PRESIDENT'S COMMISSION ON THE ACCIDENT AT THREE MILE ISLAND

PUBLIC HEARING

WEDNESDAY,
August 22, 1979

Hall of Nations
Edmund Walsh Building
Georgetown University
36th Street, N.W.
Washington, D.C.

The hearing was convened pursuant to notice at 9:13 a.m.

John G. Kemeny, Chairman, presiding.

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GREENWOOD

PROCEEDINGS

CHAIRMAN KEMENY: Will this hearing please come to order, and will Chief Counsel please call and swear in the first witness?

MR. GORINSON: Joseph LaFleur?

Whereupon,

JOSEPH D. LA FLEUR, JR.

was called as a witness and, after being first duly sworn, was examined and testified as follows:

CHAIRMAN KEMENY: Would you please state your full name and current position for our records?

MR. LA FLEUR: I am Joseph D. LaFleur, Jr., and I am the Deputy Director of the Office of International Programs of NRC.

CHAIRMAN KEMENY: Chief Counsel?

MR. GORINSON: Thank you, Mr. Chairman.

Mr. LaFleur, would you please describe for the Commission the functions of the Office of International Programs?

MR. LA FLEUR: We are the staff function for international activities, the main staff function for international activities in NRC. We have two main functions; one in the NRC is the licensing of exports and imports; the other function which we will probably talk about today is the cooperation with other nations for the sharing of

information about safety and in the case of the newly starting countries that are just building programs to help them get good safety programs organized.

MR. GORINSON: Thank you.

US manufacturers of reactors export those reactors to foreign countries. Is that correct?

MR. LA FLEUR: Yes.

MR. GORINSON: And is that done with the cooperation of the NRC? Is there a process that the NRC approves?

MR. LA FLEUR: The NRC has to license exports of reactors or other utilization facilities or production facilities or nuclear materials, including fuel.

MR. GORINSON: As a condition of obtaining an export license, is a foreign purchaser required to agree that it will submit full information on transients to the United States?

MR. LA FLEUR: No, he is not.

MR. GORINSON: Are there information sharing agreements, however, between the United States and foreign governments?

MR. LA FLEUR: Yes, there are.

MR. GORINSON: How many are there, sir?

MR. LA FLEUR: There are 17 of the kind that deal primarily with regulatory and safety information and roughly an equal number that deal with cooperation in safety research.

MR. GORINSON: Do those agreements provide for a mutual exchange of information?

MR. LA FLEUR: Yes.

MR. GORINSON: And are foreign countries under those agreements advised of transients in US plants?

MR. LA FLEUR: Yes.

MR. GORINSON: And do these notifications come from the NRC?

MR. LA FLEUR: Yes.

They probably, also, come from their vendors who sell them US equipment, also.

MR.GORINSON: Does the NRC fully disclose the events of those transients to foreign countries?

MR. LA FLEUR: Do we disclose? Yes, we do.

MR. GORINSON: And under these agreements, do foreign countries fully disclose transients occurring at their plants?

MR. LA FLEUR: The agreements require exchange of information of this kind. The significant transients would certainly be an obligation under the agreement, yes.

MR. GORINSON: Do some foreign countries supply information about their transients on a confidential basis to NRC?

MR. LA FLEUR: Sometimes.

MR. GORINSON: Could you explain how the confidentiality

system works?

MR. LA FLEUR: The other countries, almost all of them, have a less liberal requirement for full public disclosure of safety information than we have in this country.

In fact, in most of the countries, the information that is generated in their government as a result of its regulatory activities remains confidential either because it is the property of the, still the property of the owner, the source, utility or because the rules and the government require it to remain confidential for other reasons.

For this reason if we want to receive that information we have to agree to protect it.

Our agreements provide,our arrangements for cooperation in regulatory exchange provide that we will protect such information from public disclosure. So we often receive, often, I would guess about 5 percent of the total information we get is that kind of information.

We are able to use it in our work and then of course, the instructions that come out of it for our reactors in this country is public information.

MR. GORINSON: Do domestic vendors have an obligation to report foreign transients to the NRC?

MR. LA FLEUR: Yes. No, not exactly. Vendors who have responsibilities defined in our regulations for safety of US plants, when they learn of a deficiency, a

safety deficiency in the US plant, they have to tell us about it under Part 21 of our regulations.

If they happen to learn of that deficiency as a result of foreign experience or any other experience they have to report it. They do not have to report to us the events that happen in a foreign country as such.

MR. GORINSON: So, as long as it has a safety impact on US plants a vendor would have to report it under Part 21?

MR.LA FLEUR: He would have to report the deficiency in the US plant, as he understood it.

MR. GORINSON: In August 1974, a transient occurred at a Westinghouse plant in Besnow, Switzerland. Are you familiar with the details of that transient?

MR. LA FLEUR: Yes.

MR. GORINSON: A turbine tripped at that plant eventually causing two pilot-operated relief valves to open in order to relieve pressure. Is that correct?

MR. LA FLEUR: Yes.

MR. GORINSON: One PORV closed, but the other one failed to open. Is that correct?

MR. LA FLEUR: Yes.

MR. GORINSON: That is the same thing that happened at TMI-2, is that correct?

MR. LA FLEUR: Yes, so far.

I don't know that two of them failed to --

MR. GORINSON: One did.

As a result of that PORV failure at the Besnow plant, the primary system pressure fell, but the pressurizer level rose. Is that correct?

MR. LA FLEUR: Yes.

MR. GORINSON: Are you aware that the same thing happened at the TMI plant, March 1979?

MR. LA FLEUR: Yes.

MR. GORINSON: Now, when pressure fell below 1600 PSI at TMI, the high pressure injection was automatically actuated. Did the high pressure injection automatically actuate at the Besnow plant?

MR. LA FLEUR: Not initially. The operator did learn early that his value was stuck open, and he closed it or he blocked it off.

Then when the level went down in the pressurizer, the safety injection occurred.

MR GORINSON: Why didn't the high pressure injection automatically initiate at Besnow when the pressure fell?

MR. LA FLEUR: Because, as I understand it, the injection was dependent on the coincident signal of low level and high pressure.

MR. GORINSON: So, in other words, in order for high-pressure injection to automatically actuate --

MR. LA FLEUR: It is at low level and low pressure, I guess, yes.

MR. GORINSON: Automatically actuated at Besnow. Pressure had to go down, and level had to go down?

MR. LA FLEUR: Yes.

MR. GORINSON: Prior to March 28, 1979, were there US Westinghouse plants that utilized coincident logic?

MR. LA FLEUR: I don't know. I assume that there were because there were -- prior to when?

MR. GORINSON: Prior to March 28, 1979, when TMI-2 occurred?

MR. LA FLEUR: Oh, yes, there were, excuse me.

MR. GORINSON: Is it your impression that coincident logic was a common feature of US Westinghouse plant

MR. LA FLEUR: Yes.

MR. GORINSON: Since March 28, 1979, has coincident logic been eliminated from US plants?

MR. LA FLEUR: Yes.

MR. GORINSON: And that is as a result of the TMI-2 accident?

MR. LA FLEUR: I understand it was already under consideration, but it was certainly brought on immediately after the TMI accident.

MR. GORINSON: T. a bulletin was sent out within a few weeks of the TMI-2 accident?

MR. LA FLEUR: Within a couple of weeks.

MR. GORINSON: To your knowledge, when did Westinghouse report the Besnow transient to the NRC?

MR. LA FLEUR: The first I heard about it was when your counsel gave me a copy of the Westinghouse report a week ago, approximately.

MR. GORINSON: You had not heard about it from Westinghouse prior to that date?

MR. LA FLEUR: Wait. I am sorry. I understand that in a meeting at the end of April Westinghouse mentioned that there had been an accident involving a stuck PORV valve in an incident in Europe.

We followed up and consulting with the Swiss, I guess Westinghouse must have said, "Switzerland," I was not in the meeting; we followed up and the Swiss sent us some reports on this incident in Switzerland.

MR. GORINSON: Do you know why it took five years for Westinghouse to report the Besnow transient to the NRC?

MR. LA FLEUR: No, I do not.

MR. GORINSON: In August 1974, when the Besnow transient occurred, was Switzerland obliged to report a transient such as Besnow to the NRC?

MR. LA FLEUR: I think, I don't know legally whether they were or not. It would depend on how serious they considered it. We did not have an agreement specifically

calling out cooperation in regulatory or safety information at that time. So, I would guess that they were not obliged.

MR. GORINSON: That agreement did not come into being until the end of 1974?

MR. LA FLEUR: December, yes.

MR. GORINSON: Does the Besnow transient, as you know it, raise any generic safety question concerning coincident logic actuation of HPI?

MR. LA FLEUR: It seems to now.

MR. GORINSON: Was coincident logic eliminated at Besnow prior to TMI?

MR. LA FLEUR: To the best of my knowledge it wasn't.

MR. GORINSON: Do you think coincident logic in US plants would have been eliminated prior to TMI if Besnow had been brought to the attention of the NRC?

MR. LA FLEUR: I would guess probably not because these things don't come about as a result of one incident, usually, one incident which had a fairly happy conclusion, but that is a guess.

There were some things about the incident that were, that were a lot different than TMI. The operator recognized, as he should have, what the situation was and corrected it.

The instrumentation, I believe, worked a little

better, and indicated correctly the position of the valve, and not much water went out of the primary system.

Definitely or apparently from what we have heard there was no public exposure, and apparently it was not considered at the time to be nearly as significant as we considered TMI to be.

MR. GORINSON: I have no further questions, Mr. Chairman.

CHAIRMAN KEMENY: Let us see. Mr. La Fleur, you said that it was not a very significant incident or words to that effect. Do you know, to your knowledge, as to whether saturation was reached in that particular accident?

MR. LA FLEUR: I believe it was,because of the way the -- I believe the reports that we have say that it was. Certainly it appears from the way the level in the pressurizer went up that there was a bubble, a void.

CHAIRMAN KEMENY: Yes. Do you know whether that occurred a number of minutes before the high-pressure injection system eventually came on?

MR. LA FLEUR: Apparently the level in the pressurizer went up and only went down after the stuck valve was blocked, was blocked shut, the line that the stuck valve was on was blocked shut, and so it would seem to be that if there was voiding, boiling in the primary system it occurred, it was stopped by shutting off the valve and then when the

level went down, the high-pressure injection occurred.

CHAIRMAN KEMENY: Have you seen the analysis of Westinghouse Corporation that was prepared on September 4, 1974, of this event?

MR. LA FLEUR: Yes.

CHAIRMAN KEMENY: As you recollect that document, if you wish to refer to it, you are welcome, of course, was Westinghouse fully aware in 1974 that saturation had occurred and cavitation occurred in some of the pipes as a result of it?

MR. LA FLEUR: I believe I recall that from reading the report. So, I --

CHAIRMAN KEMENY: Absolutely, take your time.

(Pause.)

MR. LA FLEUR: On Page 5 of the report it says, "Subsequently" describing the early events "hot leg flashing resulted in an increase in pressurizer level."

So, from that I conclude that Westinghouse knew there had been boiling.

CHAIRMAN KEMENY: Yes, and as you yourself pointed out, the high-pressure injection system did not come out, did not come on until the operator correctly diagnosed the open PORV valve which allowed the pressure, the level in the pressurizer to drop to a low level. Is that not correct?

MR. LA FLEUR: That is what the report said, yes.

CHAIRMAN KEMENY: And if you will look on Page 3 in their sequence of events, this is an incident that started at 11:20 a.m., do I read this correctly on Page 3 that is 11:32 plus or about 12-1/2 minutes into the accident or the high-pressure injection system is actually initiated?

MR. LA FLEUR: Yes.

CHAIRMAN KEMENY: And prior to that there are in the sequence of events descriptions of saturations having been reached then, the kind of phenomenon you described.

Now, let me ask you, suppose the operator; I mean clearly there was very prompt and proper operator action here, suppose the operator had taken significantly longer time to recognize that the PORV was stuck open; what would have happened in this particular accident, in your best opinion?

MR. LA FLEUR: Well, if he had not at any point done anything to close the system, he would have had a blowdown of the primary system. If he did not recognize he was losing water from the primary system, the boiling would have soon, eventually damaged the core, I would guess, if the water was going out fast enough.

CHAIRMAN KEMENY: Yes. Isn't it true, as a matter of fact, that according to the sequence of events a quite substantial amount of water was lost from the syster? I

believe the sequence of events refers to relief tank pressure rising and eventually, I believe, it closed its seal.

MR. LA FLEUR: I don't know exactly how much was lost. The valve was broken, and when I said that it wasn't a great loss, I was comparing it to TMI.

CHAIRMAN KEMENY: But isn't it a true statement that although the system works quite differently and therefore relies on different kinds of safety features, if there is a turbine trip a PORV sticks open; there is some significant loss of water; the HPI for different reasons does not come on, and the confusion, in this case the HPI not coming on is due to the fact that it relies on the pressurizer level dropping low before HPI comes on?

MR. LA FLEUR: Is that similar to TMI you mean?

CHAIRMAN KEMENY: Yes.

MR. LA FLEUR: Yes, there are some differences, also, in that what caused the pressure rise in the system was a failure of a steam bypass line instead of failure of feed water supply.

CHAIRMAN KEMENY: Yes.

MR. LA FLEUR: As in TMI, and as I said, the operator in this case recognized the problem. Apparently his instrumentation worked correctly, and those are the significant differences.

CHAIRMAN KEMENY: Yes, I do not contest that you

are correct in that, but the point I am trying to get to is that we have had testimony over and over again that there has been confusion in operators' minds and perhaps in the minds of some of those who wrote the instructions for operators as to how much one can rely on water level in the pressurizer as an indication of how much water there is in the system.

Would you not say that this particular system was actually designed with that particular confusion built into it?

MR. LA FLEUR: It certainly was vulnerable to anything that was wrong with that coincident logic.

CHAIRMAN KEMENY: Yes, and is it not reasonable for me to assume that the reason NRC ordered the instructions in April of this year for that to be changed was because of that vulnerability?

MR. LA FLEUR: It is my understanding that that is correct, and you will have witnesses today that know a lot more than that, and I wish you would please refer those to them.

CHAIRMAN KEMENY: Yes, I suspect we may ask that question again.

Let me now return specifically to your area of expertise and I do not wish to make too much of one particular incident, particularly as you said, "Thanks to fortunately

having operators acting very promptly in this case it did not turn into a major incident," but I would like to know how much feedback one, in effect, gets that helps identify possible generic safety problems from the international program? One hopes that there will be very few serious accidents; though if there are some that even have the potential of it, one has to learn all one can.

Do you know why NRC did not hear about this incident? I understand you gave us an explanation that the Swiss Government was under no obligation to do that because our agreement was not signed with them until later, but why would you not have heard from the domestic supplier before 1979 on this?

MR. LA FLEUR: Well, the first question was how much do we get from other countries. The other countries are behind the United States in the number of reactors and in the number of years of experience in operating the reactors and in setting up their systems for reporting and analyzing and using operating information. So, with that in mind and keeping in mind, also, that we have more reactors than anyone else, we nevertheless have gotten over the last few years very good information about transients and foreign experience.

Most of the major generic problems that have come to the attention of the public have been, we have learned about

either before, from foreign information, either in one or two cases before or concurrently with the information that we learned in this country.

We have had very good exchange. All of our, all of these problems, not all, but most of the major ones have had the full benefit of consultation internationally about the technical facts so that we bring all of the experience that is available overseas, as well as here to solve the problems.

As to why -- that system is not perfect, and I don't want to say it is. It needs a lot of improvement, but the Swiss have been cooperative. They have reactors of both the PWOR and the BWOR kind that have operated as long as any of ours almost, and the main problems that have occurred in the technology of those light water reactors have on many occasions been experienced in Switzerland. We have had very good exchange of information with them on these incidents and issues.

This one incident, I can speculate several reasons as to why they did not report it and why Westinghouse did not report it.

CHAIRMAN KEMENY: Yes. I am not trying to pursue Switzerland on this since you have already testified that the exchange agreement was signed after this incident occurred. Therefore, I don't think there is any point in

exploring that, but why would Westinghouse not have informed the NRC? Were they, for example, under obligation to do so?

MR. LA FLEUR: Westinghouse is required under our regulations to set up a system for learning, for collecting information about anything that would alert them to problems in the United States reactors, and they are required then to analyze this information and then to advise us if they conclude that it reflects some kind of a deficiency with regard to safety in the reactors in this country for which they are responsible.

The Part 21, the law requiring that this Part 21 be written was the reorganization bill in 1974, which was passed in November 1974, and the regulation itself was not published until a year or so ago, because it was a very complicated regulation to write.

So, Westinghouse in its report did not seem to be concerned that this was a major incident or would involve other reactors. Most of the analysis in this report seems to deal with the physical damage to the piping and the valves and whether the plant, what would have to be done to assure safe startup of the plant again.

To say that they should have told us would be to conclude that they had failed somewhere in that long chain of collecting information which had happened before the law was written and analyzing it and concluding that it did

reflect a safety hazard in this country and reporting it to us, and I don't know where that broke.

CHAIRMAN KEMENY: You have mentioned just now from that report that a good deal of it deals with the physical damage to the piping and the questions on whether the plant can be safely restarted. Do you feel that the system is working well if there is physical damage to piping and questions as to whether the plant can safely be started up, and such things are not required to be reported to your office or to an appropriate NRC office?

MR. LAFLEUR: The conclusion of the report, as I recall, is that one of the main problems was a defect in the valve. I would prefer the system -- I would say the system were not working well if something as significant as this happened today and if we didn't learn about it and do something about it, or at least analyze whether something should be done.

CHAIRMAN KEMENY: Thank you. Governor Peterson?

COMMISSIONER PETERSON: Mr. LaFleur, I visited last week the International Atomic Energy Agency in Vienna, and they described how they have been looking into the Three Mile Island accident and expressed great concern about such an accident occurring in a developing country where they don't have any significant backup, technical backup, as we do in this country. And we here have been concerned about the thinness of the backup at Three Mile Island.

They say that countries with no technical infrastructure are buying reactors, and they don't even know what a

Geiger counter is, and that in those countries that have few if any people assigned to functions like Nuclear Regulatory Commission -- licensing, inspection, regulation.

Is this a good description of what is going on in the developing countries, and are you involved in any way in trying to promote better backup -- thus, better safety -- in the developing countries?

MR. LAFLEUR: Yes, sir. We have been -- I mentioned that one of our other functions in the international activities at NRC is to participate in the U. S. government, with other agencies of the U. S. government, in the support of the IAEA efforts and in many bilateral efforts to improve and to help the developing countries to maintain good regulatory organization and good emergency planning and that kind of thing.

We have analyzed for our Commission, which has approved as one of our objectives in the last couple of years that we initiate in our government and thence in the IAEA a new program of increased safety in the IAEA. We had started these discussions before TMI, and in the last meeting of the Board of Governors of the IAEA in June, a program of increased attention to the safety programs in the developing countries, in new countries that have reactors, was approved.

I hope that there will be a lot done in the IAEA and indirectly between the developing countries and other countries in the next few months, years, to improve the situation in

those countries.

COMMISSIONER PETERSON: I understood that some of the people at IAEA thought that the probability of developing countries establishing any significant backup was very low because their whole kind of infrastructure was so low and their resources financially were so low.

I was concerned whether we in the United States today were promoting the sale of reactors in developing countries with so little backup in those countries to provide for adequate safety.

MR. LAFLEUR: This is a very complex question. If a country, a developing country, has only a few reactors, it can be assumed that they have fewer people and less experience to devote to the safety problems that will occur, including incidents and accidents.

On the other hand, if they have to maintain more versatile and more local support because they don't have as much industrial support as another country would have, then in the critical time right after an incident started, it might be that they would be better prepared. On the other hand -- and then later on, what has to be brought in is industrial support, a certain amount of government monitoring and management, and then a large industrial effort to minimize the harm and to clean up.

That does not have necessarily to be located in the

country where the accident happened. So we can do a lot by being sure that they have the benefit of our experience and the assistance in training, our assistance in training and in teaching them how we do things in terms of being prepared for an accident, being prepared to protect the public in case of an accident, and then it might be that the lack of availability of full industrial capacity of one of the leading countries is not necessary.

COMMISSIONER PETERSON: Do you believe that the reactors in developing countries today and those currently being installed will be as well backed up as Three Mile Island was?

MR. LAFLEUR: I don't have first hand experience that would enable me to judge how well backed up, in the critical times involved, Three Mile Island was as compared to all the other plants in this country, for example, or any other leading countries, and I would have to say that I have been one of those who has been very concerned about the obvious potential for more problems in the countries that have only one or two reactors that are just getting started.

In general, I would say that we have to be very careful about -- or we have to be very diligent in helping the developing countries to avoid that problem.

COMMISSIONER PETERSON: Another question: It is apparent that the containment building at Three Mile Island was

extremely important in protecting the community from radiation, even today with its very highly lethal radiation in that containment building, and yet I learned that USSR normally produces reactors, builds plants, without containment buildings and that when they tried to sell such a reactor to Finland, the Fins objected and obtained the rights to build a containment -- the design for a containment building from the United States to put around this Soviet reactor.

Now, my question is, to what extent are reactors used around the world without containment buildings?

MR. LAFLEUR: Except the Soviet Union reactors, I believe all of the power reactors around the world have containment structures. The Soviet reactors, although some of them, or most of the present Soviet reactors, do not have the obvious large containment dome that we call containment, they -- at least some of the later versions that are operating have some of the elements of containment. They have a shell around the system which, in an incident, serves to contain the released products and to enable removal to filter it and clean up -- and cooling systems. And so there is a certain element of containment in some of their plants.

And the new thousand-megawatt PWR's that they are building will have containment.

COMMISSIONER PETERSON: Do we require that any reactor sold by the United States be constructed with the

containment building?

MR. LAFLEUR: To the best of my knowledge, we do. I'm sorry, I don't know that for sure, but I know of none that don't have.

COMMISSIONER PETERSON: One last question: I understood also that the editor of Nuclear Safety went over last year to IAEA to ask them for some examples of safety problems that they had encountered that could be used to show how that safety problem was responded to effectively, and IAEA was unable to help them because, they said, they had to respect the confidentiality of the information, and they found it difficult to get information out of a country. They said, for example, if France reported their incidents and the Germans didn't, then the Germans would have a competitive advantage internationally in selling their reactors.

Furthermore, they contended that from a public relations standpoint, it would be dangerous for IAEA to dig into accidents and report on them. Now, is this a general problem that may be seriously interfering with our acquiring knowledge about problems with reactors and how we can further the safety of operating them?

MR. LAFLEUR: The problem is to adequately deal with these safety questions, still respecting the rights of the countries that are involved. If we had the right to -- or an international organization had the right to go in and

investigate an incident or to demand a report and to presumably police its accuracy. This would violate what most countries considered to be their rights. We in this country are not prepared to give that kind of information about how we protect our public to any organization that comes along.

So the IAEA has worked in the past on a confidential basis with the countries that ask it for -- that ask the IAEA to make safety inspections, for example. If they want to know what is wrong, if there is anything wrong with a factor or a part of their nuclear energy program or one of their reactors, they might ask the agency to, the IAEA, to make an inspection. The IAEA would put together a team to do it, maybe, and the report would be a matter between the IAEA and that country. The IAEA would agree to respect any requests that the country made that the information not be published.

So far, that is the only way that most of the countries will agree to operate.

COMMISSIONER PETERSON: In other words, that information --

MR. LAFLEUR: It does not mean that safety is not dealt with; it just means that it is not published for everybody to see.

COMMISSIONER PETERSON: In other words, you do not have the benefit of the experience, then, of the other countries and their safety problems because they can't let that information

flow to you.

MR. LAFLEUR: We have agreements with them directly, most of the countries, 17 of the countries, that -- under which both countries permit to exchange information. As I said, we get good information out of the exchanges. We don't get anything like the information we get out of our systems which, because of all the licensee event report systems which are made public -- our licensee event reports, which are made public and deal with very minute incidents, anything that happens in our plants. We don't have that kind of thoroughness of reporting of foreign incidents.

We do have reporting of important incidents. Because of the factors I mentioned before, I am not satisfied that it is good enough yet, and we are working on improving them.

COMMISSIONER PETERSON: Thank you, Mr. LaFleur.

CHAIRMAN KEMENY: Professor Taylor?

COMMISSIONER TAYLOR: I would like to just briefly follow up on the question that was touched on by Governor Peterson's line of questioning, and that is, is it fair to say that there does not exist now in the world any institutional framework for systematic review of the operating experience of all the world's reactors, let's say outside of the countries with plant(?) economies, the Communist countries, for safety related purposes aimed at trying to keep the reactors as safe as possible?

MR. LAFLEUR: For systematic, meaning something that wouldn't miss any, I would say that is a fair statement.

COMMISSIONR TAYLOR: Is it fair to say that because of the nature of the International Atomic Energy Agency, its necessity for responsiveness to confidentiality requirements, and so on, is it fair to say that a large proportion of safety related incidents are not likely to become generally known to the world, public, that might be interested?

MR. LAFLEUR: There is no reason why a certain system for respecting confidentiality requirements couldn't be set up in the IAEA. We are in fact trying to set up a system of a certain threshhold of reporting in the Nuclear Energy Agency of the OECD in Paris. That is an organization of mostly the advanced countries, advanced industrialized countries. They have an active nuclear energy program and are trying -- we are trying as sort of an experiment now to see whether a useful system of reporting can be set up.

The problem with those international systems, multilateral systems, is that people tend to respond better to bilateral arrangements wherein it is easy to pin down who is going to answer it, who is going to be responsible in each country, and it isn't a situation of some countries throwing in all their information, as we would do, because we automatically publish it, and other countries just riding for free.

We have not reached a stage of development yet, I

think, where we can really depend on all the countries to voluntarily throw in the level of detail that you are talking about, but I am hoping in this NEA thing we will learn a lot about how that can work at a certain level of sensitivity.

COMMISSIONER TAYLOR: Was this IEA, the European Energy Agency, activity initiated as a result of TMI?

MR. LAFLEUR: No, that has been -- that was before TMI. That was -- we started about a year ago on that. Right now it is the NEA, the Nuclear Energy Agency of the OECD. It is being carried on under a committee of the NEA called the Committee on the Safety of Nuclear Installations.

There is a working group right now in which we have a member that is exploring the possibilities as regards an agreement among the countries that would agree to contribute and the format for reporting, because that is very important. Nobody would try to use all of the information that comes out of every power plant, and so this implies a certain threshhold will have to be established and followed by all the countries to produce a usable bank of information.

COMMISSIONER TAYLOR: I see. Are you aware of any instances of foreign reactor transients, whether supplied by U. S. vendors or someone else, that has led directly to changes in either design or operating procedures in U. S. reactors, for safety reasons?

MR. LAFLEUR: Well, the one we have been discussing

was probably in the minds of the people who knew the system, in Westinghouse, for example, and so it must have made -- it conceivably made some contribution, because Westinghouse and we, together, as I understand it, initiated this change after TMI.

COMMISSIONER TAYLOR: Well, this was after TMI and has come out about five years after it happened. I guess I am interested to know whether at any time in the history of U. S. and foreign nuclear programs there have been instances of the value of keeping alert to what is going on in operating experience in terms of actual changes in what we do as a result of that experience, but based on foreign experience. That is what I am trying to get at. How helpful has that been?

MR. LAFLEUR: I can name a few cases. There is a -- I don't know the degree of formality of this change, but we operate our PWR's in a certain way based on experience that has been gained here and abroad with water hammer problems. If we learn about a tendency of a certain flying arrangement and of a certain concept to cause water hammer, we could adjust our requirements for operating the plants accordingly, and we have done this.

We have, over the -- and this based to a large extent on foreign information. We have received good cooperation and used the information on the well known stainless steel pipe cracking problems in BWR's and have from time to

time examined our plants very carefully and issued instructions about inspections, and so forth, based on what we recognized to be a generic problem, and a large part of the experience for that has come from Germany and Japan.

COMMISSIONER TAYLOR: Has that experience become useful to the United States through the bilateral arrangements, or have there been instances in which this foreign experience has been useful to us by some other mechanism like the International Atomic Energy Agency or ERATA in the old days or any other institution.

MR. LAFLEUR: The information usually comes to us of experience overseas -- if we learn it for the first time overseas, as having happened overseas, it usually comes almost simultaneously from the governments that we deal with and from the vendors. Usually it is in an informal conversation or a cable is received about something that happened, and usually the U. S. vendor, who usually still is involved in the plant, some kind of consultant relationship with the utility, is informed also, and so he is working on the problem at the same time, and naturally the whole community works on it at once.

COMMISSIONER TAYLOR: Is there any indication of a greater alertness to the need for information about possible transients, particularly those that involve inappropriate actions by operators? In our bilateral arrangements with foreign countries, particularly those that we have reason to

believe don't have, or, as Governor Peterson put it, are really thin, technically, do we tend to be more alert to what goes on through our bilateral arrangements in those cases, and if so, what basis is there for saying yes?

MR. LAFLEUR: We distribute to them as much of our operating experience as we can. We send them all of our LER's. This is the Licensee Event Reports. They are probably too voluminous for anybody to, at this point, to really take full advantage of.

COMMISSIONER TAYLOR: But is this beyond what you do with situations in, say, West Germany or France, where there is a big backup? I guess I am looking for additional things that you do beyond what you might do in a -- this is so far as NRC action is concerned, or action called for by NRC. Do you do anything different when you are dealing with a developing country that adds information or tries to somehow make up for than thinness, technical thinness?

MR. LAFLEUR: The program that I mentioned in the IAEA is concentrating on helping the developing countries. That means that their people will receive the training. The training that will be under this program will be primarily for representatives from the developing countries.

COMMISSIONER TAYLOR: Well, I guess I am interested in what we do bilaterally, independently of the IAEA. In other words, do we something special when we sell a reactor to a

developing country?

MR. LAFLEUR: We don't neglect to give them anything that we do give the other countries. so they get the full benefit of that.

We have a program of a kind of fellowship in our staff wherein we receive representatives from the regulatory organizations of the developing countries. There are only a handful of countries that are right now building U. S. reactors, that are operating them, that need this kind of -- would be in this category that you are talking about.

We do receive their people to gain experience in our staff and to go home better informed of how we do things. We participate with the other advanced countries in missions that are organized by the IAEA to go to these countries and perform some of these advisory missions. I personally try to meet with the people from the developing countries who are working on their safety programs at least once a year, and it is usually more often, to see what it is that they need at the time and to help them to get it.

COMMISSIONER TAYLOR: Well, now, in a somewhat more sort of demanding mode, do we impose safety related criteria or conditions on the sale of a reactor from the U. S. to a foreign country, developing or otherwise, that is safety related and that relates to operating procedures or processes as a condition for sale?

For example, do we require anything that has to do with the level of training of operators as condition for sale?

MR. LAFLEUR: No, we do not.

COMMISSIONER TAYLOR: Do you think we should?

MR. LAFLEUR: Personally, I do not.

COMMISSIONER TAYLOR: Does that suggest that you would leave it, then, to the governments of the countries to which we sell reactors to provide the mechanism for making sure that the reactors are operated safely? From do we look to to make sure that operators know what they are doing? I guess this is what I am after.

MR. LAFLEUR: We have to look to the government that is responsible in the country that is operating the reactors. We could require that they agree to operate a good safety program and to supervise their operation and these things in an agreement or as a condition of our export license, but if we did, they would be very reluctant to accept this. It would be a factor that presumably would have to be enforced, and they could then be subject, presumably, to our cancelling the next shipment if we, for some reason -- if they had an accident or if somebody reported that they were going to have an accident, and they would look with very much suspicion and concern at this kind of an arrangement.

There are situations now where countries feel that any time we decide to change our process a little or if

there is a public concern about something that is happening in that country that reflects in its reactor, that they will be cut off; they will not get the shipment that they planned on, that they need, and I would be very cautious about making that kind of a demand in this respect.

COMMISSIONER TAYLOR: It seems to me, then, that we are stuck with a situation in which we just have to trust other governments to do what is appropriate to operate reactors safely and can't really have much effect on what people do, as long as they don't carefully pay attention to all of the signals that have to do with reactor safety and are competent to apply them. In other words, we have to trust them to do that. Is that a correct picture?

MR. LA FLEUR: Yes. As they trust us to do it here.

COMMISSIONER TAYLOR: Now, one final question. Are you aware of any incidents, transients, in which it is generally agreed that there was voiding of the core in a light water reactor -- pressurized water reactor, I am sorry -- of any kind outside of the United States, in addition to this Swiss reactor that we talked about earlier in your testimony?

MR. LA FLEUR: No.

COMMISSIONER TAYLOR: Thank you very much.

CHAIRMAN AHEARNE: Let's see. There are four commissioners waiting to ask questions. Professor Marrett is first.

COMMISSIONER MARRETT: I am interested in the operation of the Office of International Programs. As I understand it, one responsibility or one function of that office is to issue import and export licenses for power reactors, research reactors, radioactive materials. My first question is are there any instances in which an application has been denied?

MR. LA FLEUR: On the basis of safety considerations?

COMMISSIONER MARRETT: On whatever basis.

MR. LA FLEUR: The NRC did not approve the issuance of a license for one of the exports of fuel to the Terrapur reactors in India. After that in the procedure prescribed in the Non-Proliferation Act, the President overrode our decision and approved the application. There are some other people who could refresh my memory here, but that is the only one I know.

COMMISSIONER MARRETT: And on what basis had NRC recommended the denial of the application?

MR. LA FLEUR: We had a commission that simply did not vote in favor of it. The case of India and its non-proliferation situation is a very, very complex one. It was on the basis of non-proliferation considerations that it was not approved by NRC.

COMMISSIONER MARRETT: It was not on any technical grounds. Is that right?

MR. LA FLEUR: It was not on safety grounds, no.

COMMISSIONER MARRETT: Well, to give me some sense of what this means, about how many applications would you get, say, in the course of a year?

MR. LA FLEUR: For export of fuel and reactors?

COMMISSIONER MARRETT: Yes.

MR. LA FLEUR: Several hundred.

COMMISSIONER MARRETT: And of the period --

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MR. LA FLEUR: Only two or three reactors a year, fuel or other materials, radioactive materials and reactors.

COMMISSIONER MARRETT: So, during the time you spend in the Office of International Programs, there could have been some 400, 500 applications?

MR. LA FLEUR: Yeah. Hundreds.

COMMISSIONER MARRETT: And only one that you can recall in which NRC recommended that it be denied?

MR. LA FLEUR: May I ask someone to refresh my memory on that? Would that be all right, Mr. Chairman?

CHAIRMAN KEMENY: Yes.

MR. LA FLEUR: Jim, is that a fair statement?

MR. SHAY: Yeah, I think that --

MR. LA FLEUR: Mr. James Shay, the director of the International Program.

MR. SHAY: I think that is a fair statement, although I would clarify that the Commission's vote on that particular territory application was a tie vote, two to two. It wasn't a majority vote in favor of the dias, so by failure of the Commission to reach a positive decision, the case was referred to the Executive Branch (inaudible). But that is the only case that I can recall. I think there was one relatively minor case a long time back, which was also turned down, but those are the only two that I can recall in the course of the time that I have been with them, which is about three years. And,

of course, in that time there has probably been a thousand or more licenses that have gone, as Joe indicated, several hundred per year, (inaudible). A lot of these are relatively minor things, components for reactors, small (inaudible).

COMMISSIONER MARRETT: Well, I would like to follow up on that because one possible interpretation would be it is a fait accompli that anyone who puts in an application, it is going to be approved and I am sure that there are some other responses that could be given to that. But how might you explain to a general public the fact that there is an office charged with the responsibility for reviewing applications and they all get through.

MR. LA FLEUR: There has been a very, very strenuous tightening of export requirements in the last few years and they mostly deal with non-proliferation matters. The countries that have contracts with us to supply fuel or to supply reactors have agreed over a period of time with us, to tighten the requirements. Certain ones still have not quite met all of the requirements or there is some disagreement among the commissioners as to whether they have and India is one of them. And for that reason there have been -- at least in that one case was -- but, in fact, the tightening of the requirements has taken place. Now, some countries, as a result of it, have -- as a result of this tightening have gotten to depend less on the United States for their reactors and fuel and have turned to

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other countries or to their own resources. But anyone who knows the history of the non-proliferation policy in our country, I think, would assure you that our licensing over the last few years has been the final instrument in a very, very strong and successful effort to tighten the non-proliferation requirements that all of the recipient countries are agreeing to and living up to.

COMMISSIONER MARRETT: I would like to return to a slightly different area that bears, though, on the operation of your office. I would like to know as deputy director of the office, how do you assess how effective your office is? What is your basis for knowing whether or not you and your staff, particularly in this case, how do you determine whether your staff is doing a good job?

MR. LA FLEUR: Speaking of the exchange of safety information, I meet with the people overseas or in here, people from overseas and discuss with them from time to time, annually or more often, the program that they have, what they are doing in it and what information is coming out of it and what we are exchanging. We mail reports to them. They mail reports to us. We have many visitors. All the visitors come back to one one degree or another we consult with the travelers and we learn and they learn and report to their fellows in the staff things about the foreign programs. By means of this constant surveillance of what is going on and how the countries seem to

be reporting, seem to be developing their safety programs, I am able to judge where we should put more emphasis and where we are achieving some success.

COMMISSIONER MARRETT: Let me ask -- that is on one side of your office's responsibilities, as I understand it. That is on the program side. Your other side in the area of licensing, how do you evaluate there whether or not you are doing an effective job, with reference to licensing?

MR. LA FLEUR: Well, the -- you are speaking of licensing of exports. The agreements that the countries make with us in terms of non-proliferation measures -- this is not safety, but non-proliferation -- are enforced by their agreement to let the IAEA, as an international organization, make inspections to locate and to count and to continually audit, repetitively audit, to assure that all of the materials that we sent overseas is not being diverted from the peaceful purposes that we agreed to send it for.

CHAIRMAN KEMENY: Excuse me, Mr. LaFleur. May I interrupt you for a moment, please. This is now twice in a row when Professor Marrett asked you about how things are enforced, you switched to non-proliferation. That is not particularly the charge of this commission. We are very much interested in the question of safety. Would you be willing to answer Professor Marrett's question in the context of safety.

MR. LA FLEUR: I am sorry. I thought she was asking

about licensing. In the case of licensing, we don't connect the issuance of an export license with any safety requirements or requirements for reporting of safety events.

CHAIRMAN KEMENY: Did we understand you correctly? There is no safety consideration in issuing an export license?

MR. LA FLEUR: There are two exceptions, I would have to say. One is that the President, last January, issued an executive order that will require that before any United States agency conducts actions relating or the action of exporting or approving the export of a reactor that a certain amount of review of the environmental impact overseas of that export will be made and taken into consideration. The agencies involved, the State Department and the NRC and the other agencies, are in the process now of writing regulations to implement that decision.

The other incident that comes to mind is there is a large controversy now around the export of a reactor to the Philippines and there has been a controversy in the Philippines and here about several things connected with the building of the plant and the contracting for the plant, one of which was the safety considerations. We understand from our discussions with the State Department that they are trying to get some kind of a resolution of the safety concerns, among other things, before they make their recommendations to us. So, those are the two exceptions.

COMMISSIONER MARRETT: Let me see if I can summarize what, at least I gathered from some of your last comments. Although one of the charges of the Nuclear Regulatory Commission is to protect the responsibility -- as cited in the statement is to protect public health and safety, at least in the past the Office of International Programs in issuing export licenses has not had this as a major priority in its decision-making. Is that a summary of at least the way that it has worked?

MR. LA FLEUR: Because the charge is to protect health and safety in this country and not overseas, that is true.

CHAIRMAN KEMENY: Professor Pigford.

COMMISSIONER PIGFORD: Mr. LaFleur, does this country have an agreement with Japan?

MR. LA FLEUR: Yes, sir.

COMMISSIONER PIGFORD: Do you happen to know if the staff report on the generic assessment of feedwater transients and pressurized water reactors was the new reg 0560, called the Tedesco Report, was sent to Japan after it was issued?

MR. LA FLEUR: Yes, sir. It was.

COMMISSIONER PIGFOPD: Have we received any comments from Japan on that report to your knowledge?

MR. LA FLEUR: We have had several visits of technical teams from Japan and in the last month we have had the senior licensing man of the ministry that licenses in Japan

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visit the people who wrote the report to discuss an incident that happened in their country recently. As to whether he commented in general on the report as a whole, I don't know.

COMMISSIONER PIGFORD: Now, that incident I don't find mentioned in your deposition. Have I overlooked it or was it mentioned?

MR. LA FLEUR: I don't think I mentioned it in my deposition.

COMMISSIONER PIGFORD: Is it related to the TMI accident, do you think?

MR. LA FLEUR: It was a transient in a PWR in Japan, which apparently happened as a result of a faulty instrument. I think it was, again, not a very serious incident. It was reported to us in the course of our usual exchange of information and it was of urgent interest to the Japanese at the time because they had shut down all of their PWRs, only one of which had been operating when they issued the order. And the first ones to restart --

COMMISSIONER PIGFORD: Excuse me. Do you mean they shut them down after this transient of theirs?

MR. LA FLEUR: No, they shut them down after TMI.

COMMISSIONER PIGFORD: After TMI.

MR. LA FLEUR: And one of the first two to start up was the one that had this incident and so they were in the process of approving the start-up of their other reactors and

when this incident happened, we saw reports of it and asked them to give us more information on it and they did.

COMMISSIONER PIGFORD: Now, you say this incident. Did that happen after TMI or before it?

MR. LA FLEUR: Yes after.

COMMISSIONER PIGFORD: I see. Could you characterize that incident for us? What happened? And also, I guess, I need some clarification because it sounds like this incident happened after TMI, but their reactors were shut down. How could it have happened? I missed something there.

MR. LA FLEUR: The first two plants at one site that were started up after they had shut down the PWRs, of those first two, one of them had this incident soon afterwards. It was more of a -- I would call it more of a transient, an interesting transient, than an incident because there was very little external effects --

COMMISSIONER PIGFORD: Fine. Transient? What kind of transient? What happened?

MR. LA FLEUR: I am sorry. I don't know enough of the details of it to tell you.

COMMISSIONER PIGFORD: Do you have a report on it?

MR. LA FLEUR: We have a report on it.

COMMISSIONER PIGFORD: Could we get a copy of that, please?

MR. LA FLEUR: I don't know. I will see what we have

and I will communicate with the board about it, if it is okay.

COMMISSIONER PIGFORD: Now, why did they shut down their plants after the TMI accident?

MR. LA FLEUR: They were concerned, I suppose, about the implications of TMI.

COMMISSIONER PIGFORD: Do they have any pressurized water reactors which are designed or manufactured under license by B&W?

MR. LA FLEUR: No. These were Westinghouse-type plants.

COMMISSIONER PIGFORD: All Westinghouse-type. Do we know any more specifics about their concerns? Why they shut them down?

MR. LA FLEUR: I believe it was for the reasons that we mentioned, the things that we had learned in the early days after TMI that should be investigated and reviewed carefully and maybe even adjusted, such as this coincidence logic in the pressurizer. That concerned them. In fact, one of the things that they are doing is changing the type of coincidence logic that they use.

COMMISSIONER PIGFORD: Now, has NRC, after TMI, issued any such analysis the generic assessment of feedwater transients in pressurized water reactors designed by companies other than Babcock and Wilcox?

MR. LA FLEUR: I don't think there is a generic

report on transients in Westinghouse or other PWR plants yet. There have been extensive staff studies and discussions with the individual operators and the vendors and a lot of action has been taken, but to the best of my knowledge, no report has been issued.

COMMISSIONER PIGFORD: It sounds as if Japan decided on their own initiative to shut down their pressurized water reactors of a non-B&W-type after TMI accident. Is that correct?

MR. LA FLEUR: That is right. They did.

COMMISSIONER PIGFORD: Now --

MR. LA FLEUR: Only one was operating at the time, as I said.

COMMISSIONER PIGFORD: Only one was operating?

MR. LA FLEUR: Only one of the seven or eight of their PWRs happened to be in operation at that time.

COMMISSIONER PIGFORD: I see. But they officially shut them all down.

MR. LA FLEUR: That is right and made extensive reviews of the kind we are talking about before they allowed them to reopen.

COMMISSIONER PIGFORD: Were there any modifications or procedures or equipment required before they were allowed to reopen?

MR. LA FLEUR: The one I know about is a change in the logic of this injection signal in the pressurizer.

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COMMISSIONER PIGFORD: This is the coincidence logic?

MR. LA FLEUR: Yes.

COMMISSIONER PIGFORD: That change was made?

MR. LA FLEUR: Yes. Well, what they did -- the report that I have would give more detail, but they didn't eliminate the coincidence logic as we did. They changed the set points on one or both of the parameters.

COMMISSIONER PIGFORD: Does it mean then that you have a report from Japan on their analysis of their reactors prior to their start-up, the analysis of the safety of their reactors?

MR. LA FLEUR: Yes. I didn't read the report completely, but we have a report, at least on the conclusions that they reached.

COMMISSIONER PIGFORD: Yes. Now, that is different from the report you mentioned earlier which is on the specific transient that happened during their start-ups then. Is that correct?

MR. LA FLEUR: Yes.

COMMISSIONER PIGFORD: I see. How would you identify that report? Does it have some title? I now mean the report by Japan prior to the start-up -- authorization of the restart-up of their reactors. Does it have some title that you remember?

MR. LA FLEUR: The plant involved in the incident was OE.

COMMISSIONER PIGFORD: I am sorry. I am not speaking of the restart-up incident. I am now speaking of the analysis that finally led them to the decision to go into a new start-up.

MR. LA FLEUR: I don't remember what title it carried.

COMMISSIONER PIGFORD: There is a report, though?

MR. LA FLEUR: There is some paper on it, yes.

COMMISSIONER PIGFORD: And if we were to request it, then it is physically there and we might be able to obtain it?

MR. LA FLEUR: It is what, sir?

COMMISSIONER PIGFORD: The report is physically there and if we were to request it, we might be able to obtain it?

MR. LA FLEUR: Yes, sir.

COMMISSIONER PIGFORD: Do you have --

MR. LA FLEUR: I am not sure how extensive or how useful it will be, but there is a report there.

COMMISSIONER PIGFORD: Well, I don't know either. It sounds as if it was a post-TMI reaction by a foreign country to the issues at TMI, even though the reactors were not B&W reactors.

MR. LA FLEUR: Yes, sir. There have been several overseas reactions. We have tried to compile them and I have

a report on that.

COMMISSIONER PIGFORD: Yes. Could you describe what other reports you have?

MR. LA FLEUR: Well, each country has done a little bit differently from the others. In the case of the Swedish plants, they have had an on-again, off-again moratorium on new plants for a year or two now and it has become a very important political issue in Sweden. And one or two PWRs that were in the course of events that were happening at the time of TMI would have -- apparently would have been allowed to start up during the last few months, were not started up, pending a new public referendum that will be voted in March in Sweden. The referendum has not yet been drafted so I cannot say exactly what the impact could be, but something will be decided in a public referendum in March about to what extent the two or three already completed, but not yet operating PWRs and future plants in Sweden will go into operation. Those are the two main reactions. The report that I have outlines some of the other recommendations that have been made in the other countries and so forth and I will be glad to give it to you.

COMMISSIONER PIGFORD: Do you have some report from Germany?

MR. LA FLEUR: I don't know if there has been a national reaction in Germany. There must be something in the

report, but nothing is as drastic as what I have been describing in the other two countries. Nothing as important. The Germans license plants at the state level, so that the different states each have different reactions and it is not as uniform as some of the --

COMMISSIONER PIGFORD: However, does Germany have a commission or a committee investigating Three Mile Island or the effects of that issue upon its own reactors?

MR. LA FLEUR: There have been two or three reports. Whether there has been a formally established committee, I don't recall. We have had several visits of technical people officially sent by the government or by other parts of their community to investigate -- to learn what we know about Three Mile Island.

COMMISSIONER PIGFORD: You don't have any reports in hand from them on that investigation?

MR. LA FLEUR: Whatever I have is summarized in this one report of two parts, that I can let you have.

COMMISSIONER PIGFORD: Yes. I am really interested in going beyond the summary to see if you have an actual report from Germany itself, as well as the summary. The summary you mentioned summarized activities in several countries, I think, didn't it?

MR. LA FLEUR: I don't recall, sir, but I will be glad to look and let you know.

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COMMISSIONER PIGFORD: And what about Austria? Do they have an investigation going on?

MR. LA FLEUR: Austria decided last fall to neve- generate electric power with nuclear energy.

COMMISSIONER PIGFORD: So, do they have an investigation going on concerning the Three Mile Island accident?

MR. LA FLEUR: I don't know.

COMMISSIONER PIGFORD: All right. And Japan, does it have an investigation still going on?

MR. LA FLEUR: I don't know. I assume that the results of the investigation that initially started were what we saw in this report about the changes in the logic of the pressurizers of the Westinghouse plants.

COMMISSIONER PIGFORD: But you don't know if there is a continuing investigation in Japan from the Three Mile Island accident and its effect upon the Japanese reactors?

MR. LA FLEUR: I don't. They are certainly watching it very carefully. All their responsible authorities are watching what you do and what else comes out of NRC and the other investigations here.

COMMISSIONER PIGFORD: If there were such an investigation, would a report from that then -- a copy -- be sent to your office?

MR. LA FLEUR: I have asked all of the countries -- yes, it would. I hope.

COMMISSIONER PIGFORD: Can you tell us what countries have pressurized water reactors of the B&W design, outside of the United States?

MR. LA FLEUR: As far as I know one is being built in Germany. It is not complete yet and that is the only one outside of the United States.

COMMISSIONER PIGFORD: In Germany there have been some experiments from Karlsruhr which have been quoted frequently in some of the NRC analyses of the TMI accident, particularly those analyses concerning fuel damage and extent of fuel damage. Were those Karlsruhr experiments forwarded through your office?

MR. LA FLEUR: The --

COMMISSIONER PIGFORD: I should say the information on the Karlsruhr experiments. Were those forwarded to you?

MR. LA FLEUR: No. Rather, sir, through the research office. The research agreements are an exception or are handled very directly by the Office of Research. We monitor and help them with the relations under the agreements, but the cooperation and the research programs of our country and the others, such as the experiment program at Karlsruhr are reported directly to our research office.

COMMISSIONER PIGFORD: That is Mr. Sol Levine's office?

MR. LA FLEUR: Yes, sir.

COMMISSIONER PIGFORD: Now, have you received any specific comments from any of the foreign countries concerning the Tedesco report itself, new reg 0560, the analyses that were issued shortly after the Three Mile Island accident?

MR. LA FLEUR: I don't recall seeing a written report come through, but all of the technical visit teams that have visited us in the last -- since the report was issued -- that have been interested in transients or in the mechanical aspects of the incident or that kind of thing have discussed with the people who wrote the report their conclusions and the comments of the visitors. And so, although I don't know of any written reports, I know that a lot of comment has been received.

COMMISSIONER PIGFORD: Do you know of any -- I see. You know of no written report. What about any written comment from these teams that may have been forwarded through your office? Do you know of any such comments?

CHAIRMAN KEMENY: Professor Pigford, could I suggest that clearly Mr. LaFleur isn't prepared at the moment to do that. Perhaps we could go through the normal channels to try to obtain all relevant documents to this. Would that be satisfactory to you?

COMMISSIONER PIGFORD: Yes.

CHAIRMAN KEMENY: Thank you. Let's see, there are two more commissioners. Commissioner Trunk.

COMMISSIONER TRUNK: Mr. LaFleur, our biggest problem in the United States is disposing our nuclear waste. Why are, then, we importing nuclear wastes from foreign countries?

MR. LA FLEUR: We are getting farther and farther from my field of work and expertise, but we are importing practically nothing in terms of nuclear waste from foreign countries. If you have some specific item in mind, I would be glad to track it down for you.

COMMISSIONER TRUNK: I have an article here. It may be practically nothing, but it is something. And by 1983, we should be getting reactor spent fuel into this country, and by 1983 -- I mean this is what the NRC has said -- and by 1983, TMI is going to run out of space for its nuclear spent fuel.

What are we going to do with it all? I don't want it, and I am sure South Carolina doesn't want it. We are becoming a dumping ground, and I would like to know why.

MR. LA FLEUR: I really can't comment. It is something that is so little related to the international program -- there is an interest in some countries, in the case of some countries, in accepting waste. The alternative is letting them have, the other countries, have a situation that could endanger the non-proliferation situation.

If the other countries -- if the alternative is for

us to leave plutonium in a country, which is undesirable, then we have offered in some cases -- we have said we would agree to accept some waste. I don't know of any specific cases that we have accepted.

COMMISSIONER TRUNK: Well, this article says we import it from France, Belgium, Denmark, Switzerland, West Germany, The Netherlands, Austria, Sweden, South Africa, Japan, and Canada.

MR. LA FLEUR: I am sorry, I don't know of those cases.

COMMISSIONER TRUNK: Who do I ask to find out about this?

MR. LA FLEUR: Mr. Jim Shay, again.

MR. SHAY: I would be willing to answer that. I think what you are referring to is probably the import of foreign research reactor spent fuel by this country, which has been going on for some time. I believe Joe is distinguishing between that and waste, that is commonly understood as waste products of reactors, not spent fuel. Sometimes spent fuel is called waste. But there has been research reactor spent fuel brought back for a number of years from the countries that you mentioned and others.

As part of a program that began many years ago, the U. S. Government feels that this is a contribution to its non-proliferation objectives, to return this material which is a

highly enriched uranium which can be suitable in use for nuclear weapons, to this country rather than leaving it abroad. It is brought back, reprocessed here, and then the highly enriched uranium that is remaining is re-extracted and sent back for use abroad.

So it reduces the inventories abroad is the basic idea, but this is not required from the U. S. It is subject to whatever contractual arrangements are worked out between a foreign government and the U. S. That is the basic idea.

COMMISSIONER TRUNK: Yes, but what I am asking is why do we have to have it? India went ahead and built a bomb anyhow. So I can't accept that. I just want to know why do I have to have it in my country? I don't need it. I am having problems with my own, whether it is research or whatever. I just can't understand why I have to have it.

MR. SHAY: Again, like Joe, I guess I can't really comment on that specifically, except to illustrate, as I said, the framework for this and the reasoning behind it which was recently, incidentally, reaffirmed by the Secretary of State, the non-proliferation advantages to doing this.

Now, the other consideration is the environment impact to bringing this back, the fact that this material is shipped through ports, travels over land to some destination where it is reprocessed.

So one is faced with two competing considerations,

which you mentioned India, also pertains to that case. Quite a lot of material has not come back from India, but consideration has been given to returning it. The spent fuel from India is not research fuel in this case, but power reactor fuel, which has been in India, has caused concern that the plutonium in that spent fuel might be extracted by India and used to make weapons, and therefore the spent fuel might be returned to the U. S. or some other location in order to prevent that eventuality. And that is not something that is likely to happen very soon, but at least that idea has been considered, and the two sides of the coin are the non-proliferation plusses to be gained versus the environmental impact and the great concern that you have implied on the other hand, and those considerations are the central ones that have been debated in Congress and elsewhere.

COMMISSIONER TRUNK: This article also said that officials might be thinking of getting an island in the Pacific and dumping all this there. Do you think that that is right? Feasible?

MR. SHAY: Again, in this case, the thought is to bring the spent fuel itself back from power plants, which is different from research reactor spent fuel, to bring back a substantial amount of this spent fuel in order -- this is, again, the Executive Branch policy that has been outlined and we have been commenting on. And the policy in these matters

is set by the Executive Branch agencies. So perhaps it would be good for you to discuss this with them in terms of their reasoning.

But they are considering putting this spent fuel from foreign countries into a site in the Pacific in order to reduce the incentive for the countries to take that material and reprocess it, either in their own countries or by sending it to England and France for reprocessing, to extract plutonium which would then be recycled and used in power reactors to gain further energy from the material.

But that plutonium has always been useful in nuclear weapons and so you are moving into a plutonium economy in that case, and the materials are then subject to terrorist seizure, besides the health hazards and so on. So the State Department's policy has been that, far preferable to that, it is better to put a hold on movement in that direction by moves such as encouraging the storage of the spent fuels until measures are worked out to control the plutonium usage at a later point. They would then plan to move the plutonium to locations that might be appropriate.

COMMISSIONER TRUNK: Thank you.

CHAIRMAN KEMENY: Commissioner Lewis.

COMMISSIONER LEWIS: Mr. LaFleur, what is the purpose of the confidentiality agreements that you have with foreign governments?

MR. LA FLEUR: Since these countries, these governments, have laws requiring them to protect some of the information of the kind that we have been talking about from public disclosure, they cannot give us the information, except if we agree to also protect it.

So in order to be able to get the information so that we can use it in our safety efforts, we have to agree to protect it.

COMMISSIONER LEWIS: So in effect, some foreign countries do not, as a matter of policy, make public the problems that they have at their reactors. In other words, they prefer to keep secret from their own people the potential risks and dangers of nuclear power, is that correct?

MR. LA FLEUR: Nuclear power -- the answer is yes. But it should be pointed out that this is not a specialty of nuclear power. Most of these governments, most of the other governments, as a matter of tradition and of law and of current practice, simply don't tell their public everything, as we do in this country, as we try to in this country.

So nuclear power is nothing special in this regard.

COMMISSIONER LEWIS: Okay. We are issuing export licenses and exporting nuclear power, which is a potentially dangerous source of energy, so to what extent might we say that the United States is forced to act in collusion with those countries through the confidentiality agreements? In other

words, aren't we in effect supporting their policies of keeping such information from their people?

MR. LA FLEUR: Only to the extent that anything we do in relations with them supports their existing policies. The converse would be to make them do everything exactly the way we do it or we would have no relations. So I can't agree that we are supporting their policies of hiding from their public by agreeing to protect their information or to use it here for our safety.

COMMISSIONER LEWIS: Isn't, then, the sale of nuclear power -- I mean, can we conceive of the sale of nuclear technology to other countries as an instrument of our foreign policy? Isn't it perceived as such?

MR. LA FLEUR: To the extent that we have chosen to permit that export only when other countries comply with certain standards that we have set up, not alone, but as a part of the whole world politics, it is an instrument of our foreign policy, yes.

COMMISSIONER LEWIS: Isn't it one very important aspect of our foreign policy that we encourage human rights overseas, and isn't there a human right to knowledge about so dangerous a technology?

MR. LA FLEUR: Excuse me, I didn't get the last.

COMMISSIONER LEWIS: One of our much-vaunted cornerstones of foreign policy is to encourage human rights overseas.

Isn't one of those human rights the right to knowledge about a technology which could affect the health and safety of the people?

MR. LA FLEUR: In our concept, it is. The public has a right to knowledge about the activities of its government.

COMMISSIONER LEWIS: I am talking about in foreign countries.

MR. LA FLEUR: Well, it is my impression that the kinds of things that we are concerned about in our human rights policy, or haven't yet reached the refinement that is represented by that idea of full public disclosure that we have in this country.

COMMISSIONER LEWIS: You don't see an inter-conflict then in the sale of nuclear technology to countries which do not inform the people? For example, there could have been a Three Mile Island incident in some country using our American technology,and the people in that country could be totally unaware. That is quite a possibility, isn't it?

MR. LA FLEUR: Yes. But as I pointed out, the converse is that we could have no relations with anybody, unless he did everything exactly the way we did it. So I can't see that -- I am not the one to make the judgment that we should stop with nuclear reactors or with any kind of nuclear reactors, or with any specification on their handling, or their informing

us about their nuclear reactors.

COMMISSIONER LEWIS: What has been the impact of the Three Mile Island accident on the issuance of export licenses or the interest by foreign countries in the purchase of American nuclear technology? Has there been a sharp decline in interest? I mean are we losing sales, as far as you know?

MR. LA FLEUR: I don't know of any reported trend, change in trend. To the extent that some countries, as we noted, have delayed their programs or are considering moratoriums on their reactors, I suppose the trend, to the extent that that was caused by Three Mile Island, would be to damage the sales.

COMMISSIONER LEWIS: How much money -- can you give me a rough idea of what, in terms of foreign exchanges involved in our export of nuclear technology, can you give me an assessment of that, say, within the last few years?

MR. LA FLEUR: I don't know. A reactor costs a billion dollars, a big reactor. There are half a dozen being exported or in the process of being exported now. Fuel is of the same kind of order of magnitude of business.

COMMISSIONER LEWIS: So we are talking about a multi-billion dollar export business here?

MR. LA FLEUR: Yes.

COMMISSIONER LEWIS: Do you have any -- this may be a -- it is a loaded question, as a lot of mine are, I am afraid,

Mr. LaFleur -- but do you have a feeling that sometimes the tail is wagging the dog? In other words, in the interest of making the sales, we are shaving on some of our foreign policy in terms of how we deal with these foreign countries?

MR. LA FLEUR: My own impression is that we are going the other way; that our industry has been complaining very loudly that we have reduced its scope of activities in these policy matters in the last few years.

But I can't tell you. I don't have a strong feeling of whether we are doing it right or not, whether we are -- I don't think the tail is wagging the dog, I really don't.

COMMISSIONER LEWIS: You are saying that the industry, though, fears that there is too much interference from, say, State Department policy-makers.

MR. LA FLEUR: The industry is concerned that the tightening up that we have done in the exports will have a serious adverse effect on their business.

COMMISSIONER LEWIS: Thank you.

CHAIRMAN KEMENY: Your Chief Counsel, you had some requests about documents.

MR. GORINSON: Yes. Mr. Chairman, Mr. LaFleur has submitted a written statement for the record, and I would like to request that it be incorporated as part of this record.

CHAIRMAN KEMENY: So ordered.

MR. GORINSON: Secondly, I would like to submit for

the record the Westinghouse Report on the Beznau(?) transient and ask that it be incorporated into this record as Exhibit 1.

CHAIRMAN KEMENY: This is the September 4 --

MR. GORINSON: Spetember 4, 1974.

CHAIRMAN KEMENY: So ordered.

(The document previously marked for identification as Exhibit 1 was received in evidence.)

Thank you. The witness is excused. Would Chief Counsel please call and swear in the next witness?

MR. GORINSON: Mr. Creswell?

Whereupon,

JAMES S. CRESWELL

was called as a witness and, after being first duly sworn, was examined and testified as follows:

CHAIRMAN KEMENY: Would you please state your full name and your current occupation?

MR. CRESWELL: My name is James S. Creswell I am a reactor inspector assigned to the Office of Inspection and Enforcement.

CHAIRMAN KEMENY: Chief Counsel?

MR. GORINSON: Mr. Kane?

MR. KANE: Thank you, Mr. Gorinson.

Mr. Creswell, how long have you been employed by the NRC and its predecessor agency the Atomic Energy Commission?

MR. CRESWELL: A little over three years.

MR. KANE: And you are a reactor inspector in Region 3 of the NRC, are you not?

MR. CRESWELL: I have recently been attached to the Headquarters Group and detailed to the Special Inquiry Group that is investigating Three Mile Island.

MR. KANE: Has that change been made during the last four or five months?

MR. CRESWELL: Yes.

MR. KANE: Prior to that time you were with Region 3 of the NRC?

MR. CRESWELL: That is correct.

MR. KANE: Could you briefly describe your duties as a reactor inspector in Region 3?

MR. CRESWELL: As a reactor inspector, we go out into the field, to the facilities, power reactor facilities, conduct inspections, return to the regional offices and prepare inspection reports. That, in a nutshell, is what we do.

MR. KANE: Mr. Creswell is the Davis Bessie plant in Ohio under the jurisdiction of Region 3?

MR. CRESWELL: It is.

MR. KANE: And in 1978, were you directed by a project inspector, Mr. Thomas Tambling, to review data on a Davis Bessie transient which occurred on November 29, 1977?

MR. CRESWELL: That is correct.

MR. KANE: Was that transient one where pressurizer level had gone off the low end of the scale for some time?

MR. CRESWELL: Pressurizer level indication had gone off scale, low.

MR. KANE: All right. During the course of this investigation, did you become aware in mid-1978 of an earlier transient which had occurred at Davis Bessie on September 24, 1977?

MR. CRESWELL: I was aware of that transient before that time. At that time I became involved in reviewing that transient in more detail.

MR. KANE: And in examining utility records in 1978, concerning that September 1977 transient, did you determine that high-pressure injection had been interrupted by the operator before the cause of the transient was determined?

MR. CRESWELL: Before the cause of a loss of coolant had been determined.

MR. KANE: All right. That transient,also, involved a loss of pressurizer level off the high end of the scale, did it not?

MR. CRESWELL: That is correct.

MR. KANE: Was that handling of the high-pressure injection a source of concern to you at the time you became aware of it?

MR. CRESWELL: It was.

MR. KANE: Why was that?

MR. CRESWELL: Because the emergency core cooling system assigned to handle that accident had been disabled.

MR. KANE: Did you submit a report to your superiors on that concern of yours?

MR. CRESWELL: I submitted an inspection report.

MR. KANE: All right. Was that in or around

October 1978?

MR. CRESWELL: That is correct.

MR. KANE: Did you, also, attempt to work with the licensee to determine if operator action should be changed under these kinds of transient conditions?

MR. CRESWELL: I did.

MR. KANE: And did you submit further reports to your superiors after October 1978, regarding these concerns of yours?

MR. CRESWELL: I did.

MR. KANE: As of March 28, 1979, had any adequate operator procedure correction been made in this regard at Davis Bessie?

MR. CRESWELL: My recollection is that they weren't.

MR. KANE: Why not?

MR. CRESWELL: Well, the licensee had been somewhat unresponsive in addressing those concerns.

MR. KANE: After your first report on this concern over interruption of the high-pressure injection, did you in November and December of 1978, request the utility's analysis of the high-pressure injection performance during the September 1977 transient?

MR. CRESWELL: I did.

MR. KANE: And what were you told on those occasions in response to those requests?

MR. CRESWELL: Well, I was told that an analysis was in process, but it was going to be done by their corporate office group. I was, also, informed that the people that I was dealing with felt that I was performing functions which the licensing organization at NRC would normally perform.

MR. KANE: So you were, in effect, told that this was beyond the scope of your responsibility?

MR. CRESWELL: In effect, yes.

MR. KANE: Did you agree with that?

MR. CRESWELL: I obviously did not because I continued to pursue it.

MR. KANE: All right. As of March 28, 1979, had you received that requested analysis from the utility?

MR. CRESWELL: No.

MR. KANE: In fact, aberrations in pressurizer level, such as what occurred in the September and November 1977, transients were regarded by the utility as an operational inconvenience rather than a safety problem, weren't they?

MR. CRESWELL: I believe my previous statements to you have been of the nature that the loss of pressurizer level indication low off scale was an operational inconvenience.

MR. KANE: Did you regard it rather as a safety concern?

MR. CRESWELL: Yes, I did.

MR. KANE: Were these reports that you submitted in connection with these concerns received by your superiors at Region 3?

MR. CRESWELL: They were.

MR. KANE: Are reports of that kind routinely sent elsewhere?

MR. CRESWELL: Not routinely.

I beg your pardon. When you say, "Sent," that would be that the report would be directed to another location other than our normal distribution.

MR. KANE: Yes, well, could you describe what your normal distribution of those reports is?

MR. CRESWELL: Those reports are sent out under a boiler plate type of letter that lists certain additional distributions, the Public Document Room, the Local Public Document Room; sometimes a state official will receive a copy, but that would normally be done to send those there.

MR. KANE: Are those reports also routinely sent to the central files of the Inspection and Enforcement Division of the NRC?

MR. CRESWELL: They are.

MR. KANE: Were your statements in those reports about your concerns also brought to the attention of the project inspector, Mr. Tambling?

MR. CRESWELL: They were.

MR. KANE: What was Mr. Tambling's reaction?

MR. CRESWELL: Well, regarding the September 24, event where pressurizer level, I am sorry, where the high-pressure injection pumps were shut off, during his review of the event at the time the event occurred, he felt apparently that the operators were justified in their actions.

MR. KANE: In late 1978, did you contact the NRC project manager for Davis Bessie to request any written documentation on the September 1977 transient?

MR. CRESWELL: My recollections of dates are not perfectly clear, but I did contact the licensing project manager, yes.

MR. KANE: And what were you told about any documentation existing?

MR. CRESWELL: That none existed.

MR. KANE: You, also, mentioned that your original investigation was in connection with the November 1977 transient in which pressurizer level was lost off the low end of the scale. Did you submit a report to your superiors on that transient in 1978?

MR. CRESWELL: Yes.

MR. KANE: And during 1978, did you, also, have discussions with Davis Bessie personnel in which they indicated that there was no possibility of completely losing level in the pressurizer?

MR. CRESWELL: Excuse me. Let us go back to the previous question.

MR, KANE: Surely.

MR. CRESWELL: You said, "In 1978." I believe that the Inspection Report 503467806 went out in -- okay, it was '78. I am sorry.

MR. KANE: Approximately April 1978, correct?

MR. CRESWELL: Would you go on with your question?

MR. KANE: All right. Yes, my next question was did you have discussions with Davis Bessie personnel in 1978, in which those personnel indicated that there was no possibility of losing, of completely losing level in the pressurizer?

MR. CRESWELL: That is correct.

MR. KANE: And following up on this report on the November 1977 transient and those discussions with the utility personnel, did you participate in a conference call in December 1978 with Region 3 personnel, the utility and NRC Headquarters in Bethesda concerning the loss of pressurizer level at Davis Bessie?

MR. CRESWELL: I did.

MR. KANE: Did this conversation concern the licensee's evaluation of the problem?

MR. CRESWELL: The licensee's evaluation which had been performed by the Babcock and Wilcox Company.

MR. KANE: What was the gist of this telephone conference call conversation?

MR. CRESWELL: Well, the call was held to determine whether continued operation under the present conditions at that time was allowable. The decision was made after the conversations were completed to allow administrative controls over auxiliary feed water.

MR. KANE: Did you agree with that determination at that time?

MR. CRESWELL: I did.

MR. KANE: Did Region 3 then conduct an investigation of this matter, including a trip to B&W's offices in Lynchburg, Virginia in February 1979?

MR. CRESWELL: They did.

MR, KANE: What was the result of that investigation?

MR. CRESWELL: I had requested this investigation to see if there were any Part 21 violations on the part of either B&W or Toledo S as far as reporting unreviewed safety questions.

The investigators determined that there were no items of non-compliance, that the review had been timely and proper.

MR. KANE: Did you agree with that result?

MR. CRESWELL: I did not.

MR. KANE: Mr. Creswell, we have previously deposed

one of the NRC personnel who attended that meeting at B&W, Mr. Donald Anderson of Region 4. He has testified in his deposition that one of the Region 3 inspectors conducting the investigation stated to Anderson that the meeting was being held to shut you up.

Was that your perception?

MR. CRESWELL: I don't know that I would put things in that term, those terms. It may have been a way of addressing the issue and closing it out.

MR. KANE: In January 1979, did you, also, request that your concerns about loss of pressurizer level off the low end of the scale be submitted to NRC licensing boards for review in connection with pending license applications?

MR. CRESWELL: That is correct.

MR. KANE: Do you know what happened to that request?

MR. CRESWELL: Eventually I think on March 29, that information was released to the boards.

MR. KANE: You submitted that request in a memorandum dated January 8, 1979, did you not?

MR. CRESWELL: That is correct.

MR. KANE: So from January 8, 1979, to March 28, 1979, is how long it took to be processed through the licensing boards. Is that your understanding?

MR. CRESWELL: Not through the licensing board,

through NRC.

MR. KANE: To the licensing boards?

MR. CRESWELL: Right.

MR. KANE: After making all of these various attempts to bring your concerns up through regular channels, did you contact NRC Commissioner Bradford by telephone in February 1979, to raise your concerns over the September and November 1977 transients?

MR. CRESWELL: That is an approximate time scale, but I did contact the Commissioner, yes.

MR, KANE: Why did you do that?

MR. CRESWELL: The NRC has an open-door policy that allows going directly to the Commission. I did not feel the system was working. So, I exercised the policy.

MR. KANE: Did you specifically point out to Commissioner Bradford in that telephone conversation your concern over operator error in interrupting high-pressure injection?

MR. CRESWELL: I don't recall whether that particular item was discussed at that point in time. There was a subsequent meeting where that was discussed.

MR. KANE: Did you speak to Commissioner Bradford's technical assistant about your concerns?

MR. CRESWELL: Yes.

MR. KANE: Did you furnish written information to

NRC Commissioners Bradford and O'Hearne as to your concerns over the Davis Bessie transients and B&W system?

MR. CRESWELL: I did.

MR. KANE: Did Commissioner Bradford's technical assistant, Mr. Hugh Thompson verify that there was no NRC documentation analyzing the September 1977 transient?

MR. CRESWELL: That would have been NRR documentation.

MR. KANE: Yes.

MR. CRESWELL: That is correct.

MR. KANE: Did you then meet personally with Commissioners Bradford and O'Hearne in Commissioner Bradford's office in Washington, DC?

MR. CRESWELL: I did.

MR. KANE: Was that meeting approximately one week before the TMI-2 accident?

MR. CRESWELL: That is correct.

MR. KANE: What was discussed at that time?

MR. CRESWELL: I discussed the September 24, 1977 event, the November 29, 1977 event. I discussed some other concerns that I had about the operation of the facility. That was basically the context of the discussion.

MR. KANE: Did you discuss your concern over turning off the high-pressure injection system?

MR. CRESWELL: I did.

MR. KANE: Was your impression that Commissioners

Bradford and O'Hearne had not previously heard of these problems?

MR. CRESWELL: That was my impression.

MR. KANE: What did these Commissioners indicate they would do about your concerns at this meeting?

MR. CRESWELL: Well, following that meeting there were some memos generated by Commissioner O'Hearne asking questions in the areas where I had raised questions, concerns.

MR. KANE: Was any further action beyond that taken on your concerns prior to the TMI-2 accident on March 28, 1979?

MR. CRESWELL: I don't recall that there was. There could have been. I don't recall it.

MR. KANE: After the TMI-2 accident the NRC clearly did take action in issuing Bulletin 7905 which in fact, quotes a portion of one of your memoranda concerning loss of pressurizer level.

If the NRC had investigated the Davis Bessie September 1977 transient more carefully and had distributed the proper information to the operators, wouldn't that have improved the operators' ability at TMI-2 to have responded correctly to avoid core damage?

MR. CRESWELL: I have stated to you earlier that that would be speculation on my part, but I cannot help but

feel that it would have improved the operators' ability to cope with the transient, yes.

MR. KANE: I have no further questions, Mr. Chairman.

CHAIRMAN KEMENY: Mr. Creswell, you have been remarkably diligent in this particular incident, and therefore, I would like very much to get your feelings on how the system works.

You have stated a little earlier in your testimony that the licensee was unresponsive. I would like to probe whether possibly the NRC may have been unresponsive as well. Why do you feel you had so much trouble getting action on the wide variety of memos and conversations you conducted?

MR. CRESWELL: Well, it may have been that if action had been taken and these issues looked into thoroughly and responded to thoroughly there might have been an impact on the operation of the plants.

CHAIRMAN KEMENY: I could not hear the end of that, might have been impact on?

MR. CRESWELL: The operation of the plants.

CHAIRMAN KEMENY: What kind of impact?

MR. CRESWELL: Possible reduction in power or shutdown.

CHAIRMAN KEMENY: Are you, therefore, suggesting that NRC did not take further action because they were reluctant to reduce the power production of the plant?

MR. CRESWELL: I would characterize that more probably on the part of the utility.

CHAIRMAN KEMENY: Is the kind of experience you had in trying to follow up the two Davis Bessie incidents unique in your opinion in NRC procedures or is it fairly typical?

MR. CRESWELL: There has been a certain history of individuals that have worked for NRC that have had problems with dealing with safety issues. That is well documented, Mr. Pollard, Mr. Conrad and others, some to the extent that they have left the Commission.

CHAIRMAN KEMENY: Are you suggesting there that individuals who raise fairly consistently serious safety issues may, in the long run, find that they cannot work for NRC?

MR. CRESWELL: That they cannot work for NRC or that they would be placed in other organizations.

CHAIRMAN KEMENY: Would be placed --

MR. CRESWELL: In other organizations.

CHAIRMAN KEMENY: In other organizations. That seems to carry a suggestion that within the decision-making structure of NRC a reluctance to come to grips with very serious safety issues. Would that be a fair statement?

MR. CRESWELL: Yes.

CHAIRMAN KEMENY: I would like to explore a second

aspect of this that is related to it. You put proper stress as we now know after Three Mile Island-2 on giving instructions to the operators.

Taking that as my starting point, do you feel that within NRC there is a preoccupation with equipment and insufficient attention to the human element in the system?

MR. CRESWELL: Would you state that question again, please?

CHAIRMAN KEMENY: Yes. Since the example you have given is one where you are pushing for what we now know were correct instructions to operators, does this show that perhaps within NRC there is a great deal more attention paid to problems with equipment than problems with operator procedures?

MR. CRESWELL: Well, to address the problem that I think you are getting to, that is the human machine interaction, I think the problem there starts with the design of the plants. The plant is not designed for human factors engineering.

CHAIRMAN KEMENY: Would you mind expanding on that? I would like to have your views on that?

MR. CRESWELL: Well, for instance, the TMI-2 control room, the location of the instrumentation for the reactor coolant drain tank is located back on the back panel. It is not in the immediate view of the operators.

That is the sort of thing that I am talking about.

CHAIRMAN KEMENY: So, you are saying, in effect, that starting with the licensing process the attention tends to be on the equipment side and not taking into account the interaction between human beings and that equipment?

MR. CRESWELL: I think that is a fair characterization, yes.

CHAIRMAN KEMENY: And you feel that to the best of your knowledge this may be throughout NRC an attitude like that may be pervasive?

MR. CRESWELL: Well, I have already cited areas or people that have been involved in certain areas; Mr. Conrad, I believe, was in Safeguards. Mr. Pollard was in Nuclear Reactor Regulation.

Without specific examples in each area, I could not make that generalization.

CHAIRMAN KEMENY: Have you had any difficulty in continuing working for NRC in view of the very strong and persistent actions you have taken?

MR. CRESWELL: Since the event I have been assigned to the IE investigation of Three Mile Island and am presently working on another investigation of Three Mile Island; since that period of time there has been no problem.

CHAIRMAN KEMENY: So, you said, "Since Three Mile Island, there has been no problem." Thank you.

Commissioner Pigford?

COMMISSIONER PIGFORD: Mr. Creswell, you have mentioned that you wrote a memorandum concerning this information to be submitted to the licensing boards. Your memorandum was written in January 1979. Is that correct?

MR. CRESWELL: That is correct.

COMMISSIONER PIGFORD: Why did you send it to the licensing boards? What did you expect to happen?

MR. CRESWELL: I felt that by going through the licensing board -- first of all, I felt the information qualified for licensing board.

COMMISSIONER PIGFORD: Would you please once more say that?

MR. CRESWELL: I felt that the information contained in the memo was pertinent to what the licensing boards should be receiving, and I used a procedure to submit that information.

Now, one thing that happens whenever one submits these issues is that they do get into a public arena where they would be subject to perhaps some scrutiny.

COMMISSIONER PIGFORD: Did you pick out some particular licensing boards to send it to?

MR. CRESWELL: Well, the procedure that I was using in Region 3, as I recollect, only addressed those licensees in Region 3 that were having proceedings.

COMMISSIONER PIGFORD: Were those licensing boards having proceedings on B&W reactors?

MR. CRESWELL: That is correct.

I believe the Midland facility was the only other B&W facility in Region 3.

COMMISSIONER PIGFORD: And tell me once more what you expected the licensing boards to do with that information?

MR. CRESWELL: The licensing boards would --

COMMISSIONER PIGFORD: Or what you thought --

MR. CRESWELL: Would release this information to all parties involved in the hearing.

COMMISSIONER PIGFORD: You thought the boards themselves would do that?

MR. CRESWELL: Release the information?

COMMISSIONER PIGFORD: Yes.

MR. CRESWELL: Yes.

COMMISSIONER PIGFORD: Or maybe you said because you, in so sending it to them it becomes part of the public record.

MR. CRESWELL: It is then distributed to all parties of the proceeding.

COMMISSIONER PIGFORD: I see.

Did someone with NRC advise you to send it to the licensing boards?

MR. CRESWELL: No.

COMMISSIONER PIGFORD: That was your own initiative?

MR. CRESWELL: That was my own judgment.

COMMISSIONER PIGFORD: Were you expecting that the licensing boards would then recognize the substance of that information and themselves consider it in their deliberations of those proceedings?

MR. CRESWELL: I am not so sure that they themselves would have reviewed it. The parties to the proceedings would perhaps have questions in those areas during the proceedings.

COMMISSIONER PIGFORD: So, then your primary purpose was to use this as a device to distribute it to the parties which would be, say, the applicant, the utility company and the Nuclear Regulatory Commission and what other parties might be there?

MR. CRESWELL: That is correct.

COMMISSIONER PIGFORD: B&W was not a party to the proceeding, was it?

MR. CRESWELL: I don't recall whether they were or not. I suspect not directly.

COMMISSIONER PIGFORD: Is there no more direct way of getting this information to the applicant than using the licensing boards as a vehicle?

MR. CRESWELL: I could have generated, say, a memo to our Headquarters Group.

COMMISSIONER PIGFORD: For your what?

MR. CRESWELL: To our Headquarters Group.

COMMISSIONER PIGFORD: Yes?

MR. CRESWELL: But regarding that in your investigation you may have come across a memo from a Mr. Sternberg in Region 1 to Mr. Syfert in Headquarters about the failure of the power-operated relief valve that occurred at Three Mile Island on March 29, 1978, and you may see the results of an inadequate review of his request for a safety analysis.

COMMISSIONER PIGFORD: Now, Metropolitan Edison was not at that time a party to any licensing board proceeding, was it?

MR. CRESWELL: I think that they were included in the final -- when the memo was reviewed for other proceedings, that Metropolitan Edison was included.

COMMISSIONER PIGFORD: That was an additional inclusion, apparently, because already they had received the operating license, and the board had done its job. Is that correct?

MR. CRESWELL: Evidently there were issues still pending before the licensing board.

COMMISSIONER PIGFORD: Now, I want to get at this.

CHAIRMAN KEMENY: Excuse me, could I just clarify that? It may be important. When it goes to all licensing

boards that, therefore, covers not only those plants that are not yet operational, but it would cover apparently all those with still outstanding issues in their licensing. Is that what you said?

MR. CRESWELL: Apparently if there is still an outstanding issue before the board, then they would be included.

CHAIRMAN KEMENY: Then they would be included. So that is how Met Ed got in.

Thank you.

COMMISSIONER PIGFORD: Yes, I do think, Mr. Chairman, the Met. Ed. Licensing Board itself had been discharged at that time, but evidently, somehow sending it to other licensing boards, it still gets to Met. Ed., is that correct?

CHAIRMAN KEMENY: Professor Pigford, I wonder if that statement is correct. Is that our impression that it had been -- had then been discharged, do you know?

MR. KANE: No.

COMMISSIONER PIGFORD: Well, they had issued the operating license, had they not?

CHAIRMAN KEMENY: I believe it is correct, isn't it, Mr. Creswell, that just issuing the operating license does not automatically discharge a licensing board if there are open issues still outstanding?

MR. CRESWELL: That is correct.

COMMISSIONER PIGFORD: Well, sir, I think maybe I disagree with you, but perhaps that is something we should investigate separately.

Mr. Creswell, we have established that your intent in sending to the licensing board was a vehicle for communication, but would you now expect more that the licensing boards themselves would take up this issue and do something about it? Is that a reasonable expectation?

MR. CRESWELL: In my mind, there would have been a greater review by individuals outside.

COMMISSIONER PIGFORD: Would you please say that once more, a little louder?

MR. CRESWELL: In my mind, there would have been a more detailed review by individuals outside, outside the framework of either the Commission or the licensing board.

COMMISSIONER PIGFORD: You weren't expecting the licensing board itself to consider the substance of this issue, is that correct?

MR. CRESWELL: Yes, they would.

COMMISSIONER PIGFORD: They would?

MR. CRESWELL: Right.

COMMISSIONER PIGFORD: Now, in your opinion, had this issue also been adopted by the NRC as being a substantive issue on safety at that time?

MR. CRESWELL: Had the NRC identified it as being an unreviewed safety question, for instance?

COMMISSIONER PIGFORD: I don't mean unreviewed safety question, because I know there are special criteria, but had the NRC staff that is handling those same licensing board cases that were pending, had that staff looked at your memo or your concern and said, yes, we agree?

MR. CRESWELL: No. They did not agree.

COMMISSIONER PIGFORD: And are you aware that there is a directive to the boards that they are not expected or required to consider issues that are not put in controversy by

the NRC staff?

MR. CRESWELL: Yes.

COMMISSIONER PIGFORD: You are aware of that. Where have you learned about that directive?

MR. CRESWELL: This procedure was developed fairly recently. I believe ours was operational in November of 1978 and prior to the implementation of that procedure, we had a group come out, and I don't recall what organization they were from at this point in time, but they described in general how the procedure should be implemented in terms like you are speaking of.

COMMISSIONER PIGFORD: That is a fairly recent --

MR. CRESWELL: November of 1978.

COMMISSIONER PIGFORD: You think prior to that the licensing boards could themselves have taken up this as a matter at their own initiative?

MR. CRESWELL: I really don't know.

COMMISSIONER PIGFORD: I see. But it had not been adopted and placed in controversy by the staff, is that correct? The issue of your memorandum.

MR. CRESWELL: Perhaps I should go into the development of the memo or how it was processed. I wrote the memo. It was -- another memo was prepared to transmit it to headquarters for their review, IE headquarters. They reviewed it. There was a telephone conversation between members of the

headquarters staff, regional management, and myself. During that telephone conversations, there were discussions on whether the issues were old or new issues.

The position that I understood from IE headquarters was that these were old issues that were being handled. I disagreed with that. Upon that basis, it was then forwarded to, I believe, Mr. Vesallo in NRR and then on to the boards, or to -- not to the boards, but to the hearing group.

COMMISSIONER PIGFORD: Yes, I understand, Mr. Creswell, and please -- I can recognize the merit and the good intent of what you are doing. All I am trying to establish is reasonably what one might expect might happen versus maybe what we would like to have happen. Now you were aware that the licensing board directors then say they are not to review a new issue that is not being placed in controversy by the NRC staff and this had not been placed in controversy, and it would seem, then, that from your understanding, you would not expect them to have made a substantive review of that.

MR. CRESWELL: It is my understanding that although an individual may dissent from the levels of review that a memo like this would receive, that even then it could go to the board and they would look at it upon its merits and may not consider it, yes.

COMMISSIONER PIGFORD: But certainly, at least from the -- your motivation to get it considered regardless of

these directives to the boards or how they might be interpreted, you really wanted them to look at it, didn't you?

MR. CRESWELL: Yes.

COMMISSIONER PIGFORD: And if there is some directive, if it were to turn out that way, that would tell them, really, you don't look at it unless the staff has officially adopted it as a controversial item, then that would forestall what you were seeking.

MR. CRESWELL: I might add that what I am saying here is from my understanding of the procedures.

COMMISSIONER PIGFORD: Of course, yes.

MR. CRESWELL: That may be interpreted differently by someone else.

Now, you are speaking of controversial issues. In my discussions with IE headquarters, I, in a way, dissented from their position that these were old issues and closed out or being properly handled.

COMMISSIONER PIGFORD: Yes, but you hadn't -- but the NRC staff as a party to those proceedings that were under adjudication by the licensing board had not adopted your concern as an item to be controverted by them, is that correct?

MR. CRESWELL: To my knowledge, no.

COMMISSIONER PIGFORD: Thank you.

CHAIRMAN KEMENY: Mr. Creswell, just to follow up on Professor Pigford's question, did I hear you correctly to say

that in submitting it to the licensing boards, whether or not they would take action, you hoped that somehow other groups might take action as a result?

MR. CRESWELL: That is correct.

CHAIRMAN KEMENY: May I ask you what sort of groups you had in mind?

MR. CRESWELL: Well, there is always the possibility of intervention on a facility, and those with technical competence in that group might ask further questions about the issues.

CHAIRMAN KEMENY: In other words, in effect, you were trying to throw it into the public domain --

MR. CRESWELL: That is correct.

CHAIRMAN KEMENY: -- so that anyone with competence could comment on it.

MR. CRESWELL: That is correct.

CHAIRMAN KEMENY: Thank you. Professor Pigford, did you wish to --

COMMISSIONER PIGFORD: Another follow-up, Mr. Creswell. Did you feel you had other channels you could have pursued in addition to the licensing board channel?

MR. CRESWELL: I believe I already stated that I could have sent a memo to IE headquarters, all right?

COMMISSIONER PIGFORD: Yes.

MR. CRESWELL: That would have been one possibility.

I did not feel that that would produce -- could not improve on the situation which I had already encountered, and that was, the issue did not appear to be addressed.

COMMISSIONER PIGFORD: Now, the staff as a party to the licensing board issue is really the licensing regulation staff, isn't it? Did you consider or did you send your memo to that staff?

MR. CRESWELL: To the NRR staff?

COMMISSIONER PIGFORD: Yes.

MR. CRESWELL: Okay. Normally, if you follow the course of, say, the Sternberg memo -- Sternberg generated it, it went to IE headquarters, to Mr. Sifert, and someone in Mr. Sifert's office would have contacted NRR, either formally or informally, to get a reading on what their feelings were. That is the process that one could have gone through in this particular instance.

COMMISSIONER PIGFORD: I am a little confused. Did you initiate that process?

MR. CRESWELL: I did not.

COMMISSIONER PIGOFRD: I see. And are there other avenues? Could you have sent it directly to Mr. Gossack? Is that --

MR. CRESWELL: I could have done that. I could have sent it to Mr. Gossack, I could have sent it to the Director of Inspection Enforcement, Mr. Davis at that time. Those were

two other avenues available.

COMMISSIONER PIGFORD: What about to Dr. Hendrie?

MR. CRESWELL: That was another possibility.

COMMISSIONER PIGFORD: All right. Again, I don't want to at all downgrade the excellent motivation of what you have done. Tell me, why didn't you take the initiative to send it along that route that would have -- it would finally have gotten to the licensing and regulation staff, the NRR staff? Why didn't you take that route?

MR. CRESWELL: If you observed the course of my January 8 memo, that memo was three months when the accident happened. It was released the next day. How long it would have taken had there not been a Three Mile Island Unit 2 accident at that point in time, I don't know.

COMMISSIONER PIGFORD: Of course.

MR. CRESWELL: A guideline for the processing of that information to get it to the licensing boards is 20 days, and we are talking about 3 months. So there was reluctance on my part to wait the amount of time to appeal it through different levels.

COMMISSIONER PIGFORD: I see. And you felt as of the January -- when you initiated the memo, that even then you would feel it would take too long to get it to the NRR staff, is that right?

MR. CRESWELL: To the NRR staff or above. The NRR

staff had already looked at a number of these things, you must appreciate, either formally or informally.

COMMISSIONER PIGFORD: I understand, but I mean looking at your memo which highlighted it properly and said, Think again and look at it. You felt it just wasn't worth going to the NRR staff also on that?

MR. CRESWELL: That is correct.

COMMISSIONER PIGFORD: And because you felt it would take too long, is that correct?

MR. CRESWELL: That is one consideration, yes.

COMMISSIONER PIGFORD: Okay. Now one more avenue. What about the ACRS? Is that an avenue available?

MR. CRESWELL: I am not familiar with those procedures, but I could have, I belive, probably got the issue before ACRS, yes.

COMMISSIONER PIGFORD: All right. Why didn't you take that channel, the ACRS? I am interested why you chose the one you did as opposed to these others, or why didn't you also take the others? It is very valuable for us to get a feeling of what works, you see.

MR. CRESWELL: Yes. Well, I think that you are probably placing a lot of emphasis on the technical content of these memoranda and not necessarily other types of information -- the way issues were being handled, the possible -- the acceptable operation of a facility, and these are judgment

types of decisions, not purely technical, which ACRS would deal with. Am I making myself clear? ACRS would review the issue technically, but if there were institutional types of problems in the treating of issues, I felt the Commission would be better equipped to deal with those.

COMMISSIONER PIGFORD: All right. Then why didn't you take the other avenues we have talked about, sending it to Dr. Hendrie or to Mr. Gossack?

MR. CRESWELL: Well, Chairman Hendrie is a member of the Commission. I did talk to two commissioners. I have a problem with what is the differentiation between Chairman Hendury and talking to the commissioners.

COMMISSIONER PIGFORD: All right. So you felt you had taken that one effectively, and the only remaining thing available to you was the licensing board, is that it?

MR. CRESWELL: I had contacted -- generated the memo to go the licensing board before I talked to the commissioners.

COMMISSIONER PIGFORD: Yes. All right.

CHAIRMAN KEMENY: Professor Lewis?

COMMISSIONER LEWIS: Mr. Creswell, you said the reason why you thought no action was taken on the Davis-Besse incidents was because such action could result in -- I am quoting you here -- possible reduction of power. This suggests that economic concerns seem to far outweigh those of safety in taking some action. Am I correct in making that assumption?

MR. CRESWELL: When you say "far outweigh," that may not be entirely accurate. The purpose of a nuclear power plant is to generate electricity.

COMMISSIONER LEWIS: Okay.

MR. CRESWELL: You spend a billion dollars to build a plant. There is a certain balance that is struck. Each utility strikes that balance differently. There are, in some instances, value judgments made that the economics of generating electricity overweigh safety concerns.

COMMISSIONER LEWIS: What is the role of the NRC in tipping the balance the other way, or should it be tipping the balance the other way?

MR. CRESWELL: Well, the NRC has within its capability, through the inspection program, to identify problem areas. We could issue items of noncompliance or orders. Normally, the strongest type of action is a shutdown order.

COMMISSIONER LEWIS: You are implying that by its failure to pursue this particular incident and to get Davis-Besse to address the safety concerns, that the NRC concurred in the decision to allow economic considerations to outweigh those of safety.

MR. CRESWELL: Well, I don't know that there was an out and out concurrence. You might characterize it as at least tacit concurrence. If one doesn't take action, then one tacitly approves it.

COMMISSIONER LEWIS: Is this just an isolated incidence or have you seen a pattern of similar tacit concurrence by the NRC in this kind of thinking?

MR. CRESWELL: Most of my effort in the last year and a half, two years, has been with the Davis-Besse facility, and to give you examples, I would have to restrict my comments to what I have been dealing with.

COMMISSIONER LEWIS: Okay. Well, have there been other examples from your own experience of this kind of thing?

MR. CRESWELL: Well, I am just saying that if I were to make a statement that there was, I would have to give you, you know, the details of that example, and I am not prepared to do that at this point in time.

COMMISSIONER LEWIS: Oh, I see. All right. Perhaps you could -- we might ask for those details later because I think it would be very interesting.

At what level of the NRC have you felt that the expressions of concern about safety are generally blocked, or is it all the way up? Is there a certain level of management that you feel people are trying to turn you off when you say, "ey, this could be a problem?

MR. CRESWELL: I don't have much occasion to deal with upper levels of NRC management, and I don't think it would be appropriate for me to comment that at a certain level in the organization, that is a problem.

COMMISSIONER LEWIS: But from your own experience, where have you found that you have been blocked particularly, at the level that you operate?

MR. CRESWELL: Well, this is one point, I think, that Mr. Pigford was getting at. I didn't take the issue step by step. I bypassed a great deal of the organization to raise my issues, and so to give you an effective example, I would have had to have taken that through those different levels and saw how far I had to go.

COMMISSIONER LEWIS: You must have felt, though, that you couldn't get results at those lower --

MR CRESWELL: I think that is a fair characterization.

COMMISSIONER LEWIS: Well, can you tell me why you felt that you couldn't get results at that level?

MR. CRESWELL: I think in this area that there has been in the past a certain philosophy developed in NRC about reactor safety, a certain mind-set, if you will, that these accidents couldn't happen. I obviously thought that they were serious. Perhaps post-TMI there is a different philosophy. I certainly hope so. But I sensed that philosophy, and that is the reason I took the paths that I took.

COMMISSIONER LEWIS: Okay, that leads me to my next question. Suppose this Commission merely decides to fiddle around with the structure of the NRC in our final deliberations,

but we still keep the same people in charge, is that really going to change anything?

MR. CRESWELL: There have been reorganizations in the past where people have been moved to different positions. One, I think, would have to study what the effects have been in the past with those reorganizations.

COMMISSIONER LEWIS: Pardon me, I didn't --

MR. CRESWELL: I think you would have to study -- and it is not something that is fair for me to comment on -- it is something that needs to be looked at in some detail.

COMMISSIONER LEWIS: I guess what I am suggesting is that the mind-set will remain even if we change the structure. Isn't that likely to occur?

CHAIRMAN KEMENY: Professor Lewis, I think what Mr. Creswell was trying to say is that the Commission, if I understand you correctly, that the Commission ought to look at previous reorganizations within NRC, and then make our own determination whether pre-Three Mile Island, any of those led to change in the mind-set.

MR. CRESWELL: That is correct.

COMMISSIONER LEWIS: And just one final question. And there have been reorganizations -- I mean just changing the AEC and dividing it into ERDA and the NRC was a change in the basic structure of the regulatory agency -- isn't it likely that once the furor dies down, it will be business as usual?

In other words, we have this --

MR. CRESWELL: That is entirely possible.

COMMISSIONER LEWIS: Thank you very much.

CHAIRMAN KEMENY: Professor Taylor.

COMMISSIONER TAYLOR: Mr. Creswell, we have been exploring some formal actions that you took and some formal reactions or lack of reaction in this whole set of incidents. I would like to very briefly try to get some sense of informal actions that you may have taken and informal responses, to try to get some sense of the kind of environment that you felt that you were in during this period, I gather from your testimony, of intense frustration.

First of all, did you find yourself discussing what you should do, whether you should write a certain memorandum or not, with any of your colleagues, either at the same level or at a higher level?

MR. CRESWELL: I did discuss some of these issues with a fellow inspector in Region 3, who had previously worked in NRR, who had similar difficulties with safety issues. So there was that avenue for using him as a sounding-board, more or less.

COMMISSIONER TAYLOR: In connection with situations where you were trying to make up your mind what to do and had not yet done it, but at some time in the sequence when you had already done some other things, did you sense that you were,

in these informal interactions with your colleagues or anyone else, being encouraged to blow the whistle, so to say, or discouraged from going ahead with trying to get attention one way or another to these issues that you obviously thought were very important?

MR. CRESWELL: I wouldn't characterize it as being encouraged to blow the whistle or,the other side of the coin, to forget it. I think it was a thoughtful type of analysis to determine what is the best way to handle the issues.

COMMISSIONER TAYLOR: Now, in connection with the reaction of people informally to what you did do, we have heard the phrase used in connection with the meeting early this year, that the purpose of the meeting, according to someone, was to "shut you up."

What I would like to get a sense of is the extent to which you were told by anyone informally, perhaps a colleague, perhaps someone who was an immediate supervisor,that what you had done was not a good thing to have done and you had better sort of get in line or stop doing that; whether in connection with any formalisms about the bureaucracy or just as a matter of advice,that you were getting carried away with something that wasn't important. Were you told by people informally that what you were doing was wrong?

MR. CRESWELL: No one would make an out-and-out statement to that effect. The statements would be more

characterized toward "You're spending too much time in this one area," There are other things that need to be looked at," that sort of thing.

COMMISSIONER TAYLOR: Did you get the sense that that was because they really felt that what you were doing was not important, or because they wanted you specifically to stop pressing the issue?

Let me put it another way. Did you sense that when you were, I gather, somewhat discouraged from going ahead with memoranda or whatever, the question is, was this because they felt what you were doing was unimportant, you had other things that were better for you to do, or because they didn't want you to take the actions that you were talking about?

MR. CRESWELL: Let me -- I think this will answer your question -- let me go into how normally these issues are handled. If you find something like this, you will detail the information in a memorandum and send it to headquarters where it will be reviewed with NRR -- the Sternberg memo, for instance.

And normally, there will be some sort of finding that will come back and says there is nothing wrong here, it has been analyzed. And so your hands are clean from then on out. There is no further action required; you close it out in an inspection report and it is gone.

If you do have a problem, it is very difficult, in my

mind, in my perception, to get those things resolved, to get them addressed.

COMMISSIONER TAYLOR: Is this, partly at least, because of a change of connection between taking action and ultimately the possibility that the utility may have to shut down for a while? And so, in other words, along the lines of what Commissioner Lewis was probing --

MR. CRESWELL: I think that is a definite consideration.

COMMISSIONER TAYLOR: You think that is a major consideration then in the reaction to --

MR. CRESWELL: I think that that is a consideration. As to whether it is major or not, I wouldn't say.

COMMISSIONER TAYLOR: Thank you very much.

CHAIRMAN KEMENY: Deputy Counsel, is there a document request?

MR. KANE: Yes. Mr. Chairman, I would like to request and complete the record as to Mr. Creswell that there be marked as Exhibit 2 to this hearing and included in the public record two documents. The first is a memorandum of January 3, 1979 from Mr. Creswell to Mr. Streeter of Region 3 concerning notification of licensing boards of Mr. Creswell's concerns. And the second is a memorandum of January 19, 1979 from Mr. Keppler of Region 3 to Mr. Moseley of INE headquarters concerning the same subject.

CHAIRMAN KEMENY: So ordered.

(The documents referred to were marked as Exhibit 2 and received in evidence.)

COMMISSIONER TRUNK: Mr. Crewswell, I just would like to ask you, how often do you independently investigate a transient, or do you just take the licensee's evaluation for it?

MR. CRESWELL: Well, I like to, in the areas where I am responsible, look at as much of the original data as I can.

COMMISSIONER TRUNK: But do you go to the plant and investigate it, or you just take the report?

MR. CRESWELL: Well, normally you would be on an inspection,and you could take a look at the original data or get copies of it at the facility.

COMMISSIONER TRUNK: But you just look at the reports. You don't talk to the workers?

MR. CRESWELL: Oh, yes I do, in some instances, discuss it with the operators and so forth.

COMMISSIONER TRUNK: Thank you.

CHAIRMAN KEMENY: Professor Pigford.

COMMISSIONER PIGFORD: Mr. Crewswell, do you happen to have learned what the licensing boards did with that information that they got from you?

MR. CRESWELL: I am really not aware of that, no.

There can be a reason for that, though. As I stated, since the accident I have been attached to one investigation group or the other, and I haven't been in a location that would lend itself to receive that information.

COMMISSIONER PIGFORD: Now, I don't want to repeat what has already been established. I just want to be sure. Have you been asked to identify which licensing boards you sent these to? Is that on the record, to your knowledge?

Mr. Kane says it is on the record, Mr. Creswell, so I think that satisfies me. Thank you.

CHAIRMAN KEMENY: Can you answer the question?

MR. KANE: Yes. Just for the record, one of the documents that has been now marked as Exhibit 2 is the January 8th memorandum. The subject is "Conveying New Information to Licensing Boards, Davis Besse Units 2 and 3 and Midland Units 1 and 2."

CHAIRMAN KEMENY: Professor Marrett.

COMMISSIONER MARRETT: Just a brief question. I understand that you have been involved in some internal investigations on TMI that NRC has been carrying out. Is that correct?

MR. CRESWELL: The INE investigation of TMI-2 looked only at the licensee's performance during the event.

COMMISSIONER MARRETT: What precisely was your role? What kinds of issues did you -- were you able to identify in terms of the INE investigation?

MR. CRESWELL: Well, I participated in several of the interviews of personnel that were involved. I took a look at the B&W response to the event, the on-site technical support.

COMMISSIONER MARRETT: Well, in a sense, my question was a bit too specific. My real concern is to what extent were you able to shape the sorts of issues that the INE investigation would pursue?

MR. CRESWELL: Those topics for study were, first of all, documented in a memorandum from Mr. Davis to the Commission. It is an attachment to that report. So that defined the broad scope of the investigation.

As to assignments, we had a supervisor during the investigation who gave out assignments.

COMMISSIONER MARRETT: All right. Then you fundamentally were following the assignments as made. This is certainly going to be loaded, but, had you been able to shape the investigation, would it have taken the direction that it followed?

MR. CRESWELL: Well, once again, it was quite clear that the scope of that investigation was to look only at the licensee, not NRC or B&W. Both of those areas, as this Commission has recognized, need to be investigated.

COMMISSIONER MARRETT: And you will have no involvement in the larger investigation that is being undertaken by

NRC?

MR. CRESWELL: I am presently attached to that group.

COMMISSIONER MARRETT: You are attached to that group. Are the issues with reference to management organization coming up in that investigation that you have any involvement in?

MR. CRESWELL: That is handled by another group.

CHAIRMAN KEMENY: Mr. McPherson.

COMMISSIONER MC PHERSON: Mr. Creswell, I have two questions. One is a definitional one. And that is,the definition of the word "unresolved." In the document dated October 25, 1978, sent by Mr. Fiorelli,the Chief of the Reactor Operations, Nuclear Support Branch of the NRC to Toledo-Edison, the operator of Davis Besse, there is this sentence: "The licensee is reviewing the operator actions of blocking the SFAS logic and securing high pressure injection to determine if different actions would be advisable in the future, should a similar set of conditions arise. This matter is unresolved."

Now, that is from the NRC to the licensee, and it is saying "You are -- you, licensee -- are looking at this high pressure injection securing to see if you ought to do something different in the future, and the matter is unresolved." What does that word mean?

MR. CRESWELL: It means that it would be classified as unresolved until the issue was satisfactorily closed out, or they had satisfactorily responded to --

COMMISSIONER MC PHERSON: Well, where is the ball? In whose court is it?

MR. CRESWELL: The licensee's.

COMMISSIONER MC PHERSON: Is there any time limit by which this matter should be resolved?

MR. CRESWELL: Well, I should point out, the inspector has limited authority to demand that a certain thing will be done at a certain amount of time. As the issue drug out over a period of months, I wrote a memo to my supervision, asking that, or stating that some of these analyses were taking an inordinate amount of time to complete, that we should develop a course of action and relay it to the licensee for the completion of these items.

To answer your question, there was no request made saying 30 days or 60 days, or there was not a statement by me that you should have that done in that period of time. My supervision was involved in this issue. They were aware of what the problems were, and they were aware of the status of how long it was taking to resolve it.

COMMISSIONER MC PHERSON: Is it typical in such matters for the NRC to leave that unresolved question unresolved itself?

MR. CRESWELL: There can be unresolved items outstanding for a considerable period of time.

COMMISSIONER MC PHERSON: What does that mean?

MR. CRESWELL: Over a year, or longer.

COMMISSIONER MC PHERSON: Are you aware of unresolved safety issues right now in your district not having to do with determination of high pressure injection?

MR. CRESWELL: I can't recollect an example that I can give you, no. But there are.

COMMISSIONER MC PHERSON: This was the most urgent one.

MR. CRESWELL: Yes. There are, though, outstanding items, unresolved items, that are carried for quite some period of time.

COMMISSIONER MC PHERSON: And in your knowledge, this was the most urgent one in your jurisdiction during the time when you were an inspector?

MR. CRESWELL: Right.

COMMISSIONER MC PHERSON: Another question or two that has to do with your choice of Commissioners Bradford and Ahearne and of seeking Commission cognizance of the question. Why did you happen to choose those two Commissioners?

MR. CRESWELL: That is an interesting question. I had read certain of Commissioner Bradford's statements that he made before Congress and other places, and I felt that he had

exercised a certain amount of balance in what he had stated. So that led me to originally contact Commissioner Bradford.

Now, Commissioner Ahearne has a reputation within the Commission for asking technical questions and pursuing issues, and I thought the combination of these two gentlemen was the best way for me to go.

COMMISSIONER MC PHERSON: Could you elaborate on what you mean by "balance" with respect to Commissioner Bradford? That he was concerned about safety?

MR. CRESWELL: Yes. That he had demonstrated -- at least my perception was that he had a balanced outlook toward safety.

COMMISSIONER MC PHERSON: And you thought that might not be the case with respect to other commissioners?

MR. CRESWELL: Well, I would have been glad to have met with any other commissioners. It is just this is the way it turned out, based on what I told him.

COMMISSIONER MC PHERSON: Mr. Creswell, has your personnel evaluation report or reports reflected either positively or negatively, so far as you can tell, this effort that you have made? In other words, have you either been praised or chastised or criticized in any way in your personnel reports as a result of this effort?

MR. CRESWELL: Well, it is a difficult thing to make a direct comparison. Sometimes -- it is very difficult to

separate all the variables out. I would not have classified my last appraisal as being positive, and in fact my supervisor was quite negative.

COMMISSIONER MC PHERSON: Your supervisor was negative?

MR. CRESWELL: Yes, in my discussions with him. There are some,in the area of evaluation of my technical abilities, there were some good statements in there.

COMMISSIONER MC PHERSON: May I ask -- and you needn't say if you don't care to -- but may I ask whether the negative comments had to do with, in your mind, with your persistence in this regard?

MR. CRESWELL: Well, there was a comment on my evaluation about some complaints that the Davis Besse people had made about my work.

COMMISSIONER MC PHERSON: And were those complaints related to this matter?

MR. CRESWELL: Well, they were related to my interfacing with the group, interpersonal-type relationships, and not directed toward the issues themselves, the technical issues.

COMMISSIONER MC PHERSON: They weren't centered on the September and November transients?

MR. CRESWELL: No, they weren't.

CHAIRMAN KEMENY: Thank you very much, Mr. Creswell. The witness is excused.

(Witness excused.)

We will have one more witness, and then have a major break. Chief Counsel, please call and swear in the next witness.

MR. GORINSON: Mr. Ebersole, would you raise your right hand.

Whereupon,

JESSE C. EBERSOLE

was called as a witness and, after being first duly sworn, was examined and testified as follows:

CHAIRMAN KEMENY: Would you please state your full name and the position that connects you to nuclear power at the moment?

MR. EBERSOLE: My name is Jess C. Ebersole. I am a member of the Advisory Committee on Reactor Safeguards. I am a retired employee of the Tennessee Valley Authority, for which I worked for 38 years.

CHAIRMAN KEMENY: Thank you. May we ask you to pull your microphone slightly closer to you. It would help Chief counsel.

MR. GORINSON: Mr. Helfman.

MR. HELFMAN: Thank you, Mr. Gorinson.

Mr. Ebersole, how long have you been a member of the Advisory Committee on Reactor Safeguards or ACRS?

MR. EBERSOLE: Since April, 1976.

MR. HELFMAN: How many members are there of the ACRS?

MR. EBERSOLE: Fifteen.

MR. HELFMAN: Do the members of the ACRS tend to

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specialize or focus their interest regarding matters which are before the ACRS?

MR. EBERSOLE: I think that is a fair statement.

MR. HELFMAN: The ACRS has been described as a "independent group of experts established by law to advise the Commission on the safety aspects of proposed and existing nuclear facilities and the adequacy of proposed reactor safety standards". Do you agree with that description?

MR. EBERSOLE: Yes.

MR. HELFMAN: With respect to the licensing of proposed nuclear facilities, does the ACRS exercise a purely advisory role or does it possess any veto power?

MR. EBERSOLE: It has an advisory role.

MR. HELFMAN: How is that advisory role exercised?

MR. EBERSOLE: I think the best way to say that is that it can write a letter endorsing a given project or it can refuse to write a letter to the Commissioners.

MR. HELFMAN: What impact would the refusal to write such a letter have on the licensing application?

MR. EBERSOLE: It will certainly cause delays and controversies about future action on it. I can't go beyond that.

MR. HELFMAN: When a licensing matter is before the ACRS for review, does the ACRS do a very thorough evaluation of each such project?

MR. EBERSOLE: The degree of thoroughness has to be -- there is great generality. There are only 15 people and there are innumerable projects.

MR. HELFMAN: How does the ACRS identify those particular concerns which should be addressed?

MR. EBERSOLE: By and large, the concerns are brought to ACRS by safety evaluation reports, SERs, or by individual investigations on the part of the individual member himself. Sometimes he is helped by contributions from the field.

MR. HELFMAN: Is the SER a document which is prepared by the NRC staff?

MR. EBERSOLE: Yes.

MR. HELFMAN: Has the SER approved a satisfactory means by which the ACRS can discover issues which should be addressed?

MR. EBERSOLE: In my view the SER tends to obscure issues rather than to bring them forward.

MR. HELFMAN: Why is that?

MR. EBERSOLE: Well, the pressure is on, even by ACRS, to reduce the number of unresolved issues to the maximum extent possible. Therefore, in the ultimate, one would get an SER that would, in essence, have no controversial matters at all and then one must look underneath the surface to see if there were any. I would not say the SER is particularly useful to bring forth important matters to be resolved by ACRS.

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MR. HELFMAN: Where safety concerns before the ACRS involve already operating nuclear reactors -- in other words, it is not raised in the context of a license application, does the ACRS likewise have a purely advisory role?

MR. EBERSOLE: So far as I understand the administrative process, that is true. I would like to make clear again that I would rather not go into the details of administrative controls here. I would rather stick to the physical problems if we can do that.

MR. HELFMAN: Okay. I will try to stick to the most general types of procedural questions.

If a safety concern is before the ACRS, which is not related to a license application -- comes up in another generic context, does the ACRS follow generally the same procedure that it does during a license review. In other words, are there hearings? Are there subcommittees? Is a letter written to the Commission?

MR. EBERSOLE: There are hearings. There are subcommittee meetings and the items are consolidated into a generic list, which I think you have on record.

MR. HELFMAN: You mentioned that the ACRS has only 15 members. Does the ACRS have a staff which is responsible for follow up on safety concerns raised by ACRS members?

MR. EBERSOLE: It does.

MR. HELFMAN: How large is that staff?

MR. EBERSOLE: I am going to have to get the number. I think it may be approximately 20 or thereabouts. It has been augmented recently by a number of Fellows who are helping in the last year or so.

MR. HELFMAN: Would it be accurate to say that ACRS members and the ACRS staff relies heavily on the NRC staff for information?

MR. EBERSOLE: Yes.

MR. HELFMAN: If the ACRS concludes that an important generic safety problem has arisen in a context which is not a plant specific license application, does the ACRS have any means of insuring that appropriate corrective action is taken by vendors and utilities?

MR. EBERSOLE: The ACRS could write a letter endorsing a position that a plant not be allowed to be constructed or operated in the face of that generic issue. That would be regarded as punitive in the case of that particular project or generic plant design. In general, that sort of punitive pressure is not brought to bear.

MR. HELFMAN: In the Three Mile Island accident of March of this year, the operator terminated HPI and reliance on high pressurizer level, despite continuing loss of coolant from the core. Do you agree that is a pretty accurate summary?

MR. EBERSOLE: I believe that is true.

MR. HELFMAN: Is this the sort of generic concern,

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operator reliance on pressurizer level, which would be addressed by the ACRS?

MR. EBERSOLE: Well, it has not been identified as a generic concern. I might explain on that. The absence of pressurizer level is an old and long issue going back into say '74 or even perhaps earlier than that. And the general defense on the part of the PWR designers and the builders has been that you don't need reactor vessel level indication and, as a matter of fact, if you let the equipment do what it is supposed to do, you don't even need to know what is going on.

MR. HELFMAN: Was the question of operator reliance on pressurizer level a concern which was brought to the attention of the ACRS or to your attention by a Carl Michaelson in early September, 1977?

MR. EBERSOLE: It was.

MR. HELFMAN: Were you aware of a transient which has already been described today which occurred at the Davis-Besse plant on September 24, 1977?

MR. EBERSOLE: I was not aware of that transient.

MR. HELFMAN: Were you aware that it occurred?

MR. EBERSOLE: No. This is not to say that it may not have been sent to me. I simply didn't get to it. I had other problems at the time.

MR. HELFMAN: Well, perhaps, I can refresh your recollection by referring to the transcript of the 210th ACRS

meeting, dated October 7, 1977, apparently two weeks or so after the occurrence of the transient. This is at Tab 19. On page 347, Mr. Seyforth of I&E is explaining the Davis-Besse transient and you were present and asked the following question of Mr. Seyforth. Did the high pressure ECCS pumps come on and start to inject? Mr. Seyforth responds, "Yes, they came on at the time. I have forgotten now for the moment what initiated those." You asked, "Low level in the pressurizer?" Mr. Seyforth responds, "Yes, it was about 1,600 pounds. It was the low pressure system that got it." You asked, "Did that charge the system with water?" Mr. Seyforth answers, "No." And you inquire, "The operator turned them off?" And Mr. Seyforth answers, "Yes." Does that in any way refresh your recollection as to whether you were aware of the --

MR. EBERSOLE: Your record is much better than my memory. I am sorry. I do not recall that that particular discussion bore heavily on the matter of loss of a valid indication on the pressurizer.

MR. HELFMAN: In fact, I could inform you that that was the end of the discussion about operator action in reliance on pressurizer level at that meeting.

Do you recall whether you or the ACRS did any follow up into the question of operator reliance on pressurizer level as it occurred in the context of the Davis-Besse transient of September, 1977?

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MR. EBERSOLE: The only thing I can recall is my pursuit of the question as assisted by Mr. Michaelson's report.

MR. HELFMAN: With respect to the concerns addressed by Mr. Michaelson, what follow up did you do with his report?

MR. EBERSOLE: Well, as soon as I received it in hand, I made it a part of a large set of questions, which were more or less generic to the Babcock and Wilcox design on Pebble Springs. I added at least two questions which were directly pertinent to the level question and a third one that had to do with auxiliary feedwater.

MR. HELFMAN: Did you also provide a copy of Mr. Michaelson's report to a Mr. Sandy Israel of the NRC?

MR. EBERSOLE: I did so, informally.

MR. HELFMAN: When did Mr. Michaelson provide you with a copy of his report? Do you recall approximately?

MR. EBERSOLE: It seems to me it was in October -- September or October of '77 or thereabouts, within a few weeks of his preparation of this. We can get that precise time if you wish. I have to refer to my papers to do that. I don't think you want to do that.

MR. HELFMAN: I think the estimate is sufficient.

Do you recall whether the Pebble Springs plant was at the construction permit application stage at the time?

MR. EBERSOLE: Yes, it was. As a matter of fact,

the Pebble Springs plant was a part of this process of using a standardized design of B&W 205 in a unique plant. The questions were addressed to the B&W standard 205 design and to a great degree the issues and questions on 205 had been settled at the time I joined the subcommittee. Having not been a party to how they were settled, I elected to write a few questions on the generic aspects of the generic design. That is why the 26 questions were developed.

MR. HELFMAN: Referring to question No. 6 of the 26 that you prepared, is that the question which asks how the operator is to interpret pressurizer level in the case of a small break loca? To the best of your recollection?

MR. EBERSOLE: To the best of my recollection, right. That is it.

MR. HELFMAN: And these questions were directed to whom?

MR. EBERSOLE: Well, they were written, of course, and sent through NRC staff to the applicant.

MR. HELFMAN: And ultimately?

MR. EBERSOLE: Ultimately, I believe, these are processed as is the usual fashion through the vendor organization, B&W, and they come back in reverse through the same pathes.

MR. HELFMAN: Through the vendor, through the staff to the ACRS?

MR. EBERSOLE: Yes.

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MR. HELFMAN: Did the utility or the vendor provide a set of answers to the Pebble Springs questions?

MR. EBERSOLE: They did.

MR. HELFMAN: Did the utility or the vendor provide an answer to question No. 6, regarding operator interpretation of pressurizer levels?

MR. EBERSOLE: They did provide an answer.

MR. HELFMAN: How would you characterize that answer?

MR. EBERSOLE: Of low quality.

MR. HELFMAN: Was the question of operator reliance on pressurizer levels addressed to the best of your recollection?

MR. EBERSOLE: There was no direct answer, to my recollection. Would you want me to refer to this answer in particular? I have it here.

MR. HELFMAN: If you would like to skim it briefly.

MR. EBERSOLE: It is in my briefcase. Let's go on without it then.

MR. HELFMAN: All right. Recognizing that it was an inadequate answer --

MR. EBERSOLE: It was an inadequate answer. It was gobbledigook, I guess.

MR. HELFMAN: Did you do any follow up to get an adequate answer on this question?

MR. EBERSOLE: I did not.

MR. HELFMAN: Do you know if there was any follow up

by the ACRS?

MR. EBERSOLE: There was none that I know of and I think -- in fact, there was none.

MR. HELFMAN: Do you recall why it was that you did no follow up with respect to this question?

MR. EBERSOLE: I had problems at home. My wife is a victim of Lou Gehrig's disease and I have difficulty attending the meetings and pursuing these matters as I really should.

MR. HELFMAN: At that time?

MR. EBERSOLE: Right.

MR. HELFMAN: Does the NRC, to the best of your knowledge, have any responsibility for insuring that questions posed by the ACRS or its members are answered?

MR. EBERSOLE: I don't know of any hard words to that effect. The answer that we get are of a variable quality and I must say that in many cases the questions and no substantially satisfactory answers ever materialize over a long period of time.

MR. HELFMAN: Do you know if in the particular case of Pebble Springs whether the NRC staff did any follow up?

MR. EBERSOLE: I do not know.

MR. HELFMAN: You have indicated that you handed a copy of Mr. Michaelson's report to Mr. Israel of the NRC. Do you recall when that was in relation to the hearings on the

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Pebble Springs application?

MR. EBERSOLE: Yes. It was at the first hearing on the Pebble Springs 205 project after the submission of these questions, to the best of my recollection.

MR. HELFMAN: Did Mr. Israel later inform you of what, if anything, he did with the Michaelson report?

MR. EBERSOLE: No, he returned the report to me with a bookslip noting that he hadn't had time to read the report, but inferring that he was going to investigate it.

MR. HELFMAN: Did Mr. Israel route to you a copy of the January 10, 1978 memorandum he prepared which was signed by Mr. Novak and which has since become known as the Novak Memorandum?

MR. EBERSOLE: Not to my knowledge.

MR. HELFMAN: Did you do any follow up with Mr. Israel prior to the TMI-2 accident regarding his work with the Michaelson concerns?

MR. EBERSOLE: No. I did not.

MR. HELFMAN: Have you seen the Novak Memorandum?

MR. EBERSOLE: I have.

MR. HELFMAN: When was the first time you saw it and who provided you a copy?

MR. EBERSOLE: I believe that was sent to me by Mr. Henry Myers of Mr. Udall's committee.

MR. HELFMAN: And that was after the Three Mile

Island accident?

MR. EBERSOLE: After the Three Mile accident.

MR. HELFMAN: To the best of your knowledge, does the NRC has any responsibility to produce operating procedures?

MR. EBERSOLE: To the best of my knowledge, they do not.

MR. HELFMAN: Is there any requirement that the NRC review such procedures?

MR. EBERSOLE: I presume there is now, but prior to the TMI incident, that was a very much gray area, which led basically to my problem in not truly identifying the serious nature of the Michaelson report. The Michaelson report would have been very substantive in the knowledge that there was no compensatory operator procedures to deal with the physical problem at hand. Had there been in being a suitable set of emergency or abnormal procedures, I believe that incident could have been handled very easily.

MR. HELFMAN: Who is responsible for producing operating procedures, to the best of your knowledge?

MR. EBERSOLE: It is a joint effort on the part of the utility, which will operate the plant and the vendor, primarily.

MR. HELFMAN: Excuse me. Is there any requirement that the NRC review the routines by which procedures are produced?

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MR. EBERSOLE: I am not aware of what they do precisely in this connection.

MR. HELFMAN: Do you have any sense that the NRC does review such routines?

MR. EBERSOLE: I have a sense that they do not adequately review this process.

MR. HELFMAN: Prior to the Three Mile accident this year, did the ACRS conduct operating procedure reviews?

MR. EBERSOLE: No.

MR. HELFMAN: Are you aware of a problem which may be described as natural convection vapor problem, which arises due to an inability to vent vapor from certain plant designs?

MR. EBERSOLE: Yes.

MR. HELFMAN: Does such a concern ultimately lead to a problem in the removal of heat on account of a blockage of natural flow?

MR. EBERSOLE: Yes.

MR. HELFMAN: Do you consider this to be a generic safety concern?

MR. EBERSOLE: For PWRs I do.

MR. HELFMAN: For all three types?

MR. EBERSOLE: All three types.

MR. HELFMAN: Is this a particular concern with any particular type?

MR. EBERSOLE: I would almost say that it is of

greater concern with the combustion engineering and Westinghouse types than it is with the Babcock and Wilcox type because of the potential or as yet an unrealized potential for venting. The combustion in Westinghouse designs cannot vent their steam generators.

MR. HELFMAN: Was a question posed to the utility or to the vendor, Westinghouse, regarding this design problem at the time of the licensing hearings on the Diablo Canyon facility in California?

MR. EBERSOLE: Yes. The question was brought up with Westinghouse about principally venting or loss of flow in the context of the possibility of non-condensible gas blocking the process.

MR. HELFMAN: Do you recall approximately when this was?

MR. EBERSOLE: I think it was in the spring of 1975.

MR. HELFMAN: Did either Westinghouse or the utility provide an adequate answer to the question?

MR. EBERSOLE: No.

MR. HELFMAN: Do you know if the Diablo Canyon plant received its license?

MR. EBERSOLE: So far as I know, it has not. It may have received some limited license. I have not kept up with Diablo.

MR. HELFMAN: Was this question posed in the context of the construction permit application, do you know?

MR. EBERSOLE: It was the operational permit.

MR. HELFMAN: In your opinion, does this design problem remain an open safety concern?

MR. EBERSOLE: Yes, in my view.

MR. HELFMAN: Thank you, Mr. Ebersole. I have no further questions, Mr. Chairman.

CHAIRMAN KEMENY: I just have two fairly quick lines of questioning. One, on your reading of the Michaelson report, is it fair to characterize that you became quite concerned about the possibility of operators misreading the signals by relying on the pressurizer and therefore taking incorrect actions?

MR. EBERSOLE: Yes. That was a concern that was there. But that was more or less contradicted by the thesis that there might be instructions to the operators not to interrupt the automatic functioning of the high pressure injection pumps. Now, had that instruction existed, the vapor locking problem might have been solved, because the pressure of the system would have held high enough to keep the system solidified. The question on the matter of the non-condensible gas blocking would have remained. Primarily, however, that would have been on combustion and Westinghouse designs.

CHAIRMAN KEMENY: Yes. Going back to the former

rather than the latter, the B&W plants, if in your opinion if clearcut instructions had been available that HPI should not be turned off under certain circumstances, would that, in your best judgment, have prevented the accident at Three Mile Island 2?

MR. EBERSOLE: Yes. In my judgment that would have prevented the accident.

CHAIRMAN KEMENY: That makes your remark, of course, that to the best of your knowledge that the NRC does not review operating procedures, a serious concern.

MR. EBERSOLE: Yes.

CHAIRMAN KEMENY: The other thing that I wanted to ask is we brought out why you were personally unable to participate in the follow up on that question, which we thoroughly understand. But what does it say about the structure of ACRS itself, if one member of it raises a serious concern and then if he personally is not available, ACRS does not follow up on it?

MR. EBERSOLE: Well, I think the ACRS would look at this as it does matters in a collegiate way across the total membership. To the extent that the general membership might not have a specific interest in that kind of detailed phenomena, they might not pursue this thing. I think, in general, the membership, the other members, perhaps didn't have the detailed interest in this sort of thing that I did.

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CHAIRMAN KEMENY: The reason I am raising it, of course, is because we are instructed by the President of the United States to look at the entire structure of NRC and ACRS is part of that structure. I think you would agree with that.

MR. EBERSOLE: Yes. Right.

CHAIRMAN KEMENY: Do you feel that this is a good structure? I really have no experience with Mr. Ebersole. Do you feel it is a good structure to have a collection of 15 individuals that may pursue their own individual interests, without systematically pursuing questions?

MR. EBERSOLE: I think it is a good structure; however, I think it could be improved. I think the ACRS is probably the -- I guess I could say that they are the untouchables of the business. You have to agree that they probably have the least bias of anybody because they are after all part-time consultant-type people. On the other hand the ACRS is composed of a membership that doesn't include very much contribution from what I might call the architect-engineer segment of the utility effort, where the detailed knowledge of what constitutes a plan and what its intricacies are, the machinery problems and perhaps the dark corners of the functional processes is known. The membership doesn't get that far down into the detailed mechanics.

CHAIRMAN KEMENY: My last question is since you said that ACRS serves an important role, but could be improved,

may I ask you what would be your own recommendations on how to improve ACRS.

MR. EBERSOLE: I would like to see a larger type of contribution toward what I call system engineering, system interaction capability. I think I have to identify the possible source of this expertise largely in the architect and engineer field. It is difficult to get members from that field, without considering such membership to be biased.

CHAIRMAN KEMENY: Thank you, Mr. Ebersole.

Mr. Pigford.

CHAIRMAN KEMENY: Professor Pigford.

COMMISSIONER PIGFORD: Mr. Chairman, I want to be sure that I have heard correctly. Did you ask him, does NRC not review procedures, or does ACRS not review procedures?

CHAIRMAN KEMENY: I asked, I believe, whether NRC reviews the operating procedures, or actually before Three Mile Island. I believe Mr. Ebersole at one point said that may have changed at Three Mile Island.

MR. EBERSOLE: I might try to clarify that. It is my understanding that prior to TMI there was probably some review, but in general there was not a detailed review of emergency and abnormal procedures.

COMMISSIONER PIGFORD: By NRC.

MR. EBERSOLE: By NRC, and none on the part of ACRS. In this connection, I think I must discern between operating procedures in the conceptual aspect and the detailed aspect. The NRC and ACRS might practically look at the conceptual form of operating procedures and emergency and abnormal procedures, whereas in the detailed, such procedures which have innumerable detailed valve numbers and switch numbers, and in general the concept is converted into highly detailed, step-by-step instructions, it would be virtually impossible to undertake this sort of investigation.

COMMISSIONER PIGFORD: So now ACRS is reviewing operating procedures.

MR. EBERSOLE: No, I can't say that. I believe NRC is.

COMMISSIONER PIGFORD: Oh. And ACRS is not. Is that correct?

MR. EBERSOLE: As of this moment, I don't believe that we have ongoing solid program in that area. I am rather confident that we will.

COMMISSIONER PIGFORD: It is intended to have one?

MR. EBERSOLE: I cannot say that. I don't know. Again, it is a matter of the load on the membership, 15 men.

COMMISSIONER PIGFORD: Does it mean that the ACRS decides, is the sole arbiter of what they review in these generic items?

MR. EBERSOLE: Is the sole arbiter?

COMMISSIONER PIGFORD: Is it up to them to decide if they review operating procedures or not?

MR. EBERSOLE: The ACRS, I believe, can elect to review operating procdures if they think in a practical way they can do so.

COMMISSIONER PIGFORD: And they can elect not to, apparently?

MR. EBERSOLE: Yes.

COMMISSIONER PIGFORD: I see. Are there any guidelines to ACRS as what they have to do and don't have to do?

MR. EBERSOLE: I don't think such guidelines descend

to this degree of specificity.

COMMISSIONER PIGFORD: I see. Mr. Ebersole, is this a first for an ACRS member perhaps, your testifying regarding your activities as an ACRS member?

MR. EBERSOLE: Yes.

COMMISSIONER PIGFORD: Has any ACRS member done this before?

MR. EBERSOLE: I believe there have. I am not aware of the specific cases.

COMMISSIONER PIGFORD: Perhaps before some congressional committees?

MR. EBERSOLE: I presume.

COMMISSIONER PIGFORD: But apparently they are not allowed to testify in licensing proceedings, is that correct?

MR. EBERSOLE: They are not allowed to testify in licensing proceedings -- is that your question?

COMMISSIONER PIGFORD: Yes.

MR. EBERSOLE: I -- pardon me. I don't think they do. The decisions of the ACRS are, in general,collegial. And I am here as an individual today.

COMMISSIONER PIGFORD: Yes. Which means you are not speaking for the whole committee.

MR. EBERSOLE: That is correct.

COMMISSIONER PIGFORD: But it does mean you are, though, speaking for your own activities as a member.

MR. EBERSOLE: Yes, that is correct.

(Pause.)

At the Pebble Springs hearing, that was not testifying; it was just submitting of questions in the routine fashion that we follow.

COMMISSIONER PIGFORD: Of course. To be sure that I understand, is it correct that there is some policy that ACRS members are not to testify in licensing proceedings?

MR. EBERSOLE: I believe that is true.

COMMISSIONER PIGFORD: Do you think that is productive to this process?

MR. EBERSOLE: I think it probably is.

COMMISSIONER PIGFORD: Now, a moment ago, you were asked does the NRC have the responsibility for assuring that questions posed by ACRS are actually answered? Now, I don't have recorded an answer to that question. Could you go over that with me once more?

MR. EBERSOLE: They have the responsibility to see that the questions are answered, but the degree of quality of the answer is essentially infinite.

COMMISSIONER PIGFORD: Is essentially what?

MR. EBERSOLE: Infinte. From virtually zero quality to a very high-quality answer. An answer doesn't define how well the answer is fabricated.

COMMISSIONER PIGFORD: You mean they are allowed to

accept an answer all the way within those limits.

MR. EBERSOLE: I know of no restraint against that.

COMMISSIONER PIGFORD: That means no answer is acceptable then.

MR. EBERSOLE: No answer is frequently the case. And then, if necessary, and if in the judgment of the members of ACRS, the matter might become a generic question, to which there is no resolution at the moment.

COMMISSIONER PIGFORD: Is the ACRS then consciously accepting what seems to be the understanding,that when the ACRS poses questions, NRC is not required to assure that the question is answered? Is that correct?

MR. EBERSOLE: No. I would have to say the NRC is obligated to provide an answer.

COMMISSIONER PIGFORD: Which may go from zero to infinity.

MR. EBERSOLE: In quality.

COMMISSIONER PIGFORD: Oh, in quality?

MR. EBERSOLE: Yes.

COMMISSIONER PIGFORD: I see. But there must be an answer?

MR. EBERSOLE: Yes.

COMMISSIONER PIGFORD: Therefore, NRC really didn't follow through on the questions to Pebble Springs No. 6?

MR. EBERSOLE: Evidently not to the degree that wo'ld

have been satisfactory.

COMMISIONER PIGFORD: What branch of NRC is responsible for doing this?

MR. EBERSOLE: I can't point to the particular branch. I am talking about NRC in the general context of NRC being a participant to the ACRS hearings.

COMMISSIONER PIGFORD: But isn't there some particular individual, an office, within NRC that is assigned to carry out this interfacing function for the ACRS?

MR. EBERSOLE: It has been my view, and I don't know how accurate it is, that the questions may fall in several directions. A question might be, as a matter of fact, principally addressed to the utility operator. It might be addressed to the vendor-designer. It might be addressed to the architect-engineer. Or it might be addressed to the NRC staff, and I use the NRC staff loosely, as identifying all of the NRC participants other than the advisory committee itself.

COMMISSIONER PIGFORD: My present question, though, is there not a person or an office within NRC which has the responsibility, say,of first forwarding your ACRS questions to the different parties? For example, the Pebble Springs questions from ACRS were sent to the applicant by a Mr. Mueller from NRC. Is that his responsibility?

MR. EBERSOLE: I want to fall back on my earlier statement. I develop the questions, and I essentially hand

them over to the administrative functions of ACRS, in essence to Mr. Freilig.

COMMISSIONER PIGFORD: To Mr. whom?

MR. EBERSOLE: Mr. Freilig, who is the director. I then expect him to direct the process as necessary to the proper responsers.

COMMISSIONER PIGFORD: The present question is, to your knowledge, is there an individual or office within NRC that has the responsibility of forwarding these questions for ACRS and seeing that they get answered? Do you know?

MR. EBERSOLE: I can't point to a specific individual or organization. I don't know of that. I depend, as I said before, on ACRS administration to take care of pointing these questions in whatever direction they should go.

CHAIRMAN KEMENY: I may be able to help you. Chief Counsel just informed me that we do have that information, and an appropriate NRC official to be questioned is coming up on our witness list later.

COMMISSIONER PIGFORD: Thank you.

CHAIRMAN KEMENY: Professor Taylor.

COMMISSIONER TAYLOR: Mr. Ebersole, I would like to try to understand a little better your concerns about the lack of a release valve, vapor release valve, on the steam generators. Let me put the question this way: Do you have in mind some kind of a sequence of events in which the lack of such a capacity

to bleed off condensable gases or vapor would substantially increase the likelihood or extent of serious core damage?

MR. EBERSOLE: Yes. In the investigation of the BWR-205 design and earlier on, when I was still working for TVA, I looked upon the B&W plant, as a matter fact, as a superior design in certain aspects. Although it was more sensitive in auxiliary feed water than others, it had a capacity for installing venting valves which would enable the plant to be capable of venting either manually or by other means any non-condesables or, more importantly, or rather, less importantly vapors that might accumulate in the high spots of the circulatory system.

While I was still there, as I recall in 1974, we undertook an investigation to develop the verticle profiles of all plants for a comparative look at all of these in the general context of looking at the potential for venting and the potential for accumulation of gases, both condensable as well as non-condensable.

It was clear even then that the BWR plant,because of its unique once-through steam generator, with its -- what is now called the "candy cane design" -- that it would have been comparatively a small matter to have put venting valves on the system to relieve the system of vapors or gases, and thereby obtain a solid liquid system for natural convection.

On the other hand, we also knew at that time that it

was impossible to do this to the combustion and Westinghouse designs, because those particular reactors used wet boilers instead of super-heat boilers that have innumerable vertical U-tubes, and it is mechanically impossible to vent this sort of configuration.

COMMISSIONER TAYLOR: Now, is the difficulty there that you simply -- it is impractical to put vent valves on all the U-tubes?

MR. EBERSOLE: Correct, exactly. But it was quite practical to put it on the so-called candy cane. And, of course, we didn't do that. I think in time depth that we might have done this during the evolution of the Bellafonte plant, but of course I left TVA, and I don't really know what would have taken place prior to the operating permit on Bellafonte.

As you know, Mr. Michaelson was actively pursuing these matters, and I had a good deal of faith in his tenacity to dig this matter out.

COMMISSIONER TAYLOR: How about the main pressure vessel?

MR. EBERSOLE: Now, that is a problem, one that is vent backed, generally after refueling in any case, on any reactor; that is done by operating the main coolant pumps and purging the system several times to clear it of any accumulated gases at the main pressure vessel and in the pressurizer.

COMMISSIONER TAYLOR: Well, in connection with the

TMI system, do you think it would have made the response to the accident a lot easier to have had a vent valve right on the top of the pressure vessel that could have been operated from the control room?

MR. EBERSOLE: Yes, or even there as well as at the top of the hairpin bend or the so-called candy cane.

COMMISSIONER TAYLOR: Yes. Now, presumably, that might, in some cases, accomplish a separate purpose. In other words, you wouldn't necessarily have gotten rid of the hydrogen bubble in the pressure vessel.

MR. EBERSOLE: It would not, of course, but it would have enabled you to establish liquid convection because you would have a solid liquid system through the heat transfer process; that is, through the steam generators.

COMMISSIONER TAYLOR: Now, could you explain why it is that, as a matter of course, there isn't a vent valve on the main pressure vessel to deal with situations just like the one that took place at TMI?

MR. EBERSOLE: Well, there is always the potential that it may be inadvertently vented during operations, or that it itself may become another source of a possible leak. So there are negative aspects to this paticular feature, as there always is to any safety feature.

COMMISSIONER TAYLOR: But aren't there also lots of penetrations of the pressure vessel for reasons that aren't

always necessarily vital to having some kind of a circulatory system? For example, at TMI-2 itself, there are a number of penetrations for neutron flux monitoring, so-called "rabbits" that go in and out.

MR. EBERSOLE: Right.

CHAIRMAN TAYLOR: Now, presumably, people have made the assessment that the information that one gets from that is worth whatever additional hazard there is to having a tube that goes through the pressure vessel.

Is the problem worse than that, though, in the sense that if there is something which is designed to be opened under some circumstances, you worry about its opening when you don't want it to?

MR. EBERSOLE: Well, if I were going to worry about that, I would always worry about the set of pipes and valves that communicate the low pressure system to the high pressure system, because if one accidentally operated that system under high pressure conditions, you would essentially have a full-scale loss of coolant accident into the auxiliary building, which would destroy all the mitigating systems.

COMMISSIONER TAYLOR: Have there been discussions at the ACRS meetings of this -- of any of the safety issues related to vapor release valves of any kind, whether just on the high points in the primary system, or anywhere else?

MR. EBERSOLE: I don't think that had come around.

See, it is broken into two problems. It is the condensable vapors which can be overcome by pressure and reduced temperature, and the general thesis of the high pressure injection system is that,given a certain size break, it can do that. It can overcome the vapor-binding problem by continued operation at whatever minimum flow that is established automatically.

On the matter of the non-condensable gases, the argument has generally been that there is not enough source for non-condensables, that is, sufficient quantity in cubic feet, to provide a blocking process to the natural convection mechanism.

COMMISSIONER TAYLOR: Well, in view of the experience at TMI, do you think that it would be a good idea to put such a valve, in spite of the difficulty that you referred to, on the main pressure vessel or not?

MR. EBERSOLE: In my view, it would be a good idea.

COMMISSIONER TAYLOR: It would be a good idea. Now, I am not suggesting necessarily that you are suggesting that this be done to all the reactors that exist, but as a matter of design principle, I gather that you would favor putting a valve on the main pressure vessel that can then be operated from the control room?

MR. EBERSOLE: Yes. But at the same time, I would also look carefully toward the incremental hazard that such valves offer.

COMMISSIONER TAYLOR: I unders[illegible]..

MR. EBERSOLE: And I would also look at putting a valve on the top of the candy cane.

COMMISSIONER TAYLOR: Would you see less hazard of inadvertent openings of the valve on the top of the candy cane than on top of the pressure vessel? In other words, do you feel more comfortable about recommending that?

MR. EBERSOLE: I would see no particular difference. It seems to me that such valves should probably be at both locations.

COMMISSIONER TAYLOR: Is there any reason why you as a member of the ACRS couldn't bring up this issue at your next meeting, or ask the Director to put it on the agenda for some subsequent meeting?

MR. EBERSOLE: Well, there is a little bit of a fundamental problem here, in that we are called upon to review what is offered to us for review and to stay clearly away from design, and I find that process quite difficult.

COMMISSIONER TAYLOR: Is that formally established for ACRS, or is that just a sort of traditional way that you come to doing things?

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MR. EBERSOLE: It is a traditional philosophy that you cannot regulate or criticize your own design. And if you offer a design, then it comes biased, without your capacity to review it, although in a practical sense, and working back

with TVA, I found it impossible to separate the safety evaluations from design activities.

COMMISSIONER TAYLOR: Well, that was actually the next question I wanted to ask you. Do you think that there is a fundamental difficulty with respect to safety? Is there a tendency, in your mind, for the design for safety consciousness from first principles, from the very beginning, to be replaced by a tendency to try to fix safety-related design deficiencies after the fact?

MR. EBERSOLE: Well, I think it is far more difficult to fix safety-related designs after the fact. And inevitably, you will iterate so many times that you can't afford to any longer, and then you adopt some other procedure, such as the safety guides, the general criteria. In a disconnected and loose way, you influence the design activities, but not to the extent that you actually participate in the development of detail.

COMMISSIONER TAYLOR: Well, I am curious to get your opinion with respect to PWR's specifically, whether the safety-related actions connected with design have tended to be more after the fact or before the fact? In other words, added engineered safeguards, have they been a more important source or way to respond to safety issues than safety issues raised in the very beginning in the design of the reactors?

MR. EBERSOLE: Well, historically, if you go quite

far back, you will find a consistent belief that -- I think this comes from the university sector -- that reactors could be controlled automatically. And the ultimate response to a safety problem was to shut down, and of course, that is quite enough for a university-size reactor. To this extent, many of the standards were developed in the industry, such as IEEE-279, which were based on the thesis that the ultimate end product was a shutdown. It took no particular cognizance of the enormous amounts of residual energy that are contained in commercial-sized reactors.

However, this sort of philosophy has colored the design and review of reactors for a long time, in the light that if you look at all of these, you will find a general pattern to believe that the reactor is largely going to be controlled by automatic machinery, certainly in the short term.

I recall when we started to develop the GE reactors for TVA, we had to reach up and grab a concept, and it came out of the sky, so to speak, which went something like this: Since we see no particular definition of at what point in time an operator becomes competent, we have to establish a point in time. He can't be competent in one second, or two, or three, or four, so what should be a time? And, of course, that time should be qualified on the quality of his information and how it is displayed, and how well he is trained, and what sort of an individual he is. But to begin with, we ought to set some

sort of a standard on which to work, and we grabbed ten minutes.

It has been interesting to note that that sort of time has been more or less accepted as a common standard. That matter is being worked on by an A&S committee who were developing -- I believe it is called --

CHAIRMAN KEMENY: May I just ask for clarification, because it seems an immensely interesting point? Do I understand that the ten minutes is how long the system is able to protect itself, to give the operator a chance to --

MR. EBERSOLE: That is right; to let him collect his wits and respond. Whether that is the right time or not could be developed as a -- and it is being developed, as I said, by A&S group.

COMMISSIONER TAYLOR: I can't resist saying that in view of some of the unresolved issues about TMI, it seems to me it is conceivable that time might be more than four months.

MR. EBERSOLE: Well, anyway, it is a problem that remains with us, and to quite a large degree there is a general thesis that prevails, that reactors can be automatically protected. And you might note that the studies on even the Lopa(?) stopped short of a great deal of operator participation in the subsequent recovery of the plant.

COMMISSIONER TAYLOR: Just one final question. Do you have a strong feeling about whether or not ACRS should in fact take up operator issues? Would you recommend that or not?

MR. EBERSOLE: Yes, I do. As a matter of fact, I don't consider a design evaluation complete without the operator participation in that design being defined.

COMMISSIONER TAYLOR: All right. Thank you very much.

CHAIRMAN KEMENY: Commissioner Lewis?

COMMISSIONER LEWIS: Mr. Ebersole, when the utility and the vendor are negotiating the ultimate design of the plant, how much weight is given to the cost factors when deciding what safety implements should be put into the plant?

MR. EBERSOLE: How much consideration is given?

COMMISSIONER LEWIS: In other words, when they are saying what safety elements shall we put in, weight, against the cost of the, essential cost of the plant?

MR. EBERSOLE: It has been my experience that you must put in what the regulatory authorities require.

COMMISSIONER LEWIS: But no more?

MR. EBERSOLE: You need put no more than that, and I think I will just stop there.

COMMISSIONER LEWIS: Please don't. We would like to hear what you are thinking right now. Is it enough, I guess is what I am trying to say?

MR. EBERSOLE: Well, after all, there is considerable economic pressure to build a plant. The time scale is critical. The costs are tremendous. It has been my experience, certainly in the latter part of my years with TVA that the policy was to provide those features which the NRC requires, and that is enough, that there is essentially no particular safety issue of real importance, unless it has come from the regulatory authorities, a position which I reject.

If I can go back to about 1968, and if you are aware of a so-called "ATWAS" problem, at that time as a member of the utility and a using group, we proposed the General Electric Company put a mitigating system in for the possibility of the rods failing to insert on a boiling water reactor which is a serious problem because the failure of such a rod in a boiling water reactor is spectacular.

It was not required by NRC at that time and what meager pressure we could apply to General Electric was ineffective.

We eventually, of course, did not start the Brown's Ferry plant without having such a mitigating system in place, I am happy to say. That is the so-called recyc pump trip system, but the original proposal of that from the vendor, sorry, from the utility operator to the vendor was rejected and it was unable to get it done for a period of nearly four odd years. That is in place now, I am happy to say. That is not a finished mitigating system. It still warrants improvements, but nevertheless, it is a battleground on which to pursue improvements.

COMMISSIONER LEWIS: What I am trying to get at, and you are getting very close to it is to evaluate the role of the NRC in making that kind of decision. Do you feel that the NRC is more sympathetic with the economic costs of building a plant in drawing up its rules and regulations?

MR. EBERSOLE: No, I don't think I will say that, but I do think the utility if it has, as it should have, an investigative staff to look into these things, is bound to find things that the NRC can never encounter in the safety context, and there should be some mechanism of bringing these things forward to NRC for consideration better than we now have.

Unfortunately these things, as we have seen, and I think it is a rather striking development of this particular case, they don't seem to be able to penetrate what I will loosely call the shell of middle management. They stay subdued.

COMMISSIONER LEWIS: I might ask you the same question I asked Mr. Creswell. If we just change the structure, is anything going to change in the NRC?

MR. EBERSOLE: I think some improvements could be brought about by changing the structure. On the other hand, I think simply calling people by different names and hanging new titles on the doors everywhere does nothing.

By that I don't mean that there isn't some fraction of a given organization that might more effectively prosecute the safety issues. What that fraction is, I don't know.

COMMISSIONER LEWIS: Thanks, Mr. Ebersole.

I just want to ask you one other question. You said that where generic issues are concerned the NRC does not

bring punitive pressures to bear. Could you explain why you believe they do not do so?

MR. EBERSOLE: Well, in my own view, it would be unfair to take a particular utility or a particular project and put the total burden of a generic issue on them to solve. It should be a shared problem, and all should share the expense of solving that.

COMMISSIONER LEWIS: In other words, the vendor, the utility, and everyone who is involved?

MR. EBERSOLE: The architect, the whole team should share the cost punitive aspects of solving that. It is, in my view, inappropriate to select TVA or Metropolitan Edison or anybody else on a given project and put the whole burden of solving that particular issue on them.

COMMISSIONER LEWIS: Is there no system by which that burden could be shared under the present system?

MR. EBERSOLE: I am not aware of one. I think one could be developed.

COMMISSIONER LEWIS: But because the burden then would be laid on the utility or the licensee, there is a reluctance then to do anything at all about the --

MR. EBERSOLE: On the individual project, yes.

COMMISSIONER LEWIS: I see.

MR. EBERSOLE: There has been to some degree a sort of pressure put on, on a step-by-step process to put that

sort of burden on, but it is done always with reluctance and a feeling that you are unduly penalizing one particular applicant out of many to solve that particular generic issue.

COMMISSIONER LEWIS: So, in effect, nothing is done?

MR. EBERSOLE: More than nothing but how much more is rather obtuse.

COMMISSIONER LEWIS: Thank you, Mr. Ebersole.

CHAIRMAN KEMENY: Professor Pigford?

COMMISSIONER PIGFORD: Mr. Ebersole, in answer to Commissioner Lewis' question you brought up an extremely interesting case on how I think TVA handled the question of anticipated transient without scround(?) There I think you said TVA decided on its own initiative that it must have this additional equipment. Is that correct?

MR. EBERSOLE: It was decided at the technical investigator's level that this deserved some pressure on the designer to have him put it in. This is merely the pump trip which is a comparatively inexpensive alteration to this.

COMMISSIONER PIGFORD: So, this was the TVA initiative?

MR. EBERSOLE: Yes.

COMMISSIONER PIGFORD: Who paid for the incremental cost?

MR. EBERSOLE: It was not paid for. TVA did not

ultimately provide the corporate pressure to put this in. It came about through regulatory pressure to put it in.

COMMISSIONER PIGFORD: Did the plant cost more as a result of that?

MR. EBERSOLE: Yes, it did, of course.

COMMISSIONER PIGFORD: And TVA paid for that?

MR. EBERSOLE: I am sure they did.

COMMISSIONER PIGFORD: Let us proceed from the specific now to the generic. Is this not a continuing generic issue that has not been settled?

MR. EBERSOLE: Are you talking about the ATWAS question?

COMMISSIONER PIGFORD: Anticipated transient without --

MR. EBERSOLE: It is a generic issue which is not yet settled.

COMMISSIONER PIGFORD: It has not been settled generically for even boiling water reactors?

MR. EBERSOLE: That is correct.

COMMISSIONER PIGFORD: How long has it been going on?

MR. EBERSOLE: Well, I first noticed it in 1968. So that makes it 11 years.

COMMISSIONER PIGFORD: All right. Why hasn't it been settled?

MR. EBERSOLE: It is a very controversial matter. The vendors, the four vendors, persist in the thesis that the degree of reliability of their present scrim systems is sufficiently high or the inverse of that, the probability of failure to scrim is so low that it is essentially not a licensing problem or a real safety issue.

COMMISSIONER PIGFORD: What is the ACRS view?

MR. EBERSOLE: I think the ACRS takes the view that it will have to be developed, that is a mitigating capability will have to be developed.

COMMISSIONER PIGFORD: But apparently it is already developed, because TVA has had it --

MR. EBERSOLE: Oh, no, no. That is, as I said, earlier, that is a suitable battleground on which now to work out the details. If you understand the ATWAS in a boiling water reactor you might say that its survival time can be measured in seconds if the rods don't insert after a turbine trip. To get the recirc pumps on, to get the trip installed extends that time out to a matter of quite a few minutes, during which the operators, and this again invokes operators, can introduce boration into the system and then make the ATWAS problem essentially go away.

COMMISSIONER PIGFORD: Is this the approach that was taken at the TVA initiative?

MR. EBERSOLE: What was taken at TVA was, yes, the

pump trips were put in, and then beyond that the operators had to participate in the subsequent actions to finish the mitigating process. This is boration of the coolant. That is a manually initiated operation in again sort of a nominal 10-minute field, but hopefully a lot less than that.

CHAIRMAN KEMENY: Mr. Ebersole, we have heard a couple of times the depump trip. Could you please explain that?

MR. EBERSOLE: Oh, in that particular case the boiling water reactors have large pumps on the order of 8000 horsepower which drive jet pumps which increase the mass through quite a good bit which circulates around the core. In the case of a turbine trip the first effect is that the normally voided reactor; it is a phase change reactor; it is a boiling water reactor; it is highly voided, and here is a case where the negative void coefficient works against you. The voids collapse, and there is a very sharp, positive reactivity spike. This is turned around initially by the Doppler coefficient, but then it comes back in some say, 15 odd 20 seconds to cause a power rise after a power collapse to something like, say, 60, 70 percent of power, and continued void collapse then will cause the power to escalate rapidly on an exponential that produces very high pressures in a matter of some 40 to 50 seconds.

This process of void collapse in the core can be

mitigated or partly negated by stopping the transport of voids out of the core by the process of stopping the pumps.

The first request made of GE was that they stop the pumps by the most expeditious process of tripping the exudation circuits on the NG sets which would abruptly stop the flow process with minimum rotating mass to sustain it. That was essentially the process that was not accepted by GE in, as I recall, '68.

It was subsequently accepted under regulatory pressure.

CHAIRMAN KEMENY: So, therefore, in effect under this kind of incident the pumps would be automatically turned off, is that what --

MR. EBERSOLE: Exactly.

CHAIRMAN KEMENY: Thank you.

COMMISSIONER PIGFORD: Of course, Mr. Ebersole, we understand that this process you are describing so far is unique to boiling water reactors, and we are investigating TMI-2, which is a different reactor, but since it has been brought up, let us use this to trace the working of the regulatory decision-making process. Now, does it mean that -- you said that ACRS does not feel that there has been a generic solution to this problem of our boiling water reactors. Is that correct?

MR. EBERSOLE: Yes.

COMMISSIONER PIGFORD: They are not happy then with the solution taken at TVA?

MR. EBERSOLE: Just at that level, no, because this leaves open to question the efficiency of the operators, the efficiency of the boration process, a number of peripheral issues.

Now, the question, I think, was brought up by Ms. Lewis in a generic context and not in a PDW context.

COMMISSIONER PIGFORD: Yes, and apparently to your knowledge NRC then has not, in its mind, resolved this situation from a generic point of view?

MR. EBERSOLE: My understanding is it is being resolved on a comparatively slow pace. I think it is being accelerated on the BWR's.

COMMISSIONER PIGFORD: So, generically it applies both to PWR's and BWR's?

MR. EBERSOLE: Yes, but the PWR's have a, do their thing on a more majestic time scale.

COMMISSIONER PIGFORD: To your knowledge, are there any reactors in this country that have experienced transient without scrim?

MR. EBERSOLE: No.

COMMISSIONER PIGFORD: Has this background experience or lack of been discussed within the ACRS?

MR. EBERSOLE: No, I think this has not been

experienced. On the other hand, there have been partial failures of this process. As you know, the PWR's depend on circuit breakers in dual configuration, so-called "redundant" configuration which de-energize the rods and allow them to fall into the core. There have been quite a few half failures in which the capability to insert rods was dependent on the sole breaker following the failure of the first breaker.

I believe these, in general, have occurred only on tests. I do not remember an incident in which they have occurred in case of an actual demand to scrim.

COMMISSIONER PIGFORD: Even if you go beyond specifically commercial power reactors, there are no incidents?

MR. EBERSOLE: I know of none where this half failure has occurred on an actual demand to scrim.

COMMISSIONER PIGFORD: I see. Now, let us get at this. Here is what Commissioner Lewis -- is one of the things she was asking. You have given us an example. Here is, at least something that one segment of the industry, one utility, TVA,decided was important, and they found for their purpose some solution. To what extent is the lack of resolution of this generically due to the difficulty of deciding who will pay for it, whether it will be paid for by the utility or the reactor supplier?

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MR. EBERSOLE: Let me clarify, if I can the particular TVA case. In that particular case, the addition of these

systems was not brought about by TVA corporate pressure. If that had been done, then TVA would have had to pay, as I understand it, the incremental cost of that addition. Instead some five years later it was brought about by regulatory pressure and in that instance TVA, if I remember the contract accurately, did not have to pay an incremental cost because the nature of their contract was that they would not have to pay for incremental safety features brought about by the regulatory process.

COMMISSIONER PIGFORD: Yes, I see. Now, I am not intending to castigate TVA. I would not begin to think of that, but it sounds like then when you have this situation a good strategy is to wait until NRC puts the pressure on and therefore the particular utility does not have to pay that direct incremental cost. That sounds like the effect of strategy.

MR. EBERSOLE: It does.

COMMISSIONER PIGFORD: That is real, isn't it?

MR. EBERSOLE: I would agree with you.

COMMISSIONER PIGFORD: Yes, and doesn't that sort of impede initiative in the industry itself?

MR. EBERSOLE: Yes.

COMMISSIONER PIGFORD: And of course, we can see the problem. We can see why because if only TVA asks for it, then maybe General Electric is not going to absorb the cost

and apply to all of its future customers or to its grandfather customers to do that. They just give it to TVA.

MR. EBERSOLE: Yes.

COMMISSIONER PIGFORD: Why should TVA ever want to get into that situation?

MR. EBERSOLE: Yes.

COMMISSIONER PIGFORD: Do you think this is a significant problem in the initiative on reactor safety in developing reactor safety?

MR. EBERSOLE: I don't really know how significant it is. The contracts have always been written such that the utility will or will not pay for incremental safety features brought about by regulatory pressures.

COMMISSIONER PIGFORD: Isn't this quite a common thing in contracts?

MR. EBERSOLE: I believe --

COMMISSIONER PIGFORD: To have that spelled out?

MR. EBERSOLE: I am not aware of this, but I presume it is.

COMMISSIONER PIGFORD: Maybe you know, in TVA contracts, is that normal?

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MR. EBERSOLE: I really don't know.

COMMISSIONER PIGFORD: All right. Is there a way out of this dilemma? At least, I hope the dilemma is obvious. At least I am assuming it is a dilemma, the problem I have

described.

MR. EBERSOLE: To me the problem is shall safety features developed by utilities and architect engineers have a --

COMMISSIONER PIGFORD: Or vendors, also.

MR. EBERSOLE: And vendors. Shall they have a better way of emerging for consideration by the regulatory processes?

COMMISSIONER PIGFORD: Well, of course, there are so many aspects of that. We have been tracing decisions, but now here is a financial threshold barrier, and this present barrier says, "Wait until NRC does it, and then it won't cost you so much on an individual basis." Are we stuck with that or am I making up something that is not real?

MR. EBERSOLE: No, I think to some degree we are stuck with that. A finding made by an individual deep in an organization which implies heavy costs which is not a regulatory requirement is not likely to be encouraged by what I call the shell of middle management.

COMMISSIONER PIGFORD: What can NRC do about this? Maybe they are being used. Do you think?

MR. EBERSOLE: I don't know.

COMMISSIONER PIGFORD: I would not begin to imply they really are, but what can they do about this problem?

MR. EBERSOLE: I presume they might try to enhance

the free flow of information from these subterranean sources, somewhat better than we now have.

COMMISSIONER PIGFORD: The flow is good, but there is still a problem who pays, and that is a big problem, isn't it?

MR. EBERSOLE: First establish the flow.

COMMISSIONER PIGFORD: Do you have any idea what it would have cost TVA on this if they had had to pay for this modification?

MR. EBERSOLE: That particular modification?

COMMISSIONER PIGFORD: Yes.

MR. EBERSOLE: I doubt that it would have been significant.

COMMISSIONER PIGFORD: I see, how much? To me --

MR. EBERSOLE: The costs of such things are invariably horrendously inflated by the vendors as a mechanism to discourage that sort of alteration.

COMMISSIONER PIGFORD: Fine. Let us take the price then, not the cost?

MR. EBERSOLE: I don't know what the actual cost of putting the pump trip systems in. I think we can deduce from this that it would not have been significantly incremental. It depends on how well you do it, by the way.

COMMISSIONER PIGFORD: Ten million dollars?

MR. EBERSOLE: Oh, less than that by far.

COMMISSIONER PIGFORD: One million?

MR. EBERSOLE: I would argue less than that. Now, I am talking about at the lowest level of design competence to introduce pump trip. If one extended the idea to say, double circuit breakers of safety grade it gets more costly.

COMMISSIONER PIGFORD: To what extent is ACRS's actions in resolving this, also, impaired or limited by this problem, this slowness that maybe part of the problem is who pays? Does that influence --

MR. EBERSOLE: I don't know of ACRS becoming particularly concerned about this, although I am sure everyone in his own mind wonders whether or not the particular safety improvement at hand is cost effective.

COMMISSIONER PIGFORD: Surely ACRS does not ignore the cost. Otherwise they could just say --

MR. EBERSOLE: Of course, they --

COMMISSIONER PIGFORD: -- here is something we think must be resolved.

MR. EBERSOLE: There is a consideration given, undoubtedly. It is not perhaps as openly evaluated and expressed, but it is always there.

COMMISSIONER PIGFORD: Who in the ACRS is the principal individual who specializes in this topic?

MR. EBERSOLE: What topic?

COMMISSIONER PIGFORD: The one we are talking about,

anticipated transient without scrim.

MR. EBERSOLE: Mr. William Kerr is the Chairman of the Subcommittee.

COMMISSIONER PIGFORD: I see. Who are the other people on his Subcommittee?

MR. EBERSOLE: I don't recall offhand.

COMMISSIONER PIGFORD: Thank you.

CHAIRMAN KEMENY: Mr. McPherson.

COMMISSIONER MC PHERSON: Mr. Chairman, I wouldn't spoil that colloquy for the world.

CHAIRMAN KEMENY: Then we will conclude by questioning by Governor Peterson.

COMMISSIONER PETERSON: Mr. Ebersole, since you worked at TVA, I presume that you followed fairly closely the accident at Brown's Ferry, the burning of the insulation on the cables.

MR. EBERSOLE: I did.

COMMISSIONER PETERSON: Well, in view of our great concern here about emergency core cooling systems, about controlling reactors, a system whereby these thousands of cables all come together in one narrow place, the cables having the power and the controls for this carefully designed and planned piece of equipment and then as happened at Brown's Ferry where the candle igniting the insulation and 2,000 of those cables being disabled and putting two of those major plants out of use for 18 months and a new one delayed for a year because of it, I was wondering what has been done thereafter in other plants in order to avoid a similar problem or to avoid somebody by sabotage getting at that narrow little place where all the controls for the plant are located?

MR. EBERSOLE: You are talking about what I generally call focusing the vulnerability to comparative small dimensions

in spaces. I think I will have to say that in general reliance has been placed on a reg guide, I believe it is called 175 concerning the separability or separations requirements on electrical circuits and then over and beyond that the quite intensive improvements or modifications that have been made to reduce the potential for fire, largely in the sense of using fire resistant covers. Flenestic is one of these -- to desensitize the cable systems to gross fires. I don't think that there has been in the sense that I certainly endorse it, a movement toward extremely positive and heavy separation so that any one place in the plant you could literally burn it clean and not have a substantially serious consequence. That is an evolving process and we don't have it yet.

TVA, I think, did initiate the concept of the more conservative interpretation of GDC 19 concerning the control room design and the spreading room design, which was to make the plant, presumably, independent of the complete loss of the control room and the spreading room. Unfortunately, in the pursuit of details of that, in circuit design a few tentacles were left out which partially invalidated the thesis that the plant could have operated with a complete burnout of the spreading room or the control room or in this particular case a group of cables. However, I think the attempt to create that design, a dispersed competence to enable shut down, may well have influenced the survival of the Brown's Ferry plant. It

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did create an extended dispersion of the design and, in fact, may have provided a margin that was critical to the process by which that accident was mitigated. I can't say that positively.

COMMISSIONER PETERSON: What is the probability of a similar event occurring in other plants?

MR. EBERSOLE: I can't competently say that, especially in the light of the new steps taken to desensitize cables against gross fires. Certainly, it has been greatly reduced.

COMMISSIONER PETERSON: Are those areas very carefully guarded so that somebody couldn't come in and destroy that vulnerable point?

MR. EBERSOLE: On that score, I will have to plead ignorance. I don't know, on a general basis how well that is secured against sabotage or for that matter routine maintenance or whatever. My opinion is, based on what security reviews I have been in, that that is one of the more highly protected areas of the plant. It is locked and secured.

COMMISSIONER PETERSON: Sort of like cutting the spinal cord, isn't it?

MR. EBERSOLE: It is the spinal cord.

CHAIRMAN KEMENY: I just have one follow up question, Mr. Ebersole. To your knowledge are candles still being used?

MR. EBERSOLE: I am sorry. I didn't hear.

CHAIRMAN KEMENY: Are candles still being used or

have they been replaced?

MR. EBERSOLE: I hope they are only being used for illumination, not for leak tracing.

CHAIRMAN KEMENY: Thank you very much, Mr. Ebersole.

The witness is excused. The Commission will recess for one hour.

(Thereupon, at 1:25 P. M., the hearing was recessed for one hour.)

PRESIDENT'S COMMISSION ON THE ACCIDENT AT THREE MILE ISLAND

PUBLIC HEARING

Wednesday
August 22, 1979

Hall of Nations
Edmund Walsh Building
Georgetown University
36th Street, Northwest
Washington, D.C.

Pursuant to recess, the Commission hearing reconvened at 2:30 p.m., John G. Kemeny, presiding.

SEE MORNING SESSION FOR APPEARANCES

C O N T E N T S

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TMI
8-22-79
Tape 14

AFTERNOON SESSION

CHAIRMAN KEMENY: Will the meeting please come to order and will Chief Counsel call and swear in the next witness.

MR. GORINSON: Harold Collins, please. Paul Collins. Excuse me. That will teach me not to have my book --

CHAIRMAN KEMENY: Would you swear him in.

Whereupon,

Paul F. Collins

was called as a witness and, after being first duly sworn, was examined and testified as follows:

CHAIRMAN KEMENY: Mr. Collins, could you correct our record by stating your correct name?

MR. COLLINS: Paul F. Collins.

CHAIRMAN KEMENY: And your current position?

MR. COLLINS: I am chief of the Operator Licensing Branch in the Office of Nuclear Reactor Regulation.

CHAIRMAN KEMENY: Thank you. Chief Counsel.

MR. GORINSON: Mr. Kane.

MR. KANE: Thank you, Mr. Gorinson.

Mr. Collins, how long have you been employed by the NRC and its predecessor agency, the Atomic Energy Commission?

MR. COLLINS: Since 1964.

MR. KANE: You are chief of the Operator Licensing

Branch. Please explain your duties and the duties of that branch.

MR. COLLINS: The principal duties of our branch is to administer examinations to individuals who wish to manipulate the controls of a nuclear reactor or who wish to direct the licensed activities of these individuals. We issue two types of licenses; an operator's license and a senior operator's license. In addition to this we are also responsible for reviewing facility training plans that are submitted as part of the FSAR and reviewing the procedures for the facility as part of the FSAR review.

MR. KANE: Mr. Collins, is it true that your office does not as a primary function examine the design of equipment for which operators are licensed?

MR. COLLINS: That is correct.

MR. KANE: In your deposition we discussed the cold licensing program for operators to be licensed before a plant begins operations. Is it true that other than an initial review of this program, NRC does not administer any portion of this training and leaves that responsibility fully to the utility or its vendor.

MR. COLLINS: Yes.

MR. KANE: And for example, B&W's program has not been formally evaluated by the NRC since 1968. Correct?

MR. COLLINS: This is correct in one sense. We have

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been down to the B&W facility and have audited the administration of examinations and we have actually had training sessions down there for the examiners. So, in this manner, we have had some sort of a benchmark on the quality of the training there.

MR. KANE: But in terms of a formal evaluation of the substantive content of the course, that has not occurred since 1968.

MR. COLLINS: No, it has not.

MR. KANE: In connection with this cold licensing program, as well as the hot licensing, for licenses which are issued after the plant goes critical, if the examination results are acceptable, does the NRC delve any further into the content of the classroom training?

MR. COLLINS: No, we do not.

MR. KANE: The utilities also administer requalification programs under which they annually evaluate their operators in order to have their licenses reviewed by the NRC. Is that correct?

MR. COLLINS: Yes, this is.

MR. KANE: And all such programs must provide for accelerated training if the operator scores less than 70 percent overall on the written examination. Is that correct?

MR. COLLINS: No. Most of the programs do. There are some programs that are written so that if a man scores less -- you said accelerated training?

MR. KANE: Yes.

MR. COLLINS: I am sorry. Yes. You are correct. They do require accelerated training.

MR. KANE: And that is for less than 70 percent on the annual written evaluation?

MR. COLLINS: That is correct.

MR. KANE: However, at roughly half of the utilities an operator who does score less than 70 percent on the written exam and who must go on accelerated training, can still function as a licensed operator in the meantime if he does well enough on the oral examination. Correct?

MR. COLLINS: That is right.

MR. KANE: Does the NRC audit the results of those oral examinations?

MR. COLLINS: No, we don't.

MR. KANE: Does the NRC impose any results as to the requirements as to the contents of those oral examinations?

MR. COLLINS: No, we do not have any.

MR. KANE: As I understand it, if an operator scores less than 80 percent, but more than 70 percent overall, he is required to attend a lecture in his specific area of weakness. In the meantime he is permitted to function as a licensed operator. Is that true?

MR. COLLINS: Yes.

MR. KANE: The NRC periodically audits the contents

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of these requalification examinations, does it not?

MR. COLLINS: Yes.

MR. KANE: And these audits, as I understand it, consist of looking at three operator examinations and three senior operator examinations every two years. Is that correct?

MR. COLLINS: Essentially, yes. We looked at them more frequently when the program was first instituted in 1974 or 1975, but then we went on to a biannual review of the examination.

MR. KANE: Approximately every two years?

MR. COLLINS: Yes.

MR. KANE: The written requalification examinations consist of seven or eight parts, two of which concern safety and emergency equipment and procedures. If an operator did very poorly on those two parts relating to emergency and safety equipment and procedures and still did well enough on the rest of the parts to achieve more than 80 percent over all, would the NRC still permit him to function as a licensed operator?

MR. COLLINS: Yes. But you are a little misleading in saying that only two categories involve safety and emergency systems. I think all seven categories or eight categories would contain questions of that nature.

MR. KANE: But there are two categories that --

MR. COLLINS: Specifically entitled that, yes.

MR. KANE: Right. And that permitting him to function as a licensed operator then would be notwithstanding his poor performance in those two parts relating to safety and emergency equipment and procedures, specifically?

MR. COLLINS: Correct.

MR. KANE: Does the NRC impose any specific requirements for qualifications of instructors in these courses?

MR. COLLINS: No, we do not.

MR. KANE: As I understand your deposition testimony, the NRC changed in 1973 from requiring a new license applicant to actually start up the reactor in an NRC examiner's presence, rather than that performing start up on a simulator. Is that right?

MR. COLLINS: This is correct?

MR. KANE: How long does the NRC actually go and stand and watch the students perform on the simulator as to start-up?

MR. COLLINS: We do not make it -- it is not a frequent practice with us. We did go to the simulators in accordance with most of our audit programs on simulators to assure ourselves that the program was working correctly at the beginning and we don't periodically audit these.

MR. KANE: In your deposition, Mr. Collins, you did estimate that the NRC might actually go and stand and watch the students maybe once a year. Does that sound about right?

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MR. COLLINS: This would come about something of that nature, yes.

MR. KANE: All right. Simulator training in the requalification program is not audited at all by the NRC, is it?

MR. COLLINS: No, it is not.

MR. KANE: As of March 28, 1979, Mr. Collins, how many examiners did the Operator Licensing Branch have for the entire country?

MR. COLLINS: We had nine full time examiners and 22 part time examiners.

MR. KANE: Of the 22 part time examiners, is it true that most of them have no prior experience in commercial nuclear reactor operations?

MR. COLLINS: Yes. But they all have experience in reactor operations.

MR. KANE: But not commercial operations?

MR. COLLINS: No.

MR. KANE: And how many operator's licenses come up for renewal each year?

MR. COLLINS: Approximately 1,200.

MR. KANE: Due to the differences in plants, is it true that your full time examiners are broken into three groups, one for Westinghouse, one for General Electric and one for B&W and Combustion Engineering Reactors?

MR. COLLINS: Yes.

MR. KANE: Is it true that the NRC requires no psychological evaluation for licensed applicants and no investigation of an applicant's criminal record or employment history?

MR. COLLINS: This is correct

MR. KANE: The NRC regulatory guide suggests that licensed applicants be high school graduates or equivalent. Is it true that you have never refused a license because of an applicant's lack of formal education?

MR. COLLINS: Never refused to give him an examination.

MR. KANE: Can you, in fact, recall any instance where an individual received a license without having a high school education or equivalent?

MR. COLLINS: Yes.

MR. KANE: Cross licensing, as I understand it, is a program for an individual license at one plant to be licensed at another similar plant if he completes a differences course and a differences examination administered by the utility. Does the NRC audit this differences course?

MR. COLLINS: No, we do not.

MR. KANE: Does the NRS receive the results of the differences examination given by the utility?

MR. COLLINS: On occasion we have, but it is not a

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mandatory practice. They are certified that the man has attended the course and they are certified that he has successfully passed the examination as part of the application to get the cross license.

MR. KANE: But the NRC does not regularly receive the results of the examination?

MR. COLLINS: No.

MR. KANE: Does the NRC even know what questions the individual is asked on these examinations?

MR. COLLINS: No.

MR. KANE: Does the NRC require any examination of its own in this regard?

MR. COLLINS: No.

MR. KANE: Can cross licensing be done even if the balance of the two plants are substantially different and are designed by two different architect-engineers?

MR. COLLINS: Yes, it can, providing that the nuclear steam supply system is designed by the same vendor and is of the same generation and the plants are, from that standpoint, identical.

MR. KANE: The differences in the balance of the plant will not preclude cross licensing?

MR. COLLINS: No, will not.

MR. KANE: In fact, the supervisorial personnel at TMI were duly or cross licensed in this fashion, were they

not?

MR. COLLINS: Yes.

MR. KANE: Does the NRC have any requirement that significant transients --

MR. COLLINS: I would like to back up on that.

MR. KANE: Surely.

MR. COLLINS: When you talk about the dual licenses the policy you just talked about applies to the initial people, the cold people, if you would, going on to the second unit. Once both units are operational and a man makes an application for a license, he is examined for the total plant by NRC. It is not a case of him being examined only on the first one and then some months later, him coming up and saying now, I want the cross license or the dual license for unit No. 2. He makes application for both at the same time and he is examined on the units.

MR. KANE: Is the applicant permitted to apply for just one unit?

MR. COLLINS: Only on rare occasions. If the policy of the utility is to cross license people, then once both plants are operational, they will put in an application for both units.

MR. KANE: I see.

MR. COLLINS: If it is not their policy, then, of course, they will just ask for one unit.

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MR. KANE: On the other hand an individual who was previously licensed, for example, at TMI Unit 1 could then apply for a cross license to TMI Unit 2 when it became operational. Is that right?

MR. COLLINS: The Metropolitan Edison people did not cross license their operators. They made a conscientious choice not to do this so that they had separate units as far as the operators were concerned for Unit 1 and Unit 2. Supervisory personnel, they did cross license.

MR. KANE: All right. Does the NRC have any requirement that significant transients at nuclear reactors be incorporated into classroom or simulator training?

MR. COLLINS: There is no regulation for it, no.

MR. KANE: We discussed in your deposition an evaluation performed by Mr. Boger of your office of the Davis-Besse transient of September 24, 1977 for possible incorporation in future examinations. We know that this transient involved the operator's interruption of the high pressure injection system. To your knowledge, has the subject of operator interruption of high pressure injection ever been covered in NRC examinations?

MR. COLLINS: I couldn't say positively each and every examination. I am sure that the question has been raised in the oral contents. I would have to go through the complete set of written examinations to see if it was ever covered there.

MR. KANE: Mr. Collins, I did ask you something along

the same lines in your deposition and at that time you replied that "when we explore the need for safety systems to be actuated, we do not explore with the man when would you terminate it." Is that true?

MR. COLLINS: Yes. I did make that statement to you and I am not trying to be contrary or make any different statement to you.

MR. KANE: All right. Is it also true that saturation conditions in the reactor coolant system has not been covered in training because that condition was just not considered that possible?

MR. COLLINS: I believe so, yes.

MR. KANE: Is it true that questions on the relationship between pressurizer level and core coolant level have not been included in NRC examinations because it was assumed that if you have a water level in the pressurizer, you have solid water below that in the reactor coolant system?

MR. COLLINS: That is true.

MR. KANE: Specifically focusing on the Three Mile Island operators, prior to March 28, 1979, was there any significant dissatisfaction by the NRC with their examination results?

MR. COLLINS: No, there was not.

MR. KANE: In fact, the performance of Metropolitan Edison operators on NRC examinations was considerably above

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average. Was it not?

MR. COLLINS: It was very good.

MR. KANE: All right. Mr. Collins, we have previously deposed Donald Scovall to your superior concerning the retraining of the B&W operators immediately after the TMI-2 accident. He explained that the retraining consisted of one week at B&W's simulator, followed by an examination administered by the utility and an oral examination by the NRC by the selected number of such operators. Don't you think in light of the TMI-2 accident that the NRC should examine each of these B&W operators instead of continuing to rely on spot checking?

MR. COLLINS: My initial recommendation was to do that very thing; however, in the manner in which these events are handled, I&E has the prime responsibility to assure that the training -- that the answers to their bulletins are complied with and they normally on incidents -- not as severe as TMI -- would conduct a spot check that training programs had been completed, would interview several of the operators to assure that the training had taken. It was decided to go along the same path except that the audit of the training program, OLB, became involved in that.

MR. KANE: Why was it decided to go along the same path?

MR. COLLINS: I can't say.

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MR. KANE: Did you make your recommendations on this to your superior, Mr. Scovall?

MR. COLLINS: No. Mr. Scovall was not in the line of command at this particular time.

MR. KANE: Who did you speak to about your recommendation?

MR. COLLINS: I am trying to think. I think it was Mr. Ross.

MR. KANE: Mr. Ross?

MR. COLLINS: Dennis Ross. I believe I went up through that chain.

MR. KANE: Did Mr. Ross concur in your recommendation that all of the operators that had been retrained on the B&W simulator after TMI-2 be examined by the NRC?

MR. COLLINS: He carried it to a higher level, yes. And I don't think he carried it reluctantly, but he did take it to a higher level. But the decision came back down, no. We will factor you in, but we will not give all NRC examination.

MR. KANE: Who made the final decision on that?

MR. COLLINS: I am really not sure.

MR. KANE: Do you know how high the recommendation went?

MR. COLLINS: I am sure it went up to Mr. Denton's office and across to I&E, because this is their main function.

MR. KANE: Was Mr. Stello involved in that decision

as well?

MR. COLLINS: I have no idea.

MR. KANE: But you do believe it went as far as Mr. Denton?

MR. COLLINS: I think it went up to that office, yes.

MR. KANE: I have no further questions, Mr. Chairman.

CHAIRMAN KEMENY: Thank you, Mr. Kane.

Mr. Collins, would it be fair to describe your role as trying to assure on behalf of the NRC that operators are well qualified to carry out their duties?

MR. COLLINS: Yes.

CHAIRMAN KEMENY: Therefore, in effect, there is an educational process involved with operators, which you are -- you certainly are not administering, but are quality controlling. Would that be fair?

MR. COLLINS: With the exception that we do conduct 100 percent audit of the program by conducting 100 percent examination of the students, with the exception of these groups for the initial cross licensing. Every operator and every senior operator does get an NRC examination before he gets his license.

CHAIRMAN KEMENY: Yes. Do you feel -- I know what your current practices are and you are operating under orders,

but they are all post-Three Mile Island. I am asking in that respect. Do you feel that you can adequately carry out your function without monitoring, for example, the quality of the instructors or the instructional programs?

MR. COLLINS: I think it puts an awful lot of reliance on the NRC examination to say that we are going to pick up every single thing or every single item in that particular examination or set of examinations. So, from that viewpoint, yes, there should have been more auditing of the individual programs and the quality of the instruction.

CHAIRMAN KEMENY: Do you have any way of assuring at all that those people who are giving the instruction are qualified -- I mean, that they are the kind of people that you would want to see instructing.

MR. COLLINS: Many of them are senior operators, so --

CHAIRMAN KEMENY: Yes, but I believe there is --

MR. COLLINS: Technical competence, we don't have any questions about their technical competence.

CHAIRMAN KEMENY: No, but there isn't a requirement for instructors to be senior operators?

MR. COLLINS: No. This is among the recommendations, though.

CHAIRMAN KEMENY: How much variety is there on the written examinations? Do you choose from a relatively small

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list of questions or do you make up each examination from scratch?

MR. COLLINS: We have a bank of questions that we can use, but we try to make each examination facility oriented so it does take study of the facility procedures and study of the facility technical specifications and its design to make up the examinations.

CHAIRMAN KEMENY: The reason I asked that question is that I have no idea whether the students you are dealing with -- in this case, potential operators -- are as ingenious as the students we have. But whenever questions are selected from a bag of questions to use your phrase, it usually takes the student body approximately one year to have a complete list of every question that is ever going to be asked. I am wondering if you are faced with a similar kind of problem.

MR. COLLINS: I think the utilities have their fraternity files also, yes.

CHAIRMAN KEMENY: Thank you. I didn't want to use that phrase. That is what I was wondering about because I am not questioning the quality of your examinations. That is not the point. But is there a chance that after awhile if utilities have their fraternity files that, in effect, they will be training the operators, not really with major emphasis on how well they should operate the plant, but to make very sure that they can pass those exams.

MR. COLLINS: Yes, I think there can be a tendency in that direction. Of course, when you give a man an oral examination, which takes some four to six hours to complete for each man, you can sense if a man is giving you a canned answer to your oral and then you can start probing a little bit deeper and see if he has, indeed, given you a canned answer or if he does understand the subject. So, we do have this back-up on the written examination.

CHAIRMAN KEMENY: That is, of course, a very good safety system. Tell me, is it common for an operator to pass the written exam and fail the oral exam?

MR. COLLINS: Yes, it is. Some 37 percent of the people who fail the exam now fail the oral portion of the exam. Only about 10 or 12 percent fail the written portion. The balance fail both, written and oral.

CHAIRMAN KEMENY: Yes.

Let me turn to another topic that Mr. Kane asked you about. You said that you do not look into certain background questions on the applicants for operators. Is this because you are prevented by certain privacy laws?

MR. COLLINS: No, we have just never had it in the application. We do ask for a man's experience and education on his application. We do have a medical form where we get a medical history on the individual. As part of that medical form we request us that he inform us of any convictions that

resulted in a fine of $25 or more and many of them do for traffic violations and so forth. But we make no in depth search of the individual. But we do have some background information from him.

CHAIRMAN KEMENY: Yes, but, for example, to use your own example of the criminal record, if someone had many major convictions and then chooses to lie on your form, you would have no way of knowing.

MR. COLLINS: We would not, no. However, I would like to point out that the people we see are not neophites to the utilities. A good share of the people that we see have been working for the utilities for several years and I am sure their work habits and any criminal record of any import would probably be known to them, particularly during the years that they had worked for the utility. The job we are talking about on a licensed position is the top job at the plant. So, the man has to go up the seniority before he can make application.

CHAIRMAN KEMENY: If my memory is correct, thinking back on the Three Mile Island operators we had as witnesses, a quite large fraction of them seemed to have come from the United States Navy Nuclear Program.

MR. COLLINS: This is correct. Metropolitan Edison was very heavy with Navy, ex-Navy personnel.

CHAIRMAN KEMENY: In such a case, would the Navy personnel file of the individual be available either to you or to Metropolitan Edison?

MR. COLLINS: We have never requested any. So, I really could not say whether their file would be available to us.

CHAIRMAN KEMENY: As a matter of fact, would it be legally possible for the US Navy to release that? Do you happen to know that?

MR. COLLINS: I could not comment on that.

CHAIRMAN KEMENY: Because if the answer to that is that either it is not gotten or that it cannot be gotten which may be the case, the trouble is out of respect for the Navy program one may put very heavy emphasis on someone having served in the US Navy without having the foggiest idea whether that individual performed well in the Navy program or miserably.

MR. COLLINS: Correct.

CHAIRMAN KEMENY: I have just one final question.

I am trying to search throughout NRC as to where man and machine comes together. You are very heavily involved in the human part of the system?

MR. COLLINS: Yes.

CHAIRMAN KEMENY: Do you have regular interchanges with those who deal with equipment and talk over problems?

MR. COLLINS: No, we are relatively isolated from the people that review the design and --

CHAIRMAN KEMENY: You are relatively isolated?

MR. COLLINS: Yes.

CHAIRMAN KEMENY: Do you feel that that is desirable?

MR. COLLINS: No, it is not. No, it is too parochial.

CHAIRMAN KEMENY: Thank you.

Professor Lewis?

COMMISSIONER LEWIS: I am interested in the examination process or more concretely in the way in which you develop your own examinations, the kinds of questions. Chairman Kemeny mentioned earlier he was not talking about the quality of exams. I am. I would like to know how do you determine the adequacy of the kinds of questions that you ask in the examinations?

MR. COLLINS: Well, we have certain guidelines, well, guideline, we have a regulation that specifies 10 CFR,

Part 55 that specifies, in part, specifies the content of the examination, and it indicates the subjects which we in NRC feel an operator or a senior operator should know. In order to develop the questions we use the final safety analysis report to determine how the plant is designed. We use the operating procedures to determine how the facility wants the man to operate the plant. We use the technical specifications to see that he operates the plant within the federal law, and we use the Radiation Protection and Control Manual which details how he should conduct himself when working with jobs involving radiation.

Based on these basic documents, we pull out the questions. How does an instrument work? How does the plant respond during a given transient? What happens if a pipe breaks? What are the safety signals that are going to be generated, and what equipment comes into play?

COMMISSIONER LEWIS: I understand that there are the general guidelines and the subjects that must be covered. I am much more interested in how you, in fact, develop the specific way you are going to get at that bit of information. There are a number of different alternatives usually that one can find out.

MR. COLLINS: The examinations are essay type examinations. There may be one or two questions in there that might be multiple choice or considered multiple choice.

We do not use true and false questions. The man must respond to each of our questions in a paragrapn, one-half paragraph or in some cases a page of writing to fully explain the question.

COMMISSIONER LEWIS: Let us talk specifically about multiple choice items. How are those developed?

MR. COLLINS: They are very rare. They are extremely rare.

COMMISSIONER LEWIS: Who would be responsible for developing such questions?

MR. COLLINS: The person who was given the assignment as the chief examiner at the facility generates the written examination. This examination is subject to review, and then it is typed up and approved and given to the applicants.

COMMISSIONER LEWIS: I asked because, of course, it is a huge industry in this country that centers on tests and evaluation, and I wonder if you ever make any assessment of the adequacy of the test items themselves?

MR. COLLINS: We have talked to an institute, the Princeton Institute.

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COMMISSIONER LEWIS: Educational Testing Service?

MR. COLLINS: Yes, Educational Testing Service. They came down, and the manner in which they wrote their examinations, they indicated they could not help us out too

much on the way our examinations were structured.

COMMISSIONER LEWIS: Could you be a little more precise?

MR. COLLINS: We are looking at a way for program learning type questions. We were looking at a way for incorporating more multiple choice questions so that the grading of them would be -- the composition of them could be more formalized and the grading could be easier and to speed up the process rather than just working with the essay questions, and unfortunately the only areas where they could help us out were in the plant specific areas rather than in the generic and general knowledge we expected the operators and senior operators to have.

So, we did not pursue it any further than that.

COMMISSIONER LEWIS: How do you determine how adequate your items are, your test procedures are? What do you use as your basis for determing program adequacy?

MR. COLLINS: I think it is a matter of the experience that is within the branch, the operating experience that is within the branch to say, "Yes, this man knows a sufficient amount to be a licensed operator."

COMMISSIONER LEWIS: I will move for a moment in a way specifically from the items themselves to the larger question of one way one might say you could assess the adequacy of a training program is how operators perform when

in terms of emergencies, et cetera.

MR. COLLINS: Correct.

COMMISSIONER LEWIS: Do you look at what goes on and ask then, "How adequate is our program, given, for example, TMI-2, given, for example, the Davis Bessie incident?"

MR. COLLINS: I am sorry, do we ask who?

COMMISSIONER LEWIS: Do you ask yourselves anything about the adequacy of a program from that angle?

MR. COLLINS: Yes, we evaluate ourselves. We look at the events and see where the examination content can be improved and how the techniques can be improved.

One thing that we are recommending is that as a result of Three Mile Island is that we give simulator examinations, that obviously the walk-through and talk-through portion of our examination is not detailed enough, that it is essential that we see individuals operate the simulators as part of their examination process.

CHAIRMAN KEMENY: Professor Pigford?

COMMISSIONER PIGFORD: Mr. Collins, when you prepare your examinations of the operators, I am going over something now, again, with you, is a portion of that examination to determine how well they are knowledgeable about the procedures?

MR. COLLINS: The operating procedures, yes, sir.

There is a section in the examination entitled Normal and Emergency Operating Procedures.

COMMISSIONER PIGFORD: Yes, and you prepare the questions on that?

MR. COLLINS: Yes, we do.

COMMISSIONER PIGFORD: And do you, also, observe them in the control room as to how they would carry out those procedures?

MR. COLLINS: As part of the oral examination, yes, we will pose questions to them that several enunciators are received; what does it mean to you; and what actions do you take, and watch them take their, they don't actually take the actions, of course, but watch them talk their way through these emergency procedures.

COMMISSIONER PIGFORD: Yes, the loss of reactor coolant is one of the procedures you carry them through?

MR. COLLINS: Yes, sir.

COMMISSIONER PIGFORD: Does it mean then that you look over those procedures yourself in formulating your own examination questions?

MR. COLLINS: Yes, we have the facility send the procedures to us, so that we can prepare the examination.

COMMISSIONER PIGFORD: Do you actually review all of the emergency procedures for TMI-2 then?

MR. COLLINS: I won't say we review them. We use

them, and I won't say we use every single one of the emergency procedures, but we go through them so that we can be sure of the answers and read through them and study them to be sure that the answers that the applicant gives are the correct answers.

COMMISSIONER PIGFORD: And you, also, do that for TMI-1 as well?

MR. COLLINS: Yes.

COMMISSIONER PIGFORD: Do you keep a file of those procedures in your office?

MR. COLLINS: No, normally when a facility requests an examination they mail us the procedures. After we give the examinations and grade them we will return the procedures to them. We would find it a most difficult job. We have a tough time getting space for people, let alone procedures from 70 plants. We just could not keep up with them and the revisions to them.

COMMISSIONER PIGFORD: Incidentally, you are perhaps leaving the erroneous impression that nothing happens unless they request examination. You require them to have the examination, don't you?

MR. COLLINS: Oh, absolutely, but they normally call us up three or four months in advance and tell us they will have a class ready for us, and at that time we make the arrangements and get them to send the procedures.

COMMISSIONER PIGFORD: Do your examiners themselves then walk through these procedures on paper to see if they can follow them?

MR. COLLINS: Yes, we have done that, yes.

COMMISSIONER PIGFORD: Have you noticed any differences between the procedures for TMI-1 and TMI-2 with regard to emergency coolant?

MR. COLLINS: No. I cannot honestly answer that question.

COMMISSIONER PIGFORD: Oh, you are not yourself knowledgeable about it?

MR. COLLINS: No, not to that --

COMMISSIONER PIGFORD: Yes.

MR. COLLINS: The details of the procedures, no.

COMMISSIONER PIGFORD: How far down in the staff would it be, how many people below you would be knowledgeable about that?

MR. COLLINS: I don't think you could walk into any person and ask that question and expect the man to know the details of the emergency procedures for TMI-1 versus the TMI-2 emergency procedures.

COMMISSIONER PIGFORD: All right. Let us get at it this way then. There is someone in your organization who has worked up questions on, say, the procedures for TMI-2, right?

MR. COLLINS: Yes.

COMMISSIONER PIGFORD: And he has examined the operators on that? Okay, how far down in your organization would that man be?

MR. COLLINS: He would report directly to me.

COMMISSIONER PIGFORD: Report to you?

MR. COLLINS: Yes.

COMMISSIONER PIGFORD: Has that man reported to you any problems in himself following the procedures of TMI-2 with regard to loss of coolant?

MR. COLLINS: No, they have not reported any problem. Have they on occasion gone through a procedure and found inadequacies in it, certainly, and brought it to, not necessarily my attention but certainly to the attention of the facility.

I have gone through procedures in preparing exams and found inadequacies in them and brought it to the attention of facility management.

COMMISSIONER PIGFORD: Would that man, also, be the one who did this for TMI Unit 1?

MR. COLLINS: Not necessarily.

COMMISSIONER PIGFORD: Not necessarily. Is there any conscious effort to compare notes on those two facilities by the man making up the examination questions?

MR. COLLINS: No, sir.

COMMISSIONER PIGFORD: I see, and you say your man has indicated no problem in following the procedures on TMI-2 with regard to loss of reactor coolant?

MR. COLLINS: No, sir.

COMMISSIONER PIGFORD: Has this question come up to you before in any way?

MR. COLLINS: No. The adequacy of the TMI procedures?

COMMISSIONER PIGFORD: Yes.

MR. COLLINS: No, it has not.

COMMISSIONER PIGFORD: Have you heard of it having come up in any of the many, many investigations that are underway now?

MR. COLLINS: No, it has not been brought to my attention, no.

COMMISSIONER PIGFORD: Have you heard of even this Commission inquiring about the procedures relative to the tailpipe temperature?

MR. COLLINS: No.

COMMISSIONER PIGFORD: Would that be one of the things that the operator is examined on?

MR. COLLINS: On a leaking or a weeping or an open PORV, yes, sir.

COMMISSIONER PIGFORD: Yes. It would be reasonable to assume then that your man who prepares the examination, if

he followed the procedure and found that there was perhaps no entry point on it, namely, no clear guidance as to when you enter the procedures, he would say, "No, I cannot examine the man on this. The procedures themselves have a problem." Is that right?

MR. COLLINS: I don't know if we would go that far. We certainly would explore with the facility management when we got there how do you get into this procedure.

COMMISSIONER PIGFORD: But I don't know how you can examine a man on following a procedure when the point of entering it is not clear. What signal causes him to enter it? This is not specific to TMI-2, but isn't that reasonable? If the procedure does not say, "Here is the symptom that causes us to look this up"and say, "That is the procedure I must follow," if that signal is not written down and understood, isn't there a problem with that procedure?

MR. COLLINS: Yes, certainly there is.

COMMISSIONER PIGFORD: Yes.

MR. COLLINS: Certainly. I would say all of your emergency procedures should have a symptom section that leads it off.

COMMISSIONER PIGFORD: And has there been any reconsideration since TMI within your group of how to examine the operators at TMI on those procedures?

MR. COLLINS: On how to examine all of --

COMMISSIONER PIGFORD: What?

MR. COLLINS: Where we have reviewed our entire procedure, our entire process and have made some 16 recommendations as far as improvements to our program go and part of that would be how do you examine operators on procedures, we feel that the best way to do it is to use simulators.

COMMISSIONER PIGFORD: Yes, but you are still, also, going to look over the procedures of the facility and still test the man on that, aren't you?

MR. COLLINS: Yes.

COMMISSIONER PIGFORD: Some of these things you cannot find on a mechanical simulator, I think, isn't that right?

MR. COLLINS: Anything the operator is responsible for from the control room should be on the simulator, any actions that he --

COMMISSIONER PIGFORD: Suppose the procedure says, "If the tailpipe temperature is about 230 degrees Fahrenheit, you must take this procedure out of the shelf and look at it." You cannot simulate that, can you? That is written down on a piece of paper that the operator must understand?

MR. COLLINS: You can simulate the tailpipe temperature and see that he goes and gets the procedure.

COMMISSIONER PIGFORD: Yes. In this reconsideration, since TMI-2, has there been any specific look at the TMI-2

procedures and whether your examinations really have been covering those procedures?

MR. COLLINS: We have not made any individual or OLB investigation relative to TMI-2 or TMI-1. We have not been in on any of the investigations taking place. We have been directed to take a look at our overall operations in light of TMI-2, but not to specifically become involved in any TMI-2 investigation.

COMMISSIONER PIGFORD: Someone else is looking at this?

MR. COLLINS: I would assume it was part of the I&E inspection that has just been completed with the new reg 600 report.

COMMISSIONER PIGFORD: I will tell you what I am getting at. We already have before us an abundant record on what seems to be the problem of the tailpipe temperature procedures, and that has been out in the open now for about, oh, since sometime in June, and I must say, I don't understand how I could examine an operator on the loss of coolant procedures, but since you, yourself, aren't familiar with them, I guess I will have to pose my question to other people, because it depends upon what is that procedure and what does it say, and would I know how to then see if someone can walk through it, because maybe the procedure has a fault in it.

Now, let me pose this to you, because I am only

suggesting it, not claiming it. If there is a fault in the procedure, an inconsistency, a lack of entry or exit point, lack of symptoms of this is the signal we must act on. is it reasonable to expect that your man would pick it up?

MR. COLLINS: Yes, I think it is, yes.

COMMISSIONER PIGFORD: Yes. Now, is there some other part of the ongoing NRC investigation of TMI-2 that we can expect will be looking at this issue?

MR. COLLINS: I know that I just recently read recommendations from the ACRS, and in those recommendations there was a paragraph that addressed review of procedures.

COMMISSIONER PIGFORD: Yes. Now, probably that review of procedures they are talking about is a review aimed directly at procedures, isn't it?

MR. COLLINS: Yes.

COMMISSIONER PIGFORD: Where in the NRC is that supposed to be done?

MR. COLLINS: Presently my branch assures in the review of the FSAR's that the facility has committed to prepare procedures in accordance with a regulatory guide 1.33. The review of the procedures, the details of the procedures rests with I&E. They are responsible for seeing that, indeed, the commitments have been met and that they do have procedures that address the subjects in the reg guide 1.33.

COMMISSIONER PIGFORD: Yes. So, the formal responsibility for review of adequacy of procedures lies in I&E?

MR. COLLINS: Yes.

COMMISSIONER PIGFORD: But your people would encounter it because anyway your people have to look over the procedures to then develop the kind of examination to give to the operators. So, you must be knowledgeable about those procedures as well?

MR. COLLINS: Yes.

COMMISSIONER PIGFORD: You must make some determination that yes, those are procedures that you think could be carried out by a human being following the instructions?

MR. COLLINS: Correct.

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COMMISSIONER PIGFORD: Okay, I guess that is all I will ask. Thank you.

CHAIRMAN KEMENY: May I just follow up very briefly up on that? Mr. Collins, in view of what Professor Pigford brought out, suppose you find one of these procedures, that in the judgment of your colleage is inadequate or cannot be followed,I understood you to say that you then take that up with the utility. Is that correct?

MR. COLLINS: Yes.

CHAIRMAN KEMENY: Where else in NRC do you pass that on?

MR. COLLINS: We pass it onto INE also.

CHAIRMAN KEMENY: So you would report to INE there that there is a procedure that is inadequate.

MR. COLLINS: I can't say it would be done each and every time. There is no formal procedure for reporting this to INE, but I know we have called them up, and have indicated to them that our review of the procedures indicated a lot of holes in the procedures, a lot of missteps, and perhaps they would want to take a closer look at them when they get out to the facility.

CHAIRMAN KEMENY: What happens to such a complaint usually? Does INE follow up on that?

MR. COLLINS: It is usually acted on, yes indeed.

CHAIRMAN KEMENY: And how is it eventually resolved?

MR. COLLINS: We receive new procedures that contain the proper information.

CHAIRMAN KEMENY: I see. And that is within INE's power to do?

MR. COLLINS: Yes.

CHAIRMAN KEMENY: Thank you. Commissioner McPherson.

COMMISSIONER MC PHERSON: Mr. Collins, was the supervisor of training from Metropolitan Edison a qualified senior operator?

MR. COLLINS: I would have to check my records on that. Mr. Kane asked me that, and I think we were talking about two different subjects. I think he was talking about a professional license. I am not positive. And I was thinking licensing. And I would really have to go back to my records and find out if he was.

COMMISSIONER MC PHERSON: Is it a requirement of the NRC that a supervisor of training hold a senior operator license?

MR. COLLINS: No, it is not.

COMMISSIONER MC PHERSON: We had testimony last month from Babcock and Wilcox personnel that there was a high concern at B&W about the system going solid, and therefore there might be an indication given to persons trained on the B&W system that they should avoid that at all costs, including the cost of turning off turning off the high pressure injection

system.

Would that concern for the system going solid have been reflected in the examination given to an operator or a potential operator of a B&W system?

MR. COLLINS: In the training of the operator?

COMMISSIONER MC PHERSON: Yes.

MR. COLLINS: I think there is, and I think there has been an over-emphasis on going solid. But the procedures that a man should follow do not indicate in any way don't go solid. They usually address the parameters and say maintain the pressurizer level between X and Y, and also maintain reactor pressure at a certain value. They don't say turn off safety injection if only one parameter reaches a particular level.

COMMISSIONER MC PHERSON: And your examination would not do that?

MR. COLLINS: No.

COMMISSIONER MC PHERSON: Mr. Collins, I have the impression from that series of noes that you gave to the counsel's questions that there is a considerable, one might say, absence of oversight on the part of the NRC with respect to training.

MR. COLLINS: Only when -- if we are not satisfied with the results on the examinations, then we do delve into the training program. We have, on many occasions,because a group of applicants we will put up and, say,50 percent of them

fail the examination, call the utility in and show them the examination results, query them as to why things have gone wrong, looked at their training program, and demanded improvements in it.

But as long as we have gone to a facility, and the results of the examination are satisfactory, then we do not go back into the details of the training programs.

COMMISSIONER MC PHERSON: In your own opinion, not reflecting that of the Commission, but in your own opinion, ought the NRC's oversight of the training programs,of the requalification examinations, supervisor training,general quality of instruction, ought that to be augmented?

MR. COLLINS: I think we should do more auditing, and that is part of NRR's recommendation to the commissioners on the improvements in the operator licensing program.

COMMISSIONER MC PHERSON: Have you had budgetary problems in securing that in the past?

MR. COLLINS: Resources?

COMMISSIONER MC PHERSON: Yes.

MR. COLLINS: Yes, we -- I guess every branch does. You put in for your manpower and your resources, and so does everybody else, and decisions have to be made as to who gets what.

COMMISSIONER MC PHERSON: Well, the question I am asking is, has the training part of NRC --

MR. COLLINS: We have not had the resources to do much more than conduct the final examination at the conclusion of these training programs. We have not had the manpower to go in and even give the interim examinations, send people to watch people at the simulator with any frequency, sit in on classes to see how the classes are being conducted. We just have not had the resources to do it.

COMMISSIONER MC PHERSON: Has the Commission given you any grounds for hope that that might be changed in the future?

MR. COLLINS: Yes. I have had eight examiners, nine examiners -- excuse me -- prior to TMI. I am now up to 12, and I will be up to 17 during fiscal '81.

COMMISSIONER MC PHERSON: Does that include an increased mandate to use those examiners to do the things you are talking about?

MR. COLLINS: It is predicated on the commissioners adopting our recommendations for simulator examinations and more frequent auditing of training programs, and administration of some of the requalification examinations.

COMMISSIONER MC PHERSON: When will the Commission decide that?

MR. COLLINS: I believe that will be scheduled to give them a briefing some time in September.

COMMISSIONER MC PHERSON: Thank you.

CHAIRMAN KEMENY: Professor Pigford.

COMMISSIONER PIGFORD: Mr. Collins, one of your procedures says the pressurizer level must not exceed some number. Let's just take 184 inches as a number, period. Would you say, then, that in preparing the examination of the operators, you would want to ensure that the operators knew that they must not exceed that?

MR. COLLINS: If that was the way that -- the example you gave -- if that is all it said, it would be unacceptable.

COMMISSIONER PIGFORD: Yes. For them to do otherwise.

MR. COLLINS: No, the procedure would be unacceptable. If you are talking of the pressurizer and actions to be taken, all that was discussed was level.

COMMISSIONER PIGFORD: But if your examiner didn't note the procedure to be unacceptable, then we would expect him to require the operator to be examined, that he actually followed that. Is that right?

MR. COLLINS: That would be correct.

COMMISSIONER PIGFORD: If you found a procedure that said in a loss of coolant accident,after a certain time the main reactor coolant pumps must be tripped -- must be tripped -- turned off -- then in preparing your questions, you would expect the operators to do that. Is that correct?

MR. COLLINS: Yes.

COMMISSIONER PIGFORD: Okay.

CHAIRMAN KEMENY: Commissioner Trunk.

COMMISSIONER TRUNK: Mr. Collins, when an operator fails his requalification exam, he goes back to the plant. Has anybody failed his requalification exams at Three MI?

MR. COLLINS: Not at Three Mile, no, but a review of the requal. programs indicate that individuals have failed exams; I think some 25 operators over the last three years, and 28 senior operators have failed the requal. exam, have gone into the accelerator prequal. programs, been reexamined, and then put back on shift.

COMMISSIONER TRUNK: You would know if somebody did fail, though?

MR. COLLINS: Not necessarily, because the program would call for doing this, and as long as they complied with the program there would be no need to notify me.

COMMISSIONER TRUNK: Okay, so when he goes back to the plant, he goes back to his job, are there any restrictions put on him, or is it just a normal day for him?

MR. COLLINS: If he has been reexamined and successfully passed the reexamination, then he just assumes his duties.

COMMISSIONER TRUNK: And if he fails?

MR. COLLINS: If he failed the reexamination?

COMMISSIONER TRUNK: Yes.

MR. COLLINS: He would be prohibited from performing license duties. Are we talking of the same thing? First he

takes his annual requalification exam. If he fails this, he goes into an accelerated training program and he cannot perform shift work until he passes a reexamination. Now, if he fails that reexamination, he certainly cannot go back to work.

COMMISSIONER TRUNK: Okay. Are they tested -- do you give them a psychological test?

MR. COLLINS: No, we don't. No, we don't. The medical form filled out by the physician has several questions on there that could lead the physician to make additional inquiries as to the psychological makeup of the individual. We have a regulatory guide for filling out the medical forms and the items to be looked for, and it doesn't actually call for a psychological examination, but it does leave the option up to the examining physician to get some more expert advice in any area he wants, including psychological advice.

COMMISSIONER TRUNK: Thank you.

CHAIRMAN KEMENY: Mr. Collins, did I hear you say correctly, in answer to Commissioner McPherson's question, that if you are unsatisfied with the results of examinations at the given utility, that you would demand improvement in the training program at that utility?

MR. COLLINS: That is correct. We have written letters to utilities. As part of an application, the facility management must sign a certification that the man has been through a training program and that in their opinion he is a

safe and competent operator. This is a requirement for us to even consider examining the man.

When we get a group of applicants in who perform very poorly, we then question the means being employed by facility management to sign this certification, and consequently, we write them a letter, and at times they have told them that we would not accept any more certifications from them until we saw the improvements in their training programs.

CHAIRMAN KEMENY: Have you issued such a demand for improvement in training programs at Three Mile Island 2?

MR. COLLINS: No.

CHAIRMAN KEMENY: That gives a very narrow interpretation to the word "examination." It seems to me they took a very major examination, the group of them testified under oath before this Commission that they were totally unprepared for the accident which they had to operate. Would that not be grounds for you to be concerned about the quality of the training program?

MR. COLLINS: Yes, but we have not been concerned with reexamining the operators at TMI-2, because we don't see where they are going to operate for several years.

CHAIRMAN KEMENY: That is what I suspected you would answer, but that presumably means that your entire process works on the cycle of when somebody gets examined. And the fact that the operators themselves testified, even in public

under oath, that they were not prepared for what they had to be faced, appears to be irrelevant to your charge because it is not connected to a written or oral examination in your sense of the word.

MR. COLLINS: But this has been addressed at all the other operating plants to date. The Commission sent out teams of INE inspectors and OLB members to every operating PWR in the country shortly after the Three Mile Island accident, and these teams of people talked to each and every licensed individual at each and every one of these operating plants to explain to them what had happened at Three Mile Island, how they could determine that it would happen at their plant, and to alert the entire licensed community to be aware of what actions to take in this particular instance.

CHAIRMAN KEMENY: But, Mr. Collins, that is not responsive to my question, because that speaks to what is being told the operators. I am concerned about the training program which is your responsibility. Why have you not concluded after such public testimony that there was something lacking in that training program?

MR. COLLINS: Why have I not?

CHAIRMAN KEMENY: Yes. You are in charge of this division.

MR. COLLINS: There was a hole in the training program. I will not deny that.

CHAIRMAN KEMENY: Then why have you not demanded an improvement in that training program?

MR. COLLINS: In the Three Mile Island 2 training program?

CHAIRMAN KEMENY: In the training program of Met-Ed, let's say.

MR. COLLINS: We have, and we are going to reexamine all of the people on Three Mile Island 1 as part of the procedure for them to start up unit 1.

CHAIRMAN KEMENY: I see. So you are going to try to tie that to the -- but again, you are going to do it in terms of examinations and not in terms of looking at the training program.

MR. COLLINS: All right, I see what you are saying now. Yes.

CHAIRMAN KEMENY: Commissioner Trunk.

COMMISSIONER TRUNK: May I just ask this? If an operator passes his oral and flunks his written, he can take the accelerated course, but still continue working as an operator.

MR. COLLINS: This is the requalification program you are talking about now?

COMMISSIONER TRUNK: Yes.

MR. COLLINS: Okay. No. There are provisions that if he performs unsatisfactorily on the oral examination, he is

also prohibited from performing license duties. There is a heavy emphasis on the written examinations, I must admit.

CHAIRMAN KEMENY: May I help? I believe what you are after is the point that counsel brought out, that they are many-part exams, and as I believe Mr. Collins testified, an individual could have totally unsatisfactory grades on one or two parts of that, and continue as an operator, as long as the overall grade average was high enough. Is that not correct, Mr. Collins?

MR. COLLINS: Yes. An individual can have a low grade in a particular category; as long as he has an overall passing grade, then he can continue to operate. There are two portions to the examination. One is an oral exam, one is a written examination.

COMMISSIONER TRUNK: I thought if he had 70 percent or less on his written, he would flunk it. I mean how many parts are there to an exam? I mean there are just two -- written and oral.

MR. COLLINS: Except that the written examination is divided up into seven categories, and we take the overall grade of those seven categories, and if it is 70 percent or better then the man passes the written examination. He need not -- to date, he need not get 70 percent or better in each one of those sections of the examination.

COMMISSIONER TRUNK: And if he gets less than 70 on

his written, he can still -- and he passes his oral -- what I am trying to say is, if he passes his oral and gets less than 70, he can still go back to operating.

MR. COLLINS: Not if -- we are talking the initial NRC examination. He must pass the written and the oral in order to get a license. Now, once he is licensed, he is subject to a facility-administered examination, and on this,if he gets less than 70, then he has to go to an accelerated requal. program. If he is unsatisfactory -- and I can't speak for each and every program -- the details of each and every program -- but many of them, if he is unsatisfactory on the oral evaluation, he also is prohibited from performing duties until he demonstrates his competency again.

MR. KANE: Excuse me. Mr. Chairman, may I seek a clarification on this, because I think Commissioner Trunk is moving towards something that was covered in my examination of you, Mr. Collins. Do I understand it correctly that the requalification examination is composed of both written and oral parts; that if an operator scores less than 70 percent on the written part but performs,in the judgment of the utility, adequately enough on the oral examination, at approximately 50 percent of the utility requalification programs, that individual is permitted to continue to operate as a licensed operator during his accelerated training?

MR. COLLINS: That is correct.

CHAIRMAN KEMENY: Thank you for straightening us out, Mr. Kane. Professor Pigford.

COMMISSIONER PIGFORD: Mr. Collins, I am delighted to find that you and I are both in academic work, because of your operating the training program and this sort of thing, and evaluating it.

One of the things we worry about is evaluating the effectiveness of our training, and in universities we are urged to go out occasionally and see how well the people did whom we examined and gave grades to and so forth. Now, are you doing that in the case of Three Mile Island?

MR. COLLINS: We are doing it across the board. We do take a look at the LER s that are generated, particularly from the standpoint of those that are attributable to personnel error, particularly licensed operator error, and we have been keeping some statistics on it to see if the overall program, particularly the requalification program, is effective. There was a certain percentage of personnel errors committed prior to the requalification programs. How many are being committed now -- I don't think we have seen any significant dropoff in the LER's to date over, say, -- well, it has been about a four-year period now.

COMMISSIONER PIGFORD: Are you looking specifically to see how well the operators at Three Mile Island did, from your point of view, from the criteria that were used in your examinations?

MR. COLLINS: No, not exactly, no.

COMMISSIONER PIGFORD: Is someone else in NRC looking at that?

MR. COLLINS: No, I don't believe so.

CHAIRMAN KEMENY: Professor Pigford, I hope you have been suggesting that universities should be judged by the quality of performance of the alumni after they leave the ivy-covered wall.

(Laughter.)

COMMISSIONER PIGFORD: Well, sir, I am not suggesting it, but it has been suggested to me, and so I had to pass it on to Mr. Collins, and I think it was suggested by a president of a famous university, as a matter of fact, not necessarily the one in the Northeast, though.

CHAIRMAN KEMENY: There have been a few cases where I would have favored a requalification examination, Professor Pigford. That was what I was mentioning.

I see no further requests for questions. The witness is excused.

(Witness excused.)

CHAIRMAN KEMENY: Would Chief Counsel please call

and swear in the next witness, please.

MR. GORINSON: Roger Mattson.

Whereupon,

ROGER J. MATTSON

was called as a witness and, after having first been duly sworn by Chief Counsel Gorinson, was examined and testified as follows:

MR. KEMENY: Would you please state your full name and your current position, please.

MR. MATTSON: Roger Joseph Mattson, Director, Division of Systens Safety in the Office of Nuclear Reactor Regulation.

MR. KEMENY: Chief Counsel?

MR. GORINSON: Mr. Kane?

MR. KANE: Thank you, Mr. Gorinson.

Mr. Mattson, how long have you been employed with the NRC and its predecessor agency, the Atomic Energy Commission?

MR. MATTSON: Since June of 1967.

MR. KANE: You are Director of the Division of Systems Safety. Can you describe your duties and the duties of your division?

MR. MATTSON: The division is responsible for the safety review of nuclear power plant designs at the construction and operating license application stage. We also have

responsibility for a number of unresolved generic issues, research coordination, standards coordination, some of those other things.

MR. KANE: Does your division lend analytic support to the Divison of Operating Reactors?

MR. MATTSON: Yes, it does.

MR. KANE: Is it accurate to say that your division has the major concentration of technical expertise within the NRC?

MR. MATTSON: Concentration, yes, in the sense that we have no project managers in DSS, so that all of the people, professional people, are of a technical background.

MR. KANE: What person in your division or in the larger office of Nuclear Reactor Regulation is responsible for overall integration of systems engineering?

MR. MATTSON: We do not integrate the overall aspects of systems engineering in one person. We do that through our review procedures called the Standard Review Plan, which brings together the major systems elements which are integrated element by element at the branch level, such as the Reactor Systems Branch, the Plants Power Systems Branch, Auxiliary Systems Branch, and so forth.

MR. KANE: So for overall integration, the focus is with the standard review plan itself.

MR. MATTSON: Yes, sir.

MR. KANE: Is it fair to say that that plan reflects the NRC's official position on what safety features belong in a nuclear reactor?

MR. MATTSON: For new designs, that is true.

MR. KANE: Is it true that plants receiving construction permits prior to September, 1975, did not have to comply with this plan?

MR. MATTSON: That is true.

MR. KANE: And what that true regardless of the extent of actual construction on those plants as of September, 1975?

MR. MATTSON: Yes. I believe the date was chosen on the basis of formal action on the plants rather than on the basis of a stage of construction.

MR. KANE: All right. Is it true that TMI 2 was one of the plants which was exempted from the Standard Review Plan on that basis?

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MR. MATTSON: Yes, sir.

MR. KANE: The Standard Review Plan requires the sealing off or isolation of the containment building on at least two different signals, does it not?

MR. MATTSON: I'm sorry, I didn't quite follow the question. Can you repeat it?

MR. KANE: The Standard Review Plan calls for isolation of the containment building to be triggered upon two

different signals, doesn't it, diverse actuation?

MR. MATTSON: Yes, it does.

MR. KANE: The containment isolation at TMI 2, on the other hand, is triggered on only one signal, high pressure in the containment building, is that right?

MR. MATTSON: Yes, that's true.

MR. KANE: How long did it take for the TMI 2 containment to isolate during the accident on March 28, 1979?

MR. MATTSON: Well, it took some time. I don't recall the exact number.

MR. KANE: Was it several hours?

MR. MATTSON: Yes, it was.

MR. KANE: If anyone within the NRC had concentrated on the matter before March 28, 1979, wouldn't TMI 2 probably have been required to backfit, to change its design to include this requirement for diverse containment isolation?

MR. MATTSON: It may have depended upon the individual who did the concentrating, but in the main, I would say yes.

MR. KANE: All right. Isn't cost the bottom line in making the decision on whether to require backfitting?

MR. MATTSON: Well, cost weighed against the incremental gain in safety, yes.

MR. KANE: All right.

What office within the NRC looks at the problem of

how the operator relates to the equipment, the man-machine interface, if you will?

MR. MATTSON: Well, I will describe some of those interfaces. I do not do so to argue that what was done in the past was adequate because I don't feel it was, but there has been some man-machine interface concern in the past, or review in the licensing process.

For example, in the review of the design of safety systems, it is common, or has been common practice, to look at the time required for the system to operate on its own -- that is, automatically -- before reliance can be placed upon the human being to take over the control of the safety equipment. I think Mr. Ebersole explained this morning the genesis at TVA of the ten minute rule. There was a similar genesis of a ten minute rule in the Atomic Energy Commission regulatory staff. At times it has been raised to a 20 minute rule, depending on the complexity of the manipulations required of the operator.

So there was that kind of interface.

MR. KANE: Let me see if I can focus my question a little more. Is there any specific office within the NRC which is assigned the task of examining, on an ongoing basis, the man-machine interface in the licensing of plants?

MR. MATTSON: No.

MR. KANE: This Commission has already heard a great

deal of testimony concerning the Michelson report. I reviewed with you in your deposition various portions of the September, 1977, version of that report, which refers to possible operator error based upon a misleading pressurizer level reading.

In reviewing that report, wouldn't your division have realized that Mr. Michelson was talking about possible operator error which should be instructed against?

MR. MATTSON: I think we would have.

MR. KANE: And hasn't it now been determined that those operator instructions did not exist before the TMI 2 accident?

MR. MATTSON: I think it has been established that there wasn't sufficient training or sufficient instruction in the form of procedures for that behavior of the machine.

MR. KANE: Yes, procedures is what I was focusing on.

MR. MATTSON: I think it has also been established that there were, in a variety of places, concerns with that inadequacy.

MR. KANE: All right. If the proper operator procedures had been distributed and followed by the operators, would the TMI 2 accident have happened?

MR. MATTSON: I guess today I am a little less enamored of written procedures than I once was. I would add to that, if the training had been done with those procedures,

then it is quite likely that the accident would not have happened.

MR. KANE: And hasn't it now been established that this September, 1977, version of the Michelson report did reach the hands of one member of your division, Mr. Sandy Israel?

MR. MATTSON: That is true.

MR. KANE: In fact, we now know that Mr. Israel, after receiving that version of the Michelson report, prepared a memorandum, which has now been called the Novack memorandum. That memorandum was circulated within the Reactor Systems Branch of your division, was .t not?

MR. MATTSON: That is true.

MR. KANE: And that memorandum raised a generic safety problem as to operator error and pressurizer levels for existing nuclear power plants, doesn't it?

MR. MATTSON: I don't recall that the memorandum made a particular point about existing nuclear power plants. In fact, the memorandum encouraged the inquiry for new license applicants as to whether the technical point raised in the memorandum was indeed applicable to those designs.

If there is a fault in the memorandum, it is the failure to realize the generic significance of the fault for operating plants.

MR. KANE: For existing nuclear power plants, the

ones that are operating now.

MR. MATTSON: Yes.

MR. KANE: All right. And yet no word was put out to the Division of Operating Reactors, the NRC office which handles existing nuclear power plants, was it?

MR. MATTSON: The memorandum was not formally distributed, and it is my understanding today that it was not informally distributed, either, to the Division of Operating Reactors.

MR. KANE: In fact, that report, the Novack memorandum, was only utilized in connection with one construction permit application for one plant, the Sun Desert plant, which was ultimately cancelled, correct?

MR. MATTSON: That is my understanding.

MR. KANE: This memorandum addresses possible operator error based upon an aberrant pressurizer level reading. Before TMI 2, who in the NRC reviewed operating procedures for problems posed by equipment design?

MR. MATTSON: No one, formally. I think I commented in my deposition that the kind of review that Mr. Collins has just described to you might occasionally happen upon such a difficulty, or the use of the procedures during the start-up of a facility and the review of that use by the Office of Inspection and Enforcement might happen upon such a difficulty.

But there is no formal requirement within the system

to perform such a review. There should be.

MR. KANE: And before March 28, 1979, was such a review even conducted by the industry itself?

MR. MATTSON: I think the evidence I have seen is that there were gradations of goodness in such reviews. In some utilities, I have been told that there was a feedback of their procedures back to the designer of the machine. In other utilities, I am told that that practice was not common or thoroughly applied.

I think, even in the cases where it was done, it was not done with the thoroughness and adequacy that it should have been done.

MR. KANE: All right. Mr. Mattson, this Commission has already heard from Mr. Ebersole as to a question, question number 6, which he drafted on the basis of the Michelson report and propounded on behalf of the ACRS as part of the Pebble Springs licensing process.

The second part of that question regarding operator interpretation of aberrant pressurizer level was never adequately answered. The question, of course, arises as to who was responsible to ensure that an adequate response was made.

As I understand your deposition testimony, the NRC did not follow up for a response because the question went beyond the NRC's regulatory requirements as stated in the Standard Review Plan and because the ACRS did not ask the NRC

to seek a further response. Is that correct?

MR. MATTSON: That is essentially correct. I might add to that, there was a timing element in the response of those questions. It was near the conclusion of the staff review of Pebble Springs and very shortly before the full ACRS meeting on that application that we were provided with a copy of Mr. Ebersole's questions.

We made a decision at that point to transmit the questions directly to the applicant. Mainly because of the pressure of time for other assignments for the people who would have been involved in the staff, we did not seek to generate our own answers. Rather, we assured that the proper staff members were at the full ACRS meeting where the applicant's response to the questions would have been discussed by the committee.

It would have been my assumption that if the answers given were unsatisfactory and they raised significant questions in the staff's minds, we would have followed up on them. I did not personally attend, so I have to judge that since they were not followed up on for completeness -- and I agree with Mr. Ebersole that the answer to question 6 is incomplete -- it would have been my assumption that it was not a significant omission or it would have been followed up on.

MR. KANE: And as far as you understand it, then, no one in your division assumed primary responsibility to

ensure that an adequate response was obtained.

MR. MATTSON: Well, that is a responsibility that would fall to us in the course of participating in the ACRS review of a particular plant. But near the end of that review, when it comes time to write the ACRS letter, I think the staff has a tendency to stand back and wait and see what the ACRS letter to the Commission contains, after its review, and it is quite usual for the ACRS to recommend the approval of the granting of a construction permit with a number of qualifiers, and it is usual in those letters that the qualifiers will say, here is a list of things that we think deserve further attention and the staff should follow up on them, and we do or don't-- that is the ACRS does or does not -- want the staff to report back on the final resolution.

It is usual for them to leave it to our discretion on how to solve the problem once they have articulated it.

MR. KANE: But in the specific case of the Pebble Springs licensing process and in the specific case of question number 6, coming late in the process as it did, your division did not assume any responsibility to follow up and ensure that a full and proper response was made to that question, is that right?

MR. MATTSON: That is true.

MR. KANE: And so as far as we can tell at this point, the response to that particular question just sort of

dropped into the cracks, is that correct, somwhere between the ACRS and the NRC?

MR. MATTSON: Yes, that particular question, but realize that it was related to some other things that were going on, including the Novack memorandum, which you have already described, and the Michelson report and the Davis-Besse transient review and those sorts of things, so whether in the minds of the people who listened to the Pebble Springs presentation to the ACRS it was still an open matter or not, I cannot testify. There is no documentary evidence that it was.

MR. KANE: Mr. Mattson, who is Thomas Novack?

MR. MATTSON: He is the Chief of the Reactor Systems Branch in my division.

MR. KANE: All right.

I would like to show you a document which we have just recently received from Mr. Novack. It is a memorandum dated November 15, 1977, from the Division of Project Management to all Division of Systems Safety Branch chiefs. It encloses the Pebble Springs questions, including question number 6, which appears on page 2 of the enclosure.

The last page I would like you to look at. It is entitled "Assignments for ACRS Questions," and it indicates prime responsibility -- and I know the xeroxing on the word "responsibility" is rather poor, but it is the word

"responsibility" -- for question number 6 lies with RSB. Is RSB Reactor Systems Branch?

MR. MATTSON: Yes, it is.

MR. KANE: And as you said, that is within your division. As far as you know, why didn't Reactor Systems Branch follow up on question number 6?

MR. MATTSON: Well, I believe the process that was followed was roughly the one I have described. That is, the representatives from these various branches indicated on the last page were present at the presentation to the full ACRS meeting by the applicant of his responses to the questions. It must have been that in the judgment of the Reactor Systems Branch person, the ACRS was satisfied with the answer and chose not to pursue it. I haven't spoken to that person, and I am not even sure I know who it was, unless you have another document to show me.

MR. KANE: I do not, Mr. Mattson, and this document has only recently come to our attention. It does clearly reflect primary responsibility for question number 6 lying with Reactor Systems Branch, does it not?

MR. MATTSON: Yes.

MR. KANE: We also had some testimony from Mr. Ebersole concerning ACRS questions in the licensing of Diablo Canyon. Has Diablo Canyon received its operating license?

MR. MATTSON: No.

MR. KANE: Is there any schedule as to when it may receive its license?

MR. MATTSON: The board is in recess, as I understand it, with the record remaining open to receive an opinion from the staff as to what more should be required of Diablo Canyon before its operating license hearing is closed.

MR. KANE: Has there been any focus in that regard upon the types of questions which were discussed in Mr. Ebersole's testimony here this morning?

MR. MATTSON: Yes. The interference with natural circulation cooling by either condensable or non-condensable gases is within the scope of the Bulletins and Orders Task Force in our office, who is pursuing that issue with the Westinghouse and Combustion Engineering plants, having already completed it with the B&W plants.

It is our expectation that the requirements flowing from the Bulletins and Orders Task Force work for all of the now operating reactors on which they are concentrating will also be implemented on all of the new operating licenses, and so it will fall within the scope of staff work prior to our recommending the granting of a license for Diablo Canyon.

MR. KANE: Another subject --

MR. MATTSON: I might add that I was not aware until this morning of the 1975 concern. I didn't realize it dated back that far.

MR. KANE: Another subject about which this commission has heard a great deal is a transient that occurred at the Davis-Besse plant in Ohio in September, 1977. You had a meeting in your office concerning this transient in October, 1977, did you not?

MR. MATTSON: I don't recall that it was in my office, but I did have such a meeting, yes.

MR. KANE: Within your division?

MR. MATTSON: Yes.

MR. KANE: Several members of your division were present?

MR. MATTSON: Yes.

MR. KANE: And at that time you discussed a report on the transient prepared by Mr. Mazadas of your office. Is that not true?

MR. MATTSON: I believe I said that in my deposition. I have had a chance since the deposition to talk to Mr. Mazadas. Although the report is dated before that meeting occurred, he does not recall that he actually spoke from the report at the meeting. He spoke to the substance contained in that handwritten memorandum, but he does not recall handing it out.

MR. KANE: Well, that report makes explicit reference to the Davis-Besse operator turning off the high pressure pumps during that transient, does it not?

MR. MATTSON: Yes, it does.

MR. KANE: And you regarded this transient as significant, didn't you?

MR. MATTSON: Yes, we did.

MR. KANE: And, yet, if I understand your prior deposition testimony, this meeting in October, 1977, focused on hardware, not operator error because of a mindset, which I believe was your word, which focused on design and not operator interaction with design. Is that true?

MR. MATTSON: That is my recollection. Since then, at the same time I talked to Mr. Mazadas about his recollection of the meeting since my deposition, he made me aware of a document that he supplied to you in his deposition, which I had not previously seen. It is a late October, 1977, memorandum from Dr. Ross, his assistant director, to Mr. Seyforth, I believe, in the Office of Inspection and Enforcement, which in essence summarizes what Dr. Ross thought were the four principal items of concern on the part of my staff that were going to be followed up on by the Office of Inspection and Enforcement as a result of an agreement reached in the meeting to which you referred. I believe that the role of the operator was included in those four items.

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MR. KANE: That would then tend to indicate that the role of the operator was discussed at the meeting.

MR. MATTSON: Yes. And it may be that my recollection was poor at the time of the deposition. I recalled several of the other things receiving quite a lot of attention. Perhaps, it was my mindset.

MR. KANE: In any event, you decided that this matter should be left with the NRCs Inspection and Enforcement Office, with Mr. Mazadas of your office to be available for consultation. Is that right?

MR. MATTSON: That is right.

MR. KANE: And having made that decision, you then left the matter to Inspection and Enforcement and you made no further effort to follow up. Is that correct?

MR. MATTSON: Other than the memorandum which I just described which -- maybe it is a little bureaucratese on there, but when a memorandum of that sort flows to I&E, it is customary to name the follow up person in the form of a contact, NNRR; the contact is named in that memorandum as Mr. Mazadas, so there was a formal acknowledgment of the meeting and the assignment staying in I&E. To my knowledge there never was any response to that memorandum.

MR. KANE: Right. You have no recollection of ever receiving any report back from Inspection and Enforcement on this, do you?

MR. MATTSON: That is right.

MR. KANE: The Novak Memorandum and the Davis-Besse September 24, 1977 transient, both involved situations where pressurizer level goes high while primary coolant pressure goes down. This commission has already heard testimony as to how this situation posed a problem in Beznau, Switzerland in 1974 for a coincident logic actuation of the ECCS. As of March 28, 1979 that coincident logic was a common feature of Westinghouse plants in this country. Was it not?

MR. MATTSON: Yes, it was.

MR. KANE: And coincident logic works such that ECCS actuates automatically only if both level and pressure go down. Correct?

MR. MATTSON: That is true.

MR. KANE: So that, in the Davis-Besse situation, where the level stays high and only pressure goes down, the ECCS would not automatically actuate on coincident logic, even though you might very much want it to automatically actuate. Correct?

MR. MATTSON: That is true.

MR. KANE: Yet, again, if I understand your deposition testimony, coincident logic was not discussed at your meeting on Davis-Besse in October of 1977 and was not even recognized as the problem until the first few weeks or months after the TMI-2 accident. Is that correct?

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MR. MATTSON: That is true. I didn't make the connection in my own mind. If you look at the Novak Memorandum which Mr. Israel wrote, he talks about a monometer effect in the B&W machine and is rather uncertain, in the memo, as to whether it might apply to the other PWR designs. It may be that as far as the staff's thinking had gone at that point was the peculiar attribute of monometer design and not seeing a mechanism for pressurizer level hangup. In the Westinghouse or Combustion Engineering Design they did not grasp the more general significance of that operating experience.

MR. KANE: If you had known of the Beznau transient, which occurred on August 20, 1974 at the time you held this meeting on Davis-Besse in October, 1977, do you think you would have made the connection?

MR. MATTSON: Yes and I think my staff would have too.

MR. KANE: Mr. Mattson, this commission has heard a great deal about the PORV, the valve that stuck open during the TMI-2 accident. Prior to TMI-2 the PORV was not regarded as a safety related device, was it?

MR. MATTSON: That is right.

MR. KANE: If PORVs had been regarded as safety related, more attention would have been given by the NRC to generic safety problems with those valves. Is that correct?

MR. MATTSON: Yes, it is likely that that would have

happened.

MR. KANE: And if I understand your deposition testimony, the reason that the PORV was not considered safety related was because it had a block valve behind it. And the reason the block valve was not considered safety related was because of the PORV in series with it?

MR. MATTSON: Essentially, that is the logic.

MR. KANE: Mr. Mattson, your office obviously plays a key role in the licensing of nuclear power plants. Is it true that an applicant for an NRC plant license is not required to submit any history of failures on equipment, even safety related equipment?

MR. MATTSON: There are no such formal requirements. It is fair to say that the reliability of various elements of safety systems are occasionally discussed in the course of operating license reviews. There is no formal requirement for them to summarize the operational reliability of like designs, which I think is the point you are getting at.

MR. KANE: Is it true that the objection to that proposal to require applicants to do that is the cost to the industry, even though the NRC has significantly fewer resources to develop that information itself.

MR. MATTSON: Well, I am not certain that I ever heard that idea proposed quite that way, prior to your taking my deposition, so I can't say that people oppose it, having

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not heard it myself before. Certainly, there has been an interest on the part of the licensing staff over the years since the Reactor Safety Study was issued to find ways to take advantage of the powers of that kind of analysis and reliability information on specific safety components would be one way to do that. We hadn't come at it the way you described and certainly the assembling of such information is costly, time consuming.

MR. KANE: I am surprised at your answer, Mr. Mattson, that you say that you had not heard that proposal prior to your deposition. You did give the response in your deposition that I should ask the Commission, referring to the Nuclear Regulatory Commission, I take it. They have had a proposal in front of them for some years. Has there been a proposal in front of the NRC to require applicants to do this?

MR. MATTSON: There has been a proposal to require of all nuclear power plant operators the reporting of reliability data routinely. This is a -- the acronym escapes me. It is NPRDS or some set of letters like that which has met with wide opposition because of the burden it would impose. There have also been some technical objections to that method of approach. It gives you probably more data than you need and there are ludicrous extremes to which you could extend it right down to the individual screws and nails and what have you in the construction of a plant.

MR. KANE: What about just for safety related equipment?

MR. MATTSON: There has been difficulty agreeing that that is the approach to take for some years.

MR. KANE: All right. And if I understood your deposition testimony, the objection was burden on the industry and the bottom line on burden is cost and you did also state in your deposition that the NRC has significantly fewer resources in this regard than the industry does. Is that correct?

MR. MATTSON: Those things are all correct, yes.

MR. KANE: In connection with that resources problem, is it true that prior to TMI-2, the accident on March 28, 1979, no one in the NRC was responsible for tracking operational history to see if the assumptions used in writing regulations were valid based on experience.

MR. MATTSON: That is too sweeping a statement. Certainly, there was a recognition as a matter of policy in my division, in the Office of Nuclear Reactor Regulation generally of a need for the individual technical experts and their managers to be cognizant of the course of operating experience. Now, the way that that is reported to the agency is through some 3,000 licensee event reports in the course of a year. It is physically very hard to expect an individual staff member, in addition to all the other things he is assigned, to keep up with all 3,000 and sort out the ones that are of

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interest to him. So, there was another organization at NRC, the MPA organization, reporting to the executive director, who did certain statistical or trending analysis of licensee event reports. This is quite different than routine review by individual license reviewers which would be more of an engineering nature. This would be -- the other statistical analysis, more of a bookkeeping function.

MR. KANE: So, that we can be clear for the record, Mr. Mattson, I did ask you this question in your deposition. Had anyone in the NRC, prior to TMI-2 been responsible for tracking reactor operation experience in that or similar areas, referring to safety systems, to see if the assumptions used in writing the regulations were valid based on operating experience. You answered, not to my knowledge. What did you mean by that answer.

MR. MATTSON: Since TMI-2, there has been a formal recognition of the need for an institutional entity to have such responsibilities. That group has been ordained by the Commission. It is being formed now, starting with a selection of an office director and I was comparing the pre-TMI-2 situation to the post-TMI-2 situation. After I read my deposition over the course of the last few days, I thought I should state some of the things that were done, lest it leave the impression that nothing was done, which was not the case.

MR. KANE: But there is a clear recognition now that

what was being done prior to the accident was not sufficient in this regard. Is that right?

MR. MATTSON: Not sufficient either at NRC or in the industry generally nor at the individual plants.

MR. KANE: All right. The absence for current blueprints for TMI-2 was noted during the accident and I believe the NRC's task force on lessons learned has recommended that these be available. Wasn't the reason that this was not imposed prior to TMI-2 simply the fact that the NRC had not thought very hard about this matter?

MR. MATTSON: Neither the NRC nor others. There is a regulatory guide and its number escapes me, but it is one on quality assurance and it deals with retention of records. It was generated in the mid-seventies, as I recall, and it does speak to a certain extent to the records required to be kept at the site, I expect more for examining less than TMI-2 of events or equipment failures, but for the purpose of being able to ascertain the as-built condition of the machine.

MR. KANE: Mr. Mattson, during your deposition you stated the following about the NRC regulation of plant licensing. "The system of regulation depends upon the judgment of the licensee. There is no human way possible to do it any differently with the people and resources assigned to licensing." What did you mean by that?

MR. MATTSON: Well, we do an audit review and it

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extends from the generation of the regulations criteria through the review of the individual designs for conformance with those criteria to the inspection of operating facilities and facilities under construction. That is, we exercise judgement on what are the important elements of the machine for safety. In setting the criteria for those elements, we again exercise a judgment on an individual license application as to which are the changes of importance in this design relative to earlier designs for detailed checking of their conformance with the criteria. And finally, another judgment is exercised by the Office of Inspection and Enforcement in deciding which ones to follow up on in the field. I think if you examine the numbers of people from a gross perspective, a wide perspective, you can get a feel for the kind of audit review that is done. If I could have some liberty with numbers, I think I could show you the effect. There are roughly 600 people today in the Office of Nuclear Reactor Regulation. Let me guess, I don't know the specific number, but if you subtract the secretaries and the administrative support people and the budget people maybe you have 400 to 450 technical people. We have 150 roughly reactors in the United States. Standardization has never a whole big success in this country so all of those 150 designs have some differences. That means there are roughly three people in NNRR for each design. Each design costs in today's dollars on the order of a billion. It

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is a complex, large machine. We look at part of it, not all of it.

MR. KANE: So, where does the judgment of the licensee come into play?

MR. MATTSON: Well, the system of regulation, the audit system, depends on a conscientious and thorough conformance with safety precepts and safety regulations at all levels of procurement, design, installation, operation. So that when our audit review of what we judge to be the important thing shows that the Commission's regulations are met, we can have some confidence that in the main, the part of the iceburg below the tip has been done correctly.

MR. KANE: That is your confidence in the judgment of the licensee.

MR. MATTSON: That is the confidence that the system of regulations places in the licensee.

GREENWOOD

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MR. KANE: You did mention plant standardization. Is it true that there are no two nuclear plants in this country which are alike?

MR. MATTSON: As soon as I say that somebody will remind me of some that are. There are some plants where a very considerable effort has been made to make them identical. These are very recent plants. Three that stand in my mind are the Palo Verde units one, two and three.

MR. KANE: But they are the exception to the rule. Is that right?

MR. MATTSON: Yes, most certainly.

MR. KANE: Does this lack of standardization pose significant problems for evaluating the designs of these plants for inspection and enforcement of regulations and for devising solutions to generic safety problems?

MR. MATTSON: Well, for the first two, it is certainly a resource implication. It does not mean that you cannot do a good safety job just because the design is different if you have got the resources to devote to the design differences.

In terms of generic safety problem resolution, it definitely is a problem. You come to a generic solution, and if you ignore the nuance of design you will pretty soon find out that the generic solution does not work on some plants.

MR. KANE: Is the reason this lack of standardization has occurred been the disappointing response of the utilities and a reluctance by the NRC to require standard designs?

MR. MATTSON: Well, recognizing that standardization is a relatively new concept. five, six, seven years old perhaps and that formalization of the procedures and requirements for standardization are more recent than that, given those caveats, I would say that standardization has not been a success because of the two reasons that you named. I believe I gave them to you in my deposition.

MR. KANE: Mr. Mattson, we know that you played a role in hydrogen calculations during the TMI-2 accident, and I am certain some of the Commissioners will want to question you on those calculations. I have only one question.

The hydrogen calculations performed during the accident used information from many different sources. Yet, as I understand it, the necessary data was already in the possession of the NRC. Is it true that this data was not used simply because this was a crisis situation and apparently no one thought of that data being available?

MR. MATTSON: I believe we discussed this in my deposition, and I don't recall asking you what the data was that you thought was available. Could you do that for me?

MR. KANE: I think actually you made reference to data that has been compiled in connection with boiling

water reactors.

MR. MATTSON: Yes, what I said was that it is quite likely under different circumstances with a longer time to think about it people might have come to a better conclusion on the propensity of that situation to generate oxygen, that certainly there were people within the staff who were familiar with operational technology and boiling water reactors where hydrogen overpressure is used to suppress radiolysis during some operations. I know that knowledge is there today. It did not seem to come to the fore in the processing of the question under the crisis situation of Three Mile Island, and so, in my judgment, I say that it must have been the crisis. I cannot imagine what else it would have been.

MR. KANE: The Commission has, also, heard a good deal about the NRC's role in operator training from Mr. Collins. I understand from your deposition that you favor requiring the position of safety engineer, that is a licensed reactor operator with a bachelor's degree in engineering at all nuclear plants. Is that true?

MR. MATTSON: The Lessons Learned Task Force which I direct has issued a report, new reg 0578 which has recently been endorsed by the ACRS and acted upon by Mr. Denton within the last few days which requires the use of shift technical advisers, having a bachelor's degree or equivalent and training in nuclear power plant response and the design

layout and operation of the specific plant at which the person would be employed by January 1, 1980.

I believe in my deposition we were talking about where is this trend going over the long term, and I don't recall if I used the specific words or not, but I think I see over the long term a system of operation which is more like the naval reactor system which depends upon engineering officers of the watch for the command and control function in the control room.

I think that that will take some time, perhaps on the scale of years to completely implement and with it will come increases in the capability of control rooms for both display and diagnostics of reactor response. Hence, in the future, with both of those things happening, it may be possible to think of the shift technical adviser as a short-term requirement.

MR. KANE: You stated, I am sorry?

MR. MATTSON: Does that answer your question?

MR. KANE: Yes, it does. You stated in your deposition that this safety engineer or shift technical adviser would be the one, for example, at TMI who would have received the Davis Bessie report and have reviewed it, understood its import and changed the operator training accordingly.

Mr. Mattson, you hold a bachelor's degree, a master's

degree and a doctorate in mechanical engineering, do you not?

MR. MATTSON: Yes, sir.

MR. KANE: Yet your office which is the main location of technical NRC expertise and you, personally, reviewed the Davis Bessie transient, as I understand it, without understanding its import for operator training. What makes you think that a utility safety engineer with a bachelor's degree in engineering could do any better than you and the NRC's Division of Systems Safety?

MR. MATTSON: I don't think that is a fair assessment. I believe you will find that Mr. Masedess' trip report, Mr. Ross' letter to Mr. Syfert and subsequently Mr. Israel's NOVAC memorandum all spoke to the importance of operator training.

You must realize that DSS has no responsibility today, nor has it ever had in the past for operator training. I think there is an indication there to me that the people who supposedly had this mind set that only thought about systems design were realizing the importance of the human being in safe operation of nuclear power plants.

Unfortunately, the concern was not followed up on. It was given to others or not widely circulated, and it was lost.

MR. KANE: All right. Mr. Mattson,who is Denwood Ross?

MR. MATTSON: Today he is the Deputy Director in the Division of Project Management, currently the Director of the Lessons Learned Task Force. A year or so ago and for some years prior to that time he was the Assistant Director for Reactor Safety in the Division of Systems Safety.

MR. KANE: Do you feel he has a good deal of technical expertise?

MR. MATTSON: Yes.

MR. KANE: In his deposition which has been taken by this Commission, Mr. Ross was asked about the impact of B&W steam generated design on the ability of the operator to timely respond to an accident.

Mr. Ross responded as follows: "There is a direct correlation between the time to do nothing and when you should be doing something or to undo something you should have done. The Westinghouse system is more forgiving. You can have a system of non-feasance or malfeasance and recover. So, the B&W would be less forgiving."

Is Mr. Ross correct in that statement?

MR. MATTSON: Yes, I think I agree with that statement.

MR. KANE: And shouldn't the goal of the NRC be to license reactor designs which are more forgiving rather than less forgiving in this sense?

MR. MATTSON: That could be a goal. I am not sure

that it has been in all situations, probably because the legislative mandate for the NRC is adequate assurance, not optimum assurance of public health and safety. Certainly judgments have been exercised by a number of people over a number of years since the first B&W machine was proposed at the construction permit stage which go to the effect that the unforgiving nature of that machine relative to some others was still adequate.

I am sure that the things which Dr. Ross describes are,with hindsight from Three Mile Island certainly a fresh perspective on the inherent nature of the B&W machine, and how that will finally manifest itself in specific design requirements for the B&W machine still remains to be seen.

I think we are continuing to see some feed water transients in B&W machines which cause large swings in the pressurizer level that are of concern to us, and we are continuing to look at it quite hard.

MR. KANE: I have no further questions, Mr. Chairman.

CHAIRMAN KEMENY: Thank you, Mr. Kane.

Governor Peterson?

COMMISSIONER PETERSON: Thank you, Mr. Chairman.

Dr. Mattson, I would like to get your help in resolving some questions that bother me relative to protecting the people in the area around the plant.

I think you will agree that if a significant

release of radiation does occur or is likely to occur, it is desired to move people fairly promptly, and to interpret the data to make that decision obviously calls for some expertise in the operation and control of the plant.

Since you manage one of the principal groups of technical people involved in this important field, I thought you could help in a major way here.

I understand that you were present on that Friday morning, March 23, at Bethesda in the meeting with Harold Denton and Victor Stello and others where the decision was made to recommend the evacuation of the area around the plant.

Is that true?

MR. MATTSON: No. First, it was Friday, March 30.

COMMISSIONER PETERSON: Friday, March 30, I meant to say, yes.

MR. MATTSON: And the particular meeting to which I think you refer was a meeting in the Incident Response Center which involved the people you described, and at the time, early in the morning on March 30, that they held their meeting and reached their decision on recommending evacuation I was out of the Incident Response Center in an adjoining office working on the hydrogen problem but did not participate in that particular meeting. There may be some confusion because later that morning by an hour or two following

their recommendation I made a similar recommendation which has been widely publicized because it was on the transcripts, a recommendation for evacuation.

COMMISSIONER PETERSON: Did you communicate that to Chairman Hendry that morning?

MR. MATTSON: I did. It was directly to Chairman Hendry that I made the recommendation.

COMMISSIONER PETERSON: Do you know the basis on which Chairman Hendry made his recommendation to Governor Thornburgh after Governor Thornburgh had received the recommendation of this meeting of Denton, Stello, et cetera to evacuate, the basis for Chairman Hendry's recommendation not to evacuate?

MR. MATTSON: I have not asked the Commission or Chairman Hendry for the basis for their recommendation to the governor. I have read the transcripts, and I recall a confusion in the IRC because of the lack of good information from the site.

I do know that within roughly an hour and perhaps less of my making the recommendation to evacuate one of the principal bases for my recommendation was removed. One of the bases for my recommendation was the apparently mistaken information that the licensee had run out of waste gas storage capacity and was about to embark on a depressurization of the primary coolant system. We learned shortly

thereafter that that was not the case. Although the storage capacity was short, they had found a way to keep the reactor at high pressure, despite the small storage capacity for some fairly lengthy period of time while other alternatives were considered.

In face of that I saw no need for a precipitous move to depressurize the reactor, and I would have agreed some several hours later that there was no need to evacuate.

COMMISSIONER PETERSON: Now, in the real case you don't have that luxury of waiting several hours to make the recommendation.

MR. MATTSON: That is true.

COMMISSIONER PETERSON: On the basis of the assumptions you made and facts at hand, would you make the recommendation to evacuate today?

MR. MATTSON: I would.

COMMISSIONER PETERSON: Yes, I would think that would be a logical conclusion.

On several occasions during our hearing --

CHAIRMAN KEMENY: Could I just ask a quick follow-up on yours? You made that recommendation, you said, directly to Chairman Hendry. Is that correct?

MR. MATTSON: That is true.

CHAIRMAN KEMENY: What was his response to you?

MR. MATTSON: It is on the transcript. I have not

read it in some weeks.

CHAIRMAN KEMENY: To the best of your recollection?

MR. MATTSON: The conversation really did not have to do with evacuation. I was asked to give a status report to the Chairman. I did not understand at the time, but there were others in the room listening on a speaker phone, evidently, a status report on the work we had been doing in the course of the previous few hours on examining alternatives to deal with the presence of a large amount of hydrogen in the primary coolant system, and I had given him a rather lengthy briefing of the difficulty of removing that hydrogen during a depressurization process.

At the conclusion of that I told him I had learned of this waste gas tank storage capacity problem and that in my judgment if they were about to make a precipitous move to depressurize the reactor, we had better make a recommendation to move people to gain that extra hour and one-half of time.

CHAIRMAN KEMENY: Did Chairman Hendry respond in any way according to your recollection?

MR. MATTSON: My recollection was he acknowledged that he knew that there were judgments of that sort being expressed by people and that they had them under consideration, they, the Commission had those points of view under consideration.

CHAIRMAN KEMENY: Governor Peterson?

COMMISSIONER PETERSON: Thank you, Mr. Chairman. I think, Mr. Chairman, it might be helpful, though, if our staff could dig into this thing to find out what was the basis for Chairman Hendry making an opposite decision than that he got from all of his key people that very morning when they recommended evacuating --

CHAIRMAN KEMENY: Request so noted, Governor. Staff has heard the instructions.

COMMISSIONER PETERSON: Well, on several occasions during our hearings, Dr. Mattison, it has been pointed out that an event had not been planned for, because it was assumed that certain provisions made in the plant would preclude the event from happening. For example, some comments were made about the procedures for coping with the major hydrogen buildup in the containment building were not taken very seriously, because it was anticipated that the reactor systems would keep the temperature from building to the point where the zirconium water reaction would become significant.

Today, at all operating plants, as I understand it, and we saw it at TMI Plant 1, they are storing many tons of used, highly radioactive fuel rods in water pools directly adjacent to the reactor containment building, and they don't appear to a casual visitor, like Peterson here, that they are very well protected or isolated from the reactor.

Now, is this because the designers are convinced the

containment area will contain any problem that occurs therein?

MR. MATTSON: Yes. I think the degree of communication between a fuel pool and a reactor is a problem that is not a significant safety problem. You should understand that once the fuel is removed from the reactor and put in the pool, after not very many days its decay energy is significantly diminished, and its propensity to heat up and undergo metal-water reaction is significantly diminished compared to a freshly shut-down core in the reactor itself following an accident.

There is attention paid to the safe design of those fuel pools, seismic capability, and what have you, to assure that they will not lose water and lead to a metal-water reaction kind of problem. But the specific concern that you raise, that is, somehow communicating failures in the containment to the fuel pool outside the containment, is a mechanism that is extremely remote, in my judgment.

COMMISSIONER PETERSON: Well, I was thinking specifically -- I want to ask this question: Why would you store all this stuff right outside the containment building, because if there were a meltdown, say, that would breach the containment building, wouldn't that be kind of a dangerous thing to expose that nuclear waste there to the moltant reaction mixture?

MR. MATTSON: Well, the fuel pools would generally be on a much higher elevation in the reactor than where the

molten core would end up in the event of a core meltdown. It would be down low in the containment, below the reactor vessel.

Again, I think the possibility, the degree of communication between the spent fuel pool and a molten core inside the containment would be very remote. There are analogous concerns that you might project. If, for example, a core were to melt down and the containment were to be violated, either a melt through the bottom or an explosion which cracked the dome of the containment, access to the immediate site would be very restricted.

There is a need to maintain fuel pools. They won't sit there indefinitely and continue to replenish their water. Equipment needs maintenance. We do not design nuclear power plants under the current Commission regulations for core meltdown accidents. They are considered to be of such remote possibility that no specific design features are incorporated for that event. Hence, there is no requirement that the fuel pool, for example, have indefinite or remote maintenance capabilities.

COMMISSIONER PETERSON: That is where my concern came in, that it was assumed that that couldn't happen; therefore, no need to plan on it; therefore, you can put the waste right next door to it. But in regard to the --

MR. MATTSON: There are safety advantages and, of course, economic advantages to placing it right next door. You

take advantage of the considerable substance of the containment mat and seismic design of ancillary equipment by placing it close by.

COMMISSIONER PETERSON: I can see the economic advantages, but not the safety advantages.

In regard to the detonation or burning of the hydrogen in the containment building that led to that 28-pound per square inch pressure buildup or spike,what kind of damage can you envision might happen in that vessel as a result of such an explosion to equipment that could jeopardize the subsequent operation of the facility?

MR. MATTSON: Well, certainly it is a combustion event,and high temperatures, locally high temperatures, were probably realized, so there may be burning of some components that was a pressure spike, probably of a local nature I am advised, which would send a pressure wave through the containment which would tend to lift grates and perhaps bend equipment.

If that were a concern, it would have been a concern early after the accident. It may have been the contributor to some of the equipment failures that occurred in the course of Thursday, Friday, and Saturday. I wouldn't expect it would be a source of equipment failure at this point.

COMMISSIONER PETERSON: Thank you, Dr. Mattson.

CHAIRMAN KEMENY: Mr. Taylor.

COMMISSIONER TAYLOR: Dr. Mattson, I would like to explore two areas with you. The first has to do with the question that is on many people's minds these days, and that is, how close did the accident at Three Mile Island come to releasing a lot of radioactive material off-site and causing not only clear need for evacuation, but some real damage to the public health and safety?

Now, in connection with that, I would like to ask first whether there have been, or now going on, studies in NRC of what would have happened if conditions starting from a situation similar to what happened at TMI had been somewhat different? For example, have there been any studies of what would have happened if the operator had failed to turn the high pressure injection system back on again during that hour, that period between about two hours and three hours after the accident started?

Another kind of question could be the extent to which, with a repeat of exactly what happened so far as the operator actions were concerned, the likelihood that things might have been somewhat different in terms of internal physical, chemical development of the events that might then have caused a lot more fuel damage or qualitatively different fuel damage. Are there any study results of this sort, and if so, what are they, and if not, are there studies that are now going on within the NRC of this what-would-have-happened-if kind?

MR. MATTSON: It is my understanding there are such studies. I am not responsible for coordinating them, and I have not been informed of their progress.

COMMISSIONER TAYLOR: Who is responsible for coordinating them?

MR. MATTSON: The Commission.

COMMISSIONER TAYLOR: To me, the Commission always means two things -- NRC as a whole, or the five commissioners. And I guess I don't know what you mean.

MR. MATTSON: The overall coordination of the Agency response to Three Mile Island rests with the commissioners in a sense, in my mind, especially because of the special inquiry. There are a number of engineering evaluations of the accident not being performed in the line organizations like the Office of Nuclear Reactor Regulation, but being coordinated by the NRC Special Inquiry.

It is my understanding, and my source of information on this subject is a member of this Commission staff, that there are people in NRC doing event analyses, and looking at some of the "what if" questions. I think they are very important questions to ask.

COMMISSIONER TAYLOR: Are you aware of any results of those studies so far?

MR. MATTSON: No, I am not. I think that that is a very serious question that ought to be looked at in several

ways. You can think of different responses by the reactor operators that would have led to different consequences. For example, if the high pressure injection system had not been turned back on when it was turned back on, and the reactor was in the midst of its probably most damaging phase of the transient, some three or four hours into the transient, that would have been one consequence.

You can think of another event. If it had been turned back on then, but the reactor coolant pumps had not been turned on at 16 hours, but say 32 hours or some time longer, what would have been the consequences?

You can also think of -- I think we discussed the last time I testified -- permutations and combinations of the condition of the reactor. What if it had been an equilibrium core instead of a three-month-old core? I think we have written you a memo that said that wouldn't have made much difference, but there are other "what if" questions. What if it had a different grid structure, instead of the grid structure instead of the grid structure that it had? Those kinds of things need to be explored in depth to gain an understanding of the risk picture after Three Mile Island.

COMMISSIONER TAYLOR: Are you or someone in your office following these studies to learn what their results will be and, in particular, what implications those results might have on the licensing process itself? That is, in areas that

are directly within your office's responsibility?

MR. MATTSON: We are not, and that is a shortcoming or a caveat, I guess, on the work of the task force which I head. The Lessons Learned Group fully recognizes that a complete engineering understanding of the accident is not yet available. We keep up, to the extent that those studies are completed. For example, the EPRI study that was recently published, was quickly read and considered by my task force. Recognizing that our longevity is not much beyond the coming month, there will remain certain lessons to be learned, I am sure, when the full engineering evaluation of the accident and the risk evaluation of the accident are complete some time later.

COMMISSIONER TAYLOR: Well, it is now roughly four months after the accident. There is a lot of information available. Much of it was incorporated into your report on the lessons learned, at least the preliminary version of it. Yet, I am very surprised to find that still there are no results, that I am aware of, that give any idea in a bounded way, in an approximate way, in a very preliminary way even, of what might have happened if, for example, that HPI system had been left off for another half hour.

The reason I am concerned about that is that there are very simple-minded kinds of calculations that people have done, some of them -- I say "simple-minded" in the sense that

they are not large computer models and so on -- things that can be done with pencil and a piece of paper and a small hand calculator -- do give results that suggest that the time in that particular example is not very long. I don't even want to suggest what that time might have been, but there are indications from what I have seen and some of the work I have done myself that the chances are that that time is not measured in hours but in minutes; that is, to lead to a situation where one would have a core meltdown in the sense that the core material would melt and flow downward and begin to make contact with the pressure vessel.

Now, I have no idea why it has taken so long for people to try to get some sense of what that result is. I do understand that it is extremely complicated. Do you think that is -- let me put this as a question. Is your understanding of it that the process of really trying to get some idea of what might have happened if various things had been different is really so complex that one just can't expect to get any answers that are worth discussing for a number of months?

MR. MATTSON: I suspect that there is a sensitivity to publishing back-of-the-envelope hand calculations of the type you describe. From what I know of the calculations that are going on, people are making a very concerted effort to use the best codes, benchmarked the best way they know how, so that when the results become available, there is good assurance that

they are the right results. And that may be the reason that it is taking some time.

I am not personally involved, so I can't tell you. I agree with you, there is a need to have those results as soon as we can,but there is also, I think, the need not to have 100 different back-of-the-envelope calculations with 100 different answers for people like you and others to sort through,because some of them won't be good calculations if they are done that way.

COMMISSIONER TAYLOR: Perhaps you are not the proper person to ask this question, since you are not directly involved in these calculations -- I imagine not -- but let me pose the question anyway just to make sure to have on the record a question that has been coming up about a possible variation, and that is -- my question is whether there is any consideration being given to the following kind of scenario: that is, cooling is turned off for a longer time, either during that period between about 2 hours and 3 hours after the accident or the later period when, apparently, there was some core uncovery, too -- that is, somewhere around 10 hours after the accident started.

The question is this: Suppose that the core had gotten very hot, a large fraction of it had gotten very hot, and at the same time, its structural integrity had suddenly given way, and that, basically, the entire core had been suddenly fallen into a reservoir of water still in the bottom of the pressure vessel. The question is, is it credible that there could then be such a rapid release of steam as to rupture the pressure vessel?

It seems to me that that is an important question to come to deal, to try to deal with. I also understand that it is very difficult to make such an estimate of whether or not, under that presupposed condition of most of the core being uncovered very hot, and then suddenly losing the structural

integrity, but it seems to me that questions like that are going to have to be answered at some time in order to say something about how close the accident got to something really very bad.

Do you agree with that?

MR. MATTSON: Of course I do, yes.

COMMISSIONER TAYLOR: Now, the second area I want to explore has to do with sabotage, and I wanted to say at the beginning of this line of questioning that I am not trying to get into the public record any significantly more valuable information than may already be public to people who might, in the future, have some intentions of trying an act of sabotage.

But I would like to ask whether you have any concern, yourself, about the fact that there has been a release of a great deal of detailed information about the TMI 2 plant and other plants similar to it, about the course of the accident, and about what kinds of things people worried about that could lead to a core meltdown, a real China syndrome, in much more detail than, as far as I know, has been -- much, much more detail than, as far as I know, has been released publicly before.

I know I am concerned about this because of the coupling between the release of that information and at least one statement we have gotten from one of the witnesses before this committee -- that is, Mr. Zewe, one of the operators at Three Mile Island -- to the effect that the answer to the

question, could an operator in the control room cause a core meltdown from the control room, his answer was yes.

That answer, coupled with what we know about what happened there, coupled with the detailed release of a lot of information, I find worrisome, and I guess my question is whether you or other people that you are aware of in NRC have been concerned about the increase in the detailed knowledge that is available to the public about how an accident might actually be caused on purpose.

MR. PATTSON: There is to me, personally, a curious recurrence of an acquaintanceship in the course of this event. Carl Michelson and I first met each other in a sabotage study conducted by Sandia Corporation back in 1975-76 time frame, when the two of us took very strong positions about the need to do something about the availability of detailed information of potential value to a saboteur.

This was recognized, I believe, by the Atomic Energy Commission some years ago, that under the Freedom of Information Act, where all of the detailed information reviewed by the licensing staff was available in public document rooms and of potential use to a saboteur, that that was not necessarily in the public interest, given the increasing concern with the potential for sabotage.

Subsequent to that, there has been quite a lot of activity by the NRC on reactor sabotage protection. What I

have in mind is the development, issuance, and implementation of 10CFR, Part 7355. Now, 7355 goes a long way toward protecting nuclear power plants against the intentional acts of outsiders; that is the person in the street who would go to the PDR and picked up the detailed drawings and try to make some use of them to conduct an act of sabotage.

7355 also recognizes the potential role of the insider in a nuclear power plant to either commit the act himself or to aid and abet such an act. It requires that protection be provided against insiders, and so people have put in place access provisions in nuclear power plants where the plant layout and design are reviewed from this standpoint that you have described. Vital areas-- that is, places of high vulnerability -- are identified and special access provisions are provided for those areas, lock and key systems, card systems, voice systems, what have you.

There are also plants which use buddy systems. You cannot have one individual go into a specific area unless he is accompanied by somebody else of some approved position in the operating staff.

Clearly, there is a significant improvement today relative to a very few short years ago in the degree of sabotage protection in these plants.

I think the agency feels that it has addressed this problem adequately at this point. There is not only your

expression but there have been other expressions of interest in this area since Three Mile Island. It is not clear to me that Three Mile Island changes the problem. It may. It may be that some people were not aware of the sensitivity to the issue some years back and the steps that have been taken to protect against it.

This is another area where psychological interests have been considered in the past, and I have heard it come up a couple of times today. This might be an especially important consideration in the context of reactor operators, where I have heard several members of this Commission express an interest today.

In light of the testimony that you have heard and some thought that I have given to it previously, I think it is a valuable consideration. I have made recommendations within NRC dating back some years about the potential value of the psychological criteria. The difficulty is that there are considerable human rights infringement possibilities with psychological testing, and it smacks of big brotherism.

Those are important considerations, and in the course of deciding upon recommendations that people in the staff made about psychological testing in the past, it has been, in the past, decided not to require such things for sabotage protection. Certainly if this Commission, in its collegial judgment, has thoughts on that subject, I am certain they would be very

valuable at this time.

I have not been in the sabotage protection business for about the last two and a quarter years, so I may be slightly out of date with what the current thinking is.

COMMISSIONER TAYLOR: Now, you said that you were involved in the Sandia study in the mid-seventies. Wasn't part of that study classified Secret, Restricted Data?

MR. MATTSON: Yes, it was, and there was some concern that, having gone to all this effort and spent the taxpayers' money to study the problem and learn so much about it, that it caused it to be classified; how did we communicate the interest in this subject to the individual licensees? And so arrangements were made to obtain the proper clearances in each licensed facility for appointed representatives of utility management to come to Washington or to Albuquerque and to review the results of the classified study. So we did find a mechanism for putting the results in the hands of the people who were responsible for the management of the sabotage protection systems pursuant to 7355.

COMMISSIONER TAYLOR: Now, I don't know -- I have never seen the report -- I don't know what parts of it were secret, but I am curious to know if you could answer the question whether or not any of the kinds of information that were in the Sandia report that had to do with the response of a light-water reactor to various actions that were classified

have now been released as a result of TMI.

MR. MATTSON: No. The consequence portion of the report was actually released, and the conclusion of Sandia was something along the lines that the consequences that they saw were less than or equal to the consequences described in WASH 1400, or words to that effect.

COMMISSIONER TAYLOR: No, what I was getting at is the consequences of turning such and such a valve in such and such a way and turning -- that is, manipulating controls in whatever way would bring on a very serious loss of coolant accident.

MR. MATTSON: Well, the things that were classified were the specific event sequences for specific plants that were studied by Sandia. If your question is, is there information flowing from Three Mile Island that somehow makes publicly available some of those event sequences, in my judgment the answer is no.

COMMISSIONER TAYLOR: I see. Now just one final couple of questions on the same issue, sabotage. My question is whether there is any reason at all to be concerned about the situation at Three Mile Island now. As I understand it, the reactor is being kept subcritical with a fair margin of safety.

CHAIRMAN KEMENY: Professor Taylor, are you sure you want to pursue that line of questioning at a public hearing?

COMMISSIONER TAYLOR: Yes. I don't intend to try to

reveal anything -- I just want to ask the question about whether the subject is getting attention.

CHAIRMAN KEMENY: Yes. Dr. Mattson, if there is anything in the answer which you feel would not be in the public interest to answer, you have my permission not to answer it.

MR. MATTSON: It might help -- you brought this question up --

COMMISSIONER TAYLOR: I don't want to get into any details about how might --

MR. MATTSON: You brought this question up the last time I testified, and --

COMMISSIONER TAYLOR: My question is, is that getting attention now, by anybody.

MR. MATTSON: Well, I talked to Richard Volmer, who is the director of the TMI support activities in the Office of Nuclear Reactor Regulation just several days ago. I had heard from someone that you were still expressing concern in this area, and I was concerned because I thought we had addressed it in my testimony. I wanted to ask Mr. Volmer if there was something that had changed that I was not aware of.

It is my understanding, and Mr. Volmer confirmed this, that the reactor is being kept with a high concentration of boron, that the boron concentration is being routinely and often measured to confirm that the concentration stays where

they want it, that there is no controversy as to the required level of boron to keep the core subcritical in any configuration, and that the physicists -- there are many who have looked at the problem -- are satisfied that the core is in a safe, stable condition and will remain there indefinitely.

COMMISSIONER TAYLOR: Well, I guess my question is whether people are examining,and I don't want to know any results, whether people are examining the question about whether that situation could be changed on purpose.

MR. MATTSON: I don't know the answer to that question.

COMMISSIONER TAYLOR: Thank you very much.

CHAIRMAN KEMENY: Professor Pigford?

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COMMISSIONER PIGFORD: Dr. Mattson, in your deposition you were asked a question about the emphasis, the statement in Wash 1400, the Rasmussen Report that too much emphasis was being placed on large break loss of coolant analysis with the implication that perhaps more emphasis should be placed upon the small break accident and its analysis. Do you agree with that statement in the Wash 1400 report?

MR. MATTSON: It is yes, and it is no. Yes, in the sense that more attention needs to be paid and has needed to be paid to transients in small locus for some time, and many of us have said that. The difficulty is in abandoning the large break local program in order to pursue those interests which is really what is required in the face of constant resources.

There were commitments made by the Atomic Energy Commission and more importantly perhaps, by the staff which outlived the Atomic Energy Commission to fill certain gaps in knowledge as they were called at the time of the ECCS rule-making hearing for large break loss of coolant accidents. Those promises are in the regulations, and the statements of findings in that hearing.

It is our judgment that those gaps in knowledge need to be filled. They have turned out to be very expensive gaps, and if one were to take the conclusion that

too much attention is being paid to large break loss of coolant accidents and not enough to small breaks and transients and divert those resources, I believe it is a mistake.

Now, it may be possible to divert some and stretch some answers to the gaps in knowledge for the large break loci, but I think we have to work all of the problems and not forget that we made the promises to solve or fill in some of those gaps in knowledge.

COMMISSIONER PIGFORD: Evidently you feel we are not necessarily working all the problems in the sense we have not sufficiently been working the problem of the small break accident?

MR. MATTSON: That is clear. I will give a good example. The standard review plan we have discussed in both of my opportunities to appear here. There is in the standard review plan a requirement to examine transients with single failures. That requirement of the standard review plan is one requirement that has been implemented on no plants, to my knowledge, by the licensing staff.

The staff put it in there in 1975, in full recognition of the fact that the reactor safety study points out and the Lewis Committee points out, and Three Mile Island now points out the need to pay more attention to those events, but the resources to implement those requirements have not been available.

COMMISSIONER PIGFORD: Take us back to the days of the Rasmussen Report. It came out, and it had this clear statement anyway. Then what happened? Who was expected OSC to take up the burden of implementing it? I am asking you for your guidance throughout the whole organization. Where would it normally have expected to fall?

MR. MATTSON: The report itself had nothing to implement it. It reached certain conclusions about the probability and consequences of accidents. There were policy decisions made by the Atomic Energy Commission when it was published in draft form in 1974 that this was a very powerful tool, and its use should be encouraged in the licensing process.

Now, its use has been encouraged in the licensing process. There are examples that we could talk about.

COMMISSIONER PIGFORD: But let us get back to the small break accident, implementation of more emphasis on that. Was there a policy decision by the Commissioners to do or not to do something about that?

MR. MATTSON: To my knowledge, there was not. The policy decisions that were made by the Atomic Energy Commission and implicitly accepted by the Nuclear Regulatory Commission were more in the lines of use the methodology and less in the lines of a conscious policy decision from the Commission level to pay more attention to small break loss of

coolant accidents and transients.

COMMISSIONER PIGFORD: This was a conscious policy decision by the AEC Commissioners then? Is that correct?

MR. MATTSON: It was a conscious policy decision to encourage the use of the methodology. Whether it was a conscious decision to not pick up on the recommendation to pay more attention to small break locus and transients which they did not do, I cannot state.

COMMISSIONER PIGFORD: Where were you in the organization at that time? What year was this?

MR. MATTSON: 1974, when the Commission policy statement on reactor safety study was issued, I was the technical assistant to William Dowd, Commissioner for the AEC.

COMMISSIONER PIGFORD: Yes. Was the AEC regulatory staff asked to make any recommendations on what to do about the Rasmussen Report, and did they make any recommendations concerning this small break accident work?

MR. MATTSON: The regulatory staff was asked to review the report, did offer several rounds of comments. Whether the staff was asked for policy judgments on this particular question, I do not recall.

I do recall that the staff had opinions and was asked for opinions about the veracity of the methodology, but whether the staff was asked to reach a conclusion on the small break loci and transient conclusions of the study I do not

know.

It was about that same time though that the staff did incorporate this change in the standard review plan to which I referred, and it is, also, about that time that some attention was given to small break loss of coolant accidents beyond that which had been given in the ECCS Appendix K Rule-Making Proceeding.

COMMISSIONER PIGFORD: By whom?

MR. MATTSON: By the present Division of Systems Safety. It was not called that then, but --

COMMISSIONER PIGFORD: At that time when the staff made comments on the Rasmussen Report, was there some commentary about the Division of Research?

MR. MATTSON: Let me see. There was no research organization in the regulatory staff at that time. The research organization was on the General Manager's side of the Atomic Energy Commission.

COMMISSIONER PIGFORD: Someone named Coutz,was he in charge?

MR. MATTSON: Dr. Coutz would have been the Director of Reactor Safety Research at that time.

COMMISSIONER PIGFORD: Reactor Safety Research?

MR. MATTSON: Yes.

COMMISSIONER PIGFORD: Did he make any recommendation?

MR. MATTSON: I don't recall, sir.

I expect he would have, but I do not recall what they would have been.

COMMISSIONER PIGFORD: Do you know if the Commission, the AEC, requested additional funds from Congress to increase their safety work so they could work on the small break accident?

MR. MATTSON: I think the answer to that must be no, because I don't specifically remember. Part of my difficulty is I left that job about the same time that these decisions were reached and left the reactor safety field for about three years and was not personally involved in those discussions.

I do know that the staff shared the conclusion of the Reactor Safety Study. In fact, the technical staff, since I first joined it in the late 1960's had been of the opinion that transients, in addition to these large break loss of coolant accidents deserved more attention.

It was common for us to lament at the resources and time being spent on the rather extreme, remote accidents at the expense of our better understanding and following up on the preparations for the more likely upset conditions, and so that is a historical opinion by the technical staff of the AEC regulatory side, and so I am quite certain that if they offered comments in that vein in 1974, on that part of the Reactor Safety Study they would have agreed with it.

COMMISSIONER PIGFORD: And surely Mr. Levine who later became Director of Safety Research for NRC who was the Deputy to Rasmussen on the safety study must have felt that it was something that should be implemented. Is that a reasonable proposition?

MR. MATTSON: I believe so, yes.

COMMISSIONER PIGFORD: Now, since the TMI accident surely this question has come up. Why wasn't more work on loss of coolant accident implemented? Surely NRC, that must be one of the things that your organization is looking at, isn't it?

MR. MATTSON: Well, we had begun a fair amount of work in the last two years to improve our capability on the transients. You heard discussed this morning the anticipated transients without scram. That occupied a significant portion of my time prior to Three Mile Island in my present capacity.

COMMISSIONER PIGFORD: That work is being done in your Division?

MR. MATTSON: That is true. We had also spent growing resources on the verification of transient analysis computer codes. These, in the main, are different computer codes than the vendors use for loss of coolant accident analysis, and a good example of the work that we did there was to require the General Electric transient code to be compared against some data from a start-up test where it was

found to be an inadequate representation of the transient response of boiling water reactors. The code has been completely rewritten, rereviewed and approved in the course of the last year or so.

So, there had been some advances in the transient part of this additional work that was shown to be necessary. It may be that the reason we did not go after the small break loss of coolant accident with the same vigor is a mistake in judgment that we had sufficiently bounded that problem with the work on the large break loss of coolant accident.

There has certainly been a lot of discussion within the staff since Three Mile Island about the nuance of small break behavior that was not appreciated before the accident.

COMMISSIONER PIGFORD: Now, I am going to call this one a generic issue, since it applies to lots of reactors. Can you tell me where such generic issues are supposed to be handled in NRC?

MR. MATTSON: They are assigned to all four Divisions, actually, of the Office of Nuclear Reactor Regulations.

The two Divisions to which they are assigned if they are of a safety design nature are my Division of Systems Safety and the Division of Operating Reactors.

The assignment to those two Divisions is made by the Technical Activities Steering Committee, comprising the Deputy

Director of the Office and the four Division Directors.

The split on safety, design, generic matters is roughly 50/50 between the Division of Operating Reactors and the Division of Systems Safety.

COMMISSIONER PIGFORD: Is the Division of Operating Reactors also within NRR or is that a separate division?

MR. MATTSON: It is within NRR.

COMMISSIONER PIGFORD: Yes, and the Technical Activity Steering Committee consists of whom?

MR. MATTSON: The Director of DOR.

COMMISSIONER PIGFORD: Could you give us some names along the way?

MR. MATTSON: That was Mr. Stello. It is now, acting is Mr. Eisenhut. The Director of Project Management which the present Acting Director is Mr. Vasello, and the time when the Technical Activity Steering Committee was meeting prior to Three Mile Island it would have been Mr. Boyd.

The Director of DSE, that is the Site and Environmental Analysis Division, for a while it was Harold Denton, and prior to TMI it was Richard DeYoung, and today the Acting Director is Dan Muller.

The Director of Systems Safety is the fourth or fifth member, and that would be me.

COMMISSIONER PIGFORD: And you indicated at another place in your deposition that your staff is not allowed to

ask questions concerning what happens with the loss of all feed water, and I was surprised at that. Why can't they?

MR. MATTSON: What I was saying in the deposition is in the course of a normal licensing review the reviewers are instructed to follow the standard review plan which is our implementation of the Commission's regulations, and the Commission's regulations do not provide a basis for the presumption in the design of a loss of all feed water, both normal feed water and emergency feed water.

Now, there is an unresolved safety issue called Station Blackout which in some designs would lead to a loss of all feed water, and in that sense the problem is receiving study generically, but not on an individual case basis would the staff be allowed to undertake an inquiry in that regard.

COMMISSIONER PIGFORD: I see. So, it is a difference between what that part of the staff does that handles the individual cases versus the staff that does the generic analysis?

MR. MATTSON: Yes.

COMMISSIONER PIGFORD: Now, we did see in the response to the ACRS questions on Pebble Springs, Question No. 26, an analysis of this case, namely, what happens at Pebble Springs another B&W reactor if they lose all feed water. Is that correct?

MR. MATTSON: Yes, and there is a further analysis

that is worth mentioning in that regard. One of the requirements of the Bulletins and Orders Task Force of the Westinghouse and Combustion Engineering plants has been to review the designs for the station blackout event and to look at the reliability of the feed water system for that event.

COMMISSIONER PIGFORD: Does it mean that it was possible to pose that question to the specific licensing case, Pebble Springs, only because a question arose within ACRS?

MR. MATTSON: That is right.

COMMISSIONER PIGFORD: It could not have been posed by your staff?

MR. MATTSON: If my staff had gone to -- if a staff member had gone to his branch chief and said, "I want to pose this question," his branch chief would have said, "No." And if the staff member had appealed it to me as Division Director, my responsibility in implementation of the standard review plan under existing policy would be to say, "No, show me why it is a significant generic problem. We will pursue it on that basis, but you may not ask it on Pebble Springs."

COMMISSIONER PIGFORD: Yes, but of course, as we recognize, it is the limiting case of the small break accident, isn't it?

MR. MATTSON: Well, it is a very interesting small

break accident.

COMMISSIONER PIGFORD: Yes.

CHAIRMAN KEMENY: Could I just interject one question? Is your staff sometimes tempted to leak some questions to the ACRS so you are allowed to raise it?

MR. MATTSON: Oh, yes, and my staff is inclined sometimes to not ask whether they can ask questions.

You have heard of the ratcheting in the licensing process. That is what it means.

COMMISSIONER PIGFORD: Dr. Mattson, we have in an earlier hearing learned a lot from Mr. Dunn at B&W where he has more than one report that has a lot about this loss of feed water, and I never thought to ask him why he happened to do it. I presumed that NRC had asked him to do it, but now I am beginning to think maybe he just did it under his own initiative. Is that a reasonable guess?

MR. MATTSON: It must be. I don't know of occasions when we have asked or delved very deeply into the event of loss of all feed water.

COMMISSIONER PIGFORD: Now, during the deposition, you were asked the question about the results of that analysis in the Pebble Springs where, surprisingly enough, it showed that in that case the containment went into pressure-initiated isolation in less than 10 minutes, whereas here we have Three Mile Island, a similar reactor, with a stuck open pilot operated relief valve, whereas the containment did not go into pressure-initiated isolation for hours.

Now, do you still -- have you thought about your answer? Do you still want to stand on that one?

MR. MATTSON: Well, I haven't done any more thought about it. I believe my answer was that the difference may lie in the fact that the analysis done by the Pebble Springs applicant may have assumed some conservative discharge coefficient for the rate of coolant transfer from the primary system to the containment, which would tend to raise the containment pressure higher, faster, and may or probably took credit for full ECCS performance, which would have delivered more coolant to be transferred into the containment, which would have also shortened the time, and I was asked the question, gave an answer off the top of my head, and I guess I haven't gone back to look at it any more.

COMMISSIONER PIGFORD: Well, maybe we ought to give NRC equal opportunity. There is an outstanding question to B&W on this one to please explain why there is such a large

difference, and wouldn't you like to have an opportunity of contributing to the record on that one?

MR. MATTSON: Certainly.

COMMISSIONER PIGFORD: And here is a chance to have hydrogen oxygen revisited, the first question that came from this Commission. I think you certainly cleared up a great deal in your deposition concerning your knowledge on this, or mainly the information assembled by your staff which you provided to the Commission.

There is the outstanding question, what were the data supplied to the NRC commissioners on the March 31, and do you happen to know the complete answer on that, or should we go elsewhere?

MR. MATTSON: I can give you a status report on that.

COMMISSIONER PIGFORD: All right.

MR. MATTSON: As a result of talking to your staff last week, the Executive Director's Office has asked me to put together a draft agency chronology of what information was available to whom at what point in the course of the concern on March 30 and 31 with the hydrogen bubble. I completed a draft of that yesterday noon. It is some 15 pages single spaced in length, based on my review of some transcripts and some phone conversations, my own notes, and the notes of many other people that I was able to assemble.

I have asked for the people that I have identified

as being part of that debate -- and that is the five commissioners and a number of managers and technical staff -- to comment on the draft chronology by Monday close of business next week, to come to my office on Tuesday if they have difficulties with it, and we will resolve it. By the end of the week, you should have it in your hands.

COMMISSIONER PIGFORD: Right. Is this, then, going to include the information specifically on what information was supplied to the commissioners on March 31?

MR. MATTSON: My memorandum transmitting this draft chronology to the Commission asks them to supply that information.

COMMISSIONER PIGFORD: Oh, I see. You are still getting it.

Now, in connection with the information that was developed by the people on your staff, is Mr. Novack on your staff?

MR. MATTSON: Yes, he is.

COMMISSIONER PIGFORD: Yes. In the stack of information that we received, in going through it, I didn't find any record of what seems to be a fact, that on March 29 -- no, I am going to back up a little bit to set the reason for my question. I think, and please correct me if I am wrong, the question of the oxygen production that might have led to an explosive mixture, I think you have told us, really came up on

March 31, yes?

MR. MATTSON: Yes. I think I testified to that extent, and maybe this is a good opportunity to correct the record just slightly. It was first brought to my attention at approximately 2:00 o'clock in the morning on March 31. I have since found an indication in the handwritten notes of Mr. Eisenhut, presently the acting director of DOR, that it was brought to his attention at 11:40 p. m. on Friday, March 30. So there is basically a four hour difference in what I had testified to before. It is based on new knowledge.

COMMISSIONER PIGFORD: Okay. Have you researched this through the rest of the people to see if there is any earlier indication?

MR. MATTSON: Well, I am aware of someone, and I am not sure who, having testified to this Commission that someone from B&W recalls making Mr. Novack aware at a time earlier than had appeared in any of the documents I reviewed. I have talked to Mr. Novack. I don't know whether I should testify to what he said to me or not.

It was my understanding several days ago that he did not recall the conversation but was searching his own memory and records and looking for the specific testimony offered here so that he might try to recall what the situation had been.

COMMISSIONER PIGFORD: Let me help you, then. We first looked -- well, we located it first, to my knowledge, as

an appendage to a letter that Mr. MacMillan of B&W sent to the Udall Committee in response to some questions, and it was a copy of some handwritten calculations from Mr. Nitti, N-i-t-t-i, B&W, dated March 29, which included, among other things, a very interesting calculation to the effect, how much hydrogen would be required to suppress the radiolytic production of oxygen, and his notes indicate that he provided the answer to Mr. Novack on March 29, and that would be the day after the accident.

To me, it has two very interesting things, and I believe also there may be some record of a telephone conversation on that, without knowing who was at the end of one of the lines. But to me it has two interesting things which I wanted to probe on. First, it seems to indicate that someone was asking this question on March 29, already, the day after the accident, namely, hydrogen is there, and will it explode? Will it have enough oxygen?

MR. MATTSON: Is there any indication where the question came from?

COMMISSIONER PIGFORD: Yes --

MR. MATTSON: Was it within B&W or within the staff?

COMMISSIONER PIGFORD: It was a question posed to B&W, to my understanding, by Mr. Novack, and then, according to Mr. Novack's note, it was -- I'm sorry, according to Mr. Nitti's note, the answer was given to Mr. Novack also that same

date.

MR. MATTSON: Friday, the -- was this Thursday the 29th or Friday the 30th?

COMMISSIONER PIGFORD: Thursday the 29th.

MR. MATTSON: I have no knowledge of this subject. One point I do note is that on Monday, April 2, there is a memorandum from a Mr. Don Roy, who is an engineering manager at B&W, to me that was received by Telefax at the Three Mile Island Command Center of NRC, which attaches a written opinion by a Mr. Nitti, I assume to be the same man, dated Monday, April 2, with a time on it. 10:52, in fact, is the time noted on the written record of Mr. Nitti.

This is a memorandum that is in the material that we provided in response to your question of April 26.

COMMISSIONER PIGFORD: Yes, I have seen that one. Thank you.

Now, on this March 29 note of Mr. Nitti's, it also then has -- the other thing that is significant to me is that it seems to have provided maybe the right answer, namely there is enough there, has to be enough hydrogen there, to actually suppress oxygen production, and what I am interested in, really, of course, is completing the record on this because it is sort of surprising to find that question being raised so specifically the day after the accident and also being answered so specifically, and then secondly, why wasn't that result

adopted?

CHAIRMAN KEMENY: Would it be reasonable, Professor Pigford, since Dr. Mattson has testified he is not aware of this, to ask that as your staff is completing the sequence of events, to have an answer to this included in it?

MR. MATTSON: Well, Mr. Novack is one of the addressees of my memorandum because of my knowledge that this point was likely to come up. I would hope by next week we would have an answer to the question.

COMMISSIONER PIGFORD: Of course, sure.

CHAIRMAN KEMENY: Hopefully, next week we will have it.

COMMISSIONER PIGFORD: And it is possible I am not identifying properly all the sources of the information I relied upon. I will let the lawyers worry about that if Mr. Mattson needs to clear that up, okay?

And Mr. Mattson -- I mean, excuse me, Dr. Mattson -- I have been misquoted, and I don't mind very much, but I didn't suggest at the last -- several hearings ago -- that the data in the regulatory files on boiling water reactors would indicate no oxygen production. In fact, I don't think they would indicate that at all. I just meant to suggest if you had used those, which were readily available data, I thought you still would get an answer that would be different from what was given to the commissioners. In fact, surely there

is no hydrogen used in boiling water reactors to suppress radiolysis, is there?

MR. MATTSON: Well, it was my understanding that there was, and I have said in my deposition I am not an expert here, but I believe that is what people have told me, that there are measures --

COMMISSIONER PIGFORD: We may have to spend several days clearing up the record that we are confusing on this subject.

MR. MATTSON: We may be confusing the record.

COMMISSIONER PIGFORD: Yes, and I was going to suggest further that if you looked in the other file on pressurized water reactors, then you would get an even better answer, if you wanted a more accurate one, because it is my understanding that the hydrogen which is used to suppress radiolytic decomposition of water in pressurized water reactors is at an even lower partial pressure than the hydrogen that was present on Friday when you started doing the calculations.

MR. MATTSON: Yes, I have seen some numbers on that.

COMMISSIONER PIGFORD: Okay.

CHAIRMAN KEMENY: Next? Commissioner Lewis?

COMMISSIONER LEWIS: Dr. Mattson, just a few questions. Last time you testified before the Commission, you told us about the Standard Review Plan and indicated that

under a grandfather clause TMI was allowed to continue with its old plan concerning containment isolation.

Now, since the Three Mile Island accident, you have been head of a group called the Lessons Learned Task Force, which now recommends that containment isolation on diverse signals in conformance with Section 6.24 of the Standard Review Plan review isolation provisions for nonessential systems and revise as necessary.

In other words, now, since the accident, you are, I presume, requiring that the Standard Review Plan procedures be followed. Am I correct?

MR. MATTSON: In this particular section, that is true.

COMMISSIONER LEWIS: In this particular -- not the entire plan, but this particular section.

MR. MATTSON: That is correct.

COMMISSIONER LEWIS: My question is, why does it take an accident of this dimension to spur the NRC to pressure utilities to conform to what is your law, which is your plan?

MR. MATTSON: Well, maybe there is a misunderstanding. There are other sections of the Standard Review Plan which have been backfit, but what I described the last time I testified was that when the Standard Review Plan was originally issued, it was decided not to backfit the entire document.

Now, as additions and changes have come along in the years since 1975, there is a conscious decision made for each of those changes as to whether it ought to be backfit to operating reactors. A good example is the fire protection provisions of the Standard Review Plan that were not in the original issuance. Those provisions were backfit; overpressure protection -- there must be several others.

COMMISSIONER LEWIS: You see, what you lead, I think, the public with is a feeling that some of the older plants or the plants that were grandfathered are not going to be safe enough, and I don't -- I am just trying to ask you how you can persuade us that that is not the case if you don't backfit.

When you find a safety related item and you don't require backfitting, aren't we leaving ourselves open to having a lot of older types of plants in operation which are not as safe as they could be?

MR. MATTSON: Well, the staff and the Commission have operated under a policy as far back as I remember that it was possible to describe safety improvements for new plants that were not necessary to meet the minimum requirements for safety developed under the Commission's regulations. So in that context, each new requirement is reviewed and a judgment is made for some of them that although it is a safety improvement, it is not necessary to put it back on the old plant.

Now, several years ago people, I think exercising a

very broad overview of this process, said, well, we agree with that judgment, but we ought to go back and look anyhow. And so they developed a program called the Systematic Evaluation Program where the Commission formally approved a program to go back to the original reactors, and they started with the first eleven put into operation in this country, and are in the midst now of a thorough re-review of those plants, where one of the principal yardsticks in the re-review is current requirements, namely the standard review plan.

They went through a long process of selecting the review topics that ought to be applied to those eleven oldest machines. I think they narrowed a field of 1,000 down to 175, and one of them is aux feedwater reliability, for example. They embarked upon a two or three year program -- the exact length escapes me, but it is approximately midstream now -- to decide across the boards for those 175 issues what retrofit ought to be required for those designs.

Now, the thought was that this was a program that would be applied to all operating reactors eventually. You can see that the difference between the first eleven and the 70th reactor is probably substantial, and the 70th reactor is probably much closer to the Standard Review Plan than the first.

So the idea was to apply it to the eleven, finish that program, and then make a decision as to what set to turn

to next, whether to take on all 59 at once or to break it into subsets and take them in sequence.

So it may -- I am afraid it appeared too arbitrary the way I described it last time, that the Commission had arbitrarily decided that what was back there was safe enough and they weren't going to look at it. I probably made a mistake in not giving you that entire picture when I gave it to you.

Now, it may very well be that there is a need now, in view of Three Mile Island, to do a much more extensive consideration of backfit topics in the Standard Review Plan. My task force is looking at that with some vigor at this point of whether it is a simple recommendation to say that all operating plants ought to meet the Standard Review Plan within such and such a time frame or whether that is not an efficient way to come at the problem. There may be other ways that could be accomplished more quickly. I don't know yet.

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COMMISSIONER LEWIS: You said earlier that when you originally allowed a loophole in the grandfather clause, cost was weighted against the incremental gain in safety very carefully -- a bureaucratic phrase, by the way, for which I compliment you, Dr. Mattson. Cost weighed against the incremental gain in safety -- is that still going to be the operative principal in backfitting? In other words, are you going to say, hey, here is an old plant, and it is going to cost this much to bring it up to the safety review plan level, and we will let them slip through because it is really too expensive for this guy?

MR. MATTSON: Well, engineering, by nature, involves judgments of that sort, and you cannot remove that kind of judgment from an individual's mind when he is an engineer. The agency has a policy, approved by the Commission within the last several years, that in deciding backfit issues, we must take into consideration -- not just backfit but any change in our regulatory requirements -- both the value and the impact of those changes. That has created, in my judgment, today, not necessarily in the past, but today, multiple opportunities to stand in the way of changes. Anticipated transients without SCRAM is a good example, in my mind. That is a problem, as Mr. Ebersole described earlier today, that has been around for ten or eleven years. The ACRS and the regulatory staff of the AEC in 1972 said fix the problem. The problem still isn't fixed. I headed a group of people within the Division of Systems Safety that came out, under Dr. Hanouwer's leadership in early 1978, with another proposal on how to fix Atlas. We used reliability techniques and WASH 1400 fell into disrepute and we had to go

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back and do it again, and so we did it on a deterministic basis, and a year ago last April we came up with another proposal on how to fix ATLAS, and then the cry went out that the value impact assessment was not good enough, and multiple opportunities were provided for industry to speak to us on the impact of these changes, and dollars were cussed and discussed for many months. The ACRS sat in review of some 12 meetings of the ATLAS issue, and still it has not been concluded. It is still an unresolved safety issue. These opportunities for consideration of cost impact are important but they can reach the point that they stand in the way of effective change to safety requirements. When you talk about resources available to address the problems, which I have earlier today, you have to think about all those resources being effectively applied in the public interest.

This agency, and I am sure other government agencies, havs wrestled with the problem of how to take these interests into account, which legitimately they should be taking into account, and not stand in the way of effective change where change is required. I don't hink NRC has reached an answer to that question yet. The pendulum needs to swing back the other way, in my assessment.

COMMISSIONER LEWIS: Dr. Mattson, one thing that has happened since Three Mile Island is that we now have removed from our eyes the image of a very tightly, professionally run industry, with all the kinks out of it. It is obvious that you are tinkering and that sometimes you say that we cannot afford that little safety feature. Let me ask you this

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question. Is it likely that if you make nuclear plants as safe as they can be, you could price this form of energy out of the market?

MR. MATTSON: You are asking me a theoretical question and the answer is obviously, yes.

COMMISSIONER LEWIS: Are you then, at the NRC, aware of that as you push the safety frontiers outward, that there is a limit, an economic limit to hos safe you can afford to make these, without destroying nuclear power.

MR. MATTSON: I am sure that people are aware of that theoretical limit. As to whether it plays an important role in the exercise of their judgment, I think in the minds of some people it does. In my mind it does not, and I have often said that nuclear power will have to be safe enough, no matter what it costs, and if it costs too much that it cannot be used, then so be it. Our job is to insure safety, and we have to consider the most optimum or efficient way to meet the safety goals that we think are necessary, but if it is necessary and it prices nuclear out of the market, then that is where the coin will have to fall.

COMMISSIONER LEWIS: Do you think your views are widely shared within the Nuclear Regulatory Commission?

MR. MATTSON: I think you would have to ask the commissioner.

COMMISSIONER LEWIS: Do you think that philosophy was revealed in the experience of a James Creswell?

MR. MATTSON: You have given me an opportunity and I would like to comment on what I heard Mr. Creswell say this

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morning. I don't know Mr. Creswell and I don't know the Office of Inspection and Enforcement too well. I came up in the organization through the Office of Nuclear Reactor Regulation. NRR has had its difficulties in the past with people feeling that they could not express legitimate differences of opinion on safety improvements needed to be made. There were Congressional hearing and I am sure you are aware of those. Those things happened several years ago, and in my judgment, the process has healed. I have been Division Director for two yeas and a month, and in that two years and a month there has not been a single dissent item out of my division go over my head, of which I am aware. I think that we have successfully responded to the people who have brought differences of opinion, and there have been many brought to my attention. In the course of that time, there is another data point we have from the General Accounting Office, which did a completely unresptricted survey of some large dimensions of the technical review staff of the Office of Nuclear Reactor Regulation. It was issued in 1977.

One significant result of that study, and there were some negatives and some good stuff, but the principal good thing was that a high fraction -- and the number escapes my mind, but it was 94 to 98 percent, somewhere in that range -- of my staff said that they felt that we were interested in their differing views, that we encouraged them to bring them to us, and that we would act upon them -- that kind of response. Now those tow data points, to me, are a somewhat different picture

than painted by Mr. Creswell this morning. It may be that Mr. Creswell's particular circumstance is a different picture. I don't know. I haven't reviewed it, but I think that it is wrong to assume that that is a general status of affairs in NRC and I sense that perhaps this Commission does not, at least Mr. Kemeny in his press conference this noon recognized the positive nature of a Commission policy that allows a person at any staff level direct access to the Commissioners, is clearly a positive policy.

COMMISSIONER LEWIS. Thank you.

CHAIRMAN KEMENY: I know it is very late, Dr. Mattson, but I checked my notes and there were two topics that the Commissioners wished to explore with you and I know they have not come up so far. I will try to be brief on both.

There is a major scurrying now to try to understand the nature of what happened to the core. I am not trying to ask you questions about that. But I am curious about pre-Three Mile Island -- how many studies were there that looked at what would happen to core if a major portion of it remained uncovered for an extended period?

MR. MATTSON: In the licensing process, not very many, because that is clearly a situation that is beyond out design basis accidents. With the caveat that in boiling water reactors of some designs, in a loss of coolant accident, design basis accident, the core does not ever recover. It is cooled by spray cooling from the top. But to study cores with degraded cooling for significant periods of time was not within the

Commission-mandated set of design basis accidents. So the only studies of that sort that were done, to my knowledge, would have been the studies in connection with the reactor safety studies, or perhaps earlier developmental kinds of studies by the Atomic Energy Commission. Those studies in recent years, with the firm use of the Standard Review Plan would not be at all common in the Office of Nuclear Reactor Regulation, probably none, and few in the sense of expanding the capability of the reactor safety study sorts of methodology in the Office of Research.

CHAIRMAN KEMENY: Doesn't it become a significant handicap in managing an accident that you do not have pre-accident studies of that kind?

MR. MATTSON: It clearly can and it clearly was.

CHAIRMAN KEMENY: Yes, and if I understood your answer correctly, which I can understand, if I heard you correctly, it was somehow assumed that this would not happen because if things happened, and the safety standards are met, this kind of accident would not happen -- is this the main reason why such studies were not done?

MR. MATTSON: Yes.

CHAIRMAN KEMENY: Thank you. The other line of questions that the Commission talked about yesterday and is wishing to explore, is trying to understand why NCR, in a global scale, functions. You are in a very important position, and I would like to ask you how much communication -- you are within NRR, and surely you have communication within NRR, so I am not asking

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that -- but how much communications would you, as an individual, have with important officials in other branches of the NRC in the normal course, and pre-Three Mile Island?

MR. MATTSON: Do you want me to try to characterize it in terms of times per month or quality or what?

CHAIRMAN KEMENY: No, a qualitative answer would be quite satisfactory. Is it common for you to sit down with the head of Inspection and Enforcement to discuss issues of common concern?

MR. MATTSON: In the Division of Systems Safety, where my people are looking to new plants, our involvement with the Division of Construction and the Office of Inspection and Enforcement is limited to mutual interest in things going on at nuclear power plants in that late stages of construction. Our involvement with the Operations Division of the Office of Inspection and Enforcement is occasional, primarily because in theory, when a plant is licensed, it is transferred from DSS and DPM, the project organization, to DOR, and there is a significant interface between the Division of Operating Reactors and NRR and the Operations Division in the Office of Inspection and Enforcement. So I find that the time I spend coordinating with other offices is predominantly with the Office of Standards Development and my counterpart in the Division of Engineering Standards, Mr. Guy Orlotto, in developing generic solutions to problems or promulgating new criteria in the form of standards for future plans., and not much time with the operations people in the Office of Inspection and

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Enforcement.

CHAIRMAN KEMENY: How about if one goes higher up? This is the last question on this, and I will turn it over to you. Suppose one goes higher up. How frequently pre-Three Mile Island would you have met with members of the Commission?

MR. MATTSON: In formal Commission meetings?

CHAIRMAN KEMENY: Either way.

MR. MATTSON: In formal Commission meetings -- I don't know -- it must average somewhere about once a week or once every two weeks, something on that scale.

CHAIRMAN KEMENY: How about informal?

MR. MATTSON: As a division director? Twice in the time I have been division director.

CHAIRMAN: Twice since you have been division director.

MR. MATTSON: Both with the same commissioner.

COMMISSIONER MC PHERSON: Thank you, Mr. Chairman. Mr. Mattson, it has been suggested to some of us that the dispersion of the Commission out in Bethesda in a number of buildings, and downtown on -- is it H Street?

MR. MATTSON: Yes.

COMMISSIONER MC PHERSON: Presents a problem. That during the period from March 28 thru Sunday, that there was a great deal of confusion, a great deal of -- that is understandable -- but that there was a great absence of contact and knowledge on the part of the Commissioners as to what the senior staff thought.

I believe it has been stated by one or more of the Commissioners that they did not know, as of Friday morning, that the senior staff had almost unanimously recommended evacuation.

One of the reasons suggested for that lack of knowledge of what others were thinking is the simple physical dispersion of NRC. Do you see that as a problem?

MR. MATTSON: Well, it is clearly a problem. It was clearly a problem then; it is a problem day to day. It has been a problem since we were formed as an agency. It is hard to appreciate the difficulty that that portends for someone who is working 16-hour days or 18-hour days as a sort of normal routine. To spend hours in transportation in and out of the City of Washington is an extremely frustrating and discouraging

thing, and to have to communicate in a crisis over the telephone is an impossible situation.

COMMISSIONER MC PHERSON: Would you likely have spent more time in informal meetings with the Commission than those two times you mentioned if you had been somewhere near them?

MR. MATTSON: I am not so sure it is the logistics that has held down the number of informal -- the opportunities for informal communications between the Commission and me.

COMMISSIONER MC PHERSON: What has?

MR. MATTSON: Well, there has been a sort of standing policy of the Agency since it was first formed that when you describe something for one commissioner, you must describe it for all commissioners, or at least afford the opportunity for all the commissioners. That leads to a sort of formalism in communication; that is why I drew the difference between formal and informal in the response to the question.

Logistics may play a role there, but I don't think it is as important a role as the more formal constraints on communication between the staff and the Commission.

CHAIRMAN KEMENY: On that point, if I understand it from what the Commissioner has said to us, the moment at least three of them are present they consider it a meeting, so if you are going to provide that opportunity formally to all the commissioners -- am I correct in saying that the only place you can do that is at an official meeting of the

Commission?

MR. MATTSON: Or you can arrange five meetings.

CHAIRMAN KEMENY: I see.

COMMISSIONER MC PHERSON: Well, here is Mr. Creswell. Maybe he --

MR. MATTSON: I should point out, I think that the open door policy is an exception to the rule I have talked about. What I am saying is that it is not customary for a member of the staff, at least in my experience, a senior management person, to call a commissioner and say, "Let's sit down and chew the fat about this problem; I want your feed-back or your opinion," because of the articulated policy of encouraging equality in the information provided by the staff to the five commissioners.

COMMISSIONER MC PHERSON: I understand, and I would like to pursue that just for a minute.

MR. MATTSON: All I am saying is it is a deterrent to me in seeking those kinds of opportunities.

COMMISSIONER MC PHERSON: I can imagine it is, and I can also imagine that you would pretty nearly have to have a whopper in mind before you went to the Commission. Let's say that you had a worry much like Mr. Creswell's -- operator reaction in the kind of situation faced at Davis Besse. That might not be something that you would want to take up before the entire Commission. They are busy people and have huge

issues. But it might also be something that you would want to convey to a commissioner, along with your concern that operator training might not be readying operators to meet that kind of an emergency. That is part of the problem that I would estimate.

It ties into another problem, and that is a generic one in the really largest sense of the word "generic," that I sense in both NRC, in the suppliers, and in the utilities, and that is the problem of finding a means, finding channels for problems of the Creswell kind, which was the same problem that the two engineers with D&W saw at Davis Besse, finding channels for those concerns to get up to senior management and to get resolved with some kind of deadline.

The two problems seem to me related. They are managerial problems. In a radio factory, they wouldn't matter so much, except on the bottom line of profits. But they certainly wouldn't matter to the public. But in this regulatory enterprise and in this industry, they do matter enormously. These safety issues are of tremendous significance and urgency to the entire world.

Well, I have gone from the small managerial problem to a large universal statement, but I would appreciate your judgment on that. It is one that has concerned me throughout these hearings, and the dispersion of the Commission and the difficulty of communicating physically seems to be a kind of

an epiphany of the problem.

MR. MATTSON: Yes, I agree with you. There are other minor things that contribute to it, like the policy I was describing. And I agree with your statement; this is an endeavor that requires that good ideas, wherever they come from, get attention.

Part of the problem is, there are a lot of ideas; some are good and some are bad, and people are working hard on the ideas, and it means you need a management system that does a good job of separating the good ones so that they get the attention.

COMMISSIONER MC PHERSON: Would it be worthwhile if this Commission recommended that the Nuclear Regulatory Commission be put under one roof?

MR. MATTSON: The Nuclear Regulatory Commission has recommended that itself, and the Congress has taken steps in that direction. That seems to be a fair time to accomplish, but it is a subject that has been ventilated at the Congress and the subject of legislation, I believe. They mandated such a move by date certain; I don't know if that date is standing, and I don't recall what it is, but sometime in the future.

COMMISSIONER PETERSON: Mr. Chairman, could I ask a question?

CHAIRMAN KEMENY: Yes.

COMMISSIONER PETERSON: Did you say, Dr. Mattson,

that you couldn't study certain areas because the Commission had mandated that was outside your jurisdiction?

MR. MATTSON: No. No. I was drawing a distinction between what is done in the case of the review of an individual plant to determine its conformance with the Commission's regulations, as opposed to -- let me call it "exploratory study" of a new safety question. And it is a Commission policy to stick with the standard review plan in the individual case reviews,and for new ideas and generic problems, to study those either in the context of a generic issues program within the Office of Nuclear Reactor Regulation, or to study them in the research sense in the Office of Research.

So I didn't mean -- you shouldn't carry from that conversation that the NRC discourages creative thought and innovation in safety concerns. I think we do a good job of encouraging it. But in the individual plant reviews, there is a need to have discipline and structure and predictability in licensing requirements, else a person would never know when he would receive a license. And the policy is to do the investigative things of a technical nature on the side, make decisions as to whether they ought to be applied to the licensing applications and to which licensing applications when they are solved.

CHAIRMAN KEMENY: Before we adjour for today, I want to be sure I do not neglect getting on the record this

Commission's very deep gratitude to Georgetown University for providing these facilities and for the very excellent cooperation the Commission has received from officials of the university.

Dr. Mattson, you are excused with our thanks, and we will have our final open hearing from 9:00 a.m. to approximately 1:00 p.m. tomorrow in the same place. The Commission is recessed until that time.

(Thereupon, at 6:05 p.m., a recess was taken until 9:00 a.m., the following morning, Thursday, August 23, 1979.)

August 22, 1977
Mattson

NOV 15 1977

Docket Nos. 50-514 and 50-515

MEMORANDUM FOR: All Division of Systems Safety Branch Chiefs

FROM: Steven A. Varga, Chief Light Water Reactors Branch No. 4
Division of Project Management

SUBJECT: ACRS QUESTIONS ON PEBBLE SPRINGS

Enclosed are questions that were raised by an ACRS member on the Pebble Springs application. Written responses were requested prior to the ACRS full committee meeting which is scheduled for January 1978.

Your are requested to respond to the enclosed questions which fall in your respective areas of responsibility. Some may require a joint effort among several branches in order to provide a satisfactory response.

Please submit your responses to Carl Stahle, LPM by November 30, 1977 for incorporation in a possible formal reply to the ACRS

Steven A. Varga, Chief
Light Water Reactors Branch No. 4
Division of Project Management

Enclosure:
As Stated

NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

November 7, 1977

Carl Stahle
LPM Pebble Springs Nuclear Plant

SUBJECT: ACRS QUESTIONS RE PEBBLE SPRINGS REVIEW

Attached are questions raised by an ACRS member, to which the Pebble Springs Subcommittee would like written responses prior to ACRS full Committee review of that project.

At this moment it is not planned to schedule another Subcommittee meeting prior to full Committee review, therefore it is requested that responses be provided as early as possible.

Ragnwald Muller
Senior Staff Engineer

ATTACHMENT
Questions raised by ACRS Member

cc: R. Boyd
L. Crocker
S. Varga
T.H. Cox (2 copies)
J.C. McKinley
M.W. Libarkin
J.C. Ebersole
S.H. Bush
M.S. Plesset
H.S. Isbin
D. Okrent

TOPICS ON FEBRILE SPRINGS (related to USNRC-205)

1. Provide the interpretation used in design, of GDC 19 and Reg. Guide 1.75 (IEEE 334).

   The less conservative interpretation of GDC 19 does not allow common damage in control room.

   RG 1.75 permits convergence of total plant shutdown capability down to spacing measured in inches (with some form of panel or plate type of barrier) to a few feet of open space.

   More conservative interpretation of GDC 19 would require (as IAEA does) that safe shutdown can be accomplished if the control room (and presumably any other given safety "space") is subject to common damage within that space.

   Use of the less conservative interpretation of these criteria results as a "soft" design with extremely heavy requirements on "administrative control". If the design is "soft" describe the correspondingly "hard" administrative controls.

2. Clarify the rationale used for location of straight sections of main steam and feedwater lines in respect to potential damage to safety equipment. Is it assumed that such pipe sections are infallible?

3. Does the design accommodate potential for inadvertent flooding from vessel and piping failures within "safety" structures or in such areas where safe-shutdown equipment is located?

4. What is stress-level and maximum local deformation in steam-generator tubes and tube sheet as result of Post-LOCA flooding of tube-side of superheat section of steam-generators? Would some tube failures at this point in time seriously affect core cooling?

5. What is the maximum secondary system pressure developed after turbine trip with first subsequent random failure being loss of main feedwater flow control leading to flooding of superheat section of steam generators. Assume turbine trip without bypass (loss of condenser vacuum).

6. Does applicant know that time-dependent levels will occur in pressurizer, steam generator and reactor vessel after a relatively small primary coolant break which causes coolant to approach or even partly uncover fuel pins? What does operator do in respect to interpreting level in pressurizer?

During primary system refill from high pressure injection pumps there is some period when neither condensation nor natural convection is present to effect heat transport to secondary side. How is transition to natural convection without assistance from primary coolant pumps obtained.

7. What is the particular design of the start-up piping and pumping system for Pebble Springs? Does it involve operating with a liquid-solid secondary system? Has the Staff performed a safety analysis of this system?

8. Can the plant obtain access to the low-pressure RHR system from the high-pressure condition using only safety grade equipment?

9. Defend the rationale of having only two "active" service systems which perform continuing or long-term safety functions. The first "accident" is the failure of one train thus destroying "normal" redundancy. Dependence on a single system in terms of consequence of failure of that remaining system is essential to understanding intrinsic risks of such designs.

Describe each such system and consequence of total failure of services provided by that system as a function of time. Only "active" failures beyond first failure need be considered.

Possible examples of such systems are:

1. Battery (DC power system) (consider parasitic loads)
2. On-site AC power system - assuming prior loss of off-site AC system
3. Service water system
4. Component cooling system
5. Environmental control (HVAC) systems

"Redundancy" may be expressed in terms of time to restore service by any means whatever before undue damage ensues.

10. What are off-site dose levels resulting from Steam-Generator tube failure, associated with loss of off-site AC power due to upset from turbine generator trip? What is probability of such a grid failure following turbine trip?

11. Are any special precautions taken for storage and handling of hydrazine?

12. What is status of investigation of merits of a primary vessel coolant level indication system for use in post LOCA cooling for small breaks?

13. The fire protection system may be characterized as a "hard" or "soft" system in respect to independence or dependence on fire detection and extinguishing systems.

In a local sense, in what particular locations is this plant dependent on administrative protection and early detecting-extinguishing techniques to protect vital shutdown system from fire damage? Is complete burnout assumed for local plant space or area such as one spreading room?

14. As a general principle why is the design heavily dependent on the component cooling system for safe shutdown rather than using the presumably more reliable service water system? Both concepts are used in the industry.

15. As an example of equipment separation which may be overlooked, describe the separation of the compressors for safety grade air cooling systems.

16. Describe the inlet-air protection system for the main control room.

    What dose level would be imposed on operators after a LOCA with "realistic" releases (Not TID) to containment but with a single failure being that of electrical blow-out of an intermediate size penetration (say 10" dia.)?

17. Describe electrical protection for power-carrying penetrations subject to in-containment faulting during LOCA. Include penetration for main coolant pumps. Describe protection in context of both overcurrent trip and ground fault (arcing) protection to prevent electrical burnout and thus loss of mechanical integrity of the penetration. Incluce penetrations handling non-safety grade power circuits.

18. Page 9.9 describes what is apparently an electrical cooling system for Auxiliary Feedwater Pump rooms. Diversity was the basis for requiring engine driven Aux. feedwater pumps, yet apparently electrically powered room cooling is necessary to assure the engine-driven function. Please clarify.

19. In respect to the volcanic ash problem:

a. Are the diesel-engine air filters designed to prevent discooling uptake of ash to the engine during this situation?

b. What other air uptakes have been evaluated to insure continued safe operation to shut-down during this condition such as:

Control room ventilation and cooling

Diesel generator air cooling

Aux feedwater engine air cooling

Service water motor cooling

Any other critical air cooling system

20. For a main steam line failure inside containment followed by the first random failure being that of the opposite main steam line isolation valve to close, describe how excess flow is prevented through "non-qualified" valve failures such as turbine by-pass valves.

In this connection, clarify the rationale which, in some designs, assumes that the large LOCA is "coincident (!)" with an earthquake but, assuming no LOCA, the failure of other kinds of "passive" elements (such as main steam lines in containment) cannot be tolerated - since subsequent application of the single random failure criterion would destroy critical active services.

21. Are the main feedwater isolation valves designed to provide the closing function in a bi-directional flow sense? Is instrumentation diversified to assure main feedwater flow interruption when required? Does this include separate d-c or inverter powered systems?

What prevents spurious closure of main feedwater systems in the light of the critical need to stop such flow when necessary? What is the estimated frequency of such closures as the original accident?

22. The SER indicates that certain cables will be tested for water resistance by submergence.

How often will this be done and what is the procable frequency of exposure to this condition during operation?

Is this sort of testing program proposed for the electrical wiring and penetrations within containment.

If not, why not?

23. In once-through steam-generator designs, the auxiliary feedwater system must respond very promptly after main feedwater is tripped. Furthermore, the main feedwater system is presumably assured to trip during any significant seismic event.

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Assignments For ACRS Questions on Pebble Springs

Item	RSB	AP	MEB	AAB	EIC
1		(X)			X
2		X	(X)		
3	(X)	X			
4	(X)		X	(X)	
5	X				
6	X				
7		X	(X)		
8	X				
9	(X)	(X)			~~X~~
10				X	(X)
11		(X)		X	
12	X				
13		X			
14		X			
15		X			
16				X	
17					X
18		X			
19		X			
20	X				
21	(X)	~~X~~			X
22				~~X~~	X
23		X			
24	X				
25	(X)	X			
26	(X) X	(X)			

X = Prime Resp.
(X) = Secondary "

DPM
TR

RSB - Scott Newberry
AP - William LeFave
MEB - Kulin Desai
AAB - [Gary / Tom]
EIC - Hulbert Li

Against those conditions it appears to be poor practice not to seismically qualify the condensate storage tank as the viable "passive" source of critical feedwater following a post-earthquake trip and shutdown. The present design does not require this but, instead, depends on the electrically driven (stopped and restarted on diesel power) service water system to provide suction to the Auxiliary Feedwater pumps. For this particular condition, the advantage of the diverse engine driven Aux Feedwater pumps is lost since suction must be provided by the electrically powered service water pumps.

Why has the design evolved in this manner?

24. From the standpoint of finding the worst credible situation in the context of the maximum rate and degree of subcooling of the unbroken primary coolant system, it appears that main steam line failure within containment (which disables pressurizer heaters and provides ECCS trip signals) coupled with failure of main feedwater trip, is probably the worst configuration (It is also presumably intolerable, if persistent, from the standpoint of containment pressurization).

Discuss the consequences of this event in respect to:

a. Degree and rapidity of return of fission power after rod insertion.

b. Thermal gradients in most severely affected parts of reactor vessel and steam generators and subsequent sudden rise of primary coolant pressure to safety valve setpoints after chilling the interior face of the vessel.

c. Maximum containment pressure as function of time of continued run-on of main and/or auxiliary feedwater flow to the failed steam generator.

25. In the startup of newer design B&W systems, using comparatively large pumps and piping and using a water-solid secondary system, the temperature of the water in the secondary system is raised to 400-500° and subsequently the secondary is drained until normal level is obtained. Has the Staff examined the safety aspects of this system?

26. Considering such matters as (1) off-site power failure, (2) condenser vacuum failure, (3) spurious main feedwater valve closure (see item 21 preceding) and recent incidents of failures in auxiliary feedwater systems it appears that, single failure criteria notwithstanding, at least short term failures of the auxiliary feedwater system must be considered to estimate the needed reliability of such system.

What, for instance, would be the peak primary system pressure, consequences to primary coolant system safety and relief valves and rate of primary coolant loss following failure of the Auxiliary feedwater pumps when needed?

PRESIDENT'S COMMISSION ON THE ACCIDENT AT THREE MILE ISLAND

PRESS CONFERENCE

WEDNESDAY,
August 22, 1979

Hall of Nations
Edmund Walsh Building
Georgetown University
36th Street, N.W.
Washington, D.C.

P R O C E E D I N G S 1:33 P.M.

CHAIRMAN KEMENY: I have an extremely brief opening statement. These are the final sets of public hearings of the President's Commission on the Accident at Three Mile Island. Our staff is madly writing its reports to the Commission, and the Commission has spent the last two days, other than the portion we have had in public hearings here, going over what the staff is doing and trying to identify those loose ends that are still not being pinned down. Hopefully, we have agreed on all of those, and therefore the staff has its clear-cut marching orders as to exactly what the list of topics is the Commission expects the staff to cover.

To anticipate the first question, yes, I fully expect that this Commission will meets its deadline. I should warn you, however, that I have many colleagues who have described me as one of the most incurable optimists they have ever met in their lives.

(Laughter.)

That is all I have to say as an opening statement.

QUESTION: Mr. Chairman, can you tell us what your conclusions are after Mr. Creswell's testimony? How do you feel about the relative weight placed upon safety considerations versus economic or other considerations within the Nuclear Regulatory Commission?

CHAIRMAN KEMENY: It seems to me that within the

Nuclear Regulatory Commission there certainly are levels at which it is very hard to get a major safety concern out, if Mr. Creswell is right, because of concerns over economic matters.

But I think I would also like to make a second remark about it. In a way, the Creswell memorandum seems the analogue of the Dunn memorandum within B&W, of again someone who had correctly identified a crucial safety issue, and it does not seem to be able to work its way out of the system. At least in NRC there seems to have been a safety valve in that he had the right to go directly to two commissioners and perhaps action would have resulted in the long run. Unfortunately, as you heard, that did not occur until one week before Three Mile Island.

Yes?

QUESTION: Is this problem, then, the problem of locked doors and stone wall, solvable?

CHAIRMAN KEMENY: That is a question that our Comission will have to wrestle with. It seems to me -- you used the word "locked doors." I would have used more the phrase of almost inpenetrable walls. I think we are finding in all the organizations we are looking at that they appear to be highly compartmentalized, and that runs into a number of problems, possibly difficulty of communicating between people who have expertise in one area with people with expertise in a

second area, which is fine as long as you have a problem which falls all within one area.

But what happens when you have to resolve an issue that cuts across three areas? You may remember that happened with the Dunn memorandum.

Secondly, if you really have it compartmentalized that way, who in the entire system is worrying about what people call the systemic problems; that is, who looks at the picture overall? Where each piece of machinery works perfectly, they are just put together wrong.

QUESTION: Going back to your analogy with the Dunn memorandum, you can understand in the case of the Dunn memorandum the interest of the Babcock & Wilcox corporate structure to keep this out of sight. But where is the interest on the part of the Nuclear Regulatory Commission to keep these things out of sight?

CHAIRMAN KEMENY: Actually -- may I go back to the Dunn memorandum in answering you? If you really analyze Babcock & Wilcox's financial interest, they had no interest in keeping that particular memorandum out of sight. That particular memorandum did not raise any question about the quality of Babcock & Wilcox equipment. It was specifically aimed at do the operators really understand how to use this equipment.

Therefore, it seems to me that there was every conceivable interest for Babcock & Wilcox to get that memorandum

out, to make sure that their equipment was not misused. In a way, I find that more troublesome, because if I could identify a selfish motive on the part of Babcock & Wilcox for suppressing it, we might be able to think of cures. But they had every interest to get it out and they still didn't get it out. Now --

QUESTION: Well, then, to follow up --

CHAIRMAN KEMENY: I haven't answered your question on NRC. On NRC, at least, Mr. Creswell testified that there may indeed have been financial considerations of worrying about the welfare of utilities that may have significantly slowed down the process, and he claimed in his testimony that there had been a number of other incidents where that kind of consideration discouraged individuals from systematically raising safety issues.

QUESTION: What would be your prognosis of Mr. Creswell's career future in the NRC after his testimony today?

CHAIRMAN KEMENY: You may remember, I specifically asked him a question on that, and as I recall his answer is that he has had no difficulty since Three Mile Island -- I believe I heard him correctly -- which, hopefully, means that there may have been a change in attitude since Three Mile Island.

QUESTION: Could you paint for us a portrait or the portrait of the NRC that has emerged in your mind to date?

CHAIRMAN KEMENY: I would prefer to wait, if you

be willing to ask me the same question tomorrow after we have heard several other witnesses on the NRC. I would prefer answering that. Of course, we heard several important pieces today, but in a way we are going to be talking to really senior officials of NRC this afternoon and tomorrow morning, and I would really like to get their views and knowing how they answer certain key questions before I want to characterize that. Yes, sir?

QUESTION: On August 10, President Carter told downtown newspaper editors that he would implement only those recommendations that you come forward with that are -- I believe the quote was are at all practical. In light of that statement, do you still feel that there is as much of a full commitment as you at first had from him in terms of the implementation of your recommendations?

CHAIRMAN KEMENY: I cannot answer that without talking to President Carter, and I have not talked to President Carter since our original -- no, sorry, we had two meetings at the beginning -- since he originally appointed me, and afterwards, when he met with the full Commission at our first meeting. I have not met with him since then, so I cannot answer that.

What I can answer is that that statement, which we are aware of, has had absolutely no impact on the workings of the Presidential Commission.

QUESTION: Getting back to the problem of some form of protectionism on the part of NRC toward the utilities they regulate, a number of people have suggested before this Commission that one of the possible approaches to be taken would be to make sure that there are full time resident inspectors at all nuclear facilities. In the light of what we have seen, do you think that there might be a danger there that by putting a full time resident inspector at each facility it is going to create even greater problems with the regulator being a federal regulator?

CHAIRMAN KEMENY: I confess, I can only speak for myself on this one, but I confess that the question you raise is one I have thought about and have worried about. On the one hand, it seems a very sensible suggestion that each branch would have a resident NRC inspector, and the next remark I make is not specific to NRC but to experiences one has in many walks of life, that once that person is assigned full time to one particular plant, he cannot help becoming friends with the people there and starting to feel part of the team of the plant, and that is a very difficult dilemna, and I don't know where even I would come out, let alone the Commission.

QUESTION: Doctor, you are understandably reluctant to characterize NRC at this point. I wonder if you would characterize your feeling about the responses of, say, the state of Pennsylvania to the crisis, the administration?

CHAIRMAN KEMENY: The question was on my characterization of the response of the state of Pennsylvania. I must say that I was enormously impressed by the testimony of Governor Thornburgh, even if he belongs to the wrong party. I thought I mentioned that, that certainly my political prejudices would go the other way. I think he was an immensely individual. I thought he was one of the best witnesses we had, and he answered questions clearly. Whether I agreed with every answer is not relevant.

But I feel that he had an impossible and unprecedented situation to deal with, and everything I heard makes me admire greatly what he did.

Now, clearly, when you get further down the line, there were a number of problems that we brought out at earlier hearings -- lack of communication, disagreements, and the problems we do get into, and probably emergency plans that were not sufficiently worked out. Our evidence for that is the emergency people were spending a major portion of their time during the week of the accident writing emergency plans.

Perhaps it would appropriate to quote Mr. Dynes, who heads up our staff investigation on emergency planning, that he stated perhaps the biggest outcome of Three Mile accident was the development of significantly better emergency plans. Yes, sir?

QUESTION: You indicated that in fact the ACRS is

essentially a part of the NRC structure and that their structure would be of interest to you. On the other hand, part of the problem is that there is very little contact with ACRS except in the case of Jesse Ebersole with this one --

CHAIRMAN KEMENY: You said there is very little contact between ACRS and NRC?

QUESTION: As far as I know. Are you doing much there? Will you be asking them how they are set up?

CHAIRMAN KEMENY: Well, we were trying to find out through Mr. Ebersole and through some other conversations just exactly what is the relation between ACRS and NRC. Let me say, what troubled me about Mr. Ebersole's testimony -- I don't mean that I was unhappy with what he said, but I am unhappy as a result of what he said, that I think he is right, that this as the one sort of independent group that is there as a watchdog to help out NRC, and he seemed to have enormous difficulty identifying as to how NRC really follows up on what ACRS recommends to them or on the questions that ACRS raises. And that troubles me greatly.

Yes, sir?

QUESTION: But going back to Mr. Creswell, he made a statement that there was a comment on his performance evaluation sheet about some complaints the Davis-Besse people had made about his interpersonal relations with their organization. Of course, Davis-Besse, I guess, has a right to say whatever it

wants to, but what do you think about the propriety of the personnel people at NRC taking any account at all of what some outside organization with a vested interested has to say about this inspector?

CHAIRMAN KEMENY: I guess that would depend on what kind of complaints they were and whether NRC had an independent evaluation as to whether Mr. Creswell had performed something improper. Unless NRC independently reached that conclusion, I would certainly hope that NRC would totally ignore such a --

QUESTION: Well, he said in connection with this, as I understood it, he would not characterize -- I would not characterize my last evaluation as being positive, and my supervisor was quite negative. And then he said, waded right into this statement about the comment on his evaluation sheet about some complaints the Davis-Besse people had made, and I got the feeling in listening to that that there was some connection between the two, that Davis-Besse had badmouthed him and that his supervisor got negative. Did you get that impression?

CHAIRMAN KEMENY: Yes, I did get that impression.

QUESTION: Well, then, that goes right to my question of what do you think about the propriety of having the person that he is supervising criticize him and then have that taken into consideration by the Commission?

CHAIRMAN KEMENY: What I am saying, I agree with you

that certainly Mr. Creswell gave that impression. I would want to examine whether that was the basis on which NRC really -- Mr. Creswell feels that was the basis for it, and he may very well be right, but I would like some independent evidence that NRC really gave him a bad performance review because he was very tough on one of the customers, if that is --

QUESTION: Are your people going to look into that before the report is prepared?

CHAIRMAN KEMENY: It is not entirely clear whether it is possible under -- there are certain confidentiality things that --

MR. GORINSON: Maybe Privacy Act problems.

CHAIRMAN KEMENY: We have run into that before. There are a number of Privacy Act issues that one runs into, some of which you may hear about more during these hearings, where because of the Privacy Act, it is impossible to get information that may be absolutely vital, for example, in hiring a new operator at a nuclear power plant.

QUESTION: Can I just follow that up one second? Do you get the impression, as I have gotten from people in other parts of the government, that in some cases here the Privacy Act is being perverted to protect the agency from doing something that really common sense says it ought to do?

CHAIRMAN KEMENY: Yes, I think there are many weaknesses of the Privacy Act. That is one of them. The other

one, as I said, is that when you are hiring a new employee, there may be something in his previous employment record that -- for example, whether he has a criminal record or had been a complete bust at a certain kind of job, such as operating a nuclear plant -- that you may not be able to pass on because of the Privacy Act to your next employer, who may be employing you, for example, to operate a nuclear plant.

Yes, sir?

QUESTION: I know you don't want to speculate on the final outcome of the NRC, but doesn't it seem at this point, hearing that there are so many people, quote, set in their ways at the NRC, that there has been a way of doing business so many years, and there is a certain mind-set that we have heard; doesn't it seem obvious that some revamping of NRC is going to have to happen, some recommendation about that?

CHAIRMAN KEMENY: Yes, I would think that that is clear. I think that was clear ever since the time, quite some time ago, when we had the five NRC commissioners as a panel here, and they volunteered the information that they had not, since 1975, had a serious discussion on safety issues.

I think some of the questioning you heard clearly went in that direction. I thought Commissioner Lewis' questions were quite the crucial ones here: Can you do that simply by an internal reorganization, or is somehow something more fundamental necessary here?

QUESTION: I was going to follow up on that, whether you personally now think, having listened to Mr. Creswell, that there is a problem not only with the system but with personalities in that. It should not be necessary for a inspector to have to go to a commissioner's office in Washington, a regional inspector, to voice the kinds of safety concerns Mr. Creswell had, surely.

CHAIRMAN KEMENY: No, I agree with you that that should not be necessary. On the other hand, I must say this is one of the favorable things I heard about NRC, that unlike other organizations we have been dealing with, there was an announced policy by which -- but Mr. Creswell is very low down on the totem pole of the NRC. If you look at the organization chart, you have to go through pages and pages and pages until you get to him. That somebody that low on the organization could legally, under NRC's own rules, go right to the very top, I think says something positive about the organization.

Yes, please.

QUESTION: How troublesome do you find it that Creswell's impression, at least, was that NRC short-shrifted the safety measures as weighed against the economic pressure that might put on the industry? Doesn't the industry have people of its own who are concerned enough about cost-cutting that they could present their own case? Do you see any necessity for NRC concerning itself with that side of it at all?

CHAIRMAN KEMENY: You have asked the question in an extreme form. I think to say that NRC should pay no attention whatsoever is a difficult position for me to take in the following sense, that I am sure even when you've got the system 99.999999 percent safe, somebody can always think of another $10 million you could spend to carry out one more decimal place. You have to stop somewhere.

The very fundamental question, to me, is has NRC drawn the line at the right place in the division, and we are going to have the Director of the Safety Branch of NRC as one of our witnesses later today.

Yes, sir?

QUESTION: You pointed at one of the plusses in terms of the fact that Creswell could indeed go to the very top. One of the things that concerns a lot of just ordinary citizens, especially where these plants are located, is the testimony that has come out about apparently just nothing more than paper flow from the NRC as it has to do with the practicality of evacuation procedures.

I wonder how you would characterize that in looking at what the NRC has done, because in many instances it did not seem that those things were at all feasible.

CHAIRMAN KEMENY: Yes, I think in view of the testimony we did hear from the officials, for example, from the state of Pennsylvania and their localities, it is very

questionable whether NRC played any effective role in making sure that there were adequate and workable emergency plans.

Yes, sir?

QUESTION: Doctor, you may or may not know this, but Metropolitan Edison is more or less operating in Three Mile Island now as a tourist attraction, and I wonder -- that is, they are taking tours on the island, and they have engaged in a major public relations effort. I wonder if you would comment on the propriety of that. Do you think it is safe?

CHAIRMAN KEMENY: Well, let's say I happened to notice at the usually exceedingly funny television show the joke cracked, "What would you expect of her? She spends her vacation at Three Mile Island." Perhaps it is just because of my overoccupation with this issue, I did not think it was very funny. In other words, I am saying that I really do not think that it is appropriate to use Three Mile Island as a tourist attraction, and it troubles me a little bit about the mental -- we talked about the mind-set of some of these organizations. I wonder about the mind-set of individuals who love to rush to the site of what may have come close to being a horrendous accident and love to see at first hand that sort of thing.

QUESTION: Dr. Kemeny, yesterday we heard testimony that General Scott told his National Guard troops that not to worry, you would not send them into a radiation area for evacuation. It seemed to take everyone by surprise here in the

Commission.

CHAIRMAN KEMENY: Yes.

QUESTION: And upon checking, it turned out to be true; he did write that. Now, what is your reaction to that?

CHAIRMAN KEMENY: At least we know that. Commissioner Trunk had an actual newspaper clipping from a nearby newspaper that did verify that, and of course all of us, and I think the Governor included, were horrified by that particular statement. I think the only way I can comment is that I wonder if the attitude would be that the National Guard would be used in case of flood as long as their feet didn't get wet.

But a more serious answer to that -- I mean, presumably, the National Guard is a standby organization of great importance, precisely to be available in case of an emergency, and to use a more serious analogy, suppose there was a group of people who go crazy, and we have had a number of these, who are likely to shoot or kill individuals, and the National Guard presumably on standby there to come and, on rare occasions, risk their lives in order to save the lives of the rest of the population.

Now, you wouldn't send them into a total suicide situation, so if radiation were so high that anyone who went in there, even for a few minutes, would be killed, I could understand that kind of statement, but otherwise it is totally ununderstandable.

QUESTION: But there is a follow-up. In a situation of crisis where the people, at least in Middletown, are looking for guidance and leadership here, to hear the General of the National Guard come out with a statement like that, it doesn't do very much for morale around Middletown at the time when they need it most.

CHAIRMAN KEMENY: Yes, I had the impression -- and I shouldn't attribute it -- that it did not do very much for the morale of Governor Thornburgh.

(Laughter.)

And remember, I have already said that I admire Governor Thornburgh. Please take it in that context. Yes?

QUESTION: Commissioner Kemeny, I think it was Commissioner Pigford who raised the issue with Mr. Creswell that he might not have exhausted all the avenues by which to make his concerns known. Do you think one of the problems here is that there are so many avenues that if one doesn't work, one is terribly discouraged by seeking out others?

CHAIRMAN KEMENY: As I understand the things Mr. Creswell said before that questioning, he specifically made a decision to bypass some of those channels, that he was personally aware of other individuals who had followed such channels and got nowhere with them.

QUESTION: Doctor, are you planning to have your staff interview anyone at Westinghouse Electric about the

reasons why they did not disseminate information about the Besnow incident of 1974?

CHAIRMAN KEMENY: Yes. May I turn to Chief Counsel on that? Can you help me out on that, Stan?

MR. GORINSON: We have done some depositions at Westinghouse. The answer so far is not clear.

CHAIRMAN KEMENY: But remember also, if it goes into our depositions, it will become part of the public record.

QUESTION: Dr. Kemeny, for your information, I have talked with them, and they are very unhappy that their name was brought up here without their being called as a witness.

CHAIRMAN KEMENY: Excuse me?

QUESTION: The Westinghouse people are unhappy that the incident was introduced in testimony without their being subpoenaed or invited to testify on it publicly.

CHAIRMAN KEMENY: I see. Thank you.

QUESTION: Dr. Kemeny?

CHAIRMAN KEMENY: Yes, sir?

QUESTION: When these hearings began several months ago, a lot of the talk was that Three Mile Island was unique and that one of the reasons it became so serious is because nobody had ever seen it before. Now we have seen that there was the Swiss incident, the Davis-Besse incident, the Michelson report. How unique was it? I mean, can you give some characterization of --

CHAIRMAN KEMENY: It is still unique in the seriousness of the accident. Although we have not completed our investigation of how close we came to a really horrendous accident, it may be unique in that way, also.

The way in which it is not unique is that -- and you may have heard me say this at least twice before -- that people said, If only X didn't happen, there wouldn't have been a Three Mile Island, and I predicted to you that we will find at least ten or twenty different things about which we will be able to say at the end, If only that hadn't happened, there wouldn't have been a Three Mile Island.

There are many precursors of Three Mile Island that we keep finding. The signals were there that, if they had been correctly read or, when correctly read, had been passed on, would have prevented this particular accident. Therefore, this kind of incident had happened, even some of the confusion -- I mean, previously, we were only aware of Davis-Besse I, the September of 1977 accident. Now we are aware of the Besnow accident. That gives clear-cut signals that there is confusion about what operators or, in the other case, the equipment read on the pressurizer -- and therefore, things have to be changed, and none of these seemed to be changed until after Three Mile Island.

QUESTION: In light of what you just said, Dr. Kemeny, do you agree or how do you feel about the exchanges

that were made earlier about the confidentiality of information from other nations possessing nuclear reactors, particularly those manufactured in this country?

CHAIRMAN KEMENY: I would have no difficulty with the confidentiality agreement myself if two things happened; first of all, if you are assured that the Nuclear Regulatory Commission does hear of them and if the -- I mean, clearly, we have no business in there if it is not an American supplier. I don't know how we would ever be able to insist on something. But if the American suppliers were under the same requirements to report something they may have learned from a foreign incident as they are required to report on an American incident--

QUESTION: But is the supplier or the operator required to report in the case of an incident in the United States?

CHAIRMAN KEMENY: Yes, I think that is a very good correction on what I have just said. You are quite right on that. I misspoke there, because in an American incident, of course, it is the utility that is required to report and not the supplier. So you are pointing out the dilemna that clearly it is hard to put the same requirements when the utility is a foreign utility.

QUESTION: But could I just follow up on that? In connection with the Besnow and the Davis-Besse, I am wondering if perhaps you don't think that the supplier would have some

sort of a moral obligation to point out a potential trouble area.

CHAIRMAN KEMENY: That is a very difficult question to answer. Incidentally, since you made that remark about Westinghouse, I should tell you, when you look it, the Westinghouse analysis seems to us excellent, so it is a very high quality document. That is a very, very difficult question to answer.

The reason it is hard to answer, it is easy to say that yes, obviously, there should always be a moral commitment, but you are dealing in a situation where there are infinitely many regulations around, and we were -- I mean, the question I am raising is, if you have enough regulations around, isn't the likely outcome of that that everybody will say morality means meeting the regulations?

QUESTION: All right. Well, let me rephrase the question, then, and forget about morality. Should there be a legal obligation on the supplier to report, just as there is a legal obligation on the operator to report?

CHAIRMAN KEMENY: As I heard Mr. LaFleur testify, I believe he said that there is such a thing if, in the opinion of the supplier, this constitutes a serious safety issue. Now, that is similar to an answer we have gotten over and over again that, yes--we have got it with some utility questions and with some other questions -- that the regulations are such

that yes, if, in the judgment of the utility or X or whoever the party may be, this constitutes a serious safety issue, they must report it.

The difficulty I have with it is who judges the safety issue.

QUESTION: Retroactively, you come back and say, Well, I didn't think it was a serious safety issue; therefore --

CHAIRMAN KEMENY: Yes, and again, look, I don't want to be unfair to Westinghouse on this one. They may have made the judgment it was not a serious safety issue, and we all know after Three Mile Island, with 20-20 hindsight, that this should have been recognized as one, but nobody else recognized it prior to Three Mile Island as a serious safety issue.

QUESTION: Dr. Kemeny, do you expect the Commission to address the clean-up problem in its final report, and if so, what recommendations might you be making along those lines?

CHAIRMAN KEMENY: I know we are attempting at least to find out what is being planned as far as clean-up goes, but since that will go on very, very significantly beyond the time of the Commission, there is no way we could monitor that, for example, until the end of the clean-up process.

QUESTION: Might you include some recommendations, however, as to how to handle the decontaminated water that is stored there?

CHAIRMAN KEMENY: That is possible in the sense that

the Commission can make any recommendation that the Commission decides to vote on. I would be surprised myself if the formal recommendations we come out are inserting the Commission as the technical experts on the solution of a particular problem. I don't think that is what the composition of this Commission is. I think we are likely to be more effective by coming in with generic recommendations, to use that phrase.

I have used the example before, suppose we determine that there is something seriously wrong with the control room of a nuclear power plant. Presumably, we would have some recommendations on re-studies and perhaps analyzing what is wrong with them. I am not speaking as the member of the Commission who might possibly be one of the experts on this subject. I certainly don't think that I should be the computer expert, say, to determine, and therefore the Commission should not be the agency to determine what is appropriate use of computers in the control room.

QUESTION: Might you designate what agency would best handle the clean-up operation, in your opinion, in the Commission's opinion?

CHAIRMAN KEMENY: If the Commission has enough expertise to make that determination, yes, but I don't know whether we have that.

Last question, please.

CHAIRMAN KEMENY: Again today, there is a word that

has been used often since March 28. The reason his suggestions were not picked up on immediately was the mind-set, the belief that such incidents as TMI couldn't happen. We can already hear people at NRC saying, Yes, it was terrifically bad, but nobody was killed. Is that mind-set, you think, going to be substantially changed in the long run by Three Mile Island?

CHAIRMAN KEMENY: I think there is enough evidence to indicate that Three Mile Island has had an impact on the mind-set of individuals in many different organizations, including NRC. You have asked a much more difficult question, whether this is sufficient change in the mind-set, and I would couple that also with how long-lasting a change of mind-set it is, and I suspect that is one of the most difficult issues this Commission must wrestle with and, in my opinion, must try to make recommendations on.

Thank you very much.

(Whereupon, at 2:05 p. m., the press conference was concluded.)