never attempted to place an error band on the estimate.

Q Is it your opinion that the estimates that you have made, is it your engineering judgment that the estimates that you have made are accurate within plus or minus 5 percent?

MR. GLASSMAN: Are you asking Mr. Lanese to comment or make a judgment about the accuracy of some work he did?

MR. BENEDICT: Yes. I am asking when he did it, what his state of mind was with respect to the result at the time he arrived at the result.

MR. GLASSMAN: I don't think there has been any testimony that there was any result.

MR. BENEDICT: My impression was that he hadn't put an error band on it.

MR. GLASSMAN: Perhaps you could ask the

MR. GLASSMAN: You are not asking him to speculate?

MR. BENEDICT: No.

A The problem is I don't have an estimate with which to make that judgment. When we abandoned the estimate, the attempt to evaluate the flow out of the PORV, there wasn't a latest estimate that I would stand by.

Q In other words, when you abandoned the project, it was abandoned at least in part because you had been unsuccessful in arriving at an estimate that was viewed as useful for purposes of further analysis?

A We abandoned it because there was no need to duplicate the work that B&W was performing.

Q Is it your understanding that B&W has come up with an accurate or useful figure for mass flow through the PORV?

A I believe they have a number that they consider correct.

Q Do you --

A Not correct, but useful for study.

Q Have you or have other people at GPU used that number for purposes of analysis?

A I haven't.

Q So you don't have an opinion on its accuracy?

A No.

(Whereupon, a luncheon recess was taken at 1:00 p.m.)

A F T E R N O O N S E S S I O N

1:55 p.m.

L O U I S C. L A N E S E, having been previously sworn, resumed and testified further as follows:

EXAMINATION (Continued)

BY MR. BENEDICT:

Q Did there come a time sometime after the accident at Three Mile Island on March 28, 1979 when you became involved in efforts to calculate the net addition of water to the reactor coolant system during the transient?

A Yes.

Q Could you describe for me briefly the nature of that project?

A The purpose of the task was to, by using information available from the computer printout, from the reactimeter, and from understanding of systems operations, to estimate the amount of water that was added by way of high pressure injection and makeup taken out by way of letdown, and determine the HPI makeup injection scenario during the first two to three hours of the accident.

Q You were using the expression HPI makeup. Is it true that there is only one set of pumps and they function both in the makeup mode and in the high pressure injection mode?

A The pumps themselves can function as either makeup pumps or high pressure injection pumps. The valving associated with those two modes is different.

Q So --

A As well as the piping.

Q It is a different mode of operation for the same set of pumps? They are different modes of operation for the same set of pumps, I take it, makeup and high pressure injection?

A Yes.

Q About when did you receive a request to do this task?

A May 1979.

Q From whom did you receive it?

A Mr. Broughton.

Q What did Mr. Broughton say to you with respect to your project or task? Did he advise you of why he was seeking to have this information determined?

A Yes, it was part of an overall attempt to analyze the TMI-2 accident.

Q Was Mr. Broughton a part of a task force or group of people put together for that purpose?

A I don't recall.

Q Did you ever consider yourself to be a member of a group or task force to examine the circumstances surrounding the Three Mile Island accident?

A No.

Q You say you were given this assignment sometime in May. Did Mr. Broughton or did anyone else assign to this project any particular priority?

A It had a high priority.

Q Did you understand that you were to spend the majority of your time on it until it was completed?

A I can't say that I remember.

Q Did it in fact occupy a substantial or even a majority portion of your time during that period, the period following your receiving the assignment?

A I don't believe it was a majority, but it was a substantial period of time.

Q When did you stop work on the project or when was the project completed?

A I completed my work on the project on the makeup addition sometime in early summer of 1979.

Early to mid-summer.

Q The summer solstice is on the 22nd of June. Do you consider that the beginning of the summer or is that in the middle of the summer?

A That is the beginning of summer.

Q Would you say that you concluded this work sometime at the end of June or in July, or is it later than that?

A I believe by July, by the end of July.

Q Were you working with anyone else on this project?

A Only with Mr. Broughton.

Q Was he functioning in a supervisory role only?

A Yes.

Q Did you prepare a report with respect to your findings or conclusions?

A I prepared an appendix to a TDR.

Q Were you the draftsperson or the principal draftsperson of the document that was appended to the TDR?

A Yes.

Q I would like to show you a document that has been previously marked as B&W Exhibit 341. Could

you look at the document I have put before you which has been previously marked as B&W 341, and tell me whether you have ever seen that document before?

A Yes, I have.

Q Could you identify it for me, please?

A It is a document entitled Accident Transient Modeling Analysis, TDR No. TMI-102, Revision No. 0, dated May 18, 1979.

Q Under "Originator Signature," your name is typed, L. C. Lanese. Is your name there, does your name there indicate that you worked on this draft?

A Yes.

Q Does B&W 341, which is dated May 18, 1979, include any of the work or any of the information you learned in the course of your work about makeup and letdown?

A I am not sure.

Q Can you identify for me any portion of this document to which you had input, whether or not it related to makeup and letdown?

A With respect to makeup and letdown, Figure 8 is the only possible input.

Q Other than with respect to the makeup and letdown?

A I also had input to Figure 9.

Q Figure 9, what is the document number in the lower left margin for Figure 9, if you can read it?

A 9659.

I believe I was involved in generating Figure 14. That is 9664, and pages 9667, 9668.

That is all, I believe.

Q I would like to show you a document that has been previously marked as B&W Exhibit 171, which is a TDR No. 045, Revision 0, bearing the date August 1, 1979, and again it bears your name under the "Originator Signature."

Have you ever seen this document before?

A Yes, I have seen it before.

Q Do you recognize it as a TDR that was prepared in the mid to late summer of 1979, related to the accident at Three Mile Island on March 28?

A Yes, I do.

Q Does this TDR 045 contain any portion of the work that you did during that summer with respect to makeup and letdown during the course of the accident?

A Yes, it does.

Q Could you tell me what section that is?

A Appendix B.

Q Does Appendix B -- the microfilm number on the lower right is obliterated on my copy, but on the lower left Appendix B begins on page N56489.

A That is correct.

Q Does that go through to the end of the document, that appendix?

A Through N56512.

Q That is the end of the exhibit, B&W 171, isn't it?

A Yes.

Q Do you recognize any other sections in which you had input in what has been marked as B&W Exhibit 171?

A Figure 14 and Figure 9.

Q Other than the text that appears in Appendix B, were you wholly or partly responsible for any of the textual material in B&W 171?

A Page 13, the first and second paragraphs might have been written by me.

Q Do you at least recognize that you provided input into the information in those paragraphs?

A Yes, I did.

Q Anything else?

A The textual material that refers to Figure 9.

Q Can you identify where that is in the document?

A Beginning on Page 9. There may be some reference -- I did not write the paragraphs. I may have had some of the input on there.

Q On Page 9, does that carry over?

A Nothing on Page 10.

Q Did you want to change your last answer?

A Yes. Now I am not so sure about Page 9, since it isn't the right figure reference.

Q Do you recall having the principal responsibilitiy for drafting or providing any input into any section other than the Appendix B?

A The one reference that I made already, there are perhaps two paragraphs which refer to Figure 9.

Q And Figure 14?

A I had some input into the textual material relating to Figure 9.

Q Who was the principal draftsman, if there was one, of this document, the textual material?

A Mr. Broughton.

Q This TDR 045, B&W 171, is dated August 1,

1979. Is this the latest version of this TDR or the only version of the TDR that you ever saw?

A It is not the only version. I don't know if it is the last version.

Q Do you recall ever signing a version under the originator's signature line?

A I don't recall.

Q Is it true that 045 is a direct outgrowth from the document we were discussing previously, which has been marked B&W 341 and was headed as TDR TMI-102?

A Yes.

Q Could you turn to Appendix B in what has been previously marked as B&W 171. Immediately above the words Appendix B on the first page of that appendix appears the word Draft. Is this the latest version or the last version of the work product you produced with respect to makeup and letdown?

A I believe so.

Q Do you recall doing any further work with respect to this project after the preparation of Appendix B?

A No.

Q Do you recall whether you sought out any further information up until today with respect to

makeup and letdown at Three Mile Island during the accident since you concluded drafting what is Appendix B to 171?

A No, I did not.

Q Is it in fact -- again, I think there is an ambiguity because of the construction of my question. Did you do any further review following the conclusion of this draft of Appendix B?

A No.

MR. BENEDICT: Could you mark this as the next in order.

I would like to ask the reporter to mark the next document as B&W 608 and note for the record that this is one of the documents that I found some of the pages to be either very difficult to read or impossible, and they do not concern the portions that I want to talk about today but they are one of the documents that we may have to try to copy in a different manner.

MR. GLASSMAN: If you decide that you do want that, let us know.

(Document containing information used in preparation of Appendix B and Figure 14 of TDR No. 045 marked B&W Exhibit 608 for

identification, as of this date.)

BY MR. BENEDICT:

Q B&W 608 is materials which were assembled in a single file for production to us and were identified by your counsel as having come from your files.

Do you recognize this material?

A Yes, I do.

Q Could you describe it for me generally? First, is it in fact a single file or was it in fact a single file in your files?

A I believe it was.

Q It was a single file?

A Yes.

Q Could you describe for me generally the contents of this file?

A Information that I used in preparation of Appendix B to the TDR and in preparing Figure 14 of the TDR.

Q That is TDR 045 which has been previously marked as B&W 171?

A Yes.

Q Putting aside for the moment discussions with counsel or review at their direction in preparation

for this litigation, when was the last time you looked at this material?

A When I put it in the central files several months ago.

Q Did you review it at that time for any reason other than to be able to categorize it for filing purposes?

A No. I literally looked at it.

Q When was the last time you looked at this material for some other purpose?

A I don't know.

Q Do you recall whether you made any entries or inclusions to this file since the end of 1979?

A No.

Q You believe you have not or you don't recall?

A I don't remember making any other entries.

Q Could you turn toward the back of B&W 608, to a document that should be stapled together,starting with the document number W 026933 through 55?

A Yes.

Q The first page of this document or that section of the file, the first page of this accumulation of pages or document reads Appendix B,

"Inventory change to RCS via makeup/letdown system," and written in hand in the upper right margin is June '79.

Do you recognize this as a previous draft of what became Appendix B in B&W 171?

A Yes.

Q It is dated June 1979. Can you identify more precisely the date that you completed this draft?

A The first half of June 1979.

Q Was this the first draft of what became Appendix B?

A I don't remember.

Q How many drafts were there to Appendix B before the one that appears in B&W 171?

A I don't remember.

Q Were there more than one?

A Yes.

Q Do you recall whether this is the first?

A No, I don't recall.

Q You can't identify it one way or the other as the first?

A No.

Q Did you write the textual parts of this document?

A Yes.

Q Is all the handwriting appearing on the textual portions of this document your handwriting?

A Yes.

Q Did you submit this draft to anyone for review?

A To Mr. Broughton. I don't know if anyone else saw it.

Q Did Mr. Broughton have any comments with respect to this document?

A I don't remember.

Q If you today were going to try to find other drafts of this document, where would you look?

A I can't think of anywhere else to look.

Q You, in considering that question today, would have viewed this file as being the source you would have gone to?

A It is all the information I have and that I kept.

Q Can you by reviewing this document identify whether or not this draft was prepared prior to the interview that you had, that you and others had with the operators on June 13, 1979, which you discussed with me on Wednesday?

A Yes, this was prepared prior to the interview of the operators on June 13.

Q What specifically leads you to believe that in the document?

A My references to batch feeding of the makeup tank with borated water.

Q Referring back to Appendix B of B&W 171, looking at the first paragraph of Appendix B in 171, there is a reference to "specific interviews regarding operator actions with the makeup and letdown system during the event."

That passage does not appear in the paragraph, the first paragraph of the document in B&W 608. Are the interviews referred to here the ones we have been discussing referred to in 171?

A Yes, the interview on June 13. I call that a meeting rather than an interview.

Q To what were you referring in B&W 608 in the first paragraph of the draft Appendix B or the June '79 Appendix B, where you say, "Information regarding the net mass input to the reactor coolant system has been inferred from two sources: First; operator interviews regarding their actions during the event."

What operator interviews were you referring to?

A Interviews conducted the day of the TMI-2 accident by GPU personnel.

Q So these were interviews you read rather than -- they were not interviews where you were present?

A That's right.

Q I would like to refer you back to B&W Exhibit 607 which is your notebook, the loss of feedwater without emergency feedwater notebook, and turn your attention to page beginning at W 028129 through page 33. I would like to ask you whether the text following the ent 6/13/79 represent your notes concerning the interviews which you referred to in Appendix B of 171?

MR. GLASSMAN: Objection. Unless I misunderstood the question, the witness had testified that the interviews that he referred to were at an earlier time and that Appendix B refers to a meeting,at least as Mr. Lanese characterized it, on June 13, somewhat distinct in his mind from an interview.

MR. BENEDICT: I think the question was unclear because of its placement.

Q What I mean, referring back to 171 and Appendix B thereto and the first paragraph, you are discussing sources of information, and you refer to "specific interviews regarding operator actions with the makeup and letdown systems during the event."

Were those specific interviews the same interviews as are indicated to have occurred here in your notebook marked as B&W 607?

A Yes. That is what I recommend calling meetings with the operators for simplicity.

Q There is a list at the top or toward the top of the page where the 6/13 entry first appears. It says, as I read it, "TMI-site ACRS preparation," and then it gives a list of people's names, Keaten, Broughton, Gary Miller, LCL--and I take it that refers to you?

A Yes.

Q Craig Faust, Ed Frederick, Bill Zewe, Fred Scheimann -- can you read the next name?

A John Brummer.

Q And J. Putnam.

Is that a complete list of the people present at this meeting?

A No.

Q Who else do you recall being present?

A I recall that part-time, Dick Dubiel, then of Met Ed, and Tom Van Witbeck of EI were also present for a portion of the meeting.

Q Were all the people whom you listed in your notebook present for the entire meeting?

A I don't know if Mr. Brummer was there for the entire meeting. Everyone else was.

Q You were present for the entire meeting?

A Yes.

Q Was the meeting called specifically to discuss the issue of makeup and letdown?

A No.

Q Do you recall for what purposes the meeting was called?

A Yes.

Q What were those purposes?

A There was an ACRS meeting sometime in the near future in which GPU and B&W were going to make presentations regarding the TMI-2 accident. The purpose of the meeting was to ascertain facts in preparation for that ACRS meeting.

Q Were you to testify?

A No.

Q Was anyone else indicated here as present to testify?

A I believe Mr. Keaten was.

Q Did you arrive at this meeting with the intention of inquiring into makeup and letdown of the operators?

A Yes.

Q Did you have an opportunity to do that?

A Yes.

Q Do you recall how long you spent discussing that subject with them?

A Perhaps 45 minutes to an hour.

Q How long was the meeting, the entire meeting?

A Four to five hours.

Q Do these five pages represent all of your notes on this meeting?

A Yes.

Q Are you aware today of any other sources of information with respect to what transpired during that meeting?

A No.

Q This meeting was not recorded?

A No.

Q It was not.

Was anyone delegated the responsibility of taking minutes?

A No.

Q Do you recall discussing the meeting with anyone -- do you recall after the end of the meeting, discussing the contents of the meeting with anyone?

A Yes.

Q With whom did you discuss it?

A Mr. Broughton.

Q Other than with Mr. Broughton, do you recall discussing it with anyone?

A No.

Q What was the subject or subjects, as best you can recall, you discussed with Mr. Broughton?

A The makeup and letdown scenario.

Q Did Mr. Broughton have any notes on that or any other subject that you saw or that he used while you discussed this with him?

A I don't remember.

Q I am going to leave off these notes again, with the understanding that it is very hard to read them and maybe we can get a clear one later.

Could I refer you back to B&W 171 and ask you to turn to the page marked in the lower left margin as N 56497.

A Yes.

Q Looking at Table B-1, the continuation of it, at the page I referred to there is an entry about a fifth of the way down which reads, "1:41:XX MU-P-1C started? Operator interviews."

What is MU-P-1C?

A That is the 1C makeup pump. High pressure injection pump.

Q In the right margin, you indicate immediately to the right of this entry, operator interviews. Does that mean that the source of this information or the source of this entry was operator interviews?

A Yes.

Q In other words, the source of the information in that entry was interviews with the operators?

A Yes.

Q Are you referring to the operator meeting, as you called it, on June 13, or are you referring to the interview transcripts that you read or some other

source of operator interviews?

A I believe it was from the transcripts.

Q Did you discuss this question of the initiation of flow via makeup pump 1C during the June 13th discussion?

A I don't remember.

Q Could you review your notes in B&W Exhibit 607 and see whether anything would refresh your recollection about that?

A I don't see any reference to that item in my notes.

Q Does that refresh your recollection as to whether or not it was discussed that day?

A I have no recollection of discussing it that day, and it wasn't in my notes.

Q From whatever source you obtained this information from the operators, do you recall whether that source or sources indicated what volume of flow was initiated when makeup pump 1C supposedly was started at one hour and 41 minutes?

A No, there is no indication of the flow rate.

Q Did you utilize this information in drawing any of the drafts or tables attached to Appendix B of B&W 171?

source of operator interviews?

A I believe it was from the transcripts.

Q Did you discuss this question of the initiation of flow via makeup pump 1C during the June 13th discussion?

A I don't remember.

Q Could you review your notes in B&W Exhibit 607 and see whether anything would refresh your recollection about that?

A I don't see any reference to that item in my notes.

Q Does that refresh your recollection as to whether or not it was discussed that day?

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Q From whatever source you obtained this information from the operators, do you recall whether that source or sources indicated what volume of flow was initiated when makeup pump 1C supposedly was started at one hour and 41 minutes?

A No, there is no indication of the flow rate.

Q Did you utilize this information in drawing any of the drafts or tables attached to Appendix B of B&W 171?

MR. GLASSMAN: Which information?

MR. BENEDICT: Information relating to the initiation of makeup pump 1C.

MR. GLASSMAN: If there was some information. I notice counsel earlier read into the record there is a question mark that appears immediately after the words MU-P-1C started. I don't know what significance it has.

MR. BENEDICT: Let's hold off on the one question I have.

BY MR. BENEDICT:

Q It is true that you read or saw or heard, either in the course of an interview that you participated in or in the course of reviewing transcripts of operator interviews, that at least someone or someones said at about one hour and 41 minutes into the transient, makeup pump 1C was started.

A Yes.

Q And your recollection is that whoever it is who you understood to have spoken that, whether you heard it or read it, was an operator who was present at one hour and 41 minutes into the transient, present in the control room?

A I only recall that I took that information

from an operator interview.

Q Do you recall whether you had any information with respect to the mode of operation of makeup pump 1C when it supposedly was started on March 28 at one hour and 41 minutes?

MR. GLASSMAN: Are you talking about information Mr. Lanese obtained independently or information from the source in which he obtained this indication that it may have been started?

MR. BENEDICT: Again, if you want to expand the question.

Q Was there any other source of information with respect to the initiation of makeup pump 1C at one hour and 41 minutes other than the operator interviews that you have noted here in Table B-1?

A Not that I am aware of.

Q Did you have any information from whatever source at the time you were preparing B-1 with respect to the mode of operation of makeup pump 1C? And by mode I mean whether it was in the high pressure injection mode and utilizing that piping or whether it was in the makeup mode?

A Makeup pump 1C was aligned as a high

pressure injection pump.

Q Is it true that 1C is a dedicated high pressure injection pump?

A It can be.

Q Was it to your knowledge on the day of the accident?

A To my knowledge, it was on the day of the accident.

Q Makeup pump 1A is also a high pressure injection pump as well as a makeup pump, is that correct?

A Yes.

Q Is it correct when there is an ESFAS actuation, whether manually or automatically, that makeup pump 1B is secured and makeup pumps 1A and 1C operate in their high pressure injection mode?

A That is normally true.

Q What is the nominal flow rate for makeup pumps 1A and 1C in the high pressure injection mode at 1600 pounds, if you know?

A I don't recall offhand.

Q Is it on the order of 1,000 gallons a minute, to your knowledge?

A No, I believe it is less than that.

Q Is it less than 800 gallons a minute, to your knowledge?

A I don't think so.

Q Did the sources of information you relied on in drafting Table B-1 to Appendix B of B&W 171 provide any information with respect to the volume of flow or the mode of operation of makeup pump 1A at or about an hour and 41 minutes into the transient?

A Yes.

Q What indications did you have with respect to flow through makeup pump 1A at or about that time?

A There were two possibilities. One is that it was drawing water from the makeup tank and approximately balancing letdown flow. And the other was that it was drawing water from the borated water storage tank, and it is not possible to determine the flow rate at that time.

Q Is it true that even until today you do not know what source makeup pump 1A was drawing from at that time, at an hou. and 41 minutes into the accident?

A There are two possibilities.

Q The first possibility you mentioned was that it was aligned with the makeup tank and that makeup injection would have approximately equalled letdown

flow, is that correct?

A Yes.

Q So during this period under that first hypothesis or possibility, as you called it, there would be no or no significant net input of water into the reactor coolant system?

A That's right.

Q Now, the other possibility that you suggested or stated was that the makeup pump 1A was aligned with the borated water storage tank, and am I correct that under that hypothesis you cannot determine the volume of flow through makeup pump 1A for that time period?

MR. GLASSMAN: You are asking for what Mr. Lanese did in the course of his work?

MR. BENEDICT: No, up until today what he understands to be the case with respect to that volume.

MR. GLASSMAN: You are not asking him to speculate?

MR. BENEDICT: No.

MR. GLASSMAN: You are asking him to testify as to what he did?

MR. BENEDICT: Right, and what he knows from what he did.

A That is correct.

Q And is it correct that you do not know today which way the pump was aligned, to which tank the pump was aligned?

A That is correct.

Q Is it correct that makeup pump 1A was running throughout the first three hours of the event?

A It appears that that is true.

Q The mere fact of it operating does not, however, in and of itself tell you what it was actually putting into the system, is that correct?

A That's right, for any period of time -- yes, that is correct.

Q It is possible to vary the flow of an operating high pressure injection pump by reducing the opening of a valve between the pump and the reactor coolant system, is that correct?

A Yes.

Q Isn't it true there was some period of time during the first few hours of the Three Mile Island accident when information normally recorded by the computer was lost?

A It is unavailable, yes.

Q It is unavailable today and it has never

been available, is that correct?

A That is correct.

Q And that period included the time that we have been discussing about an hour and 41 minutes into the accident, is that correct?

A Yes.

Q At the time of the accident, was the initiation of the high pressure injection pump information that would be recorded on this information source that we have been discussing?

A Yes, the plant alarm summary would have indicated the 1C makeup pump had been started.

Q But since the plant alarm summary information today and always has been unavailable, there is no documentary evidence, contemporaneous documentary evidence, with respect to whether or not this pump was initiated, is that correct?

A Yes.

Q Do you recall whether the operators, the material that you reviewed with respect to operator interviews and the meeting that you had with the operators, do you recall whether any operator said anything about changing the flow volume of makup pump 1A at or about one hour and 40 minutes into the

transient?

A No.

Q Isn't it correct that in terms of the overall sequence of events on the day of the accident, that one hour and 40 minutes was the approximate time that the last two reactor coolant pumps were terminated?

A Yes.

Q Why is there a question mark after the entry we have been discussing on Table B-1?

A Because there was no independent verification of the operator recollection that a 1C pump had been started.

Q Did you have any reason to disbelieve the operators with respect to this issue, or do you today have any reason to disbelieve them?

A I don't think that was the issue in putting a question mark there.

Q Did you have at least two independent sources of information, one of which was documentary for every other entry in this appendix B?

A That wasn't my point.

Q What was your point?

A I didn't have any hard information that indicated that the pump had been started.

Q It wasn't that you questioned the credibility of the operators, it was a lack of other information?

A Yes.

Q Did you have any information which allowed you to exclude the possibility that the operators in fact initiated makeup pump 1C at that time?

A No.

Q Do you today have any such information?

A No.

Q I would like to ask you to turn and keep two pages before you, because I want to read some text from the June draft and from Appendix B.

Turning in B&W 608 to a page marked W 026935 and then also turning in Appendix B in 171 to a page marked in the lower left margin N 56491.

(Discussion off the record between the witness and his counsel.)

Q Do you have those pages before you?

A Yes.

Q In the June draft, a draft you said was the earlier of the two we have for Appendix B, you have written at the page I referred to, "With this information in hand, it is possible to postulate

various sequences of events for RCS water addition. These sequences have been limited to three scenarios which represent the upper and lower bounds of water addition (scenario 1 and 3) as well as a most likely amount of water addition (scenario 2)."

Whereas turning to Appendix B in B&W 171 and the page I referred to, you have written in the middle of the upper paragraph, "With this information in hand, it is possible to postulate various sequences of events for RCS water addition. An upper and lower bound on water addition (scenarios 1 and 2) can be postulated."

The scenario mentioned in the June draft relating to "the most likely amount of water addition" has been eliminated from Appendix B. Why was that done?

A As a result of having borated water storage tank level at three and a half hours, it was possible to know the total injection into the reactor coolant system over the first three and a half hours. Since the total of water -- the unknown quantity of water that could have been injected from the 1A and 1C pumps during that period was small, the upper and lower bounding scenario were really relatively close together, and the uncertainties in the most likely scenario weren't

worth addressing any more.

Q When you refer to the upper and lower boundaries, are you referring to what has been called scenarios 1 and 2 in Appendix B to B&W 171?

A Yes.

Q Did you want to supplement that answer?

A That is it.

Q Turning three pages farther into Appendix B of 171 and looking at the page numbered 6494, the statement appears in the middle of the final paragraph on that page,"The position of MU-V 16A,B is not known."

What are those valves?

A Those are the high pressure injection valves.

Q What is the significance of not knowing the position of those valves?

A For any instant in time, it is not possible to know the actual HPI flow rate.

Q Since you prepared Appendix B of B&W 171, have you come to know what the position of those valves was during the course of the accident?

A No.

Q Do you have any additional information

with respect to that?

A No.

Q Is the question of position of the MUV 16A and B valves the same question as whether or not the makeup pumps are drawing from the makeup tank or the borated water storage tank?

MR. GLASSMAN: I object to the form. I am not sure I understand the question.

A Would you read it back?

(Record read.)

A It leads to the same uncertainty. We know that there was only a limited amount of water injected in the first three hours and 30 minutes. At any given time we don't know exactly the flow rate but we know the integrated flow rate over those three and a half hours was only X number of gallons.

Q Have you ever been called -- you, Mr. Lanese -- have you ever been called upon to make an estimate as to the upward limit of makeup pump 1C operation if it had been initiated at approximately one hour and 40 minutes into the transient and if it had been initiated at its full rated flow capacity?

A That was a thought process that was required in developing this TDR.

Q And what was your judgment, if you reached one?

A Again, since we knew the total injected volume over the first three and a half hours, at full HPI flow, the 1C pump would have run no more than twenty minutes.

Q Did you at the same time you were making that calculation or making that estimate, reaching that conclusion, did you reach a similar conclusion with respect to the scenario where the 1C pump is initiated at its full rated flow at one hour forty minutes, and at the same time the 1A pump is permitted to pump its full capacity into the reactor coolant system?

A At one hour and forty-one minutes?

Q Assuming those facts were to occur at one hour and forty minutes, did you ever consider that possibility?

A No.

Q Could you turn to Figure B-6 in Appendix B of B&W 171, which you will find at N 56510. Did you prepare this figure?

A Yes, I did.

Q What does it purport to reflect generally? I don't mean you to specify every bit of information

on it. Would you describe generally what this figure intends to portray?

A It reflects the reactor coolant system mass inventory as a function of time and the way inventory was being affected by the makeup and letdown and relief valve flow, given the uncertainties in those calculations.

(Continued on following page)

Q Do I understand the top half of the table starting at 0 in the vertical axis and proceeding up to 200,000 to represent inventory additions in pounds as a function of time?

A Yes.

Q Is the upper line above the shaded-in area in the upper half of this chart the maximum upper limit flow that could have occurred during that period based on your calculations?

A The one labeled Scenario 2?

Q Yes.

A Yes, it is.

Q And the minimum flow then is the lower bounding line labeled Scenario, I assume numeral 1 has been cut off my copy. Is it on yours?

A It is cut off mine.

Q Is that in fact the Scenario 1 line?

A Yes.

Q The area, I take it, shaded in between these two lines is the area of uncertainty?

A Yes.

Q Does this figure go only out to 100 minutes?

A Yes.

Q You earlier referred to calculations out past three hours. Are they incorporated in this appendix?

A In the appendix?

Q Is the information related to calculations beyond 100 minutes? Figures B6 and B7 seem to relate only to 100 minutes.

A I don't believe there are any figures that show results beyond 100 minutes.

Q Turning to B7 which is the next page in order, could you explain to me what generally this table or this figure seeks to portray?

A The upper and lower bounds for reactor coolant system water volume over the first 100 minutes.

Q In order to prepare this table, how did you calculate the volume of water? At what temperature and pressure?

Let me ask the direct question first. Did you make your calculations based on the recorded temperature and pressure parameter for the plant during the transient for the minutes 0 to 100?

A Yes, I believe so. Yes.

Q In this chart, in light of the fact that the inventory is measured in cubic feet, how did you

account for water in its vapor phase or steam?

A This represents a so-called collapsed water volume.

Q In other words, you assume that whatever volume of steam existed was converted into water?

A I ignored the steam.

Q You ignored the steam content?

A Yes.

Q Am I reading this table or figure correctly if I said at 100 minutes, the maximum quantity of water you calculated was possible to be present in the reactor coolant system was approximately 9,000 cubic feet whereas the minimum quantity for 100 minutes, the same time, you calculated could be possibly approximately 4,000 cubic feet?

A That's correct.

Q So between Scenario 1 and Scenario 2, there was 5,000 cubic feet of water?

A Yes.

Q The total system inventory if water solid, does that include the pressurizer?

A That includes the pressurizer to 220 inches indicated level.

Q The total water inventory assuming that level

in the pressurizer is 10,500 cubic feet, is that correct?

A Excuse me. Let me correct myself. 10,500 is the water inventory excluding the pressurizer. 11,300 would be including the pressurizer to 220 inches.

Q So in any event, including the pressurizer to that level, the total inventory or the maximum inventory, I should say, or the volume of the reactor coolant system is 11,300 cubic feet, is that correct?

A Yes.

Q Turning to Figure B8 of Appendix B to B&W 171, could you briefly describe what this table purports to show?

A It shows the known or possible times in which the makeup pumps and letdown were operating or not operating. It shows the borated water storage tank level at known times, makeup tank level and inventory contribution, and the total inventory addition as a function of time.

Q Do I understand you to be saying that the figures in the bottom line are numbers that you are reasonably confident are accurate within the time frame? These are not scenarios, I take it?

A That's right.

Q So, in other words, from 4 minutes and 38 seconds into the accident on March 28th until three hours and 20 minutes and 50 seconds, you know that there was a total -- there was a gross addition of 8,143 gallons, is that correct?

A Yes.

Q Is it true that you do not, however, know the exact quantity of fluid lost during that same period?

A That's right.

Q Lost from the reactor coolant system either through makeup or through the PORV or by some other method?

A No, the sources of inventory loss would be letdown and PORV.

Q Is it a net loss or net gain through the reactor coolant pump seals?

A It is a gain.

Q There is in the line immediately to the right of MU-P1C, again there is a dash line starting at one hour and 41 minutes and ending at two hours and 45 minutes under which is a question mark.

Is that question mark there for the same reason the earlier one we discussed was where it was?

A Yes, the alarm printer was unavailable. Data was unavailable at that time.

Q The data from the alarm printer was unavailable at times prior to one hour and 41 minutes, is that correct?

A That is what I remember, yes.

Q But it came back on line or became available again starting at two hours and 45 minutes?

A Yes.

Q Approximately. So that is the reason why the two-hour-and-45-minute limit, the right-hand limit, is included?

A Yes.

Q And the reason why you have the time period started at one hour and 41 minutes is because it is that time that your information from the operators indicated that someone at least said that they had started it?

A Yes.

Q Turning back to B&W 608 and the June draft of Appendix B, looking at the page numbered 5 at the top and reading from the second paragraph, "A basic premise of this report is that the operators' motive for varying makeup and letdown was to control pressurizer level."

What basis did you have for using that as a basic premise for this report?

A It was a starting point.

Q Had someone told you that that was indeed the motive of the operators in their control of makeup and letdown?

A No.

Q Was it necessary for you to make that assumption in order to perform your responsibilities in drafting this report?

A Some assumptions were necessary as a starting point. I chose to make this one. As a starting point.

Q Are you telling me that in June 1979 you had no basis for using a premise that operators' motive for varying makeup and letdown was to control pressurizer level?

A No, I didn't say there was no premise.

Q No basis for this premise?

A I didn't mean to imply that there was no basis.

Q What do you recall was your basis?

A By that time, there was a general understanding that the operator had throttled HPI based on pressurizer level indication, and I therefore started

with that presumption as a possible motive for subsequent HPI control.

Q Do you recall any specific sources for the general understanding you referred to?

A No.

Q Do you recall whether you found any information supporting that general understanding in your review of transcripts of operator interviews?

A No.

Q Did you change at any time your view as to this general understanding? Today, do you believe the general understanding is accurate?

A I believe that in general pressurizer level was a prime consideration in controlling HPI flow.

Q I believe I asked this earlier, but just to try to close the loop, what, if any, work have you done with respect to these issues, the issues we have discussed relating to inventory change in the RCS during the March 28th accident since the time of your completion of what became Appendix B in B&W 171?

A Nothing.

Q Are you aware of anyone else at GPU or Met Ed who has done any work with respect to this?

A No.

Q Are you aware of anyone anywhere who has done any work with respect to this?

A Yes.

Q Who?

A I also remember that I had other involvement with this work with B&W subsequent to completion of this report.

Q What do you mean when you say "this work"? Do you mean the issue of inventory?

A The makeup addition.

Q What did you do with people at B&W with respect to this?

A Discussed which scenario to use in their evaluation of the TMI-2 accident.

Q Was it a choice between one of the two scenarios in Appendix B to 171?

A We ended up choosing one of the scenarios, yes.

Q Which scenario did you choose?

A Minimum injection scenario.

Q Did you choose that because that assumed the worst case with respect to core uncovery?

A It is really because it didn't make that much difference.

Q But ending up having to choose one or the other or some third alternative, did the fact that reliance on the minimum possible net inclusion of water would lead to the worst possible consequences in terms of core uncovery play a role in your decision?

MR. GLASSMAN: Objection. Lack of foundation.

(Record was read back.)

A You have to specify when in asking that question.

Q When what?

A For any particular point in time, I can minimize or maximize the HPI injection to three and a half hours.

Q Over the time since you only had a number, as you testified earlier, that you did not know at any given moment what the input was, but you had gross figures for a time period of three and a half hours, considering those three and a half hours as the when in your question, can you answer my prior question?

MR. GLASSMAN: Objection as to form.

MR. BENEDICT: Strike that question.

(Recess taken.)

(Continued on the following page.)

MR. GLASSMAN: I am pleased to note that I now have available for your review the original of the document which you have marked as B&W Exhibit 607. It is available for your inspection and, obviously, for questioning Mr. Lanese.

For our mutual edification, I take note that the page marked W 028090 bearing the date 4/5/79, which we were previously reading and which there was a question as to whether an item that appeared to read "93 gpm" or ".93" or "9.3" appears, so far as I can tell, to read something different, namely, quote, 3 GPM close quote, leak, although you can, of course, ask Mr. Lanese to interpret his own writing.

BY MR. BENEDICT:

Q Is that your reading of that?

A Yes.

Q It is a 3, not a .3 or a 3. or anything else?

A Absolutely.

Q To cut through the pending question or the question that I withdrew immediately prior to the break, if I recollect your testimony you said that you discussed with B&W choosing a scenario for inventory addition to

the RCS during the early hours of the Three Mile Island accident, and that you and the people at B&W decided to use, for the purposes of their analysis, the minimum scenario.

When I asked you why did you choose that, as I understand you, your answer was that there was very little difference between the two in terms of the effect it would have on their calculations or on their use of those numbers, is that correct?

A Yes.

Q Did you have any other reasons aside from it being not significant?

A No, but by way of clarification, I should mention that the analysis we are talking about is not a core damage scenario.

Q What was the analysis with respect to that B&W needed these figures?

A It was an analysis to evaluate the possibility of using the major reactor coolant system and secondary system components at TMI-2.

Q Using them again?

A Yes.

Q Returning to my question, did you have any other reason for picking the minimum over the maximum

or some third possibility, aside from the fact that for the purposes to which these numbers were going to be used, there was little difference between them?

A The minimum scenario is in my mind somewhat more likely than the maximum scenario.

(Discussion off the record between the witness and his counsel.)

BY MR. BENEDICT:

Q You have the original of what has been marked as B&W Exhibit 607 before you. I would like you to turn to the portion of your notes relating to the meeting you had and others had with operators on June 13, 1979. That is at pages W 028129 through '33.

Could you review those five pages, which you have identified as being the only notes that you have with respect to this meeting, and pick out for me all the entries that relate in any way to your work on inventory addition during the early phases of the Three Mile Island accident?

A Beginning on page W 028130, item 5.

Q Could you read that?

A "Makeup plus letdown discussion with operators. MU-V127 opened as per emergency boration procedure from boric acid mix tank -- check boric acid

mix tank level for amounts."

Q Was the indication of "check boric acid mix tank level for amounts," was that a note to yourself?

A Yes.

Q Did you do that?

A Yes.

Q What is MU-V127?

A I don't recall now.

Q Did you check the boric acid mix tank levels prior to your completion of Appendix B to B&W 171?

A I attempted to.

Q Did you seek any further information with respect to that level or those levels after you completed Appendix B?

A No.

Q Were you unsuccessful in obtaining information with respect to these levels?

A Yes, I was.

Q Is the next sentence under what you read related to makeup and letdown?

A Yes.

Q Could you read it, please?

A "Saw letdown..." -- I left off the N on letdown -- "...valve indication shut, but didn't check

flow."

Q What does that passage mean to you?

A We asked if the operators isolated letdown at the time of reactor trip.

Q They told you or you were told?

A I was told by one of them that they recall seeing the indication on the control panel that the valve was shut. They didn't recall also having checked letdown flow.

Q Did you white out a word on this?

A Yes, I did.

Q Is that something you did contemporaneously with taking these notes?

A I did it a short time afterwards.

Q Was there any reason why you whited it out, rather than crossing it out?

A It was a crossed-out word, and I just whited it out afterwards.

Q Did you ever make a copy of these or any other notes, any other portions of this Exhibit B&W 607 for anyone else's use?

A No. It is a nervous habit I have.

Q There are other passages or places throughout this exhibit where there appear to have been whited-out

words.

Is it true that all those areas and places that words were whited out were contemporaneously or very soon after you were drafting the material?

A Yes.

Q Is there any other in the pages that I referred you to, is there any other reference to the makeup and letdown issue?

A Yes, the next entry on the same page.

Q Which reads?

A "One minute, 25 sec. DH-V5A was opened. 1B plus 1A both running. Then opened up MU-V16A."

Q Does the entry "1:25 sec." mean 1 minute, 25 seconds after reactor trip on March 28, 1979?

A Yes.

Q Where did you get this information?

A By examining makeup tank level, there was a change in level that indicated some sort of operation with the makeup system.

Q Does this note at the bottom of page 130 not relate to your conversations with the operators? In other words, this was not information you gained during that meeting?

A There were two sources of information. In

having seen the change in level at a minute, 25 seconds, the question was what did you do at that time. The answer was that they opened the DH-V5A which was a normal procedure, and started the 1A and 1B pumps in order to get additional flow in the system, and opened MU-V16, since that was all normal post-trip activity.

Q The 1A and 1B pumps you referred to are makeup pumps, is that correct?

A Yes.

(Discussion off the record between the witness and his counsel.)

BY MR. BENEDICT:

Q What is the next entry you see that relates to this issue we have been discussing?

A The next entry is the top of the next page.

Q What does that say?

A "Tank increase-recirc. of makeup pump puts some water into MU tank at about 90 gpm per pump."

Q "Recirc." means recirculation?

A Yes.

Q And "MU tank" refers to the makeup tank?

A Yes.

Q Did you learn this information during the course of your meeting?

A Yes.

Q Was it in response to a specific question, this information?

A Yes.

Q Do you recall what your question was?

A No.

Q What does the next entry say, or at least it is the next entry you read? Is that related to the inventory issue?

A Yes.

Q Could you read that?

A "Recirc. opened when not on ES. Have seen similar changes when come from BWST."

Q "ES" stands for engineered safeguards?

A Yes.

Q Does engineered safeguards include actuation of the high pressure injection system, as you used it here?

A As used here, it was meant to mean HPI initiation.

Q ESFAS actuation?

A Yes.

Q "BWST" is borated water storage tank?

A Yes.

Q What next do you see on the page related to the issue we are talking about?

A "2 minutes and 1 second ES-isolates recirculation."

Q "ES" is, again, the engineered safeguards?

A Yes.

Q At 2:01, high pressure injection was initiated on ESFAS signal on March 28, 1979, is that correct?

A Yes.

Q What is the significance for purposes of your inventory study to know about recirculation of the pump?

A In looking at figure B-2 of the Appendix B, B&W document 171, both the previous entry and this entry are related to the change in makeup tank level. The opening of the DH-V5A meant that water was being drawn from the borated water storage tank as opposed to the makeup tank. The increase in makeup tank level from a minute, 38 to 2:01 was due to HPI pump recirculation. At two minutes, pump recirculation valves were closed, and makeup tank level flattened out.

Q Pump recirculation --

(Discussion off the record between the

witness and his counsel.)

BY MR. BENEDICT:

Q Pump recirculation adds water to the makeup tank?

A Yes.

Q The next entry reads: "2:01-4:38."

Does that refer to the period between 2 minutes and 1 second and 4 minutes and 38 seconds on March 28th into the transient?

A Yes.

Q Could you read the text following that?

A "May have started some letdown to explain the 20 gpm; did not have boric acid pumps on. Guess is leakage from the BWST."

Q Again, are these entries made here as a result of information you were hearing from the operators?

A Yes.

Q With respect to any of the material we have discussed up to this point or read up to this point, was there any disagreement among the operators as to whether something had or had not happened?

A Not that I recall.

Q What is the "20 gpm" figure that is referred to here, if you recall?

A The 20 gpm figure relates to the slope of the makeup tank line between 2:01 and 4 minutes and 38 seconds.

Q Again, we are referring to figure B-2?

A Yes.

Q From 171?

A Yes. I had originally considered that that might have been due to addition from the boric acid pumps. The operators said that was not the case. It was possible that letdown had been reinitiated, but they didn't believe that was the likely -- one or more of the operators did not believe that that was likely, and one of them suggested that it could have been leakage past the pump recirculation valves back into the makeup tank.

(Discussion off the record between the witness and his counsel.)

MR. GLASSMAN: I should just note that I had a few very brief conferences with the witness which counsel has asked to be noted on the record, and their purpose has been to answer the witness' question as to whether he is being sufficiently responsive, appropriately responsive, to questions regarding each line.

MR. BENEDICT: Unless you want to waive your

attorney-client privilege, don't include me on part of your conferences and part of what you say and not on the other parts unless you would like me to ask Mr. Lanese all that you have talked about today. Let's not have these self-serving statements.

MR. GLASSMAN: You should proceed.

MR. BENEDICT: I agree.

BY MR. BENEDICT:

Q Continuing down the page, there is an entry at 4:38 which, again, am I correct in assuming, means 4 minutes and 38 seconds into the transient on March 28th?

A Yes.

Q Could you read the text that appears after that entry?

A "Tripped C, H1A injecting through MU-V16A and B, cut HPI flow in half to see effect on pressurizer level (dip in pressurizer)."

Q Is it your recollection that when you wrote "Tripped C," you meant makeup pump 1C?

A Yes.

Q On the subject further in that sentence, you say "1A." I take it that means makeup pump 1A?

A Yes.

Q What is the significance in terms of volume of flow, if any, to the fact that 1A was injecting through makeup valves 16A and B?

A It is the normal high pressure injection path.

Q You then go on to say: "cut HPI flow in half to know effect on pressurizer level (dip in pressurizer)."

What did you mean by that?

A That is"to see effect on pressurizer level."

Q I'm sorry?

A "cut HPI flow in half to see effect on pressurizer level (dip in pressurizer)."

Q What do you recall you meant when you wrote those words?

A One of the operators said that they tripped the makeup pump 1C and cut the flow from makeup pump 1A in half to determine the effect that it would have on pressurizer level, and that they noted a dip in the pressurizer level at that time.

Q When you had this interview or meeting with the operators, did you have traces or graphs to work from?

A I believe we were looking at the same figures that appeared in the June draft of Appendix B.

Q Could you look through that which appears in B&W 608 and tell me, if you can, which figures those are?

A That is figure B-2, W 026932.

Q So it wasn't included -- it is the page immediately preceding what we have been referring to or I have been referring to as the June draft of Appendix B in B&W Exhibit 608, is that correct?

A Had we agreed it ended on 26931?

Q That it started on 26933.

Am I correct, you are referring to this page?

A That is what I am referring to. I may be wrong.

Q Is the same drawing included at some point within the June draft of Appendix B?

A There was a similar figure that we were looking at. I can't verify at this time which one it was.

Q But it was similar in your recollection to the figure in B&W 608 marked with the page number W 026932?

A Yes.

Q Had you provided copies of these to the other people present?

A I'm not sure.

Q Had you written out questions to ask the operators?

A I think I did.

Q Do you have any notion of where those questions would be found if they still exist?

A No.

Q The parenthetical in the entry we last read, "(dip in pressurizer)", what did you mean when you wrote that?

A As I recall, one of the operators noted a dip in pressurizer level at that time.

Q Did any of the operators say anything with respect to the cause or what they believe to have been the cause of that dip at that time?

A No.

Q Did you ask them whether they thought it was as a result of the reduction in HPI flow?

A I don't remember.

Q What does the entry starting with "DH-V5A, B" say?

A "DH-V5A, B open, recirc. valve closed until about 7-8 a.m."

Q Does that entry indicate that at or about 4 minutes and 38 seconds following the reactor trip, those actions or steps were taken?

A That was someone's recollection, yes.

Q Is there a dispute as to whether or not that occurred or was there a dispute at the time you were preparing Appendix B?

A I don't know what you mean by "dispute."

Q Was there disagreement as to whether or not that occurred? Did some people think it had and some people think it hadn't?

A I don't remember any other opinion being offered, no.

Q What is the next entry on the page with respect to inventory?

A "Started max. letdown right after intermediate cooling water second pump was started, 110-130 gpm letdown best remembrance plus seal return."

Q What did you understand when you made this entry you were setting forth trying to record?

A This was related to whether maximum letdown was initiated, and if so, when. There was an alarm

summary that a second intermediate cooling water pump was started, which implied that operator or operators were going to initiate maximum letdown, and the recollection of one of the operators or more, perhaps, was that they did immediately go to maximum letdown, and the valve letdown flow that was recalled was between 110 and 130 gpm.

Q What is "maximum letdown" nominally for Unit 2, do you know, at the pressures that existed in the reactor coolant system in the first ten minutes or so whenever this is supposed to have occurred?

A I don't remember the nominal value.

Q Do you know what it is rated?

A Not under that condition, no.

Q Was it your understanding at the time that 110 to 130 gpm was approximately the maximum letdown?

A Yes.

Q "Seal return," I take it, is return to the makeup tank from the pump seals?

A Not directly from the pump seals, but water that is returned from the seal injection line. It is not reactor coolant water.

Q What is the next entry with respect to inventory in the reactor coolant system?

A "DH-V5A/B was open continuously. BWST at approximately 30 feet at 11:00 or 12:00 a.m. Possible it could have been shut."

Q Did you understand the reference "11:00 or 12:00 a.m." to mean 11:00 a.m. to noon?

A Yes.

Q Turning to the next page, 132, there is a time entry at the top, "6 minutes and 48 seconds."

Is it fair to say that the entries from 4:38 on the page preceding to the bottom of the page preceding occurred after 4:38 and before 6:48?

A No.

Q Do you recognize any that are out of sequence?

A The reference to 11:00 or 12:00 a.m.

Q In other words, where it says: "DH-V5A/B was open continuously," is it correct that that decay heat valve was open at least as early as four minutes and 38 seconds?

A I think that entire reference was out of sequence. "DH-V5A" continuously opened, BWST at 30 feet, referred to valve being open until 11:00 or 12:00 o'clock.

Q Do you know when the decay heat valve 5A and

B were initially opened?

A Yes.

Q Were they open before the onset of the transient at 4:00 a.m. on March 28th?

A No, they were opened after the event began.

Q Do you know about when after?

A Approximately a minute and 25 seconds.

Q What is the first entry on page 132?

A "Six minutes and 48 seconds could have closed DH-V5A."

Q Did you ever resolve whether or not this valve was, in fact closed at that time?

A No.

Q What is the next entry?

A "Seven minutes, 45 seconds HPI throttled, two letdown coolers were on continuously, alarm printer at 71.4 gpm at 4:07:35 a.m. .346, 4:08:05:1680 could be 171.4 gpm."

Q That is the end of the entry after seven minute and 45 seconds?

A Yes.

Q Turning back to the page preceding where there is an entry on 4:38, it says "Tripped C," and if I understand correctly, that means the operators

terminated makeup pump 1C at that time, is that right?

A Yes.

Q Makeup pump 1C at that time was operating in a high pressure injection mode, is that right?

A Yes.

Q Do you know what the approximate flow of C was at that time? Maybe I can make it simpler.

Do you have any reason to believe that pump 1C was not operating at its expected volume at that time?

A No.

Q Is it, in fact, the case that you understand that it was operating at its expected volume?

A That is what I was trying to verify. I believe that is true.

Q It then goes on to say: "cut HPI flow in half."

Does that mean that half of the HPI flow from 1A was terminated or is that a repeat of the fact that one of the two operating HPI pumps was terminated, thus reducing capacity by one-half? I guess what I want to know is was there one-half total HPI going into the system after 4:38 or was there one-quarter going in.

A At that time, injection was approximately

180 GPM.

Q At 4:38, prior to the throttling that you were discussing at 7:45?

A Prior to the throttling, it was approximately 700 gpm, and then throttled at 4:38 to approximately 180 gpm.

Q What table are you looking at?

A Table B-2.

Q Of Appendix B?

A Yes.

Q Of 171.

So referring to Table B-2, it is your understanding that up to the point of the termination of the A makeup pump at four minutes and 38 seconds, the inventory addition was 720 gallons per minute. In other words, that is the volume at which the pumps were flowing?

A From approximately two minutes to four minutes and 40 seconds, yes.

Q If I understand Table B-2 to Appendix B of B&W 171 correctly, actions were taken at four minutes and 38 seconds which reduced the net RCS injection rate from 700 gallons a minute to no gallons a minute, is that correct?

A No.

Q Could you explain what did I do wrong? Is it correct that at four minutes and 38 seconds, the net RCS injection rate was 700 gallons?

A Yes.

Q Is it correct that there were actions taken between four minutes and 38 seconds and six minutes and 48 seconds that reduced the net RCS injection rate to zero?

A Yes.

Q Can you tell me based on your notes or other sources of information what, at the time you drafted B-2, you understood the operators had done to result in that change in the net RCS injection rate?

A I believe at that point the operator was taking maximum letdown and putting it into the makeup tank and drawing the same amount of injection water from the BWST and no more.

Q By what means did he reduce the inventory addition rate from 720 prior to four minutes and 38 seconds to 180 at six minutes and 48 seconds, reading from the middle column on Table B-2?

A Apparently it was by tripping the 1C makeup pump and cutting the 1A makeup pump flow approximately

in half.

Q How did you understand at the time you were preparing this material, did the operator effect a reduction in the flow through the 1C pump?

A By tripping the pump, the 1C pump.

Q How did he reduce the flow through the 1A pump?

A Throttling the injection valves associated with that train, MU-V16A and B.

Q Was there at the time you drafted this and is there today any information available from which you can directly determine the flow through the throttled valves for the A pump?

A No.

Q At the time you prepared the material that ended up as Appendix B to B&W 171, did you understand that the flow from the A pump had been throttled prior to seven minutes and 45 seconds?

A Yes.

Q Does the entry in your notes at page W 028132, which indicates HPI was throttled at seven minutes and 45 seconds, does that indicate a further throttling of HPI flow?

A There may have been.

Q Is the information contained in the entry in your notes following the entry, the time seven minutes and 45 seconds, is that information that you got from an operator or from more than one operator during the course of your June 13th meeting?

A I don't remember.

Q Do you have any recollection of the source of that information?

A No, that may have been a note to myself.

Q Is it your understanding today that between the time of the reactor trip on March 28th and, let's say, eight minutes, there were more than one -- the operators throttled makeup pump 1A more than once?

A It is a possibility, yes.

Q You couldn't confirm that it happened more than once?

A No, because of the uncertainty in the position of DH-V5A.

Q That is not the valve that you used to throttle the flow through the pump?

A No.

Q Are you aware today and were you aware at the time you drafted Appendix B that on at least one occasion in the first eight minutes of the accident, the

flow through pump A was throttled?

A Yes.

Q Did you in the course of preparing Appendix B to B&W 171 attempt to determine the extent of that throttling?

A Yes.

Q Or the extent in the reduction of flow from the A pump?

A In the first six minutes and 48 seconds?

Q Yes.

A Yes.

Q In the first eight minutes?

A Yes.

Q Does Table B-2 from B&W Exhibit 171 exhibit your best understanding at the time of the extent of the throttling?

A No.

Q What is your best understanding or is there another page or document that shows your best understanding of the extent of that flow when makeup pump 1A was throttled?

A Tables B-2 and B-4 present the alternative possibilities for throttling.

Q These are scenario 1, which was the minimum

addition, and scenario 2, which was the maximum addition?

A Correct.

Q The first change between the two scenarios with respect to net inventory addition from makeup and letdown occurs in the period between six minutes and 48 seconds and seven minutes and 45 seconds, is that correct?

A Yes.

Q Is the difference that is exhibited during that period accounted for by your inability to determine whether there was a second throttling of makeup pump 1A?

A It is due to a combination of reasons. The throttling was one point. The other point was the source of water.

Q That is the decay heat valve number 5A and B issue?

A Yes.

Q Let's go on to the next entry here. I had one question.

In the entry following the seven minutes and 45 seconds notation, there were some point numbers. Could you tell me what the point numbers are?

A I believe they are the plant's computer

points or alarm printer points, one of the two, that indicate letdown flow.

Q In other words, in order to access information with respect to letdown flow, you had to know those numbers?

A I don't know.

Q Do you today recall what it was for, why you entered those numbers there?

A No.

Q Turning to the next entry, it starts with the entry "Nine minutes and 24 seconds - ?"

What does that say?

A "May have been stuck."

Q What were you referring to?

A The makeup tank level indication.

Q Does the question mark indicate that you don't know for how long this condition may have existed?

A No.

Q Why is the question mark there?

A The question mark was whether it was actually stuck or whether makeup tank level remained at exactly a certain value for several minutes.

Q Was this remark a question that you had or was it an observation made by the operators or some

other alternative?

A It was a question I had.

Q Have you to this day satisfactorily resolved that question?

A The possibility of the indication being stuck for a short period of time is a reasonable explanation.

Q For the conditions that you saw?

A Yes.

Q But you have never been able to establish mechanistically that, in fact, it was stuck?

A No.

Q What is the next entry on the page?

A "Nine minutes and 36 seconds to ten minutes and 24 seconds. Might have gone to RC bleed tank. Were told to go back to MU tank. Suggested looking at NRC transcripts. Don't remember ever..." -- underlined -- "...losing the 1A pump."

Q What is it that might have gone back to the RC bleed tank?

A Letdown flow.

Q What, if you know, NRC transcripts were you referring to here?

A Operator interviews.

Q You don't recall specifically now?

A I don't recall, no.

Q Did you have with you the day of this meeting with the operators the copies of the interviews which you had reviewed up to that time?

A No.

Q Did anyone, to your knowledge, have them present?

A No.

Q "Don't remember ever losing the 1A pump." To what does that refer?

A That refers to the alarm summary entries at ten minutes and 24 seconds, ten minutes and 27 seconds, and 11 minutes and 40 seconds, which indicate that the pump was tripped, started and tripped, and started.

Q Can you tell me what page you are referring to?

A Page N 56496, B&W 171.

Q That is Table B-1?

A Table B-1.

Q The operators or at least an operator took issue with the entries that were on the alarm printer or alarm summary, is that correct?

A Not issue, no.

Q Did they disagree with it?

A No.

Q Were they surprised as you perceived it when this was related to them, that the alarm summary or computer printout said that?

A No, I don't remember surprise.

Q Why the emphatic underscoring of the word "ever"?

A They don't remember that the pump was lost at any time during the accident.

Q Was that a unanimous opinion by those who spoke on it?

A I don't remember.

Q Do you recall disagreement among the operators on that subject?

A No, there was no disagreement.

Q Do you know what, if any, material had been provided to the operators up to the point of your interview with respect to the Three Mile Island accident?

A No, I do not.

Q Written material?

A I don't remember.

Q Were you aware that they had seen your first

draft of what became Appendix B?

A I can't remember if they actually saw it before the interview, no.

Q Did you receive comments from any operating personnel,either before or after the interview, on what became Appendix B of B&W 171?

A No.

Q Did you ask for comments from anyone?

A I don't remember asking, no.

Q Did Mr. Broughton --

A Excuse me. I did, at the time of the interview on the 13th, ask them to provide any further comments if they had any.

Q Comments with respect to --

A Appendix B mass additional scenario.

Q To that issue, but you had not provided them with the documents?

A I don't remember whether I provided it to them.

Q You don't recall receiving any comments after that interview?

A I know I did not receive any other comments.

Q You don't recall speaking with any operators with respect to this issue following the June 13th

meeting, is that correct?

A I know I did not speak to any of the operators involved who were on shift at the time of the accident. I believe I called for some system information subsequent to that.

Q By "system information," do you mean arrangement of hardware?

A Yes.

Q Did you at any time, in preparation of your report that became Appendix B, review operating, emergency, or other plant procedures for either TMI facility?

A I don't remember having reviewed procedures, no.

Q There is an entry that reads: "16 minutes," and that is scratched out, and below it there is an entry starting at "26 minutes."

Could you read that?

A "26 minutes to 40 minutes, probably change in letdown to see how level behaved."

Q By "level," did you understand when you wrote this, were you referring to pressurizer level?

A The reference was to pressurizer level.

Q Were you taking down a remark or comment

that you received from an operator at this point?

A Yes.

Q Do you remember anything else that he or they said at that time about changing letdown to see how pressurizer level behaved?

A No.

Q Could you go on and read the remainder of that passage?

A "Don't remember asking for batch additions, but did cycle the MU-V12 every time the tank level came up. Probably due to recirc. to the tank."

Q Who didn't remember asking for batch additions?

A One or more of the operators.

Q What is a batch addition?

A That is addition of borated water to the makeup tank from other sources aside from the reactor coolant system.

Q After the period at the end of the entry, it says: "Probably due to recirc. to the tank."

What was probably due to that?

A In the period of time we were talking about, makeup tank level increased at a fairly constant rate and, then, suddenly turned around at a fairly constant

rate. My initial assumption, which was incorrect, was that the operators were adding borated water from another source. In fact, what they were doing was taking the level of the tank, controlling the level of the tank within its control band by opening and closing MU-V12.

Q What does MU-V12 do when you open and close it?

A When you open MU-V12, you provide suction to the high pressure injection or makeup pump, and thus you would draw water down. When the valve is closed --

Q Draw water down from the makeup tank?

A Yes. With MU-V12 closed, tank level was apparently increasing due to recirculation flow back to the makeup tank, and so eventually the valve would have to be reopened.

Q Where did the makeup pump or pumps take their water supply when the MU-V12 was closed?

A The only source would be from the borated water storage tank?

Q What is the next entry?

A "41 to 51 minutes - letdown orifice-type flow. Only recollection of adding water to MU tank was after RC pumps were off and they borated."

(continued on next page)

Q Does this entry indicate the the operators who spoke on this subject had no recollection of adding water from any outside source to the makeup tank until after the tripping of the final two reactor coolant pumps?

A That was specifically boration sources to the makeup tank, yes.

Q Is the borated storage tank a source of borated water?

A Not for the makeup tank, no. This is a low volume source of water.

Q What is the next entry on the page?

A "Water from MU-V9 from waste transfer pump never gets up to 50 GPM even with two pumps running."

Q Briefly, what were the operators trying to relate to you when you wrote down this passage?

A They were trying to explain to me why the increases in makeup tank level which were approximately 100 -- indicated 100 GPM flow or so would not have been due to batch additions. The waste transfer pumps which would be the pumps which transfer that water into the tanks only supplied about 50 GPM flow.

Q What is the entry on the top of page 15?

A That is the last entry with relation to this

topic, and it says, "DH-V8A,B, alarm on 53.5 feet alarm set point."

Q What did you mean to relate when you made this entry?

A That has some relationship, I believe, to the sodium hydroxide valves which would open at 53-1/2 feet level in the BWST.

Q Do you remember when in the sequence of events following the reactor trip on March 28, 1979 this issue arose or there was an actuation of these valves?

A In the time frame of three and a half hours, I believe.

Q Did you discuss with the operators the period between 51 minutes, which is the last time entry in your notebook, and the period of three and a half hours when the decay heat valve 8A and B issue arose?

A I don't remember any discussion, no.

Q Do you recall any elements of your discussions during this meeting with the operators relating to your project to create what became Appendix B of 171 which are not recorded here?

A No.

Q Do you recall with respect to any of the entries in the pages of your notebook we just read any

disagreement among the operators with respect to the facts or views set forth?

MR. GLASSMAN: You mean any voiced disagreement?

MR. BENEDICT: Yes.

A No.

MR. BENEDICT: Let's stop. I am not done but I am done basically with this issue. It is 54 seconds before 5 o'clock.

MR. GLASSMAN: Counsel has indicated that he is not yet finished with their cross-examination of Mr. Lanese. We were originally scheduled to start on Tuesday at the request of counsel for B&W. We started on Wednesday. Because of various scheduling problems, we have not had complete days, counsel for B&W indicating for reasons apparently beyond their control, we would have to terminate a bit early yesterday and begin late this morning.

It goes without saying that all parties agree we would like to wrap this up as soon as we can, and I note that the witness would also like to complete this as quickly as possible. We are prepared to complete the deposition of Mr. Lanese

at the earliest convenience. We are ready to go Monday, we are ready to go Tuesday, we are ready to go Wednesday next week.

We are doing this as quickly as we possibly can. I am advised we can tentatively schedule it for next Wednesday, but that may be a problem.

MR. BENEDICT: Sometimes I really wish you would stay off the record with your speeches, so let's go through the facts. By letter dated before Christmas of last year, we requested Mr. Lanese's documents. We received some of his files in the middle of last week. We received the remainder of his files either Monday or Tuesday of this week. Tuesday in the morning. The deposition was scheduled to begin on Tuesday.

You called and told me you couldn't be available in the afternoon. You agreed to try to start a little early. I decided since I had just gotten these documents, I couldn't start. Every evening this week I have been reading these documents.

One of the reasons why I had to end early yesterday and begin late today was because I hadn't had an opportunity to do my other work.

I think it is evident to all hands that we want to get this over with. I think it is ridiculous, however, for you to make speeches about things that include, at best, half the facts.

So let's try to wind up Mr. Lanese on a day sometime next week, and I would very much like for it to be Wednesday myself. I expect it would take a day. Perhaps a little less.

If you have any further documents, putting aside the delivery today, I would appreciate receiving them by Monday.

MR. GLASSMAN: I believe all the documents relevant to the examination have been turned over.

MR. BENEDICT: I might note another thing. You told me on Friday that there might be a page or two-- those are your words, Friday phone call last week -- a page or two more documents. Nothing more.

I asked you on Friday since I was going to be working over the weekend to get them to me by Friday. A half-full box of documents arrived Tuesday morning.

If you wanted me to put this all on the record, I am happy to, but there is no way on God's green earth you will be able to make your speeches about how you are doing all the cooperation and I am doing all the delaying.

MR. GLASSMAN: Perhaps you misunderstood the nature of my comments. All I was saying was that we were prepared to continue with the examination if you found it necessary to have another day, and we were prepared to do it expeditiously.

I am putting this on the record so we are clear that we are trying to push it along now as quickly as we can. I note that your colleague, Mr. Fiske, was intent on making similar points in a deposition of Mr. Zechman which took place today and all I am indicating is that we are attempting to be as cooperative as we possibly can.

(Continued on the following page.)

MR. BENEDICT: I am not going to quarrel with you on that one way or the other. The record stands.

(Time noted: 5:00 p.m.)

Louis C. Lanese

Subscribed and sworn to before me

this day of 1982.

CERTIFICATE

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

I, JOSEPH R. DANYO, a Notary Public of the State of New York, do hereby certify that the continued deposition of LOUIS C. LANESE was taken before me on Friday, March 26, 1982 consisting of pages _____ through _____;

I further certify that the witness had been previously sworn and that the within transcript is a true record of said testimony;

That I am not connected by blood or marriage with 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 9 day of April, 1982.

Joseph R. Danyo
JOSEPH R. DANYO

I N D E X

WITNESS	PAGE
Louis C. Lanese	305

E X H I B I T S

B&W NUMBER		FOR IDENT.
607	Notebook, first page bearing date 3/1/79 at the top	338
608	Document containing information used in preparation of Appendix B and Figure 14 of TDR nNo. 045	391

* * *

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

GENERAL PUBLIC UTILITIES CORPORATION, JERSEY CENTRAL POWER & LIGHT COMPANY, METROPOLITAN EDISON COMPANY and PENNSYLVANIA ELECTRIC COMPANY,	:	80 Civ. 1683 (RO)
Plaintiffs,	:	AFFIDAVIT
- against -	:	
THE BABCOCK & WILCOX COMPANY and J. RAY McDERMOTT & CO., INC.,	:	
Defendants.	:	

STATE OF NEW JERSEY)
: ss.:
COUNTY OF MORRIS)

I have read the transcript of my deposition taken on March 24, 25, 26 and April 19, 1982 and together with the attached corrections, it is accurate to the best of my knowledge and belief.

Louis C. Lanese

Louis C. Lanese

Signed and sworn to before me
this 7th day of October, 1982.

Alice J. House

Notary Public

ALICE J. HOUSE
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires March 7, 1985

Corrections to L.C. Lanese Deposition

September, 1982

Page	Line	Correction
39	10	"committe is" should read "committee is to"
52	19	"Clinton" should read "Clayton"
72	4	"basis" should read "bases"
88	12	"I assume," should read "assumed"
112	23	"include" should read "exclude"
122	18	"your" should read "a"
138	18	"agent" should read "manager"
310	7	"termal" should read "thermal"
315	4	"and license" should read "analysis"
340	2	"Howard" should read "Heward"
456	16	"additional" should read "addition"
472	14	"Asymmetrical" should read "Asymmetric"
476	12	"Martus" should read "Mardis"
511	15	"or" should read "our"
522	19	"Jay Correa" should read "Nick Trikouros"
527	20	"No" should read "Yes"
529	4	"and" should read "as"
531	22	"indicator" should read "indicated"
531	22	"fuel" should read "real"

Page	Line	Correction
547	14	"differentiation" should read "differential"
562	20	"and" should read "in"
586	17	"released" should read "replaced"
588	20	"Denner" should read "Denver"
588	21	"lbn/sec" should read "lbm/sec"
589	9	"SAR" should read "ACRS"