COPY

Transcript of Proceedings

UNITED STATES OF AMERICA

PRESIDENT'S COMMISSION OF THE ACCIDENT AT
THREE MILE ISLAND

DEPOSITION OF: BEVERLY W. WASHBURN

Washington, D.C.

August 29, 1979

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CERTIFICATE

I certify that I have read this transcript and corrected any errors in the transcription that I have been able to identify, except for unimportant punctuation errors.

Date: October 2, 1979 Beverly W. Washburn

Beverly W. Washburn

UNITED STATES OF AMERICA

PRESIDENT'S COMMISSION ON THE ACCIDENT AT THREE MILE ISLAND

DEPOSITION OF: MR. BEVERLY W. WASHBURN

Room 714
2100 M Street, N.W.
Washington, D.C.

Wednesday, August 29, 1979
1:00 p.m.

APPEARANCES:

On Behalf of the Commission

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I N D E X

DEPONENT	DIRECT	CROSS
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E X H I B I T S

Exh. No.	Description	Received
1	Resume of Mr. Beverly W. Washburn	3
2 (To be provided)	Question and response regarding operator action and procedures re safety features termination	68 (identified)

P R O C E E D I N G S

WHEREUPON,

MR. BEVERLY W. WASHBURN

the Deponent, was duly sworn and was examined and testified as follows:

MR. HELFMAN: Would you please state for the record your full name?

MR. WASHBURN: Beverly W. Washburn.

MR. HELFMAN: I see you brought a resume with you, Mr. Washburn. Would you hand it to me?

Is this resume an accurate summary of your employment and educational experience?

MR. WASHBURN: Yes, Sir.

MR. HELFMAN: I'd like this marked as the first exhibit to the deposition.

(WHEREUPON, the document referred to was marked for identification and received as Exhibit 1 to the Deposition.)

MR. HELFMAN: Have you ever had your deposition taken before?

MR. WASHBURN: Once.

MR. HELFMAN: Was that in connection with your work?

MR. WASHBURN: A patent case.

MR. HELFMAN: Let me describe to you very briefly

some of the characteristics of the deposition that we are going to take today.

Since your testimony is sworn, it will have the same force and effect as though you were giving it in a Court of Law, even though the deposition is being taken in the relative informality of an office here at the President's Commission. For the benefit of the Court Reporter it is necessary for you to wait until I've completed a question before you commence an answer even if you know where the question is going because it is difficult for the reporter to pick up two people speaking at once, and for the same reason it is necessary that you give verbal answers rather than gestures so that she can pick this up and make it part of the record.

It is also necessary for you to try to be as accurate as possible today with your responses. Although you will have an opportunity once the deposition is reduced to transcript form to make any corrections that you deem necessary, if those corrections are substantial, they could adversely reflect on your credibility. So, therefore, accuracy today is very important.

It is our custom at the conclusion of the deposition to recess it rather than adjourn it. In the event we have any further questions to ask of you, we simply reconvene the deposition and continue. It hasn't happened yet, and we do not anticipate doing it, but you should be aware that we maintain

that option.

Do you have any questions about any of the foregoing?

MR. WASHBURN: No.

DIRECT EXAMINATION

BY MR. HELFMAN:

Q Who was your employer in 1974?

A Los Alamos Scientific Laboratory.

Q Where is that located?

A Los Alamos, New Mexico.

Q What were your duties there?

A I'm a staff member.

Q Are you presently employed at Los Alamos?

A I am presently employed at Los Alamos.

Q What type of duties did you perform when you were at Los Alamos?

A I have worked in a variety of technical fields at Los Alamos--the nuclear rocket program, the gas laser program, the reactor safety program.

Q Who were you employed with in 1975?

A Los Alamos Scientific Laboratory.

Q Same employer?

A Same employer.

Q At some time during 1975 were you assigned to the NRC?

A I was assigned to AEC Regulatory in 1973 which in

the Energy Reorganization Act, I believe, became NRC at the beginning of 1975. So my assignment was with both agencies.

Q When you were assigned to AEC, was this a somewhat unusual event?

A AEC Regulatory in 1973 had sought outside temporary help to handle the licensing of a number of applications that they had and they expected to receive at that time. I was one of a number of persons loaned by the laboratories to the Regulatory Division of the AEC.

Q Were there a large number of people who were loaned to AEC at that time, do you know?

A My recollection is that the number was between 65 and 100.

Q Did they all come from Los Alamos?

A Approximately 20 people, I believe, came from Los Alamos; the remainder from other laboratories.

Q When you were assigned to the AEC, did you come to Washington? Did you physically change the location of your work?

A That is correct. Work was in Bethesda.

Q What particular branch with the AEC were you assigned to?

A It was the Regulatory Division, as I recall, and under that I was in the Licensing Division.

Q What role did you perform for the AEC within the

Licensing Division?

A I was licensing project manager for Three Mile Island Unit II during the time I was assigned here.

Q Was that the only plant for which you were responsible?

A That was the only plant.

Q And that responsibility commenced in 1973?

A 1973.

Q When did that end?

A June 1975.

Q And the agency at that time was the NRC?

A That is correct.

Q What was the branch or division at the time it was NRC?

A I believe it was LWR2-2 in reactor projects.

Q Is that somehow connected with the department of project management or the division of project management?

A That would be, yes.

Q And who was your immediate superior at the time that you were working for NRC?

A Karl Kniel was the branch chief, and Voss Moore was the AD.

Q Assistant Director?

A That's correct.

Q What training, if any, were you provided, prior to the time you assumed the responsibility of the project

manager?

A At the time I came here I had the experience with the Rover nuclear rocket program as a background, and in 1973 after being assigned to NRC I attended -- back up. Instead, it was AEC at that time. I attended a two-week given by Westinghouse, a short course version of the training program that they give to operators. This program was conducted for people from Regulatory, mainly people from I&E but a few people from Licensing attended.

Q Was this basically voluntary on your part, or were you assigned to attend this course?

A I was asked, I believe, if I would like to attend and I took advantage of the opportunity.

Q Was this designed to train you in what a project manager does?

A No. This course was directed at the Westinghouse light water reactor system.

Q What prior experience or training did you have for the role of project manager?

A This was my first experience with a light water reactor. My previous experience, as I indicated, was with the Rover nuclear rocket program in 1960 to 1970, approximately.

Q Did you serve as a project manager on that project?

A I was responsible for a number of things in the facilities and the operations in that program, and I was

a participant in other areas.

Q Was there a project manager for the rocket program?

A We had a test director and a test group leader and then people with particular responsibilites or job assignments under that. There were some section leaders, which I was one for a while when I was in Nevada where the facilities are.

Q You have some coordinating experience as a result of that, I assume?

A Considerable.

Q With respect to being project manager at TMI-II, would it be accurate to say that you learned the function on the job?

A The specific concept of the designs of light water reactor plants was new to me and this was another situation of learning.

Q While you were doing it?

A While working.

Q The TMI-II facility is not a Westinghouse plant, is it not?

A That is correct.

Q Were you given any training on the B&W system prior to the time you assumed these responsibilities or was it confined to this brief training course on Westinghouse light water reactor?

A The formal work was strictly with the Westinghouse

plant.

Q And your familiarity with the B&W design, did that come about as a result of your actually working on the TMI-II project?

A That is correct.

Q Could you describe briefly what the responsibilities of a project manager are?

A The project manager at Licensing was responsible for the overall management including technical and administrative coordination of the review and evaluation of the applications.

Q It was basically a coordinating function? Would that be accurate?

A Much of it was coordinating, but there were areas where information needed to be exchanged and differences resolved between the applicants and the technical review staff and it was necessary, then, to get these people together and have some agreeable conclusion arrived at in these areas.

Q As project manager, were you responsible for resolving disputes between the applicant and the regulatory agency?

A I regarded it as part of the work to try to get these matters successfully resolved without having the application go to hearings with open items or having appeals, this sort of thing, to higher management.

Q Were you successful in that regard in every case?

A I can't answer that precisely because the review was not over at the time I left and there may have been some issues, and I believe there were, that had not been satisfactorily resolved, and there may have been other issues that came out of things that were not resolved or still open at the time I was there. But there were a number that, I believe, did get resolved to the satisfaction of the staff.

Q At what stage was the TMI-II license application when you were assigned to TMI-II? Was it at the construction permit application stage?

A That is correct. They had the construction permit. Construction was underway.

Q They already had their permit?

A They had their permit at the time I was assigned on this project.

Q Was there a predecessor project manager?

A Yes.

Q Do you happen to recall the name of the person?

A I can't be sure but I would mention Hans Scherling; he may have had it briefly before I had it.

Q How would he spell his name--S-h-e-r-l-i-n-g? Does that sound --

A You'll have to resort to the telephone book. I believe it is S-c-h-e-r-l-i-n-g.

Q When you took over the project, what coordination

effort did you make with him so as to become aware of what had gone on prior to your involvement?

A As I recall, he gave me a few papers and copies of letters between the applicant and Regulatory, but mainly I got up to speed in this area by reviewing the docket file from the time the application came in through the construction permit review and ACRS letters and open items and the SER at the CP stage. I do no believe the previous licensing project manager had the project very long prior to my getting it.

Q Is it your feeling that there was a project manager involved prior to Mr. Scherling's involvement?

A There were several.

Q Seriatim?

A Several.

Q Do you happen to know the names of any of those persons?

A Robert Tedesco, I believe, was one; and Brian Grimes comes to mind as another possible project manager.

Q Is it unusualy from your understanding for a project to have so many project managers?

A My understanding is that some projects have more than others.

Q Is it uncommon for a project to have a single project manager that follows it from beginning to end?

A I believe there are cases where there has been maybe

one project manager or not more than two throughout the licensing phase.

Q In your opinion does it create any difficulty in managing a project if there are numerous project managers who are with a project for a short period of time and then turn it over to another project manager who then turns it over to another project manager, and so on?

A In principle, that could be a real problem. May I say what I did when I turned it over?

Q Yes.

A All my notes and records were turned over to my successor, and --

Q Who was he, by the way? Let me interrupt for a moment.

A Harley Silver. In addition, I recall having written a status of all the open items and items that needed further review and so, in my opinion, so that he would not have to search for these items.

Q The way you had done?

A The way I had to to start with.

Q So this was basically a procedure that you developed yourself to facilitate the transfer?

A I thought it was appropriate to pass this information on.

Q Did Mr. Silver have any direct contact with you at

the time the transfer took place?

A Well, our offices were next to each other and we ate lunch together frequently, so we had a lot of contact.

Q Can you recall if you discussed the transfer of TMI and the status of TMI at the time it was transferred to Mr. Silver?

A Well, other than explaining to him my filing system--I maintained a subject file and a chronological file--and where these things were, records of my discussions with the applicants, and so forth, I believe that was about it; nothing formal except giving him my lists of the status of the open items, items that maybe had been addressed and resolved at that point.

Q You mentioned earlier that you reviewed the records of some ACRS hearings. Were any ACRS hearings conducted while you were project manager?

A No, Sir.

Q Were any public hearings conducted?

A The last action, next to the last action on my part here was to attend a pre-hearing conference the 22nd of May, 1975 in Harrisburg. That was the status of the review and hearings.

Q And this pre-hearing conference was attended by whom, besides yourself?

A Harly Silver was in attendance. The attorney from

OGC whose name I can't recall; he was assigned to this application.

Q Were any intervenors present?

A I believe they were.

Q And I assume that you left NRC prior to the actual holding of these public hearings. Would that be accurate?

A That is correct, yes.

Q Were you present at the time the intervenors presented their complaints or their issues?

A May I ask: presented to the board?

Q They were filed with NRC?

A Yes, they were filed during that time that I was project manager.

Q Did you have any responsibility with respect to the issues raised by the intervenors?

A Yes.

Q My recollection is that the intervenors raised thirteen (13) separate points regarding the TMI license application, one of them involving inadequate radiation monitoring devices. Does that ring a bell?

A I don't recall specific details.

Q Do you recall specifically any of the complaints that were raised by the intervenors?

A I think in the initial meeting that I had with them they raised the question of pressure vessel rupture, for

example.

Q Yes, I recall that being one of them as well. And the effect this might have on ECCS?

A I don't recall that detail.

Q Do you recall a complaint raised by intervenors regarding lack of emergency preparedness, evacuation plans, the holding of drills, and so forth?

A I believe there was a point raised in that area.

Q What responsibility did you have with respect to the intervenors' complaints?

A When they submitted, following their submittal of these points, or whatever they are rightfully called at that time, to Licensing, I had a meeting in Bethesda with the branch chief and Chauncey Kepford and a lady that was a member of the group--Elizabeth, I believe, something; I don't recall her name.

Q One of the intervenors?

A Yes. Kepford and this lady represented the intervening group.

Q And the branch chief at that time would have been Mr. Kniel?

A Karl Kniel.

Q And what was discussed at the meeting?

A We discussed these issues raised by the intervenors, and sought to give them the status and the Licensing opinion

about these issues. We provided them, then, with documentation, background, from what had been done in these areas, what was being done.

Q Did you have any responsibility for these background materials or the background steps that had been taken?

A Not the details. My responsibility was to see at that point that the intervenors were informed as to what had been done and what was being done on these issues.

Q And what had been done and what was being done were things that had been done and were being done by persons other than yourself, is that correct?

A That is correct, yes.

Q Was there an attempt at this meeting to come to some sort of a resolution on the intervenors' claims?

A That would be ideal, of course; but as I recall several of these issues tnat they originally raised, either at that meeting or subsequently, they were satisfied perhaps by what was being done. This did not clear up all the issues.

Q Did these issues remain open at the time you left NRC?

A Yes. They remained open for the hearing process, as I understand it.

Q And the hearings were actually held after your departure?

A That is correct.

Q Did you attend those hearings?

A Only the prehearing conference in May of '75.

Q Normally, what would be the role of the project manager at the public hearing?

A The public hearing for licensing, as I understand it, having not been through it, is conducted by the attorney on the staff of Licensing. The project manager there is to provide information or testimony as necessary on these issues.

Q Did you brief Mr. Silver prior to any testimony he may have given at these hearings?

A I can't say that specifically that the information that I turned over to him as background and status fully covered the details of the intervention on the application; but prior to may departure he had had a meeting with the intervenors on my behalf because I had other commitments and could not attend. So he started out with the intervenors at that point, also prior, I recall, to this prehearing conference.

Q I see. Had you met with the intervenors without Mr. Silver being present prior to the prehearing conference?

A When the issues were originally filed, as I indicated, yes. Mr. Silver was not known to be my replacement at that time.

Q You mentioned a moment ago that when you assumed the position of project manager for TMI, you reviewed the records of the ACRS hearings. Do you recall what, if any, open issues,

safety issues were raised by the ACRS and had not been resolved by the time you assumed your responsibilities?

A Pump fly wheels, hydrogen generation.

Q Hydrogen generation?

A In the containment, as I recall.

Q Was there concern about hydrogen generation in the pressure vessel?

A I don't recall that ever being addressed.

Q Do you recall whether any concern was addressed regarding operator reliance on pressurizer level as an indication of core level?

A I don't recall any discussions in that area.

Q Were any questions raised by the ACRS concerning the inability to vent gas trapped in the steam generator side and its possible effect on natural convection in the B&W design?

A I have no recollection of that.

Q Do you recall whether there were any issues raised regarding PORV, the function that it serves and its reliability in the B&W design?

A Again, I have no recollection of this being addressed.

Q How about containment isolation by single parameter; was that raised?

A Containment isolation was a problem with this application in general. The specific event or condition that

initiated it, I have no recollection of the depth of which that was considered or reviewed. But the isolation itself, indeed, was a problem.

Q Was this raised in the context of the ACRS hearings?

A You mean the isolation feature?

Q Yes.

A Well, would you like me to explain that to you or just say no?

Q Well, say no, and then feel free to explain.

A My recollection here was that when the TMI-II design was originally submitted for the construction permit, it was a plant that they had intended to locate at Oyster Creek, and during the review on the construction phase the utility, the applicants elected to move that design to TMI where TMI-I was in some planning and licensing phase. So my recollection here is that the special feature had been proposed at the construction phase of TMI-II wherein not only were the double isolation valves to be provided in the lines that required isolation, but there was also to be a fluid blocking arrangement here to provide additional insurance that there would not be leakage when the containment was isolated.

When the applicants came in for the operating license, they had omitted or deleted that from the designs.

Q Had that particular design been approved previous to their deletion?

A It had been an understanding at the construction stage that this feature would be incorporated in the TMI-II design. This was reviewed, as I recall, and specifically commented on by the ACRS and by the Board at the CP stage. So my problem now was, gee, there's a long history here and the construction permit, in part, involved some consideration and deliberation on the containment isolation.

As I recall, the reasoning behind this was concern for the population density around that particular site. People were addressing this and said can we improve the isolation of the containment and it is believed it should be done.

Q So as to avoid radioactive emissions into the community?

A In the event of an accident. So the applicant had deleted that. So I spent some time urging and finding out there was no way they could delete that without going to the hearing and getting a determination finally, and then it is kind of late in the game, because in licensing we believed that feature should have been retained. And it turned out as a result a different design was submitted but the evaluation at the time I left indicated that the applicant's proposal was acceptable and did provide an additional degree of assurance of isolating the containment at TMI-II.

Q Who reviewed this change in the design plan and approved it?

A As I recall, Brian Grimes, in the accident analysis branch, was the principal reviewer.

Q Were you involved in the review and approval of this modification?

A Only to the extent of trying to get an acceptable solution worked out. We had several meetings and lots of correspondence on this particular issue.

Q You indicated that you urged the retention of the original design. How was this dispute between you and the applicant resolved?

A Well, I would maybe not characterize it as a dispute. It was a difference of opinion, as you can see when they deleted the feature from the design after receiving a permit to construct the plant with that and other features involved. So it was a matter of convincing them that that was the appropriate thing to do under the circumstances, to continue that feature in the design.

Q In your opinion, is this mode of effective containment isolation a safety related feature?

A It is definitely safety related.

Q Do you recall what the applicant's interests were or what their arguments were in deleting this feature from the design?

A I cannot really delineate these. As I recall, Unit-I had a similar feature, of course. And I don't know the

detail of the design, but it was a complicated, complex, involved approach to providing for this assurance against leakage when isolated.

Q Do you recall whether cost was a factor in the applicant's reluctance to incorporate this feature in the second plant?

A It is likely that that's mentioned. It comes up frequently.

Q Do you recall whether the number of modes of containment isolation actuation was an issue at the time?

A May I ask what you mean by modes?

Q My understanding as a nontechnical person is that containment isolation at TMI-II was actuated by pressure in the containment building, and there are other multiple choices.

A You mean how do you initiate the isolation?

Q Yes.

A I was thinking that you knew something about how to design the isolation, per se, so it would be an improvement. Well, there are a number of modes, as you say or as I say, parameters on which one would isolate the containment and they vary from plant to plant, although there are other plants, I believe, that use this containment pressure as an initiating signal.

Q It's my understanding that a number of plants use multiple parameters for initiation of containment isolation--

radiation level in the containment, pressure in the containment, or actuation of ECCS--and using maybe two of those three alternatives as opposed to just one; whereas at TMI-II containment isolation was actuated solely by pressure in the containment. Is that an accurate summary, do you think?

A To my understanding of TMI-II, only pressure was used whereas these other logical possibilities exist.

Q Did the question of the number of parameters for initiation of containment isolation come up at the time that you were project manager for TMI-II?

A That I don't recall, but I seem to vaguely recall some discussion or consideration of what parameter should be used or what the level should be.

Q The level of pressure.

A That's correct; what level of whatever was chosen, and it apparently was pressure.

Q Was there no discussion, then, of the number of parameters that would be used for containment isolation?

A That I couldn't say positively because I don't recall that much of the detail.

Q Do you know if there were plants that were licensed at the time TMI-II was going through its licensing phase in which containment isolation was actuated by more than a single parameter?

A I don't have any knowledge of that.

Q Are you familiar with a plant known as the Sequoia Plant?

A I've heard of it.

Q Are you aware of the fact that it received its construction permit six to nine months after TMI received its construction permit?

A No, that doesn't mean anything to me.

Q Are you aware that the Sequoia Plant had diverse actuation in two-phase containment isolation?

A I have no knowledge of that.

Q To the best of your recollection was diverse actuation of containment isolation required by the NRC at the time TMI-II was going through its licensing?

A I don't recall anything specific as to criteria that is applied to that.

Q Is it your recollection, then, that there were no such requirements?

A I couldn't say that definitely there were none.

Q If there were, you were unaware of them?

A Or I don't remember them now.

Q Okay. Are you familiar with the SRP, the Standard Review Plan?

A I am now.

Q Do you know when the standard review plan went into effect?

A I believe that this was developed by sections or chapters over a period of time and that some of these were published at least in draft form prior to my leaving NRC.

Q Are you aware that the standard review plan requires diverse containment isolation actuation?

A I have not studied the standard review plans except as specific questions have arisen since I left there.

Q You didn't refer to the standard review plan in the course of licensing of TMI-II?

A I don't believe that that was referred during the time when I was there. We had something at that time that was a forerunner, perhaps, of standard review plans and a thing that was incorporated in many of these. This was known as the branch position.

Q Did the branch position deal with the question of containment isolation?

A That I cannot say here.

Q You don't recall?

A I don't recall that.

Q Are you aware of whether the standard review plan was backfitted to plants that were in the licensing process and had not yet received their operating license at the time the standard review plan went into effect?

A I believe this gets into an area that was the problem in the case of TMI-II and other plants, the question of

changing regulations and changing regulatory requirements, changines in the reg guides which are not requirements but which are acceptable means of accomplishing certain things. These evolved while TMI was under construction but not yet in for licensing. So there were a lot of these issues involved.

During the time that I was there I don't think the standard review plan had not been, of course, completely developed and the sections that were there, to my knowledge, were not really applied to TMI-II except branch positions that had evolved that were applied in these areas. So it's a matter of degree in terminology in part here, maybe.

Q Did the standard review plan go beyond the branch positions in requiring safety components in the design?

A Well, I guess the standard review plan, again, like reg guides, you used the word requirements, and those are regarded as not requirements but a presentation of designs or approaches, whatever you wish to call it, that are acceptable to licensing in these various areas.

Q Would it be an accurate summary to say that with the reg guides and the standard review plan that the licensee would be obligated to follow the standard review plan or the reg guide unless they could demonstrate to the NRC that some alternative approach would produce the same result?

A I believe that's correct. They have an opportunity to take a different approach to the problem or solution

provided they can demonstrate that it is equivalent to or better than.

Q Do you know any reason why the standard review plan was not applied to TMI-II?

A During my involvement, as I indicated, the standard review plans were just under development; there were only a few sections out. So I would regard that as reason why it wasn't applied during the time I was involved. And then, of course, in all specific plans and reg guides and regulations one encounters the time frame in which these documents are applied to a given plant, usually based on when they got their construction permit. So there are degrees in which this gets applied. It's not uniform.

Q In other words, talking from your present knowledge, you are saying that you are aware that the standard review plan was not applied to TMI even after your departure as project manager?

A That I could not say.

Q You don't know whether it was or wasn't?

A I do not know.

Q Was the decision to apply the standard review plan to plants that had not yet received their construction permit made at the time that you were with the NRC?

A Would you repeat that? I was thinking.

Q Was the decision that the standard review plan is

not to apply to plants that had already received their construction permit made at the time you were with the NRC?

A I don't recall any decision like that, no.

Q Do you know from your present knowledge whether such a decision has been made by the NRC?

A I do not.

Q Do you recall whether either, in your review of the ACR hearing records or your preparation for the public hearings, whether the question of the design of the OTSG came up as compared to the recirculation steam generator design of the Westinghouse or the CE plants? I'm referring specifically to the rapid boil-on time.

A I gathered you were getting to something and my response is I regard nothing that was pointed at the OTSG per se.

Q Do you recall whether that issue occurred to you, whether or not in the context of hearings, or review of hearing records?

A No, it did not.

Q You indicated at the outset that you were unfamiliar with the B&W design when you took on this task. In the course of your being the project manager for TMI-II, did you become aware of the characteristics of the OTSG or once-through steam generator?

A Not the OTSG, per se.

Q What do you mean by that?

A That's just one piece of the system.

Q Did you gain an impression of the B&W design as a whole?

A Through the comments of others; not because of any analysis done by myself.

Q What sorts of comments are you referring to?

A I can't quote these, but you asked me for impressions so I'm free to take license with that.

Q Well, to relate them as accurately as you can.

A Several times I believe I heard people whose business it was to review that plant and system that they didn't know as much about it as they felt they should know or they would like to know and they had difficulty getting information. They were not satisfied with the responses and they tried to think of questions to ask that would shed more insight in this.

Q Are you referring to the reviewers with DSS?

A May I ask who is DSS?

Q That's the Division of System Safety. My understanding is, at least presently, they review the design aspects of the CP and OL application.

A Yes. Well, I wanted to get this back in the right time frame. These were people in Reactor Systems as part of the technical review division at that time. So DSS is a new term.

Q Do you recall the names of any of those people?

A I can't. They were people who were involved with the TMI review in the Reactor Systems Branch, as I recall.

Q Do you recall the name of Denwood Ross?

A Yes, but he was not one.

Q Roger Mattson?

A Yes.

Q Was he one?

A No, he was not one.

Q Thomas Novak?

A He was the branch chief, but I don't recall these conversations with him. This was at the reviewer level and people that I was working with on this application.

Q James Watt?

A That's the name I could not recall; one of them, I believe.

Q Do you now recall that that is one of the names?

A That's right; that's one of the people.

Q Jerry Mazetis?

A I don't recall him associated with this particular plant.

Q Do you recall whether it was James Watt who expressed some of these impressions about the flow of information concerning the B&W design?

A I think he may have been one, and something bothers

(WARREN MINNERS)

me--there is someone else that also tended to confirm this intuition I was getting from these inputs.

Q Sandy Israel?

A That name is not familiar.

Q When you refer to insufficient responses, are you referring to questions directed at the utility or the vendor by the NRC?

A Yes, in this area I guess perhaps two thing go on in the review. The specific applications which involve a specific nuclear steam supply system and vendor have questions directed at that plant and at the reactor, the reactor system by the technical review people. Responses then come back from the applicants. I believe that other reviews of the reactor designs were conducted and information exchanged directly between people like the reactor systems branch at that time and the vendors.

So those people received information in two ways about the designs, is my understanding. So they directed questions in both directions here and looked at the response.

The utility's response, I would add, I believe really comes from the reactor vendor and the utility and perhaps varying degree reviews the information supplied by the reactor vendor in response to the licensing question. So it's a chain there. I don't know what is added or deleted.

Q But essentially the answers to the questions come

from B&W with respect to the TMI-II project?

A This is my understanding, quite a few of them. The applicants here did not readily reveal the source of answers to these questions when you asked. They did not regard that as a proper question.

Q What was the role of the project manager in this exchange of questions and answers between the utility and the vendor and the NRC?

A Well, the questions would be generated, of course, by the technical people reviewing a given area or aspect of the design. Then their branch chief would review the questions. Then the Assistant Director in that area would in turn review the questions. The questions, then, come to the licensing project manager.

Q You, for example?

A When I was there, to me. ~~There~~ They were probably on paper directed at the AD level, like Voss Moore, but these are formalities in the paper routing. Then I would review these questions and summaries and talk with the reviewer to find out, geez, why are you asking this question? How does it relate? and so forth, and get some background, you know, where does this fit in the picture?

Then I would prepare a letter and forward this through the branch chief or the assistant director and the letter would go to the applicant with the questions.

Q And then the questions would come back through your hands?

A They were distributed. The responses are usually directed, I believe, nowadays to the branch chief. At one time they were directed to, like the director of reactor projects or whatever the proper term is--~~NCG, BUSQ~~ Angie Giambusso (phonetic) so it varied as to where the letter was really addressed. But then these were distributed. The copies went to ~~the~~ all the review branches and I received a copy of the response, checked to see what the responses were and the status of the responses, and then I would write an internal note to the reviewers for two or three reasons, but that note showed (1) what had been received, (2) whether I questioned that it was even close to being responsive or not, and comments like this then to the reviewer. Then I would send that out and this would alert the reviewer that he should find the response and do something.

Q In the event a response was inadequate, was it your responsibility as a project manager to obtain an adequate response from the vendor or the utility, or was that the responsibility of someone else within the NRC?

A Again, it was the responsibility of the process, I guess I would say, that there would be things, for example, that I would question and the reviewer would come back and say, no, that's all right, you don't understand, or something.

Then there would be things conversely that I didn't really raise any significant questions and the reviewer would come back with more. So we would have this exchange among ourselves.

Then these would be followed up either with a second round; if that was the first question that had gone out, for example, then there would be a second round of questions or positions. We might take a position then on an issue in order to clear it up. Say, your response is inadequate; it is our position that you -- Okay, and then this leads to either resolution or a firm difference of opinion. It keeps it moving.

Q So your --

A So these went out the same way again, okay, reviewed by the technical review management staff over to licensing and then out to the applicants then maybe phone calls and whatever else goes on to make sure -- Well, we'd also conduct meetings with the applicants during this question process after we formulated the questions to make sure that they had an opportunity to discuss with us what we meant by the question and why we were addressing this or any other thing.

Q Did the vendor normally attend those meetings?

A In some cases. This was at the discretion of the applicants.

Q Do you recall any questions that you may have raised about a question that went out to the utility at the time you

were project manager?

A Yes, I recall one; not too much detail.

Q Could you please elaborate?

A It was a question that we didn't understand and we went back and asked why it was being asked and what did they really mean, and after this discussion we said, gee, that isn't what you asked in the question. We want to change it. Oh, you can't change it. It has been approved by the AD.

So I think we did make a minor change. There are these jurisdictional disputes between the author and the editor, of course. We did make a minor change that we kind of agreed to, but nobody was satisfied with that question, and I don't know how to respond. This was right about the time I was leaving, I think, in the second round question. But I reflect on that as it is not easy to get things righted once they are wronged.

Q Were you project manager at the time any responses came back from the utility or the vendor?

A Oh, most of the questions and responses, I believe, came back during the time I was there.

Q Did you find that the responses from the utility or the vendor were adequate?

A Not in all cases. That's why I wrote the status report each time an amendment came in as a result of my review to let the reviewers know how I reacted to the responses, and

then get their judgment.

Q Were your comments and concerns directed primarily towards Mr. Watt?

A You mean the comments and concerns regarding applicants responses?

Q Yes.

A No. It was directed to everybody involved.

Q Which would mean to the utility?

A No, in Licensing, to all the reviewers.

Q The technical reviewers?

A Yes. Because Watt was one of 20 or something, if I recall the number approximately right.

Q As a result of concerns raised by you and addressed towards the appropriate reviewers, were any questions reformulated or any demands made to the utility for better responses that you are aware of?

A Yes. If you review, say, the second or third round questions, you will see lots of comments: Your response to question so-and-so was incomplete or was not adequate or words to that effect.

Q Were there any inadequate responses to the second round questions, as you recall?

A I can't identify any offhand, but I think that's likely. Let me think. (Pause) Oh, steam line breaks or high energy line breaks or something in that area, okay,

involved with the containment systems. That was a big concern, so that is probably an example of what you just asked here where second round question was inadequately responded to.

Q Is the inevitable next step the taking of a position by the NRC or is there some further effort to get an adequate response from the utility?

A I believe that the approach at this time, when I was there, that if you reached the point where responses were inadequate or unacceptable or something at the second round question stage, what might have been called at one time third round questions became positions in order to clear up these items before the hearings. That was the object, so that you could write a clean SER and not have a lot of open items, the issues had to be resolved.

Q Had TMI-II embarked upon the third round of questions while you were project manager?

A Well, may I explain something here?

Q Yes.

A I believe the third round questions mostly came after when I was there. The review --

Q After you left?

A After I left, yes. The review at TMI-II, because of the licensee's scheduling of responses to the questions, wasn't done in a nice, neat package from a scheduling standpoint whereby you could say today we send out round one

questions; 60 days we have your responses; and 30 days later we send you round two. Well, we went through that kind of a schedule, if you will, except that we had different dates for their responses to certain sections and certain portions of the questions and sections in the FSAR.

So, as a result, rather than hold up everything until the last response to round one was in and say, okay, now we'll start round two, I scheduled everything piecemeal to accommodate their staggered response schedule. So there may have been some third round questions in a few areas go out before all the second round ones had even been asked.

So it is not clean enough to answer your question directly.

Q I see. You mentioned that the effort was to produce a clean SER. What do you mean by a clean SER?

A No open items I dropped in there.

Q All right.

A You've got everything understood and resolved before you get to the hearings.

Q What role does the ACRS play in the licensing process?

A Well, after the safety review in Licensing and I believe the issuance of the SER, or at least the SER in draft stage, there is an ACRS meeting of the full committee and they review the licensing review and comment on it and give their opinion as to whether the plant can be operated safely and may

list items where they wish to be kept informed that need to be addressed.

Also, during this review, there is an ACRS subcommittee that is assigned to the plant or the plant is assigned to them, however you look at it. They go along and address the concerns that have been addressed, I guess, or raised by the full committee and other members of the ACRS, and interact with the review this way. And they have, I believe, site visits scheduled there and go and look at the plant, and so forth. And this is kind of in their review and background preparing for the full committee review.

Q Does the ACRS normally get involved in the license review process after the staff's review is virtually completed? In other words, does the ACRS get involved at the time the SER is completed?

A Well, this subcommittee of the ACRS that I mentioned is going along. They start at some point during the licensing review, so they are going along in parallel. During the time that I had TMI-II was, of course, prior to the SER, prior to the ACRS. But I did have several discussions at points with one of the ACRS staff members that was assigned to that, I guess.

Q How was the ACRS kept abreast of disputes that may have arisen between the NRC staff and the applicant over questions in the first or second round and inadequate responses,

and so forth?

A To my knowledge, there is no direct formal communication here other than that they receive copies of the questions and the responses.

Q. Were you responsible for directing copies to the ACRS?

A That was taken care of in the distribution process.

Q But you recall that that was done?

A To my knowledge, it was. They received 16 copies of everything, if I recall the number correctly, or they used to.

Q They received copies of the questions and the answers and the FSAR and the SER?

A Yes. (Pause) May I add one thing here?

Q Certainly.

A I never made any attempt to check or verify that they got their copies of everything, okay. I addressed the reviewers to make sure they had their information.

Q Did you see distribution lists on which the ACRS was listed as recipients or intended recipients of these documents?

A Oh, yes. Oh, yes.

Q And this was while the process was on-going?

A That's correct.

Q Do you recall whether at any time that you were

project manager at TMI-II whether the question of normal operation computer readouts came up and the fact that the computer would not provide information during abnormal operating conditions?

A I don't recall that specific concern being addressed.

Q Were you aware at the time that this was the case?

A No. The last thing I recall there was the question directed at them about display of information to the operator.

Q What was the nature of that question?

A I can't say. I vaguely recall something in the discussion of it though that got into the seismic qualification of that recorder and ~~it~~ that became more important ~~to~~ than having a recorder that would work.

Q Is the recorder a safety related item?

A I don't really know, but I doubt it.

Q As project manager, were you concerned primarily with safety related items if not exclusively with safety related items?

A (Pause) I guess I would judge that the majority of the effort was directed at engineered safety features, items called safety related, important to safety, this category. But it was not 100 percent.

Q Are these terms of art?

A I believed at the time when I was there that

terminology "safety related" and "safety grade" were not understood universally as to what was really required, what was meant, what the significance, and so forth, of things where or which these terms were applied.

Q Who was responsible in the first instance for determining which items were safety related and which items were not?

A I don't believe you could name a single individual or a single branch that had such a responsibility.

Q Did NRC have a list of safety related items which would be presented to the utility or did the utility present a list of safety related items to the NRC?

A I think if you are thinking of a nice clean table somewhere listing all the items of a specific plant or a specific generic design where you would find lists of safety related or important to safety, or whatever the terminology is, items, I don't recall any such lists. It is, in my opinion, woven into the review and the FSAR that you will see, maybe, in the questions, like the regulatory staff position or something. They will say we regard that as such-and-such system as safety related based on our review of your FSAR and therefore we require this meet seismic one criteria, IEEE-279, and Appendix B, and whatever is applied.

But, again, that's not uniform, so you would have to really look at each application, each detail to see how it

was treated in its entirety.

Q Is it your impression that this was idiosyncratic with each plant?

A It was handled in such a way that it could have been.

e 2-A Q Do you recall whether during the time you were project manager that any disputes arose between NRC staff and the applicant as to whether a particular component or system should or should not be deemed safety related?

A Well, you know, dispute, in my judgment, is subject to interpretation. But --

Q A difference of opinion?

A Yes. I would point out that the auxiliary feedwater system which was a thing that I had some time and i. vement in communications with the applicant, et cetera, in trying to get it upgraded, improved in TMI-II. I believe they responded to one of the questions in such a way that I disagreed with it. But that was kind of immaterial because we took a position on it, so we weren't asking for understanding. But in that case we had asked a question or maybe made the statement that we regarded it as safety related and therefore we, you know, required certain things and that we wanted an analysis of the system's behavior, following loss of off-site power and any one of the following things. And the applicant said, gee, you know, you're out of bounds with the general design criteria dated 1969, or something, and you know, indicated that they

disagreed with the question, or the way we were beginning to handle or change the feedwater system, if you will.

Q How was that disagreement with the applicant resolved?

A I believe they changed the feedwater system.

Q And you believe it was upgraded to a safety related component, system?

A I'm not sure ~~whether~~ when the final design occurred, okay, in the aux feedwater system, but it was well along except for a couple of areas that we may have been waiting for final details at the time I left.

Now, I'll just digress here. I believe the question that I referred to here is where they sort of took a difference in opinion about that system, was one of those questions directed at the TMI application where we were really trying to find out how that reactor would behave. This is my recollection. It was a good question, but it was part of this business of being concerned how the B&W plant would behave.

Q Did you get some type of response eventually to that question?

A Oh, they responded, yes.

Q What was that?

A They said well this was probably something like this is a highly unlikely and unimaginable event. However, we present the following results.

Q What type of results did they present?

A I don't recall the details.

Q Did they explain how the B&W design would function in the event of the loss of all feedwater?

A I don't think the loss of all feedwater was addressed, all right? But I would point out one thing that was done there. In presenting the results of some of these analyses, they produced plots or graphs, if you will, of pressurizer level, hot leg temperature, system pressure, and so forth. I found they only took those transients out to about 20 seconds, where in some cases I believe there are really inflection points in those curves and the more exciting parts are yet to come. My review showed that. The implication of the response is that everything is all right after that time.

Q Did you address your concerns to the technical reviewer or were these held privately by you?

A This point I mention here didn't concern -- I didn't understand the significance potentially of it at that time, okay. As I say, afterwards I looked. And this is in part, in my judgment, why people were trying to keep asking some of these questions and learn about the plant.

Q But the deficiency that you mentioned in the response when they carried the transient out to 20 seconds and nothing beyond, was this a concern which you formally raised and presented to the technical reviewer?

A No, because my feeling or impression, understanding or whatever, at that time, was that everything was all right after that point, okay. The words that were used, discussions and so forth, left you feeling that, gee, you went through that event just with no difficulty at all.

Q Do you recall whether in that context the short boil-out time of the once-through steam generator came up?

A I don't recall that specifically during this review.

Q Do you recall what the major saving apparatus was that was referred to by B&W in the event of the loss of all feedwater that enabled the transient to be successfully concluded within 20 seconds?

A I believe you mentioned loss of all feedwater. That was loss of main feedwater in which aux feedwater functions, for example, okay. I was not aware of the questioning and thrust of the staff's concerns about feedwater until after the event at TMI-II at which time I looked into these things.

Q These concerns were not raised and addressed at the time you were project manager?

A I can't say for sure, but the questions, of course, may indicate this, because there the questions addressed at the feedwater, as I indicated, one, to try to get more information and understand the behavior of the B&W system, and two, was the position of the Licensing at that time that that auxiliary water was indeed safety related, important to safety,

and should be made seismic category I in classification and treatment and the instrumentation controls should be made to meet the requirements of IEEE-279 for diversity of power sources and the feedwater system should have diversity of drive for the feedwater pumps, and so forth. Also then that the system should be able to take a single line break and still perform its intended function. So the single failure criteria, and everything, that is applied to safety related systems was applied in the design of TMI-II.

Q Is it your impression, based on comments you received from James Watt and other who were in the technical evaluation involved in technical evaluation, that give you the impression that perhaps the NRC was in the process of licensing a plant which it didn't fully understand?

A I didn't view it that way. I viewed it that they wanted more information that apparently they didn't have.

Q And were having some trouble obtaining?

A And the question -- they were having trouble obtaining it. The route of asking questions of the applicants ~~in these~~ who wanted to license the B&W plant was an avenue, that was a route, that was a way, see. And they were asking the questions. I can't answer what the concerns were, okay, except that they felt they were missing information. They either wanted to confirm something or that may have been the case, okay, or they may have just had nothing to confirm and they

wanted something to question.

Q You indicated a moment ago that a question was posed concerning how the plant would behave in the event there was a loss of main feedwater, and you also indicated that some of the technical people indicated to you that they didn't fully understand that particular B&W plant design. Would it be accurate to state that during the course of the licensing process the NRC was proceeding to license a plant which it didn't fully understand, and I'm talking only in terms of the time that you were involved and not what may have occurred subsequently.

A Let me say one thing. You used the term, I believe, that they were seeking answers for things they didn't understand. They may have well understood them; they were looking for the necessary confirmation so they could do something about it. I have that impression, too, from my recollection of these discussions, okay. So it was back and forth process.

I can't comment on what understanding the people that were reviewing the reactor system and its behavior, say, under these transient conditions, what really went on in their minds. I can't.

Q Was the B&W design a fairly new design at that time compared to the GE or Westinghouse designs?

A I guess that's a proper statement.

Q And that the NRC was learning about the design through

the process of licensing plants with that design. Would that also be an accurate statement?

A That was part of the learning process, as I said before, that they also directed questions directly to the vendors about the designs. So there were two paths by which the technical people received information about the plant.

Q Do you recall whether there was a position indicator on the PORV at TMI-II?

A Not from the licensing experience.

Q Why would PORV indication not have come to your attention at that time?

A I don't recall it being specifically addressed.

Q Was the PORV considered a safety related item at the time?

A I don't recall that, either.

Q Is it your impression that it was not?

A Well, my understanding was that it was not ASME Code Three as applied to the reactor coolant pressure boundary and therefore there has to be a code Class 3 valve downstream of the PORV.

Q Which would have been the code --

A Which would have been a block valve, to ~~relieve~~ be the pressure boundary in accordance with the requirements of the code.

Q Would the block valve have been safety related? Was

the block valve safety related?

A May I back up the answer to the last question? I believe I said downstream. It should be upstream. I think the PORV noncode has to be downstream of the block valve.

Q So the block valve would be between the PORV and the code safeties?

A My recollection is that in the top of the pressurizer there are two manifold arrangements. The code safeties are in a separate piping arrangement from the block valve and the PORV.

Q Is it your impression that the block valve was a safety related device?

A Only from the understanding of the code that I believe it would have to meet, and that is why I said in my opinion it would have to be upstream of the PORV and I inadvertently said downstream.

Q Would it surprise you if neither the PORV nor the block valve were safety related with respect to TMI-II?

A (Pause) I have trouble with the term safety related and the way it is used sometimes. I would say it would surprise me if that was not an ASME Section 3 code component, okay.

Q Apparently you are working with several definitions of safety related. Perhaps you could state several of these for the record and distinguish between them.

A Well, I mentioned before that I had some doubts that

the true significance ~~in~~ and real meaning of these terms is universally understood and I have explored that a little bit and find, I believe, I just got confirmation through what was my understanding from the years 1973 to 1975, that the regulations in Appendix A address component, systems and structures important to safety.

Q Is this 10 CFR you are referring to?

A Title 10 CFR 50. Appendix B addresses the quality assurance program that will be applied to systems components and structures that are safety related. And --

Q So, so far we have important to safety and safety related.

A That is correct.

Q Are there any others --

A These two terms appear in the regulations which is, I believe, the basis for all things that follow.

Q Are there any other definitions or uses of the term safety related besides those two that you are aware of?

A If you review the licensing, the docket file and the questions that are asked you find that some people use the term, and we mentioned before the question that was directed at TMI where they said based on our review of the information in your FSAR we find the auxiliary feedwater system to be safety related.

Q That would be a reference to Appendix B, I assume.

Is that correct?

A Yes, that, in some cases, is a reference to Appendix B, but I think you will find exceptions that Appendix B is not automatically applied.

Q Are items which are deemed important to safety treated differently than items which are deemed safety related?

A I believe that's a correct statement, and I would add that items deemed important to safety per Appendix A are not all treated uniformly.

Q With respect to the loss of feedwater, was it your attempt to have the auxiliary feed system classed as a safety related item as opposed to an item important to safety, or was it an attempt to have it classified as an item important to safety?

A The classification, per se, wasn't as important to me as how the system design turned out.

Q Would there have been a difference in the way the design turned out based on whether it was deemed important to safety under Appendix A or safety related under Appendix B?

A It could have been, but when you examine how things are actually treated when the Appendix A is applied, or Appendix B does not automatically follow, you can't predict the outcome of this.

Q Getting back to the PORV and the block valve, would you be surprised to learn that neither the PORV nor the

block valve were considered safety related as used in Appendix B?

A I would be surprised to learn that, yes. I have not looked at that and didn't consider it. I would say Appendix B is the application of the quality assurance program to those items that have been declared safety related, okay. So Appendix B itself does not delineate or describe or categorize anything as being safety related. Once I put that handle on something and say that Appendix B applies, then --

Q In other words, Appendix B does not contain a list of items?

A That is correct.

Q Would it surprise you that with respect to the PORV and the block valve, the PORV was not considered safety related because it had a block valve in series with it and the block valve was not considered safety related because it had a PORV in series with it? You have a look of surprise on your face.

A The logic defies me offhand.

Q I'll represent to you that that is the testimony of Roger Mattson at the public hearings and also in his deposition, the head of DSS one of whose branches is RSB, the technical reviewers who review the plant designs during the licensing process.

If the PORV was not considered safety related, would

it follow naturally that indication for PORV position would not be considered safety related?

A That is likely, in my opinion, because of the way these things are handled in the review, that once there is an agreement that an item is safety related then the other branches who worry about the electrical wiring to it or the instrumentation or the power or the quality grouping, and so forth, they would then look at these areas. So one sort of follows from the other in the process.

Q So would it be correct then that if an initial determination were made that a particular item was not safety related that when that item then went to the electrical engineering people they would not treat it as a safety related item and then would it also be correct that when I&E enforced regulations on the plant during the licensing stage and thereafter they would also not deem it safety related? Is it a decision that kind of nails it down in cement and then follows for the rest of the life of the plant as either being safety or not safety related?

A Well, I don't have enough experience with some of these things and I can only give my impressions or concerns. But you say do these things follow through from the review and clear on to the I&E inspections and the applicant's treatment in the field. I believe there are subtle things that go on here. For example, like where an applicant addresses

certain features of the plant or certain responses to licensing concerns may be indicative of the treatment that is going to afford that system if not directed specifically otherwise as far as his maintenance priorities, inspection, quality, and so forth. And my belief is that with regard to some of these items the applicant puts some items in the plant on his Q list which gets reviewed in licensing and certain quality assurance program of applicant is applied to those items. Then other items that are not on that list may be included in the applicant's detail plan of the site but not in the FSAR, not reviewed by Licensing.

Now, when the I&E inspectors look at the applicant's activities at the site, I believe that they review what is done to a given component or system in accordance with the applicant's listing of equipment that's included in these stages of the program.

Q In the FSAR?

A It would include the things in the FSAR and depending maybe on the applicant, things in addition to those items in the FSAR. But there is the possibility here for a lack of continuity between the licensing review and the significance attached to these items from a safety standpoint and how they eventually get treated and monitored by I&E. That's what I'm trying to say.

Q Where do you see this breakdown in continuity? Is it

that the I&E people rely on the FSAR and documents generated by the utility whereas Licensing has stated its position in the SER? Is that basically what you're driving at?

A I'm not sure the use that all of these documents receive by all the people involved in that chain. As I see it, the Licensing people are quite familiar with the plant and the detail design from their review and from their questions and they have indicated that the applicant, their position that something is safety related when the applicant either didn't even mention it or he has it in a place in the FSAR where you would not expect it to be addressed. As I pointed out, that carries some possible indication of the applicant's thinking about the system when you find these things in the FSAR where you find them.

The people then in I&E in the field don't have al this background information from the review of the FSAR. Sure, they have an FSAR; you know, they are kept informed, to my knowledge, by the system and the process. But they take over then and must review and audit the operations in the field without all of this appreciation for the system and some of the detail.

Q Do you see a lack of coordination between the Licensing people and the I&E? In other words, are there meetings and discussions? Is there a paper flow back and forth in an attempt to give this background to I&E?

A I can't address that in an operating stage, but during the construction I maintained close liaison with the inspector.

Q The I&E inspector?

A The I&E inspector on the plant. I made site visits and inspections with him.

Q Is it your understanding that that was a normal procedure or is this something that you adopted as seeming reasonable?

A It may have been done in other cases but it was not a requirement or a routine thing.

Q Did you arrange for the I&E inspector to come to the site and tour the plant with you?

A I coordinated it with him and arranged to meet him. Sometimes I'd meet him there; sometimes I would ride out with him from Philadelphia.

Q To what extent was experience at other B&W plants which were already operating incorporated into your coordination of efforts at TMI-II? Was there any method by which such experience could be brought to bear or was brought to bear?

A As I recall, I think it was a unit at Oconee that had started into operation at the time I was working on TMI, and there was, as I recall, no formal channels where I saw things like what we call the LERs now or event reports or abnormal occurrence reports, maybe they were in those days.

But I tried to talk to people in operating reactors who were following the daily operations of that plant with the startup testings and things like that, the fellow who was the project manager there, and find out what was going on.

Q Was tnere any formalized or systematic way by which you were kept abreast of operating experience at other B&W reactors?

A No, the only contact I had was through a friend who had the Oconee plant as an operating unit, and he kept up, of course, daily with the occurrences.

Q At his own plant?

A At his own plant, yes.

Q Do you recall what his name was?

A Leo McDonnough.

Q Were you aware of a transient that occurred at the Oconee plant Unit 3 on June 13, 1975?

A A transient. Could you say something about the transient? That much doesn't mean anything.

Q Were you project manager at TMI-II on June 13, 1975? Were you still there?

A That was about the end, approaching the end. I was still there, to my knowledge, on that date, yes.

Q Were you there until the end of the month?

A Near the end of the month.

Q Okay. Let me read to you a summary which is contained

in a document which bears the number AO-287/75-7 from the Duke Power Company, Oconee Unit 3. There's a paragraph on the first page entitled, "Description of Occurrence." It reads as follows:

"Description of Occurrence: On June 13, 1975, a routine shutdown for maintenance was in progress on Oconee Unit 3. When reactor power had decreased to approximately 15 percent a minor system transient occurred which resulted in the opening of the power actuated pressurizer relief valve, 3RC-66. Valve 3RC-66 remained open and a reactor coolant system depressurization continued until isolation valve 3RC-4 was shut. The reactor coolant system temperature and pressure were 480 degrees Fahrenheit and 720 psi, respectively, when the depressurization was terminated."

Then in a subsequent paragraph entitled "Designation of Apparent Cause of Occurrence" it reads:

"The apparent cause of this occurrence was operator error in that the operator did not consider the initial RC temperature drop which occurred during repressurization when establishing the subsequent cooldown rate. The reason 3RC-55 remained open was due to boric acid crystal buildup on the connecting pin of the lever arm of the pilot valve. In addition, a cellonoid operated plunger was stuck in the open position."

This appears to be a description of a failed open

PORV followed by a partial blowdown of the plant. Were you aware of this occurrence at the time you were project manager of TMI?

A I was not. I recall, I think, a pump seal failure that bothered me, I believe, in the Oconee plant there.

Q A pump seal? Which pump?

A a reactor coolant pump.

Q Did similar problems develop during the licensing process at TMI?

A I checked and found that it was a pump of different design and manufacture, so that didn't -- It doesn't say it won't happen, but it wasn't the same problem.

Q Once you discovered that the pump was a different design, you took no further action in that regard, is that correct?

A I believe that's right. Just to determine what the differences were, or were they the same; and they were different. (Pause) With regard to the abnormal occurrence that you mentioned at Oconee, the boric acid crystals on the PORV, I recall that occurring some place, but it may not be this event.

Q Do you now know of a transient which occurred at Davis-Besse in 1977 which resulted in a stuck open --

A (Whispered) September.

Q (Laughter) September -- Apparently you are aware

of that one, which involved a stuck open PORV in part because of crystalization formation? Are you aware of that transient now?

A Yes. I was aware of it before TMI.

Q Before the TMI accident?

A Yes.

Q After the time that you were project manager, necessarily?

A That's true, necessarily.

Q Is that the transient, perhaps, that you were referring to which involved the crystaline formation on the PORV stem?

A Well, I don't remember that detail of that one, but I think the point is that this may be a thing that has happened many times before and it is to be watched here in trying to create a reliable position indicator.

Q How did you become aware of the Davis-Besse transient prior to the TMI accident of this year?

A In my recent work I've been trying to address safety improvement in light water reactors, and of course I fish around and try to get ideas and think of what people ought to work on and things like this.

Q This is your work at Los Alamos you are referring to?

A In the reactor safety program, right. And I sort of go from one task to the other or pick things up and move to something and come back and so forth. But I had developed

somewhere along the line the idea that safety systems should never be challenged in a light water reactor plant. You should run for 40 years and the only time they are ever operated is when you test them routinely.

Q What is the reason for that?

A Well, they are a line of defense against serious accident.

Q Would it be fair to --

A So if you just let all the safeguards down and say, gee, I've got these features that will keep me out of trouble, I think that's not good clear thinking. So my thinking and approach has always been that, as I said in Nevada, we are here to run reactors, not to scram them. And that means that you are in control of the situation; you don't have to rely on your emergency and safety features.

Q How does the Davis-Besse transient fit into that scenario?

A Well, with that basic premise that I mentioned, the philosophy, I had gone through the LERs looking for all situations I could identify where the safety features had been challenged or used in any way during the course of routine operations and anticipated transients, and that includes all events prior to TMI-II.

I had flagged these things in the process of sorting and collating and marked the abstracts where I found this as

an early phase of my analysis to see what was going on, and of course, TMI-II occurred and I was distracted and after some time I went back and reviewed these things. I was going to pick this idea up again. Of course, the details of that scenario did 't occur to me at the time of TMI-II, okay. When I went back and I read it, I was in a state of shock and I wrote a memo and said call this to people's attention and I said I am puzzled as to why in Bulletin 79-05, the PNO's I guess that came out of I&E, that they referred to some other event at Davis-Besse a couple of months later because the similarity of the September event at Davis-Besse was striking.

And the conclusion I drew from this was, okay, safety is my concern, okay. I flagged that event because of my criteria that I would like to prevent all situations where safety features are ever called upon to operate, operational routinely, and so forth. And I said, well, I didn't forecast TMI. I would have gotten there eventually through this criteria I was applying. What can we do to stop these things?

pe 2-B That's how I got to Davis-Besse.

Q At the time you were looking through the LERs on Davis-Besse, were you aware that the operator at Davis-Besse had terminated HPI during the course of the September 1977 transient in reliance on rising and high pressurizer level at the time he was losing coolant through the PORV which had stuck open?

A I assume that information is in this abstract that I have, but that didn't catch my eye and lead to any forecasts either.

Q Did you obtain these abstracts from the NRC?

A From the OakRidge, NSLIC, is that correct? I don't know, but they are published periodically and compiled at Oak Ridge.

Q Were you aware prior to the TMI-II accident of this year that a number of persons within the NRC staff had essentially predicted the TMI-II transient based on such events as the September 1977 Davis-Besse transient? I will just throw out some names: Cresswell, Israel, Ebersall, Michelson.

A May I ask the first part of the question again?

Q Were you aware that any of these people prior to the TMI-II accident had essentially predicted the TMI-II accident based on such prior transients as the Davis-Besse September 1977 transient?

A I was not aware of this and only after TMI-II, awareness of only the concerns of a couple of these people you mentioned. Pebble Beach was --

Q Pebble Springs?

A Pebble Springs, excuse me -- I keep moving that plant— was called to my attention by someone in NRC shortly after TMI-II. I came downtown to the Public Docket Room and got a

copy of that question and the response.

Q Are you referring to Jessie Ebersall's question number six to B&W which was unanswered?

A 26?

Q Well, there were several. My recollection is there were 6, 12, and 26, and that B&W failed to respond to Jessie Ebersall's concerns on that score.

A You have comments cleaned up. *

Q But this is something you discovered after the TMI-II accident?

A After. That was pointed out to me. I was referred to that as background after TMI-II. So that had gone on, however, prior to TMI-II.

Q During the course of the licensing process, was there any systematic or formalized incorporation of operating procedures or experiences with operator procedures in the licensing process or the review of the PSAR or FSAR?

A Was there any review of the operator actions and procedures during the licensing review?

Q Yes.

A Yes, there was.

Q To what extent?

A In several ways. There was a question that in light of the event at TMI-II now, this question was addressed to the applicants regarding the termination of safety features

* Record makes no sense at all but cannot be corrected from memory.

actions by the operators --

Q Such as ECCS?

A I interpret it as any safety feature. The question was addressed because the applicant's maybe ambiguous or a statement in the FSAR--I don't know the detail of that--but the staff did address --

Q This question was addressed at the time that you were project manager for TMI-II?

A I believe that is correct, yes.

Q Do you recall what the substance of the question was?

A I think they were looking for a commitment out of the applicant that the operator would not terminate any safety features actions that were automatically initiated-period.

Q Do you recall what, if any, response was received?

A I don't recall the specific response or whether it was acceptable.

Q Would there be any way for you to obtain and provide to us the question to which you have referred and the response, if any, that was provided in response to this question?

A The question and the response should both be in the application, in the FSAR, or supplement to it. So I should be able to provide that to you.

MR. HELFMAN: Okay. Perhaps we can have a stipulation that Mr. Washburn will provide that to us and upon receipt of it, it will be deemed Exhibit No. 2 to the exhibit. Is that agreeable?

MR. OLSON: Yes.

(WHEREUPON, the information referred to will be marked for identification when received as Exhibit 2 to the Deposition.)

BY MR. HELFMAN:

Q Is that the extent to which operator procedures were taken into account during the course of the licensing review, as best as you can recollect?

A I don't recall any others, but there may have been. I would add, because the question is kind of general, that in the review of the accident analyses, if you will, in anticipated transients, operator actions may be required at some time to reset things or turn things off or start pumps or do something, okay, during the course of that accident or transient in order to get an acceptable outcome. And these are generally questioned as to the time at which the operator must take this action. My recollection here is that they allow no credit, as they state, for operator actions prior to ten minutes after an initiating event.

Q Was there any review of the procedures themselves to

determine their content or whether they were the appropriate action to take or whether it was possible for the operator to perform them?

A There is really no review to my knowledge in Licensing of the operating procedures. The operator licensing branch, I believe it is called, receives a copy of the applicant's emergency procedures, operating procedures, which they use in examination of the operators. But my understanding here is that those procedures are accepted as written and they are treated as proprietary, perhaps is the answer, but they are submitted in some confidence and they are not distributed to project managers or other reviewers. They are strictly used by the operator licensing branch to conduct the operator exam for a given plant.

Q Would it then be accurate to say that an operator procedure, whether correct or incorrect, would be incorporated in the examination of operator applicants by OLB?

A It's my opinion that that would occur.

Q Was there any systematic or formal review of control room design or layout during the licensing process?

A Not to my knowledge.

Q Do you know what the Response Review Branch is?

A No, I don't.

Q From your perspective as a project manager, what was the role played in licensing by the Commissioners, if any?

A Well, I can't think of any examples that would show that there was a role or how it would relate.

Q Are you aware of the design differences, B&W design compared to the Westinghouse design and the CE design? I am speaking generally now of the steam generator side.

A I would say I guess I'm aware of some differences.

Q Are you aware of the comparative boil out times?

A In a qualitative sort of way, I guess I tried a couple of times to find out about quantities of water available in the B&W steam generator and all I got was answers in inches from some place and that doesn't help me at all.

Q Have you become aware of the amount of time it takes for the B&W steam generator side to boil dry in full power or after a scram as opposed to the Westinghouse and CE plants?

A In a qualitative sort of way, yes.

Q What is your impression in that regard?

A The steam generators in some of these transients go dry very quickly, and --

Q Is that true of all three designs?

A In the B&W; my response applies to the B&W. The others, no, are the order of minutes, if I recall, before you dry out the steam generator. And I would put the B&W plant down in the seconds category in this qualitative answer.

Q Is there a correlation between sp ed at which the B&W OTSG boils dry and the amount of time an operator has to

an emergency or a transient?

A There may be. I think there is another aspect if your concern is how fast the operator must respond, another aspect.

Q Is there yet another aspect that you were thinking of?

A The behavior of the primary system, not unrelated to the steam generator, of course, okay, but it involves pressurizer, the volume of the pressurizer, the loop seal to the pressurizer, the location of the pressurizer, the dynamics of the system.

Q Would you agree with the characterization that the Westinghouse and CE designs are far more sluggish and forgiving than the B&W design?

A That's my understanding, but never having operated one of those plants, I wouldn't know.

Q What advantages can you see in a design which is very quick to react and relatively unforgiving in the course of a transient?

A That places a lot of demands on everything else--all the other hardware, the operator, and so forth. That I can relate to because our nuclear rocket program, we change power in short periods and high rates, so we can have--no pun intended--a fast accident. So that's even more of a problem than, say, like a B&W relative to other designs.

Q Can you think of any advantage to the B&W design,

recognizing these characteristics, from perhaps the point of view of the utility or the vendor or the NRC?

A Well, I suppose there are differences and pluses and minuses, but I have no opinion on that.

Q You indicated that you left the NRC in 1975. Did you return to Los Alamos?

A Yes, Sir.

Q And have you been with Los Alamos ever since?

A That's correct.

Q You indicated initially that you were assigned by Los Alamos to the NRC for this brief period between 1973 and 1975. Have you, since you left the NRC, been assigned by Los Alamos to any other projects or departments?

A I have been on assignment to Department of Energy here in Germantown since last Fall, last October, as part of our light water reactor safety improvement effort.

Q Does that temporary assignment continue to the present?

A The understanding was it would terminate at the end of this fiscal year.

Q Have you in turn been temporarily assigned by DOE to any projects or departments?

A No. I get my direction from Los Alamos Scientific Laboratory, and I merely exchange information with DOE and others and do not take direction from the Department of Energy.

Q I see. Has Los Alamos assigned you to any other departments or projects since you were assigned to DOE?

A I was asked to provide what assistance I could to the President's Commission on the Accident at Three Mile Island.

Q Would it be accurate to describe you as bascially in a consultant capacity?

A That's possibly correct. I don't look upon myself as a consultant.

Q As opposed to employee?

A That's true in that sense; that s true.

Q Or as opposed to staff member?

A That's true.

Q When did this latest assignment begin?

A Ayproximately two-and-a-half weeks ago.

Q Would it be accurate to state that you are concerned with technical matters in your present position with the President's Commission?

A That's the kind of questions that have been addressed to me.

Q I have one final question which goes back to the intervenors which we mentioned at the outset. Was it your impression that the intervenors had sufficient technial knowledge and funding to adequately represent the concerns of the community?

A I don't know anything about the funding that was available to them or the people really involved. As far as the technical side, I believe that Chauncey Kepford had some technical background and that he was a knowledgeable person and he could ask good questions.

Q He had the technical competence to match NRC technical people in an exchange during the licensing process?

A I can't make that judgment, but he was an informed person that, as I say, asked good questions and indicated some knowledge.

Q Would you put his inquiries on a par with those that were addressed by the NRC staff reviewers?

A This, I guess, involves a matter of the detail of one's questions versus the importance of the generalities or the areas being addressed by the other, and I think we were looking at apples and oranges there.

MR. HELPMAN: I have no further questions. Mr. Olson, do you have any questions?

MR. OLSON: Yes. It might be well just to ask a couple of questions to clear the record.

CROSS EXAMINATION

BY MR. OLSON:

Q Mr. Washburn, you stated early on and then later on in the deposition that you are employed by Los Alamos Scientific Laboratory. Is that correct?

A Yes, Sir.

Q What is Los Alamos Scientific Laboratory? Could you briefly state?

A The Los Alamos Scientific Laboratory is owned by the Department of Energy and operated for the Department of Energy under contract by the University of California.

Q That's correct. And you work for the contractor, is that correct?

A I work for the contractor.

Q And not the Department of Energy?

A That is correct.

Q And therefore any assignments that are made for you are made by your employer, the University of California, and not the Department of Energy?

A That is correct.

MR. OLSON: Thank you. I have no further questions.

MR. HELFMAN: Okay. On that note, we will conclude the deposition. Thank you very much for your time.

(WHEREUPON, at 3:30 p.m. the Deposition was recessed.)

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CA/vfs

REPORTER'S CERTIFICATE

DOCKET NUMBER:

CASE TITLE: Deposition of Beverly W. Washburn

HEARING DATE: August 29, 1979

LOCATION: Washington, D.C.

I hereby certify that the proceedings and evidence herein are contained fully and accurately in the notes taken by me at the hearing in the above case before the President's Commission of the Accident at Three Mile Island and that this is a true and correct transcript of the same.

Date: August 30, 1979

Carol V. Adams

Official Reporter

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BEVERLY W. WASHBURN

Education: University of New Mexico, B.S. EE, 1949

Stanford University, M.S. EE, 1951

Experience: Thirty years in diverse technical fields --

1949-1950	General Electric Company, Test Program
1951-1952	Pacific Gas & Electric, Office Engineer
1952-1958	Sandia Corporation, Staff Member-Section Leader, Field Test
1958-1959	Space Technology Laboratories, Assistant Department Manager, Data Analysis Department
1959-present	Los Alamos Scientific Laboratory, Staff Member --

Nuclear Rocket Program	1960-1970
Gas Laser Program	1971-1973
AEC Regulatory/NRC	1973-1975
Reactor Safety Research	1975-present

BEVERLY W. WASHBURN DEPOSITION
8/29/79 ---EXHIBIT No. 1