
*
PRESIDENT'S COMMISSION ON THE *
*
ACCIDENT AT THREE MILE ISLAND *
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DEPOSITION of SAUL LEVINE, taken before
Judith McGovern Williams, a Registered Professional
Reporter and Notary Public in and for the Commonwealth
of Massachusetts, at Massachusetts Institute of Technology,
Room 24-102, Cambridge, Massachusetts, on Saturday,
September 15, 1979, commencing at 10:30 a.m.

PRESENT:

Samuel Jensch, Esq., and Robert Burns on behalf of
the President's Commission on the
Accident at Three Mile Island.

ALSO PRESENT:

Norman C. Rasmussen



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POOR ORIGINAL

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I N D E X

Witness:	<u>Direct</u>
Saul Levine	3

(No exhibits marked.)

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SAUL LEVINE, having been duly sworn,
testified in answer to direct interrogatories by
MR. JENSCH:

- - -

Q Dr. Levine, you have previously been deposed, and I
have read your deposition. I also read the
deposition of your associate, Mr. Budnitz. I think
I have in mind some of the considerations of your
division, which is entitled Regulatory Research, is
that correct?

A The Office of Nuclear Regulatory Research.

Q You are the director of that office?

A Yes, I am.

Q You have previously in your other depositions set
forth your biographical sketch of your academic and
experience background, have you not?

A Yes, I have.

Q Have you been in this business a long time with the
Atomic Energy Commission and the Nuclear Regulatory
Commission?

A Yes, I recall some of our previous meetings,
Mr. Jensch.

Q You also appear as witnesses in some of the cases?

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A Yes, I have.

Q I don't know whether you have had an opportunity in the last say ten years to follow some of the procedures that we have had, but let me ask you this. Have you ever heard of subjects being examined in the course of a hearing and the suggestion was made, well, that's a generic issue, whereupon silence prevailed in the hearings, as if the subject became sacrosanct, and shouldn't be covered further at the hearing, have you heard about that?

A Yes, I have heard about that.

Q Does your department develop or research generic issues?

A Yes and no. The generic ---

Q That sounds like the general approach we've had in the hearings about generic hearings. Will you proceed, please?

A Yes. The generic issues arise out of a process, the licensing process. Now the history of where they came from is very simple. There were starting ^{to summarize} 15 years ago; there were reactors being licensed, given construction permits or operating licenses, with some issues not being fully resolved, and these began to collect. The basis for letting

particular issues slide on a particular case was
 that it ~~will~~^{is} be caught ~~enough~~^{up} and taken
 care of in a succeeding reactor; ^{Case} and that really
 never happened very effectively, so there was this
 collection which came to be called unresolved safety
 issues, and then I think something else, and finally
 generic issues.

Q Other descriptions that we won't mention here, but
 go ahead.

A There may be others.

I know that they are not generated ~~per se~~,
~~but~~ some definition; if there is some definition, I
 haven't heard one. I think I have given my
 intellectual ^{description which} definition is the best definition I know.

Now there was at one time a list published
 by the A. C. R. S. of several hundred, 350 or maybe
 400, and in those days there was a strong effort
 going on to try to catch up with these, and finally
 after some years they were reduced to 133.

Q By what process, if you know?

A Yes. There were in fact letters written, reports
 issued by the Regulatory staff of the A. C. R. S.,
 which said here is what we have ^d gone ^{to} through, Take
 care of this ^{or that} issue.

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1 Now I reviewed at one point briefly each
2 of a long list of several hundred items. It was
3 shortly after I became the director of research; and
4 I wanted to see if there were issues there that
5 required research, so that I could start programs
6 to help resolve ^{those} issues; and what became apparent to
7 me, almost immediately, was that those issues were
8 not real issues in terms of being important to
9 safety, that having worked with Norman, done
10 WASH-1400, I had a perception already of their
11 relative importance to risk, just by reading a brief
12 description of them, and that I felt that we could,
13 by the use of WASH-1400 techniques, demonstrate that
14 about half of those issues were not significant
15 contributors to reactor accident risk.

16 I approached some people in N. R. R.

17 Q Which is what?

18 A Office of Nuclear Regulatory Research. With a
19 proposition I would put up two of my best people,
20 if they would put up two people, which we would put
21 together, getting information, and getting our ^{WASH} WASH 1400
22 techniques to handle these issues. That proposal
23 was never accepted.

24 In the meantime, by work of others, this

list got reduced to 133.

Then about, well, sometime last year, the
 -- chairman, ~~Harold Denton~~ asked the ~~chairman~~ of the
 N. R. C. and Harold Denton asked me to work on
 -- generic issues; could I take the complete list of
 133 issues, and could I, not me personally, but could
 my office, by the use of WASH-1400 techniques
 characterize them as to relative importance ~~as to~~
 - safety, ~~or to risk~~, and ^{we} did that work in about
 - two months, and we found out of 133 items, there
 - were many ~~of them~~ that had nothing to do with safety.
 They had to do with environmental matters, and that
 - is fine, but they didn't belong on a safety list, and
 - there were procedural matters on this list also.
 There were items like update chapter so and so of the
~~state of~~ ^{standards} review plan. That didn't have any safety
 significance especially; it was not an issue. Maybe
 it needed an update, but it was not an issue. It
 was a procedure.

In any event, we went through the whole
 list, and we found about either, I can't remember
 the exact number, either 17 or 19, stood out as
 issues that could contribute significantly to
 reactor accident risk, and we found there was a

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1 sharp cleavage at that point, the rest were rather
 2 ~~small~~ ^{categories} would not affect reactor safety significantly,
 3 ~~and now we have~~ N. R. R. accepted that work after
 4 some review and minor modifications, and there is
 5 now a program in place to work on those issues.
 6 - They are called task action plan items, and we are
 7 ~~in fact~~ in the Office of Research have assumed
 8 responsibility for several of those because of the
 9 shortage of resources in N. R. R., so we are
 10 assisting them in working out these.

11 They also have a temporary organization
 12 that Harold Denton established after Three Mile
 13 Island. There is one special task force, called the
 14 Generic Issues Task Force, which Dr. Hanauer is the
 15 head of, so there is a unified effort to get this
 16 going.

17 Q Let me just go back if I may. You said some of the
 18 generic issues developed out of proceedings and I
 19 suppose experience at various plants, even I
 20 suppose throughout the world. It is in that matter
 21 that generally the generic issues are identified,
 22 is that correct?

23 A Yes, yes.

24 Q And the extent to which you participated in resolving

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1 those may vary from case to case, for instance, is
2 that correct?

3 A Generally we have not participated at all in the
4 resolution of these issues. Now occasionally my
5 people get consulted on, without my even being aware,
6 on many technical matters, and we may have given
7 advice here and there, but the basic issues are
8 settled in N. R. R. with the A. C. R. S.

9 Q Are you a statutory officer under this energy
10 reorganization plan?

11 A Yes, I am.

12 Q That led to the creation of the Nuclear Regulatory
13 Commission January of 1975?

14 A '75.

15 Q Is the N. R. R. a statutory organization?

16 A Yes, it is.

17 Q And the statute would define the function of each
18 of the two offices?

19 A Yes, it does.

20 Q Perhaps you could tell us in a practical way why
21 there isn't a closer interrelationship between the
22 two offices as the status has developed, for
23 instance.

24 A Well, it is hard to be precise about it. I can

1 give you some speculation and feelings on my part,
2 and there are a number of factors that are different,
3 but let me go through the factors. There is not a
4 coherent picture.

5 — — One factor is ^{that} before the N. R. C. was
6 establishe^d, what was the basic core organization in
7 the A. E. C. was on the general manager's side of the
8 house, not on the regulatory side of the house, the
9 division of reactor safety ~~and~~ research, which is
10 now part of my office.

11 When the N. R. C. was created, we were the
12 only portion of the general manager side of the house
13 that was transferred to the regulatory program, to
14 the N. R. C. There are many people in the N. R. C.
15 — who ^{do} not want us to come. Now I know that
16 — Manning Muntzing, who ^{was} is the director of regulations
17 under the A. E. C., had talked to Herb Kouts, who was
18 my predecessor, and asked him explicitly to come with
19 this resource to the N. R. C. as opposed to staying
20 on the general manager's side of the house with
21 Erda, and I thought that was very wise. Kouts and
22 I had long discussions about this, and while it
23 wasn't completely clear where we should go, we ended
24 up in balance the best place to go was in the

1 N. R. C. However, in spite of our views, and in
2 spite of Manning's view, there were many people on
3 the staff who did not want us to come. They wanted
4 research responsibility, all right, but they didn't
5 want an organization to come in to perform that
6 function. They wanted to perform it themselves, and
7 so there was a source of difficulty.

8 There is another source of difficulty,
9 which pertains to the general attitude in N. R. R.;
10 ~~and I'm fairly~~ -- it's wrong, but I am fairly
11 sympathetic to it, because I understand it. In all
12 the years in which the people in N. R. R. have been
13 licensing reactors, even when they were in the
14 A. E. C., they were given very little help from
15 anyone. In general, until Kouts's division was
16 established in the A. E. C., the A. E. C.'s research
17 organization was not responsive to the needs of the
18 licensing people, and so they had nowhere to turn
19 for technical input. They had no resources, they
20 had no money from Congress to spend on hiring people,
21 consultants or laboratories to do work for them,
22 and they had to do the best they could.

23 So they became clannish. They became

24 ~~interlocking, interlocking~~ inward looking and

1 not outward looking, and they treated everyone who
 2 was outside their organization with equal contempt,
 3 — although contempt is the wrong word; ^{that} is used
 4 — facetiously, ~~and~~ Some of this attitude persists.
 5 — They have a ^{not invented - new} ~~noninventive~~ attitude. ^{The kids} ~~We have an~~
 6 — ~~attitude~~, we can do ^{business} ~~this~~ better than anyone; you ^{others}
 7 never helped us before and probably aren't going to
 8 help us now. No matter how good your intentions are
 9 to help them, they're probably not going to accept
 10 it. That is a big part of it. I guess another
 11 part of it I have to say is partly our fault. We
 12 were created, at least the reactor safety portion
 13 of our work, was created with the idea that you
 14 know Appendix K of Part 50, the emergency core
 15 cooling criteria, was conservative, and we're going
 16 — to ^{to} research to prove where reality ^{is} ~~was~~, which ^{is} ~~was~~ a
 17 — noble objective. We're going to study reality, and
 18 show that Appendix K model was overly conservative.
 19 So this creates a natural tension between the two
 20 groups, and we have done that by the way, a lot of
 21 our research is showing just that, and this may be
 22 resented by some people. I don't know, but there is
 23 some of that.

24 Well, the reason ---

1 A Now I should add one other thing. Since Harold
2 Denton has become the director of that office,
3 things have become very much better. They're still
4 a long way from where they ought to be, but Harold
5 Denton has come in with a different attitude. His
6 attitude is, gee, let's get together and let's
7 solve the problems, I need all the help I can get,
8 and certainly research is a great thing and I am
9 going to use it, so certainly things are starting to
10 change in a better direction.

11 Q The reason for my asking all this -- it doesn't have
12 any relevancy to the Three Mile Island -- and let me
13 start with a specific incident of Davis-Besse.
14 Would that have come, the incident at Davis-Besse,
15 come to you for your review by your office or by
16 what is now Denton's office?

17 A It would go to two places principally. To
18 Denton's office and to I & E, Inspection and
19 Enforcement. It would come to us through the
20 licensee event reports and our probabilistic staff,
21 where we would ~~not~~ not look at safety significance;
22 ~~but~~ we are trying to collect data on plant failures
23 and system failures so that we can do better risk
24 assessments in the future.

1 Now I proposed three years ago that we set
2 up a better system. I proposed this to N. R. R.,
3 and it was rejected. I then was talking to McDonald,
4 who ^{was} head of our management and program analysis
5 office, which collects data. It does the L. E. R.
6 collection, and I said L. E. R. collection is fine,
7 but someone has to analyze it to see what it means,
8 and I have people in my probabilistic group who have
9 the capability to write computer models that will
10 take the L. E. R. data, and give you analyzed data,
11 digested data, which can then be used.

12 Q You're talking about some newer developments, are
13 you now?

14 A I am talking about three years ago, something I
15 wanted to do, and I'll update that as I go along,
16 and I suggested that we talk to all the people in the
17 N. R. R. and I and he and all the other offices, and
18 find out what their needs were, and then we could
19 write the programs to get the information and so
20 forth. This was rejected, and so nothing came of it.

21 More recently since T. M. I. I recommended
22 to the Commission we establish an operation
23 evaluation function.

24 Q In your office?

1 A I didn't say where it should be established. I just
2 said the agency needs it desperately, and almost
3 immediately a task force was ^{formed} reported, and a task
4 ~~force~~ report was written, that recommended it be
5 established, and it has now been approved by the
6 Commission, and they are now seeking a director for
7 that office.

8 The way it's going to be set up is that
9 there will be a central office of about 15 people
10 that will report to the executive director for
11 operations, which I think is a mistake, and there
12 would then be satellite offices in all the major
13 offices of a few people, and they would work together.

14 I think it's wonderful that this function
15 is finally being established. It's charter will be
16 to do all kinds of data analysis, including studies
17 of the safety significance of failures, which must
18 be done.

19 Q Well, as I understand, there has been some suggestion
20 we only need one person to make an evaluation of
21 failures. It has been charged that if you had a
22 man in each utility operating a plant, that he would
23 be able to assess, for instance, the significance of
24 the Davis-Besse situation as applicable or pertinent

1 to Three Mile Island, and so the thought that you're
2 going to, something is going to be set up in the
3 Nuclear Regulatory Commission might be somewhat
4 duplicative, if I understand the suggestion about
5 having a well qualified nuclear engineer at each
6 operating plant, but I think one of the problems
7 that many people have about Three Mile Island is you
8 had the Michaelson report, and the Davis-Besse
9 incident, and something at Ocone, and it might have
10 been put in the round file as far as any reaction
11 that we have been able or I have been able to
12 discover from the N. R. C. about those three things,
13 so that either these, whatever they call these,
14 licensee ---

15 A Licensee event reports.

16 Q --- got distributed around in the industry enough
17 to be of help ---

18 A They are distributed widely.

19 Q When was this started?

20 A Quite a few years ago.

21 Q Can you put a date on it?

22 A Three years ago, maybe more.

23 Q Was it enough to include the Michaelson report,
24 Davis-Besse and Ocone in the L. E. R.?

1 A I read the L. E. R. on Davis-Besse, and you could
2 not tell from that L. E. R. that it was a matter of
3 great significance. Just a minute.

4 Q That may be the real core of the problem.

5 A Just a minute. The way it was written, you couldn't
6 tell, but the Davis-Besse people made an analysis of
7 that in great depth with their vendor and so forth,
8 and issued a report about a half inch thick, which
9 spelled the whole thing out, the whole sequence, and
10 from that you could see the safety significance,
11 and that was submitted to the N. R. C.

12 Q Where did that go? Was that filed with the
13 Michaelson report?

14 A There was some 40 copies filed with the Office of
15 Inspection and Enforcement I know. I don't know
16 where they all went. I never heard of it until
17 after Three Mile Island.

18 Q Well ---

19 A So the industry, at least the utility and its
20 contractors in my view did an excellent job of
21 analyzing that. Now where that information was
22 propagated, how far, apparently no one tried to
23 determine very well the safety significance.

24 Q Well, I think the Ocone situation may be in that

1 same category. As I understand it, the utility
2 there, and its designer, got together and worked
3 that problem out, and they made a report to the
4 N. R. C. I guess that, either the A. E. C. or
5 N. R. C. But what happened to those data I guess
6 they're still searching?

7 A I would like to comment on that, if I may.

8 Q Please proceed.

9 A One, I am not familiar with the Ocone situation that
10 you're talking about, but that's not the point.
11 The point I would like to make is that we had a
12 situation in the N. R. R. where there was no one
13 group directly responsible for reviewing L. E. R.'s
14 for their safety significance.

15 Q Why shouldn't your department do that?

16 A I'll answer that in a moment, if I may. It was
17 scattered diversely through N. R. R. and I & E.
18 It was just a scattered thing where individual
19 viewers did whatever they wanted about it, and this
20 matter has been shown in many places, many different
21 kinds of technology, is the kind of thing, an
22 operations evaluation function is a kind of thing
23 that has to be separated from and apart from the
24 licensing offices, the line offices. Now when I.

1 recommended the evaluations function, and the
2 discussions with E. D. O. and so forth, I recommended
3 it to be located in one of two places, the Office of
4 Standards or the Office of Research. I felt it
5 could not be in an office that was either licensing
6 or inspecting reactors, whereas they have a vested
7 interest, whereas the other two do not. I felt
8 especially strongly it should not be under the
9 E. D. O., because the E. D. O. has so many other
10 things to do it could not give ---

11 Q E. D. O. is?

12 A Executive Director of Operations, for Operations,
13 could not give appropriate technical guidance to
14 whoever is the director of that office, and I don't
15 care what office you are in, you always need someone
16 above you, to talk about your technical difficulties,
17 and to exchange ideas, and set directions, so I
18 think the E. D. O. is the wrong place for this
19 office to report.

20 Q Have you observed, or can you tell us the extent to
21 which the divisions in N. R. C. have utilized the
22 analytical process reflected by WASH-1400?

23 A They produced for the Commission, after the Lewis
24 report came out, and at the request of the

1 Commission, a list of all the examples of where they
2 had used the technique, and it's a long list, and
3 it's -- they made the point clearly every time they
4 said they used it, but they really didn't rely on it.
5 They just looked at it to see what it would do.
6 That's beside the point.

7 Q It's a fun activity.

8 A The point is most people didn't know how to use it.
9 It appears simple on the surface.

10 Q Your office did not appear or participate ---

11 A They didn't ask us what we did.

12 Q Well, you or your office ---

13 A They wanted to know how it was used in the licensing
14 process.

15 Q They didn't ask you to review to see the extent to
16 which the licensing groups used the WASH-1400
17 analysis?

18 A No. No, they did not.

19 Q Did any of the people say in N. R. R. participate
20 in the development of WASH-1400?

21 A Yes, some of them did.

22 Q Were those persons involved in the utilization of
23 the WASH-1400 process in N. R. R., do you know?

24 A I don't know.

1 Q Well, continue. You were saying it's a subtle and
2 complex analytical process.

3 A Yes, and you have to know a lot of different
4 disciplines to do it well. You have to be a very
5 good reactor engineer, who understands system
6 — reliability well; ~~but he also has to~~, you also have
7 to understand the relationship that occurs between
8 physical processes and system failures. When a
9 system fails, what physical process occurs, and how
10 does that physical process affect the operability of
11 other systems, and that's a very sophisticated kind
12 of mind already. You have to understand statistics
13 pretty well to be sure you don't go astray on
14 simple assumptions that turn out wrong answers, and
15 we have seen lots of examples of people using these
16 techniques incorrectly.

17 I have maintained, for several years now
18 at least, that we should have a strong training
19 program, courses followed by on-the-job training,
20 and develop an even enlarged group of people
21 that can do this work, and it has been so far
22 opposed in N. R. R., even though the Commission
23 supported it.

24 Q It must be an interesting situation. For whom is

1 the N. R. R. working, the Commission or some other
2 organization?

3 A They're working for the Commission, obviously.

4 Q Obviously. And the Commission can't get the N. R. R.
5 to do their requests, is that ---

6 A That is essentially what happened, in my view. Now
7 I must say I have just raised this issue again with
8 Harold Denton, and I am sure he will consider it
9 carefully and with an open mind.

10 Q Well, I have heard that in many of these cases, too.
11 You also look to see what they're going to accomplish,
12 what they -- how long has Harold Denton been at that
13 job?

14 A Somewhat less than a year, I believe. Maybe a year.

15 Q Well, from all I have reviewed and read, the
16 WASH-1400 analysis is, I don't know if this is a
17 correct term, been sorely neglected in the N. R. C.,
18 and to hear a report that they have analyzed, but
19 paid no attention to it, and didn't rely on it or
20 some such, would indicate it wasn't really analyzed
21 as carefully as 1400 demands.

22 A I would like to comment on that.

23 Q Proceed.

24 A But I would also like to go back. I think you made

1 a rather disparaging comment about Harold Denton,
2 and I would like to at least present my view.

3 Q What respect?

4 A You said how long has he been on the job, implying
5 maybe he was just a part of the old gang.

6 Q What I mean, he hasn't had an opportunity to do ---

7 A He hasn't had an opportunity, but I must say even
8 before he got the job he was one of the few people
9 in N. R. R., who exhibited great interest in the
10 application of these techniques, and has consistently
11 supported it.

12 Q I think that is good to get on the record.

13 A I just wanted to ---

14 Q What I meant he hadn't had an opportunity to apply
15 some of these directions to the N. R. R. group, and
16 perhaps as time permits, he will be able to do that.

17 A I think he will.

18 Q Because I think really, if I sense some of the
19 comments about Three Mile Island, the activity
20 before at the N. R. C., things like the Davis-Besse
21 situation and the Michaelson report are appalling
22 situations of neglect, and I think there is also a
23 feeling, from all I have read, that the WASH-1400
24 analysis, as I think Professor Lewis said, is the

1 first rational approach to risk assessment of nuclear
2 power, and so I think people are looking for not only
3 a change that will utilize information from incidents
4 like Davis-Besse and the Michaelson report, but kind
5 of a change in attitude by dealing with innovations
6 that might improve the process, and I wonder how you
7 feel about the trend in that regard.

8 A I feel that's just right. Let me correct one little
9 thing you said. Lewis did not say these techniques
10 were the only rational ---

11 Q Oh, no.

12 A --- or the first rational. He said they could be
13 used to make the study of reactor safety more
14 rational.

15 Q I see.

16 A Which is very important. That is the safety of, the
17 study of reactor safety now is not irrational. It's
18 very rational. It's more qualitative than
19 quantitative, and the use of these quantitative
20 techniques can make it more rational.

21 I met recently with Harold Denton, and
22 assistant directors, heads of his task force and so
23 forth, and I proposed to them a program for the
24 considerably expanded use of these techniques in the

1 licensing process, and it's a fairly long story about
2 how I came to this, but it has come to me since
3 T. M. I. as a result of the accident and as a result
4 of the auxiliary feed water study that we did, which
5 has been discussed earlier here, that there are
6 outliers to the risk perception that we had, that we
7 had a certain perception of reactor accident risks
8 for the engineering studies we did in WASH-1400, and
9 we now found in T. M. I. there is an accident
10 sequence that was much higher in probability than
11 anything we saw in WASH-1400, and we see in the
12 study of auxiliary feed water systems across plants
13 that there is a wide variation in their probability
14 of failure, and that the Surry plant that we happen
15 to have picked and studied in WASH-1400 was among
16 the most reliable auxiliary feed water systems, but
17 there are other systems that are a factor of one
18 hundred more likely to fail than that system, and
19 they have to be fixed.

20 So it occurred to me: now how can we sit
21 here as an agency, knowing that there are outliers
22 from our perception in WASH-1400, and not do anything
23 about it. We have to look for more outliers, and so
24 I have suggested that we start a program which will

1 accomplish a number of things at once. We will draw
2 event trees on all operating reactors, except where
3 they are very similar, and we will draw simplified
4 ~~event~~ ^{event} trees, not the very large ones from WASH-1400,
5 but simpler ones ~~to~~ draw, to identify those systems
6 and failure possibilities that appear obviously not to
7 be in the ensemble of WASH-1400 risks and find out
8 what to do about those. I would also use this
9 program as a way of training people on how to draw
10 event trees, which is the biggest single thing you
11 have to do to understand risk. And I told Harold
12 he would have to put up somewhere between eight and
13 twelve people of his very best people, and have to
14 bleed over it. I told the chairman this, and he is
15 backing it. Harold is backing it. And we are
16 planning now to pick one plant to do it as an
17 exercise, and then get organized to go through the
18 whole rigmarole with plants.

19 Q Let me go back to the generic situation. You said
20 you resolved it down to about 17 or 19 issues. Who
21 is going to resolve all those?

22 A N. R. R. has the primary responsibility, and they
23 have programs organized to work on them, because of
24 their lack of resources at the moment we have taken

1 over some of that work. Some of those task action
2 plans have been assigned to research, and we have
3 people and contractors working on those.

4 Q Can you give us an enumeration, some degree of what
5 those ---

6 A There is one called station blackout, which means
7 what happens if you lose all AC power. There is one
8 on the emergency sump in the containment. When you
9 have to use emergency core cooling system in a
10 recirculation mode. There is questions about the
11 vortexing of water and so forth and so forth. I
12 think we have the one on water hammer, and two or
13 three others. I think we have about five or six.

14 Q That is in your department?

15 A My department.

16 Q What are those over in N. R. R.?

17 A I don't recall, I could make a list available to you.

18 Q Would you do that?

19 A Yes, I would be happy to.

20 Q And I guess send it in to Chairman Kmeny at the
21 President's Commission.

22 A Yes.

23 Q Room 714, 2100 M Street Northwest, 20037, I think.

24 A 714.

1 Q 2100 M Street.

2 A Room 714.

3 Q Right. In your opinion, how serious are these
4 outstanding generic issues?

5 A I think there are one or two that we ought to work
6 right away. That is my recollections.

7 Q Could you tell ---

8 A I don't recall what they are.

9 Q Would you put asterisks on the ones you are going
10 to send in?

11 A Yes, yes.

12 Q As you know, as you have indicated, this question of
13 generic issues has been pending a long, long time.
14 A. C. R. S., the Advisory Committee on Reactor
15 Safeguards, enumerated this long list to which you
16 referred, and then there have been some adjustments,
17 and so forth. Perhaps your analysis of these issues
18 has aided in the reduction of the number, either
19 that they weren't significant safety issues or they
20 were environmental issues or procedural issues or
21 that sort of thing, but outside of that I think
22 people are still looking for a resolution made on
23 these issues.

24 A Yes.

1 Q And it's like the proclamations in favor of
2 brotherhood, everybody is for getting these things
3 solved, but nobody does anything about them, and it
4 doesn't seem to affect the licensing proceeding.
5 Are those issues of such substance that the licensing
6 provision should be altered in some way to get a
7 resolution?

8 A I haven't thought about it, but I don't think so. I
9 haven't thought about it carefully.

10 Q Why not? If they're serious enough to have been
11 pending for something like ten years and nothing
12 done, isn't it about time to get some finality in
13 here someplace?

14 A I'm not sure they have been pending for ten years.
15 Don't forget there was once a list of 350 to 400
16 items. Many of those have been resolved. Some have
17 been added. Some have been eliminated as being not
18 important. So it's not been a standstill situation.

19 Q Oh, no. I appreciate that.

20 A There has been a process working on them.

21 Q They have made adjustments?

22 A They have solved many of them, a large number of them.

23 Q I see.

24 A I think in fact if you take the view that there were

1 400, and there are now 20, that's been a large mark,
2 a mark of large progress over the years.

3 Q The question really is how many were actually
4 resolved or just removed from the list under the
5 analysis you made.

6 A Oh, no, no. Many of them are resolved. I have
7 read reports. There are lists of, there are reports
8 on this issue and that issue, and what was done to
9 resolve it. Yes.

10 Q I think as I say it is interesting to know how many
11 were resolved in the process, the last of which you
12 just ---

A That could be provided.

14 Q --- and how many are really ---

15 A Would you like me to furnish that?

16 Q If you can without a lot of research.

17 A I don't know how much work it is for me.

18 Q Don't belabor the subject.

19 A I can tell you there were a significant number that
20 were solved. They weren't just eliminated.

21 Q Take one you can remember.

22 A I can't remember one. I just remember that I have
23 read reports where they have resolved issues.

24 Q Let me see if I can recall one. Well, I can't

1 offhand, but at the time of its listing, there was
2 enough, as I recall it, to have everybody in the
3 nuclear industry quite exercised about it.

4 A Yes.

5 Q And that characterization is correct, it would seem
6 of such substance to warrant some sort of adjustment
7 in the licensing provision other than saying don't
8 mention the subject again in this proceeding. It's
9 in the hands of the gods, or excuse me, it's in the
10 hands of somebody who is going to be doing something
11 about it. And I think that has led to a great deal
12 of criticism about the proceedings, if I may say a
13 lack of credibility in the results, and I think in
14 aid of trying to assist the, if not the establishment,
15 the enhancement of credibility, that some firmer
16 programming of generic issues might well be in order.
17 Do you not agree?

18 A I agree with you completely.

19 Q Well, let's get over to Three Mile Island a bit.

20 Do you know of any generic issues
21 developing from that incident?

22 A Yes.

23 Q What are they?

24 A Well, one -- there are two major issues that come

1 from T. M. I. that are generic. One is our
2 understanding of accidents. It's clear to me, and
3 one was described, I'll state it in my own words,
4 that there are accidents that can lead to severe
5 core damage but not to fuel melting that have never
6 been looked at with the care that is needed. It's
7 more difficult even to look at those than the
8 accidents we looked at that involved core melting.

9 There are issues that have been raised of
10 locas that happen and don't happen. That is you
11 have an intermittent loca. When the relief and
12 block valves were open, you had loca, and then they
13 closed it, you don't have a loca, and then they opened
14 it, you had loca, you had accidents appearing and
15 disappearing. You had emergency core cooling
16 systems turn on and off, you had reactor coolant
17 pumps on and off, you had the auxiliary feed water
18 system being turned on and off, and this makes a
19 — very complex management of things to examine. We're
20 going to have to do that.

21 Now how are we going to do that? We're
22 going to have to study the machines, the reactor
23 machine in much greater detail than we ever have
24 before. The reactor safety philosophy has been sort

1 of to establish an envelope of design basis
2 accidents, that everything that was within that would
3 be all right, because this envelope protected you,
4 and certainly that has not been violated. The
5 T. M. I. accident in fact, as regrettable as it was,
6 showed the wisdom of that, and that with these
7 enormous amounts of radioactivity released to the
8 containment, very little got outside the containment,
9 so that safety design philosophy is intact, but a
10 little crinkly around the edges. We should certainly
11 not have accidents like happened at T. M. I. happen
12 very frequently, as frequently as this is predicted
13 to happen.

14 We have already issued bulletins and
15 orders which have made the likelihood of such a
16 specific accident much less likely. What are we
17 going to do? We're going to write computer codes.
18 We're going to do experiments, and we're going to
19 study the machine, we have to develop fast running
20 codes that can analyze an accident in ten minutes
21 to an hour.

22 We now have computer codes where the
23 emphasis has been on precision, and they run in very
24 long times, 10 to 20 to 40 hours. We still have to

1 continue developing those codes for the precision
2 that is needed -- by precision I don't mean in the
3 answer, I mean in the handling of the physical
4 processes. We can develop fast running codes that
5 treat the physical processes with less precision,
6 and use these more precision codes as bench marks to
7 make sure that the shortcuts we will take in the
8 fast running codes will be adequate, and then we have
9 to study the machine very carefully and from that
10 will come the greater enhancement of understanding
11 and perhaps more changes in reactors.

12 Q Well, I think one of the questions that people
13 would like to see answered is why should not some of
14 these matters be resolved before they go forward
15 with further operations. Can you help in that?

16 A Yes, I can. I think the most immediate things that
17 have had to be done have been done. One, the
18 accident sequence that we knew was, now know is a
19 bad one, has been fixed. It has been made much
20 lower in probability.

21 Two, the lesson we learned about where
22 the operators were deficient in dealing with that,
23 basically in understanding the steam tables, if you
24 will, the relationship between pressure and

1 temperature, has been fixed because all the operators
2 have been trained now to get a better understanding
3 of that. And what we're talking about from now in
4 is making further improvements to make things even
5 more less likely. We want operators to have better
6 instrumentation, better displays of the
7 instrumentation, better diagnostics, we want better
8 simulators to train them better, and we're going to
9 do all this. It will take time, but what it will do
10 is achieve a better level of safety, or at least in
11 my view. That is our objective.

12 Now the overall risk to the society from
13 reactors changes as the number of reactors are
14 operating, so there is a real reason to say if you
15 are at a particular level of risk with 100 reactors,
16 and you go to 200, you would like a better level of
17 risk. You would like the overall risk to society
18 not to change. We're working on how to improve the
19 safety of reactors, we have a program called
20 Improved Reactor Safety.

21 Q That is a new one.

22 A It was sponsored by Congress in their 1978
23 Authorization Act for our budget.

24 Q Just in time. It hasn't had a chance to get in

1 operation, I take it?

2 A No. We didn't get any money until the very end of
3 '79, fiscal ^{year} end of '79.

4 Q Are you planning, as one of the changes, to limit
5 the number of people in the control room when you
6 have an incident like you had at Three Mile Island?
7 I understand you almost had to have tickets, you
8 couldn't get in it was so crowded.

9 A One of the lessons learned is to establish an
10 emergency center on site but away from the control
11 room, and that's where the people can go to try to
12 help.

13 Q My understanding that industry at the time of Three
14 Mile Island, particularly William Lee of Power, very
15 effective in assistance in the analytical work that
16 was being done on Three Mile Island. Are you
17 planning to have some continued close collaboration
18 with industry committees in case of incidents of
19 this kind?

20 A That is a question that I can't answer. You would
21 have to talk to Denton or someone.

22 Q You recognize the value of industry?

23 A Of course. The industry knows a great deal about
24 their machines, and have very competent designers,

1 and certainly they should be available. In fact one
2 of the things we are thinking about is what I call a
3 data link, where just as the operator needs this
4 better display and better diagnostic equipment to
5 help him, a data link can be established to send
6 that information to the reactor vendor and to the
7 N. R. C.. And we're exploring how to do that now, or
8 we have money in our fiscal '80 supplement budget
9 request to start plans in that regard.

10 Q At the time of Three Mile Island, I understand there
11 was some information or advice even coming from
12 Lynchburg?

13 A Yes, on the telephone, I believe, or something.

14 Q Is there any way of connecting computers of the type
15 to which Dr. Rasmussen referred to some sort of
16 instrumentation now at the manufacturer so that he
17 can have accurate information in case he is going to
18 be contributing advice in time of incidence, he will
19 have some not current information but recorded
20 information about the performance of the plant?
21 Can that be done?

22 A That is just what I spoke about. A data link to
23 transmit all the information the operator has.

24 Q You mentioned transmission. I was wondering if

1 ther. was something that that computer could provide.

2 A Whatever the operator 's, will be transmitted by
3 radio, or a telephone line, immediately, in real
4 time as it is happening.

5 Q You say telephone line, that means ---

6 A By transmit, I do not mean mail. I mean ---

7 Q Or horseback?

8 A Or horseback. I mean in real time.

9 Q Well, some of this I think would have been probably
10 more accurate if it had gone by horseback, as I
11 understand it, but how can you get useful information
12 if they don't have the accurate information, and
13 immediately transmit it -- now you say we're going
14 to work out a data link to transmit information.
15 My question is how can the computer in the control
16 room be somehow connected with some recording
17 device at the manufacturer?

18 A By a data link. It's a routine procedure done all
19 the time.

20 Q I am trying to eliminate telephone wires now.

21 A I am talking about wires, people speaking, that the
22 actual data that goes into the computer and out of
23 the computer could be transmitted by a
24 radiotelemetry data link directly to the manufacturer.

1 Q Well, I wouldn't want to denigrate the effort by
2 Babcock & Wilcox in any respect, because I don't
3 know anything about their capabilities or their
4 programs and so forth, but at the same time I don't
5 want to advertise any other reactor manufacturer,
6 but I have had the impression that let us say two
7 other reactor steam manufacturers have very large
8 staffs and laboratories and the equipment which in
9 totality permit them to not only actually receive
10 information but correctly analyze it, and I didn't
11 know whether Babcock & Wilcox had the capability
12 from such facilities and personnel as that to
13 receive and analyze data as let me say these two
14 other manufacturers. Do you know anything about that?

15 A I'm not able to comment.

16 Q Is this, by the way, just let me ask, is this
17 acceptance of the Class 9 accident for licensing
18 proceeding considerations going to involve multiple
19 failures, do you believe, analyses?

20 A I have to give you a long answer, and it goes like
21 this. We have an establishment ^{ch} design basis,
22 accident safety envelope, which has worked very well
23 to date, and even worked well in Three Mile Island.

24 Q As to which there may be some dispute, but go ahead.

1 A In my judgment.

2 Q Your judgment.

3 — A We now, as I have said, ^{have} had to study accidents that
4 are less severe than design basis accidents and more
5 severe than design basis accidents better than we
6 have so far. With that will come a lot of knowledge.
7 It's not clear that design basis accident envelope
8 has to be changed, although it may be or could be.
9 It's not clear to me that Class 9 accidents have to
10 become a part of the licensing process. The
11 A. C. R. S. in a very recent letter addressed this
12 subject, and they called for accident analyses of
13 the kind I described, and they specifically said it
14 is not necessary that the design basis accident
15 should be changed and probably it would be better
16 that it not be changed, and I have taken the liberty
17 of interpreting that to mean ^{what} what you would change
18 is the ensemble of engineer's ^{safety} safety features, but not
19 necessarily the design basis accidents, or certainly
20 not eliminate ---

21 Q The result would be the same, wouldn't it?

22 A --- or not eliminate the concept of the design basis
23 accident. The result would be the same intellectually,
24 but very different, and very importantly different,

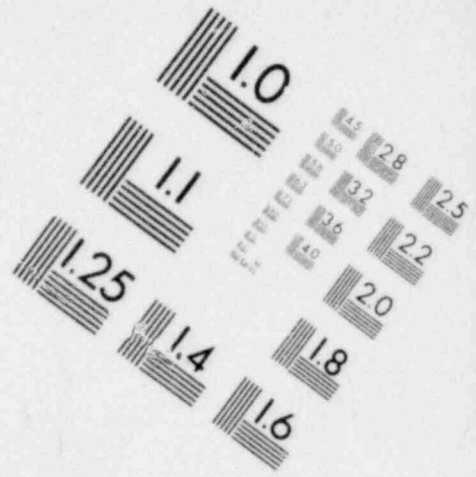
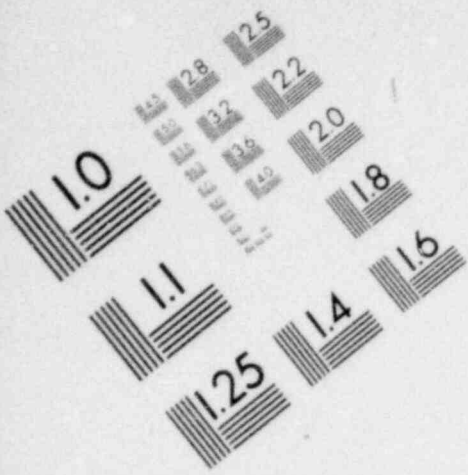
1 in terms of how you run large process involving
2 thousands and thousands of people and communicating
3 to one another. You can't simply say to them I
4 throw out the design basis accident, and review
5 reactors for safety. What do you do? How do people
6 come to work tomorrow and do their jobs? They
7 wouldn't know how to.

8 Q It would take them a day or two perhaps?

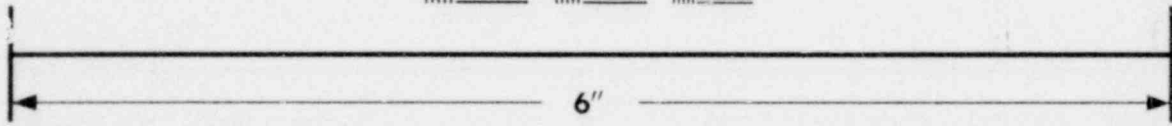
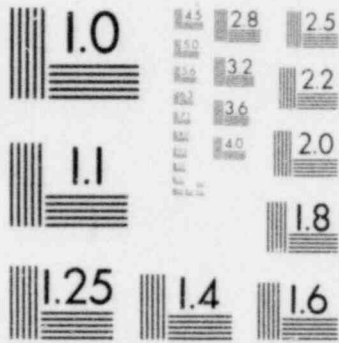
9 A No. It would take them longer than that. You have
10 to have some intellectual basis in which they work.
11 And I am not defending the design basis accident as
12 not changeable, but I am just saying you have to
13 — evolve ^{change} into a process, a requisite analysis and
14 what one has to do about it. First you have to have
15 understanding, and then the process will even
16 accommodate whatever enhancements in safety are
17 needed with this greater understanding. I would be
18 very cautious about saying throw out the design
19 — basis accident, and bring on Class 9; you would have
20 mass confusion. No one would know what to do.

21 Q What do you think about not Three Mile Island but
22 mass confusion?

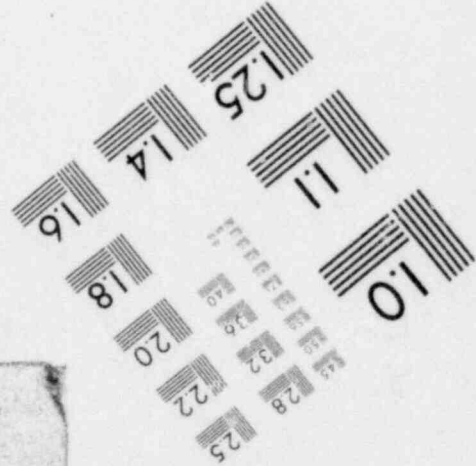
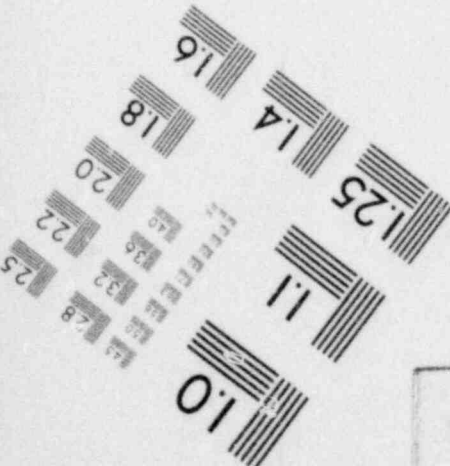
23 A That's a different matter. I have been in
24 submarines that nearly have ^{had} disasters, and some



**IMAGE EVALUATION
TEST TARGET (MT-3)**



MICROCOPY RESOLUTION TEST CHART



1 people get confused, and others don't. And sometimes
2 you save yourself, and other times you don't save
3 yourself.

4 Q This is the human element?

5 A Yes, of course.

6 Q Is it true that really the analysis of safety at the
7 A. E. C. and the N. R. C. has been directed to an
8 analysis of the adequacy and sufficiency of machines,
9 and not sufficiently of the competency of personnel?

10 A That is exactly correct, and in fact that's the
11 second thing we learned from Three Mile Island.

12 Q How do you think you could handle the personnel
13 problem?

14 A The same codes I talked about. We have to develop
15 to better understand the reactor being used to help
16 simulators better handle these accident situations.

17 Q Well how ---

18 A We could quickly for instance today take the accident
19 sequences in WASH-1400, for instance, and put them
20 into a computer and train operators to cope with such
21 accidents; ^{but} that's not realistic, ^{enough for the long term,} When in today's
22 times when a pilot is trained on a simulator, and he
23 moves a control, there are equations in that
24 simulator that make that control and his sensations

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identical to those as if he was sitting on the seat of an airplane, and we can hopefully say get our equations good enough to do just that, but that's a long way off, and we can take interim measures and with that as a goal, work toward them.

Q Why is it a long way off? This stuff has been going on for some time.

A It's a long way off to ---

Q I have learned enough data from these years of operations -- Dr. Rasmussen raised kind of a, if I use the situation, the Russian Pavlov response, that the lights flash, if you get one red light among some green lights, or the button is a red light among some blue lights, you'll get a different reaction than if the buttons were all the same and the lights were all the same, and is that kind of an adjustment so difficult to make in your analysis of personnel competency?

A No. I think you misunderstood me. I understand what you're saying now, and let me address what you just said.

What kind of things you're talking about can be done fairly soon, but not fully completely, we are already ordering equipment for the left

PERCAG CO., BAYONNE, N.J. 07002 - FORM H 248

1 reactor, the kind that I mentioned was being built
2 at ^HHolden, that ---

3 Q Is the Loft thing still going?

4 A Yes.

5 Q It's 20 years or so?

6 A Yes.

7 Q You're still working on it?

8 A We ran two large tests this year, and predicted in
9 advance very well ~~in~~ the way in which the fuel
10 would behave.

11 Q The predictions as the experiment went on, so finally
12 when it was completed it met the predictions?

13 A No, sir.

14 Q I see.

15 A These were pre-predictions, and came out very close.

16 Q Pre-predictions, but lowered at all from the original
17 prediction do you know?

18 A We made the prediction before the ^{test was} ~~test~~ run ---

19 Q Yes.

20 A --- and we ran the test, and compared the prediction
21 and the data.

22 Q How many predictions were before the one that you
23 analyzed with the test?

24 A Well, we did use two codes, the relap code, under

1 development for many years, has had many adjustments.
2 The track code, our newer and best code, has had no
3 adjustments.

4 Q Good. That sounds pretty good.

5 A Let me continue.

6 Q Yes.

7 A This is a fairly complex subject, and I would like
8 to get the record fairly clear on it. You can do a
9 lot of things quickly, but not completely, you could
10 get display hardware quickly, and put it in
11 reactors, to enhance the operator's capability to
12 see more information. You could get a better data
13 logging computer quickly. The diagnostic capability,
14 that is to build a computer that would take the
15 various pieces of data, and diagnose for the
16 operator what is going on in the accident is much
17 more complicated, and will take a while, take a
18 couple of years. Okay.

19 That's why I am recommending the need for
20 a superior kind of person, we call him a safety
21 engineer, but as far as I am concerned, he doesn't
22 have to be an engineer. He has to meet the
23 requirements that Norman spoke about earlier.

24 You need a person of that type in the

1 control room to aid the operator for situations he
2 can't understand. So that gets you through until you
3 have better diagnostics. When you have better
4 diagnostics, you may not even need this other person.
5 But certainly you have time to wait for the better
6 diagnostics, and it's going to take time.

7 You also now have a certain kind of
8 simulator capability. Those simulators could be
9 easily fixed to handle a large number of accident
10 sequences that we now understand, that go beyond
11 design basis accidents, they're all in WASH-1400,
12 they could be easily programmed into a computer,
13 and the operator could be trained on a simulator to
14 do those. What I was saying would take a long time
15 ~~would be~~ⁱⁿ the kind of capability the pilots have.

16 The first simulators that pilots had did not behave
17 like the real airplane. They were only an
18 approximation. It takes time to get that close to
19 reality in computer programming, so that final
20 objective that the pilots now have after how many
21 years? 30 years of aviation, 40 years of aviation?
22 Is ---

23 Q You have got 30 years of nuclear operation from the
24 Manhattan project and so forth.

1 A We only have about 15 years of real commercial
2 power plant experience.

3 Q Commercial research or what, it is nuclear power
4 operation.

5 A I am just telling you it is going to take time from
6 here to get to there. Maybe we should have started
7 earlier, but we didn't.

8 Q I have never heard of a nuclear research project
9 that wasn't accompanied with a description of we
10 need more time and more money. When we're going to
11 get someplace, we'll work that out later, but do
12 give us time.

13 A I am sorry, I ---

14 Q Could you tell me ---

15 A I am sorry. I told you there ^{was} a number of
16 interim steps that we can take quickly that will be
17 of ~~quite~~ utility, but a much better step takes
18 somewhat longer.

19 Q Will you tell us, please, why is it that the control
20 room board, bearing in mind you're interested in
21 safety and you're interested in analysis of safety
22 and the safety precautions that can be taken at the
23 time of an accident, that the board doesn't reflect
24 particularly the situation at the time of an

1 Q That would take care of the daily operations?

2 A Take care of everything.

3 Q At least give him one for daily operations, and one
4 for accident situations?

5 A Some of these he has before him cover accidents, too.

6 Q Have you ever heard of a description of such chaos
7 as to what must have been at the Three Mile Island
8 in the Three Mile Island control room with lights
9 flashing, bells ringing, something sounding, you
10 would want to escape to maintain sanity, let alone
11 operate anything?

12 A I have felt for 15 or 20 years that some day we
13 would have that situation, and it would be impossible
14 for the operator ---

15 Q So your prediction has come true?

16 A --- for the operator to know what to do when 150 or
17 100 alarm lights go off at the same time.

18 Q Did you ever write a recommendation to change that?

19 A I have felt for a long time we needed diagnostic
20 capability for the operator for many years. I don't
21 recall if I have ever written anything about it.

22 MR. JENSCH: Let's take a little recess.

23 (A short recess was then taken.)

24 MR. JENSCH: If we may resume.

1 Q (By Mr. Jensch) What is the practical difference
2 in the safety analytical work done by your group
3 and the N. R. E. group? This is really what my
4 question involves. Why should there be the
5 appearance at least of a difference in the quality
6 of the level of the safety work done at N. R. C.
7 and that done by your group and that done by the
8 N. R. E. group? Why should the licensing proceedings
9 affect the character of the research? That is
10 generally my thought. Can you address that subject?

11 A Well, it is a very difficult question. I can just
12 start to talk about it. I wouldn't say that their
13 work is of lower quality. When you're doing, they're
14 doing licensing reviews in an established framework
15 against established regulations where models exist
16 to cover what they do. Let me take a specific
17 example.

18 They evaluate the effectiveness of
19 emergency cooling systems in accordance with a
20 Appendix K of Part 50. They use an evaluation model,
21 which is not very precise, but it is constructed to
22 be extremely conservative, and it got that way
23 because in the days when they were making decisions,
24 I mentioned earlier they had no help from anyone,

1 they developed conservative approaches to compensate
2 for their lack of knowledge about the reality of
3 physical processes.

4 Now our job in research is to get the data
5 and make the models that predict that reality very
6 much better. That's hard to do. You need highly
7 competent people to do that. And we talk, in general,
8 of a more scientific view than the regulators, but
9 we're not more competent than they are, if that's
10 what you're trying to ---

11 Q I am not talking about competency, I am talking
12 about result. Their result is in the regulatory
13 framework.

14 A Our results are in a scientific framework, and
15 science is a very exacting thing, and regulation a
16 less exacting thing.

17 Q That's exactly why people are concerned.

18 A Yes, but it has to be. Science is unforgiving.
19 Science is the reality of ^{discovery} science, and you have to go
20 find it. It is unforgiving, and you have to be
21 very careful about it. A regulatory process can
22 make conservatism to overcome lack of knowledge,
23 and you can try to ask questions about why aren't
24 you doing this and that, when the fellows in research

1 are doing this and that, and the answer is I don't
2 have to, because I have accommodated it with a
3 conservative bound.

4 Q Well, assuming his assumptions are valid of course
5 it is a conservative bound.

6 A There was an A. E. C. hearing for two years, there
7 was a review. The Commission approved it, and
8 that's what he has to go on.

9 Q Many of these reactors have not been able to meet
10 the heat levels, or exceeded the heat levels, so we
11 get special exceptions?

12 A They drop the power level, and sometimes make an
13 exception to the rule. In the cases where we may
14 have some data to show that, say, you have been too
15 conservative in this area, if you make a little
16 exception it's all right.

17 Q Or if you don't have data, they may do it on their
18 own, where the research department ---

19 A I hope not. I don't know what they do.

20 Q I don't think many people know about it. And I think
21 there was some source of confusion as to whether
22 your research may be the more precise and should be
23 generally applied.

24 A Maybe there is an excuse for it or explanation or

1 something.

2 Q That there was something you were going to give us.

3 A I am going to give you a list of task action plans,
4 generic issues, which are being worked on by N. R. R.,
5 and being worked on by N. R. C. Maybe there is
6 some other assigned to another list, and then you
7 said maybe I could list what are the high priority
8 items.

9 Q You said you had something about Rogivin.

10 A Yes. I can give that to you now. Rogivin
11 circulated a questionnaire ---

12 Q This is, if I may just while he is searching for
13 his paper, Rogivin, R-o-g-i-v-i-n, is an attorney
14 appointed by the Regulatory Commission, I believe,
15 of the Three Mile Island situation, so is one going
16 on by Congressman Udall, the President's Commission
17 is going on, having one. I think EPRI, E-P-R-I, is
18 undertaking an investigation, and then I think some
19 people say that the fox is going to examine the
20 safety of the chickens in the coop, the Rogivin
21 Committee will analyze the performance of the
22 N. R. C. regarding the Three Mile Island, and this
23 is the response by Dr. Levine to Mr. Rogivin's
24 endeavor. Which ---

1 A I am embarrassed. I had that on my kitchen table
2 this morning, and I forgot to put it in my briefcase,
3 but I will furnish it to you.

4 Q If you could just generally tell us, are you in favor
5 of the general actions taken at Three Mile Island,
6 or what do you think should be done?

7 A Well, I talked about a number of issues. One issue
8 I talked about was the need to change the perceptions
9 in N. R. R. They have to be more open-minded.

10 Q How do you do that?

11 A Well, there are ways to do that. First of all they
12 can be encouraged by a large number of people, such
13 as your investigation. There can be organizational
14 changes made. For instance, when Rusche,
15 R-u-s-c-h-e, who was the director prior to Denton,
16 was reorganizing N. R. R., I suggested to him that
17 he needed a group of several teams of people who
18 would take a broad look at the reactor safety issues
19 and reactor situations. He saw fit not to do that.

20 I think the licensing process has become,
21 imposed too much of narrow technical specialists,
22 and no one looking across the vista of reactor
23 safety, and I suggest that a group be established
24 whose job description is such that they are, the

1 employees are required as part of doing their
2 day-to-day work to develop such a vista, and that
3 doesn't exist in the N. R. R. in my opinion now, and
4 I know Denton shares my concern, because we have
5 talked about it, and if he can ever get the Three
6 Mile Island over with, he'll get back to
7 reorganizing his organization on that.

8 I think the Commission in fact operates at
9 too detailed a level. I think the Commission doesn't
10 quite understand that it's a policy body, and not an
11 operating body, and it's operating at such a detail
12 level that it interferes with the management of the
13 agency.

14 I have suggested that they have a
15 management study made to tell them how to do their
16 jobs better.

17 Q Well, you wouldn't exclude the fact, do you think
18 the entire Regulatory Commission should begin
19 actually deciding the cases?

20 A I would not exclude anything. All I am saying now
21 the current situation is intolerable, because they
22 are enmeshed at such a level of detail, that they
23 are not concentrating on giving the staff the right
24 kind of policy guidance.

1 Q You wouldn't have them compute the hydrogen level at
2 Three Mile Island during the accident up there?

3 A That's right.

4 Q You would let that be done by people more familiar
5 or regularly doing that analysis?

6 A I am thinking not of the emergency. I have other
7 views about the emergency.

8 Q Well, deal with the emergency. I think that is
9 going to be a great concern with us.

10 A I'll say a few words. I am talking about the
11 day-to-day operations of the Commission.

12 Q All right. All right.

13 A They're operating at too detailed a level, and makes
14 the policy suffer and keeps the staff from doing its
15 job better.

16 As far as the emergency is concerned, I
17 think five people can't run an emergency. They
18 should have designated one of their number to be in
19 charge of it, and to keep them informed. They
20 didn't do that. I think that was a mistake.

21 By the same token, if they didn't have a
22 exceedingly competent person to be in charge of
23 it, that would be wrong, too. You have to have
24 somewhere in the agency some one person who is put

1 in charge of emergencies, who has the requisite kind
2 of competence to deal with it and make the decisions.

3 That can be established in the Commission
4 organization or in an administrator. You don't need
5 an administrator to have that capability, and by the
6 way, I have thought about whether we need an
7 administrator or a Commission, and I favor a
8 Commission. I think you need the kind of balance,
9 at least this day and age and this stage of the
10 development of nuclear, you need a spectrum of
11 viewpoints, and you can't count on one administrator
12 to give you the right balance.

13 I also have serious reservations about the
14 way our E. D. O. office performs, and the way we
15 manage the agency as a general rule. There has never
16 been a meeting of the E. D. O. and the five major
17 office directors to discuss a whole series of
18 major policy issues, even though it has been
19 recommended that he have such meetings.

20 The Commission and the staff and the
21 E. D. O. cannot communicate together in private about
22 management problems. This is a falacy in the
23 Sunshine Rule, Sunshine Act. We needed the kind of
24 a Commission where the major office directors and the

1 E. D. O. and the commissioners can sit down around
2 a table and talk in private about where they are and
3 where they ought to be going and why, and in a
4 completely candid and open way, which you cannot do
5 in public meetings. I have been a manager for 34
6 years in the Submarine Service and Polaris and under
7 Rickover, and I don't see how I could ever have done
8 anything I have done in my lifetime under the
9 Sunshine Act. That's a strong statement. I want it
10 to be strong. It's just utter nonsense, there has
11 to be a separation between how you manage a place
12 and how you convey information to the public.

13 Q Excuse me if I can interrupt just a moment, and not
14 to take issue with what you have said ---

15 A Yes.

16 Q --- but perhaps by way of explanation of where we are
17 in many of the governmental operations as I see it
18 at least, I think there has been a general decline
19 in the credibility of many governmental bureaus and
20 agencies.

21 A I agree with that.

22 Q And people perhaps have let the pendulum swing too
23 far, but the Sunshine Act I think was proposed and
24 enacted with the idea that there wouldn't be too

1 much undertaken in reference to the operation by an
2 agency that people didn't know about. Now there may
3 be an answer to that problem other than the Sunshine
4 Act, but this is the best they could come up with at
5 the moment.

6 Now it may be that if there were open
7 publication of actions taken, and full and complete
8 transmission of those data to the public generally
9 in some way, that might suffice, but right now I
10 just think the attitude of the public is that they
11 have lost faith, and I think they have lost faith in
12 the Nuclear Regulatory Commission, and you're talking
13 about research which may be one aspect of it.

14 A No. I am talking about the whole agency.

15 Q And there may be aspects about the licensing
16 proceedings, and the decisional arrangement made at
17 the N. R. C. where people have lost faith, and I think
18 it's something that may be insurmountable for the
19 Nuclear Regulatory Commission.

20 A If I can comment, if I can comment on that. I have
21 no quarrel with the basic premise of the Sunshine
22 Act. I believe in it, and I accept it. I am only
23 talking about one aspect of it, that in the way it's
24 implemented that we have no exemption where we can

1 have management discussions together, only the
2 decisions of which need to be recorded, but not the
3 discussion.

4 Q I think that should be a good solution.

5 A Yes. Yes, so I am suggesting that.

6 Q We would have to get legislation, I expect.

7 A I don't know whether it's an exemption or legislation
8 or whatever, but I think it is needed desperately.

9 There is another matter, perhaps the most
10 important matter. It's not clear to me that a civil
11 service organization can develop and maintain the
12 required kind of scientific objectivity and competence
13 for long periods of time that are needed to regulate
14 nuclear power, and I am making a recommendation that
15 we change the way we do business. We cut the staff
16 by a very large factor, maintain the very best
17 people we have on the staff, and we get a ~~private~~
18 ~~captive company~~, a private, not for profit, captive
19 company, that can hire and fire people to do the
20 technical work for the N. R. C., do the technical
21 safety reviews.

22 It's my belief that we'll get more
23 competent safety reviews that way, that are better
24 scientifically definable than the way we do it now.

1 I don't know if this is going to fly politically.
2 There are a lot of people that will object to that,
3 but I think it's a way we can do a very much better
4 job.

5 Q Well, I think that all those things would be very
6 helpful to the Presidential Commission in its
7 considerations of what they may prepare. Do you
8 have anything other than that?

9 A Those are the major issues, there may be one or two
10 other things, but I don't remember what they are.

11 Q Well, I think that's the kind of thing that the
12 Commission is looking for. Let me just ask you
13 about one statement you made about you thought the
14 N. R. R. should be more open-minded. What did you
15 mean by that?

16 A Well, I talked about it before. They treat everyone
17 who is not in their group as an outsider, and with
18 suspicion, and not with an open-minded way. If an
19 idea comes in to them that is not originated there,
20 it's not a good idea.

21 Q I think that explains the action taken with the
22 Michaelson report. It didn't come from them, and it
23 probably was submerged. It's unfortunate. If that's
24 the attitude of the N. R. R., then I think that the

1 whole unit should be substantially changed.

2 A Well, I suggested a way to do that. I suggested
3 this new organization, entity be added to N. R. R.
4 that would have that function.

5 Q To correct something, to add something? Why don't
6 you correct the situation that is creating the need
7 for this?

8 A I would be glad to correct it in some other way if
9 you could give me a suggestion. In fact, my note to
10 Kmeny says be careful about any suggestion that
11 anyone makes, and be very careful to make a
12 correction.

13 Q You refer to Rogivin?

14 A To Rogivin, which I will give to you.

15 Q Well, if either of you gentlemen have anything
16 further that you can add. I really think that what
17 the, and I shouldn't, it must be made clear, I
18 certainly am not speaking for certainly the
19 President's Commission on the accident at Three Mile
20 Island, but I think what the Commission is looking
21 for will be suggestions to nuclear power in a
22 different light than it is today, and I think it is
23 unfortunate. I think it's a lot of historical, as
24 you, Dr. Levine, have indicated this morning a lot of

1 the problems in research may be historical in
2 character, and I think a lot of the procedures
3 generally have been developed over a period of time
4 where they have just become enmeshed in ritual and
5 chaos. I think it's too bad. I think it is too
6 bad, and some changes have to be made, but I think
7 this perhaps to be a good time to see what could be
8 devised.

9 MR. JENSCH: Bob, do you have anything
10 further you think we haven't covered?

11 DR. BURNS: No.

12 A Could I say a word or two about the executive summary?

13 Q Yes, please do.

14 A I agree with everything Norman said about the
15 executive summary, except I would like to say a few
16 things a little more precise, that I think he'll
17 agree with.

18 One, by rewriting the executive summary,
19 I think that's an intolerable suggestion. The
20 executive summary was written to communicate with
21 laymen. It's been criticized by critics because it
22 communicated too effectively with laymen. It's
23 been ---

24 Q Well, may I interrupt there?

1 A Yes.

2 Q Let me disagree wit you.

3 A Yes.

4 Q Dr. Rasmussen indicated it was written with the
5 objective being received by a laymen group, and to
6 answer certain thoughts that that laymen group may
7 have. I think the question really is, and the
8 critics who have expressed their views publicly, was
9 that the executive summary did not fairly present
10 the main body of WASH-1400, that is that the
11 executive summary indicated unacceptability of
12 nuclear power, and that may not be the view of the
13 main body of 1400.

14 A There is ---

15 Q I think the 1400 analysis, if I understand it
16 correctly, indicated a lower risk, and as a
17 corollary, a greater safety to nuclear power than the
18 executive summary portrayed.

19 A No.

20 DR. RASMUSSEN: I don't think that is
21 right. The basic issue, if I may ---

22 MR. JENSCH: Please do. We're talking
23 about ---

24 DR. RASMUSSEN: The basic issue in the

1 executive summary is that it concludes that the risk
2 of the nuclear power is small compared to the risks
3 that we accept in society today, and is totally
4 substantiated by the main report.

5 DR. LEVINE: In fact is in the main report.

6 DR. RASMUSSEN: And is in the main report,
7 but what is a criticism that I accept as correct is
8 that our display of certain of the risks is more
9 dramatic, and hence focused people's attention on it.
10 Namely the early risks, the early fatalities. And
11 although we included in the executive summary a
12 discussion of the latent risks as well they weren't
13 equally well portrayed because there weren't nice
14 figures to show them, and they weren't as effectively
15 communicated, so many people didn't understand or
16 didn't comprehend the delayed consequences as well
17 as perhaps they should have. I do not believe there
18 is any inaccuracies in the executive summary about
19 what the report says.

20 DR. LEVINE: That's just the point I
21 wanted to make.

22 MR. JENSCH: Oh, no. I don't mean the
23 executive summary distorted the main body.

24 DR. RASMUSSEN: All right.

1 MR. JENSCH: But it didn't emphasize what
2 really was the main body report, that nuclear power
3 had greater safety than had generally been understood
4 previously. Now let me say this. I think first of
5 all ---

6 DR. RASMUSSEN: Greater safety or greater
7 risk?

8 MR. JENSCH: Greater safety to nuclear
9 power than had generally understood to be.

10 DR. LEVINE: That's all said in the main
11 report, just those words.

12 MR. JENSCH: It is. But the executive
13 summary by the description you have just given,
14 Dr. Rasmussen, you didn't equally deal with the
15 latent situation as well as you emphasized the
16 dramatic.

17 DR. RASMUSSEN: That I think is a fair
18 comment.

19 MR. JENSCH: I think that unequal treatment
20 gave the wrong impression to the main body of
21 WASH-1400. For instance, as I recall, Lewis said
22 something like this. To say that because there are
23 50,000 deaths in automobile accidents every year,
24 therefore nuclear power is safe, is in a sense :

1 non sequitur. Now the comparison may or may not be
2 an interesting one, but what people are really
3 wanting to know is nuclear power in and of itself at
4 a lower risk than had generally been understood by
5 the audience to whom you were directing your
6 executive summary.

7 DR. RASMUSSEN: Well, I think -- it depends
8 what audience you're talking about. Our estimate
9 came out at a lower risk than some of the critics
10 had said, but substantially higher than the industry
11 had thought. The industry generally claimed that the
12 chance of core melt was one in a million or less.
13 We found it to be one in 20,000. That was a factor
14 of 50 higher than much of the industry had thought.
15 It depends which audience you're talking about,
16 whether it is more safe or less safe than they had
17 imagined.

18 DR. LEVINE: Let me just make the one
19 point I wanted to make. What Lewis really said
20 about the executive summary was that it was not a
21 technical executive summary of WASH-1400. It was a
22 lay document.

23 MR. JENSCH: Right.

24 DR. LEVINE: And therefore it should not

1 have been bound in with the main report.

2 MR. JENSCH: Right.

3 DR. LEVINE: Or identified with. It should
4 have been a separate document. I'll accept that
5 criticism, but very little else.

6 MR. JENSCH: Well, I think this unequal
7 treatment is giving a lot of people a problem.

8 DR. LEVINE: Well, for those of us who
9 have read the main report carefully and those of us
10 who have read the executive summary carefully, I
11 find it hard to say in my own mind that there is
12 very much difference in treatment.

13 MR. JENSCH: Well, you may not feel so,
14 but I think that's where people, the critics, have
15 concentrated upon is your executive summary, and
16 they haven't read, they may not have read or
17 understood the main body. I think the main body of
18 the WASH-1400 just does a much, much better job in
19 presenting your view than the executive summary does.

20 DR. RASMUSSEN: Of course.

21 DR. LEVINE: Sure it does.

22 MR. JENSCH: Whether you talk about equal
23 treatment, unequal treatment or whatever it is, but
24 the executive summary was an absolute disaster for

1 the amount of work you had undertaken and the report
2 you had prepared as many people feel.

3 DR. RASMUSSEN: You're entitled to your
4 opinion.

5 MR. JENSCH: You're right, and I think
6 that's where Lewis and these people feel the same
7 way, if I understand their view.

8 Well, do you have anything further for
9 Rogovin or things for the President's Commission?

10 DR. LEVINE: No.

11 JR. JENSCH: Dr. Rasmussen, do you have
12 something that you could add?

13 DR. RASMUSSEN: Well, one point came up
14 that I didn't comment on that I have a strong opinion
15 on and it was raised by Mr. Levine, and that is
16 that having to have available in an emergency a
17 central control command post with one man in charge,
18 something that is just essential in these kinds of
19 emergencies I think. Certainly the military has
20 learned that over centuries of experience. If you
21 have an unusual, tough situation to deal with, you'll
22 be much more successful with one good man in charge
23 than to try to depend on a committee, and not many
24 battles are won with a committee of generals. It's

1 one leader takes it on. So I think it is essential that
2 the N. R. C. designate a structure for dealing with
3 emergencies that has one person in charge, and the
4 resource lines laid out so he knows who to call on
5 and who is to participate with him in the Commission.
6 I think the things I heard were secondhand, the
7 situation came up where they wanted to do something,
8 and somebody said no, you can't do that. It's in
9 violation of technical specs. Well, you know, at
10 that point the guy in command ought to be able to
11 say technical specs don't apply today. We have an
12 emergency situation, and my judgment it is better to
13 ignore that technical spec because this is more for
14 today. Whether or not that occurred in T. M. I., it
15 could surely have, and I suspect it may well have,
16 from what I am told. So I think it is essential to
17 have a man in authority, in control, and have the
18 power to make decisions.

19 MR. JENSCH: Do you think that man should
20 be somebody from N. R. C. or from the utility or what?

21 DR. LEVINE: Well, I guess I don't care
22 where he comes from, but since the N. R. C. is the
23 government agency responsible, they should have
24 someone in charge, and -- at N. R. C. The problem is

1 the utilities always set up with a man in charge,
2 but the N. R. C. is set up with five men in charge,
3 and that's why it is a particular problem for the
4 N. R. C.

5 Now who should be in charge at the site,
6 I think takes some thought. I wouldn't offhand say,
7 but generally the man who has been running the machine
8 day in, day out, is the man that ought to be in
9 charge, and if he requires N. R. C. approval, then
10 there ought to be one man at the N. R. C. who has
11 the authority to say yes, go ahead, we decided that's
12 all right.

13 MR. JENSCH: Yes. I think there has been
14 greater support for the idea that somebody from the
15 operation of the nuclear facility be the one man who
16 would really be the last man, and his word would
17 control. As I understand it, for instance on this
18 hydrogen calculation, industry made a calculation at
19 about the time that subject came up which indicated
20 that there was not enough oxygen to get a detonation.

21 DR. LEVINE: That's correct.

22 DR. RASMUSSEN: Absolutely correct.

23 MR. JENSCH: But that information did not
24 get through somewhere to quell or quash the rumor

1 that a hydrogen explosion was a real possibility, and
2 an evacuation should be taken. Then came the report,
3 as I understand it, that they were considering
4 calling out the National Guard because of the likely
5 evacuation situation, and the director of the
6 National Guard said, ladies and gentlemen of
7 Pennsylvania, you may be sure that your husbands and
8 brothers and relatives and friends will never be
9 sent into the area where there is lethal levels of
10 radioactivity, which some people thought was where
11 they could do the most good, so with the hydrogen
12 calculations being inaccurate, as I understand it,
13 it would seem to support the desirability of one man
14 being in charge, so I think that most of the comments
15 I have heard is that somebody from the operation
16 should be, because he knows his own machine.

17 DR. RASMUSSEN: Exactly.

18 DR. LEVINE: Yes, it should be.

19 MR. JENSCH: I do think there is another
20 problem in this whole thing, aside from what happened
21 at T. M. I., but I think Harold Denton said something
22 like this. Industry has come to rely upon the
23 N. R. C. so much for analysis of safety that they do
24 very little of their own, and won't initiate

1 endeavors or adopt designs and develop components
2 to be of greater safety significance, and if the
3 N. R. C. doesn't suggest it, why nothing is
4 forthcoming. If that is the situation, maybe that
5 is why EPRI, E-P-R-I, EPRI, has been developed to
6 counter that situation, and it may be that industry
7 will be more responsive to the need for greater
8 safety than they have exhibited. I don't know.

9 Well, is there anything further? I might
10 say, Miss Reporter, that for the record, both
11 gentlemen nodded their heads. It looks like
12 exhaustion. It looks like a negative response.

13 If there is nothing further, the
14 depositions of these two gentlemen is concluded.

15 Thank you very much.

16 (Whereupon, at 12:25 p.m., the Deposition
17 adjourned.)
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CERTIFICATE

I, SAUL LEVINE, do hereby certify that I have read the foregoing transcript of my testimony taken on September 15, 1979, and further certify that said transcript is a true and accurate record of my testimony.

In witness whereof, I have hereunto set my hand this ____ day of _____, 1979.

Saul Levine

Sworn and subscribed to before me this ____ day of _____, 1979.

Notary Public

My Commission expires:

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1 COMMONWEALTH OF MASSACHUSETTS

2 SUFFOLK, SS.

3 I, Judith McGovern Williams, a Notary
4 Public duly commissioned and qualified within and
5 for the Commonwealth of Massachusetts, do hereby
6 certify that there came before me on the 15th day of
7 September, 1979, at 10:30 a.m., the person hereinbefore
8 named, who was sworn by me to testify to the truth
9 and nothing but the truth of his knowledge touching
10 and concerning the matters in controversy in this
11 cause: that he was thereupon carefully examined upon
12 his oath and his examination reduced to typewriting
13 under my direction; and that the deposition is a
14 true record of the testimony given by the witness.

15 I further certify that I am neither
16 attorney or counsel for, nor related to or employed
17 by, any of the parties to the action in which this
18 deposition is taken, and further that I am not a
19 relative or employee of any attorney or counsel
20 employed by the parties hereto or financially
21 interested in the action.

22 In witness whereof, I have hereunto set my
23 hand and affixed my notarial seal this _____ day
24 of September 1979.

My commission expires
March 13, 1981.

Registered Professional Reporter
and Notary Public