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NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF:

THREE MILE ISLAND:

INTERVIEW OF KURL V. SEYFRIT

Place - Bethesda, Maryland

Date - Tuesday, September 4, 1979 Pages 1 - 74

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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INTERVIEW OF KARL V. SEYFRIT

Room 405
Arlington Road Building
6935 Arlington Road
Bethesda, Maryland

Tuesday, September 4, 1979

BEFORE:

FRED HEBDON
FRED FOLSOM

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MR. HEBDON: Would you raise your right hand, please? Do you swear or affirm that the testimony that you are about to give shall be the truth, whole truth and nothing but the truth, so help you God?

MR. SEYFRIT: I do.

EXAMINATION

Whereupon,

KARL V. SEYFRIT

was called as a witness and, having been duly sworn, was examined and testified as follows:

BY MR. HEBDON:

Q Have you read and do you understand the letter I have just given you concerning your rights as a witness in this proceeding?

A Yes.

Q Do you have any questions or comments concerning it?

A No.

Q Would you please state your name?

A Karl Seyfrit.

Q What is your current position?

A I am the director of Region IV of the Office of Inspection & Enforcement, U.S. Nuclear Regulatory Commission.

Q What was your position in late 1977?

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A I was the Assistant Director for Technical Programs in the Office of Inspection & Enforcement.

Q That was here in headquarters in Bethesda?

A That was here in headquarters, yes.

Q Approximately how many people reported to you at that time?

A About eight, I don't remember the exact number.

Q To whom did you report?

A Well, let's see. I'm not really sure at this point. There was a change which took place and I can't recall when it took place. It was either to Boyce Grier, who later moved up to be the Director of Region I, or to Harry Thornburg, who replaced Mr. Grier at that time.

Q Would you describe your employment history, including positions held at the NRC? Just a brief description.

A Just the NRC?

Q No, your complete employment history.

A Okay. I graduated from the University of Kansas in 1950 and went to work for the General Electric Company in Hanford, Washington. I worked for them for a period of 10 years and during that time held various positions, mostly involving the chemical separations plants at Hanford.

Following that, I went to work for the city of Pickwell, Ohio, who was the operator of an AEC-owned

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demonstration reactor, and I was there for about nine years during which time I handled various positions, Shift Supervisor, Operations Engineer, Operations and Maintenance Supervisor and finally a Plant Superintendent.

When that plant was closed down in 1969, I went to work for the old AEC in the Chicago office. I believe we were then called the Division of Compliance. And I worked there until either late '72 or '73 when I came to headquarters.

I worked in the office of -- I think we were called then the Directorate of Regulatory Operations or something like that -- we changed names rather frequently -- for a few months and then I was loaned to the Reactor Safety Study and I spent about a year on the Reactor Safety Study under Dr. Rasmussen, and then returned to the headquarters office as Chief of the Technical Assistance Branch.

And then, a few years later during our reorganization that position, while it was essentially the same position, was changed to an Assistant Director's job.

Q The organizations that you mentioned, I believe it was the Division of Compliance?

A Yes.

Q That is basically or functionally the same organization as what is now the Office of Inspection

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& Enforcement; is that correct?

A Yes.

Q So you've basically been with I&E since you came to the AEC and now NRC?

A That is correct.

Q What is your educational background?

A I have a Bachelor of Science in Chemistry from the University of Kansas. As far as formal education is concerned. Of course, my on-the-job kind of training has been largely in the nuclear business and I do hold a professional engineer's license.

Q In nuclear engineering?

A In nuclear engineering, yes.

Q I would like to ask you some questions concerning an incident that occurred at Davis-Besse on September 24, 1977. I am particularly interested in the knowledge or the understandings that you had prior to the accident at TMI. Specifically, prior to March 28th, 1979, what knowledge did you have concerning the incident that occurred at Davis-Besse on September 24th, 1977?

A Well, my memory of the details are a little bit on the weak side. And I must admit that they were mostly stirred up as a result of a previous deposition for the Kemeny Commission. So this is not really total recall.

But to the best of my knowledge, or to what

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happened --

MR. FOLSOM: Legally it doesn't make any difference how your memory was refreshed.

THE WITNESS: The reason I mentioned this is because I have not had available to me the documents that relate to that event since those are all here in headquarters and I have been moved out. And so I didn't have a chance to actually review the documents themselves before I was called for the deposition.

And I can't recall, as I remember it, there were actually two separate events at Davis-Besse. And I'm not sure without looking at some documents which one you are referring to. They had some similarities but there were some differences, too.

BY MR. HEBDON:

Q I think I know the two incidents you're referring to, and let me see if I can refresh your memory a little bit. The September 24th incident was an incident where the plant had been operating and they had a reactor trip. And then subsequently -- or excuse me, they had a turbine trip. And then subsequently a reactor trip.

The PORV in that particular design functioned as it was expected to do in that type of a transient, but due to some problems with a missing relay, the valve cycled several times and then eventually failed open. And then as a result

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of that they had basically a depressurization accident or a small loss of coolant accident. It took them about 20 minutes, I believe, to find out that the PORV was open. That is the incident that I would like to talk about first.

A Okay. Well, I do remember the incident. As I recall, the level in the pressurizer did indeed get somewhat below the level indication range.

Q Unless I am mistaken, now, I think you are a little confused. There was another incident that occurred in November of '77, which was a cooldown transient and that, I think, is the one where the loss of pressurizer level indication was a concern.

Now, for this Davis-Besse incident, if it might help you refresh your memory a little, on the wall behind you here is a graph that was prepared by Leon Engle who was the Project Manager for Davis-Besse at the time. And this is a plot of the September 24th incident and some of the various parameters.

A Well, I have to say that my memory is not that good, and in terms of trying to remember the details of the transient, I simply can't. If you have specific questions maybe I could get to that.

Q We have discussed the details with some of the people who were more extensively involved and I'm really more concerned with how the system -- the system meaning the

kapHEE

NRC -- responded to the incident.

How did you become aware of the incident in the first place? Do you recall?

A I don't recall specifically. But typically it would have been with a telephone call from the Regional Office.

Q Now why would they have called you?

A Well, they would have called me if they felt that there was an event that was reportable by the licensee and if they felt that there was reason for concern about the response of the system. And it seems to me that subsequent events would indicate that they probably had such a concern and therefore I expect that I was called.

I can remember having conversations with people in NRR on this subject. And I understand now that we actually had a meeting -- again, it may be the other event. There was a group of people from NRR who were sent to the site to look into this thing, and when they returned a group of us sat down in Roger Mattson's office and discussed the matter.

Q I believe the meeting you refer to was associated with this particular event.

A Okay.

Q What significance did you attribute to this incident?

A Well, I didn't really, myself, on the basis of

kapHEE

this particular event attribute a great deal of significance to it. It seemed to me that it may have taken a longer period of time to recognize that the valve had not completely reclosed.

I was somewhat disturbed by the fact that it opened and closed several times, but in my mind I sort of attributed this to the fact, as I recall, there had been a piece of electronic equipment that had been removed and not replaced in the control system for the valve. And I don't remember specifically what that was.

Q If I could refresh your memory a little, I think that was the relay that caused the valve to stay open for a short period of time and allowed the pressure to blow down before the valve reclosed.

A But at any rate, I pretty much attributed the problem to the fact that the valve rather than opening, relieving pressure and then reclosing and remaining closed, cycled back and forth and assumed since when those valves open and close it is a pretty physically demanding effort -- I mean they slam open -- that there may have been some damage done after a number of openings and closings, that prevented it from reclosing.

So I pretty much attributed it to the fact that there had been a maintenance error, if you will, that left part of the system out of service. This relay, or whatever

kapHEE

it was that had been removed and not been put back in, or maybe it was never in to begin with. I don't really know, but it was that kind of defect.

And in spite of that, and for a period of time it was recognized that the valve was still open -- and I believe they then closed the manual valve ahead of that one, which stopped the transient. And it seems to me that that is the sort of thing that we really anticipate is the proper way to handle such transients.

Q Did you send anyone to the site to review this particular incident?

A I am not sure whether I did or not. I'm sure that the Region III Office sent people to the site.

And in fact, again, I was shown earlier a copy of a handwritten report that was made by -- what was his name? One of the NRR people who went to the site.

Q For the record, this is a trip report prepared by Mr. Mazetis. It is entitled DB-1 Abnormal Occurrence 9/24/77. It is a handwritten report. Is that the report that you were shown?

A Yes. And I think somewhere in here, or maybe it was in an inspection report, there was a list of people who were at the site when these folks met. Yes, here it is. And out of this group there are a couple from the Region III Office, Terry Harpster, Bill Little and I guess that's it.

kapHEE

But I don't recall having sent anyone from headquarters out there.

Q Was it normal for headquarters not to send anyone on an incident such as this?

A Yes, we normally do not send anybody out from headquarters unless the Regional Office requests assistance. Or if we have an ongoing generic study of some sort that this would fit into, then we might send somebody out. But it is not certainly the normal thing to send somebody from headquarters any time you have something like this.

Q Did you request that Mr. Mazetis or any of the people from NRR go to the site as a result of this incident?

A I don't recall my requesting it. I may or may not even have discussed the fact that they were going prior to their appearing on the site. I don't know.

Q Would it have been normal for you to request that DSS send some people?

A Not again in this kind of a thing. I don't think that that would've been normal, for me to request that they send somebody.

Q Do you --

A As I say, based on the information that was available to me at the time I did not consider it that serious an event.

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Q All right. This trip report that you were just looking at, this handwritten report, do you recall ever seeing this report before -- prior to the time it was shown to you by the Kemeny Commission?

A No, I don't.

Q As far as you know, you never saw or received a copy of this report?

A No. I don't recall ever having received a copy of it.

Q All right.

A It may have been shown to me in the meeting that followed this trip. But I don't have any positive recollection that it was.

Q Okay. Did you talk or meet with any representatives of the utility?

A If I did, it was only in the context of a meeting that would have been called by NRR if the licensee came into headquarters to discuss the matter.

Q Do you recall if such a meeting was held?

A I do not recall. I must say that during this time span that we're talking about I probably attended on the average of three or four meetings a week with NRR people and various licensees and to try to remember or pick out specific ones -- I just simply can't.

Q Do you recall any specific meetings with people

kapHEE

from NRR, other than the briefing that was held in Dr. Mattson's office?

A I don't, although that certainly doesn't mean there may not have been some. I just don't recall.

Q Do you recall discussing this incident with anyone else?

A Well, I can recall discussing it some with Leon Engle who, as you mentioned, was the Project Manager. I can't recall the specific nature of the discussions but I know that we had some discussion on the telephone. And there was some question at the time as to whether NRR should follow up on this matter, or whether I&E should.

And I think we decided mutually that I&E would be responsible for assuring that the licensee answer the right kinds of questions. And I can recall vaguely being given on the telephone a list of additional questions that -- I think it was Denny Ross felt ought to be answered as part of the licensee's response to us.

I am sure you are familiar with the fact that typically a licensee, after an event of this kind, would write a licensee event report to the Commission. And initially that report generally just said something happened. And it doesn't attempt to explain why or to describe what may be done to prevent it from happening again. And later there is a more complete report that gives

kapHEE

additional details and includes some actions that would be taken to prevent a recurrence of a similar incident.

I believe that this was done in this case, although I can't recall the specific reports.

Q Do you recall what the concerns were that Mr. Ross felt should be addressed?

A I don't remember them specifically. I think he had some concern about the operators' reaction to the event. I don't remember now what they were.

Q Do you recall what you did as a result of the concerns that he had raised to you?

A Well, I believe that I called the Regional Office and told them that they should convey this information to the licensee and make sure that he, in his response, in his final report, covered these items.

Q Do you recall who you spoke with at the Region?

A No, I don't. I don't remember now who it was.

Q Do you maintain a telephone log that might have some more detailed information concerning these phone calls?

A No.

Q For the record, what I have here is a note to Karl Seyfrit from Mr. Ross. The subject is Davis-Besse 1 Abnormal Occurrence 9/24/77, and it is dated October 20, 1977. Do you recall ever seeing that document?

A This is the one that -- well, I thought it was a

kapHEE

telephone call, but this is apparently the stuff that he was talking about. I think he called me first and then maybe sent this over confirming it.

Q Do you recall what you did with that note?

A Well, as I said, I think I called the Region, and it may well be that I sent them a copy of this thing. But I don't have a specific recollection of which way it went. My normal response would have been to call if I had a telephone call and a piece of paper. The normal response is to send them a copy of it.

Q The reason I ask is we've talked with a lot of people in the region who were involved in this incident and no one recalls ever seeing the note. And I believe Mr. Keppler, who is the Regional Director, has reviewed the files and they have no record of ever receiving the note. And so, one of the things that we're trying to identify is basically what happened to it.

Do you have any sort of records or do you have any recollection that might help us identify what did happen to this note?

A No. I really don't. As I said, my normal procedure would've been to either telephone them and give them this information or to send them a copy of it. If they can't find a copy, obviously I did not send them a copy. So I must have telephoned and merely said, these are the

kapHEE

things that are of concern to NRR that the licensee should address in his report.

Q But you don't specifically remember making a phone call?

A No.

Q Or you don't remember who you talked to?

A No, it could have been any one of several different people. I don't know.

Q Who could it have been?

A Well, at that time I think Gaston Fiorelli was the Chief of the Operations Branch in Region III. Let me think a minute. Bill Little was the Section Chief. I may have talked to him. I am trying to remember who the assigned inspector was.

Q Could it have been Tom Tambling?

A Yes, that is the name, and I may have talked with Tom. Terry Harpster was helping out but most of his work was in a different field and I doubt that I would have discussed it with him.

Q Did you receive the licensing event reports that Toledo Edison prepared as a result of this incident?

A Well, I am reasonably sure that I did. If they were prepared. If I might look, I think maybe those were appended to the deposition that I made before, although, again, I'm not certain.

(Pause.)

THE WITNESS: Let's see. This is an inspection report that deals with the subject.

(Pause.)

THE WITNESS: No, I don't see them in here. I don't have any specific recollection. If they wrote one, which I'm reasonably sure they did, I would have received a copy of it in my former position. And it would be on file in the headquarters office.

BY MR. HEBDON:

Q But you don't recall any specific details the report or any concerns that it might have raised?

A No. I do have a copy in here of something that was put together by the Office of Management and Program Analysis. They may not have been that at the time. I think they were OMPIC or something like that which describes this event. And this information is normally taken from a Licensee Event Report, which makes me feel fairly certain that such a report did exist.

Q For the record, this is a document entitled "Current Events Power Reactor." It's prepared by the Nuclear Regulatory Commission, published in December of 1977.

MR. FOLSOM: And it is marked Exhibit 7 to the President's Commission deposition taken of this witness.

THE WITNESS: Yes.

BY MR. HEBDON:

Q Do you see or discuss any other reports produced as a

result of the investigation or analysis of this incident?

A I probably did, but I do not have specific recollection of them at this point; I just don't.

Q Were you aware that a Mr. McDermott of the Quality Assurance Branch in NRR conducted an investigation of the Quality Assurance implications of this incident?

A I don't specifically remember that having been done, but it would not at all surprise. And he may have even mentioned it to me. But it did not register as something that jogs my memory.

Q At any time in the review of this particular incident were you concerned that the investigation was not being conducted in an orderly or systematic manner?

A I don't have any specific recollection of any concerns along those lines, no.

Q Did you consider the generic implications of this incident?

A Well, I think it is fair to say that we always attempted to consider generic implications. And as I indicated earlier on, I think that my feeling about this particular incident was that it was really largely a result of the incident that had been left in an inoperable condition -- that is, with the one piece missing -- so it couldn't really perform in the way that it was intended.

And that, to me, does not really indicate a generic problem

per se.

Q Did you consider at all the generic implications of an incidence similar to this that might be initiated by some other cause of the PORV failing open?

A No, I don't think that I specifically had that in my mind. There was somewhat later an event at another reactor. As a matter of fact, it was at Three Mile Island -- I don't think it was Unit 2; I think it was Unit 1, but I'm not sure of that either -- in which the relief valve failed open because of an instrument failure of some kind there, or a power failure -- I've forgotten now which. Again, the details escape me.

And as a result of that, we had an inquiry from Region 1, where they had asked us to look at the question of whether or not there needed to be some special study made or something done, because of the potential for this valve to fail in the open position.

And what was done in that case was to take a look at the safety analysis report, and the accident or the event involving that valve being stuck open had been specifically analyzed and was, based on the safety analysis report, an acceptable design -- that is, the valve could fail open, and the backup systems were sufficient to prevent anything of any consequence occurring.

Q Do you recall approximately when that incident occurred?

A I don't remember, but, again, I know that one is in here. It would have happened in '78.

Q Approximately when?

A Someplace around in March of '78.

Q Okay.

I believe the memo you are referring to was written by Mr. Sternberg of Region 1?

A Yes, that's right.

Q We will discuss that in a little more detail later on.

Now, you mentioned that you attended a briefing in Bethesda, shortly following the incident at Davis-Besse, in Dr. Mattson's office. Do you recall who gave that particular briefing?

A Well, I really don't have a personal recollection of the briefing. The handwritten trip report, plus some other discussion -- I think there was maybe a set of meeting minutes written; I'm not sure. But apparently Mazetis is the one that gave most of the discussion of what had been found when they went to the site.

Q Do you recall what the concerns were that were raised during that briefing?

A Well, I don't have a real recollection of it, no. I can read what he has in his report. And I assume those are the same concerns that he raised then. But I just, frankly, don't

remember specifically that meeting.

Q You mentioned that you thought a meeting summary of that meeting might have been prepared. Do you have any specific knowledge of whether or not a meeting summary was prepared?

A No, I d' 't. Although it was not so much an internal meeting, but in m.etings where the Licensee was involved, they almost always write up a set of meeting minutes. And I just don't know whether there was one prepared for this one or not.

Q Do you remember if the Licensee was involved in that meeting?

A I don't believe that he was, based upon what has been discussed with me since then.

Q What actions did you take as a result of that meeting?

A I really don't remem.er specifically what was done. I can only talk to you in terms of what we typically would have done. And as I told you earlier, I think that it was agreed that I&E would have the responsibility for following up on the incident.

Any time that we have this kind of a thing, the regional office will make special inspections, investigations, what have you, to try to determine exactly what the cause of the matter was and what the Licensee has done about it.

And the Licensee, in turn, is required to do his own

review of the event, to make a detailed report on it.

The only thing that I would have done, again, would be to relay to the region the specific conerns that had been raised, and ask them to be sure that these were covered in their review of the matter.

And in those cases where it was something we wanted from the Licensee, to make sure that he addressed. And that is about all.

I am sorry, but I don't have a good recollection of the specific details of this event or the discussions involved with it.

Q Do you maintain a meeting log that might contain any more details concerning this meeting?

A No, I do not.

Q Do you recall briefing the ACRS during October 1977 and again in November 1977 concerning this incident?

A Once again, I did not remember that specifically, but I assumed, when I was deposed for the Kemeny Commission, that such a briefing would have taken place, because it is typical of the way we do business. And I understand that. Actually, I talked to them twice about this matter. I requested that transcripts of those two discussion be provided to the Kemeny Commission, but I personally have not seen them yet. So I haven't had an opportunity to review them.

Q For the record, what I have here is a copy of a memo

sent to a Mr. Helfman of the President's Commission. It is dated August 15th, 1979. And it states that the enclosed are the transcripts that you, Mr. Seyfrit, had promised as a result of your interview. And enclosed is a document labeled "210th ACRS Transcript, October 7th, 1977," and another document, "211th ACRS Transcript, Novebmer 3rd, 1977."

I would like to ask you some specific questions about that transcript in a moment. But, first, why were you called upon to give the ACRS a briefing concerning this particular incident?

A Well, in my position in headquarters at that time, I performed the function -- as sort of liaison with the ACRS. And whenever the ACRS had questions about the events that had occurred, or if we felt that an event was of sufficient importance that they ought to hear about it. I normally got the information from the regional office and then made the presentation to ACRS.

Now, on ocassion, we also called people in from the regions to make the presentation.

Q Do you recall how this particular briefing was initiated? Was it at their request or at your request?

A I don't really recall for sure. I just don't know which way it was.

Q Okay.

A It could well have been either way, since it was

done fairly soon after the event, as I recall, this first one. I think the chances are pretty good that we initiated it, but I'm not really sure.

Q How did you get the information that you used in the briefing?

A I got it from the regional office and probably from Tom Tambling for the most part. Although, again, I'm not sure who I specifically talked to. Generally, I would talk to either the section chief or the branch chief and ask them to get the information together for me and send it in.

Q But you don't recall specifically talking with anyone to try to get the information for that particular briefing?

A No. Please understand, again, during this particular time, I had so many different events, so many different interactions with people on so many different subjects, that I cannot sort them out. I can't remember the specific contents over any other.

Q Do you recall, by any chance, either as a result of your recollection now or as a result of some of the discussions you've had with the Kemeny people, for example, that you provided any graphs of parameters, such as pressurizer level or reactor system pressure or any of that sort of material?

A I don't remember it right now. If I could read through this, I may have my memory refreshed. But, again, that was fairly typical of the kinds of things that we did. And

these would be either copies of charts from the plant or graphs that may have been prepared by the inspectors from those graphs. But I don't really remember whether I had any in this particular presentation or not.

Q You don't recall if, by chance, you might have had this graph that was prepared by Mr. Engle, that I believe was used for the briefing that Mr. Mazetis gave?

A I don't remember specifically whether I did not not. It is entirely possible, but I don't recall.

MR. HEBDON: Why don't we take a break for a few minutes and give you an opportunity to review the transcript. And then I will have a couple of questions I would like to ask.

(Recess.)

MR. HEBDON: Let's go back on the record.

BY MR. HEBDON:

Q Mr. Seyfrit has just taken the opportunity to review the transcript of the ACRS meetings during which he discussed this particular Davis-Besse incident that occurred on September 24th.

Referrring, first, to this graph that we have on the wall here that Mr. Engle prepared that was used for the briefing by Mr. Mazetis, a couple of points you might want to notice:

One is that at approximately four-and-a-half minutes into the transient there is a note that the high pressure

injection pumps were secured.

And then, at a point about 20 minutes into the transient, there's a note that the block valve was closed, which I believe is the block valve or the PORV.

Did you realize at the time that the operators had secured the high pressure injection before they had isolated the cause of the leak?

A I don't think that it particularly registered with me, but I believe the description that I gave in here included that kind of a statement.

Q Do you recall where in there you made that statement, because I've also read that particular transcript, and that is the question that I had, that I did not see any reference to the fact that the operators secured the high pressure injection before they isolated the leak.

A Well, I don't think that it came across that specifically. But I believe, if we go through this completely, that it comes out that way.

Let me take a minute to look.

MR. HEBDON: Certainly.

(Pause.)

THE WITNESS: Well, here we say the operator turned them off.

BY MR. HEBDON:

Q Excuse me. Is there a page number with that?

A 348.

Q Yes, 348.

A Mr. Ebersole had asked me if the high pressure ECCS pumps had come on and started to inject.

Answer: "Yes, they came on."

And he asked me if it charged the system with water, and I said, "No. The operator then turned them off; yes."

Q But as I understand it, the ECCS, the high pressure injection pump did charge the system to some extent.

A Well, for a very short period of time.

Q For about four minutes.

A Yes. That is not a very significant amount really. And I think his question, really, following the previous discussion, he was really asking me, did the high pressure system continue to keep pumping water and keep the core covered that way.

And the answer is "no," because they shut it off.

Q But there wasn't any specific reference to the fact that they had shut it off before they had isolated the leak?

A No, I guess that is true. I sort of inferred that from my reading of the thing. I guess it doesn't really say that.

Q Do you recall at all why that point wasn't made?

A No, I don't.

Q In hindsight, would you have considered that to be a

particularly significant point in this transient?

A Well, obviously, when you look at what happened at Three Mile Island, one would be a little bit crazy not to consider it, but I think, for the purposes of this discussion, that I sort of have to separate myself from what happened at Three Mile Island later.

And in light of what we knew and what actually transpired at Davis-Besse, I don't think it was a question that would have really floated to the top and have been of great concern.

Q But looking back just a little, that is one of the concerns that Mr. Mazetis raised in his note to you, through Mr. Ross, of concerns he had about this particular issue. So it was raised by him as an issue.

A I did not read that that closely.

Q This, again, is the memo from Mr. Ross to you, item number 2. He seems to be raising a concern about the fact that the operators secured the high pressure injection as early as early as they did.

A Well, his concern was, really, why did they make the decision to secure it when the did? He says it should be explained. I think that perhaps it was explained, and in the explanation we perhaps didn't reach as far as one ought to reach.

It was secured, essentially, for the same reason it

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was secured at Three Mile Island. The pressurizer level was going up; they thought they had plenty of water.

Q If you'll notice on this particular graph, again referring to Mr. Engle's graph, at approximately four-and-a-half minutes into the transient, the operator secured the high pressure injection system. And at that point in time the pressurized level was increasing, then it turns and starts to back down, which you would reasonably expect because of the fact that the plant was continuing to cool off.

But at about six minutes into the transient, the pressurizer level turns and goes back up rather sharply and continues to increase until the pressurizer is completely full, at about eight minutes, and then the pressurizer remains full out to about 28 minutes, at which time the pressurizer level drops very sharply. And, in fact, the pressurizer level goes from off-scale high to off-scale low, in what would appear to be a matter of about a minute or two.

What would be your explanation of that particular response?

A Well, I don't know that I have specific explanation. Frequently, when you have readings that vary considerably from what you would expect, the answer has to do with perturbations of system pressures that cause faulty readings. It is not too uncommon, depending upon what kind of instruments you have and what these instruments -- how they are hooked up -- to have an

instrument show you either an erroneously high level or an erroneously low level, because there are differences in pressure between what I will call the reference leg and the leg that is trying to measure what is sitting above it.

I don't offer that as an explanation in this case. Let me relate, to say that is the kind of thing that may is the kind of thing that may happen when changes are taking place very rapidly. Instruments do some strange things. I don't think that is probably the case here. I don't really offer that as an explanation. I don't know.

Q Do you recall if anybody raised a similar concern about this particular response during the briefing that Mr. Mazetis gave?

A I really don't recall what was discussed at that briefing; I just don't.

Q Could it be that that particular response is due to the fact that boiling was taking place in the reactor coolant system and that boiling caused an insurge into the pressurizer?

A Certainly, that is a possibility. And it may even be the most likely probability, given all that we know at this point, yes.

Q Do you recall if this particular response was addressed with the ACRS as part of the briefing at the ACRS?

A I don't recall specifically whether it was or not. I don't think it was.

Q Do you have an idea why it wasn't addressed?

A Well, I think probably because it just hadn't made an impression on me or the others who were preparing the information for me to give to the ACRS. That is the only explanation I can come with.

Q This is an issue I've been having a difficult time coming to grips with. A lot of people have told us that pressurizer level is, in their mind, one of the key indications that the operators use for monitoring how the plant is performing. And yet here you have pressurizer level following a rather anomalous looking response for what is going on elsewhere in the plant. Do you have any idea why apparently no one seemed particularly concerned about this particular response?

A Well, I think that perhaps there are two parts to the question that you raise.

Certainly, during reactor operation, while the reactor is operating, pressurizer level some people watch, and they have a concern for. I don't think that typically they have the same degree of interest in the pressurizer level per se once the reactor is shut down. That is not to say they shouldn't have, but I don't think that the same thought process is there.

I think there is also a sort of mental block that says since the reactor vessel and the pressurizer are connected with the pipe, that if you've got water at this level up here,

you must have water down here. I don't think that people really, prior to Three Mile Island, gave serious consideration to the fact that you could void a part of the reactor vessel and still maintain the level of the pressurizer, although it is obviously something that can be done if you drop below the saturation temperature-pressure curve.

But I just don't think that people really thought about it.

Q Well, one of the points that I think has been raised as a result of the accident at Three Mile Island is possibly that the operators, during accidents, were placing too much reliance on pressurizer level as an indication.

A I think that is obviously the case.

Q And so it seems that the feeling was that at the time pressurizer level was one of the most essential indications available to the operator.

A It tells you that you've got water, yes.

Q And yet here we have a rather stange response from pressurizer level, one that doesn't seem to be consistent with the other principal parameters. And yet no one, as far as I can tell, seemed to be concerned that the pressurizer responded in this way.

A I think that is probably true. And I would respectfully suggest that you may perhaps not raise the same question, had it not been for Three Mile Island.

Q That is very possibly true, and I recognize that.

A It is the hindsight.

Q Hindsight is a wonderful thing.

A But I don't think that any of us really gave it that kind of thought before.

Q On page 344 of the transcript, you make a statement that the transient was completely terminated at about 15 minutes.

Do you recall what the basis was for that statement?

A I think the basis for that statement was really that is what I had been told by the folks out in the region. I think that by this time -- well, I'm not really sure -- the one thing that this did was to put enough water in the second steam generator, to give you the additional cooling. And I believe that by this time the manual block valve had been closed. Therefore, there was no further loss of water.

Q That is why I found that statment to be a little bit curious, because the PORV wasn't shut, the block valve for the PORV wasn't shut until 20 minutes into the transient. And at about 36 minutes into the transient the pressurizer level went from off-scale high to off-scale low and wasn't recovered until some 50 or 60 minutes into the event.

A Well, I think that the thing that people were looking at -- and I think my response would have been much the same -- was that at the point where we got the second aux feedwater

pump delivering at full flow, that there was really no further concern for additional loss of coolant and overheating of the core -- I don't remember what the temperature was at this point -- and how fast this brought down. I can't give you that.

But, of course, you know unless the level in the reactor vessel -- and I don't think any of us really thought about it being terribly low at that point -- unless the level was down close to the top of the core at the time you got this second pump started, you've got some boil-off time before you uncover the core. And I think basically that is what we were thinking about.

Q On page 350 of the October transcript, and again on page 183 of the November transcript, Mr. Ebersole raises a concern about what would have happened if the plant had been operating at 100 percent power, at a higher power level. And I believe you make a statement to the effect that you didn't feel it was possible or likely for this particular incident to occur at that high a power level.

What was the basis for that conclusion?

A Well, at this time they didn't have the main turbine rolling. They were dumping steam through the back end of the condensor, through a bypass valve. They were operating on start-up feedwater flow, rather than full feedwater flow.

The conditions, if they had been operating at full power, would have been quite different. And the point was not

so much that it couldn't happen, but that there would have been different systems in operation. And a trip, under these same circumstances, would not have gone in the same direction.

Q Well, if they had a turbine trip and, say, they had been operating at 100 percent power and had had a turbine trip, wouldn't they have followed basically the same scenario as what happened here, assuming that the relay was missing and that the pressurizer level increased, and the pressure increased, so that the PORV opened and short-cycled.

A It is not clear whether they would have or not. And I would have to look into this a little further. Again, at the time, I probably had a better rationale than I've got at the moment.

I believe that the parameters which triggered this feedwater rupture, or steamline rupture --

Q Steam and feedwater rupture control system?

A Yes -- would not have been triggered if they had been operating.

Q Well, the event that triggered the steam and feedwater rupture control system was a spurious trip anyway.

A Yes, but after it trips, what happens? I think there are some different things that would have happened if they had been on main feedwater instead of the start-up feedwater system.

I can't really give you a direct answer to your

question. I just don't remember now.

Q Is there any way that you could reconstruct what the rationale was for that particular conclusion?

A I think, probably at this point, the only way I would be likely to would be to go back and talk with Tambling and those who have supplied the information to me. I presume you have already talked to them, or intend to talk to them, so you may get a better answer from them than you can get from me. I just can't answer that. I don't know.

Q I would like to ask you a couple of question concerning some of the specific parts of this particular scenario. And I think we have already discussed these, at least to some extent. But I would like to just make sure that we have a complete record.

As a result of your review of this incident at the time that it occurred, and as a result of the briefing that you attended that Mr. Mazetis gave, did you realize that steam formed in the reactor coolant system during the transient?

A I can't really say what my thoughts were on that basis. Obviously, reading this transcript, I did make the statement that boiling had occurred. And I am well aware that if boiling occurrs, there would be some voids formed in the reactor vessel.

I think that, based on the overall timing of the event, that our conclusions -- and I can't remember now how

these were reached -- it strikes me that there were some people who did some calculations to try to determine how much volume may have been lost, that it wasn't very significant.

Q Do you recall who made those calculations?

A No, I don't.

Q What significane would you assign to the fact that boiling or void formation occurred in the reactor coolant system. And I recognize this is going to be colored an awful lot by the TMI accident, but trying to separate what you know now, as opposed to what you knew then.

A Well, I think that there was no question that I would have recognized, and did recognize, that the boiling that occurred would displace some water out of the reactor vessel. And the only place that can go is up to the pressurizer. And I think that is one reason that I wasn't terribly surprised to see some increase in pressurizer level when you weren't feeding any water in.

Q What significance would you have assigned to this fact, that the pressurizer level would be increasing while boiling was taking place in the reactor coolant system?

A Just what I told you.

Q Would that have been of particular concern to you, that pressurizer level was going up as a result of void formation in the reactor coolant system?

A I don't think that it would have been of particular

concern, depending upon the amount that it goes up. What you are really concerned with is the overall coolant inventory in the reactor vessel. And as long as you don't have an indication that you are losing enough to give you reason to believe that you're going to uncover the core. then I don't think you get that concerned about it.

And I think, in this case, we did not have that much concern.

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BY MR. FOLSOM:

Q Where would you get the indication that the core was in any way threatened by loss of coolant?

A Well, you just know intuitively that if you don't keep water over that core --

Q But how do you know water is over the core?

A Well, that is the $64 question at this point. You know that water was over the core to start with; there is no question about that. You know that you lose some water through this valve that was stuck open, and the quantity -- you don't really know how much that is. The valve opened, closed, opened, closed.

You know that you don't lose any water from over the core until you reach the point where the temperature and pressure are such that boiling can occur.

Q Which is the fact here?

A Yes. But, now, how long can that take place before

there is a boil-off rate and you can calculate what that is? And I think that, intuitively, the people who were involved here were not boiling that rapidly, so we have still got water down there. Yes, it is boiling, but it is still there.

To give you an actual measurement, no, there is no way. I think there is no question that that is one of things from the Three Mile Island event that needs to be looked at pretty carefully. We need to have a way of having firm information as to what the liquid level is in the reactor vessel, aside from what is in the pressurizer.

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BY MR. HEBDON:

Q Do you feel that that same conclusion could have been reached as a result of the incident at Davis-Besse?

A Well, I think it is obvious that it could have been reached. It is also obvious that it wasn't reached. Now, 20-20 hindsight -- again, I don't think that I would charge the fact that it wasn't reached to negligence on anybody's part. I don't think that anybody intentionally overlooked the fact that this might be the case. But, obviously, we did overlook it.

Q Do you recall ever discussing this incident or any of the issues raised by this incident with a Mr. Kelly or a Mr. Dunn or any other employees of B&W?

A I don't believe that I had any such discussions, unless they were in the form of a meeting with NRR.

Q But you don't recall any specific discussions?

A No, I don't.

Q I would like to go on now and discuss an incident that occurred at TMI on March 29th, 1978. This is an incident that I believe you referred to earlier in our discussion.

Prior to March 28, 1979, prior to the TMI accident, what knowledge did you have concerning an incident that occurred at TMI on March 29th, 1978?

A Well, that event was reported by means of what we call a preliminary notification, which means that our Region 1 office had had a report from the Licensee, and that was the initial report which talked about a reactor trip and subsequent blowdown with the emergency system actuation.

They described the cause of the event as the loss of a vital bus. The reactor tripped, and then because of the electromatic relief valve was supplied from this same vital bus, the electromatic relief valve failed open on loss of power, and that resulted in a depressurization of the primary system.

I think the next information that I got about the event was a memo which was written by Dan Sternberg. And I've forgotten now to whom he addressed it. It was written to me through his section chief, and he then pointed out the PN that I just mentioned.

And the question that was asked was -- it was requested that the adequacy of the design approach -- that is,

the valve failing open on loss of control power -- be reviewed on an expedited basis for B&W facilities in general and Three Mile Island in particular.

The question really relates to is the design for this system adequate?

In response to that memo, I had a member of my staff check into it; and I can't tell you all of the places that he might have checked, but he wrote a memo then, for my signature, to Mr. Brummer, which in essence says that the failure of the valve in the open position was covered in the FSAR. And since it was part of the application which had been reviewed by NRR previously, that design was an acceptable design as far as we were concerned. And that was the way the request was answered.

Q Do you remember any of the details of the incident itself?

A Not really, no.

Q Now, you mentioned this memo that Mr. Sternberg wrote concerning the design of the electromatic relief valve. Is the review of such issues a normal function of your job?

A Well, I am not quite sure what you mean by the question. It was a normal function of my job to resolve questions of that kind that were raised by people in the field.

Q So it was normal for Mr. Sternberg to send such a memo to you for resolution?

A It is a little bit surprising that Mr. Sternberg sent

it to me directly, because normally this would be something that would come over his branch chief's signature. But it is not that unusual either.

Q But it was sent through his branch chief?

A Yes. Right. Not through his branch chief, through his section chief; Mr. McCabe was the section chief.

Q Well, I don't think it's worth going to into in great detail, but Mr. McCabe was acting branch chief at the time Mr. Sternberg was the acting section chief.

A No, he was acting chief of the Reactor Projects Section, not branch.

Q And Mr. McCabe was the acting branch chief of the RO&NS Branch.

A You're right. I apologize.

Q That's not a big point, obviously. But it was normal for you to review such issues?

A For my office to review them, yes.

Q In Mr. Sternberg's memo, he mentions that it does not appear that the valve is safety-related. Did you give any consideration to whether or not the valve should be safety-related?

A No, I did not. The determination as to whether or not these things e safety-related or whether they belong to systems that are specified as being safety-related is one that is, again, made by NRR. And they had reviewed these systems.

And I think it is fair to say that none of the plants that had this kind of a setup had these valves listed as safety-related. I can't vouch for that, but I think that, in general, these valves, as well as the feedwater system and the steam system, are not typically listed as safety-related systems.

Q Then, as I understand it, you didn't give any indication or any consideration to possibly sending a memo to NRR recommending that this valve be included in the list of safety-related systems?

A No, I don't think that we did that at that time. I think that there may have been an occasion since that time to have suggested that it might -- ought to be a safety-related valve. But that I sent such a memo, no.

Q Would that have been before or after Three Mile Island?

A I suspect it was after, but I don't really remember.

Q Now, you mentioned that Mr. Sternberg's memo was referred to someone on your staff who reviewed the issue?

A Yes.

Q Do you know if any contact was made with anyone in NRR?

A I am not positive whether there was or not. But I would suggest that typically there would have been some contact, at least with the project manager. But I can't, at this

point, say positively that that was done.

Q You don't know of any contact, and you didn't make any contact yourself?

A I did not make any myself; definitely not.

Q What, in your mind, or what did you think should have been done with this particular memo? What did you think at the time should be done with the memo?

A From Mr. Sternberg?

Q Yes.

A I felt that it should be answered and that it should be answered on the basis of the questions that he raised, which is what I instructed Mr. Woodruff to do. And it was answered on that basis.

Q Now, Mr. Woodruff prepared a response that you signed -- and it is a memo -- on May 3rd, 1978.

A Yes.

Q In that memo he references a section of the FSAR, Section 7.4.1.1.6. Did you review that particular section of the FSAR in the course of concurring in this memo?

A I don't recall whether I specifically did or not. I believe that Roger brought that in for me to read and that I looked at it. I am just not absolutely sure.

Q I have here a copy of Section 7.4.1.1.6 of the FSAR for Three Mile Island. And if we could, I would like to take a moment and have you read the particular section that refers

to the electromatic relief valve.

And let's go off the record for a moment.

(Discussion off the record.)

MR. HEBDON: Let's go back on the record.

For the record, Mr. Seyfrit has been reading from Section 7.4-3. Excuse me, from page 7.4-3 of the FSAR for Three Mile Island.

BY MR. HEBDON:

Q In reading this particular section, do you read it at all to imply that the PORV is assumed to fail open as part of the safe shutdown analysis?

A Yes. I think that it is rather clear that it talks about the fact that in the event that the relief valve were to fail in the open position, so it recognizes that it might fail in the open position.

Q Do you read in that any implication that it must fail in the open position?

A No.

Q But isn't the discussion there, concerning the redundancy of the function of relieving reactor system pressure, based on the assumption that that valve will fail open?

A That is true. But by the same token, if they recognize that it is going to fail open, it is recognized that it may fail open and still have the opportunity to control the pressure by cycling the manual block valve.

By the same token, you have the option of closing the manual block valve to serve the function of a closed valve if that is the position it ought to be in. So I think that both situations are covered.

Q But if the valve, if the PORV were changed to fail shut, wouldn't you lose the capability to control pressure by cycling the block valve?

A Yes, that's true.

Q So then wouldn't that seem to indicate that the valve was supposed to fail open; or there was an implication, or even a requirement, that the valve fail open as part of the safe shutdown analysis?

A No, I don't think that is necessarily true.

Q Well, if the valve were changed and designed to fail shut, how would the redundant capability to control pressure be provided, since cycling the block valve would not longer have any effect?

A Well, you still have relief valves. You have code safety valves that would operate it.

Q But the operator can't control the code safety valves.

A That's true.

Q The only way they would get involved is if the pressure reads their lift point.

A That is true, but then they would close again and then cycle back and forth there, so there is a backup to a

degree. But I don't think this was intended to mean that that was the only purpose for that discussion. That may be your interpretation; it is not mine.

Q Were you aware that the utility, in fact, later changed the PORV to fail shut on loss of power?

A No, I'm not aware of that.

Q Would that normally have been something that would have been brought to your attention?

A Not necessarily. And it may well have been brought to my attention at the time. I just don't have a recollection of it, but I don't remember it.

The reason I say that it would not necessarily have been brought to my attention is the fact that the Licensee may make changes in design to his facility without prior Commission approval so long as he does a safety review in-house and determines that it doesn't substantially change what has been described in the SAR.

This valve -- going back to the question of is it safety-related or not? -- had not been so designated before, and that makes it easier for him to make changes, because he is not really changing a "safety component of his system," which may or may not be a good idea, but nevertheless that is sort of the way things go.

Q Well, that was the other point I wanted to get back to, the functioning of this valve to permit a reduction, or to

permit controlling reactor coolant pressure, is discussed in the safe shutdown analysis for this particular system. Aren't components that are involved in the safe shutdown of the plant normally safety-graded?

A If they are required for safe shutdown of the plant, that is true; but I don't think that what you're reading here would necessarily imply that this valve was required for a safe shutdown. There are other ways of achieving safe shutdown other than by use of that valve.

Q The particular section, the opening sentence of the discussion on the electromatic relief valve control says, "The electromatic relief valve is required to ensure the capability of controlling reactor coolant pressure."

Now, that would seem to indicate, to me, that the valve is required for safe shutdown.

A I think you're reading into that something that is not there. But I don't want to get into an argument with you. I would suggest that perhaps you ought to talk to the NRR folks who review these. I don't believe that that -- that this is necessarily a discussion of a safe shutdown capability of the plant. This is a description of the pressurizer controls, and it talks about those things that are available. But it does not, in my view, necessarily say these things must function, as described here, to provide safe shutdown.

This merely says here are some things and this is the

way they function, and this is what they were designed to do. But it doesn't say they are required for safe shutdown.

Q Again, I guess the thing to do would be to discuss this with NRR, but I think it should be noted that the heading of Section 7.4, of which Section 7.4.1.1.6 is a part, is titled "Systems Required for Safe Shutdown." And that would seem to indicate that these are the systems that are, in fact, required for safe shutdown.

A Some of those are backups for other systems in case something else doesn't work. They are not all required at the same time.

Q Let's go on.

At the time that you prepared your response, do you recall what your understanding was with respect to the indication of PORV position that was available to the operator?

A I don't think there was any specific position indication available to the operator. And the devices that were used at that time to determine whether or not there was leakage past the valve or temperature indications in the downstream piping on the discharge side of the valve --

Q Did you feel that those indications were adequate?

A At the time, I must have felt that they were adequate or I would have asked that they be changed. I had no reason to belief otherwise at that point.

Q Were you aware that some additional indication was

eventually provided on the PORV at Three Mile Island?

A I was aware after the fact. I don't recall that I was made aware of it at the time the change was made. I learned this during the deposition for the Kemeny Commission. Again, that is not to say that some piece of paper might not have crossed my desk that said it was being done. But my memory is just not that good.

Q Were there any other aspects of the March 29th, 1978, incident at Three Mile Island that are relevant to the March 28 March 28th, 1979, accident at Three Mile Island?

A Without reviewing the details of the earlier incident, I am unsure of the documents in that question.

Q To your knowledge.

A Well, yes, didn't the original PNs say something about the loss of feedwater? No, it was the reactor coolant pump. I don't see anything else in the brief description that I have here that really triggers anything. The depressurization was, of course, because the valve was open.

Q One last question on this particular incident at Three Mile Island: Did you give any consideration to the possible generic implications of PORVs failing opin on loss of power or any other aspect of this particular incident?

A Well, yes, I think we did. And that was, while not specifically stated in the answer, I think implied we reviewed other B&W plants, and they all had essentially the same kind of

a statement in them regarding the fact that there had been consideration for the valves failing in the open position.

Q Did you give any consideration or did you review the indication that was available to the operators at other B&W plants?

A No, we did not at that time?

Q Did you at any time?

A No. It is not a question that was ever raised in our minds; frankly, we always assumed that the temperature indication in the tailpipe would be sufficient to tell them that the valve was either open or leaking through. And, indeed, there were some limitations, and they weren't supposed to operate with significant leakage in that valve.

I understand, at Three Mile Island, that the valve had been leaking for some time, which perhaps contributed to their problems; I don't know.

Q I would like to go on and ask you some questions that are considerably more general in nature, and they particularly relate to the relationship between I&E headquarters and I&E regions, for example, or NRR and various other organizations.

What is your general perception of the relationship between I&E headquarters and the I&E regions?

A Well, having been in both places, I guess I have a fairly broad perspective. But I think that there tends to be, at times, some degree of adversary relationship between the

field offices and headquarters. But I think that is a fairly minor thing.

Overall, I think the relationships have been pretty good. I think that probably personalities turn out to be very important in the relationship between the field offices and headquarters, and it depends a great deal on who the individuals are that are making the contacts back and forth.

I don't perceive of there being the kind of tension between the field and headquarters that really gets in the way of doing the assigned jobs for either the field or headquarters.

Q Would you briefly describe the I&E Vendor Inspection Program?

A Well, the Vendor Inspection Program was instituted a few years ago and has been designed to be largely one of looking at certain vendors -- and by "vendors," we mean those people who supply equipment or services to the utilities; "vendors" include the nuclear steam system suppliers who design the plants, the architect-engineers who design and balance the plant; and even in some cases the constructors of the plants, but that is generally handled from the field offices directly. It also includes the suppliers of large pieces of equipment, the people who build the reactor vessels, for example, steam generators, the large pumps, motors, what have you.

But that program, unfortunately, was conceptualized and instituted as one primarily of checking the implementation

of quality assurance programs. It was not designed to -- and in most cases has not been used to really look at the quality of materials that flow from the vendor or from the architect-engineer, or from the nuclear steam system supplier, but rather to look at his system for controlling these things.

MR. HEBDON: Why don't we go ahead and take a break at this point?

end t.4 (Recess.)

MR. HEBDON: Let's go back on the record.

BY MR. HEBDON:

Q Is there any mechanism by which the vendor inspectors can exchange information with the inspectors who are involved with the plants who have equipment that is manufactured by a particular vendor?

A Well, there is a mechanism by which this can be done. Unfortunately, I don't think that in the past it has been done as well or as often as it ought to be. Since the vendor inspection program now has run out of my region, I am attempting to make some changes in that area and we are indeed at the point doing more of what I would call reactive inspections than programatic inspections. That is, we are reacting to problems that are raised by the regional offices or by information that comes to us from whatever source. And we are attempting to become a little bit more oriented toward looking at the product that comes out of these organizations that we inspect. It is a difficult line to walk. I don't think that it is appropriate for the NRC to be the acceptance inspectors, if you will, for the utility, and therefore I don't want to see us getting into the position of having to give our stamp of approval before something gets shipped. I don't think that is an appropriate stance for the NRC.

On the other hand, I think that we do need to look more deeply into whether or not the actual work in terms of

sls-2

fabrication of components is performed adequately or not performed adequately. Whether indeed the designs that are put out by the people that are doing the designs are appropriate, whether they have considered the proper design principles and so forth. We don't have right now the kind of people that we would need in any great detail, but I think we can make an effort in that direction and improve our work.

Q Then as I understand it, your involvement with the vendors has historically been more in the context of the physical products that they produce rather than any consideration of their design analyses?

A Well, I think it is not even that. I think it has been more in the system that they use to produce their product, whatever it is. As you know, 10 CFR 50, Appendix B, which describes the kinds of quality assurance program that people should have. That basically has been what has been what we have inspected against the quality assurance program and its implementation.

Now, you can have on paper a tremendous quality assurance program. And if all you do is look at paper, you can say, "Gee, they are doing this in great shape." But, you go and look at the weld that was made using that program, and it may be a lousy weld. That is the kind of thing -- the difference.

Q Now, when you are talking about this quality

sls-3

assurance program, would that quality assurance program also cover such things as design analyses?

A Yes.

Q So, it would consider that sort of thing?

A That's right.

Q By quality assurance, then that is a broader context than just quality assurance of a physical component?

A That is correct; yes. And, indeed as I indicated earlier, we do look at the nuclear steam system suppliers and the architect engineers. And, of course, since their product is primarily a design, what we are looking at and what we have traditionally looked at is the quality control or quality assurance system that they use in terms of internal reviews of design and that sort of thing to make sure that the guy that does the design originally isn't the one that sides off as approving the design, but it gets reviewed by somebody else. Those kinds of things.

Q Would that inspection also include such things as how the organization responds to concerns that are raised by people within the organization?

A It doesn't lend itself specifically to that. And one of the problems is that you don't really always know when somebody within the organization has raised a question, and it is not clear to me how our inspection program would necessarily uncover that kind of thing to the extent that we are aware that

sls-4

somebody has raised the question. We may look into the resolution of it, but we don't really become aware of those things usually unless somebody tells us that it has happened.

Q Would your inspection include the licensee's procedures for complying with 10 CFR, Part 21?

A Not in the vendor inspections. Well, yes, excuse me. I was thinking of a different part. Yes, you are talking about the business of whether or not known deficiencies that might lead to problems are reported to us and so forth.

Q Yes, that is correct.

A Once again, to the extent that we are aware of the known deficiencies and the circumstances under which it is reported. We would look into it, yes.

Q So, if the deficiencies and reporting under Part 21 were to come to your attention, that would be something your inspectors would be involved with?

A Well, it would not always necessarily fall to the vendor inspection program to look at it, but it might be one of the other regional offices that would look into it.

Part 21, if it dealt with the licensee, for example?

Q What if it dealt with the vendor?

A If it dealt with the vendor, that should come to us.

Q Are you aware of some concerns about a possible Part 21 violation that were raised by Mr. Creswell of Region III?

sls-5

A I am not aware that he raised any questions about a Part 21 violation; no.

Q Were you aware of a meeting that was held at B&W in February of '79 that included a Mr. Kohler and Foster from Region III, and I believe a Mr. Anderson from your region?

A I think that probably is the meeting that Mr. Anderson attended. I am only aware that he was present at the meeting and actually let me see if I can remember what I've been told about this.

Mr. Anderson had a meeting with Kohler and Foster prior to their discussions with the B&W folks. I don't think that Anderson actually participated in the discussions with B&W until they had a close-out interview, and I think he sat in on that. I am not sure of the details, but I believe that is the way it was.

Q Are you aware by any chance of why Mr. Anderson was there? Do you know if he was sent there specifically because of that meeting or was it coincidental or what?

A It is my understanding, and I really should know this better because he was working for me at the time. When was that meeting?

Q It was in February of this year; February of '79.

A His branch chief, I believe, asked him to go down there because we had been told that Region III was sending some

sls-6

inspectors into B&W and he was asked to sit in with them and discuss with them what their purpose was in going to the meeting so that if there were things that we needed to follow up on he would be aware of what those were and basically, that is the reason that he was there.

Q What is your perception of the relationship between I&E and NRR?

A Well, I think again there is perhaps a pretty strong adversary relationship between I&E and NRR on some subjects. I would have to say that I think there is a concern for guarding each other's turf, to some degree. I think there are sometimes perceptions that that organization can't do it as well as this organization, whatever that is, and that there are some difficulties in communicating with each other, particularly when it comes to working on specific problems. I wouldn't really be able, I think to comment on why this is so, other than my own personal beliefs, and I think it perhaps is a problem that goes back a great number of years and that it probably has again a lot of personality problems associated with it that the difficulties, the tensions between the two organizations are more acute as far as certain individuals are concerned, than they are with others.

Q Does I&E headquarters review plant procedures?

A Not as a general rule. The procedures generally are reviewed by the regional offices. Back several years there was

sls-7

an attempt to do something in the way of reviewing plant procedures at the headquarters level and the regional offices were requested to send in copies of certain plant procedures but that was not an all out effort, certainly, and it was more to try to look at consistency from plant to plant and see what kind of quality these procedures were more than anything else.

Q What was the conclusion of that effort?

A I don't think it ever concluded. The effort that I am talking about took place just prior to a fairly substantial reorganization within headquarters I&E. I've forgotten which iteration it was. I believe they were going from regulatory operation to something else. I've forgotten. But the folks who had been doing that wound up with some different assignments and I think that just sort of went by the boards and nothing much further was done with it.

Q Do you recall who was in charge of that particular effort?

A I think Bob McDermott was doing a great deal. He was working for I&E or Compliance or whatever we were at that time. I think as I recall, Bob had one group with reactors and Frank Nolan had the other, and the two of them combined doing most of the work, as I recall.

Q What is the difference in your inspection procedures and inspection philosophy for safety related versus nonsafety related systems?

sls-8

A Well, I think that the major difference is that we look a lot harder at the systems that are defined as being safety related than we do those that are not certified.

For example, in terms of something that I could put some numbers to, start-up procedures, the preoperational testing procedures we review in detail. I believe all of the start-up procedures relating to safety equipment we review only a small percentage of those that are marginally related to safety and only assure that procedures exist for others that are even farther removed from the safety systems.

So, in general it is a matter of the depth with which we look at it.

Q What is the basis for deciding that a system is safety related or it is not safety related?

A I am not sure that I can articulate that accurately. This is something that the licensee and NRR agree upon, basically. But in essence, any system that can prevent or mitigate accidents are considered to be safety related. I don't know whether that gives you the kind of answer that you are looking for or not.

Q That is fine.

Does I&E ever become involved with the determination of whether a system is safety related or not?

A Only in the sense that we may question whether or not something ought to be safety related or ought not to be, I

sls-9

suppose. I can't think of any case where we have gone in that direction, but we may make suggestions or question NRR's decisions and ask that something be reviewed in perhaps a different light.

Q How frequently, from your experience, has I&E recommended that the decision that a system is nonsystem related be reviewed and possibly reconsidered?

A I wouldn't really have any good idea.

Q Would you say it is frequent, infrequent, often?

A I would say occasionally would be the best description. It is not a terribly frequent thing, but it is not unheard of.

BY MR. FOLSOM:

Q Can you recall any instance?

A Well, I think that there have been some questions. Let me preface this by saying I am not sure that what I am about to say has been formally recorded as a recommendation or not, but there have been some questions raised about the requirements that relate to the steam and feed water system in pressurized water reactors, particularly when you are looking at the failure of steam generator tubes which then gives you a path between the primary and secondary system. And yet, to deal with that kind of an accident, we do rely on the operation of some secondary systems which have not been designated as safety related. And in my view I think we perhaps ought to take

sls-10

another look at that and we have had some discussions along those lines.

Another one has to do with some control systems and I can't really pin this down specifically, but there are in some pressurized water reactors some control systems that are associated with the actions that are taken at certain pressure levels that have not been designated as safety related. And again, there is a question that perhaps they ought to be. They are not redundant at the present time, and maybe they should be redundant. I've forgotten the specific details, but one of my inspectors in Region IV has raised this question with a licensee.

Q What has been the probability of success of people who have raised issues about systems that they felt ought to be safety related?

A I don't know that I can give you any kind of numbers. There have been some successes and some failures, I think, but I couldn't give you hard evidence in numbers.

Q Well, I didn't really mean down to a decimal place, but is it a 50-50 chance, ten percent, ninety percent success?

A I would say that it is certainly less than 50 percent, but I think there is a good reason for that. I think that in general most of these systems have been pretty thoroughly reviewed and the fact that I, an inspector out in the field, raised the question about whether something should or should not

sls-11

be safety related. I am not sure that I, as that individual inspector, has the same degree of knowledge about this matter, this system that we're talking about, as the people back here who have spent a lot of time reviewing it. And they may have already considered the kinds of things that concern this individual and still concern it.

They decided it was okay and obviously he is not going to win, he is not going to have his position prevail. On the other hand, if it is something that has not been thoroughly considered, if it is truly a new issue, then his chance is pretty good I think.

Q Do you believe that the designation of systems as safety related is applied in a consistent and rational manner?

A I think that it is open to some degree of question. I would be hard pressed to give you specific examples, but I think that there are cases where a particular item or system or function, while it may not of itself create an accident and it may not of itself be able to mitigate an accident, it may have the potential for causing the failure of something that can -- How far removed do you need to get, and I don't think we have really considered that terribly thoroughly.

Q Well, one example that was cited to me by one of the earlier interviewers is the fact that the diesel is a safety related system, but the air start system and the fuel for the diesel are not safety related. Now, would it strike you

sls-12

as very surprising if that, in fact, is true?

A It would indeed strike me as surprising if that is true, and I think it is not true.

Q As I said, it was cited just as an example, and we haven't done any particular efforts to verify it.

A I was thinking of another situation, and we have right now a question that you were asking about, raising questions to headquarters that my office has raised which relates to the nozzle design of some boiling water reactors, and whether or not the thermal sleeve and the feed water sparger ought to be safety related. Right now they are not so designated, but there are some.

Let's see how I can explain this: A weld that is made on the base material of either the piping or the reactor vessel is safety related. A weld that may attach something else to that piping, likewise is safety related. But a weld that is made in a component that inserts in there like a thermal sleeve is not safety related at the present time, and yet, I believe, that there are cases where the failure of the weld on the thermal sleeve could lead to failure of the pipe that is associated with it.

Q So, this is a failure of the weld then. Is it associated with two parts of the thermal sleeve?

A Right.

Q So, the weld of the thermal sleeve to the nozzle

sls-13

would be safety related?

A That is right.

Q But welds in the thermal sleeve itself are not?

A That is right.

And yet, I think it may have the potential and we have asked NRR to look at that.

Q Do you know of any other precusor events that are relevant to the accident at TMI?

A I do now only because I read about it in the newspaper. The event in -- where was it -- Switzerland. A foreign reactor, at any rate. And that is the extent of my knowledge.

Q Do you have any additional information that might be relevant to our inquiry into the events surrounding the accident at TMI?

A No, I don't think that I know of anything. My involvement at TMI did not occur until some three days after the accident. I arrived up there on Saturday, I believe it was. And so, I was not present during the initial phases of the accident. I was there while we were still very concerned about the bubble. I guess most everything I was involved in after that is really not that germane to the inquiry.

Q Have we failed to elicit any information in areas that you believe to be in accordance?

A Well, I don't think that you failed to elicit any.

sls-14

I think that perhaps I might have expanded some, and you probably have a copy of the letter that I wrote shortly after my first stint at Three Mile Island.

Q Yes, I believe this is the letter from you to a Mr. Greer of Region I?

A Yes. And in that I expressed some of the things that we talked about today in terms of the difficulties of the two organizations working together at Three Mile Island, and I think certainly there must be something done to reduce the degree of friction to make cooperation easier and the more routine between those two organizations.

Q Have you ever written a memo similar to this memo that you wrote to Mr. Greer concerning this issue of the lack of harmony between I&E and NRR?

A I don't believe that I have ever written such a memo before. I never really had specific occasion to do it. I think as I've said several times, and I don't like to make too much of an issue of it, but I think the problem in a great many respects is one of personalities, and I know during my time here at headquarters whether it is false modesty or immodesty or whatever, I really feel that the relationship between I&E and NRR headquarters was working pretty well. In those contacts that I had, the office as a whole had some reservations, and while I have not written this kind of a memo in the past, there have been times when I have discussed with

ls-15

some of the I&E management who may have complained about the actions of one or more of the NRR people, that in my view they shouldn't be complaining. That NRR was performing its functions, and we shouldn't be so doggone sensitive to their doing things that we maybe normally did.

I have had some of those kinds of conversations, yes, but I don't think I ever formalized it in writing.

Q How do you feel that particular problem could be alleviated?

A Well, I think that it is largely one of personal education at the top level. I think, quite frankly, that a lot of it is going to be resolved by virtue of the fact that the head of I&E is a former NRR man, and I think that Vic and I both feel very strongly that this has to come about. He and I have talked about this matter on a number of occasions, and in fact we discussed it some while we were at Three Mile Island. It turned out that Vic and I -- maybe we ought to go off the record on this point.

MR. HEBDON: Okay, let's go off the record.

(Off the record discussion.)

MR. FOLSOM: Let's go back on the record.

The off-the-record discussion indicated that you feel, and I wonder if this is a fair statement:

Q That in the administration of the emergency at Three Mile Island there was something less than full exchange

sls-16

of information between NRR representatives at the site and I&E personnel at the site.

A Yes, I think that is a fair characterization. At the time I arrived at Three Mile Island there were a fair number of people from I&E and a fair number of people from NRR. I don't know what these numbers were precisely, but I would guess that they numbered in the twenties or so for each organization.

There was a certain amount of duplication of effort. There were a number of people from NRR who were attempting to get operational information from the control room, and I&E was attempting to get that same kind of operational information.

There were people from NRR who were looking for radioactive material numbers, that is what the concentration of certain isotopes might be in this sample or that sample, and there were I&E individuals attempting to get the same kind of information.

So, from that point of view there was duplication of effort.

I think there also were some occasions where I&E assumed that NRR was taking responsibility for a certain function. NRR assumed I&E was taking responsiblity for that function. And as a result, nobody was actually watching it for a period of time until it was realized that that was the case. Those things did happen, and I think there was a period of time when

it wasn't really clear who was in charge of the NRC contingent at Three Mile Island.

Q Let me go back, if I may, to the Sternberg memorandum of March 31, '78 dealing with the incident at Three Mile Island the day before.

This is the memorandum that we referred to before. Do I understand it correctly that the response from your office to this memorandum was that NRR had considered the components and particularly the pressure operated relief valve and its back-up valve, and considered that an adequate and safe assembly?

A Yes. It is my understanding that NRR had reviewed the matter and that they considered this an acceptable design.

Q Now, what I'm driving at, is your office in effect deferred to the NRR preconception of that design?

A I am not sure that I would agree with that characterization. What we agreed with was the material that was written in the final safety analysis report which describes situations in which that valve would fail in the open position and it was recognized that that valve could fail in that open position, but that was an acceptable design.

Q Is this per chance a kind of reverse rivalry that is going on where your office didn't do an independent study of the problem but accepted the FSAR analysis?

A No, I don't believe that is the case. I think that

sls-18

there is a clear separation between the responsibilities of the two offices, as I see it in general terms, at least. The Office of Inspection and Enforcement's role is to ensure that the rules and regulations of the Commission as set forth in 10 CFR 50 and as amplified by the technical specifications that are issued for each plant are adhered to by the licensee.

The Office of Nuclear Reactors Regulations' responsibility is to review the application for license which includes a review of the design of the plant and a review in general of the intent of the utility as far as their plants were operating the plant.

The review of detail procedures is one that has been the responsibility of the Office of Inspection and Enforcement. So, I think there are those divisions, and this is a case where the matter that was in question was one of design which is an NRR responsibility for review and not an I&E responsibility.

Q Looking at the third paragraph, there seems to me to call for something more than design of the specific plants at TMI, but rather a review on an expedited basis, and I'm quoting,"for B&W facilities in general and Three Mile Island in particular." Was the response intended to say that B&W designs in general were satisfactory under that standard that you just suggested?

A I think that I would not suggest that the total

sls-19

design necessarily was satisfactory, but we are really only questioning the design of this one valve. Is it okay for this valve to fail in the open position, and I think the answer is yes. It is okay for this valve to fail in the open position for any of the B&W plants.

Q In hindsight, would you say that that is still true?

A I would still say that is true providing the responsible and proper actions are taken in other areas. The fact that this valve failed in the open position of itself did not create the Three Mile Island event. There were at least --

Q There were concomitant actions and other elements of the plant that did contribute to it; that is correct.

A Well, what I was going to say is that there were a number of events, if you will, rather than a single event that contributed to the final situation that occurred at Three Mile Island. I think that it is fair to say that in our requirements and in our philosophy, we do not require and never have required, and it would be very foolish of us to try to require that every piece of equipment, every component in the plant always absolutely functioned correctly without fail. We have to recognize that there will be failures, and this is a case where we will recognize, yes, this valve may fail in the open position, however there are at least two other actions that can be taken to prevent that particular event from becoming

sls-20

a real problem.

One is to recognize that the valve is open, which the operators were not capable to do at Three Mile Island for whatever reason.

Q Were at Davis-Besse?

A They did recognize it at Davis-Besse albeit some 20 minutes late, but that was soon enough.

BY MR. HEBDON:

Q If I could interrupt, that was soon enough due to a large extent to the fact that they were at such a low power rate.

A So be it. I don't know what the exact timing would be, how long you've got.

Q Well, they left it open for about 20 minutes, and they had one effect of full power a day at the plant.

A As I understand the situation at Three Mile Island, if they had closed that valve within 20 minutes they probably would not have had the trouble, either. But I am not sure of that.

At any rate there was that possibility to close the valve. The second possibility, of course, was to allow the high pressure injection system to continue to operate. And again, some other signals suggested to the operators that we are putting too much water in, we ought to stop it. That was an erroneous assumption.

sls-21

So, the point that I make is, yes, individual components are going to fail and we try to decide to have something that is going to take care of the situation in the event that failure does occur. And indeed, these things did exist. They were misinterpreted where other circumstances were misinterpreted, so they did not get used like they should have been, but they were there.

MR. FOLSOM: Thank you.

BY MR. HEBDON:

Q Do you have any additional things to add?

A No, sir.

MR. HEBDON: Do you have any additional questions?

MR. FOLSOM: I can't think of any at the moment.

MR. HEBDON: I have no other questions. Thank you very much.

End t-6

(The proceedings were adjourned at 11:45 a.m.)