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PRESIDENT'S COMMISSION ON THE

ACCIDENT AT THREE MILE ISLAND

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DEPOSITION of NUCLEAR REGULATORY COMMISSION

by VICTOR STELLO, JR., held at the offices of the
Nuclear Regulatory Commission, 4350 East West Towers,
Bethesda, Maryland, on the 24th day of July, 1979,
commencing at 1:30 p.m., before Robert Zerkin, a
Notary Public of the State of New York.

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A P P E A R A N C E S :

NUCLEAR REGULATORY COMMISSION:

MARK E. CHOPKO
Attorney, Office of General Counsel
United States Nuclear Regulatory Commission
1717 8th Street, N.W.
Washington, D.C. 20055

PRESIDENT'S COMMISSION ON THREE MILE ISLAND:

KEVIN P. KANE, ESQ.
Deputy Chief Counsel

ALSO PRESENT:

WILLIAM BLAND
Technical Staff

oOo

V I C T O R S T E L L O , J R . , having been first
duly sworn by Kevin P. Kane, Esq., took the stand
and testified as follows:

DIRECT EXAMINATION

BY MR. KANE:

Q Would you state your full name for the
record.

A Victor Stello, Jr.

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Q Have you ever had your deposition taken before, Mr. Stello?

A Not that I am aware of, although the conversations that I have had have been recorded, which I assume is equal to it.

Q Let me just explain what we are doing here today. The legal staff of the President's Commission has had an interview with you prior to today, as I am sure you recall. We did not tape that interview, although you may have given other interviews to our staff which were taped. Based on that interview with you, we would like to get your statement under oath on the record, and you are under oath, and although we are sitting here in the relative informality of your office, the testimony you will give will have the same force and effect as if it were given in a court of law. My questions and your answers are being taken down by the court reporter and will be reduced to a transcript in booklet form, and you will be provided a copy of it, and you can make any changes or corrections you wish. It would be best to avoid the necessity for such changes, so it would be best if we can be as precise and accurate as we can now.

If you are confused by a question or do not

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Stello

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2 understand what is being asked of you, or you think the
3 question or answer needs elaboration or explanation,
4 please feel free to stop me, and we will put that on the
5 record.

6 Let me just remind you of two basic ground
7 rules. One is that the reporter can only take down an
8 audible response, so I would request that you please
9 respond audibly to the questions, and the other thing
10 is that you should permit me to finish my question before
11 you respond even if you know what the question is going
12 to be, and that is only because the reporter cannot
13 take us both down at the same time, so it is necessary
14 to let me finish my question before you respond.

15 Do you understand all of that?

16 A I think so.

17 Q You are the director of the Division of
18 Operating Reactors. Could you generally explain the
19 nature of your duties as director and what the Division
20 of Operating Reactors does.

21 A I am not now the director of the Division of
22 Operating Reactors.

23 Q That is right; that came out in Mr. Eisenhut's
24 deposition.

25 What is your title now?

1
2 A Director of the Office of Inspection and Enforcement.

3 Q In that regard, what is Norman Moseley's
4 current position?

5 A Let me get a correct title so that I do not -- the
6 last time I gave it to you I did not have his correct
7 title. He is the director of the Division of Reactor
8 Operations Inspection; that is the title.

9 Q The Division of Reactor Operations Inspection
10 is a division within I&E?

11 A It is indeed.

12 Q You were formerly director of DOR, is that
13 correct?

14 A That is a correct statement.

15 Q When did you cease to be the director of
16 the Division of Operator Reactors?

17 A When I assumed the present position that I am now
18 in, which was in June of this year.

19 Q You have brought with you here today a brief
20 resume which generally describes your educational and
21 professional background.

22 Let me ask you if this statement accurately
23 reflects your educational and employment background.

24 A I did not include work toward my PhD. at Rensselaer
25 Polytechnical Institute which I pursued from about 1960

2 through sometime in 1966 at which time I completed
3 all the course work for my PhD. and subsequently joined
4 the Atomic Energy Commission and dropped a program at
5 that time, and I noticed that is not reflected on that.

6 Q Other than that point, does this brief resume
7 accurately reflect your educational and professional
8 background?

9 A It does.

10 MR. KANE: Therefore, I would request that
11 it be marked as Exhibit 1 on this deposition.

12 (The above-described document herein marked
13 Stello Deposition Exhibit 1 for identification,
14 this date.)

15 Q Mr. Stello, since you have had a relatively
16 recent job change within the NRC, let me ask you what
17 your duties were until June 1979 as director of the
18 Division of Operating Reactors.

19 A As director of the Division of Operating Reactors
20 I had the responsibility for the reactors assigned to
21 that division; those reactors were essentially all of
22 the "non-power reactors," and those commercial nuclear
23 power plants that were licensed for operation, and in
24 many instances, or at least in several instances, I
25 should say, it did not include all of the operating

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reactors, and some of them were still within the project organization. I had, in addition, the responsibility for the conduct of the ~~industrial~~ ~~let me call it, our reactor safeguards program, which~~ ~~is a more generic term, for all reactors:~~ Those reactors that were in operation as well as those reactors which were under review for construction permit or operating license.

(Continued on Page 7.)

Q Is there any kind of reactor that would

fall into non-power?

A It is a generic term ~~with a regulation.~~

Non-power reactors ~~can~~ include ~~a~~ test and research

reactors. The test and research reactors are divided

up according to power level.

Q You mentioned the reactor safeguard program,

as well, in connection with plans under review for

either construction permit or operating license.

What little I understand of the NRC organization,

my understanding would suggest that those kinds

of plants would also be under the Division of Project

Management in some form or another if they had

pending applications for construction, is that right?

A Not non-power.

Q I was jumping to the other point, reactor

safeguards.

A Those parts of the reviews were conducted by

a staff which was assigned to me. You seem to

suggest that there is a point of confusion. Ask

me another question because you have me confused.

Q I thought I heard you say that in connection

with the reactor safeguard program you would be

looking in the Division of Operating Reactors at

1 Stello

2 plants that had pending applications for construction
3 permits or operating licenses?

4 A With respect to the activities of reactor
5 safeguards, yes.

6 Q So that to that extent there would be an
7 interface with the Division of Project Management
8 which otherwise was handling the licensing of those
9 plants, is that right?

10 A That is correct. I neglected to say that there
11 was one other group for which that interface exists,
12 and that is the group that was responsible for standard
13 technical specifications; that group also formulated
14 the specific technical specifications that were finally
15 issued at the time the plant was licensed, and they
16 had the responsibility for developing the standard
17 technical specifications for plants, so those are
18 the two areas where there was a cut different than
19 just the operating reactors.

20 Q As director, did you have overall
21 responsibility in all these areas, or did you tend
22 to concentrate on one more than others?

23 A Most of my time ~~in my~~ working hours was
24 spent directly related to the operating reactor
25 workload which was the bulk of the work. Most of

2 our resources were devoted to following the activities
3 associated with the operating reactors.

4 Q In your involvement with operating reactors,
5 did you have regular occasion to deal with reports
6 generated by the Inspection and Enforcement Division?

7 A I received copies of those reports and looked
8 at a sampling of them, at best, and had them directed
9 to individual project managers ^{which were} that were responsible
10 for that particular reactor that ^{a given} this report was
11 written for.

12 In addition, these reports were circulated
13 among the technical people, the specialists who
14 would look at the reports ~~on that particular reactor.~~

15 Q Was the purpose behind examining those
16 reports to give some technical input into it with
17 respect to problems that might be raised by those
18 reports?

19 A The first and primary interest in the report
20 was to look at the action that might be needed on
21 a particular reactor for which ^{a given} the report was written
22 to assure that that reactor had the issue, with respect
23 to whatever it was that was dealt with in that report,
24 resolved and if there were outstanding issues, then
25 our people would get together -- let me correct

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myself -- the people within the Division of Operating Reactors would get together with the people in the Office of Inspection and Enforcement and work together with them, either here in headquarters or in the field through the regional offices.

Q To the extent that I&E reports would identify a significant generic safety issue relating to a specific type of reactor, say, B&W plants, would the Division of Operating Reactors work with I&E on that matter?

A For the most part, when ^{accidents} they are generic, both ~~of~~ offices are involved, much ~~of~~ the way in which you see many of the bulletins that have ^{been} issued as a result of the experience of the Three Mile Island accident.

(continued on the following page.)

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Q That is what, a joint DOR-I&E effort?

A It is ~~a joint~~ and remains a joint effort. ^{so} When ^{the} problem ^{became} generic there ~~would~~ be a very close relationship between the two of them in pursuing ~~this~~. There are many examples: The seismic difficulties that have been found in the five shutdown plants, the problem of the base plates ^{and} ~~in~~ the anchor bolts ^{on} ~~on~~ which ~~there are~~ recent bulletins ~~which~~ have been issued; problems of equipment qualification, electric equipment qualification, ^{and} ~~and~~ I think I ^{can} go on and on.

Q What have been some of the problems on electrical equipment qualification?

A The question that arose as a result of looking at the qualification of electrical connectors for which questions came up as a result of a test at Sandia Corporation, ~~Bell Labs~~ ~~that was~~ in connection with electrical connectors, ^{and} ~~and~~ there were questions as to whether these connectors would adequately survive pressure, temperature, and humidity conditions that might result following an accident.

Q Would that be within containment?

A Yes, principally within containment.

As a result of looking further into that question other pieces of equipment ^{was identified} for which questions arose as

2 to whether they were or were not adequately qualified.
3 came about which generated the generic concern for which
4 these bulletins I have spoken of were ~~addressed~~.

5 Q You said, DOR would look at a sampling
6 of I&E reports in order to determine whether or not
7 these problems should be followed up on.

8 A I don't believe I said that. I said that when
9 I looked at them, I would look at a sampling of them,
10 but the project managers were responsible to look at
11 all of the reports that were prepared by Inspection &
12 Enforcement on the particular reactor that they were
13 assigned to.

14 Q Would the project managers also have occasion
15 to examine all LER's on their reactors?

16 A ~~Project managers~~ A project manager is focusing
17 on the cases he is assigned the responsibility for, so
18 with respect to those cases I would not be hesitant
19 to use "all LER's" ~~but as~~ his own interest may ^{was} be peaked,
20 he may have looked at other LER's.

21 The technical branches, which are specialists, tend
22 to look at more of the LER's in their particular area
23 of specialty. we unfortunately, never had sufficient
24 resources to put together a group assigned that particular
25 task of looking at all of the LER's in any systematic way,

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Stello

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2 and that was a shortcoming in the Division of Operating
3 Reactors.

4 Q Why do you feel that was a shortcoming?

5 A Well, there is a great benefit that could be
6 derived from having a systematic looking at all of the
7 LER's for trends that might in some way suggest problems
8 of potential significance, early. These trends could
9 be studied on the basis of a cross-cut of a lot of data
10 rather than trying to restrict yourself to the individual
11 LER's, ^{individual LER's} which, I think, were looked at pretty carefully,
12 on the cases, and in some instances, the LER data was
13 used in ^{that} manner, but it wasn't done in any systematic
14 way. There were instances where this was done, LER
15 searches were made to look at experience, for example,
16 on diesel generators, and how well had they performed,
17 and what difficulties ^{had} have arisen, Over-pressure
18 transients was another area that was looked at in terms
19 of a ^{cross-cut} cut of all of the LER's and the experience, ^{But} ~~it~~
20 ^{in LER reviews} was rather spotty, and there was no real systematic
21 effort made to look and digest and evaluate trends in
22 all of them.

23 Q Why was there no systematic effort made?

24 Was it a matter of lack of manpower, or something else?

25 A Principally, it was a competition of resources.

2 It would have required taking resources from the
3 Division of Operating Reactors working on ^{the} ~~the~~ problems
4 that we had and assigning them to this task? ^I ~~that~~ became
5 a question of how do you use the resources that you have,
6 and there just weren't enough to go around to do every-
7 thing at that time.

8 Q Is there any thought now being given to go
9 about setting a system in place?

10 A Yes, there is.

11 Q What is the status of that? Is it being
12 considered?

13 A As I understand it, ~~now~~ there is to be a group
14 which will be organized at the Gossick level which will
15 be assigned ~~this~~ ^{this} task.

16 Q Gossick is the executive director for
17 operations?

18 A That is correct. ^{There} ~~this~~ was a task ^{held} ~~for example,~~
19 put together to study that question and it issued ~~its~~
20 report on what it felt needed to be done on handling
21 the LER's ~~and~~ ^{and} as I recall, their recommendation was to
22 form ^{such} a group. Where the group should exist, I think,
23 was an open issue, but to the best of my recollection
24 at the moment, I think it has been decided that it would
25 probably be at the EDO staff level.

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2 Q When was this task force on this particular
3 topic set up?

4 A My best recollection is that. ~~I think~~ it was in
5 April, and that is about as close as I can get.

6 Q April 1979?

7 A April of 1979.

8 Q Was the task force set up as a result of
9 the TMI 2 accident on March 28, 1979?

10 A Since I didn't set up the task force, I don't
11 know if the individual that set it up had that in
12 his mind, but I would believe that the accident
13 probably was a consideration. I believe the task
14 force was set up under the direction of Mr. Gossick.
15 Since I don't really know all of what Mr. Gossick
16 had in his mind, I can't be sure that that was
17 his major reason or if it was a reason.

18 Q Is it your feeling, Mr. Stello, that the
19 events which occurred at TMI 2 on March 28, 1979
20 demonstrate the need for such a system within the
21 Division of Operating Reactors?

22 A No, I thought there was a need before TMI.
23 TMI only emphasized the need.

24 Q What was it about Three Mile Island that
25 emphasized the need for that?

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A I believe looking at the history of other transients that have occurred in B&W plants which had characteristics that, if studied carefully, one could at least ask the question, ~~now,~~ "Would a systematic study have allowed us to conclude that this was a serious problem and have instituted corrective actions, and hence, have avoided the Three Mile Island accident?"

Q What do you think the answer to that question is? I understand that is a personal opinion.

A Well, clearly with hindsight, I think one can conclude that there was sufficient information there to have taken the corrective action, but whether or not had we ^{had} had a group studying the problem, it is difficult to decide that that group would have, in fact, uncovered this particular sequence of transients and taken the action. It depends a lot on how long the group would have been in existence, how many resources had been applied to it, and a lot of other constraints, ~~and until I~~ I guess I haven't had the time to think about it, and I would like to think about it a little more, ~~and until I have~~ I wouldn't want to say that they could have. It could have been constituted in such a way that I feel

2 comfortable with concluding that they would have
3 found it.

4 Q You keep referring to the history of other
5 transients. What other transients do you have in
6 mind?

7 A I guess those that seem to have been closest to
8 understanding what happened at the Three Mile Island
9 are the transients of Davis-Besse of some time ago.
10 I don't remember the exact dates of them. They dated
11 back, I believe --

12 Q To 1977?

13 A You know, I am not sure of the dates, but that
14 would be about right.

15 Q Having read the Tedesco report, it is my
16 understanding that there were two transients at
17 Davis-Besse toward the end of 1978, one in September
18 and one in November.

19 A I would have to refresh my memory. I could just
20 look at the report and see the transients which are
21 enumerated in that report, ~~and~~ rather than try to
22 guess at the transients, I would prefer to go to the
23 report and say these are the transients I have in
24 mind rather than to try to recall them from memory.
25 Would you like me to do that?

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Q Yes, if you have it here and you find that to be of help to you.

A They are enumerated in here, and I would simply prefer to look at them.

Q We have a copy of that I can show you.

A They are all enumerated in here. The thought that I had in mind when I was answering the question was these. (indicating)

Q Let me make a reference for the record that you are referring to the chapter of the Tedesco report which begins on page 3-1, otherwise known as New Reg 0560, and it is the chapter entitled "B&W Plant Operations."

There are, as you say, different transients described in that chapter, and I would like to go over a few of them with you, if I could.

You made reference to the Davis-Besse transient, for example, and my recollection is that on September 24, 1977, there was a transient at Davis-Besse in which a PORV stuck open, in which the pressurizer level began to rise, and one fact which is not reflected in the Tedesco report, but what apparently occurred was that the operator based on that pressurizer level reading did terminate

2 or throttle back the HPI, and I believe it is now
3 fairly well established that that was a premature
4 and improper action on the operator's part. It is
5 also, I think, fairly understood that since the plant
6 at that time was only at 9 percent power, it didn't
7 pose a serious problem as was the situation at TMI 2
8 which was at almost 100 percent power, if not
9 100 percent.

10 When did you first hear of that Davis-Besse
11 transient?

12 Let me preface that with a previous question.
13 Were you the director of the Division of Operating
14 Reactors in September 1977?

15 A I was.

16 Q In that position, given the circumstances
17 surrounding that transient, would that be the kind
18 of transient that would have been brought to your
19 attention?

20 A The reason I am having difficulty is I am
21 trying to recall whether Davis-Besse was assigned
22 to my division at that time, and my best recollection
23 is it wasn't, but I may be wrong.

24 Q It might have still been with the Division
25 of Project Management?

A I think it was.

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Q If the determination was made that that transient involved some significant safety issue, even if it was under the control of the Division of Project Management, it would have been brought to the attention of the Division of Operating Reactors in the ordinary course, wouldn't it?

A If people had identified that this was a significant issue for which corrective action had been taken or needed to be taken, then the answer would be yes. It depends on the relative importance that was attached to it at that time. I cannot recall at this distance that it, in fact, was an issue of discussion in my office. I cannot recall when I first heard of it. It clearly has had considerable attention since Three Mile Island, and perhaps that has clouded my ability to look back and try to recall. I don't know, but the facts are so prominent as a result of the Three Mile Island experience -- I don't have any special recollection back in 1977, however, that leads me to conclude that this was an item of considerable interest or discussion within my division.

If a significant safety issue were involved in that Davis-Besse transient of September 1977, how rapidly would you have expected that issue to be resolved in some fashion?

2 A Again, a very difficult question. You are asking
 3 me in light of the circumstances of 1977 versus the
 4 circumstances of today. In 1977 I would suspect that
 5 it would ~~get~~ ^{have} resolved quickly, but not nearly as quickly
 6 as now since the sensitivity level within the Commission
 7 undoubtedly has been raised, and hence there is
 8 considerable visibility and response to any potential
 9 problem.

10 In 1977, I would guess that if people looked at
 11 it and believed it was a significant problem then, that
 12 even though ~~this~~ ^{the incident} visibility were not ~~here~~ ^{ful} it would have
 13 had fairly fast response from a management standpoint.
 14 I know if I had believed it, I certainly didn't feel
 15 constrained in my ability to deal with it then or now,
 16 ~~so~~ personally I think I would have responded as quickly
 17 then as now.

18 Q In these days, post-TMI, what is a rapid
 19 response? Is it weeks or months?

20 A If it is a really important safety issue which
 21 would require action on a plant, hours, if need be.

22 Q Were you aware, prior to today when I just
 23 mentioned it, that this Davis-Besse transient of
 24 September 24, 1977 involved a premature termination of
 25 HPI?

2 A Yes, I was aware of it.

3 Q How did you become aware of that?

4 A I would have to say the thought in my mind is one
5 that I can't distinguish in time since the intensity of
6 the discussion of these transients has been post-TMI.
7 If I had to pick the time frame, I would think it was after
8 the TMI accident. It may have been that I had some
9 discussion as a result of the concerns of Jim Creswell
10 that were brought to my attention very soon after the
11 accident, a day or two, and any time from then on, it
12 could have been.

13 Q That was my next question as to how it was
14 brought to your attention. It was brought to your
15 attention in terms of James Creswell's concerns on board
16 notification?

17 A I wasn't trying to leave that impression, but
18 starting very soon after the accident, I became aware of
19 a memo dealing with board notification, of Mr. Creswell's
20 concerns, and from that point on, the Davis-Besse transient,
21 as well as a number of other transients, became subjects
22 of discussion, and I couldn't identify it with one or the
23 other. They just happened.

24 Q How did you become aware of that memorandum
25 concerning board notification?

2 A I believe Mr. Moseley showed it to me, and that
3 I believe I can fix the date for. It was probably ~~even~~
4 the dayst or the next day following the accident; ^{so} it
5 would be either the 28th or the 29th while I was here
6 at the Incident^s Response Center that he showed me that
7 memorandum. The reason I know it was one of those two
8 days is because on Friday I left to go up to the site
9 and was there for approximately 40 days, and I knew it
10 before I went to the site.

11 Q This situation came up several times in
12 reference to documentation which I will ask you about
13 later which apparently surfaced right after the initial
14 events at TMI 2, and I mean within 24 to 48 hours. I am
15 curious because my impression is that those first two or
16 three days were pretty hectic with people getting two or
17 three hours' sleep and working around the clock and the
18 focus was on the immediate situation with respect to what
19 you had to deal with at TMI 2. How did it come about
20 that Mr. Moseley had the time or the presence of mind or
21 whatever to be pulling out documents that were of previous
22 vintage?

23 A My recollection is that the memo was contemporaneous
24 with the accident. He either had signed it or was about
25 to sign it that day or the day before. It was in the

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very narrow window of the accident itself, and I am sure
it was an issue ^{he} had concern over, and I can remember
remarking to him --

MR. CHOPKO: "He" is Mr. Moseley?

THE WITNESS: Yes, Mr. Moseley.

A (Continuing) -- in discussing that clearly as a
result of the accident that they were now dealing with,
that he ~~may~~ ^{might} want to reconsider whatever position he had
taken or wished to take on that issue, since the events
at TMI clearly were significant in dealing with that
circumstance.

(Continued on Page 25.)

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Stello

RZ/mf .1

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Q Let me show you a document that has been

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marked as Exhibit 10 to a prior deposition taken

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by the Commission of Mr. Foster from Region 3.

5

This is a document dated January 19, 1979 from James

6

Kepler to or for Mr. Mosley, and I believe it is

7

probably through Mr. Thornberg, and the subject

8

stated as "Recommendation for Notification of

9

Licensing Boards and Requests for Technical

10

Assistance."

11

Let me ask you if that is the memorandum

12

you are referring to?

13

A I am hesitating even before I look at this.

14

As I recall, the memorandum that I had looked at

15

was a memorandum either prepared by or to be signed

16

by Mr. Mosley.

17

Q This would appear not to be it?

18

A But it could have been an attachment to it.

19

Q Let me ask you whether or not you have

20

seen that memorandum before?

21

A Yes, I have. I do recall seeing it.

22

Q Under what circumstances did you see this

23

memorandum previously, if you can recall?

24

A I tend to want to respond to your question to

25

say I think I saw it at the time I saw Mr. Mosley's

1
2 and subject to correcting the transcript, which you
3 have indicated I will have an opportunity to do, I
4 will leave the answer that it was attached to the
5 memorandum, that I saw on either the 28th or 29th
6 that I referred to, and if that is not right, I
7 will take the opportunity to correct the transcript
8 at that point.

9 Q This memorandum does appear to concern the
10 same subject matter that you were referring to with
11 respect to certain concerns of Mr. Creswell regarding
12 the Davis-Besse transients and the notification to
13 a licensing board, is that right?

14 A It has items in it that are in my view
15 different from the one which I was speaking of in
16 terms of transient behavior. It raises questions
17 about power oscillations, as I recall, and some
18 other issues. I would have a difficult time in
19 believing that those could properly fit under the
20 transient that we are discussing.

21 Q I am looking at page 2 of this document
22 previously marked as Foster Deposition Exhibit 10.
23 Item 3 states, "The pressurizer level question is
24 presently the subject of communications between
25 NRR and the licensee. We have not addressed the

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possibility that the cold and makeup instrumentation do not meet GDC 17."

Was that one of the concerns that was involved in the memorandum that you are referring to?

A Yes.

Q So in part it appears to be the same subject matter?

A The memorandum contains other things ~~and~~ I would not wish to confuse the fact that the other issues raised therein are also subjects that could properly fit into the question of the transcript.

Q Let me show you another memorandum from Creswell to Streeter, Exhibit 11, dated January 8, 1979, and the subject concerns conveying information to licensing boards on Davis-Besse Units 2 and 3 and Midland Units 3 and 4, and the second page of this document was quoted verbatim in the I&E bulletin 7905 right after TMI 2.

Let me ask you if you have seen that document before?

A Yes, I have. This one I would have some difficulty in identifying the time frame though, ~~and~~ I guess I would just need some time to refresh my memory and ask Mr. Mosley for the package of

2 documents that I had seen to determine whether it was
3 included in the documents I had referred to on the
4 28th and 29th.

5 Q Do you think it might have been attached?

6 A Subsequent to that, I know I have seen this
7 document several times in the past month or two, so
8 if it weren't then, I know it is within the past
9 month or two that I have seen it.

10 Q Why did Mr. Mosley^E show you this document
11 on March 28th and 29th?

12 A I thought I had answered that earlier. It was
13 a document contemporaneous with the accident. I
14 don't know whether he had or was planning to sign
15 it within days of the accident.

16 Q I know you did say that.

17 A They relate to the same issue, board
18 notification.

19 Q But why at that time on March 28 and 29
20 was Mr. Mosley^E coming to you with this particular
21 document? You were then in the midst of a crisis
22 situation relating to TMI 2, and I would assume you
23 were both focusing on the immediate situation and
24 the problems you had in front of you, so it seems
25 unclear as to why you were referring to other documents

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about some other transients?

I was asking you why he was showing it to you then.

A You will have to ask him.

Q He did not tell me and I am asking you.

A I gathered from the discussion we had it was an issue that was clearly on his mind since he was dealing with the document in that contemporaneous time frame. I assumed it was the thought he had in his own mind at that instant, and asked me for a view, and we discussed the question of board notification and why he had decided to come in and show it to me, whether we were having a conversation about incidents similar to what had happened at TMK because we clearly were fresh as to what happened at TMI at that time, but as to what he may have had on his mind and why he showed it to me then, you will have to ask him.

(Continued on the following page.)

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Q I thought perhaps he might have told you,
but we will ask him that.

A I don't remember him telling me, but I do remember
leaving the conversation with the impression that I
thought he had had it on his mind because of the very
close proximity of the action taken on the documents
with the accident itself.

Q Did you have any discussion with Mr. Moseley
in relation to that document concerning incidents similar
to the Davis-Besse incident and what was happening at
that time?

A The discussion wasn't very lengthy, and we had
the press of other business, and I didn't take very much
time either discussing it or dealing with the document.
I clearly had other things that I wanted to devote my
energy to.

Q Did Mr. Moseley ask you whether or not you
thought it should be referred to a board?

A I don't know if he asked me that specific question.
The reason I pause is I think I volunteered an answer,
but in light of what I knew⁰ now, I clearly would recommend
sending it to the board in light of the Three Mile Island
accident.

Q Let me take you back to March 28 and ask you

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2 whether or not you felt that the matter of the Davis-
3 Besse concerns as reflected in the document Mr. Moseley
4 was showing you should be taken to the board?

5 A Did you say March 28? Did you want it to predate
6 the accident?

7 Q No.

8 A After the accident?

9 Q At the time Mr. Moseley showed you the
10 document.

11 A At the time he showed me the document is when I
12 volunteered the answer that it should be referred to the
13 board.

14 Q Did Mr. Moseley indicate his opinion on that
15 subject then?

16 A I believe he had signed a document which was going
17 to recommend not sending it to the board, or was consider-
18 ing signing such a document. I cannot recall whether he
19 signed it or whether he was going to, but the impression
20 I had after the discussion is that he, too, had come to the
21 conclusion that it ought to go.

22 Q Did he explain to you why he initially felt
23 it should not be referred to the board?

24 A The discussion, if we had a discussion of that,
25 ~~It~~ was brief, and I am at a loss to recall if there were

2 reasons offered. They just don't stand out. The only
3 reason I remember having seen the document is because
4 it was unusual, as you pointed out, that it would come
5 up at that time.

6 Q It struck me that way because you did have
7 other priorities.

8 A Yes.

9 Q At the time you saw the document, did you
10 realize it related to transients at Davis-Besse which
11 occurred more than a year before the date of the document?

12 A The dates were there. I don't recall focusing on
13 them at the time.

14 Q Would it be unusual for a transient which
15 raises significant safety concerns, significant enough
16 to be referred to a board hearing that that referral
17 would take place more than a year after the event took
18 place?

19 A As a general matter, I would think that would be
20 a long time, so the answer would be no.

21 Q Your answer would be that it was unusual for
22 it to take that long?

23 A It would be unusual if the significance were
24 "also known a year earlier." If at the time of the
25 event someone had clearly understood the significance,

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2 then just deciding the issue of board notification, I
3 would think would be a long time.

4 Q After Mr. Moseley brought the documents to
5 your attention, did you make any attempt to get the
6 ground rules on how these concerns were raised and when
7 they were raised and how they were treated?

8 A None whatsoever.

9 Q Did Mr. Moseley make any such attempt, to
10 your knowledge?

11 A I would think that he had probably considered it
12 prior to any discussion I had with him, but I certainly
13 made no attempt to follow the matter at that point.

14 Q Up to today, have you made any attempt to
15 explore that matter and find out how it was initially
16 handled and what the attitude was at each step as the
17 concerns were raised?

18 A No, I haven't had the time to go through the
19 history. I have become acquainted with a number of
20 documents related to the particular issue of the concerns
21 raised by Mr. Creswell for a variety of reasons. I have
22 had requests for such documents from various people, and
23 as a result I have had an opportunity to look at them.

24 Q Have you spoken to Mr. Creswell about the
25 situation?

2 A No, I have not. That would not have been something
3 I would normally have done. He was working in the
4 Office of Inspection and Enforcement, and I would not
5 have sought him out, although if he chose to, if he
6 wanted to come in and consult with us, it clearly would
7 not have been something out of line to do so, but that
8 would normally be an activity within the Office of
9 Inspection and Enforcement to pursue.

10 Q What is your understanding today of how
11 Creswell's concerns were raised and handled at each
12 step of the process concerning the Davis-Besse transient
13 of September 24, 1977?

14 A I don't really have a chronological account of how
15 they were raised. I do know that Mr. Creswell has spoken
16 to commissioners about the issue.

17 Q Do you know which commissioners?

18 A I am sure he spoke to Mr. Ahearn.

19 Q Did he speak to any of the other commissioners?

20 A He may have spoken to Mr. Bradford. I am not
21 certain of that fact. What happened from that point on,
22 and who all may have gotten involved, I could not give a
23 detailed chronology. I have not, myself, been involved
24 with the matter other than to respond to the inquiries
25 and ~~that~~ I have had people collect the documents and send

1 them to whomever has asked.

2 Q Do you know who is involved within the
3 NRC in an inquiry into the Creswell chronology, if you
4 will?
5

6 A Mr. Moseley certainly has been involved.

7 Q Why Mr. Moseley?

8 A That is an area of responsibility that he now
9 has here with Operating Reactors, and that is the
10 activity that Creswell is involved in. I believe Sam
11 Bryan had interviewed Mr. Creswell.

12 Q What is his title?

13 A Assistant Director for Field Coordination is his
14 title, and my recollection is he did interview
15 Mr. Creswell.

16 Q And Sam Bryan is the assistant director for
17 field coordination?

18 A Yes, and ^{also} works for Mr. Moseley.

19 Q Who is the director of operations inspection?

20 A Yes.

21 Q And he basically works with people who
22 inspect operating reactors which is Mr. Moseley's
23 division?

24 A Yes, Mr. Moseley is responsible programmatically
25 for the inspection activities in all of the regions in
that particular function.

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2 Q And it is your understanding that Mr. Bryan
3 has interviewed Mr. Creswell regarding his concerns and
4 what the history was?

5 A I know he has interviewed ~~them~~ ^{him} about concerns; I
6 don't know if he, in fact, did ^{go} into the blow-by-blow
7 account on the chronology or not; I don't know.

8 Q Has Mr. Bryan interviewed Mr. Creswell since
9 the TMI 2 incident about that?

10 A My recollection ^{is} it was since the accident.

11 Q Now, you did say that you know Mr. Creswell
12 has spoken to commissioners about this issue, Commissioner
13 Ahearn and Commissioner Bradford. How did you come
14 across ^{that} that information? Did Mr. Moseley tell you that?

15 A I believe I heard it from Mr. Ahearn.

16 Q You heard it from Commissioner Ahearn?

17 A Yes. I can't recall hearing it from others, but
18 there could have been others.

19 Q What did Commissioner Ahearn tell you?

20 A It was more of a passing remark that Mr. Creswell
21 had come up to see him regarding his concerns over
22 Davis-Besse.

23 Q Did Commissioner Ahearn tell you when
24 Mr. Creswell had come to see him?

25 A No. I think that was the sum and substance of

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2 the conversation.

3 Q Did Commissioner Ahearn tell you that
4 Mr. Creswell had spoken to him about this before the
5 accident of March 28, 1979 at TMI 2?

6 A He didn't tell me.

7 Q Did Commissioner Ahearn tell you what his
8 response was with respect to Creswell's concerns?

9 A The conversation was very short on this subject.

10 Q Even in short conversations things are said.

11 A No, he didn't respond.

12 Q Do you know when Mr. Creswell spoke to
13 Commissioner Ahearn and Commissioner Bradford about this
14 subject?

15 A No, I don't know when he did.

16 Q Do you know what Mr. Creswell did about
17 these concerns before he spoke to Commissioners Ahearn
18 and Bradford?

19 A No, I don't. I had asked the director of that
20 region, Mr. Keppler, if he had been involved prior to the
21 discussions that I referred to, and you have, I hope,
22 not adopted as a certainty that he spoke to Mr. Bradford.

23 Q You are only telling me what you have heard?

24 A Yes.

25 Q I understand that. Let me say, you should

2 bear in mind that when I ask these questions, if you
3 heard anything, whether it is hearsay or a rumor or
4 anything at all, I want to know what you have heard,
5 and you can indicate that it is a rumor or suggestion
6 or whatever, and you do not know it for a fact, but I
7 do want to know what you have heard.

8 A That is what I have been trying to do.

9 Q You spoke to Mr. Keppler?

10 A Yes, about it, asking Mr. Keppler if Mr. Creswell
11 had followed the procedures that he has within the region
12 for making concerns known. After I had heard that he
13 had been to Commissioner Ahearn and the response that I
14 had had from Mr. Keppler, which I still haven't had an
15 opportunity to pursue in any detail, is that he had not --
16 he hadn't followed the procedures within the region. I
17 don't know any more than that about it because I haven't
18 had an opportunity to get back and discuss it.

19 Q Let me see if I can explore that conversation
20 with Mr. Keppler. Did Mr. Keppler tell you what procedures
21 there were that Creswell failed to follow?

22 A Procedures in the office, as I understand it,
23 that if someone has a strong belief that action isn't
24 being taken to their satisfaction, there is a process to
25 follow to bring their attention to it up through the

2 regional director, which is the highest level of
3 supervision for Mr. Creswell in his region.

4 Q Did Mr. Keppler tell you what that process
5 is?

6 A Not in any detail, just that there was a process
7 that he had made known to his people that they could
8 follow. I assume it is a procedure where if someone
9 has a strongly-held view of some action being needed ~~or~~^y
10 to be taken, that it is a procedure which assures that
11 this matter can be brought to the attention of the
12 highest level of management within the region. It is
13 something that I would attach -- if I had to describe a
14 process, you can ask me or I will volunteer, an office
15 letter -- in NRR we have a procedure where if there was
16 a strongly-held view, such as Mr. Creswell had, how the
17 process ought to come up to the office director.

18 Q Is that the office letter No. 9?

19 A I don't remember the number, but that is what I have
20 in mind, whatever that number is that describes this
21 procedure. It is a procedure where people, if they
22 have a ^{view} ~~few~~, that they can make it known.

23 Q Did Mr. Keppler tell you that there had been
24 any investigation within Creswell's region about Creswell's
25 concern?

2 A You are using that word how?

3 Q In a broad sense.

4 A That term, "investigation," is something very
5 specific in Inspection and Enforcement; it is a very
6 formal process. It can be an investigation performed
7 by investigators of this office or of the auditor. I
8 am not aware of any investigations in that sense what-
9 soever.

10 Q Did Mr. Keppler tell you whether or not
11 within Region III any Region III I&E personnel other
12 than Mr. Creswell had been assigned to evaluate the
13 validity of Mr. Creswell's concerns?

14 A I had no conversation which led me to conclude
15 that he did.

16 Q As of today, do you know whether or not any
17 such evaluation of Mr. Creswell's concerns was conducted
18 within Region III?

19 A I would have to defer to Mr. Bryan who had the
20 conversations, and if there were any others I am sure
21 he would be aware of them. I personally am not aware
22 of any such investigation started by Region III. There
23 is an investigation ongoing with B&W that deals with
24 this whole issue.

25 Q Why don't you tell me about that. That is

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2 an ongoing investigation as to B&W?

3 A Well, the investigation isn't complete, and I
4 would rather not.

5 Q Can you at least tell me the circumstances
6 of the investigation without getting into the results?

7 A The investigation is to inquire into the matter
8 of what B&W did regarding the whole question of the
9 Davis-Besse issue and the Part 21 notification of the
10 Commission.

11 Q Is this an I&E investigation?

12 A Yes, it is an I&E investigation.

13 Q Are you in charge of that?

14 A It is being done by my office.

15 Q Who in your office is in charge of it?

16 A I don't know the investigator by name ^{who} that has
17 been assigned to it.

18 Q Who would you go to in your office to find
19 out the status of the investigation?

20 A I am reasonably new at this game and I am not
21 sure I will pick the right individual. I believe the
22 investigation would probably be performed by investigators
23 from Region III. I am not certain of that, and again
24 reserve the option to correct the transcript.

25 Q Surely.

2 A If you really want to know, if you will give me a
3 few moments I will find out who the investigators are.

4 Q Maybe you can check on that at the break, or
5 we can take a break now if you wish.

6 A Do you want to take a break now?

7 MR. KANE: We will take five minutes.

8 (Whereupon, a brief recess was taken.)

9 MR. KANE: Back on the record.

10 Q Mr. Stello, we have been discussing an
11 ongoing investigation you made reference to under
12 Part 21 over the concerns as to the Michelson report.

13 Let me ask you if you know what the Michelson
14 report is.

15 A Yes, I do.

16 Q As I understand, there are several versions,
17 two handwritten versions and one typed version. Have you
18 seen all three versions?

19 A I have seen a typed version. I have not seen the
20 handwritten version.

21 Q Just for purposes of identification, let me
22 show you a document that has been marked previously as
23 Exhibit 8 to the Foster deposition taken by this
24 Commission, and ask you if that is the typed version of
25 the Michelson report that you have seen. (Handing.)

2 A Can we go off the record for a moment?

3 Q Yes.

4 MR. KANE: Off the record.

5 (Discussion held off the record.)

6 MR. KANE: Back on the record.

7 Q To my knowledge, that is the only typed
8 version of the Michelson report that I am aware of.
9 Is this the one that you have seen previously?

10 A To my recollection, and scanning the summary,
11 this is the report I have seen before.

12 Q Have you read that document?

13 A I have read the document.

14 Q Have you read Section 4.6 of the document
15 that talks about the operator relying mistakenly on the
16 pressurizer level to assess the inventory in the core?

17 A I read the entire document. I will have to
18 refresh my memory on what Section 4.6 deals with, but,
19 yes, I have read it before and am familiar with it.

20 Q When did you first see this document?

21 A It was sometime in April while I was up at the
22 site, and I read it while I was at the site.

23 Q How did it come to your attention?

24 A Someone from headquarters, and I can't remember
25 who -- it might have been Mr. Eisenhut -- sent a copy

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up to the site for my review.

Q Did anyone tell you or were you informed as to why a review of that document by you was deemed appropriate?

A The way I viewed presenting the document to me was to understand better what had happened at TMI from the point of view of deciding on what future actions we ^{might} take up there. In reading the document I came to the conclusion that it wasn't going to be helpful in deciding what course of action we ought to follow at TMI 2 from the post-accident environment, but identified that there were clearly a number of issues raised in there from the point of view of understanding safety, and I didn't spend a great deal of time with it. After a quick review, I came to that conclusion.

Q Did you also come to the conclusion which bears upon the accident which occurred at TMI 2 in reviewing the document?

A Yes.

Q Have you made any determination or have you come across any information which indicates what happened to the Michelson report which is dated January 20, 1978 within the NRC, as to who saw it, who read it, and where it went?

2 A Most of the knowledge that I acquired as to the
3 history of the report was second- and third-hand infor-
4 mation from conversations with other people; ~~that~~ I
5 cannot attest to its accuracy, but my general under-
6 standing is that a handwritten version of the report
7 was provided to Mr. Ebersole who was then a member of
8 the ACRS, and I believe a copy was provided to Sandy
9 Israel who worked in the Division of System Safety for
10 Dr. Mattson.

11 Q Do you know when Mr. Ebersole received his
12 handwritten version of the report?

13 A I believe I heard Mr. Michelson suggest that it
14 was soon after its preparation in ² discussion he had with
15 Mr. Ebersole, ¹⁻¹ shortly thereafter, ¹⁻¹ so it probably was at
16 the latter part of 1977.

17 Q Have you been given any information as to
18 when a copy was provided to Sandy Israel?

19 A I have a vague recollection that it was sometime in
20 the latter part of 1977 or early 1978, but again my
21 information is not firsthand at all.

22 Q Who did you get your information from?

23 A I had some conversations with Dr. Mattson about the
24 general subject. I also heard testimony of Mr. Michelson
25 ^{not} on Congressman Weaver's Task Force ^{so} between the two of

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2 them ~~that~~ is where I picked up most of the information
3 of what happened to the report.

4 Q Have you been given any information as to
5 what happened to the report after it was provided to
6 Mr. Ebersole in handwritten form and later on to
7 Mr. Israel?

8 A My recollection of what they did with the report
9 is too vague to try to recall what each of them did
10 with the report.

11 Q Can you give us your vague recollection?

12 A I would have to go back and read the transcript,
13 and I would prefer to rely on whatever it says as being
14 what I heard.

15 Q Which transcript?

16 A That is the transcript of a hearing where
17 Mr. Michelson was asked about his report.

18 Q We have that transcript so we can review
19 that.

20 Do you have any recollection as to what
21 happened to it after it was provided to Mr. Ebersole and
22 Mr. Israel?

23 A Other than what is in that transcript?

24 Q Yes.

25 A No.

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2 Q Were you informed by any other source other
3 than reading that transcript as to what happened to it
4 after it was provided to Mr. Ebersole and Mr. Israel?

5 A Conversations with Dr. Mattson, and that was more
6 of the chronology of who received it and when rather than
7 what they did with it.

8 Q Can you tell me what Dr. Mattson told you?

9 A Basically what I told you.

10 Q That it was given to Mr. Ebersole and
11 Mr. Israel?

12 A Yes.

13 Q I am trying to focus on what happened there-
14 after. Did Dr. Mattson tell you what happened after it
15 was given to Mr. Ebersole and Mr. Israel?

16 A Not that I can recall. I did not have any
17 extensive conversations with him on what was done with
18 the document.

19 Q Do you have any reason to think that the
20 document was given to anyone else within the NRC other
21 than Mr. Israel?

22 A I have no reason to believe that anyone else got a
23 copy. Let me add as a parenthetical note much of the
24 discussion of the Michelson report and what happened
25 was taking place here in Washington while I was up at

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2 the Three Mile Island site, so ~~hence~~ I would not have
3 been involved in these discussions, ~~so that~~ I don't have--
4 I didn't have a reason to really be a party to trying
5 to understand the history of what did happen to the
6 report.

7 Q While we were off the record previously, I
8 believe you did mention that there is an ongoing investi-
9 gation concerning this matter of the Michelson report.

10 A That is correct.

11 Q What is the purpose and substance of that
12 investigation?

13 A The purpose is to evaluate whether or not we should
14 have been notified under Part 21 by B&W of its existence
15 and what the significance of the B&W analysis of the
16 report was.

17 I might note that earlier I had indicated that I
18 thought that investigation was being performed out of
19 Region III, but during our break I went and asked who
20 the investigator was, and I found out his name is
21 Mr. Ward, who is the investigator here in our headquarters
22 office, ^{he} and would be the individual most knowledgeable
23 of the present status of the investigation.

24 Q Is that Mr. William Ward?

25 A Yes.

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Q He is a member of I&E here in Bethesda?

A Yes, he is. What the scope of this investigation is at the present time and how it might change in the future, he would clearly be the best source of that information. I have not been briefed on the status of the investigation and would not be able to speak to its details.

Q Who does Mr. Ward report to?

A He is doing this investigation under the direction of Mr. Harry Thornberg, who is the director of the Division of Reactor Construction Inspection, and within that division lies the responsibility for the conduct of our follow-up of the Part 21 information.

Q Do you foresee any problem in taking the

deposition of Mr. Ward as to the status of what is going on in connection with that investigation?

A I would hope since it is an ongoing investigation that if a deposition is taken that appropriate arrangements are made to preserve the integrity of the investigation and avoid any compromise of the ongoing investigation. I recognize the need for all of what we do to be in the full public view, and indeed this will be the case when the investigation is complete, but prior to completion of that investigation, since it is ongoing,

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2 I would hope that some protective order would be avail-
3 able to withhold the results of that deposition until an
4 appropriate time.

5 Q We will definitely have to look into that.

6 If I understand what you are saying, there
7 is some question as to whether or not B&W was under an
8 obligation under Part 21 to have reported its receipt
9 of the Michelson report to the NRC and its evaluation of
10 that report, is that correct?

11 A That is correct.

12 Q In fact, did B&W provide the NRC with any
13 evaluation of that report?

14 A That is what the investigation will determine.

15 Q You do not know at this time?

16 A I have not been briefed on the status; therefore,
17 I can't give you an answer.

18 Q How long has this investigation been ongoing?

19 A The investigation was started prior to my assuming
20 responsibility as the director, so that would cause it
21 to be sometime prior to June. I could get you a precise
22 date, but my recollection is that it was probably late
23 April or early May.

24 Q Right after TMI?

25 A Clearly after TMI.

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Q In April or May of 1979?

A Yes.

Q We were talking about ~~the~~ Davis-Besse and about investigations relating to Davis-Besse, and we had a conversation off the record to which I will not refer in that regard. However, it is my understanding that there was an investigation of the Creswell concerns relating to a transient at Davis-Besse, and that that investigation was conducted by Region III in late 1978 and early 1979. Are you aware of that?

A I don't have any recollection of it, but I have no reason to dispute that it indeed occurred.

Q That suggests to me that you have heard something about that. Have you heard anything about that?

A I have no specific recollection of that investigation or of its results.

Q Let me show you a document that has already been marked as Exhibit 5 to the deposition of Mr. Willse of B&W in connection with this deposition taken by this Commission's legal staff, and let me ask you if you have ever seen that document before. (Handing.)

A I cannot recall ever having read this document before. I don't recognize its contents nor the names

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of the people who were being interviewed, and that again does not say that as a result of compiling lists of documents that that could not have been on a list. It pre-dates, again, my tenure with I&E, so I certainly can't speak in any knowledgeable way of it.

Q Exhibit 5 is a memorandum dated January 9, 1979 and it concerns loss of pressurizer level indication, and it appears to memorialize a meeting which took place at B&W in Lynchburg on February 14, 1979. The meeting was apparently attended by two inspectors from Region III, Mr. Kohler and Mr. Foster, and the second paragraph on the first page recites that Mr. Foster of NRC opened the meeting by stating that "The purpose of this meeting was to investigate an allegation by an NRC inspector that B&W had not responded in a timely manner to resolve the loss of pressurizer level indication concern at DB-1" which is a reference to Davis-Besse 1. I should tell you that the depositions of Mr. Kohler, Mr. Foster, and other NRC representatives have already been taken, and the testimony indicates that an inspector here has spoken to Creswell prior to today, and I would ask you if you have any knowledge concerning Creswell's concerns in this regard and this investigation of his concerns?

2 A Well, again, it raises the general issue of the
3 behavior of Davis-Besse Unit 1 in a very general way,
4 and I clearly, prior to reading that memo, was aware
5 of those concerns, so in the broad sense, yes, I was
6 aware of the concerns.

7 Q Were you aware of this investigation by
8 Region III, specifically Mr. Foster and Mr. Kohler on
9 behalf of Region III of the NRC as to those concerns
10 before today?

11 A No. Again, I have to provide a caveat to that.
12 A very large volume of documents cross my desk, and that
13 does not mean that could not have been on one of the
14 lists of documents that have been transmitted to others,
15 and it does not mean that I had read it because I
16 certainly don't recall ever reading the document before
17 today.

18 Q On the second page of this document in the
19 final paragraph in the second sentence the statement is
20 made that "Mr. Foster stated that as far as he was
21 concerned loss of pressurizer level indication was
22 merely an operational inconvenience and that the loss
23 of pressurizer level was not a safety concern."

24 Prior to today were you aware that this
25 determination had been made in connection with an

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investigation of Mr. Creswell's concerns as to Davis-Besse 1?

A No, I am not aware that Mr. Foster said what he said, but the statement that he made is not one that I would find outrageous since dealing with pressurizer level for transient conditions could have been compensated for in plants, and indeed is being compensated for in plants. I do think it is a safety concern, but it also is an operational concern, so again the general subject --

Q A safety concern would almost always be an operational concern, would it not?

A No. There are many safety concerns that are concerns that are well beyond what anyone would reasonably ever expect to occur during operation -- in normal operation of the plant. For example, you would not have to be concerned with the behavior of the plant during a very sudden decompression transient due to a break. There are many concerns about what might happen if such an accident took place, which doesn't impose operational problems, so that the two are not necessarily coupled in that sense. An operational concern is one that does have safety significance to it. All of the modes that the plant normally operate in is what one has to look

2 at fairly carefully from a safety point of view.

3 The inverse of what you said is more appropriately
4 correct, and that is that operational concerns are
5 concerns that have to be considered, but there are many
6 other safety concerns beyond normal operation of the
7 plant.

8 Q Prior to March 28, 1979, what was the
9 parameter that operators in pressurized water reactors
10 looked to in the control room in order to assess the
11 state of inventory in the core?

12 A Normal operation in transient conditions where
13 you are not concerned with accidents, the primary
14 parameter -- a primary parameter -- there are several --
15 include pressurizer level. It is a parameter he needs
16 to be aware of.

17 Q To the extent that that parameter was used
18 to assess the state of inventory in the core and to the
19 extent that parameter is lost to the operator under
20 certain circumstances either by going off scale, high
21 or low, doesn't that raise a safety concern?

22 A Surely.

23 Q To that extent then, Mr. Foster's statement,
24 assuming he made it, the statement memorialized in this
25 memorandum is incorrect in that it is not just an

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operational inconvenience?

A May I have the statement again and read it?

Q (Handing.) Let me show you Page 2 of the document marked as Exhibit 5 to the Willse memorandum, and direct your attention to the last paragraph on Page 2.

A I have a great deal of difficulty either agreeing or disagreeing with you, ~~and that is~~ ^{As} I read what is said here, if I assume they are the thoughts Mr. Foster had in mind, it is dealing appropriately ⁽⁻⁾ or is a way to deal appropriately with ⁽⁻⁾ pressurizer level during normal operations ^{as} ~~is~~ an inconvenience; it indeed is that.

With the knowledge I have now of what happened at Three Mile Island, that was an accident; it was a loss of coolant accident. The evaluation of a PWR ⁱⁿ the event of a loss of coolant accident, pressurizer level is not a primary parameter of concern. It is the operation of emergency core cooling equipment, because clearly for conditions of a loss of coolant accident you will not get an indication in the pressurizer all of the time.

Q Prior to March 28, 1979, did operators in pressurized water reactors around the country generally realize that during transient conditions they should not look to water level in the pressurizer to assess the

2 level of water inventory in the core?

3 A Do you want to repeat your question?

4 Q Prior to March 28, 1979, did operators in
5 pressurized water reactors throughout the United States
6 generally understand that during transient conditions
7 they should not look to pressurized water level to
8 assess the state of inventory in the core?

9 A Let's agree on some definitions before I answer
10 the question, so I am sure I understand what you are
11 driving at.

12 A transient to me does not include accidents, a
13 loss of coolant accident, loss of inventory.

14 Q Let us say during a small break LOCA.

15 A During a loss of coolant accident, the operators
16 should have been trained ~~so~~ they ought not to worry about
17 pressurizer level, and must worry about the performance
18 of emergency core cooling.

19 Q Based on your experience, did operators
20 prior to March 28, 1979 understand that?

21 A They should have understood that for a loss of
22 coolant accident they ~~would~~ ^{should} not focus on pressurizer
23 level.

24 Q We have been discussing the Davis-Besse
25 transient of September 24, 1977.

2 A For transients in the way in which they are
3 normally used, operators were trained to focus on
4 pressurizer level to the point where there was a pre-
5 occupation on pressurizer level, maintaining the
6 pressurizer level within the operating range for normal
7 operation, and in transient conditions that is what they
8 focused on. They should have been trained and there
9 were procedures for loss of coolant accidents that
10 clearly make it known that you are not going to get a
11 level in the pressurizer because you will have breaks
12 where the pressurizer will not ever fill up again.

13 Q That was not the question. I am not focusing
14 on what their training was, but based on your knowledge
15 of these prior transients and your experience in DOR
16 and now in I&E, as to whether or not prior to March 28,
17 1979 the operators understood that during a small break
18 loss of coolant accident they should not look to the
19 level of water in the pressurizer to determine the state
20 of inventory in the core; not what they were trained to
21 do, but did they, in fact, understand that?

22 A I have got to answer the question with respect to
23 the analyses and understanding of plant behavior that
24 are documented in the FSAR and various related documents.
25 With respect to the knowledge that individual operators

2 may or may not have, I can't -- I haven't done a survey
3 that would allow me to answer that question. How did
4 the average operator react to the compilation of infor-
5 mation in the FSAR? The FSAR provides those analyses.
6 I am assuming that the FSAR's are read and understood by
7 the operators regarding the procedures in the control
8 room and what they are intended for are understood by
9 the operators.

10 In that context, I make the sharp distinction
11 between an accident and normal operation. For normal
12 operation, based on what I knew and understood after
13 TMI 2, especially in B&W plants, there was clearly a
14 focus and, in fact, a mind set on following pressurizer
15 level for what they considered to be normal operation
16 in transients. Had they recognized at Three Mile
17 Island that they had a loss of coolant accident, and
18 had they taken out the procedure to follow a loss of
19 coolant accident, I believe that you would not have had
20 any serious accident at Three Mile Island.

21 Q And they would not have interrupted the HPI?

22 A They clearly should not have interrupted the HPI.

23 Q If they understood the situation, they
24 clearly should not have?

25 A Yes. There was a procedure that says as your

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2 reactor pressure is dropping, here are the actions you
3 take for that particular event. They didn't take it.
4 They were trained to take action when the reactor
5 pressure is developing.

6 Q Are you aware that on September 24, 1977 at
7 Davis-Besse the operator looked at a rising pressurizer
8 level and went over and terminated the HPI based on that
9 pressurizer level?

10 A I am aware of that.

11 Q Are you aware that that also involved a
12 PORV sticking open?

13 A I am aware of it.

14 Q As a result of that accident, are you aware
15 that there was indeed some voiding within the reactor
16 coolant system? Are you aware of that?

17 A Yes, I am aware that he would have had a reactor
18 vessel with steam voiding in it.

19 Q If you had been aware of that information
20 at the end of 1977, would that have indicated to you
21 that at least some operators did not understand how to
22 treat pressurizer level as an indicator during a small
23 break loss of coolant accident?

24 A Clearly at Davis-Besse and at TMI the facts tell
25 us that they didn't. They turned off the HPI when they

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2 should not have, but whether that is representative of
3 operators in general, that is too broad a question.

4 Q It does indicate to you that there was a
5 mind set among the operators to do that?

6 A A mind set focusing on pressurizer level to the
7 exclusion of what went on in the plant.

8 Q Are you aware that Mr. Creswell became aware
9 of that problem, having been aware of what happened at
10 Davis-Besse on September 24, 1977, and that is the
11 premature termination of HPI?

12 A I am aware of it now.

13 Q Are you aware that Mr. Creswell made some
14 attempt to have that evaluated within Region III during
15 1977?

16 A I am aware that he did.

17 Q How did you become aware that he did?

18 A Through the documents we spoke about in the last
19 hour or so.

20 Q The documents we were talking about were
21 dated January, February, and thereon during 1979, and
22 I am focusing on the middle and fall of 1978. Are you
23 aware that the Creswell history goes back that far?
24 A I am aware that the Creswell history goes back to
25 the 1977-1978 time frame. I couldn't pick the date out.

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I am aware of some of it because of some of the things that transpired since then. I cannot, as I have answered earlier, tell you when I first heard of it. It all post-dates TMI.

Q That relates to that confidential matter we spoke about?

A No. All our discussion of all the documents that surround the Creswell matter and the concerns raised by him and how they have been resolved within the agency.

Q Have you seen any documents that indicate to you that Mr. Creswell was delving into this matter in 1978?

A Did I see them in 1978?

Q Have you seen as of today any documents which indicate that Mr. Creswell was delving into this matter in 1978? The documents we discussed were all dated in 1979.

A To answer yes or no is difficult. There are a whole variety of documents that have come across my desk. I cannot remember the dates of them, but I do know that they relate to the Creswell concerns that extend back into several years past, and the answer is I really couldn't speak to them one by one or as a

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2 collection.

3 Q Let me show you a stack of documents which
4 was provided to me this morning by Darrell Eisenhut, and
5 as I recall his testimony this was a package of documents
6 distributed to him after the TMI 2 incident, and it is
7 perhaps a half-inch of documents with an index on top
8 and the title of the whole package is the "Creswell
9 package." Let me ask you if you have seen documents
10 arranged in that format, without going through each
11 document. Have you seen a collection of documents
12 similar to that? (Handing.)

13 A Several of the documents that are identified in
14 here are documents we have talked about earlier.

15 Q Right. What I meant was whether you have
16 seen this format or this grouping of documents under the
17 title, "The Creswell Package"?

18 A No.

19 Q You haven't seen that?

20 A I have seen a stack of documents relating to
21 Creswell which are even thicker than those, and those
22 are the ones I suggested you need to discuss with Sam
23 Bryan. They go back further in time than those.

24 Q All of these documents appear to be dated
25 in 1979. Have you seen any documents relating to

2 Creswell's concerns that were dated in 1978?

3 A I think so, as part of the discussion I had with
4 Sam Bryan on pulling together documents that were
5 supplied to people who had requested them. Without
6 an opportunity to go back and check through the docu-
7 ments, again, I would have to at least leave a question
8 mark, and I will have to correct the transcript if I
9 need to. My recollection is that there were clearly
10 documents which went back further than these do for sure.

11 Q What were those documents that you saw?

12 A It was a collection of documents related to the
13 concerns raised by Creswell and go back in chronological
14 time.

15 Q Were they I&E reports?

16 A A large number were I&E reports. I don't know whether
17 they were only I&E reports or not; I cannot be sure.
18 There were a large volume of them. I will have to
19 check.

20 Q Were they collected in a package?

21 A Yes.

22 Q Who collected them?

23 A Sam Bryan.

24 Q You said you have provided those to a number
25 of sources, the people who requested them.

2 A At least one source that comes to mind, yes,
3 and I don't know whether there were sources.

4 Q Would you tell me who requested them?

5 A John Austin.

6 Q Who is John Austin?

7 A He works for one of the Senate subcommittees.

8 I am not sure which. Senator Glenn's subcommittee.

9 Q Anyone else?

10 A I'd have to go back and ask. That one stands out
11 to me because it is the most recent one.

12 Q Has anyone within the NRC requested such
13 documents from you?

14 A I don't know. From me personally?

15 Q To your knowledge.

16 A No.

17 Q Are you aware of the fact that there were
18 two transients involving pressurizer level indication
19 at Davis-Besse in 1977?

20 A I would have to --

21 Q That was an indication in which pressurizer
22 level did not go off scale and involved premature
23 termination of HPI which was on November 29, 1977, at
24 which pressurizer level dropped off the low end of the
25 scale. Were you aware of that second transient?

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2 A I would have to consult something.

3 Q It is described in the Tedesco report.

4 A I thought it was, and to the extent it is in here,
5 yes. I said I reviewed all the transients. I don't
6 remember them by date or function.

7 Q Aside from the Tedesco report that you have
8 in front of you, have you made any attempt to evaluate
9 or determine the nature of that transient on November 29,
10 1977?

11 A No.

12 Q Have you made any attempt to trace the history
13 of how that transient was reported, resolved, or handled
14 by the NRC?

15 A There was a question with respect to which transients
16 were reported to the licensee, Metropolitan Edison, and
17 in that context, I recall looking through various documents
18 that we provide routinely to the licensees, Metropolitan
19 Edison included, and as a result, and as I recall there
20 were printouts from the LER's that were provided to the
21 licensee as well as a summary of this particular document
22 as one of the documents that are provided by MPA.

23 Q Which document? Was it an LER?

24 A No. I need some time to go back and look at the
25 title. It is a document provided by MPA whose title

2 escapes me that reports significant events.

3 MR. CHOPKO: Referring to a bulletin on
4 significant events?

5 A It is a significant event in a licensee's facility
6 and the exact title escapes me.

7 Q Like a newsletter called "Current Events"?

8 A That might be it. The exact title is what I
9 don't recall.

10 Q And that is circulated to all licensees?

11 A It is.

12 Q Have you had occasion to check to see whether
13 or not this transient had been reported to the licensees?

14 A Yes, and as I recall, it was.

15 Q Under what circumstances did it come about
16 that you were checking on that?

17 A I believe it was a question that was asked by one
18 of the Congressional committees.

19 Q After TMI 2?

20 A Following TMI 2. I don't remember whether it came
21 out of Congressman Weaver's task force or Congressman
22 Udall's subcommittee, but one or the other asked for the
23 information, and I remember asking people to search back
24 to find out if it was, and I believe that transient was
25 in there, I think, and that is the extent ^{to} of which I looked

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2 at the reporting of it.

3 Q Was James Creswell concerned about that
4 transient as well as the September 24, 1977 transient,
5 to your knowledge?

6 A I don't know.

7 Q In checking back to see what word was put
8 out to the licensees concerning that transient, did you
9 also have occasion to determine what disposition there
10 was of any potential safety issue in NRC concerning
11 that transient of November 29, 1977?

12 A I did not do that.

13 Q Do you know if anyone else did that?

14 A I believe Dr. Mattson made an effort to do so.

15 Q Was that effort instituted after the TMI 2
16 accident?

17 A I believe it was after TMI 2. It was an attempt
18 to find out what was done regarding those transients
19 as well as an evaluation that the staff may have made
20 of them.

21 Q Was that as to both of those transients,
22 September and November 1977?

23 A I believe so.

24 Q What determination was made as to the
25 resolution of those transients within the NRC?

2 A I don't know. I did not follow up on it myself.

3 Q Have you heard anything in that regard?

4 I am asking for tenth hand hearsay if that is all you
5 have got.

6 A I would not be able to identify a particular date
7 of the transient versus reports that were issued.

8 I know there were some safety analysis reports that were
9 issued regarding some of them. I don't know if they
10 include those two transients or not.

11 Q That was a safety analysis report as to a
12 Davis-Besse transient?

13 A Yes.

14 Q What do you recall about that safety analysis
15 report?

16 A Just that it existed.

17 Q Do you know what determination it made about
18 the transients?

19 A No.

20 Q Did it identify the transients as identifying
21 a generic safety issue?

22 A I don't think so. I don't recall any discussion
23 of it.

24 Q Did these evaluations determine that there
25 was no generic safety issue and, in fact, the matter had

2 been satisfactorily resolved?

3 A I don't know.

4 Q How long ago did you look at the safety
5 analysis reports?

6 A I don't recall even looking at them or reading
7 them except to identify their existence which is what
8 you have been asking me to do. I have heard about them.
9 I don't have a specific recollection.

10 Q What have you heard about them beyond their
11 existence?

12 A That as a result of trying to find out what the
13 staff had done about them, that there were these reports
14 prepared.

15 Q I do not mean to keep belaboring it, but it
16 seems to me that it would be perfectly natural to see if
17 there was a safety analysis report done, that you would
18 almost always inevitably --

19 A I didn't ask if they were done. These were
20 conversations I had heard about. I couldn't even tell
21 where I heard it, just that I recall conversations of it.
22 I certainly didn't ask for the information. Others
23 were, and in trying to be as responsive to you as you
24 are asking me for tenth hand recollection, and I am trying
25 to tell you I heard of their existence. I didn't

2 initiate them or follow up on them.

3 Let me remind you that my principal activity was
4 at Three Mile Island at the site, and much of what you
5 have been asking me about were things that happened
6 here in Washington while all this was going on from
7 the Washington point of view, and all of my energy was
8 being devoted to what was going on the site.

9 Q Let me see if we can move to the accident
10 of TMI 2.

11 A That is what I am familiar with.

12 Q Let us begin with the events on March 28,
13 1979. The problem began presumably at 4:00 o'clock
14 in the morning.

15 When did you first hear on that day that
16 there was a problem at TMI 2?

17 A It was in the neighborhood of 8:00 o'clock in the
18 morning.

19 Q How did you hear?

20 A I received a phone call from Mr. Moseley.

21 Q Was that at your home?

22 A I was at the office. I was in a meeting with
23 my deputy, Darrell Eisenhut, at the time.

24 Q What occurred? What did Mr. Moseley tell
25 you at that time?

2 A He briefly described that there had been an
3 event at the site, and my first question to him ^{was} "Was
4 there an environmental release?" and he indicated that
5 there was, and I told him that I would make suitable
6 arrangements and that I would be over, and when I hung
7 up I asked Mr. Grimes to go over to our operations
8 center immediately.

9 Q That is the Incidence ⁺ Response Center?

10 A Yes, called the operations center -- because
11 there was an environmental release and he was the best
12 man that I had working for me that could deal with those
13 issues. I instructed Darrell Eisenhut to collect
14 appropriate people to be able to deal with all issues
15 related to the Three Mile Island facility in our office
16 in the Phillips Building, and then I left immediately
17 after doing that to come over to our operations center
18 and arrived shortly thereafter.

19 Q You went to the Incidence ⁺ Response Center
20 within the operations center; is that the idea?

21 My confusion is that you are calling it the
22 operations center, which is something new. I heard it
23 referred to in the past as the Incidence ⁺ Response Center.
24 Is that the same place?

25 A Its correct title is ~~the~~ our Operations center."

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2 Some people have referred to it as the Incidence⁺ Center.

3 Q And we can use those terms interchangeably?

4 A Yes, and I will have no difficulty following you.

5 MR. KANE: Off the record.

6 (Discussion held off the record, following
7 which a brief recess was taken.)

8 MR. KANE: Back on the record.

9 Q Mr. Stello, we were just about to get into
10 an area that you indicated you do know something about,
11 and that is, on March 28, 1978, when you were first
12 notified of the accident at Three Mile Island, Unit 2,
13 and you did state that you asked Mr. Grimes to go to the
14 Incidence Response Center because of an environmental
15 release, and shortly thereafter you also went to the
16 Incidence Response Center, is that correct?

17 A That is correct.

18 Q You arrived at the IRC at around 9:00 o'clock
19 in the morning?

20 A Approximately that is correct.

21 Q What did you do when you arrived there?

22 A When I arrived there, I first tried to get briefed
23 on what we knew about the accident at Three Mile Island.
24 My primary concern initially was to understand how they
25 were cooling the core.

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Q What did you learn?

A And what information they had to persuade themselves that they knew they had, in fact, adequate core cooling.

Q What did you discover?

A It took some hours in trying to understand the status of the system and how they thought they had been cooling the core.

Q Why was that delay?

A It was very difficult getting information in the first hours. The original communication system was very poor. We had an arrangement where an engineer sitting here in the operations center was talking to another engineer in Region I who was in turn talking to someone from the site. The communication system was burdened with requests and the need for information of a variety of sources that could bypass the system that we had here, saying it in a different way, people could call up Region I and ask Region I directly to try to get information, as well as the engineer sitting here communicating with Region I, so there was a burden on the one link of the communications system, and for some period of time we had lost communications. Communications got very difficult when they had to put on masks and they

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2 had to leave the control room to go over to Unit 1 and
3 get back and forth for information, so the ability to
4 get information was strained. It was not very good.

5 The understanding of how the core was being cooled
6 was not in any usual condition for the core cooling
7 system. They thought that they were cooling the core
8 through the steam generators with the primary coolant
9 pump stopped, and as the morning wore on it became
10 apparent to me and others that they had a condition
11 where the hot ^{leg} ~~light~~ temperatures were indicating the
12 possibility of a super heat condition.

13 Q . Could you just explain a little what a
14 super heat condition is?

15 A Normally, steam and water at a given pressure can
16 be in equilibrium condition where the temperature of
17 steam and the temperature of water are equal. If you
18 add more energy to the steam in that condition, it is
19 possible ~~for heat~~ to heat the steam to a higher temperature
20 than the water. Whenever steam exists at a higher
21 temperature than the water, under those conditions the
22 steam is in a "super heat condition."

23 Q Is there a danger in having the steam super
24 heated?

25 A Well, there may or may not be. The concern was

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2 that if there was indeed a super heat condition, the
3 only plausible explanation I could see to create a
4 super heat condition was a core being partially uncovered
5 which would be the place where the extra energy would
6 be added to the steam which is what you are measuring
7 in the hot ~~lights~~ ^{lights}, and if, indeed, the core was uncovered
8 then you had a condition of questionable cooling of the
9 portion of the core which was uncovered; that is, it may
10 or may not be cooled adequately. You can't determine
11 that from one indication alone.

12 Hence we started to become concerned over trying
13 to get some information on what the temperatures were
14 of the in-core thermo-couples. These are thermo-couples
15 that are placed in assemblies about four inches above the
16 active fuel at the outlet of the reactor. We spent a
17 considerable time trying to determine whether or not
18 we could get a reading on those thermo-couples.

19 Q Was there a difficulty in getting a reading
20 on those thermo-couples?

21 A In getting a response back as to whether or not,
22 yes -- the communication was very difficult. We finally
23 had someone who got a printout of what the thermo-
24 couples were reading, and as I recall for the most part
25 the, were generally printing a question mark.

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2 Q Was that because the computer was not
3 programmed to handle anything over a certain temperature?

4 A Yes. We later found that out. At that point
5 when it was printing a question mark we got that indi-
6 cation, and we determined that there were three possible
7 ways, as I recall it that this could happen. The
8 temperatures were off scale high, off scale low, or there
9 was a failure. The most plausible explanation again
10 was most likely off scale high, which meant that they
11 had exceeded the capability for the computer. We know
12 that now because we subsequently found out when a
13 technician went down and put a meter across the thermo-
14 couples leads, ^{the} and had, in fact, measured temperatures
15 that were in excess of 2,000 degrees, so it is clearly
16 the capability of the electronics in the system that had
17 been able to do that, not the thermo-couple device itself.

18 Through most of the afternoon, trying to assess
19 whether there were, indeed, other ways in which this
20 condition could come about, we were trying to advise the
21 licensee that he may have a condition of inadequate core
22 cooling, and that there would be a need to get more water
23 into the core to cool it.

24 Q By that time, had you ascertained whether
25 or not you had super-heated steam in there?

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2 A Oh, yes.

3 Q By the afternoon of the 28th?

4 A By "ascertain," meaning did I believe?

5 Q Were you personally satisfied?

6 A I became satisfied in my mind that the prudent
7 thing to do was to believe that those thermo-couple
8 readings did, in fact, indicate super-heated steam, and
9 that even in spite of what the pressurizer level was
10 telling him, he ought to believe his core was uncovered.

11 Q Did you advise anyone over the phone to that
12 effect at the site?

13 A Me personally?

14 Q Yes.

15 A Yes.

16 Q And what I was specifically referring to is
17 that it came out that they vividly recall you shouting
18 over the phone "that the core was uncovered." Do you
19 recall that?

20 A I speak with a loud voice. I don't know if I was
21 shouting but communications weren't very good.

22 Q Were you very excited?

23 A My voice may have been elevated, and yes indeed I
24 was trying to communicate to them that perhaps they
25 ought to believe that the thermo-couple reading was

1
2 correct, and they ought to consider whether or not that
3 if it were correct, the core was uncovered, and there
4 was a need to put more water in the core.

5 Q Would that be by turning the HPI on?

6 A Yes. They were using a high-pressure pump and
7 it just meant increasing the flow rate in other HPI
8 pumps.

9 Q Was that advice followed at the time?

10 A No. When I did communicate to the control room,
11 I asked for someone from the licensee's organization to
12 talk to, and I don't remember his name, and I have not
13 been able to determine who it was since then. I have
14 not made any real effort to find out.

15 Q He is the one you told, that as far as you
16 were concerned the core was uncovered and he should turn
17 on the HPI?

18 A Yes.

19 Q What did he respond?

20 A He responded at that time, as I recall, that they
21 were floating on the core flood tanks, the accumulators,
22 and that he thought that because he was floating on the
23 core flood tanks that they gave him assurance that he
24 had adequate core water levels ~~and~~ and I tried to make him
25 understand that that wasn't a valid reason, and that he

3 x that is a terminology, "floating on the
4 core flood tanks" that I have not heard. What does
5 that mean?

6 A The valves that separate the water in the core
7 flood tanks from the reactor vessel are opened and the
8 pressure and level of water in the accumulators attempt
9 to come in equilibrium with the conditions in the
10 primary system. When things equilibrate, you are
11 floating on them, which means that there is no net flow
12 of water from the tank; that the water level stays fairly
13 stable in the tanks, and hence the tanks are ~~at whatever~~^e
14 ~~level they are~~ attempting to put whatever water the
15 system will let come into it, but because of the
16 pressure imbalance, you don't need a very large pressure
17 differential to make up for the elevation -- difference
18 in water level, and indeed you still could be in an
19 uncovered situation.

20 Q You advised the licensee's representative
21 of that at that time in the telephone conversation?

22 A I think I told him that that wasn't necessarily
23 so, that you could still be uncovered, and if you really
24 believed the implication of super heat ^{in the} and hot ^{lines,} ~~lights~~
25 that that was a clear indication you were.

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2 Q What did he respond to that?

3 A That it was their belief they were adequately
4 covered.

5 Q The thing that has come up several times
6 at that point in time, did you feel you had the authority
7 to order him to turn on that HPI?

8 A Yes. I think if we had had more confirming
9 information than we had at that time, I believe we
10 would have called the licensee and ordered him to do it.

11 Q You did not think it was appropriate for you
12 at that time?

13 A I knew I only had fragmented information. I
14 clearly did not have all the information he did. There
15 were an awful lot of people advising the licensee who
16 had access to this information in the control room ~~that~~
17 I didn't feel that I was in a position to recommend to
18 my management that we ought to take that step, although
19 I do recall at least mentioning ~~it~~ while I was in the
20 Incident Center to people ~~whether~~ ^{that} we ought to consider
21 whether we should ~~and~~ since we had sketchy information, ~~and~~
22 it caused me to be hesitant.

23 Q In any event, at that point you decided not
24 to seek an order that he do this, and although you dis-
25 agreed with him, you decided to let him do what he thought

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2 was best, "he" being the licensee?

3 A We kept trying through the afternoon to persuade
4 him that he ought to consider more and more that this
5 is something he ought to consider, and eventually they
6 did get around to doing it.

7 Q Based on what you know today, at that time
8 in this telephone conversation, who was right?

9 A ~~I think that~~ ^{by} judgment is they should have put
10 more water in the core; that is what I believed then,
11 and I believe that now.

12 Q They finally got around to that?

13 A Eventually increased the water level in the system
14 and brought the pressure back up and turned on the
15 primary coolant pump, and that was the eventual mode of
16 recovery.

17 Q The reason for your strong suggestion at
18 the time that they do something about that was your
19 conviction they did have super-heated steam in the core
20 and partial uncover, given the hot ^{low} ~~right~~ and temperatures?

21 A Yes, and pressure ^I ~~izer~~ level, ~~and~~ ^{and} the fact that he
22 was floating on the core flood tanks was not, in my view,
23 overriding the clear indication of super ^{heat} ~~heat~~ and hot
24 ^{low} ~~lights~~.

25 Q Did you discuss that conviction of yours with

1
2 others at the Incidence~~ce~~ Response Center?

3 A I do remember discussing it, I am sure, with people
4 who were there, but I don't remember who.

5 Q Obviously the licensee at that time disagreed
6 with your position on it. Did anyone at the Incidence~~ce~~
7 Response Center, people of the stature of, say, Roger
8 Mattson, did people on that level also disagree with
9 your analysis on that?

10 A I can't come to agreement or disagreement as much
11 as the uncertainty as to whether we had enough informa-
12 tion to really be persuaded that that was indeed the
13 case. I don't know of anyone who disagreed that if
14 you believed the thermo-couple readings, that that was
15 indeed a question of super heat, and there was some
16 question as to whether the thermo-couples were reading
17 correctly or not, and there was concern over whether
18 that was, indeed, the case.

19 Q But you were convinced from all the parameters
20 you were looking at that, in fact, you were getting
21 meaningful readings from those thermo-couples?

22 A My recollection is that there were two things
23 which were leading me to the conclusion. One was that the
24 thermo-couples, the in-cores were reading a question mark,
25 were reading off scale high, and that would fit with an

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indication of super heat on hot ^{line} lights, ~~and~~ those two
tend to support each other. If I believed the thermo-
couples, that was the conclusion I would come to.

Q And you did?

A And I did, and I did not accept the fact that
pressurizer level was a controlling parameter or that
the accumulator gave sufficient information to conclude
that the core was adequately covered.

Q Who besides the licensee did you communicate
this conviction of yours to on March 28th at the
Incidence ~~Response~~ Response Center?

A We had discussions ~~and there would be~~ ^{with} people who
were present at the time, Mr. Moseley was there and
Mr. Thornthberg, and Mr. Grimes was around. I know
Mr. Case was there.

Q Was Roger Mattson there on the 28th?

A No. Dr. Mattson was not there. There were some
other engineers that I recall having discussions with
from my staff, but who ~~was~~ ^{were} there at that time -- they
kind of blend, in, and to tell you who was there when, I
don't know.

Q Were any of the Commissioners there?

A During the course of the day there were three
commissioners that I recall who came in.

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Q Who were those?

A Commissioners Ahearn, Bradford, and Gallinsky.

Q Did you speak with them about your conviction on this point?

A I told them that I had a concern that the ~~call~~^{cell} was uncovered.

Q Did you tell them why you were concerned about that and what you were basing your concern on?

A I don't know if --

Q Did you point out what you just told me concerning the hot ~~light~~^{light} and temperatures?

A I don't know if I went into just as much detail as I went into now. I don't recall.

Q Did you tell them about the super-heated steam?

A Since it was ~~just~~^{such} such a concern to me, I may have mentioned it to them. I can't recall the specific conversation. There were too many things going on. I was preoccupied with getting as much information as I could and making sure that they were getting our people to analyze, as fast as we could. Our conversations were short and fragmented. I don't believe I sat down and had any quiet conversation such as we are having now.

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Q As the day went on, did you obtain more data that further convinced you of the correctness of your position on core uncovering?

A Yes. I do recall a conversation, but exactly when I had it I don't remember, but it was during the course of the day when we were trying to get in touch with B&W, and I believe I spoke to Don Roy, and I think he too came to the conclusion that they had to get more water in the core.

Q Did he agree with your conviction?

A He agreed.

Q Did he agree with your conviction that you had core uncovering?

A I think so, but I don't remember him specifically saying that, which is making me pause. We both, I think, reached a conclusion at the end of our conversation that they ought to have more water in the core, and they were trying to communicate with the licensee. He indicated difficulty in doing so, as I recall, ^{the} ~~too~~, and later ~~and~~ I guess I don't understand why, because ~~there~~ ^{was} I ~~now~~ have subsequently learned that they had Mr. Floyd, from Metropolitan Edison, at B&W, ^{He} ~~who~~ was, in fact, communicating with the control room starting as early as, as I recall, around 7:00 o'clock in the

2 morning, but he did indicate some difficult in communi-
3 cating.

4 Q You mentioned before that you spoke to
5 Commissioners Ahearn, Bradford, and ^{ij}Gallinsky about your
6 concern regarding core uncovering during the time they were
7 at the IRC. Did you call anyone to formally brief
8 anybody about your assessment of the core condition?

9 A Not in any formal way. The conversations were
10 short ^{and} fragmented, and there was an individual who was
11 assigned as part of the system that is used in the
12 operations center. We were a group of people who were
13 trying to assess what was going on at the site. There
14 was an emergency management team, an individual assigned
15 with communicating back and forth between the two ~~but~~
16 ~~From~~ time to time, I talked to Mr. Case and others in
17 the management team while we were waiting for more
18 information ^g and there was a lull for a few moments, but
19 they were not in any sense formal. Things were moving
20 fairly rapidly, and ~~again~~ my energy was devoted ^{to} in
21 getting as much ^{inaccessible} information essentially, and a sense
22 of what was going on.

23 Q As time went on with more information coming
24 in, you did become more convinced that you were correct
25 about super-heated steam and partial core uncovering?

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2 A Yes, and that is perhaps what made me become more
3 compulsive in trying to communicate that.

4 Q Did you communicate to the licensee?

5 A Yes, I spoke directly over the phone. The
6 normal system for handling the phone was to direct our
7 questions to an engineer manning the phone, and he, in
8 turn, would transmit the questions back to someone up at
9 the site to get the answers, and that was the normal
10 system for communicating, ~~and~~ I guess at some point in
11 the afternoon, and I don't recall exactly when, I did
12 get compulsive and grabbed the phone and --

13 Q And you demanded to speak to the licensee?

14 A Yes.

15 Q And he came on the line?

16 A Yes.

17 Q And is that when you had the conversation
18 you told me about?

19 A Yes.

20 Q And he disagreed?

21 A Yes.

22 Q How much longer did that situation go on
23 before the licensee decided that your advice was good?

24 A Wait a minute.

25 Q I do not want to jump ahead.

2 A What the licensee did was more than I was
3 suggesting. A natural outcome of what I suggested was
4 maybe what he did, but he made a decision to do both.
5 He made a decision to turn on the pumps, add more water,
6 take the ~~sump pump~~^{drainage} system up to high pressure, ~~to also use~~^e
7 ~~the high pressure~~ to condense any steam that was in
8 there, and shrink its volume just by the increase in
9 pressure, ^{g/h} ~~so~~ whether there was ^g condensable or non-
10 condensable gas, when you raise the pressure you clearly
11 will shrink the volume of gases, ^{c/h} and he did add more
12 water. As far as how long after that occurred, I have
13 to look at exactly -- there is a record of when.

14 Q I know the sequence of events. We have
15 that, and you have a record of it as well.

16 A The sequence of events -- I think it is recorded
17 on the sequence of events when that NRC official, and
18 that was me, ~~that~~ made that call, and then the difference
19 of the two times which I'd have to look at the sequence
20 of events to answer your question. If you look at the
21 sequence of events it is the difference between the two,
22 which was several hours as I recall.

23 Q Sometime on the evening of March 28, and you
24 said you talked to the licensee toward the end of the
25 afternoon, is that correct, to the best of your

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2 recollection?

3 A It was late afternoon as I recall, yes, and what-
4 ever that time is, it is a matter of record. It isn't
5 something that needs to be recorded. ^{see}
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6 Q I understand. Again, if there is some
7 mistake between your recollection and what the official
8 record is, that is not a mortal sin.

9 A I am trying to be responsive.

10 Q How late did you stay at the Incidence ^{*}
11 Response Center that day?

12 A I didn't go home. I stayed through the night
13 all the way through -- I did get home sometime Friday
14 morning.

15 Q You stayed all day through Thursday?

16 A Yes.

17 Q On Thursday morning, were you called upon
18 to brief anybody about that analysis?

19 A I am not exactly correct. I did go home to
20 shower and change clothes at 5:00 or 6:00 o'clock the
21 following Thursday morning, and I had something to eat
22 and came back in and stayed through until sometime
23 Friday morning.

24 Q Did you stay at the Incidence ^{*} Response
25 Center?

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A I was in the operations center, yes.

Q Were you called upon Thursday morning to brief anybody about your analysis of the condition of the core?

A On Thursday, I believe I sat down and had a discussion with Dr. Mattson telling him that I thought that what we had seen was a condition where we had damage to the core, and we needed to look and assess that damage, to track and follow what the in-core thermocouples were doing. I believe I also made known to Darrell Eisenhut who was going to do some of the briefings, and ^{to} tell him what I thought, ^{so} there were, I guess, those two that I do have a recollection of having more of what I considered to be a briefing and assessment of what had gone on.

Q Did you tell them there was super-heated steam in the core?

A Probably. My concern at the moment ^{was} there ^{was} an assessment of what might have happened to the core, as I believed there was damage to the core at that point, ^{and} we had a condition where the thermo-couples were coming back on scale, and they were high, ^{and} we saw them coming back on scale, and we had to track them very carefully to follow what was going on.

2 Q Did you tell them at that time that you
3 believed there was partial uncovering of the core?

4 A I think so. ^{that} The reason I believed there was
5 damage ^{was just} I believe I related to them. I thought there
6 were extended periods when I thought ^{the core was} let me say,
7 just uncovered, ~~and~~ ^T the degree or depth would not be
8 something I would get into a great deal of detail
9 because I didn't have sufficient information as to the
10 extent.

11 Q Just uncovered?

12 A Just uncovered. That, in my judgment, led to the
13 possibility of damage to the core by overheating. ^{ing} We
14 clearly knew that there was damage to the fuel rods.
15 The amount of activity that was out clearly suggested
16 that you were in a situation where large numbers of
17 fuel rods had been breached, had failed, ^T the failure
18 mechanism ^{was} by overheating, and for sure all of the gap
19 activity in the plenum where fission gases collect,
20 that those had been breached. I don't know that I
21 used the words, "all of the rods may have failed," but
22 I believe I gave the impression it was a large number,
23 that it wasn't just a rod or two, but a large number of
24 fuel rods failed.

25 Q This was in your explanation or discussions

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2 with Mattson and Eisenhut on the morning of March 29,
3 Thursday morning?

4 A Let's call it Thursday because without going back
5 and checking, I cannot say whether it was the morning
6 or the afternoon since things were starting to blend
7 as to timing.

8 As I recall, I thought Mattson got here later; I
9 think it was early afternoon.

10 Q You did mention Darrell Eisenhut.

11 A Darrell was here in the morning. He was here
12 before Mattson because he was going to do some of the
13 briefing.

14 Q He was going to do some of the briefing for
15 who?

16 A To the Commission, and I don't know whether they
17 went to -- they may have gone to brief some of the
18 congressional subcommittees. I can't recall whether
19 they were or not on Thursday, but it may have been.

20 Q You expressed this information to Darrell
21 Eisenhut. Did he indicate whether or not he agreed
22 with your analysis on the state of the core?

23 A I think there was general consensus of agreement
24 on large numbers of fuel rods being failed. I don't
25 think he was in a position to agree or disagree, neither

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he nor Mattson, since I was briefing them ^{on} of what I believed transpired. They hadn't been here.

Q They were not in a position to disagree?

A Right. There may have been subsequent conversations with others to allow them to form an opinion. I guess I would have been surprised if there was a basis for much disagreement.

Q Then Mr. Eisenhut went on to brief the commissioners themselves and the NRC and the Congress later on that day?

A All of whom he briefed I don't know. You would have had to have asked him. I don't know who he briefed.

Q That is your understanding that was why he wanted the information?

A Yes, so he could perform that function of briefing whomever it was that needed to have that information, so I could continue to provide that continuity of following what was going on in the core.

Q Did Darrell Eisenhut leave the Incidence ^{of} Response Center to go to the briefings?

A He left to go to the briefings, yes.

Q And you stayed?

A I stayed.

Q Did you speak to any commissioners of the

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2 NRC on Thursday, March 29?

3 A I don't recall any of them dropping in on the

4 29th, but they may have.

5 Q Did you speak to anyone from Congress on

6 Thursday, March 29 about the situation?

7 A I was asked to take one phone call from one of

8 the staff people on one of the Congressional subcommittees,

9 but, no, I never -- I don't recall speaking to any

10 congressmen, but there was a staff member, and I can't

11 remember who it was I talked to. It may have been

12 Henry Meyers. I am not certain. I will have to check.

13 Q It was a congressional staff member?

14 A Yes.

15 Q And you spoke to him on Thursday, March 29?

16 A I believe so, yes.

17 Q Do you recall what time of day?

18 A No.

19 Q What did you tell him? Was it essentially

20 what you told Darrell Eisenhut?

21 A I think they were more interested whether things

22 at that point were all right.

23 Q I take it you told him that they were not?

24 A No. I felt that they were adequate in terms of

25 cooling the core at that time, and that is the conclusion

2 once we got the pump on and established circulation
3 with the primary cooling pump, that we then had a
4 condition where we had adequate cooling in the core.
5 My confidence from that point started to increase.

6 Q You were still convinced that you still had
7 a substantial number of fuel rods damaged?

8 A We knew we had a ~~release~~ ^{release}.

9 Q You were convinced that those fuel rods
10 had been damaged during a partial uncovering of the
11 core?

12 A That is the view I had, yes.

13 Q Do you have that view today?

14 A Absolutely.

15 Q Do you think that subsequent knowledge has
16 borne out those convictions on your part?

17 A Much more, yes.

18 A ~~A~~ I guess the primary coolant sample results
19 which I got must have been late Friday night or early
20 Saturday morning. ~~A~~ An understanding of hydrogen burn in
21 the containment clearly fit together with a view of
22 damage, but it was at that time that I really -- that
23 was the first time I started getting an appreciation
24 for how extensive that damage was. I think those two
25 particular pieces of data, the results of the primary

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2 coolant sample and the hydrogen burn in the contain-
3 ment, I guess that occurred Wednesday afternoon, but
4 I didn't know about it until Friday.

5 Q That has come up several times. What was
6 the explanation why you found out about it only two
7 days later, that is, the hydrogen burn?

8 A As I understand it, the question of the hydrogen
9 burn was first identified by someone who was reviewing
10 the data collected on Wednesday sometime either late
11 Thursday or Friday morning. Whenever that was, in that
12 general time frame, ~~and~~ it was in reviewing the data
13 that it was first hit on, and I believe the individual
14 that was identified as reviewing the information was
15 Bill ^{el}Low, who was a consultant for the licensee, ~~that~~
16 I In reviewing the information he identified that the
17 pressure spike could have been caused by a hydrogen
18 burn in the containment.

19 Q On Thursday, March 29, besides Mr. Mattson
20 and Mr. Eisenhut, were you called upon to brief anybody
21 else about the condition of the core?

22 A No. As new people come into the Incident ~~Center~~
23 Center, I am sure I had conversation with them to tell
24 them what my views were and what I thought we had.
25 The two that I did feel the need to get ~~into~~ into in the way

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2 of briefing were Mattson and Eisenhut.

3

Q And in the case of Mr. Mattson, was that
4 also because he was going to give further briefings
5 and needed that information?

6

A No, it was because he was going to be party to
7 the operations center from that point on, and would be
8 available to spell me. I was going to try to get some
9 sleep.

10

Q And in the case of Mr. Eisenhut, he needed
11 the information to brief others?

12

A Darrell Eisenhut was identified as an individual
13 that needed to have the information to go out and start
14 giving some of the briefings. I didn't feel that I was
15 in a position to leave the Incident ~~Center~~ Center. I thought
16 that I would be most valuable in staying on and following
17 the ~~course~~ ^{course} of the accident.

18

Q Let me take you back in time back to
19 Wednesday, March 28 again. About seven and a half
20 hours into the event, there was some discussion by the
21 licensee that they wanted to rapidly depressurize, and
22 I believe it is called letting down. Do you recall that?

23

A Not letdown.

24

Q What is the term?

25

A Letdown is a phenomenon that was going on all the

2 time. They take some of the primary coolant system
3 from seals of the pumps and from the system itself,
4 and letdown is a process where they reduce the pressure
5 primarily, run it through the cooler, process it, and
6 then put it back in the system, and then can add more
7 fluid to it, which is makeup. ~~and~~ That process is
8 generally not used to control pressure. There was
9 an attempt being made, and that is the point where they
10 got down to the accumulators, ~~trying~~ to reduce the
11 pressure in the primary system.

12 Q Why?

13 A To get on to decay heat removal system. If they
14 had been able to reduce the pressure they would have
15 been able to convert the system over to decay heat.

16 Q The reason you wanted to go to decay heat, you
17 are onto a cold shutdown at that point?

18 A Under normal conditions, that is the system you
19 go on to bring the plant ultimately, if you didn't have
20 an accident condition, to cold shutdown.

21 Q If I understand the sequence of events, about
22 11:30 in the morning, the licensee began to try to do
23 that, which was seven and a half hours into the event.
24 Does that jibe with your recollection?

25 A I would have to go to the actual sequence of events

2 to identify the time, but it sounds approximately
3 correct.

4 Q Does that sound like it jells with your
5 recollection? If it does, it is fine then.

6 A Yes.

7 Q Whose idea was that at that point to start
8 doing that? Was that the licensee or was it suggested
9 by someone at the IRC?

10 A There clearly was discussion in the operations
11 center that that was an option available, depressurizing
12 the plant and going on to decay heat removal system; that
13 clearly was an option the licensee had. As to whether
14 it was first our idea or their idea, I can't say. I
15 do recall that we were trying to suggest to him that
16 that clearly was an option.

17 Q Is there a danger in that particular option?

18 A With the condition of the core as it exists now --
19 let's back up -- not as it exists now, but as it existed
20 at some point in that accident sequence, it would not
21 have been a desirable thing to do.

22 Q Why not?

23 A Because of the existence of a large quantity of
24 what we know to be probably a combination of the steam
25 and non-condensable gases. If you had depressurized

2 further, you probably had the hot leg of the system
3 which is where the drop line for decay heat removal system
4 is attached and probably would have cavitated the
5 pumps, and it wouldn't have worked.

6 Q What would have happened?

7 A You wouldn't have flow and would have ^{had} ~~attempted~~
8 to abort ~~to~~ provide ^{just} cooling through that mechanism.

9 Q What would have happened then?

10 A You have to try some other way in which to
11 accomplish core cooling.

12 Q If you were not able to do that, then what?

13 A There was another option that was being considered.
14 The other option would be to open up, and I think we had
15 discussion of this too. We could have opened up the
16 relief valve on the pressurizer and turn ^{ed} on the high
17 head pumps and directed water through the core out
18 through the relief valve, ^{and} eventually after you used
19 up the inventory ^{initial} ~~and~~ borated water storage tank ^{again} ~~being~~
20 into a recirculation mode, using that system.

21 Q So you still had that option?

22 A Yes. You clearly had that option, which is one
23 that we were thinking of. If there was some way in
24 which to have caused the system to open ¹⁻¹ to vent ¹⁻¹⁰ which
25 is what the relief valve would provide for you, then

2 you could go to that option.

3 Q Is it possible if the operator or if the
4 licensee had persisted in attempting to depressurize,
5 that would have resulted in further uncovering of the
6 core?

7 A That is a hard question to answer without an
8 analysis. If he depressurized by opening the relief
9 valve and leaving it open, you had the water in the
10 core flood tanks as well as high pressure injection
11 water, and, in fact, the low pressure pumps that could
12 have been used. If they were used. It may be that
13 the answer is, no, he would not have had further
14 uncovering. Had he not turned on additional pumps and
15 just opened the relief valve itself, then as you
16 depressurized the size of the gas in the system would
17 have expanded and would have gotten even larger.

18 Q And would have resulted in further uncovering
19 of the core?

20 A Well, at that point how far was the core uncovered?
21 Some people suggest that it may have been totally
22 uncovered. I think Michelson's analysis suggested
23 that there may have been a period of total uncovering then.
24 If it had been uncovered and there was water, it would
25 have reduced water level further.

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2 Q What is the ultimate scenario if the core
3 is completely uncovered for a long period of time?

4 A If it is uncovered for a long enough period of
5 time, you would expect fuel melting and depending on
6 how long that persisted, what is commonly referred to
7 as a core meltdown.

8 Q Coming back to the question I asked before,
9 whose idea was it to attempt to depressurize seven and
10 a half hours into the event?

11 A I answered that to the best of my ability.
12 Discussing it here -- it was being discussed by the
13 licensee, ~~and~~ whether it was our idea or whether it was
14 their idea first, I don't know, but based on the infor-
15 mation I had it was an item being discussed by both.

16 Q Did you and Norman Moseley discuss that
17 at the Incidence ~~I~~ Response Center?

18 A It would have been him, but I don't recall.

19 Q Did the licensee suggest any type of
20 approval or concurrence with the NRC in connection with
21 making that move?

22 A I don't recall.

23 Q Were you called upon to indicate your
24 opinion as to whether or not they should depressurize?

25 A Your asking me the question is leading me to

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2 believe that I may have been asked, and you researched
3 it, but I don't have a specific recollection.

4 Q I am asking these questions for information.
5 I have no prior information on the subject, and I am
6 asking to find out.

7 Were you asked to indicate whether or not
8 you thought that they should rapidly depressurize?

9 A I don't have any recollection.

10 Q Was Mr. Moseley called upon to render some
11 opinion on that?

12 A I don't recall.

13 Q If somebody had to make a decision at the
14 ~~Incidence~~ ^{Incident} Response Center as to whether or not the
15 licensee should depressurize, who was the officer in
16 charge, so to speak?

17 A If that decision came through and we had to
18 decide it, it was a decision that would have been
19 discussed with the emergency management team, of which
20 Mr. Gossick was the head, and there were representatives
21 from this office, the office of Inspection and Enforcement,
22 as well as ~~the~~ ^I NRR ~~and~~ ^I if it came up I would think it
23 would have normally gone to them, although I don't
24 believe that they would have needed our approval to take
25 that action.

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2 Q Did you believe you had the authority to
3 order them not to do that?

4 A Surely.

5 Q Who would have made the final decision of
6 the people present at IRC if it came up? Who was the
7 one to make the final decision as to whether or not
8 to order them to do that?

9 A It would have been the highest-ranking official
10 in EMT which would have been Mr. Gossick.

11 Q What is IRAT?^C

12 A That is -- I can look it up and make sure I am
13 right.

14 Q Can you just explain what it is?

15 A It is a team of people assigned the task of
16 assessing technical information on the incident.

17 Q Who is the ranking director?

18 A The ranking director in that instance was
19 Mr. Moseley because this was a reactor incident and
20 he is the head of the IRAT^C team.

21 Q Does that position as ranking director give
22 Mr. Moseley the ultimate authority to decide whether
23 the licensee should be given permission to rapidly
24 depressurize on March 29, 1979?

25 A Not in my view. It would have been discussed

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with the EMT which is the decision-making body ~~and~~ I
view the IRAT^C as an information assessment body which
provides information and provides an advisory role on
things that might be useful for the licensee to consider,
but if it became a question of either issuing an order
or a specific approval, that would be something that
would come out of the EMT.

Q In fact, the licensee on March 28, 1979
did attempt to rapidly depressurize and go on to ~~DR~~^{decay}
heat removal, did they not?

A To drop the pressure down, yes.

Q Did you concur in that action at that time?
Did you think it was a good idea at that time?

A I think in light of the period of uncovering that
I saw that an effort to establish forced cooling through
the core would have been a good idea. I don't remember
going through the process, but it was one ~~of~~ which I
would have thought would have been a good way to get
better cooling than they had which, in my view, was
inadequate.

Q Did you object at that time to the licensee
attempting to rapidly depressurize to go on to ~~DR~~^{decay} heat?

A No.

Q Did you think it was a good idea for the

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licensee to do that based on what you knew at that time?

A Based on what we knew at that time, I would say yes, an alternative to the way he was cooling was needed, and that was an alternative to the two others I mentioned.

Q Based on what you know today was it a good idea at that time on March 28, 1979?

A We are back to the same question that ~~I perceived~~ you asked me earlier. That would require a rather detailed analysis of how much voiding and how much gas there was in the system as to whether he had gone on it he could have been successful or not, and the answer is he may have or may have not been depending on the actual status of the core at that time.

Q He attempted to go on and he was not successful?

A But he could have gone further and could have opened the relief valve and depressurized, but not in a condition where the pressure was that he was at. He was at the lowest pressure he could have achieved and could have gone further.

(Continued on Page 108.)

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2 Q Did you secure after March 28, high iodine
3 levels in the cooling sample which showed a high degree
4 of cooling core damage?

5 A That information became known with the primary
6 sample cooling damage that I attempted to get results
7 on Friday.

8 Q You became aware on Friday that there was
9 hydrogen damage present, and you had the pressure
10 spike, the hydrogen pressure spike?

11 A Yes.

12 Q Did that information with respect to the
13 hydrogen damage and hydrogen pressure spike indicate
14 to you on Friday that it was not a good idea to attempt
15 to rapidly depressurize on Wednesday?

16 A In light of the information I had on Friday, I
17 think the correct conclusion was to take the system
18 back up the way they did and cool it the way they
19 did, and that either of the two attempts I discussed,
20 going on to decay heat removal or using the high head
21 pumps would be a less desirable approach.

22 Q It would not be the best approach?

23 A Not the best approach, no.

24 Q Is it true that you first heard of the
25 27 PSI pressure spike on the radio?

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2 A I^{don't} think I heard it on the radio. I think I heard
3 it when I got here Friday morning.

4 Q To the Incident Response Center?

5 A Yes.

6 Q There has been quite a bit of testimo^ly of
7 hydrogen gas being generated and calculations being
8 done in connection with that by persons on Roger
9 Mattson's team, and there has also been some testimony
10 concerning mistakes in connection with those
11 calculations. Were you called upon to speak with
12 Chairman Hendry^{il} and Roger Mattson concerning those
13 errors in hydrogen calculation?

14 A When Dr. Mattson and Chairman Hendry^{il} arrived at
15 the site shortly after noon on Sunday, I was briefed
16 on the results of the analyses that had been going
17 on which led them to conclude that there was a poten-
18 tial for oxygen to be generated added to the hydrogen
19 bubble that was believed to be in the reactor vessel.
20 Our conversation was very brief because the President
21 was due in momentarily. After the briefing of the
22 President, Chairman Hendry^{il} and I returned to our
23 trailer where he and I discussed it. Dr. Mattson was
24 not there and was not present during our discussions.

25 Q What did you tell Chairman Hendry^{il} at that

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2 time about the hydrogen calculations, the hydrogen-
3 oxygen calculations?
4 A I told the chairman that I did not think that
5 there was a possibility for oxygen evolution in the
6 reactor system, and I tried to reason that the way
7 pressurized water reactors normally work, there is
8 a hydrogen over pressure which forces a back reaction
9 of the oxygen and suppresses any net generation of
10 any oxygen. Hence there would be no net addition
11 of oxygen into the system. I also told him that based
12 on what happened during the night before in discussing it
13 with Mr. Taylor, going over the analyses of what the
14 evolution rate would be, if one were to assume a
15 radiolysis reaction were taking place, that we calculated
16 approximately the same number; that is, I think their
17 number may have been 36 and ours may have been 40,
18 except in our case the units were standard cubic feet
19 per day, and the case as I understood it they were
20 assuming the rate of volume metric addition of oxygen
21 to ~~the~~^{the} gas bubble, and that is that they were applying
22 that evolution rate ^{directly} to the gas bubble, and that was
23 clearly far too conservative by a factor of 50 or
24 60 ~~and~~ hence if there was a problem, the time frame
25 in which there would be a problem would be significantly

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2 different than they would calculate by that same
3 factor of 50 or 60.

4 I told the chairman that if he could wait
5 before he did anything further with it, I would like
6 an opportunity to discuss the two issues that I have
7 just described with various experts, ~~and~~ I recall
8 specifically calling someone at the Bettis laboratory,
9 and I think I spoke to some one of the experts at
10 General Electric Company, ~~and~~ I think I made one
11 further phone call which may have been to one of our
12 laboratories or some of our experts and asked each of
13 them two questions: Was there in fact a possibility
14 for radiolysis to occur and, two, assuming you did
15 get radiolysis, what was the rate at which they were
16 calculated, ~~and~~ the results I got from these phone
17 calls supported my contention that there was unanimous
18 agreement that you would not get radiolysis, ^{just} and _{if}
19 you did, ~~and~~ the approximate numbers I gave were
20 correct in terms of the units being standard cubic
21 feet rather than at system pressure ^{and} temperature, ~~and~~
22 ^{As} I got those results, the chairman became convinced
23 that this was no longer a concern and he communicated
24 that view to, I believe, other commissioners in
25 Washington. I am not sure he spoke to the commissioners

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2 or whether someone else did, since he made the calls
3 and I did not.

4 Q Before March 28, 1979, what analyses had
5 the NRC performed on the possibility of generation
6 of hydrogen for the collection of gasses in the
7 pressurized water reactor or in the containment?

8 A In a loss of coolant accident, either in a
9 pressurized water reactor or a boiling water reactor,
10 where you have a major breach of coolant system, the
11 system then ^{is} opened to containment atmosphere, ~~and~~ you
12 have boiling in the core ^{and} ~~which you can have~~ Under
13 those conditions, ~~and~~ you can have a condition where
14 radiolysis can occur because the back reaction is
15 inhibited, ~~and~~ there are many calculations as to the
16 rate of hydrogen evolution to the containment might
17 be from a variety of sources.

18 Q Where can we find those calculations? Are
19 they in published documents?

20 A Yes.

21 Q Can you give us guidance there?

22 A I believe the way in which the calculations are
23 to be performed are specified in a reg guide whose
24 number escapes me. As part of the deliberation on
25 what hydrogen concentration one ought to assume in the

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2 need for inerting in the boiling water reactors was
3 a subject of several hearings and those records are
4 replete with calculations of this type and various
5 sources of hydrogen and oxygen.

6 Q Are you familiar offhand with any regulatory
7 guide you can think of or any other source for calcu-
8 lations on hydrogen?

9 A I can't recall the specific names of those docu-
10 ments. I have to research them myself.

11 Q Would you be willing to write us a letter
12 indicating what sources we could go to for those
13 calculations?

14 A I would be delighted to.

15 Q That would be of some help to us.

16 THE WITNESS: (to counsel) Are you going
17 to make a note of that? I have several other
18 items.

19 Q Are you familiar with the fact that the safety
20 evaluation report for TMI 2 in 1976 included that the
21 level of 4 volume percent of hydrogen would not be
22 reached before 25 days after a loss of coolant
23 accident?

24 A I haven't specifically reviewed that analysis,
25 so I can't speak to it, but I am not surprised at the

2 result. The amount of ~~mineral~~^{metal-} water reaction that
3 occurred, as best as we can now determine it was
4 far more extensive than anything we had heretofore
5 concluded would occur. The criteria that are used
6 for emergency core cooling performance limited the
7 amount of ~~mineral~~^{metal-} water to less than 1 percent, ^{on} ~~in~~
8 the average, of the core -- ~~mineral~~^{metal-} water reaction.
9 ~~Based~~ Based on the degree or the amount of ~~mineral~~^{metal-} water
10 reaction it was probably 20 to 30 times greater than
11 that ~~and~~ the analysis being done with meeting LOCA
12 criteria clearly would have predicted significantly
13 lower amounts of hydrogen occurring than in Three Mile
14 Island.

15 Q The circumstances at TMI were clearly not
16 bounded that support that calculation, that 25 day
17 estimate?

18 A Clearly.

19 Q You did have some time out at Three Mile
20 Island. Is it your understanding that the hydrogen
21 problem, the hydrogen recombiners at TMI 2 were
22 "operational"?

23 A There are two hydrogen recombiners up at TMI;
24 one was in a warehouse and I thought the other was
25 connected so it could be used.

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Q It was physically connected before the problem arose? It is my understanding it was not physically connected, and it is also my understanding that additional shielding --

A I was going to get to that. My involvement was in terms of deciding or in determining whether or not we ought to require them to put it on which means it was already there, so it may have been added when I got to the site. The issue around whether we ought to get the redundant unit and put the shielding in place so if we had to use it, we could use it. It is a redundant unit and we would have had that arrangement made to shield it and the necessary connections before turning it on because it clearly would be an area for which the activity levels would be very, very high, and make it difficult if you needed to put the additional unit on after the first one was used.

Q In fact, was there shielding on site in order to employ that?

A I don't think so. I spent considerable time Friday night asking people here at the Incident Center to get us more lead shielding and we got large quantities of it delivered that day and the next

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2 several days ~~and~~ ^{and} whether or not there really was
3 sufficient shielding available on site to do that
4 one job I really can't be sure, but there clearly
5 wasn't enough shielding to do all that needed to be
6 done. ~~and~~ I know the recombiner was a particular
7 area we were very interested in making sure that
8 we had enough shielding to get that unit on before
9 we turned on the furnace.

10 Q Regulatory Guide 1.7 NRC indicates that
11 adequate shielding should be present in order to
12 deploy the recombiners, does it not?

13 A It has been some time since I have looked at that
14 reg guide. It does not seem to me to be a statement that
15 would be out of line, but without going back to the
16 document I would be hard pressed to say that I ~~have~~ ^{could}
17 ~~sworn~~ ^{sworn} to the truth of that statement. I need to go
18 back and check. I wouldn't be surprised if it is there
19 though.

20 Q To your knowledge, was any determination
21 made that TMI 2 was in violation of Regulatory Guide
22 1.7 insofar as it required adequate shielding which
23 was not present on the site at the time the recombiner
24 was needed?

25 A The problem is with the word you are using,

2 "required." The requirements that this agency has
3 of those that are issued as part of its rules and
4 regulations, and as a license condition for the plant¹
5 A reg guide is not a requirement, but in terms of
6 conformance with the elements of reg guides, I don't
7 recall whether anyone did in fact look at the reg
8 guide and see to the extent that the Licensing complied
9 with the elements of that guide. I don't know.

10 Q Do you think it is a good idea for a utility
11 to have adequate shielding on site in order to deploy
12 hydrogen recombiners if they are needed?

13 A Not only is it a good idea that they do have the
14 shielding, but there is a question in my mind as to
15 whether we need to go back and look at, perhaps, the
16 need to have both recombiners available for service.
17 We now allow them to not have the recombiners hooked
18 up, and I think that is an issue that deserves
19 further attention.

20 Q What efforts were made by Inspection &
21 Enforcement prior to March 28, 1979 to insure that
22 there was adequate shielding to employ the recombiners
23 at TMI 2?

24 A I don't know.

25 Q Is that something that anyone at I&E is

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2 looking into in any way?

3 A Investigations surrounding the incident will be
4 hopefully published on August 1st and that is where
5 I'd expect to see it if we see it at all, and based
6 on the briefings I have had of what we have learned
7 so far, that is not an issue that they looked at. I
8 don't think they questioned the shielding.

9 Q You are saying that question has not been
10 raised?

11 A In the investigation, I don't think so. I will
12 need to wait until August 1st when it is finished.

13 Q Do you think it is a question that should
14 be raised?

15 A I am more concerned quite frankly with the need
16 to have a unit available and in service and checked
17 out. We presently don't require that. I think the
18 emphasis that we have had on recombiners is one that
19 has been somewhat passive. I think that although
20 there has certainly been considerable resistance in
21 the industry to even suggest a need for that, and I
22 think we need to go back and reexamine the question
23 in a more total way. The issue of shielding in my
24 view is a secondary consideration. One ought to look
25 at whether both units ought to be on a standby basis

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2 at the facility which I think is more significant.

3 Q In other words, as to whether or not they
4 should be physically hooked up and ready to go?

5 A Yes.

6 Q Even without the --

7 A If both of them are there -- I would forego the
8 issue of shielding if both of them are hooked up.

9 Q If they are not physically hooked up?

10 A If neither one is physically hooked up, the
11 more important issue is that maybe we ought to lock
12 real hard first at requiring one to be hooked up, and
13 then its shielding ~~re~~placed so the other can be hooked
14 up.

15 Q Up to March 29, 1979, that was not required?

16 A Not required.

17 Q And it is not required as of today?

18 A Not required as of today.

19 Q Why not?

20 A I think probably because there is a general feeling;
21 that existed prior to Three Mile Island that the
22 amount of hydrogen that we really were going to have
23 to deal with was very, very small in terms of the need
24 of recombiners, and indeed this is the case, if you
25 have a loss of coolant accident of any type that meets

2 our criteria that isn't true.

3 Q Those criteria clearly did not suggest water
4 zirconium reaction; that was not bounded by the cal-
5 culation?

6 A It clearly was not. The whole issue has to be
7 reexamined. This question of shielding, if you pardon
8 me, is one that in terms of my personal evaluation
9 is not one that I rank as high as some other consider-
10 ations, such as the need for asking the question, ["]is
11 the 1 percent criterion, ^{under 10CFR 50.4,} ~~50.4~~ adequate or should we
12 now go back and look at whether there is a need to
13 get some more ~~metal-~~ ^{metal-} ~~metal~~ water reaction?"

14 Q Mattson's report raises a question on in-
15 erting with respect to BWR water contain^{ments}~~ers~~ and
16 speaks strictly to the issue of evolving considerably
17 more hydrogen, and that same report indicates that
18 is a minority position as to requiring deployment
19 of the ^{re-}combiners?

20 A No. That deployment of recombiners -- the in-
21 erting --

22 Q That is the minority exposition.

23 A There was an issue on inerting, not placement
24 of recombiners.

25 Q One of the things that came up several

2 times which was first raised concerning the operator
3 interrupting the flow of HPI was that he was concerned
4 about the fact that his water level in the pressurizer
5 had gone off scale high and the whole question of
6 going solid has come up. Is it your understanding
7 that the operators of TMI have been trained to avoid
8 going solid?

9 A Under normal operating conditions the answer is
10 yes.

11 Q Why were they trained to avoid that?

12 A The normal way in which you have to control the
13 pressure in a pressurized water reactor is to establish
14 the two phase interface in the pressurizer; that is,
15 assure that the bubble, the steam bubble is in the
16 pressurizer. Whenever you go solid during normal
17 operation you no longer have the assurance that
18 the bubble is in the pressurizer and hence your
19 capability to assure that you are properly controlling
20 the pressure in the plant is significantly diminished.
21 It is clearly an undesirable condition under normal
22 ^Noperation, and one for which under certain conditions,
23 as you are bringing the plant and cooling it down,
24 it can be a potentially hazardous condition and one
25 in which you want to be careful, especially as you are

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cooling down, not to go water solid. If pumps come on and inject more water in the system you have the capability of arriving at a pressure which is too high for the given temperature of the primary system and raises questions as to the capability of the system to fail due to brittle fracture.

Q Under normal operating conditions, what is the worst thing that can happen from going solid in a pressurized water reactor that is at full power?

A If the pumps came on under that condition, the system pressure would be raised to where the safety valves would be lifted and if all of the pumps are on, I don't know if the safety pumps are sized to handle all of the ~~fuel~~^{will} supply of pressure pumps. It is a question that might be raised as to whether or not you exceed the allowable limits of the primary systems, primary piping, pumps, valves, whatever. I don't know in that instance whether or not you can get that high. That would be the concern, taking the primary system to high pressure pumps from a safety --

Q Under those circumstances, you would blow the code safeties, wouldn't you?

A I don't know if the code safeties can handle all of the pressure pumps coming on. I assume that they

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2 can, and if they controlled the pressure to an acceptable
3 level, then you would not need to worry about the
4 integrity of the primary system, but it is clearly
5 an undesirable way to operate a pressurized water
6 reactor since you no longer have the capability to
7 control the pressure where you want it to be.

8 Q This is a rhetorical question, and I realize
9 that, and I know the answer, but is that result better
10 than uncovering the core?

11 A With respect to core uncovering, clearly that
12 is the overriding consideration.

13 Q Anything is better than that?

14 A One does what he needs to do to prevent core
15 uncovering.

16 Q Are you aware of any documents that speci-
17 fically set forth this thinking about going solid
18 that you have been describing to me with respect to
19 the dangers and the problems et cetera?

20 A I am going to have to broaden the question a
21 little bit. There is a safety concern I spoke about
22 and we issued letters to the licensee⁵ that ^{the circuit is} very
23 sensitive to the question of going solid in the
24 pressurizer because of the potential, especially
25 during the shutdown conditions ~~and~~ that issue is one

2 for which we initiated a generic concern, one I spoke
3 to you about earlier, as we looked at the LER's and
4 we saw what we called overpressure transients, the
5 plants being taken to pressure higher than permitted
6 by the technical specifications.

7 Q I did have a note to ask for a copy of a
8 letter concerning not going solid?

9 A I have asked Mr. Eisenhut to send them over, and
10 I have a note to send them to somebody else at the
11 Commission, but do you want to have the documents
12 referred to you?

13 Q That someone else at the Commission, would that
14 be Stan Hellman, and you can send it to him?

15 A That is who asked for it.

16 Q Are you aware of any other documents that
17 specifically focus on this concern of not going solid
18 but what the problems are in going solid?

19 A Dr. Mattson showed me a letter originated in
20 B&W that I think went into the question of a solid
21 pressurizer. It dealt with pressurizer level and
22 directed the licensees to pay careful attention to
23 pressurizer level. It may have had a reference to
24 a water solid pressurizer, but I am not certain. That
25 is the only other document that comes to mind when

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2 you asked the question, that I can think of right
3 now.

4 Q We can take it up with Dr. Mattson.

5 Are you aware of anybody within the NRC
6 who has specifically focused on the question of going
7 solid, whom you regard as an expert, somebody who
8 really informed themselves about it?

9 A Should I bring back this subject of overpressure
10 transients, because Ron Fluge raised this issue of
11 overpressure transients, and really looked into it
12 in detail.

13 Q I understand that that is where the initial
14 concern was back within the NRC about avoiding going
15 solid, but I am asking about somebody beyond that,
16 somebody within the NRC?

17 A Carl Berlinger was following that up for us.

18 Q Anybody else?

19 A People that worked for him have been pursuing
20 this issue.

21 Q Has Denny Ross been looking into that?

22 A Not to my knowledge.

23 Q How about Charles Graves?

24 A He may have been looking at it for DSS. I guess
25 I have been negligent. I have been answering your

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2 question from the point of view of DOR. Burlinger
3 was looking at it for us and Tom Novak and Jim
4 Watt may have been looking at it for DSS.

5 Q Do you know if there is any potential fluid
6 dynamic concerns about going solid?

7 A If you try to operate a plant with a solid
8 pressurizer, you are going to have a heck of a time
9 in trying to get the dynamics of the primary system
10 to be anywhere near correct. You are not going to
11 see the dynamic response to be anything like it should
12 be. Its behavior on the transients is going to be
13 terrible. The whole fluid response with a solid
14 pressurizer would be very undesirable during normal
15 operation.

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16 Q Therefore, as I understand it, a PWR is
17 not designed to be operated without a bubble in the
18 pressurizer?

19 A That is correct, it is designed for all of its
20 normal operating and possible transient conditions
21 to be operated with the bubble in the pressurizer.

22 Q Is it your impression, based on what you
23 knew up through today, that before March 28, 1979,
24 there was an inordinate amount of emphasis in the
25 training of operators on avoiding going solid?

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2 A I don't know how much training those operators
3 had with respect to that, but since TMI everything
4 that I have seen has led me to believe that that
5 was something that was emphasized more than it should
6 have been.

7 Q Is that part of that mind set you referred
8 to before?

9 A Yes, there were several instances of that.

10 Q I have a note here to follow up with you
11 which was an outcome, I believe, of the prior interview
12 had with you, and that concerns the 1971 conceptual
13 review of the B&W design. Do you know anything about
14 the conceptual review of the B&W design in 1971?

15 A No, I can't recall it. I might review the standard
16 B&W plans, but I don't think it was back in 1971. I
17 don't know what it means.

18 Q Neither do I, since I did not take the inter-
19 view, but I thought I had better ask.

20 There has been an awful lot of talk about
21 standard review plan vis-a-vis TMI 2 and "grandfather-
22 ing" of TMI 2 such that it was not called upon to
23 comply with many portions if not all of the standard
24 review plan.

25 Is it true that with respect to the standard

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2 review plan that TMI 2 was found to be exempt from
3 the standard review plan requirements?

4 A Let me give you my view of the standard review
5 plan, and how I recall it being formulated and used.

6 At the time the standard review plan was
7 prepared, the concept of preparing it was to be
8 very forward looking, to look at those ideas and
9 contents that we believe were appropriate for plans
10 that were under construction permit review. The
11 reviewers that reviewed plans for an operating license
12 at the time that they were coming through the system
13 were using a standard review plan as the guidance for
14 those reviews. The concept of blanket waiver, or
15 whatever, to establish the standard review plan is
16 not one that I can adopt since reviewers who came to
17 me in the various capacities I have had within the
18 Commission used the standard review plan to conduct
19 their reviews for both operating licenses as well as
20 for construction permits. There was a concept that
21 ~~was~~ evolved that all of the deviations from the
22 standard review plan were to be carefully documented
23 so that as reactors were operated we would know
24 if there was anything that was done differently in
25 that review process, and what the difference was and

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2 why the difference was okay. Hence there was a
3 concept of trying to identify all of the deviations
4 and document them.

5 With respect to suggesting that any
6 operating license had a blanket waiver of the
7 standard review plan, I just never have been able
8 to identify that that blanket waiver ever really
9 existed. There could be instances where an operating
10 license review for which there was a particular
11 requirement in the standard review plan that was
12 looked at and not implemented because the reviewer
13 made the judgment it did not need to be and made
14 the judgment that it was okay.

15 Q That was up to the individual reviewer's
16 discretion to make that determination?

17 A The individual reviewers would make that ^{judgment} which
18 would not be documented in the way I have referred
19 to as a concept that evolved later, ~~and he~~ ^{he} was
20 responsible for the adequacy of those review areas,
21 and he would use that standard review plan as his
22 guidance. If he found it to be acceptable in what
23 was proposed, that would be part of what he would
24 propose to his management system, which would be
25 section leader, branch chief and all the way up. I

2 don't think I could say that all of these had the
3 documentation that they should have had ^{there were} a number
4 of instances where indeed they didn't, and ^{for} some of
5 them -- some plant reviews ¹⁻¹ there was a need to go
6 back and generate the bases where things were not
7 followed.

8 Q Was that in fact the situation for plans
9 like TMI 2 in terms of age and genesis, that as they
10 came through the licensing process that it was up
11 to the individual reviewers to negotiate the large
12 number of standard review plan items that they could
13 for each plant and that they could for each utility
14 and some reviewers succeeded in that effort better
15 than others?

16 A Individual reviewers, depending on their ability
17 and strength to articulate their review, managed to
18 get different things on different reviews to some degree.
19 I don't know that I could use an adjective to say it
20 was widespread or it was generally true. I think that
21 the individual reviewer's judgment would clearly come
22 to bear as well as the strength and ability of the
23 section leader and branch chief as he clearly became
24 involved in the negotiations, so he would not use the
25 reviewer alone.

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2 Q That was the situation at TMI 2 with regard
3 to containment isolation actuation?

4 A I don't know the specifics.

5 Q Does the standard review plan require that
6 containment isolation actuation is PSI in the contain-
7 ment building, radiation or HPI actuation and in the
8 case of TMI, as I understood it, was actuated only
9 on one of those criteria, PSI in the containment
10 building?

11 A It is true that that is the situation at TMI
12 with respect to containment isolation.

13 Q Is it true also that TMI requires two of the
14 three?

15 A I don't know the extent that that subject was
16 reviewed and by whom and what the issues were.

17 Q It is the case obviously that that portion
18 of the standard review plan was not applied to TMI
19 2 then, is that correct?

20 A I assume so. We do an audit review. We don't
21 have to review every aspect of the plant. You ^{will} have
22 to go to others to determine to what extent that
23 particular issue was reviewed.

24 I might make a comment on this. This is one
25 I was at, the meeting with the Commission when they

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2 were discussing this matter with Dr. Mattson, ~~and~~ ^{At}
3 that time there was a concern that this was a very
4 important parameter since it contributed ^{to the} release
5 of radioactive material ^{to} in the auxiliary building ^{and} out
6 to the environment, ^{this was} because of the fact that con-
7 tainment isolation did not exist ^{and} that the water
8 may have been pumped out and siphoned out after there
9 was high radiation. At a briefing, our investigation
10 subsequently found out that that particular source
11 was not very significant, that the water that was lost
12 from the system through that path was not highly
13 contaminated, ^{of} the water lost as a result of the non-
14 isolation of the sump pump was probably not a signifi-
15 cant contributor at all to the amount of activity that
16 left the plant.

17 Q Is that new information that the environ-
18 mental releases may have come from other locations?

19 A No, from the auxiliary building, but from an-
20 other system, the letdown system you referred to,
21 specifically the one that is believed now to be the
22 major probable source of contamination; as well as
23 possible leakage paths in the makeup tank, which we
24 knew.

25 Q What was the system that caused radioactive

2 water to be spilled out on the floor of the aux
3 building?

4 A Radioactive water of slight contamination which
5 is primarily coolant was pumped from the sump pumps
6 but it had very, very low concentrations of radio-
7 activity, and that did go on the floor of the aux
8 building. It was subsequently contaminated with
9 water which had high specific activity in it from
10 other sources such as leakage from valves in this
11 letdown system, ~~and~~ although the large quantity of
12 water that was pumped out in terms of volume was from
13 the source of the sump pump. The highly contaminated
14 water leaked out through other paths, and this is
15 something that we have found out subsequent to the
16 questioning, so the importance of this particular issue
17 was changed since then.

18 Q Mr. Stello, does it make any sense to have
19 containment isolation actuation based on PSI in the
20 containment coupled with the sump pump arrangement
21 which automatically drains the sump into the auxi-
22 liary building?

23 A If the sump pumps are draining into the tank
24 where they should drain, there is the protection and
25 room for little harm if they are used correctly. If

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2 there was an inappropriate valve ~~or~~ line ^{CMP} in addition
3 to the operation of the pumps, that could raise the
4 question ~~or~~ ^C If you had that condition, that clearly
5 is an undesirable situation, and one you can avoid
6 very quickly by causing ~~the~~ containment isolation to
7 occur when you have high radiation. ^B But the fact that
8 you do not have it does not necessarily mean that you
9 are going to get into an undesirable situation.

10 Q This may be a very naive idea what I am
11 thinking about, but under those conditions of containment
12 isolation actuation, where it is only four PSI
13 in the containment, which I have been led to believe
14 is very, very large indeed, and if you had a large
15 break loss of coolant accident and the spillage of
16 primary coolant into the containment building, I would
17 assume given the size of the containment, it would
18 take a while to reach 4 PSI?

19 A No, ~~the~~ ^{the} computations from ^{the} PSAR, and you reach
20 4 PSI, the amount of energy you add to that containment,
21 ~~in~~ ⁱⁿ a matter of seconds.

22 Q What happened at TMI was more in the range
23 of a small break loss of coolant accident?

24 A Yes.

25 Q And that took several hours to reach 4 PSI?

2 A I don't recall that they -- I thought the thing
3 that actually tripped it was the hydrogen burn. I
4 don't recall that the addition of energy to the con-
5 tainment ever ranged that high. I think the trip
6 was caused by hydrogen burn which increased the
7 pressure to in excess of 20 PSI.

8 Q You have a small break loss of coolant ac-
9 cident and have primary coolant running down the
10 sump and the automatic sump pulling it over into the
11 aux building. Does that make sense?

12 A If the loss of coolant accident went like you
13 think it would, it wouldn't be a major safety con-
14 cern for in a small break loss of coolant accident you
15 wouldn't likely get fuel failures ~~the~~ the amount of ac-
16 tivity would be very, very small ~~in~~ in light of what
17 was learned at TMI, it suggests that maybe we better
18 stop thinking about small break loss of coolant accidents
19 going exactly the way we want them to and broaden our
20 horizons of it ~~and~~ I would hope that ^{what} is ~~not~~ done ~~and~~
21 ~~and that~~ is to prevent the core from being damaged,
22 which is what we should do. I hope we don't lose the
23 focus; that is where the primary emphasis ought to
24 be, that we prevent damage to the core.

25 Q Are there currently any other nuclear

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2 reactors for which containment isolation actuation
3 is related to PSI in the containment?

4 A I have not done a survey as to whether or not
5 there are. I would suspect that there would be, and
6 it is an area that the Lessons Learned Task Force has
7 reached a ^{recommendation for} short term action ~~on it, so~~ It will be some-
8 thing that we will be getting. I don't happen to know
9 the status of it at the moment.

10 Q During 1972 and 1973, you were involved in
11 ECCS hearings before the Atomic Energy Commission?

12 A Yes.

13 Q Were you director of the task force on
14 ECCS actuation?

15 A At that time?

16 Q At that time.

17 A I was a branch chief of the reactor systems
18 branch, who had responsibility for looking at emergency
19 core cooling system performance ~~and~~ when the issue
20 of the hearing arose, I became, as that branch chief,
21 responsible for providing testimony and being a witness
22 at those hearings. I don't recall ever having the
23 title that you suggest, but I think the function was
24 there.

25 Q Concerning the ECCS involvement, in connection

2 with those activities in 1972 and 1973, did you con-
3 sider operator interruption of the HPI after ECCS?

4 A No. As I recall, we didn't require, nor did we
5 do, any specific analysis of what would happen if the
6 operator intentionally defeated the engineered safety
7 features.

8 Q Prior to March 28, 1979, were you aware
9 of any study having been done concerning premature
10 interruption of the HPI by operator error?

11 A Wash 1400 which looked at the casualties, which
12 would have included failure of the HPI by operator
13 error as well as by mechanical, so the Wash 1400
14 scenarios include that eventually.

15 Q Is there anything else beside Wash 1400?

16 A I did do some study as to what would happen with
17 interruption of core cooling as a general matter, but
18 the concern was raised as to the possibility of

19 SIS ~~reactor~~ ^{disturbance} ~~which is~~ a condition, where the diesels
20 are on and doing their thing; is it possible that the
21 operator could interrupt the use of diesel generators

22 while you were being powered from the off site source
23 and should ~~the diesels~~ ^{you then} lose off site power ~~and then~~ ^{under those conditions}

24 ~~and~~ the diesels won't come back on automatically and
25 pick up the load. ~~and~~ in that context there was a

2 potential for a momentary interruption of the engineered
3 safety features which include HPI and everything else^o
4 But in the context of Three Mile Island where they
5 literally turned them off because they thought that
6 was the right thing to do, I am not aware of any
7 such thing.

8 Q Did you have any contact with TMI 2 at
9 any point during the licensing process as it was
10 going up through to OM?

11 A I believe some part of Three Mile Island, and
12 I can't remember whether Unit 1 or Unit 2 was going
13 through the process while I was the assistant director
14 for reactor safety, and I can remember participating in
15 at least one meeting where a number of issues were
16 raised on that plant, but I can't remember whether
17 it was Unit 1 or Unit 2.

18 Q What I was looking for was more of a follow-
19 on responsibility, more than just sitting in at a
20 meeting, and I mean doing something over a period
21 of days, weeks or months.

22 A I have to go check. When was Three Mile Island 2
23 safety evaluation issued?

24 Q September 1976, I think is the date I have
25 in mind, but I could be wrong. They got their OL,

2 February 1978.

3 A Well, I was appointed director of the Division
4 of Operating Reactors in 1976, and the timing is so
5 close it is possible that I had some of it, but I
6 have to go back and look.

7 Q Had it been extensive, you would have
8 recalled?

9 A I said, I recall engaging in meetings with Metro-
10 politan Edison and GPU staff on Three Mile Island,
11 but I don't remember whether it included Unit 2 or
12 not, and I will have to go back and check the records
13 to be certain. I don't recall.

14 Q Based on what you know today, Mr. Stello,
15 what is your opinion of the condition of the training
16 given to the operators at TMI 2, and I am asking now
17 for an opinion, mind you.

18 A I guess I concluded that the training that they
19 have had and the mind set that they established
20 on several issues suggests to me that it was not
21 adequate. They clearly had a preoccupation with
22 pressurizer level throughout the accident, even
23 when I thought there were clear indications that
24 they ought not to still have that mind set. The
25 whole question of the training that they had in

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2 terms of transient accident analyses as an area, and
3 it is clearly as an area that we have concluded has
4 been inadequate, ~~and that~~ there is a need for the
5 training. All of the B&W plants which have evolved
6 subsequently have had that training.

7 Q So you think it is more than just TMI?

8 A I think there is a mind set of operators on the
9 B&W units that had to be reexamined, and I think that
10 that examination and retraining has generally taken
11 place, but it does raise or open for me the question
12 of how to deal with the adequacy of operator training.
13 I believe that is an area where we can get a signi-
14 ficant improvement in safety by concentrating more on
15 it in the future.

16 Q Do you think that that situation exists at
17 Westinghouse and ^ECD and other manufacturers, that is
18 the mind set of the operators?

19 A Since their plants are less sensitive to these
20 kinds of transients, I think it is less so.

21 Q The once-through steam generator used in
22 B&W plants has come up in several different contexts
23 and it has been suggested by some people, I think,
24 that the once-through steam generator does not give
25 the operator a sufficient amount of response time,

2 for example, in the loss of feed water. Do you think
3 that is true?

4 A I don't know whether I would point to the steam
5 generator as quickly as I pointed to the pressurizer.
6 I think that there the sizing of the pressurizer is
7 one I have questioned as to whether it has been sized
8 adequately.

9 Q Do you think it is too small, perhaps?

10 A Yes. Whether it would be helpful to have a
11 larger volume in the pressurizer than it now has --
12 the storage capacity in the steam generator is not one
13 that I am as concerned about, because clearly that can
14 be compensated by the addition of pumps with whatever
15 reliability is required, but the size of the pressurizer
16 is one we need to look at more carefully, ~~and~~ I think
17 that that is the area that I think more analysis is
18 going to be required to make sure that the responsive-
19 ness to the pressurizer is understood ~~and~~ ^{that}, in
20 fact, has been done and that is something that we
21 have required considerable analysis of ~~some~~ accidents
22 and transients to look at pressurizer performance.

23 Q We were talking about the standard review
24 plan at TMI 2 and Mr. Bland, my technical advisor,
25 has indicated to me, and I think you have confirmed

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it off the record in the discussion, Mr. Stello, that there is an analogous situation that exists concerning the tailoring of technique to technical specifications as between TMI 1 and TMI 2 and visa versa. Can you tell us how does that come about?

A It was recognized that in trying to deal with plants, all of which had their technical specifications and constructed in a manner that was individualized and stylized, it makes it more difficult, from the regulatory point of view, ^{to have} ~~in terms of having~~ a comprehensive program where one can look at the adequacies and inadequacies in ^{review} techniques ~~and~~ It is clearly desirable to try to convert over to a program of standard technical specifications where, although there could be differences in units, it could be accommodated within a standard ^{review} program ~~and~~ there was a program to develop standard ^{review} techniques for each of the established suppliers, B&W, Westinghouse, et cetera ~~and~~ the plants that were licensed from the time that these techniques were developed, would be licensed using that format, ~~and~~ ^R rather than letting them be discussed and hammered out in each and every case, there would be a standard form to go to. There has not been a mandatory requirement to make plants

2 go back now and convert their system and techniques
3 over to the standard format, but it is on a voluntary
4 basis where this is accomplished. We try to persuade
5 them that it is to their advantage as well as ours to
6 convert over to the new system of technical specifi-
7 cations. They are much easier for us to deal with
8 with respect to licensing requirements as well as the
9 enforcement program, of knowing what the interpretation
10 would be of each technical spec~~ification~~ there would be
11 little confusion on behalf of the licensee as to what
12 was intended and required of those tech specs, or on
13 behalf of and regulatory staff to know what was intended^{ed}
14 ~~and~~ it would become an understood document between the
15 regulatory staff and the regulated industry and it
16 has tremendous advantage and one ^{is} which we will
17 work very hard suggesting to licensees that each of
18 them ought to convert, but falling short of making it
19 mandatory at the moment.

20 Q Therefore, as I understand from your answer,
21 there are some plants which aren't subject to tailored
22 techniques and some of which are now subject to
23 standard techniques?

24 A That is true.

25 Q Does that lead to a situation where I & E

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has to have different inspection procedures or goals at different plants?

A No.

Q I think the difference in techniques would create a situation where there are different ways of going about and conducting inspections.

A The license documents used in the inspection, whatever form it is, and the inspection program takes on the same character. The difficulty comes about when you have a tailored technique that the inspector thinks means one thing, and to the licensee it means another, and that has to be resolved in a custom fashion. There is a tendency now in all of these issues that come up to use more of the standard technical interpretation anyway and we are gradually rolling over to where that is now becoming understood by everyone, and there is lesser and lesser need to get into it, but it is still a desired approach. We did change all of the technical specifications with respect to the ~~section on the~~ administration section on all of the plants, but ^{we} have not converted the other five sections over yet.

Q What is the relationship between I&E and other NRC divisions like the DOR in establishing inspections

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and instructions?

Does I&E look to any other division in NRC to assist in that process?

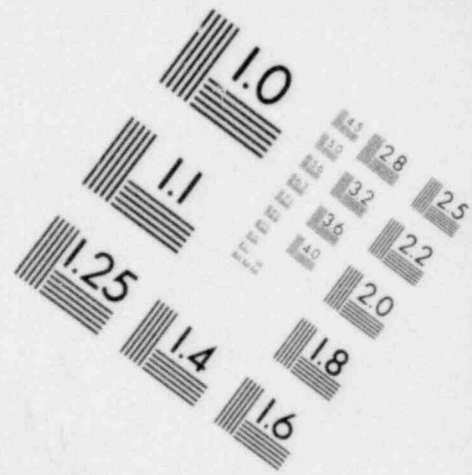
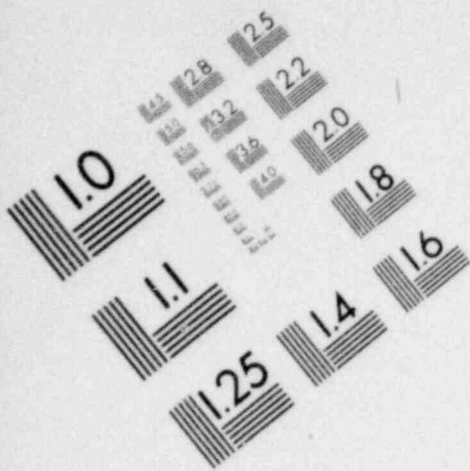
A The inspection process is one that is documented in the I&E inspection manuals which typically will take up a full shelf.

Q We have those.

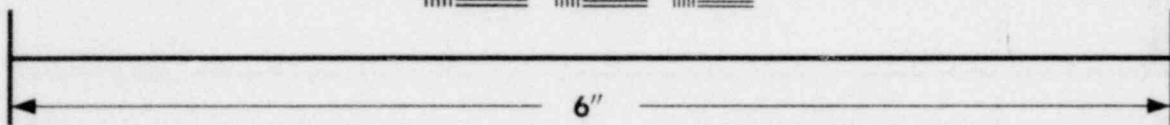
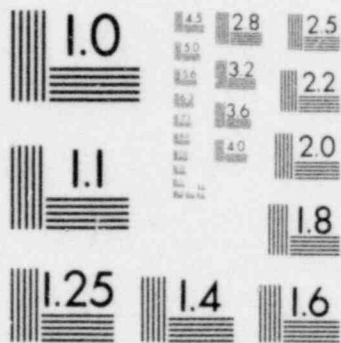
A I know you do. This is the programatic guidance for the inspections and they contain the various modules that inspectors use to inspect whatever there is in the plant. Those are what I will characterize as the routine inspection program that is followed by I&E, ~~and~~ ^I in addition to that, whenever a problem

arises where there is some specific need to go into a plant and get information that DOR, as an example, feels the need to have, such ^{as} ~~as~~ ^{many} of these bulletins we spoke of in terms of special inspections, ^{temporary instructions} are drawn up to provide the guidance for the inspectors to seek out that information needed by a particular office, be that NRR or ^NMSS, or whomever it is ~~is~~ ^{is} ~~there~~ ^I if there is a need there is a capability to add those special instructions and obtain that information.

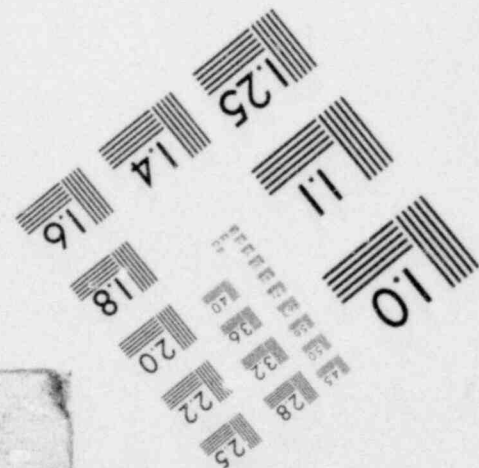
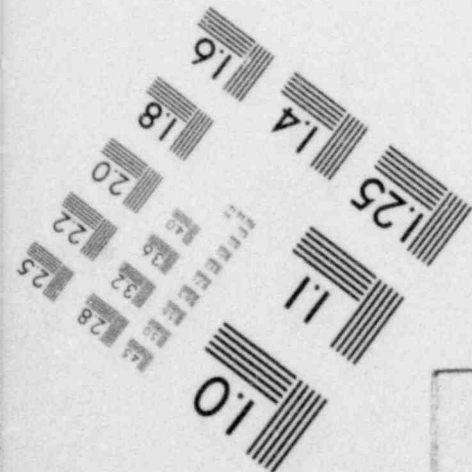
Q Is there any input by any other divisions beside I & E as to the standard inspection instructions,



**IMAGE EVALUATION
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MICROCOPY RESOLUTION TEST CHART



2 and particularly let us take the example, suppose
3 they want to make a change in the standard inspection
4 instructions?

5 A The past practice, the answer has been no; that
6 programatic guidance is developed here in head-
7 quarters staff of I&E and the assumption is made that
8 they are aware of what the other offices need and
9 desire. I am thinking very hard now that I am in this
10 job now for all of a month, as to whether there needs
11 to be a closer liason and relationship with the other
12 offices to make the inspection activity be as effective
13 as it can be in coordination and conjunction with the
14 activities of the other offices. This may very well
15 mean that as we devise new inspection modules that
16 those ought to be coordinated with other offices, and
17 I don't know how much of a burden this might place
18 on other offices, but this is an area I am giving
19 further thought to.

20 I think there is a potential for great
21 benefit by getting a closer coupling of inspection
22 activity and licensing activity. One needs to be
23 concerned that that ^{is} not get too close, because we
24 have the capability of providing an independent look
25 to the other offices. ~~we~~ ^{we} need to deal with that

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2 question very carefully.

3 Q Are there any existing lines between I&E and
4 any other division of NRC in connection with reviews
5 of LER's?

6 A There is no formal process that I am aware of.
7 that exists any time there is any problem on any LER,
8 the inspector, on up through the entire I&E office,
9 is not the least bit hesitant about coordinating
10 that activity with all of our program officers,
11 research, standards, I&E. There are many occasions
12 when people from other offices are brought into it.

13 Q So it is an informal but frequently exer-
14 cised effort?

15 A Yes, the thing that is missing is the systematic
16 concept, and that is an area that is not there.

17 Q What about reviews of inspection reports;
18 would that be the same situation?

19 A No, the inspection reports are made available
20 and are reviewed by, at a minimum, the appropriate
21 project manager in the other offices.

22 Q That is a systematic thing?

23 A Yes. That goes on all of the time; all the reports
24 are sent to them.

25 Q Mr. Stello, we had talked at the

2 beginning about the changing of position within NRC
3 from the Division of Operating Reactors to the Office
4 of Inspection and Enforcement. Has the organization
5 charter set up, is that a promotion for you or is
6 it sort of a sideways move?

7 A No. I think it is a promotion. It is not a
8 change in pay, but clearly a change in responsibility.
9 I am in a much more responsible job now.

10 Q Then you feel that I&E places a much greater
11 demand on you in terms of the responsibility than DOR?

12 A Yes, I think so.

13 MR. KANE: That is all the questions I have.

14 MR. CHOPKO: I have no questions, unless
15 Mr. Stello feels that there is some area which
16 he requires be clarified or to elaborate on or
17 to make any additional comments on just so the
18 record is complete.

19 THE WITNESS: The only comment I would make
20 is that we spent a great deal of time talking
21 about the concerns of Creswell and what went wrong
22 with respect to following that activity. I guess
23 maybe in one place I would like to say that a
24 great deal of that activity has gone on in a
25 way which has not been under my direct cognizance

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and supervision, especially for the first several months following Three Mile Island, and most of my energy and time were spent dealing with the situation at the site, and a lot of what we talked about earlier was activity being done by others rather than me, so that if there are gaps or holes, or whatever in that discussion, maybe at this point of the record that explains why.

Q I think that did come out, Mr. Stello, and I appreciate that, but let me say in closing that I have completed my questioning. However, there is an ongoing investigation and there may be further facts that may come to our attention which will require us to bring you back for a further session of your deposition. I assure you we will make every effort to avoid having to do that. However, given that situation, we are adjourning the deposition today rather than terminating it, and I thank you for your time.

(Whereupon, at 6:00 p.m., the deposition was adjourned.)

Subscribed and sworn to before me
this _____ day of _____ 1979.

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I N D E X

WITNESS

DIRECT

Victor Stello, Jr.

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E X H I B I T S

STELLO DEPOSITION
FOR IDENTIFICATION

PAGE

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Resume of Victor Stello, Jr.

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C E R T I F I C A T E

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STATE OF NEW YORK)
 : ss:
COUNTY OF NEW YORK)

I, ROBERT ZERKIN, a Notary Public of the State of New York, do hereby certify that the foregoing deposition of VICTOR STELLO, JR., was taken before me on the 24th day of July, 1979.

The said witness was duly sworn before the commencement of his testimony; that the said testimony was taken stenographically by myself and then transcribed.

The within transcript is a true record of the said deposition.

I am not related by blood or marriage to any of the said parties, nor interested directly or indirectly in the matter in controversy, nor am I in the employ of any of the counsel.

IN WITNESS WHEREOF, I have hereunto set my hand this 26 day of July 1979.

Robert Zerkin
ROBERT ZERKIN