GPU 6034

Designations from the NRC Special Inquiry Group Deposition of Joseph J. Kelly, dated October 2, 1979

9:1 - 9:20

9:24 - 10:5

10:15 - 10:23

11:6 - 11:8

14:19 - 16:4

16:10 - 17:18

18:19 - 18:24

18:25 - 19:7

19:9 - 19:18

19:22 - 21:12

21:15 - 22:19

23:14 - 23:25

25:2 - 25:9

29:11 - 30:21

31:9 - 31:21

32:25 - 33:12

36:5 - 36:21

37:20 - 38:4

39:9 - 39:20

42:10 - 45:7

48:3 - 48:17

49:9 - 49:12

62:11 - 63:15

63:22 - 64:5

65:19 - 65:22

GPU 6034

Q Okay. I'd like to ask you some questions concerning an incident that occurred at Davis-Besse on September 24th, 1977. I'm particularly interested in the knowledge that you had of that incident and your understanding of that incident prior to the accident that subsequently occurred at TMI.

Specifically prior to March 28, 1979, what knowledge did you have concerning the incident that occurred at Davis-Besse on September 24th, 1977?

A Well, I was detailed to go from Lynchburg to Davis-Besse and report in to the B&W employee there, our site operations manager, Fred Feist, shortly after the September 24th -- 27th?

Q 24th.

A -- 24th, 1977 incident at Davis-Besse. My assignment was to -- and his name is Fred Feist -- my assignment was to assist him in uncovering the sequence of events that occurred during that transient at Davis-Besse, and I did that.

We used -- we reduced data that was available at the plant site, reactimeter data, graphs and charts, et cetera.

Q Was it normal for you to be involved in such an activity? Was that a normal function of your job?

A That was the first time I was asked to do that.

Q Would it have been considered to be a normal function of your job to do such a thing?

A I don't believe it would be on a job description for someone in my position in Plant Integration. However, I think I was picked because of my plant experience and my recent association with Nuclear Service, and my knowledge of how plants -- B&W plants operate.

BY MR. FOLSOM:

Q What prompted sending anybody out to this particular site?

A Fred Faist asked for it.

Q He asked for it. Do you know why he asked for it?

A I think he had a great deal of data he wanted to reduce. He knew the people back here in Lynchburg were interested in the details of the transient, and he wanted help to do it.

Q What was peculiar about the transient that sparked all this, either in Feist or in the people back here?

A Well, to my knowledge, what I had heard about the transient, they had suffered a loss of feedwater and they knew that they had electromatic relief valves stuck open, and they had to blow in a ruptured disc on the quench tank and got primary coolant into the reactor building, and it was just unusual in its complexity, and he wanted someone to help him sort it out.

BY MR. HEBDON:

Q Was it usual for your particular group to send

somebody out to assist -- I think his title was a site rep?

A He was site operations manager.

Q -- following a transient, such as this, or following a transient?

A No.

Q So then it was somewhat unusual for somebody to be sent out from Lynchburg as a result of this particular incident?

A Yes.

Q Did you talk with or meet with any representatives of the utility while you were there?

A Yes, I did. I met several of them. Most of the ones I met, I just met -- socially is not the right word. I was just introduced because I was there. I talked with Jack Evans who was the plant superintendent at the time and was introduced to him.

Fred Feist was doing most of the talking. This was after Fred and I had gone through the sequence of events, and he was telling Jack, you know, what we found out.

Q What concerns were raised by the utility people that you talked with?

A The only thing I remember about that -- I don't remember any particular concerns that the utility raised. Fred and I had uncovered a few of our own we wanted to investigate, but the utility's interest was mainly in parceling out the assignments on how to recover from the transient,

BY MR. HEBDON:

Q Okay.

A I know that also because after I came back from Davis-Besse, Fred -- Feist came back with me, and Fred and I gave a briefing here at Lynchburg again. At the conclusion of that briefing, there were a planeload of people going back up to Davis-Besse from B&W to support the customer in that meeting with the NRC. That's the kind of thought process I'm going through.

Q Okay. You mentioned this meeting with the NRC. Did you talk with or meet with any representatives of the NRC?

A I didn't go to that meeting. While I was still up there -- that meeting happened after I had come back to Lynchburg. That was subsequent to that, and I was not involved. But while I was still up there, yes, I met an NRC representative, but I don't remember what his name was.

Q Do you recall what concerns he raised?

A No, I don't remember any details about it.

Q Okay. What were the concerns that you and Mr. Feist raised or developed?

A We had, after reviewing the pressure and temperature plots, and Fred had -- I think Fred had been in the reactor building, but there were such things as we knew that they had had boiling in the loops and boiling in the core, and we knew we'd have to address the question of whether there had been

any fuel damage, of whether that could have damaged the fuel with boiling in the loops.

We knew that they had run reactor coolant pumps under that condition, and we at least had to address the question of possible damage to the reactor coolant pumps. Fred had said that the steam escaping from the ruptured disc -- ruptured portion of the quench tank had knocked some insulation off the steam generator, and Fred was worried about boric acid crystallization on the exterior of the carbon steel piping, whether there was any chemical damage to the pipe. These are the types of concerns, knocking some of the insulation off of the steam generator.

Fred was worried about possible mechanical stress because of the large delta T across the steam generator. Without the insulation, the delta T is going from the 550 degrees on the inside of the loops to ambient on the outside, as opposed to what it would normally be with the insulation on it.

Fred was worried about exceeding the 100 degree per hour cooldown rate at some portion of the transient which was a design parameter not to exceed 100 degrees per hour, and that would have to be addressed.

Oh, of course, the automatic relief valve had stuck open and we were all concerned about why at that point in time.

Q Were these concerns written down anywhere?

A Oh, yes.

Q In what form?

A They were typed and entered into the site problem report on the site incident.

Q Do you have a copy of that?

MR. EDGAR: That's already been furnished to you.

MR. HEBDON: It has been? All right, we'll get that out of the file.

BY MR. HEBDON:

Q What was your involvement with the incident after you returned to Lynchburg?

A Well, as I said, Fred and I gave a briefing here in one of the training rooms down next to the cafeteria to a large number of B&W people who came to find out what had happened.

Q Do you recall the substance of that particular briefing? What sort of issues did you discuss, what sort of concerns did you raise?

A We talked about this list of concerns that we previously discussed. I went over the sequence of events as we had reconstructed it to date as to what had happened during the transient, and Fred at that time could reconstruct what had happened to the electromatic relief valve, and he went into the electrical details of a missing relay that would not seal in that valve once it was opened and keep it open.

that was the gist of the meeting.

Q Did you have any involvement with the incident after that meeting?

A Yes. I continued to reduce all these, my sequence of events and everything, into writing so it could be finalized in a site problem report.

Q And that was all included in the site problem report?

A Yes.

Q Did you receive the Toledo Edison reports concerning the incident?

A I think I -- once you mention it, I think I did, but I don't remember them in any detail.

Q Do you recall if you reviewed them at all?

A Yeah, that's what I'm saying, I think I did, because you just keyed my memory into that, I think I got their reports -- at least their preliminary reports, to the NRC, because I would use that in my own mind to help formalize the sequence of events, at least as they understood them.

Q Do you recall any of your conclusions as a result of that review?

A Well, my review was directed towards determining the sequence of events, not necessarily reaching conclusions. I don't understand.

Q Did you find the sequence as described in that report to be reasonably consistent with the sequences as you

had understood?

A I don't remember any discrepancies.

Q Do you recall if you referred any or all of that report to anyone for additional review?

A It's in the site problem report.

Q Still in the LER?

A Yeah, the LER is what I'm talking about, I think.

Q Yes, yes, the reports that were prepared by Toledo Edison, did you refer them to anyone for additional review?

A They went out to many people besides myself, I'm sure. I did not -- they were included in the site problem report, I think. I don't remember.

Q All right. I'd like to ask you some specific questions about the incident itself. You mentioned you realized that steam had formed in the reactor coolant system during the transient. What significance did you assign to that fact?

A What significance?

Q Well, trying to get a perspective on how significant that particular event is. When you found out that steam had formed in the reactor coolant system, was this something that you had fairly well expected to happen? Is it something that was very much a surprise to you? Was it a major problem that was much different than what you had anticipated?

MR. EDGAR: Answer one question -- I mean let's

pin the question down, because you got three questions right now, and just be sure we're fixing what the question is and what your answer is.

THE WITNESS: The one I heard was did I expect to see steam formation in the reactor coolant system. The answer is no, I would not expect to see it. That was a surprise to me.

BY MR. HEBDON:

Q Okay. How serious a problem would you describe that to be, or would you consider that to be?

A I don't know how to answer that. I mean in the scale of serious compared to what?

Q Well, if you take -- if you want to use a scale of 1 to 10, core is melted in the bottom of the reactor vessel, which I think would be a surprise to you on an incident such as this, and 1 being that some trivial little situation that you weren't aware of, but that had no real safety significance, where would you put the fact that boiling occurred?

MR. EDGAR: In this incident, in the context of this incident.

BY MR. HEBDON:

Q We're still talking about Davis-Besse, and we're still talking about your perception at the time, without the additional coloration of TMI.

MR. EDGAR: Not in the abstract. Looking at

Davis-Besse, did you regard that fact as significant, and if so, how significant?

THE WITNESS: Yeah, I thought it was significant because I didn't know the impact of boiling on the core and in the loops, and what effect that would have chemically or metallurgically on the fuel assemblies, for instance. I thought that was significant in my mind.

It was one of the things I very clearly pointed out during the interview -- during the debriefing, rather.

BY MR. HEBDON:

Q Is it your understanding that Mr. Feist shared your level of concern with this particular problem?

A Yes.

Q What was done as a result of this concern?

A After the formal briefing, we were all still gathered in the meeting room, and I discussed it with Bob Jones and Bert Dunn, and Bob Jones said yes, there was boiling in the core, but no, there would be no damage. That was his opinion, and he was sure the analysis would confirm it, and that put a lot of my fears to rest about the fuel problem.

Bert Jones said that he was concerned that the operators had terminated high pressure injection prematurely, in his opinion, and that he said that he could develop scenarios where they would -- I'm probably paraphrasing now, I can't quote him exactly -- where they could get into trouble

if they secured high pressure injection.

BY MR. FOLSOM:

Q Why did he consider the HPI terminated prematurely?

A I guess because they had boiling in the core, but you'd have to ask him. I didn't --

MR. EDGAR: Could we define who "him" is?

THE WITNESS: Bert Dunn.

MR. EDGAR: Did you misspeak yourself when you said Bert Jones?

THE WITNESS: Oh, did I say Bert Jones? I'm sorry, I meant Bert Dunn. There was Bob Jones and Bert Dunn I was talking to.

MR. FOLSOM: Yes, I got them confused, too.

BY MR. HEBDON:

Q So then would it be safe to say that Mr. Dunn's comments laid to rest the concern that you had about the fact that boiling had occurred in the reactor coolant system?

A At that time, yes, laid the concern -- any concerns I had about fuel damage as a result, direct result of Davis-Besse incident. In other words, I didn't think there would be any problem with it.

Q You say at that time. At some later time did your concern reappear?

A Oh, no, not with the fuel damage. What I meant was he raised another one in my mind, in this time, with regard

to securing high pressure injection.

In other words, Bert was saying that they secured high pressure injection and nothing happened, but under different circumstances they could have been in trouble, so that I was no longer worried about the immediate results of that Davis-Besse transient on the Davis-Besse plant. I was more concerned now about a similar thing happening.

Q So he replaced the one concern with another concern?

A Yes.

Q All right. Did you realize at the time that the steam formation in the reactor coolant system caused the pressurizer level to increase while the leak was continuing?

A Yes.

Q What significance did you assign to that fact?

A I -- it was obvious to me, given that now I have the reactor coolant loops in saturation and continuing in saturation, I expected the level to go up. You know, I mean the water is boiling in the core, it's got to be expanding and going somewhere in the loops.

Q Did you raise that as a concern that pressurizer level had increased as a result of this boiling in the core, despite the fact that the water continued to escape through the PORV?

A I don't think I raised that as a direct concern. There were boiling in the core -- I mean in the reactor coolant

system because they're losing -- because th POPV was open and they lost pressure control.

In other words, I would have pointed that out in trying -- I can't say I directly remember this, but normally I would think logically at the time I'd point it out that they had reached saturation conditions and level was going up in the pressurizer. But not in -- I would not raise that as a concern. That was an expected result to me.

Q So then it didn't anomalous to you that pressurizer level was increasing during the LOCA?

A I don't remember ever asking myself that question, but I also do not remember raising it as a concern, so I can only conclude that, no, it wasn't.

Q Okay. You mentioned that Mr. Dunn had raised the concern in your mind about the high pressure injection. Prior to your discussions with him, did you realize that the operators secured HPI before they identified the leak?

A Yes. Yes, that came out in sequence of events.

Q Did that cause any concern in your mind?

A No.

Q So then it wasn't until you talked with Mr. Dunn that he raised your consciousness concerning that particular issue?

A Yes.

A No, not that I remember.

Q Did you consider that any of the events that occurred during this incident had any generic implications to other B&W plants?

A With this concern that Bert Dunn raised in my mind about them securing high pressure injection, that could have been generic in my mind, yes.

Q Any other issues other than that one?

A Not that I remember, no.

Q You mentioned that you had a training session here after you returned from that particular incident. Did you give any consideration to sending information about that incident to other utilities, general information about what happened, the chronology of events that you prepared, for example?

MR. EDGAR: By training session, you mean briefing session?

BY MR. HEBDON:

Q The debriefing in the training room, yes.

MR. EDGAR: And also just to fix the time when you said did you give any consideration, at what time do you mean?

MR. HEBDON: At the time that he was involved with the actual incident, say within two to three weeks following the incident itself.

THE WITNESS: No, I did not do that.

discussing with people from the NRC their scenario or their chronology of events that they had developed following the incident?

A No.

Q Okay.

MR. HEBDON: Can we go off the record for a minute and take a break?

[Discussion off the record.]

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

BY MR. HEBDON:

Q I'd like to go on and ask you some questions concerning some memos that were written that I think have become known as the Kelly and Dunn memorandum.

Specifically for the record, this first memo is a memo from J. J. Kelly to distribution, dated November 1st, 1977. The subject is "Customer Guidance on High Pressure Injection Operation."

[Handing document to witness.]

Did you write that memorandum?

A Yes, I did.

Q Why?

A Well, as we have said, in discussions with Bert Dunn after the briefing, he had raised some doubts and concerns in my mind about whether the Toledo operators had operated correctly in securing high pressure injection during

that transient.

I talked some with my supervisor after that, to the best that I can remember, Eric Swanson, and we didn't do anything about it at the time. During my investigation, as I said, I was formalizing these curves and submitting information to Nuclear Service for the site problem report.

I was in communication with Fred Feist who was back at Toledo fairly often during this period of time, over the next few weeks after the accident, and he told me one day that they'd had a second incident where they lost feedwater and Fred told me at this time the operators did not let high pressure injection initiate. They had bypassed it before it would even initiate.

Again there were no consequences directly to Toledo from that incident, but then to my mind I had two incidents relatively quickly in succession where it was not clear to me that the operators were operating the high pressure injection system correctly.

Q Excuse me. Do you recall the date of the second incident?

A October 23rd, 1977.

Q Okay.

A So I talked about that one again with Eric and said, "I think we ought to do something about it," and Eric said, "Write a memo." And Eric advised me at the time, he

said to put down my feelings on when they should secure high pressure injection, and I did that in the memo, and then ask for comments.

In other words, I was trying to give these people something to comment on, rather than just say create some rules for high pressure injection, I was giving them something to aim at, and I sent this out to distribution and expressed my concerns about high pressure injection.

Q Was it a normal part of your job to prepare such a formal memorandum?

A I felt responsible for preparing it in the sense that I'm a B&W employee, and I felt that this was an area where we ought to -- where we may not be -- we're not being specific enough to our customers. So from that respect, I would say, yeah, it was part of my job, because I was a conscientious-thinking engineer, and I thought something was not, you know, going the way I thought it ought to, and I wanted to bring it to management attention.

If you looked at the job description for Plant Integrator, I don't think this would show up.

I don't know if that answers your question or not.

Q So then would it be fair to say that the subject of how the operators are operating the high pressure injection system would not normally fall within the purview of the group that you are assigned to?

A That's correct. That's not Plant Integration's job.

Q What group would that come under?

A To my mind -- and you're getting my opinion -- it's got to be the Nuclear Service who is giving the instructions to the customer and/or Emergency Core Cooling Systems, ECCS, who has -- who were putting the design information into what the high pressure injection system had to do, anyway.

Q But the people that you sent that memo to, who on that list is in Nuclear Services?

A Don Hallman and Norm Elliott, and at the time Ron Finnan was.

Q Okay. And who in that group was in the ECCS Analysis Group?

A Bert Dunn. He's the manager.

Q All right.

BY MR. FOLSOM:

Q Before we leave this subject, will you get me off the hook and tell me how it was that the October 23rd, '77 incident was resolved without further complications, despite the fact that HPI was secured before -- prematurely? Do you recall?

A I can't answer that.

Q Okay.

BY MR. HEBDON:

Q What were the concerns that you had with the

operator securing the HPI when they did secure it?

A I didn't understand technically what Bert Dunn was talking about, but I know Bert Dunn and I was convinced that he probably knew what he was talking about. And I'm not trying to be sarcastic, I'm trying to lead into my thinking.

I felt that if Bert said that there were situations where they could get in trouble by securing high pressure injection early -- now I had just gotten two examples, one from September 24th and one October 23rd, 1977, where they had apparently done that -- then I had Bert's concern reflected in me, and I said I'd rather bring this matter out and get some attention on it.

That's where my motivation --

Q So then the technical basis for the concern really originated with Bert Dunn?

A Yes.

Q And then you were just reflecting your perception of his concern?

A Yes.

Q Now you sent the memo to a list of people. Why to those particular people?

A Go down the list. Bruce Karrasch is my unit manager. I send him a copy of everything I write.

Eric Swanson is my supervisory engineer, and he and I had talked about this a few times, and so I wanted him

Q All right. When you wrote the memo, did you consider the potential problems associated with going solid or with water surges through the relief valves?

A No.

Q What was done as a result of your memo?

A I got an answer to this, one answer, it was from Frank Walters. I read Frank's memo and his answer to mine. Frank's memo was confusing to me, and he was talking about, to me, when I read the thing, he said that the Training Department that Toledo Edison had acted correctly, and I went down and I talked to simulator instructors about what they were teaching -- these are Norm Elliott's people.

Q Excuse me. Do you recall specifically who you talked to?

A Yeah, Harry Halmer was there, and John Lind, and there were probably one or two others, but I can't put the faces to them, and we went over the September 24th Davis-Besse incident, the sequence of events as I understood them at that time, and Harry and John Lind both said that they didn't understand why the operators would react that way; that they were not trained to do that.

Q Let me clarify this just a little. I'm a little confused.

They said that they disagreed with Mr. Walters' statement that the operators were trained to respond in that

way?

A No, I didn't -- I don't think I mentioned to them that Frank had answered my letter. This is Frank's confusion that I kept to myself. I just wanted to go in there and try to get an unbiased opinion from them about what they thought was going on.

Q Okay. Did they express the opinion that the operators responded correctly, or did they say the operators responded incorrectly?

A No, they said the operators responded incorrectly from the way they had been trained.

Q Did they give you any specifics as to how they thought the operator had responded incorrectly?

A They said that they should not have turned high pressure injection off unless they had primary temperature stabilized and primary pressure increasing and pressurizer level in the indicated band.

I don't remember the exact words about pressurizer level, but under control is what they mea..

Q So then it was your understanding they felt that the operators did secure the high pressure injection prematurely, based on how they were trained?

A Yeah.

Q All right. Did anyone else give you any sort of feedback or response in result to your memo?

A No.

Q Did you make any efforts to obtain additional information from any of these people?

A No.

Q Did you call any of them to ask if they'd had a chance to take a look at it, and if so, what their comments were, or anything to that effect?

A No. I didn't expect Bruce Karrasch to answer it. I got the letter from Hallman -- from Frank Walters, so that would take care of Finnan and Hallman.

I knew what Bert Dunn's feelings were.

Danny La Belle didn't answer, and I just assumed he didn't have anything to say.

When I got Frank's reply, and after talking to the simulator instructors, then my concern was that I was convinced that we were teaching the right thing in the simulator, but I wasn't convinced any more that we were putting the right words out on paper. I didn't know what we were putting out, so I told the simulator instructors that I was going to -- now maybe -- you know, as I'm going over that, maybe I talked to the simulator instructors before I wrote this and before I got Frank's memo.

You know, that's the first time that popped back into my mind. I don't -- I'm confused on the dates now as to whether I talked to the simulator instructors before or

after I got Frank Walters' memo.

Q Okay.

A But in any case, I was convinced that we were teaching the right thing, and I wanted to make sure we were putting the right words out. Okay? So that's -- maybe that makes sense to me. I must have talked to them before I wrote this, before November 1st, I must have talked to the simulator instructors.

Q Okay. You said that you wanted to make sure that you were putting out the right words. What did you do to make sure that you were in fact putting out the right words?

A That's what convinces me that I did that before I wrote this memo.

Q Did you check to see what guidance, what was being given?

A No.

Q Did you have a copy, for example, of the procedures that B&W provides to the utilities?

A No. I could have gotten them, they were in Nuclear Service, but I didn't check them.

Q Now you got a response from Mr. Walters, and I guess from what I understand, you didn't expect a response from any of the other people. What did you do next?

A Went to talk to Bert Dunn and told him that Frank Walters was the only response that I had gotten; that I was

A I don't think I knew why he sent it to Mr. Taylor.

Q Why didn't you send your memo to Mr. Taylor?

A I thought that the -- the people concerned were the Customer Service or Nuclear Service Department who handled the guidelines, and ECCS, who had the original concern. I didn't think of sending it to Mr. Taylor.

Q Could it have been that it was sent to Mr. Taylor because of the possibility of Part 21 implications?

A Bert Dunn could answer that.

Q Okay. Did you at any time in the course of your involvement with this incident consider the possible Part 21 implications of the incident -- of this particular concern?

A No, I never considered putting it on a preliminary safety concern report to turn it in.

Q What was done as a result of Mr. Dunn's memo?

A Well, about a week later, a second memo came out from Bert Dunn on February 16th, which you just handed me, and again I got a copy of it because I was on distribution, and from reading it, it says that -- the contents said to me that Bert Dunn and Nuclear Services had worked out their differences of what the guidelines should say, and what should be issued to the customer; that they were in agreement because Bert Dunn says, "I find this as acceptable from the standpoint of preventing adverse long-range problems."

So when I read the second Bert Dunn memo, I thought

the problem was resolved; that there was agreement reached between ECCS and Nuclear Service, and that Nuclear Service would subsequently generate whatever words had to be put out to the customer.

Q Now specifically what differences are you referring to?

A Well, I don't know what the difference -- what concerns that Field Service had when they came to Bert Dunn as a result of this first memo, okay? My point was that reading the second one, Bert is saying that he and Field Services worked out their differences, and he reached this conclusion here as he presents it in the second memo.

Q Would these concerns have been the concerns that Mr. Walters had raised in the memo that he wrote to you?

A I assume that. I assumed that that was part of it, that no one had any more problems with it.

Q So then it was your perception -- I realize this is a perception only -- that the concerns that Mr. Walters had had and the concerns that Mr. Dunn had had, had been resolved to some sort of a mutually-acceptable solution?

A Into these two paragraphs that he states in his February 16th memo, correct.

Q What did you expect would then be done?

A Well, as I said, I thought that Nuclear Service would go ahead and issue appropriate instructions to the

customers, that they had to.

Q Do you know if those instructions were ever issued?

A I think they were sent out after TMI 2, we sent out the high pressure injection memo station instructions, but again I don't think I ever saw them, even to today.

Q But prior to the accident at TMI 2, it's your understanding that the instructions were not sent?

A Prior to TMI 2, I was acting personally under the assumption that they were sent, but that was only a perception as a result of this memo here from February 16th. I never saw anything again after this until after TMI 2.

Q Just as a matter of timeframes and the rate at which things normally progress through the system, would it have been surprising to you if it had taken to, say, the middle of April '79 to get out the instruction to the utilities?

A Based on this February 16th, 1978 memo, that would surprise me.

Q Do you have any idea why the instructions weren't sent?

A Are you asking me what I learned since TMI 2, now, or what I knew before TMI 2?

Q Well, let's do what you knew before TMI 2 first.

A No. As I said, I thought they were sent, acting on what I believed -- this happened -- I thought it would generate through the mechanics and send them out the door, and

I didn't worry about it any more.

Q Okay. What have you learned since TMI 2?

A Apparently this did not address all of Nuclear Service's concerns, and there was another memo written. Don Hallman wrote a memo to Bruce Karrasch on August 3rd of 1978, asking Bruce as manager of Plant Integration to resolve the differences between Nuclear Service and ECCS.

Q You did not receive a copy of that memo?

A No, I didn't know about that memo until after TMI 2.

Q What was your understanding again after TMI 2, what was your understanding of the concerns that remained to be resolved?

A From what I've learned from Frank Wilters after TMI 2, they were concerned that these instructions that Bert proposed in his February 16th memo were too restrictive, in that there could be non-LOCA events causing initiation of high pressure injection that could subsequently, if the operator followed these instructions, fill the reactor coolant system solid and challenge the primary code safety valves.

Q Okay. Have you ever discussed any of this material with anyone from the Nuclear Regulatory Commission?

A Anything we've talked about today?

Q Yes.

A Let me tell you what I'm thinking of. One of my earlier interviews has been with a Mr. Shackleton and

information in the course of that review?

A Operational information?

Q Operational experience. Somebody sent over a procedure for you to review, is there any way that you can incorporate in that review operational experience from plants that have already been in operation? Or would your assessment be strictly in engineering?

A Our assessment would be engineering, unless, as in my own case, for instance, I happen to know of something operationally. If anybody feeds in the plant operational experience, it has to come from the Nuclear Service side. They are the ones that handle all the site problem reports and disposition of all those.

Q Were you ever asked to review any procedures that were relevant to the incident that occurred at Davis-Besse on September 24th?

A No.

Q To your knowledge, who in B&W is responsible for preparing standard technical specifications?

A Technical content of the technical specifications are farmed out to appropriate organizations, such as fuel, thermohydraulics, ECCS, technical specs, fuel management for rod position specifications, and to my knowledge, I believe that's coordinated for standard technical specifications by Licensing, but I'll admit that's just a feeling I have. I

don't know whether that's true or not.

Q Is that an area that your group gets involved with?

A Eric Swanson's group does not, no.

Another mini-subsection of Bruce Karrasch's Plant Integration, I believe, does get involved with technical specifications.

Q Are you part of that subsection?

A No, I'm Eric Swanson.

Q To your knowledge, who in B&W reviews the actual procedures developed by the licensee to see that they are consistent with procedures proposed by B&W?

A To my knowledge, that's not done.

Q You mentioned the concerns that you had had about the premature securing of high pressure injection, and I think Mr. Folsom may have touched on the subject a little bit already.

Are you aware that the Davis-Besse small break procedure was subsequently revised to include precautions designed to prevent premature securing of high pressure injection and to alert the operators of possible failures of the PORV?

A No. If you asked if I was aware of that.

Q That's right.

A No.

Q Do you know if that change was ever reviewed by

the perspective of solving the problem or more from the perspective of just being aware that it happened?

A Both. In the answer to your question, I was -- we get the review and Plant Integration site problem reports from the aspect of incorporating it into any futu e design or incorporating it into our newer design.

Q So then you do make some effort to take these site problem reports and feed back that information into subsequent designs?

A Yes.

Q Okay. In the area of plant integration, what is your perspective of the operator as far as how the operator is integrated into the plant? Do you consider the operator at all as a subsystem of the overall plant?

A I guess if you're talking about before Three Mile Island, the answer is no, the whole system design philosophy is to try and minimize operator involvement and get him out of the picture as much as possible.

If you're talking about currently, there has obviously been a great recent emphasis on operator involvement in getting him into the design of the plant, and I am running a program now on abnormal transient operating guidelines as a result of NUREG 0578, where we are taking a possible plant malfunction and operator malfunctions and equipment malfunctions, and categorizing these and logically developing

event trees, and then we are eventually going to develop guidelines and give the operator not only operating guidelines, but also the basis and expected plant response, so that we can close the loop between the engineer, the analyst, and the safety analysis guy who analyzes the transient with computer codes, and knows why he needs to have a certain safety function. We want to reduce that to words and give them to the operator so he can study them and have a greater understanding of why he is being asked to do a certain thing. We ask now there is a lot of emphasis in our organization in closing the loop between the engineer and the operator.

Q Was that sort of work done prior to Three Mile Island?

A No.

Q Do you know why it wasn't done?

A In my opinion, as I said, I thought it was just a different philosophy. We're trying to design the system to preclude any necessary operator action.

Q Do you know of any other --

BY MR. FOLSOM:

Q Let me ask a question, following up on something Mr. Hebdon asked about integration of experience from the industry into design variations.

Do you find any pressure not to vary designs from

the way that the NRC scheme is set up?

A You find pressure to minimize design changes that cost money.

Q From what source does that pressure come?

A It comes from my supervisors.

Q Okay, from the industry side, then, I'm talking now about NRC, its philosophy of supervising the industry, does that philosophy tend to minimize design changes?

A To minimize design changes?

Q Do you understand what I'm driving at?

A No, I don't think before Three Mile Island, the NRC's emphasis has always been to design a system and change the design of the system as necessary to preclude any operator action, to get the guy out of the whole picture, following up with what he's saying. That's been their emphasis that I can see.

Q Well, quite apart from operator action, the engineering design, is that -- does that tend to become stereotyped because of NRC pressures?

A I haven't seen it, but I don't get involved with them that much.

Q Okay. Thank you.

BY MR. REBDON:

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

MR. EDGAR: Do you understand the term precursor?

THE WITNESS: Precursor, the only time I've heard the word used is in nuclear reactions.

BY MR. HEBDON:

Q Well, let me define it, because I think we may be using it a little bit differently than it's defined in the dictionary, anyway.

Precursor, in the sense of what I mean here, is any sort of an event or an action that would have given some indication or some forewarning that an accident such as TMI might happen some day.

Your memo is considered to be a precursor. The Davis-Besse incident would be considered to be a precursor, and what I'm wondering is if you know of any others that we haven't discussed.

A That I would consider precursor events to this thing? No.

BY MR. FOLSOM:

Q Does the Michaelson report strike a responsive chord?

A I have heard of it, I have never read it, I've never had any dealings with it.

BY MR. HEBDON:

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